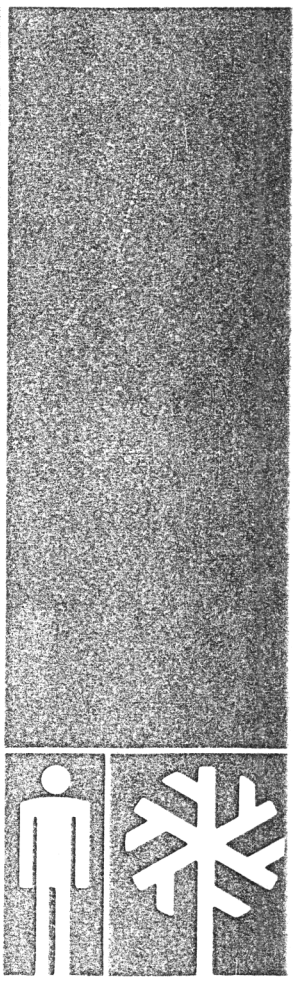
park suitability study
february 1976



GRAND CANYON

NATIONAL PARK / ARIZONA

PARK SUITABILITY STUDY

GRAND CANYON NATIONAL PARK / ARIZONA

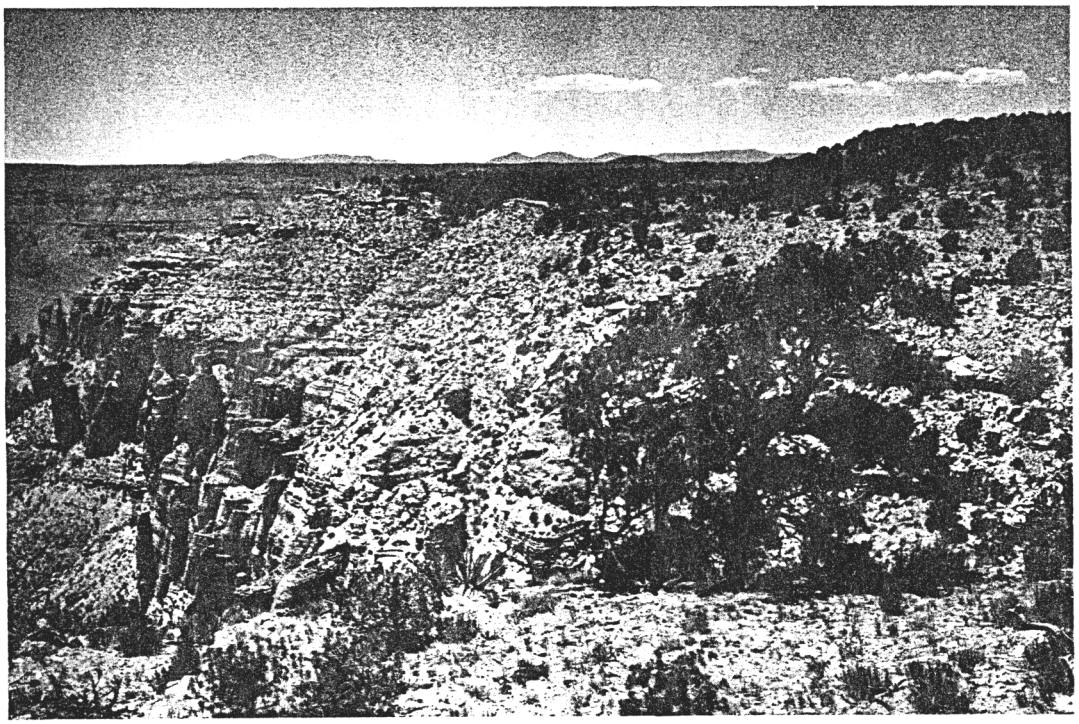
CONTENTS

DECLARATION OF POLICY

SEC. 2. It is the objective of this Act to provide for the recognition by Congress that the entire Grand Canyon, from the mouth of the Paria River to the Grand Wash Cliffs, including tributary side canyons and surrounding plateaus, is a natural feature of national and international significance. Congress therefore recognizes the need for, and in this Act provides for, the further protection and interpretation of the Grand Canyon in accordance with its true significance.

Public Law 93-620
January 3, 1975

BACKGROUND OF THE STUDY



Toward Tuckup Canyon from S B Point

Grand Canyon National Monument, now incorporated into an enlarged Grand Canyon National Park, was established by the Presidential Proclamation of December 22, 1932 (47 Stat. 2547). The monument thus established consisted of 273,145 acres. The Presidential Proclamation of April 4, 1940 (54 Stat. 2692) reduced the acreage of the monument by 71,854 acres on the basis that the deleted lands were not necessary for the proper care and management of the objects of scientific interest within the monument.

The August 1971 draft master plan for Grand Canyon National Park proposed the deletion of 38,080 acres in the Tuckup Point, Jensen Tank, and Slide Mountain areas of Grand Canyon National Monument, based upon the rationale that these lands were not required for the protection of the canyon resources and were better suited for grazing. The National Park Service map, drawing number 113-20,000-E, contained in this draft plan depicts the individual acreages and configurations of these proposed deletions. However, this draft plan was never approved. The May

1974 draft master plan for the Grand Canyon Complex does not propose these deletions. This draft plan was reviewed in public meetings during July 1974.

On March 20, 1973, Senator Barry Goldwater of Arizona and Congressman Morris Udall of Arizona simultaneously introduced identical bills, S. 1296 into the Senate and H.R. 5900 into the House, calling for the deletion of lands in Grand Canyon National Monument, known as Slide Mountain, Tuckup Point, and Jensen Tank, depicted on drawing number 113-20,000-G, dated February 1973. The recommended deletion of these lands was based upon the same rationale contained in the 1971 draft master plan. It was also suggested that these lands could be exchanged for lands that were needed to protect park resources.

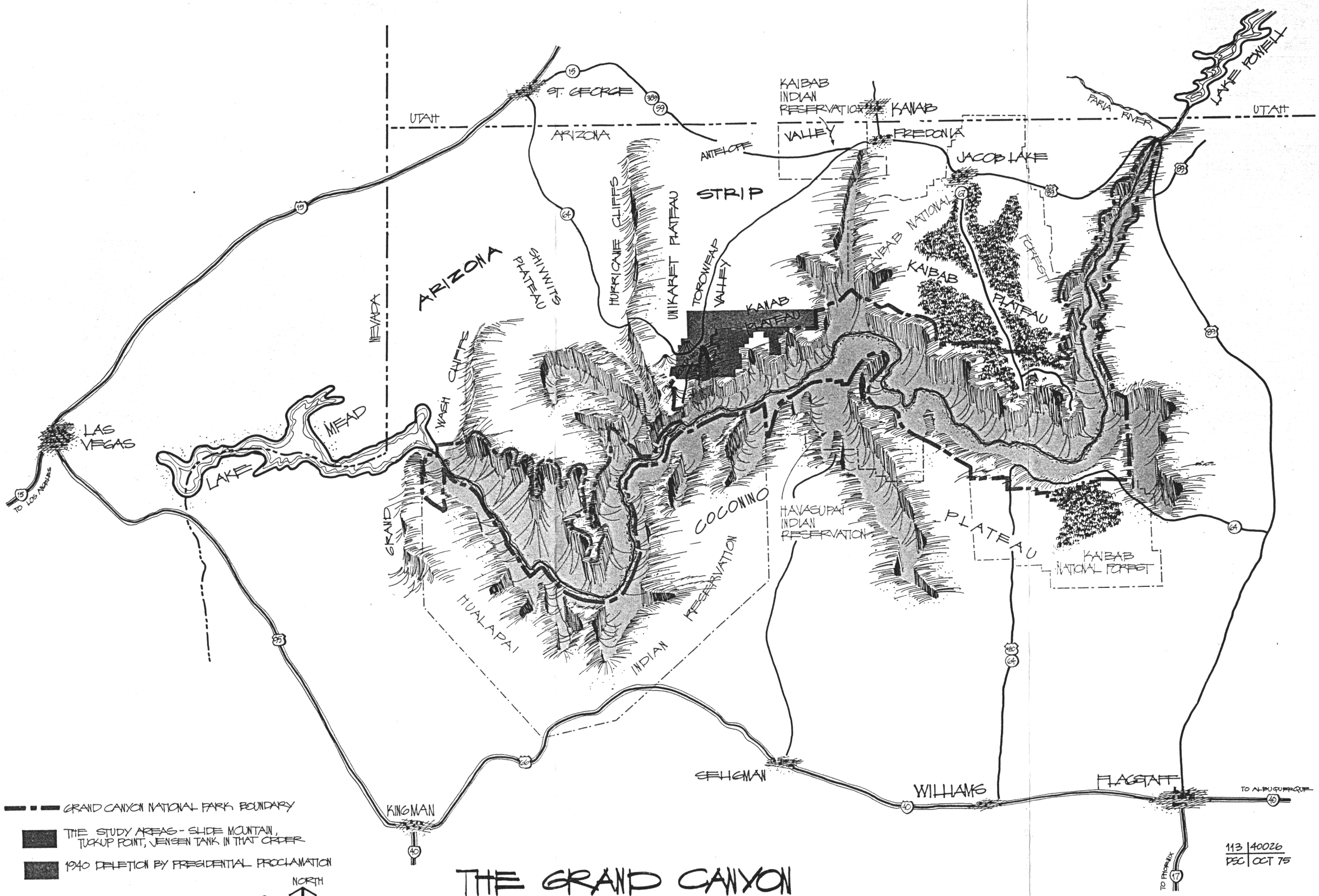
In June 1973, the Secretary of the Interior recommended to the subcommittee on Parks and Recreation of the Senate Interior and Insular Affairs Committee that the Slide Mountain, Tuckup Point, and Jensen Tank areas, considered for deletion in S. 1296, be included in an enlarged Grand Canyon National Park because they were not needed for exchange purposes and were rich in unexplored archeological resources representing several Indian cultures.

Limited archeological examinations by Dr. Richard A. Thompson, Professor of Anthropology, Southern Utah State College, indicated that the areas promised to yield data of incalculable value on the westward expansion of the Kayenta Anasazi and their ultimate withdrawal from the area.

While the potential value of these areas for research was recognized, the means of protecting the archeological site created some controversy. Hunting and ranching interests felt that adequate protection could be provided under the multiple-use management of the Bureau of Land Management and urged deletion of the area. Conservationists felt that the preservation policies of the National Park Service were essential for adequate protection and opposed deletion of these lands or any park lands for "economic-use" reasons.

A compromise was reached whereby it was agreed to retain the three areas in an enlarged park with a provision in the bill that these lands be studied to determine whether any portion of them might be unsuitable for park purposes. An amended S. 1296 passed the Senate on September 24, 1973. On October 11, 1974, an identical bill passed the House after lengthy debate.

On January 3, 1975, President Ford signed S. 1296 into law, enlarging the boundaries of Grand Canyon National Park. This act, Public Law 93-620, enlarges the Havasupai Indian Reservation; abolishes the former Grand Canyon and Marble Canyon National Monuments; combines the former monuments' lands with Grand Canyon National Park; and adds other adjacent lands to an enlarged Grand Canyon National Park.



THE GRAND CANYON

GRAND CANYON NATIONAL PARK

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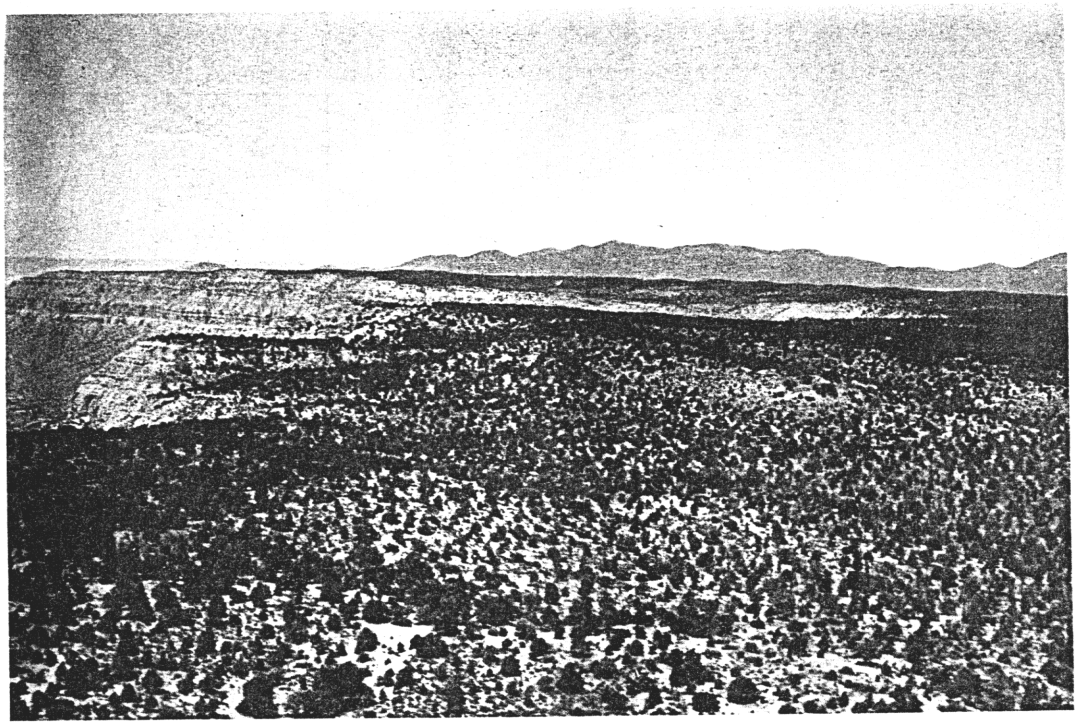
SCOPE OF THE STUDY



Tuckup Point

The Grand Canyon National Park Enlargement Act, Public Law 93-620, dated January 3, 1975, Section 3c requires that: "The Secretary of the Interior shall study the lands within the former boundaries of the Grand Canyon National Monument commonly known as the Tuckup Point, Slide Mountain, and Jensen Tank areas to determine whether any portion of these lands might be unsuitable for park purposes and whether in his judgment the public interest might be better served if they were deleted from the Grand Canyon National Park. The Secretary shall report his findings to the Congress no later than one year from the date of enactment of this Act."

This position paper is the documentation of compliance with these requirements. Data accumulation and analysis have been done by a multi-disciplinary planning team in cooperation with professional consultants, interested individuals, private organizations, and State and Federal agencies.

The study areas are identical to those delineated on the drawing entitled "Boundary Map, Grand Canyon National Park," number 113-20,000-G, dated

February 1973, referred to in the March 20, 1973, version of S. 1296. The areas total 38,080 acres divided as follows: Tuckup Point – 23,700 acres; Slide Mountain – 5,380 acres; and Jensen Tank – 9,000 acres.

This paper evaluates the resources of the study areas to determine their national significance; their supportive role in maintaining the integrity of nationally significant features contained within the Grand Canyon National Park, including the Grand Canyon, its tributary canyons, and adjacent plateaus; their use as scientific control areas for comparison with similar environments subject to resource-altering management practices; and their potential use for non-park purposes, primarily for commercial uses of grazing, timber harvesting, hunting, and mining. Economic consideration is the primary value judgment for non-park uses. The following National Park Service criteria for natural areas, quoted from *Criteria for Parklands,* are the value judgments used to evaluate park suitability:

National Significance

"National significance is ascribed to areas which possess exceptional value or quality in illustrating or interpreting the natural heritage of our Nation. . . .

"To possess national significance, the area must reflect integrity, i.e., it must represent a true, accurate, essentially unspoiled natural example."

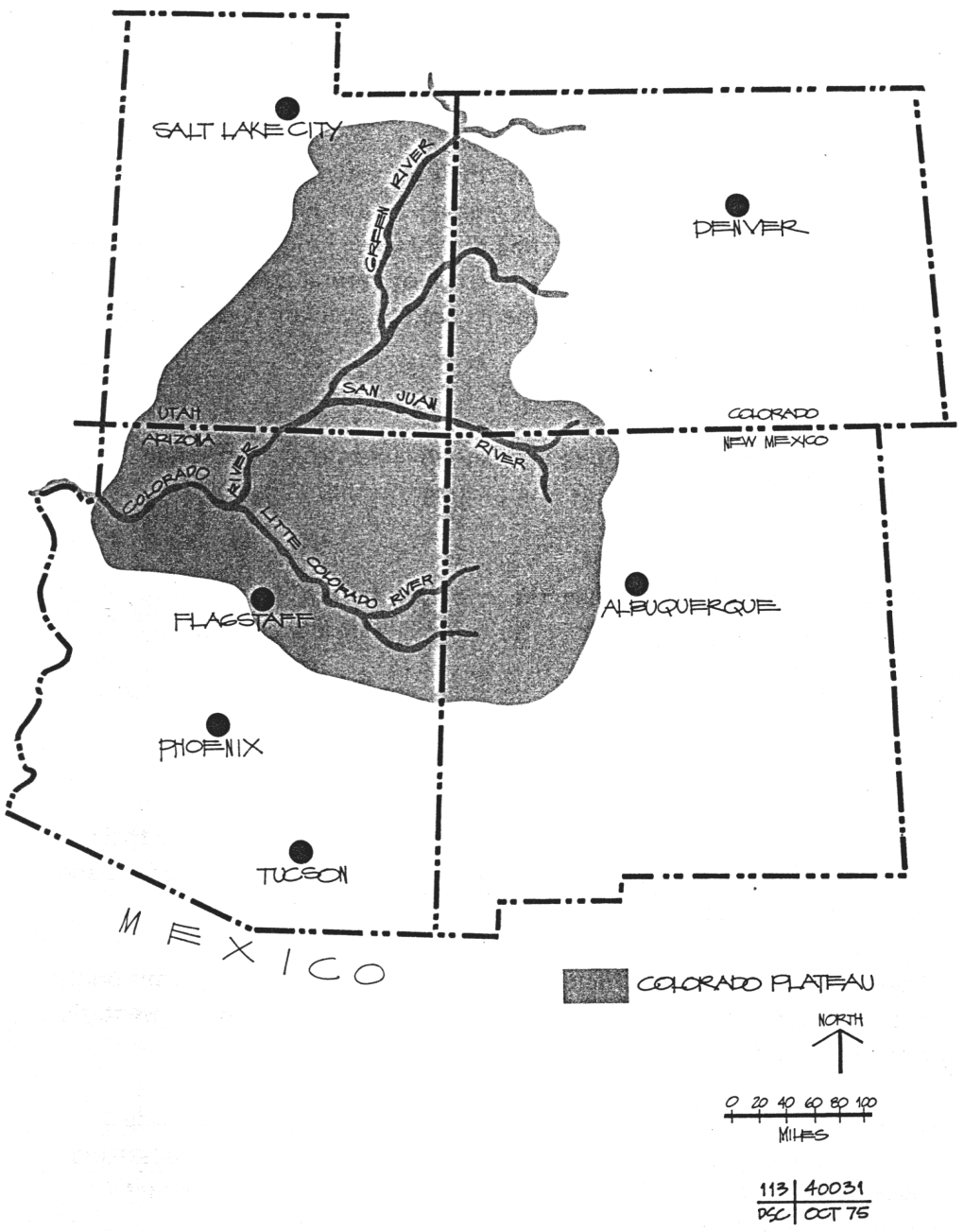
Suitability

"National Parks should be relatively spacious land and water areas so outstandingly superior in quality and beauty as to make imperative their preservation by the Federal Government for the enjoyment, education, and inspiration of all people.

"They should embrace a sufficiently comprehensive unit as to permit public use and enjoyment and effective management of a continuing representation of its flora and fauna.

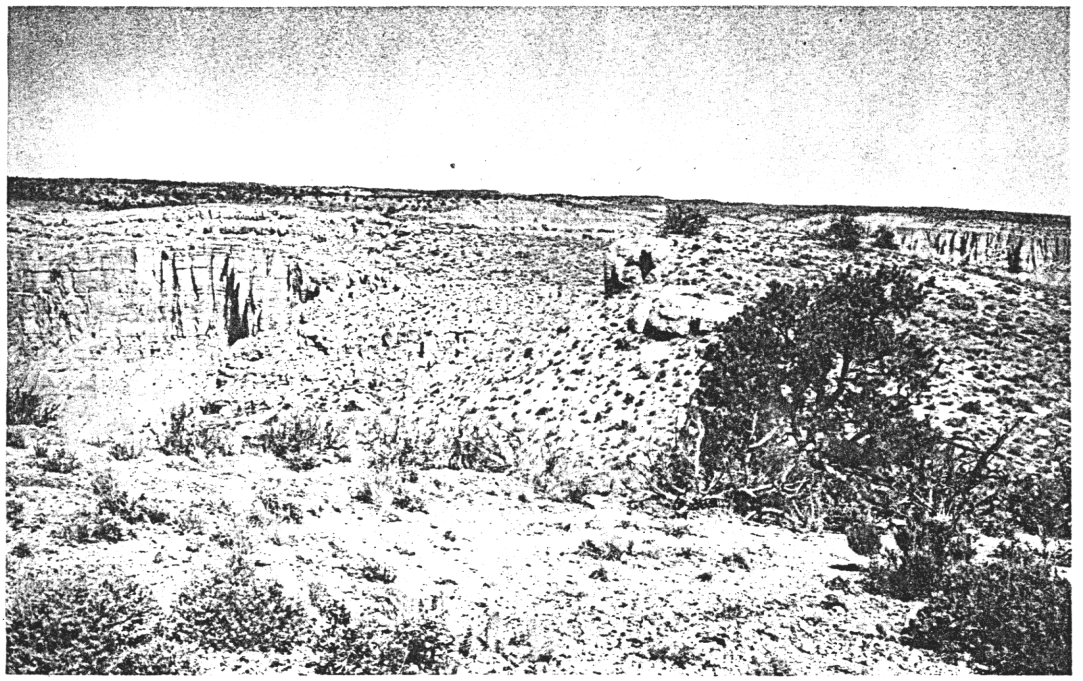
"They should be adaptable to a type of management that can provide a wide range of opportunities for human enjoyment . . ., in a natural setting consistent with the preservation of the characteristics or features that merit their establishment.

"They will most often contain a diversity of resources and values, including scenic and scientific."



COLORADO PLATEAU

THE GRAND CANYON REGION

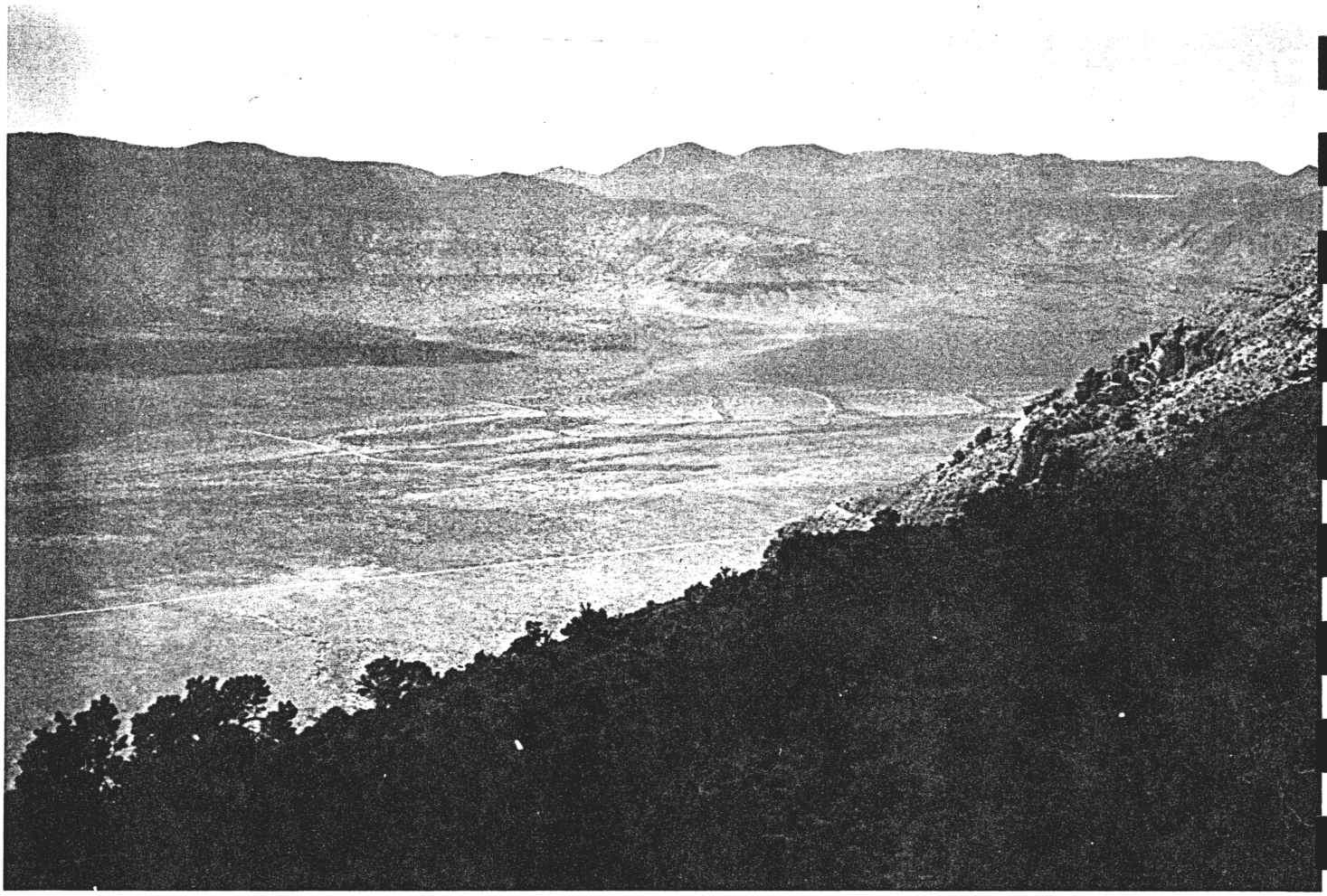


The Colorado Plateau physiographic province is a vast semiarid land of raised plains and desert basins dramatically cut by the jagged gash of the Grand Canyon across northwestern Arizona. The higher elevations of the plateau are forested; the lower elevations are a series of desert basins. Six of the seven climatic zones described by C. Hart Merriam are found within the region — five of them within Grand Canyon National Park.

Approximately one half of the lands of the Colorado Plateau are federally owned and are administered by the Bureau of Land Management, Forest Service, and National Park Service. The other lands are owned primarily by Indians.

This is Indian country — home of the Havasupai, Hopi, Hualapai, Navajo, and Paiute. The vast open spaces are only occasionally dotted with tiny settlements. Over a thousand recorded Indian ruins in the park attest to the prehistoric occupation of the canyon and its plateaus. The Kayenta, Virgin Branch of the Kayenta, and Cohonina cultural groups came together here and left evidence of their boundaries and relationships.

Today, the Grand Canyon draws nearly 3 million visitors each year — primarily to the south rim of the park — and still dominates the natural and economic picture of northern Arizona. South of the canyon are Flagstaff and the growing Phoenix/Tucson metropolitan area. To the north lies the almost uninhabited Arizona Strip; beyond are the ranching communities of southern Utah.



Toroweap Valley

THE STUDY AREAS

Tuckup Canyon from S B Point

THE ENVIRONMENT

The southernmost fingers of the Kanab and Uinkaret Plateaus hold the north wall of the Grand Canyon in the north-central portion of the park. Here, in the region of the three study areas, the plateaus are broad high desert lands of sweeping views, volcanic cones and great escarpments, sagebrush flats and piñon/juniper forests. They are little known and seldom visited parts of the Grand Canyon.

The Slide Mountain area is, in many ways, the most distinctive and the most variable of the three areas. It is also the smallest of the study areas, containing only 5,380 acres and measuring only 2 miles north-south by about 4.25 miles east-west. The elevation range extends from a high point of 7,002 feet on the western boundary to a low of 4,637 feet in the extreme southeastern corner.

The Slide Mountain area begins at the crest of the Pine Mountains and descends down their eastern slope to terminate on the floor of Toroweap Valley. The Pine Mountains are an extensive series of great volcanic cinder cones and basalt formations that overlie the Kaibab formation. Volcanic activity is believed to have begun about one and a quarter million years ago and to have persisted at widely spaced, irregular intervals until no more than twenty thousand years ago.

A striking feature of this particular area is that along both the northern and southern boundaries great projections of the Kaibab formation have thrust out to the east from beneath the overlying basalt, and between these two massive limestone points a great lava flow descends from the higher western portion of the tract to the floor of Toroweap Valley. These "lava cascades," when seen from below, look like great black glaciers – but their once incredibly slow movement has ceased.

In the western portion of the Slide Mountain unit the dominant vegetation is extensive stands of piñon/juniper forest. The density of this forest is highly variable, as is its associated flora. In some areas, particularly at the lower elevations,

sagebrush is the major associated plant, while on the higher western slopes, manzanita and scrub oak are more significant. The Gambel oak is distinctive throughout the western area at about the 6,400-foot elevation. An unusual feature of this forest is the penetration of tall ponderosa pines from the higher elevations south of the area, which mix with the piñon and juniper in the southwestern portion of the Slide Mountain unit.

As the lava flow descends to the east, the piñon/juniper dominance gradually gives way to a sagebrush dominance with a scrub oak and cliffrose association. The vegetation covering the floor of Toroweap Valley is comprised almost entirely of sagebrush and grasses.

The Tuckup Point area, containing 23,700 acres, comprises over 50% of the total land area under study. This area lacks the environmental variety of Slide Mountain, but it contains an almost ideal example of the piñon/juniper forest. The elevation here ranges from a low of about 5,850 feet to a high of around 6,250 feet. The surface has been formed on top of the Kaibab limestone with ridges projecting from 200 to 400 feet above the intervening sagebrush flats.

In this area the piñon/juniper forest almost completely dominates the slopes and crests of the ridges. This wooded area is so extensive that only a little more than 3,840 acres are dominated by sagebrush flats. Sagebrush characterizes the drainage systems flowing east into Tuckup Canyon, west into the Toroweap Valley, and south onto the Esplanade of the Grand Canyon.

The Jensen Tank area, located on SB Point, contains 9,000 acres. The area has the lowest elevation of the three study areas. Elevations range from a low of 5,700 feet on the northern boundary to a high of 5,886 feet at a point slightly south of the center of the unit. The land, also on the Kaibab formation, has only a few ridges rising more than 150 feet above the intervening sagebrush flats.

The distinctive feature of Jensen Tank is the preponderance of sagebrush areas. The piñon/juniper forest encompasses less than 40% of the total area, while sagebrush covers the remainder. A distinct ecological variation occurs in the frequency with which sagebrush covers the slopes, and in many cases, even dominates the crests of the ridges, in contrast to the pattern in the Tuckup area.

PREHISTORY

While some minimal evidence of a pre-Basketmaker or Archaic culture has been found here, the primary occupation was by the Anasazi (the "Ancient Ones" in Navajo) and seems to have begun in the Basketmaker II period about A.D. 100

STUDY AREAS
GRAND CANYON NATIONAL PARK

1932 NPS BOUNDARY

UINKARET PLATEAU

KANAB PLATEAU

KANAB CANYON

MOUNTAINS

MOUNT TRUMBULL

HANCOCK KNOLL

JENSEN TANK

PROVO CANYON

TUCKUP POINT

SCHMUTZ RANCH (ABANDONED)

TUCKUP CANYON

S.B. CANYON

BUCKHORN SPRING

TAQUKMACH POINT

BOYSAC POINT

BULLIVAN RANCH (ABANDONED)

HADES KNOLL

BRADY CANYON

TRAILHEAD CAMP-GROUND

SLIDE MOUNTAIN

VALLEY

KENT RANCH (ABANDONED)

TUWEEP AIRSTRIP

S.B. POINT

ESPLANADE

MOUNT SINYALA

TUCKUP POINT

TOROWEAP RANGER STATION

THE POMF

PINE

TOROWEAP

TOROWEAP POINT

COVE CANYON

FERGUSON CANYON

MOUNT EMMA

BIG POINT

STAIRWAY CANYON

THE COVE

CAMPSITES

RESERVATION

INDIAN

VULCANS THRONE

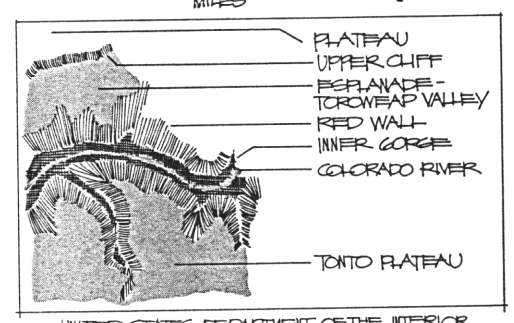
HUALAPAI

LAVA FALLS

EXISTING NPS BOUNDARY
STUDY AREA BOUNDARY
GRADED ROAD
PRIMITIVE ROAD
TRAIL

NORTH

0 1 2
MILES



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and to have continued through the Basketmaker III, and the Pueblo I, II, and III periods.

The principal occupation was by those agricultural people with close ties to the Kayenta Anasazi of northeastern Arizona identified as the Western Kayenta or the Virgin River Branch of the Kayenta Anasazi.

The Virgin Branch occupation of the region lasted for approximately 1,000 years. The earliest settlement of these people appeared sometime between A.D. 100 and 320 in the Pine Mountains basalt zone. Sometime around A.D. 1050, the population of the basalt area began a decline, at about the same time that settlements were suddenly established on the Kanab Plateau. Early in the Pueblo III period, about A.D. 1150-1200, the Anasazi abandoned the areas in the park, and indeed, the entire Arizona Strip, probably moving easterly to the Kayenta homeland.

Sometime between A.D. 1150 and 1300, the ancestors of the Southern Paiutes moved into the region from the north. Completely unrelated to the Anasazi, these people lived a semi-nomadic life, hunting, gathering, and farming only sporadically along the Virgin River. Almost no evidence of Paiute occupation of the study areas has been found to date. The Paiute occupation of the region continued probably into the latter part of the 19th century, to be supplanted much later by the settlement of Mormon ranchers and farmers.

HISTORY

The early history of Slide Mountain, Jensen Tank, and Tuckup (or "Tuckit") Point began, as did the history of the Arizona Strip as a whole, with the Church of Jesus Christ of Latter Day Saints. The Mormons first began to utilize these areas in the mid-1860s, when a sawmill on Mt. Trumbull was producing the lumber for the temple in St. George, Utah, and cattle were brought in to provide beef for the men working in the mill. Mt. Trumbull provided excellent summer range for these cattle, but when the snow became too deep in the winter months, range was sought in the lower valleys to the east and west of the mountain. The Tuckup and Jensen Tank areas were often utilized as winter range. With the dedication of the temple in 1871, the mill was shut down and the church removed its herds, but several of the one-time lumbermen who had taken part in the stockgrowing stayed in the area to tend their acquired herds.

Many prominent ranching families were introduced to stockgrowing during the church lumbering period, but the one that has figured most prominently in the history of the three study areas is the Schmutz family. In 1887 they began to establish a herd on Mt. Trumbull and to gain prominence as cattlemen. In 1897

they bought out Victor Meekum and acquired the range rights to Tuckup and began to run cattle in a manner similar to the way the church had run its herd before them. Their cattle found summer range on Mt. Trumbull and winter range on Tuckup Point.

After the turn of the century, the largest change to ever affect the Strip took place – the coming of the sheepmen. Perhaps the first herd of sheep to winter on the Strip was brought in by the Heaton family of Alton, Utah, in 1908. Around 1915, transient herds began to find their way down onto the Strip. Most of these came from Utah, entering late in the fall and making a large circle down to where the feed was best and adequate water could be found. The rich grasses of Tuckup Point and the Jensen Tank area offered excellent winter range when snow was available for watering stock. By the 1920s, 500,000 head of transient sheep were wintering in the Arizona Strip and many of these made the circular route through Tuckup and Jensen Tank.

Local ranchers became alarmed at the condition of the range caused by the excessive grazing of sheep. Ensuing battles over rights to water tanks created further controversy. The enactment of the Taylor Grazing Act in 1934 put an end to the open range and established grazing allotments based on prior use of water rights to existing tanks.

Poor markets and "predation" caused a rapid decline in sheep herding throughout the 1940s, and by 1964 only one small herd wintered on Tuckup. Today, only cattle graze on Tuckup Point. The evidences of the intense grazing pressures of the past are healing with the passage of time.

The homesteaders on the Strip were either ranchers or dry-land farmers. In the Toroweap area, the Schmutz brothers started a ranch homestead in 1910; today they operate from a home base in Utah. Two individuals, Robert Sullivan and Walter Kent, attempted dry-land farming in the late 1920s. But the farming proved to be too dry, and Sullivan sold out after living on his proved-up homestead only a short time. Kent attempted grazing in the Slide Mountain area. A statement by John Schmutz sums up Kent's success: "Ranching is fine on Slide Mountain, if you can get anything to stay there."

EXISTING USES

Recreation

The Uinkaret and Kanab Plateaus are the most isolated and least visited of the plateau lands that are accessible by road within Grand Canyon National Park. Few visitors to other parts of the park are willing to travel the roundabout route

and 50 miles of dirt road across a sparsely vegetated desert environment to reach them. Most visitors see these plateaus as distant horizons or as the sharply silhouetted edge of the canyon walls viewed from a raft on the Colorado River. A few are in the region momentarily as they await a charter plane at "Tuweep International Airport" (a dirt runway) at the conclusion of their river trip.

Those who do come to visit these plateaus come to experience the canyon: in solitude – for a sense of spaciousness – under primitive conditions. Most people who come to this part of the park camp informally in primitive campsites on the Esplanade below Toroweap Point. A few camp outside the park near Nixon Spring in the cool pine forests on Mt. Trumbul'. In contrast to the park visitors are the deer and turkey hunters who come seasonally to hunt and camp on the lands adjacent to the park.

A lack of either surface or accessible groundwater has deterred development generally in the region and has inhibited use by all except the few seeking and willing to work for a different park experience.

Principal access to the area is the graded road in Toroweap Valley. A network of primitive roads, established to serve grazing allotments, lead from the graded road in the valley to higher Kanab Plateau lands to the east and into the Pine Mountains and Uinkaret Plateau to the west. A number of these roads provide access to trailheads leading onto the Esplanade and into the Inner Gorge for those seeking an alternative to the more heavily used backcountry accessible from the more highly developed Coconino and Kaibab Plateaus.

Road to Toroweap Point

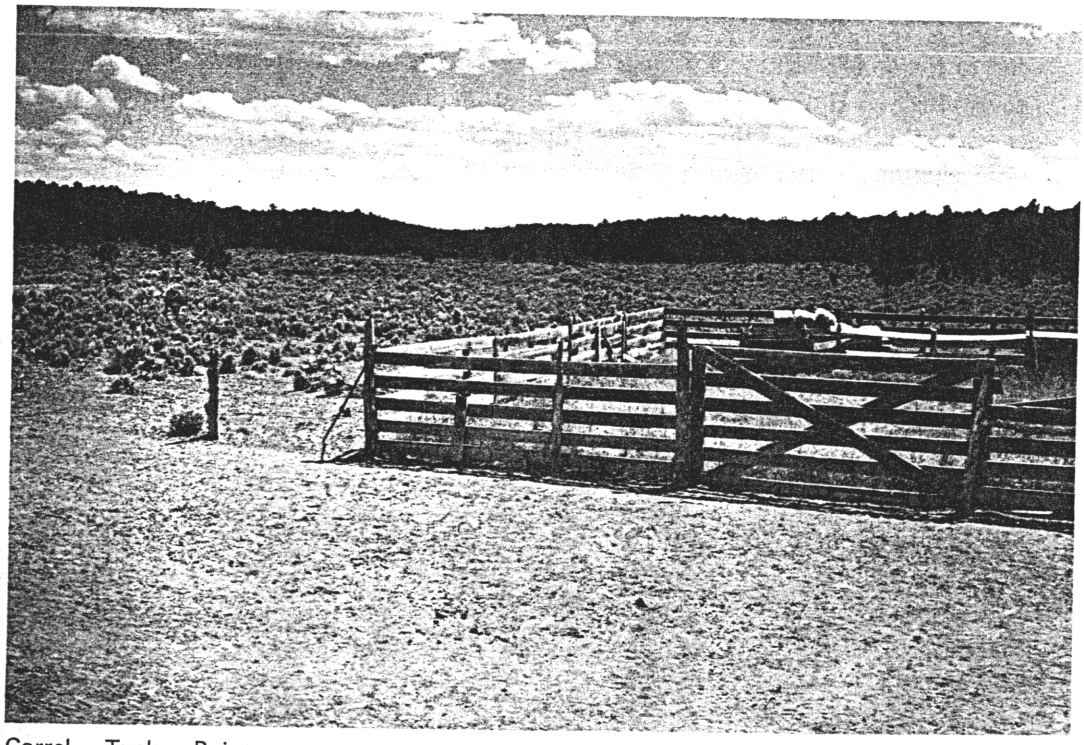
Grazing

Lifetime livestock grazing privileges were granted to a number of individuals when Grand Canyon National Monument was established in 1932.

At the present time, two permittees are allowed to graze a total of 215 head of cattle on 56,960 acres of land that is now part of Grand Canyon National Park: Jense McCormick has an allotment to graze 37 head for 12 months on Tuckup Point, and John Schmutz has allotments to graze 111 head for 6 months on Tuckup Point and 67 head for 6 months in Toroweap Valley.

In addition to these allotments, approximately 40 head of cattle trespass graze on SB Point (Jensen Tank) – crossing into the park from adjacent unfenced Bureau of Land Management allotments.

Under the provisions of the Grand Canyon Enlargement Act, the existing grazing allotments in the park will be terminated upon the death of the present permittees. These permits are not transferable.



Corral – Tuckup Point

GEOLOGY

GRAND CANYON NATIONAL PARK

UINKARET PLATEAU

MOUNTAINS

MOUNT TRUMBULL

MT. LOGAN

HURRICANE

WHITMORE CANYON

FAULT

SLIDE MOUNTAIN

SLIDE MOUNTAIN

VALLEY

FAULT

BRADY CANYON

TUCKUP POINT

HANCOCK KNOLL

KANAB PLATEAU

KANAB CANYON

JENSEN TANK

TUCKUP CANYON

HADES KNOLL

S.B. CANYON

BOYSAG POINT

TAQUESKAHEH POINT

S.B. POINT

ESPLANADE

MOUNT SINYALA

THE DOME

FERRELL CANYON

TUCKUP COVE CANYON

TUCKUP POINT

STAIRWAY CANYON

TOROWEAP POINT

PINE

TOROWEAP

TOROWEAP

MOUNT EMMA

THE COVE

VOLCANIC THROAT

LAVA FALLS

INDIAN RESERVATION

HUALAPAI

NORTH

0 1 2

MILES

PLATEAU

UPPER CLIFF

ESPLANADE-TOROWEAP VALLEY

RED WALL

INNER GORGE

COLORADO RIVER

TONTO PLATEAU

EXISTING NPS BOUNDARY

STUDY AREA BOUNDARY

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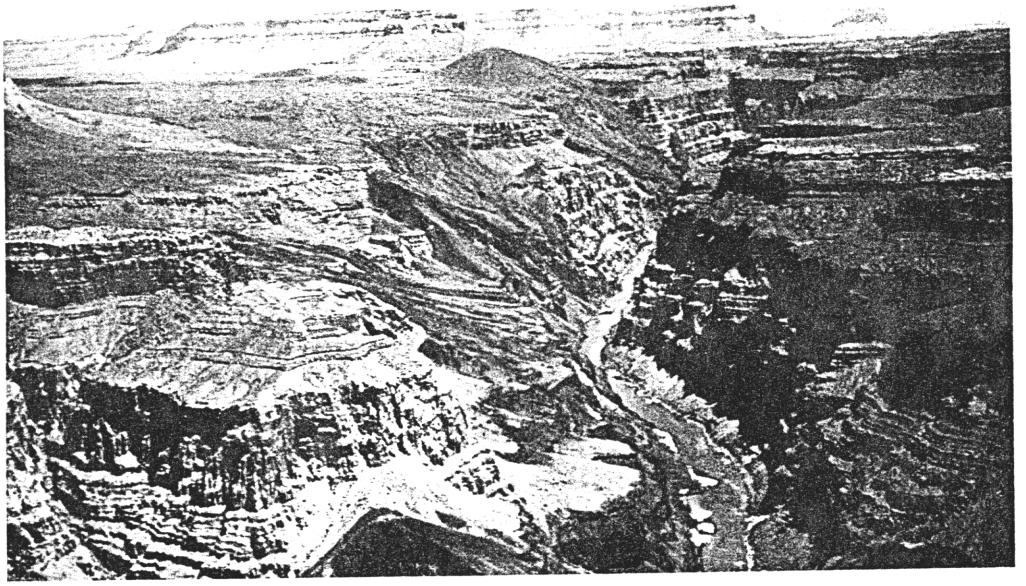
RESOURCE ANALYSIS



Lava Flows – Toroweap Valley

PARK VALUES

Geology

The Resource: The study areas occur in a region where horizontal stratigraphy has been broken into block plateaus. The Uinkaret Plateau in the western portion of the study areas is bounded by the Hurricane Fault on the west and separated from the Kanab Plateau by the Toroweap and Sevier Faults. Elevations on the Uinkaret Plateau range from 6,000-6,500 feet in the east to 4,500-5,000 feet along the Toroweap Fault. Isolated pediments, or steep sloped, roughly triangular masses (Mounts Trumbull, Emma, and Logan) rise 2,000 to 3,000 feet above the Uinkaret Plateau. These mesa-like pediments consist of flat-lying strata capped with a resistant layer of basalt.

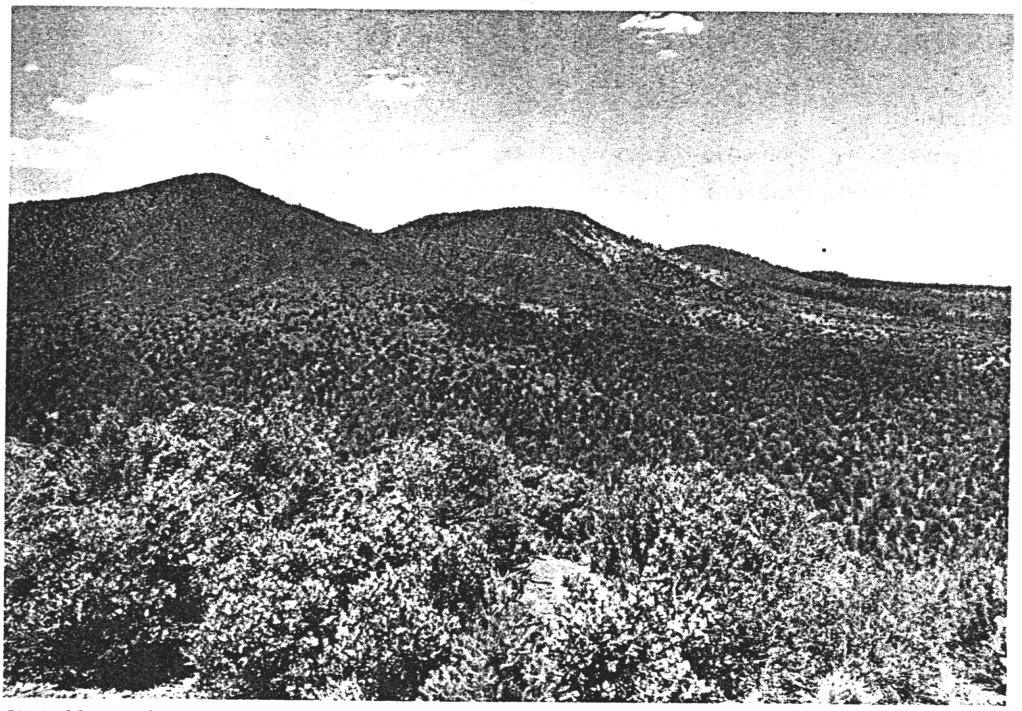
The Kanab Plateau, with elevations ranging from 5,000 to 6,000 feet, lies between Toroweap Valley to the west and Kanab Creek to the east. On this plateau and in its related canyons, 2,100 feet of Permian age strata are exposed. The upper member of the Supai group consists of crossbedded sandstone. This layer forms a bench called the Esplanade on which the outer canyon develops. Soft Hermit shale forms slopes above the Esplanade, which is followed by 100 feet of Coconino sandstone. The Toroweap formation and Kaibab limestone above it are both massive layers 400 to 600 feet thick. They contain interbedded limestone, shale,

and sandstone, with some gypsum deposits. Generally, these form the uppermost beds in the Jensen Tank and Tuckup Point areas.

Triassic age sediments are found in isolated areas. The soft sandstone and shale of the Moenkopi formation and the more resistant Shinarump conglomerate are preserved under the protective lava caps on Mounts Trumbull, Emma, and Logan, and possibly in the Slide Mountain area.

A volcanic field has been superimposed on the block plateau. In the Slide Mountain area, the Toroweap Valley is underlain by lava which flowed into the area during three recent episodes of volcanic activity. An older flow (pre-faulting) caps the underlying Permian formations and possibly the Triassic beds. The younger periods of igneous activity can be correlated with recent activity along the Hurricane and Toroweap Faults. Cinder cones occur along both sides of Toroweap Fault but are more abundant on the Uinkaret Plateau to the west.

Slide Mountain, lying west of the Toroweap Fault, is an area of these cinder cones and coalescing young (post-faulting) lava flows. The cinder cones parallel the major faults and trend north-south. Volcanic activity probably occurred during the Pleistocene/Quaternary time. The relative age of the lava flows is determined by weathering and stratigraphic position.



Slide Mountain

GRAZING ALLOTMENTS
GRAND CANYON NATIONAL PARK

KANAB PLATEAU

UINKARET PLATEAU

MOUNTAINS

PINE

MOUNT TRUMBULL

SLIDE MOUNTAIN

SLIDE MOUNTAIN

MOUNT EMMA

THE COVE

TOROWEAP VALLEY

TOROWEAP

TOROWEAP POINT

BRADY CANYON

BRADY MCCORMACK TANK

SCHMUTZ TANK

JOHN H. SCHMUTZ
111 CATTLE FOR
3 MONTHS

TUCKUP POINT

PARADISE MEATON TANK

PARADISE MCCORMACK TANK

MARTINE MCCORMACK -
37 CATTLE CR.
HORSES FOR 6
MONTHS

TUCKUP MEATON TANK

HANCOCK KNOLL

TUCKUP CANYON

TUCKUP POINT

COVE CANYON

MARCELL E. AND JOHN H. SCHMUTZ -
67 CATTLE
FOR 3 MONTHS

VOLCANO THRONE

LAVA FALLS

HUALAPAI INDIAN RESERVATION

JENSEN TANK

JENSEN TANK

JACKSON S.B. TANK

HAPPY KNOLL

SIDE CANYON

SIDE POINT

FERGUSON CANYON

THE DOME

ESPLANADE

S.B. CANYON

S.B. POINT

TAQUESKAHEH POINT

BOYSAG POINT

KANAB CANYON

MOUNT SINYALA

EXISTING NPS BOUNDARY

STUDY AREA BOUNDARY

LIVESTOCK WATER TANK

NORTH

0 1 2
MILES

PLATEAU
UPPER CLIFF
ESPLANADE - TOROWEAP VALLEY
RED WALL
INNER GORGE
COLORADO RIVER
TONTO PLATEAU

UNITED STATES DEPARTMENT OF THE INTERIOR
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Evaluation: The Slide Mountain area contains cap rock of the oldest – late Miocene/early Pliocene – lava found on the Uinkaret Plateau. One other remnant occurs in Grand Canyon National Park 3 miles south of Mt. Emma. The cap preserves an old pediment surface formed in the weak Triassic beds prior to faulting. Displacement along the Hurricane and Toroweap Faults caused the former pediment surface to retreat. In this way, the topography became regraded, reaching a second level of erosional equilibrium.

In current theories, two cycles of regional erosion have been required to explain the geomorphology of the canyon: regional peneplains, or broad flat featureless areas, were formed during a period of extensive erosion; then the inner canyon was cut by a second period of erosion.

The Jensen Tank and Tuckup Point areas have similar stratigraphic records. The resistant Kaibab limestone forms the surface of the plateau. The Kaibab formation is divided into three members: gamma, beta, alpha. Kaibab beta and alpha, which represent a time of open and retreating sea, respectively, are both found in the study areas. Kaibab alpha, facies 1, consists of thin bedded dolomitic limestone, red beds, and gypsum. Exposures of Kaibab alpha, facies 1, are apparently uncommon in this region, although the fossil fauna has not been studied in sufficient detail to determine the significance of this formation.

The Moenkopi formation lies on an erosional surface above the Kaibab limestone in a few isolated areas. However, the contact cannot be differentiated between the two formations. In the study area, these two formations can only be distinguished by the change in fossil life. The Kaibab limestone contains an abundant population of brachiopods and bryozoans; the Moenkopi has an increased number of mollusks and gastropods. An in-depth study of the paleontology of these two formations has not been accomplished.

An intricate pattern of drainage systems cuts the Jensen Tank and Tuckup Point areas. This geomorphology has not been studied but may provide valuable information on the formation of the Grand Canyon itself. The drainage patterns appear to go nowhere. They may connect with drainage systems on the south rim that formed before the canyon was cut, or they may be controlled by the northeast regional dip of the Colorado Plateau. These historical drainage systems are still not understood. New theories may rely on this kind of information, that is, the direction of regional drainage systems and the time of their development. The Jensen Tank and Tuckup Point areas need to be studied to determine the significance of these ancestral stream drainages. Grazing and related developments might cause rapid erosion and gullying in these areas and valuable scientific information leading toward a better knowledge of the formation of the Grand Canyon could be destroyed.

Ecology

The Resource: The lands under study are located on one of the southern extensions of the Great Basin Desert, often classified as a cold temperate desert. Biological communities on the major portion of the area are representative of the Upper Sonoran Life Zone, with remnants of the Transition Life Zone also represented. However, Merriam's life zone classification system is general and is based primarily on altitudinal belts. As is true elsewhere, local differences in soils, available soil moisture, climate, and topography account for the vegetation mosaic displayed. Similarly, the distribution of various animal species is related to the different plant associations.

The soils of Jensen Tank, Tuckup Point, and the eastern portion of Slide Mountain are derived from a sandy limestone. They are generally fine textured and loosely cemented. Elsewhere in the Slide Mountain area the soils are of volcanic origin (cinder cones).

Daily temperature and precipitation data recorded at the Tuweep Ranger Station for the period between June 1941 and December 1969 give a representative picture the recent climate for the area. During this 28-year period, average annual precipitation was approximately 11 inches, with an annual precipitation low and high of 4.75 inches and 18.25 inches respectively. The seasonal distribution of moisture is one of drought in April, May, and June, followed by heavier rains in July and August, with August the wettest single month of the year.

The temperature records reveal an average growing season of well over 200 days. Summer months are typically hot with daily temperatures ranging between highs in the 90s and lows in the 60s. Although winters are cool with average daily lows in the 30s, average daily highs in the 50s are typical.

High temperatures during the growing season, the small amount of annual precipitation, the seasonal distribution of moisture, and the poor moisture-holding capacity of the soils are the primary environmental factors which produce the vegetation complex in the study area. Great Basin desertscrub, piñon/juniper, and ponderosa pine are the major plant associations which have developed under these conditions.

The piñon/juniper association occupies the major portion of the study area and is represented at Slide Mountain, Jensen Tank, and Tuckup Point. Piñon pine and Utah juniper are the overstory dominants in this association, although in a few areas cliffrose also exerts codominance. The understory is composed primarily of a mixture of forbs and grasses with a conspicuous absence of shrubs. Based upon coverage data, blue grama is the major understory species.

A chaparral association is, at certain locations, superimposed upon the more "typical" piñon/juniper woodlands. This is especially apparent in the Slide Mountain area, but it also occurs in more isolated instances in the Jensen Tank and Tuckup Point areas. Gambel oak, turbinella oak, one-seed juniper, mountain mahogany, buckbrush, and manzanita are some of the shrubs that may occur to varying degrees and are indicative of this chaparral association.

The Great Basin desertscrub association occurs here at the southeastern limit of its range, and big sagebrush is the characteristic dominant of this association. Other shrubs commonly associated with big sagebrush are snakeweed, rabbitbush, shadscale, and Mormon-tea.

Although several species of grasses and forbs occur in the understory of this association, blue grama dominates, as it does in the piñon/juniper association. Another similarity exists between these two associations. Aggressive, exotic invaders such as cheatgrass and tumbleweed are exerting dominance where past grazing pressure was moderate to heavy. Where grazing has been excluded for decades, as in other portions of the former monument, natural succession is very slowly reversing this situation in some instances.

Apparently, the nearly identical ecological requirements and competitive abilities of the plants involved in these two associations had resulted in a tenuous equilibrium between the two. Recently, this equilibrium has been changed, and the piñon/juniper association is invading the Great Basin desertscrub association in certain areas. The exact cause of this invasion is unknown, but the relatively recent suppression of fire in the area, climatic changes, and a past history of over-grazing are hypothesized to have contributed in some degree to this localized phenomenon.

The ponderosa pine association is represented on only 285 acres of the Slide Mountain study area, but it is represented elsewhere in the Pine Mountains range both within the park boundary and on adjacent lands. Since available soil moisture appears to be the most critical factor in determining the lower ecological limits for ponderosa pine, the greater amounts of precipitation and lower temperatures present at the higher elevations on Slide Mountain probably account for the presence of this plant association.

Ponderosa pine is the sole overstory dominant in this association. The two-layered canopy of these stands, which is composed of both very old trees and young, more vigorous trees, resulted from the logging of intermediate size trees during the 1870s. Except in openings, the relatively closed canopy and mat of pine needles on the forest floor result in an impoverished understory composed of a few clumps of grass, some scattered forbs, and occasional shrubs.

VEGETATION
GRAND CANYON NATIONAL PARK

UINKARET PLATEAU

KANAB PLATEAU

MOUNTAINS

PINE VALLEY

MOUNT TRUMBULL

HANCOCK KNOLL

BROAD CANYON

TUCKUP POINT

TUCKUP CANYON

JENSEN TANK

KANAB CANYON

S.B. CANYON

PAGEANT POINT

BOYSAG POINT

HADES KNOLL

S.B. POINT

SLIDE MOUNTAIN

SLIDE MOUNTAIN

BRADY CANYON

MOUNT HAYDEN

ESPLANADE

MOUNT SINYALA

PINE

MOUNT EMMA

TOROWEAP

TOROWEAP POINT

COVE CANYON

TUCKUP POINT

FERGUSON CANYON

THE DOME

STAIRWAY CANYON

THE COVE

VOLCANS THRONE

LAVA FALLS

INDIAN RESERVATION

HUALAPAI

EXISTING NPS BOUNDARY

STUDY AREA BOUNDARY

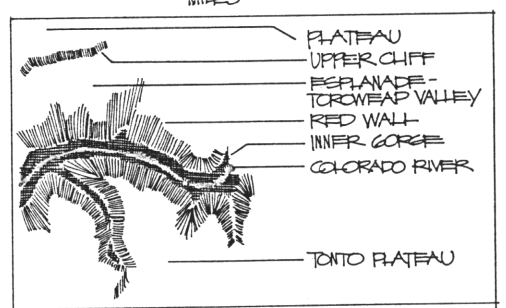
PIÑON / JUNIPER

PONDEROSA

SAGE / SAGE-GRASS / GRASS (IN ORDER)

0 1 2 MILES

NORTH



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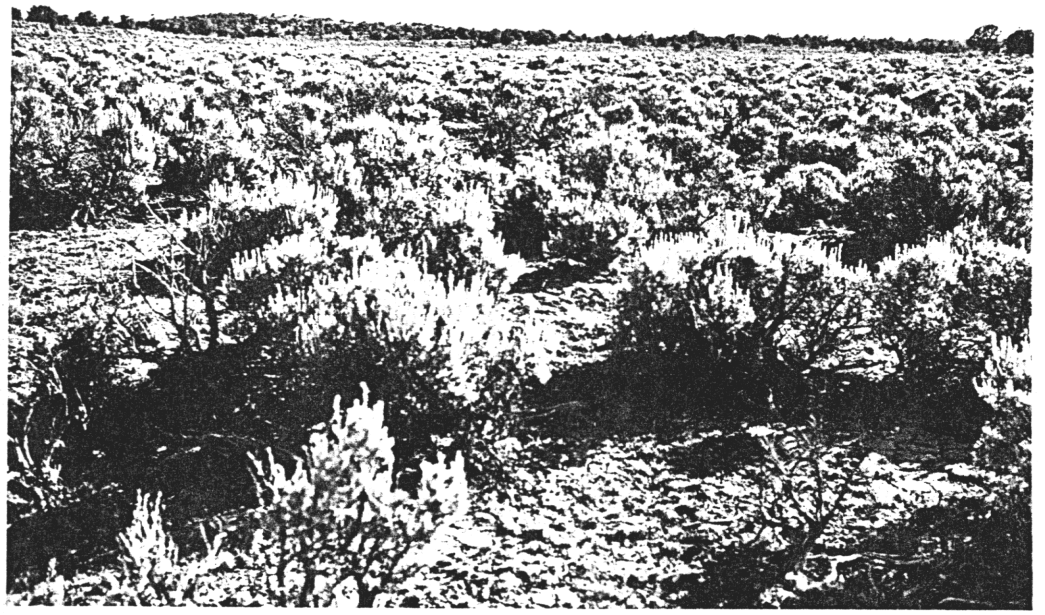


Great Basin Desertscrub Association

Pinon/Juniper Association

A recent field reconnaissance of the study areas documented the occurrence of 17 species of mammals, 52 species of birds, and 12 species of amphibians and reptiles. A few of the more common animals are the deer mouse, piñon mouse, jackrabbit, white-tailed ground squirrel, badger, coyote, mule deer, Gambel's quail, mourning dove, horned lark, violet-green swallow, raven, piñon jay, meadowlark, western rattlesnake, horned lizard, Great Basin spade-foot toad, and fence lizard.

Range extensions have been noted for a few of the species observed in the study area. However, this is to be expected because the area has not been thoroughly studied. None of the species known to occur in the study areas are officially listed as rare or endangered.

Of the three areas, Slide Mountain has the highest diversity of wildlife. This probably results from the high degree of interspersion of the different plant associations. Attention has been focused on the mule deer and Merriam's turkey found in this area because of the added potential for hunting these species if the study areas were deleted from the park. Mule deer are abundant in the Slide Mountain area and they are part of the resident herd from Mt. Trumbull. The Arizona Game and Fish Department estimates the population density in the Slide Mountain/Mt. Trumbull area to be approximately 25 deer per section.

No reliable estimates of the deer population are available for the Jensen Tank and Tuckup Point areas. The only evidence of deer in these areas during the summer was a few tracks around the stock tanks. It appears that what few deer do use these areas remain close to the stock tanks and that they are individuals that have moved up from the canyon. Winter deer populations in the area are unknown.

The lack of free water in the study areas is one of the most obvious habitat factors limiting herd size. The availability of browse species may also be a limiting factor. The hedged condition of important browse species in the Slide Mountain area is indicative that the natural carrying capacity of the range in this area may have already been reached, if not exceeded.

Merriam's turkey, which is now found in the Slide Mountain area, is not native to the area. Its original range was confined to the south of the Grand Canyon. The presence of turkey in the area is the result of a successful transplant on Mt. Trumbull of 37 individuals in 1961. Although the Mt. Trumbull population is maintaining itself at a level which allows a limited yearly hunt, existing habitat conditions in the Slide Mountain area are far from being ideal for the buildup of any sizable population.

Evaluation: The biological communities of the Slide Mountain, Jensen Tank, and Tuckup Point areas meet, by strict definition, the following examples cited under the National Park Service criteria for natural areas:

> "An ecological community significantly illustrating characteristics of a physiographic province or a biome"
>
> "A biota of relative stability maintaining itself under prevailing natural conditions, such as a climatic climax community"
>
> "An ecological community significantly illustrating the process of succession and restoration to natural condition following disruptive change"

However, these communities probably do not "possess exceptional value or quality" with regard to the aforementioned criteria. The biological communities present in these areas are already adequately represented in other areas of the National Park System as examples of the natural history for the Colorado Plateau, and they may be adequately represented elsewhere in Grand Canyon National Park.

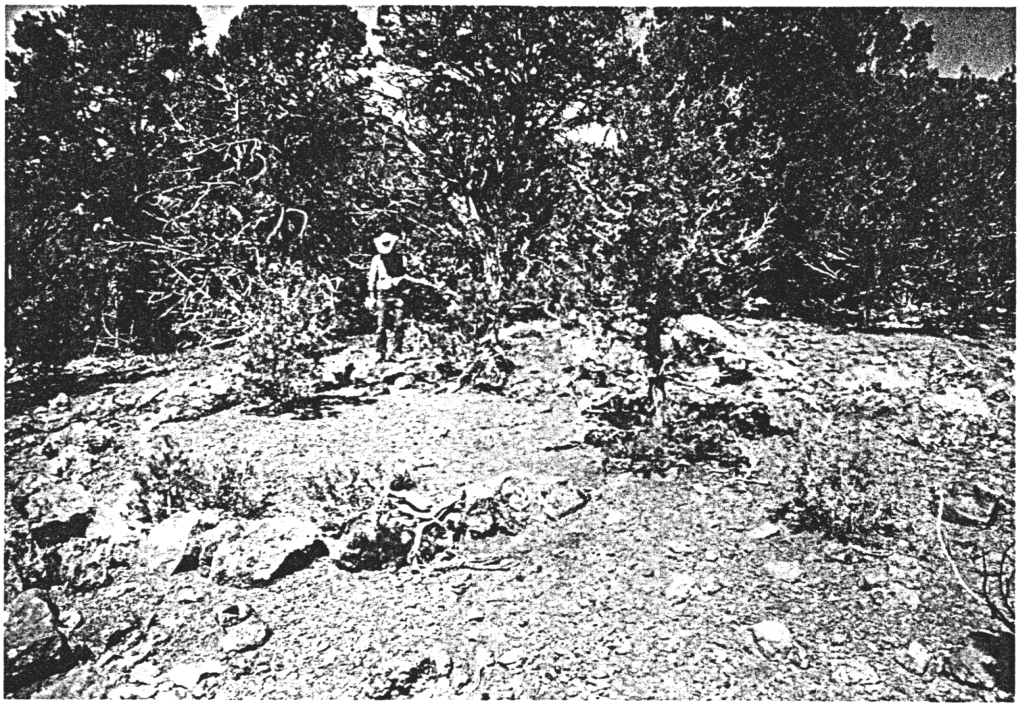
The biotic communities of the Slide Mountain, Tuckup Point, and Jensen Tank areas do, however, have a role in supporting the integrity of the nationally significant features found in the Grand Canyon, because these communities provide the ecological context or framework necessary for a Gestalt interpretation and appreciation of the Grand Canyon. Simply stated, the entire Grand Canyon is greater than the sum of its parts.

While the question remains as to how much of the surrounding land is required to provide the ecological context to maintain the integrity of the Grand Canyon, it should be remembered that once this context is lost, it is not replaceable. Whether or not the study areas are critical to protecting the integrity of the canyon, they are still valuable as units for scientific study or as areas capable of providing baseline ecological information for evaluating changes in similar environments that are subject to manipulative management practices.

When compared to the total area of the Arizona Strip, the acreage involved in this study is relatively insignificant. But when compared to the remaining acreage of unmanipulated "like-lands" within the Strip, the study areas have added importance. Chaining, railing, burning, herbicide application, grazing, and other types of vegetative manipulation have occurred and are continuing to occur on virtually all of the Arizona Strip lands – with the notable exception of park lands. The study areas, therefore, contribute significantly to the only large contiguous block of land that can be used as control areas to evaluate the results of manipulative land use practices. In this regard, strict preservation also fulfills multiple-use objectives.

These areas also have intrinsic value for other types of scientific study, which might be precluded if they were deleted. With the exception of some limited archeological work, the only scientific study of these areas has been the preliminary reconnaissance work carried out for the purposes of this report. This work has called attention to subjects of significance that need further scientific study.

Retention of these areas is important for the study of the relationship of the environment to prehistoric cultures. The preservation of biotic communities associated with important archeological resources provides additional information that allows a more complete analysis and interpretation of those resources. Under multiple-use management, such study would be jeopardized. Chaining, railing, or herbicide treatments could be initiated on these areas resulting in only a small portion of the biotic community being retained to provide an ecological context for the archeological sites.



Outline of Prehistoric Structure – Slide Mountain Study Area

Archeology

The Resource: The settlement patterns of the Virgin Branch of the Anasazi show an interesting adjustment to the environmental zones of the study areas and the surrounding lands of the former monument. Structures in two of the zones were for permanent habitation, sites in two other zones were used for seasonal nonagricultural purposes, and structures in the fifth zone included both permanent farmsteads and seasonal sites.

In the Pine Mountains, at elevations ranging from 5,000 to 6,500 feet, the usual dwelling site is a ring of basalt in either a single alignment or a mounded circle of stones. These rings of stone, varying from 10 to 18 feet in diameter, are probably the visible ruins of semi-subterranean pit houses. There are also smaller circles varying from 4 to 8 feet in diameter that are randomly placed storage cists.

On the Kanab Plateau, the structures are all the later surface types, either one to three room nuclear family dwellings or unit pueblo dwellings to house the extended family. In both the Pine Mountains and the Kanab Plateau the location of dwellings was directly related to the immediate availability of building material and proximity to arable land.

The characteristic site on the Esplanade is the large pit used seasonally for roasting agave root. These sites usually are associated with rock shelters and were probably used during a springtime descent of the Anasazi from their permanent homes as winter food supplies ran low.

Both unit pueblos and seasonal campsites are found on the floor of Toroweap Valley. Lack of building material seems to have precluded building sites in the agriculturally desirable middle of the valley floor except at a cluster of basalt plugs near Vulcan's Throne in the lower portion of the valley.

Evidence of human habitation has been found in the upper portions of the inner gorges of SB and Tuckup Canyons. These sites are the agave roasting pits and rock shelter combinations found on the Esplanade. However, the difference is that the presence of petroglyphs and pictographs are fairly common in the inner gorges.

Evaluation: Within the 38,080 acres of the study areas – exclusive of the inner gorges of the canyons, the Esplanade, and the plateau lands outside the study areas – it is predicted that there would be found at least 3,176 sites of prehistoric habitation and/or identifiable specialized activities. Density of sites varies within the study areas. In terms of the number of sites predicted in relationship to the acres of land, the tabulation is as follows:

Slide Mountain: 5,380 acres; 940 sites
Jensen Tank: 9,000 acres; 639 sites
Tuckup Point: 23,700 acres; 1,597 sites

In the lands encompassed within the boundaries of the former Grand Canyon National Monument there exists today a block of territory that has enjoyed considerable protection behind its more than 50 miles of dirt road access. Here is to be found extensive evidence of a settled way of life which persisted for more than a thousand years. Within these resources may lie the clues to solutions to many unresolved archeological research problems encountered in other parts of the Southwest.

Data should eventually come from this area that will also improve existing knowledge of the transition from a hunting and gathering life to a sedentary pattern that occurred some 2,000 years ago. It will further offer new information concerning the end of the agricultural era and the return of the area to later-day hunters and gatherers.

The sites recorded within these boundaries cover a full range of pueblo culture from Basketmaker II through early Pueblo III. The great diversity of structural forms and the occurrence of many of these forms through several time periods suggests that new data will have to be taken into account when the sequence of structural forms and of community organization is reconsidered.

It has long been assumed that major cultural influences passed through the Arizona Strip from east to west. Evidence currently coming to light indicates that this issue has by no means been settled. It is entirely possible that during at least the earlier periods, those influences moved in the opposite direction. Should this data continue to accumulate, it will become necessary to rewrite significant portions of the prehistory of the upper Southwest.

The exceptional site density in the area may also make it possible to collect highly detailed demographic information which should produce within a very limited period of time a more accurate picture of the size and composition of communities.

All three of the areas incorporate good collections of both early and late Pueblo II sites which should make it possible to study in great detail the multiple factors which prompted the so-called Pueblo II population explosion.

One of the most perplexing problems requiring archeological research in this area is the critical issue of culinary water. While the pattern of rainfall currently observed is normally adequate for raising Indian crops, the absence of significant live water through much of the area poses the problem of determining how these communities obtained drinking water and water for cooking. Geologists tell us that the absence of springs is due to the lack of aquifers or water-bearing strata. This means that no change in rainfall patterns or in volume would alter the condition. Only archeological investigations promise answers.

The list of significant issues in Southwestern prehistory to which studies undertaken in sites located in these areas may make substantial contributions is almost endless. The sites that have been recorded do not represent an isolated backwater cluster of communities of unexpected size. The people who lived in this area for centuries were a stable part of a cultural continuum that linked them ultimately with the entire Southwest.

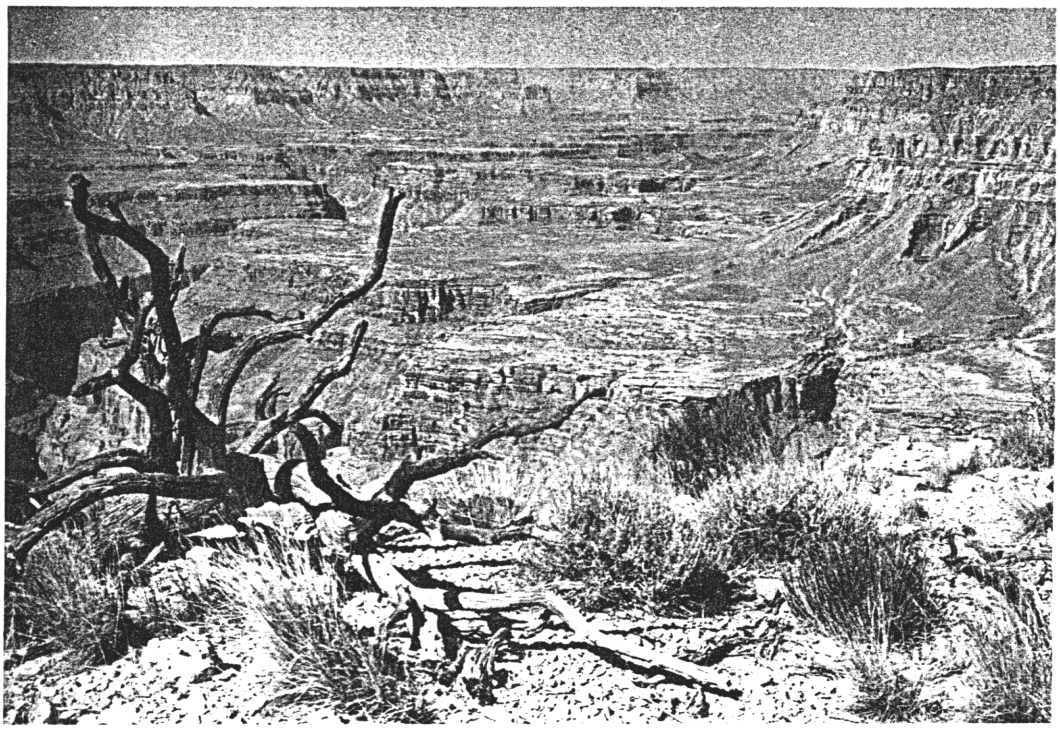
While mere quantity of sites is by no means a measure of their archeological significance, the appearance of an unexpected concentration of sites in a little-known area must, of necessity, be considered to have great potential for new knowledge. The area of the former monument is not well known archeologically, yet its archeological significance may soon surpass that of the better known portions of Grand Canyon National Park.

Antiquities contained in lands managed by the National Park Service and the Bureau of Land Management are administered under uniform policies of the Antiquities Act of 1906 (34 Stat. 225; 16 U.S.C. 431). Although the legislative mandate for antiquities is, in fact, identical for both agencies, the differences in the results to be expected are to be found in the different needs and goals which each agency is meant to serve.

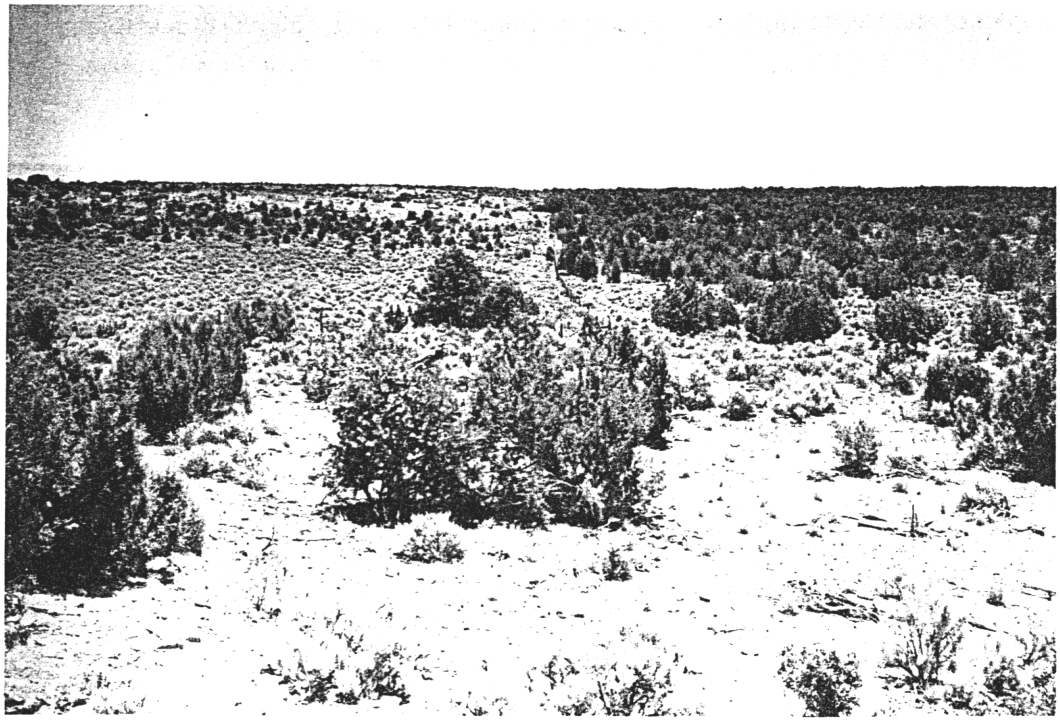
The appropriate and recognized role of the Bureau of Land Management is summarized in its commitment to the principle of "multiple-use management." This objective certainly includes the conservation of all kinds of resources, including the archeological. At the same time, however, the Bureau of Land Management has an obligation to assist in the national quest for new food and mineral resources. Although it exercises an increasingly restraining hand against uninhibited exploitation, the Bureau of Land Management must, inevitably, weigh pressing needs for food and fuel in the development of future management strategies. Under BLM management, valuable archeological resources might thus have to be excavated under emergency conditions rather than remaining the subject of deliberate study over a long period of time when full advantage might be taken of the steady refinement of archeological excavation and interpretive skills.

The National Park Service is, on the other hand, committed to the management of its lands to the end of preservation and nonconsumptive use. While most citizens regard the National Park Service as being committed to fostering outdoor recreation and to the conservation and administration of the country's major scenic resources, the National Park Service also conserves both historical and prehistoric values. National parks are ideal field laboratories for a wide range of problems in the social sciences as well as the natural sciences.

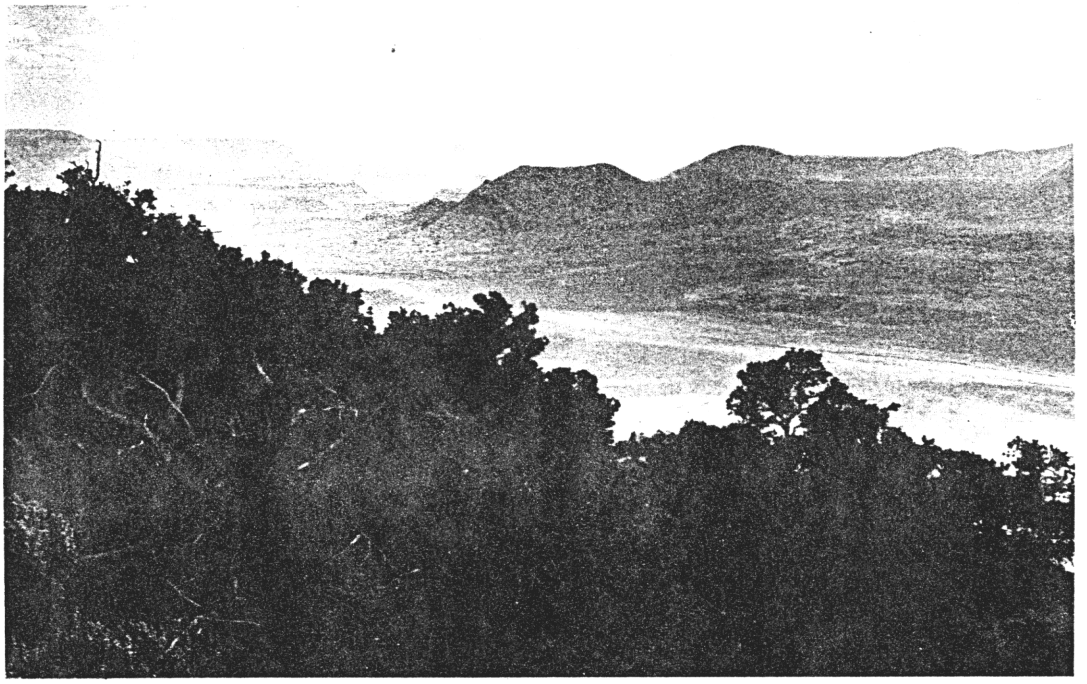
If the value of these archeological resources is accepted, the conclusion must be that the areas in question will be administered more effectively and be more certainly held in reserve for long-term study if they are retained under the jurisdiction of the National Park Service.



Eastward from Boysag Point



Southward from Toroweap Point



Toroweap Valley from Toroweap Point

Scenic Grandeur

The Resource: Jensen Tank, Tuckup Point, and Slide Mountain are part of the vast plateau lands from which the Grand Canyon is derived. Visually, the flat plateau with its mantle of vegetation contrasts sharply with the relatively barren, vertical world of the canyon. This contrast accentuates the awesome visual impact of the inner canyon landscape. This impact is further heightened as one suddenly encounters the verticality of the canyon after having moved for hours through miles of horizontal plateau land.

There are four major subdivisions of this vast plateau region represented in the park: the Kaibab, Coconino, Uinkaret, and Kanab Plateaus. Each of these plateaus offers a distinctive canyon viewing experience. On the Kaibab Plateau, the canyon is viewed from a relatively high forest/meadow environment. The Coconino Plateau is the most accessible and highly developed vantage point, where the canyon can be viewed in relation to a favorable sun angle. The Kanab Plateau affords views of the western portion of the canyon and a particularly dramatic view of the Esplanade, a distinctive outer canyon formation consisting of great expanses of sandstone slickrock dotted with potholes and agave; this landscape feature is not visible from the Kaibab and Coconino Plateaus. The Pine Mountains on the Uinkaret Plateau contain significant vantage points of the Grand Canyon region, because they include the highest elevations outside the Kaibab Plateau, which is located 50 miles to the east. The Pine Mountains are also visible from the south rim, particularly as a backdrop at sunset.

From selected high points within the Tuckup and Jensen Tank study areas, one can also gain panoramic views of the vast Grand Canyon region: to the west, the rounded volcanic forms of the Pine Mountains are etched against the horizon; to the east rises the lofty purple mass of the Kaibab Plateau; to the south, the San Francisco peaks are often visible 100 miles beyond the south rim lands of the Hualapai and Havasupai; to the north, the plateau lands fall away to the faintly visible form of the Virgin Mountains.

Evaluation: The scenic qualities of the three study areas lend diversity to the viewing experiences available throughout the park. When compared to other plateau/rim experiences, the most notable characteristics common to all three areas are a quality of spaciousness and a feeling of isolation derived from a lack of man's imprint on the land and the primitive nature of the access roads. Throughout these areas there is much more of an awareness of the sweeping plateau lands in contrast to the Kaibab and Coconino Plateaus where the viewing experiences are primarily oriented to the canyon proper.

The rounded forms of the Pine Mountains, although not unusual in themselves, do contribute to the overall scenic qualities of the Grand Canyon region when viewed in relation to the flat plain of the plateau lands and the vertical depths of the canyon.

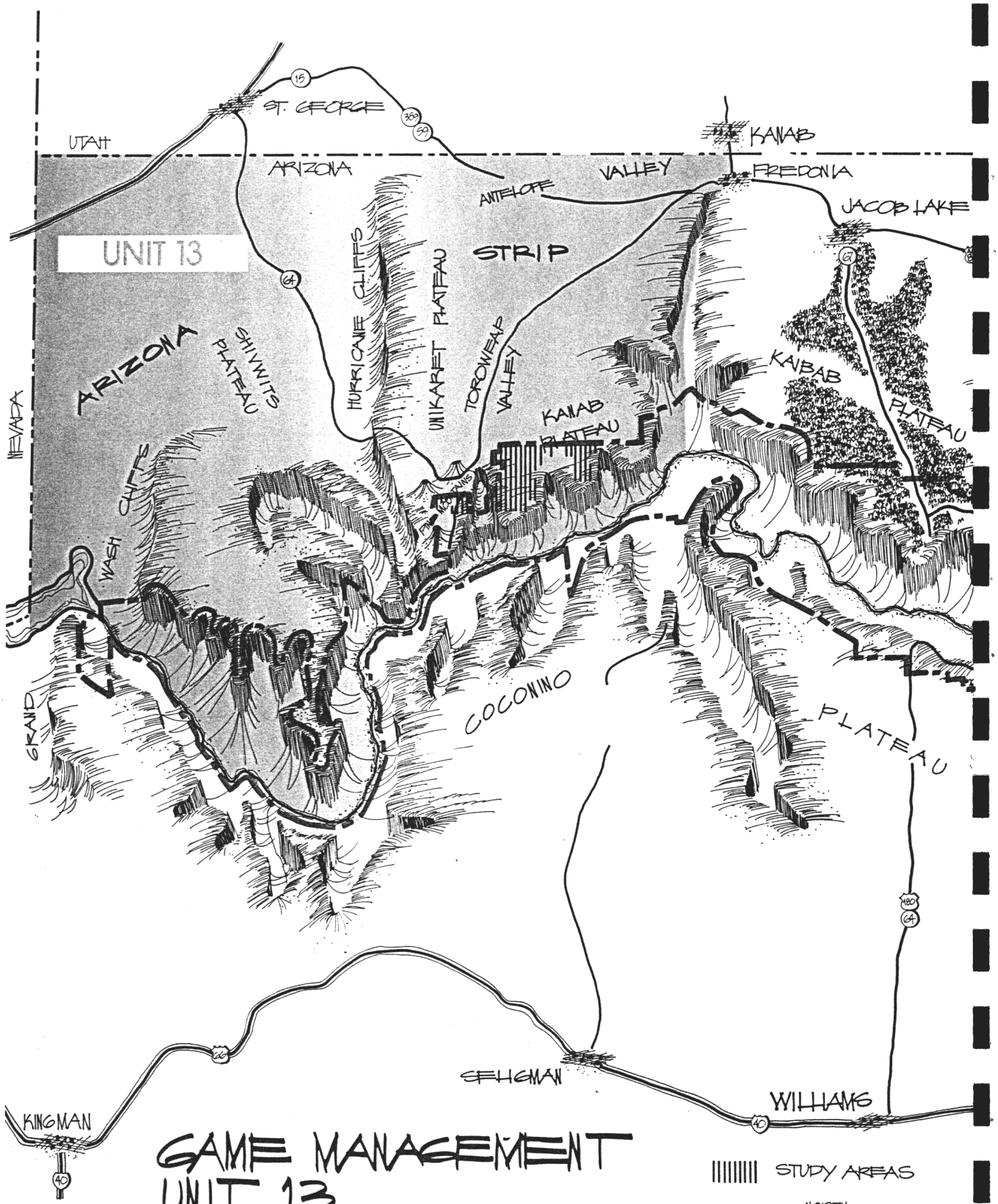
The Slide Mountain study area is important because it is visually an integral part of Toroweap Valley, which is the primary access corridor to the rim of the inner canyon in the western portion of the park.

POTENTIAL NON-PARK USES

The maximum potential economic benefits that could be generated from the study areas, if deleted from the park and managed by the Bureau of Land Management or other multiple-use management agency, are best demonstrated by comparison with the economic benefits currently derived from grazing, timber harvesting, hunting, and mining within the Game Management Unit 13 of the Arizona Game and Fish Department.

Unit 13 is bounded on the south by the Colorado River, on the east by Kanab Creek, on the north by the Arizona/Utah State line and on the west by the Arizona/Nevada State line, encompassing the major portions of the lands popularly known as the Arizona Strip. The study areas Slide Mountain, Tuckup Point, and Jensen Tank are totally contained within the boundaries of this management unit.

Using all of the Arizona Strip or Mohave County, including the town of Kingman, as a comparison base would tend to minimize the comparative potential economic benefits of multiple-use management of the study areas. This position paper, therefore, uses Unit 13 as the comparison base in order to maximize the comparative potential economic benefits under multiple-use management.



GAME MANAGEMENT UNIT 13

ARIZONA GAME AND FISH DEPARTMENT

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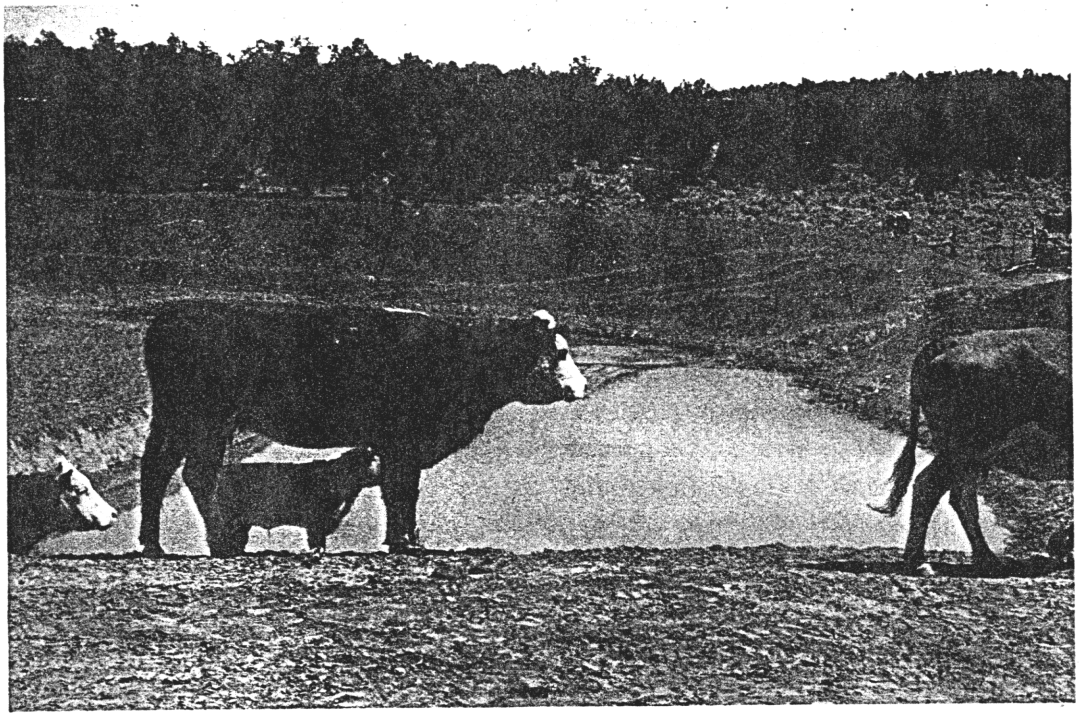


Cattle at Jensen Tank

Grazing

The Resource: The range on Tuckup Point and Jensen Tank consists of an overstory of unmanipulated piñon/juniper, with associated brush and grasses, interspersed with sagebrush flats. Piñon/juniper forest dominates the Tuckup Point area, covering 65 to 70% of the area, while the sagebrush flats cover over 60% of the Jensen Tank area. The vegetation in the Slide Mountain area varies from grasses and sagebrush in Toroweap Valley on the east, through piñon/juniper forest and associated brush, to chaparral and ponderosa pine on the west.

Evaluation: Over the years most of the grazing within the study areas has occurred on Jensen Tank and Tuckup Point with very little, if any, grazing occurring in the Slide Mountain area. However, the total 38,080 acres of all three areas are assumed to have potential for commercial grazing. Currently the areas require about 20 acres per animal unit month (Ac/AUM).

Traditionally, grazing has been a way of life in this area since the 1870s. Both sheep and cattle were grazed during the late 1800s and early 1900s. Gradually sheep were phased out in favor of cattle. Early unrestricted use resulted in severe overgrazing of the available range. The creation of grazing allotments by the U.S. Grazing Service was the first of a series of management practices on public domain lands that gradually improved the range. A multitude of practices followed, including the development of catchment basins, known as tanks; manipulation of vegetative covers by chemical control; seasonal use or rest rotations; and culminating with chaining of piñon/juniper forests.

Chaining the piñon/juniper overstory to increase grass production has been a common practice in the past. Currently, this practice is being questioned. The Bureau of Land Management is involved in writing environmental impact statements evaluating the impact of these and other management practices on their grazing allotments.

A long-range cost/benefit analysis on the results of chaining is not available for the Arizona Strip area. If additional chaining is deemed to be an appropriate management practice, archeological surveys will be required at a cost ranging from $3 to $5 per acre. In addition, depending on the result of the surveys, archeological salvage projects may be required.

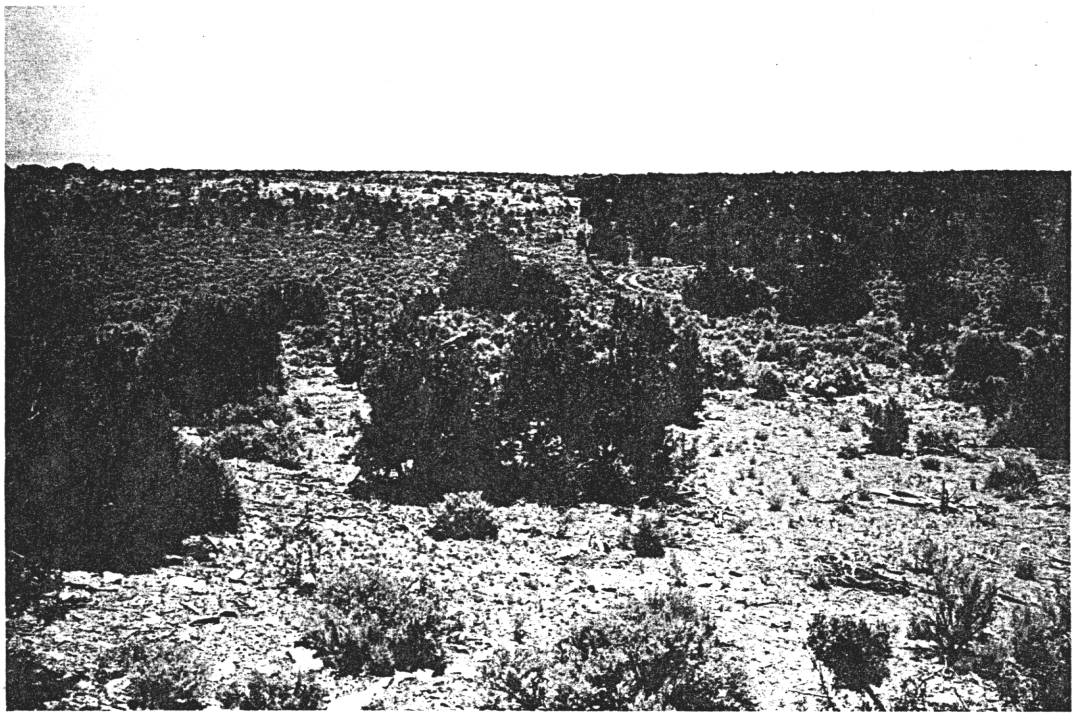
A variety of range management practices could be adopted if the study areas were to be deleted and managed for grazing purposes and/or compatible purposes. Management could be applied without artificial manipulation of the existing vegetation by prescribing seasonal use or rest rotations, which would allow the range to recover. Future practices might also include further control by chemical means, follow-up mechanical maintenance on areas already chained, and reseeding of grasses.

It is difficult to forecast what improvement in terms of Ac/AUM might be realized under various management practices. However, past records indicate at least a short-term improvement from 15 to 20 Ac/AUM before chaining to 6.2 to 10 Ac/AUM following chaining. Using this data as an indicator of possible improvement in range forage production on Jensen Tank, Tuckup Point, and Slide Mountain would mean an increase from the current capacity of 20 Ac/AUM to a maximum of 6.2 Ac/AUM.

The Bureau of Land Management, Arizona Strip office, has indicated that $10/AUM based on a 50 cents/pound market was a fair gross return to ranchers of Unit 13 under Bureau allotment management. This meant a total annual gross return of approximately $840,000 to ranchers of Unit 13. However, the market has since dropped to a current figure of about 25 cents/pound.

Based on current markets, the 38,080-acre study areas, if utilized for grazing in their present state, could sustain 1,905 AUMs, which would realize a gross return to the cattle growers of $9,520 at $5/AUM. The total gross for the entire Unit 13 management area, including Jensen Tank, Tuckup Point, and Slide Mountain, would be $429,520. Therefore, the study areas in their present condition could produce 2.2% of the gross income from grazing in Unit 13. Assuming that chaining under BLM management would result in a short-term improvement in grass production in the study areas, there would be an increase to $30,710 in gross income from the study areas compared to an overall potential gross increase to $450,710 from Unit 13. This improvement would result in an increase to 6.8% of the total gross income that might be realized by ranchers in the area if the study areas were chained.

Regardless of the type of range management applied, specific information on long-term improvement in the range and corresponding improved beef production is not known. Therefore, long-range results in terms of actual income based on beef production cannot be assessed at this time.



Chained Area on the Left, Unchained on the Right –
Tuckup Point Area

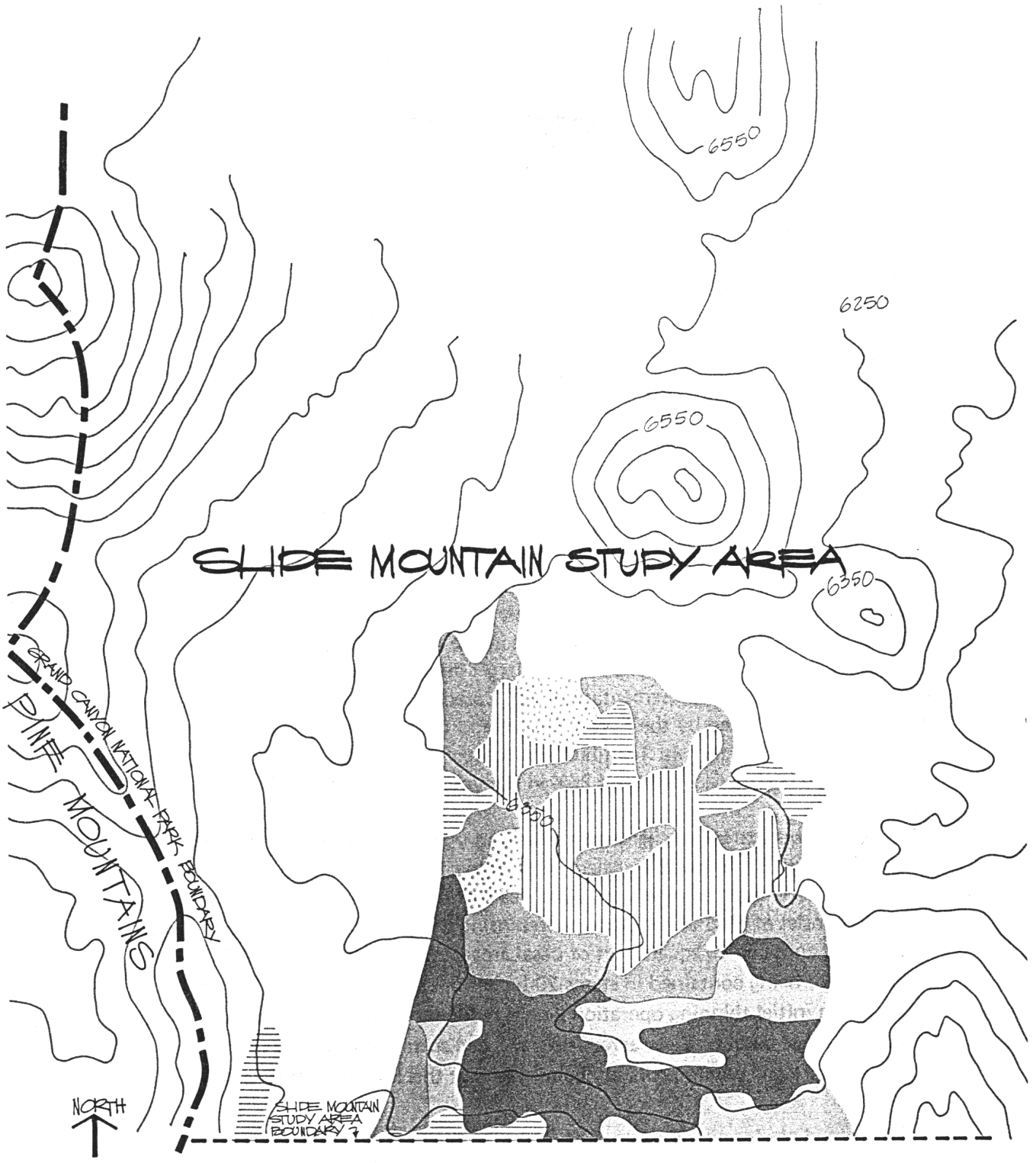
Ponderosa Pine — Slide Mountain

Timber Harvesting

The Resource: The only commercial timber species found on the study areas is ponderosa pine, which occurs only in the Slide Mountain portion of the study areas, where it is surrounded by stands of piñon/juniper forest.

Much of the 285 acres typed as ponderosa is actually mixed in nature. Most of the ponderosa overstory is quite open, with a piñon/juniper understory. Only on the steeper north-facing slopes along the south edge does pine reproduction exist in any appreciable quantity. As the elevation decreases to the west, north, and east, juniper and piñon become more and more prevalent, finally replacing the pine completely. The stand of commercial timber occurs as an isolated pocket that can best be described as extremely marginal.

Existing mature trees average three 16-foot logs per stem, with some four log stems growing on the better sites where soils are deeper. The timber is quite low in quality, being characterized by old age, slow growth, lightning scars, and broken tops. Reproduction of all sizes is sparse over most of the area, and pole stands are limited.



TIMBER RESOURCE

PONDEROSA PINE
GRAND CANYON NATIONAL PARK

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Evaluation: In 1972 the Bureau of Land Management assumed management responsibility of the Mt. Trumbull area from the Forest Service. Cutting is recommended as part of an overall timber management plan for the district to remove primarily high-risk trees. This may be followed by selective thinning operations on a sustained yield basis.

If the 5,300-acre Slide Mountain area were turned over to the Bureau of Land Management, it would most likely be incorporated within the Mt. Trumbull Timber Management District. Slide Mountain by itself could not be economically logged, due to distances to market and the small volume of commercial timber available for harvest (604,100 board feet).

The overmature, decadent nature of the stand is illustrated somewhat by the large volume of standing dead trees in the larger diameter classes. Average age of the mature trees is estimated to be in excess of 200 years. In southwestern ponderosa pine, growth is generally considered to peak at 125 years. On the 43 acres of plots measured, standing mortality averaged 218 board feet per acre. Considerable additional volume is present in the form of fallen snags. Observation of an unusual number of broken tops in larger stems in the southwest quarter of the area indicates a high percentage of rot. Based on these observations as well as information gathered by the Forest Service and the Bureau of Land Management on nearby lands in the Mt. Trumbull area, defect is estimated to be 35% in the mature and overmature pine and 25% in the young thrifty-growing stems.

If the area were to be managed on a sustained yield basis, 70.5% of the timber volume would be removed by selective thinning. This would involve the removal of high-risk trees, most of which are 200+ years of age. The remaining stand (29.5%) would consist of 75% of the stems representing the young vigorous trees. Currently the stand contains 40 square feet of basal area per acre, with about 19.5% of the square feet being contained in stems 20 inches in diameter at breast height and larger. An initial thinning operation would reduce the stand to approximately 20 square feet of basal area per acre. The stand can sustain 40 square feet of basal area per acre and would probably be managed at this level by selective thinning.

The immediate economic return to the United States Treasury would amount to about $19,314 in stumpage based on a harvest of 604,100 board feet. Sustained yield practices would mean a sustained monetary return, but one that is difficult to forecast because of the nature of the rapidly fluctuating timber markets. The removal of 604,100 board feet cannot be considered an economical venture at this time because of the depressed lumber market. Intermediate harvests would be of considerably less volume and would require excellent markets to be considered economically feasible.

The Bureau of Land Management timber management plan for Mt. Trumbull indicates that initially 9.3 million board feet of ponderosa pine would be removed by 1980. In order to demonstrate the economic impact that a timber sale of 604,100 board feet would have on Fredonia and/or Unit 13, net product value serves as a better indicator than does stumpage value. While stumpage income measures those dollars which would be returned to the U.S. Treasury, net product value quantifies the cash flow that would result from the total conversion of the logs to the final product, in this case lumber.

Based on the August 1975 Western Wood Products Association Indices, the average ponderosa pine lumber selling price is currently $189.75 per thousand board feet. This value, therefore, represents the expected return per thousand board feet to a manufacturer including labor and other costs incurred in the logging and manufacturing process. Total economic benefit to the Fredonia area from a 604,100 board-foot timber sale from the Slide Mountain area is projected to be $114,628, based on current market prices. The total potential economic value to be derived from the projected sale on Mt. Trumbull of 9.3 million board feet would be $1,764,675. The combined total would be $1,879,303. A $114,628 timber harvest on Slide Mountain would amount to about 6% of the total projected economic return from Unit 13.

Hunting

The Resource: Hunting is the primary recreational use of lands north of the former monument. Big game hunting draws the largest single group of users to the vicinity. Mt. Trumbull, the Pine Mountains, and generally the Uinkaret Plateau harbor substantial populations of mule deer, the quarry of the majority of hunters. Turkeys were introduced to the area in 1961. Small game and sport animals such as dove, coyote, and rabbit exist in the region but are not actively sought by hunters.

Evaluation: Hunting is a traditional use dating back to man's first habitation of the area. Since the creation of Grand Canyon National Monument in 1932, hunting has been prohibited within the boundary of the monument.

The Bureau of Land Management contends that current National Park Service management of 68,795 acres within the Mt. Trumbull mule deer habitat area, which includes areas in the Pine Mountains, SB Point, and Tuckup Point that are not a part of this study, is detrimental to wildlife production. The Bureau's game management program would include such activities as chaining, prescribed burning, and water tank development to increase deer populations. There is a basic philosophical difference between the National Park Service wildlife management policy, which preserves wildlife as a component of natural ecosystems, and the Bureau's policy of managing game populations for harvest.

If the Slide Mountain area (5,300 acres) were deleted and opened to public hunting, an additional 50 bucks might be harvested. In 1974, 378 deer were harvested in Unit 13, requiring 6,293 hunter-days, or 16.6 hunter-days per deer harvested. This analysis indicates that the 50 deer harvested could add an additional 830 hunter-days in Unit 13. Based on 1974 data, which indicated that each hunter spent about 4.9 days hunting, 170 additional hunters could use Unit 13.

Economically, this could mean that an additional $6,322.47 would be injected annually into the economy of Unit 13. This figure is derived from information provided by the Arizona Game and Fish Department that indicates a hunter spends an average of $7.59 per each day of hunting. The percentage increase of dollars spent would amont to 11.7% of all expenditures generated by hunting in Unit 13. However, even though hunter-days would increase in the area, most of the economic benefit would not accrue to Unit 13 because most of the hunters come from populated areas in southern Arizona and bring most of their supplies with them. This is also true of the 16% of the hunters using Unit 13 who are nonresident.

Turkey hunting in 1974 amounted to 41 hunter-days with a harvest of 10 birds. Adequate data has not been collected by either the Bureau of Land Management or the Arizona Game and Fish Department upon which to base projections of possible impacts of the Bureau's management of the study areas in terms of dollar value from turkey hunting.

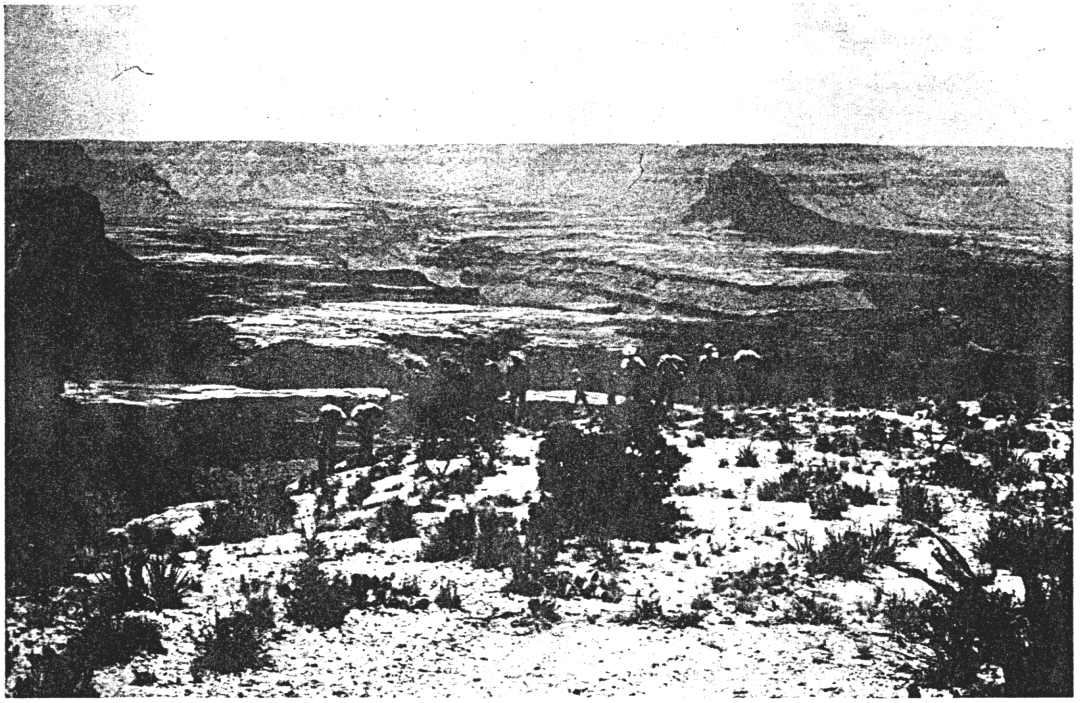
Mining

The Resource: The study area does not contain known deposits of commercial minerals.

Evaluation: The likelihood of any mineral discovery in any of the three study areas is nil due to the Kaibab upwarp, which tilts downward to the north with a downward trend to the west. For the same reason oil and gas are not found on the southern extremities of this uplift. The Bureau of Land Management has identified an east-west line about 10 miles north of the park boundary north of which oil and gas might be expected to occur.

There is no recorded evidence of mineral or oil and gas exploration on the Kanab Plateau lands or in the Slide Mountain area; nor has there been any mining. Therefore, the economic impact of continuing the prohibition of mining and mineral exploration in the study areas is zero. The one possible exception would be the use of cinders from volcanic cones for road surfacing materials. However, there is an abundance of this material that is much more easily accessible to the north of the park boundary.

CONCLUSION



The Grand Canyon from Tuckup

The analysis of the resources contained within the study areas clearly establishes that the lands known as Tuckup Point, Slide Mountain, and Jensen Tank are suitable to continue to be used for park purposes and that the public interest is best served by the retention of these lands within Grand Canyon National Park. This conclusion is based upon the following:

> The archeological resources contained in these areas are nationally significant in that they possess exceptional value for interpreting the archeological heritage of our nation. Within these resources may lie the clues to solutions to many unresolved archeological research problems encountered in other parts of the Southwest. Data should eventually come from these areas that will also improve existing knowledge of the transition from a hunting and gathering life to a sedentary pattern that occurred 2,000 years ago, and offer new information about the end of the agricultural era and the return of the area to later-day hunters and gatherers. Accumulation of data may reverse current theories on the movement of prehistoric peoples and make it necessary to rewrite significant portions of the prehistory of the upper Southwest.

The ancestral drainage patterns in the Jensen Tank and Tuckup Point areas may be nationally significant in providing important scientific information leading to a better understanding of the formation of the Grand Canyon. At a minimum, they should be protected from alteration as a source of scientific information.

While the biological communities are not evaluated as nationally significant, they support the integrity of the nationally significant features of the Grand Canyon in providing the ecological context necessary for a Gestalt interpretation and appreciation of the Grand Canyon. They are also important as scientific control areas that provide baseline ecological information for evaluating changes in similar environments that are subject to manipulative management practices. Further, they are important for the study of the relationship of the environment to prehistoric cultures. The preservation of biotic communities associated with important archeological resources provides information that allows a more complete analysis of cultural resources.

The scenic qualities of the three areas lend diversity to the viewing experience available throughout the park and contribute to the sense of spaciousness that is essential to a national park. They provide a distinct canyon experience that is not available elsewhere in the Grand Canyon. Deletion of these lands would impair the quality of this experience.

The benefits to the local economy that could be derived from these areas, if deleted, are marginal at best. Chaining of the entire 38,080 acres would increase the annual grazing income to the cattle ranchers on these lands to $30,710 per year, or 6.8% of the gross grazing income produced from Game Management Unit 13. Without chaining, income from these lands would only be $9,520 per year, or 2.2% of the gross grazing income from Unit 13. An initial timber harvest in the study areas, as part of a total management plan, would yield a total economic benefit of $114,628, or 6% of the potential gross initial timber harvest for the entire unit. Subsequent annual sustained yield harvests would be considerably less. Hunting in the study areas might generate an additional $6,322.47, or 11.7% of the gross hunting income from Unit 13. However, most of the hunters are self-sufficient and little, if any, of this income can be expected to remain in the area.

Deletion of the study areas would reduce the remaining plateau lands to an unmanageable fragment; increase the problem of cattle trespass and the maintenance of the integrity of the area; and increase the administrative costs to the National Park Service.

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SELECTED REFERENCES

DAVIS, W.M.

1901 "An Excursion to the Grand Canyon of the Colorado." *Harvard University Museum of Comparative Zoology Bulletin,* Vol. 38, pp. 107-201.

HEWITT, C.H.

1967 *The Wild Turkey and Its Management.* Washington, D.C.: The Wildlife Society.

HOFFMEISTER, D.F.

1971 *Mammals of Grand Canyon.* Urbana, IL: University of Illinois Press.

KEARNEY, T.H., AND R.H. PEEBLES

1960 *Arizona Flora.* Berkeley, CA: University of California Press.

KOONS, E.D.

1945 "Geology of the Uinkaret Plateau, Northern Arizona." *Bulletin of the Geological Society of America,* Vol. 56, pp. 151-160.

LOWE, C.H.

1964 *Arizona's Natural Environment.* Tucson, AR: University of Arizona Press.

McCULLOCH, C.Y.

1973 *Control of Pinyon-Juniper as a Deer Management Measure in Arizona.* Arizona Game and Fish Department Final Report, Project No. W-78-R. Phoenix, AR.

McKEE, E.D.

1938 *The Environment and History of the Toroweap and Kaibab Formations of Northern Arizona and Southern Arizona.* Carnegie Institute Publication, No. 492. Washington, D.C.

1967 *Evaluation of the Colorado River in Arizona.* Flagstaff, AR: Museum of Northern Arizona.

McKEE, E.D., AND W.J. BREED
1969 "The Toroweap Formation and Kaibab Limestone in San Andres Limestone and its Correlatives." *New Mexico Geological Society Symposium,* No. 3.

PIKE, D.G.
1974 *Anasazi, Ancient People of the Rock.* Palo Alto, CA: American West Publishing Company.

TAYLOR, W.P.
1956 *The Deer of North America.* Washington, D.C.: The Wildlife Management Institute.

THOMPSON, R.A.
1970 *Prehistoric Settlement in the Grand Canyon National Monument.* Southern Utah State College Faculty Research Series, No. 1. Cedar City, UT.

1971 "Prehistoric Settlement in the Grand Canyon National Monument." *Plateau,* Vol. 44, No. 2, pp. 67-71.

U.S. DEPARTMENT OF THE INTERIOR, GEOLOGICAL SURVEY
1882 *The Tertiary History of the Grand Canyon District,* by C.E. Dutton. USGS Monograph, No. 2.

1969 *Geologic History of the Colorado River,* By C.B. Hunt. USGS Paper, No. 699. Washington, D.C.: U.S. Government Printing Office.

U.S. DEPARTMENT OF THE INTERIOR, NATIONAL PARK SERVICE
1972 *Criteria for Parklands.* Harpers Ferry, WV: Harpers Ferry Center.

1975 "A Projection of Archeological Site Densities in the Slide Mountain, Tuckup Point, and Jensen Tank Areas of the Grand Canyon National Park," by R.A. Thompson. File Report, Grand Canyon National Park.

1975 *Grand Canyon National Park Master Plan* (Draft). San Francisco, CA: Western Regional Office.

1975 "Timber Survey for Slide Mountain, Grand Canyon National Park," by T.S. Koenig. File Report, Denver Service Center.

WILLEY, G.R.
1966 *North and Middle America.* An Introduction to American Archeology, Vol. 1. Englewood Cliffs, NJ: Prentice-Hall, Inc.

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