

general management plan  
development concept plan

# CHACO CULTURE

NATIONAL HISTORICAL PARK / NEW MEXICO



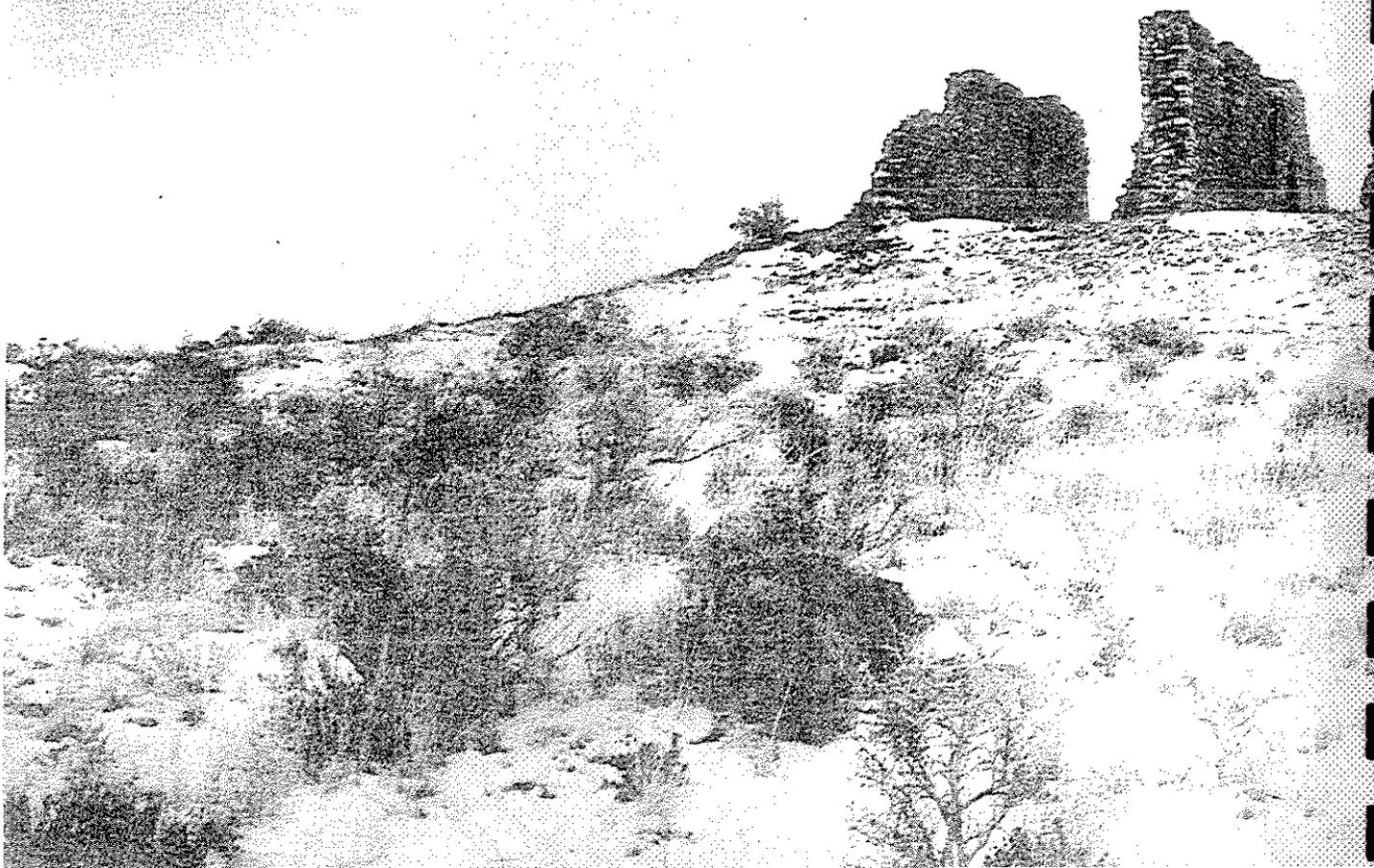


Chaco Canyon's concentration of ancient ruins have long attracted visitors to this remote, hard-to-reach unit of the national park system. Unfortunately, these seemingly isolated, impressive ruins have unintentionally obscured the larger story of the Chaco culture. The Chaco story is much greater than the canyon itself, although Pueblo Bonito and other major ruins seem to suggest otherwise. Nonetheless, the canyon is the logical starting place — the place to gain an understanding of the obvious before moving toward the more abstract elements of this complex story, now popularly referred to as the Chaco phenomenon. This move to the abstract — an understanding of the Chaco phenomenon — provides the focus for all elements of the park's interpretive program, and it highlights the need for personalized interpretation. The opportunity to probe for answers by asking questions will permit visitors to grasp the numerous theories and concepts associated with the evolution of this prehistoric culture. The interpretive objective will be achieved when visitors leave knowing that the canyon is but one important piece of a much larger puzzle. The fact that there are more questions than answers will suggest that the puzzle is not yet complete.

Until recently, modern society has all but bypassed the San Juan Basin — the Chacoan homeland. This fact should receive more than casual mention because so much of the park's character is a product of the vast, sparsely inhabited landscape that surrounds the canyon. The isolation, remoteness, and unobstructed views, broken only occasionally by livestock, hogans, windmills, and dirt roads, are very much part of the mystique that is Chaco. This perception of an almost forgotten landscape has done much to enhance the visitor experience and has served to romanticize the canyon and its ruins for people who make the journey to this remote outpost.

However, what has been may soon change. Our needs for energy may soon necessitate changes in the landscape that surrounds the canyon. Energy development, more people, and a paved highway are all possibilities that may combine at any moment, bringing Chaco into full swing with the energy boom and into the mainstream of National Park Service visitation.

In 1980 Congress asked public and private interests to work together "to provide for development in the San Juan Basin in a manner compatible with preservation" of its many prehistoric resources. Although such efforts are already being made, it seems inevitable that the regional landscape will change significantly in the future. It is therefore incumbent upon the National Park Service not only to protect the archeological values of lands within the park but also to preserve a remnant portion of the landscape that is directly visible from the canyon and contributes so much to the Chaco experience. This challenge will require diligence to guarantee continuation of the values for which the park was established and of the element of fascination that enhances perceptions of Chaco. The future may soon exert its pressure. The final limits and boundaries of man's impact must now be defined.

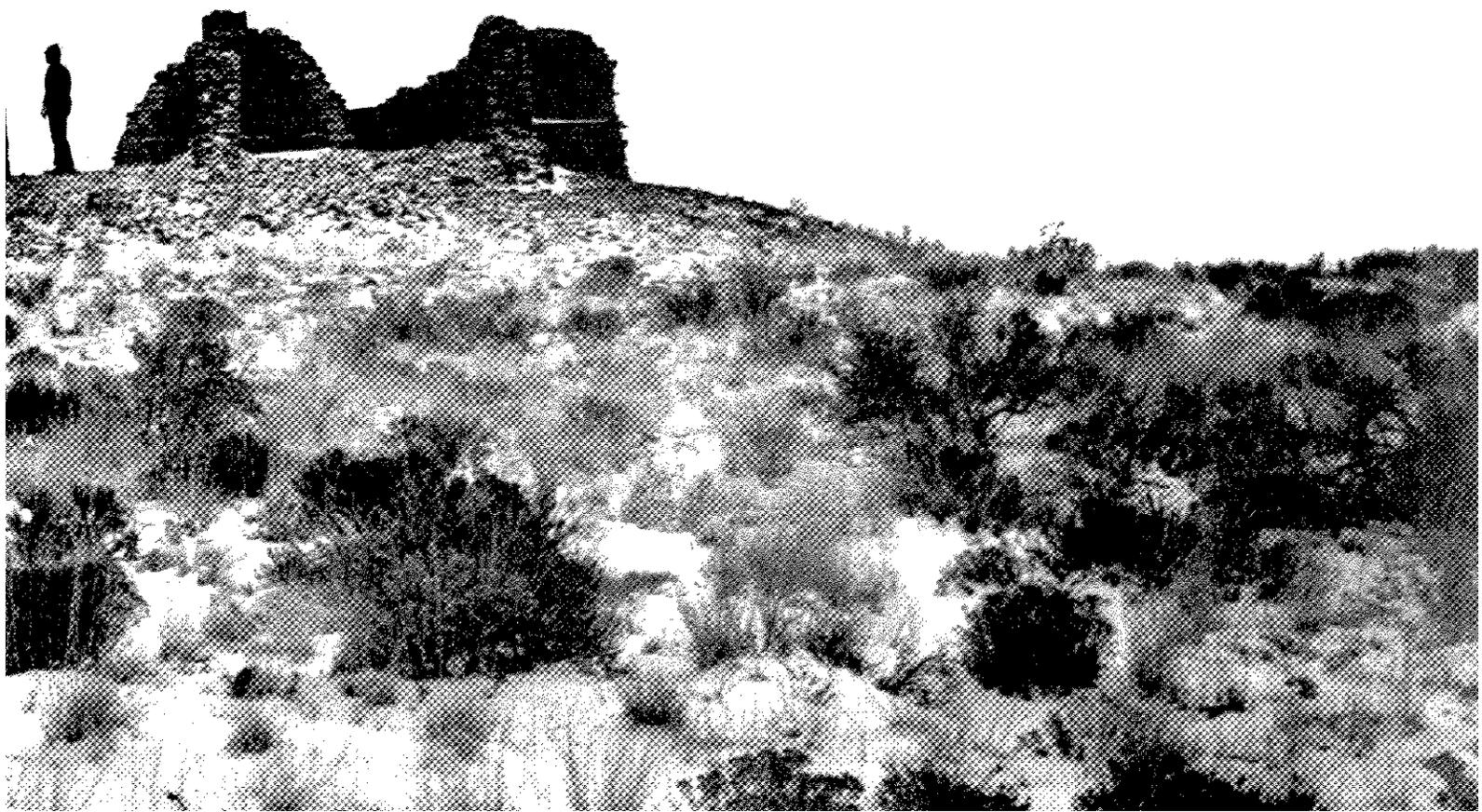


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General Management Plan / Development Concept Plan  
Chaco Culture National Historical Park / New Mexico  
United States Department of the Interior / National Park Service

Recommended:	Robert Budz, Acting Team Manager	September 18, 1985
Recommended:	Tom Vaughan, Superintendent	September 18, 1985
Approved:	Robert Kerr, Regional Director	September 20, 1985

See FONSI in appendix B for decision rationale



## SUMMARY

This document contains a general management plan/development concept plan (GMP/DCP) for the recently enlarged Chaco Culture National Historical Park. The GMP/DCP revises and updates a GMP approved in 1979, and many of the concepts in the earlier plan have been carried forward. The current GMP provides a general strategy for managing lands within the expanded boundary. It includes an analysis of critical resource values and an overall management zoning concept. Land protection proposals are summarized in the GMP and described on a tract-by-tract basis in the Land Protection Plan that is being circulated concurrently. Other GMP and DCP proposals include establishment of markers along the newly authorized boundary by agreement with current landowners; an improved interpretive program to provide opportunities for greater personal contact between visitors and interpretive staff; a regulated access system in the primary ruins area during peak periods; relocation of the campgrounds to provide a more desirable camping setting above the 100-year floodplain; continued monitoring of activities near the park to reduce their impacts on park resources; an increase in the ruins maintenance program and limited backfilling of excavated rooms to bring stabilization up to an acceptable standard; and renovation or development of utility, waste disposal, and communication systems. The proposals are expected to have few adverse impacts on cultural and natural resources. Impacts on resources within the newly expanded boundary will be minimized primarily through land exchanges, existing regulations, and cooperative agreements. No impacts on endangered species, floodplains, or wetlands are anticipated. Impacts on the local economy may result because mineral activity will be largely excluded, but the extent of these impacts is unknown because the recently authorized addition lands have not been thoroughly investigated for mineral resources. The GMP/DCP will guide management and use of the park for the next 10 to 15 years.

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## INTRODUCTION

The San Juan Basin in northwestern New Mexico is an area of major significance in the cultural history of North America. Chaco Culture National Historical Park, lying near the center of this region, contains spectacular archeological remains of the native American past, which have long been recognized as representing an architectural peak in Anasazi Indian prehistory.

The park was originally designated as a national monument in 1907 to preserve "extensive prehistoric communal or pueblo ruins . . . of extraordinary interest because of their number and their great size and because of the innumerable and valuable relics of a prehistoric people which they contain." At that time numerous archeological sites were known outside the boundary, although their relationship to Chaco Canyon was unclear. Over the years increasing numbers of such sites were documented and studied to determine their place in the prehistoric system. In the late 1920s the boundaries of the monument were enlarged to include additional ruins ascertained to be of Chacoan Anasazi affiliation.

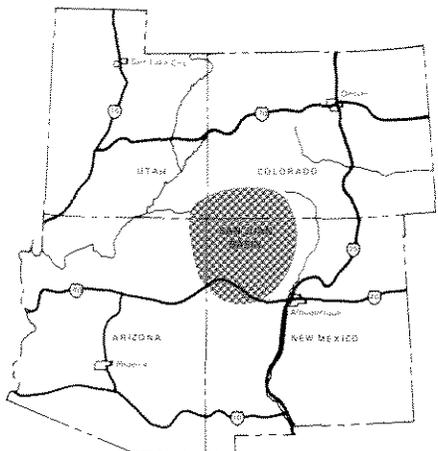
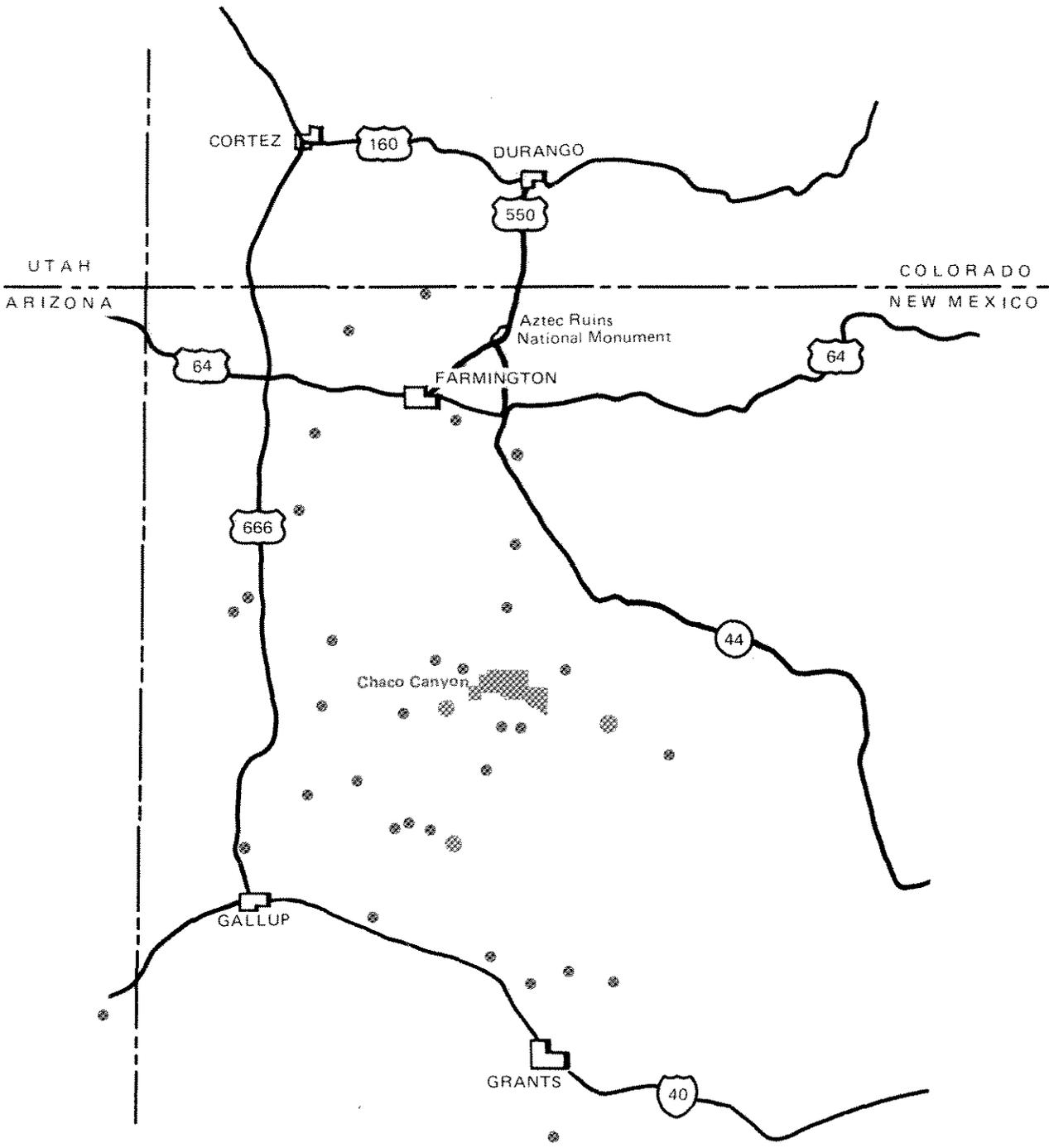
During the next 50 years research within and surrounding Chaco Canyon continued. Characteristics unique to the Chacoan culture were identified, and many more sites lying outside the monument boundary were determined to be part of this culture. The extent of the system also became increasingly apparent, as Chacoan sites were identified as far as 100 miles from the canyon proper.

As research and discoveries verified the extent of the prehistoric Chacoan system, the need to protect areas adjacent to the monument as well as the outlying sites became increasingly evident. Recognizing the potential for conflicts between resource preservation and energy exploration and development, on December 19, 1980, Congress passed title V of PL 96-550 to direct activities pertaining to Chacoan resources in the San Juan Basin (see appendix A). The primary purpose under title V was to provide for the preservation, protection, research, and interpretation of the Chacoan system by

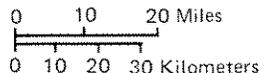
enlarging the monument boundaries by approximately 13,000 acres (5,260 ha) and renaming the monument Chaco Culture National Historical Park

authorizing a system of 33 archeological protection sites, totaling approximately 9,000 acres (3,642 ha), that have been identified as part of the Chacoan system, and providing for the addition of other sites that may be discovered (outliers designated by PL 96-550 are not administered by the National Park Service; they are hereafter referred to as "protection sites")

authorizing the preparation of a joint management plan (JMP) for the protection sites and a general management plan (GMP) for the park



-  CHACO CULTURE NATIONAL HISTORICAL PARK
-  DESIGNATED PROTECTION SITE  
(Not Administrated by National Park Service)



## REGION

CHACO CULTURE NATIONAL HISTORICAL PARK  
 UNITED STATES DEPARTMENT OF THE INTERIOR  
 NATIONAL PARK SERVICE

for the identification, research, and protection of Chacoan cultural resources

authorizing a continuing program of archeological research in the San Juan Basin

In implementing these and other provisions of the law, Congress called for continued cooperation among the public and private entities with interests in the area to achieve coordinated preservation, research, and development efforts throughout the San Juan Basin.

In response to PL 96-550 an interagency management group (IMG) was established in early 1981 to coordinate planning and management activities pertaining to the park and protection sites. This group includes representatives from agencies and tribes having jurisdiction over or interest in lands preserving significant remains of the Chacoan culture--the Bureau of Land Management, Bureau of Indian Affairs, state of New Mexico, Navajo tribe, National Park Service, and Forest Service. During 1981 and 1982 the IMG served in an advisory capacity, directing the preparation of the joint management plan called for in the 1980 legislation. That document, which was released for public review in February 1983 and approved in July 1983, provides guidelines and recommendations for the protection of the designated protection sites and any newly discovered Chacoan sites. More important, the joint management plan recognizes these widespread and isolated sites as representing a unified cultural system, and it provides a strategy for coordinated management by the several administering agencies and tribes.

In 1982 the National Park Service began preparation of the second document called for in PL 96-550--the general management plan for Chaco Culture National Historical Park. This effort began with a survey and evaluation of the lands included in the newly expanded boundary (hereafter referred to as "addition lands"). These addition lands lie generally to the north, southeast, south, and west of the old monument--the core canyon and adjacent mesas--and are important not only because they contain archeological resources but also because they protect significant park views and watersheds. Planning was also directed toward incorporating new knowledge of the Chacoan culture. The designation of the protection sites and the addition of lands to the park has given formal recognition to the "Chaco phenomenon," requiring new programs and services to broaden visitor understanding of the magnitude and extent of this culture.

This document represents the final stage in general management planning. It describes the proposed course of action for management and use of Chaco Culture National Historical Park for the next 10-15 years. In developing this document, the views of other federal, state, local, and tribal agencies, private organizations, and individuals were sought in a series of meetings held in Farmington, Crownpoint, and Albuquerque during March of 1983. Based on public comments and subsequent planning and management discussions, the Draft General Management Plan/Development Concept Plan/Environmental Assessment was prepared.

That document included a description and evaluation of the proposed course of action (general management plan) as well as alternatives for the major proposals of the plan. The draft document was released for public and agency review in October 1984, and a public meeting was held in Albuquerque on November 1, 1984, to receive comments. The majority response was in favor of the general management plan proposals as described in the draft document.

Also during the fall of 1984, meetings were held with federal, state, and local agencies, the Navajo tribe, energy companies, and individuals to review the major land management and protection proposals described in the Draft Land Protection Plan, Chaco Culture National Historical Park. Certain changes, primarily involving land protection methods, were recommended as a result of the meetings, and those changes are reflected in this General Management Plan/Development Concept Plan. A "Finding of No Significant Impact" (FONSI) has been prepared and published, which documents the revisions to the two draft documents and provides the rationale for the decision not to prepare an environmental impact statement. The FONSI is reproduced in this document as appendix B.

## PURPOSE OF AND NEED FOR THE PLAN

The 1980 legislation for Chaco stated that the monument was to be expanded and renamed to "recognize the unique archeological resources associated with the prehistoric Chacoan culture in the San Juan Basin; to provide for the preservation and interpretation of these resources; and to facilitate research activities associated with these resources." The purpose of this document is to fulfill the intent of PL 96-550, to incorporate proposals for the newly authorized lands, and to coordinate planning for the park with the efforts of other agencies and groups administering Chacoan sites throughout the San Juan Basin.

Several issues have been critical in planning for the park. First, and most important, most of the addition lands are in other than federal ownership and contain outstanding rights. Traditional grazing and more recent mineral exploration and development are occurring both within and adjacent to the expanded boundary. An estimated 30 energy companies are currently exploring the area; oil production is taking place at a well within 2 miles (3.2 km) of the park; and uranium is being mined adjacent to one of the detached park units. Plans for Chaco Culture National Historical Park include decisions on how best to ensure protection of the significant cultural values of these lands while recognizing traditional native American uses and current energy requirements.

A factor affecting both resource management and visitor use at the park is the potential upgrading of the 30-mile (48-km) northern access road into Chaco Canyon. At present this dirt road (New Mexico 57) is impassable to all but four-wheel-drive vehicles following even mild rains or snows. Upgrading it to an all-weather road will provide a consistently reliable means of access. This fact, together with regional population growth, proposed development adjacent to the park, and recent publicity concerning Chaco, will likely result in visitation increases in the future. Because both the prehistoric resources and the park's isolated setting could be threatened--also diminishing interpretive experiences--techniques for handling increases in visitation are addressed in the plan.

Current preservation of the major stabilized ruins within the park is not commensurate with National Park Service standards, and the maintenance involved in bringing this work up to standard is enormous. The plan describes ways to ensure adequate preservation of the ruins while reducing the costs and manpower involved in stabilization efforts.

Several threats to cultural and natural resources have been identified. As archeological sites and other cultural features become more accessible to the public, the possibility of vandalism, illicit excavation, and theft increases. Population growth and mineral activities could result in a number of indirect impacts: increased air pollution, oil/saltwater/acid spills or other contamination of surface and groundwater resources, accelerated erosion, and visual intrusions. The plan calls for continued NPS cooperation in monitoring and mitigating adverse impacts outside the boundary.

The existing campground in Chaco Canyon is within the 100-year floodplain of Gallo Wash. Traffic on the adjacent entrance road is a visual and noise intrusion. To reduce potential safety hazards and improve camping experiences, a new campground location is proposed.

The park's utility systems (water/wastewater, electrical, landfill, and communications) are inadequate to serve existing visitor and staff needs. To correct these deficiencies and provide for present and probable increases in visitor use, these systems are recommended for upgrading or replacement.

Details of the general management plan proposals and specific measures for solving problems facing the park are presented in "The Plan" section of this document.

## DESCRIPTION OF THE PARK

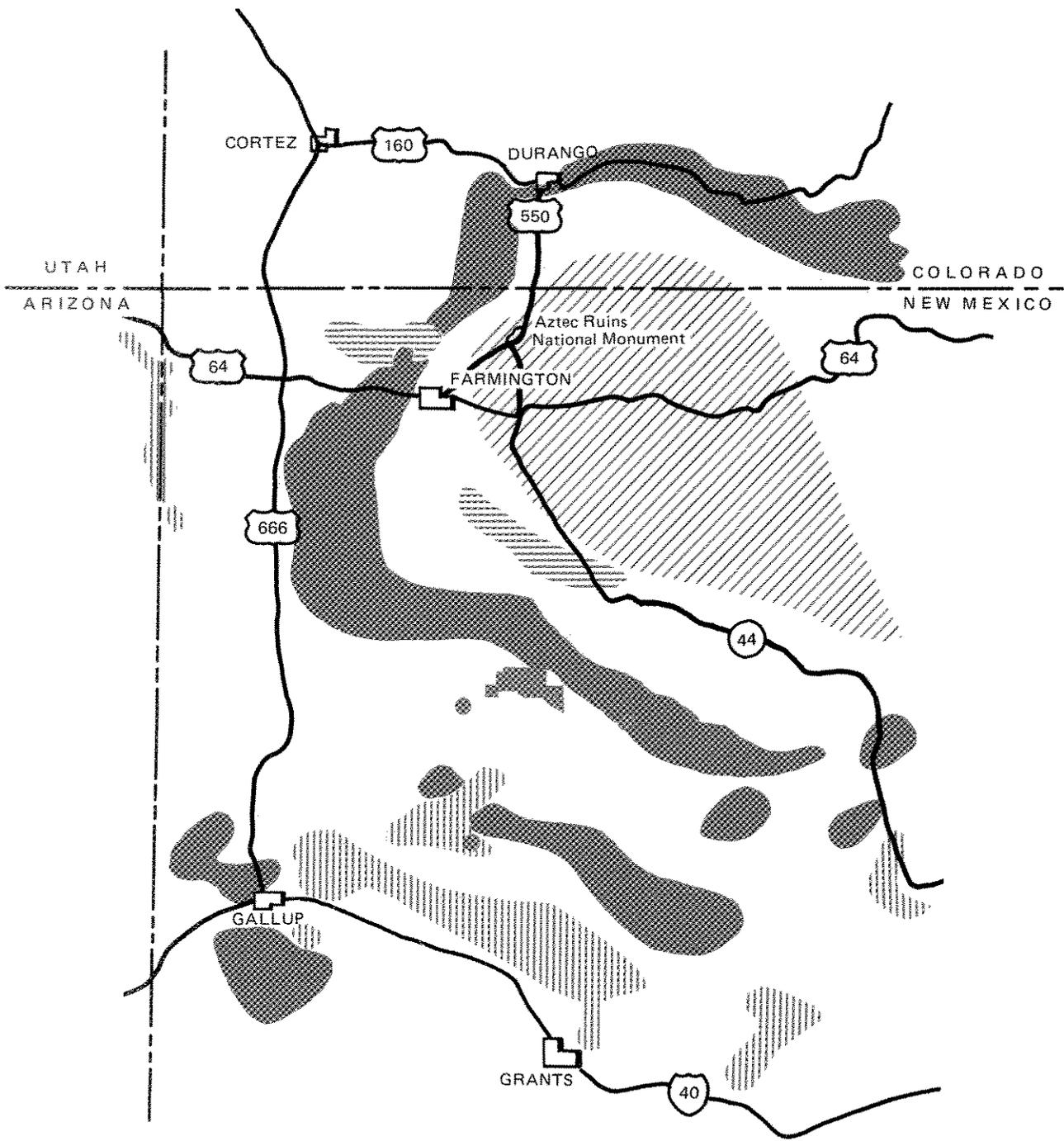
### REGIONAL SETTING

The San Juan Basin is generally a semiarid region of mesas, volcanic remnants, canyons, cliffs, plains, and badlands; there are few forests, flowing streams, or rivers. Beneath the basin's sandy soil lie vast reserves of uranium, natural gas, oil, and coal, which are important for the future energy needs of the country. These deposits, trapped in specific layers of sedimentary rocks, are distributed throughout the basin (see Regional Energy Resources map). Atop the mineral reserves are the area's other significant resources, including numerous archeological remains from the Chacoan culture.

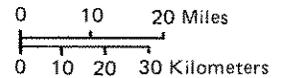
The regional environment varies from wooded uplands to barren, dry, and wind-scoured saltbush plains. There are two dominant vegetation types: pinyon/juniper woodland and grassland/shrubland, generally referred to as desert scrub. Numerous grasses and forbs are part of the more common desert scrub community, including Indian ricegrass, which was harvested and eaten by the Anasazi, and Russian thistle, an invader of disturbed sites and an indicator of the changes wrought by time and human impact. Wildlife in the basin is not abundant. Human predation and over 100 years of competition with domesticated animals have drastically altered and reduced historical wildlife populations to the point that they reflect little of what was present during Anasazi times.

The region is a generally isolated rural area where subsistence grazing is the most common land use, native Americans (primarily Navajo) make up the majority of the residents, population densities and incomes are low, and unemployment is high. However, the entire region is experiencing activities associated with the development of energy resources. Coal, uranium, natural gas, crude oil, and geothermal steam are either being developed or explored and mapped for future development. Active uranium mining and milling is taking place in the southern part of the basin near Crownpoint, large coal strip mines are operating in the northwestern portion, and producing natural gas and oil fields have been located in the northeast. Power plants, railroads, and associated facilities are also planned (see Vicinity map).

From a landownership standpoint, the basin is one of the most complex regions in the country, especially in the "checkerboard" area where a mixture of federal, state, Indian, and private land exists. This area is generally east and south of the Navajo Reservation. Much of the region is in multiple ownership, with federal, state, private, and/or Indian interests. The status of Indian lands is further complicated by a number of subcategories, including tribal trust, allotted, and tribal fee lands. Allotted lands frequently involve complex title chains, with 10-50 people having interests in the land. In addition, the combination of surface and subsurface ownerships sometimes creates overlapping and undefined property rights and jurisdictions.



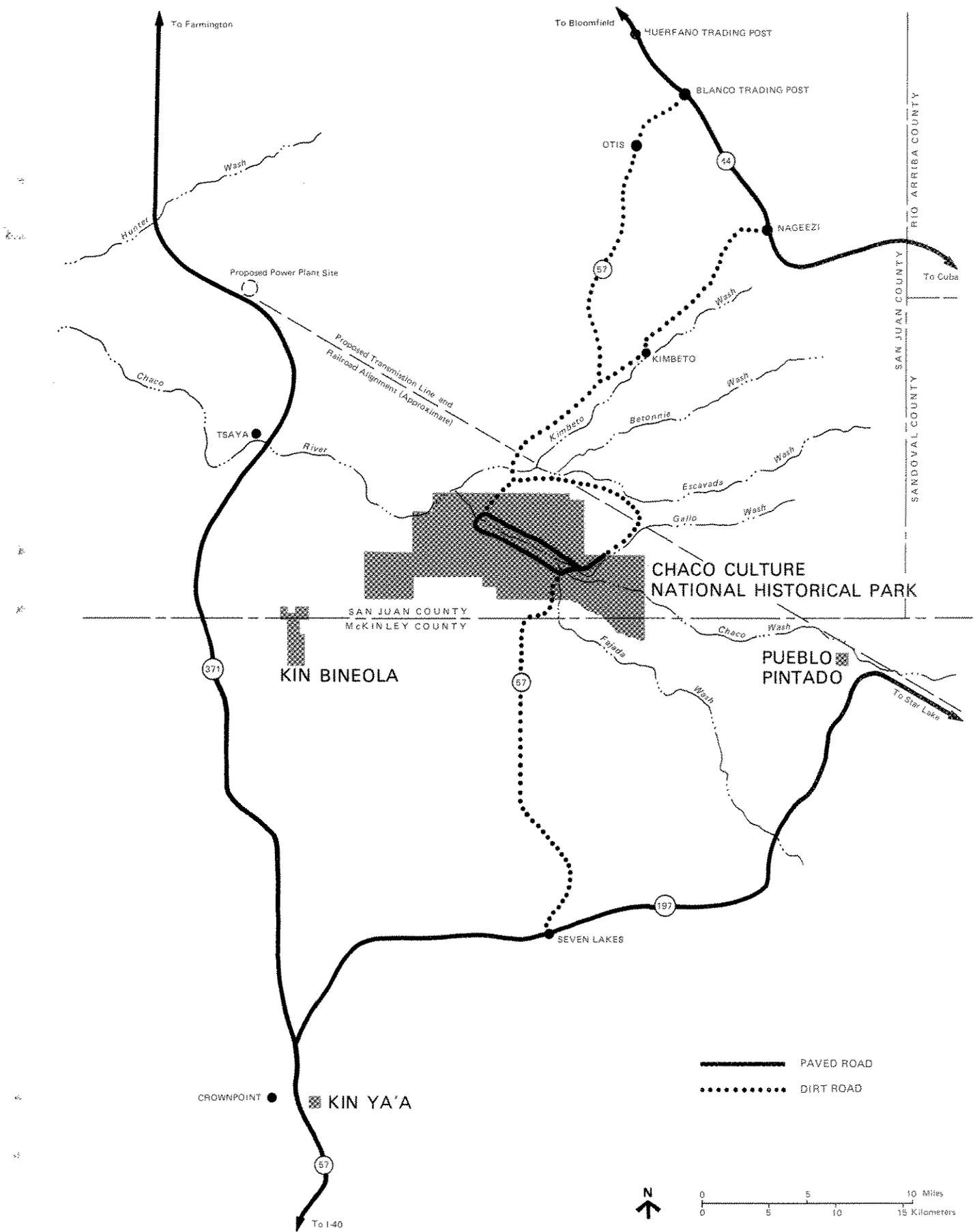
NOTE: The areas shown represent a generalized scheme of current high interest lands for given resources, as represented either by leasing or development activity. As exploration continues and new data is uncovered in the basin, many of these resource zones may expand.



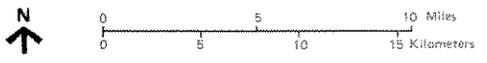
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-  COAL
-  URANIUM
-  NATURAL GAS
-  OIL

# REGIONAL ENERGY RESOURCES

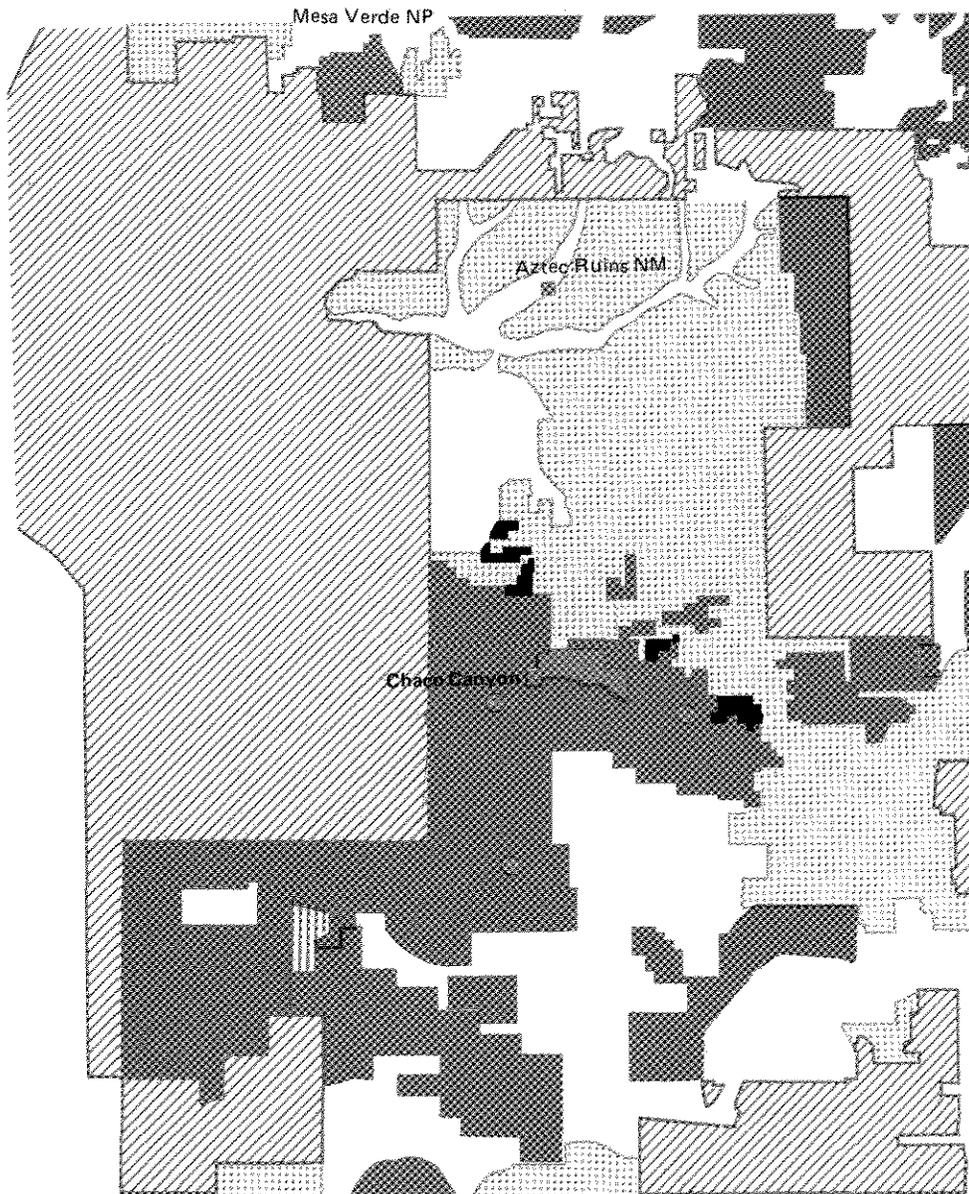
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NATIONAL PARK SERVICE



 PAVED ROAD  
 DIRT ROAD



**VICINITY**  
**CHACO CULTURE NATIONAL HISTORICAL PARK**  
 UNITED STATES DEPARTMENT OF THE INTERIOR / NATIONAL PARK SERVICE



-  CHECKERBOARD (Primarily Private)
-  CHECKERBOARD (Primarily BLM)
-  CHECKERBOARD (Primarily Navajo)
-  NATIONAL PARK
-  NATIONAL FOREST
-  INDIAN RESERVATION
-  STATE
-  MILITARY AND NRC



0 10 20 Miles  
 0 10 20 30 Kilometers

# REGIONAL LAND STATUS

CHACO CULTURE NATIONAL HISTORICAL PARK  
 UNITED STATES DEPARTMENT OF THE INTERIOR  
 NATIONAL PARK SERVICE

Jurisdictional authority is as complex as ownership patterns. On the federal level, two agencies have primary land administration responsibilities (Bureau of Land Management and Bureau of Indian Affairs), while others have lease, license, or permitting responsibilities (Office of Surface Mining, Bureau of Land Management, Environmental Protection Agency, and others). In addition, tribal, state, county, and municipal governments have certain jurisdictional responsibilities. Much of the region is under the jurisdiction of the BIA and the Navajo tribal government. There is no county zoning in the area around the park.

With the exception of the Kin Ya'a detached unit, which is being developed for uranium leach mining, the immediate vicinity of Chaco Culture National Historical Park has not yet been subjected to intensive development. However, coal strip mining, a railroad line, and power transmission lines have been proposed just north of the park boundary. An oil well is producing within 2 miles (3.2 km) of the boundary, and a power plant is proposed just 15 miles (24 km) northwest of the park. Additional oil and gas activity may occur when the market rebounds. Uranium development activity may move closer if that market also recovers.

Navajo graze sheep, cattle, and horses year-round on lands in and near the park, including many of the additional lands. Scattered parcels of federal land are under BIA grazing allotments. There is a small community of Navajo living just north of the park who graze small flocks of sheep and goats in the area that includes much of the northern addition. Federal lands used by these people are under a BLM grazing allotment. Lands south of the park are private Navajo ranches. Some local residents also derive income through employment at the park.

## PARK ENVIRONMENT

### Overview

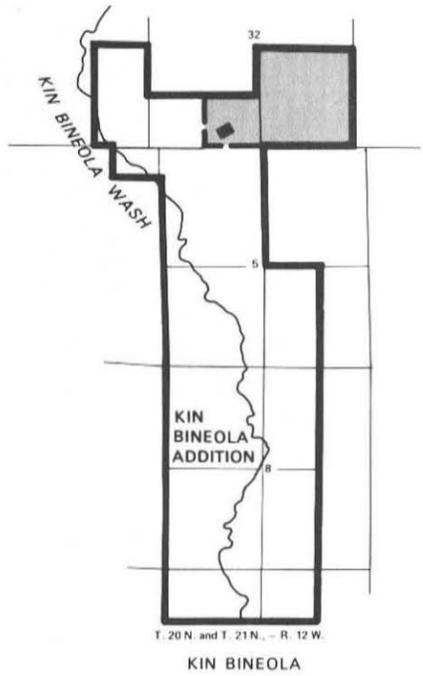
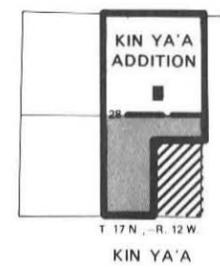
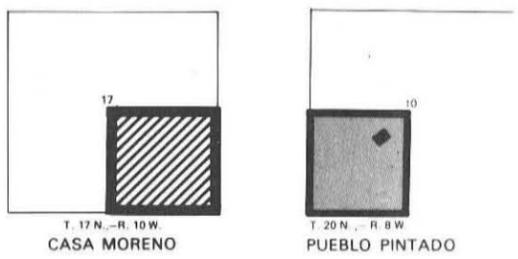
When Congress designated Chaco Culture National Historical Park, it expanded the boundary to include lands on the periphery of the former monument or contiguous to the detached units (see the Boundary map). The 34,000 acres (13,760 ha) now included within the park embrace 12 linear miles (19 km) of Chaco Canyon, a shallow, sandstone-walled canyon drained by the ephemeral Chaco Wash. The grassland/shrubland-covered alluvial bottom of the canyon is bounded by cliffs and slickrock benches on both the north and south. The cliffs rise to gently sloping mesa tops covered by shallow loess soils, scattered shrubs, and occasional pinyon and juniper. Several major side canyons and two gaps in South Mesa provide natural entry points to the canyon. In the southeast portion of the park, the mesa area includes deep, sheer-walled side canyons and rugged, pinyon/juniper-covered mesa slopes. The canyon proper preserves thousands of archeological sites, including most of the more spectacular ruins that prompted the area's designation as a national monument.

As seen on the Boundary map, the park additions are to the north, southeast, south, and west of the canyon and adjacent to two detached park units. The northern park addition, about 2,480 acres (1,003 ha), preserves approximately 150 known archeological sites, including several prehistoric roads. It also includes portions of the watersheds of several small tributary drainages that flow into the main canyon. The southeast, or Chacra Mesa, addition, covering about 3,320 acres (1,345 ha), includes some 500 Anasazi, historic Navajo, and possible late Archaic sites. The northern portion of this rugged canyon-and-cliff scarred mesa is visible throughout the eastern portion of the park, and the mesa drains into the canyon. The south addition, totaling about 4,640 acres (1,878 ha), includes a variety of Anasazi and Navajo remains (about 300 sites) on South and West mesas. Portions of this area are visible from the major Chaco ruins, and its tributaries also drain into the canyon. The western, or Kin Klizhin, addition (about 1,280 a, or 518 ha) surrounds and ties the previously detached Kin Klizhin unit to the main body of the park. It contains numerous highly significant Anasazi sites (145 known) associated with the Kin Klizhin outlier, in particular the remains of a large and complex irrigation system.

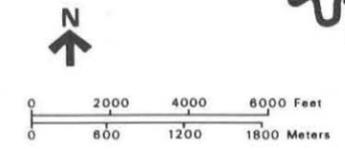
At the detached Kin Bineola park unit, 1,120 acres (435 ha) have been added to preserve important Anasazi sites (approximately 150) and prehistoric irrigation works associated with this very large Chacoan outlier. At the detached Kin Ya'a unit, 160 acres (65 ha) have been added to include the impressive Kin Ya'a ruin with its free-standing tower kiva, numerous surrounding Anasazi sites (approximately 50), and a prehistoric road. This addition corrects previous survey and legal description errors, which excluded the major ruins and included areas with few or no significant archeological resources. Sixty acres of the previously designated detached unit were deleted to correct these errors. Finally, the detached Casa Moreno park unit (160 a, or 65 ha) and a 160-acre unit east of Pueblo Pintado were also deleted to correct previous errors that had resulted in designated areas without archeological values.

The National Park Service is currently working with the Bureau of Land Management to effect a transfer of land from BLM to the Park Service. The transfer involves approximately 25 acres (10 ha) of land in the southeast quarter of section 10, T20N, R8W. Transfer of this acreage will expand the eastern boundary of Pueblo Pintado, a Park Service administered Chacoan outlier, and will aid both preservation and interpretation of this outlier by including a segment of prehistoric road, a multistory house, four small houses, and a quarry site (see the Boundary map).

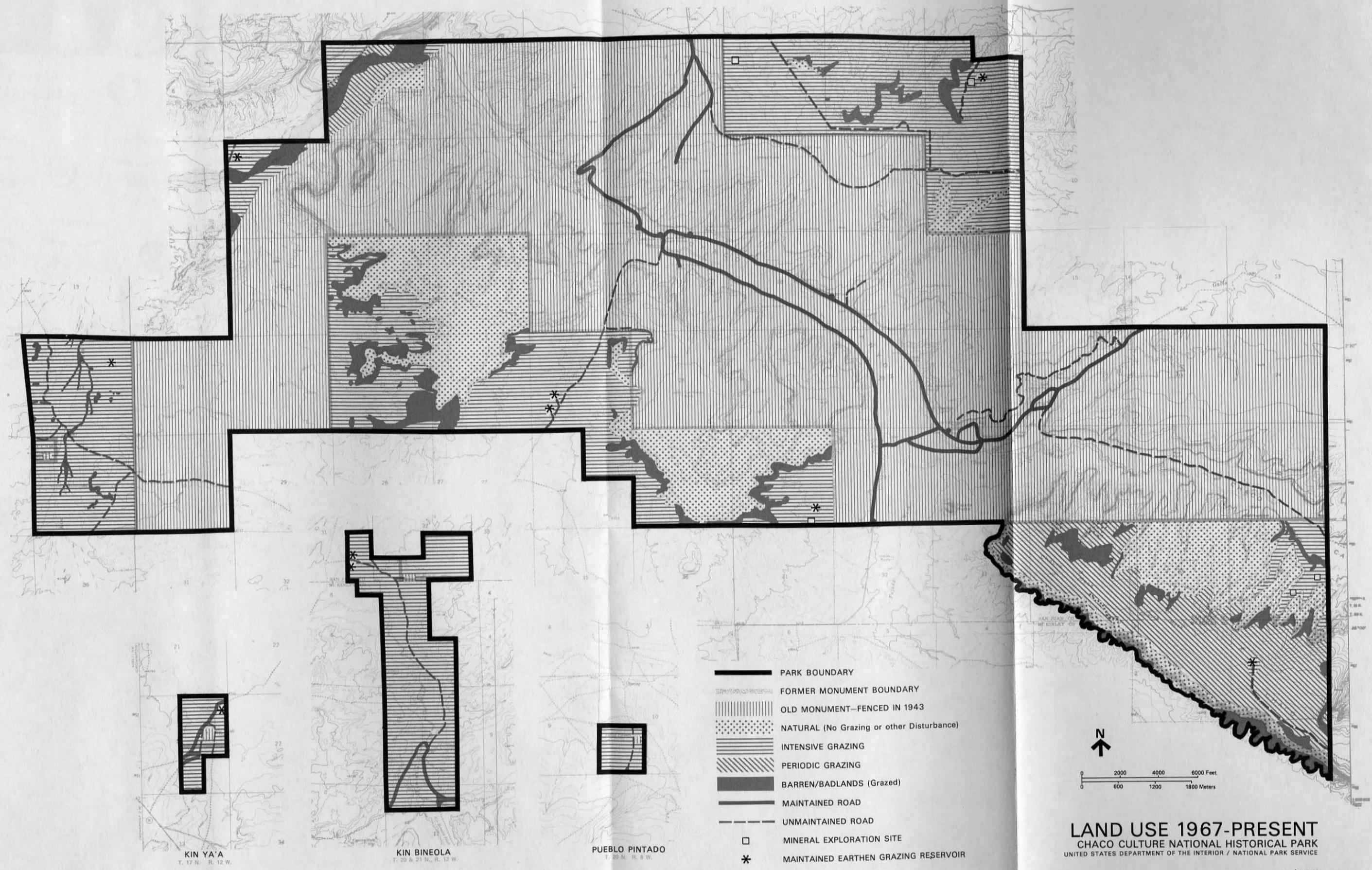
Including the new park areas, Chaco Culture National Historical Park contains over 3,600 prehistoric sites and some of the most spectacular aboriginal architecture in the United States.



- PARK BOUNDARY (PL 96-550)
- FORMER NATIONAL MONUMENT
- SECTION NUMBER
- DELETED FROM AUTHORIZED PARK (PL 96-550)
- MAJOR RUIN



**BOUNDARY**  
 CHACO CULTURE NATIONAL HISTORICAL PARK  
 UNITED STATES DEPARTMENT OF THE INTERIOR / NATIONAL PARK SERVICE

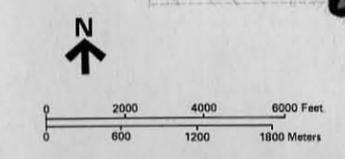


**KIN YA'A**  
T. 17 N., R. 12 W.

**KIN BINEOLA**  
T. 20 & 21 N., R. 12 W.

**PUEBLO PINTADO**  
T. 20 N., R. 8 W.

- PARK BOUNDARY
- FORMER MONUMENT BOUNDARY
- OLD MONUMENT—FENCED IN 1943
- NATURAL (No Grazing or other Disturbance)
- INTENSIVE GRAZING
- PERIODIC GRAZING
- BARREN/BADLANDS (Grazed)
- MAINTAINED ROAD
- UNMAINTAINED ROAD
- MINERAL EXPLORATION SITE
- MAINTAINED EARTHEN GRAZING RESERVOIR



**LAND USE 1967-PRESENT**  
CHACO CULTURE NATIONAL HISTORICAL PARK  
UNITED STATES DEPARTMENT OF THE INTERIOR / NATIONAL PARK SERVICE

## Land and Mineral Ownership Status

Chaco Culture National Historical Park contains approximately 34,000 acres (13,675 ha), of which some 21,500 acres (8,705 ha) constituted the previous national monument.\* In addition, about 1,280 acres (518 ha) from the Bureau of Indian Affairs and 960 acres (389 ha) from the Bureau of Land Management were transferred to the National Park Service on April 23, 1981, subject to existing oil, gas, and mineral leases and grazing permits. All of the leases will expire by mid 1989, except one (on about 160 acres), which will expire September 1, 1990. All mining claims under the 1872 Mining Law have been relinquished.

Total nonfederal surface ownership in the park is 10,965 acres (4,439 ha), as shown on the Surface Land Status map. About 1,769 acres (716 ha) are owned by the state of New Mexico, and all state lands are encumbered by grazing leases. Of the remaining 9,196 acres (3,723 ha), 4,697 acres (1,902 ha) are tribal fee lands, 3,059 acres (1,239 ha) are tribal trustlands, 1,120 acres (453 ha), which were distributed under the General Allotment Act of 1887, are held in trust for allottees or their heirs, and 319 acres (129 ha) are privately owned.

Total nonfederal subsurface ownership in the park is approximately 10,584 acres (4,285 ha), which roughly coincides with the nonfederal surface ownership (see the Subsurface Land Status map). All of the addition lands, including those transferred to the Park Service from other federal agencies, have outstanding subsurface interests. Most lands are split estates, that is, the surface owner does not own the subsurface. Additionally, 1,437 acres (582 ha) of the former monument have outstanding subsurface interests. The federal subsurface tracts are closed to any new entry effective December 1980. However, these tracts are subject to existing leases that may not expire if the lessee develops his interest before the expiration date. This applies on approximately 3,738 acres (1,513 ha), primarily in the Chacra Mesa and northern additions. The other federal subsurface interests are administered by the Bureau of Indian Affairs under legal provisions (including the Allottee Mining Act of 1909) that require that interests be managed to the economic benefit of individual Indians or the tribe for whom title is held by the federal government. This includes 1,120 acres (453 ha), of which 800 acres (324 ha) are not currently leased. The state of New Mexico has similar requirements for economic benefit on its 1,769 acres (716 ha). Besides the Bureau of Land Management, Bureau of Indian Affairs, and the state, the tribe and private individuals have subsurface tracts that are leased or open to leasing.

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\*All acreages in this section are approximate. See the "Land Protection" section and the Land Protection Plan for additional details concerning land and mineral ownership.

## Cultural Resources

Overview of Prehistory. Like other massive prehistoric ruins of the American Southwest, those at Chaco caught the fancy of early archeologists, dilettantes, and the Victorian public. Later investigations dealt with progressively more ancient cultures and with less obvious archeological remains. Archeologists now know that the prehistory of the San Juan Basin is extraordinarily complex and that Chaco Canyon represents one of the most organized and far-reaching cultures of its time on this continent north of Mexico.

Humans probably first entered the Chaco region about 8500 B.C. These Paleo-Indian hunters were replaced by more sedentary gatherers and small game hunters during the subsequent Archaic stage (6000 to 1000 B.C.), perhaps because the large Pleistocene mammals were becoming extinct and the climate was fluctuating.

While still without pottery, the Basketmaker II people (1000 B.C. to A.D. 500) began using domesticated plants such as corn and squash. Thus began the emergence of the Anasazi tradition that came to dominate the Four Corners region of the American Southwest.

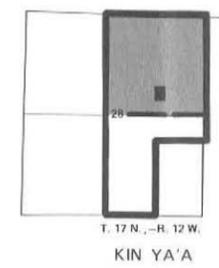
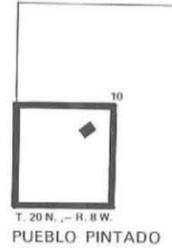
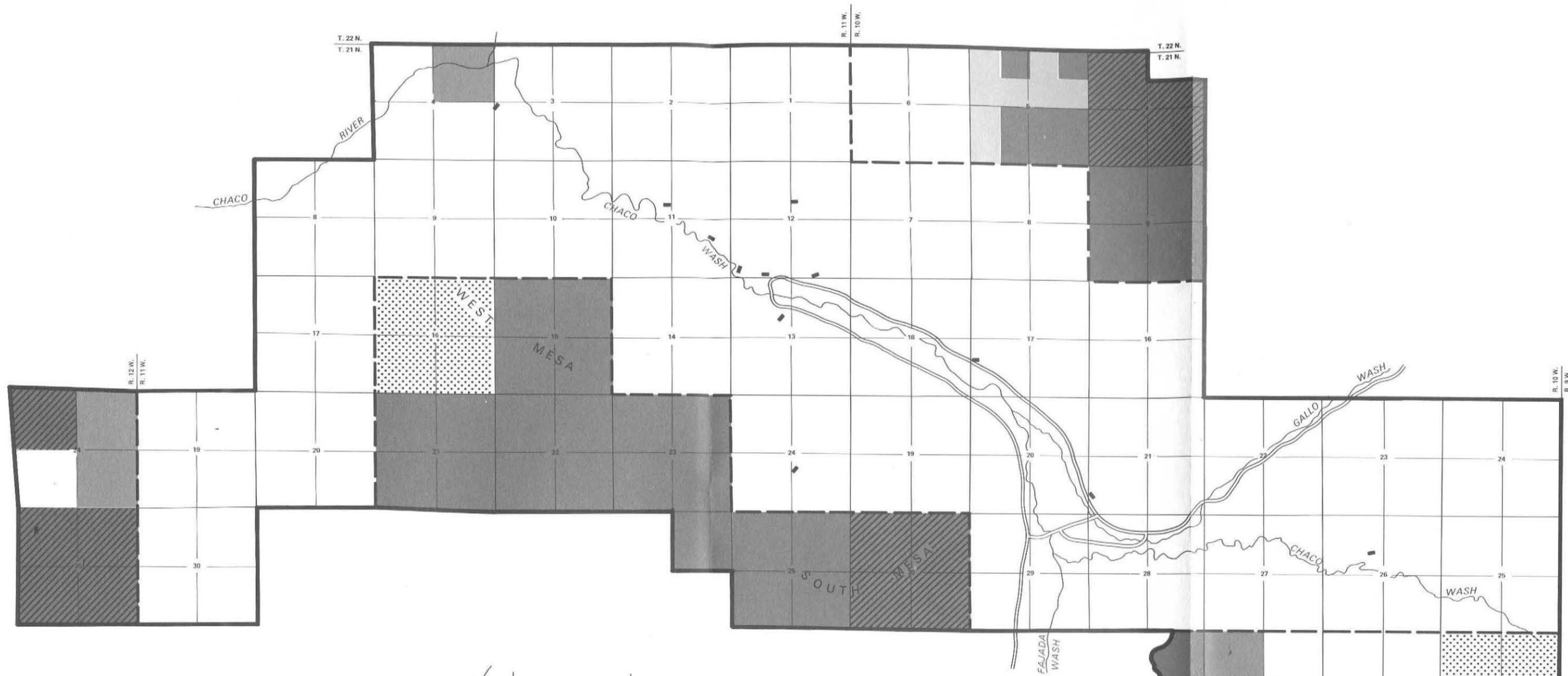
Chaco Canyon witnessed its first significant exploitation by farmers in Basketmaker III time (A.D. 500 to 750). The canyon was permanently occupied by A.D. 500, and villages of up to 20 pithouse dwellings were established. Pottery was first manufactured during this period.

During the Pueblo I period (A.D. 750 to 900), above-ground storage rooms occurred in conjunction with pithouses. Crescentic villages composed of small storage rooms, larger habitation rooms, and pithouses (in front of the room block) became more formalized and rectangular in Pueblo II time (A.D. 900 to 1050), with the kiva replacing the pithouse by the end of the period.

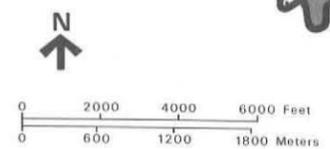
Up to A.D. 900 the Anasazi farmers of Chaco were little different from their neighbors throughout the Colorado Plateau. The small pueblos in Chaco were similar in construction to those on Mesa Verde or along the Little Colorado River. Then in the 10th century came a turning point in Chaco prehistory, an unparalleled transition that set the Chacoans apart from all other Anasazi.

Between A.D. 900 and 1140 numerous large masonry pueblos were constructed. New architectural techniques such as rubble core/banded veneer masonry appeared. Pueblo Bonito, Chetro Ketl, Una Vida, Penasco Blanco, Hundo Pavi, and Kin Bineola are examples of these carefully planned multistoried houses of up to several hundred rooms. The great kiva--reaching immense dimensions (up to 25 meters in diameter)--became a predominant feature.

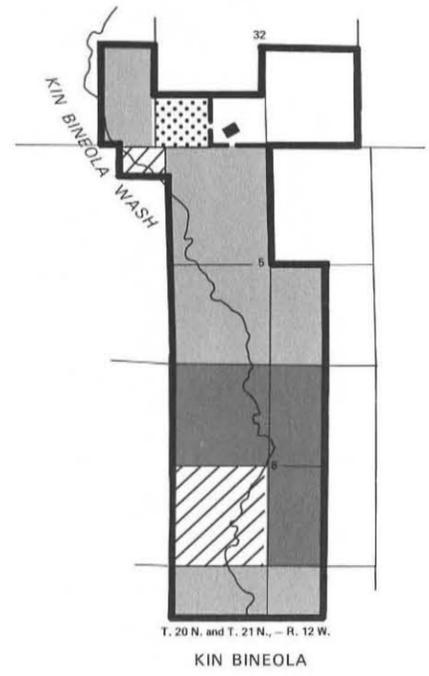
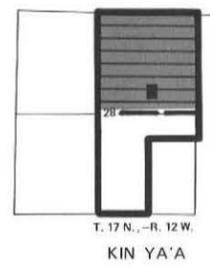
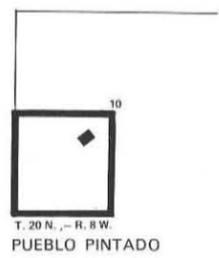
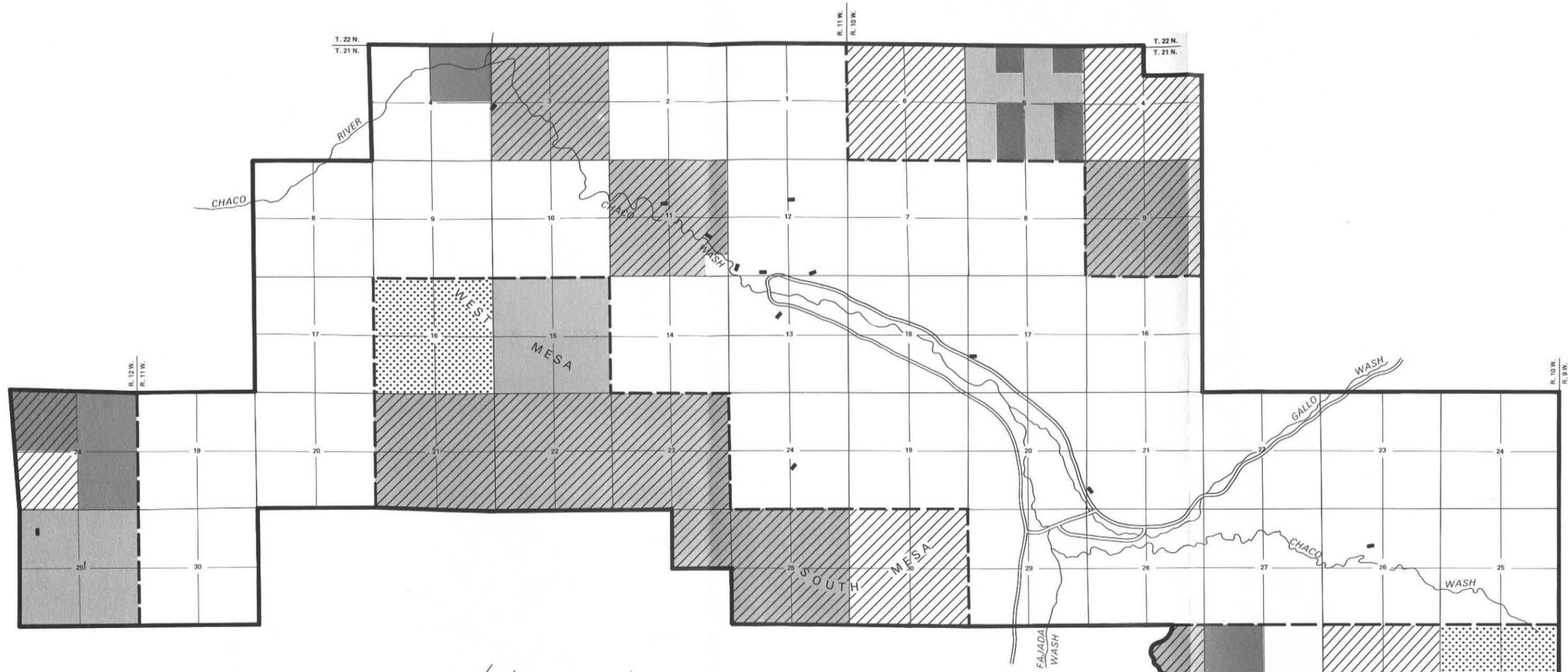
Similar construction spread far beyond the immediate Chaco Canyon area, apparently representing a regional sphere of influence. The canyon became established as the population, cultural, and trading nucleus for



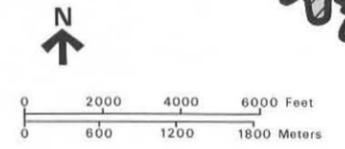
- PARK BOUNDARY
- FORMER MONUMENT BOUNDARY
- SECTION NUMBER
- FEDERAL
- STATE
- NAVAJO TRIBAL FEE
- NAVAJO TRIBAL TRUST
- ALLOTTEE
- PRIVATE
- MAJOR RUIN



**SURFACE LAND STATUS**  
**CHACO CULTURE NATIONAL HISTORICAL PARK**  
 UNITED STATES DEPARTMENT OF THE INTERIOR / NATIONAL PARK SERVICE



- PARK BOUNDARY
- FORMER MONUMENT BOUNDARY
- SECTION NUMBER
- FEDERAL
- STATE
- UNKNOWN OWNER
- ALLOTTEE
- PRIVATE
- OIL AND GAS LEASE
- MINERAL LEASE
- MAJOR RUIN



**SUBSURFACE LAND STATUS**  
CHACO CULTURE NATIONAL HISTORICAL PARK  
UNITED STATES DEPARTMENT OF THE INTERIOR / NATIONAL PARK SERVICE

what has become recognized as a cohesive economic and possibly ceremonial system linking dozens of Chacoan communities and resource areas throughout the San Juan Basin.

Yet the small (3-20 rooms) communities with simple masonry rooms and kivas--typical of earlier Anasazi--continued to be built in the canyon and around the huge communal structures (average 288 rooms) of both the canyon and the outlying communities. Scores of the irregular, old-fashioned pueblos continued to be occupied and added to. The material culture of the small villages was similar to that found at the large structures. The settlements appear to have been comprised of small village domiciles clustered around a multistory communal structure and great kiva(s). These population centers were often connected by a formal network of straight, wide roads. Possible signaling stations and public works such as reservoirs, dams, and irrigation canals were also common.

By A.D. 1050 there was a large regional economic system operating, especially to the south and west. The canyon's population increased. Around A.D. 1100 outlying communities appeared in the north, reflecting interaction with populations in the San Juan River Valley or Mesa Verde region. No major new construction occurred in the following Late Pueblo III period (A.D. 1130-1200), and by the end of the period most of Chaco was abandoned.

Some small Mesa Verde-style sites were inhabited in the Chaco area during the Late Pueblo III/Mesa Verde phase (A.D. 1200-1300); then they too were abandoned. The area was not reinhabited until the Navajo migrated into the region from the northeast in the 1600s.

Overview of History. Vague historical references to what seems to be Chaco Canyon came from the mid-1600 Spanish outposts, and Vizcarra named Penasco Blanco and Fajada Butte in 1822. The first detailed reports of Chaco date to the early American era, beginning in 1849. The earliest archeological evidence of European-American presence consists of inscriptions left by American troops in 1858. By the 1880s the American public had seen published photographs of many Chaco features. Still, sheepherders remained the most frequent visitors until 1895, when Richard Wetherill (formerly of Mesa Verde) came to Chaco Canyon.

From 1896 to 1901 Wetherill and archeologist George Pepper, funded as the Hyde Exploring Expedition, excavated portions of Pueblo Bonito and adjacent Chacoan ruins. Like most excavators of this era, they sought relics as well as information. Railroad carloads of artifacts were shipped to the American Museum of Natural History in New York--50,000 pieces of turquoise, 10,000 pieces of pottery, 5,000 stone tools, and 1,000 bone and wooden objects.

As word got out, other collectors came to dig in Chaco, and Wetherill, who had already started a trading post in the canyon, sought to protect his interest in the relic sources by filing for a homestead that included Pueblo Bonito, Chetro Ketl, and Pueblo del Arroyo. This resulted in a

General Land Office investigation that contributed detailed descriptions of many ruins.

But around the turn of the century there was increasing public concern about the rapid destruction of Southwestern antiquities, and in 1906 the Antiquities Act was passed. Under the provisions of that act, in 1907 Theodore Roosevelt proclaimed Chaco Canyon a national monument. In the midst of protests and controversy, the General Land Office ordered the Hyde expedition to cease its excavations. Wetherill's homestead entry was denied.

In 1921 Neil Judd set up field operations for the National Geographic Society expedition's 5-year excavations of Pueblos Bonito and del Arroyo. In 1927 Frank H.H. Roberts, Jr., of the Smithsonian excavated Shabik'eshchee, a pithouse village on Chacra Mesa that became the type site for Basketmaker III.

In the 1930s New Mexico institutions took the lead in Chaco archeology. The School of American Research/University of New Mexico field schools, under Edgar Hewett, excavated portions of Chetro Ketl, the Casa Rinconada and Kin Nahasbas great kivas, and the talus unit behind Chetro Ketl. Between 1939 and 1942 and in 1947 university students built a research center and excavated small village sites on the south side of the canyon, especially near Casa Rinconada. The Chacoan suburbs had been discovered, and the dichotomy between them and the large communal sites became the topic of the day.

The university, through Hewett's efforts, had acquired parcels of land within the national monument, and after tedious negotiations these holdings were deeded to the Department of the Interior in 1949. As part of that agreement, the University of New Mexico obtained preferential research rights.

In the early 1930s the National Park Service had built upon Judd's initial efforts and instituted a modest stabilization program. In 1937 a Civilian Conservation Corps camp was established in the canyon, which operated through 1941. Salvage archeology projects included the excavation of sites at the CCC camp, park headquarters, and campground sites. Efforts were also directed to salvaging and protecting remains threatened by erosion, most notably the Pueblo del Arroyo triwall structure (1950).

In 1971 the Chaco Center--a multi-disciplinary research unit of the National Park Service--began a program to inventory all the visible archeological resources of the monument (see USDI, NPS, SWRO, Hayes, Brugge, and Judge 1981; USDI, NPS, WO, Maruca 1982). As a more comprehensive view of the Chacoan resources emerged, a remote sensing (for example, aerial photography, radar and thermal scans) program was instituted. Remote sensing data revealed the elaborate road network.

Water control devices, paleoecology, improved dating, and Archaic sites have also received the center's attention. Village sites from all periods have been excavated. The Chaco Center's efforts--and those of other

archeologists in the San Juan Basin--have revealed complexities undreamed of a decade ago. Although much has been learned about the Chacoans, advances in anthropological theory continue to stimulate questions that remain to be answered.

Archeological Resources. Chaco Culture National Historic Park was established because of its prehistoric archeological resources. The park is listed on the National Register of Historic Places and has been nominated to the World Heritage List.

Over 3,600 archeological sites have been recorded within the authorized boundaries. Hayes, Brugge, and Judge (USDI, NPS, SWRO 1981) have summarized the results of archeological surveys in and adjacent to the former national monument. Almost 2,400 sites have been recorded within and adjacent to the old monument boundaries; average site density is 47 per square mile. The sites that could be assigned to specific times, and the approximate percentage attributed to each is as follows:

Navajo	22
Late Pueblo III	8
Early Pueblo III	14
Late Pueblo II	15
Early Pueblo II	17
Pueblo I	16
Basketmaker III	6
Archaic-Basketmaker II	2

A reconnaissance of the lands added to the park by PL 96-550 was completed by Powers (1982) as part of the general management plan data-gathering process. Lands previously surveyed were not reinvestigated. Powers recorded over 800 sites (see the "Land Management" section and appendix E).

A number of ruins in the park have been excavated and stabilized. In fact, Chaco has many more square feet of exposed wall fabric than other NPS units in New Mexico and Arizona. Chaco Culture National Historical Park contains 350,000 square feet (32,516 sq m) of exposed wall, as compared to 85,550 square feet (7,948 sq m) at Aztec Ruins National Monument and 75,150 square feet (6,982 sq m) at Canyon de Chelly National Monument. Ruin stabilization is by its nature continuous, so maintenance of prehistoric structures in the park constitutes a monumental task.

Compared to the massive structural remains of later Anasazi periods, the Paleo-Indian, Archaic, and Basketmaker II sites--typically scatters of lithic debris--have very low visibility and have only recently been looked for. Moreover, windblown sands on the mesas and alluvial deposits in the canyon have concealed numerous pre-Pueblo remains. Even Pueblo I period sites are known to be deeply buried, having been revealed in the cutbanks of Chaco Wash. Hayes (USDI, NPS, SWRO 1981, 24) suggests

that probably more than half the pre-Pueblo sites are buried and are therefore not recorded by surface surveys. On the other hand Navajo sites, spanning 200 years of utilization under an economy that required a scattered population, are quite visible and numerous. It is assumed that a larger proportion of the Navajo sites were recorded, as compared to earlier Anasazi sites.

Brugge (USDI, NPS, SWRO 1981, 69) indicates that about a third of the sites surveyed in or adjacent to the former monument had evidence of use during the historic period. Sites could be assigned in roughly equal numbers to either the late Spanish colonial period, 1750-1820, or the "recent" historical period, 1880-1945, the gap between the periods representing a period of intense warfare. The most common archeological feature of the historic period is the Navajo hogan, followed by corrals and other animal husbandry structures, hornos (ovens), trails and roads, cairns, storage rooms, and rock art. Although remains relating to early archeological efforts have received little attention, the archeological record of Wetherill's trading post, Judd's field camps, the field school's research center and hogans, and the CCC camp are becoming increasingly valuable as part of the history of American archeology.

Navajo Sacred Sites. The last Navajo family residing in the former national monument left in May 1948 (Pierson 1956), but most had been moved out in 1936 or 1937 (Brugge in USDI, NPS, SWRO 1981, 95; see also USDI, NPS, SWRO, Brugge 1980, 486). "In the decades since the fencing of the monument, many of the local white ranchers, or in some cases their heirs, have sold their lands to the Navajo Tribe. As tribal ownership has grown, the country has once again become largely Navajo in population. . . ." (USDI, NPS, SWRO, Brugge 1980, 487).

Although most of the Navajo residing adjacent to the park have adopted elements of industrial American culture, many elements of traditional Navajo culture continue to be practiced. Hence, a review of traditional religious beliefs is pertinent in light of constitutional guarantees of freedom of religion, as reinforced by the American Indian Religious Freedom Act of 1978.

The role models for proper behavior among traditional Navajos come from culture heroes in their mythology (Reichard 1950, 13). Navajos believe that sickness and other maladies result if these models are not followed. Ceremonies to counteract or prevent such supernatural retribution, modeled after mythological examples, constitute a major element of traditional religious practice (USDI, BIA, WRO, Holt n.d.).

Navajo myths and ceremonies are closely tied to the actual physical localities described (Van Valkenburgh 1974). Such mythical places have been utilized for certain ceremonies--as shrines where offerings are left and prayers are made and as gathering areas for ingredients critical to certain ceremonies (Van Valkenburgh 1974; Kluckhorn and Leighton 1948; Franciscan Fathers 1910).

As Holt (USDI, BIA, WRO n.d.) has pointed out, "Particular Anasazi ruins are viewed as major shrines, others as minor shrines, and all retain some aspect of supernatural forces." The origin myths of the Navajo mention many Anasazi ruins (Matthews 1897). For example, mythical wanderers are described passing Kin Ya'a, Kin Bineola, Kin Klizhin, Pueblo Bonito, and Wijiji (Kluckhorn 1967, 159, 166). Pueblo Pintado and Wijiji are important locations in an origin story and in "Pueblo War" stories (Matthews 1897, 195-208). The origin myth of the Kinya'ani clan unfolds at Kin Ya'a, while Pueblo Pintado has similar relevance to the clan Tse'n'ji'kini' (Van Valkenburgh 1974, 38).

Moreover, because Anasazi ruins are places of the dead, they are usually avoided or treated reverently by traditional Navajo. Disturbance of an Anasazi ruin antagonizes the ghosts of those who died there, and Navajo believe that retribution against the violator or an innocent bystander results (Matthews 1897; Reichard 1950; Fransted 1979).

Clay used in certain ceremonies was gathered near Pueblo Bonito (Franciscan Fathers 1910, 410), and chipped-stone projectile points--a revered ritual ingredient--have been gathered from numerous Anasazi sites (USDI, BIA, WRO, Holt n.d.). Prominent topographic features such as Fajada Butte also play a role in Navajo mythology.

Although little research has been devoted to understanding sacred sites in the park area, it is clear that there may be numerous locales within that continue to be sacred to some of the Navajo who live adjacent to the park.

### Natural Resources

Climate. The semiarid climate of the area is generally dry and sunny, with warm summers and cold winters. Average annual precipitation is only 8 inches, with considerable variation from year to year. Most of the precipitation occurs in locally heavy thundershowers during the summer months. The potential evapotranspiration is greater than the average precipitation. Sunshine occurs about 70 percent of the time, making the area suitable for solar energy uses. Temperatures vary considerably according to season and time of day. Daytime summer temperatures often exceed 90 degrees and winter lows are commonly below freezing. Intense summer sun and heat and winter cold and snow can pose harsh conditions for visitors.

Air Quality. Air quality in the vicinity of the park is generally excellent. Concentrations of sulfur dioxide (SO<sub>2</sub>) and nitrogen dioxide (NO<sub>2</sub>) are well below state and federal air quality standards (BLM 1982c). Total suspended particulate (TSP) levels are also normally low. Occasional high concentrations of TSP are probably the result of windblown dust. Normally Chaco has the best visibility of any of the 28 NPS monitoring stations in the West. In fact, the San Juan Basin has the best visibility of any area in the contiguous 48 states (USDI, NPS, Yarborough 1982). The region is listed as a class II "attainment" area

for air quality by the Environmental Protection Agency. This means that degradation is allowed up to the national ambient air quality standards.

Geology/Minerals. The walls of Chaco Canyon are composed primarily of the Cliff House sandstone, a massive formation that is about 360 feet (110 m) thick in the area. It is underlain by the Menefee formation, which crops out at the base of the canyon walls. The Menefee is a coal-bearing formation. However, the coal beds are highly lenticular, are relatively thin, are generally of low quality, and usually grade rapidly into sandstone (USDI, GS, Dane 1936; New Mexico BMMR 1971). A small abandoned coal mine is within the former monument boundaries southwest of Pueblo del Arroyo. The coal was probably used for local domestic purposes. The excessive overburden and limited thickness make these coal beds in the park uneconomic for strip mining (New Mexico BMMR 1971). The limited deposits and relatively low quality of the also make underground mining unlikely. The potentially more valuable Fruitland formation coal is north of the park boundaries. These conclusions are based on surface evidence and some very limited drilling data. There may be unknown coal resources of greater value in the park, although it appears unlikely. While the Kin Ya'a unit is underlain by the Dilco coal member, it is deeply buried in the area and is also of limited potential (New Mexico BMMR 1971). There is no evidence of coal in the Kin Bineola unit.

The entire park is classified as prospectively valuable for oil and gas by the Bureau of Land Management, meaning that there are geologic formations in the area that have potential for oil and gas deposits. There are no known geologic structures (KGSs) within park boundaries. (A KGS is a subsurface geologic structure identified as having significant potential for oil and gas production.) There are three KGSs within 10 miles (16 km) of the park to the northeast, east, and southeast. There are no oil or gas wells within the park boundaries. There has only been one exploratory drilling operation in the park, in the Chacra Mesa addition, which produced a dry hole.

The U.S. Department of Energy has identified the park area as having potential for uranium resources (USDE, MAD, GJO 1982). The park is estimated to have possible and probable resources but only at a forward cost of \$50/lb.  $U_3O_8$  or more. This is above the current depressed market rates. Favorable environments for uranium deposits exist in the Morrison formation but at a depth of 4,000-5,000 feet (1,200-1,524 m) in the area of the park (Bendix 1980). The marginal nature of the resource is reflected by the fact that all 1872 mining law claims within the park boundary (presumed to be for uranium) have been relinquished or abandoned. The exception is the Kin Ya'a unit, which is 25 miles (40 km) south of the main portion of the park and currently under lease for uranium extraction. Mineralization in that area occurs at a depth closer to 1,000 feet (305 m). Other than at Kin Ya'a, no uranium development has occurred within the park.

More detailed information on geology and minerals can be found in the Chaco Land Protection Plan.

Soils. The soils of the canyon bottom consist of textured clay loams and silty clay loams (USDA, SCS 1980). They are deep, slowly permeable soils formed in alluvium derived dominately from sandstone and shale, which are highly susceptible to erosion and piping. The soil cover on the canyon slopes is thin and also easily eroded when vegetation is disturbed. Gentle slopes above the canyon are covered with deep, well-drained loams and silty clay loams. The soils at lower elevations south of the canyon consist of deep loamy fine sands that are somewhat excessively drained. The hazard of soil blowing is severe in and near the park. There are no prime or unique farmlands within the boundary.

Hydrology. Chaco Canyon is drained by Chaco Wash, an intermittent stream, and its intermittent tributary washes. There are a few small, naturally occurring seeps within the park, but Kin Bineola Wash now runs consistently because of uranium mine dewatering 10 miles (16 km) to the south. Flooding happens irregularly in the park, usually as a result of intense upstream thunderstorms, when waters can rapidly rise. When these ephemeral streams flow, suspended sediment concentrations are very high. The floodplains of Chaco Wash are primarily in the incised channels. The floodplain in Gallo Canyon is broader, covering much of the canyon floor and including the existing campground. No other developed area is within the 100-year floodplain (1 percent chance of happening any given year). The visitor center is on the fringe of the 500-year floodplain. There are no wetlands within the park. There is groundwater in the alluvial fill of the canyon bottom at an average depth of about 40 feet below ground level; however, the quality is not suitable for park use. The park water supply is derived from a 3,100-foot (945-m) well drawing from the Gallup sandstone. This artesian water must be cooled and demineralized prior to use for drinking purposes.

Vegetation. Vegetation in the area is sparse because of the dry climate and past overgrazing. The canyon floor is dominated by saltbush and greasewood. Scattered pinyon and juniper are found on mesa slopes, and grasslands occur on the relatively level uplands outside the canyon proper. There are no known federally listed endangered or threatened plant species inhabiting the park. There is a likelihood that Mesa Verde cactus occurs in the area, and there may be some "review" species, which could be listed after studies are completed by the U.S. Fish and Wildlife Service; no official legal status is afforded them until that time. The park has not had a thorough plant survey to discover whether one or more of these species exist.

Wildlife. Wildlife species are typical of the habitats described above. Rabbits, mice, and coyotes are common, mule deer are fairly common, and bobcats inhabit the park. Numerous bird species can be found at Chaco, including golden eagles and prairie falcons; peregrine falcons have been sighted in the area on rare occasions. No nesting sites have been documented for any of the raptor species within the park; however, it is suspected that golden eagle and prairie falcon nesting does occur based on the frequency of pair sightings during the nesting season. There are no known federally listed threatened or endangered animal species inhabiting the park. There are two known prairie dog towns in the



park, but no sightings of black-footed ferrets (a listed species associated with prairie dogs) have been recorded, and historical sightings in the region were extremely rare (New Mexico DFG 1979). However, there has been no extensive surveillance of the prairie dog towns to confirm that ferrets are not present. There have been no recorded sightings in San Juan County, and the last verified sighting in McKinley County was in 1940. Sightings have been reported by local people approximately 15 miles (24 km) northwest of the park, but these have not been confirmed by a trained biologist (USDI, BLM, NMSO 1982).

### Visitation Projections

Annual visitation to Chaco has shown only modest increases over the past few years, but it could grow dramatically in the near future depending on several ongoing and proposed activities in the region. The Chaco phenomenon has recently received extensive media attention on the regional and national level. This exposure, along with the growth of energy exploration and development in the San Juan Basin, could result in major increases in use of the park. However, the most significant effect on visitation will result if the northern access road (NM 57, connecting with NM 44) is upgraded.

At present visitors approaching the park from the north or south (NM 57) must drive 29 miles (47 km) and 21 miles (34 km) respectively over unimproved dirt roads. Except in summer, access to the park can be very difficult, and more than occasionally, summer rains can slow or restrict access. These problems have contributed to the extreme seasonality in park use and the relatively modest visitation figures (an adjusted estimate of approximately 51,600 recreation visits in 1984\*). However, with the increases in regional energy development, there is a probability that the park's primary entrance road (NM 57 north of Chaco) will be upgraded to an all-weather road during the life of this plan. If so, access will be consistently reliable, and annual visitation to the park could increase to as many as 150,000 people in the next 10+ years. If the primary entrance road is not upgraded, annual visitation will probably increase to a more modest level of 60,000-70,000 people in the same time period.

### Existing Development/Facility Analysis

Roads. Access and circulation is provided by roads shown on the Existing Development map. In addition to park traffic, NM 57 carries some local traffic through the park. A new entrance road parallel to Gallo Wash was recently completed to allow the future rerouting of NM 57 to keep through-traffic away from the main ruins and provide better

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\*For an explanation of the adjusted estimate of recreation visits, see appendix D, "Visitation Analysis."

control of visitor use at the ruins. Visitor access to the ruins is along an interpretive loop road in the canyon bottom. There are several primitive roads (truck trails) in the park that provide access to adjacent private ranches and serve as maintenance roads.

The detached park units are reached by way of truck trails on private ranchlands. The National Park Service currently has no official agreements for continued use of these roads and depends solely on the good will and discretion of each landowner. Since these roads are private, no gates can be constructed to limit unauthorized public access to the detached unit ruins. Some monitoring has occurred when permits are issued at the visitor center to those interested in visiting the detached units.

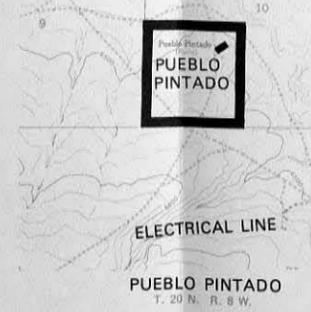
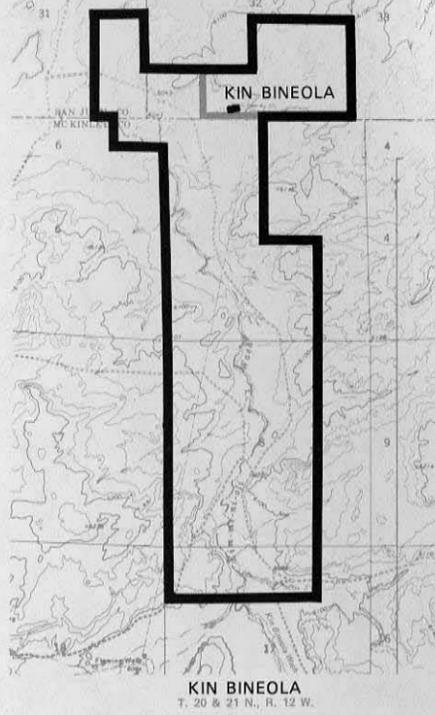
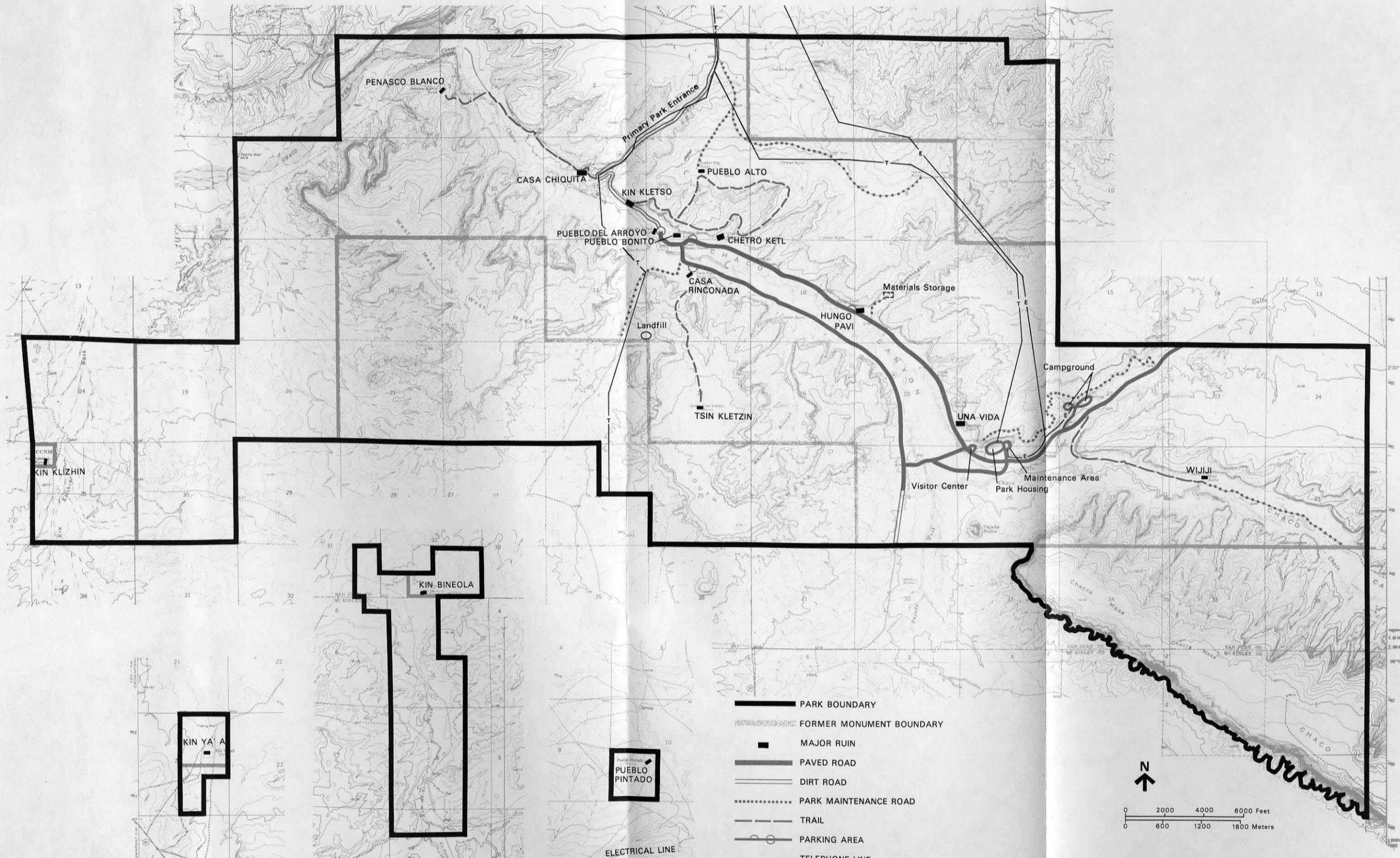
Parking. Parking areas along the interpretive loop road provide for approximately 62 cars. This space is adequate to handle current visitation on most nonpeak days but is not sufficient for peak season use.

Administrative Area. The administrative area includes the visitor center/headquarters building, employee housing, maintenance building and yard, and water and sewage treatment plants. The visitor center was expanded in 1981 and is now adequate to meet the needs of the area. Parking at the visitor center was also recently relocated and expanded to provide for visitors entering along the new Gallo Wash road. The visitor center is on the fringe of the 500-year floodplain of Gallo Wash. Under this extreme event, it is estimated that water would rise to about 2 feet (0.6 m) above ground level around the building.

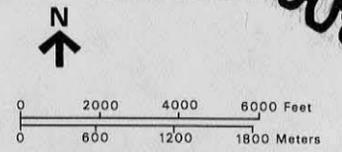
Employee housing currently consists of four permanent houses, two new 4-unit apartment buildings, and several trailers. The trailers are expensive to maintain and are aesthetically incongruous with the character of the park environment.

Campground. A 45-site campground with a comfort station is adjacent to Gallo Wash east of the visitor center. A nearby group camping area also has a comfort station. The campground is frequently filled during peak use periods. Since there are no locally available options, overflow camping is provided during these periods. Untreated water is piped from the administrative area to the comfort stations for flushing toilets and lavatory use. Potable water must be obtained at the visitor center. The comfort stations' wastewater is disposed through an evapotranspiration bed near the campground.

The campground abuts the new Gallo Wash entrance road, an aesthetically undesirable situation. It is also in the 100-year floodplain of Gallo Wash, a normally dry water course that is subject to infrequent but rapidly rising floods. At the base of the cliff behind the campground are two small prehistoric ruins that are a continual resource protection problem because of camper use. The group camping area is in a side rincon above the 100-year floodplain.



- PARK BOUNDARY
- FORMER MONUMENT BOUNDARY
- MAJOR RUIN
- PAVED ROAD
- DIRT ROAD
- PARK MAINTENANCE ROAD
- TRAIL
- PARKING AREA
- TELEPHONE LINE
- ELECTRIC LINE



**EXISTING DEVELOPMENT**  
**CHACO CULTURE NATIONAL HISTORICAL PARK**  
 UNITED STATES DEPARTMENT OF THE INTERIOR / NATIONAL PARK SERVICE

Picnicking. A metal shade ramada with two portable toilets is along the loop road between Chetro Keti and Pueblo Bonito. This facility receives only moderate picnicking use and is visually out of character with the ruins environment.

Trails. Interpretive trails, surfaced with compacted gravel, have been developed through the major ruins. Generally the impact of the trails on the ruins is minimal; however, visitors frequently wander from the designated route and disturb fragile or unstable surfaces, sometimes placing their own safety in jeopardy.

Other trails to backcountry areas, particularly the mesa tops, are rough and often difficult to follow. Visitors are generally unaware that backcountry hiking opportunities exist, unless a ranger informs them and issues a permit. At present only 10 percent of Chaco visitors go into the backcountry.

Utilities. Potable water for the park is supplied from a buried 50,000-gallon (189-cu m) concrete storage tank on top of the mesa behind the residential area, which in turn is supplied by the artesian well (drilled in 1972) at the maintenance area. This tank also supplies the fire suppression system. A reverse-osmosis water treatment plant was installed at the maintenance area to remove minerals, but the facility is expensive to operate and requires frequent maintenance. The capacity of the system to meet even current needs is limited. An older 70,000-gallon (265-cu m) steel surface storage tank on the mesa behind the visitor center supplies untreated water for flushing toilets and lavatory use at the visitor center, apartment buildings, maintenance area, and campground.

Wastewater is collected through a sewage system in the administrative area and processed at a secondary treatment plant in the maintenance area. Reject water from the reverse-osmosis water treatment plant is also run through the plant. Effluent is disposed in evapotranspiration beds and sprayfields adjacent to the residential area. The system malfunctions and is frequently overloaded during the peak season, is expensive to operate, and requires frequent maintenance. The sprayfield poses a health hazard and causes mosquito problems in the area.

Solid wastes are collected and disposed of in a sanitary landfill at South Gap, southwest of Casa Rinconada (see Existing Development map). The landfill will reach its planned capacity in less than 5 years.

A maintenance materials storage yard in Mockingbird Canyon immediately northeast of Hungo Pavi is an aesthetic intrusion incompatible with nearby cultural resources and interpretive use of the area (see Existing Development map).

Commercial electric power from the Jemez Cooperative is supplied through an overhead line that runs from the north into the administrative area and campground. Service failures are common. In addition, the line only provides single-phase electrical service and requires a convertor for the

three-phase service necessary for operating the water and sewage treatment plants and garbage compactor. Should the convertor fail, it would cause the failure of these important utilities.

There are two overhead telephone lines in the park. One line, which parallels the electrical line into the support base area, is for park use. Service failures are common. The park has been cut off from outside communications on numerous occasions for weeks at a time. The other line, which extends through South Gap and Clys Canyon, serves local residents north of the park. An intercom system in the support base area employs an underground cable network.

Fencing. Before the enlargement of the park in 1980, major portions of the monument were fenced along its boundaries. About 25 percent of the existing 35 miles (56 km) of fence is in need of replacement. None of the new lands have been fenced and/or marked to designate the new park boundaries or federal ownership within those areas. By the act of February 17, 1931, owners of land acquired in the former monument who own land adjacent to the monument have the right to drive stock across monument lands. However, in recent years nearly all stock has been trucked rather than driven.

## THE PLAN

This general management plan and development concept plan for Chaco Culture National Historical Park has been prepared to fulfill the requirements of PL 96-550 and to reflect new knowledge concerning the Chaco phenomenon. In addition, it updates and revises some of the concepts in the approved 1979 general management plan for Chaco Canyon National Monument, which contained proposals for natural and cultural resources management, interpretation and visitor use, support development, and management zoning on monument lands. Three major development proposals in the 1979 plan--the paving and realignment of the Gallo Wash entrance road, the paving of the interpretive loop road through the primary ruins area, and the establishment of new parking areas--have been implemented and are therefore discussed as existing conditions in this document.

The plan contains four major elements. First, and most important in terms of the 1980 legislation, it provides a general strategy for managing lands within the expanded park boundary. The management strategy, which is based on an analysis of critical park resources and other relevant considerations (see the Land Protection Plan), is consistent with protection of those resources. Based on NPS traditions, the Park Service will seek control of all mineral activity within the boundary (see the "Management Zoning" section). Markers will be placed along the newly authorized boundary by agreement with landowners. The fence around the former monument boundary will be rehabilitated and maintained, and isolated sites on addition lands will be fenced to protect significant resources.

The second major recommendation involves expansion of visitor services and programs to reflect new knowledge of the Chaco phenomenon. This will be accomplished by increasing personal services throughout the park, supplementing interpretive themes and media, and expanding the trail system within the canyon and in the backcountry. Taking into account current visitation levels and projected visitation trends while supporting a "development freeze" in the primary visitor use areas of the park, the proposal also calls for the implementation of a regulated access system on the interpretive loop road during peak periods.

The third action is a program of increased stabilization maintenance and limited backfilling at major ruins to better preserve prehistoric resources.

Additional recommendations concern relocation of the campground and other minor development improvements to reduce flood hazards, support an expanded interpretive program, and enhance the visitor experience. Utility systems are to be upgraded to meet current visitor and staff demands and reduce environmental effects. Monitoring of land use and development activities in the region and vicinity will continue, to ensure that park resource values are perpetuated.

All but two of the actions proposed here are designed to meet the park's existing needs and those projected with modest visitation (up to 70,000 people a year) over the next 10+ years. The transit system and the high-growth interpretive staffing recommendations described in the "Proposed Circulation" and "Staffing" sections reflect contingency actions that will be required only if and when visitation reaches the 150,000 annual visitors anticipated if the northern access road is upgraded. Proposed utility systems (new and upgraded) will be designed to allow future expansion in the event the high-growth potential is realized.

## LAND MANAGEMENT

The land management component of this proposal is intended as a management guide. It includes an analysis of critical resource values and a zoning scheme that establishes an overall management strategy and identifies allowable uses for each zone.

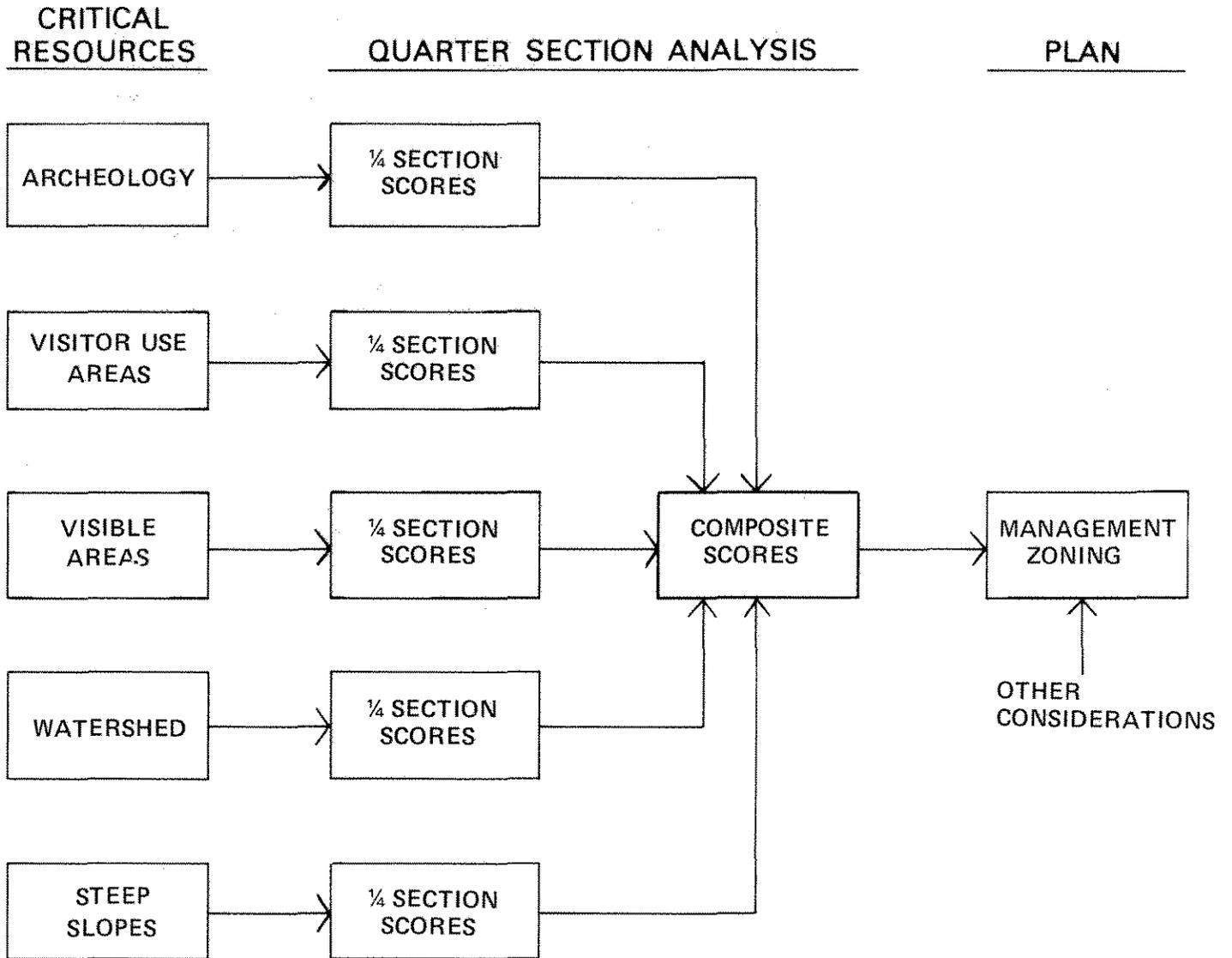
### Resource Analysis

To assist in the preparation of land management and land protection proposals for Chaco, a map overlay/numerical ranking system was developed to assess resource values. The resource analysis indicates those lands in the park that have the highest resource values and should therefore receive the most stringent levels of protection and those lands that have lower values, requiring lesser levels of protection to fulfill the primary park purpose. Although the entire park was evaluated, the primary focus was lands with nonfederal surface or mineral rights.

As depicted on the Land Use Planning Process flowchart, certain factors were identified as critical in assessing resource values and determining appropriate land uses. In order of importance these included archeological resources, visitor use areas (visitor attractions), areas visible from major ruins, relation to the Chaco Wash watershed, and steep slopes. These factors were selected for the following reasons.

The primary purpose of the park is to protect significant archeological features; hence, all such resources must be considered in any decisions regarding land use within the park boundary. An area's visitor use potential is also critical because of the congressional mandate to provide for public use and enjoyment of NPS units. The viewshed--the existing scene--contributes to the overall park experience, so the landscape as viewed from the major ruins must be taken into account. Finally, the Chaco Wash watershed and the park's rugged topography are natural features that affect cultural resource protection and visitor use because of the potential for visual intrusions, scarring, erosion, and increased runoff. If a number of these factors combined, for example if mineral development was taking place on a steep slope within the primary watershed and in an area visible from a major ruin, the potential for adverse effects on both cultural resources and the visitor experience would be far greater than if only one of these factors was present.

# LAND USE PLANNING PROCESS



After the critical factors were identified, they were individually mapped on a common topographic base, and numerical scores were assigned. The quarter-section (160 acres, or  $\frac{1}{4}$  of a square mile) was the basic unit used to analyze factors and develop comparative scores because it generally corresponds to land use and protection issues where multiple ownerships are involved.

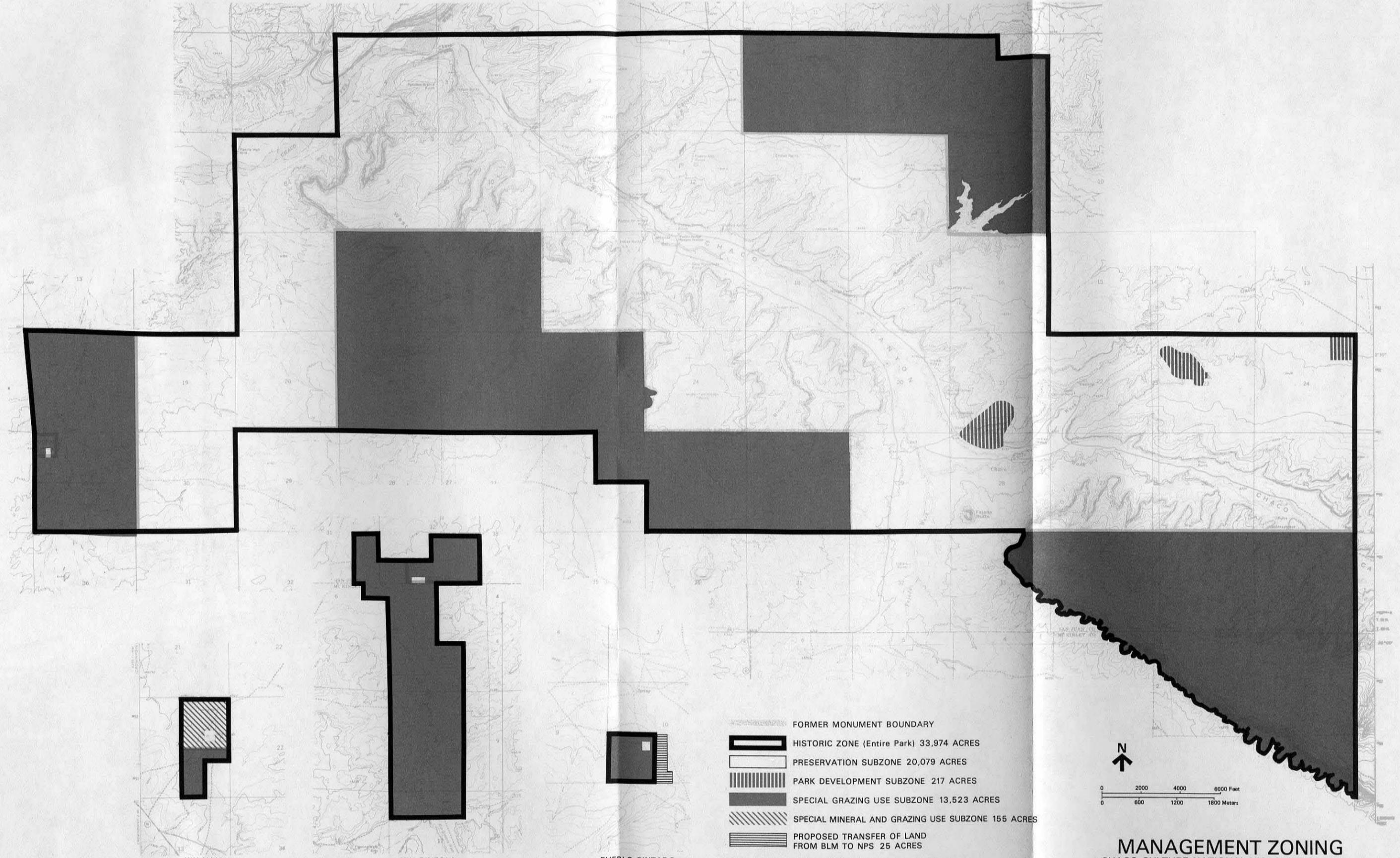
Numerical scores for specific factors were derived in several ways. For the cultural resource factor, each archeological site within the park was mapped and assigned an individual score based on recognized attributes, including cultural affiliation, site type, period of occupation, and overall significance. Individual site scores were then aggregated within a given quarter-section, and the aggregate score was assigned as the relative resource value of that area. Visitor use scores were derived based on type of use area (primary or backcountry) and presence of major ruins. Visibility was scored according to the percent of the quarter-section that could be seen from each of the 11 major ruins within the primary resource area; these individual scores were also aggregated to derive an overall score for the quarter-section. Watershed scores were based on the percent of a quarter-section within the watershed. Slopes were analyzed and subsequently scored according to the percent of the quarter-section with slopes greater than 25 percent.

After numerical scores were assigned for each factor in each quarter-section, the quarter-section scores were totaled. These composite scores were used, along with other relevant considerations, to develop the management zoning scheme presented in the following section. A detailed discussion of how each factor was mapped and how the numerical scores were assigned is included in appendix E, along with the five critical factor maps and the composite score map.

For additional details on the resource analysis, see the accompanying Chaco Land Protection Plan.

### Management Zoning

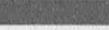
Management zones are established to define appropriate land uses within certain areas of a park. The resource analysis outlined above was one consideration in identifying zones within Chaco. Additional considerations, which were evaluated during the preparation of the Land Protection Plan, included current federal ownership, existing uses, proximity to the main canyon, trail potential, physiographic features, wildlife habitat, and the need to establish manageable "boundaries" for the zones. These factors were used in identifying appropriate zones for surface uses. With one exception, NPS management considers subsurface uses (mineral exploration and extraction) to be incompatible with the park's purpose; however, the management zoning system provides for the possibility that mineral activity could occur prior to the expiration of existing leases.



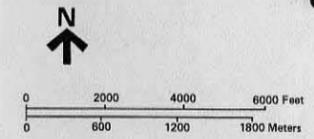
**KIN YA'A**  
T. 17 N. R. 12 W.

**KIN BINEOLA**  
T. 20 & 21 N. R. 12 W.

**PUEBLO PINTADO**  
T. 20 N. R. 8 W.

-  FORMER MONUMENT BOUNDARY
-  HISTORIC ZONE (Entire Park) 33,974 ACRES
-  PRESERVATION SUBZONE 20,079 ACRES
-  PARK DEVELOPMENT SUBZONE 217 ACRES
-  SPECIAL GRAZING USE SUBZONE 13,523 ACRES
-  SPECIAL MINERAL AND GRAZING USE SUBZONE 155 ACRES
-  PROPOSED TRANSFER OF LAND FROM BLM TO NPS 25 ACRES

Note: All lines that do not follow section lines follow identifiable natural barriers such as cliffs.



**MANAGEMENT ZONING**  
CHACO CULTURE NATIONAL HISTORICAL PARK  
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Under the proposal, the entire park will be included in a historic zone, with the primary purpose of protecting and interpreting cultural resources. In addition, subzones are delineated to guide management and use as follows:

Preservation Subzone. This will be the largest subzone (20,079 a, 8,129 ha, or 59% of the park); it will include lands within the former monument boundary and in Mockingbird Canyon. The management strategy will be to preserve, protect, and interpret cultural resources and their natural settings. Allowable uses will include interpretation and NPS activities needed to protect resources and manage visitor use. Development in this subzone will be restricted to trails, signs, and approved structures necessary for protecting cultural features, including erosion control features and other structures necessary to preserve the ruins (for example, braces on the Bonito back wall). The existing fence around much of this subzone (the old monument boundary fence) will be rehabilitated and maintained, and new fencing will be placed along the boundary and at isolated sites within the subzone where necessary to protect significant cultural resources. The Park Service will also seek short-term cooperative agreements with current landowners in this subzone to allow fencing to be placed on their land where necessary for protection of significant resources. Natural resources will be protected as required by applicable law, regulation, or NPS policy. Management actions will be guided by the resource analysis, that is, greatest protection for the sections with the highest resource values.

Park Development Subzone. The management direction in the park development subzone (217 a, 88 ha, or less than 1% of the park) will be to provide the facilities and services necessary for visitor use and park management. Allowable uses will include interpretation, camping, picnicking, operations, and maintenance. Development may include park roads, parking areas, visitor centers, restrooms, campsites, picnic ramadas, offices, staff housing, maintenance areas, water and sewage treatment facilities, communications facilities, maintenance materials storage areas, and sanitary landfills. Natural and cultural resources will be preserved and protected to the degree practicable; however, some adverse effects may occur because use and development will be concentrated in this subzone.

Special Grazing Use Subzone. Management of this special use subzone (13,523 a, 5,475 ha, or 40% of the park) will be to preserve, protect, and interpret cultural resources while allowing existing grazing and agricultural activities to continue; natural resources will also be protected to the extent possible. In addition to trails, signs, and resource protection structures, development may include stock ponds, ranch roads, and other grazing-related facilities. Residential uses are considered incompatible activities within this subzone. New fencing will be established in this subzone only when critical to the protection of significant cultural or natural resources or sites.

Lands within the special grazing use subzone will be acquired by the National Park Service through exchange. Grazing by present

leaseholders will be allowed to continue under cooperative agreements, although the long-range goal is to transfer most grazing rights to lands outside the park through the exchange process. The Park Service will also prepare a grazing management plan to provide further detail on how traditional uses will be managed to accomplish established objectives. The resource analysis will guide this plan.

The long-range goal concerning mineral activity in this subzone is to eliminate such activity and to acquire the subsurface rights through exchange and expiration of leases; however it is possible that mineral activity will take place before lease expiration (all BLM-administered subsurface leases will expire by 1990 unless drilling and production is undertaken before that time). If a plan of operations for mineral production is submitted before lease expiration, the necessary stipulations will be added to it before its approval to ensure protection of significant park resources.

Special Mineral and Grazing Use Subzone. A small special use subzone will be designated on the northern half of the Kin Ya'a detached unit (155 a, 63 ha, or less than 1%). The strategy in this zone will be to preserve and protect cultural resources while allowing traditional uses and controlled mineral exploration and extraction to continue where nonfederal rights exist. Mineral development will be allowed in this small segment of the park for the following reasons:

Mobil Oil, the present leaseholder, has taken an active interest in the identification and protection of cultural resources at the site.

Mobil's investment of funds for exploration and research in the Kin Ya'a area has been extensive, and the area contains major proven deposits of uranium that can be extracted without significant damage or disturbance to surface resources.

The mineral extraction process and surface reclamation involved in uranium leaching is compatible with the protection of cultural resource values.

Developments in the special mineral and grazing use subzone may include those described for the special grazing use subzone plus mineral exploration and extraction facilities. Park management will protect natural as well as cultural resources to the maximum degree practicable. Access rights for resource protection and limited visitor use of the Kin Ya'a site will be obtained. Future mineral operations will be authorized by the Bureau of Land Management and the Bureau of Indian Affairs on approval of an acceptable plan of operations. Because the land in question is within the authorized boundary of the national historical park, the National Park Service will be provided the opportunity to review and comment on each plan of operations before its approval. Previous archeological clearances between Mobil Oil and the Bureau of Indian Affairs are valid and should meet all compliance requirements.

Decisions about whether to establish new fencing in this subzone will be based on the same criteria as for the special grazing use subzone.

For additional information on management zoning, see the accompanying Land Protection Plan for the park.

### Boundary Delineation

The existing boundary fence that was erected by the Park Service around the former monument will be rehabilitated and maintained; approximately 25 percent of the fencing will be replaced. As the Land Protection Plan is implemented and land exchanges are completed, boundary markers will be placed along the newly authorized boundary.

### LAND PROTECTION

The Chaco Land Protection Plan, which is being released concurrently with this plan, identifies existing ownerships and interests within the expanded park boundary and prescribes, on a tract-by-tract basis, the methods by which the Park Service will protect the resources and values of these lands. Following is a summary of the land protection recommendations.

Consistent with the requirements of PL 96-550, the Land Protection Plan proposes a protection strategy that consists of acquisition through exchange, donation, or purchase and cooperative agreements. In most cases where acquisition is proposed, the recommended method is exchange, utilizing existing federal properties under the jurisdiction of the secretary of the interior that are not managed by the National Park Service. One small parcel of privately owned land will be purchased in fee, and cooperative agreements will be used on one parcel where mineral production is occurring under an existing lease and as needed to administer grazing on federal lands within the boundary.

The park contains a total of 33,974.29 acres (13,754.77 ha). The National Park Service currently manages 23,009.03 surface acres (9,315.40 ha) and 23,390.31 subsurface areas (9,469.76 ha) that are owned in fee by the federal government, including 2,239.68 acres (906.75 ha) that were administratively transferred to the Park Service by the Bureau of Land Management and Bureau of Indian Affairs following enactment of PL 96-550. The Land Protection Plan addresses the 10,965.26 surface acres (4,439.38 ha) and 10,583.98 subsurface acres (4,285.01 ha) that do not have an approved protection strategy. The basic protection methods for surface rights include acquisition of 10,885.26 acres (4,406.99 ha) through exchange or donation and acquisition of 80.00 acres (32.39 ha), which are currently owned by the Archeological Conservancy, with appropriated funds. The plan also proposes to acquire subsurface interests through exchange and expiration of existing leases, except for a 160-acre (64.78-ha) tract within the Kin Ya'a unit that will be managed by means of a cooperative agreement. Controlled mineral extraction will

be permitted on this tract after approval of a plan of operations from the energy company. The long-term goal is to acquire this subsurface interest after existing operations cease.

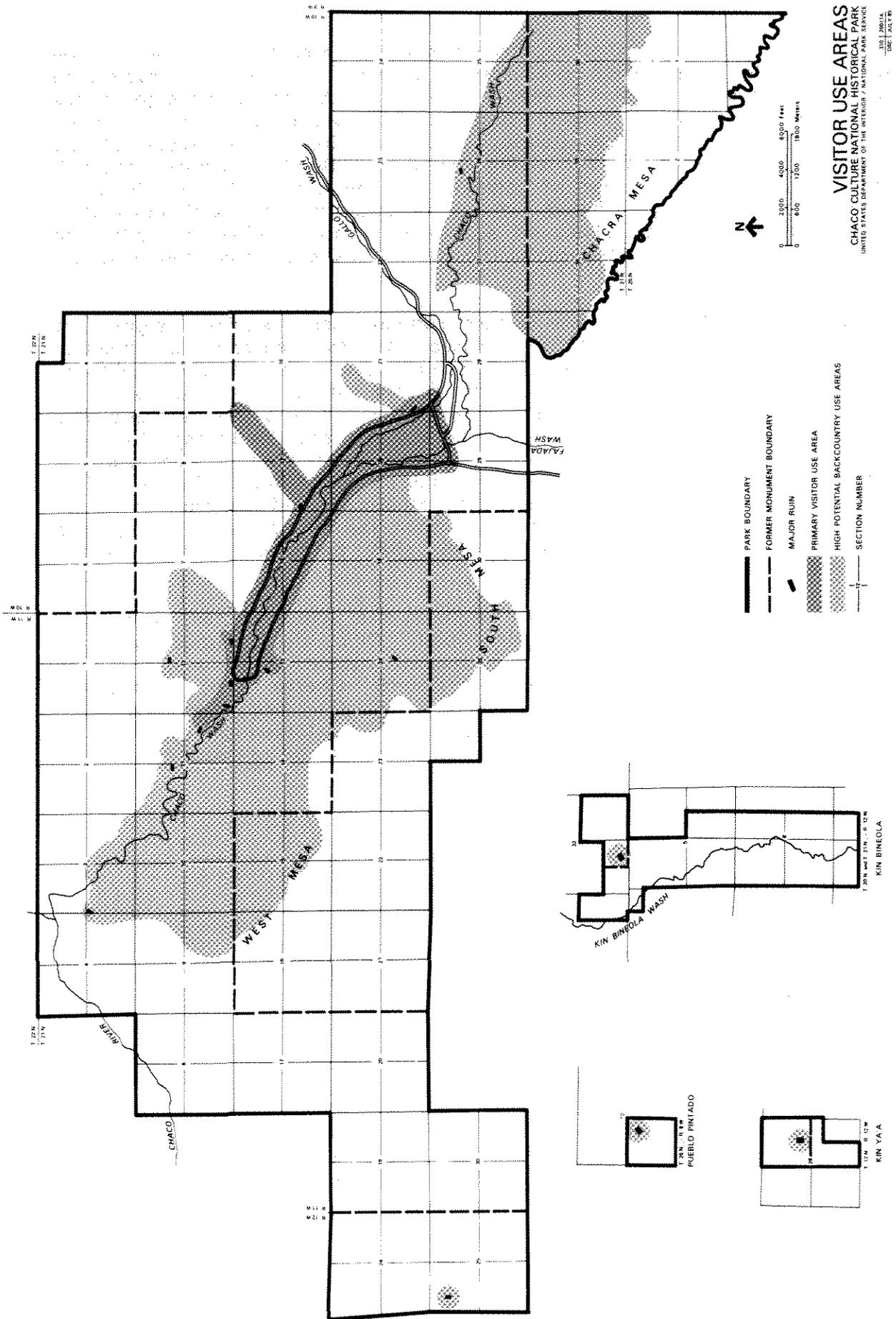
### VISITOR USE/INTERPRETATION AND RELATED DEVELOPMENT

As indicated in the management zoning section, a key element of the current proposal is the concept of maintaining the existing scene--the canyon ambience--so that the major ruins can be experienced and interpreted in a setting much like the environment that supported the daily existence of Chacoan inhabitants. The primary visitor use area in the park (see the Visitor Use Areas map), in particular the sites along the interpretive loop road on the canyon floor, has already reached a saturation point for development. Any new surface-disturbing activities in this area would have unacceptable impacts and would so destroy the ambience that desired experiences could not be achieved. Therefore, a major objective of this plan is to halt development in the primary visitor use area. There will be no additional roads, no expansion or addition of parking areas, and no further support facilities beyond those proposed in the 1979 plan, except as required for resource protection. This decision has provided the basis for a number of recommendations concerning visitor use and interpretation within the park.

#### Framework for Interpretation

It has long been recognized that the carefully planned, well-designed structures of the Bonito phase of Chacoan prehistory represented a cultural development unique in the Southwest. Less perfectly recognized was the relationship between the central canyon and outlying communities. Recent research has strengthened the view that the settlements in the San Juan Basin represented more than scattered, isolated villages. It is now recognized that these settlements were linked by lines of communication and trade and that a great qualitative change took place beginning in the tenth century A.D., a change by which the Chacoan people developed a complex, interconnected society able to deal with the vagaries of a harsh and unpredictable environment. It appears that the response to the strain on the food supply in this region of variable rainfall was the creation of a system of resource redistribution to equalize yields. As the system became more formalized, Chaco Canyon apparently became the principal control center.

The implications of these developments, in terms of a social system necessary to marshal human efforts on such a scale, are awesome. Further research will be required before any of a number of hypotheses is judged most likely, but with present knowledge, we can apply our own thoughts to what might make such a system work, or not work. Encouraging visitors to ponder such hypotheses is a central objective for interpretation at Chaco Culture National Historical Park.



**VISITOR USE AREAS**  
 CHACO CULTURE NATIONAL HISTORICAL PARK  
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The fact that sophisticated research has been necessary to establish the uniqueness of the Chaco phenomenon points to a critical problem in planning for interpretation: Most of what contributes to the significance of the resource is not readily discernible by visitors. Only the great pueblos, especially Pueblo Bonito, give any hint of the scope of the Chaco culture. It is not surprising that Pueblo Bonito has been, and will continue to be, the center of attention in the park. The challenge of interpretation is to go beyond a focus on structures and artifacts and to show the greatness of Chaco as a regional system, allowing visitors to search for their own answers to the many questions associated with the culture.

Because the theme of the Chaco phenomenon requires significant explanation, the various interpretive media and tour messages will need to be coordinated. Anecdotes associating sites and concepts will be essential. For instance, an aspect of the story that illustrates an important point might appear in several media--turquoise beads found at a site could be talked of there, their manufacture and the transportation of new materials and finished products along the road system can be illustrated by visual media, and the beads can be exhibited in the visitor center. Notions of trade, regional influence, and religion must be presented in a conceptual format and then reinforced by on-the-ground experiences that are preselected for that particular communications purpose.

The primary work experience will begin at the visitor center, where the Chaco phenomenon will be fully described. Once visitors understand the complex interrelationships of the Chacoan people, their visits to the primary ruins--Hungo Pavi, Pueblo Bonito, Chetro Ketl, Pueblo del Arroyo, Kin Kletso, Casa Rinconada, and the prehistoric stairway nearby--may generate numerous questions. The following partial list of topics suggests the range of interpretive themes to be presented:

- regional cultural system
- prehistoric roads and water systems
- Chaco outliers
- settlement patterns
- daily life
- agricultural methods and evolution
- construction methods
- architecture and planning
- social systems
- paleoecology
- abandonment and resettlement
- archeological research - history and techniques

It is proposed that tour guides and roving interpreters stationed at the primary ruins during the peak season provide the critical element in the proposed interpretive scheme. Having first stopped at the visitor center, people will arrive at the ruins with questions on a variety of subjects

beyond the obvious topics associated with ruins architecture. Both the tour guides and the roving interpreters can assist visitors in developing their own theories and ideas about what took place at Chaco. This type of interaction--the attempt to solve the mystery through questions, answers, and hypotheses--will ensure more personalized experiences with the canyon and will offer visitors a chance to become involved by allowing them to draw their own conclusions. This interpretive presence will also provide subtle but important protection benefits. During nonpeak months, limited weekday and weekend guided tours of selected primary ruins will be scheduled to achieve the same interpretive objective. All seasonal interpreters will receive training from Chaco Center staff and the park archeologist to ensure the most accurate presentation of facts.

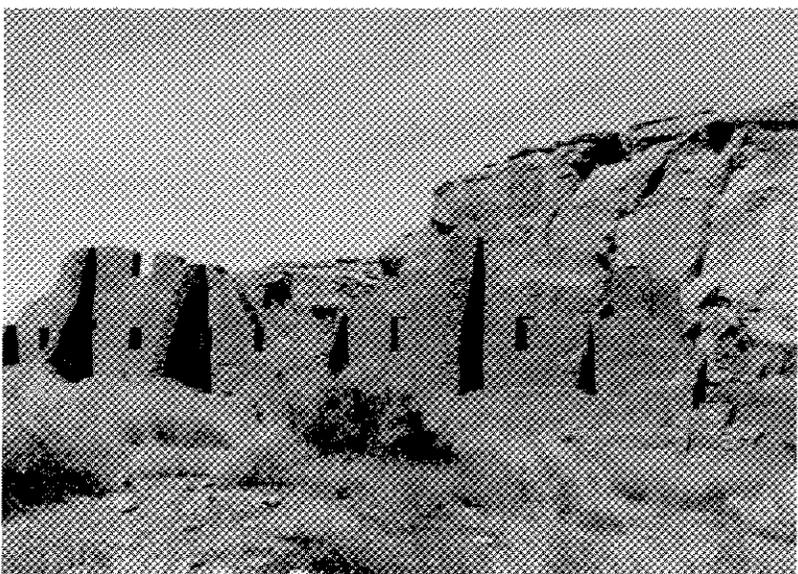
A new series of self-guide publications (professionally written and illustrated) for the primary ruins is proposed to replace the current booklets. The new series will be designed to enhance onsite experiences and to be taken home for additional study of the Chaco story. With minimal repetition, it will highlight the most significant aspects of each primary ruin in relation to the overall story. There will of course be some overlap in themes at sites and in the various types of media presentations. In cases where a feature does not fall conveniently into an assigned category, it should not be overlooked for the sake of organization.

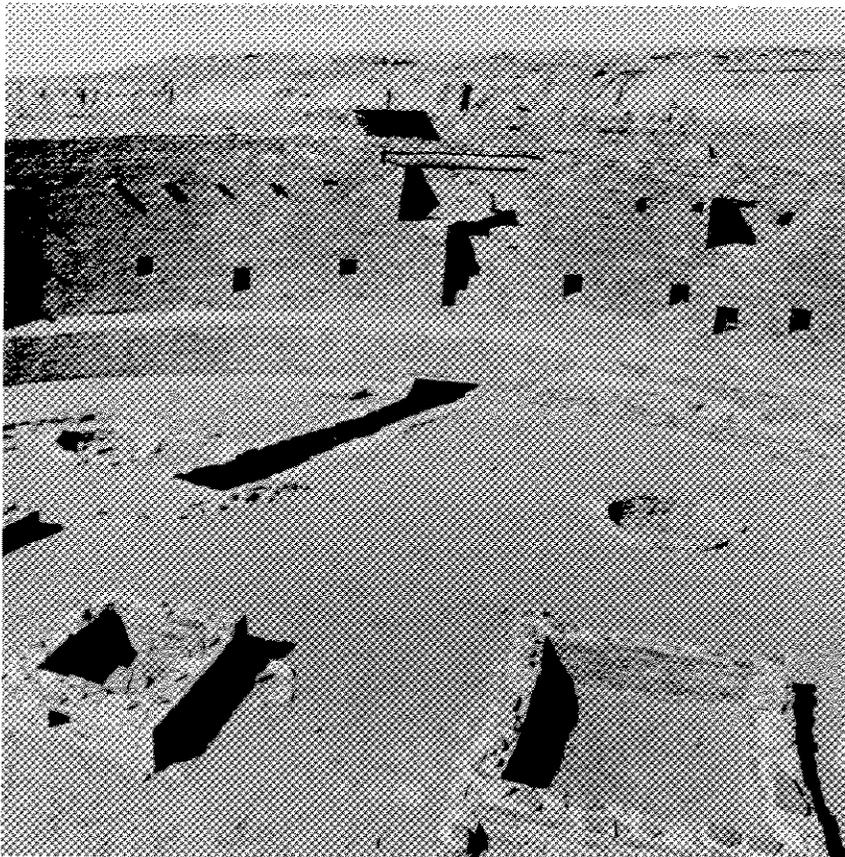
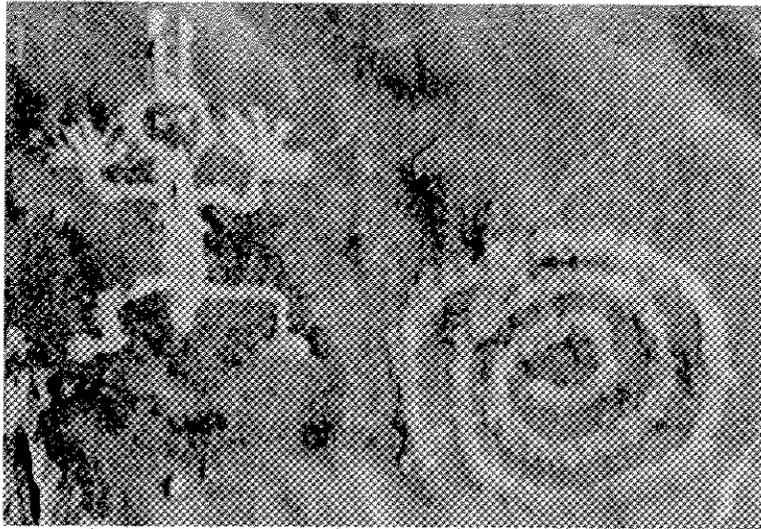
Generally, interpretation for the primary visitor experience will be handled as described in the following sections.

Visitor Center. The visitor center will serve as the main area for presenting the regional overview concept--the Chaco phenomenon--in a major audiovisual presentation; it will also house a display of artifacts from the area to give added dimension to the primary themes presented in the audiovisual program. A specialized lobby exhibit will interpret and answer questions about the Navajo culture and their traditional uses of lands within the Chaco region. During nonpeak periods, visitors desiring more information on specific aspects of the park story will be able to view other brief audiovisual presentations on a range of topics. An audiovisual library of slide/sound or possibly video cassettes will accommodate the specialized interests of groups or individuals during offpeak times when the auditorium is not heavily used. High-priority theme topics for this specialized library include

- Chacoan outliers/prehistoric roads
- developmental complex/evolution of the Chaco culture
- Fajada Butte/solstice marker
- research/stabilization techniques
- Chaco Canyon/a history of archeology
- natural history of the park/paleoenvironments

Although these topics may also be addressed in the audiovisual program and the exhibit area, the specialized presentations will provide in-depth analysis.





During peak periods, programs and other interpretive offerings at the visitor center will be designed to last approximately an hour. A roving interpreter will be assigned at the Una Vida ruin, and visitors will be encouraged to take a short interpretive walk from the visitor center for an introductory experience; provisions will be made for access by the handicapped.

The objective at the primary ruins will be to reinforce the overview concept while focusing on the significant features associated with each site. The tour guides, roving interpreters, and self-guide publications will aid in fulfilling this objective. Visitors will be required to carry their own water for this three- to four-hour interpretive loop experience. Trails will be modified to allow for wheelchair access through at least portions of Pueblo Bonito, Chetro Ketl, Pueblo del Arroyo, and Casa Rinconada; these modifications will be designed to have minimal impact on the ruins.

Hungo Pavi/Mockingbird Canyon Hiking Trail. A 5-space gravel parking area currently provides access to the Hungo Pavi self-guiding interpretive trail. This is the only stop along the interpretive loop road where visitors can view an unexcavated ruin--a time capsule that may someday contribute new information about the Chacoan culture. The existing parking area will also serve as a trailhead for a new 2-mile loop trail that will be developed through Mockingbird Canyon to provide opportunities to explore one of the park's more interesting canyon environments. Rock art will be the focus of this interpretive experience.

Pueblo Bonito/Chetro Ketl. A new 26-space parking area serves both of these ruins (this and all other new paved parking areas were proposed in the 1979 GMP). These ruins represent the Classic Pueblo period of occupancy and create an awareness of the magnitude of Chaco society and architecture at the peak of development and population expansion. Because of the aesthetic and popular appeal of Pueblo Bonito, it is assumed that most visitors will wish to tour this site.

The interpretive objective at Pueblo Bonito will be to point out construction techniques and sequence, masonry styles, and functions associated with the various structures; interpretation will treat only those topics that are represented physically. At Chetro Ketl the presentation will focus on the aesthetic qualities of the ruin and the more conceptual aspects of the Chaco story. The column-fronted gallery will be compared to similar prehistoric architectural features in central Mexico, thus serving as a springboard for consideration of various hypotheses on the origin of certain Chacoan traits. Prehistoric irrigated fields nearby will illustrate discussions on subsistence, trade, and possible reasons for the development of the far-reaching Chacoan system.

The two existing porta-toilets and the metal shelter across the road from the sites will be removed to enhance the setting. A new small comfort station (waterless) will be placed adjacent to the parking area; it will be designed to blend with the canyon features.

Pueblo del Arroyo. A new 20-space parking area provides access to this ruin. Because of its proximity to Chaco Wash, Pueblo del Arroyo is an appropriate area for interpreting the canyon's natural environment--both past and present--encouraging visitors to speculate on how the daily life of the ancient ones might have been influenced by their surroundings.

Kin Kletso Interpretive Trail. A self-guide system will be developed for a proposed 1/2-mile interpretive loop trail in this area, which will also be interpreted in a new, professionally written self-guide publication. Trailhead parking will be at the new Pueblo del Arroyo parking area. The Kin Kletso trail will be part of the primary visitor experience and will be developed for the purpose of integrating both natural and cultural themes. The natural theme presentation will build on the paleoecological concepts presented at Pueblo del Arroyo. The trail will show visitors a cross section of the canyon floor from the exterior wall to Chaco Wash. Interpretation along the trail will focus on natural history, but topics will be selected for their relevance to the larger cultural story.

The Kin Kletso ruin will be the major stop on this trail. The architecture of this ruin (interior kivas, walled-in layout, block masonry, tower kiva), will be contrasted with that of other sites in the park. Climatic and agricultural conditions, as well as social conditions in this last phase of Pueblo life, will be explained.

Casa Rinconada. A new 12-space parking area allows access to the park's largest excavated kiva. The impressive architecture of Casa Rinconada argues for a sophisticated level of social organization, ceremony, and engineering skill. The structures within the kiva provide reference points for imagining the various ceremonies that may have taken place there. How the kivas were used, and in particular how this great kiva may have been used, will be the dominant story at the site. Comparisons will be made with smaller kivas at other sites, with other prehistoric great kivas, and with the kivas still in use in modern pueblos. The role of the kiva in social and cultural institutions will be presented.

Casa Rinconada can also be used to expose visitors to archaeoastronomical theories and the hypothesized use of the structure to mark important days in the solar year. This aspect of great kivas and the kivas' window-niche solstice sun alignments together may illustrate the significance of the solstice. Similar features in other great kivas and the theorized function of the corner door in Pueblo Bonito should be interpreted.

Adjacent to Casa Rinconada are a number of village sites that were occupied contemporaneously with the Classic pueblos. Theories regarding the relationship of these villages (on the south side of the canyon) to the Classic pueblos (on the north side) will be presented.

Prehistoric Stairway. A new 4-vehicle interpretive pullout identifies the stairway from a distance. This feature, on the south side of the canyon east of Casa Rinconada, is an excellent site for encouraging visitors to consider the extent of the Chacoan culture and the relationship of the

canyon to associated outlying sites. The presence of this prehistoric feature should reinforce the regional overview presented in the visitor center.

Backcountry. Nothing dispels the perception of Chaco Canyon as an isolated phenomenon quite as satisfactorily as discovering the more remote ruins and the visible remains of prehistoric roads that lead to even more distant sites beyond the horizon. As visitation increases, the backcountry will offer opportunities for isolated, individual encounters with this environment.

In this plan, backcountry is defined as all areas of the park except the roads and parking areas designated for visitor use, all administratively closed areas, the visitor center complex, the maintenance and housing area, the campground, and the interpretive trails at Una Vida, Hungo Pavi, Mockingbird Canyon, Chetro Keti, Pueblo Bonito, Pueblo del Arroyo, Kin Kletso, and Casa Rinconada. The backcountry areas with high potential for use are depicted in the Visitor Use Areas map and include the existing developed trails to Casa Chiquita, Penasco Blanco, Pueblos Alto, Tsin Kletzin, and Wijiji. The development of loop systems on these trails and the addition of loop trails on Chacra, West, and South mesas will provide many new backcountry opportunities (see General Development map).

Access to all backcountry areas, including the canyon floor, rincons, talus slopes, benches, and mesa tops, will be along simple desert trails and will be restricted to foot travel, except on the Wijiji trail, which will also be open to bicyclists. A separate self-guide publication will cover a range of backcountry themes but will be tailored to build upon the park's interpretive story.

Atlatl Cave and Fajada Butte will be closed to the general public. Atlatl Cave is significant as a research site, with fragile cultural materials dating back approximately 10,000 years. Fajada Butte contains vulnerable, controversial, and perhaps very significant archeological sites including a solstice marker; in addition, it is receiving excessive attention because of recent publicity, and it presents potential safety hazards to visitors. Use of Fajada Butte will be by permit only and will be restricted to

Native Americans using the site for religious purposes (requests for access to be supported by tribal leaders, including religious leaders)

Researchers with antiquities permits or with research proposals approved by the superintendent, after consultation with the Division of Anthropology, Southwest Cultural Resources Center, and cleared only when the proposed research is nondestructive

National Park Service personnel on well-justified official business approved by the superintendent

General access to Fajada will be prohibited, and all routes posted to indicate closure. Mapping and nondestructive analysis of the butte's cultural resources will be completed at the earliest possible date. Park staff will patrol and monitor to enforce closure and identify impacts on cultural features on the butte.

The solstice marker and other archeoastronomical features represent an important element of the Chaco story. Because onsite experiences may not be possible for the general public, this element will be interpreted in the visitor center exhibit and/or an audiovisual presentation.

Detached Park Units. The park's three detached units--Pueblo Pintado, Kin Ya'a, and Kin Bineola--are representative of the Chaco outlier system. During the peak season only, weekend guided tours originating at the visitor center are proposed to provide opportunities to experience these units. When legal authority is granted for access to the units, small parking areas and trailheads will be developed for self-guided visits. These large, remote outliers will likely attract visitors who are seeking a more complete understanding of the cultural system. The interpretive objective will be to explore the relationship between the outliers and the canyon sites.

Visitors will be encouraged to visit other regional Chaco outliers on their own, such as Aztec National Monument, Salmon ruin, Chimney Rock (a Forest Service site--by reservation only), and Casamero. These regional outliers, with the exception of Casamero, provide formal interpretive programs.

Previsit Information. The visitor's experience at Chaco can be enhanced by an introduction to the area before arrival. The staff should encourage the preparation of relevant publications by authors and publishers within and outside the National Park Service. Methods for alerting arriving visitors of the limitations of the Chaco experience and how to properly prepare for it are needed too. Signs at the start of the monument access roads currently warn of the lack of facilities ahead, but this is often too late for visitors to do much except get gasoline. The use of regional travel guides, road maps, newspapers, and magazines will be explored in providing information to visitors before they reach the park entrance. This previsit information will also be placed in state and local government information centers and offices and in other public and commercial establishments in the region to assist visitors in trip planning.

Wayside pulloffs will be developed at the principal access points to Chaco Canyon (Blanco, Nageezi, and Seven Lakes) to provide basic information for people coming to the park. Legal authority will be required before these wayside stops can be constructed, because the lands are not administered by the Park Service.

## Access and Circulation

Two factors have had a direct bearing on proposals for access and circulation within Chaco: (1) the need to establish carrying capacities in the primary visitor use area that will encourage desired visitor experiences, and (2) the potential for substantial increases in visitation as a result of regional growth trends, including the fact that there is a significant possibility that the northern access road (NM 57) will be upgraded to an all-weather road during the life of this plan.

Carrying Capacity of the Primary Visitor Use Area. From a physical standpoint, the ruins within the park can sustain fairly high visitation levels. They have long been maintained to offset the effects of weather. Surfaces that are exposed to visitor wear are mainly durable sandstones, and because of their tough quartz grains and strong internal cementing agents, they last a long time. Treads in many places where visitors pass are not original; in others they can be replaced with nonoriginal fabric when present surfaces deteriorate. Wear from visitor use is thus comparatively minor and localized, and techniques are available to offset it. However, the "social carrying capacity" of the ruins is reached long before significant physical damage might occur. Saturation points are difficult to judge, because individuals react differently--favorably or unfavorably--to varying levels of use. However, it is assumed that large numbers of people detract more from the setting than add to it. The plan therefore recommends that the following carrying capacity ranges be used as a guide to help ensure quality experiences at the primary park ruins:

<u>Ruin</u>	<u>Number of People (at any one time)</u>
Hungo Pavi/Mockingbird Canyon	10-15
Pueblo Bonito/Chetro Ketl	70-90
Pueblo del Arroyo	15-25
Kin Kletso	20-30
Casa Rinconada	30-40
Stairway (observation pulloff)	10-15

The sizes of the new parking areas along the interpretive loop road will accommodate these ranges:

<u>Interpretive Loop Parking Area</u>	<u>Parking Spaces</u>	<u>Number of People (parking spaces x 3)</u>
Hungo Pavi/Mockingbird Canyon	5	15
Pueblo Bonito/Chetro Ketl	26	78
Pueblo del Arroyo/Kin Kletso/ backcountry trailhead	20	60*
Casa Rinconada area	12	36
Stairway pulloff	4	12
Total	<u>67</u>	<u>201</u>

\*This figure exceeds the carrying capacities for Pueblo del Arroyo and Kin Kletso because the parking area also serves as a trailhead for backcountry hiking.

Because the parking areas reflect the social carrying capacities of the ruins, they can be monitored to determine when the capacities are being exceeded and desired visitor experiences are likely to be diminished.

The 1982 visitor use figures suggest that Chaco has already achieved or is very near its carrying capacity during the peak season months. During the three peak months, the interpretive loop parking areas were full on all holidays and weekend days and 20-30 percent of the time on weekdays (see appendix D for details). Therefore, even with modest increases in visitation over the next 10-15 years, the social carrying capacity of the ruins and the parking areas along the interpretive loop road will be exceeded on an almost continuous basis during these months. Although the ruins can sustain such visitation levels, visitor experiences will be sacrificed accordingly. To ensure desired visitor experiences and to maintain the existing setting, this plan proposes that a regulated access system be instituted and tested on the interpretive loop road during peak periods. If this system proves inadequate to handle increasing visitation, alternative public transit systems will be studied, and the most feasible system will be selected and implemented. These two access systems, along with other proposed improvements, are described below.

Proposed Circulation. As shown on the General Development map (see the "Visitor Support Services" section), visitors will enter Chaco Canyon along the newly paved Gallo Wash entrance road, which will bring them directly to the visitor center for orientation and information (1979 GMP proposal). The Clys Canyon entrance road will then be abandoned, eliminating through-access at the west end of Chaco Canyon to better ensure visitor safety and improve protection of primary cultural features.

Through-traffic will continue indefinitely to mix with visitor traffic along the Gallo Wash entrance road. However, the Gallo Wash bypass will divert through-traffic away from the visitor center, helping to minimize

noise, vibration, and visual impacts caused by commercial or industrial vehicles. If an alternate route becomes available in the future, a long-range goal is to completely eliminate through-traffic from the park.

The interpretive loop road currently accommodates two-way traffic. To improve traffic flow and reduce congestion, it is proposed that, after leaving the visitor center, motorists follow a counterclockwise one-way interpretive loop through the primary ruins area. Traffic will move in a counterclockwise direction for two reasons: First, many visitors have strong desires to visit the well-known ruins, particularly Pueblo Bonito, and are likely to cut short interpretive experiences at less spectacular sites. Second, neither one-way circulation pattern is better in terms of a chronological progression because of contemporaneous and overlapping periods of site occupancy. Counterclockwise movement will allow visitors to satisfy their initial eagerness to view the Classic ruins and then relax and give due consideration to the other sites.

The interpretive loop road and five parking areas will continue to provide access to the seven primary cultural features in the ruins area (Hungo Pavi, Pueblo Bonito, Chetro Ketl, Pueblo del Arroyo, Kin Kletso, Casa Rinconada, and adjacent ruins, and the prehistoric stairway). All but one of the parking areas are adjacent to major ruins (the stairway pulloff allows visitors to view this feature from a distance). Portions of the primary ruins, except the stairway and Kin Kletso, will be accessible to the handicapped. Bicycling will be encouraged along the loop road and the Wijiji trail, especially during the spring and fall seasons when temperatures are comfortable and traffic is fairly light. Bike racks will be placed at the visitor center, all loop road parking areas, and Wijiji.

The loop road will normally be open to unrestricted travel. During the peak season and at other times when the 67 parking spaces reach capacity, a regulated access system will be instituted to prevent overcrowding in the primary use area. (Peak season is generally from June through August.) This regulated access system may be instituted immediately to handle peak weekend use and will likely become a permanent feature during the peak season even if only modest increases in visitation occur in the next 10 years. Park managers will experiment with several techniques for regulating the flow of traffic entering the interpretive loop road and will implement the most efficient system. The visitor center is the logical place to hold people waiting to enter the loop road. Even during the peak season, waiting time should be less than an hour. While there, people will be encouraged to view an audiovisual program, visit the exhibit area, and then take a short self-guided walk to nearby Una Vida ruin, where a roving interpreter will be stationed. The access system will provide a reasonable and low-cost method for regulating visitation in the primary ruins area during periods of heavy use.

If visitation begins to approach high-growth levels (150,000+ per year)--which is likely to occur if the northern access road is upgraded--it may become economically justifiable to institute a transit system, as discussed in the 1978 transportation study for Chaco Canyon

National Monument. However, it should be stressed that a transit system will only be feasible when access to the park improves and/or visitation increases significantly. If a transit system appears to be warranted, the 1978 study will provide the basis for evaluating management and operation considerations and for selecting the most appropriate system. Any system selected will have to be economically self-supporting.

Both the regulated access and transit systems will have to be designed to ensure that visitation levels are within the social carrying capacity of the primary ruins and that expansion or addition of parking areas is not required.

Backcountry access will be by registration only, and registration boxes will be placed at the visitor center, campgrounds, parking areas, and trailheads. Hungo Pavi will serve as the trailhead for the new loop hiking trail through Mockingbird Canyon. The Kin Kletso trail, originating at the Pueblo del Arroyo parking area, will provide access to the new backcountry loop trail to Casa Chiquita, Penasco Blanco, and other nearby sites. The same parking area will serve as the trailhead for the existing north canyon rim overlook trail leading to Pueblos Alto. The existing trail to Tsin Kletzin will be expanded into a loop trail, and access will be from the Casa Rinconada parking area. Trailhead parking for access to Chacra Mesa and Wijiji will be near the Gallo Wash entrance road.

All trails will be located to minimize impacts on natural and cultural resources. Directional signs will be placed at all trailheads and junctions. Park staff will monitor backcountry activities using the registration system, patrols, and stationary surveillance. The policy of prohibiting backcountry camping, fires, and motorized vehicles will be continued.

Travel Time. At present the nearest towns with lodging and food services are at least 1½ hours' driving time from Chaco Canyon, so visitors not camping in the park have to obligate a minimum of 3 hours' travel time (to and from the park) during the course of a day. These hours must be considered when designing the interpretive program. A long program would be a burden to those not willing or able to drive in darkness or bring food for more than one meal. On the other hand, a short program would be a disservice to the public and to the integrity of the Chaco story. Therefore, the interpretive experience at Chaco Canyon should not be longer than 6 hours, allowing visitors to leave their lodgings at 9:00 a.m., after having had breakfast, and be comfortably back for dinner by 6:00 p.m.

If NM 57 is improved to an all-weather road in the future, visitation patterns will likely change dramatically. With reliable access, the peak season will probably extend more into the fall and winter months (see appendix D), and with travel time reduced, visitors will have more time to spend in the park. If this occurs, interpretive programs and services will be modified to reflect changing visitor needs.

## Visitor Support Services

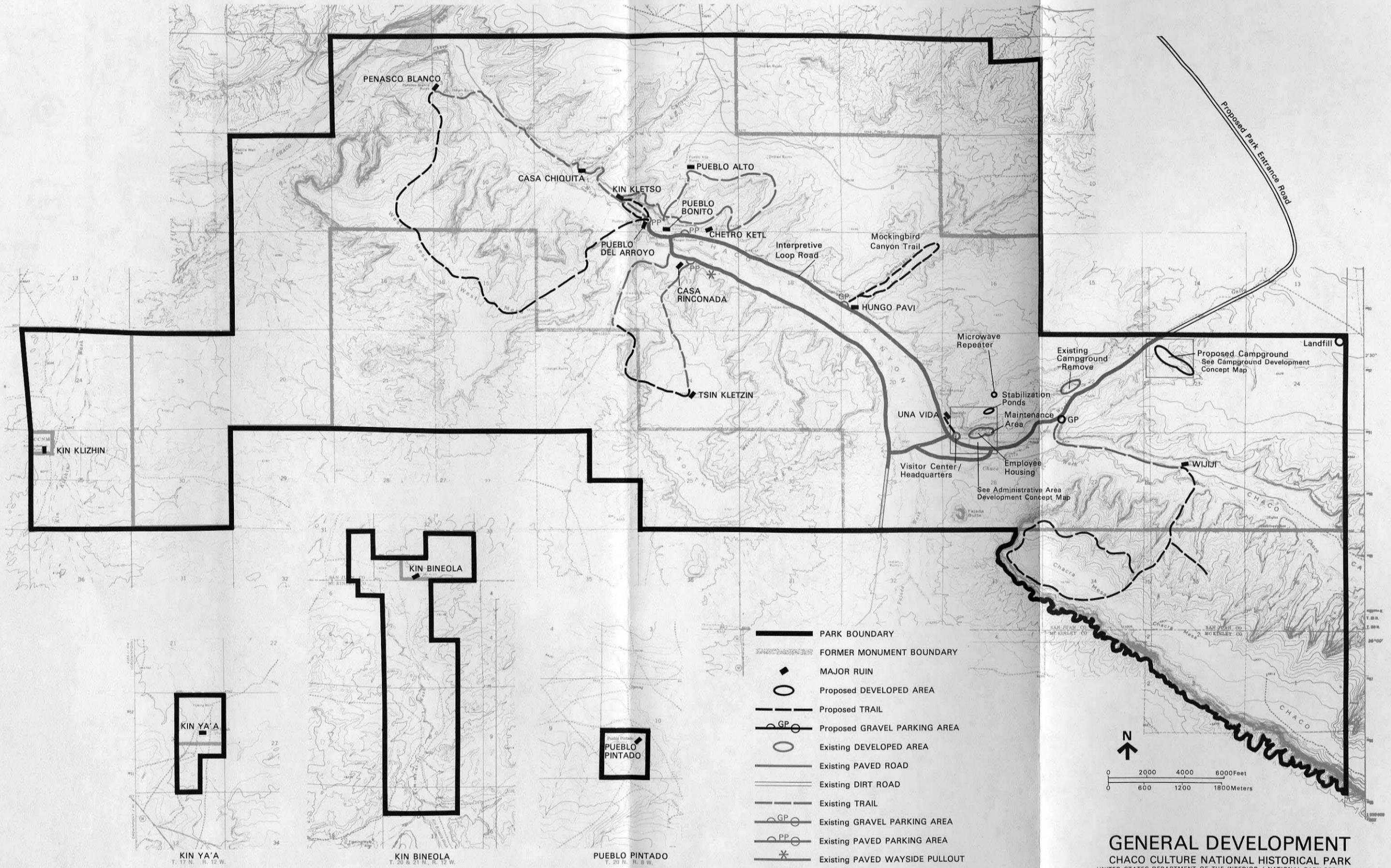
Traditionally, this remote park has provided few services to accommodate visitors. The long distance and associated high costs required to replenish supplies severely restrict the park's ability to provide such amenities. As a result, visitors to Chaco have a "rustic" encounter with the park, and for many this contributes to a better understanding of the Chaco story. This plan proposes a continuation of only basic visitor services--limited food service, potable water, campsites, and emergency assistance.

Camping. The present campground is within 100 feet of the newly realigned entrance road and is also within the 100-year floodplain, which poses potential health and safety problems. The new elevated road realignment may aggravate the flooding problems already associated with the present location. Further, the campground's proximity to the entrance road decreases the quality of the camping experience.

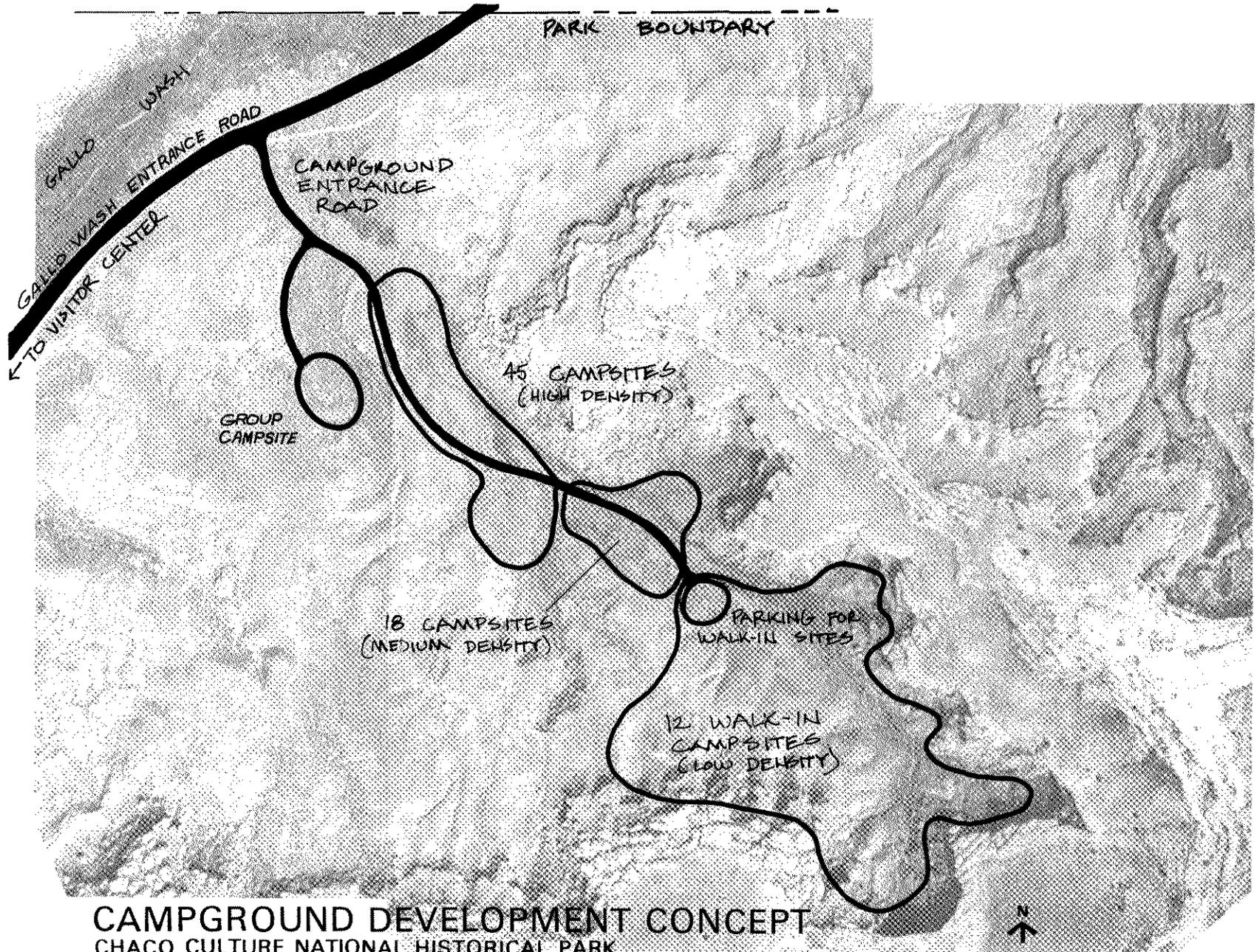
In an effort to avoid flood-related problems, a new campground with a maximum of 75 individual sites and a group camping area will be developed near the Gallo Wash entrance to the park, as shown on the General Development map. The campground will accommodate various camping styles, including recreation vehicle, walk-in (tent), and group camping (see Campground Development Concept). The present campground will be obliterated, and the site restored. Potable water lines will be extended from the existing well to the new campground, and three chemical toilets will be provided to meet camper needs. This will reduce congestion at the visitor center, where all visitors must currently obtain drinking water, and will provide a more convenient potable water source for overnight visitors. The sanitary station for travel trailers at the entrance to the existing campground will be retained.

Picnicking. This plan expands upon the 1979 proposals for picnic facilities at the visitor center. The visitor center approach currently hosts a walled courtyard and patio with a shade ramada and plantings that provide a pleasant outdoor sitting area. A new picnic area adjacent to the visitor center will provide up to 12 tables with shade ramadas. During peak periods, when the regulated access system is instituted, the picnic area will provide a place for people to relax and lunch before entering the interpretive loop road. The design of the picnic area will reflect the architectural character of the visitor center, and the tables will be placed to minimize their visual intrusion on the area. The existing restrooms in the visitor center will be modified to permit easy access by picnickers.

Food/Gas. No gas station services will be available in the park. The Park Service will continue to inform potential visitors, by all practical methods, that there are no such services at Chaco or in the vicinity. Snacks, cold sandwiches, fruit, and soft drinks will be provided by park management at the visitor center.



**GENERAL DEVELOPMENT**  
**CHACO CULTURE NATIONAL HISTORICAL PARK**  
 UNITED STATES DEPARTMENT OF THE INTERIOR / NATIONAL PARK SERVICE



# CAMPGROUND DEVELOPMENT CONCEPT CHACO CULTURE NATIONAL HISTORICAL PARK

UNITED STATES DEPARTMENT OF THE INTERIOR / NATIONAL PARK SERVICE

310 / DSC / JUNE 84 - 20015A

250 Feet

Restrooms and Drinking Water. Restrooms will be available at the visitor center, Bonito/Chetro Ketl parking area, and new campground. Drinking water will be available both inside and outside the visitor center and at the new campground.

## RESOURCES MANAGEMENT

The National Park Service will continue to preserve and protect both the cultural and natural resources of the park. While these preservation efforts will generally be compatible, conflicts may arise, for instance, the effects of wash erosion on archeological sites. In these instances, management of cultural resources will take precedence over management of natural resources, according to applicable law, regulation, and NPS policy.

Except for management of the addition lands, this document only updates natural resources management proposals contained in the 1979 general management plan.

### Park Influence Area

In recent years interest in resource exploration and development has increased dramatically in the San Juan Basin. Although activities have slowed somewhat due to the decline in the uranium market, several major proposals are still under consideration and other activities could resume as the economy improves. These projects and activities, which include a major power plant, transmission lines, a railroad line, coal mining, oil and gas development, and road improvements, may have significant effects on the park. The Park Service will monitor mineral activities in the vicinity of Chaco and will work with other management agencies and private entities to minimize adverse effects resulting from these actions.

### Cultural Resource Management

A resource management plan is currently being prepared, which will reflect the general strategies outlined in this document. Following are the major proposals for cultural resources management.

Treatment of Major Stabilized Ruins. All exposed walls will be stabilized to NPS standards. Thereafter, about 15 percent of the exposed fabric will receive stabilization maintenance annually to counteract normal deterioration.

A backfilling program will be instituted in portions of the major stabilized ruins to reduce the maintenance and preservation workload. The park archeologist and the staff of the Division of Cultural Research, Southwest Regional Office, will determine the research necessary to implement this program, including collection of wood samples for dendrochronology, selected subfloor testing, and recordation of features. Backfilling

projects will include the design and installation of comprehensive drainage/erosion control systems, the treatment of exposed structural members with preservatives, and the use of culturally sterile fill that is compatible with site soils. These projects will reduce maintenance and preservation efforts in designated rooms or structures by

eliminating the need for periodic mortar repointing

eliminating the need for periodic veneer replacement

providing support for standing walls

equalizing differential fill and thereby equalizing pressure on walls (where an excavated room adjoins an unexcavated one, backfilling will equalize the pressure; rooms will not be backfilled if this would cause damaging pressure on adjoining excavated rooms that cannot be backfilled)

reducing drainage problems by eliminating water-holding capacities of the excavated rooms

Rooms to be backfilled will be selected so as not to diminish NPS interpretive efforts or the visitor experience on the specified tour routes. The following illustrations show the approximate areas to be filled; final determinations will be based on further research and study that will be presented in programmed historic structure reports. Present estimates indicate that approximately 30 percent of the total rooms can be backfilled.

Because of the large number of historic structure reports required for the park, a 20-year implementation program is proposed:

<u>5 Years</u>	<u>10 Years</u>	<u>15 Years</u>	<u>20 Years</u>
Tsin Kletzin (completed '81)	Wijiji	Kin Klizhin	Shabikeshchee
Kin Nahasbas	Hungo Pavi	Pueblos Alto	
Chetro Ketl	Penasco Blanco	Rabbit Ruin	
Talus Unit One	Kin Kletso	Una Vida	
Pueblo Bonito	Kin Bineola	Casa Chiquita	
Pueblo del Arroyo	Pueblo Pintado	Kin Ya'a	

Historic structure preservation guides will be prepared for those structures listed in the five- and ten-year priorities above. Maintenance of the other structures and sites will be based on instructions in the proposed cultural resources preservation guide. That guide will provide detailed guidelines for treating all the park's cultural resources in the course of day-to-day operations.

Collections. The Division of Cultural Research (NPS) and the University of New Mexico (Albuquerque), through a memorandum of agreement, are currently working to establish a repository for the curation, study, and display of collections from Chaco Culture National Historical Park and other Chacoan sites. This cooperative effort is a continuation of a research relationship that began in 1949 and was strengthened in 1969 with the formation of the Chaco Center. The involvement of other land-managing entities that have Chacoan Anasazi collections (the Navajo Nation, Bureau of Land Management, U.S. Forest Service, Bureau of Indian Affairs, and state of New Mexico) will also be sought in order to form a truly regional repository.

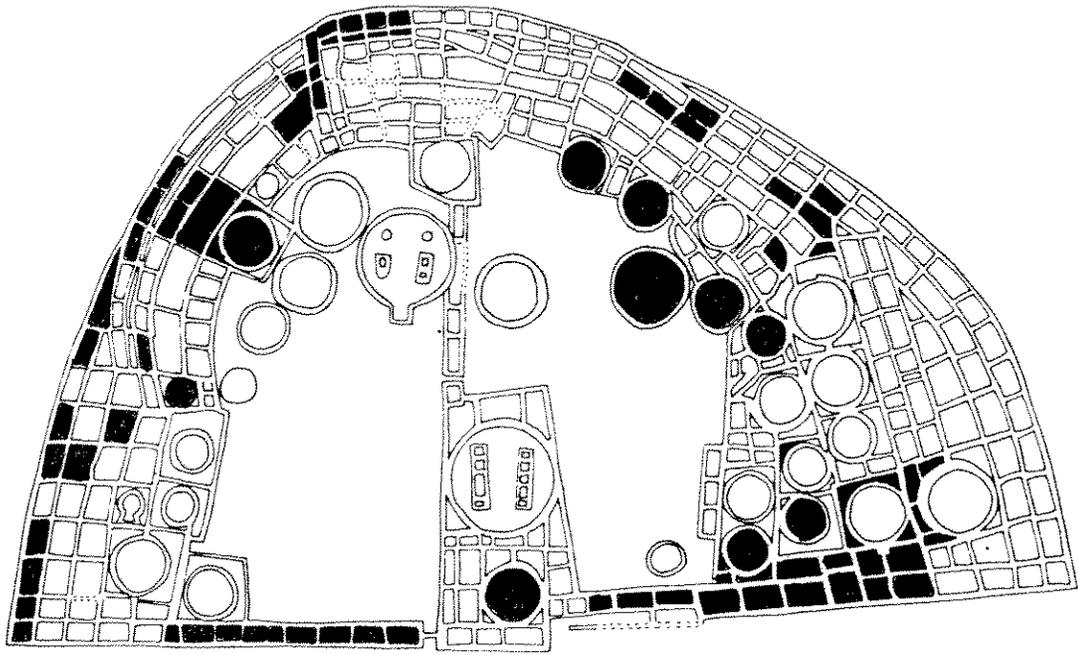
A smaller repository will be maintained at the park. The park collection will be large enough to broadly define and illustrate the cultural characteristics and day-to-day existence of the Anasazi peoples who lived in and near Chaco Canyon.

The proposed scope of collections statement will outline the scope, types, range, variation, amount, and quality of artifacts, documents, etc., necessary for NPS research, reference, interpretation, and exhibit needs. The park collection will need to be of a size and quality adequate to serve the above-mentioned uses. Specific collections management and maintenance requirements will be detailed in a collection preservation guide to be prepared by the park archeologist and the regional curator. Additional space will be provided for the proper storage of the park collection.

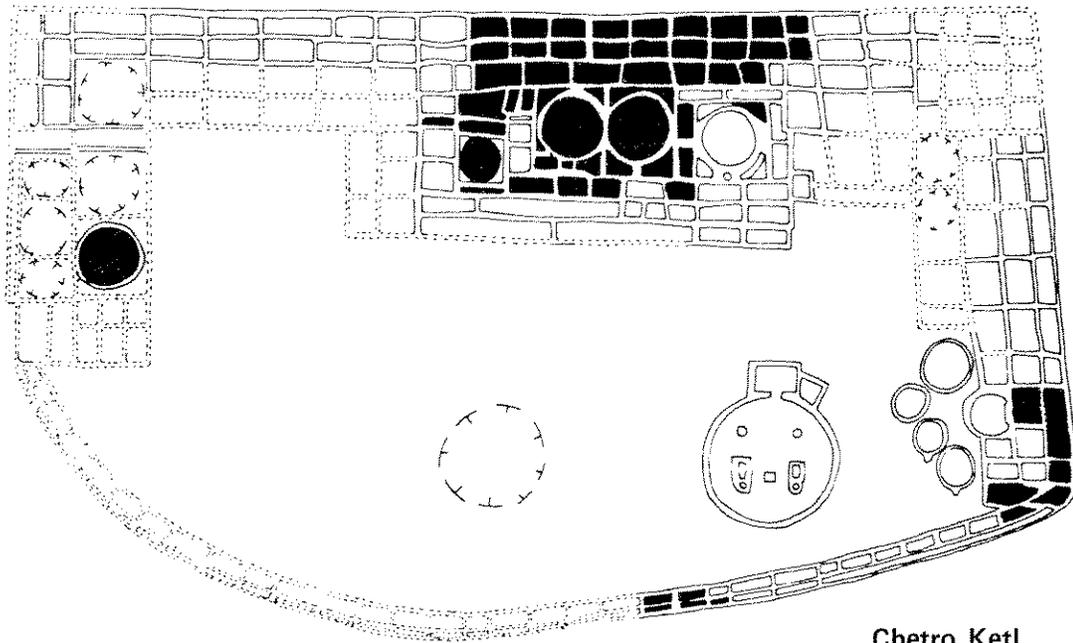
All collections that resulted from archeological work within the park, including those objects held by other institutions, will be accessioned.

Research. Congress has instructed the National Park Service to "continue such research and data gathering activities as may be appropriate to further . . . knowledge of the Chaco culture" (PL 96-550). The goals of such research are, according to the act, to gather sufficient baseline data to permit the development of recommendations for the long-term management of the Chacoan cultural resources and to acquire and analyze data relevant to various cultural models that address the origin, growth, function, and decline of the Chacoan system.

Because a primary research goal is further understanding of the Chacoan system, a regional perspective will be a critical criterion in the selection of research proposals. Examples of pertinent research topics include trade within and outside the Chacoan sphere of influence, roads and outlying communities, and subsistence techniques (irrigation systems, etc.). From the perspective of current archeological theory, other potential topics might include paleoenvironmental reconstruction, pre-Anasazi adaptations, and early Navajo chronology and settlement patterns. Historical and perhaps archeological research might clarify the nature of early archeological efforts, thus contributing to the history of American archeology. Specific research guidelines will be included in the park's resource management plan, which is in preparation.



Pueblo Bonito



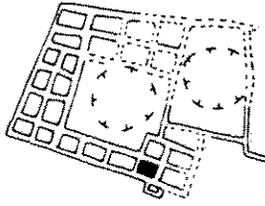
Chetro Ketl

-  EXCAVATED ROOM
-  PROPOSED BACKFILL
-  UNEXCAVATED ROOM

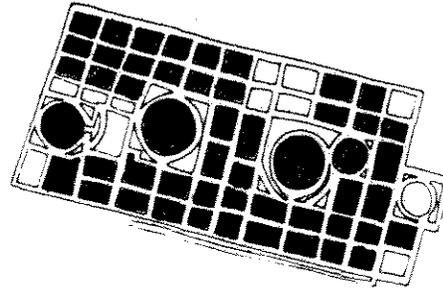


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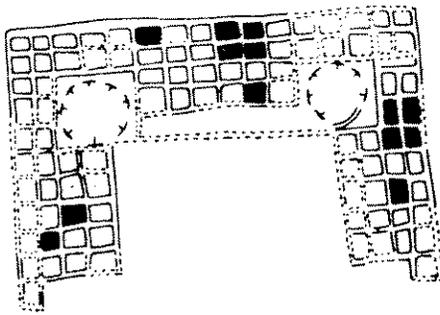
RUINS BACKFILL CONCEPT



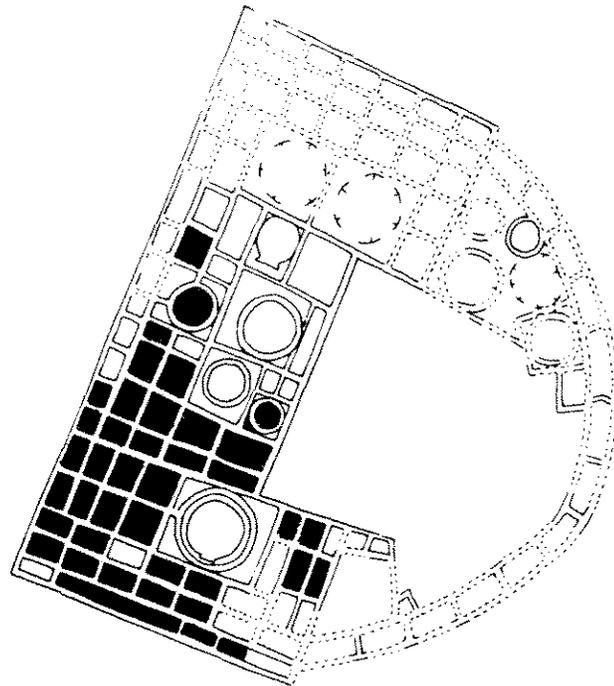
Casa Chiquita



Kin Kletso

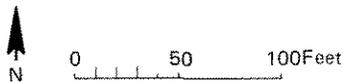


Wijiji

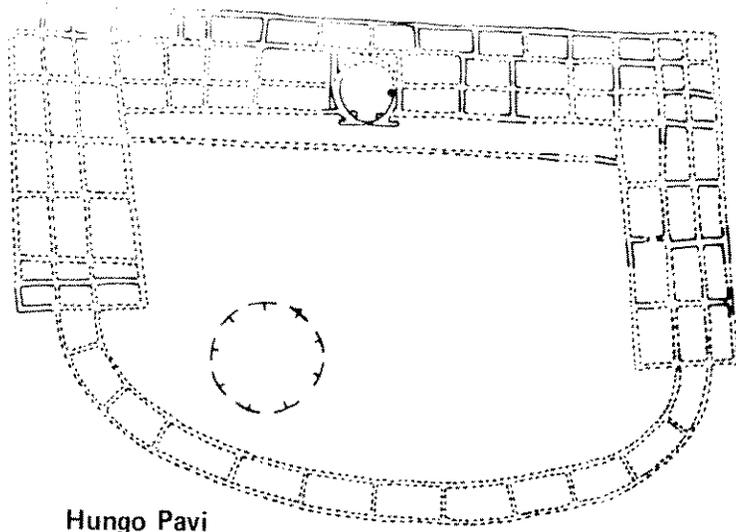


Pueblo del Arroyo

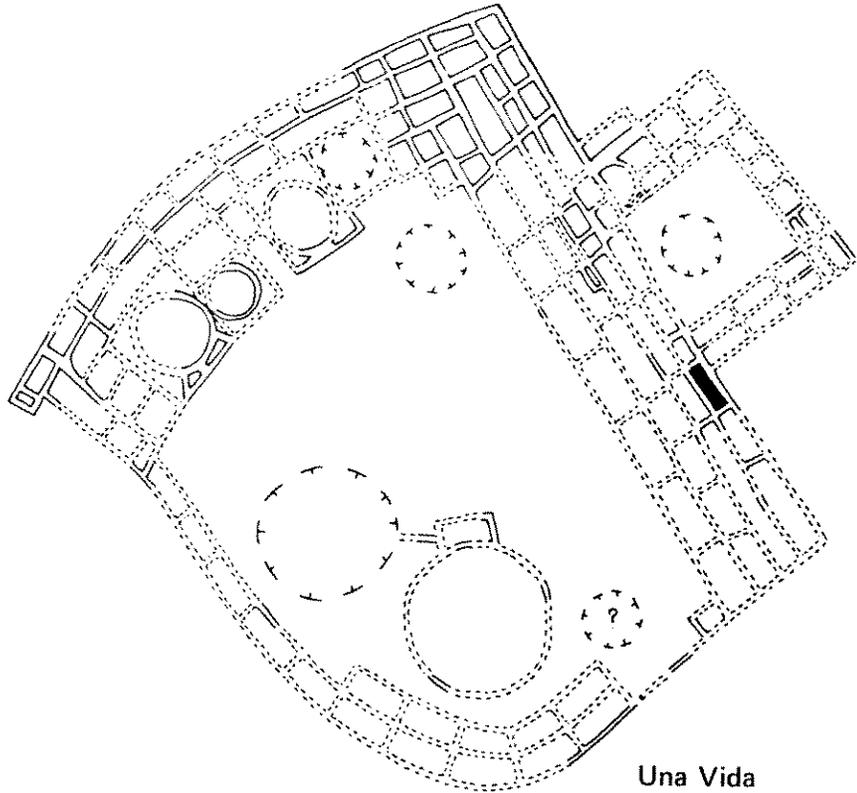
-  EXCAVATED ROOM
-  PROPOSED BACKFILL
-  UNEXCAVATED ROOM



**RUINS BACKFILL CONCEPT**



**Hungo Pavi**



**Una Vida**

-  EXCAVATED ROOM
-  PROPOSED BACKFILL
-  UNEXCAVATED ROOM



0 50 100Feet

**RUINS BACKFILL CONCEPT**

In accordance with NPS policy, research will be encouraged within the park, whether directed to a particular planning or management problem or conducted to provide general data for preservation, management, or interpretation. However, because much archeological research is destructive, representing an irreversible and irretrievable commitment of resources, all research will have to be adequately justified and professionally conducted.

Cultural Resource Compliance. Section 106 of the National Historic Preservation Act of 1966, as amended, directs federal agencies to consider the effects of their actions upon cultural resources and to allow the Advisory Council on Historic Preservation to comment on proposed undertakings. The "Protection of Historical and Cultural Properties" regulations (36 CFR 800) detail procedures for compliance with section 106 and other sections of the act. The regulations provide for the grouping of related actions, or "programs," requiring compliance with section 106. Under this provision, the National Park Service has entered into a programmatic memorandum of agreement with the Advisory Council on Historic Preservation and the National Conference of State Historic Preservation Officers. This agreement allows the completion of the section 106 compliance requirements for all actions described in this plan, eliminating the need to complete the procedures on a case-by-case basis for individual actions.

The Advisory Council and the New Mexico historic preservation officer have participated in this planning effort, lending their expertise to ensure that cultural resources were adequately considered.

All actions taken pursuant to this plan will be certified by NPS regional cultural resource specialists as (1) consistent with all relevant management policies and standards, (2) adequate in documenting effect, (3) incorporating all feasible mitigating measures, and (4) within the scope of the programmatic memorandum of agreement. The NPS "Assessment of Effect on Cultural Resources" form will be used in this certification. It will be prepared by the park archeologist and then sent to the regional cultural resource specialists for review.

In accordance with the first amendment of the Constitution, the American Indian Religious Freedom Act of 1978, the National Park Service's "Native American Relationships Policy, Management Policy" (Federal Register 11/26/82), and other NPS policies, the superintendent will maintain communications with native American groups whose religious practices may be affected by park management actions or programs. Nondestructive ceremonial use of sites within the park will be allowed, subject to NPS policies and regulations regarding religious activities and public assemblies ("Management Policies," chapter 7). Park management will work cooperatively to permit continuation of religious and ceremonial practices by individuals and groups who have traditionally used the park for such purposes.

## Natural Resource Management

The following is a summary of the major projects recommended for managing natural resources at Chaco; projects are listed in priority order. Additional details on these and other projects will be included in the park's resource management plan.

Soil Erosion. The most important natural resource problem at Chaco is soil erosion, which also significantly affects cultural resources. Chaco Wash and its tributaries drain almost 400,000 acres (161,878 ha) of overgrazed, sparsely vegetated land. Rapid runoff coupled with the nearly impervious clay soils of Chaco Canyon causes this accelerated erosion, resulting in the formation of destructive gullies and soil pipes (Simons, Li & Associates 1982a). These gullies and soil pipes have destroyed several small archeological sites and in the past have caused roads and culverts to collapse.

Between 1930 and 1968 various erosion control projects were undertaken to reduce this increasing damage. These included spider jetties, rock jetties, brush bundle jetties, cable rail fences, earth dams, drop structures, contour furrowing, channel realignments, culverts, tree plantings, and post/wire dams. Little work took place during the 1970s, and because of the lack of periodic maintenance, many structures were partially destroyed or rendered useless for erosion control purposes. The effectiveness of some of the early projects is also in question. Some structures may have aided rather than curtailed erosion.

Three major ruins are threatened by erosion. Soil pipes and gullies have developed within 10 feet (3 m) of Pueblo del Arroyo; Chaco Wash has cut to within 40 feet (12 m) of Kin Kletso; and soil pipes and large gullies have developed within 75 yards (64 m) of Wijiji.

In 1980 a renewed effort to combat erosion began. The park has completed numerous small erosion control projects using in-house day labor. In 1982 a comprehensive erosion study was completed by Simons, Li & Associates (SLA), which includes a conceptual erosion control plan. A more detailed study of soil piping by the same firm has just been completed. Annual funding has been established for erosion control work to implement selected recommendations in the SLA studies. Each project will be assessed individually, and an overall priority for funding and implementation will be determined. Erosion control devices will require routine and cyclic maintenance to remain effective in preventing the destructive effects from recurring. All devices will be monitored on a regular basis to assess their effectiveness and need for maintenance action. The Park Service will also work with adjacent landowners and manager to improve range conditions and reduce runoff.

Air Quality. Existing and planned energy development in the San Juan Basin could have significant impacts on the air quality at Chaco, which in turn could adversely affect archeological resources because of the introduction of chemical particles in the air and the resulting formation of destructive acids and decomposition of ruin walls. Visibility, which

contributes to the interpretive experience at the park, could also be affected.

Chaco has the only permanent air quality monitoring station in the San Juan Basin. Since mid-1978 visibility has been monitored from Pueblos Alto using a contrast telephotometer. In late 1978 a total suspended particulate sampler was installed, and in 1979 a fine particulate sampler was added. The Chaco station is part of the system of air quality monitoring stations at NPS areas throughout the West. The instruments allow the Park Service to measure visibility and determine the nature of the material degrading the atmosphere. The data provide baseline information needed to protect air quality around the parks and can be used to assess proposals that may affect visibility. The data gathered at Chaco are also valuable for monitoring air quality in class I air quality areas in the region--Mesa Verde National Park, San Pedro Park's wilderness area, and possibly Bandelier National Monument's wilderness area. The Park Service will continue this critical monitoring program and will work to minimize the adverse effects of surrounding development on regional air quality.

Water Resources. Water utilization and runoff in the park and surrounding area are of critical importance for reasons in addition to the soil erosion problem, and energy development in the vicinity of the park could seriously affect this scarce resource. Mine dewatering could lower the water table, increase turbidity in underground aquifers, and create unnatural perennial streams in normally dry washes. The last condition exists in the Kin Bineola unit because of dewatering at a uranium mine south of the area.

In 1975 the U.S. Geological Survey began stream-gauging operations on Chaco Wash under a cooperative agreement with the Park Service. In 1979 operations were expanded by the Park Service to include Fajada Wash. Water quality is monitored at the Chaco Wash highway bridge. Underground water quantity and quality are also monitored at the wells in the park. This data will provide valuable baseline information for assessing potential changes in the hydrological regime that could result from nearby actions.

Vegetation Management. Grazing will continue to be excluded from the preservation and park development subzones, as discussed in the "Land Management" section. However, because this activity will continue to be allowed in the special use subzones, the grazing management plan will include provisions to reduce adverse effects on vegetation in these areas. Although there are no plants known in the park that are listed or proposed for listing by the U.S. Fish and Wildlife Service as endangered or threatened, there may be some species that are under review for listing. These plants do not have legal status, but efforts will be made to protect them by locating, monitoring, and minimizing impacts, if any, until their status is determined by the Fish and Wildlife Service.

Wildlife Management. Protection from hunting, trapping, or molestation on lands owned by the Park Service will continue to be the primary method

of preserving native wildlife in the park. Wildlife preservation will also be attempted on lands within the park boundary that are not owned by the Park Service through the establishment of cooperative agreements. The Park Service will monitor wildlife populations through the use of transects and other appropriate research techniques. Although there are no known endangered or threatened animal species in the park, prairie dogs, which are essential in maintaining black-footed ferret populations, inhabit certain areas. Prairie dog towns will be protected wherever possible.

## SUPPORT DEVELOPMENT/OPERATIONS

This plan stresses the need to restrict all future development within the park, and especially on the canyon floor, to the development areas identified on the Management Zoning map in order to define the limits of potential surface-disturbing activities within the park. (The only exceptions will be for park trails, erosion control features, and actions necessary to protect cultural resources.) These designated development areas provide an adequate land base for both operations and visitor support.

### Staffing

One of the most immediate concerns is to expand the staff to meet the park's minimum interpretive needs and to ensure adequate surveillance and protection of cultural resources. Even with current visitation, Chaco is so understaffed that visitors rarely have an opportunity to talk to an interpreter. Guided tours are infrequent, and there are not enough employees to provide roving interpreters--even at the most popular ruins. Exclusive reliance on self-guide publications and outdoor exhibits limits visitor understanding and appreciation of the extent and complexity of the Chaco phenomenon.

Assuming modest increases in visitation, 7 seasonal employees will be needed to bring the interpretive program up to standard. If visitation reaches the high-growth potential of 150,000 people per year, a contingency plan--expanding the seasonal interpretive staff from 7 to 14--will be required to handle the increased demand.

In addition to the interpretive staff, 8 new permanent employees (7 less-than-full-time) and 4 seasonal employees are needed immediately to implement the administrative, maintenance, and ruins stabilization actions recommended in the plan. These positions are particularly critical in ensuring that the exposed walls and fabric of the ruins receive adequate treatment.

Land protection proposals will require a new resource/land protection management specialist to assist the superintendent and regional personnel in managing land protection activities associated with the park addition lands.

A complete list of staffing needs is included in appendix F.

## Housing

Onsite housing for administrative, maintenance, protection, and interpretive staff is essential to the successful operation of the park. Pot hunting and vandalism of cultural resources are well documented in the San Juan Basin, and a 24-hour presence is critically needed to protect Chaco's valuable sites and features from such activities. Because the Gallo Wash entrance road will eventually provide the only access into the canyon, all traffic will have to pass directly in front of the existing visitor center and housing area. This 24-hour/7-day-a-week presence will offer the most effective surveillance mechanism within the canyon and will also facilitate patrols and allow the quickest response time to outlying areas of the park.

A second reason for maintaining onsite housing is the park's isolation from population centers. Chaco is in a remote, hard-to-reach location, some 70+ miles (113 km) over poorly maintained, largely dirt roads from Farmington, the nearest town with available housing. Under good conditions, a one-way trip takes about 1½ hours; under bad conditions, it may take considerably longer or may be impossible.

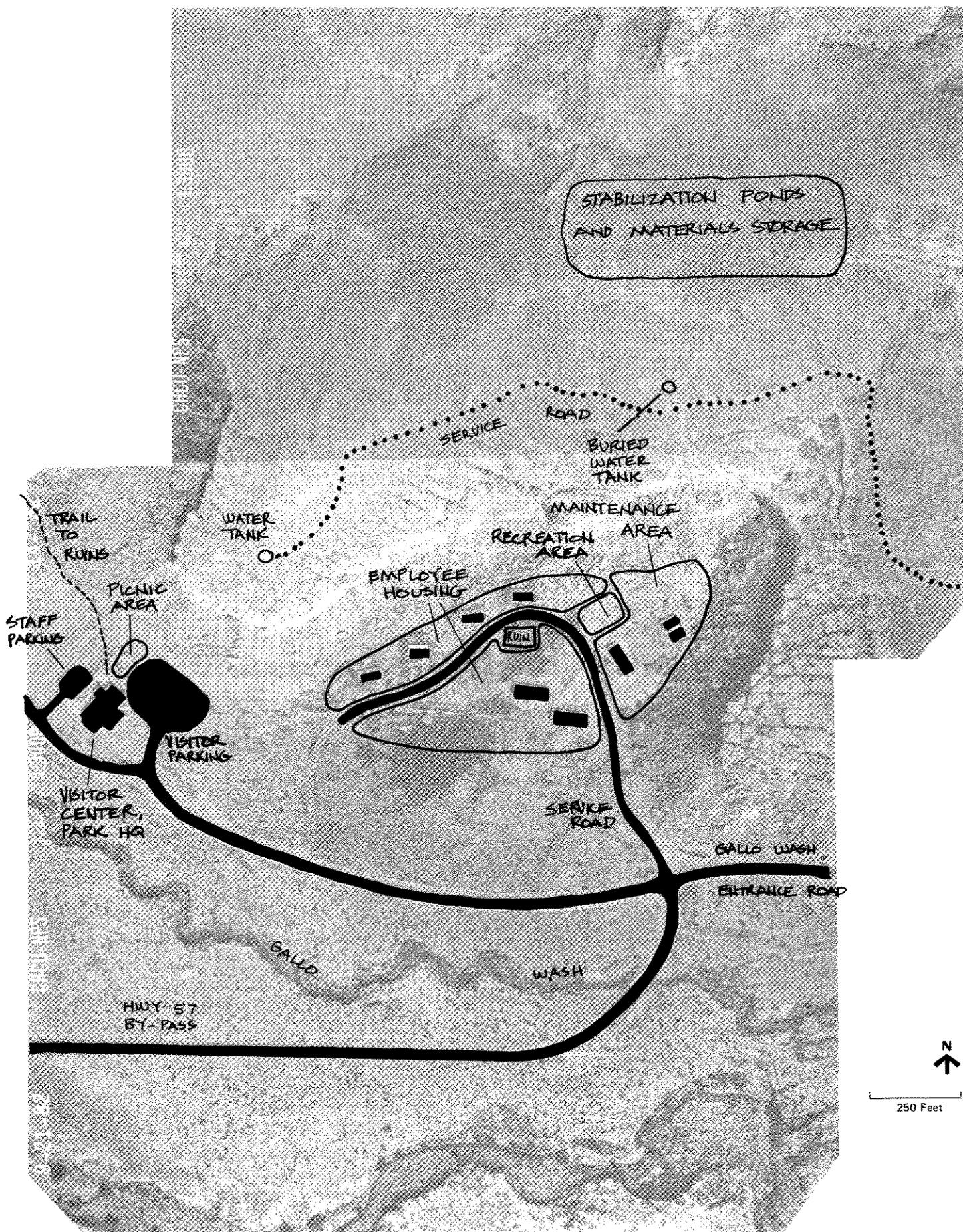
The four existing single-family dwellings and two new 4-unit apartments provide adequate housing for the superintendent, chief ranger, administrative clerk, park archeologist, and seasonal staff and researchers. Five new permanent housing units are needed to replace the four substandard and aesthetically incongruous mobile homes that are currently occupied by the protection ranger, interpretive ranger, resource monitoring ranger, and general ranger. The additional home would be for the proposed resource/land protection management assistant.

## Maintenance

The existing maintenance materials storage area in Mockingbird Canyon will be phased out. Many of the larger stored items that no longer serve a useful need will be removed from the park. Ruins stabilization materials and other items necessary to the park's daily operation will be stored in the maintenance area, which will be expanded to accommodate additional functions (see the Administrative Area Development Concept map). Larger items used only on a seasonal or occasional basis will be placed in a new maintenance materials storage area, which will be included as part of the new sewage treatment facility and located on the mesa above and behind the residential/maintenance area (see the "Utilities" section).

## Landfill

The present landfill site will reach capacity in the next two to three years. A new landfill site, to be located 2 miles (3.2 km) east of the proposed campground (see General Development map), will provide for the park's long-term needs. This site has suitable soils and is removed from



**ADMINISTRATIVE AREA DEVELOPMENT CONCEPT**  
**CHACO CULTURE NATIONAL HISTORICAL PARK**  
 UNITED STATES DEPARTMENT OF THE INTERIOR / NATIONAL PARK SERVICE

the primary visitor use area and not visible from any of the major ruins. The necessary legal authority for right-of-way access will require the consent of the landowner (access is on lands not administered by the Park Service), and an archeological survey and clearance completed, before the site can be used as a landfill.

### Maintenance Roads

Motorized vehicles will be prohibited in the backcountry, except for infrequent visits by maintenance or patrol vehicles. The emphasis on pedestrian access only will help existing road scars to heal.

The road extending from the Clys Canyon entrance to Pueblos Alto will continue to be closed to vehicular access and allowed to revegetate. Administrative access to this area will be provided along the existing road extending toward Pueblos Alto from the east (Gallo Wash entrance road).

The road to Wijiji will no longer be necessary for ranch access, because the Gallo Wash entrance road will provide easier access to the ranch outside the park boundary. The Wijiji road will be allowed to revert to a trail but will remain suitable for infrequent access by ruins maintenance vehicles. Similarly, the canyon road from Pueblo del Arroyo to Casa Chiquita (Clys Canyon) will be allowed to revert to a foot trail suitable for infrequent maintenance vehicle access.

The road to the sanitary landfill at South Gap will continue to be used as long as the landfill is operating; however, when the new landfill east of Gallo Wash is operational, the South Gap road will be closed. The road to the water tanks and sewage stabilization ponds above the administrative area will also continue to be maintained, without improvements, for use by park vehicles on a routine basis.

### Utilities

At present, the water supply for fire protection comes from the treated water distribution and storage system. During peak periods in recent years, the visitor demands for treated water have frequently resulted in storage levels below those necessary for fire fighting. In addition, even at existing use levels during peak periods, the sewage treatment plant and effluent disposal system exceed capacity and often malfunction, posing potential health and safety problems. To meet existing and future demands, the following actions are proposed.

The existing reverse-osmosis (RO) water treatment system will be retained (existing capacity) but will be renovated to improve raw water cooling and reduce the RO reject flow. A new structure incorporating state-of-the-art treatment equipment will be built to house this facility, and a new distribution system will be provided to supply treated water to the administrative area, sanitary station, and new campground. The existing distribution system will be converted to supply raw water,

including water for fire protection. A new supply line will be laid from the well head to the raw water storage tank. If visitor use and staffing approach the high-growth potential over the next 10+ years (see appendix D), the renovated reverse-osmosis system will near capacity, requiring monitoring of the irrigation system or expansion of the RO plant capacity.

Water-saving measures will include drip irrigation systems for residential yards, appropriate water-conserving fixtures in proposed and existing structures, and conversion of toilets in the existing single-family dwellings and shop to raw-water flushing.

The existing secondary sewage treatment plant will be removed, and new nonoverflowing stabilization ponds built on the mesa above and directly behind the maintenance area. The new system will be designed to accommodate the 10+ year projection of approximately 150,000 visitors per year (see appendix D). The existing pumping station in the developed area will be renovated to transfer all wastewater, including the reject water from the reverse-osmosis plant, up to the stabilization ponds.

Three-phase electrical power will be required to operate the renovated sewage system. This buried line will extend from the administrative area along the Gallo Wash entrance road to the park boundary. From there the line will connect with the Dome power junction. Right-of-way access may be required.

### Communications

A new microwave telephone system to serve the support base will be installed to eliminate the need for an overhead line within the preservation subzone, minimize visual intrusions, provide reliable state-of-the-art communications, and facilitate use of computer terminals to access data in major cities for research, management, and protection. With the cooperation of the telephone company, the existing South Gap/Clys Canyon overhead line will be removed and/or relocated to bypass the park.

The internal (two-way radio) communication system used by the staff for management of the area will be improved by the addition of components to extend mobile coverage. The existing system only permits short-distance car-to-base communications and very limited car-to-car communications, and improvements are expected to provide virtually total coverage of the Chaco Wash and Gallo Wash areas within the boundary, reliable coverage along most roads into the park, and future communications (as the need develops) from protection sites within a 30-mile (48-km) radius of the support base.

## PLAN IMPLEMENTATION: COSTS AND PRIORITIES

Estimated costs and priorities for the proposed plan are shown in table 1. The subject headings are arranged according to the plan outline and do not reflect a priority sequence. Priorities are referenced within each subject heading. The staffing required to implement the plan is shown in appendix F and is incorporated in the total annual operating costs shown in table 2. Capital equipment costs are shown in table 3.

The interpretive proposals will be implemented by the National Park Service's Harpers Ferry Center. The cost of implementing the interpretive program is estimated to be \$121,000 net or \$181,000 gross (1985 dollars). Interpretive facilities and media costs will be described in more detail in an interpretive prospectus, which will be prepared after approval of the general management plan.

Table 1: Proposal Costs/Priorities (1985 Dollars)

Land Management

1. Prepare grazing management plan		\$ 8,800
	Net	\$ 8,800
	Gross	\$ 13,200

Interpretation

1. Prepare interpretive prospectus		16,500
2. Establish audiovisual library		55,000
3. Develop new self-guide publications for interpretive loop trail		38,500
4. Develop a new backcountry self-guide publication		<u>11,000</u>
	Net	\$ 121,000
	Gross	\$ 181,500

Cultural Resource Management

1. Prepare and print draft cultural resource management plan		3,300
2. Prepare historic structure reports/preservation guides		
0-5 years	5 @ 6,600	33,000
6-10 years	6 @ 6,600	39,600
11-15 years	6 @ 6,600	39,600
15+ years	1 @ 6,600	6,600
3. Backfill selected areas of major stabilized ruins		
Prefill research and treatment		77,000
Backfill		183,700
Stabilize all exposed fabric to standard		1,195,700
4. Record, stabilize, backfill noninterpreted but previously excavated archeological sites		13,200
5. Prepare cultural resources preservation guide		13,200
6. Prepare collection preservation guide		6,600
7. Prepare scope of collections statement		5,500
8. Accession all collections from the park and vicinity		<u>33,000</u>
	Net	\$1,650,000
	Gross	\$2,409,000

Natural Resource Management

The natural resource management proposals are all recurring costs and are identified in table 2.

Development

1.	Install regional communications system	\$ 33,000
2.	Improve water supply system	478,500
3.	Update sewage treatment facilities	858,000
4.	Campground proposal:	
	Remove existing 48-unit individual campground and group camping area and restore sites	24,200
	Develop 75-unit individual campground and group camping area and 750-foot campground entrance road	302,500
5.	Develop regulated access system	33,000
	5a. (future option)	
	Establish transit system - \$150,000-500,000*	
	Construct storage/maintenance facility - \$50,000*	
6.	Develop Bonito/del Arroyo parking area comfort facility (waterless) and remove existing metal picnic shelter	11,000
7.	Upgrade interpretive trail from visitor center to Una Vida for handicapped use	22,000
8.	Provide alternate access to visitor center restrooms and potable water outlets adjacent to visitor center	8,800
9.	Establish visitor center picnic area (10-12 tables with ramadas)	12,100
10.	Provide interior park communication system improvements	15,400
11.	Develop ½-mile loop interpretive trail (unsurfaced) from Pueblo del Arroyo to Kin Kletso	24,200
12.	Develop 2-mile loop hiking trail (unsurfaced) and trailhead parking area for Mockingbird Canyon	165,000
13.	Expand maintenance area (grading on 1 acre and 750-foot fence)	27,500
14.	Pave administrative area road (1,500 feet)	74,800
15.	Develop landfill	11,000
16.	Develop 15 miles of backcountry trail	554,400
17.	Construct five new housing units and remove existing mobile homes	473,000
18.	Replace 25 percent of 38-mile boundary fence around the former monument	220,000
19.	Develop information wayside pulloffs at Blanco, Nageezi, and Seven Lakes	16,500
20.	Develop a trailhead and parking area (10 cars, 1 bus) for the Chacra Mesa backcountry trails	27,500
21.	Construct a collection storage room (450 sf)	112,500
		<hr/>
	Net	\$3,504,900
	Gross**	\$5,117,150

\*These estimates are not included in the total development costs. The cost range is based on type of transit vehicle, as discussed in the 1978 transportation study.

\*\*Development gross costs include net costs plus 46 percent for design, construction supervision, and contingencies.

Table 2: Proposed Annual Operating Costs (1985 Dollars)

Staffing Requirements

Management and administration	\$ 123,200
Interpretation, natural resource management, and visitor protection	232,100
Cultural resource management	498,300
Maintenance	<u>149,600</u>
Total	\$1,003,200

Nonstaffing Requirements (Equipment, Vehicle Rentals, Supplies, Utilities Studies, Contracts, etc.)

Management and administration	\$ 39,600
Interpretation, natural resource management, visitor protection	137,500
Cultural resource management	81,400
Maintenance	<u>36,300</u>
Total	\$ 294,800
Total Annual Operating Cost	\$1,298,000

Table 3: Capital Equipment Costs (1985 Dollars)

Management and administration	\$ 9,900
Interpretation, natural resource management, and visitor protection	80,300
Cultural resource management	34,100
Maintenance	<u>11,000</u>
Total	\$ 135,200

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## APPENDIXES

- A: LEGISLATION (PL 96-550)
- B: FINDING OF NO SIGNIFICANT IMPACT
- C: MANAGEMENT OBJECTIVES
- D: VISITATION ANALYSIS
- E: RESOURCE ANALYSIS
- F: STAFFING REQUIREMENTS

PUBLIC LAW 96-550—DEC. 19, 1980

94 STAT. 3227

Public Law 96-550  
96th Congress

An Act

To designate certain National Forest System lands in the State of New Mexico for inclusion in the National Wilderness Preservation System, and for other purposes.

Dec. 19, 1980  
[H.R. 8298]

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,*

National Forest System lands, New Mex. Designation.

TITLE V—CHACO CULTURE NATIONAL HISTORICAL PARK

SEC. 501. (a) The Congress finds that—

16 USC 410ii.

(1) archeological research in the San Juan Basin conducted over the past several years has greatly increased public knowledge of the scope of the prehistoric culture referred to as Chacoan Anasazi;

(2) the discoveries and the increased general interest in the Chaco phenomenon have come at a time when the San Juan Basin is experiencing extensive exploration and development for a wide variety of energy-related resources, including coal, uranium, oil, and natural gas;

(3) development of the San Juan Basin's important natural resources and the valid existing rights of private property owners will not be adversely affected by the preservation of the archeological integrity of the area; and

(4) in light of the national significance of the Chacoan sites and the urgent need to protect them, continued cooperation between Federal agencies and private corporations is necessary to provide for development in the San Juan Basin in a manner compatible with preservation and archeological research.

(b) It is the purpose of this title to recognize the unique archeological resources associated with the prehistoric Chacoan culture in the San Juan Basin; to provide for the preservation and interpretation of these resources; and to facilitate research activities associated with these resources.

SEC. 502. (a) There is hereby established in the State of New Mexico, the Chaco Culture National Historical Park comprising approximately thirty three thousand nine hundred and eighty nine acres as generally depicted on the map entitled "Chaco Culture National Historical Park", numbered 310/80,032-A and dated August 1979. The Chaco Canyon National Monument is hereby abolished, as such, and any funds available for the purpose of the monument shall be

Establishment.  
16 USC 410ii-1.

Abolishment.  
16 USC 431 note.

available for the purpose of the Chaco Culture National Historical Park.

(b) Thirty three outlying sites generally depicted on a map entitled "Chaco Culture Archeological Protection Sites", numbered 310/80,033-A and dated August 1980, are hereby designated as "Chaco Culture Archeological Protection Sites". The thirty three archeological protection sites totaling approximately eight thousand seven hundred and seventy one acres are identified as follows:

Name:	Acres
Allentown.....	42
Andrews Ranch.....	640
Bee Burrow.....	40
Bisa'ani.....	131
Casa del Rio.....	40
Coolidge.....	15
Dalton Pass.....	10
Great Bend.....	19
Greenlee Ruin.....	60
Grey Hill Spring.....	23
Halfway House.....	40
Haystack.....	115
Hogback.....	371
Indian Creek.....	100
Jacques.....	40
Kin Nizhoni.....	726
Lake Valley.....	30
Las Ventanas.....	31
Morris 41.....	85
Muddy Water.....	1,210
Newcomb.....	44
Peach Springs.....	985
Pierre's Site.....	440
Raton Well.....	23
San Mateo.....	14
Sanostee.....	1,565
Section 8.....	40
Skunk Springs/Crumbled House.....	588
Standing Rock.....	321
Twin Angels.....	40
Toh-la-kai.....	10
Upper Kin Klizhin.....	60
Squaw Springs.....	870

List additions or deletions, submittal to Congress.  
16 USC 410ii-2.  
*Supra.*

Lands, waters, and interests, acquisition.  
16 USC 410ii-3.

SEC. 503. The Secretary of the Interior shall continue to search for additional evidences of Chacoan sites and submit to Congress within two years of date of enactment of this Act and thereafter as needed, his recommendations for additions to, or deletions from, the list of archeological protection sites in section 502(b) of this title. Additions to or deletions from such list shall be made only by an Act of Congress.

SEC. 504. (a) The Secretary is authorized to acquire lands, waters, and interests therein within the boundaries of the Chaco Culture National Historical Park (hereinafter referred to as the "park") and the archeological protection sites as identified in section 502 of this title by donation, purchase with donated or appropriated funds, or exchange. Property owned by the State of New Mexico or any political subdivision thereof, may be acquired by exchange or donation only. Property held in trust for the benefit of any Indian tribe or for the benefit of any individual member thereof may be acquired only with the consent of such owner or beneficial owner as the case may be.

(b) The respective tribal authorities are authorized to convey by exchange, purchase, on donation the beneficial interest in any lands designated by section 502 of this Act and held in trust by the United States for the respective tribes, to the Secretary, subject to such terms

and conditions as the tribal authority deems necessary and which the Secretary deems are consistent with the purposes of this title.

(c)(1) The Secretary shall attempt to acquire private lands or interests therein by exchange prior to acquiring lands by any other method authorized pursuant to section 504 of this Act.

Private lands or interests, acquisition.

(2) The Secretary shall attempt to enter into cooperative agreements pursuant to section 505 of this Act with owners of private property for those archeological protection sites described in section 502(b) of this Act. The Secretary shall acquire fee title to any such private property only if it is necessary to prevent direct and material damage to, or destruction of, Chaco cultural resources and no cooperative agreement with the owner of the private property interest can be effected.

Private property owners, cooperative agreements.

(d)(1) For purposes of completing an exchange pursuant to subsections (a) and (b), the Secretary shall designate a pool of at least three times the private acreage described in subsections (a) and (b), comprised of the Federal property interests of a similar resource character to property to be exchanged. Federal property shall, whenever possible, be designated in blocks of at least one section in size, but in no event shall the blocks designated be less than one-quarter of a section in size.

Pool, acreage designation.

(2) The Secretary may include within the pool any Federal property under his jurisdiction except units of the National Park System, National Forest System, or the National Wildlife Refuge System that are nominated by the owner of the private property to be exchanged. Exchanges shall be on the basis of equal value, and either party to the exchange may pay or accept cash in order to equalize the value of the property exchange, except that if the parties agree to an exchange and the Secretary determines it is in the public interest, such exchange may be made for other than equal values.

(e) All Federal lands, waters, and interests therein excluded from the boundaries of Chaco Canyon National Monument by this title may be exchanged for non-Federal property to be acquired pursuant to this title. Any lands so excluded shall be managed by the Secretary under the provisions of the Federal Land Policy and Management Act of 1976. Transfer of administration of such lands to the Bureau of Land Management shall not be considered a withdrawal as that term is defined in section 103(j) of the Federal Land Policy and Management Act of 1976.

Federal lands exchanged for non-Federal property.

43 USC 1701 note.

43 USC 1702, 16 USC 410ii-4.

SEC. 505. The Secretary shall seek to enter into cooperative agreements with the owners, including the beneficial owners, of the properties located in whole or in part within the park or the archeological protection sites. The purposes of such agreements shall be to protect, preserve, maintain, and administer the archeological resources and associated site regardless of whether title to the property or site is vested in the United States. Any such agreement shall contain provisions to assure that (1) the Secretary, or his representative, shall have a right of access at all reasonable times to appropriate portions of the property for the purpose of cultural resource protection and conducting research, and (2) no changes or alterations shall be permitted with respect to the cultural resources without the written consent of the Secretary. Nothing in this title shall be deemed to prevent the continuation of traditional Native American religious uses of properties which are the subject of cooperative agreements.

SEC. 506. (a) The Secretary shall administer the park in accordance with the provisions of this title and the provisions of law generally applicable to the administration of units of the National Park

Administration, 16 USC 410ii-5.

System, including the Act of August 25, 1916 (39 Stat. 535; 16 U.S.C. 1, 2-4), and the Act of August 21, 1935 (49 Stat. 666; 16 U.S.C. 461-7).

48 USC 1702. (b) The Secretary shall protect, preserve, maintain, and administer the Chaco Culture Archeological Protection Sites, in a manner that will preserve the Chaco cultural resource and provide for its interpretation and research. Such sites shall be managed by the Secretary in accordance with the provisions of this title and the provisions of law generally applicable to public lands as defined in section 103(e) of the Federal Land Policy and Management Act of 1976: *Provided, however*, That lands held in trust by the Secretary for an Indian tribe or any individual member thereof, or held in restricted fee status shall continue to be so managed or held by the Secretary.

(c) No activities shall be permitted upon the upper surface of the archeological protection sites which shall endanger their cultural values. For the purposes of this title, upper surface shall be considered to extend to a depth of twenty meters below ground level. Nothing in this title shall be deemed to prevent exploration and development of subsurface oil and gas, mineral, and coal resources from without the sites which does not infringe upon the upper surface of the sites.

(d) Nothing in this title shall be deemed to prevent the continuation of livestock grazing on properties which are the subject of cooperative agreements.

General management plan, transmittal to congressional committees.

(e) Within three complete fiscal years from the date of enactment, the Secretary shall transmit to the Committee on Interior and Insular Affairs of the United States House of Representatives and the Committee on Energy and Natural Resources of the United States Senate, a general management plan for the identification, research, and protection of the park, pursuant to the provisions of subsection (12)(b) of the Act of August 18, 1970, to be developed by the Director, National Park Service, in consultation with the Directors, Bureau of Land Management and Bureau of Indian Affairs and the Governor, State of New Mexico, and a joint management plan for the identification, research, and protection of the archeological protection sites, to be developed by the Director, National Park Service, in consultation and concurrence with the Directors, Bureau of Land Management and Bureau of Indian Affairs, and the Governor, State of New Mexico.

16 USC 1a-7.

16 USC 410ii-6.

SEC. 507. (a) Consistent with and in furtherance of the purposes of the Division of Cultural Research of the Southwest Cultural Resources Center, operated by the National Park Service, the Secretary shall continue such research and data gathering activities as may be appropriate to further the purposes of this title and knowledge of the Chaco culture. The Secretary shall submit in writing within six months of the effective date of this section, to the Committee on Interior and Insular Affairs of the United States House of Representatives and the Committee on Energy and Natural Resources of the United States Senate, a plan for the continued operational program of the Division. The Secretary is authorized and encouraged to establish a committee composed of professional archeologists and others with related professional expertise including the designee of the Governor of the State of New Mexico to advise the Secretary in matters related to the surveying, excavation, curation, interpretation, protection, and management of the cultural resources of the historical park and archeological protection sites.

Plan, submittal to congressional committees.

Computer-generated data base, development.

(b) The Secretary shall, through the Division of Cultural Research of the Southwest Cultural Resources Center of the National Park Service, be responsible for the development of a computer-generated

data base of the San Juan Basin, and make such information available to Federal and private groups when to do so will assist such groups in the preservation, management, and development of the resources of the basin.

(c) The head of any Federal agency having direct or indirect jurisdiction over a proposed Federal or federally assisted undertaking with respect to the lands and waters in the archeological protection sites, and the head of any Federal agency having authority to license or permit any undertaking with respect to such lands and waters, shall prior to the approval of the expenditure of any Federal funds on such undertaking, or prior to the issuance of any license or permit, as the case may be, afford the Secretary a reasonable opportunity to comment in writing with regard to such undertaking and its effect upon such sites, and shall give due consideration to any comments made by the Secretary and to the effect of such undertaking on the purposes for which such sites are established.

SEC. 508. Effective October 1, 1981, there are authorized to be appropriated such sums as may be necessary to carry out the provisions of this title but not to exceed \$11,000,000 for acquisition and \$500,000 for development.

Appropriation  
authorization.  
16 USC 410ii-7.

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**LEGISLATIVE HISTORY:**

CONGRESSIONAL RECORD, Vol. 126 (1980):

Oct. 1, S. 2583 considered and passed Senate.

Nov. 21, H.R. 8298 considered and passed House, in lieu of S. 2583.

Dec. 1, considered and passed Senate.



## B: FINDING OF NO SIGNIFICANT IMPACT

### General Management Plan/Development Concept Plan and Land Protection Plan

#### Chaco Culture National Historical Park New Mexico

#### Introduction

The National Park Service (NPS) is in the process of preparing a new general management plan (GMP) for Chaco Culture National Historical Park. The GMP and an accompanying land protection plan (LPP) that provides for protection of approximately 13,205 acres of new park lands were required by the enactment of Public Law 96-550, December 19, 1980. The plans provide guidance for the preservation, use, development, and operation of the park for the next 10-15 years and beyond.

In developing these plans, the views of other federal, state, and local governmental agencies, the Navajo Tribe, private organizations, and individuals were sought in a series of formal meetings the first of which were held in Farmington, Crownpoint, and Albuquerque, New Mexico during March, 1983. The draft GMP and LPP were prepared and released to the public for review in October 1984. A formal public meeting was held in Albuquerque, November 1, 1984 to receive public comments on the draft plans. A series of consultation meetings were also conducted with federal, state, and local governments, the Navajo Tribe, individuals, and energy companies to discuss plan proposals, suggested plan changes, and implementation procedures.

Following the issuance of this document a final GMP/DCP and LPP will be prepared, approved, and released for public information.

#### Summary of Draft Plan Proposals

The GMP/DCP revises and updates a GMP approved in 1979, and many of the concepts in the earlier plan have been carried forward. The current GMP provides

a general strategy for managing lands within the expanded boundary. It includes an analysis of critical resource values and an overall management zoning concept. Land protection proposals are summarized in the GMP and described on a tract-by-tract basis in the Land Protection Plan that is being circulated concurrently. Other GMP and DCP proposals include the rehabilitation of the fence along the old national monument boundary and establishment of markers along the newly authorized boundary by agreement with landowners; an improved interpretive program to provide opportunities for greater personal contact between visitors and interpretive staff; a regulated access system in the primary ruins area during peak periods; relocation of the campgrounds to provide a more desirable camping setting above the 100-year floodplain; continued monitoring of activities near the park to reduce their impacts on park resources; an increase in the ruins maintenance program and limited backfilling of excavated rooms to bring stabilization to an acceptable standard; and renovation or development of utility, waste disposal, and communication systems. This document includes alternatives for the major GMP/DCP proposals, and it assesses impacts of the plan and alternatives.

The management zoning system proposed in the GMP/DCP and in the LPP defines appropriate uses and management strategies for specific areas within the park. Four subzones were proposed each providing specific guidance on permitted land uses within each subzone. According to the zoning system, grazing within the 13,205 acre park addition would have been permitted on approximately 8,205 acres and discontinued on approximately 5,000 acres.

The LPP proposes a protection strategy for 13,205 acres of recently authorized park lands. The proposed strategy consists of cooperative agreements, conservation easements, and fee acquisition through the use of exchanges utilizing existing surface and subsurface lands under the management of the Bureau of Land Management. In those cases where the LPP recommends acquisition of private lands or an interest in private lands, the recommended method of acquisition is to be through the use of an exchange utilizing federal property under the jurisdiction of the Secretary of Interior that are not managed by the National Park Service. LPP proposals address the protection and management of all surface and subsurface rights and interest.

Three basic protection methods were proposed for surface rights: 3,676.6 acres were to be protected by cooperative agreement, 1,440 acres by conservation easements, and 5,848.66 acres to be acquired in fee through the use of land exchanges. The LPP also proposed to acquire all subsurface interest including leases through exchange, except for a 160-acre tract within the Kin Ya'a unit that is to be managed by means of a cooperative agreement.

### Summary of Public Response

Public review of the draft planning documents was conducted during October and November 1984. A formal public meeting was held in Albuquerque in November 1, 1984 which was attended by 35 individuals. Six consultation meetings were held with agency and private interests that were attended by a total of 90 individuals. The NPS received 27 written responses to the draft plans from governmental agencies, energy companies, the Navajo Tribe, and private individuals.

The majority of verbal and written comments received during the public review focused on the following concerns: Grazing within the park boundary, the use of cooperative agreements versus land exchanges to protect park lands, the need for more collective planning with the Navajo Tribe and other involved governmental agencies, regional transportation needs within the vicinity of the park, acquisition of road rights-of way along the north side of the park, Navajo Tribal involvement with park operations, improved NPS communication with allottees, the lack of legislative authority to exchange subsurface leases, the control of oil and gas exploration and development prior to implementation of protection measures, and the need to more completely address native American religious freedom concerns.

The New Mexico State Historic Preservation Office and the Advisory Council on Historic Preservation participated in the development of the plan in accordance with the Programmatic Memorandum of Agreement between the National Park Service, the Advisory Council, and the National Conference of State Historic Preservation Officers.

### Plan Changes As A Result Of Public Review

Additions and modifications will be made to the GMP/DCP and LPP to reflect changes that were formulated during and subsequent to the public review period.

Changes that will be made to the LPP also will be summarized in the GMP/DCP. More emphasis on consideration of native American concerns will be included in the final GMP. Park addition lands where proposals for a reduction in grazing were made will be reevaluated cooperatively with Navajo Tribal representatives. The purpose of further discussions of grazing will be to make the plan and management zoning system less restrictive to grazing within the new park addition. Also, the NPS will place emphasis on increasing Navajo employment at Chaco Culture and within other NPS managed areas located within the Navajo reservation area.

As a result of public and agency review of the LPP, it has been determined by the NPS Field Solicitor that the NPS and Bureau of Land Management do not have legal authority to exchange lessees' interest in federal oil and gas leases within Chaco for the lessees' right to select an oil and gas lease of comparable value in the same general area outside Chaco Culture. Such an exchange would require special legislative action to provide for legal authority. However, the lack of this authority does not prevent lessees from relinquishing their interest in the leases within Chaco Culture to the United States or NPS, if they so desire. Because of the stated position of the Navajo Tribe not to enter into cooperative agreements on Tribal fee lands within Chaco Culture, this proposal will be modified to provide for exchange of Tribal fee lands within the park for Bureau of Land Management lands within the vicinity of the park.

The NPS will pursue a commercial lease of State of New Mexico lands within the recently expanded park area prior to completing the proposed exchange. This will be undertaken to provide the NPS with some level of resource protection and access to cultural resources. The NPS will consult with Navajo Tribal representatives to assure that all LPP details are accurate and conform with records of the Navajo Tribal Lands Office.

#### Impact Summary

The proposals in the GMP/DCP and LPP are expected to be beneficial to the protection and long-range care of the important cultural resources of Chaco Culture. Impacts on visitor use should be positive allowing for a more complete understanding of the significance of the "Chacoan phenomenon" and with the use of facilities that will have less safety risk to visitors.



## C: MANAGEMENT OBJECTIVES

### Resources Management

Preserve and protect the cultural resources and perpetuate the natural resources of the park by

monitoring and mitigating external threats to cultural and natural resource integrity

monitoring the effects of visitor activities and backcountry use

supporting the natural evolutionary process of the landscape and ecological communities except where cultural resources and necessary park developments are threatened

encouraging a continuous research program that emphasizes nondestructive methods and is directed toward improved resource knowledge, understanding, appreciation, preservation, and protection

backfilling excavated and exposed ruins not required for interpretive purposes

limiting storage of artifacts to those working collections essential for authentic presentation of the interpretive themes

controlling all mineral activities

### Visitor Use

Provide for enjoyment, appreciation, and understanding of the park by the public and control uses that could impair resources or their enjoyment by

allowing each visitor the opportunity for a safe and enjoyable visit

providing effective visitor information services

offering a balanced, up-to-date interpretive program focusing especially on the rise, florescence, and decline of the Chacoan civilization

encouraging visitor enjoyment of the Chaco backcountry

providing access to primary sites and basic interpretive programs for the handicapped and the aged

### Development

Provide minimum facilities necessary for visitor enjoyment, resource protection, and safe and efficient management of the park by

offering minimum support services to sustain visitors within the park

maintaining development within the optimum social or physical carrying capacity of the resources

providing for sensitive and professional design of facilities that recognizes the need to blend structures with the environment

### Cooperation

Achieve harmonious integration of activities inside and outside the park by

maintaining cooperation with other federal agencies and state and local governments

maintaining cooperation and contact with adjacent landowners, the Navajo Nation, and local and regional organizations

maintaining active involvement in efforts to conserve natural and cultural resources throughout the region

## D: VISITATION ANALYSIS

An analysis, based on carrying capacity, economic eras, and the assumption that NM 57 would be upgraded to an all-weather gravel road, was carried out on adjusted Chaco visitation data. The results indicated that visitation would likely double to about 100,000 annual visits by 1989 and triple to a high-growth rate of 150,000 by 1993. Fairly rapid growth could be expected between 1986 and 1996, followed by a decreasing growth rate that would continue into the first quarter of the next century, leveling off at roughly 250,000 annual visits around the year 2030. A second analysis, assuming that NM 57 would remain unimproved, indicated a modest increase--60,000-70,000 annual visits--by 1993.

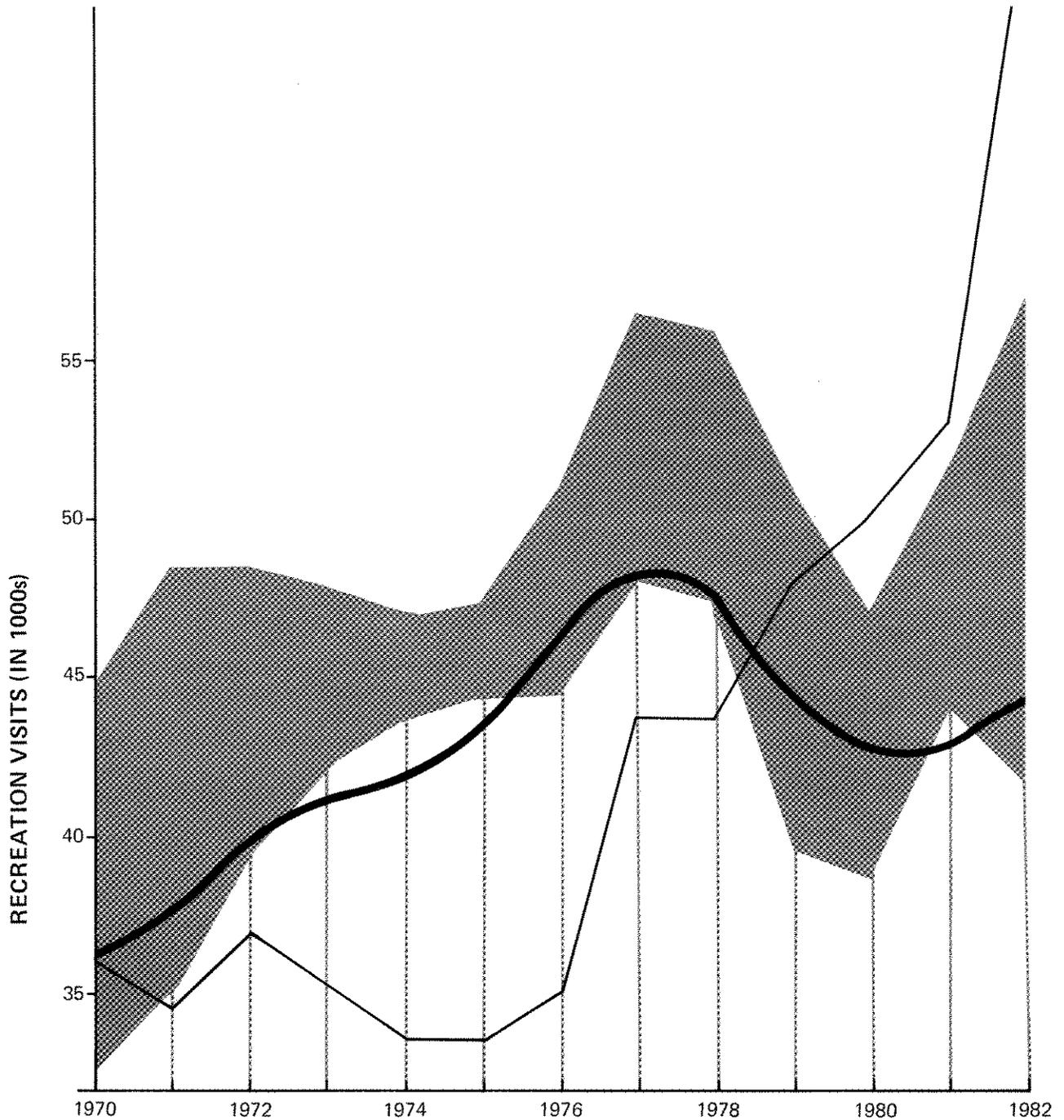
### Correction of Visit Counts

A 1982 audit of the counting procedure at Chaco revealed that some modifications are necessary in the procedure used since 1971. The procedure is being corrected, but extensive adjustments to the previous data have been required for use in forecasting. The earlier counting procedure had consisted of counting all cars entering the park, multiplying this by an estimated number of people per car (the multiplier varied by season), and allocating 2 percent of this count to nonrecreation visits. The multiplier is now judged to be too high, the amount allocated to nonrecreation too low, and park employee vehicles and construction vehicles are included in the count. From 1971 through 1978, the reported recreation visit allocation was judged to be too low.

The recreation visit trends of five surrounding, similar areas (Navajo National Monument, Canyon de Chelly National Monument, Aztec Ruins National Monument, Mesa Verde National Park, and Hovenweep National Monument) were compared with those of Chaco. The result of this comparison showed that the Chaco recreation visit count appeared to be too high from 1980 through 1982 (see figure 1). This agrees with the findings of the audit.

A theoretical trend was constructed for Chaco recreation visits based on the average annual visitation of the five surrounding areas and on the adjusted total visit counts at Chaco. The following table shows total reported visits (raw data) and theoretical adjusted estimates of the recreation visits at Chaco:

<u>Year</u>	<u>Total Reported Visits</u>	<u>Adjusted Estimate- Recreation Visits</u>
1973	57,900	39,972
1974	42,400	40,795
1975	40,000	42,396
1976	51,900	45,845
1977	44,700	48,204
1978	44,000	47,526
1979	51,900	43,538
1980	55,600	41,573
1981	76,862	41,870
1982	74,928	43,600
1983	72,174	50,331
1984	71,119	51,607



When recreation visits were first counted separately from total visits, in 1971, the proportion allocated for recreation visits was too small. In 1977 a change in the counting procedure overcompensated for this error. In addition, since 1977 a significant number of nonreportable visits were included in the recreation visit count.

- Reported recreation visits for Chaco Culture NHP
- Visitation range of five surrounding parks (shaded area)
- Adjusted recreation visits for Chaco Culture NHP

**Figure 1:**  
**ADJUSTMENT OF CHACO CULTURE NHP VISITS**

### Impact of Upgrading the Access Road

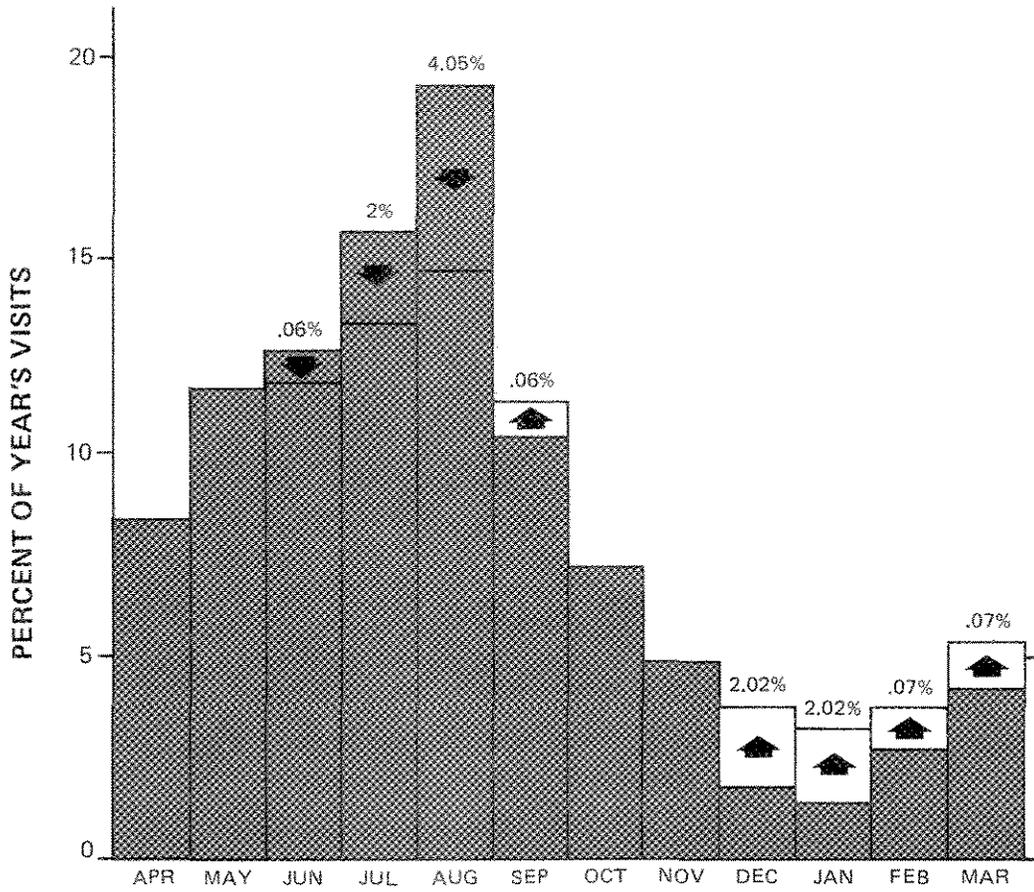
The potential upgrading of the access road to Chaco Culture National Historical Park would have a significant impact on the volume of recreation visits. To estimate this impact, the change in volume at three comparable areas where roads have been paved in the past was studied. The access roads to Canyon de Chelly, Navajo, and Gila Cliff Dwellings national monuments were paved in the mid 1960s, resulting in huge increases in recreation visits in all three areas. Between the five years before paving and the post-paving five-year period, the average change for these three areas was an increase of 953 percent. The mid-1960s was a rapid growth period for all National Park Service areas, whereas the early 1980s is a slow growth period. Therefore, such a huge jump would not be expected if the Chaco access route was improved. Other reasons for a lesser jump would include the limited carrying capacity at Chaco and the slow growth rate in the years just before upgrading. The recreation visit volume change between the five-year periods before and after upgrading could be expected to be roughly +80 percent.

The seasonal use pattern would also be affected by the road improvements. Seasonality could be expected to shift significantly within a short time after the upgrading of the access route. Canyon de Chelly's seasonality shift was used as a model to estimate Chaco's shift. As seen in figure 2, the proportion of the annual recreation visits occurring in summer decreased, while winter's proportion increased. At Canyon de Chelly, August's proportion dropped over 4½ percentage points, while December and January each experienced an increase of over 2 percentage points. The effect is a slight but significant leveling of the seasonality curve. This effect could be expected at Chaco, but different months would likely be involved. As seen in figure 3, Chaco now has a "plateau" in its seasonality curve from May through August, comprising of about 55 percent of the annual visits (the data used for seasonality were from the 1980-1982 period). Seasonality has varied considerably because of difficult access during bad weather, which fluctuates from year to year. Therefore, any seasonality shift forecast could only be that of a general flattening of the distribution; about 8 to 12 percentage points could be expected to be shifted from summer to winter.

Another seasonality shift has been occurring mainly in rural areas such as Chaco. This is also a flattening of the seasonality curve. It has several causes such as improvement in transportation and other technical advances and changes in lifestyles allowing vacationing during what were formerly traditional nonvacation seasons.

### Physical Carrying Capacity of Visitor Use Facilities

For visitation forecasting purposes, physical carrying capacity has been based on transportation access. There are two possible capacities covered here: with a shuttle or with a regulated access system. The ultimate seasonality for the 50-year era starting in about the year 1980 is based on seasonality patterns of high visitation areas that have had time



Seasonality shift as a result of paving the access road to Canyon De Chelly in 1964 shows summer's proportion decreased as winter's increased; between seasons did not change.

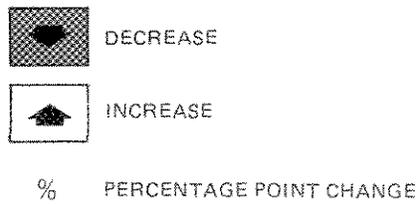
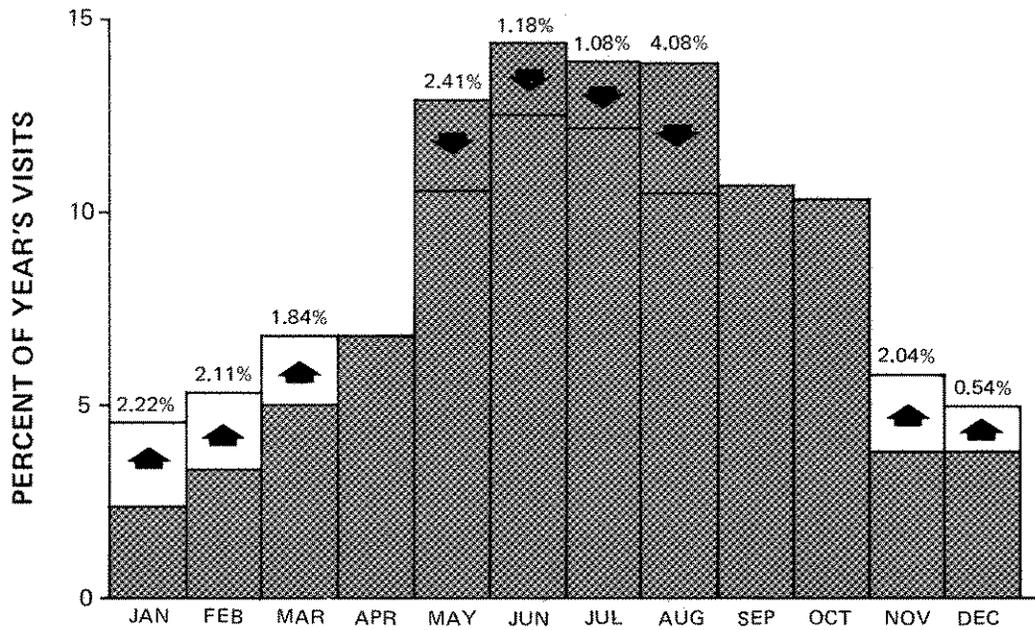
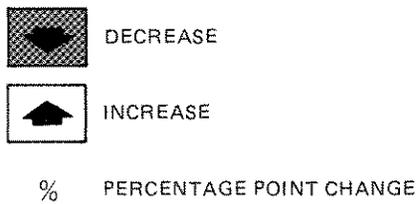


Figure 2:  
SEASONALITY SHIFT AFTER ACCESS ROAD PAVING AT CANYON DE CHELLY



At Chaco Culture NHP a theoretical seasonality shift as a result of paving the access road would result in significant increases in November through March and decreases in May through August.



**Figure 3:**  
**THEORETICAL SEASONALITY SHIFT AT CHACO AFTER ROAD UPGRADING**

to evolve this pattern over many years, plus the trend of increasing "off season" visitation. The ultimate seasonality is hypothesized as:

January	3.6%	April	9.5%	July	12.5%	October	7.5%
February	3.4%	May	11.7%	August	13.5%	November	4.9%
March	5.6%	June	11.8%	September	12.0%	December	4.0%

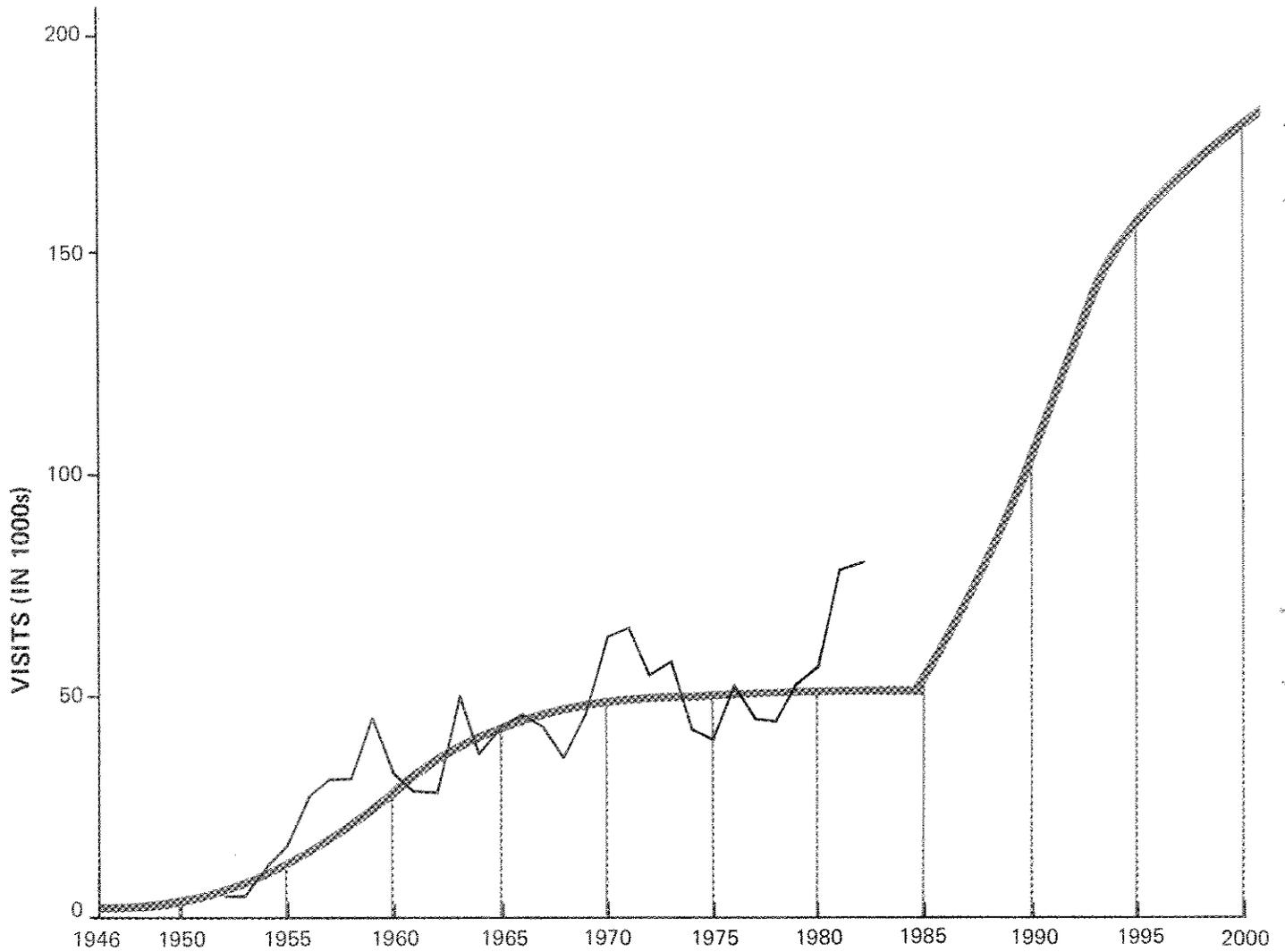
The carrying capacity would be met when weekends in August reach absolute capacity. That is, eight weekend days in August are completely full, and 23 weekdays in August are at 60 percent capacity.

With a transit system, approximately 85 visitors could be accommodated every 30 minutes from 9:00 a.m. through 5:00 p.m. (17 trips). There would be variation over the day even on the busiest days, so the ultimate day is based on 16 full shuttles ( $16 \times 85 = 1,360$ ). Planned camping provision is 75 individual campsites plus 2 group sites. At 2.5 persons per individual campsite and 30 persons per group site, 248 more visits could be accommodated each day. Daily capacity would be 1,608 visits ( $1,360 + 248$ ). The ultimate monthly figure for August would then be  $1,608 \times 8 = 12,864$  for weekends plus  $0.60 \times 1,608 \times 23 = 22,190$  for weekdays, or 35,054 visits. August is projected to have about 13.5 percent of the year's visits so the annual visitation rate would be ultimately about 259,659 visits.

With the regulated access system, the theoretical carrying capacity is based on the number of parking spaces and would not be much different than with the shuttle. The number of parking spaces is 67 on the loop road, 50 at the visitor center, and 25 overflow spaces also at the visitor center. With an expected 2.5 persons per car, this is 355 day visits at one time. If there are  $1\frac{1}{2}$  turnovers of traffic in a day, 888 day visits can be accommodated ( $2.5 \times 355$ ). Adding the 248 campers, the ultimate daily capacity would be 1,136. Using the same reasoning as before, August would have 24,774 visits and the annual visitation rate would be 183,510.

### Long-Term Forecast

The long-term forecast is based on a life-cycle model. The economic cycle, which started in 1930, was interrupted in 1941, and was restarted in 1946, has ended. We are now at the beginning of a new economic era that is likely to last about 50 years. The beginning of the era will be characterized by slow growth, but the upgrading of Chaco's access road should attract more visits than would usually be expected during a slow period. The graph in figure 4 illustrates the fitting of logistic growth curves to two sets of data: the estimated recreation visitor population for 1946-1982; and a set of hypothesized visitation figures for 1946-1982 if the access road was upgraded and if the ultimate threshold (carrying capacity for the era) was 218,000 annual visits. A bridging had to be used from 1986 through 1992 to get from one curve to the next. The raw



Annual visitation to Chaco Culture NHP has reached a threshold in the post-war era. A new economic era and the potential paving of the access road in 1985 will create a new growth curve which will probably reach a threshold of 220,000 in the beginning of the next century.

————— REPORTED TOTAL VISITS  
 ═════════ THEORETICAL GROWTH CURVE

Figure 4:  
 THEORETICAL GROWTH CURVE AT CHACO

reported total visitation figures are also plotted, which illustrate how well, in the long term, a properly applied logistic trend fits.

For discussion purposes, let's assume that the road would be upgraded in 1985. The annual recreation visitation would then likely increase from around 70,000 in 1986 to around 150,000 in 1993. Beyond the mid-1990s should be a period of decreasing growth rate. Annual visitation would increase through the first quarter of the next century and approach the level of the carrying capacity (roughly 250,000 annual visits).

#### Additional Visitation Data

About 15 percent of past recreational visitors have camped during the visitor season; less than 10 percent have stayed overnight during the off-season. The typical weekend day has experienced more than twice the visitation of a weekday, regardless of the time of year. Thus, summer weekends, especially holiday weekends such as Memorial Day, Independence Day, and Labor Day, have constituted the park's peak days.

Year-round the daily peak arrival period has been from noon to 2 p.m., although arrivals have been rather evenly distributed between 8 a.m. and 5 p.m. Average length of stay for noncampers has been about 4 hours.

Well over half the park visitors have entered along the north entrance road. About one-fourth of the visitors have come from New Mexico, mostly from outside the park vicinity. Almost three-fourths were from other states, especially Texas, Colorado, and California. Family groups have comprised nearly half the total visitation.

## E: RESOURCE ANALYSIS

### Critical Resources

The resource values determined to be critical in making land use and protection decisions were (1) archeological resources, (2) existing and potential visitor use areas, (3) visibility from major ruins, (4) relation to watershed, and (5) steep slopes.

A reconnaissance survey was undertaken by the Chaco Center during the summer of 1982 to identify and map all archeological sites on newly authorized lands. Sites were mapped and recorded for use in an overlay system. This survey supplemented surveys of the older parts of the park. The Archeological Site Density map shows the results of the surveys. The actual reconnaissance survey maps used in the overlay system are on file at the Chaco Center.

Visitor use areas were mapped based on major features and visitor development in the park. The primary visitor use area was defined as the area of the canyon floor containing the interpretive loop road and associated ruins (Una Vida, Hungo Pavi, Chetro Ketl, Pueblo Bonito, Pueblo del Arroyo, Kin Kletso, and Casa Rinconada). This area has received and will continue to receive the greatest visitor use. Backcountry use areas were identified based on major backcountry ruins, existing and potential trail alignments, and areas attractive for interpreting paleoenvironmental conditions in the park. Recreation sites not directly related to the resources, such as the campground, were not included in either the primary or backcountry visitor use area.

Areas visible from the 11 ruins that receive significant visitor use were identified and composited on the Visible Areas map; these areas are important for protecting the existing scene in the park and for maintaining the visitor experience. The ruins include

- Una Vida
- Hungo Pavi
- Chetro Ketl
- Pueblo Bonito
- Pueblo del Arroyo
- Casa Chiquita
- Kin Kletso
- Casa Rinconada
- Pueblos Alto
- Penasco Blanco
- Wijiji

Visible areas were first mapped using Defense Mapping Agency digitized topographic data and the VIEWIT computer program. Eleven maps were generated using 1-acre cells, showing the area that could be seen from each ruin. The maps were corrected in the field using a plane table,

binoculars, and two-way radios as needed. The Visible Areas map shows the composite area seen from the ruins. Although the number of times areas were seen is not indicated on the map, it was factored into the numerical ranking system.

The Chaco Wash Watershed map and the Steep Slopes map were developed manually, using the USGS 1:24,000 topographic base map. Slopes greater than 25 percent (25 foot rise in 100 horizontal feet) were defined as "steep" for the purposes of the plan. Development on such slopes could cause unsightly scarring, increased runoff, and soil erosion. The Bureau of Land Management uses 25 percent as a cutoff point in their oil and gas leasing programs. The watershed is important because runoff, erosion, and spills could flow into the main canyon, adversely affecting the major ruins and primary visitor experience.

It must be stressed that the above mapping efforts were deemed suitable and accurate enough for general planning work. Although these maps may be used as a guide for more detailed planning, site-specific decisions need to be preceded by additional field survey.

#### Quarter-Section Analysis

The quarter-section grid was chosen for analyzing the resources and assigning numerical scores. Each quarter-section contains approximately 160 acres. Where park boundaries do not follow the quarter-section line, the geographic unit of analysis was that portion of the quarter-section within the boundary.

Each archeological site within the park was assigned a score based on certain recognized attributes, including cultural affiliation, site type, period of occupation, and overall significance. Individual site scores ranged from a minimum of 4 points for an unknown site with little significance to a maximum of 25 points for a highly significant Anasazi habitation site. Additional details on the site scoring system are contained in the paper appended to this analysis ("Archeological Site Scoring System"). Individual site scores were aggregated for all sites within a given quarter-section. Totals ranged from 0 for a small partial quarter-section on Chacra Mesa to a high of 875 for the quarter-section containing Kin Ya'a. Most high-scoring quarter-sections, however, were in the canyon proper.

The Visitor Use Areas map was analyzed by percent of quarter-section; scores were also based on the type of use area and the presence of major ruins. Backcountry use areas were "scored" according to the percent of quarter-section within an area (0-100 points). If one or more of the major ruins fell in the quarter-section, an extra 100 points was added. The primary visitor use area (interpretive loop road) was scored according to percent of the quarter-section times 10. In addition, an extra 1,000 points was added if one or more of the major ruins fell in that quarter-section. The 1 to 10 scoring ration was based on the approximate ratio of backcountry visitor use to total visitor use at the

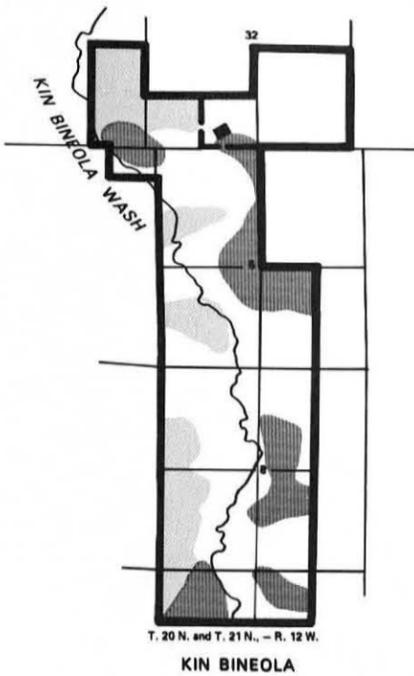
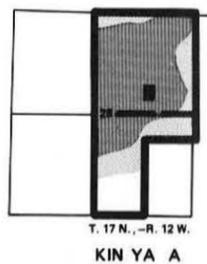
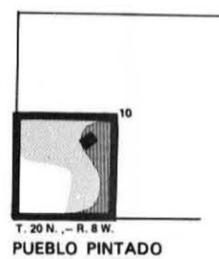
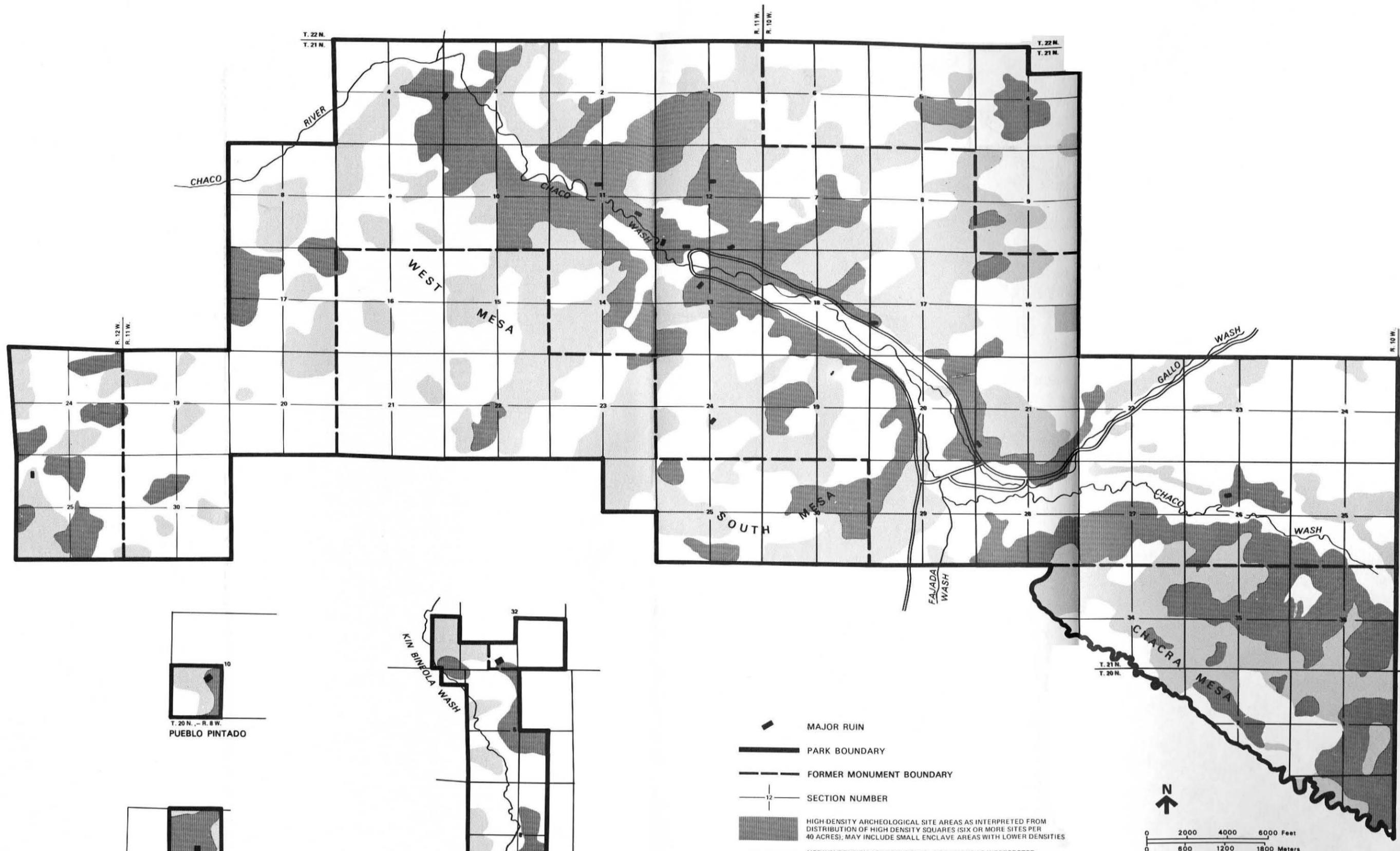
park in recent years. According to this system, a quarter-section could have scored up to 2,000 points if it was entirely in the primary use area and it included one or more of the major ruins. The actual high score was 1,530 for the quarter-section that contains Hungo Pavi. This was followed closely by a score of 1,460 for the quarter-section containing Casa Rinconada and near Pueblo Bonito and Pueblo del Arroyo.

The individual visible area maps were analyzed by percent of each quarter-section that is within the area seen from the given ruin. The "scores" could range from 0-100 percent. A partial quarter-section received a score for that portion of the whole quarter-section within the park and the visible area. Individual quarter-section scores were totaled to provide an overall visible areas score for all 11 ruins. Total scores ranged from 0 for outlying quarter-sections with no portions in any of the areas seen from the selected ruins, to a high of 710 for the quarter-section containing Casa Rinconada and near Pueblo Bonito and Pueblo del Arroyo.

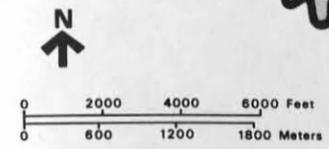
The Watershed map was analyzed by quarter-section in a manner similar to the visible area maps. The "score" was derived by determining the percent of the quarter-section within the Chaco Wash watershed. These ranged from 0 for areas completely outside the watershed boundaries to 100 for quarter-sections completely within the watershed.

The Steep Slopes map was analyzed similarly to determine the percent of the quarter-section with slopes greater than 25 percent. The resultant "scores" ranged from 0 for relatively level quarter-sections to a high of 70 for a quarter-section at the head of the Weritos rincon. No quarter-section was 100 percent in steep slopes.

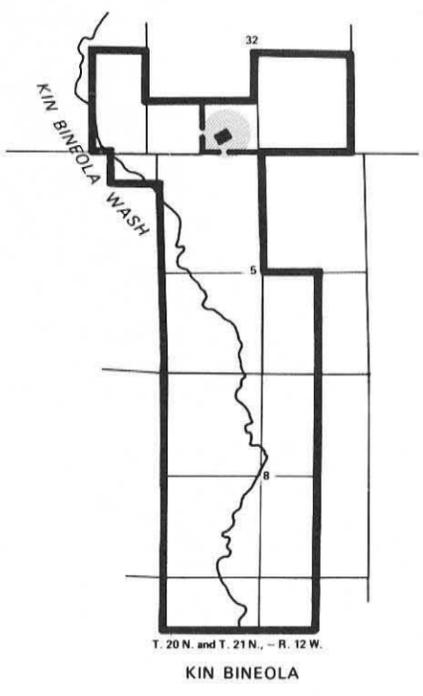
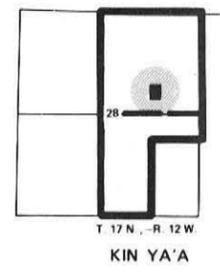
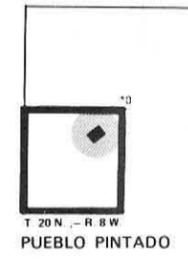
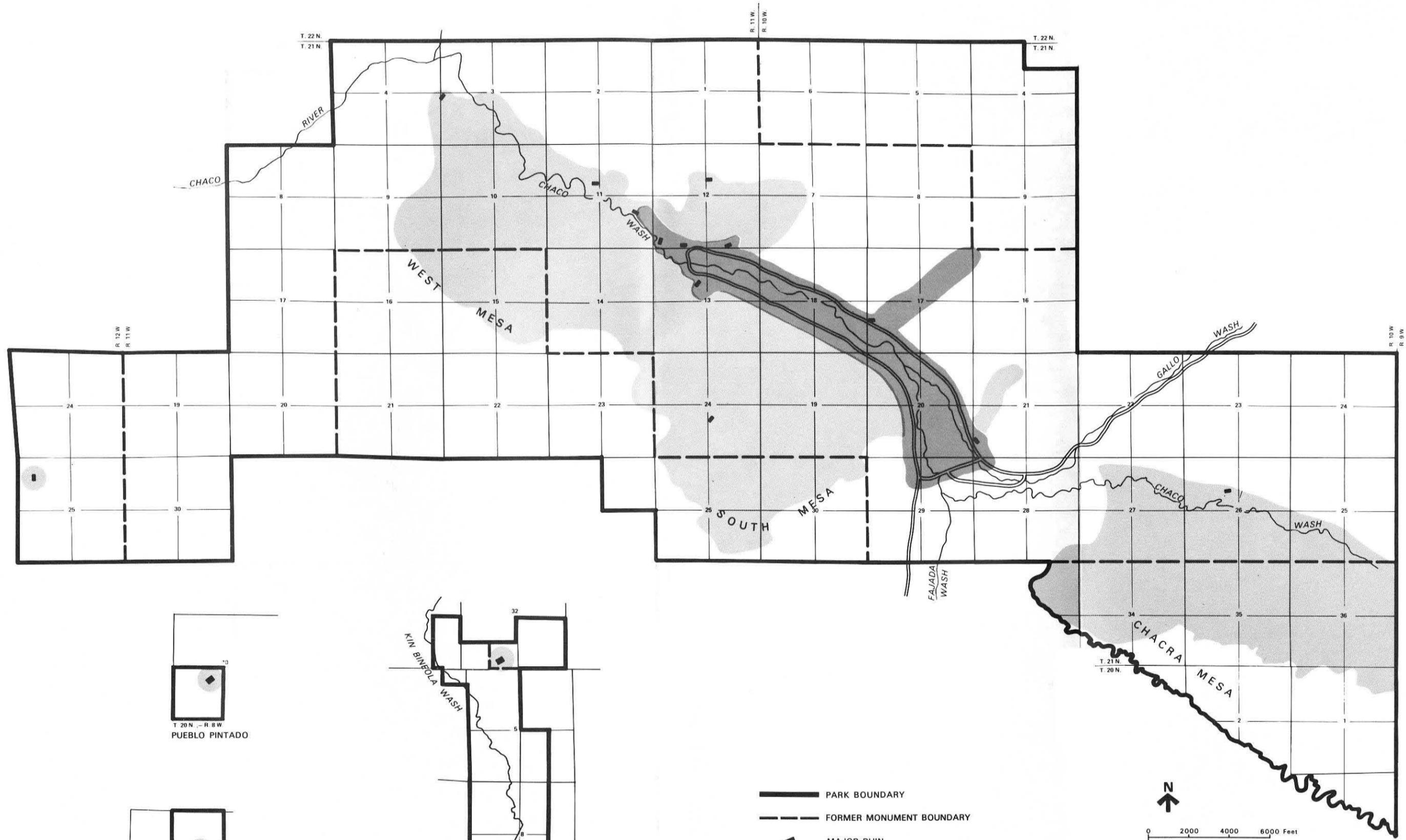
The composite Quarter-Section Scores map shows the scores for each of the evaluated resources along with a total for each quarter-section. Since there is a certain amount of subjectivity involved in any numerical ranking system, individual resource scores are shown to explain how the quarter-sections rank by resource type. The total score is an indicator of the need for use restrictions and protection measures. Simply stated, quarter-sections with higher scores deserve more use restrictions and greater levels of protection.



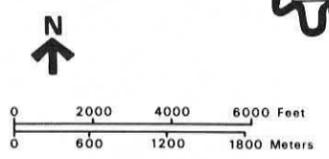
-  MAJOR RUIN
-  PARK BOUNDARY
-  FORMER MONUMENT BOUNDARY
-  SECTION NUMBER
-  HIGH DENSITY ARCHEOLOGICAL SITE AREAS AS INTERPRETED FROM DISTRIBUTION OF HIGH DENSITY SQUARES (SIX OR MORE SITES PER 40 ACRES); MAY INCLUDE SMALL ENCLAVE AREAS WITH LOWER DENSITIES
-  MEDIUM DENSITY ARCHEOLOGICAL SITE AREAS AS INTERPRETED FROM DISTRIBUTION OF MEDIUM-DENSITY SQUARES (THREE TO FIVE SITES PER 40 ACRES); MAY INCLUDE SMALL ENCLAVE AREAS WITH LOWER OR HIGHER DENSITIES
-  LOW-DENSITY ARCHEOLOGICAL SITE AREAS AS INTERPRETED FROM DISTRIBUTION OF MEDIUM-DENSITY SQUARES (ZERO TO TWO SITES PER 40 ACRES); MAY INCLUDE SMALL ENCLAVE AREAS WITH HIGHER DENSITIES



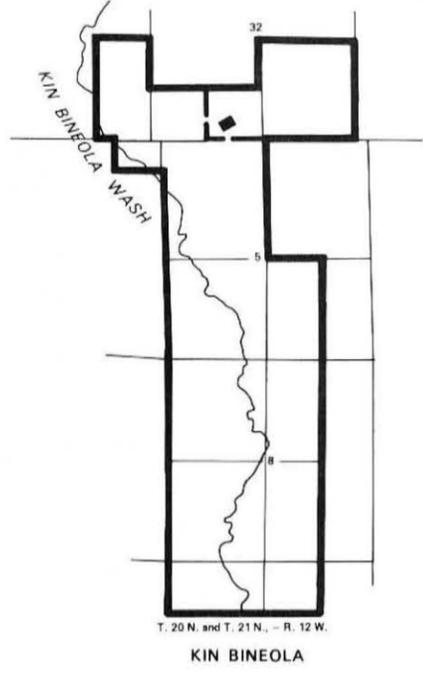
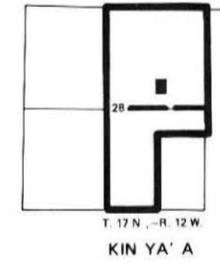
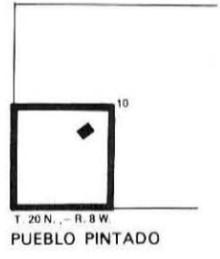
**ARCHEOLOGICAL SITE DENSITY**  
**CHACO CULTURE NATIONAL HISTORICAL PARK**  
 UNITED STATES DEPARTMENT OF THE INTERIOR / NATIONAL PARK SERVICE



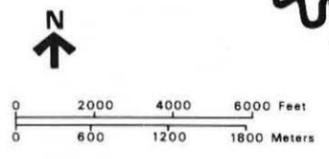
- PARK BOUNDARY
- FORMER MONUMENT BOUNDARY
- MAJOR RUIN
- PRIMARY VISITOR USE AREA
- HIGH POTENTIAL BACKCOUNTRY USE AREAS
- SECTION NUMBER



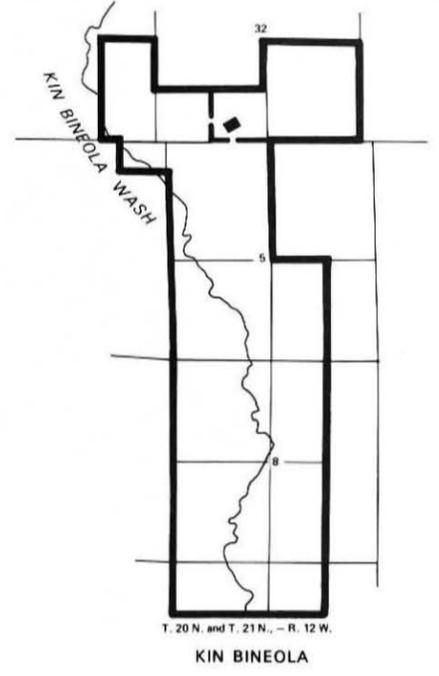
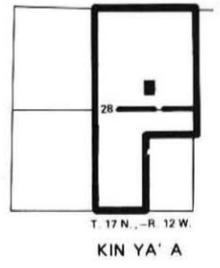
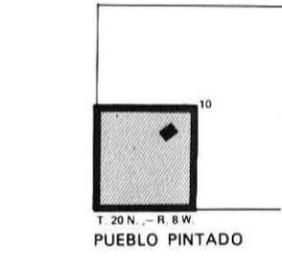
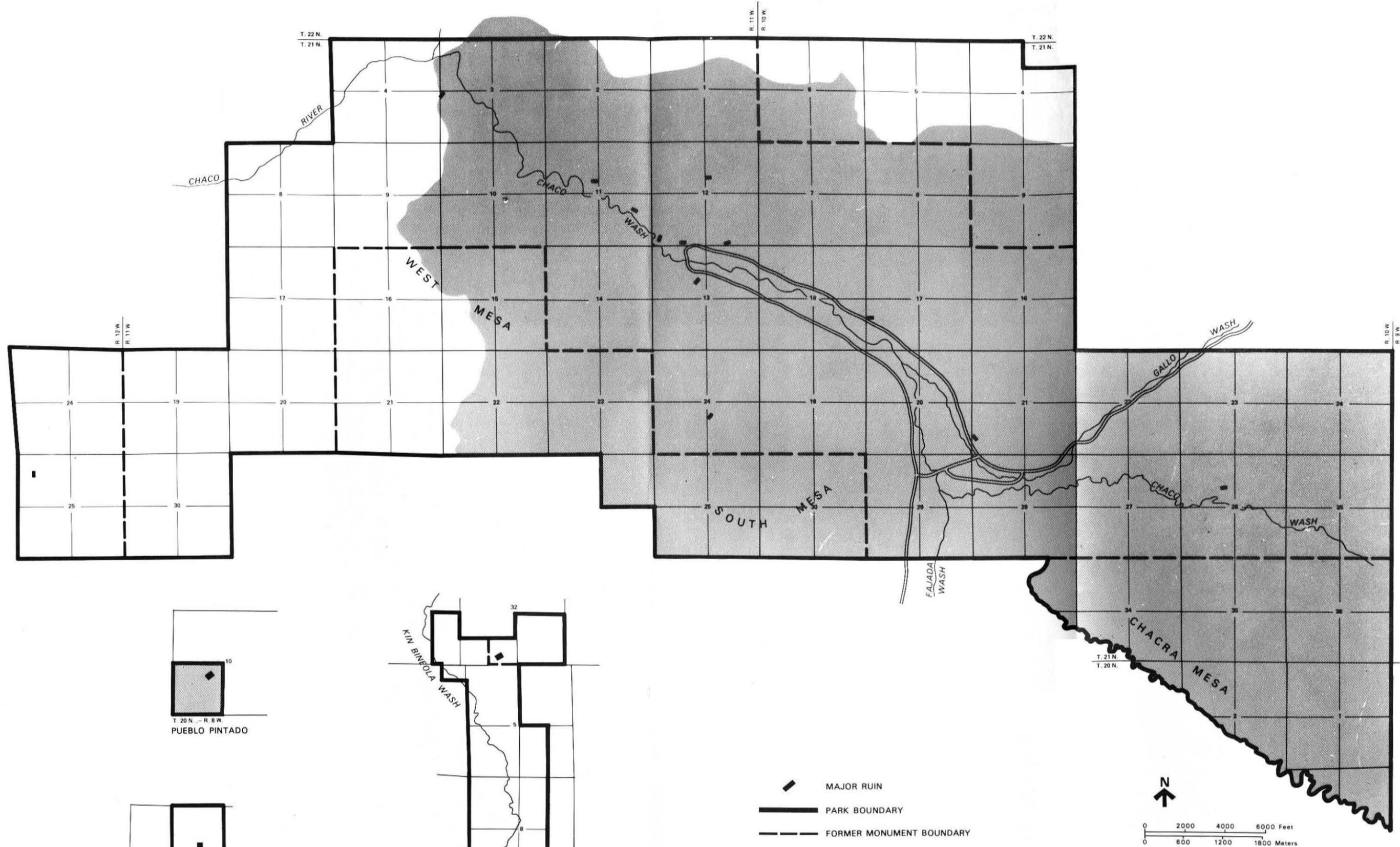
**VISITOR USE AREAS**  
CHACO CULTURE NATIONAL HISTORICAL PARK  
UNITED STATES DEPARTMENT OF THE INTERIOR / NATIONAL PARK SERVICE



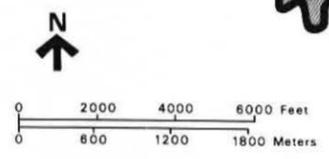
- MAJOR RUIN
- PARK BOUNDARY
- FORMER MONUMENT BOUNDARY
- SECTION NUMBER
- VIEWPOINT
- VISIBLE AREA



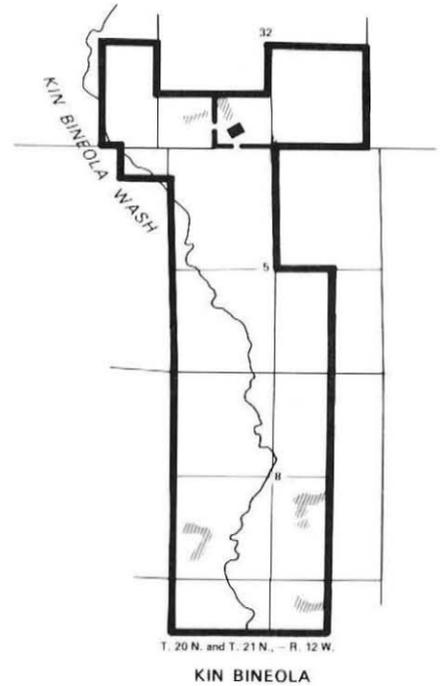
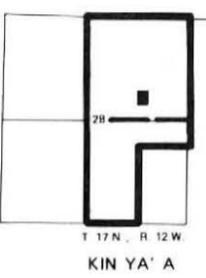
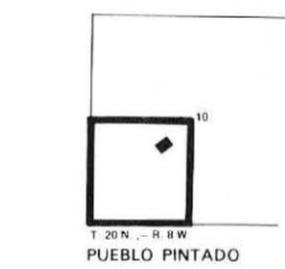
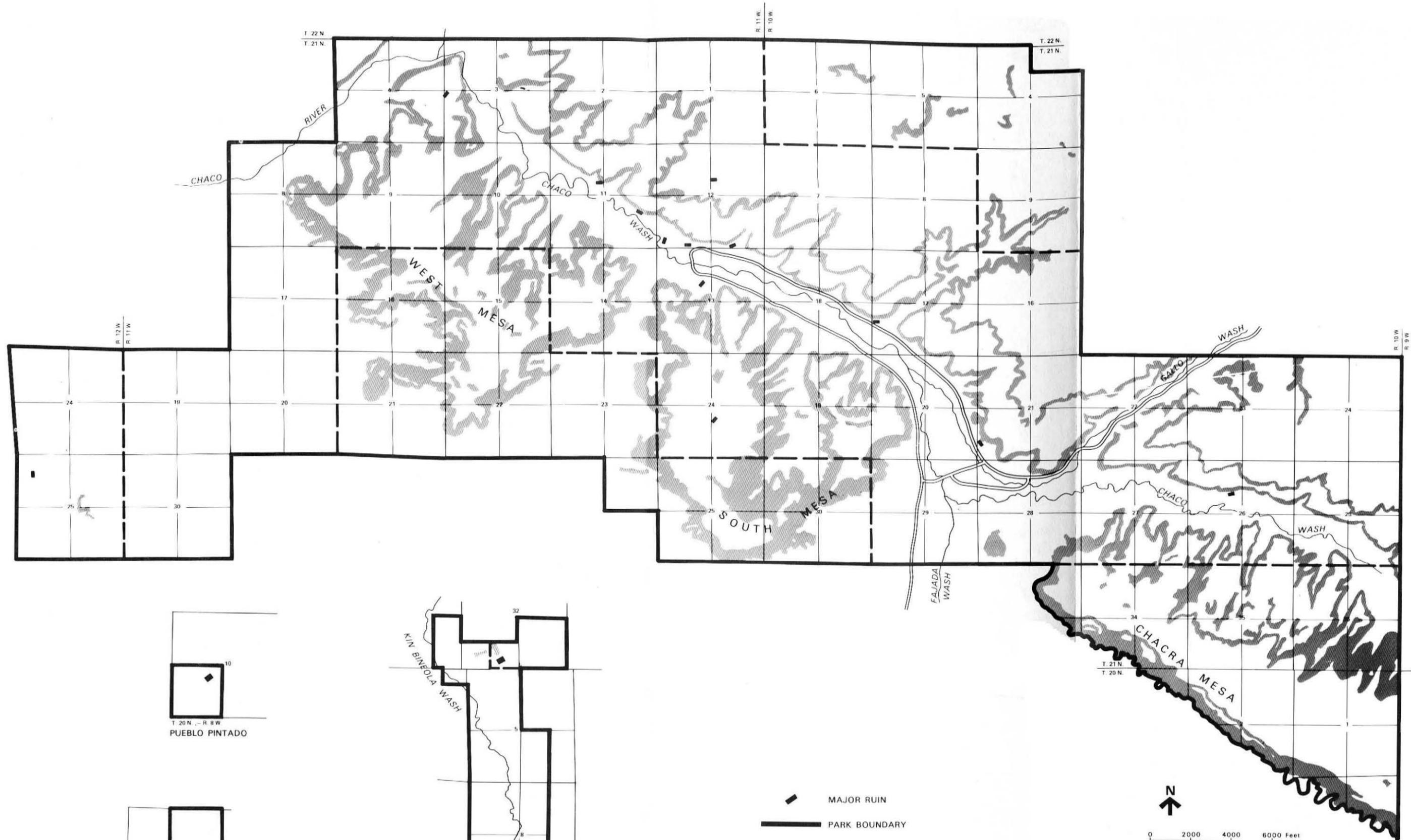
**VISIBLE AREAS  
FROM MAJOR RUINS IN THE CANYON**  
CHACO CULTURE NATIONAL HISTORICAL PARK  
UNITED STATES DEPARTMENT OF THE INTERIOR / NATIONAL PARK SERVICE

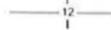


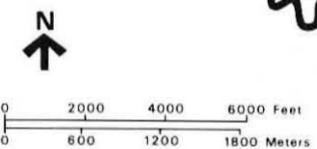
- MAJOR RUIN
- PARK BOUNDARY
- FORMER MONUMENT BOUNDARY
- SECTION NUMBER
- PARK AREA WITHIN CHACO WASH WATERSHED



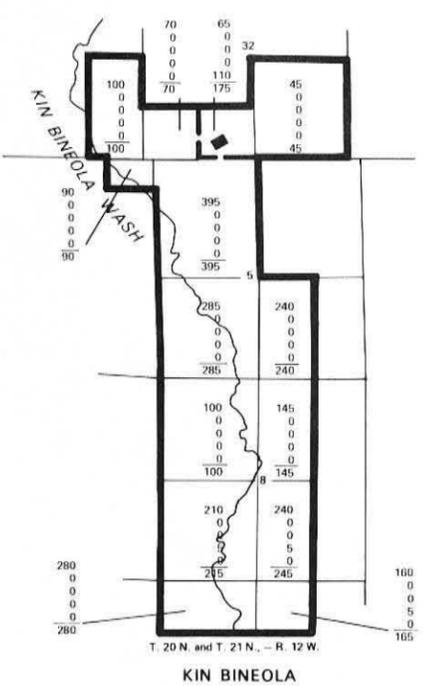
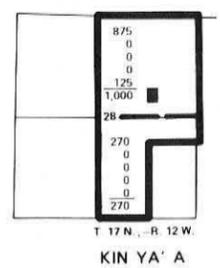
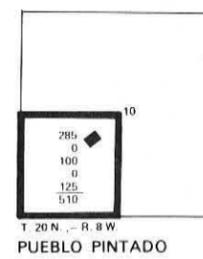
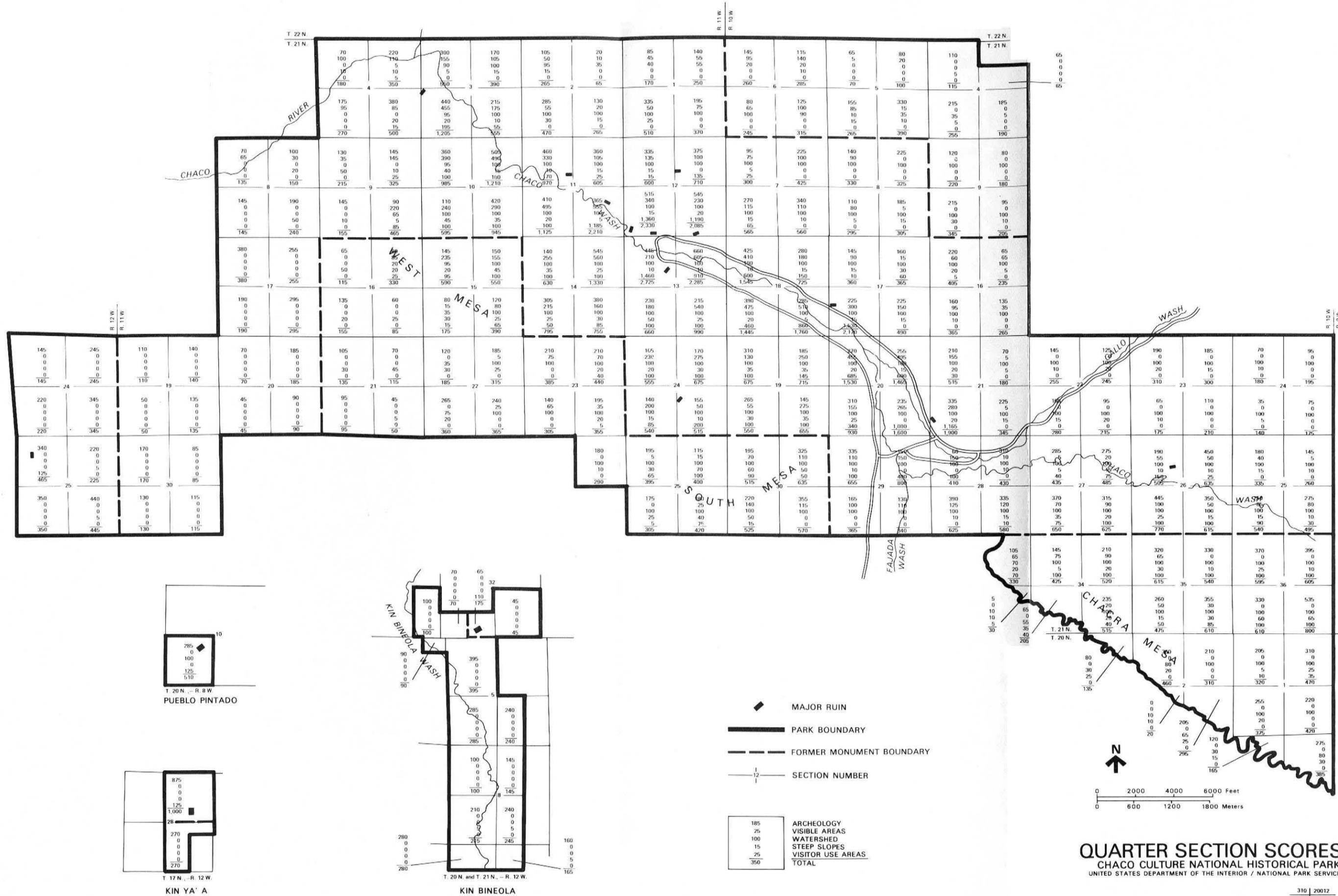
**CHACO WASH WATERSHED**  
CHACO CULTURE NATIONAL HISTORICAL PARK  
UNITED STATES DEPARTMENT OF THE INTERIOR / NATIONAL PARK SERVICE



-  MAJOR RUIN
-  PARK BOUNDARY
-  FORMER MONUMENT BOUNDARY
-  SECTION NUMBER
-  SLOPE OVER 25%



**STEEP SLOPES**  
CHACO CULTURE NATIONAL HISTORICAL PARK  
UNITED STATES DEPARTMENT OF THE INTERIOR / NATIONAL PARK SERVICE



- MAJOR RUIN
  - PARK BOUNDARY
  - FORMER MONUMENT BOUNDARY
  - SECTION NUMBER
- |     |                   |
|-----|-------------------|
| 185 | ARCHAEOLOGY       |
| 25  | VISIBLE AREAS     |
| 100 | WATERSHED         |
| 15  | STEEP SLOPES      |
| 25  | VISITOR USE AREAS |
| 350 | TOTAL             |

**QUARTER SECTION SCORES**  
 CHACO CULTURE NATIONAL HISTORICAL PARK  
 UNITED STATES DEPARTMENT OF THE INTERIOR / NATIONAL PARK SERVICE

## Archeological Site Scoring System

The use of number scores to determine the relative importance of archeological sites in newly authorized Chaco areas requires a number of subjective assumptions. To make it clear how particular number scores were derived, these assumptions are explained below.

The main premise for all site scoring is that the park was created specifically to preserve, protect, and interpret Chacoan Anasazi archeological sites and that these sites are the primary park resource. All other resources, both cultural and natural, are of secondary importance and concern. Based on this premise, sites of Anasazi cultural affiliation, site type, and time period were generally awarded the highest scores (see the Archeological Site Scoring form). For most categories, a 1 to 5 scale was used, with 5 being the highest score. On the 1 to 10 scale, a score of 10 was the highest.

A number of secondary assumptions or factors were also used in generating the site scores. These are discussed below by data category.

Cultural Affiliation (refer to the Archeological Site Scoring form), all Anasazi sites were given the highest possible score (5), Paleo-Indian and Archaic remains, although generally ephemeral and visually unimpressive, were assigned a relatively high score (4) because research, protection, and interpretation of these sites will be necessary if the origins of the Anasazi are to be properly understood. Navajo and Historic sites were assigned lower scores (3 and 2 respectively) because they are by definition secondary resources and their interpretation is not directly related or critical to understanding of the Anasazi occupation. This is not to say that Navajo and Historic archeological sites lack importance; clearly, they are a valuable resource and can contribute to our knowledge of Navajo culture and the history of the Chaco area.

The lowest possible score (1) was used for sites of unknown cultural affiliation. It was assumed that if a site was so insubstantial as to have no visible diagnostic artifacts, its value as a resource was greatly diminished.

Site Type scores were assigned to reflect both the cultural affiliation and the relative importance of the site compared to other types of the same cultural affiliation. For example, habitation and kiva sites were assigned the highest possible score (5) because they are site types unique to Anasazi culture and because, relative to other Anasazi and non-Anasazi site types such as artifact scatters (3) or hearths and baking pits (2), they may be expected to provide a much larger and broader range of research and interpretive information. Following this scheme, such Anasazi site types as roads and trails (4), signalling sites (4), shrines or ceremonial sites (4), ledge units (4), fieldhouses (4), and water control sites (4) are expected to have substantial research and interpretive value, while Anasazi or non-Anasazi sites such as rock art (3), storage sites (3), and quarries (1) are not expected to yield such substantial results.

Period of Occupation scores were assigned to reflect both the importance of the cultural affiliation and the greater or lesser importance of a specific time period within the overall time span of each cultural group.

Since each time period of the Chaco Anasazi occupation was considered critical, each period was rated equivalently (5). Paleo-Indian and Archaic time phases were also considered to be of equal importance and accordingly were assigned equal scores (4). The time periods used to divide the Navajo occupation were rated differently, with earlier remains scored higher (4) and recent or unknown sites scored lower (2). Earlier Navajo sites are felt to be of greater importance for the information they may yield on development of the Navajo culture in the Chaco area. Historic sites were assigned scores of 1 and 2, again with the higher score going to the earlier sites.

The Overall Significance is an objective assessment of a site's archeological or historic value relative to all other archeological sites. Although somewhat subjective, these scores were assigned based on several factors:

the uniqueness or singularity of a site, and the importance of this uniqueness relative to research, historic events, or interpretation

the volume of archeological deposits at a site, as a general index of the quantity of information and artifactual material that might be recovered if it were excavated

the potential of a site for providing significant data relevant to general or specific research problems

the physical condition or state of preservation of archeological deposits, structures, or artifacts present at the site

Highly Significant - These are the extremely important archeological sites that are clearly unique, may be expected to produce large quantities of archeological information and materials, have excellent potential for general and specific research, and are in a good or excellent state of preservation.

Very Significant - These are sites that are not necessarily unique but may be expected to yield substantial quantities of archeological information and material, have good potential for general and specific research, and are in a good or fair state of preservation.

Significant - Although not unique, these sites may be expected to yield moderate to small quantities of archeological information and materials, have potential for specific research problems, and are in a good or fair state of preservation.

Little Significance - These sites are not unique and, because of their ephemeral nature or degraded condition, cannot be expected to produce more than minor amounts of archeological information or material. For the same reasons, these sites have little potential for even specific research topics.

Archeological Site Data Categories  
(refer to Archeological Site Scoring form)

1. Cultural Affiliation refers to the cultural or social group responsible for constructing and occupying a site.

Anasazi: The Chaco Anasazi were sedentary agriculturalists who occupied the Chaco Canyon area between A.D. 500-1300. Ancestors of the modern Pueblo Indians, the Anasazi constructed both small and large masonry pueblos. Anasazi sites were most clearly distinguished from sites of other cultural affiliation by the presence of a variety of gray utility and painted black-on-white pottery types. Examples of Anasazi sites are small pueblos (habitations), kivas, fieldhouses, water control features, and rock art.

Archaic: Seminomadic Archaic hunters and gatherers occupied the Chaco Canyon area between 5500 B.C. and A.D. 500. The sites of these precursors of the Anasazi were distinguished in the field reconnaissance by the presence of diagnostic projectile points or one-hand manos and basin metates (grinding stones). Since Archaic people did not manufacture pottery, the absence of ceramics was necessary before Archaic occupation could be assumed, but this absence in itself was not significant enough to define an Archaic site. Typical Archaic site types are camps, hearths, baking pits, and lithic (chipped stone) scatters.

Paleo-Indian: Nomadic big game hunters who passed through the Chaco area between 8500 and 5500 B.C. are termed Paleo-Indian. The only evidences of their passage were occasional campsites and scattered chipped stone tools that appeared to have been lost or discarded.

Navajo: The Navajo are historic and modern occupants of the Chaco area who until recently practiced a mixed economy based on hunting, gathering, farming, and herding. Navajo survey sites were most commonly distinguished from sites of other cultural affiliations by the presence of Navajo ceramics and historic Pueblo trade wares in addition to hogans, sweathouses, ovens, and other characteristic features. Typical Navajo site types include hogans, storage rooms, sweathouses, ovens, and animal husbandry features (corrals and sheep pens).

Historic: This is a lump category used for all non-Navajo historic remains of Euro-American affiliation. In the Chaco area these are typically Spanish and Anglo ranches or herding camps. These sites were distinguished from historic Navajo sites by the absence of diagnostic Navajo ceramics and architectural features and by the presence of rock inscriptions or architecture of European origins.

Unknown: These were sites that lacked all diagnostic features and therefore could not be placed in a cultural affiliation category.

Unknown (probably Anasazi or Archaic): Sites placed in this category did not manifest enough diagnostic characteristics of either Anasazi or Archaic sites to allow definite assignment but did display some attributes common to both (e.g., chipped stone, hearths). Site types most frequently relegated to this category were lithic scatters, hearths, baking pits, and camps.

(Unknown (probably Anasazi or Navajo): Sites placed in this category did not manifest enough diagnostic attributes of either Anasazi or Navajo sites to allow definite placement but again did display some features shared by both (e.g., masonry architecture). Collection and use of Anasazi potsherds by Navajos in some cases made it impossible to determine if a site was in fact Anasazi or Navajo.

Unknown (Navajo or Historic): Sites assigned to this category were clearly of the historic era, as indicated by historic artifacts or architecture, but had no attributes distinctive to Navajo or Historic (Euro-American) sites.

2. Site Type is defined as a single feature or group of features that by their regularity of occurrence can be recognized as the location of certain day-to-day activities performed by members of a cultural group. Site types such as Anasazi habitation sites or Navajo hogans implicitly include a variety of site features (e.g., ovens, hearths). Where such features occurred independently, they were classed as site types in their own right.

Habitation: These are Anasazi residence sites including masonry pueblos of three or more rooms, individual pithouses, and pithouse villages. Typical features associated with these sites are kivas, plazas, hearths, rock art, burials, and refuse mounds.

Kiva: These circular, subterranean Anasazi ceremonial structures are classed as a separate type only when they occur as isolated structures.

Hogan: Navajo hogans or historic sites may include one or more circular or ovoid, masonry or wood hogans and a variety of associated residence features including storage rooms, rock art, ovens, corrals, sheep pens, wood piles, and ash heaps.

Road or trail (Anasazi): Prehistoric roads are 7- to 9-meter-wide cleared or constructed routes that are generally straight or linear and may extend substantial distances. Rock borders and stairways are common features of these sites. Sherd scatters occur along the road surfaces in some areas. Trails are narrow (1 to 2 meters), sinuous routes distinguished by linear sherd scatters, steps, hand and toe holds, cairns, and rock art.

Signaling site: These are Anasazi sites consisting of a fire pit or a room on a point of topographic prominence with high visibility.

Some of these sites may be associated with prehistoric roads. Since this site type is not yet well defined or understood archeologically, identification is difficult and classification tenuous.

Shrine or other ceremonial feature: Included within this site type are Anasazi and Navajo ceremonial sites. The Anasazi shrine is characteristically a low masonry wall forming a "c" or fishhook-shaped enclosure open to the east. The location of these sites on topographic prominences with direct sight lines to other sites suggests that they may also have been signaling sites. A scatter of turquoise chips may be the only associated artifacts.

Navajo shrines include semicircular masonry enclosures, large cairns, and stick piles. Also included within this site type are a variety of other "ceremonial" sites to which no definite function can be attributed, but which the archeologist suspects may have had some religious or esoteric function.

Ledge unit: These are ovoid to squarish masonry rooms generally found in boulder talus or constructed against cliff edges or rock outcrop ledges. Extensive refuse or other features associated with permanent residence sites are not present. Ledge units appear to be Anasazi, Navajo, and Historic, although uses may vary with cultural affiliation. The function of Anasazi ledge units is not known, but Navajo or Historic ledge units may have been used as fieldhouses or herding camps.

Fieldhouse: Fieldhouses are Anasazi structures of one or two rooms, often with an associated scatter of refuse. These are temporary or seasonally occupied structures that are presumed to have been used primarily as shelters in or adjacent to agricultural fields. Some sites may alternatively have functioned as camps or shelters on hunting or gathering trips.

Water control feature: The water control site type includes dams, ditches, headgates, diversion walls, berms, or other features used to control runoff. These features are most commonly associated with the Anasazi, but since diagnostic ceramics or other culturally distinctive features are generally not present, affiliation is often indeterminate.

Camp (Archaic or Paleo-Indian): Camps include scatters of chipped or ground stone tools in addition to hearths, baking pits, and other features suggesting a variety of activities and/or temporary residence.

Artifact scatter: These are surface scatters of chipped stone, sherds, or rocks without accompanying architectural features. Sites of this type have been identified for all cultural affiliations.

Other (Archaic or Paleo-Indian): This is a catch-all category for Archaic or Paleo-Indian sites that fall outside the realm of the camp, artifact scatter, hearth, or baking pit site types.

Camp (Anasazi, Navajo, Historic, or Unknown): These camps include scatters of chipped stones, sherds, or historic refuse associated with hearths, storage rooms, rock art, shelters, and animal husbandry or other features suggesting a variety of activities and/or temporary residence.

Rock art: Rock art includes pecked, incised, and scratched (petroglyphs) or painted (pictographs) designs, figures, symbols, or writings on rock. Rock art sites are commonly of Anasazi, Navajo, and Historic cultural affiliations.

Storage site: This site type category includes small bins, cists, rooms, and walled natural cavities that may have been used for storing foodstuffs, hunting or gathering equipment, and other items. Although diagnostic artifacts are often absent, these sites are generally assumed to be of Anasazi or Navajo cultural affiliation.

Baking pit: Baking pit sites consist of one or more large circular, squarish, or polygonal slab-lined pits with an associated concentration of heavily burned rock. Baking pits were probably used to cook large quantities of animal or plant material away from the residence site. These sites are characteristic of both Archaic and Anasazi occupations, although typically few diagnostic artifacts are present.

Hearth: These are fire pits of all shapes or forms used for cooking or heating. Examples of this site type are associated with all cultural affiliations.

Burial: This site type is limited to isolated human remains with or without accompanying burial goods.

Ranch complex: These are Historic, Hispano, or Anglo sites that display such features as ranch houses, sheds, corrals, windmills, tanks, refuse, or other associated features.

Road or trail (Navajo and Historic): Navajo or Historic roads are mostly clearly distinguished by double ruts characteristic of wagon or motor vehicle traffic. Rock borders, retaining walls, cut and fill, and cairns are common improvements associated with these sites. Trails are narrow footpaths marked by recent cairns, log steps and ramps, historic rock art, hand and toe holds, and historic debris. It is important to note that only those portions of roads or trails exhibiting construction or improvements were recorded as sites. No attempt was made to trace out these numerous features or to interlink separate segments.

Animal husbandry feature: These are Navajo or Historic sites with stock-raising features such as corrals, sheep beds, or sheep pens.

Sweathouse: These are Navajo sweatbath structures consisting of small conical sweathouses formed by wooden poles and accompanied

by rock heating fire pits and rock discard piles. Generally few or no artifacts are associated with sweathouses.

Oven: Masonry beehive-shaped ovens used for baking are associated with both Navajo and Historic sites, primarily the former.

Quarry: Quarries are Anasazi, Navajo, or Historic source areas for masonry stone, although in many cases affiliation cannot be determined due to lack of artifacts.

Cairn: These are piles of stacked rock of varying size and cultural affiliation. Many cairns mark trails; others may be shrines or simply the result of idle activity. These features were classed as a site type only when unassociated with more prominent features (e.g., trails, hogans).

Other (Navajo or Historic): This is a lump category for any unforeseen and miscellaneous site types of Navajo or Historic affiliation.

Other: This is a lump category for miscellaneous site types of unknown cultural affiliation.

Unknown: This is a lump category for all sites of indeterminate site type.

3. Periods of Occupation: This refers to the intervals of time during which a site was in use. The presence or absence of diagnostic artifacts, architecture, or other material remains as described below were used to determine the date of occupation.

#### Anasazi:

Basketmaker III (A.D. 500-750). Basketmaker III sites are distinguished by the presence of Lino Gray, La Plata B/W, and Whitemound B/W ceramics. Architecturally, the sites exhibit upright slabs forming the outline of cist rooms, scattered small stones, and in some cases slight depressions indicating the presence of buried pithouses.

Pueblo I (A.D. 750-900). Basketmaker III pottery types continued to be made in this period but were joined by a new group of diagnostics, including Kan'a Gray (neck-banded) and Kiatuthlanna B/W. Architecturally, Pueblo I habitation sites are distinguished by small-acred blocks of rooms constructed of upright slabs and jacal (mud and sticks). This room block debris usually forms a low mound accompanied on the south or southeast by a slight pithouse depression and refuse scatter.

Early Pueblo II (A.D. 900-975). Beginning in Early Pueblo II, a new group of ceramic types, including Tohatchi Banded, Coolidge Corrugated, Red Mesa B/W, and Escavada B/W became

dominant. Room blocks at habitation sites of this period were more linear and, as indicated by the greater size and large amounts of masonry rubble, had more substantial masonry walls. Although not always visible, slight depressions at some sites indicate the presence of one or more pithouses. The typical refuse scatter south or southeast of the surface rooms and pithouse structures is often large and deep enough to be termed a mound.

Late Pueblo II (A.D. 975-1050). Coolidge Corrugated, Red Mesa B/W, and Escavada B/W continued into this period but were augmented by Gallup B/W. At the habitation sites the room block architecture continued to become more substantial, as did often the refuse areas. Although not visible from the surface, the pithouses of this period lost most of the features (or features were absent) typically associated with kivas.

Early Pueblo III (A.D. 1050-1175). Chaco Corrugated, Chaco B/W, Puerco B/W, and Wingate B/W are diagnostics of this time period, but they appeared in low frequencies, supplementing the Gallup B/W that continued from the previous period. Late in the period, McElmo B/W and a variety of other painted carbon wares made their appearance. Habitation sites constructed during this period tended to be more compact and architecturally more massive. Masonry walls were usually of compound (two stone wide) construction, or even core and veneer. Although generally not visible on survey, during this period kivas were first integrated into the room block.

Late Pueblo III (A.D. 1175-1300). McElmo B/W and a variety of other carbon types continued into this period with the addition of Mesa Verde B/W. Habitation sites continued to be compact and massive structures, but some sites constructed during this period were on cliff ledges. At these sites many of the more massive architectural features were abandoned due to the space limitations of these more constricted locations.

Unknown. These are sites with some pottery or architecture indicating Anasazi affiliation that cannot be assigned to any specific period.

Paleo-Indian: Projectile point types and other distinctive chipped stone tools unique to the Paleo-Indian period are the chief diagnostic materials. At present the Paleo-Indian occupation of the Chaco Canyon area is thought to have extended from about 8500-6000 B.C. Because of the limited number of such sites in present data base, a breakdown of the cultural phases is not considered necessary.

Archaic: Certain types of projectile points and other chipped stone tools are unique to the Archaic period and are used as diagnostics to distinguish several phases (Jay 5500-5000 B.C.; Bajada 5000-3000; San Jose 3000-1800; Armijo 1800-800; Basketmaker II 800 B.C.-A.D.

500) of the Archaic. A variety of other features are unique to the Archaic period but are not useful for distinguishing specific intervals of occupation.

Navajo: The two Navajo time intervals defined here do not necessarily follow temporal divisions used by scholars of Navajo cultural history. Rather, they were determined for the most part by the limitations in the survey methodology.

No Navajo sites in the Chaco area are currently dated prior to 1725, although additional research may be expected to move this date backward.

1725-1900. Common diagnostic pottery types of the 18th and 19th centuries include Dinetah Utility, Dinetah Utility (transitional variety), Navajo Utility, Gohernador Polychrome, and Puname and Ashiwi series polychromes. Since many early Navajo sites do not yield pottery, the presence of certain architectural features (small ovoid to circular hogans) in conjunction with the absence of 20th century Euro-American goods is necessary to make a definite period assignment.

1900-1945. During this period, glass, metal, and other Euro-American artifacts appeared on Navajo sites and became frequent or even dominant. At the same time, native and Pueblo trade ceramics all but disappeared (by 1900). Hogans of this interval were generally circular and larger, with residence sites occupying larger, more open locations. A cutoff date of 1945 was used because most Navajo moved out of the Chaco Canyon vicinity in the late 1930s, before the monument was fenced in 1947.

Unknown Navajo (1725-1900). These are Navajo sites with no diagnostic attributes.

Unknown Anasazi or Archaic: This category includes Anasazi or Archaic sites of unknown time period.

Unknown Navajo or Historic: These are Navajo or Historic sites of unknown time period.

Unknown: These are sites of unknown cultural affiliation and time period.

Archeological Site Scoring Form

1.	<u>Cultural Affiliation</u>	Scale 1-5*
	Anasazi (Ana)	5
	Archaic (Arc)	4
	Paleo-Indian (Pal)	4
	Navajo (Nav)	3
	Historic (His)	2
	Unknown (Un)	1
	Unknown--probably Anasazi or Archaic (UnA)	4
	Unknown--probably Anasazi or Navajo (UnN)	3
	Unknown--Navajo or Historic (UnH)	2
2.	<u>Site Type</u>	Scale 1-5*
	Habitation (including pithouses) (Hab)	5
	Kiva (K)	5
	Hogan (Ho)	4
	Road or trail--Anasazi (Road)	4
	Signaling site (Sig)	4
	Shrine or other ceremonial feature (Cere)	4
	Ledge unit--Anasazi (Lu)	4
	Fieldhouse (Fh)	4
	Water control feature (Wc)	4
	Camp--Archaic or Paleo-Indian (Cp)	4
	Artifact scatter (Art)	3
	Other--Archaic or Paleo-Indian (Oth)	3
	Camp--Anasazi, Navajo, Historic, or Unknown (Cp)	3
	Rock art (Ra)	3
	Storage site (St)	3
	Baking pit (Bp)	2
	Hearth--Anasazi or Unknown (He)	2
	Ledge unit--Navajo or Historic (Lu)	2
	Burial (Bu)	2
	Ranch complex (Rch)	2
	Road or trail--Navajo or Historic (Road)	1
	Animal husbandry feature (An h)	1
	Sweathouse (Sw)	1
	Oven (Ov)	1
	Quarry (Qu)	1
	Cairn (Ca)	1
	Other--Navajo or Historic (Oth)	1
	Other--Unknown (Oth)	1
	Unknown (Un)	1

3. Period of Occupation

Scale 1-5\*

Anasazi

Basketmaker III (BMIII)	5
Pueblo I (PI)	5
Early Pueblo II (EPII)	5
Late Pueblo II (LPII)	5
Early Pueblo III (EPIII)	5
Late Pueblo III (LPIII)	5
Unknown (Un)	5

Paleo-Indian (period not subdivided) 4

Archaic

Jay (AJ)	4
Bajada (AB)	4
San Jose (AJ)	4
Armijo (AA)	4
Basketmaker II (BMII)	4
Archaic (time period unknown) (Arc)	4

Navajo

1750-1900 (N1)	4
1900-1945 (N2)	2
Unknown (N3)	2

Historic

Pre-1900 (H1)	2
Post-1900 (H2)	1

Unknown - Anasazi or Archaic (UnA) 4

Unknown - Navajo or Historic (UnH) 2

Unknown (Un) 1

4. Overall Significance

Scale 1-10\*\*

Highly significant	10
Very significant	5
Significant	3
Little Significance	1

\* 5 is the highest possible score

\*\*10 is the highest possible score

F: STAFFING REQUIREMENTS

EXISTING STAFFING

As of 01/01/83

<u>Position #</u>	<u>Position Title</u>	<u>Grade</u>	<u>Work Year Authorized</u>
7400-01	Superintendent	GS-12	1
7400-10	Chief I&RM	GS-09	1
7400-16	Archeologist	GS-09	1
7400-17	Administrative Clerk	GS-06 (1)	1
7400-18	Lead Park Ranger	GS-07 (2)	1
7400-19	Park Technician (General) (Interpretation)	GS-05	1 (3)
7400-20	Maintenance Foreman	WS-08	1
7400-22	Equipment Operator	WG-09	1
7400-23	Masonry Foreman	WS-07	1
7400-25	Maintenance Worker (Caretaker)*	WG-05	1
7400-27	Water Treatment Plant Operator	WG-09	1
7400-28	Park Technician (General) (RM)	GS-05	1 (4)
7400-905	Administrative Assistant	GS-04 (5)	1 (6)
7400- (7)	Park Technician (General)*	GS-05	0.8 (8)
	Seasonal Park Technician (General)	GS-04	3 positions @ 4½ mo/each
	Seasonal Motor Vehicle Operator	WG-05	1 position @ 0.8 work year
	Seasonal Laborer	WG-03	1 position @ 0.4 work year
	Seasonal Masonry Workers	WG-05	5 positions @ 4½ mo/each

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- (1) Funded at GS-05
  - (2) Funded at GS-05
  - (3) Funded at 0.9 work year
  - (4) Funded at 0.9 work year
  - (5) Funded at GS-03
  - (6) Position filled by 24-hour appointment
  - (7) Position description not yet approved
  - (8) Work year approved/not funded/needed at one full work year

\*Vacant positions

PROPOSED ADDITIONAL STAFFING

<u>Permanent Additional</u>	<u>Grade</u>	<u>Work Year Authorized</u>
Management Assistant	GS-09/11	1
<u>L.T.F. Permanent</u>		
Project Clerk (Ruins & Maintenance)	GS-03	0.8
Archeologist Aide (1)	GS-5	0.66
Masonry Workers--5 positions (2)	WG-5	0.66/each
<u>Seasonal/Temporary</u>		
Park Ranger/Technician (Seasonal Supervisor)	GS-5	0.6
Park Ranger/Technician (General)-- 13 interpretive positions	GS-4	0.5/each
Clerk/Typist Aide	GS-3	0.42
Maintenance Workers--3 positions	WG-4	0.5/each

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- (1) Either subject-to-furlough or trainee or coop student position
- (2) Subject-to-furlough positions; also convert existing 5 seasonal masonry workers to subject-to-furlough positions

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As the Nation's principal conservation agency, the Department of the Interior has basic responsibilities to protect and conserve our land and water, energy and minerals, fish and wildlife, parks and recreation areas, and to ensure the wise use of all these resources. The department also has major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

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