UNITED STATES DEPARTMENT OF THE INTERIOR

DRAFT

ENVIRONMENTAL ASSESSMENT

MESA VERDE NATIONAL PARK

MASTER PLAN

SEPTEMBER 1975

DRAFT

Denver Service Center

National Park Service

Regional Director, Rocky Mountain Region

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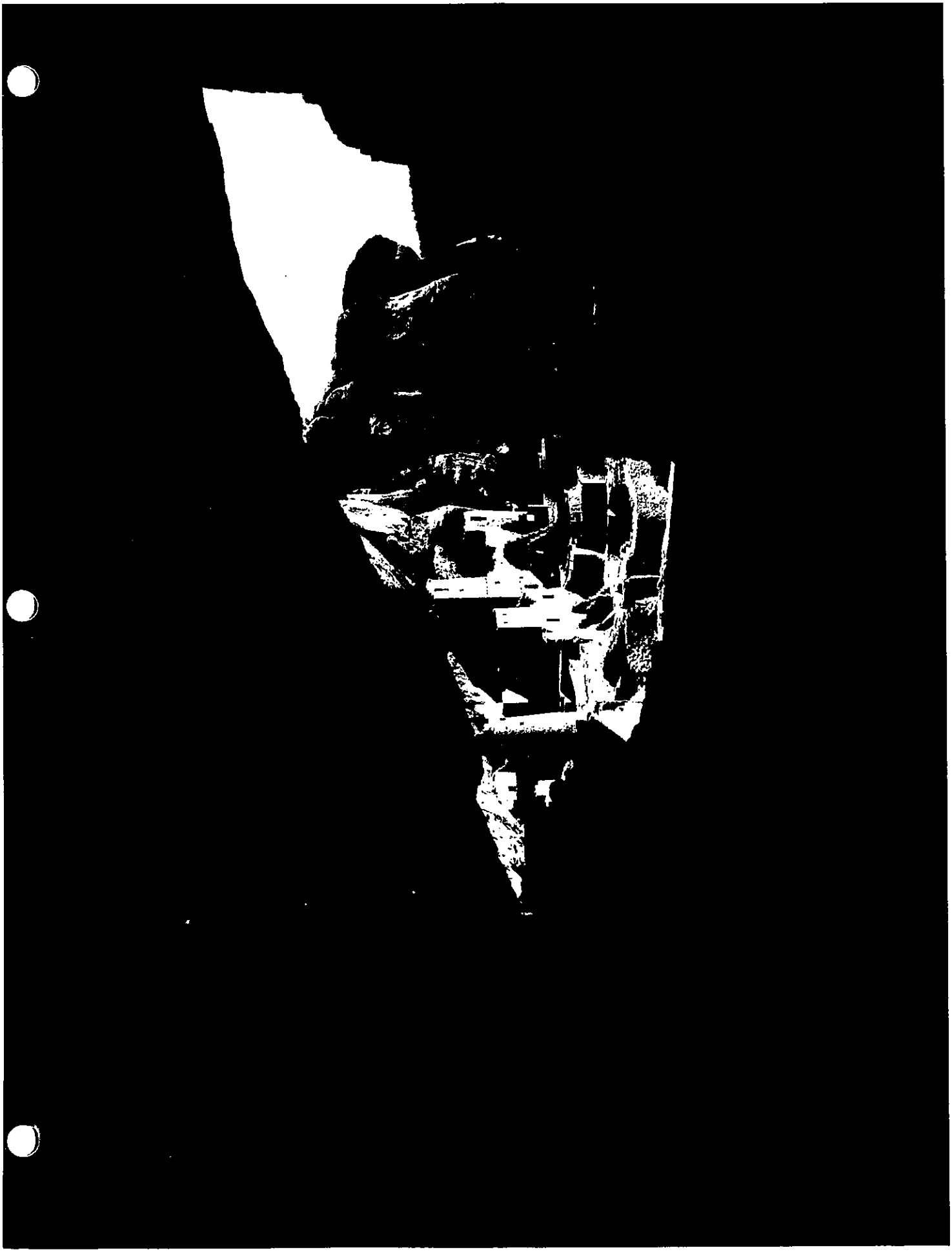
ILLUSTRATIONS AND PHOTOGRAPHS

MESA VERDE MASTER PLANNING PROCESS

The Mesa Verde National Park Master Plan Environmental Assessment analyzes the environmental impacts associated with proposed alternative courses of action studied during the master planning process. The environmental assessment will be available for public review, used as an aid in selecting the master plan concepts, and of help in determining whether the environmental impacts associated with the selected master plan proposals are of such magnitude that an environmental statement will be required. This assessment, including the presentation of all the alternatives studied by the master plan team, will be discussed at a public meeting on _____ . Comments from the public are invited during the 30 days following the meeting.

Following consideration, and incorporation where appropriate, of all comments, the regional director will select a combination of alternatives that will become the master plan proposals. At this stage, the preparation of the Mesa Verde master plan document will begin. The regional director will also decide at this time whether the proposals require preparation of an environmental statement (ES). His decision will be reached after evaluating the magnitude of impact, controversiality of the proposals, and comments offered during the review of the assessment.



After the decision has been made on the master plan proposals, and if an ES is to be developed a Notice of Intent will be prepared by the regional director. This is a National Park Service letter notifying appropriate Federal, State, and local agencies, and interested groups and persons that as a result of the environmental assessment and environmental review an ES is being prepared relative to the contemplated actions. This notice is published in the Federal Register in accordance with Council on Environmental Quality guidelines.

Should the regional director find as a result of the environmental assessment and consequent environmental review that an ES is not necessary, he will prepare a Negative Declaration. The notice of such a negative determination is published in the same manner as the notice for a formal environmental statement.

INTRODUCTION AND PLANNING PROBLEMS

Mesa Verde, ancient home of the northern or Mesa Verde branch of the San Juan Anasazi Indians, contains some of the best preserved examples of prehistoric architecture anywhere in North America. The structures and communities developed by the Anasazi, from early pithouses to large apartment complexes, all bear witness to the close relationship between man and nature that is so characteristic of Pueblo philosophy. The clustered dwellings of modern communities have an antecedent in the 13th-century cliff dwellings.

Mesa Verde National Park was established by Congress on June 29, 1906, to "preserve from spoliation" the unusual and large number of prehistoric remains, among which are the largest and most spectacular cliff dwellings in the United States. It is the only national park established primarily to protect historic resources. Since its establishment the mandate for preservation and study has been expanded to include the interpretation of the culture to which those artifacts are both a memorial and a linkage with modern man. Protection and interpretation of the natural systems of Mesa Verde are no less important and are, indeed, inextricably linked with the cultural artifacts.

The success of Mesa Verde as a national park is clearly evident from its popularity. This popularity combined with the finite limitations of the resource itself is endangering the unique experience for which Mesa Verde is so famous. This master plan assessment attempts to take a fresh look at Mesa Verde National Park -- its current problems and limitations, as well as its untapped potential -- in order to establish sound and exciting objectives and priorities for its future use, management, and protection.

The planning directive that was approved in 1972 recommended that a full-scale master plan be prepared for Mesa Verde National Park. This document would evaluate the resources of Mesa Verde and analyze present and potential influences that might affect them, in order to provide strong guidance for future management and development. The planning directive identified the following seven key problems that must be among those discussed in the master plan:

> Suggest methods by which the interpretive program can be diversified to create a stronger feeling of association between the visitors to the park and the people who once lived here.

Undertake a thorough study of access to and circulation within the park to include the possibility of eliminating automobile circulation during peak visitor-use seasons.

Determine the best locations for park headquarters and for permanent and seasonal employee housing.

Study the type of and best locations for visitor services and accommodations to be supplied by the park concessioner.

Suggest methods through which the National Park Service interpretive facility at Navajo Hill can be more effectively integrated into the total interpretive program.

Explore cooperative planning efforts with the Ute Mountain Indian Tribe to analyze ways the potential programs and facilities on the reservation could complement those of the National Park Service. Expand this to include other public lands managed by such agencies as the Bureau of Land Management (BLM) and the Forest Service.

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DESCRIPTION OF THE ENVIRONMENT

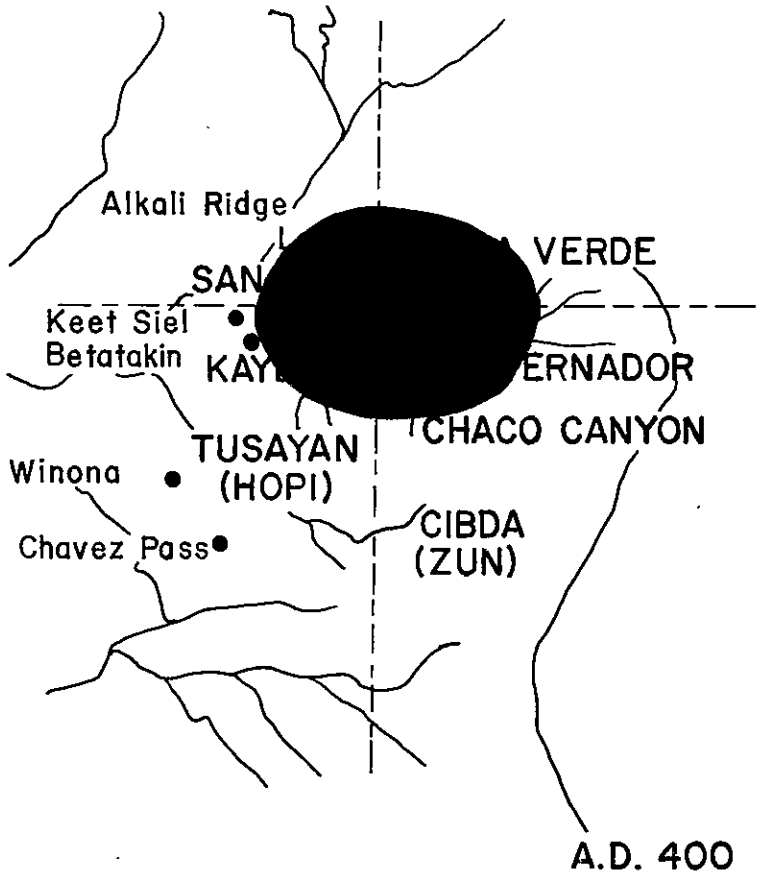
THE REGION

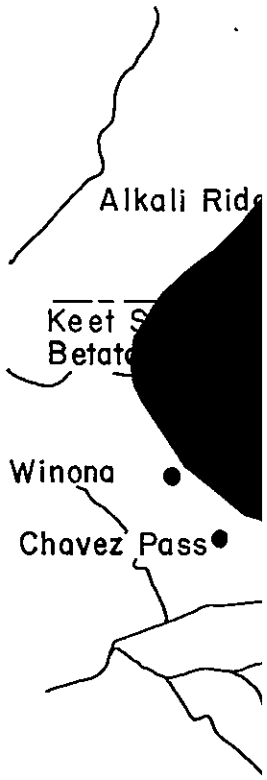
Anasazi Cultural/Geographic Evolution

The concept of "region" in relation to Mesa Verde and the Anasazi culture is most accurately phrased in cultural/geographic terms. Because the size, shape, and extent of the Anasazi culture area fluctuated from the time a recognizable culture first appeared, it is most appropriate to begin an exploration of the region on a cultural basis.

The Anasazi culture is first identified when the nomadic inhabitants of the plateau area of the Southwest began to adopt an agricultural tradition and establish semi-permanent settlements. The earliest communities in what we now call the Four Corners region of Utah, Arizona, Colorado, and New Mexico date from the beginning of the Christian Era.

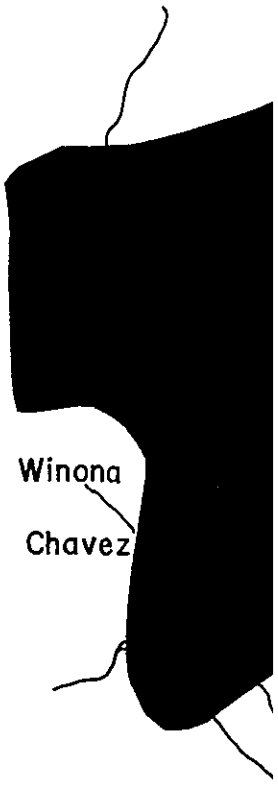
As the culture developed, the area of influence and occupation expanded. Trade, both among Anasazi communities and with other cultures, was prevalent. As the population increased, heavier demands were made upon the land; larger communities appeared, and perhaps a stronger sense of communal responsibility evolved.





LEGEND

ANASAZI CULTURAL



ANASAZI CULTURAL - GEOGRAPHIC EVOLUTION

Eventually, the Anasazi abandoned the Four Corners region, including Mesa Verde. Their probable descendants can now be found in the Rio Grande Pueblos of New Mexico.

To experience the Anasazi culture today, one can encounter the "Ancient Ones" through the medium of the artifacts and environments they left behind. These have been preserved and protected in national parks, national monuments, and in State and private museums throughout the region.

Major archeological areas in the region deal primarily with the Anasazi heritage. Mesa Verde is the best known and most heavily visited of these areas. It is the functional heart of the Southwest archeological region. Its role as a focal point for modern exploration of prehistoric Indian culture in the Mesa Verde cultural area implies that it might very well serve as the primary informational source for all archeological sites of the area.

Establishment of a regional information center at or near Mesa Verde would serve the public well. Such a facility would introduce the traveler to the available archeological sites and recreational opportunities within the region, as well as briefly orient him to the Indian culture.

The Modern Region

Surprisingly enough, the region within which Mesa Verde National Park is situated is much more sparsely settled these days than it was during the era of Anasazi occupation. The reason may well be similar to that which caused the ancient inhabitants of the area to depart -- the inability of the land to support a large population. Today, population is largely concentrated in the Colorado towns of Cortez and Durango and in Farmington and Shiprock, New Mexico. The remainder of the region consists of sparsely settled small towns; farms; the Ute Mountain, Southern Ute, and Navajo Indian Reservations; and national parks, national forests and BLM lands.

La Plata and Montezuma Counties, with current populations of 13,000 each, comprise the area of greatest regional influence in relation to Mesa Verde National Park. Area population has fluctuated over the past 50 years. Three major in-migrations have occurred: The first noticeable influx was a result of the movement of dry-land farmers from the drought-stricken Midwest in the 1930s. The second occurred during the 1950s, accompanying oil, and gas, uranium exploration. Current immigrants to the area include people of retirement age. At the same time, the trend of out-migration by younger people is increasing.

The Economy

Agriculture, forest products, mineral and gas extraction, and tourism make up the bulk of the local economy. Because of the seasonal nature of agriculture and tourism, and the often short-lived nature of mineral extraction, the economy of the area experiences some instability. One stimulant for the regional economy lies in extension of the tourist season wherever possible.

Two major ski areas are easing the economic problem somewhat. Extension of the visitor season at Mesa Verde would also help. Major obstacles to such an expansion are lack of visitation in the winter months and shortage of funds and staff to operate an extended park season. The development of the proposed Ute Mountain Tribal Park south of Mesa Verde National Park will open to the public the extensive archeological resources of Mancos Canyon, and may provide income and valuable work experience for tribal members. Other significant regional development activities include cultural and fine-arts programs of the Southern Ute Tribe near Ignacio, and the $40 million, 650-condominium Golf Host West resort being developed 18 miles north of Durango. Approximately 400 individuals will be employed at the site, and many jobs will be created in Durango as a result of the increased demand for personal services.

In the Montelores region (Mancos, Dolores, Cortez) 24 motels with 835 rooms are currently in operation. Durango offers an additional 1,200 rooms. Tourism continues to grow, as indicated by the opening of two new motels in Durango during 1974; two more are expected to be built in Cortez during 1975. In addition to the 496-site Morfield campground in Mesa Verde National Park, there are two private campgrounds in the immediate area.

Significant expansion of the industrial segment of the economy is unlikely because of the limited availability of freight transportation. Four truck freight carriers presently serve the area. Air freight is also available now, but jet service would greatly increase the service capacity. It should be noted, however, that jet service to Cortez will be limited with the regional airport removed from the immediate Mesa Verde area. Presently, the nearest railroad service is situated at Gallup, New Mexico, and Alamosa, Colorado, although there is a very remote possibility that it could eventually be extended to Farmington, New Mexico, and then to Cortez, Colorado.

Regional Land Use

Regional land use has largely been determined by the availability of water. The major population centers of Durango and Cortez were located on or near rivers

because of the water depth and the prohibitive costs of reach groundwater in most areas. Wells are virtually impossible in large portions of the area -- Cortez, Ute Mountain Reservation, and Mesa Verde. Mesa Verde and Cortez pipe water in from the nearest rivers, and the reservation obtains its supply from springs on Ute Mountain that often dry up. The U.S. Public Health Service is currently constructing a reservoir at Towaoc to provide a year-round supply. The Southern Utes obtain water from the Peidra, Pine, Animas, and San Juan Rivers. Water rights are currently being adjudicated on these rivers. Durango obtains its supply from the Animas River and from several mountain lakes.

The Montezuma Valley Irrigation Company (MVI) provides water to the county of Montezuma from the Dolores River. The supply is adequate for both irrigation and domestic consumption only after a heavy snow year and/or numerous summer showers. In addition to this supply problem, water distribution lines are inadequate for domestic use. Financing is obtained through FHA when needed; the location of new lines is established in cooperation with county planners as a check on uncontrolled development.

Although funding is uncertain, two irrigation projects are currently planned in the region. The Dolores River Project

(Bureau of Reclamation) will provide water-based recreation and an increase in irrigation capacity for the Cortez area. The second project includes an even larger dam proposed for the Animas/La Plata Project.

The limited availability of housing has been a dilemma for both Durango and Cortez for many years, and there does not appear to be a simple solution. In Cortez only an average of four new homes per year were constructed during the 1960s. Practically all homes in the area are custom-built, as opposed to tract housing. This situation makes it difficult for National Park Service employees to find housing suitable for their family requirements. Housing for seasonal personnel is practically nonexistent in the private sector. Many residents buy house trailers because of the limited -- and expensive -- single-family housing.

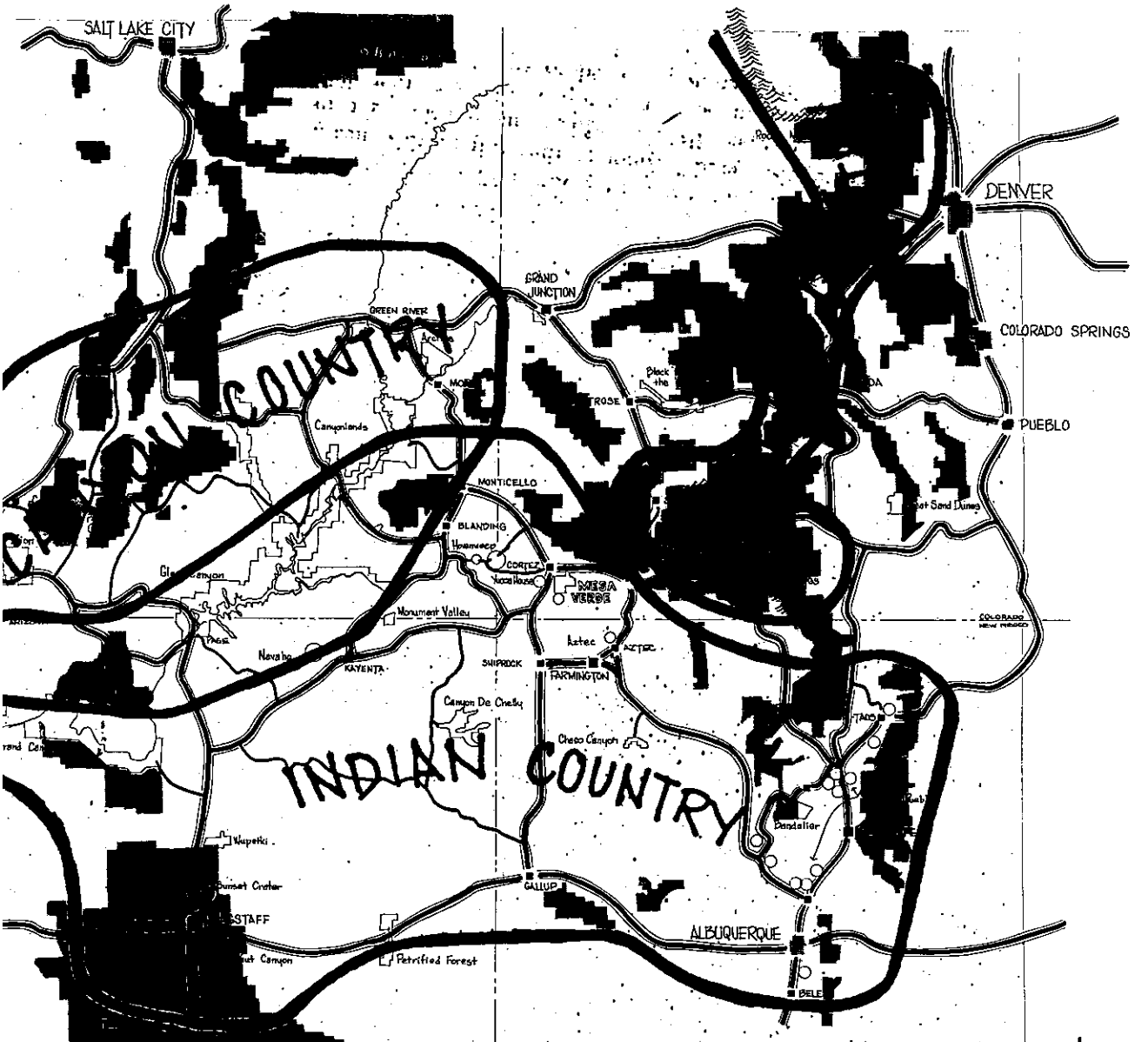
Regional Recreation Opportunities

A considerable amount of public recreation land surrounds Mesa Verde. North and northwest of the park are the La Plata and San Juan Mountains (about 30 miles away), whose peaks tower over 14,000 feet. South of the park lies a portion of the great Southwest Desert. Mesa Verde is thus situated between extremely high mountains only 30 miles to the north and desert 25 miles to the south. In the San Juan National

Forest, 30 miles northeast of Mesa Verde, substantial recreational opportunities attract over 2 million visitors to the 2,086,462-acre preserve to camp, picnic, hunt, fish, ski, hike, and sightsee.

National Park Service areas in the vicinity of Mesa Verde National Park include Hovenweep National Monument, about 53 miles west, and Yucca House National Monument, about 12 miles west. Aztec Ruins National Monument lies about 68 miles southeast, and Chaco Canyon National Monument about 132 miles southeast, both of which complement the story of the Mesa Verde Anasazi Indians. Canyonlands National Park, a scenic and geological area, is situated about 140 miles northwest and contains cultural remains similar to those at Mesa Verde. Arches National Park, 135 miles distant, and Natural Bridges National Monument, 138 miles away, are of considerable geological importance and possess great scenic appeal; Canyon de Chelly National Monument, 154 miles away, preserves both outstanding Indian ruins and present day Navajo Indian culture. Extensive water-oriented recreation activity occurs at Glen Canyon National Recreation Area, 285 miles west of Mesa Verde, and at Curecanti Recreation Area on Blue Mesa Reservoir, 200 miles northeast of the park.

North and west of the park and extending into Utah lie large acreages of public lands administered by the BLM for



The Region

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multiple-use resource values. Some of these lands contain great numbers of ruins from the same prehistoric culture that occupied the park.

Approximately 110 miles southeast of the park, on the San Juan River, is Navajo Reservoir; here the State of New Mexico manages Navajo Lake State Park. The Colorado Division of Parks and Outdoor Recreation operates the water-based recreation site at Arboles, 100 miles southeast of the park entrance.

Surrounding Indian Reservations

Ute Mountain Reservation: Some 1,200 Utes are registered with the tribal government. Exploitation of oil and gas on their 550,000-acre reservation, as well as a major land claims settlement, have been the tribe's main source of income for the last 20 years. This gradual depletion of the tribal reserve has been distributed on an annual per capital basis of $1,000 per person. Current principal tribal revenues are derived from ranching, pottery manufacture, and the operation of a gas station. Most of the Ute Indians' income (an estimated $2.5 million) flows directly into Cortez. In the next few years the tribe will have to reduce the number of employees and eliminate the per capita distribution unless new major income sources are developed. A general assistance program is currently being prepared

by the Bureau of Indian Affairs in case such income is not forthcoming. The proposed Ute Mountain Tribal Park south of Mesa Verde National Park may provide added income to the tribe through tourism.

Southern Ute Reservation: This reservation is "home" to 1,600 Utes. Oil and gas were discovered on 350,000 acres of tribal land, a lesser extent than on the Ute Mountain Reservation. Much of the income deriving from these sales was invested in developing an agrarian society; jobs in agriculture, however, are gradually giving way to jobs in Durango for tribal members, and to employment with the Bureau of Indian Affairs. Although there is a new motel on the reservation, tourism is low because of the lack of developed attractions. A labor force exists on the reservation, but industry has not yet moved into the area.

The Southern Ute Indians currently expect to construct two road segments as part of a Scenic Beautification Highway to connect Dulce, New Mexico, with Ignacio, Colorado, and then on to Bondad, Colorado on U.S. 550. Long-range plans are to continue on to Towaoc, Colorado by way of Red Mesa. The first two segments would serve as a shortcut around Pagosa Springs, offering access to a superior winter pass, Cumbres.

Access

Access to Mesa Verde National Park is directly from U.S. 160, an east/west highway designated as the Navajo Trail, which has its western terminus in Los Angeles and the eastern terminus at Garden City, Kansas. U.S. 666 from Gallup, New Mexico, intersects U.S. 160 at Cortez, Colorado, 12 miles west of the park entrance.

Because of limited public transportation in the area, the majority of tourism depends on the private automobile. Although retail gas supplies were in short supply for only one month during the 1973 season, many potential tourists were deterred from traveling because of insufficient gas-supply information. In an effort to separate themselves from the gasoline shortage in the Denver/Colorado Springs area, a publicity campaign was started by chambers of commerces in the Mesa Verde area.

Access to the park by concessioner bus is possible from May 15 to September 15 from Cortez. This service is regularly scheduled. The Gray Line service picks up airline passengers and other visitors in Durango and delivers them to Chapin Mesa in the park. The in-park concessioners bus does not operate in the off season. Rental cars and taxi service are available at the Durango and Cortez, Colorado, and Farmington, New Mexico, airports for transportation to the park throughout the year. Park headquarters is situated approximately 31 miles from Cortez.

Four airports in the region are served by Frontier Airlines: Farmington carries the largest passenger volume, with Durango close behind. Cortez and Montrose, Colorado handle about 30% of Durango's volume. None of these airports is equipped to handle commercial jets, and Frontier is pressing for a regional airport that will allow it to convert to all-jet passenger service, using 737s. Because FAA policy encourages the merging of small airports that lie within 50 miles of one another, Durango and Farmington are pursuing the idea. A 1970 study to find a site suitable to both cities found only two, both near Farmington and approximately 60 miles from Durango and 80 miles from Cortez. It is likely that a jetport will be developed at one of these sites. While the other three airports will probably continue in operation, their service will be reduced to third class carrier or only charter service. If passengers have to change flights several times before reaching their destinations, this could hurt tourism considerably. A decision on which sites get what service and by whom may be reached in the near future, and a new jetport might be in operation before 1980. The possibility exists that this decision will be delayed for several more years, by which time Durango, with increasing tourism, may also qualify for jet service.

As transportation improves ties between the canyon county parks and monuments of Utah and the Indian cultural areas of the Four Corners region will become more pronounced; visitors will become aware of more varied and interesting areas to experience. The term "recreational super region" might be used to describe the "canyon country" and "high country" recreation resources that surround Mesa Verde. Because Mesa Verde National Park is centrally situated within this super-region, it has become an important stop on a great variety of touring routes.

NATURAL SYSTEMS

The inherent limitations and opportunities imposed on any landscape by the components of the natural system provide the basic framework for human occupation and use of that resource. Those same factors of geology, climate, and soil conditions that influenced the lifestyle and development of the Anasazi people who lived on the mesa for 700 years exert their individual and collective constraints on what we do here now and in the future. The basic unit -- the landform -- of natural systems and the types of environmental characteristics of the soils and vegetation that cover it provide a natural framework for understanding how the Anasazi were able to live in this relatively inhospitable land. Furthermore, an analysis of these factors provides the basis for assessing the impact of the works and activities of contemporary man on this environment.

Geology

The Mesa Verde includes about 520 square miles of the northwestern part of the San Juan basin in Montezuma and La Plata Counties, Colorado. The area lies within the Colorado plateau's province and is immediately adjacent to the La Plata Mountains, one of the westernmost ranges in the Rocky Mountain system. The mesa is an erosional remnant rising 1,500 to 2,000 feet above the Dolores Plateau.

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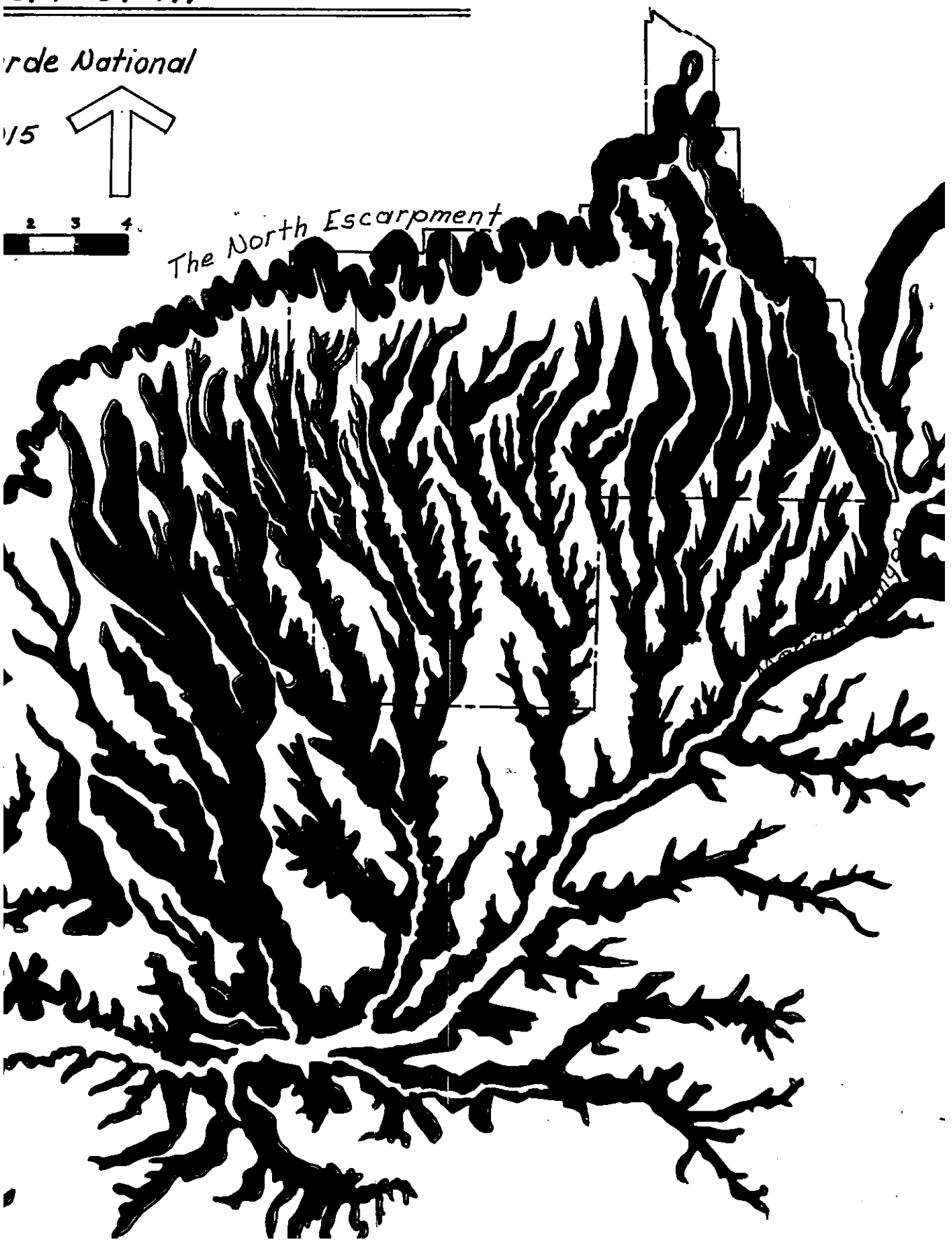


The Mesa Verde is a high (elevation 6,000 to 8,575 feet) tableland incised with deep vertical-walled canyons. It slopes gently from the top of the escarpment along the north boundary toward the Mancos River. The slope on the surface of the uplands conforms to the dip of the resistant sandstone beds that underlie it. The north escarpment drops off precipitously into the Montezuma Valley.

The Mesa Verde boundaries are delineated by escarpments in all directions. These escarpments display a geological sequence from the mesa top to the valley floor -- the Menefee formation, Point Lookout sandstone, and Mancos shale. Capping the Menefee formation on the mesa tops where it has not eroded away is the Cliff House sandstone, and underlying the Mancos shale is the Dakota sandstone formation.

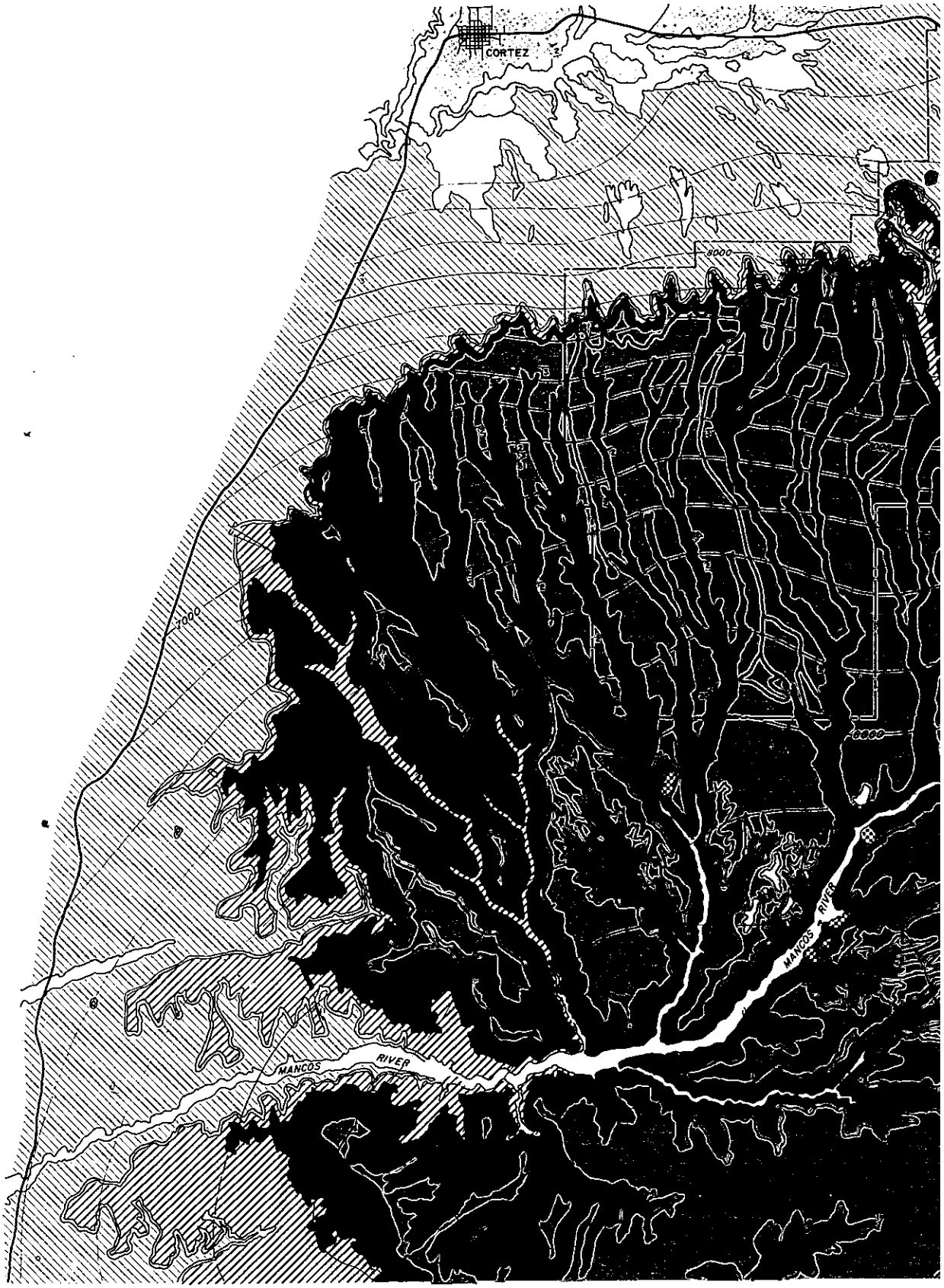
Mesa Verde is the local type of the Mesa Verde group and consists of rocks or beds of Upper Cretaceous origin found over large areas of the Rocky Mountains and the greater Southwest.

The Mesa Verde group consists of three members:

Point Lookout sandstone, the oldest or basal member, is a massive cliff-forming deposit laid down by a regressing sea. Named for the bold promontory that dominates the eastern end of the north escarpment, it is the conspicuous cliff capping the rim of the Mesa Verde.

The Menefee formation, of continental origin, is the middle member and apparently was deposited in river floodplain and coastal swamp environments. It is a thick sequence of massive, lenticular sandstone beds with interbeds of siltstone, shale, and coal. This member crops out in precipitous slopes along the escarpment and forms the steep, lower talus slopes of the mesa's many canyons. It is named for Menefee Mcuntain to the east, the site of extensive coal deposits.

Cliff House sandstone, the massive cliff-forming youngest member, is also of marine origin and was deposited near shore by a transgressing sea. Usually this formation consists of two cliff-forming tongues separated by talus-forming sequences of thin- to medium-bedded sandstone intercalated with thin lenses of shale and coal resulting from minor retreats of the sea. The younger, or Barker dome, tongue that forms the upper canyon walls is characterized by numerous alcoves; many of these contain prehistoric Pueblo structures, hence the name "Cliff House" sandstone. The older, lower tongue is more friable and, where exposed along the north escarpment, is usually broken down into rounded domes as at Park Point; farther down, however, it appears as the second, or lower cliff that overlies the Menefee. Occasionally the two tongues coalesce, as at Echo Cliff in Navajo Canyon. Here a maximum thickness of 400 feet of Cliff House sandstone is exposed.



GEOL

MESA VERDE NA

COLOR

UPPER CRETACEOUS

Formation	Thickness (feet)	Character
Cliff House sandstone	400±	Pale to dark yellowish-orange massive cliff-forming crossbedded marine sandstone: intertongues toward base with Menefee formation and includes locally a lower tongue, a middle tongue, (Barker Dome tongue), and an upper tongue. Top eroded.
Menefee formation	340-800	Gray to grayish-orange lenticular crossbedded sandstone and gray to brownish-gray and black carbonaceous shale and coal beds; includes locally an upper coal member, a middle barren member; and a lower coal member; intertongues toward top with Cliff House sandstone and toward base with massive sandstone member of Point Lookout sandstone.
Point Lookout sandstone	400±	Pale to yellowish-orange massive cliff-forming crossbedded marine sandstone consists of an upper massive sandstone member 230-340 feet thick and at the base an alternating sandstone and shale member 60-140 feet thick which intertongues with upper massive sandstone member at top and Mancos shale at base.
Mancos shale	2,000	Soft dark-gray to black marine shale containing thin lenses and concretions of sandy yellowish-orange limestone: intertongues at top with sandstone and shale member of Point Lookout sandstone.
Dakota sandstone	134+	Grayish to yellowish-orange crossbedded sandstone interbedded with siltstone and carbonaceous shale and lenticular coal; conglomeratic toward base. Base not exposed.

The Mesa Verde group is underlain to a depth of approximately 2,200 feet by the Mancos shale, a deep marine deposit that crops out in a wide belt along the escarpment of the Mesa Verde forming steep, intricately dissected slopes that rise to the base of the Point Lookout sandstone. About 550 feet above the base of the Mancos shale several fossiliferous sandstone beds form a prominent cuesta wherever exposed along the escarpment. The Dakota sandstone, which underlies the Mancos shale and forms the surface of the Dolores Plateau, crops out at the base of the Mesa Verde at the northwest end of the escarpment. The Lewis shale and the Pictured Cliff sandstone that overlie the Mesa Verde formation in the area just to the east do not occur. Such younger rocks probably were present prior to erosion. A generalized section of outcropping sedimentary rocks in the Mesa Verde area follows:

The mesas are topped by an erosional surface of late Tertiary or Quaternary age. On the eastern edge of Big Mesa and the southern ends of Moccasin and Cahpin Mesas lie remnants of pediment gravels that include polished pebbles and cobbles of jasper and quartzite, as well as many types of igneous rocks. A deep layer of red, aeolian soil covers the mesa ridges, and colluvial deposits cover the slopes and floors of the majority of the canyons. Narrow bands of alluvium

are present intermittently along the floors of large canyons, especially near their junction with Mancos Canyon. A pronounced shoulder in the Mancos shale, lying 800 to 1,000 feet below the mesa top along the east-northeast escarpment marks a former position of the Mancos Valley; it can be traced down Mancos Canyon to its junction with Weber Canyon. This and smaller terraces that occur below the high terrace are covered with coarse gravels.

A few igneous intrusions occur in the form of plugs (blowouts) and dikes. One plug lies at the southwest end of Wetherill Mesa, one can be seen in the side of Weber Mountain (a detached section of the Mesa Verde) from the Mancos Valley overlook, and several others are situated in Mancos Canyon. Dikes occur in the same general locality as plugs. These igneous plugs and dikes show a northeastward trend. They are believed (Williams, 1936) to be of Pliocene origin.

The Mancos River is the only perennial stream that drains the Mesa Verde. Surface flow is rare or nonexistent in the many canyons except during and immediately after periods of precipitation and during the spring runoff. Seeps and springs are not numerous but do occur. Usually at the contact between the Barker dome tongue and the under-lying middle member of the Cliff House sandstone; this contact is charaterized by impervious shale lenses.

Today's climate appears to approximate that of the 13th century in most significant aspects (Erdman, 1969). The climate, combined with the rich, red topsoil, made dryland farming -- the main pursuit of the ancient Indians -- practicable and certainly profitable for centuries. Water percolating down through the massive upper tongue of the Cliff House sandstone and running along the underlying shale appears as seeps and springs in low spots or at the heads of draws and side canyons. An assured, though small, water supply was available for the Indians.

Flora and Associated Soils

Vegetation on the Mesa Verde is typical of the transition life-zone of the high, arid plateau country of the Southwest and is unique for the general area because livestock grazing has been effectively prevented in most areas of the park for nearly 40 years. Vegetation in the high northern part of the park consists primarily of gambel oak and various grasses, interspersed with serviceberry and other shrubs. This mountain-shrub vegetation covers about 48% of the park. The southern and lower portion of the plateau supports a mature pinyon pine-Utah juniper forest that covers about 50% of park lands. More sheltered areas along the north rim of the park and in most of the canyons support scattered small stands of Douglas fir and occasional aspen. Ponderosa pine occurs

on some northern and eastern slopes and canyon bottoms where there is sufficient moisture. Dissecting canyon walls are generally covered with moderate amounts of gambel oak, pinyon pine, juniper and some grasses. Various mosses and lichens are found near seeps and springs.

For the purpose of this environmental assessment, the vegetation of Mesa Verde has been grouped into six vegetation types: grassland, sagebrush, chaparral, semi-desert chaparral, Douglas fir-ponderosa pine, and pinyon-juniper. These vegetation types and their associated soils are described below:

The grassland is dominated by herbaceous vegetation. The major grass species are western wheatgrass, blue grama, junegrass, muttongrass, and needle-and-thread grass. At Mesa Verde this vegetation type is usually found on gently sloping to relatively flat topography, with deeper soils than the other communities. Many times the grassland community is found on canyon floors where the soils are probably of alluvial origin.

The sagebrush is dominated by big sagebrush. Cheatgrass is the only other plant in abundance. This is a climax stand and occurs on the alluvial terraces in the Mesa Verde canyons. On the mesa tops sagebrush is successional,

but in the canyon bottoms it is better adapted to the deep alluvial soils than other species and is therefore able to maintain its dominance.

The boundary between the sagebrush type and the adjacent pinyon-juniper forest on the canyon slopes is very pronounced, the line occurring where the coarse colluvium of the talus abuts the alluvial sediments of the terrace. The soils on these terraces are azonal -- that is, they lack well-developed profile characteristics because of their youth. They were developed on a floodplain or low terrace formed over the bedrock of the rather narrow canyon bottom. Subsequent erosion has cut the present intermittent stream channel, which dissects the floodplain.

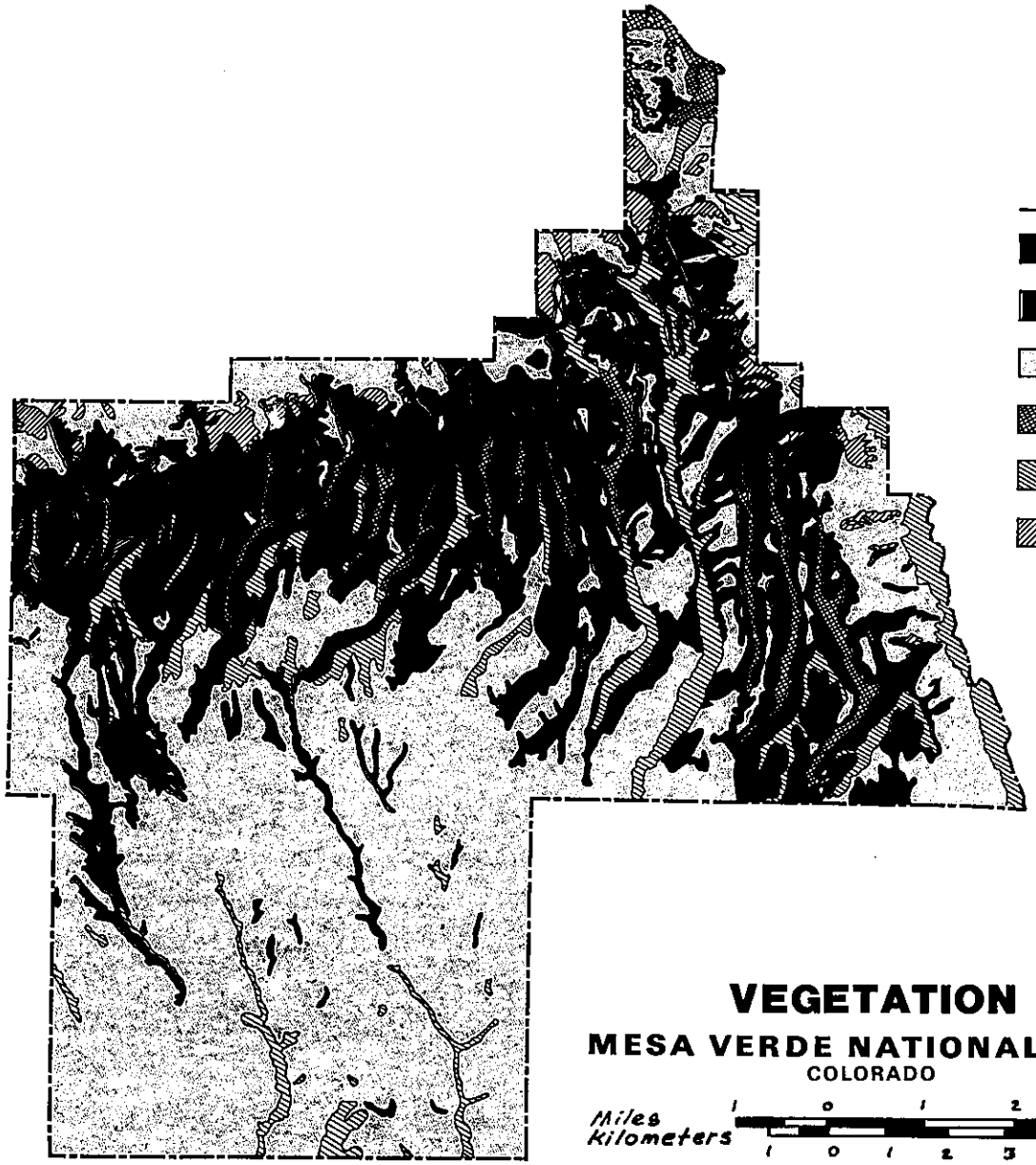
The chaparral prevalent along the north rim consists of dense thickets of oak and serviceberry, interspersed with openings dominated by black sagebrush. Conifers are gradually becoming established within this zone -- primarily pinyon, with some junipers and Douglas fir mixed in.

Soils associated with this vegetation type include well-drained, non-calcareous brown soils that are developing in residual materials derived from the underlying sandstone and interbedded shales. These are the typical soils of the upland hills and ridges along the north rim. The soils

at Park Point are somewhat darker colored than average. Soil depth is quite variable, ranging from 18 to 43 inches.

A considerable portion of the chaparral type is covered by a surface pavement of sandstone slabs. In spite of the relatively low water-storage capacity in these soils, their shallow depth and high proportion of rock fragments probably provide quite a favorable moisture regime for plant growth. The large amount of coarse rock and gravel creates more pore space and increases permeability. In addition, much of the underlying parent material is an unconsolidated, weakly cemented residium that allows deeper wetting. Thus, the under-lying bedrock may be an important source of moisture, acting as a temporary reservoir. These coarse-textured soils also favor root penetration. In some areas inclusions of caliche are also prevalent.

The semi-desert chaparral is a type where desert shrub species dominate in characteristic open stands, similar to the chaparral plant association. The same species are usually present in both types, but the semi-desert chaparral vegetation is less dense because of more extreme environmental conditions. The soils associated with this community are generally more shallow, have lower moisture-holding capacities, and are less favorable to plant growth.



LEGEND

- PARK BOUNDARY
- DOUGLAS FIR; PONDEROSA PINE
- CHAPARRAL
- PINON - JUNIPER
- GRASSLANDS
- SAGEBRUSH
- SEMI-DESERT CHAPARRAL

N

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

VEGETATION

MESA VERDE NATIONAL PARK

COLORADO

Miles 1 0 1 2 3
Kilometers 1 0 1 2 3 4

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JUNE 75 | DSC

The Douglas fir-ponderosa pine is dominated by these two species. The community is situated on north-facing slopes, in sheltered canyons and seep areas, and at higher elevations. The favorable soil moisture conditions in these areas account for the presence of these species.

The pinyon-juniper is defined as an area on which 30 percent or more of the cover consists of pinyon pine or juniper, to the exclusion of other conifers. Other common plants in this community are bitter-brush, muttongrass, vetch, phlox, and fendlerbush.

Soils associated with this plant community are quite variable, depths range from 10 to 30 inches. Surface soil textures are generally clay loams, loams, and fine sandy loams. Shale and talus slope sites are often quite steep, and the soils are high in gravel, rock, and interbedded sandstone shales. The parent material of these soils is generally sandstone of alluvial or colluvial origin.

Soils

The mesa's pre-Columbian farmers' tilled soils can be divided into four groups -- basalt rockland, rough broken land, sandstone outcrop, and sandstone outcrop-stonyland complex. The first unit is characterized by rock outcrops, cliffs, and very steep, rock-covered talus slopes that are unsuitable for farming.

These furnish runoff water, however, to lower-lying soils. Soils in the second group are generally too shallow and have too low a moisture-holding capacity for farming, although small patches of arable soils may be found within these mapping units. Silt carried by runoff from these soils has been partly responsible for the formation of the soils in the third group.

The third group includes the alluvial land. The alluvial soils could all have been farmed with tools and techniques available to the early farmers. These soils are highly stratified, very sandy, and are drained by deep gullies. They have a low moisture-holding capacity that is somewhat compensated by an ability to take moisture quite rapidly.

Runoff from adjoining slopes adds considerable moisture, as well as silts and organic matter. The soils show levels of organic matter indicative of past stabilization and possible use. Taluds have formed behind manmade check dams and are of predominantly sandy loam or light loam texture.

Many of these manmade structures have collapsed over the years, and, consequently, a large percent of the taluds have been lost. Numerous dams remain, however, and the terraces of arable soils still being held by them are testimony to the Anasazi agricultural skill (see Hayes, Wetherill Mesa Survey). Enough of these soil features

remain to indicate an average depth of 2 to 3 feet during the pre-Columbian period. Moisture-holding capacity would have been fair with additional runoff available from the side slopes. These taluds are nearly always found directly on bedrock and on downstream slopes of 3 to 5% or more. Moisture that penetrated through the soil would flow downward on the underlying bedrock, and would also be available for crops. Observed profiles of taluds indicate that they were formed predominantly by the deposition of water-carried soil material. Construction of these check-dam terraces in series along drainages made possible optimum conservation of soil materials.

Laminations typical of storm-runoff deposits make up the greater part of remaining taluds, but a small amount of loose fill appears to have been placed there by the pre-historic Indian farmers. While small in total acreage, these soils were probably very important. They would have been easily worked with primitive tools, and should have produced at least a small crop even in years of drought. Corn, beans, or squash would also have matured earlier than on the mesa's more finely textured soils.

Also a part of this third group are deep, well-developed, and very fertile soils. They are situated in the northern part of the mesa where there is more precipitation, but a

shorter growing season. Barring heavy wind or water erosion, typical profiles of these soils indicate that they were never cultivated to depths much greater than 6 to 10 inches.

The last group includes those moderately deep to deep soils developed in place on the mesa's weathered bedrock, and loess deposits. It is the largest arable group. These soils have topsoil textures ranging from fine and very fine sandy loams to loams. They can be easily worked with primitive tools and have a very good moisture-holding capacity. Clay loam subsoils predominate, but light sandy clay loam to heavy sandy loam subsoils also occur. All soils in this group exhibit a recurrent pattern of small wind-deposited hummocks in the thicker brush areas or in the denser pinyon-juniper stands. Boundaries between surface and subsoils are typically clear and smooth, but small areas show abrupt boundaries that could indicate disturbance from cultivation or erosion. The strong difference in phosphate and potash between the A and B horizons of the soil also indicates a possible cultivated land use or erosion effect.

Soil fertility was probably not a seriously limiting factor for prehistoric farmers. The more or less random spacing of corn hills by the Indian farmers actually reduced the

fertility loss for a given unit of land by installing a sort of miniature rotation and fallow system. It should be noted that the types of corn grown were entirely different from today's corn. Ears were small, 3 inches long and 1/2 inch in diameter, with small, irregularly placed kernels. The plant itself more closely resembled large, wild grasses than modern corn plants. Beans were probably planted in the same field.

The corresponding geologic formations, soil series, and mapping units are given in the table below:

Geologic Formation	Wetherill Study Soil Services 1/	1974 Study Mapping Units 2/
Mancos Shale	Rough broken land (Rb*)	2111 C-2
		2221 C-2
		2221 C-2 7
		2221 D-2 7
		2221 E-2
		22C2 D-2
		22C3 E-2

(1) Parsons, O.A., Unpublished Soil Survey of Wetherill Mesa.

(2) Land Inventory Consultants, 1974. Soil Survey of Designated Portions of Mesa Verde National Park, Colorado.

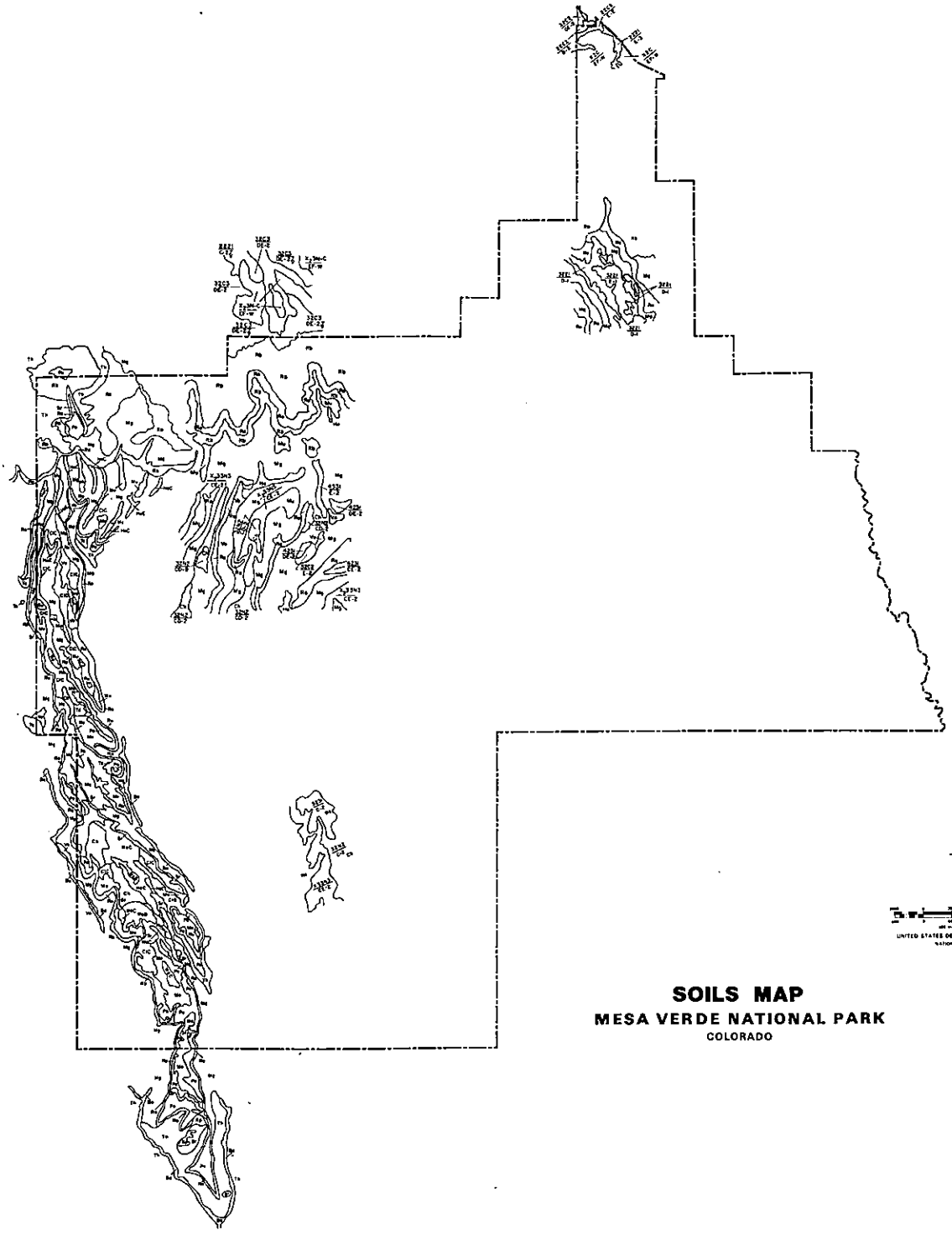
* Mapping symbols

		$\frac{32C3}{DE-2}$ 7
		$\frac{X.2C}{EF-W}$
		$\frac{X_2 3N-C}{EF-W}$
		Rb
Point Lookout and Cliff House Sandstones	Sandstone outcrop - Stonyland complex (R_o)	R_o
	Cliffhouse series (C/B or C/C)	
	Roubideau series (Ru)	
	Sandstone outcrop (Sn)	
Menefee Foundation	Mughouse series (Mu or Mg)	Mu $\frac{X_2 32NC2}{CD-2}$
		Mg $\frac{X_2 32NC-M}{F-W}$
		$\frac{X_2 33N}{CE-2}$
		$\frac{32C2}{E-C}$
	Bankard series (Bc)	
	Montvale series (Mo)	
	Penrose series (Pe)	
	Thedahund series (Th)	
Menefee Colluvial Alluvial Sediments	Vaner series (Vo)	Vo $\frac{4331}{E-2}$
	Hesperus series (HeC or HeE)	He $\frac{3231}{C-1}$

			$\frac{4231}{DE-2}$
			$\frac{3221}{E-1}$
	Local alluvial land (Ta)		$\frac{3221}{D-1}$
Loess Deposits Over Sandstone	Witt series (WeB or WeC)	We	$\frac{3231}{D-1}$
	Chapin series (Ch)	Ch	$\frac{32N2}{CD-2}$
	Verde series (Ve)		
Basic Igneous Rocks	Basalt rockland (BR)		
	Shotwell series (Ap)		

The soils studies strongly indicate that within certain areas there are soil and associated land features that will present serious engineering, economic, and environmental problems if major construction of any type disturbs or changes the present delicate balance of the natural land conditions. A partial listing of these problems follows:

Soils developed from Mancos shale, especially alluvial and valley-fill sediments, have a high shrink/swell potential and the increase of moisture in the soil resulting from any source will activate this property and cause serious construction problems and very high maintenance costs. This situation is most prevalent in the BLM portion of the survey area.



UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

SOILS MAP

MESA VERDE NATIONAL PARK

COLORADO

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The existence of very deep gullies in some areas indicates potential high runoff from high intensity rains on the watershed. These very deep gullies are partially stabilized in their present condition, possibly because they constitute a drainage system that is adequate for the present runoff. Any contemplated manmade changes or disturbances in the present balance must be evaluated from the standpoint of positioning any development in a natural drainage-way, effect on sheet erosion from a highly erosive soil, and greater surface runoff.

If the moisture regime is increased by raised roadbeds or borrow pits in highway construction, or additional moisture from any source, the frost action would present problems, particularly on the alluvial soils developed from Mancos shale.

Maintenance costs of restabilization and landscaping of disturbed areas will be high for most soils found in the area.

Depth of soils, steepness of slopes, and stoniness are other common limiting factors.

General use interpretations indicate the severity of constraints for various kinds of development and use within land units. This constraint information is unavailable from the soil survey of Wetherill Mesa, but the following table summarizes the constraints of the designated areas studied

by Land Inventory Consultants. These areas are the sites discussed in the alternative section that have potential for visitor development.

Climate

The study and analysis of microclimatic factors at Mesa Verde is important in both a historical and a contemporary sense. The Anasazi intuitively adapted to a idiosyncrasies of climate so well that the design of their communities set an example applicable even today.

"Mesa Verde Cave dwellings are oriented to catch winter sunlight and shed summer heat....In the winter when the sun is low in the sky, it shines directly on the adobe and brick walls which store the heat during the day and release it during the night. In the summer the sun strikes the horizontal surfaces - the roofs of wood and grasses act as insulation...never more than one-quarter of the cave's inner surfaces are lit in the summer - only one-quarter remains shadowed through the winter day." (1) It should be noted, however, that a winter day in a canyon can be much shorter than on top of the mesa because of the shadows cast by the canyon walls.

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(1) Stein, Jane. There Are Ways to Help Buildings Conserve Energy." Smithsonian, Vol. 4, No. 7, Oct. 1973

Furthermore the Anasazi, by taking advantage of existing caves with a southern exposure, welcomed the cooling summer breezes and shunned the winter storms that blew down from the north.

We may even find it advisable to correct mistakes we have made in the past. The Navajo Hill visitor support facilities and the Far View Visitor Center are, in terms of microclimate, situated in areas where weather conditions are often more severe than in other areas of the park. The elevation (8,050 feet) and exposure make the area more susceptible to high wind, severe cold, and blowing snow than most other areas in the park. Other encounters with the weather occur at several road cuts along the north-facing escarpment, which are sometimes ice covered.

Mesa Verde climate has been classified as a cold, middle-latitude, semiarid climate. Though it lies in an area of dry climate, Mesa Verde is not as dry as the surrounding valleys and plateaus.

"The district climatic feature of the western section (of Colorado)... is the comparative uniformity of the weather from day to day. Severe cold waves, common on the eastern plains, are comparatively rare.... There is a tendency for a high pressure area to form in western

Colorado in winter and to remain stationary for several days. When such a pressure distribution controls the weather, the sky is clear, the day temperatures are moderately high and uniform, and the nights are cold, though seldom excessively so except when the ground is covered with snow and when the air drainage is poor. Night temperatures depend largely on the topography, air drainage exerting a greater control than does the actual elevation.... In western sections of the state the most important part of the precipitation occurs in later summer, winter and early spring; January, February, and March are the months of heaviest snowfall.... In southwestern counties there is a marked tendency toward drought in late spring and early summer; June is practically rainless."(1)

	Mean Maximum Temperature (Deg. F)	Mean Minimum Temperature (Deg. F)	Mean Monthly Precipitation (in.)	Mean Monthly Snowfall (in.)
January	40	18	1.68	19.4
February	45	22	1.82	17.6
March	50	26	1.74	13.6
April	61	34	1.37	4.5
May	71	43	.98	.4

(1) Erdman, J.A., C. L. Douglas, and J. W. Mair, 1969, Wetherill Mesa Studies, Environment of Mesa Verde, Colorado. pp. 18

	Mean Maximum Temperature (Deg. F)	Mean Minimum Temperature (Deg. F)	Mean Monthly Precipitation (in.)	Mean Monthly Snowfall (in.)
June	83	52	.67	trace
July	88	57	1.76	0
August	85	56	2.16	0
September	78	49	1.69	.2
October	66	39	1.63	.9
November	51	28	1.03	5.5
December	42	21	1.62	16.0
TOTAL			18.15	78.1

Winter moisture is a critical factor because it determines the vegetational aspect of the landscape. Annuals and some perennials are highly dependent upon surface moisture during periods of low rainfall in late spring and early summer.

Although July is the hottest month of the year with a mean temperature of 72°F and a maximum of 102°F, the heat is tempered by thundershowers that normally begin about this time of year. Rainfall reaches its peak in August and decreases gradually into the autumn. During the late summer months the days begin with cloudless skies, but by noon, cumulus clouds develop and thunderstorms are common. During these storms precipitation is usually localized and intense for a short period of time.

Water

A shortness of water supply was probably encountered on Mesa Verde as early as the Basketmaker period nearly 2,000 years ago. The agricultural Indians who drifted into the area inhabited the gently sloping mesa tops and the caves in the canyon sides, utilizing the natural springs and seeps as their principal sources of water.

The exact number and distribution of prehistoric water sources can never be fully known. Enough evidence is available, however, to indicate that several major springs and seeps existed in prehistoric times and were probably utilized by the ancient inhabitants.

"Cliff dwellings, large surface pueblos and clusters of smaller ruins sites are found near the larger water sources which probably yielded unfailing supplies of good water then much as they do today."(2)

In the sides and heads of deeply incised canyons of the central portion of Mesa Verde are found natural caves of sufficient size to accommodate groups of houses and cliff dweller villages. Conditions in the canyons are favorable for the occurrence of springs and seeps. These springs emerge from the canyon bottoms and from contact zones in canyon sides between impervious layers of shale and the overlying porous sandstones.

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(2) Rose, R. H. 1952. Water supply history of Mesa Verde National Park. USDI, NPS, Mesa Verde National Park, Colorado. pp. 54.

Numerous earthen and rock structures on Mesa Verde appear to be check dams; a few appear to be reservoirs and canals. The check dams seem to have been used for slowing the flow of water along drainages and as catchments for water and silt. As the silt catchments filled, they were probably used as garden terraces.

Mummy Lake Ruin, just north of the Far View Ruin group, is considered an ancient reservoir. The structure is 98.43 feet in diameter and is surrounded by a low circular wall 14.76 feet thick. The lake is believed to have been part of an irrigation or water distribution system on Chapin Mesa. A ditch has been traced from Mummy Lake to the headquarters area.

After the establishment of Mesa Verde National Park in 1906, numerous attempts were made to obtain an adequate permanent water source. Attempts were made to construct dams, cisterns, and storage tanks, and to dig wells. Many of these were short-term successes that ended in failure as the numbers of visitors to the park and, hence, water demand increased.

In 1926 efforts were shifted to 1-acre galvanized sheet metal catchments. Runoff was trapped by the catchment, filtered, and then stored in large underground reservoirs. The catchments were successful, but the storage capabilities

were insufficient to furnish the water demanded by visitation because of the low amounts of runoff and slow replenishment of the storage.

A deep well (4,192 feet) was completed in 1934. The well provided water to the park until 1950, when the West Mancos Water Supply System was completed. During the period of time the well was in operation, numerous problems developed. Breakdowns occurred at frequent intervals, the most serious in the autumn of 1938 and 1948. The problems were never fully defined, and a major reconditioning and rehabilitation project was completed in 1948. In 1939-40 a million-gallon reservoir was built approximately 0.9 miles north-northwest of the present Navajo Hill developments.

Construction of the West Mancos Water Supply System began in July 1949 and was completed in June 1950. The 28-mile-long, 6-inch-diameter pipeline from the West Fork of the Mancos River to a million-gallon concrete reservoir on Chapin Mesa, coupled to the then existing underground concrete storage tanks, provided a dependable gravity water supply to the park. The locations and capacities of these tanks are as follows: a well tank in the CCC area, 50,000 gallons; a catchment tank in the Hogan area, 86,000 gallons; and the spring tank at the headquarters picnic area road junction, 50,000 gallons.

In subsequent years the West Mancos Water Supply System capacity has been increased by storage and supply tanks at Morfield Canyon; a 300,000-gallon gravity-filled steel tank at Navajo Hill; a 2-million-gallon steel tank filled by the entrance pumping station; and Wetherill Mesa, a 300,000-gallon steel tank filled by gravity from the Navajo Hill tank. These brought the park water storage to over 3-3/4 million gallons of potable water.

As the total park water need increases, the systems capacity can only be increased by additional storage tanks. The available water at the intake on the West Mancos River is now being totally used during June, July, and August; however, the other months of the year water could be delivered and stored to bridge peak water-use periods.

Wildlife

Mammals: The distribution of animals if influenced by geographic, vegetational, climatic, altitudinal, and other factors. The Mesa Verde is intermediate in geographic position and altitude between the high southern Rocky Mountains and the low Southwest Desert. For this reason, we find on the Mesa Verde a preponderance of species having wide distribution in this part of the Country, and having relatively wide ranges of tolerance for different habitats;

a lesser numer of exclusively montane or boreal species than occurs in the higher mountains to the northeast of the mesa, and which may reach the limits of their ranges here; and a small number of species of southern or Sonoran affinities.

Park Mesa is the only complete mesa in Mesa Verde National Park. However, included in the many mesas and canyons of the park is a relatively complete representation of the ecosystems of the Mesa Verde. Mule deer migrations routes in Mesa Verde National Park are indicated on the following map. During most winters the deer migrate from the park to lower elevations in adjacent areas, however, there is little migration during mild winters when the park affords suitable winter range. Mule deer and elk also sometimes pass through the park from the La Plata Mountains to the northeast during severe winters.

Most of the mammals in the Mesa Verde are wide-ranging species and are more abundant in the deserts or lowlands than in the coniferous forests associated with Mesa Verde. These include the desert cottontail, Bottas pocket gopher, badger, ringtail, coyote, western harvest mouse, and black-tail jackrabbit. However, other wide-ranging species such as the black bear, mountain lion, beaver, porcupine, and elk are more common in the highlands than in the lowlands. The

ranges of three of these -- bear, mountain lion, and elk -- are more restricted today than ever before. Still other species find their favorite habitats and reach their greatest abundance in altitudinally and vegetationally intermediate areas as upon Mesa Verde, or in special habitats such as the rock ledges and crevices that are so abundant on the mesa. Examples of this group are rock squirrel, canyon mouse, pinyon mouse, bushy-tailed wood rat, and Mexican wood rat.

Less mobile species most frequently found at higher elevations of Mesa Verde are the vagrant shrew, mountain cottontail, golden-mantled ground squirrel, yellow-bellied marmot, abert squirrel, and several varieties of vole.

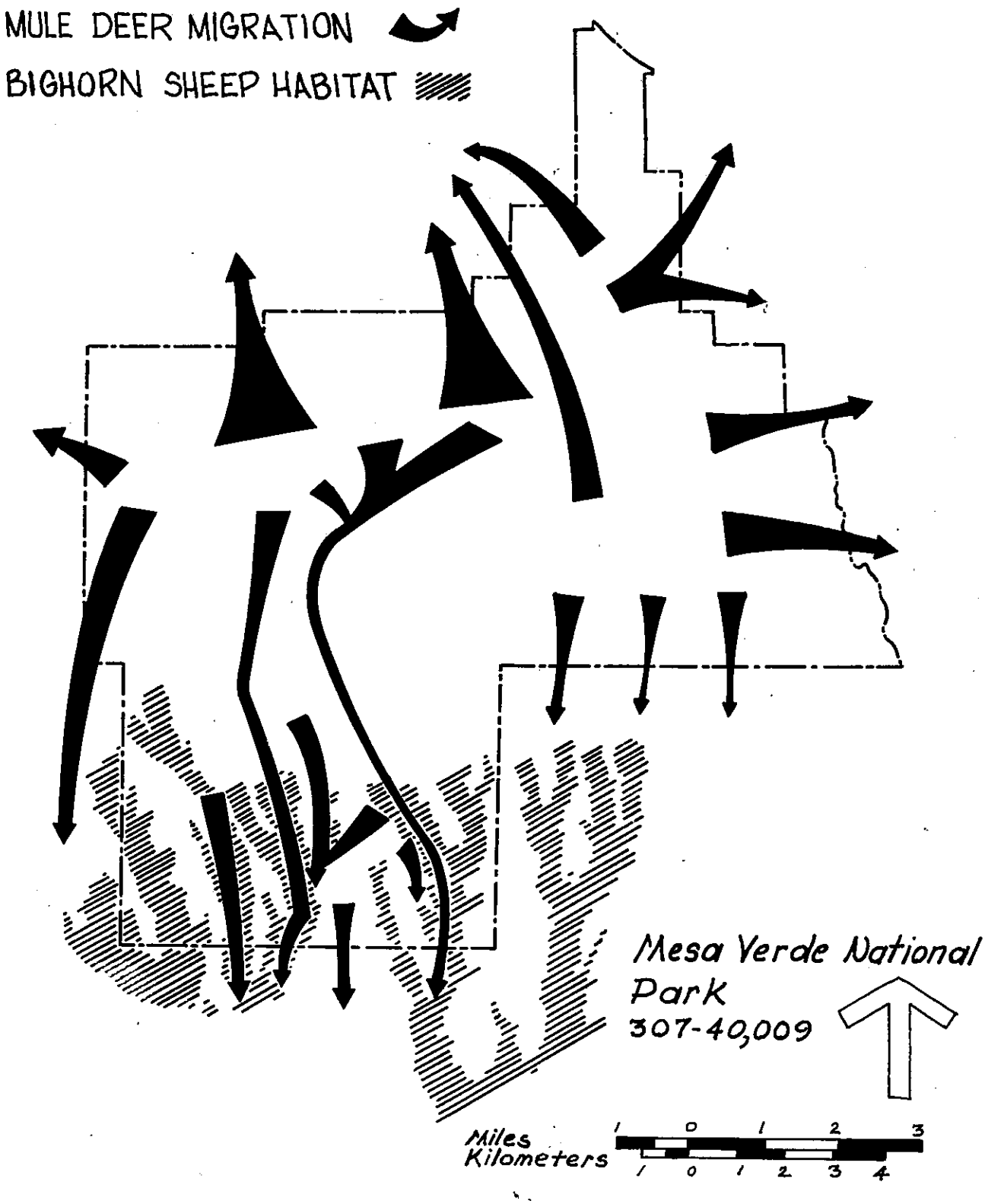
Mule deer are known to have changed in numbers during the past 50 years; prairie dogs have decreased, and it is doubted that they currently inhabit the park.

Species such as bighorn sheep and marmot that are rare within the park, or those such as wandering shrew, montane vole, and long-tailed vole that occupy only small areas of suitable habitat within the park, are the species most likely to be eliminated by natural changes or through the activities of man. For example, parasites introduced by domestic sheep that wander into the range of bighorns

within the park might endanger the bighorn population. An increase in grazing activity, road building, and camping in Prater and Morfield Canyons might eliminate the small areas of habitat occupied by the montane vole and wandering shrew. Fire in Chickaree Draw could destroy all its Douglas fir and, consequently, much of the habitat occupied by the abert squirrel. The prairie dog was once an inhabitant of Morfield Canyon, but is no longer found -- probably because as plant succession proceeded under fire protection and grass density increased, suitable habitat for prairie dogs decreased to the point where a population could no longer be supported.

The bighorn is probably the mammal visitors would be most interested in seeing and yet are least likely to see. Archeological evidence, including pictographs, indicates that bighorn were present during the time of the Anasazi. They had since disappeared from Mesa Verde, but were reintroduced in January 1946 by the National Park Service when 14 sheep supplied by the Colorado Department of Game and Fish were released near Spruce Tree Lodge.

Sighting records of the park since 1946 indicate two general areas of bighorn concentration. These are the Wetherill Mesa area and the Chapin Mesa area near the loop roads. The sightings records may lead to a biased


MULE DEER MIGRATION
BIGHORN SHEEP HABITAT
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conclusion about bighorn range in Mesa Verde National Park if it is not kept in mind that these two areas also receive the heaviest human use, resulting in more frequent opportunities for observation. However, the park staff feels that these two areas are the best bighorn habitat in the park because of the availability of water, forage, and rough topography for protection.

Other species that may be of particular interest to visitors include black bear, coyote, mountain lion, elk, and mule deer. Of these, probably only mule deer, coyote, and mountain lion are residents of the park. Black bear and elk are considered transient species to the area and are only occasionally sighted in the park. These two species probably come from the La Plata Mountains to the northeast. Numerous toads, lizards, and snakes are residents of the park.

Birds: Approximately 175 species are presently on the "Checklist of Birds for Mesa Verde National Park." These include herons, ducks, hawks, eagles, owls, hummingbirds, woodpeckers, flycatches, swallows, jays, nuthatches, wrens, thrushes, vireos, warblers, buntings, finches, sparrows, juncos, and upland game birds.

The southern gold eagle has been reported as a resident species, but is generally considered transient as is the bald eagle, a threatened species. Two birds that have been

sighted in the park were added to the endangered species list -- the peregrin falcon (endangered) by the Bureau of Sport Fisheries and Wildlife in 1974 and the prairie falcon (threatened) by the same bureau in 1973. Merriams turkey was both a prehistoric and historic resident of the park, where it became extinct, was subsequently reintroduced, and is no longer resident. After necessary research has been conducted, the turkey may be reintroduced.

Minerals

Coal: Soft high-volatile "B" and "C" rank bituminous coal is known to occur in this region and is commonly associated with the Dakota and Menefee formations. Generally these coals are thin and discontinuous and mostly of poor quality because of the high ash content, but in several areas the coal is thick enough and clean enough to be mined. Some mines near the park boundary have been active in the past, although they are presently inactive.

Coal beds are found in the Menefee formation of the Mesa Verde canyons west and south of Mesa Vrde National Park. These have not been mapped, but probably extend within the park. Although the coal beds may be of minable quality, they cannot, at present, be exploited because of the enabling legislation for Mesa Verde National Park (34 Stat. 616, 1906 and 36 Stat. 796, 1910) that closed the area to development and mineral entry.

A site is presently being prepared near Mancos, Colorado, for construction of an ore-processing plant primarily intended to process gold ore. The product will be a concentrated ore that will be shipped out for further processing.

The plant will probably employ about 20 people. Several mines in the Mancos/Hesperus area that closed down between 1920 and 1940 are being reopened because the climbing price of gold makes them profitable once again.

Oil and Gas: Exploration for oil and gas in the Mesa Verde region has been carried on intermittently for many years, and gas has been found in the Dakota sandstone. The marine Cliff House sandstone, the Point Lookout sandstone of the Mesa Verde group, and the Paradox of the Pennsylvanian age are also important gas producers in the San Juan basin.

Lands within and adjacent to the park do not lie within a known oil or gas producing geological structure; however, there are several existing oil and gas leases on lands adjacent to and near the park boundary. Active oil wells exist in Mancos Valley and on the north end of Weber Mountain. The Barker Creek gasfield in northern New Mexico extends to

within 8 miles of the south boundary of the park, and small amounts of oil have been taken from the Red Mesa field situated 12 miles southeast of the park in Colorado. There are no known metallic or nonmetallic mineral resources of significant value on lands lying within or adjacent to Mesa Verde National Park.

Fire

Fires are frequent in Mesa Verde National Park. Prehistoric fires are presumed to have occurred, but records of fires have been kept only since 1928. The frequency of reported fires since 1928 has been quite variable, ranging from zero in several years to 30 in 1972. This variation is probably due to a real difference in fire frequency, as well as a difference in the park staff's reporting requirements.

Fire frequencies would be expected to be greater during summers of higher thunderstorm activities, and the pattern of reported fires in Mesa Verde supports this premise. Generally, two storm tracks cross the park: The winter storm track approaches from the northwest and expends much of its energy along the north escarpment. The summer storm track is exhibited by storms approaching the park from the southwest and expending their energy on the western and southern parts of the park near Wetherill, Chapin, and Moccasin Mesa.

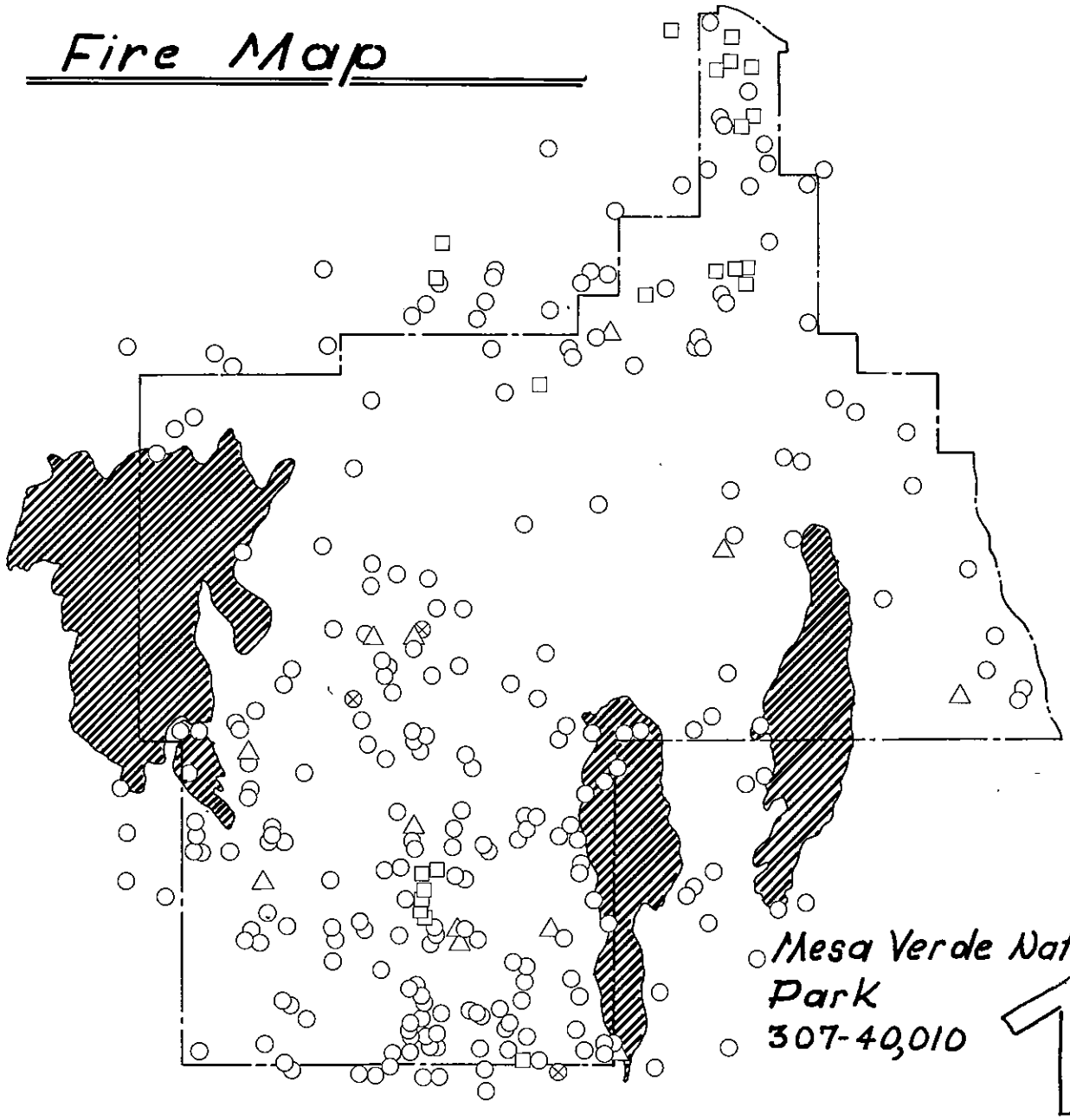
Recent large fires have occurred in Whites Canyon (a 2,043-acre 1959 burn), on Moccasin Mesa (a 2,680-acre 1972 burn), at Rock Springs in the central part of Wetherill Mesa (a 700-acre 1972 burn), and at Wetherill burn (a 4,492-acre 1934 burn).

Fire management is recognized as a resource tool by land management agencies and agricultural management. Like any system including natural resources and biological life, an exceedingly complex system is involved and the introduction of a fire management plan is another variable to be considered in the system. Further study and, possibly, experimentation must be accomplished before a fire management plan is implemented.

Fire management research has identified many of the variables important in using fire as a management tool: humidity, wind direction and velocity, cover condition and density, soil moisture and temperature, physiological condition of plants, air temperatures, and fire intensity.

Burning, when the condition of one of these variables is less than that desired, may result in slow recovery of the vegetation or even short-term sterilization of the soil and subsequent denudation of the burned area for several years. It is important to have additional knowledge

Fire Map



Legend

○	Class A	Lightning Caused
□	Class A	Man Caused
△	Class B	Lightning Caused
⊗	Class B	Man Caused
▨	Class C, D, E, & F	

Class A = 0-2.5 Acres
Class B = 2.6-9 Acres
Class C = 10-99 Acres
Class D = 100-299 Acres
Class E = 300-999 Acres
Class F = 1,000-4,999 Acres

of what limitations the above variables impose on the use of fire management at Mesa Verde and to monitor these parameters as an aid in determining whether natural fires will be allowed to burn, be extinguished, or whether prescribed burning may be used as a management tool.

CULTURAL FACTORS - ARCHEOLOGY

The most significant resources within the park are archeological. Mesa Verde National Park is the type locality of archeological remains representative of the northern, or Mesa Verde, branch of the prehistoric San Juan Anasazi culture. Thousands of archeological sites including pithouses, coursed masonry pueblos and cliff dwellings, water diversion canals, reservoirs, ceremonial complexes with kivas, and farm terraces are scattered throughout the park, averaging over 100 per square mile in some areas. These archeological resources in the park become scientifically more valuable with the passage of time and the loss of archeological resources in nearby areas. Mesa Verde is an outstanding archeological area of the National Park System. The park contains sites dating from Basketmaker III, or Modified Basketmaker, through Pueblo III, or Classic Pueblo. Basketmaker II has yet to be documented, and prehistoric occupation later than A.D. 1300 is not identifiable. The area received intensive use, and, with the exception of Basketmaker II, all types of sites associated with Anasazi occupation are represented.

Archeological evidence indicates Mesa Verde was first occupied about 1,300 years ago, if not before, by the

Basketmaker people of the Anasazi tradition who were relatively widespread throughout the area that is today northeastern Arizona, southeastern Utah, northwestern New Mexico, and southwestern Colorado. For several hundred years the people lived on the Mesa Verde and in its canyons. Their culture developed, prospered, and changed until the end of the 13th century, when they abandoned the entire region and moved south, perhaps into what is now New Mexico. When they departed they left behind their homes and other evidences of their culture. Today, some of these relics, including basketry, pottery, weapons, tools, and items of clothing and personal adornment, are preserved in Mesa Verde National Park. Many additional ruins on adjoining Ute reservation lands are currently being surveyed and will be protected and interpreted in the proposed Ute Mountain Tribal Park.

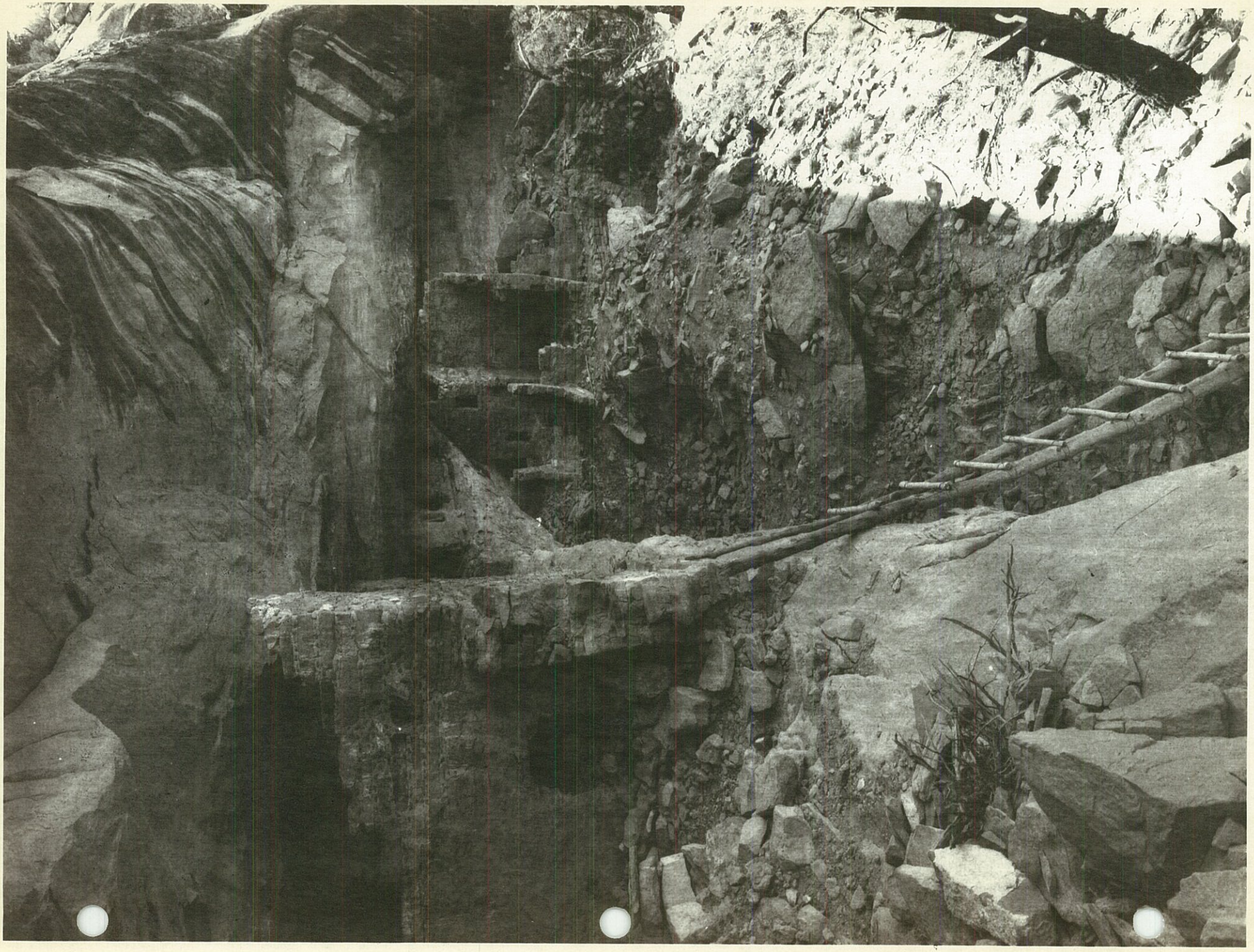
Beginning in the sixth century A.D., the inhabitants of Mesa Verde lived in clusters of semi-subterranean pithouses on the top of the mesa or occasionally in rock shelters in the cliffs. The pithouse dwellings were dug into the ground so that the walls of the pit composed the walls of the house. Archeologists have named these people Basketmakers in recognition of their impressive skill in that craft. They also made pottery, but at this stage of cultural development their pottery lacked the quality of their baskets.

They raised crops of corn and squash in the red aeolian soils on the mesa tops. Dogs and turkeys were their only domesticated animals. Apparently, turkeys were raised primarily for their feathers and not for food - turkey feathers were woven into blankets and robes for use during the cold winter months.

As time went on the Basketmakers prospered on the mesa, the population increased, and skills and technology improved. By the middle of the eighth century their descendants were building above-ground houses constructed with vertical poles and plastered with adobe mud for weatherproofing.

Houses were built one against another, with common walls, in a long curving row. Frequently they built one or two deep pithouses in front of the crescent-shaped rowhouses. Perhaps these were the beginning of the underground religious rooms -- kivas -- of later times. The people who built these new villages were the descendants of the Basketmakers, but we call them Pueblo Indians in recognition of their new architectural skill.

Before A.D. 1000 the prehistoric Mesa Verde people began replacing pole-and-mud architecture with coursed stone masonry. Sturdy, compact apartment-like buildings were constructed, and by the 12th century they were exceptionally



well made. Some stood as much as three stories high and contained more than 50 rooms. Often the rooms were built around courtyards that contained several kivas similar to those used today by Pueblo Indians.

Just before the end of the 12th century, the Pueblos abandoned the mesa tops and moved down into the many rock shelters in the cliffs, where they built the spectacular cliff dwellings that are observed today by park visitors. Occupation of the cliff dwellings lasted less than 100 years, and before the close of the 13th century the Mesa Verde was completely abandoned. The reason for this abandonment is not known, but archeologists continue to gather data that may someday provide the answer. One theory is that this was a time of warfare; local Indians may have fought among themselves or with a foreign tribe, and used the caves for defensive purposes. Others speculate that the lengthy periods of drought late in the 13th century combined with civil strife resulting from repeated crop failure led to desertion of the area.

It is believed that when the cliff dwellers left here they traveled to the south and southeast -- down to the valley of the Rio Grande and its tributaries. They may have joined existing vilages of Pueblo Indians in this new land, or they may have established villages of their own; perhaps both;

whatever happened, it seems likely that some of the Pueblo Indians in central New Mexico are at least partly descended from the cliff dwellers. Appendix C contains a more detailed description of the cultural sequences at Mesa Verde.

Examples of the houses, tools, and clothing of the Mesa Verde people can be seen in the park. Nineteen major cliff dwellings and surface pueblos have been excavated, stabilized, and made available for visitation on Chapin and Wehterill Mesas. Approximately 30 inaccessible sites can be viewed from overlooks along the present roads and trails.

Nowhere else in the United States is a sequence of pre-Columbian architectural development so completely displayed as on the Ruins Road drive on Chapin Mesa. In the future, additional comparable architectural remains will be displayed and interpreted on Wetherill Mesa.

The National Park Service has attempted to preserve the remains of this ancient people rather than to make restorations based on guesswork. In addition to their scientific importance, many of the park's resources are scenic. It is important to recognize that the geologic features, vegetative cover, and wildlife all contribute to the visitor's understanding of the prehistoric Pueblo Indian habitation.

Frank Sweet ... [illegible] ... E. Ingersol — ok —

Photographic Party of U.S. Geological Survey of 1875 — W.H.J. Photo. at Parrot City

Harry Lee. Guide — Mitchell - Packer. — W.H.J. — E. Barber {Naturalist} — Wahn. Packer — The Cook

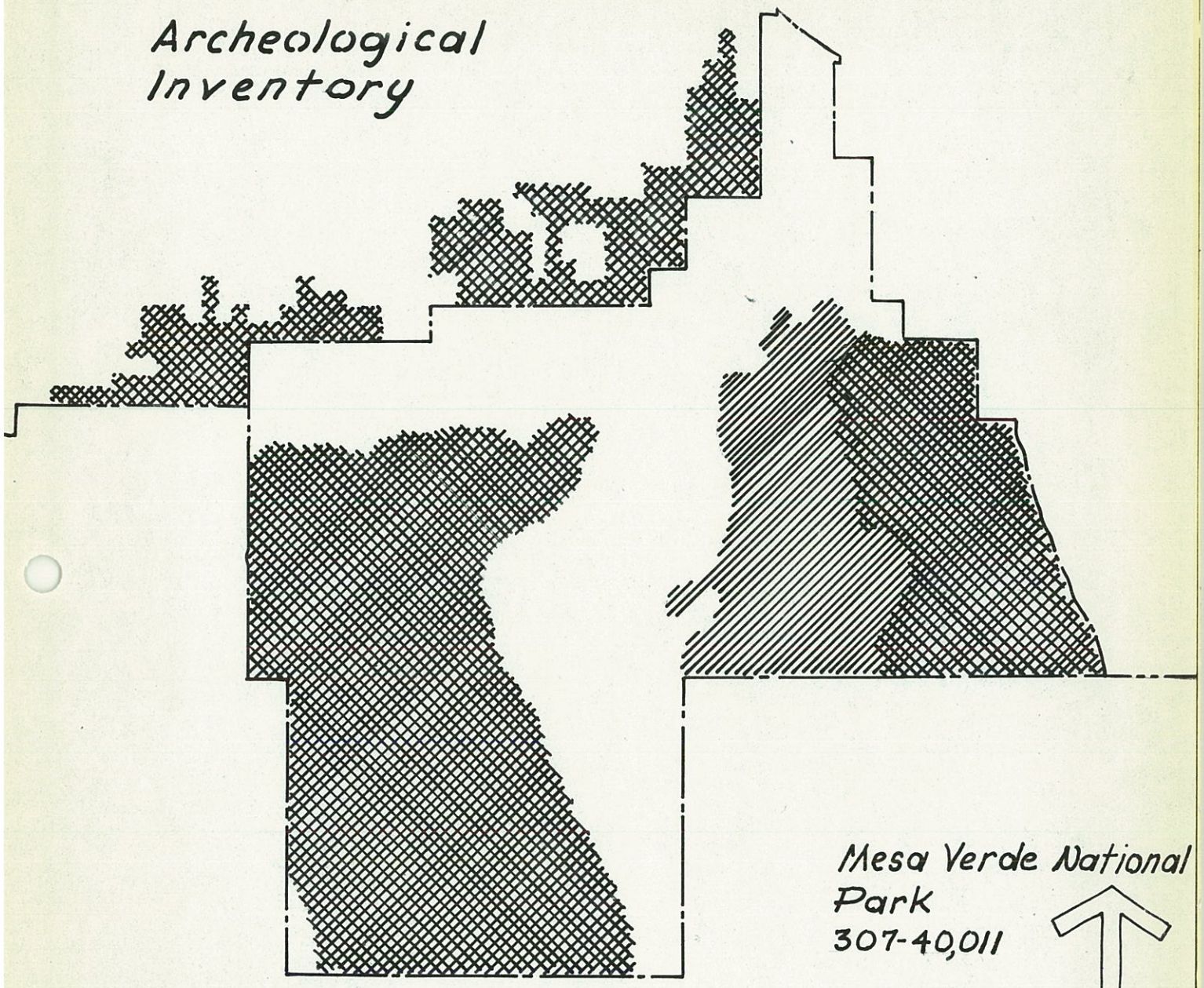
Scientific archeological investigations began in 1908 when Dr. Jesse Walter Fewkes, of the Smithsonian Institution, excavated Spruce Tree House. Since that time numerous investigations have been accomplished -- about 60% of the park has been examined by intensive archeological survey, with over 4,000 sites currently recorded. The University of Colorado is now working under contract to complete the survey of the entire park by 1977.

The park museum and the storage facilities at the Mesa Verde Research Center house a collection of over 40,000 artifacts representative of the Mesa Verde culture. These specimens are currently utilized in museum exhibits and as a resource for comparative study and research. They comprise the most extensive collection of cultural material from the Mesa Verde branch of the Anasazi and are a popular resource for scholars and exhibit planners.

The park photographic collection includes over 35,000 negatives, many of which record archeological explorations and the historic record of the park. They are utilized alike by planners, interpreters, and researchers.

A third archival resource is the Archeological Site Survey file. An outline for the archeological significance of

Archeological Inventory



Mesa Verde National Park
307-40,011

Miles
Kilometers

1 0 1 2 3
1 0 1 2 3 4

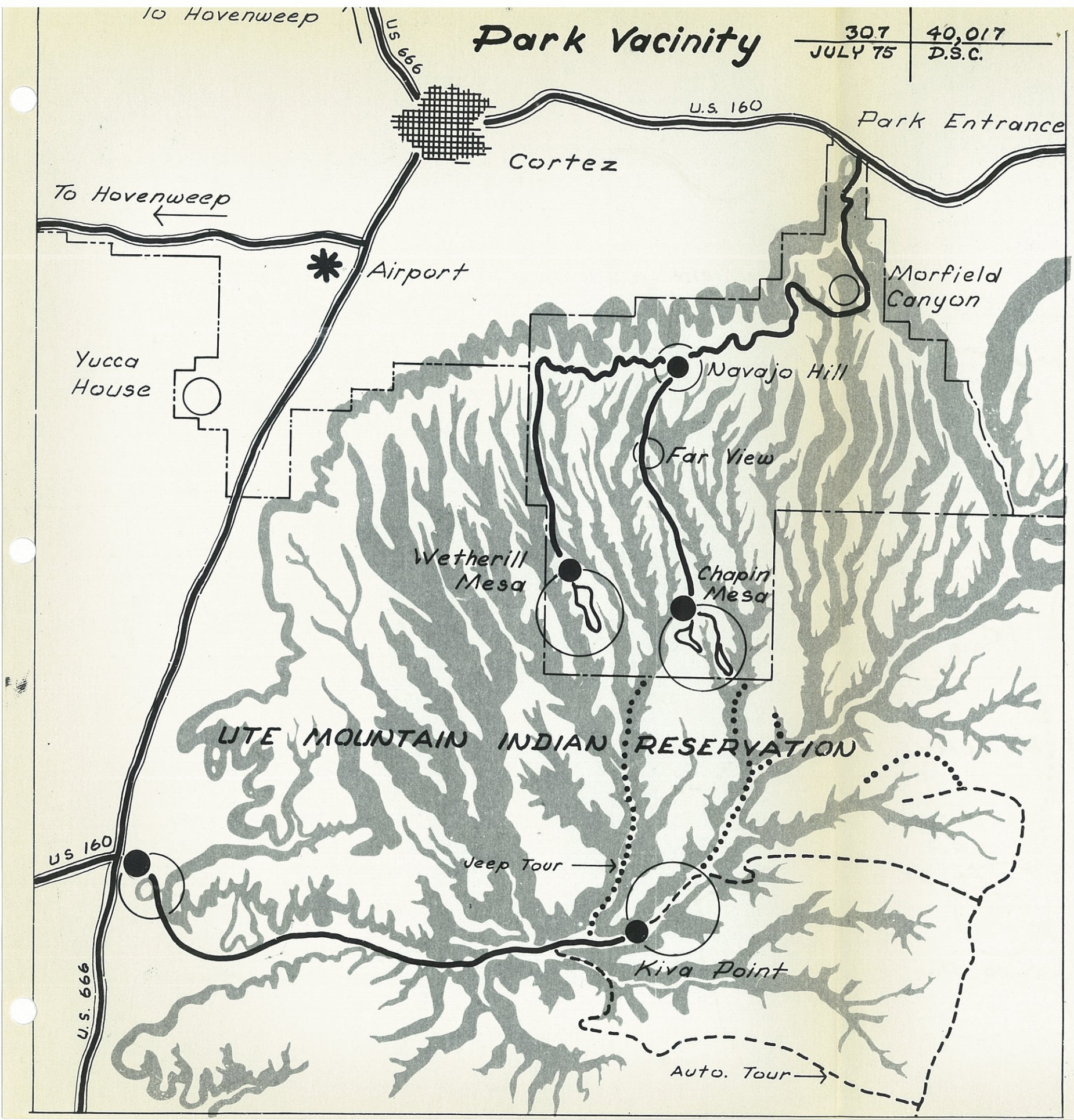
Legend

- Archeological Survey Completed
- Archeological Survey to be Completed in 1974
- No Archeological Survey

Notes: There has been an archeological survey for the first 7½ miles of entrance road into the Ute Indian Park.

each site is recorded on over 4,000 5- by 8-inch cards. This resource will expand to over 7,000 recordings as current contracts with universities are fulfilled.

The park library fulfills a supplementary function by making a collection of approximately 4,000 volumes available as references.


Park Vacinity
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Park Entrance
Cortez
To Hovenweep
Airport
Morfield Canyon
Yucca House
Navajo Hill
Far View
Wetherill Mesa
Chapin Mesa
UTE MOUNTAIN INDIAN RESERVATION
US 160
Jeep Tour
Kiva Point
U.S. 666
Auto. Tour

EXISTING PARK CONDITIONS AND DEVELOPMENT

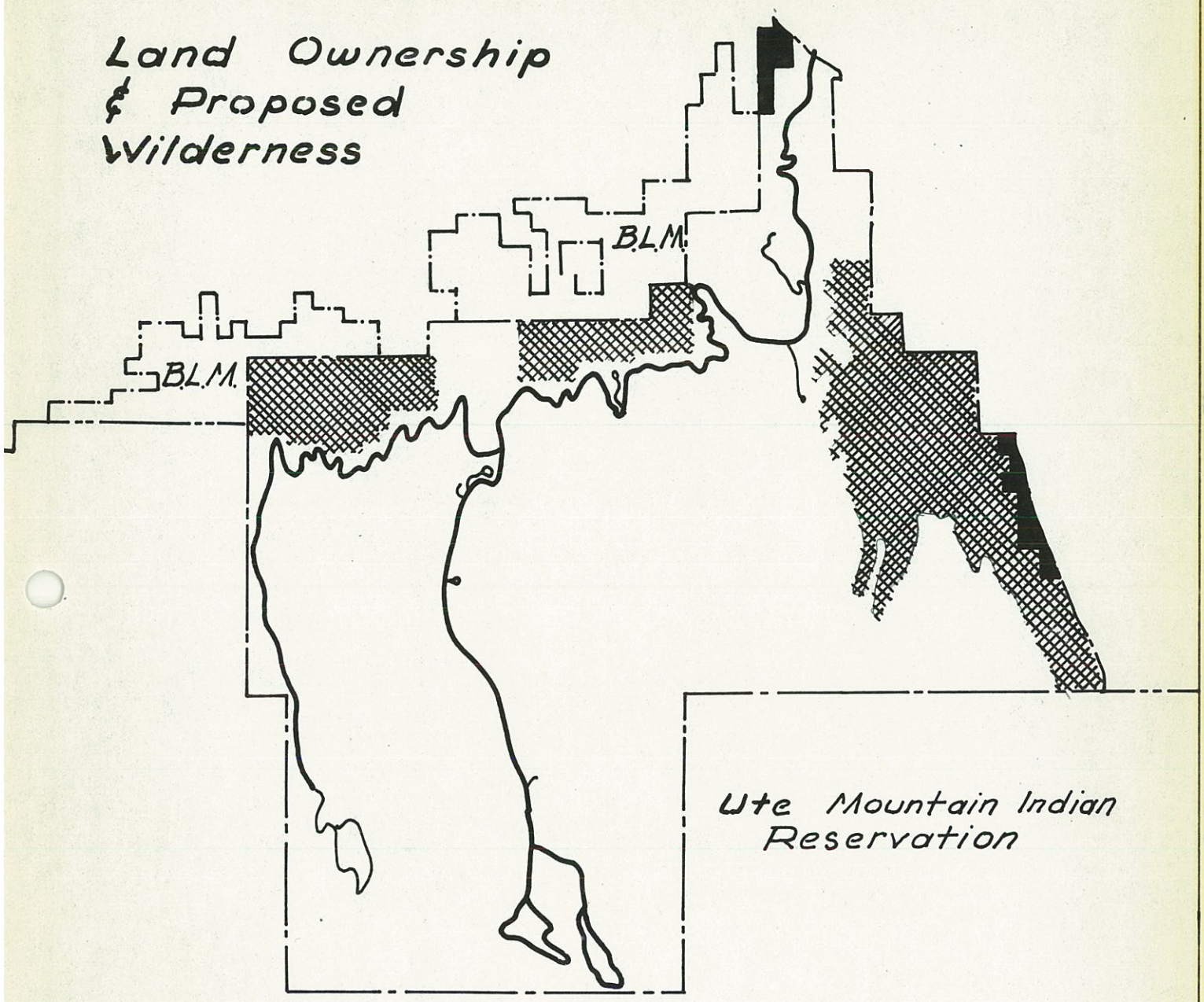
General

The 52,074-acre park comprises about 40% of the high, deeply dissected tableland known as the Mesa Verde uplift, which rises nearly 2,000 feet above the plain of the Dolores Plateau. Steep cliffs that descend into the narrow canyons and separate the finger-like projections of the mesa contain numerous rock shelters, active springs, and seeps.

The area is considered eminently suitable as a park because it contains sufficient land to properly portray its mission. Additional lands, while desirable for administrative purposes or for a more complete coverage of the Mesa Verde story, are not mandatory for interpretation. It is true that the present boundary appears whimsical in some respects, and that some boundary adjustments would be desirable. However, many additional ruins on adjoining Ute reservation lands have been surveyed and will be protected and interpreted in the proposed Ute Mountain Tribal Park.

Two parcels of privately owned land are included within the park's boundaries. One inholding near the park entrance is 400 acres in size and the other in the eastern section of the park, adjacent to the Mancos River, is approximately 240 acres.

Land Ownership & Proposed Wilderness



Legend

- Private Inholdings
- Proposed Wilderness

Mesa Verde National Park
307-40,019

Miles
Kilometers

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1 0 1 2 3 4

Pursuant to Public Law 88-577 (1964) establishing a National Wilderness Preservation System, a recommendation was submitted by the President to Congress on November 28, 1973, requesting designation of 8,100 acres within Mesa Verde National Park, Colorado, as wilderness. The recommendation is presently under consideration by Congress. In order to provide maximum protection for archeological resources, backcountry use in the park is currently prohibited.

Although Mesa Verde National Park was established to protect and preserve the extensive archeological resources, the intrusions of modern man are visible and extensive. Roads, parking lots, and buildings -- both those in use and those abandoned -- are particularly noticeable. These works of modern man, however, have served to make the archeological resources and their story more accessible to the visiting public.

Entrance Road and Associated Facilities

The first motor access road to Mesa Verde National Park was opened to traffic in 1919 and ran about a mile east of the present entrance road. It was a switchback road that circled north of Prater Ridge and followed the north and west sides of the Knife Edge, as shown on the Existing Conditions Map. The switchback portion of the road was abandoned in 1927

because of the steep grade and sharp curves, when the present entrance road from U.S. 160 to about 2,000 feet north of the Morfield Canyon campground was completed.

The road with this alignment had serious landslides at both the Point Lookout slide area and the Knife Edge. The Knife Edge portion of the road was abandoned in 1957 when Prater Tunnel was built. According to William Winkler, a park concessioner, the overburden problem had nearly been corrected at the Knife Edge area when it was abandoned. With the exception of the Point Lookout slide area and approximately 6 miles of entrance road between the entrance and Navajo Hill, park roads used by private vehicles are in good condition and capable of handling existing traffic volumes.

As previously mentioned, portions of the entrance road were constructed as early as 1927, and consequently, two road sections, the first 1.15 miles of entrance road, and an approximate 7.4-mile section from the head of Prater Canyon extending out to Navajo Canyon, are substandard in roadway width. The pavement at these locations is a perpetual maintenance problem, requiring continual patching; the concrete ditch associated with the latter section requires considerable hand-labor maintenance. The Federal Highway Administration has estimated it would

cost approximately $1 million to correct these problems and upgrade these two road sections to current National Park Service road standards.

The Point Lookout slide area continues to have problems because of the constant shifting and sliding of the overburden material above the Mancos shale. The road cuts have hastened the erosion by accelerating the landsliding of debris down the oversteepened cut slopes. Normally these slides occur more frequently and involve greater quantities of material during years of heavy precipitation, when the increased moisture functions as lubrication to the bedding and joint planes in the exposed shale. However, there have been exceptions such as the 1972-73 winter when heavy precipitation produced less sliding material the following spring than had the year before, which was extremely dry.

There is one area (approximately 200 feet in length) near the south end of the slide where surface cracks have appeared in the road, indicating that this section may fail by sliding down the hill. Other than this section, the road is constructed on in-place shales and sandstone. As previously stated, the main problem is that the mass of debris above the road continues to move downward and onto the road. According to the Federal Highway Administration,

approximately 170,000 cubic yards of this overburden material must be removed immediately.

The existing fill area beneath the road has been continually used by maintenance for slide material disposal. Consequently, the entire mountainside is slumping and is generally void of vegetation. The Federal Highway Administration believes that with the removal of the overburden, proper compaction and benching, and revegetation of both the cut and fill slopes, the Point Lookout slide area can be corrected. The estimated cost for this work is approximately $750,000.

The engineering problem at Point Lookout has resulted in expensive maintenance costs and potential safety hazards to the visitors. A total of $353,900 has been spent over the past 10 years by the park and the Midwest and Southwest Regions for the maintenance of this slide area. If the overburden is not removed, these costs will continue to escalate. An additional $662,200 was expended by the park over the same period for maintenance of the entrance road. A summary of the yearly maintenance costs for the slide area and the park entrance road is given on the following table. These costs do not include any maintenance for Wetherill Mesa or any other roads in the park.

MESA VERDE NATIONAL PARK ROAD

MAINTENANCE COSTS

	POINT LOOKOUT SLIDE AREA		20.5-MILE ENTRANCE ROAD
	Budgeted by Park	Budgeted by Regional Office	
	($)	($)	($)
1964	6,800		40,000
1965	8,500		48,000
1966	4,250	75,000	54,000
1967	8,100		62,000
1968	10,800	175,000	73,000
1969	9,000		71,000
1970	9,500		70,000
1971	12,000		76,000
1972	11,000		82,000
1973	24,000		86,200
TOTAL	103,950	250,000	662,200

The entrance road maintenance costs totaled $1,016,150 for the 10-year period.

It must be noted that a portion of the maintenance budget is attributed to hand work necessitated by the 7.4 miles of concrete curb and gutter that have to be cleaned regularly with shovel and broom. The yearly maintenance costs could be reduced considerably if the concrete curb and gutters were eliminated.

The primary nodes of development are Morfield Canyon (vehicle campground, service station, and store); Far View (lodge units, seasonal housing, service station, restaurants, gift shop, and visitor center); and Chapin Mesa (administrative headquarters, museum, maintenance facility, housing, store, and archeological research station). Development on Wetherill Mesa is limited to roadways, a parking area, and a portable tent-type food service unit.

The Morfield Canyon campground, the third largest campground in the National Park System, contains a snack bar, market, coin-operated laundry, showers, service station, amphitheater, 496 family campsites, and 17 group campsites. In addition to these visitor-use facilities, there is a ranger station that includes an employee duplex house, two National Park Service trailer houses, and two Mesa Verde Pack and Saddle concessioner house trailers. In addition to the campground, the Morfield Canyon development area will accommodate approximately 100 cars. During the peak visitor season, July and August, this area is the second largest community in Montezuma County.

There are many pull-offs and overlooks situated on the park entrance road; Point Lookout, Montezuma Valley, and

Mancos Valley are the three major developed overlooks. Montezuma Valley overlook has a parking area for approximately 11 cars and a small shelter for interpretive use. From this site a visitor can view the Knife Edge and Montezuma Valley. At the Mancos Valley overlook there is parking for approximately 23 cars and an excellent view of Mancos Valley and the town of Mancos.

The development at Park Point lookout includes two pit toilets and parking for 25 cars. A fire lookout with a radio tower on top; a small storage building housing radio equipment and a radio tower; and a small weather station to record temperature, wind movement, and precipitation are also situated here. A water tank, approximately 4,300 feet north of the Far View development and the Wetherill water tank are visible from this point.

No.	Miles	Approximate Size	Road Side As Visitors Enter Park
1	0	Park entrance	
1	0.5	Trailer parking -- 30 trailers	Right
2	1.3	20 cars	Right
3	2.2	5 cars	Left
4	3.5	23 cars (Mancos Valley overlook)	Left
5	6.6	11 cars (Montezuma Valley overlook)	Right
6	9.0	3 cars	Right
7	9.2	2 cars	Right
8	9.6	12 cars	Left
9	11.0	25 cars (Park Point lookout)	Right
10	11.8	6 cars	Left
11	12.6	2 cars	Left
12	13.7	3 cars	Right
13	14.0	6 cars	Right
14	14.4	6 cars	Left
15	15.1	2 cars	Left
16	15.6	7 cars	Left
		Navajo Hill	
TOTAL		133 cars	

Far View

The Far View Visitor Center on Navajo Hill is situated just south of the entrance road; the visitor center parking area lies north of the road and will accommodate 42 cars. A pedestrian tunnel under the road provides access from the parking area to the visitor center.

The Far View concession complex includes a service station, gift shop, and an adjacent cafeteria. Parking near the shop will accommodate 31 cars. The shop and restaurant are open from May 15 to October 15 each year. Northwest, behind the gift shop, trailers are available for housing concessioner and Park Service seasonal employees. Parking is provided in this area for approximately 80 employee vehicles.

At Navajo Hill a concessioner-operated lodge includes a restaurant, cocktail lounge, public meeting room, and 100 motel rooms. The lodge and motel are open for approximately 120 days each year. There is parking for 290 cars, but only about 100 of these spaces are currently being used. This recently completed complex was considered in the 1969 master plan. The concessioner's obligations under the 1964 contract for building requirements was fulfilled with the completion of the new lodge in 1973.

Chapin Mesa

The Far View ruins, 1-1/2 miles south of Navajo Hill on Chapin Mesa, are reached by a short loop road with parking for six cars provided around the loop. Additional cars usually pull off the road along the shoulder and park while occupants visit the ruins.

A mile north of the park headquarters turnoff, the entrance to the Civilian Conservation Corps (CCC) area leads to 9 buildings and 11 trailer sites. Six buildings built by the CCC are in very poor condition and are used for a recreation hall, dry storage, LP gas storage, fire control equipment and appliances storage, and the winter storage of two vehicles. One 20- by 25-foot rock building, in fair condition, contains the water control valves for the lower Chapin Mesa system. A large, relatively new, metal building, the Mesa Verde Research Center, is used for housing park artifacts. A new 30- by 50-foot metal building is used for the Ruins Stabilization warehouse. Seven trailer sites are available for summer rental to seasonal employees. Two trailer sites are assigned to the Mesa Verde Company, and two sites are occupied by National Park Service trailer houses.

Situated 1/2 mile north of the park headquarters turnoff, the utility area comprises the park maintenance area and the major residential area, including 4 trailer houses, 18 small 1- and 2-bedroom quarters, and a dormitory for summer archeology students. The maintenance area includes 11 CCC-type buildings moved there from different park areas. These buildings contain warehouse space for such things as lumber and paint storage; electric, carpenter, mechanic, and blacksmith shops; three vehicle storage sheds; a gas-diesel station; a fire cache, and a new fire station. There are open storage areas for sand, gravel, and other stone products. Petroleum products such as heating fuel, gas, diesel-fuel, motor oil, and asphalt materials are also stored in this area.

Northwest of the headquarters road junction another residential area includes seven hogan-type summer quarters for seasonals and seven wooden tent frames. In addition to the two previously mentioned residential areas, eight permanent employee residences, including the superintendent's house and a dormitory, are situated on Spruce Tree Point. The headquarters area also includes administrative facilities, a post office, ranger station, museum, and a store and snack bar operated by the concessioner. There is paved parking for approximately 120 cars and 3 buses in this area, with unsurfaced spaces for another 120 cars in areas currently used for overflow parking.

The old campground lies west of the park headquarters. During the summer this campground is used as a picnic area, with approximately 30 picnic tables, firepits, and a comfort station. During the winter, when snow closes the Morfield campground, this area is used for camping.

The following table gives the number of turnouts on the Chapin Mesa drives and the approximate parking capacities:

TURNOUT	PARKING CAPACITY
Pithouse	31
Square Tower House	45
Pit and Pueblo Ruins	20
Mesa Top Ruins	22
Sun Point Pueblo	27
Sun Point	22
Oak Tree	2
View	2
Cliff Palace View and Sun Temple	22
Cliff Palace	100
Cliff Canyon	5
House of Many Windows	4
Hemenway House	10
Balcony House	87
Soda Canyon Overlook	14
	413 TOTAL

Wetherill Mesa

The access road from Navajo Hill to Wetherill Mesa is 12.7 miles long, has seven turnouts situated along its route, and ends in a 200-car parking area. Visitors are routed from the parking area by means of a minibus train to the various archeological sites on the mesa.

It must be noted that there have been some pavement structural failures on the Wetherill Mesa Road, not currently open to private vehicular use. The only traffic using the road are the buses that transport park visitors from Navajo Hill to the parking area on the mesa and Park Service maintenance and administrative vehicles. Since initiating the use of buses (4 per hour) in 1973, the park has observed 46 sites in the road pavement that are showing distress or total failure. The majority of these sites lie in cut sections where there is minimal ditch and, apparently, some moisture penetrating beneath the roadway. Indications are that the subgrade thickness in these areas is deficient.

Other development facilities including unpaved roads, utility lines, and sewage lagoons are shown on the Existing Conditions Map.

CURRENT INTERPRETIVE PROGRAM

Primary interpretation at Mesa Verde centers upon archeological interpretation of the prehistoric Anasazi through a variety of public service opportunities. These include ranger-guided tours through Indian ruins on Chapin and Wetherill Mesas, self-guided tours on Chapin Mesa and at Far View, and walks on the Pictograph Nature Trail, as well as slides and movies in the existing Chapin Archeological Museum in spring, fall, and winter. The self-guided tours may be expanded to include Wetherill Mesa.

Continuous film programs at the Far View Visitor Center during the summer supplement the modern Indian arts/crafts exhibits in the facility.

Bird lists and photographic-aid handouts are available for visitors. Self-guiding trail guides, produced by the Mesa Verde Museum Association, supplement the interpretive programs. Numerous onsite interpretive programs (environmental, archeological, and the like) are offered in the spring and fall for school groups. Other interpretive activities are taken off site to school, civic, and scientific groups in the Four Corners region. During the summer, campfire programs are presented, as well as special tours to mesa top ruins. Cultural demonstrations have been tried, but are currently not in use, although the idea has not been abandoned.

PARK VISITATION

Annual visitation to Mesa Verde National Park currently numbers about 482,851 visitors. Visitation increased from 344,440 in 1964 to 546,286 in 1972. This figure decreased in 1973 to 482,851, probably because of the extreme shortage of gasoline in Colorado that summer. It must be noted, however, that 1974 visitation was 8% lower than in 1973. Camping has decreased since a peak was reached in 1969. Private campgrounds in the nearby area are credited with providing much of the relief from overcrowing in recent years.

In June of 1973 part of Wetherill Mesa was opened to the public for ranger-guided tours and general viewing. A transportation contract between the National Park Service and the concessioner provides public bus transportation from Navajo Hill to Wetherill Mesa, where a minitrain transports visitors to Long House. This program was highly successful, and, as more ruins are opened to the public in the future, it is anticipated that it will become even more popular. The Wetherill program served slightly less than 50,000 visitors in 1974; however, not all of the available seats (500 seats, or 10% of the daily park visitation) were utilized on days in July and August. It appears that a similar transportation system would be practical on the Chapin Mesa loops.

Visitor-use patterns have been sufficiently well-established on Chapin Mesa to determine visitor capacities of the individual ruins and to aid in determining future facilities needs. Visitor capacity for the park as a whole should be established to set the level of visitation that can be accommodated without physical damage to the resources or diminishing the quality of the park experience.

PARK CAPACITY

The uses of Mesa Verde's resources by the general visitor who comes for both education and recreation are difficult to direct. Within social mores of freedom-of-choice, too much regulation of use is oppressive and counter-productive to the purposes that warranted Mesa Verde's creation. However, resources must still be protected from misuse and overuse; accordingly, the problem becomes one of controlling the quality and quantity of use by proper development, interpretation, maintenance, and non-arbitrary and uncapricious regulations. In this light it is necessary to develop a knowledge of a resource's capacity and the way visitors will freely use it.

The cliff dwellings are the critical resources in determining the parks capacity because of their value to the visitor experience, their fragile nature, and the limited number of dwellings suitable for visitor tours. A capacity and experience time frame was established for each cliff dwelling on Chapin and Wetherill Mesa that had potential for visitor tours (see Visitor Capacity Test Model). It was further determined by the park staff and the planning team that only approximately two thirds of the visitors to Mesa Verde actually tour one of the cliff dwellings. Using this data, travel

time, and the actual time required to experience the park's other resources on each mesa the following capacities were determined:

Experience	Visitor Capacity 1 Hour	Average Visitor Time Incl. Travel Time	Visitor Capacity at any Moment in Time
Wetherill Mesa	350	3 hours	1,050
Chapin Mesa	490	3 hours	1,470
Park Entrance (Inter. Fac.)	900	1 hour and 10 minutes	1,050
Mesa Verde National Park Total	1740	Varies by Trans. System--See Chart on Visitor Costs and Time Frames	3,570 Does not include overnight facilities

VISITOR CAPACITY TEST MODEL

MESA	CLIFF DWELLING	CURRENTLY USED	GUIDED TOUR EXPERIENCE	SELF-GUIDING EXPERIENCE	MAXIMUM VISITOR CAPACITY	EXPERIENCE TIME
WETHERILL	LONG HOUSE	*	*		50	1 hour
	STEP HOUSE	*	*		50	45 minutes
	RUIN 16		*	*	50	45 minutes
	MUG HOUSE			*	50	1 hour
CHAPIN	BALCONY HOUSE	*	*		50	1 hour
	CLIFF PALACE	*	*	*	100	45 minutes
	SQUARE TOWER		*		50	1 hour
	SPRUCE TREE	*	*	*	100	45 minutes

NOTES: The following information is based on the above data and the premise that 67% of the visitors will tour a cliff dwelling.

* Wetherill Mesa's capacity is 3,150 visitors per day (8AM-8PM) or 350 per hour.
* Chapin Mesa's capacity is 4,410 visitors per day (8AM-8PM) or 490 people per hour.
* Mesa Verde's capacity is 7,560 or 840 visitors per hour.
* The Museum on Chapin Mesa has a cpacity of 350 visitors per hour which means it can accommodate approximately 70% of the visitors on Chapin Mesa.
* The Far VIew Ruins have a capacity of 300 visitors per hour.
* The proposed interpretive facility will be designed to accommodate approximately 900 visitors/hour.

VISITOR COST AND TIME FRAMES

Transportation Type	Average Cost/Visitor From the Park Entrance to:		Visitor Travel Time (one way) From the Park Entrance to:			Average Total Visitor Time Spent in Mesa Verde if one Mesa was Visited		Average Total Visitor Time Spent in Mesa Verde if both Mesa's were Visited
	Far View	Chapin or Wetherill	Far View	Chapin	Weth-erill	Wetherill Mesa	Chapin Mesa	
Bus	1.60	2.90	25 min.	40 min.	1 hr.	5 hrs.	5 hrs.	8 hrs.
Tram & Bus	1.00	2.30	10 min.	25 min.	45 min.	4 hrs. & 30 min.	4 hrs. & 30 min.	7 hrs. & 30 min.
Private Car @ 16¢/mile	3.30/car	5.80/car	25 min.	40 min.	1 hr.	5 hrs.	5 hrs.	8 hrs.
Bus & Tram & Bus Ute Mountain Reservation	4.70	5.35	1 hr. & 15 min.	1 hr.	1 hr. & 50 min.	6 hrs. & 40 min.	5 hrs. & 50 min.	9 hrs. & 20 min. 5 hrs. & 50 min.

MANAGEMENT OBJECTIVES, APPROACHES AND OPTIONS

In order to manage the park in compliance with the enabling legislation, the following management objectives were prepared. The objectives and the various approaches and options finally chosen will be accomplished by the year 2000. Those objectives were prepared concurrently with the Mesa Verde Master Plan Assessment and will continue to be reevaluated during the master planning process.

OBJECTIVES	APPROACHES	OPTIONS
I. Provide for the health, safety, comfort, recreational, and residential needs of the park residents	I.A. Bring park residences up to standard	A.1. Upgrade existing employee housing within the park boundaries 2. Develop new employee housing, and utilize existing housing in the surrounding communities a. Existing park entrance area, b. Cortez vicinity c. Near lower tram terminal d. Mancos
	I.B. Develop employee recreation programs and facilities	
	I.C. Develop employee safety and first-aid programs and facilities	
	I.D. Provide fire protection	D.1. Park responsibility 2. Agreement with local fire department
	I.E. Provide an effective communications system	E.1. Initiate short-wave radio system 2. Computerize visitor tour reservation system
	I.F. Provide law enforcement	F.1. Contract with security police 2. Agreement with local police 3. Park rangers

OBJECTIVES	APPROACHES	OPTIONS
II. Reduce unnecessary park operational costs and energy consumption	II.A. Train supervisory park personnel in maintenance management	
	II.B. Locate administrative and maintenance facilities where those functions can be carried out with minimum consumption of energy	B.1. Upgrade existing facilities within the park boundaries 2. Remove all administrative and operational support facilities from the mesa except the minimum determined by park management to be needed for protection and maintenance a. Cortez vicinity b. Lower tram terminal c. Mancos d. Existing park entrance area
	II.C. Close the park for all or part of the low use winter months	C.1. Specified period of time (January and February) 2. Flexible - based on weather conditions
	II.D. Utilize public transportation to move visitors into and through the park (Minitrains would be used on both Chapin and Wetherill Mesa end loops	D.1. Private automobile access to Far View and Chapin Mesa - bus transportation to Wetherill Mesa 2. Private automobile to both Chapin and Wetherill Mesas 3. Private automobile access to Far View and Wetherill Mesa - bus transportation to Chapin Mesa 4. Private automobile access to Far View, and bus transportation to both Chapin and Wetherill Mesas

OBJECTIVES	APPROACHES	OPTIONS
		D.5. Bus transportation throughout the park
		6. Tram access to the Far View area, and bus transportation to both mesas
		7. Tram access to Chaplin Mesa, and bus transportation in the rest of the park
	II.E. Facilitate efficient use of personal transportation to move visitors into and through the park	E.1. Provide regional maps for travel agencies and key travel centers
		2. Develop a regional orientation system to provide visitors with trip-planning information
		3. Develop a regional sign system
III. Encourage regional planning and cooperative land management	III.A. Promote and continue to provide sound comprehensive planning, management, research, and consultation services to the Ute Mountain Indians	A.1. Develop a comprehensive inventory of all natural, cultural, scientific, economic, and recreational resources
		2. Assist in resource management planning
		3. Confer on interpretation and development
		4. Train in archeological excavation and historic restoration.
	III.B. Assist local governments surrounding Mesa Verde National Park in establishing compatible land-use zoning	B.1. Ordinances
		2. Zoning restrictions
	III.C. Participate in local activities and community projects	

OBJECTIVES	APPROACHES	OPTIONS
	III.D. Develop sound liaison with all Federal, State, and local agencies in the surrounding area	
	III.E. Develop cooperative land-use, soil, and moisture programs among area land managing agencies in the park's immediate vicinity	
IV. Provide a flexible, safe and convenient system of access and circulation that will facilitate travel between interpretive and recreational destinations	IV.A. Allow private vehicles on the mesa during the entire visitor season	A.1. Allow them on the entire mesa 2. Allow them on Chapin Mesa 3. Allow them on Wetherill Mesa 4. Allow them only to Far View
	IV.B. Allow private vehicles on the mesa only from October 1 through April 30	B.1. Allow them on the entire mesa 2. Allow them on Chapin Mesa 3. Allow them on Wetherill Mesa 4. Allow them only to Far View
	IV.C. Utilize public transportation to move visitors to and through the parks	C.1. Develop a bicycle trail system in the park 2. Develop a minitrain system on Chapin Mesa 3. Continue the minitrain system on Wetherill Mesa 4. Develop a bus transportation system on Chapin Mesa 5. Continue the bus transportation system on Wetherill Mesa 6. Develop a bus transportation system to the park 7. Develop a tram to the Far View area 8. Develop a tram from the Ute Mountain Park to Chapin Mesa

OBJECTIVES	APPROACHES	OPTIONS
	IV.D. Route traffic through the park to avoid bisecting significant resource areas	D.1. Realign the park road to bypass the Far View Ruins area
	IV.E. Route traffic through the park along existing roads	
	IV.F. Develop a park capacity based on the resource and on the desired visitor experience	
V. Develop facilities that adequately meet visitor needs for food, lodging, and comfort and that do not infringe upon the park's significant resources	V.A. Encourage the development of visitor support facilities by private enterprise outside the park boundary	
	V.B. Continue to provide visitor support facilities (concessioner) within the park boundary	B.1. Provide food services at: a. Chapin Mesa b. Wetherill Mesa c. Far View d. Park entrance 2. Provide overnight lodging at: a. Far View Lodge b. Morfield Campground c. Park entrance 3. Provide retail sales a. Chapin Mesa b. Wetherill Mesa c. Far View d. Morfield Complex e. Park entrance 4. Provide horse rentals 5. Provide bike rentals 6. Computerize visitor tour reservation system

OBJECTIVES	APPROACHES	OPTIONS
	V.C. Ensure that a reasonable proportion of overnight accommodations are free or moderately priced	C.1. Provide overnight accommodations inside the park a. YCC camp b. Youth hostel c. Environmental education camp d. Family campground e. Lodge or motel units
VI. Preserve and protect the significant natural, cultural, and scientific park resources	VI.A. Within legislative constraints, prohibit incompatible land uses in areas where they impair the quality of significant resources and when they exceed resource capacities	A.1. Remove the concessioner development at Far View 2. Remove the park facilities from Chapin Mesa a. Superintendent house b. Ranger office c. Museum d. Post office e. Concessioner building f. Remove housing units that are not adequate g. Remove excess maintenance facilities if the primary park operations function is removed from the mesa 3. Remove the excess parking from the mesa if public transportation is used
	VI.B. Through boundary adjustments and cooperative agreements, minimize conflicts between legislative constraints and the preservation of the significant resources	

OBJECTIVES	APPROACHES	OPTIONS
	VI.C. Acquire all inholdings necessary to protect and preserve the park's significant resources	C.1. Acquire Mr. Lee Sheek's 315.8-acre inholding in fee T.35N, R14W, Sec. 26 and 35 T.34N, R14W, Sec. 1 and 2 2. Acquire Mr. Douglas Hindmarsh's 232.14-acre inholding in fee T.36N, R14W, Sec. 29 and 32 3. Acquire scenic easements on one or both of the above inholdings
	VI.D. Reestablish the historic setting of certain cultural resources	D.1. Restore the Far View area to an appearance much like the scene pictured in park diorama 4 2. Restore the Spruce Tree area to what it was like at the time the park was established
VII. Manage the natural and cultural resources of the park through a sound innovative management program to stabilize the fluctuating ecosystem and provide maximum preservation of the cultural resources	VII.A. Develop the necessary resource management programs	A.1. Complete the archeological survey 2. Provide antiquities with additional protection from fire, theft, vandalism, and climatic elements 3. Provide adequate mesa top ruins shelters 4. Eliminate manmade intrusions within sight and sound of the archeological sites 5. Control the exotic fauna and flora 6. Manipulate the vegetation to reduce fire potential 7. Manipulate the vegetation to enhance the ruins setting and provide a setting more like that of Anasazi times 8. Reintroduce native fauna and flora 9. Control the deer population 10. Develop a fire management plan 11. Continue ecological research

OBJECTIVES	APPROACHES	OPTIONS
	VII.B.	
	Complete and maintain an accurate, comprehensive inventory of all natural, cultural, scientific, economic, and recreational resources	B.1. Complete the archeological inventory 2. Prepare a socioeconomic profile/visitor-use survey 3. Conduct a geologic survey 4. Identify, inventory, and submit all qualifying sites to the national register 5. Complete the soil mapping for key developments 6. Conduct studies of rare, endangered, and endemic fauna and flora 7. Complete annotated lists of flora and fauna
	VII.C.	
	Preserve and protect the outstanding prehistoric sites, structures, and objects from direct or indirect damage from natural forces or human activities	C.1. Expand the ruins stabilization program 2. Control soil erosion 3. Develop proper artifact storage 4. Provide direct supervision of public use at the resource 5. Provide specialized training to the park staff 6. Establish capacities for the surface ruins and cliff dwellings 7. Provide 1-day and overnight guided tours in the proposed wilderness area 8. Assist other archeological areas within the subregion

OBJECTIVES	APPROACHES	OPTIONS
	VII.D. Encourage and participate in southwest archeological research activities in order to strengthen interpretive and research management programs	D.1. Provide assistance and cooperation in programs of human and earth sciences research in the Southwest scientific community 2. Staff and rehabilitate the Wetherill Laboratory as a functional archeological research facility and clearinghouse for archeological data relating to this area of the Southwest 3. Continue archeological surveys and excavations within the park 4. Encourage institutions of higher learning to undertake scientific investigations within the park to increase the knowledge of prehistoric man and his environment 5. Encourage and provide opportunities for employees at Mesa Verde to further their professional skills 6. Make the park's archeological resources, including the study collections, available to the scientific community
VIII. Provide for visitor enjoyment and appreciation of park resource through a vareity of information/ orientation facilities and programs	VIII.A Provide orientation and information on park resources and activities to visitors before their involvement with the resource	A.1. Existing park entrance 2. Lower tram terminal 3. Upper tram terminal 4. Ute Mountain Indian Reservation 5. Far View 6. Low-frequency radio broadcasts 7. Computerize visitor tour reservation system

OBJECTIVES	APPROACHES	OPTIONS
	VIII.B. Use low-frequency radio broadcasts as an informative and interpretive media	B.1. On park entrance road 2. On bus minitrains on chapin and Wetherill Mesas
	VIII.C. Provide orientation/information services outside the park	C.1. Provide special road maps to travel agencies and key travel center 2. Develop a regional orientation/information system to provide visitors with trip-planning information 3. Develop a regional information sign system
	VIII.D. Increase number and variety of tour guidebooks, informational leaflets, films, slide shows, etc.	
IX. Increase and improve interpretive and other visitor-activity services commensurate with park capacities, use trends, visitor needs, and enabling legislation	IX.A. Upgrade wayside exhibits, museum facilities, interpretive trails, publications, and other interpretive elements	A.1. Wetherill Mesa 2. Chapin Mesa 3. Far View 4. Morfield Canyon
	IX.B. Develop meaningful natural history interpretive facilities and programs relating to the Anasazi	B.1. Nature trails 2. Natural history exhibits a. Park Point b. Museum (Chapin Mesa) c. Park entrance facility d. Overlooks - park entrance and Wetherill Mesa roads 3. Publications

OBJECTIVES	APPROACHES	OPTIONS
	IX.C.	
Make more archeological sites and other remains available for public viewing and interpretation		C.1. Open farm terraces and water control devices at Far View 2. Open other cliff dwellings: a. Cedar Tree Tower b. Spring House c. Swallow's Nest d. Square Tower 3. Open Yucca House to the public 4. Open more of Hovenweep (Goodman Point) to the public 5. Use closed-circuit TV, films, etc. for inaccessible sites
	IX.D.	
Create a greater awareness and appreciation for the science of archeology and its methods		D.1. Onsite interpretation of archeological excavations and ruins stabilization 2. Museum exhibits 3. Audiovisual presentations
	IX.E.	
Interpret the geological history of the north escarpment and Mesa Verde		E.1. Park entrance road 2. Lower tram terminal 3. Park entrance facility 4. Park Point 5. Wetherill Mesa road 6. Publications
	IX.F.	
Develop an awareness in visitors of of what life might have been like for people of the Anasazi culture		F.1. Implement Anasazi craft and life-style demonstrations, including visitor participation a. Far View b. Cliff dwellings (various) c. Surface ruins on the mesa end loops 2. Provide audiovisual program at the park entrance facility about Mesa Verde and the Anasazi 3. Provide publications

OBJECTIVES	APPROACHES	OPTIONS
	IX.G.	
	Determine the number of visitors that can be accommodated by the park's resources and enforce this capacity by regulating activities so as not to diminish the quality of the visitor experience	G.1. Determine tour sizes based on physical and psychological capacities 2. Require advance surface ruin and cliff dwelling reservations during the peak season 3. Establish a communications system to the concessioner facilities
	IX.H.	
	Extend visitor-use periods in various areas	H.1. Extend museum and tour schedules over a longer season 2. Develop evening interpretive programs a. Museum b. Far View c. Park entrance d. Chapin Mesa 3. Publicize the park's availability during spring and fall 4. Develop a program, and actively cooperate with local school districts in environmental education programs, particularly during the winter months 5. Develop a sound and light program at Spruce Tree
	IX.I.	
	Develop a comprehensive interpretive program with the major concept of "interaction" - a basic park experience will involve an association with a mesa and/or cliff dwelling ruin, and an appreciation or feeling for life at Mesa Verde during prehistoric times	I.1. Portray the cultural, social, economic, and architectural development of Mesa Verde's prehistoric inhabitants a. Far View b. Chapin Mesa c. Wetherill Mesa d. Park entrance facility

OBJECTIVES	APPROACHES	OPTIONS
		I.2. Relate, whenever feasible, prehistoric peoples' interaction with their environment, striving for a visitor appreciation of what it was like to live at Mesa Verde during prehistoric times
		3. Design an interpretive program around a variety of preselected ruins sites that visitors will have the opportunity to view and/or visit to satisfy a basic park experience
		4. Provide a high quality interpretive experience using the cliff dwelling guided tour, recognizing that the quality of the visitor experience is a vital part of the park's carrying capacity
	IX.J. Provide special interpretive programs and activities for school children, the handicapped, and special interest groups	J.1. Develop braille trails
		2. Develop achievement and crosscountry trails
		3. Present cultural demonstrations
		4. Develop photography and viewing blinds
		5. Offer special tours of Mesa Verde archeological collections
	IX.K. Encourage a strong cooperating association publication program to assist the interpretive and educational goals of the park	

VISITOR USE AND INTERPRETATION

The Park Story

The story of the San Juan Anasazi interacting with their environment at Mesa Verde is complex and encompasses over 700 years, during which modification and change were generated both from within the group and from outside.

Cultural periods from Modified Basketmaker to Classic Pueblo are known at Mesa Verde. The challenge is to present the total cultural progression of the prehistoric Pueblo people -- their origin and the development and abandonment of Mesa Verde -- while preserving a sense of the mystique and lifestyle of its inhabitants. Such a story also involves the economic, social, and architectural contributions of the inhabitants.

Another aspect involves the outgrowth of interest generated by discoveries of prehistoric ruins in the Southwest. Through archeological techniques, the architecture and artifacts of the Pueblo people have been preserved, studied, and interpreted for the enjoyment of park visitors. However, many questions remain.

The natural history of Mesa Verde and its relationship to the Anasazi cultural development should not be overlooked.

The geology, geography, vegetation, climate, and wildlife strongly influenced the Ancient Ones. Prehistoric man interacted with the environment by means of relatively simple technology; Pueblo religious and ceremonial traditions have for centuries been oriented toward agricultural and environmental considerations.

Modern Pueblo Indians are intimately concerned with the balance of nature in their universe. Fertile fields, sun, abundant rain, the regular progression of the seasons -- all necessary for successful crop maturation -- are literally vital to these farming people. Their involvement is expressed in reverence for the powers that dwell in nature and in invocations for their help.

On the Mesa Verde, the Anasazi were apparently successful in their adaption to the environment until earth forces were no longer adequate for their needs. One can only speculate about the technical and religious reasons for abandonment of the Mesa Verde, but environmental pressures -- especially prolonged drought -- were major factors. In probing such unknowns, modern man wonders if there is not a parallel to his own environmental problems. The technology and setting are different, but the pattern similar. There is an awareness to be gained from the events of nearly 700 years ago, when the Anasazi faced an energy crisis perhaps as threatening as our own.

The quality of the visitor experience at Mesa Verde relies on effective interpretation perhaps more than at any other national park. Don Watson, former chief archeologist at the park, described this need succinctly -- "Unfortunate indeed, is he who views this ancient city and sees only the towering walls. Unfortunate because the stones are the least important part. Cliff Palace is really built of the hopes and desires, the joys and sorrows of an industrious people. It is not a cold empty city, for it is still warm with the emotion of its builders." It could appear cold and empty, though, unless the visitor can be carried in spirit seven centuries into the past.

The best way he can attain this mood is to spend a generous amount of time in the ruins by himself or with a knowledgeable person in a quiet, uncrowded atmosphere -- to listen to stories of the people in concert with the wind, the ravens, or the sound of rain; to feel the warmth of the sun and the fear and cold of the night. This is not easy to accomplish in a span of 4 hours, much of which is spent on the road in a private vehicle. A guided tour, supplemented by a walk through a fine old museum, comprises the experience of many visitors. This may be adequate for some visitors,

but other options should at least be available, such as a purely simulated experience for large groups or a special real adventure for a few.

The fragile nature of the dwellings has obviated former opportunities that permitted in-depth personal exploration. With the increase in visitation, the denial of such experiences to the visitor has resulted in a more shallow exposure to the resources -- with a corresponding loss of feeling for them. It is difficult to provide quality interpretation while conducting an overcrowded tour. The inability to accommodate all comers has brought about consideration of a closely supervised, self-guiding tour system.

It must be recognized that there are other solutions to overcrowding such as increasing the operating season, extending the visitor day, scheduling more tours, and/or developing night programs.

Methods of immersing the visitor in a cliff dwelling existence, without destroying the structures themselves, must also be sought. The use of short-range radio transmitters that would transmit audio visual programs and devices, and demonstrations of Anasazi technology are some methods that could be explored. The continued popularity of the

dioramas in the existing museum demonstrates the visitor's desire to seek a real empathy with the Ancient Ones.

The unifying interpretive concept that will guide all subsequent interpretive themes at Mesa Verde is that of "interaction." A basic park experience will involve an association with a mesa and/or cliff dwelling ruin, and an appreciation or feeling for life at Mesa Verde during prehistoric times. Visitors will also have the opportunity through a variety of interpretive media to perceive the fascinating aspects associated with each phase of the Anasazi cultural development at Mesa Verde. This approach, however, must be responsive to seasonal variations in park visitation.

In order to fulfill the park experience, the following four interpretive objectives must be accomplished:

Portray the cultural, social, economic, and architectural development of Mesa Verde's prehistoric inhabitants.

Relate, whenever feasible, prehistoric peoples' interaction with their environment, striving for a visitor appreciation of what it was like to live at Mesa Verde during prehistoric times.

Design and interpretive program around a variety of preselected ruins sites that visitors will have the opportunity to view and/or visit to satisfy a basic park experience.

Provide a high quality interpretive experience using the cliff dwelling guided tour, recognizing that the quality of the visitor experience is a vital part of the park's carrying capacity.

Interpretive concepts and visitor use at Mesa Verde are influenced by previous planning documents that have identified increasing visitor congestion as a major problem since the 1950s. Therefore, two alternatives were considered in previous plans:

Either limit access by restricting visitor numbers or close the irreplaceable ruins at Chapin Mesa.

Disperse park visitation by excavating and developing new ruins sites, specifically, Wetherill Mesa.

The latter plan was pursued.

In the fall of 1973, after a successful opening of Wetherill Mesa, it was discovered that some visitors were

extending their length of stay by visiting both mesas. It is too early to assess the implications or potential impact of this discovery. As long as Chapin Mesa has significantly different resources not duplicated at Wetherill Mesa, such as Cliff Palace and the museum, the desire will be strong among a large percentage of the visitors to visit both mesas.

The objective of this plan is to accommodate this desire to visit both mesas whenever visitation is low enough to permit it. During the peak visitor season there may come a day when this will no longer be possible, and regulatory options would then be initiated. Visitors could see Chapin or Wetherill, but not both in one day. Eventually, the restrictions of such a system could encourage a great spring and fall distribution of visitation.

In the following section an attempt has been made to consider the alternatives that relate to visitor use and interpretive facilities and programs. Impacts marked with an asterisk (*) involve adverse effects that cannot be avoided should the proposal be implemented.

Alternative 1

The no action alternative does not imply status quo. The park would continue to develop its resources under the

present development concept plan, which includes the completion of the development of administrative and visitor facilities on Wetherill Mesa. The administration would retain the flexibility to redirect interpretive, protection, and maintenance programs in order to alter visitor-use patterns, utilizing existing, remodeled, or presently programmed visitor-use facilities. Staffing and funding would continue to increase commensurate with park use. However, other than existing development programs, the resources would not be altered by any further major development.

Impacts:

. Existing development would remain within a prime archeological resource area at Spruce Tree.

* Visitor congestion could result from the lack of information and orientation at an entrance facility and from the limited facilities that support visitor use, if yearly visitation increases.

* The distance between the local communities and park facilities and programs would continue to be a limiting factor if the visitor has less than 4 hours to spend in the park.

. Costs for maintaining and operating the old structures, utilities, roads, and trails would continue to accelerate.

- All known human impacts would continue.
- Funding and staffing would continue to fluctuate.
- Congestion would continue in the popular museum if more than 350 visitors utilize the limited space at one time.
- The buildings on Spruce Tree Point, because of their proximity to the archeological resources, would continue to intrude visually and, through usage, audibly on some visitors.
- Visitors would continue to be poorly prepared for the interpretive sequence and might often be confused because of limited information and orientation.
- Some visitors would want to visit both Chapin and Wetherill Mesas, thus approximately doubling the length of their stays.
- The museum and other facilities on Chapin Mesa would continue to cause visitors to extend their stays in a prime archeological area.
- No further major impacts would affect natural resources because of developing new areas.
- Existing use and development would continue to exert an impact on one of the park's prime wildlife habitats -- that of the bighorn sheep.
- Structures would continue to fall short of modern fire and security standards, increasing the probability of serious fire and/or theft.

* Known irreversible impacts would continue to occur simply because prehistoric ruins are subject to the natural elements.
* Emergency stabilization might be necessary to hold unexcavated, unprotected ruins at status quo.
* Excavated ruins open to the public would continue to require a great deal of stabilization because of the combined impact of human and natural elements.
* The park would continue to operate with insufficient office space to carry out daily park functions at maximum efficiency.

Applying the criteria and effect and adverse effect as required by the Procedures of the Advisory Council on Historic Preservation, it is determined that this alternative will have an effect, but the effect will be not adverse.

Mitigating Measures:

There are no additional mitigating measures for the impacts discussed in this alternative except that visitors feel the historic buildings on Spruce Tree Point are compatible with the ruins.

Alternative 2

This alternative analyzes the development philosophy for visitor use and interpretation if an information/ orientation facility would be located at the park entrance rather than in the Far View area as it currently exists.

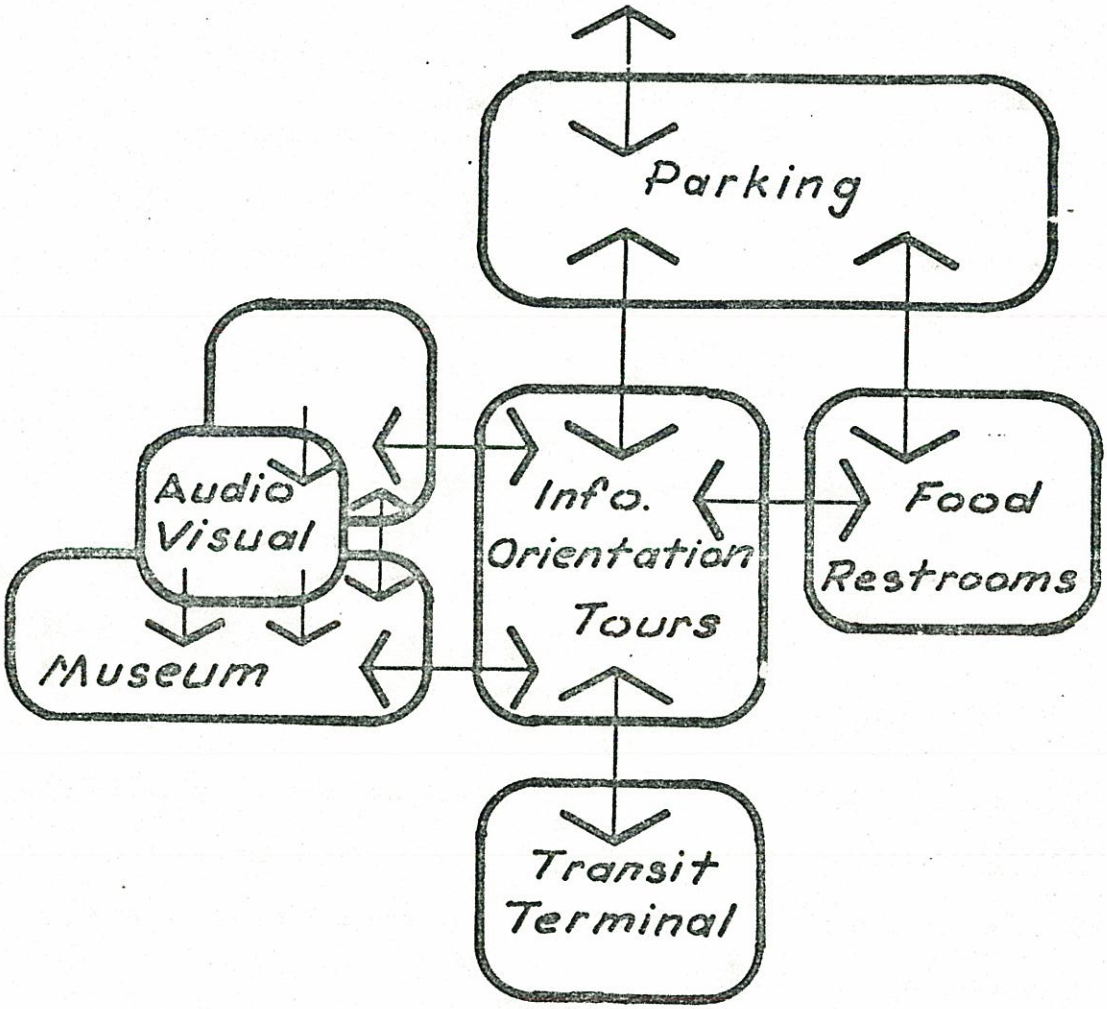
There is a vital need to accomplish the park information/ orientation function adjacent to the park entrance so that visitors may consider time allotments and tour options prior to their involvement with the resources on the physically limited mesa top.

Interpretation's role at the entrance facility would be to prepare park visitors to visualize life during prehistoric times in Mesa Verde. This includes some basic story elements of Mesa Verde inhabitants and regional information relating to prehistoric Pueblo people in nearby sections of the Southwest. A guided-tour reservation system for Mesa Verde during the peak visitation season would be an important aspect of visitor preparation. The siting of a visitor service facility near the park entrance would also be responsive to nearby community interests.

In addition to the above, the proposed visitor facility would house the following interpretive and visitor-use functions:

An orientation center designed to meet the cursory needs of the visitor entering the park.

A central office and an outlet for the cooperating association interpretive publications and service program.


Parking
Audio Visual
Info. Orientation Tours
Food Restrooms
Museum
Transit Terminal

Multipurpose space suitable for audiovisual presentations, guest lectures, evening programs, and exhibits.

Assuming that the preliminary functions would be served at the park entrance, the remainder of the park would become the outdoor museum where onsite interpretation would reinforce and develop the broad concepts presented in the entrance facility.

Chapin Mesa and Wetherill Mesa would become separate nodes that duplicate the general interpretive story and disperse visitors within the park. During peak visitation, the park story would be available at either mesa, obviating the need for visitors to experience both places.

Visitor capacity must be established at Mesa Verde if a quality experience is to be preserved. The cliff dwellings are the critical areas to use as a control measure for visitor capacity. By limiting the size of tours, management would preserve the highest quality interpretive experience. The tour reservation system operating at the park entrance facility on a first come, first served basis would provide park management with a daily sampling tool to assess visitor use on either mesa at any time. Visitors unable to coordinate tours with their schedules could attempt

other options such as a museum tour or visiting the demonstrations of Anasazi technology. The point is that visitors would know their options before involving themselves in the park resource.

The cliff dwelling tour also would serve as the vehicle to direct visitors swiftly to the site where they later become involved with additional elements of the park story. Predefined destinations would allow visitors to make the best use of their time in the park.

Back from the restricted space at the ends of Chapin and Wetherill Mesas, a complementary interpretive resource exists, the Far View /Mummy Lake Ruins. Interpretive development here ould supplement the mesa top cultural and architectural themes developed on each of the mesas. Here at Far View -- the apex of a v-shaped circulation system -- a new dimension of interpretation might be maximized. In order to accomplish this, a 1/2-mile bypass road would be built west of the present road, and the existing section of park entrance road that passes through the archeological area would be obliterated.

With due consideration for the preservation and protection of surface ruins, thought should be given to restoring some of this area to an appearance much like the scene

pictured in park diorama 4. This would not preclude the possibility of constructing examples of the major architecture to serve as interpretive demonstration centers during peak visitation.

Here in the Far View ruins screens of Indian corn, beans, and squash could be planted as they were when the Anasazi occupied the Mesa Verde. Perhaps even turkeys, the Anasazi primary domesticated animal, could be interspersed within the ruins area. Visitors would gain greater insight into the daily routine of prehistoric peoples as demonstrators coiled pottery, ground corn, repaired roofs and masonry, chopped wood with a stone ax, used an atlatl, or worked with a crude digging stick. Visitors would be invited to try these activities, best stressed at Far View, but not necessarily limited to that area.

Visitors returning from their initial involvement at Chapin or Wetherill Mesas would be served by the Far View site if they had additional time and interest. At times of peak visitation, the Far View experience could serve as an overflow area for those waiting to catch later conducted tours through the cliff dwellings. A self-guided cliff dwelling tour would also be made available at each mesa to serve visitors unable to join conducted tours.

Other areas, such as Park Point, would have interpretive themes that focus on the natural history and geology of the Mesa Verde. If management considers that a basic park experience should involve association with the mesa top and cliff dwelling ruins, and an appreciation of life on Mesa Verde during prehistoric times, the preceding proposals would meet all requirements regardless of proposed transportation systems.

It is also presumed that visitors would have the opportunity, through a variety of interpretive media, to develop the fascinating aspects associated with each phase of the Anasazi cultural development on the mesa. This approach must also be responsive to seasonal variations in park visitation.

The need to construct extensive interpretive facilities at Wetherill Mesa and to remodel the existing museum at Chapin would become less important if the entrance facility were developed. Cultural exhibits including artifacts should be displayed within the entrance facility. Limited exhibitry (replica artifacts) should be considered in the cliff dwellings and select ruins.

A final thought regarding the Far View Ruins demonstration area -- the popularity of such approaches has elsewhere proven the need to apparently over-estimate numbers of visitors who might wish to visit the site. Planning for capacity and for transportation systems should take this into account.

Based on the premise that park support functions and an orientation/information facility would be best located at or near the park entrance, whether in the present location or not, the following concept is what such a facility might include and the way different visitor functions should interact.

There are two alternate locations for the major interpretive facility. In alternative 2a it would be situated between Cortez and Mancos, and in 2b it would be associated with the Ute Indian Park. The following is a list of impacts that affect both locations. Later in the text, only those impacts that affect the facility at one particular location will be discussed.

Impacts: These impacts relate to both 2a and 2b.

* Construction activities and resulting buildings would create a major impact on the vegetation, land form, and wildlife of perhaps 50 acres of undeveloped land.

- Existing functions that occur within the prime archeological resource area at Spruce Tree Point would be modified.
- The orientation/information facility could cause congestion at the entrance area during peak visitation, but should reduce traffic and visitor congestion at Navajo Hill and Chapin Mesa. It could significantly reduce congestion and confusion caused by lack of information and orientation.
- Short-term construction costs would be maximized; long-term resource and maintenance costs would be minimized for the entrance facility.
- Maintenance and operational costs would continue to escalate for the remaining buildings on the mesa.
- Additional staffing would be required.
- Use might be dispersed and environmental damage reduced in fragile archeological areas if visitors are fully informed of available opportunities.
- An entrance facility would provide pertinent information to help visitors locate activities in which they are interested.
- An information/orientation entrance facility would provide a general understanding of the Mesa Verde Anasazi to those visitors who can't visit the park interior.

- Such a facility could stimulate commercial development by providing orientation and information about other cultural, natural, and recreational resources in the region.
- Information disseminated at the entrance to the park would help visitors spend their time within the region more efficiently.

Applying the Criteria of Effect and Adverse Effect as required by the Procedures of the Advisory Council on Historic Preservation, it is determined that this alternative will have an effect and that the effect may be adverse. The effect will be adverse if the historic buildings at Chapin Mesa are significantly altered or demolished; if there is no change in the buildings, the effect will not be adverse. Thus, the adverse effect depends upon which alternatives are chosen relating to visitor use.

Mitigating Measures:

- If existing development was removed, the site would be scarified and revegetated with native species.

- Other archeological areas in the Four Corners region would be promoted as archeological resources offering different visitor experiences, thus dispersing visitation from Mesa Verde.
- The facilities would be designed to minimize impacts and intrusiveness on the landscape and natural resources. Compliance with National Park Service and the Advisory Council of Historic Preservation procedures would be completed before designs and working drawings are finalized.
- A sound land use plan for the Cortez/Mancos area would be developed in cooperation with county and local organizations.

Alternative 2a

This alternative would locate the information/orientation facility at the park entrance somewhere between Cortez and Mancos. The only direct connections other than the entry road for visitors at Mesa Verde National Park would be horse and foot trails.

Impacts: Only those impacts that are associated with 2a and that are not in any way common with 2b are discussed in this section.

- A facility situated between Cortez and Mancos would maximize the potential for closer park/community ties; visitors would not have to pay an entrance fee nor travel 20 additional miles to use the park's interpretive facilities and programs.
- There will be no further impact on the environment from highway construction because the existing highway interchange provides an excellent approach to Mesa Verde National Park.
- The need for housing at the park entrance or in nearby communities would increase.

Alternative 2b

This alternative would provide a joint headquarters/interpretive facility in the Ute Indian park with the primary entrance to Mesa Verde National Park from the south through the Ute Indian park.

Visitors would have to use three public transportation systems to get to Chapin Mesa and three or four systems to get to Wetherill Mesa. The visitors would leave their cars near Chimney Rock and take a bus about 16 miles to a tram at Kiva Point, then use a second bus system to go to Chapin Mesa or Wetherill Mesa from Chapin Mesa requires a second tram or an additional 34-mile round trip bus ride.

Impacts: Only those impacts that are associated with 2b and that are not in any way related to 2a are discussed in this section.

. An information/orientation facility situated in the Ute Indian Park to the south would maximize the financial opportunity to be realized from tourism for the Indians, but it could cause financial hardship for some visitors with additional fees charged by the Utes.

* Cortez would probably be bypassed by a significant portion of tourists traveling east and west, should a through road be developed in the Ute Indian park.

- The economic gains arrived at through tourism in Cortez might be affected if existing visitor traffic patterns are changed to a primary southern entrance.
- Climatic extremes in Mancos Canyon during the summer could exert severe physical strains on some visitors.
- Nearby communities and winter tourists could become involved in off season programs and activities at the park entrance facility without having to negotiate the winter road to reach the major park museum; however, travel distance and time from Durango would be greatly increased.

Time and inconvenience involved with access to the park would detract from the total park experience.

Alternative 3

A major area of specific concern is the Chapin Museum and the other structures in the Spruce Tree area. The following discussion analyzes the visitor use concepts that would be considered if Alternative 2a is developed. The no action alternative is not discussed because it is covered under Alternative 1 -- no action for the entire park.

Alternative 3a

The present Chapin Museum and ranger station would be converted to an orientation facility with site specific exhibits dealing with representative cultural material such as might have been found at Spruce Tree House. The Spruce Tree Ruins would also become the center of evening programs.

A secondary interpretive theme would be the contribution of Jesse Nusbaum when he carried the park theme (Pueblo motifs) into the Chapin Mesa architecture. This sensitivity for the area and concern for manmade intrusions certainly represents a significant insight into early park developments and their relationship to the natural and cultural environments.

Under this alternative the superintendent's house would be determined as excess and, after proper Federal proceedings, eliminated from the mesa. It must be noted that these buildings on Spruce Tree Point are older than 50 years and have been nominated to the National Register of Historic Places; therefore they must be treated as historical structures. Any alteration would require compliance with historic preservation laws and policies.

Impacts:

- There would be some alteration of interior space and use of historic buildings.

. Additional themes would be added to the singular theme of archeological interpretation on Chapin Mesa.

. Conversion of the museum to an orientation facility would parallel the function of the original building.

. This alternative would not recognize the historic value of the post office, administrative building and the superintendent's residence, nor utilize these three structurally sound buildings for a specific park use.

. One building (Superintendent's house) would be removed to eliminate a visual intrusion on the Spruce Tree House remains.

* The superintendent's house, which is classified as a historic building would be removed from a prime archeological area.

Applying the Criteria of Effect and Adverse Effect as required by the Procedures of the Advisory Council on Historic Preservation, it is determined that this alternative will have an effect and that the effect will be adverse because of the proposed demolition of the Superintendent's residence.

Mitigating Measures:

. The building sites would be revegetated and topographic diversity reestablished.

- Architectural studies, including measured drawings would be completed for any building to be removed from the mesa.
- Materials would be salvaged for use elsewhere.
- Visual intrusion of remaining historic buildings on the setting of Spruce Tree House could be mitigated by the additional planting of screening junipers.
- Interior alterations would be accomplished in accordance with historic preservation law and National Park Service preservation policies.

Alternative 3b

All the structures at Spruce Tree Point would, after proper Federal proceedings, be eliminated from the mesa.

Impacts:

- This alternative would not recognize the historic value of many of these structures nor utilize structurally sound buildings for some specific park use.
- The Spruce Tree Point area would be returned to a natural, prehistoric setting, thus allowing the visitor to experience Spruce Tree House without manmade intrusions upon the scene.

- Historic manmade facilities would be removed from a prime archeological area.

Applying the Criteria of Effect and Adverse Effect as required by the Procedures of the Advisory Council on Historic Preservation, it is determined that this alternative will have an effect and that the effect will be adverse because of the demolition of the historic buildings.

Mitigating Measures:

- The building sites would be revegetated and topographical diversity reestablished.
- Architectural studies, including measured drawings would be completed for any building to be removed from the mesa.
- Materials would be salvaged for use elsewhere, perhaps at the entrance facility.

Alternative 3c

Under this alternative no historic buildings in the Spruce Tree Point area would be demolished, but their uses would be changed in some cases from what they are under the no action alternative.

A major problem is the periodic heavy visitor traffic in the museum during months of high visitor use. To relieve this pressure, Alternative 3c would convert the present ranger station into a natural history museum to interpret the flora, fauna, and geology of Mesa Verde, thus siphoning off that group of visitors more interested in the natural environment.

The post office would be converted to public restrooms, its original function.

The superintendent's home would be converted into offices for the personnel displaced from the ranger station, making this building more accessible to the general public.

No changes are proposed under this alternative for the remainder of the structures.

The Architectural and Historical Study prepared by the National Park Service for the Spruce Tree area recommended this alternative.

Impacts:

- There would be some interior alteration of historic buildings to adapt them to new uses.
- Additional themes would be added to the singular theme of archeological interpretation on Chapin Mesa.
- Preservation of the historic buildings would be aided by keeping them in use.
- Visual intrusion of contemporary manmade structures on the prehistoric setting, as viewed from Spruce Tree House, would be perpetuated.
- The visitor's length of stay at Spruce Tree Point would probably increase.

Applying the Criteria of Effect and Adverse Effect as required by the Procedures of the Advisory Council on Historic Preservation, it is determined that this alternative will have an effect but the effect will not be adverse.

ACCESS AND CIRCULATION

During the summer months, when over 70% of the park visitation occurs, traffic congestion is a problem at several locations within the park. Although the average visit consumes only 4 hours, delays of up to an hour sometimes occur at peak visitation periods. The 20-mile narrow and winding entrance road distracts many visitors, as well as prolongs the time it takes to reach the ruins. Continued use of the entrance road for visitors and/or maintenance will necessitate extensive and expensive alterations of the cut and fill slopes, removal of water from the Point Lookout slide area, and reconstruction of 8.55 miles of road to attain a level of stability. The 1974 proposal of the Federal Highway Administration estimates that this will cost $1,750,000. The existing road will be needed for maintenance use regardless of which of the following alternatives is chosen. Traveling to the park's prime resources involves the consumption of approximately 3 gallons of fuel in a time when gasoline and other forms of fuel are at a premium. Heavy traffic on the roads and in the parking areas that serve the various ruins is also a problem, partly because visitors tour all the most popular features of the park such as the museum, Cliff Palace, and Balcony House. Well-organized ticketing and scheduling schemes have helped, but the problem still exists.

The location of the park's major resources and the length of time the visitors spend at certain key areas such as the Chapin Mesa Museum have caused a great deal of space to be allocated for roads and parking. These roads and parking areas have created an environmental impact on the resource and along with the automobile have infringed upon the park's visual integrity and, consequently, the visitor experience. In addition to those impacts, the automobile has added further air and noise pollution to the mesa environment.

A transportation system accommodates internal circulation at Wetherill Mesa. The existing master plan suggests that "further studies might be undertaken to use a similar operation on Chapin Mesa." It is felt that the right time for such studies is now, and the persistent question as to how the automobile fits into the overall plan for visitor use at Mesa Verde should be finally answered.

The congestion problem, considered with the need to create a special mood for optimum appreciation of the park resources, renders the potential for alternate modes of transportation in this park a compelling challenge. The following seven alternatives are an attempt to meet that challenge based on current knowledge in transportation systems. Impacts marked with an asterisk (*) involve adverse effects that cannot be avoided should the proposal be implemented.

The chart titled Access and Circulation costs is a summary of the costs necessary to implement each of the seven alternatives discussed in this section. The second chart, Visitor Cost and Travel Time is a listing of the costs and time needed to experience Mesa Verde.

ACCESS AND CIRCULATION COSTS

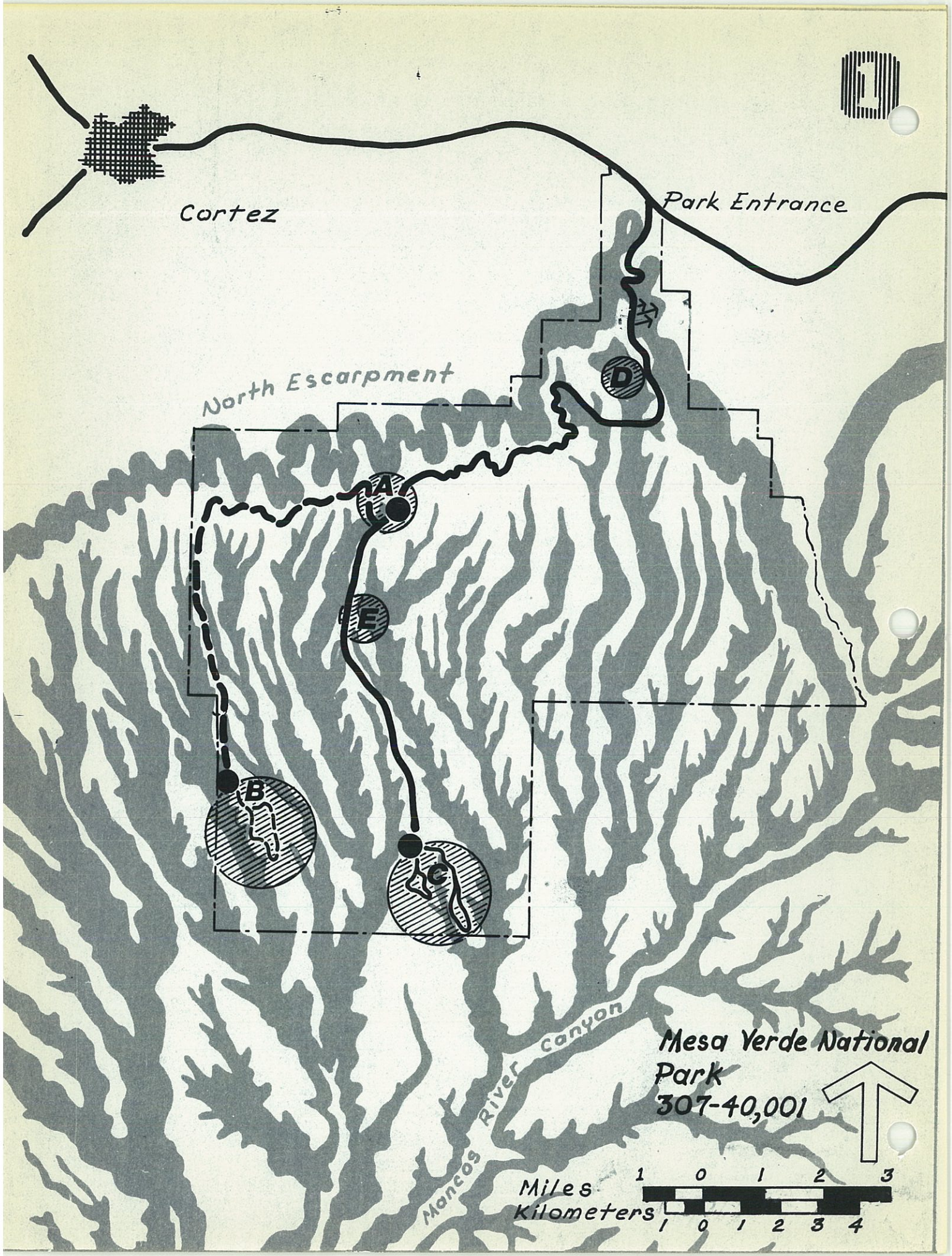
ALT.	TOTAL COST	EXISTING PARK ENTRANCE ROAD	ADDITIONAL PARKING ($700/CAR)	INTER-PRETIVE FACILITY	TRAM AND REQUIRED ENTRANCE ROAD	BUSES (45,000/ Bus)	MINI-BUSES (60,000/ Bus)	ADDITION LAND REQUIRED	UPGRADE WETHERILL ROAD	VISITOR COST (Interpretive facility &tour tc either Chapin or Wetherill Mesa)
1	6,245,000	1,750,000	245,000 (350 cars)	-	-	540,000 (12 buses)	60,000 (1 mini-bus)	-	3,720,000	5.80/car=Chapin 3.30/car +1.85/ person=Wetherill
2	8,275,000	1,750,000	525,000 (750 cars)	2,000,000	-	-	180,000 (3 mini-buses)	50 Acres	3,720,000	5.80/Car
3	8,552,000	1,750,000	542,500 (775 cars)	2,000,000	-	360,000 (8 buses)	180,000 (3 mini-buses)	50 Acres	3,720,000	3.30/Car+.95/ person=Chapin 6.90/Car=Wetherill
4	9,482,300	1,750,000	752,300 (1075 cars)	2,000,000	-	900,000 (20 buses)	180,000 (3 mini-buses)	50 Acres	3,720,000	3.30/car+ 1.30/person
5	10,470,000	1,750,000	890,000 (1200 cars)	2,000,000	-	1,800,000 (40 buses)	180,000 (3 mini-buses)	50 Acres	3,720,000	2.90
6	13,306,000	1,750,000	756,000 (1080 cars)	2,000,000	4,000,000	900,000 (20 buses)	180,000 (3 mini-buses)	50 Acres	3,720,000	2.30
7	16,520,000	1,750,000	1,050,000 (1500 cars)	2,000,000	5,120,000	2,700,000 (60 buses)	180,000 (3 mini-buses)	50 Acres	3,720,000	5.35

Alternative 1

This no action alternative would maintain unlimited private auto access to Far View and Chapin Mesa. The park transit system would continue to operate on Wetherill Mesa. The possibility of a transit loop on Chapin Mesa exists under this system.

Visitor Related Facilities:

Far View	- Far View Visitor Center, gas station, store, food services, lodging, public transportation, additional parking, 300 cars, and tour reservation system.
Wetherill Mesa	- Limited food services, interpretive services, minitrain ruins loop.
Chapin Mesa	- Limited food services, interpretive services, minitrain ruins loop, museum, store, and post office.
Morfield Canyon	- Campground, store, service station, laundry and horse rental.
Far View Ruins	- Interpretive services, additional parking 50 cars.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Mesa Verde National Park
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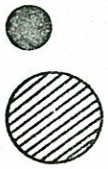
Map Legend:

- Private Vehicle Access
- Park Transit System
- Staging Area
- Activity Zone



Impacts:

- This alternative would not relieve any of the access and circulation problems that now exist -- (noise, air quality, space allocation, fuel consumption, travel time, visual quality, and runoff).

- There would be limited short-term costs to the cultural and natural resources, but the long-range costs would be maximized because the major access and circulation problems will be unresolved.

- There would be no short-term economic costs caused by implementing a transportation system, however, long-range costs could be severe because of the congestion and overcrowding of certain prime resource areas on the mesa.

- The natural settings of the park would receive no further impacts because of new facility development.

- Vegetation destruction and soil disturbance would continue to occur in the developed areas.

* Periods of overcrowding would continue on Chapin Mesa in the Spruce Tree area and at most of the cliff dwellings during the summer months.

Applying the Criteria of Effect and Adverse Effect as required by the Procedures of the Advisory Council on Historic Preservation, it is determined that this alternative will have an effect but the effect will not be adverse.

Mitigating Measures:

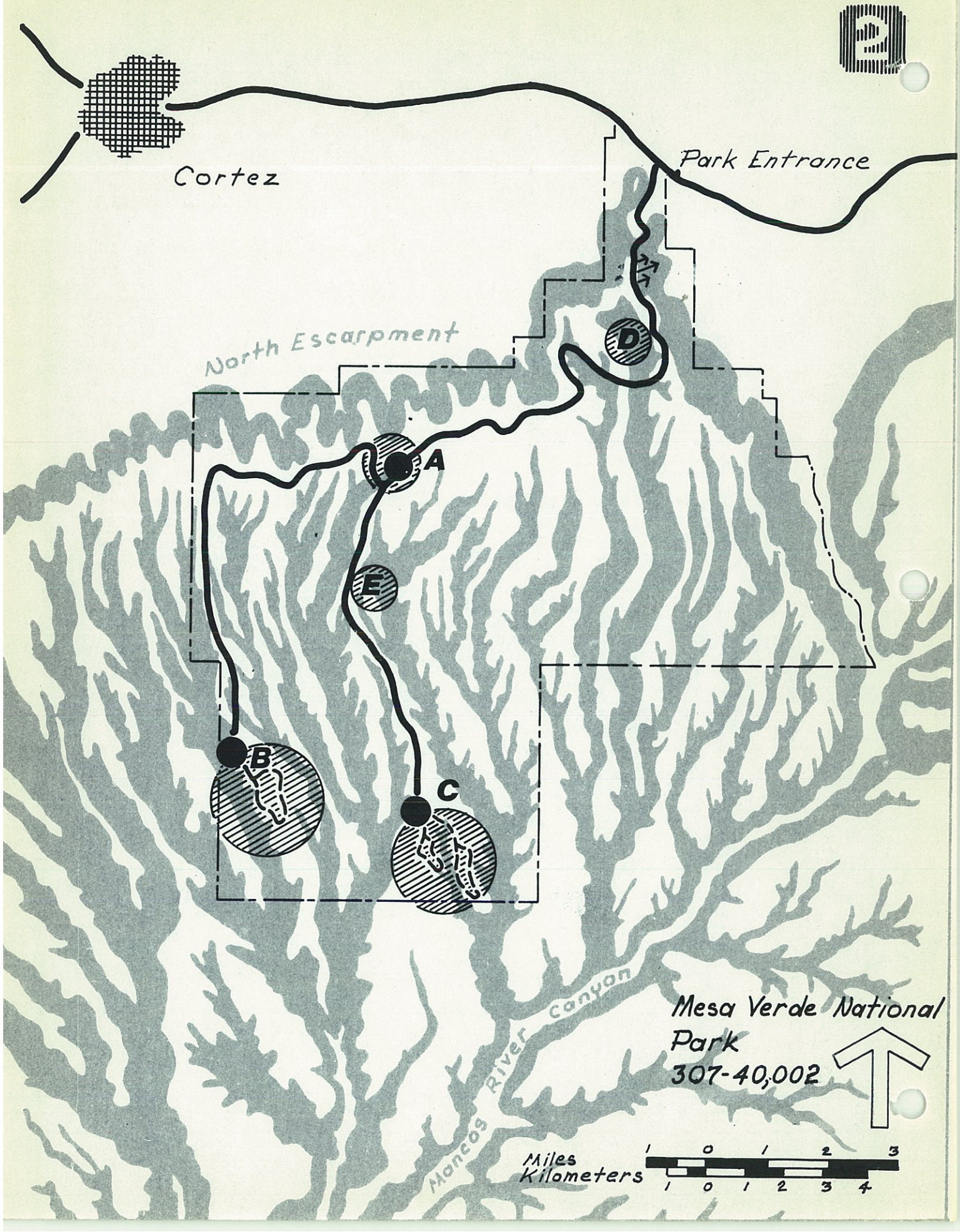
- There are no mitigating measures for the impacts discussed in this no action alternative.

Alternative 2

This alternative proposes private vehicular access to both Chapin and Wetherill Mesas. Only minitrain public transportation would be available at the mesa end loops during peak visitation. During the off season private vehicles would be allowed on the mesa loops. Ultimately parking for approximately 200 cars would be provided on Wetherill Mesa and 350 cars on Chapin Mesa. Parking at Far View would be increased to approximately 50 cars. A new visitor facility would be developed at the park entrance with parking for approximately 350 cars.

Visitor Related Facilities:

Park Entrance - Information/orientation, interpretive services, food services, parking (350 cars), and reservation system.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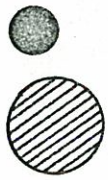
Far View	- Far View Visitor Center (administrative hub and interpretive services), food services, lodging.
Wetherill Mesa	- Limited food services, interpretive services, additional parking, and minitrain ruins loop.
Chapin Mesa	- Limited food services, interpretive services, additional parking, minitrain ruins loops, and museum.
Morfield Canyon	- Campground, store, service station, laundry, and horse rental.
Far View Ruins	- Interpretive (reconstruction demonstration), and additional parking.

Map Legend:

- Private Vehicle Access
- Park Transit System
- Staging Area
- Activity Zone



Impacts:

- There would be minimal disturbance to the vegetation and minimal alteration of landforms because most of the land to be developed has previously been disturbed.

- The new park entrance development would be built on 50 acres of reclaimed farm land.
- The access and circulation problems and congestion on Chapin and Wetherill Mesa loops would be relieved through the transportation system. However, these problems would not be affected in other parts of the park.
- If the trend for increased travel continues, problems associated with the private vehicle (noise, fuel consumption, travel time, parking allocations) would over a period of time all increase on the mesa.
- The public transportation system at the mesa end loops would reduce noise, air pollution, fuel consumption, and vehicular visibility on the mesa loop roads.
- The Wetherill Mesa Road is not properly designed and therefore would be regraded and realigned to accommodate all forms of private vehicular traffic. If this is not done, dangerous conditions for private vehicles would be perpetuated, and maintenance cost would be extremely high.
- This concept would reduce the efficiency of the existing transportation system on Wetherill Mesa and increase the transportation efficiency on Chapin Mesa during the visitor season.

- Fewer vehicles would traverse prime wildlife habitat on Chapin Mesa.
* Maintenance cost of buses for transportation from Navajo Hill to Wetherill would be eliminated.
* The maintenance cost of the minibus system would increase because of the additional systems on Chapin Mesa.
* Realignment, grading, and surfacing the Wetherill Mesa Road would require the removal of additional vegetation. The alteration of topography in cut and fill spots, and might result in a possible increase in soil erosion for a period of time after construction.

Applying the Criteria of Effect and Adverse Effect as required by the Procedures of the Advisory Council on Historic Preservation, it is determined that this alternative will have an effect but the effect will not be adverse.

Mitigating Measures:

- The areas where roads and parking areas are reduced in size or obliterated would be scarified and revegetated with native species.
- The archeological inventory would be reviewed and additional surveys conducted where necessary before any additional roads or parking areas are constructed.
- The new roads and parking areas on top of the mesa would be located on sites that had previously been altered by development.
- The road engineering and stabilization problems associated with the entrance road would have to be corrected ($1,750,000).

- The new automobile-related facilities would be designed to fit into the landscape with a minimum environmental impact.

Alternative 3

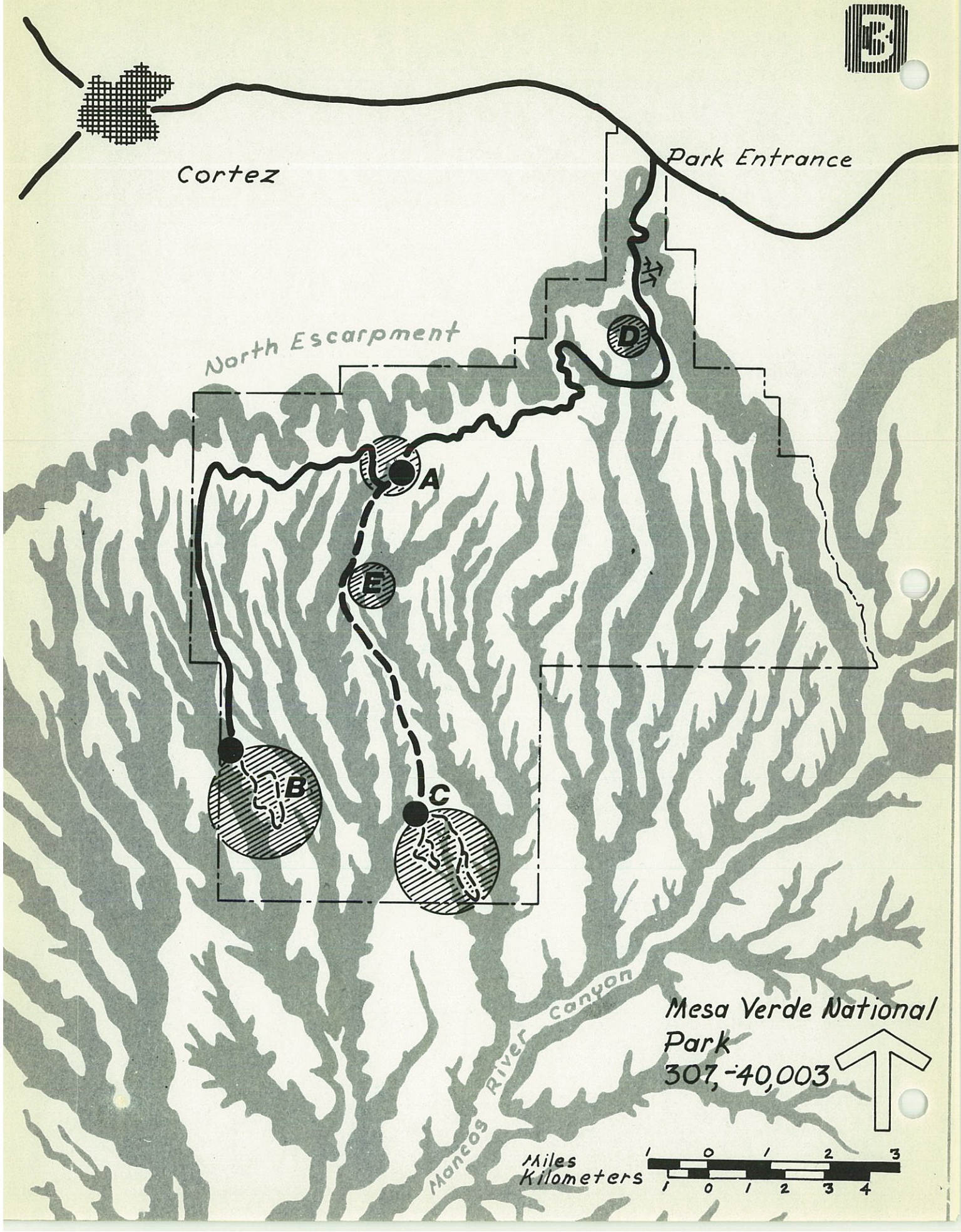
This alternative proposes private vehicle access to Far View and Wetherill Mesas with a public transportation system to Chapin Mesa. During the off season, Wetherill Mesa would be closed and private vehicles would be allowed on Chapin Mesa. The following new parking capacities would be provided for:

Park entrance, 350 cars;
Far View, 425 cars; and

The other parking areas would require only minor adjustments. A new visitor facility would be built at the park entrance.

Visitor Related Facilities:

Park Entrance	- Information/orientation, interpretive services, food services, parking (350 cars), and reservation system.
Far View	- Far View Visitor Center, food services, additional parking, lodging, and public transportation.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Wetherill Mesa - Limited food services, interpretive services, minitrain ruins loop.

Chapin Mesa - Limited food services, interpretive services, minitrain ruins loops, and museum.

Morfield Canyon - Campground, store, service station, laundry and horse rental.

Far View - Interpretive (reconstruction demonstration) and Additional Parking.

Map Legend:

- Private Vehicle Access
- Park Transit System
- Staging Area
- Activity Zone

Impacts:

- The maintenance cost of the public bus transportation system would be lessened because the distance involved to reach the Chapin Mesa minitrain loops is shorter than the distance to the Wetherill minitrain loops.
- The transportation system on Chapin Mesa would be more efficient in travel time, distance traveled, and fuel consumption.

. The maintenance cost of the minibus system would increase because of the additional systems on Chapin Mesa.

. If the trend for increased travel continues, problems associated with the private vehicle (noise, fuel consumption, travel time, parking allocations) would over a period of time all increase on the mesa.

. The public transportation system at the mesa end loops would reduce noise, air pollution, fuel consumption, and vehicular visibility on the mesa loop roads.

. The new park entrance facility would be built on 50 acres of reclaimed farm land.

* This alternative would relieve the access and circulation problems and some of the congestion on Chapin Mesa. However, it will have no effect on the access and circulation problems related to the entrance road.

. Private automobiles on the Wetherill Mesa Road would be a frequent disturbance to wildlife.

Applying the Criteria of Effect and Adverse Effect as required by the Procedures of the Advisory Council on Historic Preservation, it is determined that this alternative will have an effect but the effect will not be adverse.

Mitigating Measures:

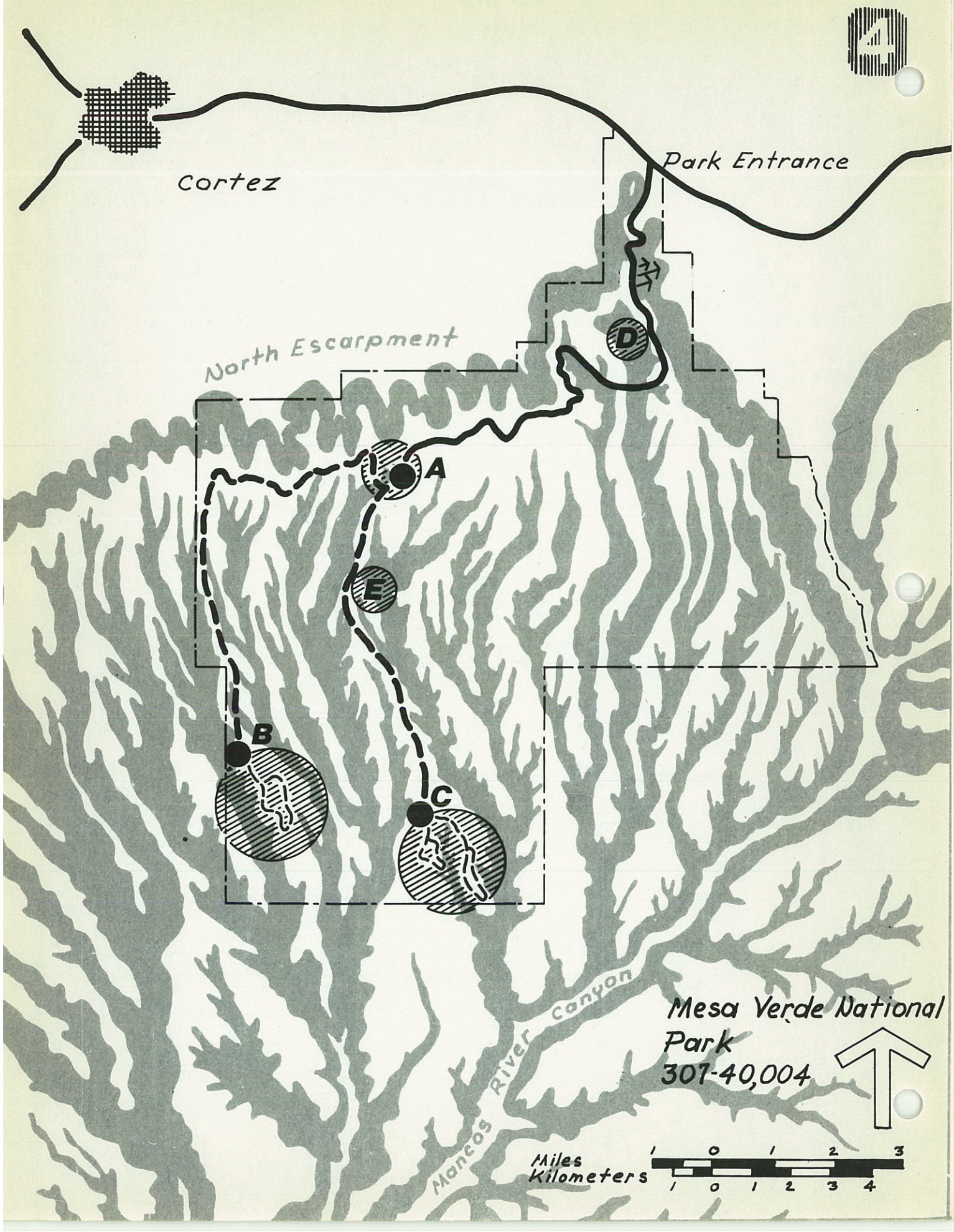
- The areas on Chapin Mesa where roads and parking areas are reduced in size or obliterated would be scarified and revegetated with native species.
- The archeological inventory would be reviewed and additional surveys completed if needed before any additional roads or parking areas are constructed.
- The road engineering and stabilization problems associated with the entrance road would have to be corrected ($1,750,000).
- The new automobile-related facilities would be designed to fit into the landscape with a minimum environmental impact.

Alternative 4

This concept would continue private auto access to Far View, but from there would institute a transportation system to both Chapin and Wetherill Mesas. During the off season Wetherill Mesa will be closed, and private vehicles will be allowed on Chapin Mesa. The following parking capacities will be provided: park entrance, 350 cars; and Far View, 725 cars. The Parking areas on Chapin Mesa would require minor adjustments, and the ones on Wetherill could be eliminated.

Visitor Related Facilities:

Park Entrance - Information/orientation, interpretive services, food services, parking (350 cars), and reservation system.



Mesa Verde National Park
307-40,004

Far View - Far View Visitor Center, food services, additional parking, lodging and public transportation.

Wetherill Mesa - Limited food services, interpretive area, minitrain ruins loop.

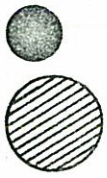
Chapin Mesa - Limited food services, interpretive area, minitrain ruins loops, and museum.

Morfield Canyon - Campground, store, service station, laundry, and horse rental.

Far View Ruins - Interpretive (reconstruction demonstration), and additional parking.

Map Legend:

- Private Vehicle Access
- Park Transit System
- Staging Area
- Activity Zone



Impacts:

- This system would probably improve the visitor experience by relieving congestion in the tour area, and remove the auto-associated problems from the

primary resource areas on Chapin and Wetherill Mesas during the heavier visitation season.

. If the trend for increased travel continues, problems associated with the private vehicle (noise, air pollution, fuel consumption, travel time, parking allocations) would over a period of time all increase on the entrance road and at Far View.

. Parking on Chapin and Wetherill Mesas would be reduced, resulting in less visual impact on the prime archeological resources.

. Much of the automobile-related development situated in a prime archeological resource area on Chapin Mesa would be eliminated. Some parking must remain for off season use.

* Fifteen acres would be required for parking at Far View. The parking function would disturb the vegetation and alter the landscape in the Far View area. Because of the land form in this area, additional facilities would probably be visible for quite some distance.

* This alternative could only relieve those access and circulation problems associated with Chapin and

Wetherill Mesas. The other automobile-related problems in the park would not be affected.

. There would be a decrease in the visual quality of Far View from resource areas such as Far View Ruins.

* The new park entrance facility would be built on 50 acres of reclaimed farm land. This would result in disturbance to the vegetation on the site, alteration of topography, redirecting runoff patterns, and some disturbance and destruction of wildlife habitat.

Applying the Criteria of Effect and Adverse Effect as required by the Procedures of the Advisory Council on Historic Preservation, it is determined that this alternative will have an effect but the effect will not be adverse.

Mitigating Measures:

- If the area north of Far View, Upper Navajo Canyon, is used, the facilities would be less visible from other park areas.
- The areas on Chapin Mesa where roads and parking areas are reduced in size or obliterated would be scarified and revegetated with native species.
- The archeological inventory would be reviewed and additional surveys completed if needed before any additional roads or parking areas are constructed.
- These new automobile-related facilities would be designed to fit into the landscape with a minimum environmental impact. (Perhaps a parking garage could be utilized to reduce the horizontal size of the parking area.)

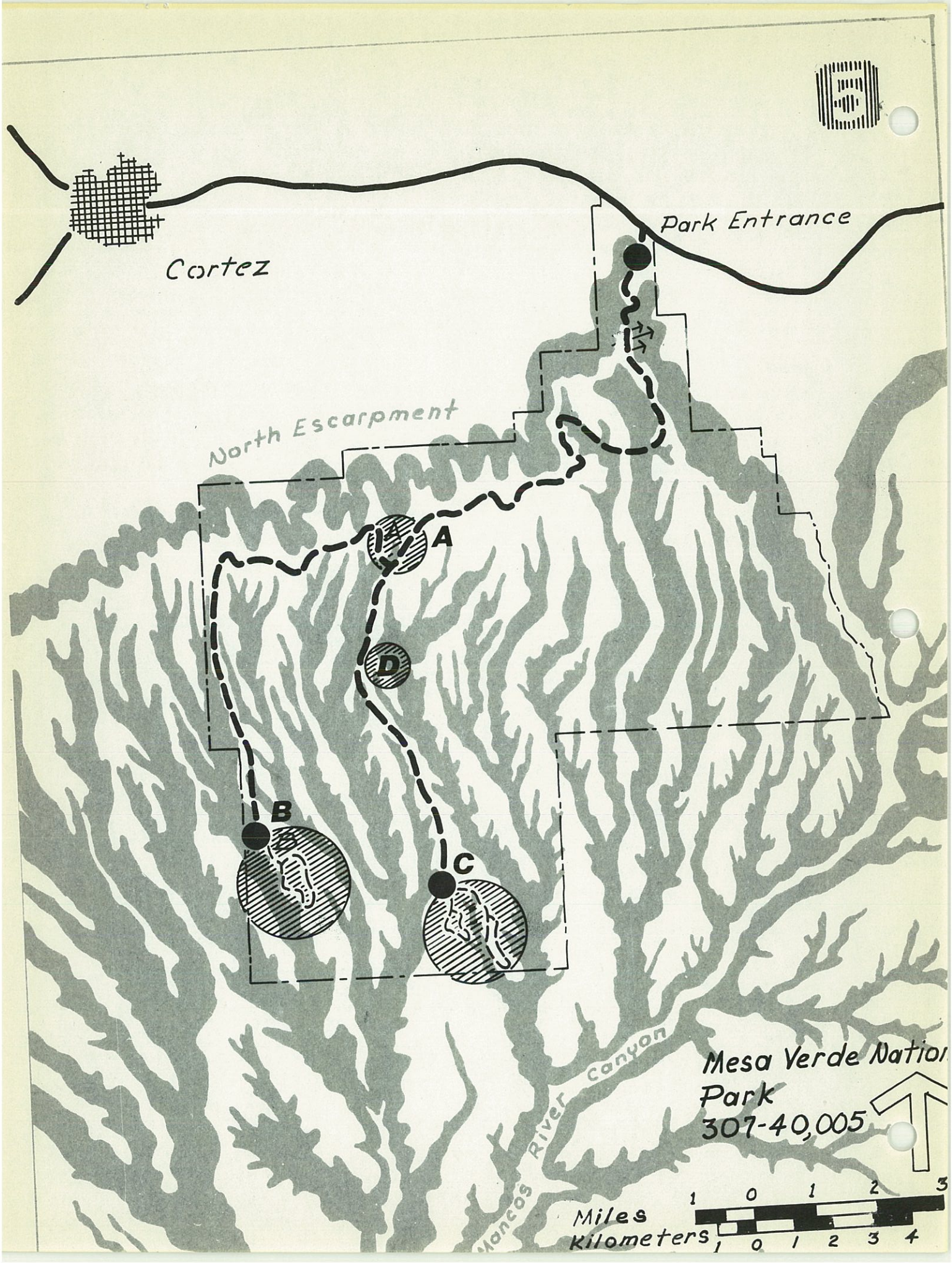
- The road engineering and stabilization problems associated with the entrance road would have to be corrected ($1,750,000).
- Parking areas near prehistoric ruins will be designed so as to adequately mitigate any adverse visual intrusion through design and appropriate plantings.

Alternative 5

Here a public transportation system would begin at the existing park entrance. During the off season Wetherill Mesa will be closed, and private vehicles will be allowed on Chapin Mesa. This alternative could have several phases of development utilizing Far View and Morfield developed sites. A new visitor facility would be developed at the existing park entrance. An 1,200 car parking area will have to be constructed at the park entrance.

Visitor Related Facilities:

Park Entrance - Information/orientation, major interpretive facility, food services, reservation system, 1,200 car parking area, and public transportation.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Far View - Far View Visitor Center (administrative hub, library, and interpretive services), food services, and lodging.

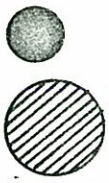
Wetherill Mesa - Limited food services, interpretive services, minitrain ruins loops, and museum.

Morfield Canyon - Campground, store, laundry, and horse rental.

Far View Ruins - Interpretive (reconstruction demonstration).

Map Legend:

- Private Vehicle Access
- Park Transit System
- Staging Area
- Activity Zone



Impacts:

- By coordinating resource capacity with a transportation system capacity and scheduling, the congestion, confusion, and visitor impact problems in the park would probably be greatly reduced.
- The space allocated to parking on the mesa would be greatly reduced.

- Road maintenance would continue to be a major expense. Buses could increase the road deterioration and cause higher yearly maintenance costs.
- The construction of an interpretive facility and parking area would exert an impact on 50 acres of reclaimed farm land.
- The travel time involved in experiencing the park would not be significantly reduced.
- Fuel consumption would be reduced significantly (3 gallon/private vehicle).
- The noise and visual impact of private automobiles would be eliminated from the mesa during peak visitation periods when the transportation system is ir operation.
- There could be problems transporting the elderly and handicapped on a public transportation system resulting in inconvenience for some visitors.
- Buses would exert some noise and visual impact on the resource, but significantly less than private vehicles.
- Oil impregnated runoff would be reduced from the parking areas on Chapin Mesa, Far View, and

Morfield Canyon, but increased in the parking area near the park entrance.

- If visitor demand is not sufficient, lodging (including the campground) would be eliminated from the mesa, reducing the possibility of a 24-hour park experience for visitors.
- The maintenance problems of the road system and the travel time would still be major park constraints.

Applying the Criteria of Effect and Adverse Effect as required by the Procedures of the Advisory Council on Historic Preservation, it is determined that this alternative will have an effect but the effect will not be adverse.

Mitigating Measures:

- The road engineer and stabilization problems associated with the entrance road would have to be corrected ($1,750,000).
- The archeological inventory would be reviewed before any additional roads or parking areas are constructed.
- The areas on Chapin Mesa, Far View, and Morfield Canyon where roads and parking areas are reduced in size or obliterated would be scarified and revegetated with native species.

- The parking area and interpretive facilities at the park entrance would be designed to fit into the landscape with a minimum environmental impact.
- Private enterprise would be encouraged to develop campgrounds and other overnight facilities outside the park boundary, resulting in additional stimulus to the regional economy.
- Drainage systems for the parking areas would be constructed to reduce the damage from oil impregnated runoff to vegetation or other natural resources.

Alternative 6

There would be tram access from the base of the north escarpment to Far View, and a public bus transportation system on the mesa.

This alternative would eliminate private auto access to the park, and would provide access by aerial tram from the base of the mesa near Cortez. All circulation on the mesa would be by bus, minitrain, bicycle, and or on foot. An interpretive facility and parking for 1080 cars would be developed at the park entrance (lower tram terminal).

Limited road access would still be maintained for necessary vehicle use by buses, maintenance vehicles, park, and emergency vehicles. During the off season Wetherill Mesa would be closed.

This proposal would require the acquisition of approximately 50 acres for ther lower tram terminal and interpretive facility and a corridor 300 feet wide and 5 miles long. This acquisition would include approximately _____ acres of federally owned lands under the administration of Bureau of Land Management (BLM) and _____ of privately owned land.

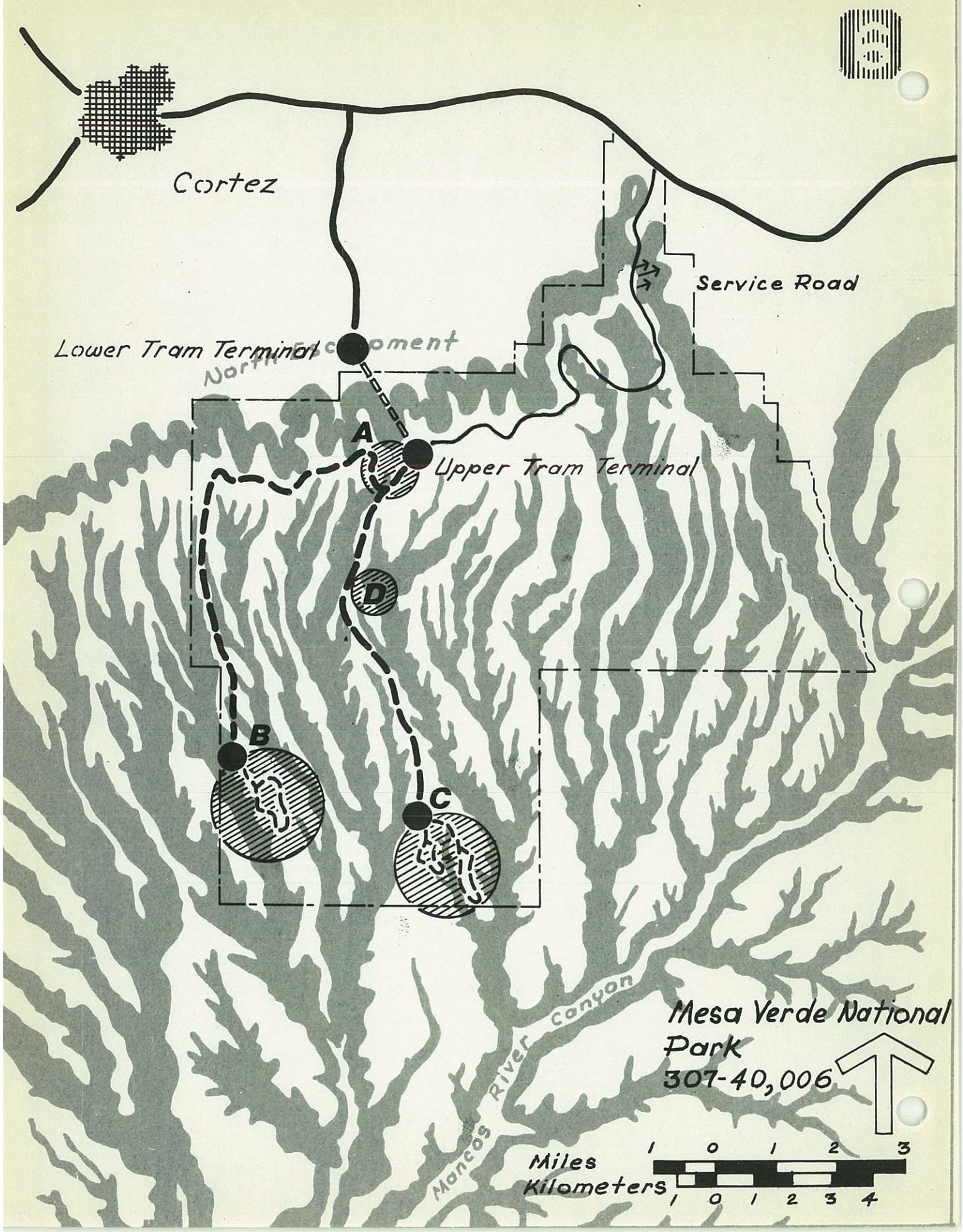
Visitor Related Facilities:

Lower Tram Terminal - Information/orientation, interpretive services, food services, reservation system, 1080-car parking area, and public transportation.

Upper Tram Terminal - Change transportation mode.

Far View - Far View Visitor Center (administrative hub and interpretive services), food services, and lodging.

Wetherill Mesa - Limited food services, interpretive area, minitrain ruins loop.


Cortez
Service Road
Lower Tram Terminal
Upper Tram Terminal
A
B
C
D
Mesa Verde National Park
307-40,006
Mancos River Canyon
Miles
Kilometers
1 0 1 2 3
1 0 1 2 3 4

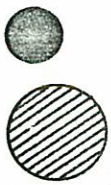
Chapin Mesa - Limited food services, interpretive services, minitrain ruins loops and museum.

Morfield Canyon - Campground, store, service station, laundry, and horse rental.

Far View Ruins - Interpretive (reconstruction demonstration).

Map Legend:

- Private Vehicle Access
- Park Transit System
- Tram Access
- Staging Area
- Activity Zone



Impacts:

- By coordinating resource capacity with a transportation system capacity and scheduling, the congestion, confusion, and visitor impact problems in the park would probably be greatly reduced.
- The majority of the space allocated to parking on the mesa would be eliminated.

- A new entrance road would have to be built to the lower tram terminal. This area is crisscrossed by actively eroding gullies and there could be significant alteration of drainage patterns.
- Because the existing entrance road would only be used for maintenance, problems associated with visitor congestion and traffic safety on the existing entrance road would be eliminated.
- The construction of an interpretive facility and parking area would exert an impact on 50 acres of reclaimed ranch land.
- The travel time involved in experiencing the park would be significantly reduced.

Total fuel consumption would be significantly reduced (3 gallon/private vehicle).

- Buses and minibuses would exert some noise and visual impact on the resource, but significantly less than private vehicles.
- If visitor demand is not sufficient, lodging (including the campground) would be eliminated from the mesa, reducing the possibility of a 24-hour park experience for visitors.
- Oil impregnated runoff would be greatly reduced on the mesa, but increased in the area of the lower terminal site.

. The noise and visual impact of automobiles would be eliminated from the mesa.

. There would be a visual impact of the facilities at the lower tram terminal from the mesa and of the facilities of the upper tram terminal from the valley.

. A number of people would not get to the mesa because of their fear of riding an aerial tram.

* The entrance development would be built on a site that currently has no development, resulting in vegetation disturbance, topography alteration, drainage pattern alteration, and wildlife habitat destruction.

* The loss of lands and possibly land uses to present land owners affected by the land acquisition would involve a maximum of about 50 acres that is currently used for sheep grazing.

Applying the Criteria of Effect and Adverse Effect as required by the Procedures of the Advisory Council on Historic Preservation, it is determined that this alternative will have an effect but the effect will not be adverse.

. There would be visual impacts caused by the construction of the tram.

- Based on 1975 construction costs, the tram would cost $1,600,000.

Mitigating Measures:

- The areas on Chapin Mesa, Far View, and Morfield Canyon where roads and parking areas are removed would be scarified and revegetated with native species.
- The parking area and interpretive facilities at both the base and top of the escarpment would be designed to fit into the landscape with a minimum environmental impact.
- Bus service would be provided for those visitors who are afraid to ride the tram.
- The archeological inventory would be reviewed and additional surveys completed if needed before any additional roads or parking areas are constructed.
- The road engineering and stabilization problems associated with the entrance road would have to be corrected ($1,750,000).
- Private enterprise would be encouraged to develop campgrounds and other overnight facilities outside the park boundary, resulting in additional stimulus to the regional economy.
- Establish strict limits of construction and fly materials in by helicopter for construction of the tram.

- The cable system and towers for the tram would be designed to fit into the landscape with a minimum environmental impact.
- Lodging could be provided at the park entrance on park and/or private lands.
- The lands to be acquired from BLM would be transferred to or exchanged with the National Park Service, and private lands would be acquired at the fair market values. Private lands acquisition would be mitigated by the Uniform Relocation Assistance and Land Acquisition Policies Act of 1970 (P.L. 91-646). This is explained in the National Park Service Acquisition Policies and Relocation Assistance booklet, which can be purchased for 10 cents from the Government Printing Office Bookstore in Washington.
- Facilities will be designed to adequately mitigate and visual intrusions on the prehistoric and historic resources through appropriate design, color, texture, and vegetative plantings.

Alternative 7

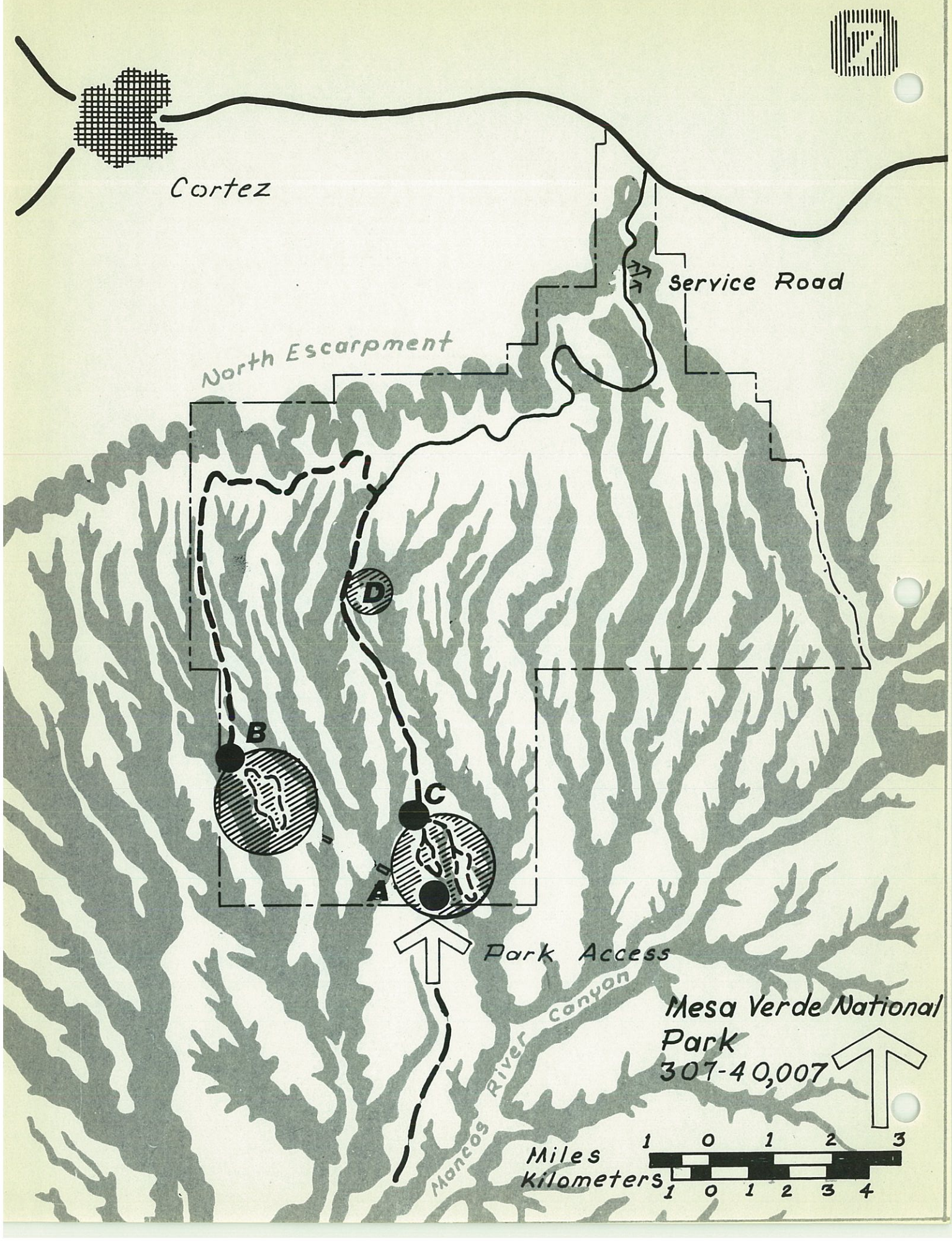
Tram access is proposed from Mancos Canyon (Ute Indian Park) to Chapin Mesa; bus transportation to the ruins on Chapin and Wetherill Mesas.

This alternative would involve a cooperative agreement with the Ute Mountain Indians to provide access through their lands and into Mesa Verde National Park.

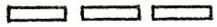
The effects on both the proposed Ute Mountain Tribal Park and Mesa Verde National Park would be significant. For both areas to operate effectively, cooperative management would be essential. There is a possibility that the Mancos Canyon Road now under construction by the Ute Mountain Indians will be extended in the future from Kiva Point to Mancos, thus providing an east/west bypass around Cortez through Mancos Canyon.

Visitor Related Facilities:

Park Entrance	- (Ute Indian Reservation) - Information/ orientation, interpretive services, food services, reservation system, 1,500-car parking area, and public transportation.
Far View	- Administrative hub.
Wetherill Mesa	- Limited food services, interpretive, and minitrain ruins loop.
Chapin Mesa	- Limited food services, interpretive services, minitrain ruins loops, and museum.
Far View Ruins	- Interpretive (reconstruction demonstration).


Cortez
Service Road
North Escarpment
D
B
C
A
Park Access
Mancos River Canyon
Mesa Verde National Park
307-40,007
Miles
Kilometers
1 0 1 2 3
1 0 1 2 3 4

Map Legend:

- Private Vehicle Access
- Park Transit System
- Tram Access 
- Staging Area 
- Activity Zone 

Impacts:

The following impacts are based on a cooperative agreement with the Ute Indians and the National Park Service.

- By coordinating resource capacity with a transportation system capacity and scheduling, the congestion, confusion, and visitor impact problems could probably be greatly reduced.
- The majority of the space allocated to parking on the mesa would be eliminated.
- Since the existing entrance road would only be used for maintenance, the problems associated with visitor congestion and traffic safety on the mesa would be eliminated.
- There would be visual impacts caused by the construction of the tram.

* The construction of an interpretive facility and parking area on the Ute reservation would exert an impact on 60 acres of reclaimed ranch land. Impacts would include vegetation disturbances, topography alteration, soil erosion, and disturbance to wildlife habitat.
. Buses and minibuses would exert some noise and visual impact on the resource, but significantly less than private vehicles.
. Oil impregnated runoff from vehicles would be greatly reduced from the park, but increased at the site of the southern entrance development in the Ute Mountain Tribal Park.
. Fuel consumption would be reduced significantly (7 gallons/private vehicle).
. The noise and visual impact of automobiles would be eliminated from the mesa.
. If visitor demand is not sufficient, lodging (including the campground) would be eliminated from the Park reducing the possibility of a 24-hour park experience for visitors.
. There could be economic impacts on Cortez because tourists would be able to stay in facilities on

the Indian reservation. If the Ute Mountain Indians extend the Mancos Canyon Road from Kiva Point to Mancos, Cortez could be completely bypassed by some tourists.

. The tram facilities might be a visual intrusion on the cultural resources.

* The entrance development would be built on a site (Ute Mountain Tribal Park) that currently has no development.

Applying the Criteria of Effect and Adverse Effect as required by the Procedures of the Advisory Council on Historic Preservation, it is determined that this alternative will have an effect but the effect will not be adverse.

. The tram to the mesa would cost $1,600,000

Mitigating Measures:

- The areas on Chapin Mesa and Far View where roads and parking areas are removed would be scarified and revegetated with native species.
- The parking area on the Indian reservation could be designed to fit the landscape with minimum environmental impact.
- Lodging might be provided in the Ute Mountain Tribal Park.
- The parking area and interpretive facilities at both the base and top of the escarpment could be designed to fit into the landscape with a minimum environmental impact.
- Campgrounds and other overnight facilities could be developed by private enterprise outside the park boundary, resulting in additional stimulus to the regional economy.
- Establish strict limits of construction and fly materials in by helicopter for construction of the tram.

- The cable system and towers for both trams would be designed to fit into the landscape with a minimum environmental impact.
- Hopefully, an archeological survey would be completed before any new roads or parking areas are constructed on Ute lands.
- The road engineering and stabilization problems associated with the entrance road would have to be corrected ($1,750,000).
- The tram facilities will be designed so as to adequately mitigate any visual intrusion through appropriate use of color, design, texture and vegetative plantings.

Alternative 8

This alternative combines public (tram and bus) and private (vehicle) transportation. An interpretive facility and parking for 600 cars would be developed at the base of the north escarpment. Access via a tram would be provided from this facility to Far View, and a public bus transportation system on the mesa.

However, with this alternative park visitors would have the option of using their private vehicles on the mesa rather than using the public transportation system. Minitrain public transportation would be available at the mesa end loops. Parking for approxiximately 150 cars would be provided on both Chapin and Wetherill Mesa. Parking at Far View would be increased to about 20 cars.

Limited road access would still be maintained for necessary vehicle use by buses, maintenance vehicles, park and emergency vehicles. During the off season Wetherill Mesa would be closed.

This proposal would require the acquisition of approximately _____ acres for the lower tram terminal and interpretive facility and a corridor _____ feet wide and _____ miles long. This acquisition would include approximately _____ acres of federally owned lands under the administration of Bureau of Land Management (BLM) and _____ of privately owned land.

Visitor Related Facilities:

Lower Tram Terminal: Information/orientation, interpretive services, food services, reservation system, 600 car parking area, and public transportation.

Upper Tram Terminal - Change transportation mode.

Far View - Far View Visitor Center (administrative hub and interpretive services), food services, and lodging.

Wetherill Mesa - Limited food services, interpretive area, minitrain ruins loop.

Chapin Mesa - Limited food services, interpretive services, minitrain ruins loops and museum.

Morfield Canyon - Campground, store, service station, laundry, and horse rental.

Far View Ruins - Interpretive (reconstruction demonstration).

Map Legend:

- Private Vehicle Access
- Park Transit System
- Tram Access
- Staging Area
- Activity Zone

Impacts:

- By coordinating resource capacity with tour scheduling, the congestion, confusion, and visitor impact problems in the park would probably be greatly reduced.
- There would be visual impacts caused by the construction of the tram.

- The public transportation system would not be economically feasible if visitor were allowed to drive to all points on the mesa.
- The access and circulation problems and congestion on Chapin and Wetherill Mesa loops would be relieved through the transportation system. However, these problems would not be affected in other parts of the park.
- If the trend for increased travel continues, problems associated with the private vehicles (noise, fuel consumption, travel time, parking allocations) would over a period of time all increase on the mesa.
- The public transportation system at the mesa end loops would reduce noise, air pollution, fuel consumption, and vehicular visibility on the mesa loop roads.
- The Wetherill Mesa Road is not properly designed and therefore would be regraded and realigned to accommodate all forms of private vehicular traffic. If this is not done, dangerous conditions for private vehicles would be perpetuated, and maintenance cost would be extremely high. This concept would reduce the efficiency of the public transportation system.

* The maintenance cost of the minibus system would increase because of the additional systems on Chapin Mesa.
* Realignment, grading, and surfacing the Wetherill Mesa Road would require the removal of additional vegetation. The alteration of topography in cut and fill spots, and might result in a possible increase in soil erosion for a period of time after construction.

Applying the Criteria of Effect as required by the Procedures of the Advisory Council on Historic Preservation, it is determined that this alternative will have an effect but the effect will not be adverse.

- A new entrance road would have to be built to the lower tram terminal. This area is crisscrossed by actively eroding gullies and there could be significant alteration of drainage patterns.
- The construction of an interpretive facility and parking area would exert an impact on 50 acres of reclaimed ranch land.
- The travel time involved in experiencing the park could be significantly reduce only if visitors used the public transportation system. Total fuel consumption could be significantly reduced (3 gallon

private vehicle) only if the visitors used the public transportation system.

. Buses and minibuses would exert some noise and visual impact on the resource, but significantly less than private vehicles.

. If visitor demand is not sufficient, lodging (including the campground) would be eliminated from the mesa, reducing the possibility of a 24-hour park experience for visitors.

. There would be a visual impact of the facilities at the lower tram terminal from the mesa and of the facilities of the upper tram terminal from the valley.

* The entrance development would be built on a site that currently has no development, resulting in vegetation disturbance, topography alteration, drainage pattern alteration, and wildlife habitat destruction.

* The loss of lands and possibly land uses to present land owners affected by the land acquisition would involve a maximum of about 50 acres that is currently used for sheep grazing.

. Based on 1975 construction costs, the tram would cost $1,600,000.

Mitigating Measures:

- The areas on Chapin Mesa, Far View, and Morfield Canyon where roads and parking areas are removed would be scarified and revegetated with native species.
- The parking area and interpretive facilities at both the base and top of the escarpment would be designed to fit into the landscape with a minimum environmental impact.
- The archeological inventory would be reviewed and additional surveys completed if needed before any additional roads or parking areas are constructed.
- The road engineering and stabilization problems associated with the entrance road would have to be corrected ($1,750,000).
- Private enterprise would be encouraged to develop campgrounds and other overnight facilities outside the park boundary, resulting in additional stimulus to the regional economy.
- Establish strict limits of construction and fly materials in by helicopter for construction of the tram.

- The cable system and towers for the tram would be designed to fit into the landscape with a minimum environmental impact.
- Lodging could be provided at the park entrance on park and/or private lands.
- The lands to be acquired from BLM would be transferred to or exchanged with the National Park Service, and private lands would be acquired at the fair market values. Private lands acquisition would be mitigated by the Uniform Relocation Assistance and Land Acquisition Policies Act of 1970 (P.L. 91-646). This is explained in the National Park Service Acquisition Policies and Relocation Assistance booklet, which can be purchased for 10 cents from the Government Printing Office Bookstore in Washington.
- Facilities will be designed to adequately mitigate any visual intrusion on the prehistoric and historic resources through appropriate design, color, texture, and vegetative plantings.
- The new roads and parking areas on top of the mesa would be located on sites that had previously been altered by development.

CONCESSIONER OPERATIONS

Several of the alternatives would have significant impacts upon the concession operation and physical plants. In accordance with the contractual concession agreements between the two concessioners and the National Park Service,

> "Where facilities are to be abandoned, removed or demolished and replaced somewhere else by Concessioner, compensation will have to be provided to the Concessioner for his possessory interest and all other property used in connection with the operation on the basis of "sound value" and for the cost of restoring the land to a natural condition and for the cost of transporting to a reasonable market, for sale, of moveable property rendered useless by this action and for cost of such removal on demolition less salvage accruing to the Concessioner.
>
> Where facilities are to be abandoned, removed or demolished and are not to be replaced by Concessioner, compensation would have to be provided to the Concessioner for his possessory

interest in the amount of the book value of the improvements and for the cost of restoring land to a natural condition and for the cost of transporting to a reasonable market for sale moveable property rendered useless by this action and for the cost of such removal or demolition, less salvage accruing to the Concessioner.

Since this would affect all the alternatives in varying degrees except the no action alternative it is still only mentioned here.

Alternative 1

This alternative relates to services on Chapin and Wetherill Mesas. Impacts marked with an asterisk (*) involve adverse effects that cannot be avoided should the proposal be implemented.

Alternative 1a

Provide food services on both mesas (similar to existing facilities on Chapin Mesa).

Impacts:

- The facilities would be located in two of the park's major activity zones where visitors need them the most.
- These facilities would be located in the park's most significant archeological resource areas.
- There would be an impact on the mesa's visual quality that would affect the visitor experience.
- These facilities could prolong visitors' stays on the mesas.
- Because the necessary utilities for these facilities already exist on both mesas there would be little additional disturbance.
- Visitor convenience would be enhanced and he would not have to leave one or the other Mesa prematurely just to eat.
- The staff and supply functions necessary for these facilities would increase the energy consumption.
- There would be an increase in the noise level on the mesas.
- This alternative would provide a use for several existing buildings on Chapin Mesa.
- There would be minimal impacts on the land from construction because on Chapin the buildings already

exist, and on Wetherill Mesa the buildings could be built on land that was originally cleared for parking.

- Applying the Criteria of Effect and Adverse Effect as required by the Procedures of the Advisory Council on Historic Preservation, it is determined that this alternative will have an effect but that the effect will not be adverse.

Mitigating Measures:

- The facilities would be designed and located to minimize impacts on the archeological resources and the visitor's experiences.

Alternative 1b

No food or retailing services would be provided on either mesa, but comfort facilities would be provided.

Impacts:

- This alternative would eliminate another function and, consequently, several buildings from the park's most significant archeological resource areas, Chapin and Wetherill Mesa.

. It would reduce the visual impact of buildings from the mesa.

. The visitors' length of stay on the mesa would be reduced.

* No visitor food services would be available in the park's two major activity zones, resulting in possible discomfort and inconvenience to visitors because of the hot summer temperatures and the length of stay necessary to see the ruins.

. Applying the Criteria of Effect and Adverse Effect as required by the Procedures of the Advisory Council on Historic Preservation, it is determined that this alternative will have an effect and that the effect will be adverse because a building nominated to the National Register of Historic Places would be demolished.

Mitigating Measures:

. All Federal historic preservation laws and policies would be complied with prior to any building demolition. Proper studies and architectural records will be made prior to demolition.

Alternative 2

This alternative relates to services on Far View.

Alternative 2a

No action.

Impacts:

* The present operation would continue to infringe on the area's visual integrity because it is visible from several of the park's prime resource areas.
. This no action alternative would continue to offer an opportunity for a 24-hour park experience, which allows early- and late-hour viewing of wildlife and other activities and fits in well with current plans for expansion of the night programs.
. Because Far View receives the harshest weather on the mesa -- very severe winds, and drifting snow in winter -- this no action alternative should not affect visitation.
. Overnight visitors would disperse visitation by becoming involved in park activities earlier in the morning and later at night than most visitors who lodge outside the park.
. These buildings are new and would require only minimal maintenance.

- Indian-type foods served at the lodge add to the visitor experience.
- Applying the Criteria of Effect and Adverse Effect as required by the procedures of the Advisory Council on Historic Preservation, it is determined that this alternative will have an effect but that the effect will not be adverse.

Mitigating Measures:

- Some design changes could be made to equip the buildings for visitor use during colder periods of the year.

Alternative 2b

Food services; no overnight facilities or retailing at Far View, but similar overnight accommodations would be located below the mesa on National Park Service or private land.

Impacts:

- The visual impact caused by the roads, parking, and buildings would be reduced.
- The opportunity for visitors to have a 24-hour experience on Mesa Verde would be greatly reduced.

- Several relatively new motel units that require only minimal maintenance would be eliminated.
- Indian-type foods served at the lodge add to the visitor experience.
- The Far View area receives the harshest weather on the mesa -- very severe winds, and drifting snow in winter -- and, consequently, can only be open for a short visitor season.
- Overnight visitors would disperse visitation by becoming involved in park activities earlier in the morning and later at night than most visitors who lodge outside the park.
- Could eliminate one of the best existing concessions (Mesa Verde Company) in the National Park Service.
- Applying the Criteria of Effect and Adverse Effect as required by the Procedures of the Advisory Council on Historic Preservation, it is determined that this alternative will have an effect but that the effect will not be adverse.

Mitigating Measures:

- Facilities and parking areas currently associated with overnight accommodations would be scarified, revegetated, and returned to their natural condition.
- Visitors could be transported into the park for the evening programs.

- The Mesa Verde Company could operate the facility at the lower tram terminal if on park lands and possibly on other lands.

Alternative 2c

No food services, retailing, or overnight facilities at Far View, but similar facilities would be located below the mesa on National Park Service and/or private lands.

Impacts:

- The visual impact caused by the roads, parking, and buildings at Far View would be significantly reuced.
- The opportunity for visitors to have a 24-hour experience on Mesa Verde would be greatly reduced.
- Buildings that are relatively new and require only minimal maintenance would be eliminated.
- * Vegetation disturbance and topographic alteration to the construction site below the mesa would occur. The removal of facilities from Far View would leave scars on the landscape and vegetation. Visitor services (food, retailing, and lodging) would be available for a longer season.

- Applying the Criteria of Effect and Adverse Effect as required by the Procedures of the Advisory Council on Historic Preservation, it is determined that this alternative will have an effect but that the effect will not be adverse.

Mitigating Measures:

- Areas presently used for food services, retailing, and overnight lodging will be scarified, revegetated, and returned to a more natural condition.
- Visitors could be transported into the park for the evening programs.

Alternative 3

This alternative relates to camping in Morfield Canyon.

Alternative 3a

No action.

Impacts:

- This no action alternative would continue to offer an opportunity for a 24-hour park experience, which allows early- and late-hour viewing of

wildlife and other activities and fits in well with current plans for expansion of the night programs.

- Applying the Criteria of Effect and Adverse Effect as required by the Procedures of the Advisory Council on Historic Preservation, it is determined that this alternative will not have an effect.

Mitigating Measures:

- None contemplated.

Alternative 3b

Promote tent camping and eliminate vehicular camping.

Impacts:

- This would continue to offer an opportunity for a 24-hour park experience, which allows early- and late-hour viewing of wildlife and other activities and fits in well with current plans for expansion of the night programs.
- The campground would be restricted to a certain user group.

- Applying the Criteria of Effect and Adverse Effect as required by the Procedures of the Advisory Council on Historic Preservation, it is determined that this alternative will not have an effect.

Mitigating Measures:

- Private industry would be encouraged to provide additional adequate vehicular camping facilities outside the park.

Alternative 3c

Camping would be entirely eliminated from within the park as private enterprise, and other agencies would provide this recreational pursuit outside the park.

Impacts:

- The opportunity for a 24-hour experience at Mesa Verde National Park would be greatly reduced.
* A recreational pursuit would be eliminated from the park.
- Staffing and maintenance costs would be reduced.

- A $5 million investment would be eliminated, and the obliteration of the campground and its related facilities would require additional funding.
- Applying the Criteria of Effect and Adverse Effect as required by the Procedures of the Advisory Council on Historic Preservation, it is determined that this alternative will not have an effect.

Mitigating Measures

- Camping could be provided off the mesa.
- The camping site would be returned to its natural state by scarifying, revegetating, and restoring the topography where possible.

Alternative 4

This alternative is concerned with developing an interpretive program through the use of horses.

Alternative 4a

No action.

Impacts:

- The stable area is situated near the campground and attracts flies and other insects.
- Odor pollution from the stable area could be a problem at some of the camping sites.
- Horse traffic and droppings on trails would be undesirable to some hikers.
- Applying the Criteria of Effect and Adverse Effect as required by the Procedures of the Advisory Council on Historic Preservation, it is determined that this alternative will not have an effect.

Alternative 4b

Develop horse rental programs and facilities with private enterprise in order to provide visitors with a quality interpretive experience.

Impacts:

- It could be difficult to coordinate, operate, and manage well an activity between the two parties.
- * Development of a new trail system would result in destruction of vegetation and subsequent accelerated erosion.

- Applying the Criteria of Effect and Adverse Effect as required by the Procedures of the Advisory Council on Historic Preservation, it is determined that this alternative will have an effect but that the effect will not be adverse.

Mitigating Measures:

- New trails will be surveyed for archeological sites before construction and designed so as to not have an adverse effect upon the cultural resources.

Alternative 4c

Eliminate horse rentals entirely from the park, relying on private enterprise to provide the equestrian experience outside the park.

Impacts:

- It could be difficult to coordinate, operate, and manage well an activity between the two parties.
* Development of a new trail system would result in destruction of vegetation and subsequent accelerated erosion.

- The National Park Service could not ensure a well-done system compatible with the park's objectives.
- Applying the Criteria of Effect and Adverse Effect as required by the Procedures of the Advisory Council on Historic Preservation, it is determined that this alternative will have an effect but the effect will not be adverse.

Mitigating Measures:

- None contemplated.

ADMINISTRATION, HOUSING, AND MAINTENANCE

Alternative 1

This is a no action alternative. Impacts marked with an asterisk (*) involve adverse effects that cannot be avoided should the proposal be implemented.

Impacts:

- Structures would continue to fall short of modern fire and security standards, increasing the probability of serious fire and/or theft.
- The existing facilities (offices, housing, maintenance) would continue to remain within a prime archeological resource area at Spruce Tree.
- The park would continue to operate with insufficient office space to carry out daily park functions at maximum efficiency.
- The old facilities would continue to require high maintenance costs.
- Potential hazard to the buildings, records, and stored artifacts on the mesa would continue because of the tarred roofs and wooden ceilings of the buildings and the high fire danger during the fire season.

- There would be minimal additional impact on the natural resources from new construction except for replacing necessary utilities and the older facilities.
- There would be limited additional new building costs, but maintenance and operational costs would continue to escalate.
- Freight trucks would continue to refuse deliveries on the mesa top, continuing the inefficient use of park staff to supply delivery and pickup.
- Park maintenance, administrative, and residential traffic would continue to add to the traffic loads on the park roads.
- 50% of the permanent and 80% of the seasonal park staff currently live in the park and would continue to do so.
- Public relations and interagency affairs would continue to be difficult to conduct because of the time and distance involved in commuting to park headquarters from neighboring communities and agency offices.
- Use of existing buildings would be maximized.
- Winter roads would continue to be plowed for the employees living on the mesa.
- Travel time and fuel consumption related to work would be minimized for employees living on the

mesa and maximized, along with pollution related to the automobile, for employees living off the mesa.

- The small and inadequate employee quarters would continue to be used.
- Housing would continue to be insufficient to meet present park staffing needs.
- School children living in the park would continue to have difficulty participating in after-school activities because of the time and distance involved in travel to Cortez or Mancos.
- The occasional restriction of employees and their families from movement into and out of the park because of snowy and icy road conditions would continue.
- Because of travel time and distance, supervision, management, and maintenance costs of Hovenweep and Yucca House would continue at the present level.
- Park housing would remain approximately 33 miles from Cortez and 30 miles from Mancos, the closest areas for buying necessities and obtaining medical attention.

Applying the Criteria of Effect and Adverse Effect as required by the Procedures of the Advisory Council on Historic Preservation, it is determined that this alternative will have an effect but the effect will not be adverse.

Mitigating Measures:

- Management is situated in close proximity to the resource for both resource and visitor protection.

Alternative 2

Remove all administrative and operational support facilities from the mesa except the minimum determined by park management to be necessary for protection and maintenance. This decision would then determine which jobs require permanent and/or seasonal employees to live in the park. Those employees whose jobs require them to live in the park would occupy existing structures as long as the structures remain adequate or can be renovated or remodeled to make them adequate. If the functions and structures removed from the mesa are still needed, they would be reestablished at one of the four alternative locations for visitor support facilities listed below.

The impacts related to all four would be very similar.

Existing park entrance area
Cortez vicinity
Near the lower tram terminal
Mancos vicinity

Impacts:

- This alternative would eliminate some of the existing facilities in the prime archeological area on Chapin Mesa without the reduction of protection and maintenance functions.
- The cost of logistical support for administrative and operational support facilities would be reduced by locating these facilities closer to neighboring communities and highway access.
- Stronger ties with the local communities and cooperating agencies would likely result with the increased opportunity for interaction.
- The administration and support facilities of Yucca House and Hovenweep would be more easily served by such a location.
- This proposal would reduce energy consumption year around, but primarily in the winter. It would also reduce fuel consumption by the staff traveling to and from work.
- It would reduce the cost of snow removal in the winter when visitation is very low.
- Telephone, electric, gas, and water lines would have to be installed to a previously undeveloped site.

This would involve vegetation disturbance, loss of wildlife habitat, and soil erosion along utility corridors.

. A reduction in the maintenance costs on the mesa would occur.

. There would be a reduction of nonconforming uses (housing and administration) in a primary resource area.

. The hazard of driving by park staff and families during the winter on the entrance road would be reduced.

* There would be vegetation disturbance and topography alteration at the construction site involving as much as 5 acres.

. Buildings eligible for the National Register of Historic Places would be demolished.

Applying the Criteria of Effect and Adverse Effect as required by the Procedures of the Advisory Council on Historic Preservation, it is determined that this alternative will have an effect and that the effect will be adverse because of the proposed demolition of the historic buildings.

Mitigating Measures:

- The construction sites of new permanent and seasonal employee housing could be revegetated with native species, and topography would be restored as soon as possible to as near preconstruction conditions as practical.
- The housing units would be designed to be functional, to fit into the theme of the park, and to be as unobtrusive as possible.

Historic Buildings to be demolished would be properly recorded and studied and no demolition would occur until all federal historic preservation laws and policies have been complied with.

RESOURCE MANAGEMENT

The resources of Mesa Verde National Park have not been completely inventoried at this time. In order to properly manage, interpret, and use the total resources of the park, further research, analysis, and inventory are needed.

A discussion of the alternatives considered in the resource management of the park follows. Impacts marked with an asterisk (*) involve adverse effects that cannot be avoided should the proposal be implemented.

Archeological Resources

Alternatives that directly affect the archeological resources and the impacts of those alternatives are discussed below.

Alternative 1

This no action alternative would be a status quo of the management affecting archeological resources.

Impacts:

- Unexcavated or partially excavated ruins might continue to degrade and deteriorate because of inadequate protection from the weather. However, the unexcavated ruins will probably not deteriorate as rapidly as excavated but unstabilized ruins.

- Ruins foundations would continue to be weakened and walls sometimes toppled by the burrowing of small mammals, which are presently uncontrolled in the park.
- Incomplete knowledge of the total archeology of Mesa Verde National Park might allow inadvertent damage to some of the resources.
- Because protection of archeological resources requires the elimination or very careful supervision of visitor use in backcountry areas, some resources might not be optimally used in the interpretive program, and visitor use would continue to be restricted.
- The interpretive program and archeological story of Mesa Verde would continue to lose the benefit of presently unknown archeological resources.

Applying the Criteria of Effect and Adverse Effect as required by the Procedures of the Advisory Council on Historic Preservation, it is determined that this alternative will have an effect and that the effect will be adverse.

Alternative 2

Complete the archeological inventory.

Impacts:

- . An inventory would provide park management with the information necessary to formulate a complete protection and management plan for the archeological resources of the park.
- . An inventory might provide information and knowledge that would be valuable to the archeological story of the park and its interpretive program.
- . An inventory, if no significant archeological resources are found, might justify additional backcountry use in some areas.
- * Some sites might be disturbed, and those excavated would be damaged.

Applying the Criteria of Effect and Adverse Effect as required by the Procedures of the Advisory Council on Historic Preservation, it is determined that this alternative will have an effect but the effect will not be adverse.

Mitigating Measures:

- . Care will be taken to minimize damage to sites.

Alternative 3

Provide additional antiquities protection from fire, theft, vandalism, and climatic elements. This may include new storage facilities suitable for preservation of artifacts.

Impacts:

- Improved fire and theft protection for antiquities would reduce the potential for loss of valuable artifacts and archeological resources.
- New storage facilities for undisplayed artifacts would improve protection from fire and from deterioration because of inadequate storage conditions.

Applying the Criteria of Effect and Adverse Effect as required by the Procedures of the Advisory Council on Historic Preservation, it is determined that this alternative will have an effect but the effect will not be adverse.

Mitigating Measures:

- Experts in antiquities preservation and protection would be consulted.

Alternative 4

Provide adequate mesa top ruins shelters. Numerous mesa top ruins have been partially excavated and temporary shelters have been built over them. Some of these shelters have caved in on the ruins, devastating them. The shelters are not weatherproof and allow rain, snow, and runoff to reach the ruins, accelerating their deterioration.

Impacts

- Adequate shelters would protect the ruins until permanent shelters could be constructed.
- Shelters would provide protection to ruins in the process of being excavated until they could be incorporated into the interpretive program or back-filled.
- Shelters would protect visitors from sun and rain.
- Shelters would be a visual intrusion on the natural and archeological resources.

Applying the Criteria of Effect and Adverse Effect as required by the Procedures of the Advisory Council on Historic Preservation, it is determined that this alternative will have an effect but the effect will not be adverse.

Mitigating Measures

- Buildings or shelters would be designed to protect the ruins with as little visual intrusion as possible.

Alternative 5

Eliminate modern man-made facilities within sight and sound of archeological sites.

At some of the more important archeological sites, some man-made intrusions are very noticeable and detract from the interpretive program and visitor experience.

Impacts:

- The elimination of intrusions would restore a more primitive interpretive setting.
- In some cases, the elimination of intrusions would make it less convenient for people to move from site to site on the mesas.

Applying the Criteria of Effect and Adverse Effect as required by the Procedures of the Advisory Council on Historic Preservation, it is determined that this alternative will have an effect but the effect will not be adverse.

Mitigating Measures

- In present areas where vehicular traffic and sound are intrusions on prime resources, an alternative transportation system might be provided.

Vegetation Management

Alternative 1

This no action alternative would be a status quo of the management affecting vegetational resources.

Impacts:

- Exotic plants would continue to advance their range.
- Secondary succession would continue -- an increasing deviation from probable prehistoric vegetative conditions.
- The probability of catastrophic fire would be high because of understory buildup.
- Plant succession would proceed toward the climax stage wherever local conditions permit -- a further deviation from probable prehistoric vegetative conditions.

Applying the Criteria of Effect and Adverse Effect as required by the Procedures of the Advisory Council on Historic Preservation, it is determined that this alternative will have an effect and that the effect will be adverse.

Mitigating Measures:

- Careful research and consulation with experts would determine the best methods to control vegetation.

Alternative 2

Control exotic species.

Impacts:

- Control would speed the return of the vegetational communities to a state more representative of Anasazi times.
- Control would slow the spread of exotic species, although possibly would not eliminate them from the park.
- If control of exotic species would not be extended to a zone around the park, the program would have to be continuous and therefore costly.
- Other species might be affected in the attempt to control exotic species.
- Control might result in less groundcover, with a resultant higher rate of soil erosion.

Applying the Criteria of Effect and Effect as required by the Procedures of the Advisory Council on Historic Preservation, it is determined that this alternative will have an effect but the effect will not be adverse.

Mitigating Measures:

- Care would be taken to use control methods that would have as little effect as possible on other components of the ecosystem.
- Careful study of past research and consultation with experts on the specific subjects would be accomplished before any action is implemented.

Alternative 3

Manipulate vegetation to reduce fire potential.

Impacts:

- The possibility of a wildfire sweeping the park and damaging present developments should be reduced.
- The possibility of fire damaging the archeological resources should be reduced.
- Vegetative succession might be slowed and possibly halted.
- The understory species of grasses, forbs, and shrubs might be reduced.
- The accumulation of dead plant material and litter on the soil surface should be reduced.
- Soil organic matter might be reduced, thereby decreasing water infiltration and penetration.

. Fires should be more easily controlled and burn with less intensity and lower temperatures than if there were no attempt to reduce fire potential.

. Less intense and lower temperature burns would enable vegetation to regenerate more quickly.

. The possibility of intense burns that produce short-term destruction of soil organic matter and sterilization of the soil for as much as 30 years should be reduced.

* Habitat and food sources for small mammals and birds that feed on understory plants and seeds might be reduced for a short period.

* Habitat of deer might be reduced by control of browse and understory plants.

. Habitat of wildlife might be enhanced, providing more desirable food sources.

. Soil erosion might be slightly increased because of vegetation removal.

Applying the Criteria of Effect and Adverse Effect as required by the Procedures of the Advisory Council on Historic Preservation, it is determined that this alternative will have an effect but the effect will not be adverse.

Mitigating Measures

. Careful research, review, and consultation would be accomplished before any action is taken.

Alternative 4

Manipulate vegetation to enhance ruins settings and provide a setting more like that of Anasazi times.

Impacts:

- Vegetation would more closely represent that of prehistoric times, thus enhancing the interpretive programs and improving the visitors' concept of Anasazi life.
* Soil erosion could increase because of the removal of vegetation from around the ruins, or decrease if the program included adding vegetation where presently there is none.
- Panoramas of the ruins and from the ruins could increase.

Applying the Criteria of Effect and Adverse Effect as required by the Procedures of the Advisory Council on Historic Preservation, it is determined that this alternative will have an effect but the effect will not be adverse.

Mitigating Measures

- Research would be carried out to make the vegetational setting of the ruins as near that of the Anasazi time as possible.

Wildlife Management

Alternative 1

This no action alternative would be a status quo of the management affecting wildlife resources. The current policy of Mesa Verde National Park pertaining to wildlife management and control is dictated by the Administrative Policies for Historical Areas of the National Park Service. This policy states:

> Insofar as possible, control through natural predation will be encouraged.
>
> Public hunting outside of the area is recognized as the next most desirable means of controlling wildlife populations. Cooperative studies and management plans with States and other Federal agencies are to be continued to facilitate public hunting outside of the areas, especially through extended special seasons established by the States.
>
> Other control measures, as necessary, shall be undertaken as follows:
>
> (1) Live-trapping in the areas for transplanting elsewhere; (2) research specimens for National Park Service and cooperating scientists; and (3) direct reduction by National Park Service personnel. It is recognized that it may be necessary, on occasion, to carry on each phase of this program simultaneously. The National Park Service will adjust the use of these control methods (except natural predation) to meet varying weather and other relevant conditions, giving highest priority to the opportunities for public hunting outside the areas and live-trapping in the areas for transplanting elsewhere.

Presently there is no management or manipulation of the wildlife populations except for a limited small mammal control program. This program includes poison baiting of small mammals in areas adjacent to the ruins. The populations are free to seek their balance with other species and with their environments through predation, habitat suitability, and food source availability.

Should game species population exceed habitat capacity, cooperative agreements would probably be sought with the Colorado Division of Wildlife for special hunting seasons in areas adjacent to the park to reduce the populations as they migrate or move in and out of the park.

Nongame species populations exceeding their habitat capacity may necessitate control or management. If this occurs, cooperative agreements would probably be sought to live-trap and transplant the excess animals.

At the present time there are no monitoring programs for the wildlife populations or their habitats to determine whether or not habitat carrying capacities are being exceeded.

Applying the Criteria of Effect and Adverse Effect as required by the Procedures of the Advisory Council on Historic Preservation, it is determined that none of the wildlife management alternatives will have an effect.

Impacts:

* Under this no action alternative the population density and numbers of small mammals would continue to be reduced in areas where the control program is in effect.
* The food chain of the ecosystem, particularly the predator/prey relationship of coyotes and raptors to small mammals, would continue to be altered in the areas of control, and the abundance of food sources would be reduced.
. Protection from burrowing activities of small mammals would continue to be afforded archeological ruins.
* Nontarget species population would continue to risk being reduced by the control program.
. The no action alternative might result in overpopulation, and overbrowsing of vegetation by herbivores that could start a chain reaction leading to lessened vigor of plant growth, plant death, soil erosion, and, ultimately, a completely altered ecosystem and a virtually barren land.
. Control could possibly result in a more natural system of checks and balances as a result of the

total food chain and predator relationships, and could allow a more natural population limitation than would an uncontrolled population.

- With overpopulation, animals generally become more susceptible to starvation and to diseases, especially those of catastrophic proportions. They also become more susceptible, as a result of malnutrition and disease, to predation.

Mitigating Measures

- Before any further control programs would be implemented, research and consultation will be carried out to ensure as specific a control program as possible for the target species and prevent undue effect on the ecosystem food chains.
- Periodic monitoring would determine the success of the action and its effect on other components of the ecosystem. This would indicate whether or not adjustments or alterations are needed in the control program and whether additional regulation would be needed.

Alternative 2

Reintroduce native fauna.

Impacts:

- Undesirable competition might result between species now present in the park and the reintroduced species.
- Reintroduction of native species might fail because the habitat conditions and competitive relationships have changed.
- A new attraction could be added to the interpretive story.
- A new attraction would be added to the park for amateur and professional naturalists.
- More complicated management problems might result from unforeseen interactions between the reintroduced and existing species. (When wild turkeys were introduced in previous years, they undesirably and inadvertently became domesticated pests.)
- Wild animals such as bighorn sheep and deer might turn into beggars, with resultant unnatural and undesirable behavior patterns.
- The danger of road kills for partially domesticated wild animals could increase.
- Food handouts or garbage could be detrimental to animal health.

Mitigating Measures:

- Before action would be taken, careful review, consultation, and research would be carried out to ensure the success of the program, as well as minimal impact on other native species and processes in the ecosystem.
- Periodic monitoring would determine the success of the action and its effect on other components of the ecosystem. This would indicate whether or not some regulation of the components would be desirable.

Alternative 3

Control of deer population.

An effective control method may be a cooperative venture with the Colorado Division of Wildlife to encourage hunter-harvest of deer as they migrate from the park in late fall and winter.

Impacts:

- Excess animals would be harvested should the park become overpopulated, possibly more than is necessary, for protection of other resources.

- The harvesting of excess animals would prevent permanent damage to the vegetational cover and irrepairable denudation and erosion.
- Control would result in an unnatural population balance.

Mitigating Measures:

- Research and inventorying of the park's vegetation and range capacity to support deer should determine the number of deer the park could support.

Alternative 4

Control of Exotic Species.

This alternative might include various methods of controlling exotic wildlife species in the park. These methods might include live-trapping and transferring the animals to other areas, kill-trapping, or direct reduction by the National Park Service. The Administrative Policies for Historical Areas of the National Park System neither permit nor prohibit control of exotic species.

Impacts:

- Control of exotic species could bring about an approximation of the condition of the wildlife population during Anasazi times.
- The competition for various niches in the ecosystem could be reduced in most cases; in some cases it could be increased.

Mitigating Measures:

- Before any control programs would begin, thorough review, research, and consultation will allow implementation of a program that would have minimal impact on other components of the ecosystem.

Fire Management

The current policy of Mesa Verde National Park pertaining to fire management and control is dictated by the Administrative Policies for Historical Areas of the National Park Service. There are no alternatives discussed in this section. This policy states;

> Any fire within a historical area that poses any threat to the historical resources or facilities of the area or any resources or facilities outside the area will be controlled and extinguished.

Any fire within a historical area other than one employed in the management of vegetation and/or wildlife habitat of the area will be controlled and extinguished.

The use of natural fire or prescribed burning may be employed in the management of vegetation and/or wildlife habitat consistent with approved resource management plans.

The Service will cooperate in programs to control or extinguish any fire originating on lands adjacent to a historical area and posing a threat to the historical or natural resources or physical facility of the area.

Impacts:

- The control and extinguishing of natural fires would allow continued fuel accumulation of fuel leads to hotter fires that are more difficult to control and are more damaging to both vegetation and archeological resources.

Applying the Criteria of Effect and Adverse Effect as required by the Procedures of the Advisory Council on Historic Preservation, it is determined that this alternative will have an effect but that the effect will not be adverse.

Mitigating Measures

- Before present policies of fire suppression, allowable burns, or prescribed burning are changed, review, research, and consultation will be carried out to ensure minimal adverse impacts on the natural resources, as well as on the archeological resources.

CONSULTATION AND COORDINATION WITH OTHERS

A planning directive was prepared for Mesa Verde National Park in July 1972. Four specific problem areas were identified at this time - (1) interpretation, (2) access and circulation, (3) cooperation with the Ute Mountain Indians, and (4) Hovenweep and Yucca House National Monuments. In the fall of 1973 a master plan team from the Denver Service Center made a field reconnaissance to Mesa Verde National Park.

A preplanning public meeting was held in Cortez during that trip. Following this meeting several discussions evolved with representatives of the National Park Service, Bureau of Land Management, Bureau of Indian Affairs, the Soil Conservation Service, and the Planning Department of Montezuma County.

After examining the monument and its surrounding environs, it became obvious to the team that the problems mentioned in the planning directive must be expanded in scope to go beyond current National Park Service boundaries. As a result of their field investigation of Hovenweep and Yucca House and discussions with the Bureau of Land

Management, the team identified the need for a comprehensive resource basic inventories package, including archeological investigations of the numerous and extensive sites that exist on surrounding Bureau of Land Management, lands in both Utah and Colorado. It was agreed that the National Park Service would initiate a joint resource basic inventories study with the Bureau of Land Management to accomplish the needed comprehensive package. This study would be programmed over a 2-year period and would cost the Service an estimated $50,000. It was agreed that the master plans for Hovenweep and Yucca House would be deferred until this inventory was completed.

During the following months as the assessment for Mesa Verde Master Plan was being prepared, several meetings were held with representatives from Mesa Verde National Park, the Rocky Mountain Region, Midwest Region, the concessioner, and the Denver Service Center.

On May 15, 1974, representatives of the following organizations met to discuss and evaluate the various alternatives discussed in the first draft of the Mesa Verde Master Plan Assessment.

1. Soil Conservation Service
2. Farmers Home Administration

3. Bureau of Land Management
4. Bureau of Reclamation
5. Southern Ute Agency - Bureau of Indian Affairs
6. Mountain Ute Agency - Bureau of Indian Affairs
7. Forest Service

This draft environmental assessment was prepared by the Denver Service Center, National Park Service. However, in view of the complex problems associated with regional studies, much input has been contributed and will continue to be made by staffs of the following specific local offices:

1. Mesa Verde National Park
2. Bureau of Land Management
3. Bureau of Indian Affairs

APPENDIXES

A - Legislation

B - Contracts, Permits, and Letters of Agreement

C - Cultural Sequences

D- -Annotated Checklist of Plants

E - Annotated Checklist of Amphibians and Reptiles

G - Historic Preservation Compliance

H - Bibliography

I - Planning Team and Consultants

APPENDIX A

LEGISLATION

9. Mesa Verde National Park

An Act Creating the Mesa Verde National Park, approved June 29, 1906 (34 Stat. 616)

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That there is hereby reserved from settlement, entry, sale, or other disposal, and set apart as a public reservation, all those certain tracts, pieces, and parcels of land lying and being situate in the State of Colorado, and within the boundaries particularly described as follows: Beginning at the northwest corner of section twenty-seven, township thirty-five north, range sixteen west, New Mexico principal meridian; thence easterly along the section lines to the southwest corner of the southeast quarter of section twenty, township thirty-five north, range fifteen west; thence northerly to the northwest corner of the southeast quarter of said section; thence easterly to the northeast corner of the southeast quarter of said section; thence northerly to the northwest corner of section twenty-one, said township; thence easterly to the northeast corner of the northwest quarter of said section; thence northerly to the northwest corner of the southeast quarter of section sixteen, said township; thence easterly to the northeast corner of the southeast quarter of section fifteen, said township; thence southerly to the southeast corner of said section; thence easterly to the southwest corner of section thirteen, said

Mesa Verde National Park, Colo. Establishment of. Description.

township; thence northerly to the northwest corner of the southwest quarter of said section; thence easterly to the northeast corner of the southwest quarter of said section; thence northerly to the northwest corner of the northeast quarter of said section; thence easterly to the northeast corner of said section; thence northerly to the northwest corner of the southwest quarter of section seven, township thirty-five north, range fourteen west; thence easterly to the northeast corner of the southwest quarter of said section; thence northerly to the northwest corner of the southeast quarter of section six, said township; thence easterly to the northeast corner of the southwest quarter of section four, said township; thence southerly to the northwest corner of the southeast quarter of section nine, said township; thence easterly to the northeast corner of the southeast quarter of said section; thence southerly to the northwest corner of section twenty-two, said township; thence easterly to the northeast corner of the northwest quarter of said section; thence southerly to the northwest corner of the southeast quarter of said section; thence easterly to the northeast corner of the southeast quarter of said section; thence southerly to the northwest quarter of section twenty-six, said township; thence easterly to the northeast corner of the northwest quarter of said section; thence southerly to the southeast corner of the southwest quarter of section thirty-five, said township; thence easterly to the northeast corner of section two, township thirty-four north, range fourteen west; thence southerly along the section line between sections one and two and between sections eleven and twelve to the northern boundary of the southern Ute Indian Reservation; thence westerly along the northern boundary of said reservation to the center of section nine, township thirty-four north, range sixteen west; thence northerly along the quarter-section lines to the northwest corner of the southeast quarter of section twenty-eight, township thirty-five north, range sixteen west; thence easterly to the northeast corner of the southeast quarter of said section; thence northerly to the northwest corner of section twenty-seven, said township, the place of beginning. (U.S.C., title 16, sec. 111.)

Name.

SEC. 2. That said public park shall be known as the Mesa Verde National Park, and shall be under the exclusive control of the Secretary of the Interior, whose

Regulations.

duty it shall be to prescribe such rules and regulations and establish such service as he may deem necessary for the care and management of the same. Such regulations shall provide specifically for the preservation from injury or spoliation of the ruins and other works and relics of prehistoric or primitive man within said park (U.S.C., title 16, sec. 112): *Provided*, That all prehistoric ruins that are situated within five miles of the boundaries of said park, as herein described, on Indian lands and not

Proviso. Prehistoric ruins.

on lands alienated by patent from the ownership of the United States, are hereby placed under the custodianship of the Secretary of the Interior, and shall be administered by the same service that is established for the custodianship of the park.

Excavations, etc.

SEC. 3. That the Secretary of the Interior be, and he is hereby, authorized to permit examinations, excavations, and other gathering of objects of interest within said park by any person or persons whom he may deem properly qualified to conduct such examinations, excavations, or gatherings, subject to such rules and regulations as he may prescribe: *Provided always*, That the examinations, excavations, and gatherings are undertaken only for the benefit of some reputable museum, university, college, or other recognized scientific or educational institution, with a view to increasing the knowledge of such objects and aiding the general advancement of archæological science. (U.S.C., title 16, sec. 113.)

Proviso. Restriction.

Penalty for destroying ruins, etc.

SEC. 4. That any person or persons who may otherwise in any manner willfully remove, disturb, destroy, or molest any of the ruins, mounds, buildings, graves, relics, or other evidences of an ancient civilization or other property from said park shall be deemed guilty of a misdemeanor, and upon conviction before any court having jurisdiction of such offenses shall be fined not more than one thousand dollars or imprisoned not more than twelve months, or such person or persons may be fined and imprisoned, at the discretion of the judge, and shall be required to restore the property disturbed, if possible. (U.S.C., title 16, sec. 114.)

Excerpt from "An Act Making appropriations to supply deficiencies in appropriations for the fiscal year 1910, and for other purposes," approved June 25, 1910 (36 Stat. 796)

Mesa Verde National Park. Leases, etc., permitted. (Amended by 46 Stat. 1043. See p. 135.)

The Secretary of the Interior may, upon terms and conditions to be fixed by him, grant leases and permits for the use of the land or development of the resources thereof, in the Mesa Verde National Park, and the funds derived therefrom shall be covered into the Treasury of the United States: *Provided*, That such leases or grants shall not include any of the prehistoric ruins in said park or exclude the public from free or convenient access thereto; * * *

Proviso. Conditions. Expenses.

Excerpt from "An Act Making appropriations for the current and contingent expenses of the Bureau of Indian Affairs, for fulfilling treaty stipulations with various Indian tribes, and for other purposes, for the fiscal year ending June 30, 1914," approved June 30, 1913 (38 Stat. 82)

Agreement with Wiminuche Band of Southern Ute Indians, Colo.

That an agreement, made at the Navajo Springs Indian Agency, in the State of Colorado, on the tenth day of May, in the year of our Lord nineteen hundred and eleven, with the Wiminuche Band of Southern Ute In-

dians, belonging to the jurisdiction of the Navajo Springs Indian Agency, be, and the same is hereby, modified and amended to read as follows:

"ARTICLE I

Lands relinquished.

"The said Wiminuche Band of Southern Ute Indians hereby agrees to relinquish and surrender to the United States of America all its right, title, and interest in and to that portion of its reservation described as follows:

"Beginning at a point on the north boundary of the Southern Ute Indian Reservation in southwestern Colorado where the north quarter corner of unsurveyed fractional section two (2), township thirty-four (34) north, range fifteen (15) west, 'south of the Ute boundary,' intersects the same; thence south to the south quarter corner of unsurveyed section twenty-six (26), said township; thence west to the southwest corner of unsurveyed section twenty-five (25), township thirty-four (34) north, range sixteen (16) west; thence north to the northwest corner of unsurveyed fractional section one (1), said township; thence east to the north quarter corner of unsurveyed fractional section two (2), township thirty-four (34) north, range fifteen (15) west, 'south of the Ute boundary,' the place of beginning; fourteen thousand five hundred and twenty (14,520) acres, more or less, lying and being in Montezuma County, State of Colorado.

"ARTICLE II

Lands to be conveyed in exchange.

"In consideration for the lands relinquished and surrendered as aforesaid the United States hereby agrees to convey to said Wiminuche Band of Southern Ute Indians in exchange therefor lands lying within the present boundaries of the Mesa Verde National Park and from the public domain, said lands to become a part of the reservation of said Wiminuche Band of Southern Ute Indians and to take on the same character and title as the rest of the land of the said reservation, of which they become a part by virtue of this agreement, and described as follows:

"Sections one (1), two (2), three (3), four (4), five (5), fractional sections eight (8), nine (9), ten (10), eleven (11), twelve (12), in township thirty-four (34) north, range sixteen (16), west, 'north of the Ute boundary'; also sections twenty-five (25), twenty-six (26), twenty-seven (27), southeast quarter section twenty-eight (28), sections thirty-two (32), thirty-three (33), thirty-four (34), thirty-five (35), and thirty-six (36), township thirty-five (35) north, range sixteen (16) west, containing ten thousand and eighty (10 080) acres, more or less.

"Also sections five (5) and six (6) and fractional sections seven (7) and eight (8) (unsurveyed) in township

thirty-four (34) north, range seventeen (17) west, 'north of the Ute boundary,' and sections one (1), two (2), three (3), four (4), five (5), and fractional sections eight (8), nine (9), ten (10), eleven (11), and twelve (12) (unsurveyed), in township thirty-four (34) north, range eighteen (18) west, 'north of the Ute boundary,' and sections nineteen (19), twenty (20), twenty-nine (29), thirty (30), thirty-one (31), and thirty-two (32), in township thirty-five (35) north, range seventeen (17) west, and sections twenty (20), twenty-one (21), twenty-two (22), twenty-three (23), twenty-four (24), twenty-five (25), twenty-six (26), twenty-seven (27), twenty-eight (28), twenty-nine (29), thirty-two (32), thirty-three (33), thirty-four (34), thirty-five (35), and thirty-six (36) in township thirty-five (35) north, range eighteen (18), west, New Mexico principal meridian, containing twenty thousand one hundred and sixty (20,160) acres, more or less.

Additional.

"And in case it be found that any portion of the lands herein described have been entered or patented under any of the land laws of the United States, then, and in that event, it is stipulated and agreed that public lands of an equal amount and like character and lying adjacent to the lands herein described be substituted and given to said Wiminuche Band of Southern Ute Indians, to make the total area of lands to be given in amount equal to the above-described lands, the total area in said western tract to contain twenty thousand one hundred and sixty (20,160) acres.

"ARTICLE III

Annuities, etc., not impaired.

"Nothing in this agreement shall be construed to deprive the Indians parties hereto of any annuities or benefits to which they are entitled under existing laws and treaties.

"ARTICLE IV

Ratification required.

"This agreement shall become effective and binding on the parties hereto when ratified by the Congress of the United States."

Agreement confirmed.

That the said agreement be, and the same is hereby, accepted, ratified, and confirmed as herein amended.

Additional lands to be conveyed.

That the Secretary of the Interior is hereby authorized to add to the area conveyed to the Indians in exchange for the lands relinquished any tracts of unappropriated public land adjoining thereto which may be necessary to make the total area of the acreage ceded to the Indians in lieu of that lost to them by any prior existing valid rights attaching thereto.

Mesa Verde National Park. Boundaries extended. Vol. 34, p. 616.

That the boundary of the Mesa Verde National Park, created by the Act of Congress approved June twenty-ninth, nineteen hundred and six (Thirty-fourth Statutes at Large, page six hundred and sixteen), is hereby extended on the south so as to include the land relinquished

by the Indians in the foregoing agreement as herein provided and the boundaries of said park shall hereafter be defined as follows:

Description.

Beginning at a point on the north boundary of the Southern Ute Indian Reservation in southwestern Colorado where the north quarter corner of unsurveyed fractional section two (2), township thirty-four (34) north, range fifteen (15) west, "south of the Ute boundary," intersects the same; thence south to the south quarter corner of unsurveyed section twenty-six (26), said township; thence west to the southwest corner of unsurveyed section twenty-five (25), township thirty-four (34) north, range sixteen (16) west; thence north to the northwest corner of unsurveyed fractional section one (1), said township and range; thence west to the southeast corner of fractional section twelve (12), township thirty-four (34) north, range sixteen (16) west, "north of the Ute boundary"; thence north to the northwest corner of section nineteen (19), township thirty-five (35) north, range fifteen (15) west; thence east to the southwest corner of the southeast quarter of section sixteen (16), said township; thence north to the northwest corner of the southeast quarter of said section; thence east to the southwest corner of the northeast quarter of section thirteen (13), said township; thence north to the northwest corner of the northeast quarter of said section; thence east to the southwest corner of section seven (7), township thirty-five (35) north, range fourteen (14) west; thence north to the northwest corner of said section; thence east to the southwest corner of section five (5), said township; thence north to the northwest corner of said section; thence east to the northeast corner of said section; thence south to the southeast corner of the northeast quarter of said section; thence east to the northeast corner of the southwest quarter of section four (4), said township; thence south to the northwest corner of the southeast quarter of section sixteen (16), said township; thence east to the northeast corner of the southeast quarter of said section; thence south to the northwest corner of section twenty-two (22), said township; thence east to the northeast corner of said section; thence south to the northwest corner of section twenty-six (26), said township; thence east along the north section line of section twenty-six (26) to the east bank of the Rio Mancos; thence in a southeasterly direction along the east bank of the Rio Mancos to its intersection with the northern boundary line of the Southern Ute Indian Reservation; thence west along said Indian reservation boundary to its intersection with the range line between ranges fourteen (14) and fifteen (15) west, the place of beginning. (U.S.C., title 16, sec. 111.)

Included in Park control, etc.

And the provisions of the Act of June twenty-ninth, eighteen hundred and ninety-six, creating the park, are hereby extended over the same.

So much of the Act of June twenty-ninth, nineteen hundred and six, as provides that the custodianship of the Secretary of the Interior shall extend over all prehistoric ruins situated within five miles of the eastern, western, and northern boundaries of the park, as described in said Act, not on lands alienated by patent from the ownership of the United States, is hereby repealed.

Custody of adjoining prehistoric ruins repealed. Vol. 37, p. 617.

Excerpt from "An Act Making appropriations for sundry civil expenses of the Government for the fiscal year ending June 30, 1918, and for other purposes," approved June 12, 1917 (40 Stat. 152)

The Secretary of the Interior is authorized to accept patented lands or rights of way over patented lands in the Mesa Verde National Park that may be donated for park purposes. (U.S.C., title 16, sec. 116.)

Mesa Verde National Park, Colo. Acceptance of donated lands, etc. (Repealed by 46 Stat. 1028, but subject matter covered by U.S.C., title 16, sec. 6, 41 Stat. 917. See p. 13.)

Act of General Assembly of Colorado, approved May 2, 1927, ceding to the United States exclusive jurisdiction over the Mesa Verde National Park in the State of Colorado (Session Laws of Colorado, 1927, p. 481)

Be it enacted by the General Assembly of the State of Colorado:

SECTION 1. Exclusive jurisdiction shall be and the same is hereby ceded to the United States over and within all the territory which is now or may hereafter be included in that tract of land in the State of Colorado set aside and dedicated for park purposes by the United States, known as Mesa Verde National Park, saving, however, to the State of Colorado the right to serve civil or criminal process within the limits of the aforesaid park, in suits or prosecutions for or on account of rights acquired, obligations incurred, or crimes committed outside of said park, and saving further to the said State the right to tax persons and corporations, their franchises and property on the lands included in said tracts, and saving also to the persons residing in said park now or hereafter the right to vote at all elections held within the county or counties in which said tracts are situated: *Provided, however*, That jurisdiction shall not vest in the United States now or hereafter over any lands included within said park until the United States, through its proper officer, notifies the State of Colorado, through its Governor, that the United States assumes police jurisdiction over the respective tracts involved.

An Act To accept the cession by the State of Colorado of exclusive jurisdiction over the lands embraced within the Mesa Verde National Park, and for other purposes, approved April 25, 1928 (45 Stat. 453)

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the provisions of the act of the Legislature of the State of Colorado, approved May 2, 1927, ceding to the United States exclusive jurisdiction over the territory

Mesa Verde National Park, Colo. Acceptance of jurisdiction of Colorado over territory included in.

Rights reserved to State.

embraced and included within the Mesa Verde National Park, are hereby accepted, and sole and exclusive jurisdiction is hereby assumed by the United States over such territory, saving, however, to the State of Colorado the right to serve civil or criminal process within the limits of the aforesaid park in suits or prosecutions for or on account of rights acquired, obligations incurred, or crimes committed outside of said park; and saving further to the said State the right to tax persons and corporations, their franchises and property on the lands included in said tracts; and saving also to the persons residing in said park now or hereafter the right to vote at all elections held within the county or counties in which said tracts are situated. All the laws applicable to places under the sole and exclusive jurisdiction of the United States shall have force and effect in said park. All fugitives from justice taking refuge in said park shall be subject to the same laws as refugees from justice found in the State of Colorado. (U.S.C., 6th supp., title 16, sec. 117.)

Application of United States laws. Extradition of criminals.

Assigned to Colorado judicial district.

SEC. 2. That said park shall constitute a part of the United States judicial district for the State of Colorado, and the district court of the United States in and for said district shall have jurisdiction of all offenses committed within said boundaries. (U.S.C., 6th supp., title 16, sec. 117a.)

Punishment of offenses against State laws.

SEC. 3. That if any offense shall be committed in the Mesa Verde National Park, which offense is not prohibited or the punishment for which is not specifically provided for by any law of the United States, the offender shall be subject to the same punishment as the laws of the State of Colorado in force at the time of the commission of the offense may provide for a like offense in said State; and no subsequent repeal of any such law of the State of Colorado shall affect any prosecution for said offense committed within said park. (U.S.C., 6th supp., title 16, sec. 117b.)

Hunting, fishing, etc., prohibition.

SEC. 4. That all hunting or the killing, wounding, or capturing at any time of any wild bird or animal, except dangerous animals when it is necessary to prevent them from destroying human lives or inflicting personal injury, is prohibited within the limits of said park; nor shall any fish be taken out of the waters of the park in any other way than by hook and line, and then only at such seasons and in such times and manner as may be directed by the Secretary of the Interior. That the Secretary of the Interior shall make and publish such general rules and regulations as he may deem necessary and proper for the management and care of the park and for the protection of the property therein, especially for the preservation from injury or spoliation of the ruins and other works and relics of prehistoric or primitive man, all timber, natural curiosities, or wonderful objects

Regulations, etc., to be prescribed.

within said park, and for the protection of the animals and birds in the park from capture or destruction, and to prevent their being frightened or driven from the park; and he shall make rules and regulations governing the taking of fish from the streams or lakes in the park. Possession within said park of the dead bodies, or any part thereof, of any wild bird or animal shall be prima facie evidence that the person or persons having the same are guilty of violating this Act. Any person or persons, or stage or express company, or railway company, who knows or has reason to believe that they were taken or killed contrary to the provisions of this Act and who receives for transportation any of said animals, birds, or fish so killed, caught, or taken, or who shall violate any of the provisions of this Act or any rule or regulation that may be promulgated by the Secretary of the Interior with reference to the management and care of the park or for the protection of the property therein, for the preservation from injury or spoliation of the ruins and other works and relics of prehistoric or primitive man, and timber, natural curiosities, or wonderful objects within said park, or for the protection of the animals, birds, or fish in the park, or who shall within said park commit any damage, injury, or spoliation to or upon any building, fence, hedge, gate, guidepost, tree, wood, underwood, timber, garden, crops, vegetables, plants, land, springs, natural curiosities, or other matter or thing growing or being thereon or situated therein, shall be deemed guilty of a misdemeanor and shall be subject to a fine of not more than $500 or imprisonment not exceeding six months, or both, and be adjudged to pay all costs of the proceedings: *Provided*, *however*, That any person or persons who may, without permission from the Secretary of the Interior, in any manner willfully remove, disturb, destroy, or molest any of the ruins, mounds, buildings, graves, relics, or other evidences of an ancient civilization from said park shall upon conviction before any court having jurisdiction of such offenses be fined not more than $1,000 or imprisoned not more than twelve months, or such person or persons may be fined and imprisoned, at the discretion of the judge, and shall be required to restore the property disturbed, if possible. (U.S.C., 6th supp., title 16, sec. 117c.)

Evidence of violations.

Punishment for violating provisions hereof, etc.

Proviso. Additional punishment for molesting ruins, etc.

SEC. 5. That all guns, traps, teams, horses, or means of transportation of every nature or description used by any person or persons within said park limits when engaged in killing, trapping, ensnaring, or capturing such wild beasts, birds, or animals shall be forfeited to the United States and may be seized by the officers in said park and held pending the prosecution of any person or persons arrested under charge of violating the provisions of this Act, and upon conviction under this Act of such person or persons using said guns, traps, teams, horses,

Forfeiture of guns, traps, etc., illegally used.

or other means of transportation, such forfeiture shall be adjudicated as a penalty in addition to the other punishment provided in this Act. Such forfeited property shall be disposed of and accounted for by and under the authority of the Secretary of the Interior. (U.S.C., 6th supp., title 16, sec. 117d.)

Commissioner for. Appointment, authority, etc.

SEC. 6. That the United States District Court for the State of Colorado shall appoint a commissioner who shall reside in the park and who shall have jurisdiction to hear and act upon all complaints made of any violations of law or of the rules and regulations made by the Secretary of the Interior for the government of the park and for the protection of the animals, birds, and fish, and objects of interest therein, and for other purposes authorized by this Act.

Judicial powers in violations of rules, etc.

Such commissioner shall have power, upon sworn information, to issue process in the name of the United States for the arrest of any person charged with the commission of any misdemeanor, or charged with a violation of the rules and regulations, or with a violation of any of the provisions of this Act prescribed for the government of said park and for the protection of the animals, birds, and fish in said park, and to try the person so charged, and, if found guilty, to impose punishment and to adjudge the forfeiture prescribed.

Appeals to district court.

In all cases of conviction an appeal shall lie from the judgment of said commissioner to the United States District Court for the State of Colorado, and the United States district court in said district shall prescribe the rules of procedure and practice for said commissioner in the trial of cases and for appeal to said United States district court. (U.S.C., 6th supp., title 16, sec. 117e.)

Procedure in criminal cases.

SEC. 7. That such commissioner shall also have power to issue process as hereinbefore provided for the arrest of any person charged with the commission within said boundaries of any criminal offense not covered by the provisions of section 4 of this Act to hear the evidence introduced, and if he is of opinion that probable cause is shown for holding the person so charged for trial shall cause such person to be safely conveyed to a secure place of confinement within the jurisdiction of the United States District Court for the State of Colorado, and certify a transcript of the record of his proceedings and the testimony in the case to said court, which court shall have jurisdiction of the case: *Provided*, That the said commissioner shall grant bail in all cases bailable under the laws of the United States or of said State. (U.S.C., 6th supp., title 16, sec. 117f.)

Proviso. Bail.

Service of process.

SEC. 8. That all process issued by the commissioner shall be directed to the marshal of the United States for the district of Colorado, but nothing herein contained shall be so construed as to prevent the arrest by any officer or employee of the Government or any person employed by the United States in the policing of said reser-

Summary arrests.

vation within said boundaries without process of any person taken in the act of violating the law or this Act or the regulations prescribed by said Secretary as aforesaid. (U.S.C., 6th supp., title 16, sec. 117g.)

Pay of commissioner.

SEC. 9. That the commissioner provided for in this Act shall be paid an annual salary as appropriated for by Congress, payable quarterly: *Provided*, That the said commissioner shall reside within the exterior boundaries of said Mesa Verde National Park, at a place to be designated by the court making such appointment: *And provided further*, That all fees, costs, and expenses collected by the commissioner shall be disposed of as provided in section 11 of this Act. (U.S.C., 6th supp., title 16, sec. 117h.)

Proviso. Residence required. Disposal of fees, etc.

United States fees.

SEC. 10. That all fees, costs, and expenses arising in cases under this Act and properly chargeable to the United States shall be certified, approved, and paid as are like fees, costs, and expenses in the courts of the United States. (U.S.C., 6th supp., title 16, sec. 117i.)

Deposit of fines and costs.

SEC. 11. That all fines and costs imposed and collected shall be deposited by said commissioner of the United States, or the marshal of the United States collecting the same, with the clerk of the United States District Court for the State of Colorado. (U.S.C., 6th supp., title 16, sec. 117j.)

Acceptance of cession.

SEC. 12. That the Secretary of the Interior shall notify, in writing, the Governor of the State of Colorado of the passage and approval of this Act.

Excerpt from "An Act Making appropriations for the Department of the Interior for the fiscal year ending June 30, 1931, and for other purposes," approved May 14, 1930 (46 Stat. 315)

Mesa Verde National Park, Colo. Operation of Aileen Nusbaum Hospital.

Appropriations made for Mesa Verde National Park shall be available for the operation of the Aileen Nusbaum Hospital and the furnishing of the necessary service in connection therewith at rates to be fixed by the Secretary of the Interior. (U.S.C., 6th supp., title 16, sec. 118.)

Excerpt from "An Act To provide for uniform administration of the national parks by the United States Department of the Interior, and for other purposes," approved January 26, 1931 (46 Stat. 1043)

National parks, administration. Mineral prospecting, etc., Mesa Verde, Colo., forbidden. (Amends 36 Stat. 796. See p. 127.)

No permit, license, lease, or other authorization for the prospecting, development, or utilization of the mineral resources within the Mesa Verde National Park, Colorado, * * * shall be granted or made. (U.S.C., 6th supp., title 16, sec. 115.)

An Act To provide for the addition of certain lands to the Mesa Verde National Park, Colorado, and for other purposes, approved February 26, 1931 (46 Stat. 1422)

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That for the purpose of protecting the scenery

Mesa Verde National Park, Colo. Additions to, authorized.

along the Point Lookout Road between the north boundary of the Mesa Verde National Park and this road's juncture with the Cortez-Mancos Road, the President of the United States is hereby authorized, upon the recommendation of the Secretary of the Interior, to add to the said Mesa Verde National Park, Colorado, by executive proclamation, a strip of land two hundred and sixty feet wide along and including said Point Lookout Road, and the triangle formed by the fork in said road and such other public land along or adjacent to said road and right of way and lands as may be acquired by gift or by exchanges as hereinafter provided, which lands shall thereupon become and be a part of said park subject to all laws and regulations applicable thereto. (U.S.C., 6th supp., title 16, sec. 111.)

Acceptance of donations.

SEC. 2. That for the purpose of carrying out the provisions of this Act the Secretary of the Interior is hereby authorized to accept donations of land or right of way, or to acquire title to any land along or adjacent to the said Point Lookout Road as may be deemed desirable by him for the protection of said road. by exchange for any unappropriated public lands within sections 29 and 32, township 36 north, range 14 west, New Mexico principal meridian, of equal value; the value of the lands offered for exchange hereunder and the value of the lands of the United States to be selected therefor shall be ascertained in such manner as the Secretary of the Interior may direct; and the owners of lands offered to the United States pursuant hereto shall, before the exchange is effective, furnish the Secretary of the Interior evidence satisfactory to him of title to the lands offered in exchange.

Exchange authorized.

Value ascertained.

Title.

11. Mesa Verde National Park

BY THE PRESIDENT OF THE UNITED STATES OF AMERICA

A PROCLAMATION

[No. 1998—May 27, 1932—47 Stat. 2511]

WHEREAS Congress by act of February 26, 1931 (46 Stat. 1422–1423), entitled "AN ACT To provide for the addition of certain lands to the Mesa Verde National Park, Colorado, and for other purposes," authorized the President of the United States, upon the recommendation of the Secretary of the Interior, to add to said park by Executive proclamation a strip of land 260 ft. wide along and including Point Lookout Road between the north boundary of the Mesa Verde National Park and the junction with the Cortez-Mancos Road and the triangle formed by the fork in said Point Lookout Road and lands along or adjacent to said road and right of way as may be acquired by gift or by exchanges, and such other public lands along or adjacent to said road and right of way as may be recommended; and

WHEREAS by deed dated March 11, 1932, there was conveyed to the United States a strip of land 260 ft. wide along the said Point Lookout Road in accordance with the act of February 26, 1931; and

WHEREAS for consideration as a part of the Point Lookout Road, by Executive Order No. 5424, dated August 15, 1930, there was withdrawn from public disposition, in aid of legislation, the E. ½ SW. ¼ sec. 32, T. 36 N., R. 14 W., New Mexico principal meridian; and

WHEREAS the said Secretary of the Interior has recommended the addition to the park of the lands hereinafter described; and

WHEREAS it appears that the public interest would be promoted by including the above-mentioned strip of 260 ft. in width and a part of the said E. ½ SW. ¼ sec. 32 within said park, for preservation, scenic, and road-protection purposes;

NOW, THEREFORE, I, Herbert Hoover, President of the United States of America, do proclaim that, subject to all valid existing rights, the lands hereinafter described shall be, and are hereby, added to and made a part of said park, and they are hereby made subject to the provisions of the act of August 25, 1916 (39 Stat. 535), entitled "AN ACT To establish a National Park Service, and for other purposes," and all acts supplementary thereto and amendatory thereof and all other laws and rules and regulations applicable to and extending over the said park;

NEW MEXICO PRINCIPAL MERIDIAN

T. 36 N., R. 14 W., SE. ¼ NE. ¼ SW. ¼, SE. ¼ SW. ¼ sec. 32, and a parcel of land which has been conveyed to the United States in the SE. ¼ SE. ¼ sec. 29, and E. ½ NE. ¼, NE. ¼ SE. ¼, and W. ½ SE. ¼ sec. 32, described as follows: All that part or parts of the SE. ¼ SE. ¼ sec. 29, E. ½ NE. ¼, NE. ¼ SE. ¼, and W. ½ SE. ¼ sec. 32, T. 36 N., R. 14 W. of the New Mexico principal meridian, lying 130 ft. on each side of the center line of the present public road between the north boundary of the Mesa Verde National Park and the Cortez-Mancos State Highway, together with all the land within 130 ft. on each side of the center line of the two curves of the said road as they enter the Cortez-Mancos State Highway,

and all the land lying between the two said curves and the said Cortez-Mancos Highway; said parcel of land being more particularly described as follows: 130 ft. in width on each side of a line beginning at a point on the north boundary of the Mesa Verde National Park, and on the south section line of said sec. 32, 263 ft. west of the quarter-section corner of said sec. 32, and running thence, following the center line of said highway, N. 21°6′ W. 300 ft., thence on a 10° curve to right 550 ft., thence N. 33°54′ E. 479.5 ft., thence N. 33°54′ E. 130 ft., thence on a 6° curve to right 408.3 ft., thence N. 58°24′ E. 359.9 ft., thence on a 2° curve to left 196.7 ft., thence N. 54°28′ E. 656.4 ft., thence on a 20° curve to left 203.8 ft., thence N. 13°43′ E. 771.4 ft., thence on a 6° curve to left 460 ft., thence N. 13°53′ W. 350 ft., thence on a 6° curve to right 750 ft., thence N. 31°07′ E. 398.3 ft.; said parcel being, further, 130 ft. in width on the right side of a line beginning at the north end of said course N. 31°07′ E., and running thence on a 27° curve to right 316.5 ft., and thence S. 58°53′ E. 200 ft., to an intersection with the Cortez-Mancos Highway, and 130 ft. in width on the left side of a line beginning at the north end of said course N. 31°07′ E., and running thence on a 27° curve to left 301.7 ft., and thence on a 4° curve to right 200 ft., to an intersection with the Cortez-Mancos Highway, and together with the land lying between the said two 27° curves; containing approximately 60.2 acres.

IN WITNESS WHEREOF, I have hereunto set my hand and caused the seal of the United States to be affixed.

DONE at the City of Washington this 27th day of May, in the year of our Lord nineteen hundred and thirty-two, and of the Independence of the United States of America the one hundred and fifty-sixth.

[SEAL]

HERBERT HOOVER.

By the President:

HENRY L. STIMSON,
Secretary of State.

MESA VERDE NATIONAL PARK—COLORADO

PUBLIC LAW 88-235; 77 STAT. 473

[H. R. 6756]

An Act to revise the boundaries of Mesa Verde National Park, Colorado, and for other purposes.

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

The boundaries of Mesa Verde National Park are hereby revised to include the following described lands which, subject to valid existing rights, shall be administered as a part of the park in accordance with the Act entitled "An Act to establish a National Park Service, and for other purposes," approved August 25, 1916 (39 Stat. 535), as amended and supplemented (16 U.S.C. 1 et seq.) [30]:

NEW MEXICO PRINCIPAL MERIDIAN, COLORADO

Township 36 North, Range 14 West

Section 29: All portions of the south half and the southeast quarter northwest quarter lying south and west of the right-of-way of United States Highway 160.

Section 32: Those portions of the section lying south and west of the right-of-way of United States Highway 160, except the north entrance road to the park, the southeast quarter southwest quarter, and the southeast quarter northeast quarter southwest quarter.

Section 33: That portion of the northwest quarter northwest quarter, more particularly described as follows: Beginning at a point on the west line of section 33 which is 456.5 feet south of the northwest corner of section 33, thence running south along the west line of section 33 for a distance of 373.0 feet, thence running east for a distance of 516.8 feet, thence running north for a distance of 132.7 feet, thence running north 65 degrees 00 minutes west for a distance of 570.0 feet along the southwesterly right-of-way of Highway 160 to the point of beginning.

Sec. 2. The Secretary of the Interior may acquire by purchase, with donated or appropriated funds, lands and interests in lands within the boundaries of Mesa Verde National Park as revised by section 1 of this Act.

Sec. 3. There are hereby authorized to be appropriated such sums, but not more than $125,000, as may be necessary to carry out the provisions of this Act.

Approved December 23, 1963.

30. 16 U.S.C.A. § 1 et seq.

APPENDIX B

Contracts, Permits and Letters of Agreement

Contracts

1. Contract No: NPS-WASO-IX-64-1
   Effective Dates: 11/1/63 thru 10/31/83
   Type: Concessioner, Mesa Verde Company -- To provide all accommodations, facilities and services for the public with the exception of those authorized in the following contract.

2. Contract No: 9900C20046
   Effective Dates: 1/1/73 thru 12/31/77
   Type: Concessioner, MV Pack and Saddle -- To provide guided horseback tours in Mesa Verde.

3. Contract No: 14-10-0333-1504
   Effective Dates: 20 years from effective date of July 1, 1965
   Type: Contract for Electric Power facilities and services for Mesa Verde National Park, Colorado, with Empire Electric.

4. Contract No: 14-10-0333-976
   Effective Dates: 10 years and thereafter effective Sept. 17, 1962
   Type: Contract for Electric Power facilities and services Square Tower area of Hovenweep National Monument, with Empire Electric.

5. Contract No: CX-2000-4-0004
   Effective Dates: July 23, 1973 thru June 15, 1974
   Type: University of Colorado to survey all archeological sites in Mesa Verde National Park.

Permits

1. National Park Service Contract No. NPS-WASO-IX-64-1, one year renewable. Building Use Permit with Mesa Verde Company

2. National Park Service Contract No. 3-307-20, one year renewable. United States Forest Service, San Juan National Forest, Radio Mast at Park Point.

3. Bureau of Land Management Contract No. U-16045, effective 2/14/72 and continuing for 10 years. Special Land Use Permit at Hovenweep National Monument for trash disposal.

4. National Park Service Contract No. 3-307-18, expires 6/30/75 with U. S. Post Office.

5. National Park Service Contract No. 3-307-21, expires 12/31/74 with Bureau of Reclamation. Radio Mast at Park Point.

6. United States Forest Service Special Use Permit. Right-of-way for maintaining tool house and pipline at water intake.

Letters of Agreement

1. Memorandum of Supplemental Agreement between National Park Service and Mesa Verde Co. Transportation subject to and bound by the provisions of Contract #NPS-WASO-IX-64-1.

2. Memorandum of Understanding between the National Park Service and the Bureau of Reclamation. No. 177r-666, relating to the use of water from Jackson Gulch Reservoir for Mesa Verde National Park.

3. Agreement between GSA Motor Equipment Division and Mesa Verde National Park effective 4/1/73 indefinitely for vehicle rental.

4. Agreement between National Park Service and Bureau of Land Management effective 1/15/73 for signing trails at Hovenweep National Monument Square Tower group to Holly Tower group.

5. Agreement between National Park and Bureau of Land Management effective March 3, 1962 and ongoing - Cooperative Fire Reconnaissance.

6. Agreement between Bureau of Indian Affairs, Ute Mountain Agency and National Park Service for Cooperative Fire Agreement - Pending.

Inholdings

Mr. Lee Sheek, 315.8 acres
T. 35N, R14W, Sec. 26 & 35
T. 34N, R14W, Sec. 1 & 12

Mr. Douglas Hindmarsh, 232.14 acres
T. 36N, R14W, Sec. 29 & 32

APPENDIX C

Cultural Sequences at Mesa Verde

Basketmaker 11 (?A.D. 1 to 450-475): While this period so far is not identifiable locally, remains are found in immediately adjacent areas. Widespread occupation of the mesa in the ensuing period may well indicate prior knowledge of its resources. Use during this stage may have been seasonal If cliff alcoves were utilized as campsites, construction centuries later of masonry-walled cliff dwellings would have effectively concealed or obliterated traces of such earlier occupation. Concentrations of burned stone, chipped stone, charcoal and occupational debris, but no pottery, which are scattered irregularly over the mesa tops, possibly mark campsites of this period, though they may equally well be post-A.D. 1300 or be work areas dating from the occupation. Such sites need extensive testing.

This was essentially a semi-nomadic, non-ceramic stage with an apparent absence of substantial habitations except in the Durango area east of Mesa Verde. Agriculture was practiced, corn and squash being grown, but foraging and hunting were important occupations. Formal burial customs and use of ceremonial paraphernalia point to an established complex of religious beliefs and practices. Weaving

was an important craft; the profusion of baskets he found in graves of this period led Richard Wetherill, in the 1890's to refer to the people as "Basketmakers."

Other specific trails are: yucca fiber, linen, nettle and human hair cordage; coiled basketry; twined bags; matting; square toed sandals, often fringed; belts, tumplines, sashes and aprons; fur-cloth blankets and hide robes; beads and pendants of stone, bone, wood, shell, berries and seeds; flexible cradles; atlatl and throwing spear and curved, grooved clubs; digging sticks; wooden scoops and small boxes; bone implements and tools; chipped stone drills, knives, scrapers and dart points, flat metates and manos; stone pipes; horn blades and wrenches; unfired clay vessels.

The above inventory, with a few additions, serves very well for later periods. To quote Erik K. Reed, "Most of the 'Basketmaker' traits *** continued in use, except those which were supersided by new introductions *** the great majority of implements of stone, bone, and wood; basketry containers; sandals, and various textile items carried right on with only minor changes. In fact, virtually all continued up to the later prehistoric Pueblo periods with rather slight modifications and very few losses or disappearances. The story is one of continuous addition of new elements, some locally developed and some introduced." (The Greater Southwest, in Prehistoric Man in the New

World, University of Chicago Press, 1964, page 181.) The most notable addition of course is that of increasing use of ceramics and increasing skill in their manufacture.

Basketmaker 111(A.D. 450-475 to 750-775): Increasing acceptance of and dependence on agriculture toward the end of Basketmaker 11 forced the people to more or less abandon their semi-nomadic way of life. The beginning of this period throughout the San Juan area is marked by construction of permanent, semi-subterranean houses (pithouses) clustered in small villages. In these habitations, division of labor and/or use is indicated, the living and often ceremonial sections of most pithouses being distinctly separated from the "kitchen," storage and general work areas. The basic culture remained much the same but settlement undoubtedly was responsible for many changes in social and religious practices. Hunting and foraging continued, the people making good use of their environment.

This period saw the introduction of pottery (or at least its universal acceptance and manufacture), notched stone axes and grooved stone mauls, trough metates, small stone projectile points, turquoise, parrot feathers, tobacco, beans (possibly known in Basketmaker 11 but not extensively utilized) and numerous minor items. The turkey was domesticated (?) and feather cloth replaced fur cloth to a great extent. The atlatl and throwing spear were abandoned in favor

of the bow and arrow. Crescent-toed sandals replaced square-toed footgear. The manufacture of twined bags declined and ceased. Arts and crafts continued to flourish and techniques improved.

Pueblo 1 (A.D. 750-775 to 900): This period saw the beginning of the Pueblo pattern of life we know today. Marked architectural changes took place which undoubtedly indicate evolvement of more formalized kinship, social and religious patterns. Pithouses were abandoned as living rooms in favor of vertical-walled, flat-roofed houses built in contiguous, southward-facing rows, often backed by a secondary row of small storage rooms. Slabs, posts, poles, stone and adobe were employed in varying combinations in constructing the houses, with stone masonry appearing late in the period. Fully subterranean pithouses, more accurately described as pitrooms, were constructed in the area south of the rows of houses. It is assumed on the basis of kiva location in the following period and known kiva use today, that these pitrooms served chiefly as men's society rooms and were used for "club" and ceremonial purposes. Long, sprawling villages of multiple units characterize this period.

Artificial cranial deformation started early in the period when the hard cradleboard replaced the flexible cradle of Basketmaker times. Cotton was introduced and loom-woven cloth was manufactured. Full-grooved axes came into use. Pointed-toed sandals replaced cresent-toed sandals. Shallow basket trays disappeared and plaited yucca

ring baskets became common. Black-on-white pottery became increasingly popular. There were some red wares and even some polychromes. A marked improvement in pottery took place late in the period when concentric coiling was dropped in favor of the spiral coiling technique of manufacture.

Pueblo 11 (A.D. 900-1100): With the development of almost universal acceptance in the eastern San Juan of coursed stone masonry, the large, sprawling villages of Pueblo 1 gave way to many small to fairly large "unit" pueblos. These substantial buildings were constructed in southward-facing rectangles, or in E, L, or U-shaped structures. True kivas, formal ceremonial rooms with specialized features characteristic of Pueblo culture from A.D. 900 to the present, replaced pitrooms in the area in front of the houses. Late in the period tower-like structures appeared, frequently connected to kivas by means of tunnels. By now all trash was dumped in the area south of the kivas to form sizable mounds. These mounds also were used as burial grounds.

The population was large and in areas like Mesa Verde water supplies were severely taxed. This period saw the introduction of reservoiring systems to provide water for domestic purposes. Draws were terraced to provide garden plots which would take advantage of sheetwater runoff.

Other than architectural advances, the most distinctive contribution of Pueblo 11 was in ceramics. Excellent pottery was made; there was a profusion of shapes and many styles of decoration. Standard utility ware was fully corrugated, the corrugations being manipulated to produce decorative effects approaching in variety the designs on painted wares. Jog-toed sandals replaced round or pointed-toed sandals. Flat metates replaced trough metates late in the period. There was steady advance in most arts and crafts, and by the end of the period, all basic Pueblo traits were established.

Pueblo 111 (A.D. 1100 to 1300): This was the climax period of Pueblo culture, and arts, crafts and architecture reached the peak of development. Material evidence, interpreted in light of what is known of present-day Pueblo culture, points to the people having a rigid social structure. The importance of religion is evidenced by the large number of kivas and construction of separate buildings apparently designed solely for ceremonial use. On the basis of cultural development and village location, this period is divided into two phases:

1. Early Phase--A.D. 1100 to 1200 or 1225: Multistoried compound pueblos were intramural kivas replaced unit pueblos and many earlier villages were abandoned. These villages were, for the most part, constructed in the upper reaches of the mesa. Excellent masonry

of well-shaped, pecked-face sandstone blocks laid in a minimum of mortar was used in construction. Outer walls of the pueblos were massive; there were no doorways to ground floor rooms unless such rooms opened onto enclosed courts; towers were common. Better pottery was made and decorations were more carefully applied. Fine craftsmanship was exercised in manufacture of tools and implements. Turkey bone artifacts appeared for the first time, indicating the bird now was used for food as well as for feathers. Throughout this and the following phase there was a gradual decline in population.

2. Late Phase--A.D. 1200-1225 to 1300: Marked by construction of the spectacularly located cliff dwellings, this phase saw the culmination of Pueblo culture in the Mesa Verde. Most mesa-top pueblos were abandoned in favor of cave and cliff ledge locations. The reservoiring systems of Pueblo 11 and early Pueblo 111 were elaborated, more terraces were constructed, and small farm houses, without kivas, were built near the garden plots. Beautifully made and elaborately decorated pottery characterized this phase. Due to preservation of perishable materials in the dry caves, it is known the people were adept at woodworking, were master weavers, tanners, and utilized numerous plant. There were many articles for personal adornment. The presence of items foreign to the Mesa Verde indicates extensive trade with other groups.

The cliff dwellings, highest architectural achievement of the Mesa Verde people, were not inhabited for long. The population declined rapidly as groups moved out of the area and by the late A.D. 1200's, or early 1300's, the San Juan Pueblo area was abandoned, the Anasazi moving south to the drainages of the Rio Grande and Little Colorado Rivers.

APPENDIX D

Annotated Checklist of Plants

Found in Mesa Verde National Park

	Scientific Name	Common Name
Tree Layer		
	Juniperus osteosperma	Utah juniper
	Pinus edulis	Pinyon pine
	Pinus ponderosa	Ponderosa pine
	Populus tremuloides	Quaking aspen
	Pseudotsuga menziesii	Douglas fir
Shrub Layer		
	Amelanchier utahensis	Utah serviceberry
	Artemisia tridentata	Big sagebrush
	Fendlera rupicola	Fendlerbush
	Odostemon aquifolium	Oregon grape
	Phlox hoodii	Phlox
	Purshia tridentata	Bitterbrush
	Quercus gambelii	Gambel oak
	Ribes leptanthum	Gooseberry

	Scientific Name	Common Name
Grass and Forb Layer		
	Agropyron smithii	Western wheatgrass
	Bouteloua gracilis	Blue grama
	Bromus tectorum	Cheatgrass
	Hilaria jamesii	Galleta
	Koeleria cristata	Junegrass
	Poa fendleriana	Muttongrass
	Stipa comata	Needle-and-thread

APPENDIX E

Annotated Checklist of Mammals

Found in Mesa Verde National Park

Bassariscus astutus	Ringtail
Canis latrans	Coyote
Castor canadensis	Beaver
Cervus canadensis	Wapiti
Cynomys gunnisoni	Gunnison's prairie dog
Dipodomys ordii	Ord's kangaroo rat
Eptesicus fuscus	Big brown bat
Erethizon dorsatum	Porcupine
Eutamias minimus	Least chipmunk
Felis concolor	Mountain lion
Lepus californicus	Black-tailed jackrabbit
Lynx rufus	Bobcat
Marmota flaviventris	Yellow-bellied marmot
Microtus longicandus	Long-tailed vole
Microtus mexicanus	Mexican vole
Microtus montanus	Montana vole
Mus musculus	House mouse
Mustela frenata	Long-tailed weasel
Mustela vison	Mink
Myotis californicus	California myotis
Myotis evotis	Long-eared myotis
Myotis subulatus	Small-footed myotis
Myotis thysanodes	Fringed myotis

APPENDIX F

Annotated Checklist of Amphibians and Reptiles

Found in Mesa Verde National Park

Ambystoma tigrinum	Utah tiger salamander
Bufo punctatus	Red-spotted toad
Bufo woodhousei	Rocky Mountain toad
Cnemidophorus velox	Plateau whiptail lizard
Crotalus viridis	Rattlesnake
Crotaphytus collaris	Yellow-headed collared lizard
Eumeces multivirgatus	Two-lined skink
Holbrookia maculata	Speckled earless lizard
Hypsiglena torquata	Mesa Verda night snake
Lampropeltis doliata	New Mexico milk snake
Masticophis taeniatus	Desert striped whip snake
Opheodrys vernalis	Western smooth green snake
Phrynosoma douglassi	Mountain short-horned lizard
Pituophis melanoleucus	Great basin gopher snake
Rana pipiens	Western leopard frog
Scaphiophus hammondi	Hammond's spadefoot toad
Sceloporus graciosus	Great basin sagebrush lizard
Sceloporus undulatus	Northern plateau lizard
Terrapene ornata	Ornate box turtle
Thamnophis elegans	Wandering garter snake
Uta stansburiana	Northern side-blotched lizard
Urosaurus ornatus	Northern tree lizard

Myotis volans	Long-legged myotis
Neotoma cinerea	Bushy-tailed wood rat
Neotoma mexicana	Mexican wood rat
Odocoileus hemionus	Mule deer
Ondatra zibethicus	Muskrat
Ovis canadensis	Bighorn
Peromyscus boyei	Brush mouse
Peromyscus crinitus	Canyon mouse
Peromyscus difficilis	Rock mouse
Peromyscus maniculatus	Deer mouse
Plecotus townsendii	Townsend's big-eared bat
Procyon lotor	Raccoon
Reithrodontomys megalotis	Western harvest mouse
Sciurus aberti	Abert's squirrel
Spermophilus lateralis	Golden-mouthed ground squirrel
Spermophilus variegatus	Rock squirrel
Spilogale putorius	Spotted skunk
Sorex merriami	Merriam's shrew
Sorex vagrans	Wandering shrew
Sylvilagus audobonii	Desert cottontail
Sylvilagus nuttalli	Nuttall's cottontail
Tadarida brasiliensis	Brazilian free-tailed bat
Tamiasciurus hudsonicus	Red squirrel
Taxidea taxus	Badger

Thomomys bottae	Botta's pocket gopher
Urocyon cinereoargenteus	Gray fox
Ursus americanus	Black bear
Vulpes vulpes	Red fox

APPENDIX G

Historic Preservation Compliance

The entire Mesa Verde National Park is listed on the National Register of Historic Places and the Chapin Mesa historical buildings have been nominated to the National Register of Historic Places. Therefore, any projects affecting it must comply with Section 106, National Historic Preservation Act of 1966 (80 Stat. 915) as detailed in the Advisory Council on Historic Preservation "Procedures for the Protection of Historic and Cultural Properties" (36 CFR Part 800), Section 800.4.

Additionally, in accordance with Executive Order 11593, archeological and historical surveys and evaluations will be completed prior to approval of any construction project. These surveys will be documented with assessments, based on professional examination, to determine if any sites need further study, and if necessary, for the proper conservation and management of the sites found.

The projects, activities and management policies will be designed in accordance with the Historic Resource Management Activity Standards to preserve the physical remains, and the greatest amount of information from the cultural resource base.

The Council procedures will be carefully followed and all developments will be designed to satisfactorily eliminate or mitigate any adverse effects on all cultural resources. Adverse effects on these kinds of resources are most likely to result from: (1) construction within the park and (2) visitor traffic with resultant erosion and vandalism.

Avoidance or mitigation of both effects will require intensive archeological survey in the project area to assess the scientific potential of the archeological remains. The survey, evaluations and compliance with the Advisory Council procedures will be accomplished before final development sites are chosen.

In compliance with the Advisory Council on Historic Preservation "Procedures for the Protection of Historic and Cultural Properties" (36 CFR Part 800), the National Park Service shall, in consultation with the Colorado State Historic Preservation Officer, apply the National Register Criteria, set forth in Section 800.10 of the "Procedures," to all properties possessing historical, architectural, archeological, or cultural value located within the project area and/or subject to impact. Those that appear to meet the Criteria shall be afforded full consideration and protection as detailed in Section 800.4 of the "Procedures."

The National Park Service will plan and design visitor facilities to avoid or satisfactorily mitigate any potential adverse effects on the cultural resources of Mesa Verde National Park, or on the integrity of the resources for which the park was established or which are eligible for the National Register of Historic Places. In any cases where an adverse effect cannot be avoided or adequately mitigated, the proposal that would cause any unavoidable adverse effect will not be implemented unless it is determined to be in the public interest and has the concurrence of the State historic preservation officer and the advisory council on Historic Preservation. Prior to approval of any project, and at the appropriate time, adequate support documentation, including the views of the State Historic Preservation Officer will be forwarded to the Advisory Council on Historic Preservation for review and comment, as required by Section 800.4(d) of the "Procedures."

APPENDIX H

Bibliography

A. ARCHEOLOGY/ANTHROPOLOGY

COLORADO UNIVERSITY. DEPARTMENT OF ANTHROPOLOGY.

1964. Contributions to Mesa Verde Archeology (Series in Anthropology. Boulder, Colorado: University of Colorado Press.

FLYNN, ARTHUR J.

1907 The American Indian as a Product of Environment with Special Reference to the Pueblos. Clifton, New Jersey: August M. Kelley, Publisher.

LONGACRE, WILLIAM A.

1970. Reconstructing Prehistoric Pueblo Societies. University of New Mexico Press.

OSBORNE, D.

1965. "Contributions of the Wetherill Mesa Archeologists." American Antiquity. Vol. 31.

U.S. DEPARTMENT OF THE INTERIOR. NATIONAL PARK SERVICE.

1964. Archeological Survey of Wetherill Mesa, Mesa Verde National Park, Colorado.

1969. Big Juniper House, Mesa Verde National Park

1971. Early Indian Farmers and Indian Villages and Communities.

1971. Mug House, Mesa Verde National Park.

1972-1974. "Summaries of the Field Seasons." The Archeological Survey of Mesa Verde National Park. In DSC-THP file.

1974. "Proposal for Continuation of Mesa Verde National Park Archeological Survey." In DSC-THP file.

WATERS, FRANK.

1971. The Man Who Killed the Deer. New York: Pocket Books, Inc.

WATSON, DON.

1961. Indians of the Mesa Verde. Mesa Verde Museum Association.

WORMINGTON, H. M.

1970. Prehistoric Indians of the Southwest. Denver. The Denver Museum of Natural History.

B. PUEBLO INDIAN ARCHITECTURE

CURRENT, WILLIAM AND SCULLY, VINCENT.

1971. Pueblo Architecture of the Southwest, A Photographic Essay. Austin, Texas: University of Texas Press.

CURRENT, WILLIAM.

1970. "Pueblos of the Four Corners." Architectural Forum Vol. 133.

SCULLY, VINCENT.

1969. American Architecture and Urbanism. New York: Praeger Publishers.

STEIN, JANE.

1973. "There are Ways to Help Buildings Conserve Energy." Smithsonian Vol. 4

C. THE REGION

ANDRUS, JOSEPH L.

1971. Economic Base Study, Montelores Sub-Region, Montezuma and Dolores Counties, Colorado. Boulder: Western Interstate Commission for Higher Education.

BAKKER, JOHANNES I.

1971. Montezuma County, A General Survey: Land Use, Housing, Population. Cortez, Colorado: Montezuma County Planning Commission.

DENTON, DAVID M.

1973. Public Transportation in Dolores and Montezuma Counties, Colorado. Dolores and Montezuma Counties Planning Commissions.

UNITED BANKS OF COLORADO, INC.

n.d. Cortez, Colorado: An Economic Overview. Economic Development Department.

VAN DRESSLER, STEVEN L.

1973. Feasibility Study for a Mancos Canyon Indian Park. Albuquerque, New Mexico: Kirschner Associates, Inc.

D. TRANSPORTATION REPORTS

CLARKSON ENGINEERING CO.

1968. Report on Wetherill Mesa Transportation Needs, Mesa Verde National Park. Wellesley Hills, Massachusetts.

ISBILL ASSOCIATES, WILBUR SMITH AND ASSOCIATES.

1970. Four Corners Jet Airport, An Economic Feasibility Site Selection Study. Farmington, New Mexico: Four Corners Regional Commission.

U.S. DEPARTMENT OF AGRICULTURE, BUREAU OF PUBLIC ROADS.

1973. Mesa Verde National Park, Colorado 1926-1969. A Compendium of Road Reports for Mesa Verde National Park.

WANKANTA LIFT COMPANY.

1972. An Advanced Transportation System for Mesa Verde National Park. Boulder, Colorado: Wankanta Lift Company.

E. NATURAL HISTORY

ANDERSON, S.

1961. "Mammals of Mesa Verde National Park, Colorado." Museum of Natural History Vol. 14. University of Kansas Publications.

COOPER, W.D.

1969. "Physical Condition of Mule Deer." Unpublished MS Thesis. Colorado State University.

DILLINGER, K.C.

1970. "Evaluation of Mule Deer Habitat in Mesa Verde National Park." Unpublished MS Thesis. Colorado State University.

ERDMAN, J.A.

1970. "Pinyon-Juniper Succession After Natural Fires on Residual Soils of Mesa Verde, Colorado." Brigham Young University Science Bulletin, Biological Series. Vol. XI.

LAND INVENTORY CONSULTANTS.

1974. Soil Survey of Designated Portions of Mesa Verde National Park, Colorado.

SCHMIDT, J.L.

1970. "Population Dynamics of Mule Deer in Mesa Verde National Park." Unpublished Ph.D. Dissertation. Colorado State University.

STATE OF COLORADO. DEPARTMENT OF NATURAL RESOURCES.

1973. "1973 Summary of Coal Resources in Colorado, Special Publication No. 3." Colorado Geological Survey.

STATE OF COLORADO. DIVISION OF WILDLIFE.

1962. The Bighorn Sheep of Colorado. by C. A. Moser.

U.S. DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY.

1959. "Geology and Fuel Resources of the Mesa Verde Area; Montezuma and La Plata Counties, Colorado." Geological Survey Bulletin 1072-M.

NATIONAL PARK SERVICE.

1964. Checklist of Birds of Mesa Verde National Park, Colorado.

1969. Environment of Mesa Verde, Colorado

1969. Wetherill Mesa Studies, Environment of Mesa Verde, Colorado

WELSH, S.L. AND ERDMAN, J.A.

1964. "An Un-notated Checklist of the Plants of Mesa Verde, Colorado." Brigham Young University Science Bulletin, Biological Series Vol. V.

WHITAKER, A.F.

1970. "Movements of Mesa Verde Deer." Unpublished MS. Thesis. Colorado State University.

WILLIAMS, H.

1936. "Pliocene Volcanoes of the Navajo-Hopi Country." Geological Society of America Bulletin Vol. 47.

F. GENERAL

U.S. DEPARTMENT OF THE INTERIOR. NATIONAL PARK SERVICE.

1969. A Master Plan for Mesa Verde National Park, Colorado.

1970. Mesa Verde National Park, An Administrative History 1906-1970.

1972. Wilderness Recommendation, Mesa Verde National Park, Colorado.

1973. Administrative Policies for Historical Areas of the National Park System.

1974. Mesa Verde Historical Administrative District: An Architectural and Historical Study.

APPENDIX I

Team

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