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RESOURCES MANAGEMENT PLAN

FOR

ALIBATES FLINT QUARRIES NATIONAL MONUMENT

NOVEMBER

1982

Concurred by: _____ 11-23-82
Superintendent, ALFL — Date

Approved by: _____ 12/13/82
Regional Director, Southwest Region — Date

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1976

Prepared by: Alibates [illegible] Pueblo Culture
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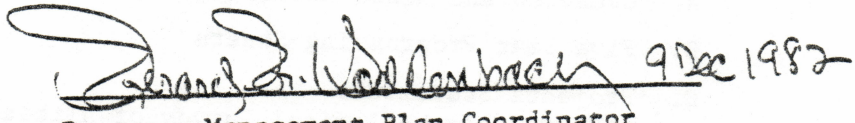
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Pueblo Culture [illegible]

Approved for Implementation: [signature] Date 10/8/76
Regional Director, Southwest Region

Revised and Approved on October 30, 1981

This Resources Management Plan will be reviewed annually.

Next Review scheduled for November, 1983.



9 Dec 1982

Resource Management Plan Coordinator
Southwest Region

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I. INTRODUCTION

A Resources Management Plan is a strategic planning document and a key factor in good management and preservation of the resources.

This plan is a set of project statements which include proposed actions for implementation, as well as 5-year programming sheets for management and research actions. Other sections of the plan serve as an introduction and a set of guidelines. Project statements are determined on the basis of approved Management Objectives and Land Classification. Management Constraints and Completed Research serve as guidelines for projects. The Plan serves the Superintendent in two ways: 1) as a manual for management activities which will preserve the environment or achieve an environmental status quo to comply with Park Service Standards, and 2) a set of research projects and priorities that are designed to obtain additional information for management and interpretation.

A. GENERAL PROGRAM

Designation as "Management Plan"

It is fully recognized that certain portions of the Resource Management Plan may more closely resemble a research plan than a management plan. The reason for this is, simply, that, in many areas, basic data for proper management are lacking. Thus, the funding of research projects to acquire basic data for intelligent management purposes may take priority over other activities. Most areas undertake some form of vegetative management, yet data on fire history, role of exotic plants and animals, successional patterns and stages, and basic inventories of plants and animals are often lacking.

The research projects proposed in this current plan are designed to provide information on which to base sound management projects that will satisfy both management objectives of the area and NPS mandate under the 1916 Organic Act. The plan itself is not just this one document, but, rather is designed as an ongoing process to be revised every year, as projects are completed and new input is available. Since management will, naturally, replace research as a priority in the future, the present use of the term is justified.

Management Program

For the purpose of clarity, all of the projects discussed will be separated into Archeological, Historical and Natural Resources. All of the actions included in the project discussions will be divided into four types and discussed within these categories in the Overview. The four types of actions are:

I. Those actions whose implementation will have a significant and measurable effect on the environment, or resources management actions.

II. Those actions which will continue existing maintenance or monitoring.

III. Those actions which will initiate new maintenance or monitoring.

IV. Those actions which entail research.

Action types are included for each action statement: e.g., Significant Resources Management Action, Continue Maintenance or Monitoring, New Maintenance or Monitoring and Research.

B. GENERAL OVERVIEW AND NEEDS

MISSION: Alibates Flint Quarries National Monument was created by Public Law 89-154, on August 31, 1965, and amended by Public Law 95-625, to alter the boundary and to make the name change.

The mission of the Park Service at Alibates Flint Quarries National Monument is to preserve the extensive flint quarries, associated with prehistoric man, and the ruins of several village sites of the Panhandle Aspect culture of the Plains Village Indians, who occupied the area from about 1200 AD to 1450 AD, and present these to the public in an acceptable manner. Though the area is still undeveloped, and open to guided tours only, the reaction of the visiting public is usually positive. They are amazed by the number and small size of the individual quarries, and very interested in the Plains Village Culture which, though found throughout the Great Plains, is virtually unknown to the average visitor.

NATURE OF THE RESOURCE: The Alibates Flint Quarries National Monument contains, at present, several hundred quarries, with perhaps 250 to 400 more, on private land, which has been authorized but not purchased. In addition to the quarries, there are between 150 and 200 structures belonging to the prehistoric Plains Village Cultures of the Panhandle Aspect Culture. Many of these structures were excavated during the late 1930's, but the onset of World War II stopped development of this resource. During the construction of Lake Meredith Recreation Area, local residents became alarmed that visitation at the lake would open up the area to vandalism and pothunting, and pushed for acceptance as a National Monument, under the title of Alibates Flint Quarries and Panhandle Pueblo Culture National Monument. The title was changed by Public Law 95-625 amendment on 11/10/78, to Alibates Flint Quarries National Monument and boundary changes have increased the acreage from the original 92 acres to about 1,000 acres, with 292 acres remaining in private hands. Much of the resource has been fenced, but two sizable areas are still unfenced, and the ranch owners allow flint collecting and artifact collecting on the nearby Alibates Ranch, including the portion to be included in the National Monument.

SIGNIFICANT RESOURCE PROBLEMS: Most of the problems at Alibates Flint Quarries National Monument stem from oil and gas extraction, and the long history of the area as part of a working ranch and such internal problems as needed archeological surveys and excavations and the nature and distribution of Alibates Flint. First considerations should be given to adequate collection storage, followed by such projects as a detailed Archeological Survey, preservation of the Ruins and Petroglyphs, both prehistoric and historic, and to projects which lessen the impact of man on the ecosystem, including controlling exotic plants, lessening effects of gas companies and past ranching practices, and opening the area up for bonafide park visitors through construction of a road and a visitor center, on site.

PAST SIGNIFICANT ACCOMPLISHMENTS: The opening of the area, in 1968, to guided tours marks the beginning of visitation into the flint quarries area. Due to poor roads and a steep hill, visitation has remained the lowest in the region, consistently, since the establishment of the National Monument. Fencing the area, in 1977/78, marked the beginning of better protection for the resource, and also excluded livestock from much of the resource, though two large tracts remain unfenced. We are now meeting, though only marginally, our mandate to Protect and Preserve, while opening the area to visitation on a limited basis.

Development of the area will both increase visitation and increase the protection to the resource, with a residence on site. At present, immediate development seems unlikely, and future actions should concentrate on improving services under current restraints.

NEEDS: As long as Alibates Flint Quarries remain undeveloped, visitor needs will remain few, and the need for protection will remain great. The present brochure needs to be revised, in light of current status, and should include more information on how to see the quarries, as well as a better map of the National Monument, showing ruins and quarry locations. Currently, only two tours a day are possible, during the summer months, as it takes two hours for a tour, and this is followed by a flint chipping demonstration. If development were to progress, tours could be given all day long on the hour, up to 10 tours in a day, if needed.

SUMMARY: Though Alibates Flint Quarries National Monument is mandated to preserve the resource and to be available for public enjoyment, both goals are, at present, far short of being met.
Implementation of developments described in the General Management Plan, coupled with implementation of the Resources Management projects, will make this area one of the crown jewels of the National Park System.
All resource management plan projects should be completed, or underway, before development projects described in the GMP are completed.

II. CULTURAL RESOURCES MANAGEMENT PROGRAM

ARCHEOLOGY

This area is rich in archeological sites. Over 200 sites have been recorded in Lake Meredith Recreation Area and Alibates Flint Quarries National Monument, and, as yet, no intensive archeological survey has been made.

Alibates flint has provided a raw material for almost every prehistoric culture on the High Plains, for at least 12,000 years. The entire cultural sequence is represented at Alibates, as well as the techniques of surface mining, the methods of preparing, shaping and finishing stone, and the subsequent use of these weapons, tools and ornaments. Items of this flint are reputed to be found over much of North America and even in South America.

The first human use of the quarries was by Paleo-Indian nomadic groups that roamed the Plains from before 10,000 BC to 6,000 BC, hunting such now extinct large game animals as the mammoth, camel, bison, horse, etc. Points and artifacts of Alibates flint have been found in direct association with the skeletal remains of these extinct animals and represent such Paleo-Indian cultures as Clovis, Folsom, Midland, Plainview, Meserve, Milnesand, Scottsbluff, Eden, Angostura, Agate Basin, and others.

No Paleo-Indian sites have been found in the immediate vicinity of Lake Meredith, but it is almost a certainty that sites are there to be discovered. The Paleo-Indian projectile points and other artifacts, fashioned from Alibates flint, that have been found, occur in such numbers as to indicate that these early big game hunters must have visited this area quite often. Intensive investigations could reveal Paleo-Indian sites or components within Alibates National Monument.

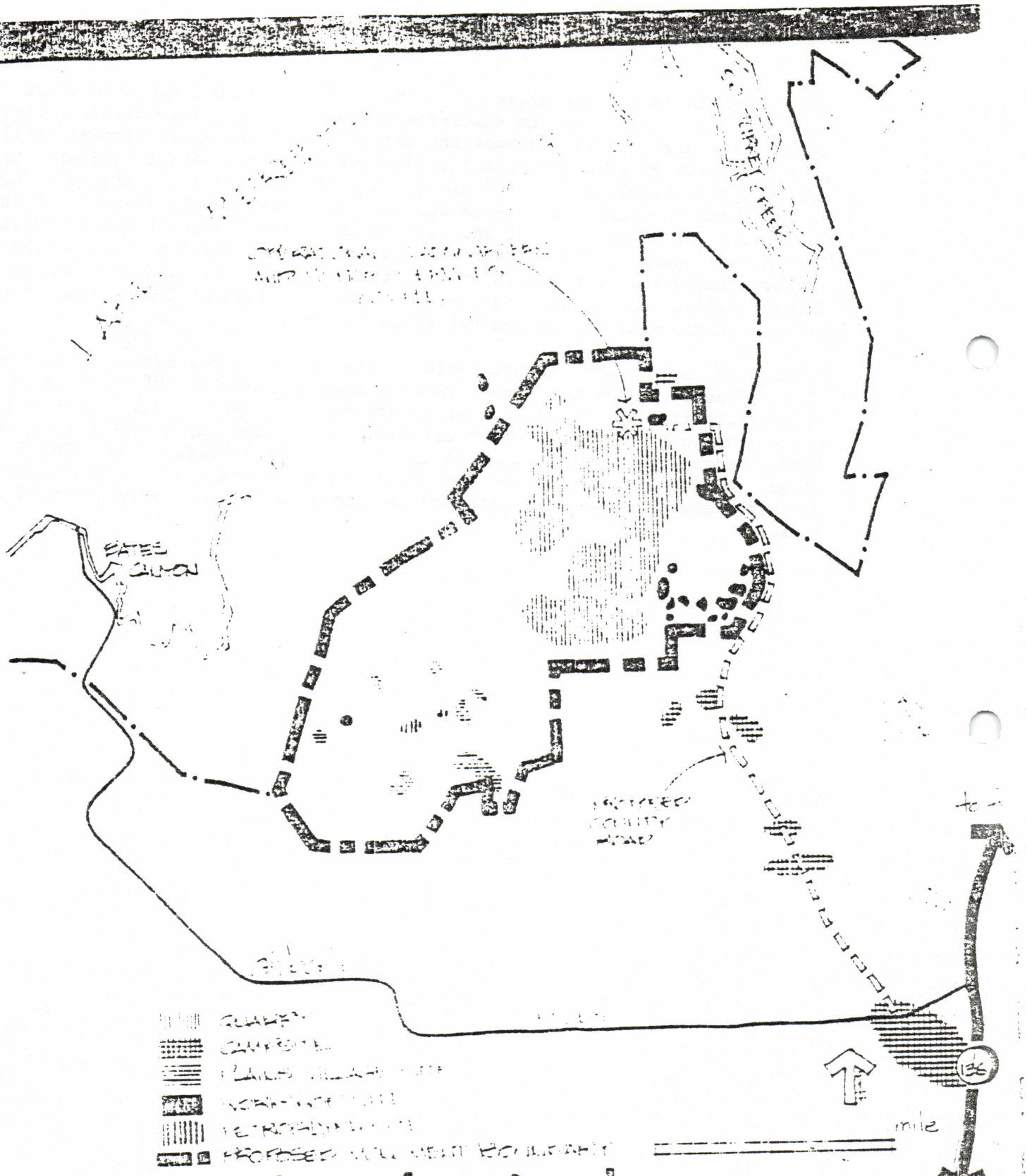
The Archaic Stage developed out of the earlier Paleo-Indian tradition about 6,000 BC, as a result of environmental pressures, and diffusion and interchange with the Eastern Archaic. These people probably had a subsistence dependent on hunting and foraging, however, this period is poorly understood. Very little research has been done on this stage in this area, although a few sites in the general area have been studied. There is evidence that the Archaic people worked the flint quarries and conducted chipping workshops on the near-by hilltops. Since there are several Archaic sites in Lake Meredith Recreation Area, indications are that sites of this stage do exist within the monument.

The Woodland Stage (up to about AD 1300) is a formative period of the Neo-American Stage, and is marked by the introduction of agriculture, pottery, and the bow. It is thought to be basically a Plains development from the east, which spread to the Texas Panhandle, along the Arkansas and Canadian Rivers. Very little is known about it in this area, except that quarrying of Alibates flint continued.

Influences from the east, especially the expanding Mississippian tradition, continued and blended with the Woodlands. The Plains Village tradition followed the Woodlands and lasted up to about AD 1540. It was during the first part of this period, AD 1250-1450, that the characteristic villages occurred. The sedentary farmers that occupied this area are referred to as

the Panhandle Aspect, Antelope Creek focus. They built large, permanent stone and adobe villages, in multi-roomed pueblo style, and smaller outlying communities utilized for farming and gathering. These early farmers still depended heavily on game and wild plants; hunting bison, antelope, deer, turkey; and gathering hackberries, wild plums, wild grapes, and other plants. Cultivated plants included corn, beans and squash. They conducted extensive quarry operations for Alibates flint and carried on a lively trade with both Plains Indians and Southwest Pueblo Indians. Items they traded for included obsidian, pottery, turquoise, sea shells and catlinite. Sherds of Southwest Indian pottery reflect this trade and contact. Several Plains Village sites occur within the monument, including the Alibates Ruin.

During the latter part of this period (after AD 1450) the agricultural villagers were gradually replaced by the marauding Apache. The Plains Stage (AD 1450-1876) is characterized by nomadic tribal groups gathering wild plant foods and hunting bison, antelope, deer, and other animals. This stage has not been studied in the Alibates area, and information is from historical references. The Plains Stage includes introduction of the horse, European trade goods, and Anglo military campaigns, which terminated the American Indians' occupation of the area.



archeological resources

HISTORY

The history of the Alibates area involves the same general themes as that of the Panhandle-Plains region of Texas. Spanish Conquistadores, Comancheros, Spanish, Mexican and U. S. Military expeditions crossed the region numerous times. Frontiersmen, trappers, explorers, and buffalo hunters used the area, and the Gregg and Marcy routes of the Santa Fe Trail passed through the region. The cattle industry, homesteading, and the current petroleum industry also represent a significant part of the area's history.

The region which contains the National Monument was first part of the Spanish southwest with its capital at Santa Fe. It was the hinterland from which Spaniards of New Mexico obtained their buffalo meat and hides each season. In summer, it was the pastureland for their far-ranging flocks. Aside from Indians, there were no permanent residents in the area until 1875 when Anglo-Americans began to settle in the area. By 1877, the entire region was pre-empted by Anglo stockmen. Amarillo was known then as "Ragtown" because it was originally a community of buffalo-hide dwellings. Railroads entered the picture in 1887, and "Ragtown" began to grow. In the twentieth century, the oil and gas industry and ranching have been the most important economic enterprizes in this part of Texas.

Allie Bates, one of the early Anglo cowboys in the area, settled along the creek that now bears his name. His activities are remembered, primarily, through oral tradition. The remains of his dugout residence are located on the monument.

A. OVERVIEW AND NEEDS ASSESSMENT

Basis for Determining Priorities:

Since Alibates Flint Quarries National Monument is principally an Archeological Monument, these priorities are, in general, given preference over other projects. Those environmental projects, which most directly effect the area, are also given high priorities. The projects, dealing with preservation of historic sites, should be considered of minimal importance, since they do not deal directly with the primary resource.

The four most important projects are as follows:

Preservation of Petroglyphs and Acid Rain

This is the number one priority for ALFL. The petroglyphs are slowly disappearing. Immediate steps should be taken to retard this disappearance by using adobe-seal, while experiments with other substances take place. Acid rain experiments should be delayed to a later time.

Schedule of Accomplishments

1973 - Adobe-seal placed on a test plot, adjacent to the petroglyphs. This substance wore off, in time, but initially, caused water to bead up.

1983 - Apply adobe-seal to the petroglyphs. Obtain other substances as recommended for test purposes.
Funding and staffing required (beyond normal levels) - None (until acid rain studies).

1984 and Recurring - Make recurring visits to petroglyphs. Re-apply adobe-seal and other substances, as needed.
Funding and staffing required (beyond normal funding levels) - None (until acid rain studies).

Inadequate Collections Storage

Before further research and excavations are undertaken, adequate collections atorage must be provided.

Schedule of Accomplishments

1982 - Work on archeology lab and artifacts storage room, started by LAMR maintenance staff, in basement of new Ranger Station building.

1983 - Submit 10-237 for funding to purchase storage cabinets. Complete construction of archeology lab and artifacts storage room.
Funding and Staffing Required - To be done by existing maintenance staff.

1984 - Or, upon receiving funding generated by 10-237, obtain 15 storage cabinets to house artifacts from YACC digs and projects on excavating.

Three Quarries and 1 or 2 House Sites

Funding and Staffing Required - (beyond Normal Levels) -
1 - 15 Artifact Storage Cabinets - Total $3,000.00

Archeological Survey of Alibates National Monument

An archeological survey is high priority -

Thirty-four sites are known to exist, at present, within the boundaries of the National Monument, but, many more could be located by an extensive survey, combined with testing and excavation of significant sites. The Flint Quarries, themselves, have never been adequately explored. A map, prepared by the Bureau of Reclamation, shows 550 quarries, in a small section of the National Monument. This represents only a fraction of the total number of quarries present, and, once a complete survey is made, over 1,000 quarries are likely to be found within the present boundaries, and another 200 to 400 in the area presently on private land.

Schedule of Accomplishments

Prior to 1982 FY - Sites are recorded on existing site map on a hit and miss basis.

1983 - Revise and re-submit 10-238 and update cost estimates.
Funding and Staffing Required - Done by existing staff.

1984 - Or upon receiving funds generated by 10-238. Arrange for comprehensive archeological site survey, including testing through qualified institution.
Funding and Staffing Required - Coordination - by existing staff.

Comprehensive Archeological Survey - (including testing)(Contract to a qualified institution)
2 - Three man teams for 3 months total = 1.5 MY's
Preparation of Archeological/Historical Base Map (Drafting/Printing) .3MY
Obtain data for further investigations - .3MY
Write up of findings in above areas - 1 MY
Printing costs = $2,000.00 estimate

Summary Costs

One research leader at $14,000. per year for 1.5 MY = $21,000.
Five assistants for field work = 1.25 MY;s at $6,000. per year = $7,500.
Preparation of Base Map - Drafting/Printing = $4,000.
Printing costs for research document = $2,000.
Total costs = $34,500.

1985 - or following research - incorporate into interpretive message - done by existing staff.

Geology and Trade of Alibates Flint

Existing information on the geology of Alibates Flint needs to be researched and additional studies inaugurated. This information must be, then, utilized to develop a valid method to identify Alibates Flint and determine the extent of its geographic distribution.

Schedule of Accomplishments

Prior to 1982 FY - Some documents have been researched and obtained for the

LAMR library. ALFL has cooperated in some studies, most notably "Petrography and Pegrogenesis of the Alibates Dolomite" by Roger Bowers, 1965.

1983 - Revise and resubmit 10-238 and update cost estimates.

1984 - Or upon receiving funding generated by 10-238 - Arrange for research through a qualified institution.

Funding and Staffing Required -

Coordination - by local staff

Research to define characteristics and positive identification of Alibates Flint -

One researcher in techniques such as spectrographic, petrographic, chrystalography, etc.	
Part-time - over one year	$15,000.
Print report	2,000.
One researcher to conduct studies on geologic history of flint and subsurface and surface mapping -	
Part-time - one year	15,000.
Assistants	6,000.
Print map and report	3,000.
One researcher to determine geographic distribution and time span of prehistoric use of Alibates Flint -	
Research - Part-time for one year	20,000.
Assistants	6,000.
Print Maps and report	3,000.
Total costs	$70,000.

1985 - Or, following research - Incorporate into interpretive message - done by existing staff.

Other Projects - Such as excavation of 3 quarries and site testing and excavation of 2 house structures are important and should be done not later than during development of the visitor center, the trail system, etc.

RESOURCES PROGRAMMING SHEET

Alibates Flint Quarries Nat'l. Mon. (Park) | Southwest (Region) | TEXAS (State) | ____ Natural | X Cultural | _____ (Date) | Page ____

Area Priority	RMP Ref.#	Pkg. #	Project Title	Action Type	Year 1 NPS MY	Year 1 NPS Cost	Year 2 NPS MY	Year 2 NPS Cost	Year 3 NPS MY	Year 3 NPS Cost	Year 4 NPS MY	Year 4 NPS Cost	Year 5 NPS MY	Year 5 NPS Cost
1	ALFL C4		Preservation of Petroglyphs	Research and Monitor	0.1	Base Fund'g.	Same		Same		Same		Same	
2	ALFL C6		Inadequate Collection Storage	New Maint.	--	----	0.2	3.0	Base		Base		Base	
3	ALFL C1	10-238	Archeological Survey	Research and Monitor	--	----	0.3	34.5	0.5	0.5	0.5	0.5	0.5	0.5
4	ALFL C5	10-238	Geology & Trade of Alibates Flint	Research and Monitor	--	----	0.3	70.0	Base		Base		Base	
5	ALFL C7		Flint Depletion	Research and New Maint.	--	----	---	----	0.5	5.0	Base		Base	
6	ALFL C2	10-238	Archeological Investigation of Quarries	Research and Monitor	Prior to Implementing GMP Development Plan									
7	ALFL C3	10-238	Excavate Dwellings	Research and Monitor	Prior to Implementing GMP Development Plan									
8	ALFL C8		Background History of ALFL	Research	Prior to Implementing GMP Development Plan									

RESOURCES PR[illegible]RAMMING SHEET

Alibates Flint Quarries Nat'l. Mon. (Park) Southwest (Region) TEXAS (State) ____ Natural __X__ Cultural _____ (Date) Page ____

Area Priority	RMP Ref.#	Pkg. #	Project Title	Action Type	Year 1 NPS MY	Year 1 NPS Cost	Year 2 NPS MY	Year 2 NPS Cost	Year 3 NPS MY	Year 3 NPS Cost	Year 4 NPS MY	Year 4 NPS Cost	Year 5 NPS MY	Year 5 NPS Cost
9	ALFL C9		Excavation Stone Well	Research and New Maint.	Prior to Implementing GMP Development Plan									
10	ALFL C10		Maint. of Allie Bates Dugout	New Maintenance	Prior to Implementing GMP Development Plan									

C. PROJECT STATEMENTS

Project Title and Number:

Archeological Survey of Alibates National Monument

ALFL C1

1. Statement of the Problem

A comprehensive site survey has not been accomplished for the monument and the archeological base map is incomplete.

1.1 Background Information

Over 35 archeological sites have been reported by Park Rangers, Park Archeologists and other individuals and have been recorded on the archeological base map. Many of the recorded sites lack needed information. Other sites undoubtedly exist and have not been identified. An archeological survey and base map are necessary for management purposes, both in planning and in the protection of archeological resources.

1.2 Current Management Action

Record sites on base map as sites are identified by existing personnel during routine trips to the area. Lack of adequate manpower prevents a coordinated comprehensive site survey.

1.3 Legal Authority

2. Alternative Actions and Probable Impacts

2.1 No Action

Through this action, many sites will not be identified and could be lost, through time.

2.2 Current Management Action

This action relies on the existing staff on an "as time is available" basis. Some sites would be identified and recorded but many would not and could be lost in time.

2.3 Comprehensive Archeological Survey of Alibates National Monument

An archeological site survey would accomplish the following:

A. A complete inventory of archeological and historical sites, to provide information needed for management, protection and interpretation of archeological and historical resources.

B. An archeological/historical base map.
C. Obtain sufficient data to formulate research designs for further investigations.
D. Attempt to answer or determine the potential for answering the following questions:

1. Ethnogeography. What was the natural resource base and what was the natural resource exploitation by prehistoric and historic Indians.

a. Tool kits used.
b. Flora and Fauna - uses and how used.
c. Land Utilization.
d. Water Resources.
e. Minerals and Stone.

2. Settlement patterns, demography and changing cultural patterns.

a. Much more data needed on Paleo-Indian, Archaic and Woodland cultures in the area.
b. Data needed on historic and proto-historic Indian occupations.

3. Recommended Course of Action (Research)

3.1 A comprehensive archeological survey including testing through contract to a qualified institution. (Done in conjunction with LAMR)

4. Requirements to Accomplish Action

4.1 Research

A 10-238 "Archeological Survey" has been approved for a comprehensive survey of LAMR and ALFL. Funding generated by the 10-238 is required for this project.

4.2 New Maintenance

ALFL staff would provide routine coordination of site survey done by qualified institution. Periodic visits to sites by existing staff, once they are identified, is required.

Project Title and Number:

Archeological Investigations of Quarries

ALFL C2

1. Statement of the Problem

No excavated flint quarries are available as a visitor display.

1.1 Background Information

The Alibates Flint Quarries are shallow pits which have been almost completely filled, by wind and water borne soil. Many visitors have difficulty in recognizing the quarries in their present state, even when the quarries are pointed out to them. At least three of the quarries should be excavated, to provide an exhibit for interpretive purposes. Excavation and testing of several of the quarries might recover some of the quarrying tools used by the Indians and add to our knowledge of quarrying methods. It may be possible, through radiocarbon dating, to assign various quarries to specific cultures.

1.2 Current Management Action

The existing staff does not have time or expertise to undertake excavation of three quarries. Current action is to protect the quarries as they are, by routine patrols and permitting visitor access by Ranger guided tours only. Rangers must point out to visitors, the depth and extent of the quarries.

1.3 Legal Authority

2. Alternative Actions and Probable Impacts

2.1 No Action

This would result in a loss of information and view of the quarries to the park visitor.

2.2 Current Management Action

Allow visitors to view the quarries as they are, and provide protection by routine patrols and through scheduled tours. No excavations undertaken.

2.3 Archeological Investigation of Selected Quarries

Excavate three or more quarries to their original depth, to provide an exhibit for visitors. Test excavate selected additional quarries to obtain datable materials in order to relate quarries to specific cultures. Areas to be excavated would be identified by the interpretive prospectus.

3. Recommended Course of Action

3.1 Archeological investigation of selected quarries by a qualified institution will facilitate interpretation of the quarries to the park visitor, and enable them to view the depth and extent of a quarry pit.

4. Requirements to Accomplish Action

4.1 Research

A 10-238 "Archeological Investigation of Quarries" has been approved. Funding generated by the 10-238 is required for this project.

4.2 New Maintenance

The ALFL staff would provide routine coordination of the archeological investigation. Periodic patrols to the quarries would be necessary during and after excavation.

Project Title and Number:

Excavation of Plains Village Indian Dwelling for Exhibit

ALFL C3

1. Statement of the Problem

No Plains Villager structures are available for use as a visitor display.

1.1 Background Information

LAMR 52 is a prehistoric village site consisting of 60 or more structures of the Plains Village Indian. The presence of these buried structures is marked only by occasional scattered rocks, cobble, pieces of flint and other cultural debris. The nearby Alibates Ruin, excavated in 1941, was not stabilized or backfilled, and, consequently, is not suitable for exhibit purposes. 10 to 15 of the houses from LAMR 52 should be tested and 1 or 2 excavated, for exhibit purposes.

1.2 Current Management Action

Visitors to the quarries learn about Plains Village structures through verbal descriptions and a small diorama.

1.3 Legal Authority

2. Alternative Actions and Probable Impacts

2.1 No Action

The ruins would remain intact as are, but there would be a cost in visitor enjoyment to the area, in that visitors would not be able to understand the culture as well.

2.2 Current Management Action

Visitors to the area would continue to learn about Plains Village structures through verbal descriptions and a small diorama only.

2.3 Excavation of Plains Village Indian Dwelling for Exhibit

The way of life of prehistoric Plains Villagers will be a significant part of the interpretive story of Alibates National Monument, and an exhibit of some of their dwellings will add, greatly, to the interpretive experience of the visitors to Alibates. Test 10-15 houses in site LAMR 52 and excavate 1 or 2.

2.4 Excavate All of LAMR 52

3. Recommended Course of Action

This would be a large scale operation, taking several years to complete and would be more than necessary for exhibit purposes.

3.1 Excavation of a Plains Village dwelling for exhibit purposes. Through a qualified institution, test 10 to 15 houses from site LAMR 52 and excavate 1 or 2 for exhibit purposes.

4. Required to Accomplish Action

4.1 Research

Submit updated 10-238 on project, in an effort to generate funding necessary for excavation by qualified institution.

4.2 New Maintenance

The existing ALFL staff would provide routine coordination of this project. Once completed, periodic patrols would be required, to provide protection of dwellings.

Project Title and Number:

Preservation of Petroglyphs/Acid Rain

ALFL C4

1. Statement of the Problem

Several groups of petroglyphs are located near the ruins of the Plains Village Indian dwellings. With time and weather, these are slowly disappearing. Acid rain may be a factor in this disappearance.

1.1 Background Information

On the bluff near Alibates Ruins, are several petroglyphs which are probably the work of the prehistoric Indians, who occupied the village. Designs, which include turtles, human footprints, and a bison, were pecked into the horizontal surface of the dolomite caprock. Because the dolomite is susceptible to weathering, deterioration of the petroglyphs is occurring. In August, 1973, the park staff initiated a field test of "Adobe-Seal". This substance was applied to sections of dolomite caprock in the vicinity of the petroglyphs where the test plot will receive the same amount of weathering as the petroglyphs. At the present time, the adobe-seal has worn off the rocks, adjacent to the petroglyphs, and there is no sign of excessive damage to the rocks. The rocks appear to have received some protection from the adobe-seal, and, if reapplied to the petroglyphs, could effectively protect them, also.
During an Environmental Assessment in 1979, the Environmental Protection Agency was contacted, to determine if there could, indeed, be acid rain in this area, due to the presence of the ASARCO Copper Refinery, in Amarillo, and the various oil and gas field activities in the immediate area of the flint quarries. They stated, orally, that this was, indeed, a possibility, if the wind conditions were right, but that it would be a minimal problem under normal wind conditions.

1.2 Current Management Action

No preservatives are currently in use on the petroglyphs, since the test of adobe-seal was made. The test was felt to be inconclusive, since no measurement of erosion was possible.
No studies on acid rain are currently underway.

1.3 Legal Authority

2. Alternative Action and Probable Impacts

2.1 No Action

With no further action or testing, the petroglyphs will continue to deteriorate. Several of these petroglyphs are already nearly gone.

and a few more years will completely erase them. This will make it impossible for future visitors to enjoy this unusual feature of the National Monument.
Implement no studies on acid rain.

2.2 Continue Testing Various Substances for Possible Use on the Petroglyphs

This step will stop deterioration at some future date, but, at present, the erosion will continue.

2.3 Apply Adobe-Seal to the Petroglyphs Immediately

This step will effectively stop erosion, though there is a question about the reaction of the dolomite with the adobe-seal. If the adobe-seal does the job, the petroglyphs will be preserved.

2.4 Enclose Petroglyphs in a Building for Viewing

Though this would preserve the petroglyphs, it would present a visual intrusion on the natural scene, which would offset the benefits gained by preserving the petroglyphs.

2.5 Implement Acid Rain Monitoring Tests

3. Recommended Course of Action

3.1 Apply adobe-seal directly to the petroglyphs, and continue testing other substances for future use, if the adobe-seal fails to stop erosion.
Do not implement acid rain monitoring test, as ALFL is a Class II air quality area.

4. Requirements to Accomplish Action

4.1 Research

Continue research on preservative until adobe-seal is proven ineffective.

4.2 Monitor

Test monitoring done by existing ALFL staff.

Project Title and Number:

Studies of Geology and Trade of Alibates Flint

ALFL C5

1. Statement of the Problem

Knowledge of the physical characteristics, origin, geologic history and geographic distribution of Alibates Flint is needed for interpretation.

1.1 Background Information

There are reports of the occurrence of Alibates Flint all over North America and even as far as South America. However, the material occurs in a wide range of colors and patterns, making visual identification extremely difficult.

1.2 Current Management Action

Information is available on physical characteristics, origin and geologic history of Alibates Flint from various sources. Some information is valid. Verbal information from archeologists on geographic distribution is available, but is based on visual identification, and some may be of questionable validity.
This information is currently used in ALFL interpretation.

1.3 Legal Authority

2. Alternative Actions and Probable Impacts

2.1 No Action

This alternative implies giving no information or information of questionable validity to ALFL visitors on geology and trade of Alibates Flint.

2.2 Current Management Action

Rely on existing limited knowledge on geology of Alibates Flint and highly suspect knowledge of geographic distribution of Alibates Flint for visitor information.

2.3 Studies on Geology and Trade of Alibates Flint

Through a qualified institution, conduct research on Alibates Flint to:

1. Define the characteristics of Alibates Flint through techniques such as spectrographic, petrographic, neutron activation and

X-ray crystalography analysis to provide positive identification of this material as opposed to flint from other sources.

2. Conduct geologic studies at Alibates National Monument to determine geologic history and to map surface and sub-surface geologic history.
3. Determine geographical distribution and time span covered in prehistoric use of Alibates Flint.

3. Recommended Course of Action

Studies on geology and trade of Alibates Flint will generate valid information to use in interpretation and enhance the visitor experience.

4. Requirements to Accomplish Action

4.1 Research

A 10-238 "Geologic Study and Mapping of Alibates Flint" has been submitted.
Funds generated by this 10-238 are necessary to accomplish the research.

4.2 Maintenance

Existing ALFL staff would provide coordination during research by a qualified institution and would assemble information for visitor presentations, following research.

Project Title and Number:

Inadequate Collection Storage

ALFL C6

1. Statement of the Problem

Collections are subject to deterioration and loss, due to inadequate curation, i.e., lack of proper storage spaces and adequate trained staff.

1.1 Background Information

Archeological collections were begun during salvage operations with construction of Sanford Dam, which now impounds Lake Meredith. Lake Meredith and Alibates share collection facilities, which house all collections kept in the area. In addition to collections in the area, there are collections at Texas Technological College in Lubbock, West Texas State University in Canyon, and Texas University in Austin. Though these collections are housed at the aforementioned institutions, they have expressed an interest in returning them to us for curation, due to the amount of materials they are storing from contracts with other agencies. Some of these collections, stored off-site, have received excellent preservation and storage, while others are merely "Housed" with no real preservation efforts possible. The total number of artifacts may be in excess of 200,000 items owned by the National Park Service, plus another 200,000 items owned by West Texas State University, which came from excavations at Alibates Ruin in 1938 through 1941, with the aid of WPA labor. Current collections at the area consist of surface collections made by various collectors over the years, plus uncatalogued collections from several seasons of YCC digs, which took place from 1976 through 1980. Collection facilities are currently in a state of turmoil. The Ranger Station and associated activities have been moved within the last year, but no facilities have been completed to house the collections. Work has been under way for the last few months on completing the collection storage facility in the new building, but, currently, no progress is being made. Cataloguing is currently going on for the Blue Creek dig, which was a project of the Texas Archeological Society Summer Field School, in 1969.
When this cataloguing is completed, there will be approximately 100,000 other artifacts which we will need to have stored. These are currently at the Panhandle Plains Historical Museum in Canyon, but, due to a small staff, these cannot be properly cared for at that institution. The current staff needs training directed to the care and preservation of prehistoric artifacts, mostly lithic materials, but also bone, shell and, possibly, basketry.

1.2 Current Management Action

Due to shortage of funding and, consequently, manpower loss, completion of the proposed storage facility has been delayed. The present Archeological Lab has become a catch-all for the materials and furniture not yet transferred to the new complex. Though the present staff

has completed the course in Curatorial Methods, this course failed to direct itself to the problem of Archeological collections consisting mostly of stone, bone and shell. Further training or cross-training with regional personnel is needed to completely retrain individuals in collections management.

1.3 Legal Authority

2. Alternative Actions and Probable Impacts

2.1 No Action

If no action were taken, collections would continue to deteriorate. Dust is a major problem in the old Archeological Lab, and, to this is added the clutter, due to failure to complete the move to the new building.

2.2 Current Management Action

Current management action is essentially the same as no action. Collections are at a distance from the curatorial staff, and, therefore, no curatorial actions are being taken. As funds and personnel are returned, the new lab will be finished and this will provide better collection storage.

2.3 Proposed Actions

To bring the collections up to an acceptable standard, the storage facility must be completed and curatorial staff must be adequately trained. Additional cabinets will be needed if the collections, housed at the Panhandle Plains Historical Museum are transferred to our card, and, if adequate storage is to be provided for YCC collections.

3. Recommended Course of Action

3.1 Storage facilities will be completed, and the staff adequately trained to manage what is becoming a large collection of potentially valuable artifacts.

4. Requirements to Accomplish Action

4.1 Research (none)

4.2 Maintenance

Funding for carpenter to complete storage facility;
Funding for 10 new cabinets to house materials from YCC digs;
Funding for 10 other cabinets if we take over curation of TAS materials and
Funding for 5 additional cabinets if ALFL research projects take place.

Project Title and Number:

Archeological Collecting and Flint Depletion

ALFL C7

1. Statement of the Problem

Illegal digging and surface collecting of both artifacts and Alibates Flint is occurring.

1.1 Background Information

The boundary of ALFL is not entirely fenced. Approximately 300 acres of private land, adjacent to the National Monument, contain extensive flint quarries, and is proposed for inclusion in the National Monument.
Natural gas and oil company service roads and pipelines run through the area. Gas and oil company employees travel these roads daily, in capacity of their employment.
The adjacent LAMR land is open to hunting and is heavily hunted during the fall seasons.
The access road to South Turkey Creek point, on Lake Meredith, runs immediately adjacent to ALFL boundary.
The adjacent private landowner gives some people access to his land for purposes of artifact and flint collecting.
These problems all contribute to illegal digging and flint collecting within the boundaries of ALFL.
Flint is being hauled off in substantial quantities from the 300 acres proposed for inclusion in ALFL and heavy livestock grazing occurs there.
In addition, despite being warned, visitors cannot resist taking small quantities of flint during tours of the area. The flint in the vicinity of the quarries is an especially valuable resource, as much of it represents "tailings" from the prehistoric quarrying operation.

1.2 Current Management Action

Visitors to the quarries must be in the company of a Park Ranger. Before and during tours, visitors are cautioned not to take flint.
Patrols to detect illegal entry into the monument are made by one permanent employee. These patrols are augmented by seasonal and LAMR permanent employees. These patrols are infrequent and inadequate, especially during the off-season.
Area visitors are told they can legally collect one handful of flint from adjacent LAMR lands. No efforts are currently underway to acquire or obtain funding to acquire the 300 acres of private land, proposed for inclusion in ALFL.
No flint depletion studies are underway.
No progress has been made on getting development funding for on-site visitor center or Ranger residence.

1.3 Legal Authority

2. Alternative Actions and Probable Impacts

2.1 No Action

This action implies nonconformance with one of the purposes of the monument, which is to protect and interpret the flint resources.

2.2 Current Management Action

This action relies on existing infrequent Ranger patrols to prevent artifact collecting and flint depletion. It also implies no action on the remaining issues.

2.3 Finalize Acquisition of Approximately 300 Acres of Private Land

Revive efforts to obtain the private acreage, either through trade or purchase. The land owner was willing to trade or sell, as recently as 1979.

2.4 Increased Patrols to Quarry Area

Implement measures to restore seasonal and increase permanent personnel to increase patrols to the quarry site.

2.5 Establish Photographic Study Plots

Establish plots in the quarries area to determine the magnitude of flint depletion.

2.6 Completion of Development Plans

Developments calling for an on-site visitor center and Ranger residence would decrease flint depletion and artifact collecting.

3. Recommended Course of Action

3.1 Implementation of action 2.3, 2.4 and 2.5, would help deter flint depletion and artifact collecting and would provide solid information on the magnitude of the problem. Development will probably not take place in the near future.
Action 2.6 is desirable, but probably well into the future, due to the present fiscal NPS climate.

4. Requirements to Accomplish Action

4.1 Research

A 10-238 to establish photographic study plots should be prepared and submitted. Funds generated by the 10-238 will be necessary to obtain equipment and implement depletion studies.

4.2 New Maintenance

A 10-237 to obtain funding to restore seasonal personnel to 1981 levels should be prepared and submitted.
Permanent personnel will probably not be increased, until development takes place.

Existing personnel can perform research at study plots and assemble information, once equipment is obtained and the study implemented.

Project Title and Number:

Background History of Alibates Area

ALFL C8

1. Statement of the Problem

Research is needed to complete the historical picture of the Alibates area of the Canadian River Valley.

1.1 Background Information

Information is lacking on the area around Alibates Flint Quarries National Monument, from the time of historic contact (1541) to the establishment of the National Monument (1965). Since the main theme of the area deals with the prehistoric Indian occupation, it is necessary that information be collected on historic Indian occupations also. The contact period with European civilization is better documented, but no overall study has been made to collate all this information. This study could be made in conjunction with a similar study for the Lake Meredith area.

1.2 Current Management Action

Information on the post-contact period is given on the tours of the Flint Quarries. Information is scanty, and only partially fills the visitors need for information on this period.

1.3 Legal Authority

2. Alternative Actions and Probable Impacts

2.1 No Action

No action on this item would deprive the park visitor of valuable information on the resource, and, would also deprive the park planner of information which might prove vital in future planning.

2.2 Current Management Action

Currently, information on the areas history is being gathered piecemeal, which, at times, gives good information on a particular facet of park history, but, since there is no general history of the area, the information may become lost to future planners and interpreters.

2.3 Proposed Action

Conduct interviews with local residents and research on the specific

history of the Alibates area up to and including development of the area by the petroleum industry.

3. Recommended Course of Action

3.1 Have a qualified institution develop a background history of the Alibates area to include historic contact with Indians by Spanish, first contacts with Anglos from the east, army activities, early ranching and farming activities, and development of the oil and gas industry in the area.

4. Requirements to Accomplish Action

4.1 Research

Prepare and submit a 10-238 to generate funds for research. Research should consist of an indepth look at records which might pertain to any of the above areas of historical interest, and interviews with local residents who would have a knowledge of the area's history.

4.2 New Maintenance

Existing staff provide coordination for research project and assemble information for use in interpretation.

Project Title and Number:

Excavation of Stone Well

ALFL C9

1. Statement of the Problem

A stone well, near the Alibates Ruins, may contain some artifacts of cultural value.

1.1 Background Information

A historic housesite near the main Alibates Ruins, has an adjacent stone-lined well, which is partially filled with debris. It is currently fenced off, to keep people away, and prevent injury. There is some question as to who lived in the nearby dwelling, and, it is felt that contents of the well could elucidate the problem, as well as add valuable historic information to the information base. A further problem is the location of Allie Bates cabin. Two cabins occur on the Alibates Creek, and either of these could be the one he lived in, if he lived on the creek bearing his name.

1.2 Current Management Action

No action has been made to stabilize the well, and there are no signs to call attention to the well, either as a safety hazard or as a cultural resource. An existing fence is in disrepair, but does indicate the danger by its presence. As the area is off limits for park visitors, the well does not present a particularly bad hazard.

1.3 Legal Authority

2. Alternative Actions and Probable Impacts

2.1 No Action

If left as is, the well will continue to deteriorate, and, eventually collapse, completely filling in, and, possibly removing any evidence of the well from the ground surface. The fence will fall down, prior to this, and present another safety hazard, greater than before. Any material of cultural value will be lost, at least for the short term, and valuable historical evidence will disappear.

2.2 Current Management Action

Current management action is essentially no action, though the fence would be repaired and possibly, if visitors were allowed in the area, the safety hazard would be signed.

2.3 Proposed Action

Excavate and then fill, the stone-lined well. This would give us

valuable cultural data, as well as remove the existing hazard from the environment. Filling the well could remove a possible source of pollution to ground water from small mammals falling in the well and decaying.

3. Recommended Course of Action

3.1 Archeological excavation of stone-lined well should include dating of artifacts recovered to determine age of well and possible owner of adjacent historic structure. Stones should be left in place, and well filled to ground level, to remove safety hazard.

4. Requirements to Accomplish Action

4.1 Research

Archeological investigation of stone-lined well and analysis of data.

4.2 New Maintenance

Signing of well, with interpretive sign, if visitors are allowed into the area, in the future.

Project Title and Number:

Maintenance of Allie Bates Dugout, Alibates Creek

ALFL C10

1. Statement of the Problem

A historic house (half dugout) on Alibates Creek, has the foundation left, and some of the wall rocks still in place. It would make an excellent spot for historic interpretation.

1.1 Background Information

Two historic house foundations have been located along Alibates Creek. It is unsure whether either of these was used by Allie Bates, the line camp foreman for the LX Ranch, in the early 1900's, but they both exhibit characteristics of the houses found in this area during this period. This particular house is built in the form of a half dugout, that is, with the back dug into the hill, but the front is on a level with the creek bed of Alibates Creek. The creek does, at times, flood, and the waters might, conceivably, wash it away, unless the foundation is stabilized.

1.2 Current Management Action

The foundation exists in a restricted area, with all access limited. No one is allowed in the area, without a Park Service representative with their party. Vandalism is, therefore, an unlikely occurrence. The area is unmarked, and the foundation is overgrown with weeds, making it difficult to see, even from the creek bottom. The only possible damage would be natural through water action or natural deterioration.

1.3 Legal Authority

The area is closed through CFR 2.6(b)(5), Closing of Areas, in which the Superintendent of a park can close any areas of the park to access.

2. Alternative Actions and Probable Impacts

2.1 No Action

If no action is taken, the historic dwelling will continue to deteriorate, causing possible pollution of the downstream area of the creek, with cultural debris, and destroying the existing foundation. The cultural resource will be destroyed and the potential interpretive program will suffer.

2.2 Current Management Action

Current deterent efforts are only a stopgap measure to prevent vandalism and human caused deterioration. These consist of a boundary

fence around the National Monument, signs warning of government land, and, occasional patrols into the area to check on the site and it's condition.

2.3 Proposed Action

The proposed action to maintain the present foundation consists of photographing the present structure, periodically, from several viewpoints, to determine changes, stabilizing the walls, as they are at present, and preserving the historical scene, as nearly as possible to the time period represented.

3. Recommended Course of Action

3.1 Continue patrols and signing of area, and, as funds become available, stabilize the walls and existing foundation. As personnel become available, begin walking historic tours into the area.

4. Requirements to Accomplish Action

4.1 Research

None on this project. See project ALFL C8.

4.2 New Maintenance

Funds to stabilize existing foundations.

III. NATURAL RESOURCES MANAGEMENT PROGRAM

Alibates Flint Quarries is in the Short-grass Plains District of the Kansan Biotic Province. Along the Canadian River Breaks, an extension of the Mesquite Plains District of the Kansan Biotic Province also occurs. Common plant associations, within the National Monument, include Bottomland, along Alibates Creek, Steep Slope, in several side canyons, Gravelly Slope, in areas of rolling hills and Mesatop, along the crests of the higher hills and mesas. Bottomland vegetation consists of hackberry, soapberry, cottonwood and a variety of grasses and forbs. Steep Slope vegetation includes broomweed, skunkbush, feather dalea, cat's claw mimosa, sideoats grama, blue grama, little bluestem, fleabane daisy, ragweed, bladderpod and baby white aster. Yucca is often common on these areas. Gravelly slope vegetation includes broomweed, yucca, blue grama, hairy grama, sideoats grama, cat's claw mimosa, bladderpod, Indian blanket and occasional stands of mesquite. Mesatop vegetation includes plains prickly pear, yucca, mesquite, blue grama, buffalo grass, Indian blanket, bladderpod, plaintain and tansy aster. In general, the area can be said to be covered by a mesquite-grass association which would cover each of the above areas.

The vertebrate population is varied and interesting. 60 species of mammals, 200 birds, 11 amphibians, 32 reptiles and 15 fish have been identified in nearby Lake Meredith Recreation Area. Many of these might be expected to be found in and around Alibates Flint Quarries National Monument. Over 300 kinds of plants have also been identified from Lake Meredith, and, about half of these can be expected in Alibates Flint Quarries National Monument.

Within the National Monument, the geology is interesting and varied. Many of the features on the surface are determined by the presence or absence of the Alibates Dolomite Formation, which varies from six to twelve feet thick and is the caprock in much of the National Monument. In places in or near the National Monument, filled chimneys occur where a sub-surface layer of salt has dissolved and allowed the overlaying sediments to fall into the resulting cavity. Permian rocks, including redbeds, gypsum and the dolomite, form the lower and most abundant series of rock units, within the monument area. Above this, where it hasn't eroded away, is the Ogallala formation of Pliocene Age, and various Pleistocene rocks, including beds of volcanic ash. The Alibates Flint occurs within the dolomite beds, as a secondary deposit, and is currently believed to be derived from the ash beds, which have been dated as mid-Pleistocene in age. A recent alluvium covers much of the area, with a mixture of gravels from upper sediments scattered over the surface of many of the hills.

The climate around Alibates Flint Quarries is a semi-arid climate with an average of 20 inches of rain per year. Much of this rainfall falls during the months from May thru October. Winter temperatures are cold, averaging 22 degrees for overnight lows during the winter months. Summer temperatures are warm to hot, with an average high temperature in the low nineties.

Soils are developed in areas, varying from gently sloping to steep. They consist of sandy and gravelly loams, varying from gray to brown in color. Moisture content varies with the amount of vegetation present on the surface, and erosion potential can be determined by amount of plant cover and the heaviness of the individual soil type.

A. OVERVIEW AND NEEDS ASSESSMENT

Basis for Determining Priorities:

Those natural resources management projects that are considered to be resource threatening are given highest priority. Many natural resources projects are maintenance/monitor in nature and are underway now, at current staffing and funding levels. Others will require substantial funding.

The four most important projects are as follows:

Gas and Oil Extraction and Development

Gas and oil facilities in the form of gas wells, pipelines and a pig launching facility, exist within the boundaries of ALFL. Other facilities exist nearby. New construction and modification of existing operations may be proposed in the future.

Schedule of Accomplishments

1983 - Develop map and lists, showing all existing gas and oil facilities in and immediately adjacent to ALFL. Contact and establish liaison with each company. Deliver Minerals Management Comprehensive Regulations.
Funding/Satffing Beyond Normal Levels - None

1984, 85, 86, 87 - Monitor area for new gas and oil activities.
Funding/Staffing Beyond Normal Levels - None

Vegetative Cover and Effects of Grazing

Grazing still occurs on a small portion of ALFL, adjacent to the approximate 300 acres of private land proposed for addition. It would be more feasible to fence this area, following acquisition of the 300 acres.
A study to determine nature of vegetation prior to grazing is needed.
Existing fences cross several drainages and may wash out.

Schedule of Accomplishments

1977 - Most of ALFL was fenced, a small area was not fenced.

1983 - Close one interior gate and sign boundary.

1984, 85, 86, 87 - Patrol fenceline and make repairs to fence, as needed.
Funding and Staffing Beyond Normal Levels - None

Note: Following acquisition of the 300 acres of private land, fencing would be required at a cost of $10,000. If acquisition is well in the future, the small, unfenced portion of ALFL should be fenced at a cost of $3,000.
Study on effects of grazing by a qualified institution would cost $20,000. Project ALFL N1, Natural Resources Basic Inventory, and Project ALFL N9, Ecosystem Analysis, are related projects, and could be conducted concurrently. A basic inventory should, when completed, include lists of all vertebrates, invertebrates, vascular plants, non-vascular plants, geological features, soil types, hydrological features, including intermittent streams and groundwater

sources, and a continuation of monitoring of the water quality of the lake and it's tributaries began in the Water Resource Analysis. The Ecosystem Analysis ties together all phases of the areas environment and involves the transfer of energy from one trophic level of the environment to another.

Cost Estimates for Field Work:

1 geologist at $12,000. per man year for 1.25 man years = $15,000.
1 hydrologist at $12,000. per man year for 2 man years = $24,000.
1 botanist at $12,000. per man year for .5 man years = $6,000.
1 vertebrate biologist at $12,000. per man year for 1 man year = $12,000.
1 entomologist at $12,000. per man year for 3 man years = $36,000.
1 invertebrate biologist at $12,000. per man year for 2 man years = $24,000.
1 ecologist at $12,000. per man year for 3 man years = $36,000.

Analysis and Write Up Estimated Costs:

Collation of data by ecologist at $12,000. per man year for 1 man year = $12,000.
Drafting Services = $4,000.
Printing Services = $5,000.
Total Cost Estimates = $174,000.

RESOURCES PROGRAMMING SHEET

Alibates Flint Quarries Nat'l. Mon. (Park) Southwest (Region) TEXAS (State) X Natural Cultural (Date) Page

Area Priority	RMP Ref.#	Pkg. #	Project Title	Action Type	Year 1 NPS MY	Year 1 NPS Cost	Year 2 NPS MY	Year 2 NPS Cost	Year 3 NPS MY	Year 3 NPS Cost	Year 4 NPS MY	Year 4 NPS Cost	Year 5 NPS MY	Year 5 NPS Cost
1	ALFL N-11		Gas and Oil Extraction & Development	Research Maintenance Monitor	Base Funding - No additional funding unless new activity is proposed.									
2	ALFL N-4		Vegetative Cover and Effects of Grazing	Research New Maint-enance and Monitor	Base Funding		Base Funding		Base Funding		0.2	20	0.3	10
3	ALFL N-1		Natural Resources Basic Inven-tory	Research Mainte-nance	Base Funding		Base Funding		0.5	39	02	6	0.5	72
4	ALFL N-9		Ecosystem Analysis	Research New Maint-nance	Base Funding		Base Funding		Base Funding		0.2	36	0.2	21
5	ALFL N-3		Soil Structure	Research Mainte-nance	Base Funding		0.2	5	Base Funding		Base Funding		Base Funding	
6	ALFL N-13		Availability of Water Alternatives	Research	Prior to Development									
7	ALFL N-14		Test Drill for Water Dakota Sandstone	New Maint-nance	Prior to Development									
8	ALFL N-7		Control Exotic Plants	Research Maintenance	Base Funding		Base Funding		Base Funding		Base Funding		Base Funding	
9	ALFL N-6		Grassland Fires	Maintenance	Base Funding		Base Funding		Base Funding		Base Funding		Base Funding	

RESOURCES PROGRAMMING SHEET

Alibates Flint Quarries Nat'l. Mon. (Park) Southwest (Region) TEXAS (State) X Natural _ Cultural _____ (Date) Page ____

Area Priority	RMP Ref.#	Pkg. #	Project Title	Action Type	Year 1 NPS MY	Year 1 NPS Cost	Year 2 NPS MY	Year 2 NPS Cost	Year 3 NPS MY	Year 3 NPS Cost	Year 4 NPS MY	Year 4 NPS Cost	Year 5 NPS MY	Year 5 NPS Cost
10	ALFL N-12		Neighboring Real Estate	Maintenance Monitor	Base Funding		Base Funding		Base Funding		Base Funding		Base Funding	
11	ALFL N-5		Faunal Factors	Research Maintenance Monitor	Prior to Development									
12	ALFL N-2		Climatic Factors	New Maintenance	Following Full Operational Level									
13	ALFL N-8		Impact of Man	Maintenance Monitor	Base Funding as Identified									
14	ALFL N-10		Identify Essential Habitat	Research Maintenance	Prior to Development									

C. PROJECT STATEMENTS

Project Title and Number:

Completion of Natural Resources Basic Inventory

ALFL N1

1. Statement of the Problem

Additional basic natural resource data are needed for sound management plans and decisions, and to comply with Natural Science Studies Activity Standards.

1.1 Background Information

Natural resources information, when available, is in a scattered form, with no set form to organize the entire package into a single unit. Though studies have been done in some fields, there are many more which lack basic data for even a partial inventory. Categories to be considered as sub-proposals include:

ALFL N1a - Inventory all vascular plants and all significant non-vascular plants, denoting those species that are considered rare and/or endangered, of unusual size, or of visitor or scientific interest.

ALFL N1b - Prepare list of known fungi and bacteria in the park area.

ALFL N1c - Inventory all of the vertebrates (except fish, amphibians, and reptiles) and invertebrates and denote those species that are considered rare and/or endangered or of high visitor or scientific interest.

ALFL N1d - Inventory all significant geological features and processes, e.g., caves, fossils and rock systems.

ALFL N1e - Inventory soils and prepare distribution map of major soil found within the monument. This study should coincide with study of soil structure (Project ALFL N3).

ALFL N1f - Inventory all of the hydrological features, e.g., streambeds ponds, groundwater and other water resources.

1.2 Current Management Action

Ongoing projects are slowly accumulating data on park resources, but there is no completed inventory for most categories listed above. A vegetative survey and a small mammals survey have recently been completed, and soil maps are available for Hutchinson, Potter and Moore Counties, around the lake. Topographic maps are available for the National Monument, which indicate water distribution in general, but no study has addressed these problems directly, for the National Monument. General geology of the area is known, but much remains to be recorded for specific data.

1.3 Legal Authority

2. Alternative Actions and Probable Impacts

2.1 No Action

This alternative implies noncompliance with the Natural Science Studies Activity Standard. It would mean a loss of data necessary for proper planning and interpretation of the resource.

2.2 Current Management Action

Current action allows for slow accumulation of the data, but some will never be finished or completely inventoried by this process. A more active cultivation of the local research community might result in studies being completed in accordance with degree plans for Master's degrees or PhD degrees.

2.3 Proposed Action

Initiate contracts with local qualified institutions to provide the needed expertise to complete each of the sub-phases of this plan. Some of this could be undertaken with the aid of the Soil Conservation Service or the State Geologist's Office.

3. Recommended Course of Action

3.1 Work with the Soil Conservation Service on a general soil map for the area, and check with the Office of the State Geologist, to see if they would join in a cooperative venture of geologic mapping and description. As funds become available, through normal 10-238 action, other projects could be finished.

4. Requirements to Accomplish Action

4.1 Research

Initiate research projects to complete the monuments natural resource inventory, and prepare an area ecosystem map. Begin map with data presently available and add natural science data as it becomes available.

4.2 Continue Existing Maintenance

Park staff will continue collecting and collating data as they become available.

Project Title and Number:

Climatic Factors and Analysis

ALFL N2

1. Statement of the Problem

Scarcity of basic climatic data for the National Monument may limit concise planning and decision making.

1.1 Background Information

Present climatic analysis is based upon weather data obtained from stations in Borger, Texas and, since 1966, the Canadian River Municipal Water Authority Headquarters, at Lake Meredith. More defined climatic analysis is necessary for the monument to comply with Natural Science Studies Activity Standards.

1.2 Current Management Action

Weather and climate data, from Borger and Amarillo, are used to supplement the data gathered from the Canadian River Municipal Water Authority. Recently, a Fire Weather Station has been set up in the Sanford-Yake area, to collect data on fire danger, and this includes many basic weather factors. The Bureau of Economic Geology, of the State of Texas, has a climatic weather data station set up in Alibates Flint Quarries National Monument, to record weather data in relation to an erosion study currently underway. Data from these two stations, plus the current data from the Canadian River Municipal Water Authority, will make our climatic data base much more complete.

1.3 Legal Authority

2. Alternative Actions and Probable Impacts

2.1 No Action

This alternative would, essentially, mean abandoning the data gathering stations we have currently set up, so this alternative is not acceptable.

2.2 Current Management Action

Until development, the current action is the most acceptable. When Alibates Flint Quarries National Monument is fully operational, a full time weather station should be set up in the National Monument, to facilitate data gathering.

2.3 Proposed Action

The proposed action is to continue monitoring with the present

facilities until the time of development, and then add another weather station in the National Monument, to record additional data.

3. Recommended Course of Action

3.1 Data recording has begun on the Fire Weather Station, in the Sanford-Yake area of Lake Meredith Recreation Area. This should continue, and supplemental data should be used to create a general weather and climatic picture for the National Monument, until such time as the area is developed, at which point, a more complete weather station should be installed in the area, near the flint quarries. The new weather station should include a soil temperature monitor, to record temperatures at the soil surface and six inches below the surface, and above the surface of the ground, to give data on temperatures the flint may reach during the course of the year.

4. Requirements to Accomplish Action

4.1 Research

None

4.2 New Maintenance

Funds will need to be budgeted for the proposed weather station through the use of 10-238's, when the area becomes fully operational.

Project Title and Number:

Soil Structure

ALFL N3

1. Statement of the Problem

No soil analysis has been done within the National Monument. The lack of these basic data may limit planning and decision making. A soil study must be made to comply with Natural Science Studies Activity Standard.

1.1 Background Information

Soil maps are available for Potter County, but no specific site data is available for Alibates Flint Quarries National Monument.

1.2 Current Management Action

Some data on soils are available from the publications of the Soil Conservation Service, but these are inadequate for studies of erosion control or removal of exotics. Management actions, regarding these parameters, are done, at present, without adequate knowledge of soils.

1.3 Legal Authority

2. Alternative Actions and Probable Impacts

2.1 No Action

Without a comprehensive soil analysis, the resource will suffer from management actions, rather than benefit from them. Such resources as vegetation, fauna, geologic features and cultural features, depend on management actions, which must take cognizance of soil structure and analysis.

2.2 Current Management Action

Currently, such management objectives as controlled burning, exotic removal, reseeding of disturbed areas, and other soil related parameters, are not adequately considered in planning, due to lack of information in the data base. This means that, occasionally, in fragile areas, the soil may be damaged and either erosion or silting may occur, due to poor management action.

2.3 Proposed Action

Conduct a complete soils study of the National Monument. This should include an analysis of the chemical composition, erosion potential and related geological features and should be coordinated with study ALFL N1e. A soils map should be prepared to illustrate the various

soil types and areas that may offer an unstable building base.

3. Recommended Course of Action

3.1 Initiate a study in cooperation with the Soil Conservation Service, to comply with the above requirements. Any service they cannot provide should be budgeted, under contract, to a qualified soils research lab or research institution, associated with a college or university.

4. Requirements to Accomplish Action

4.1 Research

To be conducted in conjunction with the Soil Conservation Service in Amarillo, Stinnett and Pampa, Texas.
A 10-238 should be prepared to accomplish any data gathering which the Soil Conservation Service cannot provide.

4.2 Maintenance

Use information in planning, by existing staff, once research is completed.

Project Title and Number:

Vegetative Cover and Effects of Grazing

ALFL N4

1. Statement of the Problem

No information is available to identify the condition of the range, at the time cattle ranching began, in the Texas Panhandle.

1.1 Background Information

Prior to 1880, the area, within the National Monument, was open range, occupied with bison and antelope. Cattle ranching began in about 1880, and continued until 1977, or nearly one hundred years. The impact of this intense grazing is unknown on the National Monument, but, presumably, this was a harmful effect, since the buffalo and antelope had the freedom of movement which the introduction of the barbed wire fence did not give the cattle. Cattle trails tended to follow the same path day after day, and erosion scars are still visible in many places, within Alibates Flint Quarries National Monument.

1.2 Current Management Action

Fencing was completed in 1977 for most of the National Monument, though there are still two areas which have not been fenced completely. This has eliminated grazing within most of the area, though traces of trails and differences in vegetation are still noticeable. Petroleum industry equipment, roadways and pipeline scars are found within the National Monument, which also effect the historical scene, but, as petroleum supplies dwindle in this area, the effects of these operations will lessen and, eventually, disappear. Reseeding is practiced by the gas companies, when an area is disturbed, but the seed beds often are overgrown with Russian thistle (tumbleweed). Controlled burning is recommended for areas of Russian thistle, to aid in restoration of the historic scene.

1.3 Legal Authority

2. Alternative Actions and Probable Impacts

2.1 No Action

If no action is taken, exotic and inappropriate plants will encroach on the historical area and cattle trail scars will remain to detract from the natural scene.

2.2 Current Management Action

Though current management action lessens the effects which have taken

place in the past, it cannot change back the scene to its pristine point without knowledge of the resource at the time grazing began.

2.3 Proposed Action

Initiate research to determine vegetative conditions of the area at the beginning of ranching, provide analysis of vegetative dynamics, and establish benchmarks. The vegetative history and conditions of the vegetation at the appropriate time period for Alibates Flint Quarries National Monument must be determined. Analyse vegetation productivity, stand composition, succession, biomass, water needs, nutrient needs and other ecological parameters. Establish benchmarks for a monitoring system that will provide a warning system of future vegetative changes. Construct boundary fence on the unfenced area. This would be more easily accomplished, following acquisition of the 300 acres of private land.
Continue to check existing fence, twice annually and make needed repairs.

3. Recommended Course of Action

3.1 Finish the fencing project, so that the entire monument is fenced off from the ranch. Begin research to determine vegetative changes. Adjust vegetation as data becomes available. Continue monitoring selected species to insure that no future change takes place.

4. Requirements to Accomplish Action

4.1 Research

Research should be contracted with a qualified research institution which will provide the needed data to implement the plan.

4.2 New Maintenance

Budget for approximately three to five miles of fencing to finish the fencing project around the National Monument.

4.3 Existing Maintenance

Continue to make repairs as needed on existing fence.

Project Title and Number:

Faunal Factors

ALFL N5

1. Statement of the Problem

Data is lacking on wildlife management, which must be obtained to properly manage the areas wildlife populations.

1.1 Background Information

The extermination of the bison, and subsequent reduction in numbers of deer, antelope, bobcats, coyotes, panthers and other large species of animals has changed the composition of the fauna to such an extent that data on faunal relationships are lacking. Probable coyote increases help control small rodents and rabbits, but bobcat are seldom seen and lions only rarely reported. Bears, which were encountered in the Texas Panhandle by early explorers, are no longer found in the area or for five hundred miles or more from the area. This, coupled with the change in vegetation, due to nearly 100 years of grazing, has so changed the faunal picture as to make it unrecognizable, as far as the historical scene is concerned.

1.2 Current Management Action

Hunting is no longer allowed in the National Monument, which affects the deer and turkey populations, as well as populations of dove and quail. The area is fenced, preventing cattle entry, but not restricting wildlife movement significantly.

1.3 Legal Authority

2. Alternative Actions and Probable Impacts

2.1 No Action

If no action was taken on this problem, the wildlife would stay at its current levels, and the historic scene would suffer.

2.2 Current Management Action

Current management action allows growth of wildlife populations without pressure from hunting or grazing. However, the extent of recovery and growth is questionable for large faunal forms, due to the small size of the National Monument. Current action does not, however, provide for return to the natural scene. There is also no provision for factors affecting management planning or resources management with the current lack of knowledge of this important resource base.

2.3 Proposed Action

Continue Existing Maintenance

Continue monitoring wildlife numbers, until research data becomes available to make a determination of future management actions. Keep fences repaired and put patrols in the area during hunting season, to prevent poaching.

Initiate New Maintenance

Provide funds for new fence on approximately five miles of park boundary.

Research

Research is needed both in present populations within the National Monument, and in past populations within the same area. As data becomes available, it will be used in resources management to restore the historic scene.

3. Recommended Course of Action

3.1 Continue patrols to repair fencing and prevent poaching, and begin action to complete fencing. Initiate research to provide new data, and, as this becomes available, begin management action to return fauna to original levels.

4. Requirements to Accomplish Action

4.1 Research

Prepare a 10-238 to initiate research, both on present numbers of animals in the National Monument, and, on past numbers, in relation to effects of grazing, hunting, bison reduction, wolf extermination and other faunal factors. This could be done in conjunction with Lake Meredith.

4.2 Existing Maintenance/Monitor

Continue patrols and repair fence, as needed.

4.3 New Maintenance

Add new boundary fence as per project for grazing.

Project Title and Number:

Grassland Fires

ALFL N6

1. Statement of the Problem

Drying of vegetation constitutes a fire hazard both to visitors and to use areas.

1.1 Background Information

In September or October, the annual rains often stop, and, as the vegetation dries, it is susceptible to burning. Smoking is discouraged, but, with larger groups, it is difficult to control. Hunting season begins during this dry time, and threats of fire spreading, from either the ranch or the nearby Lake Meredith Recreation Area, are common. Fire fighting response is usually from both the city of Fritch, and the National Park Service, and often, the damage done by the vehicles is worse than the results of the fire. No data is available on the natural effects of fire in maintaining the grasslands, but is seems likely that growth of mesquites and other brushy plants was controlled, in part, by fire. Though the nearby ranch land is often overgrazed, the consequences of a fire spreading, from the National Monument, onto ranch land, would be difficult to determine. This would be more difficult if the fire was man-caused.

1.2 Current Management Action

Fires are currently controlled on the nearby recreation area, and, though no history of fires within the monument is known, it is likely that the same course of action would apply to the National Monument, to prevent the spread of the fire to adjacent ranchland. Controlled burning has been instituted in the recreation area, and will soon be used on disturbed areas in the National Monument, to determine its effectiveness in removing Russian thistle.

1.3 Legal Authority

2. Alternative Actions and Probable Impacts

2.1 No Action

If no actions were taken, in the event of a wildfire, our relationships with park neighbors would be damaged, and there would be the possibility of a tort claim against the part for grasses lost to fire. Burning at the wrong time of year could result in overburning with resultant erosion, which would deleteriously effect the natural resources.

2.2 Current Management Actions

Current policy of suppressing all burns could result in damage to the resource and disappearance of the historical scene.

2.3 Proposed Action

Resource Management Actions

Continue suppressing fires if they have the potential of getting off Federal land and onto the ranch. Conduct controlled management burn in a limited area, until their effects are well known.

Continuing Maintenance

None

New Maintenance

Monitor the effects of fire to determine the results both of wildfires and management burns.

Research

Institute research to determine the effects of fire on the grassland vegetation of the National Monument.

3. Recommended Course of Action

3.1 Continue suppressing fires if they have the potential of leaving Federal lands. Begin management burns as conditions warrant. Initiate research on results of burning.

4. Requirements to Accomplish Action

4.1 Initiate Research

Submit 10-238 to initiate research on effects of controlled burning in a historic environment.

4.2 Continue Existing Maintenance

Continue to suppress fires with the potential of leaving ALFL.

4.3 New Maintenance

Implement management burns. Monitor effects of management burns and wildfires.

Project Title and Number:

Control of Exotic Plants

ALFL N7

1. Statement of the Problem

Russian thistle (Salsola kali), a common exotic in the National Monument, is a visual intrusion.

1.1 Background Information

Russian thistle, commonly known as "Tumbleweed", is a native to the steppes of Asia, and was introduced into this country in the mid 19th century, in grain shipments from Russia. It has spread until is a common roadside plant throughout the west. In the fall, following wet years, Russian thistle accumulates in numbers as they break off and travel across the soil, scattering seeds to produce more growth the following year. By the time of the spring windy period, in February or March, the thistle is dry enough that great numbers break off during high winds and accumulate along fence rows and in natural depressions, causing an extreme fire hazard, in dry periods.

1.2 Current Management Action

In setting the historical scene at Alibates Flint Quarries, the thistle is removed by hand where practicable and where it presents a visual intrusion to the visitor's enjoyment of the area. In recent years, with smaller budgets, it has not been possible to even have this preventive maintenance and the thistle accumulates in ever increasing numbers where it is a visual intrusion as well as a fire hazard.

1.3 Legal Authority

2. Alternative Actions and Probable Impacts

2.1 No Action

If no action is taken, the thistle will increase in numbers, especially along roadsides where the soil is constantly disturbed. The visual intrusion will continue, and fire hazards will increase.

2.2 Current Management Action

Current management action is essentially no action. Even if hand gathering of the thistle were possible, it would only be a stopgap measure, aimed mostly at preserving the historical scene during the growing period of the thistle. There would be no control of the larger problem of wind distribution during the windy season, which would bring the weed into the area in the spring, even if it had been hand picked the previous summer.

2.3 Proposed Action

Resource Management Actions

Conduct management burns in areas of heavy thistle growth. This will take place in the fall when the grass is cured, but the weed hasn't set seed, and should control Russian thistle growth if properly applied.

Continuing Maintenance

Continue to remove those thistles which sprout along the trail to the flint quarries, or otherwise impair the natural scene in the National Monument.

New Maintenance

None proposed.

Research

As management burns are made, collect data on percent of thistle before and after the burn, and use this data to reapply burns at later periods.

3. Recommended Course of Action

3.1 Continue hand picking thistle along the trail or in other areas of high visibility. Conduct management burns as correct conditions become available. Use data in formulating new plans.

4. Requirements to Accomplish Action

4.1 Resource Management Actions

Conduct management burns to control thistles.

4.2 Continuing Maintenance

For maintenance by hand picking to continue, staffing will have to be at greater levels than at present.

4.3 Research

Research will be of an informal type, accomplished by data recovery after a burn, compared with data previously recovered before the burn.

Project Title and Number:

Impact of Man on the Ecosystem

ALFL N8

1. Statement of the Problem

Gas pipelines and oil company roads have scarred and will continue to scar the area around and within Alibates Flint Quarries National Monument.

1.1 Background Information

In the 1920's, oil and gas was discovered in the Texas Panhandle, and, since that time, right-of-ways have been purchased by the petroleum industry for pipelines and roads, as well as facilities, from the ranch. The National Monument inherited these problems when the land was purchased from the rancher, and, with recent increases in activity, the problem has become one of major importance in the area. Some of these roads and right-of-ways cross the National Monument, and the trail to the quarries follows part of an abandoned road for a portion of the way to the quarries.

1.2 Current Management Action

As roads are abandoned, they are blocked from further travel by barricades, and, occasionally, obliterated and reseeded to native grasses.

1.3 Legal Authority

2. Alternative Actions and Probable Impacts

2.1 No Action

If no action is taken, roadways and pipelines will continue to cause erosion and continue to be visual intrusions on the natural and historic scene.

2.2 Current Management Action

Currently, the petroleum industry is still active within the boundaries of Alibates Flint Quarries National Monument. No new roads are being built, but existing roads are graded regularly, and, occasionally, widened, through careless handling of the motor grader. These activities are closely monitored, and, when incursions occur, the company involved is immediately notified and actions taken to correct any damage which has been done. As roads are abandoned, they are blocked off and allowed to return to a natural state, and, occasionally, in exceptionally scarred areas, reseeding is attempted, though this has met with little success, when tried.

2.3 Proposed Action

The proposed action is to continue maintenance, with the goal to eliminate all unnecessary roads within the boundaries of the National Monument. Close contact will be maintained with the petroleum industry, to insure that new roads do not develop, and that present road systems are not widened or otherwise expanded within the National Monument.

3. Recommended Course of Action

3.1 Close off all abandoned roads to further vehicle traffic. Contact petroleum companies, to ensure their cooperation in road closings. Continue to monitor activities within the National Monument to ensure that further incursions do not occur.

4. Requirements to Accomplish Action

4.1 Resource Management Actions

Occasional roadbeds or pipelines will not reseed naturally, due to soil compaction and erosion of topsoil. These areas must be broken up, possibly fertilized, and reseeded to native plants.

4.2 Continue Existing Maintenance

Continue blocking old roadways, and repairing erosion as it occurs. Remain in contact with the petroleum industry to ensure compliance with all area policies.

4.3 Initiate New Maintenance

As more roads are abandoned, the process will have to be repeated, to ensure closing of all access roads within the National Monument.

4.4 Research

Research initiated by other projects will cover erosion, vegetative cover, and the ecosystem analysis.

Project Title and Number:

Ecosystem Analysis

ALFL N9

1. Statement of the Problem

The lack of complete analysis of the monument's ecosystem may limit planning and decision making.

1.1 Background Information

An ecosystem analysis involves all phases of the area's natural resources, and is, therefore, a final step in a comprehensive analysis. With data, the area resources could be managed properly, and with the best effect on the ecology of the area.

1.2 Current management decisions are made without full knowledge of the way in which the ecosystem works. This makes planning difficult, since any action made by management has an effect on the overall environmental picture of the area. Such parameters, as habitat preference, productivity, and trophic levels affect the ecology of the area, and, when disturbed by man, in an attempt to improve the area for visitors, the ecology of the area may be disrupted, and new unwanted environments may replace natural environments in the area.

1.3 Legal Authority

2. Alternative Actions and Probable Impacts

2.1 No Action

If no action is taken, management will continue with the present course of action, without the data available after this study. This will mean that the environment will often be disrupted needlessly, and the habitats within the National Monument may eventually degrade.

2.2 Current Management Action

Currently, management is making decisions which affect the environment in and around the National Monument, such as road placement, excavation, parameters, wildlife management, reseeding of disturbed sites, oil and gas activity areas and visitor use, without knowledge gleaned from this study. This haphazard approach to environmental management can no longer be condoned, since the means of correcting the loss are easily obtained from qualified research institutions.

2.3 Proposed Action

The proposed action would give the National Park Service at Alibates a good basis for sound management principles in the future. With

ecosystem analysis, the Service may study the consequences of each action within the monument, and determine the effects of the action on the various habitats and environments within the area.

3. Recommended Course of Action

Initiate research to provide for a comprehensive Ecosystem Analysis within Alibates Flint Quarries National Monument, which, in turn, will provide a basis for many future decisions affecting the area.

4. Requirements to Accomplish Action

4.1 Research

Research should measure the productivity of the several habitats which make up the total environmental picture at Alibates Flint Quarries National Monument.

4.2 Initiate New Maintenance

As information becomes available from this study, new maintenance projects may be defined, which will require new actions to keep the environment from degrading.

Project Title and Number:

Identification of Essential Habitat

ALFL N10

1. Statement of the Problem

Habitat for threatened and endangered species should be identified and managed in such a way as to provide an optimum opportunity for the retention of habitat for threatened, rare or endangered species of plants and animals.

1.1 Background Information

Several species of plants and animals, occurring within the Texas and Oklahoma Panhandles, are endemic, threatened, rare or endangered. Alibates Flint Quarries National Monument, though set aside to preserve the cultural remains of various groups of prehistoric inhabitants, also provides a protected area for the reintroduction of native species threatened in any way, or the introduction of species not known to have been native, which would thrive in this environment. Species in any of the above categories should be identified, and plans made to preserve them within the boundaries of the National Monument.

1.2 Current Management Action

Currently, though several endemic species are known to be present within the National Monument, no efforts have been made to list these, nor to provide for their protection within the boundaries.

1.3 Legal Authority

2. Alternative Actions and Probable Impacts

2.1 No Action

If no action is taken on this project, several rare or otherwise endangered species of plants and animals may become extinct. If this happens to a species, which has host specific feeders, those animals or fungi may also become extinct.

2.2 Current Management Action

No action is currently being taken to identify either endangered species or critical habitat.

2.3 Proposed Action

Personnel in the regional office are planning this study. It will involve the identification of habitat which is suitable for

endangered species, the amount and type of habitat available, an evaluation of the current status of each species, which may have occupied the area, both in past and present, and recommendations for the retention or renovation of habitat which is thought to be of potential value as critical habitat. Personnel from Alibates Flint Quarries, the Southwest Regional Office and State and Federal personnel involved with endangered species will be requested to provide consultation and service.

3. Recommended Course of Action

Gather data at the park level, which will support the upcoming study by the regional office, and have this data ready to offer when the study is initiated.

4. Requirements to Accomplish Action

4.1 Research

Research by a management team from the area, plus regional and local personnel, will gather in the area to discuss critical habitat and endangered species. A report will be prepared to list all threatened, endangered, rare and endemic species found or previously found, in the area.

4.2 New Maintenance

As data becomes available, habitat management activities will be initiated, which will involve new maintenance of habitat now existing, to encourage growth of species currently in the area.

Project Title and Number:

Gas and Oil Extraction and Development

ALFL N11

1. Statement of the Problem

Gas and oil facilities exist in and near Alibates Flint Quarries National Monument. New pipeline construction and other development may be proposed in the future.

1.1 Background Information

The petroleum industry has been active in the Texas Panhandle since the early 1920's. Existing transmission lines, cleaning facilities, booster stations, meter houses and access roads have been built in or near the National Monument, and there is the possibility that others could be built nearby in the future. The mineral rights still belong to the petroleum industry, and it is possible that they might desire other wells within the National Monument.

1.2 Current Management Action

Management currently monitors all gas and oil extraction activities with the National Monument and nearby Lake Meredith Recreation Area. Companies are required to file a plan of operations with the National Park Service before beginning a new facility, but operations within present facilities are exempt from this regulation.

1.3 Legal Authority

Legal authority for these operations comes from the Mineral Management Guidelines, as set down by Congress.

2. Alternative Actions and Probable Impacts

2.1 No Action

No action is currently unacceptable, since it has been shown in the past that this course of action allows the oil and gas companies to move in as they please and build where they see fit.

2.2 Current Management Action

If current management action is continued, the petroleum industry will be controlled, to a certain extent, within the boundaries of Alibates Flint Quarries National Monument. Current action, however, needs to be enhanced by the addition of features to further control the operations within the boundaries of the National Monument.

2.3 Proposed Action

Proposed action consists of developing lists and maps, pin pointing all existing gas and oil facilities in and immediately adjacent to

ALFL and listing companies which operate the facilities. A close relationship will be maintained with each of these companies to ensure that we are notified whenever a new project is proposed, or maintenance or changes made in current operations. We will continue to require plans of operations for each new facility before it is installed and implement other requirements of the Minerals Management Comprehensive Regulations, as the need arises.

3. Recommended Course of Action

3.1 Continue monitoring present activities of the petroleum industry, while preparing maps and lists of operations within and near the boundaries of ALFL.

4. Requirements to Accomplish Action

4.1 Continue Existing Maintenance

Continue monitoring ecological damage done by oil and gas field equipment within the area.

4.2 New Maintenance

New maintenance will be required if new operations are begun in the area.

4.3 Research

Begin research on existing right-of-ways, pipelines and other facilities, within ALFL.

Project Title and Number:

Adverse Effects of Neighboring Real Estate Development

ALFL N12

1. Statement of the Problem

The possibility exists that housing or commercial development will be established in the South Turkey Creek area, very near the National Monument. Such development could constitute an intrusion and increase non-visitor vehicle and foot traffic in the monument area.

1.1 Background Information

When the boundary was finalized, a small section of the ranch was enclosed on three sides by either Lake Meredith or ALFL. This area overlooks several scenic areas of the lake, and would be a good area for a potential development, especially if development were to take place at ALFL and Turkey Creek. If a paved road were put into this area, by the county, to provide access to the flint quarries, it would also give access to other traffic and enhance the possibilities for development. If this road were extended on, to give access to Turkey Creek, it would encourage commercial developments, such as marinas and snack bars to go in.

1.2 Current Management Action

As long as there are no plans for immediate development, there are fewer chances that any commercial or housing developments will go in at this location. When money becomes easier to obtain for Alibates development, other developments may also occur. Currently, management is keeping informed on plans, by the land owner, but new developments could change this outlook.

1.3 Legal Authority

2. Alternative Actions and Probable Impacts

2.1 No Action

If no action were to take place, there would be little chance for development to take place outside the area.

2.2 Current Management Action

Current programs are not geared for Alibates development, and would, therefore, not encourage outside development.

2.3 Proposed Action

The proposed action includes maintaining friendly relationships w

the landowners, development of a scenic easement to discourage development in the future, and carefully consider the alternatives when development plans for Alibates come to fruition.

3. Recommended Course of Action

Continuing monitoring development plans, both of Alibates and by the landowner. If Alibates development seems eminent, contact the landowner, to secure a scenic easement, to maintain the historic scene.

4. Requirements to Accomplish Action

4.1 Resource Management Actions - None.

4.2 Continuing Maintenance

Continuing monitoring the feelings of the landowner toward the proposed development.

4.3 Initiate New Maintenance

Develop a scenic easement if development appears near.

4.4 Research - None

Project Title and Number:

Alternatives for Development of Water Source

ALFL N13

1. Statement of the Problem

Development plans call for a visitor center complex with Ranger residence and small maintenance facility. This complex will require a water source.

1.1 Background Information

Southwest Regional Office Specialist rejects Lake Meredith as a potential water source because of poor quality and other problems. During 1966, two test wells were drilled in the vicinity of Alibates. One hole was abandoned after 10 feet, and, although the other was capable of producing water, the quality was too poor for useful drinking water.
The potential of using water from private wells, near the Turkey Creek Natural Gas Plant became a potential source, following meetings with Mr. Joe Batson.

1.2 Current Management Action

No other test wells are underway. The existing operation at the Bates Canyon Information Station is to utilize chemical toilets and bottled drinking water, brought in by employees.
The National Monument is still undeveloped.

1.3 Legal Authority

2. Alternative Actions and Probable Impacts

2.1 No Action

With no action, development plans could not be implemented, due to no useable water source.

2.2 Current Management Action

Continue to operate the interim Bates Canyon Information Station by employees bringing in bottled water and utilizing chemical toilets. No additional developments are possible under this alternative.

2.3 Proposed Action

Resource Management Actions - None.

New Maintenance - None.

Research

Study potential sources for water development at Alibates, from geo-hydrologic and economic standpoint. Develop alternatives.

3. Recommended Course of Action

3.1 Have SWRO specialists develop a plan to study potential sources of water for the proposed ALFL development complex, and develop a list of alternatives.

4. Requirements to Accomplish Action

4.1 Resource Management Actions - None.

4.2 Continuing Maintenance - None

4.3 Research

SWRO specialist develop plan to study water problem for ALFL as described in item 3.

Project Title and Number:

Test Drilling for Water in the Dakota Sandstone

ALFL N14

1. Statement of the Problem

1.1 Background Information

1.2 Current Management Action

1.3 Legal Authority

2. Alternative Actions and Probable Impacts

2.1 No Action

2.2 Current Management Action

2.3 Proposed Action

3. Recommended Course of Action

4. Requirements to Accomplish Action

IV. ENVIRONMENTAL ASSESSMENT

A. FINDING OF NO SIGNIFICANT IMPACT

Determination

It is determined that all actions outlined above are maintenance, monitor or research in character, and do not significantly affect the environment or cause controversy. Some projects will require a consultation in compliance with section 106 of the National Historical Preservation Act.

Therefore, in accordance with guidelines, NPS 12, Chapter 3, Page 6, concerning the preparation and review of environmental assessments.

NO ENVIRONMENTAL ASSESSMENT WILL BE PREPARED

Recommended by: _____ 12/6/82
Chief, Division of Natural Resource Management — Date

Recommended by: Richard W. Sellars 12/3/82
Chief, Southwest Cultural Resources Center — Date

Concurred by: _____ 12/13/82
Associate Regional Director, Operations — Date

Concurred by: _____ 12/13/82
Associate Regional Director, Planning & Cultural Res. — Date

Approved by: _____ 12/13/82
Regional Director, Southwest Region — Date

B. CULTURAL AND NATURAL RESOURCES MANAGEMENT BY CATEGORIES

1. Those Actions Whose Implementation Will Have Significant and Measurable Effect on the Environment:

No such actions planned. Each project included in the Resources Management Plan was considered on its own merit and, in every case, the actions planned do not have a significant and measurable effect on environment.

II. Those Actions Which Will Continue Existing Maintenance or are Monitoring Action:

ALFL C4 - Preservation of Petroglyphs/Acid Rain
ALFL N4 - Vegetative Cover and Effects of Grazing
ALFL N5 - Faunal Factors
ALFL N6 - Grassland Fires
ALFL N7 - Control of Exotic Plants
ALFL N8 - Impact of Man on the Ecosystem
ALFL N11- Gas and Oil Extraction and Development
ALFL N12- Adverse Effects of Neighboring Real Estate Development

III. Those Actions Which Initiate New Maintenance:

ALFL C1 - Archeological Survey of Alibates Flint Quarries National Monument
ALFL C2 - Archeological Investigations of Quarries
ALFL C3 - Excavation of Plains Village Indian Dwelling for Exhibit
ALFL C5 - Studies of Geology and Trade of Alibates Flint
ALFL C6 - Inadequate Collection Storage
ALFL C7 - Archeological Collecting and Flint Depletion
ALFL C8 - Background History of Alibates Area
ALFL C9 - Excavation of Stone Well
ALFL C10- Maintenance of Allie Bates Dugout
ALFL N1 - Completion of Natural Resources Basic Inventory
ALFL N2 - Climatic Factors and Analysis
ALFL N3 - Soil Structure
ALFL N4 - Vegetative Cover and Effects of Grazing
ALFL N5 - Faunal Factors
ALFL N6 - Grassland Fires
ALFL N8 - Impact of Man on the Ecosystem
ALFL N9 - Ecosystem Analysis
ALFL N10- Identification of Essential Habitat
ALFL N11- Gas and Oil Extraction and Development
ALFL N12- Adverse Effects of Neighboring Real Estate Development

IV. Those Actions Which Involve Research:

ALFL C1 - Archeological Survey of Alibates National Monument
ALFL C2 - Archeological Investigation of Quarries
ALFL C3 - Excavation of Plains Village Indian Dwelling for Exhibit
ALFL C4 - Preservation of Petroglyphs/Acid Rain
ALFL C5 - Studies on Geology and Trade of Alibates Flint
ALFL C7 - Archeological Collecting and Flint Depletion
ALFL C8 - Background History of Alibates Area
ALFL C9 - Excavation of Stone Well

ALFL N1 - Completion of Natural Resources Basic Inventory
ALFL N3 - Soil Structure
ALFL N4 - Vegetative Cover and Effects of Grazing
ALFL N5 - Faunal Factors
ALFL N6 - Grassland Fires
ALFL N7 - Control of Exotic Plants
ALFL N9 - Ecosystem Analysis
ALFL N10- Identification of Essential Habitat
ALFL N11- Gas and Oil Extraction and Development
ALFL N13- Alternatives for Developing Water Source
ALFL N14- Test Drilling for Water in Dakota Sandstone

All research projects would result in increased knowledge of the resource. None would have a measurable impact on the resources. Should research indicate the need for action, an action plan and environmental assessment would be prepared.

ENVIRONMENTAL ASSESSMENT MATRIX

Project Statement Title: Archeological Survey of Alibates Flint Quarries National Monument
ALFL C1

GOAL OF PROPOSAL: An archeological survey of Alibates National Monument has not been accomplished and is necessary for management purposes, both in planning and in protection of archeological resources.

*Indicates Current Action

Alternative Actions / Impact Categories	PROPOSED ACTION	NO ACTION 1	* ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4	ALTERNATIVE 5
	Archeological Survey, including Testing	No Survey Conducted	List Sites as Current Staff Locate During Other Duties			
Water	Testing will be away from water	No Effect	No Effect			
Soils	Some disturbance to soil will occur but no significant impact	No Effect	No Effect			
Flora	Minimal disturbance	No Effect	No Effect			
Fauna	No significant disturbance	No Effect	No Effect			
Cultural Resources	Location and protection of all Cultural Remains	Many sites will not be located and may be lost	Some sites located - hit and miss			
Coat	Contract with Research Institute	Loss of Resource	Existing Staff			
Visitor Use	Gives more data for use in programs	Loss of Information for use in visitor programs	Some loss of visitor information			

ENVIRONMENTAL ASSESSMENT MATRIX

Project Statement Title: Archeological Investigation of Quarries
ALFL C2

Project Rationale: At least three quarries need to be excavated to determine methods used in quarrying, and to show visitors what the quarries looked like when in use.

*Indicates Current Action

Alternative Actions / Impact Categories	PROPOSED ACTION	NO ACTION 1	*ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4	ALTERNATIVE 5
	Excavate three or more Quarries	No Excavation carried out	Visitors View Quarries "as are" enhanced by Ranger description			
Water	Minimal impact, since quarries are away from water	No Effect	No Effect			
Soils	Little disturbance since area mostly rock	No Effect	No Effect			
Flora	Minimal disturbance	No Damage	No Effect			
Fauna	No Damage	No Damage	No Effect			
Cultural Resources	Will expose and delineate the quarries and give data for visitors	No Data Gathered	No Data Gathered			
Coat	Research institute one man year or more	Loss to visitors of information and view of quarries	Existing Staff			
Visitor Use	Enhance Visitor use by delineating quarries	Visitors cannot vision the extent of quarrying	No Excavation. Verbal explanation of depth and extent of quarries			

ENVIRONMENTAL ASSESSMENT MATRIX

Project Statement Title: Excavation of Plains Indian Dwelling for Exhibit ALFL C3

NEED FOR PROPOSAL: Though this culture extended throughout the Plains from 1000 AD to 1500 AD, the sites at Alibates are the only examples of this type in the National Park System. Excavating several would give visitors a feel for the people who lived here from 1200 to 1450 AD.

* Indicates Current Action

Alternative Actions / Impact Categories	PROPOSED ACTION	NO ACTION 1	ALTERNATIVE 2	* ALTERNATIVE 3	ALTERNATIVE 4	ALTERNATIVE 5
	Testing about 10 Dwellings and Excavate two, to Show Interior	Do Not Excavate any Ruins	Excavate all of Site 52, about 60 Rooms, to Find Out More About Culture	Most visitors don't visit Ruins Area. Verbal description and diorama		
Water	Minimal Impact	No Effect	Erosion would deposit some silt in water	No Effect		
Soils	Extensive impact locally, but no erosion problems	No Damage	Extensive damage and some erosion	No Effect		
Flora	Minor Damage	No Effect	Major damage to plants within the area	No Effect		
Fauna	Minor Damage	No Effect	Diversity would decrease as well as numbers	No Effect		
Cultural Resources	Preserve and display Plains Village Culture Ruins	Ruins remain intact but not available for view	A complete Village on display	Same as Action #1		
Cost	One crew for one or two seasons	Cost in visitor enjoyment of the area	A large scale operation taking several seasons	Existing Staff		
Visitor Use	Enhance visitor use by allowing a view of the ruins	Would not be able to understand culture as well	Enhancement of view of Ruins But cause damage to the natural resource.	No view of Ruins for visitor. Verbal description and diorama only		

ENVIRONMENTAL ASSESSMENT MATRIX

Project Statement Title: Preservation of Petroglyphs/Acid Rain
ALFL C4

NEED FOR PROPOSAL: Petroglyphs, near the Ruins, are deteriorating, due to natural conditions and, possibly, Acid Rain. Petroglyphs are rare in Plains sites and should be protected.

* Indicates Current Action

Alternative Actions / Impact Categories	PROPOSED ACTION	NO ACTION 1	ALTERNATIVE 2	* ALTERNATIVE 3	ALTERNATIVE 4	ALTERNATIVE 5
	Check Adobeseal and Apply Other Preservatives	Apply No Preservatives to Petroglyphs	Enclose Petroglyphs in a Building for Viewing	Same as No Action		
Water	Minimal Effect	No Effect	Some erosion into streams	No Effect		
Soils	Slow down erosion slightly	No Effect	Erosion and damage to soils	No Effect		
Flora	No impact	No Effect	Plants damaged	No Effect		
Fauna	No impact	No Effect	Minor changes in fauna	No Effect		
Cultural Resources	May preserve petroglyphs	Petroglyphs eventually lost	Petroglyphs are preserved	Same as Action #1		
Coat	Minimal	Loss of resource	Construction of a building - manpower	Same as Action #1		
Visitor Use	Enhance future visitor use by preserving petroglyphs	Loss of resource	Visual intrusion	Same as Action #1		

ENVIRONMENTAL ASSESSMENT MATRIX

Project Statement Title: Studies of Geology and Trade of Alibates Flint
ALFL C5

NEED FOR PROPOSAL: The geographic distribution and time span used for Alibates Flint are unknown. Reports indicate the flint may be distributed all over the continent, but this seems unlikely.

* Indicates Current Action

Alternative Actions / Impact Categories	PROPOSED ACTION	NO ACTION 1	* ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4	ALTERNATIVE 5
	Research Characteristics of the Flint and Distribution	No Research Carried Out	Rely on Existing Information			
Water	No Effect	No Effect	No Effect			
Soils	No Effect	No Effect	No Effect			
Flora	No Effect	No Effect	No Effect			
Fauna	No Effect	No Effect	No Effect			
Cultural Resources	Realize distribution and nature of the flint resource with some flint lost for research	Lessen knowledge of the resource	Some valid and some questionable info on flint			
Coat	One or more researchers or projects	Cost in visitor knowledge	Existing Staff			
Visitor Use	Enhance visitor use	No enhancement of visitor experience	Incomplete and inaccurate visitor info.			

ENVIRONMENTAL ASSESSMENT MATRIX

Project Statement Title: Inadequate Collection Storage
ALFL C6

ISSUE STATEMENT: Collections are subject to Deterioration and Loss, due to Inadequate Curation

*Indicates Current Action

Alternative Actions / Impact Categories	PROPOSED ACTION	NO ACTION 1	* ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4	ALTERNATIVE 5
	Provide Future Storage and Train Personnel	No Storage Provided/No Training	Inadequate Storage/Some Training			
Water	No immediate effect	No Effect	No Effect			
Soils	No Effect	No Effect	No Effect			
Flora	No Effect	No Effect	No Effect			
Fauna	No Effect	No Effect	No Effect			
Cultural Resources	Properly cared for and at times, displayed	Collections will deteriorate	Some collections properly stored, most not			
Coat	Training for one or more people.	Conditions of resources	Some artifact deterioration and loss			
Visitor Use	Displays will have excellent artifacts	Poor displays due to poor artifacts	Poor displays due to poor artifacts			

ENVIRONMENTAL ASSESSMENT MATRIX

Project Statement Title: Archeological Collecting/Flint Depletion
ALFL C7

NEED FOR PROPOSAL: Flint Resource is Disappearing, Especially from 300 acres, due to Illegal Collecting. Potting of Sites occurs throughout the National Monument.

*Indicates Current Action

Alternative Actions / Impact Categories	PROPOSED ACTION	NO ACTION 1	* ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4	ALTERNATIVE 5
	Land Acquisition, Increased Patrols, Depletion Studies	No Acquisition, Patrols or Depletion Studies	No Acquisition or Development, No Depletion Studies, Infrequent Patrols	Carry Out GMP Development Plans		
Water	Quality Improved	Continued deterioration	Continued deterioration	Some improved, some not		
Soils	Quality improved	Continued deterioration	Continued deterioration	Some improved, some not		
Flora	Quality improved	Continued deterioration	Continued deterioration	Some improved, some not		
Fauna	Quality improved	Continued deterioration	Continued deterioration	Some improved, some not		
Cultural Resources	Protected	Some loss and damage	Some loss and damage	Better overall protection		
Coat	Land prices, personnel	Lost resource	Lost resource	Development costs		
Visitor Use	Resource protected	None to 300 acres, reduced interpretation	None to 300 acres, reduced interpretation	Improved		

ENVIRONMENTAL ASSESSMENT MATRIX

Project Statement Title: Background History of Alibates Area
ALFL C8

NEED FOR PROPOSAL: Little is known about the history and recent prehistory of the Alibates Area. As the area is historic in nature, this information is vital to correct interpretation of the resource

* Indicates Current Action

Alternative Actions / Impact Categories	PROPOSED ACTION	NO ACTION 1	* ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4	ALTERNATIVE 5
	Research and Interviews with Local Residents	Research Not Conducted	Rely on Existing Information. Gather New Information Piece-Meal			
Water	No Effect	No Effect	No Effect			
Soils	No Effect	No Effect	No Effect			
Flora	No Effect	No Effect	No Effect			
Fauna	No Effect	No Effect	No Effect			
Cultural Resources	Better understood in light of recent history	Information lost	Little understood w/information missing			
Cost	$10,000.	Lack of information	Lack of information			
Visitor Use	Improved	Visitors poorly informed	Visitors poorly informed			

ENVIRONMENTAL ASSESSMENT MATRIX

Project Statement Title: Excavation of Stone Well
ALFL C9

PLAN PURPOSE: A Stone Well, near the Ruins, is partly filled with Debris, which may contain Artifacts of Cultural Value.

* Indicates Current Management Action

Alternative Actions / Impact Categories	PROPOSED ACTION	* NO ACTION 1	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4	ALTERNATIVE 5
	Excavate and Fill the Well	Well Left As Is				
Water	May remove sources of contamination to ground water	No improvement				
Soils	Minimal effect, as digging will be sub-surface	Minimal effect				
Flora	Minimal effect	No effect				
Fauna	Minimal effect	No effect				
Cultural Resources	Well fill may determine who lived there and when	No data will be provided on previous resident				
Cost	Research contract	Loss of data				
Visitor Use	Visitors made safer by well fill	No effect				

ENVIRONMENTAL ASSESSMENT MATRIX

Project Statement Title: Maintenance of Allie Bates Dugout, Alibates Creek
ALFL C10

[illegible]: A Small Dugout Shelter, on Alibates Creek, typified the Structures used by Early Settlers and would provide an excellent site for Interpretation.

*Indicates Current Management Action

Alternative Actions / Impact Categories	PROPOSED ACTION	* NO ACTION 1	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4	ALTERNATIVE 5
	Maintain Present Foundation	Let Foundation Deteriorate				
Water	Near a water course, and, during floods, might be inundated and cause erosion	Nearby water course might become polluted				
Soils		Erosion could increase				
Flora	No effect	Minimal effect				
Fauna	No effect	No effect				
Cultural Resources	Good site for cultural interpretation	Cultural resource disappears				
Coat	Minimal - occasional/patrols	Loss of feature				
Visitor Use	In future, could be used for interpretation	Loss of area				

ENVIRONMENTAL ASSESSMENT MATRIX

Project Statement Title: Completion of Natural Resources Basic Inventory
ALFL N1

NEED FOR PROPOSAL: Additional Basic Natural Resources Data are Needed for Sound Management Plans

* Indicates Current Management Action

Alternative Actions / Impact Categories	PROPOSED ACTION	NO ACTION 1	* ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4	ALTERNATIVE 5
	Inventory Flora, Fauna, Soils, Water Courses and Geological Features	No Inventory Conducted	Information Collected. Existing Staff "as time available"			
Water	Sources and courses, known and controlled	Floods of unknown origin might cause problems	Impacts in all categories the same as for "no action" except consequences not as major			
Soils	Inventoried and stabilized when needed	Erosion problems worsen				
Flora	Inventoried (exotics removed)	Exotics increase and former species unknown				
Fauna	Inventoried	Exotics increase and former species unknown				
Cultural Resources	Improved by knowing resources available to Prehistoric people	Loss of knowledge of habitat of prehistoric peoples				
Coat	Several research teams in area for several years	Loss of historic environment				
Visitor Use	Improved by knowledge of habitat and environment	Loss of historic scene				

ENVIRONMENTAL ASSESSMENT MATRIX

Project Statement Title: Climatic Factors and Analysis
ALFL N2

NEED FOR PROPOSAL: Scarcity of Climatic Data for the National Monument area may limit precise planning and decision making.

* Indicates Current Management Action

Alternative Actions / Impact Categories	PROPOSED ACTION	* NO ACTION 1	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4	ALTERNATIVE 5
	Install a Weather Station in the National Monument	No Station Established				
Water	Amount of rainfall monitored	Rainfall data unknown				
Soils	Minimal effect	No effect				
Flora	Minimal effect	No effect				
Fauna	Minimal effect	No effect				
Cultural Resources	No effect	No effect				
Cost	Weather data collecting equipment and manpower	Loss of information needed for planning				
Visitor Use	Possible visual intrusion if improperly placed	May suffer from improper management				

ENVIRONMENTAL ASSESSMENT MATRIX

Project Statement Title: Soil Structure
ALFL N3

NEED FOR ACTION: No Soil Analysis has been done at Alibates. Lack of basic data may limit planning and decision making.

* Indicates Current Management Action

Alternative Actions / Impact Categories	PROPOSED ACTION	NO ACTION 1	* ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4	ALTERNATIVE 5
	Initiate a Soils Study on Chemical Composition, Erosion Potential and Geology	No Soils Study Conducted	Information Collected by Existing Staff "as time available"			
Water	Proper study will aid in keeping water clean	Water quality may drop if erosion increases	Impacts in all categories the same as for "no action" except consequences not as major			
Soils	Erosion potential for various soils known	Erosion may increase if construction initiated				
Flora	Vegetation on various soils determined	Vegetation in relation to soils unknown				
Fauna	Soils may effect faunal distribution	Faunal factors unknown				
Cultural Resources	Soils may have effected the prehistoric placement of buildings	Prehistoric sites not correlated with soils				
Cost	Research costs	Loss of information. Buildings may deteriorate				
Visitor Use	Improved by proper placement of facilities	Poor facilities				

ENVIRONMENTAL ASSESSMENT MATRIX

Project Statement Title: Vegetative Cover and Effects of Grazing
ALFL N4

NEED FOR PROGRAM: The land has suffered from over one hundred years of intensive grazing, and some species of plants may have changed patterns of growth. Original cover should be restored.

*Indicates Current Management Action

Alternative Actions / Impact Categories	PROPOSED ACTION	NO ACTION 1	ALTERNATIVE 2	* ALTERNATIVE 3	ALTERNATIVE 4	ALTERNATIVE 5
	Eliminate Grazing and Restore Native Vegetation - Upkeep on Fences	Allow Grazing to Continue	Discontinue Grazing Only. No Research	Eliminate Grazing in Areas Currently Fenced. Grazing Continue Unfenced Area		
Water	Quality improves as native plants return	Quality continue to decrease	Quality improves somewhat	This option causes the "No Action" impacts on the unfenced portion and the Alternative 2 impacts on the currently fenced area		
Soils	Erosion stops as cow trails are eliminated	Erosion continues	Erosion slows but exotics fail to stop			
Flora	Native plants restored	Imbalance with native and exotics	Exotics still present, tho natives increase			
Fauna	Native grazers increase. Balance with predators	Cows force native grazers out	Native grazers increase			
Cultural Resources	Sites no longer impacted by cattle	Cultural sites damaged by cattle	Sites no longer impacted by cattle			
Cost	Research costs to determine original vegetation	Natural and cultural values lost	Complete fencing around monument			
Visitor Use	Natural scene restored	Natural scene lost	Natural scene improved			

ENVIRONMENTAL ASSESSMENT MATRIX

Project Statement Title: Faunal Factors
ALFL N5

NEED FOR PROPOSAL: The wildlife in Alibates Flint Quarries has never been monitored. Hunting is excluded, but condition of native species remains unknown.

* Indicates Current Management Action

Alternative Actions / Impact Categories	PROPOSED ACTION	* NO ACTION 1	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4	ALTERNATIVE 5
	Research and Continued Documentation of Faunal Factors	No Research or Documentation. Hunting Prohibited				
Water	No effect	No effect				
Soils	No effect	No effect				
Flora	May improve as fauna is better understood	May decline if fauna is in imbalance				
Fauna	Will improve as more data becomes available	Will decline in proportion of native species				
Cultural Resources	Undetermined effects, depending which species increase	Undetermined, depending on which species are abundant				
Coat	Research costs and patrols	Loss of natural fauna				
Visitor Use	Heightens visitor enjoyment as fauna balances itself	Visitor enjoyment less				

ENVIRONMENTAL ASSESSMENT MATRIX

Project Statement Title: Grassland Fires
ALFL N6

LAND USE PROPOSAL: Drying of vegetation, following the annual rainy season, produces an abundance of dead grasses and herbs which constitute a fire hazard to visitors and use areas.

* Indicates Current Management Action

Alternative Actions / Impact Categories	PROPOSED ACTION	NO ACTION 1	* ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4	ALTERNATIVE 5
	Institute Research on Fire in the Natural Environment	No Research on Fire	Control Wildfire. Management Burns for Exotic Plant Control			
Water	No water available for fighting a fire	Fire may remove vegetation, currently holding soil, causing erosion and water quality damage	Fire will remove some vegetation, increasing run-off and soil erosion			
Soils						
Flora	Some species may not be fire resistant		Some species affected by wildfire - exotics reduced			
Fauna	May increase or decrease, due to fire	No damage	May increase or decrease, due to wildfire and exotic control.			
Cultural Resources	May be damaged by fire	No effect	May be damaged by wildfire			
Cost	Research costs, manpower, mileage	Loss of data as to natural fires	Exotic plants reduced - some loss of flora & fauna from wildfire			
Visitor Use	Threatened at present. Improved by study	Continue threatened	Minor threat to visitor use			

ENVIRONMENTAL ASSESSMENT MATRIX

Project Statement Title: Control of Exotic Plants
ALFL N7

NEED FOR PROPOSAL: Russian thistle (Salsola kali) is a common exotic in the National Monument. It is a visual intrusion, and a firehazard and should be controlled.

* Indicates Current Management Action

Alternative Actions / Impact Categories	* PROPOSED ACTION	NO ACTION 1	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4	ALTERNATIVE 5
	Continue Removing by Hand	Do Not Remove	Use Chemical Sprays to Control			
Water	No effect	No effect	Quality impaired			
Soils	Soils will become stabilized if native species of plants return	More likely to erode	If spray applied at wrong time, erosion occurs			
Flora		Native species crowded out	Native plants may also be sensitive			
Fauna	Will improve with native flora	Native species less abundant	May be sensitive to chemicals			
Cultural Resources	Looks of cultural resources will improve with removal of exotics	Cultural resources hidden by tumbleweeds	Rock slabs may react to the chemicals in the spray			
Cost	Hand labor	Deterioration of the resource	Chemicals, manpower, machinery			
Visitor Use	Improves if the Russian thistle is removed	Visual scene impaired	Improves if chemical applied properly			

ENVIRONMENTAL ASSESSMENT MATRIX

Project Statement Title: Impact of Man on the Ecosystem
ALFL N8

NEED FOR PROPOSAL: Roads, Abandoned Roads and Pipeline Scars, cross the Monument in various places, causing a visual intrusion. In places, these roads give access to the National Monument to individuals who pick up Flint or Artifacts.

* Indicates Current Management Action

Alternative Actions / Impact Categories	PROPOSED ACTION	NO ACTION 1	ALTERNATIVE 2	* ALTERNATIVE 3	ALTERNATIVE 4	ALTERNATIVE 5
	Close Abandoned Roads and Fence Off Areas where Use is Damaging	Allow Continued Use of all Roads and Right-of-Way	Purchase All Mineral Rights, Right-of-Ways and Roadbeds	Allow Continued Use of all Roads & Right-of-Ways. Obliterate When No Longer Needed		
Water	Water quality improves	Water quality continues to decline	Water quality improves	Decrease run-off and erosion on obliterated areas		
Soils	Erosion slows	Erosion continue	Erosion stops from this cause	Erosion continues		
Flora	Plants return	Plants crushed by vehicles	Plants return	Flora returns to obliterated area		
Fauna	Fauna improves	Fauna shows no improvement	Fauna improves	Fauna returns to obliterated area		
Cultural Resources	Cultural resources protected	Access to cultural resources continues	Cultural resources protected	No change		
Cost	Fencing, barricades manpower	Loss of resource, Visual intrusion	Cost of leases, manpower, fencing, barricades signs	Manpower & equipment to obliterate rut roads & row		
Visitor Use	Improved natural scene	Deterioration	External influences cease deteriorating the natural scene	No change		

ENVIRONMENTAL ASSESSMENT MATRIX

Project Statement Title: Ecosystem Analysis
ALFL N9

NEED FOR PROPOSAL: With an Ecosystem Analysis, we will find out how the environment functions, and where we are loosing in productivity, from man caused interference, such as roads or exotic plants

* Indicates Current Management Action

Alternative Actions / Impact Categories	PROPOSED ACTION	* NO ACTION 1	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4	ALTERNATIVE 5
	Study All Phases of Areas Resources and Relationships	No Study Conducted	Study All Phases as Related to Cultural Data Only			
Water	Sources and uses determined	Sources and uses not determined	Sources and use for prehistoric people			
Soils	Kinds and flora of each noted	Variety and types not noted	Which most useful to former inhabitants			
Flora	Variety and use by fauna determined	Environmental factors unknown	How used by people			
Fauna	Habitat and floral used determined	Habitats not determined	Relationship to culture			
Cultural Resources	How environment effects cultural remains will be determined	Relationship to environment unknown	Relationship to environment			
Cost	Several researchers over several years	Loss of valuable data needed for planning	Intermediate			
Visitor Use	Improved by habitat analysis so that visitors may see relationships	No new knowledge	Some improvement			

ENVIRONMENTAL ASSESSMENT MATRIX

Project Statement Title: Identification of Essential Habitat
ALFL N10

NEED FOR PROPOSAL: Habitat for Threatened and Endangered Species should be identified and managed in such a way as to provide an optimum opportunity for the retention of habitat of Threatened, Rare or Endangered Species of Plants or Animals

* Indicates Current Management Action

Alternative Actions / Impact Categories	PROPOSED ACTION	* NO ACTION 1	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4	ALTERNATIVE 5
	Identify and Re-introduce Species which may have lived here at earlier times	Endangered Species not Re-introduced				
Water	No effect	No effect				
Soils	May improve soils	Not improved				
Flora	Improve variety of plants	Not improved				
Fauna	Improve variety of animals	Not improved				
Cultural Resources	No effect	No effect				
Cost	Research and man-power for rein-troduction	Cost in lack of endangered spec-ies to the envir-onment				
Visitor Use	Enhanced by pre-sence of endanger-ed plants	Not enhanced				

ENVIRONMENTAL ASSESSMENT MATRIX

Project Statement Title: Gas and Oil Extraction and Development
ALFL N11

NEED FOR PROPOSAL: Existing Gas and Oil Facilities Cannot be Removed Until the field is depleted. Existing and new facilities will be governed by the "Minerals Management Comprehensive Regulations."

* Indicates Current Management Action

Alternative Actions / Impact Categories	* PROPOSED ACTION	NO ACTION 1	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4	ALTERNATIVE 5
	Map & Record Existing Facilities. Close Contact with Companies. Require Plans of Operation	Do Not Monitor Gas and Oil Activities				
Water	Some siltation from existing activities	Water polluted				
Soils	Some disturbance and mixing from existing activity	Soil erosion common				
Flora	Species composition and ground cover changed from existing operation	Flora removed & little recovery				
Fauna	Animals disturbed by existing operations	Animals driven from area and destroyed, habitat changed				
Cultural Resources	Some damage thru existing operation	Cultural resource damaged and lost				
Coal	Some natural resources lost	High natural resource lost				
Visitor Use	No impact	Visitor information, safety and enjoyment lost				

ENVIRONMENTAL ASSESSMENT MATRIX

Project Statement Title: Adverse Effects of Neighboring Real Estate Development
ALFL N12

NEED FOR PROPOSAL: The Advent of Neighboring Real Estate Development would introduce potential natural and visual impacts

* Indicates Current Management Action

Alternative Actions / Impact Categories	* PROPOSED ACTION	NO ACTION 1	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4	ALTERNATIVE 5
	Close Relationship with Adjacent Land Owners - Scenic Easement in Event of Development	No Coordination in Event of Development				
Water Soils Flora Fauna Cultural Resources	There would be an increased adverse impact in all areas, should development occur, due to increased indiscriminate visitor use	Same as for proposed action, except degree much more severe				
Coat	Greater impact on natural scene					
Visitor Use	Visual impact, even with scenic easement					

ENVIRONMENTAL ASSESSMENT MATRIX

Project Statement Title: Alternatives for Development of Water Source
ALFL N13

PEPC 204 Proj No.: GMP Development Plans call for a Visitor Center with Residence. This complex will require a safe, reliable water source.

* Indicates Current Management Action

Alternative Actions / Impact Categories	PROPOSED ACTION	NO ACTION 1	* ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4	ALTERNATIVE 5
	Study Potential Sources for Water Source	No Study of Potential Water Sources	Use Existing Information			
Water	Will identify adequate water supply	No source identified	Test well drilled but none have adequate water			
Soils	No effect	No effect	No effect			
Flora	No effect	No effect	No effect			
Fauna	No effect	No effect	No effect			
Cultural Resources	No effect	No effect	No effect			
Coat	Cost of study	No water supply available for use of visitors	Test wells already drilled			
Visitor Use	No effect	Same as above	Test wells did not have adequate water source			

ENVIRONMENTAL ASSESSMENT MATRIX

Project Statement Title: Test Drilling for Water in Dakota Sandstone
ALFL N14

NEED FOR PROPOSAL: GMP Development plans call for a Visitor Center/Residence Complex. No adequate water source has been identified. The Dakota Sandstone may be a potential source.

*Indicates Current Management Action

Alternative Actions / Impact Categories	PROPOSED ACTION	* NO ACTION 1	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4	ALTERNATIVE 5
	Drill Test Well in Dakota Sandstone	Not Drill Test Well				
Water	Dakota sandstone may be tapped as water source	No impact				
Soils	Minor disturbance	No impact				
Flora	Minor disturbance	No impact				
Fauna	Minor disturbance	No impact				
Cultural Resources	Drilled where none exist	No impact				
Cost	Cost of drilling test well	No water available for visitor use				
Visitor Use	Possible source of visitor use water	No water available for visitor use				

A. CONSTRAINT DOCUMENTS

A General Management Plan has been formulated for Alibates Flint Quarries National Monument and was approved in 1978.

Public Law 89-154 authorizing Alibates National Monument. This document limits only the amount of money to be spent for development and land acquisition.

Public Law 95-625, amending Public Law 89-154, by raising the amount for development, changing the boundary and changing the name to Alibates Flint Quarries National Monument.

This area is located within the Ground-Water Conservation District No. 3, south of the Canadian River and, as such, our use of groundwater may be regulated by the Texas Water Rights Commission, thru the broad and specific powers given to the ground-water conservation districts. These powers provide for districts to:

1. "...make and enforce rules to provide for conserving, preserving, protecting, recharging and preventing waste of the underground water..."

2. "...employ registered professional engineers to make surveys of the underground water reservoir or subdivision and surveys of the facilities for development, production and use of the water..."

3. "...develop comprehensive plans for the most efficient use of the underground water..."

4. "...carry out research projects, develop information and determine limitations which should be made on withdrawing underground water..."

5. "...collect information regarding the use of underground water and the practicability of recharging the reservoir..."

6. "...publish its plans and the information it develops..."

7. "...acquire land to erect dams or to drain lakes, draws and depressions; construct dams; drain lakes, depressions, draws and creeks; and install pumps and other equipment necessary to recharge the underground water reservoir..."

B. COMPLIANCE WITH PRESERVATION LEGISLATION

All management actions must be in compliance with provisions of the Antiquities Act of 1906, the Historic Site Act of 1935, the National Historic Preservation Act of 1966, Executive Order 11593, the National Environmental Policy Act of 1969, and the Archeological and Historic Data Preservation Act of 1974.

Any construction activities or permits for construction activities, within the proposed boundaries of the Monument, must have the required archeological surveys, and, where necessary, mitigating actions must be taken to comply with applicable legislation. Special use permits for construction activities, such as natural gas pipelines and associated facilities and roads, require consultation with the State Historic Preservation Officer and the Advisory Council on Historic Preservation in compliance with Section 106 of the National Historic Preservation Act of 1966.

When construction is located on land under the administration of the Bureau of Reclamation, the Bureau will complete the 106 process before issuing a special use permit. The National Park Service will accomplish this, in cases where NPS managed land is involved. The monument Superintendent should notify the Division of Cultural Resources in the Southwest Regional Office upon learning that construction activities are planned which will effect the monument.

C. COMPLETED RESEARCH

1. Water Study: An 8-inch (20 CM) diameter hole was drilled in Potter County to 429 feet (131 m) and cased the full depth with 6-inch (15cm) diameter steel casing (includes 100 linear feet (30 m) of perforated casing). The log of the well indicated the following formations. 0 to 10 feet (0-3 m), top soil; 10 to 40 feet (3-12 m), Ogallala; and 40 to 429 feet (12-131 m), permian. A water-bearing strata of sand was encountered at 395 feet (120 m), however, chemical test results indicated the water to be high in sulfates and undesirable for domestic use. A 24-hours pump test confirmed a yield of 5 to 7 gallons per minute (19-26 1/min.).

2. Completed Archeological Research Within the Park: In 1939 and 1940, Ele and Jewel Baker excavated the Alibates Ruin. This project was done under the WPA program, sponsored by Floyd Studer of the Panhandle Plains Historical Museum. Their mimeographed field report is on file at park headquarters.

   Kirk Bryan visited the Alibates Flint Quarries and reported on them in his monograph on flint quarries and stone working technology, published in 1950.

   Since 1967, National Park Service personnel have been recording archeological sites in the monument as part of the archeological survey for Lake Meredith Recreation Area and Alibates National Monument.

3. Research Completed Outside the Park: The archeology of the Texas Panhandle has been under investigation since 1907. Many people have contributed to the body of information concerning Panhandle archeology and a historical sketch of the investigation is presented below. This is not a discussion of the archeology, but, rather an outline of the who, what, where and when of the archeological investigations in the area of Lake Meredith and Alibates. The intensity of investigation has been quite high for such a small area, especially when compared to surrounding areas. This interest may be attributed to very active local people who were interested enough with the preservation of the archeology to attract archeologists to the Panhandle, and the occurrence of numerous prehistoric "pueblo" masonry dwellings.

   In 1907, T. L. Eyerly, under the auspices of the Canadian Academy, conducted a group of students on a geological-archeological field trip to the "buried cities" on Wolf Creek. The excavation which took place in 1907 was the first systematic, reported research conducted with the archeology of the Texas Panhandle. Since this first excavation, 90 percent of all archeological research, in the Texas Panhandle, has been concerned with only the "buried cities", ignoring other types of prehistoric remains in the area.

   It was not until 1920 that another research project was initiated by W. K. Moorehead. Moorehead also excavated at the Wolf Creek Ruins which he renamed the Handley Ruins. At Wolf Creek, he excavated the Thorburn, Eyerly, Handley and Gould Ruins. He also visited sites at Landergin Mesa, Antelope, Cottonwood, Tarbox and Dixon Creeks. In 1929, J. A. Mason, from Pennsylvania University Museum, excavated two ruins. The same year, W. C. Holden excavated at the Cottonwood and Tarbox Ruins. The next year (1930), Holden excavated at Tierra Blanca and Antelope Creek, which had been tested by Moorehead in 1920. In 1931, Floyd V. Studer, who had accompanied Eyerly in 1907,

published the conclusions of 24 years of field work in the Panhandle. Studer reported the existence of 110 sites which displayed stone structures, and later the same year, Earl Ingerson reported the discovery of 5 other sites, which also had stone structures.

In 1932, W. C. Holden again returned to the Panhandle and excavated at the Saddleback Ruin. The same year, E. J. Lowery, one of Holden's students at Texas Tech, submitted a master's thesis which described the results of 5 expeditions to Antelope Creek. Lowery excavated the Antelope Creek Ruin and the Lookout Ruin and tested others in the immediate area.

In 1934, Studer excavated Ruin Number 55 and E. B. Sayles published the results of a survey in Texas in which he described ruins in the Texas Panhandle. In 1939, under the WPA program, C. S. Johnson excavated the Antelope Creek Ruin and Baker worked at Chimney Rock Ruin. This period of intensive investigation ended in 1940 and was not renewed for 14 years.

In 1946, Alex D. Krieger synthesized the known archeological information on the Texas Panhandle Cultural Ruins and proposed that the ruins be classified as the Antelope Creek Focus of the Panhandle Aspect. Krieger was the first person who attempted to organize the great mass of information into a comprehensive, systematic body.

Actual field research in the Alibates area was not resumed until 1953, when the Glasscocks excavated CR-1, a hunting camp affiliated with the Antelope Creek Focus. In 1955, Jack Hughes reported his finding at Little Sunday, an Archaic campsite, and in 1957, the Nor-Pan Archeological Society excavated the Roper Site. In 1962, Hughes reported a Neo-American site which had woodland affiliations, instead of Panhandle Aspect.

A preliminary archeological survey of the area to be affected by the construction of Sanford Dam was conducted by W. A. Davis of the Texas Archeological Salvage Project. The field reconnaissance was carried out between April 17 and April 28, 1961, and 51 sites were recorded. Davis recommended that six of these sites be tested extensively and that limited testing be carried out at eight other sites. Davis' site survey was funded by National Park Service Purchase Order No. 33-310. This report is entitled, "Appraisal of the Archeological Resources of Sanford Reservoir, Hutchinson, Moore and Potter Counties, Texas."

As part of the Interagency Archeological Salvage Program, Lathel F. Duffield excavated three Panhandle Aspect sites; Spring Canyon (41HC20), Medford Ranch (41HC10), and Conner (41HC7), located in proposed borrow areas and thus endangered by construction of Sanford Dam. The three sites exhibited a great degree of variation and were considerably different from those described as <u>typical</u> Antelope Creek Focus. Duffield attempted to date the sites by a relative dating method, based on percentages of projectile points. This research was carried out in 1961, under provisions of Memorandum of Agreement No. 14-10-0333-802, between the National Park Service and the University of Texas. Duffield's report is entitled, "Three Panhandle Aspect Sites at Sanford Reservoir, Hutchinson County, Texas."

Duffield later completed a study of the bones from these sites and other

Panhandle Aspect sites. Duffield's report on these studies, his doctoral dissertation, is entitled, "Some Panhandle Aspect Sites in Texas: Their Vertebrates and Paleoecology." The report contains valuable information for interpreting the Panhandle Aspect culture. Of particular interest are the percentages of bones of various animals utilized and the apparent sharing relationships between groups as reflected in differing predominance of certain bison parts at various sites.

F. E. Green of Texas Technological University carried out salvage excavations in the following sites:

University of Texas Designation	LAMR Site Records No.
41HC19	17
41MO7	no designation
41MO5	67
41PT8	61
41PT29	20
41PT25	24

Two of these sites (LAMR67 & LAMR20) were open sites with archaic components. The remainder of the sites were of the Panhandle Aspect. Green hypothesized that the Panhandle Aspect settlement pattern consisted of large multi-roomed pueblos at varying distances from each other, all on major tributaries of the Canadian River. In between the major pueblos were small single to 5-room structures representing outlying farming communities. He also hypothesized that the large multi-roomed pueblos developed out of the single room structures as a result of contact with New Mexico pueblos. Green's research was carried out under Memorandum of Agreement No. 14-10-0333-1126, between the National Park Service and Texas Technological University. The field work was accomplished in the fall of 1963 and summer of 1964. His report entitled, "Archeological Salvage in the Sanford Reservoir Area," was submitted in 1967.

In 1961, the Nor-Pan Archeological Society excavated the Roper Site and LAMR74. Both sites are now beneath the waters of Lake Meredith. Colored slides and plane table site maps of both sites are on file at park headquarters, and a report in manuscript form is on file at Panhandle Plains Historical Society, excavated 41HC3, a Panhandle Aspect multi-roomed site now under the approach to Sanford Dam. No report was written on this excavation.

During the summer of 1969, the Texas Archeological Society excavated at sites LAMR 145, LAMR 147, and LAMR 242 on Blue Creek. No report on these excavations has been submitted, as yet.

4. Minor Archeological Research in the Vicinity of Alibates National Monument:

In 1967, Ronald Corbyn did an archeological-geomorphic survey of the Big Canyon area. He recorded fourteen sites and discussed the settlement pattern in relation to geomorphic formations. During the same period, Corbyn excavated a burial at Big Canyon. Manuscripts reporting his findings are on file at park headquarters.

In 1973, Jack T. Hughes of West Texas State University surveyed proposed development areas at Blue Creek and Bates Canyon for archeological sites. This field reconnaissance located 26 sites, most of which are workshop quarry sites. Hughes' report is on file at park headquarters.

In 1974, before granting a permit for construction of a natural gas pipeline, across the monument, the National Park Service required that an archeological survey be conducted and that salvage excavations be accomplished, if needed. The survey was conducted by Dr. Jack T. Hughes, of West Texas State University, assisted by Park Ranger Edwin Day, of the monument staff. Dr. Hughes and Kim Taylor conducted test excavations at Site No. 88 and also examined the profile in the pipeline trench. In addition, a geologist, Dr. George R. Asquith of WTSU, examined the strata exposed in the pipeline trench. A preliminary report on the survey was submitted by Dr. Hughes in May, 1974, and a final report authored by Hughes and Taylor was submitted in March, 1975.

These investigations revealed that Site No 88 is not as rich as surface evidence indicates, and that the site was used more as a workshop than a campsite. The geological studies revealed the nature of the deposits as well as the origin of the flint in the vicinity of the pipeline.

Anonymous
1962 Alibates Flint Quarries, A National Monument. Manuscript on file at the Potter County Historical Society. Amarillo.

1966 Texas Alibates Flint Quarries Declared a National Monument. Lapidary Journal 9:10:1117-1131.

Archambeau, E. R.
1963 The Valley of the Canadian River. Panhandle Geological Society, Field Trip September 1973.

Baerreis, D. A. and Reid A. Bryson
1965 Historical Climatology of the Southern Plains. Oklahoma Anthropological Society Bulletin 13:69-75.

1966 Dating the Panhandle Aspect Cultures. Oklahoma Anthropological Society Bulletin 14:105-116.

Baker, E. and J. Baker
1941 Final Report Archaeological Survey - O. P. 655-66-3-404, State Application 30976. Unpublished manuscript on file at Sanford Recreation Area.

1941 Final Report W.P.A. West Texas State Archaeologic Project 9249. Unpublished manuscript on file at Sanford Recreation Area.

Baker, W. E., T. N. Campbell and G. L. Evans
1957 The Nall Site: Evidence of Early Man in the Oklahoma Panhandle. Oklahoma Anthropological Society Bulletin 5:1-20.

Bell, E. H.
1939 Great Plains Area. American Antiquity 5:355-357.

Bell, R. E.
1962 Precolombian Prairie Settlements in the Great Plains. Great Plains Journal 2:1.

Bell, R. E. and D. A. Baerries
1951 A Survey of Oklahoma Archaeology. Bulletin of the Texas Archeological and Paleontological Society 22:7-100.

Blair, W. F.
1950 The Biotic Provinces of Texas. Texas Journal of Science 2:1:93-117.

Bryan, Kirk
1950 Flint Quarries - The Source of Tools and, at the same time, the Factories of the American Indians. Papers of the Peabody Museum, Harvard University.

Campbell, R. C.
1969 Prehistoric Panhandle Culture of the Chaquaqua Plateau, Southeast Colorado. Unpublished Ph.D. dissertation. Department of Anthropology, University of Colorado.

Corbyn, Ron
1967 Archeological-Geomorphic Survey of Big Canyon - Canadian River Confluence. Unpublished manuscript on file at Sanford Recreation Area.

1967 Big Canyon Burial, Site 84 Park Service. Unpublished manuscript on file at Sanford Recreation Area.

Crabb, M. L.
1968 Some Puebloan Trade Pottery from Panhandle Aspect Sites. Bulletin of the Texas Archeological Society 38:83-89.

Cummings, C. R.
1969 Alibates Development Outline. Unpublished manuscript on file at Sanford Recreation Area.

1969 Archeological Site Survey for Bugbee Canyon Access Road Right-of-way, Sanford Recreation Area, Texas. Unpublished manuscript on file at Sanford Recreation Area.

Davis, W. A.
1962 Appraisal of the Archeological Resources of Sanford Reservoir, Hutchinson, Moore and Potter Counties, Texas. Unpublished manuscript on file with the National Park Service.

Duffield, L. F.
1962 Archeology of the Sanford Reservoir in the Texas Panhandle, Plains Anthropology 7:16-79.

1964 Three Panhandle Aspect Sites at Sanford Reservoir, Hutchinson County, Texas. Bulletin of the Texas Archeological Society 35:19-82.

1970 Some Panhandle Aspect Sites in Texas: Their Vertebrates and Paleoecology. Unpublished Ph.D. dissertation. Department of Anthropology, Universi of Wisconsin.

Ellzey, T. S.
1967 A Panhandle Aspect Site (Preliminary Report). Transactions of the Second Regional Archeological Symposium for Southeastern New Mexico and Western Texas, South Plains Archeological Society Guidebook.

Every, T. L.
1907 Archaeological Work in the Texas Panhandle. Canadian Academy Bulletin 1.

1907 The Wolf Creek Expedition. The Student 2.

Fischel, H. E.
1939 Folsom and Yuma Culture Finds. American Antiquity 4:3:232-264.

Gladwin, H. S.
1934 The Archaeology of the Southwest and its Relation to the Cultures of Texas. Bulletin of the Texas Archeological and Paleontological Society 5:19-35

Glasscock, Keith and Alma
1955 Report on CR-1, an Indian Campsite in Moore County, Texas. Panhandle-Plains Historical Review 28:96-106.

Gould, F. W.
1962 Texas Plants - A Checklist and Ecological Summary. Texas Agricultural Experiment Station MP-585.

Green, F. E.
1967 Archeological Salvage in the Sanford Reservoir Area. Unpublished manuscript copy 2, National Park Service. Memo of Agreement No. 14-10-0333-11?

Green, F. E. and J. R. Kelley
1960 Comments on Alibates Flint. American Antiquity 25:3:413-414.

Green, J. H.
1955 Some Flint Caches, the Alibates Quarry, and a Stone and Pestle. Panhandle-Plains Historical Review 28:78-81.

Hertner, H. E. (Editor)
1963 Alibates Flint Quarries, a National Monument. Potter County Historical Survey and Panhandle Geological Society, 1.

1964 Alibates Flint Quarries, a National Monument. Supplement. Potter County Historical Survey Committee and Panhandle Geological Society, 2.

Hesse, C. J.
1945 Some Archeological Material in the Museum of the A and M College of Texas. Bulletin of the Texas Archeological and Paleontological Society 15:80-9

Hobbs, H. R.
1941 Two Texas Panhandle Ruins. El Palacio 48:121-129.

Holden, W. C.
1929 Some Recent Exploration and Excavations in Northwest Texas. Bulletin of the Texas Archeological and Paleontological Society 1:25-35.

1930 The Canadian Valley Expedition of March 1930. Bulletin of the Texas Archeological and Paleontological Society 2:21-32.

1931 Texas Tech Archeological Expedition, Summer 1930. Bulletin of the Texas Archeological and Paleontological Society 3:43-52.

1932 Recent Archeological Discoveries in the Texas Panhandle. Southwestern Society Science Quarterly 13:3:287-293.

1933 Excavation of Saddleback Ruin. Bulletin of the Texas Archeological and Paleontological Society 5:39-52.

Hughes, J. T.
1955 Little Sunday: An Archaic Site in the Texas Panhandle. Bulletin of the Texas Archeological and Paleontological Society 28:55-74.

1959 Archeological Survey of Greenbelt Reservoir, Doney County, Texas. Unpublished report on file with the National Park Service.

1959 In Notes and News. American Antiquity 24:4:45[illegible].

1961 Lake Creek: A Woodland Site in the Texas Panhandle. Bulletin of the Texas Archeological Society 32:65-84.

1973 Data for Archaeology Section of Environmental Impact Statement on Blue West and Bates Canyon Areas, Lake Meredith Recreation Area, Texas. Manuscript on file with Ecology Audits, Inc. Da

Hyatt, Robert D.
1968 The Evidence for Plains-Southwestern Cultural Contacts. Unpublished masters thesis. Departmen of Anthropology, University of New Mexico.

Jackson, A. T.
1938 Picture-writing of Texas Indians. University o Texas Publication No. 3809.

ohnson, C. S.
1939 A Report on the Antelope Creek Ruin. Bulletin of the Texas Archeological and Paleontological Society 11:190-202.

Krieger, A. D.
1946 Culture Complexes and Chronology in Northern Texas. University of Texas Publication No. 4640.

1947 Certain Projectile Points of the Early American Hunters. Bulletin of the Texas Archeological and Paleontological Society 18:7-27.

1947 The Eastward Extension of Puebloan Datings Toward Cultures of the Mississippi Valley. American Antiquity 12:3:141-148.

Kelley, J. H.
1964 Comments on the Archeology of the Llano Estacado. Bulletin of the Texas Archeological Society 35:1-18.

Kendrick, Judson
1966 The Alibates National Monument. In West Texas State University Geological Society Guidebook for 1966. Southwestern Association of Student Geological Societies Annual Field Trip. 53-57.

Kirkland, Forrest
1942 Indian Pictographs and Petroglyphs in the Panhandle Region of Texas. Bulletin of the Texas Archeological and Paleontological Society 14:9-26

Lowery, E. J.
1932 The Archeology of the Antelope Creek Ruin. Unpublished masters thesis. Texas Tech University.

Malone, James M.
1970 Archeological Reconnaissance in the Mackenzie Reservoir Area of Tule Canyon. Texas State Historical Survey Committee and Texas Water Development Board, Archeological Survey Report No. 8.

Mason, J. A.
1929 The Texas Expedition. University of Pennsylvania Museum Journal 22:318-338.

1930 Archeological Field Work in North America During 1929. American Anthropologist 32:2:361-371.

1935 The Place of Texas in Pre-Colombian Relationships Between the United States and Mexico. Bulletin of the Texas Archeological and Paleontological Society 7:20-46.

McKern, T. W.
1964 Indian Skeletal Material from the Jim Arnold Site. Bulletin of the Texas Archeological Society 35:95-100.

Mewhinney, H.
1965 Alibates Flint Quarry. Texas Parks and Wildlife 23:8:20-25.

Moore, Ray
1966 Archeology of Palo Duro Canyon. West Texas State University Geological Society Guidebook for 1966 Southwestern Association of Student Geological Societies Annual Field Trip. 35-37.

Moorehead, W. K.
1920 The Origin and Development of the Pueblo Cliff Dweller Culture Etc. Andover, Phillips Academy.

1921 Recent Exploration in Northwestern Texas. Americ Anthropologist 23:1-11.

1931 Archeology of the Arkansas River Valley. New Haven, Yale University Press.

1933 The Importance of Texas as an Archeological Field. Bulletin of the Texas Archeological and Paleontological Society 5:9-13.

National Park Service
1953 Project Report, Recreation Use and Development, Sanford Reservoir. Unpublished report on file with the National Park Service.

1963. A Public Use Plan, Sanford Reservoir, Canadian Project, Texas. Unpublished report on file with the National Park Service.

1964 Sanford National Recreation Area, Texas; A Proposal; A Recreation Planning Report. Unpublished report on file with the National Park Service.

1965 Sanford Recreation Area, Texas. Unpublished report on file with the National Park Service.

Panhandle Geological Society
1963 Field Trip, September 14, 1963, Alibates Flint Quarries, Alibates Indian Ruin, Santa Fe Trial, Sanford Dam. Unpublished manuscript on file at Panhandle Geological Society.

Pearce, W. M.
1936 A Survey of the Sand-Hill Camp Sites of Lamb and Bailey Counties. Bulletin of the Texas Archeological and Paleontological Society 8:184-186.

Pearson, F. J.
1965 University of Texas Radiocarbon Dates III. Radiocarbon 7:296-314.

Poteet, Sybil
1938 The Occurrence and Distribution of Beveled Knives. Bulletin of the Texas Archeological Society 10:245-262.

Potter County Historical Survey Committee
1963 Alibates Flint Quarries, A National Monument. Unpublished manuscript on file at Potter County Historical Society 1.

1964 Alibates Flint Quarries, A National Monument, Supplement. Unpublished manuscript on file at Potter County Historical Society 2.

Sayles, E. B.
1935 An Archaeological Survey of Texas. Medallion Papers, No. 777. Gila Pueblo.

Schaeffer, J. H.
1958 The Alibates Flint Quarry, Texas. American Antiquity 23:2:189-191.

Schroeder, A. H.
1961 A Re-analysis of the Routes of Coronado and Onate into the Plains in 1541 and 1601. Plains Anthropology 7:15:2-23.

Schultz, C. B.
1943 Some Artifact Sites of Early Man in the Great Plains and Adjacent Areas. American Antiquity 8:242-249.

Sellards, E. H.
1938 Artifacts Associated with Fossil Elephant. Bulletin of the Geological Society of America 49:999-1010.

1947 Fossil Bison and Associated Artifacts from Plainview, Texas. Bulletin of the Geological Society of America 58:927-954.

Smith, Victor J.
1936 The Pottery Horizons of Texas. Bulletin of the Texas Archeological and Paleontological Society 8:94-112.

1938 A Survey of Indian Life in Texas. West Texas Historical and Science Society, No. 5.

Studer, Floyd V.
1931 Archeological Survey of the North Panhandle of Texas. Bulletin of the Texas Archeological and Paleontological Society 3:70-75.

1931 Some Field Notes and Observations Concerning Texas Panhandle Ruins. In Archeology of the Arkansas River Valley. Edited by W. K. Moorehead. New Have, Yale University Press.

1934 Texas Panhandle Culture Ruin No. 55. Bulletin of the Texas Archeological and Paleontological Society 6:80-96.

1955 Archeology of the Texas Panhandle. Panhandle-Plains Historical Review 28:87-95.

Suhm, D. A., A. D. Krieger and E. B. Jelks
1954 An Introductory Handbook of Texas Archeology. Bulletin of the Texas Archeological Society, 25.

Tunnell, C. D.
1964 Two Burials from the Jim Arnold Site in Northwest Texas. Bulletin of the Texas Archeological Society 35:83-94.

Tunnell, C. D. and J. T. Hughes
1955 An Archaic Bison Kill Site in the Texas Panhandle. Panhandle-Plains Historical Review 28:63-70.

U.S. Congress
1965 Alibates Flint Quarries and Texas Panhandle Pueblo Culture National Monument, Legislative History. House Report No. 148, Senate Report 581, Public Law 89-154, Congressional Record III, 89th Congress.

Watson, V. D.
1950 The Optima Focus of the Panhandle Aspect: Description and Analysis. Bulletin of the Texas Archeological and Paleontological Society 21:7-68.

Watts, W. C.
1939 Lake Sites of the South Plains of Texas. Bulletin of the Texas Archeological and Paleontological Society 11:79-91.

Webb, W. P.
1931 The Great Plains. Austin, Ginn and Company.

Wedel, W. R.
1962 Prehistoric Man on the Great Plains. Norman, University of Oklahoma Press.

Wendorf, Fred
1960 The Archaeology of Northeastern New Mexico. El Palacio 67:2:55-65.

———— 1961 The Paleoecology of the Llano Estacado. Fort Burgwin Research Center Publication No. 1, University of New Mexico Press.

Witte, A. H. 1942 Certain Caches of Flints from the North Texas Area. Bulletin of the Texas Archeological and Paleontological Society 14:72-76.

" " 1947 Certain Archeological Notes on the High Plains of Texas. Bulletin of the Texas Archeological and Paleontological Society 18:76-82.

Wormington, H. M. 1964 Ancient Man in North America. Denver, Museum of Natural History.

Wright, Welty 1940 The Type, Distribution and Occurrence of Flint Gravers in Texas. Bulletin of the Texas Archeological and Paleotological Society 12:31-48.

Bibliography

The following written materials relate to the early history of the Alibates area:

Archambeau, Ernest R., ed. "Lieutenant A. W. Whipple's Railroad Reconnaissance Across the Panhandle of Texas in 1853," Panhandle-Plains Historical Review, XLIV, 1971. Whipple led the expedition which surveyed a potential railroad route westward from Fort Smith, Arkansas, roughly along the 35th parallel. Whipple's route followed the Canadian River Valley, but ran several miles to the east and south of the park boundaries.

Battle, David G. "Interview with Mrs. Monte Rockwell, Canyon, Texas," October 17, 1973. On file with Professional Services, Division of Historical Properties, National Park Service, Southwest Regional Office, Santa Fe.

Haley, J. Evetts. Charles Goodnight, Cowman and Plainsman, Norman: University of Oklahoma Press, 1949 (originally published in 1936). The Palo Duro-Dodge City Trail which Goodnight blazed, passed to the east of the Alibates area.

Haley, J. Evetts. The X I T Ranch of Texas, Norman: University of Oklahoma Press, 1953 (originally published in 1929). X I T lands did not cover any of the Alibates area, but the general aspects of ranching history would apply throughout the Panhandle.

"The History of the McBride Ranch House," published manuscript No. 3234, Texas State Historical Survey Committee, Austin, Texas.

Koue, A. Lewis. "Historic Structure Report, McBride Ranch House," National Park Service, Denver Service Center, March 1972.

Thomas, Myra. Moore County, The Windswept Land, no publication information.

Wall, Walter Prescott. The Great Plains. Austin: Ginn and Company, 1931.

NATURAL RESOURCES BIBLIOGRAPHY

Blair, W. F.
1950 The Biotic Provinces of Texas. Texas Journal of Science 2:93-117.

Gould, F. W.
1962 Texas Plants - A Checklist and Ecological Summary. Texas Agricultural Experiment Station MD-585.

Kendrick, Judson
1966 The Alibates National Monument. In West Texas State University Geological Society Guidebook for 1966. Southwestern Association of Student Geological Societies Annual Field Trip. 53-57.

Mewhinney, H.
1965 Alibates Flint Quarry. Texas Parks and Wildlife. 23:20-25.

National Park Service, U.S. Department of the Interior
1953 Project Report, Recreation Use and Development, Sanford Reservoir. Unpublished report. National Park Service.

1963 A Public Use Plan, Sanford Reservoir, Canadian Project, Texas. Unpublished report. National Park Service.

1964 Sanford National Recreation Area, Texas: A Proposal: A Recreation Planning Report. Unpublished report. National Park Service.

1965 Sanford Recreation Area, Texas. Unpublished report. National Park Service.

Panhandle Geological Society
1953 Field Trip, September 14, 1953, Alibates Flint Quarries, Alibates Indian Ruin, Santa Fe Trail, Sanford Dam. Unpublished Ms. Panhandle Geological Society.

D. INFORMATION BASE CHECKLIST

Topography

There is a USGS map at 1:24,000, the Alibates Ranch Quadrangle, map number N3530-W10137.5/7.5, which includes the 92.5 acres of Alibates Flint Quarries National Monument. The monument is not designated as such on the map. The acreage (including the access corridor) considered in all alternatives for development, are also covered by this map.

Geology

A geological map of Texas has been published by the Fort Worth Geological Society, although no copies are at present available at out library. It is a rather general map and shows only the larger formations in Texas.

Books available at the Lake Meredith Library include: Red Beds and Associated Formations of New Mexico by N. H. Darton, GPO 1928, Oil and Gas Fields of the Texas and Oklahoma Panhandle by the Panhandle Geological Society, 1961, and Petrography and Pegrogenesis of the Alibates Dolomite by Roger Bowers, 1965.

Land Use and Ownership

Maps are available at Lake Meredith and SWRO, showing present land use and ownership. Fee take line data for Lake Meredith Recreation Area boundaries, showing property owners, grid bearings, distances, etc., are available at Lake Meredith Recreation Area, Canadian River Municipal Water Authority and the Bureau of Reclamation. Survey notes for the 92.5 acres of Alibates National Monument are available at Lake Meredith and SWRO.

Soils

A soil map of Potter County, Texas, is available at the Lake Meredith Library and also at local Soil Conservation Service Offices.

Hydrology

No surface hydrologic features occur on the present monument, except for a small portion of one minor drainage and the lower edge of a small stock pond. These are shown on the USGS Alibates Ranch quad map. If the monument is extended, several hydrologic features, including portions of several intermittent streams, stock ponds and, possibly, a windmill, could be within the monument, and are shown on the Alibates Ranch map. One portion of Lake Meredith would be adjacent to the monument.

Vegetation

Studies on vegetation are currently underway by park personnel. A plant checklist was drafted by Barbara A. Lund in 1971, and a list of Indian uses of native plants was drafted by John Wesley Phillips in 1976. To our knowledge, no vegetative maps are available, however, older vegetative type maps have been done by the Soil Conservation Service.

A vegetative survey was done for Lake Meredith Recreation Area during the late 1970's, by Robert A. Wright and Keith Meador, of West Texas State University. A report, "The Vegetation of the Lake Meredith Recreation Area, Texas" resulted. Even though this report is for Lake Meredith, much of it

applies to Alibates.

Wildlife

Checklists are available for Lake Meredith, of all vertebrates except fish. No separate studies have been made for Alibates. A small mammals survey was done during the late 1970's by Dr. Flavius C. Killebrew, of West Texas State University. A report, "A Survey and Population Analysis of Mammals by Habitat, at Lake Meredith Recreation Area and Alibates National Monument" resulted from the survey.

Climate

No climatological data are available for the monument area, though such data are available for Amarillo and Borger. Ten year weather records have been taken by CRMWA at Sanford Dam.

Socioeconomic Environment

Some minor information is available in the 1975 Texas Almanac, and also in the interim Master Plan for Lake Meredith Recreation Area.

Business and Industry

There is some information in the interim Master Plan for Lake Meredith Recreation Area.

Cultural Values

The Archeological Assessment for Alibates is available at the Lake Meredith Recreation Area Library.

Recreation, Development and Support Facilities

None are available at the monument. Many are offered by the nearby recreation area.

E. COLLECTIONS AND LOCATIONS

Collections resulting from the archeological site survey initiated by park personnel in 1967 are being kept at park headquarters, along with the collections from Lake Meredith Recreation Area. There are 30 specimens in the collection, which is housed in a specimen cabinet. The articles have been field catalogued only. Five containers donated by Mrs. Floyd Studer are housed at park headquarters, pending their use of disposition to other NPS areas. Excavations by Panhandle Plains Museum, under WPA contract (1938-1941) specimens housed at the museum in Canyon, Texas. National Park Service has no claim to any of these collections. Copies of the final report on these excavations are in the NPS library at Lake Meredith Headquarters.

A large collection of specimens, recovered from Alibates Ruin, by the Bakers, is located in the Panhandle Plains Historical Museum in Canyon, Texas. Some of these artifacts will be available for exhibit when a museum is completed at the monument. Also, the photographic record of the Alibates Ruin excavation, consisting of some 2,000 photos, is held by Ele and Jewel Baker. Attempts should be made to obtain copies of these photos for Alibates National Monument.

F. ANNUAL REVIEW STATEMENT

The Resources Management Plan will be reviewed annually by the Superintendent and Regional Resources Management Plan Coordinator. Necessary changes will be initiated at the Park area, for approval by the Superintendent and the Regional Director.

ALIBATES FLINT QUARRIES AND TEXAS PANHANDLE PUEBLO CULTURE NATIONAL MONUMENT

Texas

STATEMENT FOR MANAGEMENT

May 1976

UNITED STATES DEPARTMENT OF THE INTERIOR / NATIONAL PARK SERVICE

Appendix G

STATEMENT FOR MANAGEMENT

Alibates Flint Quarries and Texas Panhandle Pueblo Culture National Monument

Prepared by: William E. Dyer — Superintendent — 9/7/76 Date

Recommended by: [signature] — Regional Director, Southwest Region — 9/14/76 Date

WASO Policy Review: /s/ Ernest Allen Connally — 12/30/76 Date

Approved by: [signature] — Regional Director, Southwest Region — 3/14/77 Date

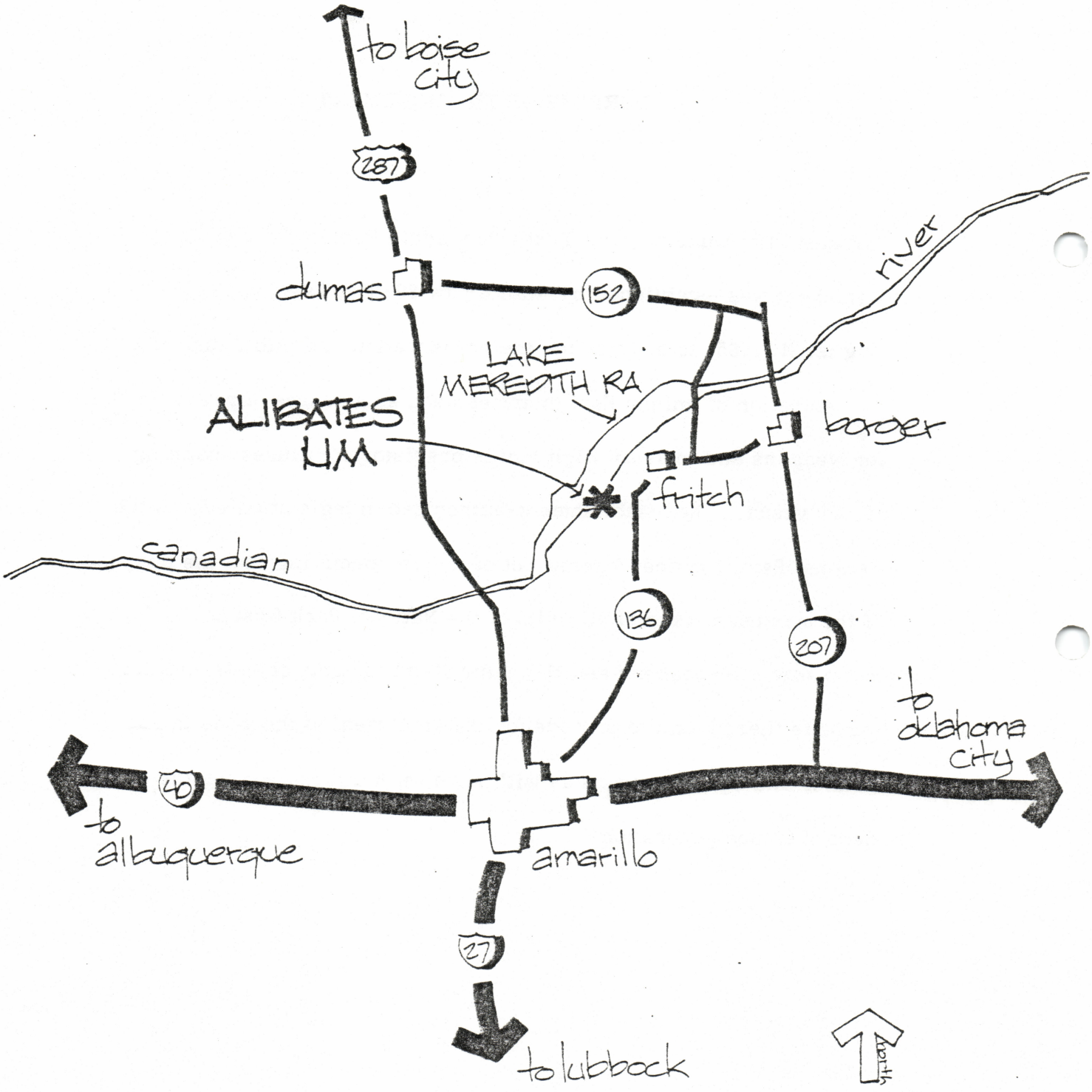
The Statement For Management is the first documentation in the National Park Service planning process. Every park in the National Park System must have an approved Statement, which is subject to annual review and revision. The Statement will be used to guide short- and long-term management of the park, and to determine the nature and extent of planning required to meet the park's management objectives. In the absence of more specific planning documents, the Statement will provide a general framework for directing park operations, and for communicating park objectives to the public.

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PURPOSE OF THE MONUMENT

Alibates Flint Quarries and Texas Panhandle Pueblo Culture National Monument was established by Public Law 89-154, 79 Stat. 587, of August 31, 1965, to provide for the preservation and public use of a concentration of unique flint quarries used as a source of raw materials for weapons and tools by High Plains prehistoric cultures spanning 12,000 years. The establishment-authorization legislation echoes the National Park Service Organic Act of 1916 in specifying that the purpose of the monument (and of all units of the National Park System) is " . . . to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."



vicinity

ALIBATES FLINT QUARRIES AND TEXAS PANHANDLE PUEBLO CULTURE NM
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SIGNIFICANCE OF MONUMENT RESOURCES

The physical extent, quantity, and appearance of the Alibates flint quarries are impressive: Here is an approximately-300-acre, horseshoe-shaped series of 250 to 300 mostly-oblong quarry pits, surrounded by flint surface rubble ranging in size from large boulders to small chips. Visitors are aware that they are almost constantly crunching over vast areas of ground that are literally layered with flakes and chips representing waste materials, or tailings, from the quarry operations. (The manufacture of weapons and tools was evidently carried on away from the quarry area.)

Also impressive is the tremendous span of human occupation represented at the quarries: A continuum of occupations spanning 12,000 years extends from Paleo-Indian nomads (between 10,000 B.C. and 5000 B.C.), through Plains Archaic Tradition peoples (between 6000 B.C. and 0), through Woodland Tradition peoples (between 0 and A.D. 900), through Plains Village Indian peoples (between A.D. 900 and A.D. 1450), through Historic Indian nomadic peoples (between A.D. 1450 and the latter part of the 19th century), to the present, when Alibates flint is still highly

polished flint and projectile points

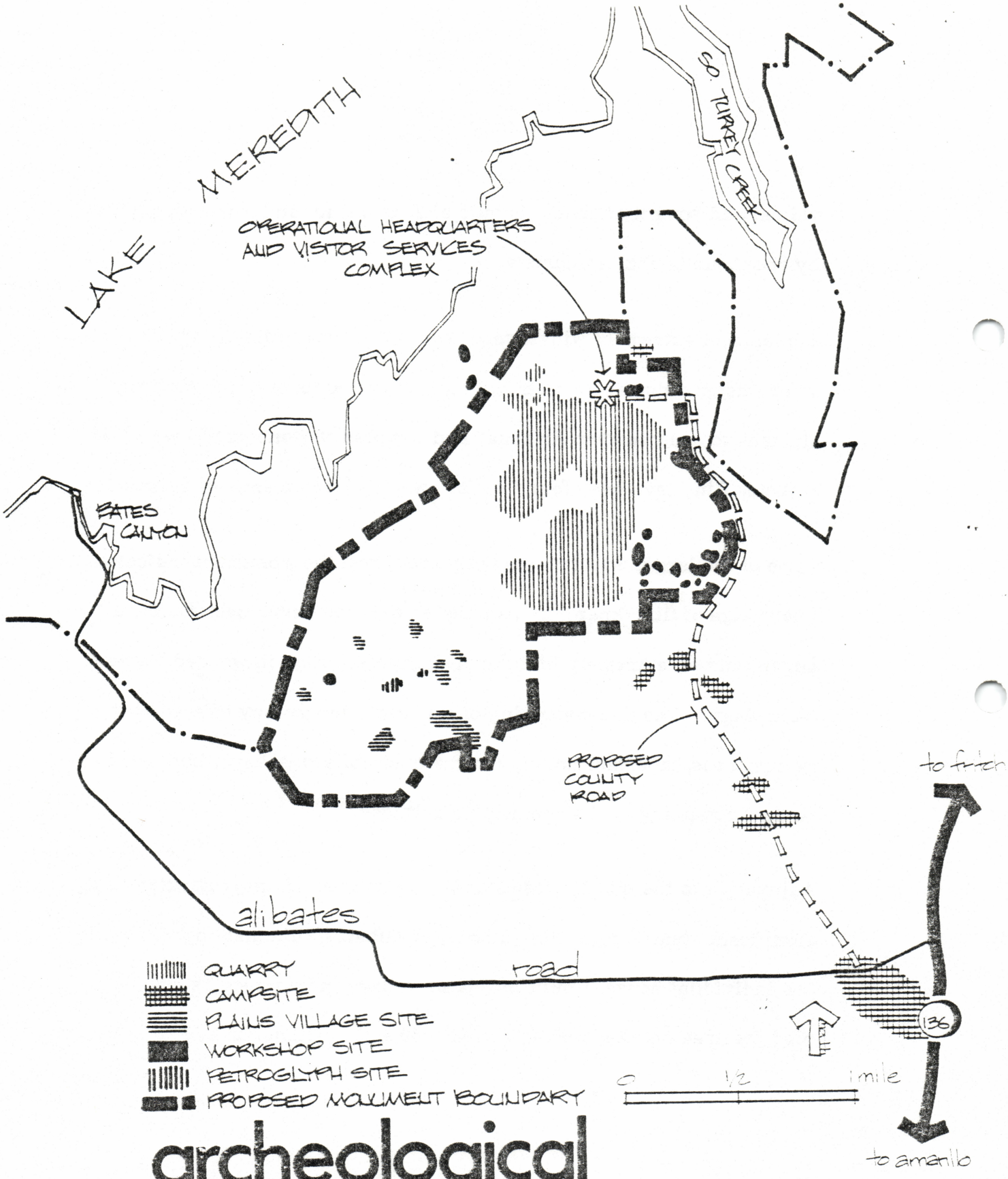


valued and sought after for its outstanding beauty and working qualities by rockhounds and lapidarists.

Evidence of extremely widespread trade of Alibates flint is significant: In prehistoric times, its distribution is believed to have ranged from Montana to southeastern Arizona, and samples of stone purported to be Alibates flint have been found as far away as Mexico and South America.

Some of the larger spearpoints recovered from the monument indicate a knowledge of flint-knapping techniques that has never been matched, suggesting an extremely high level of sophistication in worked-stone technology. The understanding of this early technology offered at the monument is important not only to the study of archeology, but also to an understanding of the prehistoric cultures.

Adjunctive to the quarry resources are a number of unspectacular, but significant, house ruins (including the Alibates Ruin and approximately 100 individual houses) built by Plains Village Indian peoples who occupied the area between 900 A.D. and 1450 A.D. Although the Plains Village



archeological resources

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Indian peoples did build some permanent houses, and did farm, like their Southwestern Pueblo counterparts, their multi-roomed houses are not considered true "pueblos," nor are the structures even considered typical of the Plains Village Indian Culture. Of note is the fact that Alibates Flint Quarries and Texas Panhandle Pueblo Culture National Monument is the only area in the Texas Panhandle region set aside to conserve and interpret the prehistory of the Plains Village Indian Culture.

Also adjunctive to the quarry resources, and of interest, is a concentration of petroglyphs pecked into the dolomite bluff near the Alibates Ruin, with designs including turtles, a bison, human footprints (one 20 inches long), and a human figure.

Highly significant is the fact that no other archeological area in the National Park System has been used as long and as continuously by man. Thus, the monument contributes significantly toward understanding Indian occupation in the Region that spanned over 12,000 years.

A single transluscent or opaque--or mixed--sample of the stone may contain striations, splotches, and other patterns exhibiting all the colors of the rainbow; some pieces contain pockets and veins of intricate crystal concentrations and formations. Some archeologists believe that the stone's spectacular beauty was fundamental to its extensive trade into farflung areas--some of which already possessed lithic resources of equal working properties. Too, there are other lithic materials with equally good working properties near the quarry area--yet Alibates flint was obviously preferred by the peoples using the quarries for the fashioning of weapons and tools. The stone is highly prized today by rockhounds and lapidarists for the same superlative natural beauty and working properties.

LAND CLASSIFICATION

The monument's existing 92.56 acres are listed on the National Register of Historic Places; therefore, they are classified and managed as historical zones, in accordance with National Park Service Management Policies (1975), which stipulate that physical development therein shall be

the minimum needed to preserve, protect, and interpret the historical values, and that activities therein shall generally be limited to sightseeing and the study of the cultural features.

INFLUENCES UPON MANAGEMENT

LEGISLATIVE AND ADMINISTRATIVE CONSTRAINTS

1. All management, planning, and development decisions and actions relating to Alibates Flint Quarries and Texas Panhandle Pueblo Culture National Monument must comply with the provisions of the establishment-authorization legislation (Public Law 89-154, 79 Stat. 587, August 31, 1965, appended); the Antiquities Act of 1906; the National Park Service Organic Act of 1916; the Historic Sites Act of 1935; the National Historic Preservation Act of 1966; the National Environmental Policy Act of 1969 (NEPA); Executive Order 11593 of May 13, 1971; and the Historical and Archeological Data Preservation Act of 1974. Applicable guidance and procedures are also provided by

the National Park Service Management Policies (1975) and Activities Standards (1972).

2. A major management constraint imposed by the monument's establishment-authorization legislation is the land-acquisition funding-ceiling of not-to-exceed $5,000. This entire amount has been expended in the purchase of 92 acres.

The limitations imposed upon management by this funding-ceiling are many: Because planning has not been completed, and the monument has therefore not been established, monument acreage is limited to 92. The access route (to avoid traversing private lands) is long, difficult, and roundabout, and can only be changed to equally difficult locations within the existing 92 acres at the present time. Significant archeological sites now lying on adjoining private lands cannot be federally protected, nor can they be included in the monument for interpretation and research purposes. Space for development is limited to that available within the existing 92 acres. And these limitations tend to

discourage people from visiting the monument, and serve to diminish the quality of their visits while there.

3. Another major constraint imposed upon management by the establishment-authorization legislation is the development-funding ceiling of not-to-exceed $260,000 (of which $115,000 remains).

   The limitations imposed upon management by this funding-ceiling are many, and serious: The standard of the present access road cannot be improved. Visitor-services and management-support facilities cannot be increased and improved within the existing 92 acres, and they must remain as they are (as described in "Within-Monument Influences," number 1).

4. Special-use permits for construction activities, such as natural-gas pipelines and associated facilities and roads, require consultation with the Texas State Historic Preservation Officer and the Advisory Council on Historic Preservation, in compliance with Section 106 of the National Historic Preservation Act of 1966.

5. Park planning has not yet been completed and approved for the monument, which imposes severe constraints upon management of the monument. As was mentioned earlier in this section, this means that the remaining $115,000 from the original development-funding cannot be used. More important, no new land-acquisition funding, development funding, and change-of-name legislation can be sought, nor can Section 106 clearance be sought for development plans, until the complete park-planning process is completed--culminating in an approved General Management Plan.

As of August 1976, the status of park planning is: An Environmental Review of four alternatives for preservation and development of the monument (appended) was prepared by the superintendent and approved by the regional director in April 1976, on the basis of public workshops and response. The third alternative was selected, and because its proposals are considered non-controversial in nature, no environmental statement will be prepared. The alternative forms the basis of all decisions in the interpretation

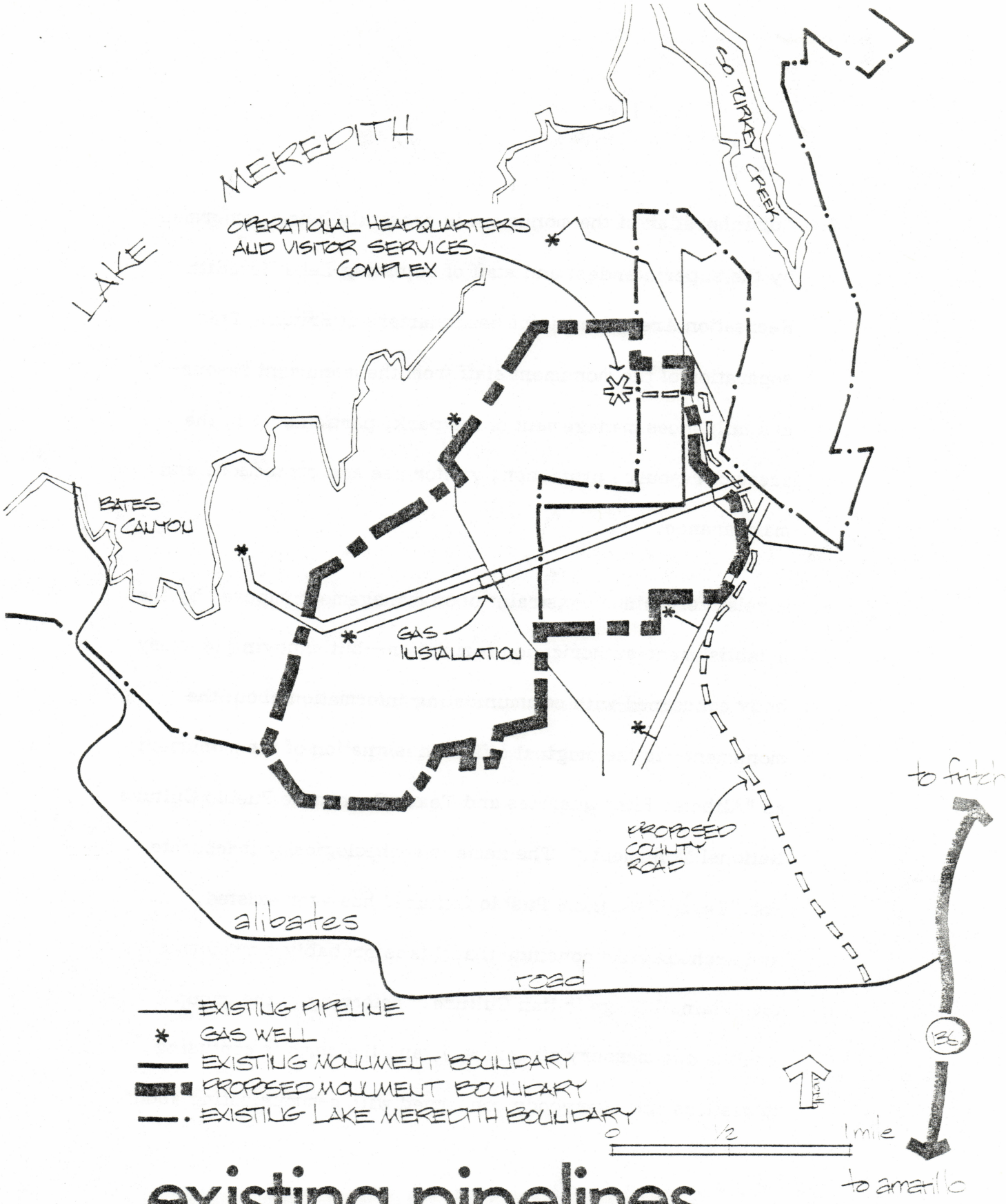
and development sections of the upcoming General Development Plan. This Statement for Management will eventually be integrated into the four-part General Management Plan as the first section. An Outline of Planning Requirements, prepared by the superintendent, is presently undergoing in-house review. The Resources Management Plan is completed, for later integration as the second section of the General Management Plan. Fieldwork for preparation of the General Development Plan section of the General Management Plan is completed, and also that required for Denver Service Center preparation of the Plan for Interpretation (an implementation plan to be incorporated into the Visitor Use section of the General Management Plan, the former already completed by the Denver Service Center, and out on in-house review).

6. All oil, gas, and other mineral rights on monument lands (excluding flint) are permanently outstanding in the form of easements and deeds. As a result, related access, road, pipeline, and powerline easements and equipment sites are widespread

in the area surrounding the monument, thus posing threats to the environment and archeological resources, as well as presenting safety hazards to monument visitors. (See map.)

The companies involved in these activities have been cooperative in attempting to limit the adverse uses emanating from their activities, but any further expansion would present severe threats to the archeological resources, as well as considerable visual intrusions in the relatively flat landscape.

A special-use permit for cattle-grazing has been issued on an annual basis to the Coldwater Cattle Company on Lake Meredith Recreation Area lands adjoining the monument. As a result, access roads, tanks, and windmills associated with this activity are scattered about the landscape surrounding the monument. Cattle have marred the countryside through over-grazing, and cattle hooves are damaging the flint resources and room walls and other surface features of the archeological sites.



existing pipelines

ALIBATES FLINT QUARRIES AND TEXAS PANHANDLE PUEBLO CULTURE UM
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7. Administration of the monument is presently being performed by the superintendent and staff of adjoining Lake Meredith Recreation Area, from joint headquarters at Fritch. This separation of the monument staff from the monument resources influences management of the park, particularly in the areas of resource protection, visitor use and protection, and maintenance.

8. A relatively minor constraint upon management imposed by the establishment-authorization legislation--but annoying to everybody concerned with communicating information about the monument--is the original official designation of the monument as "Alibates Flint Quarries and Texas Panhandle Pueblo Culture National Monument." The name is archeologically inaccurate (no "Texas Panhandle Pueblo Culture" has ever existed, and archeologists conclude that this is probably a misnomer for "Plains Village Indian Culture," referring to the group's pueblo-like masonry structures), and the name is confusing to visitors and everybody concerned with communicating about

the monument because of its inaccuracy, and its extreme length and complexity.

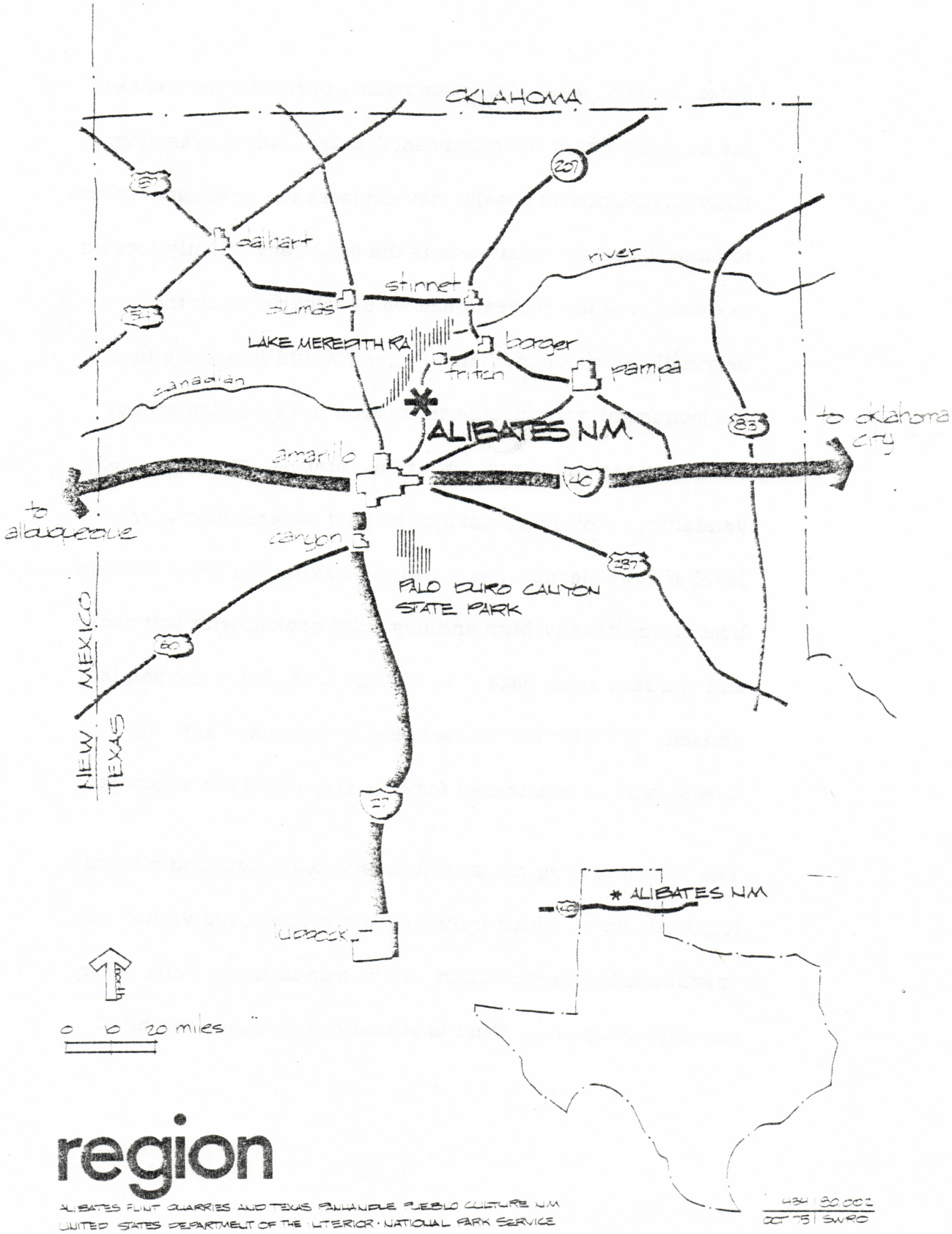
9. Constraints are imposed upon management of the monument by the fact that the National Park Service exercises only proprietary law-enforcement jurisdiction, which limits park-management staff to enforcing only Federal codes within the boundaries. The Park Service depends upon good working relationships with the Potter County Sheriff's Office and with the Texas Department of Public Safety.

REGIONAL INFLUENCES

1. The monument is situated in northeastern Potter County, Texas, about 35 miles north of Amarillo, in the center of the Texas Panhandle. Within a 50-mile radius, population exceeds 200,000; it doubles this figure at 100 miles. However, even though weekend traffic from Amarillo congests the highways to adjoining Lake Meredith Recreation Area, visitation to the monument is presently low (190 recorded as of April 1976).

2. Many high-standard highways radiate in all directions from nearby Amarillo, including Interstate 40 (U.S. 66), one of the Nation's most heavily used transcontinental east-west highways, and three other well-traveled U.S. routes. Visitors now leave Texas 136 (which leads north from Amarillo) at the county-maintained Alibates Road, which leads to the Bates Canyon area of Lake Meredith Recreation Area, to the west of the monument. From Bates Canyon, they must take a primitive dirt road that winds through Lake Meredith Recreation Area lands, making access to Alibates presently long, difficult, and roundabout, because of a lack of Federal easements on privately owned adjoining lands.

3. Lake Meredith Recreation Area adjoins the monument on one side, and is presently administered under a joint cooperative agreement with the Bureau of Reclamation. Visitation at Lake Meredith exceeds a million and a half persons annually, and this factor influences the management of the monument, in that a single management staff is responsible for administration of both areas.



region

ALIBATES FLINT QUARRIES AND TEXAS PANHANDLE PUEBLO CULTURE N.M.
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Bates Canyon, west of the monument, presently serves as the access point to the monument. Bates Canyon was originally envisioned as a major development for upstream visitors to Lake Meredith, because it is the most conveniently located to Amarillo of the recreation-area developments on the lake. As originally envisioned, Bates Canyon would introduce into the monument many problems common to recreation areas, such as noise and visual pollution, hunting, trespass, and vandalism. However, during the past several years, the level of Lake Merdith has receded, leaving the Bates Canyon boat ramp literally high and dry, and choked with salt cedar and marshes at its base. As of June 1976, Bates Canyon is unused. An alternative site north of the monument (Turkey Creek) will be considered for lake recreation development.

4. The Panhandle region experiences meteorologic and climatologic extremes, which influence management and visitor use (particularly interpretation) of the monument and also future development plans. Wind is almost constant, averaging 12

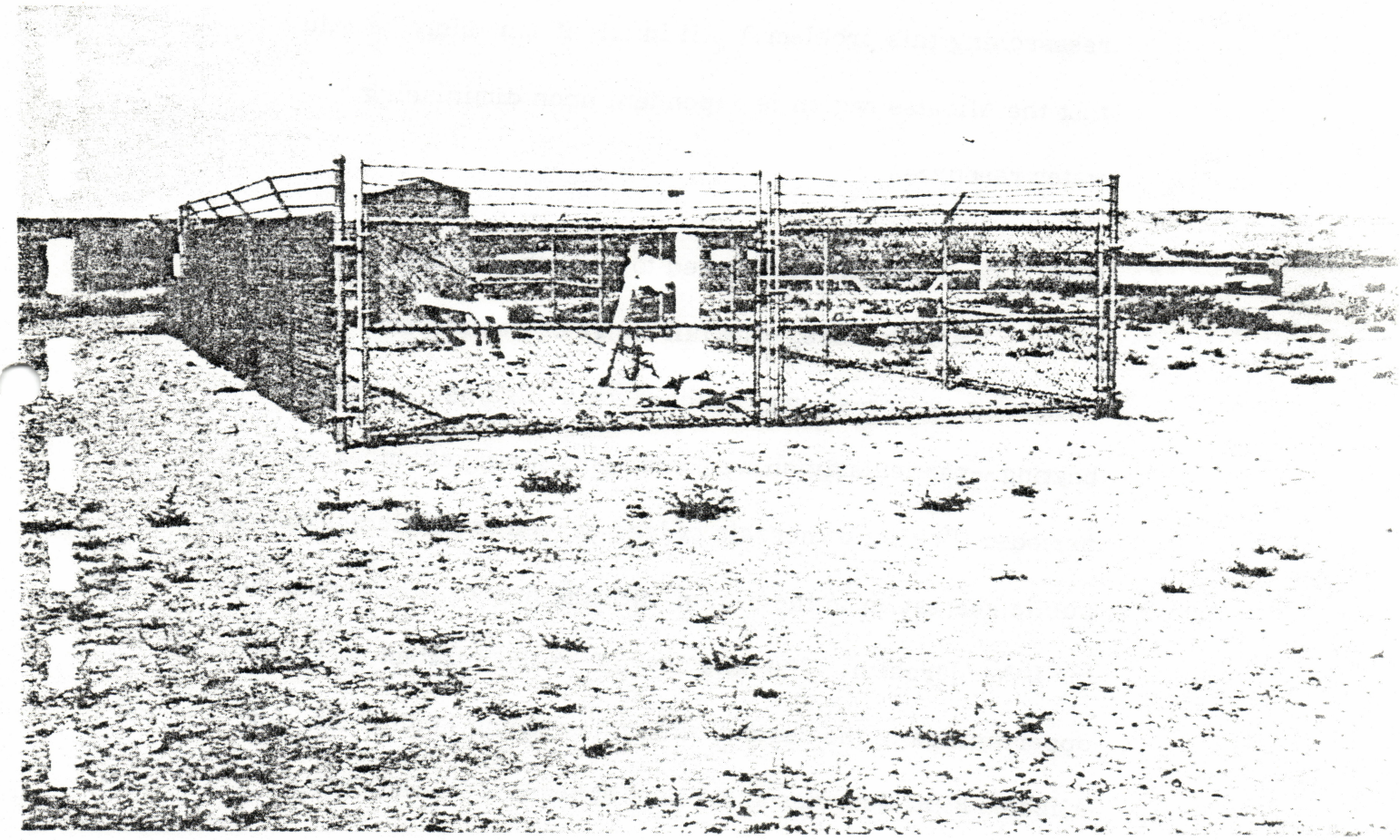
miles per hour, frequently reaching 30 miles per hour, for prolonged periods, and occasionally--and suddenly--reaching 60 to 80 miles per hour. "Northers" occur in winter. Thunderstorms (sometimes accompanied by flooding, which can prevent access to, and circulation within, the monument) occur in spring and summer. Tornado threats are frequent, although tornadoes rarely materialize. Winter temperatures may drop 50 to 60 degrees within a 12-hour period. Summer temperatures are high (and wooded and other shaded areas are almost non-existent). Humidity is low. Rainfall normally averages 21 inches a year; 1975 was considered a wet year; 1976 (as of June) has been a dry year. Hailstorms occur occasionally, snowfall averages 12 inches annually. Dust storms often result from a combination of strong winds, scarce vegetative cover, and light winter precipitation.

5. Cattle-ranching comprises the primary land use in the Panhandle region. Lands adjoining the monument on three sides are owned by the Coldwater Cattle Company, and their activities directly

influence monument management because of the cattle trespass and developments mentioned earlier. Oil, gas, and other mineral-extraction activities are the second most important land uses in the region, which also affect monument management because of the developments associated with these activities. The rising waters of Lake Meredith Recreation Area, adjoining the monument on one side, accommodate active outdoor recreation, which comprises the third major form of land use in the Panhandle region, and which affects management of the monument primarily by virtue of its large visitation.

6. Water in the Panhandle is a precious commodity, and its scarcity imposes severe limitations upon the management, and future development, of Alibates Flint Quarries and Texas Panhandle Pueblo Culture National Monument. (Water as it relates specifically to the monument is discussed in "Within Monument Influences.")

The Ogallala geological formation is the Panhandle's only waterbearing strata, and has long supplied the region with water for farming, ranching, and commercial and domestic uses.



gas well site

Lake Meredith supplies water for 11 cities within a 200-mile radius of the monument. The lake is presently experiencing an increasing level of salinity, however, due primarily to lower-than-predicted Canadian River inflow and high summer evaporation rates. (The Bureau of Reclamation is currently researching this problem.) All in all, it can safely be said that the Alibates region is dependent upon diminishing water resources.

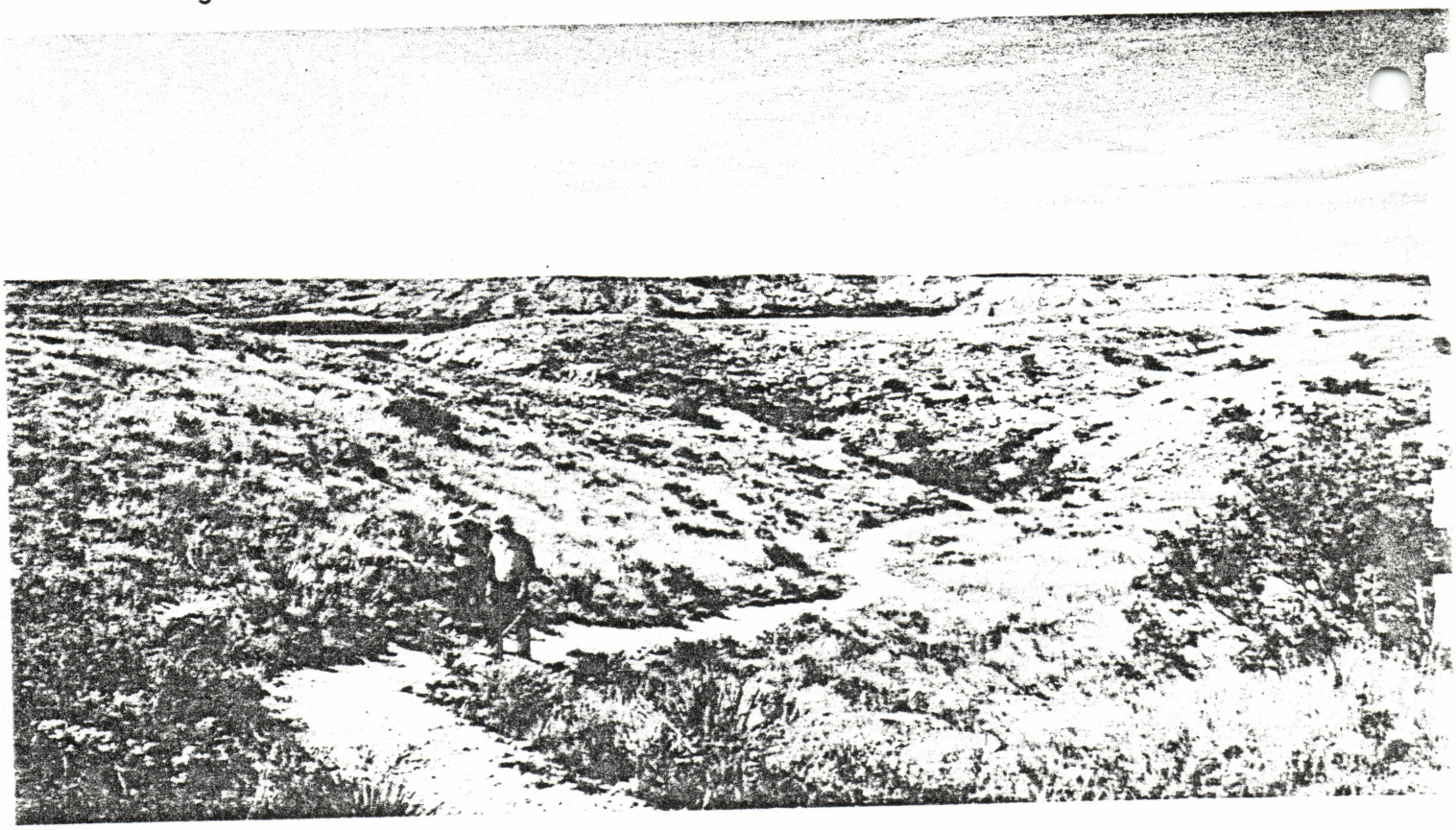
7. When Lake Meredith was opened to the public in 1965, visitors quickly began to pursue the full range of water sports--sailing, swimming, water-skiing, scuba-diving, fishing, and power-boating--particularly on weekends and during extended holiday periods. Private ownership of land served to preclude extensive public recreation in the region until the purchase of the acreage for Lake Meredith. The lake now offers the greatest recreational opportunities in the region, which has strong implications for Alibates Flint Quarries and Texas Panhandle Pueblo Culture National Monument. A few widely scattered roadside parks,

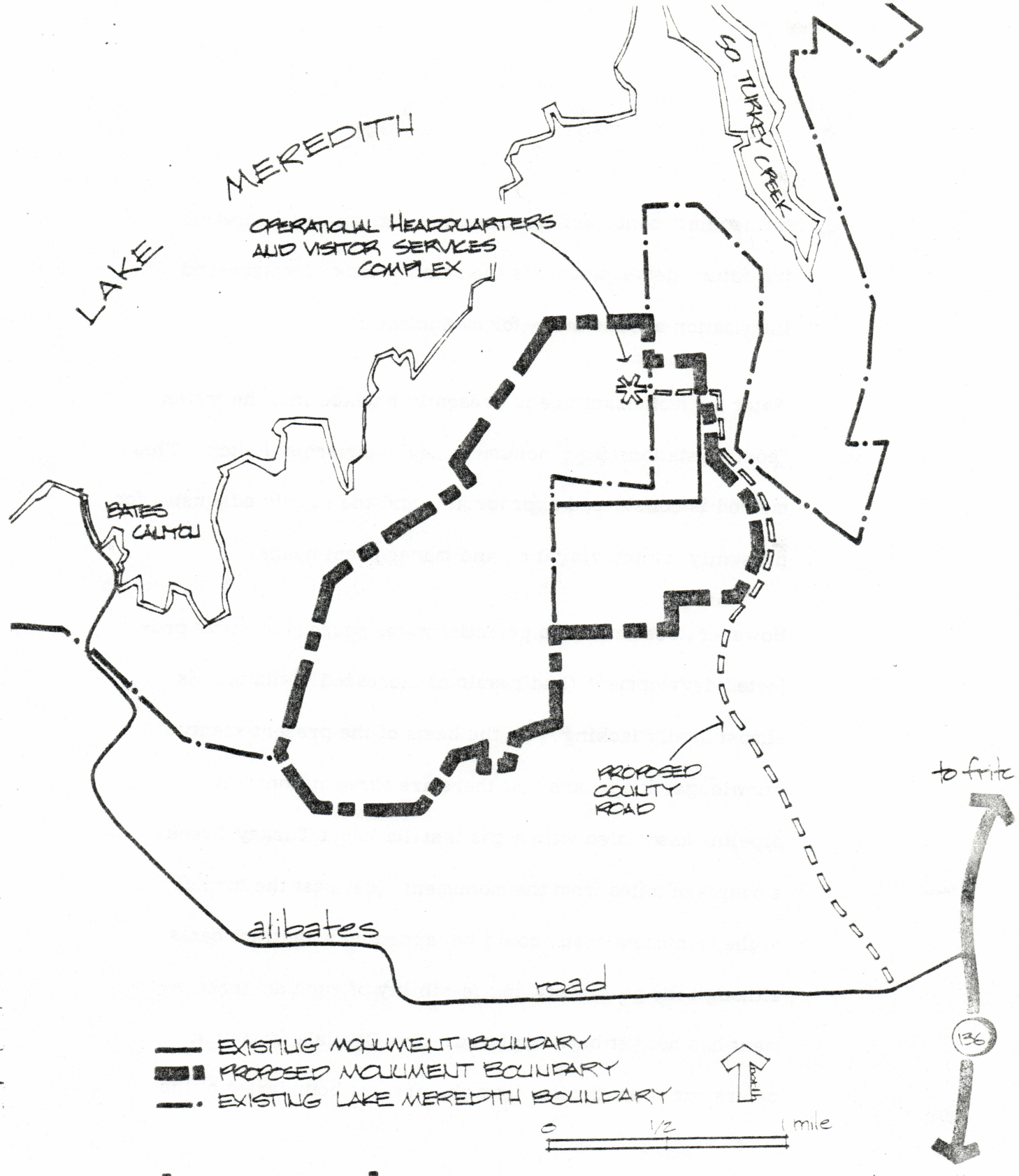
local parks, and small lakes, and Palo Duro Canyon State Park south of Amarillo, presently provide limited camping and recreational facilities.

WITHIN-MONUMENT INFLUENCES

1. As described in the "Legislative and Administrative Constraints" section, no formal development (and only limited informal development) has thus far been implemented to serve the monument. The only monument-associated developments now lie off monument lands, and are limited to a short, unsurfaced trail leading from a gas-well road to the top of the bluff where the quarries are situated; a temporary trailer "contact station" parked at the point where a gas-well road egresses from Alibates Road near Bates Canyon; a parking lot near the trailer, and another near the quarries; and limited protective fencing around portions of the boundaries of the monument. Such limitations in development serve to discourage people from visiting the monument, and diminish the quality of their visits while there.

existing trail





boundary

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2. Influencing monument management, and severely constraining future development, is the relative lack of water--and information about water--for monument use.

Water for monument use is presently trucked into the trailer "contact station" from monument headquarters at Fritch. This method is considered appropriate, and the supply adequate, for presently limited visitation and management needs.

However, research into potential water sources to serve projected development (and resultant increased visitation) is almost totally lacking. On the basis of the present scanty knowledge, it appears that there are three options: A pipeline associated with a gas installation at Turkey Creek, a couple of miles from the monument, just past the turnoff to the monument road, could be tapped on a contract basis, although the possibility and feasibility of such an arrangement has not yet been explored. The Ogallala formation peters out about 2 miles from the present boundaries of the

monument, but could be considered as a possible water source, with treatment (because of its highly gypsiferous quality). A third possibility could be Lake Meredith.

3. The monument is closed to the public for 9 months of the year, except for limited guided tours conducted by appointment through the flint quarries and associated (but approximately 2 miles distant) petroglyph sites, and occasional archeological tours through the Plains Village Indian Ruins. During the summer months, through Labor Day, the monument offers scheduled tours. This limited schedule serves to limit visitation, thereby influencing management of the monument.

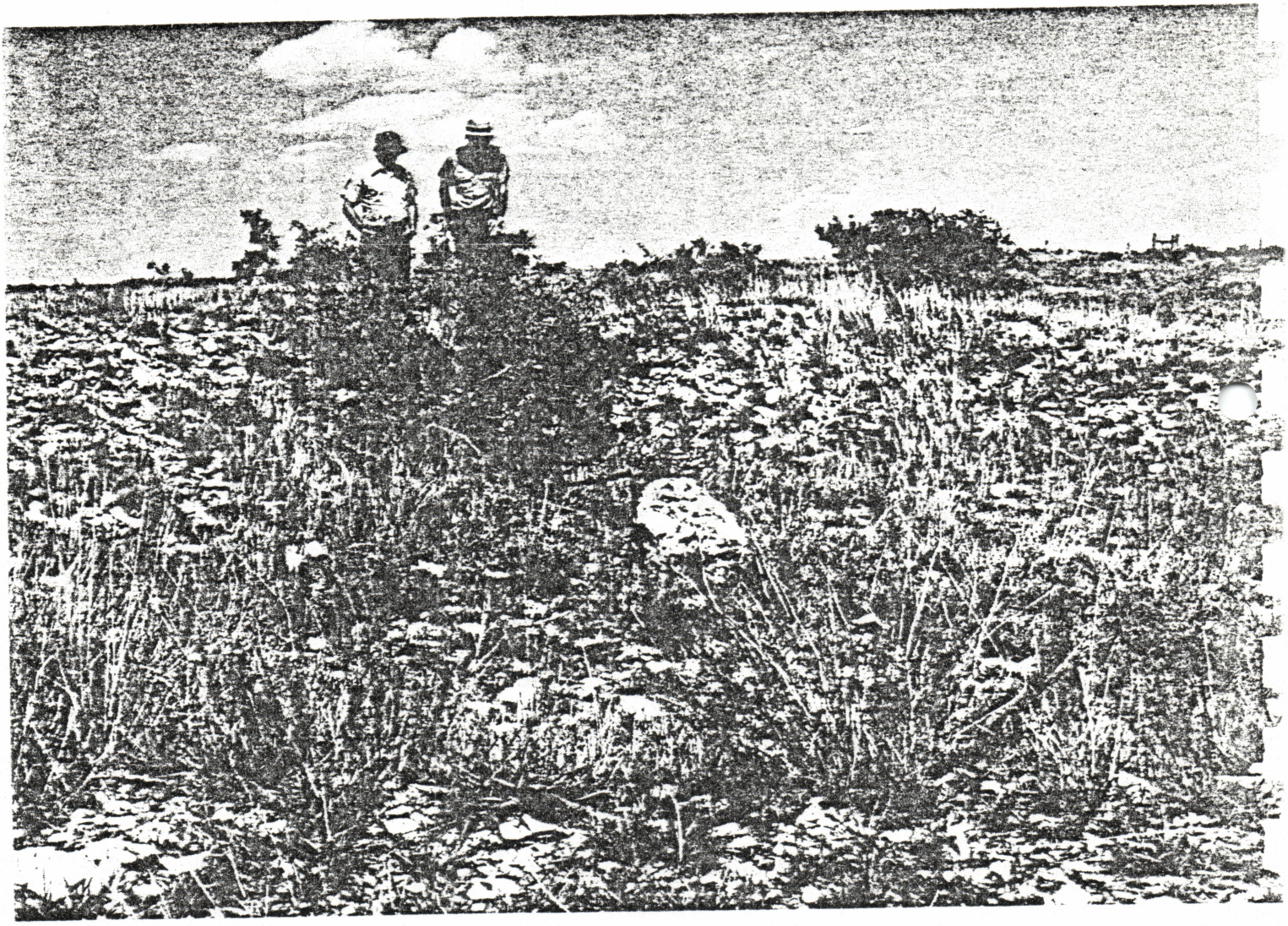
4. Research into the archeological resources of the monument is almost lacking, which serves to exert very real constraints upon management, particularly in the area of interpretation, and of course upon future development.

   No intensive, systematic site survey (required for compliance with Executive Order 11593) has been conducted. No comprehensive

site report has been completed. The archeological base map is incomplete. No environmental reconstructions (including soils, pollens, flora, micro- and macro-faunal studies, land base, water resources rocks and minerals) have been made. No quarries have been tested or excavated, and visitors have trouble even recognizing that the shallow pits are quarries. None of the Plains Village Indian dwellings have been excavated for interpretation purposes. A historic stone well situated near the Alibates Ruin, which contains cultural debris related to the ruin, has not been tested. No research has been conducted into occupation stages, settlement patterns, demography, and culture-pattern changes. No studies have been conducted to provide basic information about the geology of Alibates flint--that is, characteristics, origin, and geological history. No substantive data to support hypothetical explanations of trade relationships exists nor has the trade of Alibates flint been methodically traced; other intra-area relationships also remain unknown. These basic archeological resource data are fundamental to sound management, interpretation, and other visitor-use considerations, and of course future planning.

5. Not all of the quarries are situated on the monument's existing 92 acres. Many quarries and other significant archeological resources lie within Lake Meredith Recreation Area, and still others are found on private property lying immediately to the south of the monument. Thus, as was mentioned in number 2 of "Legislative and Administrative Constraints," these significant resources, integral to the monument resource-story, are not at present available for proper management (including protection and maintenance), nor can they be included in the interpretation and research programs of the monument.

6. The petroglyphs described in the "Significance" section are rapidly deteriorating. because the dolomite caprock into which they are pecked is highly susceptible to weathering. In August 1973, monument staff initiated a field test of a substance called "Adobeseal," which was applied to sections of the caprock in the vicinity of the petroglyphs that receive the same weathering. The effects have not been fully evaluated. No other preservation materials have been tested. Several alternatives to chemical



quarry site

treatment have been offered, including covering the petroglyphs with a shelter, or covering them with plexiglas or a similar material--both of which would cause visual intrusion.

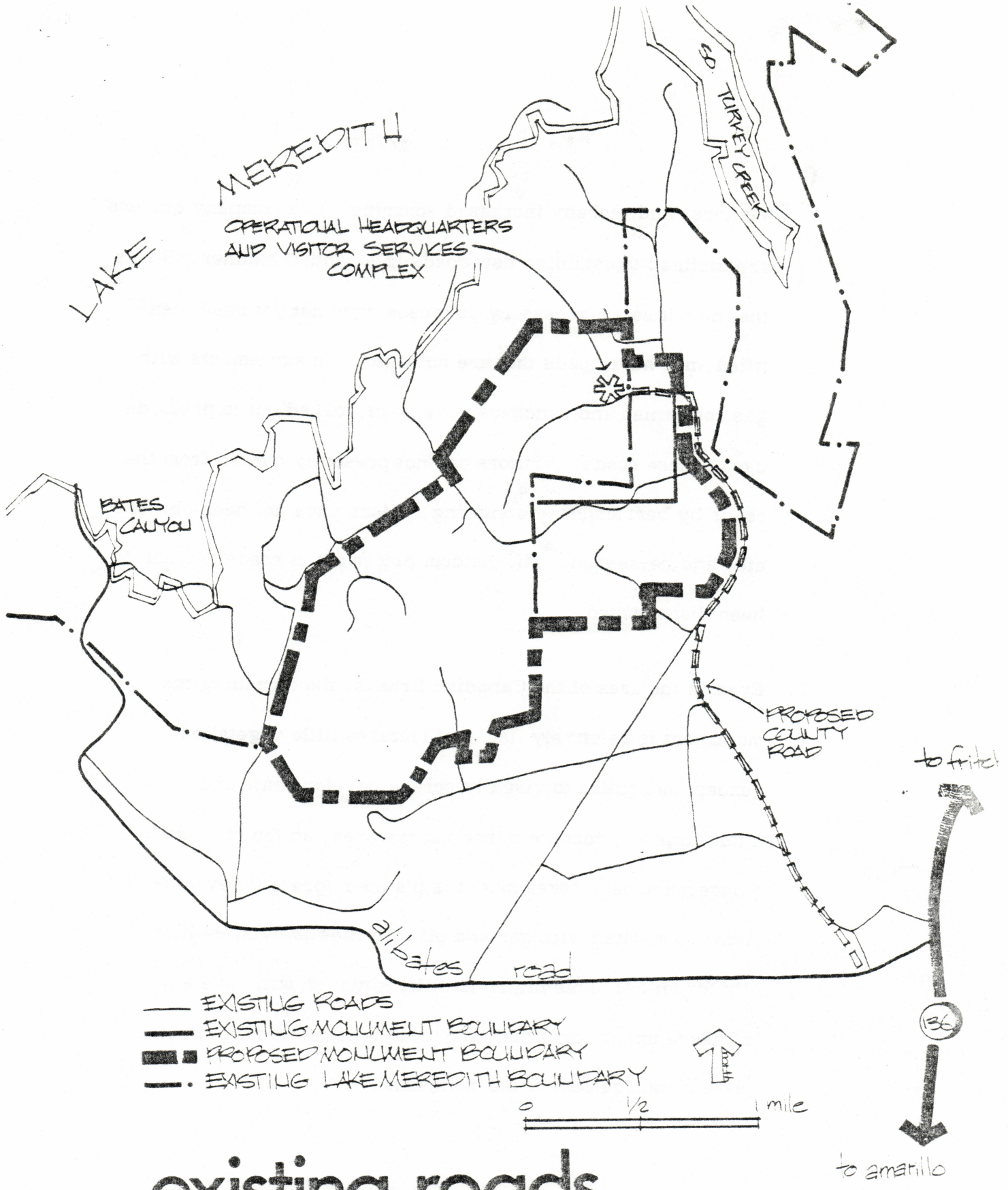
7. The spectacular beauty of Alibates flint inspires the "itchy fingers" syndrome in most visitors. Although it seems unlikely at this time that people could actually carry the monument resources away, the situation could become serious in the not-too-distant future. The completion of fencing around the monument boundaries will help to eliminate the theft of Alibates flint.

8. Although a general picture of the history of the Alibates region is available, background history specifically relating to the monument is scarce. A historical sites survey has been conducted, but research is needed to complete the historical picture of this part of the Canadian River Valley, including books, articles, and local records, as well as interviews with the older natives of the area who are familiar with local history. No effort has yet been made to determine the personal history of Allie Bates, one of the few early Anglo occupants of the monument area, whose alleged dugout

is one of the few historic sites actually on monument lands. The lack of the above historical data hampers management, particularly interpretation, and also future planning.

9. Research into the natural history of the monument is almost entirely lacking, which serves to constrain sound management and planning, as well as failing to comply with NPS Natural Science Studies Activity Standards. To meet these standards, the following are needed: a complete natural-resources basic inventory and ecosystem map; inventory and analysis of climatic factors; soil structure analysis and map; analysis of vegetative cover and the effects of grazing; faunal factors study; grassland fires study; ecosystems analysis; and a list of endangered species and critical habitat.

10. In the past, vehicles have established roads throughout the area, some of which are no longer in use. (See map.) Numerous high-pressure gas lines have rights-of-way remaining with the gas companies. Both of the above situations have caused scarring of the land, and some of the scars have resulted in erosion. In some cases, the eroded areas have invited further use by



existing roads

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visitors, and thereby increased scarring. Gas company drivers are inclined to establish new roads in a random manner. Roads that do not serve necessary purposes have not yet been identified, nor have roads that are not used. No agreements with gas companies and ranchers have been worked out to preclude use of these roads. Visitors are not presently barred from the roads by barricades and signing. Scars have not been obliterated and re-seeded. The random placement of roads has not been discouraged.

11. Even in the area of the Canadian Breaks, the terrain of the monument is relatively flat, and features little vegetation (except mesquite) to visually screen developments and automobiles. From the prime quarry area, on top of a bluff, where monument development is planned, present developments associated with gas and oil activities are visible literally for miles. This high-visibility situation will have an influence upon future planning, but does not unduly affect present management of the monument.

12. Although climatic factors for the region have been observed and recorded (as discussed in "Regional Influences"), the scarcity of basic climatic data for the monument itself may limit optimal management and sound planning and decision-making. Climatic analyses are necessary for compliance with Natural Science Studies Activity Standards, as well. The only climatic information presently available is based upon data obtained at stations in Borger, and (since 1966) the Canadian River Municipal Water Authority headquarters at Lake Meredith.

13. Russian thistle (Salsola Kali), a common exotic in the monument, comprises a visual intrusion along roadways. Thus far, no program has been instituted to control this exotic plant, through normal maintenance procedures (hand labor).

14. Natural gas development in the vicinity of the monument will be ongoing until the gas field is entirely depleted. Extraction efforts at the present time involve the laying of additional pipeline and the drilling of new wells.

MANAGEMENT OBJECTIVES

Preservation of Cultural Resources

To identify, evaluate, protect, and preserve the unique Alibates flint quarries and archeological resources within their natural and historical setting in a manner consistent with legislative and executive requirements and the Service's historic preservation policies.

To prevent to the greatest extent possible deterioration of Indian ruins, petroglyphs, and artifacts.

Coordination

To work with the Bureau of Reclamation, cattle ranchers, oil, gas, and mineral extractors, and others to reduce and, where feasible, eliminate the adverse effects on non-park uses such as cattle grazing, rights-of-way, and off-road travel.

To identify and eliminate obsolete roadways. To provide adequate signing, fencing, and other methods for reducing trespassers and vandalism.

Acquisition of Information (Cultural)

To secure adequate information of the monument's cultural and natural resources through research, surveys, inventories, and other methods, in order to improve resource protection, park management, interpretation, and the quality of visitor experience.

Interpretation

To foster public understanding and appreciation of the natural and cultural resources, including the unique flint quarries used as a source of raw materials for Indian weapons and tools; the trade of Alibates flint; the worked-stone technology represented at the quarries; the plains village Indian culture; the petroglyph sites; and Texas Panhandle history.

Natural Resources Management

To identify, protect, and perpetuate the park's geological and other natural resources.

To reduce and where feasible eliminate exotics that are adversely affecting the monument, such as the Russian thistle.

Visitor Use and Access

To encourage visitor use and enjoyment through the provision of adequate facilities, information and services in locations that do not impair the monument's cultural or natural values.

To provide access to and circulation within the monument to the extent that visitor use is facilitated in a manner compatible with resource protection.

Water Supply

To cooperate with the Bureau of Reclamation, local jurisdictions, and other appropriate agencies for the purpose of assuring an adequate water supply for the monument.

Acquisition of Information (Environmental)

To secure information on the environmental effects of visitor use, non-park use, climate, and management actions on the park's cultural and natural values for the purpose of developing sound policies for preservation and public use.

Park Management

To provide for adequate protection and visitor use by locating administrative and management functions in areas that are compatible with archeological resources and their preservation and interpretation.

Land Base

To secure, through acquisition and other means, an adequate land base in order to protect archeological resources associated with the monument.

APPENDIX: ESTABLISHMENT-AUTHORIZATION LEGISLATION
(PUBLIC LAW 89-154; 79 Stat. 587; August 31, 1965)

2. Alibates Flint Quarries and Texas Panhandle Pueblo Culture

An Act to authorize the establishment of the Alibates Flint Quarries and Texas Panhandle Pueblo Culture National Monument. (79 Stat. 587)

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled. That the Secretary of the Interior may designate, acquire and administer as a national monument lands and interests in lands comprising the Alibates Flint Quarries and the Texas Panhandle Pueblo Culture sites, together with any structures and improvements thereon, located in and around Potter County, Texas.

SEC. 2.(a) The property acquired under the provisions of the first section of this Act shall be set aside as a national monument for the benefit and enjoyment of the people of the United States and shall be designated as the Alibates Flint Quarries and Texas Panhandle Pueblo Culture National Monument. The Secretary of the Interior shall administer, protect, and develop such monument, subject to the provisions of the Act entitled "An Act to establish a National Park Service, and for other purposes", approved August 25, 1916, as amended and supplemented, and the Act entitled "An Act to provide for the preservation of historic American sites, buildings, objects, and antiquities of national significance, and for other purposes", approved August 21, 1935, as amended.

(b) In order to provide for the proper development and maintenance of such national monuments, the Secretary of the Interior is authorized to construct and maintain therein such markers, buildings, and other improvements, and such facilities for the care and accommodation of visitors, as he may deem necessary.

SEC. 3. There is hereby authorized to be appropriated not to exceed $5,000 for the acquisition of land and not to exceed $260,000 for the development of the area.

Approved August 31, 1965.

Legislative History
House Report No. 148 (Committee on Interior and Insular Affairs).
Senate Report No. 581 (Committee on Interior and Insular Affairs).
Congressional Record, Vol. 111 (1965):
Apr. 5: Considered and passed House.
Aug. 16: Considered and passed Senate, amended.
Aug. 17: House concurred in Senate amendment.

The information required for the Visitor Use Plan section of this General Management Plan is contained in the following approved "Plan for Interpretation."

RECOMMENDED BY:

Marc Sagan
Manager, Harpers Ferry Center — August 30, 1976

William E. Dyer
Superintendent, Alibates Flint Quarries and
Texas Panhandle Pueblo Culture National Monument — August 26, 1976

John W. Henneberger
Manager, Denver Service Center — August 23, 1976

APPROVED BY:

Joseph C. Rumburg, Jr.
Regional Director, Southwest Region — September 15, 1976

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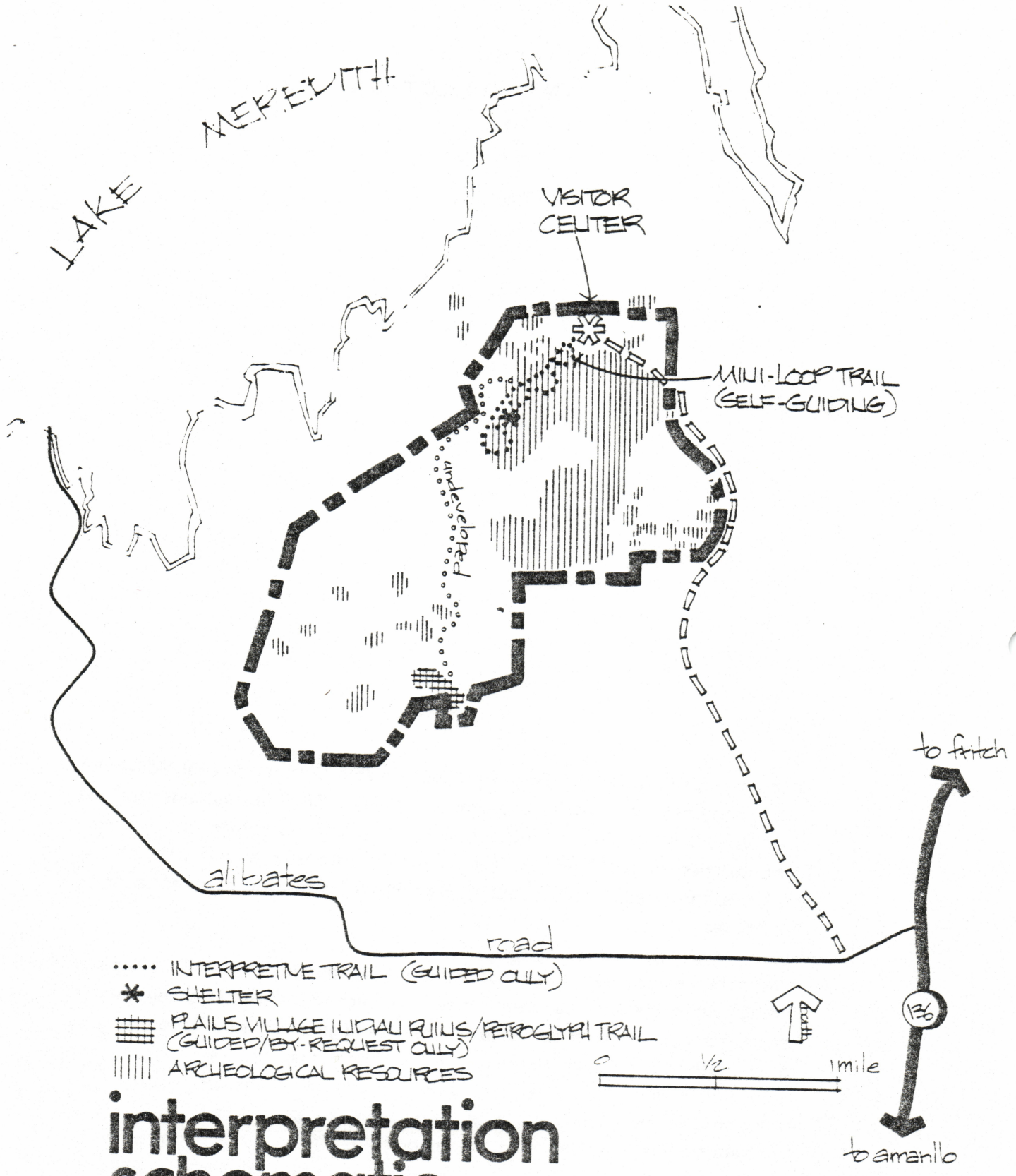
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INTRODUCTION

Alibates Flint Quarries and Texas Panhandle Pueblo Culture National Monument was established on August 31, 1965 (79 Stat. 587), to provide for the preservation, interpretation, and public use of a large concentration of unique flint quarries in the Texas Panhandle, which were used as a source of raw materials for weapons and tools in High Plains prehistoric cultures spanning 12,000 years.

The monument offers a wealth of interpretation potential: Here is a window through which the American people may view a significant chapter of the story of prehistoric man on America's Great Plains. Although much information remains to be gathered through research, we do know that the vast expanses of multicolored chips and flakes that layer the ground at Alibates represent the evolution of lithic technology in the New World – a story told nowhere else in the National Park System. And the monument offers us the opportunity to celebrate the tremendous artistry, industry, and resourcefulness of so-called "primitive" peoples, revealed in articles they made and used in their daily lives.



interpretation schematic

ALIBATES FLINT QUARRIES AND TEXAS PALINHALE PUEBLO CULTURE UNIT
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GIVENS

RESOURCES

The Quarries and Associated Features

The physical extent, quantity, and appearance of the Alibates flint quarries are all impressive: Here is an approximately 300-acre area containing about 800 variously shaped quarry pits, surrounded by flint surface rubble ranging in size from large boulders to small chips, representing waste materials, or tailings, from the quarry operations. Only blanks, or preforms, are actually found in the quarry area; the manufacture of weapons and tools was evidently carried on elsewhere.

Also impressive is the tremendous span of human occupations represented here: For approximately 12,000 years, the flint quarries served as a major source of raw materials for weapons and tools for occupations extending from Paleo-Indian nomads (between 10,000 B.C. and 5000 B.C.), through Plains Archaic Tradition peoples (between 5000 B.C. and 0), through Woodland Tradition peoples (between 0 and A.D. 900), through Plains Village Indian peoples (between A.D. 900 and A.D. 1450), through Historic Indian nomadic peoples (between A.D. 1450 and the latter part of the 19th century), to the present.

Evidence suggests extremely widespread trade of the flint. In prehistoric times, its distribution is believed to have ranged from Montana to southeastern Arizona, and samples of stone purported to be Alibates flint have been found as far away as Mexico and South America.

Some of the larger spearpoints recovered indicate a knowledge of flint-knapping techniques that has never been matched, suggesting an extremely high level of sophistication in lithic technology. The understanding of this early technology available at the monument is fundamental not only to the study of archeology, but also to an understanding of prehistoric cultures everywhere – and it can ultimately lead to some comprehension of the progressive growth of total human culture.

Adjunctive to the quarry resources are a number of visually unspectacular, but unusual, house ruins (including the Alibates Ruin and approximately 100 individual houses) built by Plains Village Indian peoples (distinct from nomadic Plains groups such as the Apache) who occupied the area between A.D. 900 and A.D. 1450. Although the Plains Village Indians did build some permanent houses, and did farm, like their Southwestern Pueblo counterparts, their multiple-roomed dwellings are not considered true *pueblos* nor are the structures even considered typical of the Plains Village Indian culture. The monument is the only area in the Texas Panhandle region set aside to preserve and interpret the prehistory of the Plains Village Indian culture.

Also adjunctive to the quarry resources, and of interest, is a concentration of petroglyphs pecked into the dolomite bluff near the Alibates Ruin, with designs including turtles, bison, human footprints (one 20 inches long), and a human figure.

Archeologists believe that no other archeological area in the National Park System has been used as long and as continuously by man. Thus, the monument fills a serious lack in the National Park Service's efforts to convey to the American people an understanding of, and feeling for, the prehistoric occupants of our continent.

The Beauty of Alibates Flint

A single transluscent or opaque – or mixed – sample of the stone may contain striations, splotches, and other patterns exhibiting all the colors of the rainbow; some pieces contain pockets and veins of intricate crystal concentrations and formations. Some archeologists believe that the stone's spectacular beauty was fundamental to its extensive trade into far-flung areas – some of which already possessed lithic resources of equal working properties. Too, there are other lithic materials possessing equally fine working properties near the Alibates quarry area – yet Alibates flint was obviously preferred by the early peoples using the quarries for the fashioning of their weapons and tools. And even today, the stone is highly prized by rockhounds and lapidarists for the same superlative natural beauty and working properties.

flint outcroppings



Natural History

The Canadian River, rising in the Sangre de Cristo Mountains of New Mexico, flows eastward across the Texas Panhandle. In its course across the high plains of Texas, the Canadian has cut through the dolomite caprock and created a broad valley some 15 to 30 miles wide. Within this valley is a steep-walled inner canyon some 200 to 300 feet deep and ½ to 2 miles wide. The land between the inner canyon and the caprock is extensively dissected by tributary streams, resulting in a rough and broken topography called the Canadian River Breaks. It is within this strip of terrain, on the south side of the river, between Turkey Creek and Alibates Creek, that the monument is situated.

The geological strata of the area are comprised of three separate formations: The highest, deposits of shale, clay, limestone, and sandstone of the Tertiary period, are exposed on the level upland and in the "breaks" at the edge of the plains. Lying below these Tertiary formations are ledges of sandstone and shale, known as the Doakum beds, which represent the Triassic period. These outcroppings are exposed along the slopes and valleys of the Canadian River, and along Alibates Creek. Below the Triassic formations occur Permian period red beds, made up of red-clay shales, beds of gypsum, and Alibates dolomite. The dolomite forms several layers, varying between 8 and 14 feet in thickness. The Alibates dolomite is responsible for the steep character of the slopes, and it is within the Alibates dolomite that veins, lumps, and nodules of Alibates flint occur.

The monument is situated in the ecological zone of the Southern High Plains, within the northern limits of the Llano Estacado. This is the Kansas Biotic Province of Texas, and represents a transition from Eastern to Western flora and fauna.

The vegetative cover for this zone is predominantly grasses, including blue grama, little bluestem, and buffalo. Interspersed with the grasses are scattered clumps of sand sagebrush, yucca, broom snakeweed, pricklypear cactus, catclaw acacia, oneseed juniper, and mesquite. In several locations, the mesquite forms open thickets. Along limited areas of spring-fed tributary canyons are found such plant species as cottonwood, hackberry, plum, chinaberry, soapberry, grapevine, and assorted oaks. Gordon bladderpod blankets some of the flats and lower slopes in winter and spring. Scattered Russian thistle and buffalo gourd grow along roadsides and flats. In the springtime, the famed wildflowers of Texas spread color throughout the area.

Typical arid-high-desert fauna are found here, including populations of larger mammals such as mule and white-tail deer, pronghorn antelope, coyote, bobcat, and rarely sighted mountain lion; smaller mammals include swift fox, raccoon,

porcupine, striped skunk, and badger, and a variety of small rodents. Birds are a major faunal resource, with sightings of 180 species on file at monument headquarters. Osprey, golden eagle, and the northern race of the bald eagle have been sighted. Associated historically with prairie environments, hawks – including red-tailed, Swainson's, and American kestrel – are not an unusual sight, nor are scaled quail, wild turkey, mourning dove, and bobwhite. There is a resident population of great blue herons in the area adjoining the monument. Ducks and geese come in seasonally in great numbers; and the marshy areas of canyons provide wintering space for species that are uncommon in the Panhandle, including American bittern, Virginia rail, long-billed marsh wren, and song sparrow. Cattails of the marshes are utilized as nighttime roosts for thousands of blackbirds. An inventory of reptiles and amphibians in the monument is currently being assembled. Diamondback rattlesnake, prairie rattler, racer, bullsnake, Texas horned lizard, collared lizard, and box turtle have been observed.

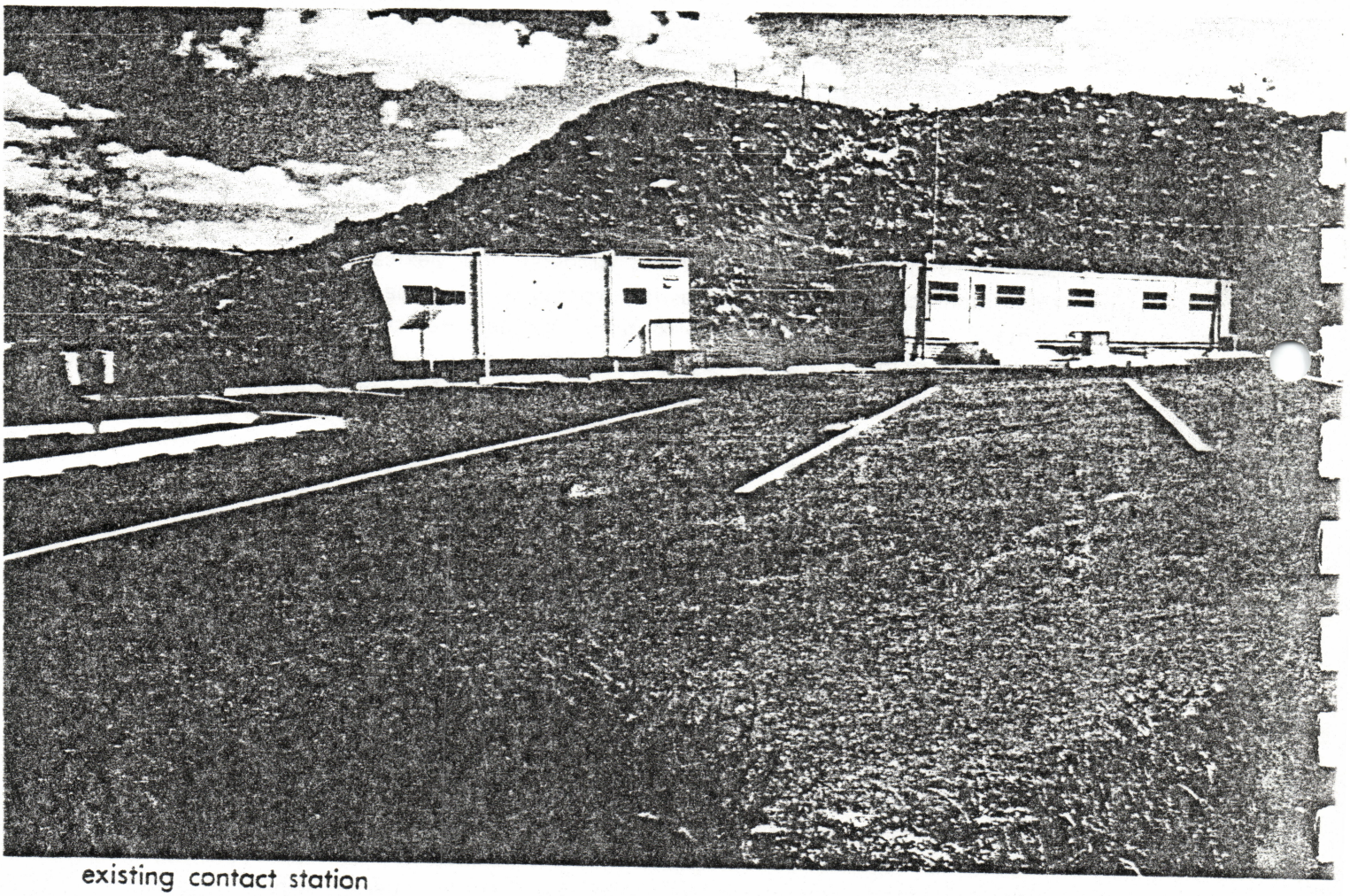
Panhandle History

The spectrum of early Texas Panhandle history known to have been enacted in the monument area (although it is not visible today) is impressive: Numerous Spanish conquistadores, *Comancheros* (traders), and Mexican and U.S. military expeditions crossed the region, as did frontiersmen, trappers, explorers, buffalo hunters, and the Gregg and Marcy routes of the Santa Fe Trail. Recent chapters in the history of the Panhandle region – the cattle industry, homesteading, and the petroleum industry – add interesting (and visible) historical sidelights to the Alibates resource-picture.

INTERPRETATION TODAY

Administration of the monument is presently being performed by the superintendent and staff of adjoining Lake Meredith Recreation Area, from joint headquarters at Fritch. No formal development – and only limited informal development – has been implemented to serve monument visitors. The only monument-associated developments now lie off monument lands, and are limited to a short unsurfaced trail leading from a gas-well road to the top of the bluff where the quarries are situated; a temporary trailer "contact station" parked at the point where a gas-well road egresses from Alibates Road near Bates Canyon; a parking lot near the trailer, and another, smaller lot, near the quarries; and limited protective fencing around portions of the monument boundaries. Signing has been kept minimal for protection purposes.

At present, one fulltime interpretive employee, a half-time interpretive employee, and two 3-month (heavy-use-season) seasonals are allotted to serve the monument's interpretation needs. During the summer months, from Memorial



existing contact station

Day through Labor Day, scheduled tours are offered at 10 a.m. and 2 p.m. daily. The visitor arrives at the trailer "contact station" near Bates Canyon, is contacted by the tour leader, and views several small, informal exhibits of Alibates flint. From there, a car caravan travels 3 miles on rough, unpaved roads to the parking lot at the foot of the trail leading to the quarries. There is little of archeological interest on the way up; the guide talks about the origin of the flint, prehistoric man's use of it, and Indian culture in general. At the quarries, the interpreter discusses quarrying techniques, the variety of colors of the flint, trade blanks and their development through knapping into tools and weapons, the trade of the flint, the Plains Village Indian ruins and petroglyphs several miles away, and other relevant subjects. He sometimes demonstrates flint-knapping before, during, or after the tour.

The monument is closed to the public for the remaining 9 months of the year, except for limited guided tours conducted by appointment through the flint quarries and associated (but several miles distant) Plains Village Indian ruins and petroglyph site. After these unscheduled tours, demonstrations of flint-knapping and atl-atl-throwing are sometimes offered. New demonstrations are planned for this year, including corn-grinding, use of the bow-drill, and bead-making from freshwater mussel shell.

A few photographs and several flint specimens are on display at joint headquarters at Fritch, and a park folder and publications relating to the monument and Texas Panhandle region are also available there.

VISITOR PATTERNS

Because of the monument's limited development and interpretation programs, visitation has remained low in the 10 years since establishment. Only 2,546 visits were recorded by the end of 1975 (an increase over the two previous years, but a decrease from the 2,769 visits recorded in 1972). Most visitors live within 100 miles of the monument. They often travel in family groups, and bring along visiting friends. These individuals and groups often return to the monument again and again, so one of the goals of this plan for interpretation will be to provide changing exhibits and demonstrations to encourage these repeat visitors. Some visitors come from out of state, specifically to explore the quarry/flint story and the archeology of the area.

Attracting visitors will continue to be a challenge. Because of its proximity to Lake Meredith Recreation Area (which attracted more than a million and a half visitors in 1975), and heavily traveled Interstate 40, the monument has excellent potential for substantial increases in visitation as development is implemented.

One possibility is to encourage Lake Meredith's visitors to change their pace and spend a couple of hours exploring the nearby monument. Special tours traveling by bus and large school groups can be expected to call upon the Alibates facilities. Large groups can be expected during the more climatically comfortable winter months; many smaller tours will come during the summer.

CLIMATE

The harsh and extreme climate of the Texas Panhandle influences visitation to, and interpretation of, the monument: Wind is almost constant, averaging 12 miles per hour, frequently reaching 30 miles per hour for prolonged periods, and occasionally – and suddenly – reaching 60 to 80 miles per hour. "Northers" occur in winter. Summer temperatures are high – and wooded and other shaded areas are almost nonexistent. Thunderstorms (sometimes accompanied by flooding, which can impede access to, and circulation within, the monument) occur in spring and summer. Tornado threats are frequent (although tornadoes rarely materialize). Winter temperatures may drop 50 to 60 degrees within a 12-hour period. Humidity is low. Rainfall normally averages 21 inches a year: 1975 was considered a wet year; 1976 (as of June) has been dry. Hailstorms occur occasionally. Snowfall averages 12 inches annually. Dust storms often result from a combination of strong winds, scarce vegetative cover, and light winter precipitation.

LEGISLATIVE COMPLIANCE

All actions proposed in this plan for interpretation of the Alibates flint quarries must comply with the provisions of Section 106 of the Historic Preservation Act of 1966 and Executive Order 11593, as codified in the "Procedures for the Protection of Historic and Cultural Properties" of the Advisory Council on Historic Preservation (36 CFR 800). All 92 acres of the present monument are listed on the National Register of Historic Places. When the monument boundaries are expanded, these procedures require that all cultural resources within or near the project areas must be identified and evaluated in terms of National Register Criteria for Eligibility, prior to decisions to implement any provisions of this plan. The evaluation must be performed for the Regional Director by a qualified professional, in consultation with the Texas State Historic Preservation Officer. Additionally, the Criteria of Effect and the Criteria of Adverse Effect (36 CFR, Sections 800.8 and 800.9) must also be applied by a qualified professional for the Regional Director, in consultation with the Texas State Historic Preservation Officer, and the Advisory Council procedures must be implemented as appropriate.

PROPOSALS

THEME/OBJECTIVE

The basic theme is . . . . . the quarrying of flint . . . a highly specialized form of prehistoric lithic technology . . . manifesting the artistry, industry, and resourcefulness of prehistoric peoples, in objects they made and used in their daily lives.

Interpretive development of this theme will focus upon the quarries and the flint: the impressiveness of the extent, quantity, appearance, and associated span of human occupation of the quarries . . . flint-quarrying methods and tools . . . one of the oldest industrial sites in North America . . . flint-working techniques . . . the working qualities and intrinsic beauty of the flint, and its widespread trade because of these attributes . . . the geological history and origins of the flint . . . the Plains Village Indian culture associated with the quarries . . . the quarry landscape, its natural history, and the hardships endured there by early peoples . . . the spectrums of Panhandle history and natural history . . . the uniqueness of the Alibates flint quarries in the National Park System . . . "the Texas Panhandle's best kept secret" . . . .

The basic objective is . . . to promote in visitors an understanding and appreciation of the unique and rich Alibates story . . . by offering an imaginative spectrum of interpretation opportunities, at the visitor center and along the trails . . . all emphasizing person-to-person communications . . . and all geared to reveal, and to invite visitors to search out for themselves, the secrets . . . thereby inspiring visitors to take personal responsibility in helping to protect the nonrenewable values they came to see.

Development of the theme and realization of the objective will focus upon interpretation provided at a visitor center; through onsite programs, including a scheduled, guided Quarry Trail tour, a self-guiding Mini-Loop Trail tour, and a by-request Plains Village Indian Ruins/Petroglyph Trail tour; and through special offsite programs offered to the Texas Panhandle community.

FOCUS 1: THE VISITOR CENTER

Situated within easy walking distance of the quarries, this multimedia facility will be designed to encompass these functional areas:

Entrance
Lobby
Restrooms
Audiovisual Room/Auditorium
Native Materials/Crafts Room
Plains Village Indian Room
Flint-Working Room
Tour Assembly Area
Administration/Storage

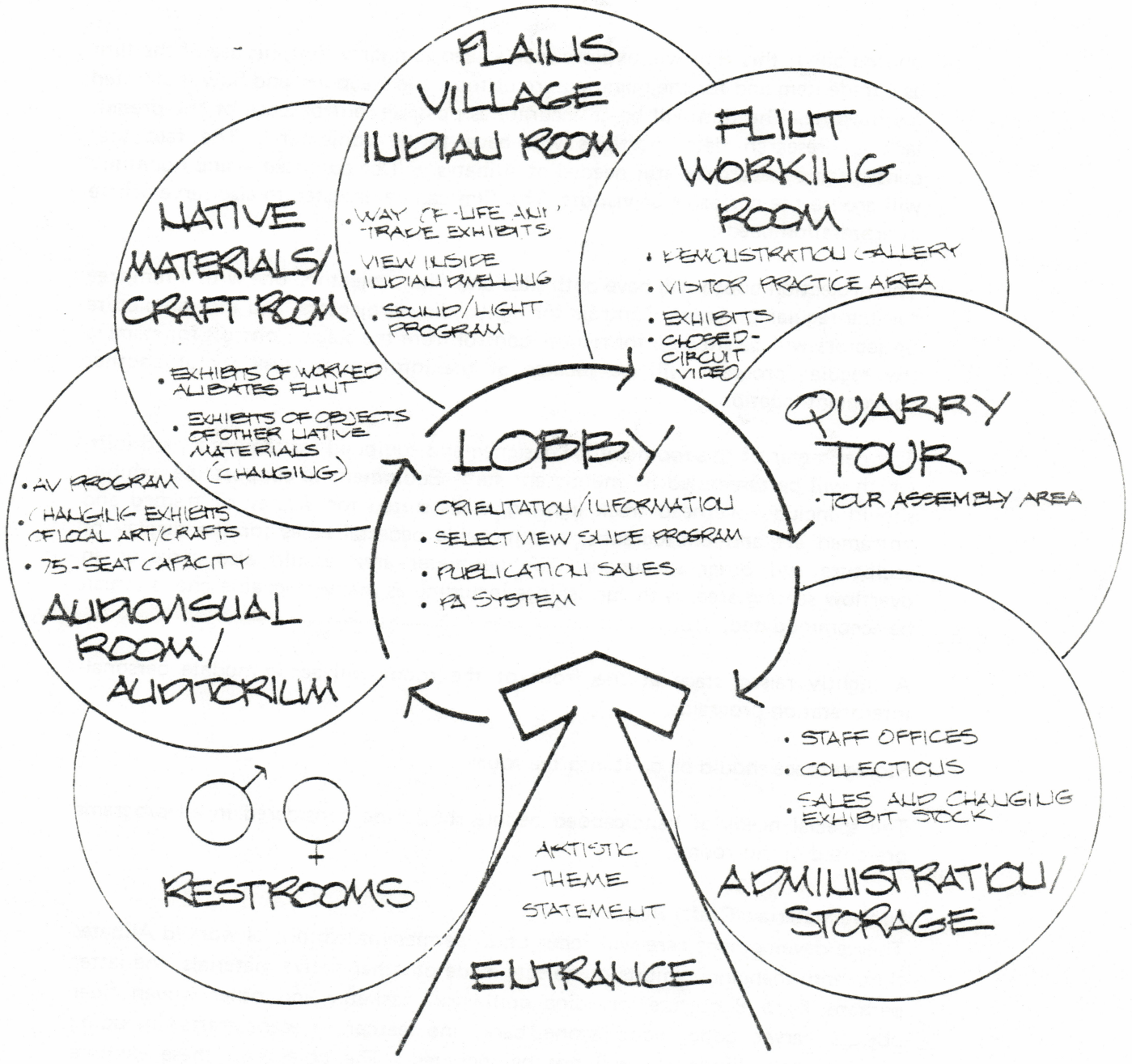
Entrance
As visitors approach or enter the lobby, they will first see a dramatic artistic statement of the quarry/flint theme. Possibilities include a spectacularly lighted and displayed chunk of flint, hands working flint, a mammoth hunting scene, or a full figure or group quarrying or working flint.

Lobby
The usual orientation/information functions ("What can we do here? What is there to see? How far away is it? How long does it take to do it/see it/get there?") and publications sales will be offered here. An orientation map will indicate the Visitor Center, the Quarry Loop and Mini-Loop Trails, the Plains Village Indian Ruins/Petroglyph Trail, and monument features accessible to visitors on guided walks. (No wall map of Lake Meredith Recreation Area is proposed; the park-folder map is expected to answer any questions on the recreation area.) An activities schedule will be provided. A random-access slide projector at the information desk will give the attendant the option of answering questions in this way. A public-address system at the desk will enable staff to announce the starts of programs and tours, and to convey special messages. Trail safety (clothing required, hazards to be anticipated) will be stressed here.

Restrooms
These facilities will adjoin the lobby.

Audiovisual Room/Auditorium
This multipurpose room, which will be most visitors' first stop in the Visitor Center, will hold a maximum of approximately 75 people, and will be separated from the lobby.

A motion picture will form the audiovisual emphasis. It will be 10 to 12 minutes long, and provide an overview of the approximately 12,000 years the flint quarries have been used. Done primarily with artwork, interspersed with location



visitor center schematic

ALIBATES FLINT QUARRIES AND TEXAS PANHANDLE PUEBLO CULTURE NATIONAL MONUMENT

photography, this film will explore man's need to quarry flint, his use of the flint as a trade item and for the manufacture of tools and weapons, and how it affected his lifestyle. The film will be as accurate as possible, but because of the present lack of research data, portions will have to be conjectural. The fact that considerable research is still needed at Alibates will be admitted – and hopefully will arouse the curiosity of visitors. The film can be designed to also serve offsite interpretation needs.

The projection booth will have both slide and film projectors, one with a film tree for the regular program. Controls for lights, slide projectors, and motion-picture projectors will be situated for remote control from the stage. Controls for starting the regular program will be located at the information desk, or at another convenient location.

The perimeter of this room will be designed and equipped for temporary exhibits, which will be assembled by monument staff. Equipment to support the exhibits should include overhead track lighting, walls suited for display of framed and unframed art and photographs, and movable pedestal cases for the display of sculpture and other specimens. The perimeter area should also serve as an overflow seating area, with furnishings including as many stackable chairs as can be accommodated.

A slightly raised stage at the front of the room will accommodate personal-interpretation programs.

Storage space should be built into the room.

The special needs of handicapped people should be considered in all programs presented in this room.

Native Materials/Crafts Room

Theme development here will focus upon permanent exhibits of worked Alibates flint, and changing exhibits of objects made of other native materials, the latter perhaps 6 to 8 objects including quillwork, basketry and other woven fiber objects, carved bone, wood, stone, bark, and leather. (Recent crafts, including contemporary flintwork, will not be included.) The objects in these exhibits should be featured as art, rather than as information. Label copy should provide some factual background, but the format should render the copy secondary. Cases, lighting, and labeling should be designed to permit changing of the exhibits as new materials are acquired. Exhibit objects other than flint may be borrowed from other National Park Service areas, and from other sources.

Plains Village Indian Room

Thematic treatments in this room will deal with the trade of Alibates flint by this group for a variety of other materials (such as shell, obsidian, and catlinite);

visitors will be offered a view into the interior of a full-size Plains Village Indian dwelling, and a brief, controlled light/sound program touching upon buffalo-hunting, farming, quarrying, and trading activities. It is highly likely that the actual ruins, situated about 2 miles from the Visitor Center, will remain in their present unspectacular unexcavated state for some time, and interpretation in this room should mention that fact.

Flint-Working Room

The Visitor Center experience will culminate in this room, which will adjoin, rather than be separate from, the lobby. The room will have a capacity of 40 people.

In the demonstration gallery, visitors will stand in elevated semicircular rows surrounding a demonstrator seated at a workbench below the level of the front row of visitors. A closed-circuit color video screen should be mounted above and behind the demonstrator, to enable closeup views of his hands. The color television camera should be mounted on, or slightly above, the bench. A color videotape player should be available to provide a taped program during periods when live demonstrations cannot be offered. Two cameras and screens may be needed to show the two main working positions – percussion (striking) and pressure-flaking.

Near the demonstrator should be exhibits illustrating the qualities of Alibates flint that attracted the early quarriers – conchoidal-fracturing properties, sharpness and strength of the flakes produced, and spectacular variegated colors. A backlighted fractured chunk of flint could illustrate the fracturing properties, and also dramatize the colors. Completed tools and weapons, exhibiting hafting, shafting, and handles, could be exhibited, along with examples of their uses.

Another high point for visitors in this room will be the opportunity to try their own hands at working flint. A bench separated into 10 to 12 working stations will be provided. Basic tools and materials will also be furnished, along with leather gloves and safety goggles. The bench should be situated so that visitors may observe others working the flint. Visitors will be encouraged to feel the edge and heft of flint, to listen to its sounds as they strike pieces together, to appreciate the individuality of different pieces, and to imagine their potential for the fashioning of tools and weapons.

The floor and working surfaces should be made of materials that can withstand the abrasion of flint chips – perhaps rough, unfinished lumber. A heavy-duty industrial vacuum-cleaner should be provided.

Safety must be stressed in this room, for we are essentially creating hazards.

Administration/Storage
Offices, and space for collections, sales stock, and changing-exhibit storage will be provided here.

FOCUS 2: TRAIL TOURS

Visitors will be offered two options for onsite interpretation at the quarries: a guided Quarry Trail, and a self-guiding Mini-Loop Trail. In addition, unscheduled guided walks (approximately 4 miles round trip) to the Plains Village Indian ruins and petroglyph site will be offered on request to special-interest groups, when staff is available.

The Quarry Trail
Guided tours along this trail, which will wind through the quarries and cover approximately 1½ miles, will depart from, and end back at, the Visitor Center.

The physical appearance of the quarries and countryside may seem unspectacular to many people. Thus, the responsibility of and challenge to the onsite interpreter is great. Personally in charge of visitors' senses and imaginations, he can lead visitors into new perceptions of time and place.

The fragility and irreplaceability of the quarry resources will be emphasized throughout the tour.

Three to five quarry sites will be excavated as interpretive focal points. Archeological methods will be interpreted for visitors so long as excavation is in process. It is not yet known what these excavated quarries will look like; hopefully, they will present a spectacular display of acres and tons of multicolored chips and flakes, punctuated by the pits themselves. It will not be until visitors actually see the excavated quarries before their eyes that they will be able to begin to comprehend the thousands of years and the prodigious amount of human energy represented around them.

Placing primary emphasis upon the quarrying story, the guide will encourage visitors to admire the color and form of flint – and to appreciate its limited availability.

Expanding their awarenesses further, the guide will encourage visitors to think about the tremendous span of human occupations that came to quarry the flint – to feel the sun and wind as they did – to look out to the horizon and

imagine what they saw – to conjecture about their lifestyles in this place – and to empathize with their needs and aspirations.

With the help of their guide, visitors can also view the entire landscape about them in terms of the geologic forces that shaped it. The guide can connect these forces with the origins of the dolomite caprock, and can stimulate interest in the origins of the flint, all of which will make visitors more aware of its irreplaceability, and hopefully more responsive to efforts to preserve it.

The Quarry Trail will run southeast from the Visitor Center, along a high ridge, which offers a splendid view of the geological "breaks" formations; of chronologically intrusive, but visually interesting, Lake Meredith; and of the rolling terrain lying off in all directions.

Although environmental interpretation is not a primary objective at Alibates, thinking about prehistoric peoples as they related to their environment can lead us to think about ourselves in the same terms. The guide can encourage this train of thought by pointing out the intricate interrelationships between environmental factors and features, some of which are the same today as in prehistoric times.

Approximately ¼ mile out, a loop will be formed to take visitors to a very fine quarry site where the interpreter can offer his introduction to the monument theme. Interpretive emphasis should be placed upon the forming of blanks, rather than on the manufacture of tools and weapons, for research indicates that the actual manufacture was performed elsewhere.

After leaving this quarry, the interpreter will not have another designated stop until the group reaches the midpoint of the trail, which loops at a high point overlooking Lake Meredith. Here, he can offer a variety of subject-talks, including man's influence upon the land (illustrated by the oil and gas activities, and by Lake Meredith), the "breaks" story, and the interrelationships between the animal and plant communities.

After leaving this viewpoint, the guide will take the group around the loop, and pause at a shelter situated below the skyline level. The shelter will seat at least 25 people (the maximum tour-group size), and contain a fixed storage case. The case will enable the guide to display various flint objects, tools used by early peoples in quarrying operations, and any of a series of portable fiberglass illustrations (measuring about 14 by 20 inches). The subjects of the fiberglass illustrations will include quarrying techniques, Plains Village Indian dwelling-construction techniques, petroglyph-pecking, flint-deposition, and the "breaks" type of terrain. The illustrations will be stored in the fixed storage box. In addition, fixed exhibit-panels could be installed at the shelter. Flint-working should not be

demonstrated at this shelter. The shelter will offer visitors relief from the heat and wind that can be so distressful during the summer months in the Panhandle, and the length of time spent there must be flexible.

After a rest period at the shelter, the guide will lead the group back over a portion of the trail that they traversed coming out, again passing by several excavated quarries and nonexcavated quarry sites, and explaining the differences.

Except for the three designated stopping-points, the guide will have the freedom to "play it by ear" all along the trail, and to stop where he wishes, thus supporting the theme set forth in the Visitor Center's changing art and artifact exhibits. Thus, repeat visitors will experience a "spice of variety" when they return to the quarries.

By the time visitors return to the Visitor Center, they should have gained some perception and appreciation of the intensity of, and the hardships early peoples suffered due to, the elements – and the feeling of the land in which the quarriers accomplished their tasks and worked to live.

No waysides are planned along this trail, because of the visual intrusions they would introduce into the relatively flat, open landscape, and also because they might limit the guide's freedom to create his own programs and capture the undivided attention of his audience.

The Mini-Loop Trail

This short (approximately 1/3-mile) tour may become the most popular outdoor program offered at the monument, because of the frequent extreme heat and winds, and the special needs of handicapped, elderly, and young visitors. It will also serve to protect the fragile quarry resources along the longer Quarry Trail from heavy use. The surfaced trail (suitable for wheelchairs) will be self-guiding, and a roving interpreter will be on site at all times to afford protection and answer questions. The trail will extend from the Visitor Center, along the route of the Quarry Trail as far as the first major quarry, and then loop back to the Visitor Center.

Portions of the trail could be left in a natural state, to provide a brief "crunchy" experience that will convey some feeling of the vastness and quantity of man's work underfoot.

Five to six small unobtrusive waysides will be placed along this trail, dealing with the quarries and the flint. (Natural history will not be treated in these waysides or at the Visitor Center, but will be covered in publications and oral interpretation along the trails. Panhandle history will be covered only in publications.)

The Plains Village Indian Ruins/Petroglyph Trail
This rigorous 4-mile round-trip tour will not be offered to the general visitor, but guided walks will be available upon request by special-interest groups, such as archeology students and professionals, when staff is available.

Subjects dealt with in personal interpretation along the trail will be the same as those offered along the Quarry Trail and Mini-Loop Trail, but emphasizing a complementary treatment of the Plains Village Indian culture and the petroglyph concentration near the ruins.

The ruins are difficult to identify in their present state, so sometime in the future some will be excavated and stabilized, and a room might be reconstructed on site. Treatments here will complement those in the Plains Village Indian Room of the Visitor Center.

The method and material chosen to preserve the petroglyphs should leave them visible for interpretation.

FOCUS 3: OFFSITE PROGRAMS

The monument is considered a personal treasure to many people in the Texas Panhandle, who warmly welcome visitors to their towns and businesses. Residents are hungry for information about what park staff is doing to illuminate the Alibates story. Thus, it will require minimal effort on the part of staff to maintain this high level of interest. Many local people have offered their "head" collections for use at the proposed Visitor Center. Some will undoubtedly offer volunteer services, so a VIP program would be a natural here.

In response to the Panhandle people's intense interest in the monument, special programs should be made available year round to schools, clubs, and other interested organizations. A film (either the one shown at the Visitor Center, or a specially designed one) should be prepared for general distribution. The fiberglass illustrations used at the Quarry Trail shelter could be used outside the monument as well. A weekly interpretation newsletter to the local newspapers, and radio and television appearances by staff, would also be beneficial in enhancing this communication with local communities. The changing exhibits at the Visitor Center, featuring artwork and crafts by local people (including schoolchildren), will also be an excellent tool for encouraging community support.

Local people should also be encouraged to produce exhibits for display in places like convention centers and chambers of commerce, to inform visitors to the Panhandle Region of the monument's significant values and its accessibility.

SUPPORT

SECURITY

Protection and preservation of the monument's fragile and irreplaceable resources are paramount in all planning and management. "Itchy fingers" is a common response in visitors who walk the trails. Visitors will be encouraged to examine – and even to work with – the flint, in the Flint-Working Room of the Visitor Center – but they will at all times be made aware of the importance of leaving the flint where they see it along the trails, so that it may be enjoyed by others, and security regulations will be strictly enforced by interpretation staff. The Quarry Trail will operate on a guided basis only. The Mini-Loop Trail will be self-guiding, but roving interpretation staff will enforce regulations. (This will be a relatively easy task, because the flat terrain permits excellent visibility for miles in all directions.) The Plains Village Indian ruins and petroglyph site will be closed to the general public; those tours conducted for special-interest groups upon special arrangement will be closely monitored. Housing for after-hours onsite protection staff will be provided.

RESEARCH

Severely constraining interpretation for Alibates is a relative lack of basic information concerning the archeological and other resources. To support a viable and effective interpretation program, the following are needed:

A systematic, intensive site survey

A comprehensive site report

A complete archeological base map

Environmental reconstructions (including soils, pollens, flora, micro- and macro-fauna, land base, water resources, rocks and minerals)

Excavation of selected quarries

Excavation of several Plains Village Indian ruins

Reserach into occupation stages, settlement patterns, demography, culture-pattern changes

Research into the characteristics, origins, and geological history of Alibates flint

Substantive data to support hypothetical explanations of trade relationships, the trade of Alibates flint, other intra-area relationships

Research into the background history of the monument area

Research into the basic natural-history values

These projects are described and projected in the Resources Management Plan for the monument.

COLLECTIONS

Present Status

The Southwest Regional Office staff curator reports that under present staffing limitations, curatorial work is allotted little time. Accessioning needs to be brought up to date. The accession book contains three numbered accessions and five pages of unnumbered entries of archeological survey materials, which have

the field specimen numbers listed in the "Catalog Number" column. Entries date from 1968 to 1974. In all, there are 85 lots of materials, most consisting of one to six specimens, but a few with large numbers ranging upward to 449 specimens. Most of these entries were made in 1974, and are listed in order of site number in the area survey, not in order of date of collection. The survey file includes 289 sites. Accession No. 1 consists of 725 items donated from the papers of Floyd Studer, and includes notes and reports on local archeology, photographs, ground plans, and sketch maps. These are in acid-free folders; because they are prime source material on the archeology that comprises the major interpretation theme at the monument, they require the best care possible. In addition, there are a number of Studer photographs that have not yet been accessioned. Three sites were excavated by the Texas Archeological Society in 1969, and the collections from these projects are at West Texas State University in Canyon.

In 1970, Barbara Ann Lund assembled a small natural-history collection, which includes both botanical and zoological specimens. The most valuable part of this collection is the herbarium, which includes a large number of items. These have been identified, herbarium labels have been prepared, and the specimens have been mounted on herbarium sheets. The identifications are said to have been checked, at least in part, by West Texas State University, and the labels were supplied by that institution.

Most of the collections are made up of archeological specimens – largely surface collections – from numerous sites in the monument area. There is also a small geological collection, consisting primarily of samples of stone used for worked-stone tools. The products of the current flint-working demonstrations are made from stone gathered outside the monument; they are not kept in museum collections, although a few are used in a small exhibit at monument headquarters.

Cataloging is very much behind. Field specimen forms are said to exist for the archeological materials, but the present staff does not know where these are filed. With these forms as a basis, cataloging could be accomplished for this part of the collections. The herbarium series could be very useful for both interpretation and research purposes. The specimens should be mounted on herbarium sheets, and be cataloged. If used to any degree in their present state, the specimens would suffer rapid deterioration.

Onsite inventory control will be effective once the specimens at headquarters are included in the museum record system. There are three archeological collections – at the University of Texas, Texas Tech, and West Texas State – which should also be incorporated into onsite records.

The Regional Curator feels that sufficient data exist to authentically restore or construct a full-scale model of a Plains Village Indian room.

Further collecting should be kept at a minimum until collections currently on hand are processed, except for any necessary salvage work. Surface collecting is a favorite outdoor sport in the region, which means that private collections exist, and that we might be recipients of donations and loans.

Indeed, many local people have expressed enthusiasm about donating or loaning their private "head" collections. However, only donations of individual items of high interpretation potential and documentary materials of research value should be encouraged at this time; with loans, there are often "strings" attached regarding where/when/how items will be exhibited. All collecting must be coordinated with the Southwest Regional Office, the archeological centers, and museums in the Texas Panhandle area.

Aside from a few items used in furnishing and exhibits at headquarters, all collections are kept in a small metal building in the maintenance yards. The room is also used by maintenance personnel. There are several keys to the door, and locks on only part of the storage cabinets. There is little of high market value in the collections, but the stone tools have high interest appeal. Some pilfering of artifacts has been noted, primarily of reproductions made by the current flint-working demonstrator, but the size of the archeological collection is such that losses could go unnoticed for some time. The materials are well labeled and shelved. The Studer documents are in a file cabinet in the interpreter's office. The unaccessioned photographs are merely kept in an envelope.

Policy Statement

The purposes of the monument collections will at all times be consistent with applicable provisions of National Park Service Management Policies (1975) and other documents governing management and interpretation. Such purposes are:

To collect and acquire, as appropriate,

> Archeological specimens from the flint quarries, the Plains Village Indian villages, and any other prehistoric or historic sites found within the boundaries of the monument and Lake Meredith Recreation Area. All collections resulting from projects by cooperating institutions will be accessioned by the monument, but may be cataloged and stored by the cooperating institution, or as may be agreed upon in any permits, contracts, memorandums of agreement, or other documents governing the work.
>
> Only representative specimens, or those needed for special purposes, from archeological sites outside the boundaries of the monument and recreation area.

The Floyd V. Studer collection of data and photographs relating to the local archeology.

Such biological and geological specimens as will provide a better understanding of the environment of the area and the resources available to the prehistoric inhabitants.

Original historical objects that may be specifically related to any historical themes identified as significant to the monument in other documents.

Only sufficient material from modern flint-working demonstrations as is needed to illustrate the flaking characteristics of the local flint and the kinds of debitage resulting from different techniques.

Only such ethnographic specimens and objects of fine art as are required for use in displays and interpretive demonstrations.

To exclude from the collection

Objects that needlessly duplicate materials already collected, or those that do not relate to the monument interpretive theme.

All original historical documents that do not relate to the local archeology. Appropriate archival repositories for all such materials as may become available to the monument must be found. Copies of all materials needed for monument purposes will be made for the monument reference files.

All reproductions or replicas that might be acquired for use as props in exhibits or living-history demonstrations.

To maintain

A library and reference file adequate to meet most needs for interpretation, and for documenting collections.

To recognize

The intrinsic and irreplaceable value of all original objects in the monument collections; to make use of only reproductions in living-history demonstrations; to mark all reproductions appropriately; and to take all necessary measures to document, conserve, and safeguard the entire collection.

PUBLICATIONS

Publications offering subject-specific and in-depth treatments of the monument resources and the surrounding region are needed to supplement the interpretation programs. The park brochure can be beefed up, until additional publications can be obtained. Handouts such as the existing "History Sketch" are encouraged. The sketch could be accompanied by in-depth sketches relating to flint-working, trade, the Plains Village Indians, and other pertinent subjects. A "handbook" will be needed. So will a Mini-Loop Trail guidebook, and guidebooks for the other trails.

The superintendent will be responsible for final selection of sales publications; the following existing items are possibilities: Stewart Peckham's *Prehistoric Weapons in the Southwest* (Museum of New Mexico State Pamphlet 3); Robbins, Bruun, and Zim's *Birds of North America*; Sweet's *Common Edible and Useful Plants;* Western Publishing Company's Golden Guide Series on birds and rocks and minerals; James's *Know Your Poisonous Plants;* Frome's *National Park Guide;* Ferris's *Prospector, Cowhand and Sodbuster;* the U.S. Geological Survey's quadrangle maps (series of 5); Wills and Irwin's *Roadside Flowers of Texas;* Thomas's *Roughing It Easy;* Brown's *Story of the Plains Indians;* Wallace and Hoebel's *The Comanches;* Robertson and Robertson's *Panhandle Pilgrimage;* Tilden's *The National Parks: What They Mean To You;* Olsen's *Outdoor Survival Skills;* and Hesselberg's notecards and postcards.

STAFFING REQUIREMENTS

A substantial increase in interpretation staff will be required to carry out interpretation and protection functions that meet the standards required by the National Park Service.

The monument will operate on a year-round basis, from 8:00 a.m. to 5:00 p.m. during the off-season, and from 8:00 a.m. to 8:00 p.m. during the busy season. Staff will live on site after hours for protection of the fragile flint resources.

Staff will be required to perform the following interpretation and protection functions: conducting guided tours on the Quarry Trail (regularly scheduled) and Plains Village Indian Ruins/Petroglyph Trail (on-request but nonscheduled); roving interpretation and protection along the Mini-Loop Trail; coordination of interpretation staff, programming of interpretation, VIP coordination, environmental education, media relations, and other administration concerns; provision of area introduction, operation of AV, directions, phones, clerical, publications sales, stock, cooperating association coordination, and general front-desk concerns; flint-working demonstrations, and the overseeing of visitor participation in flint-working; and provision and implementation of special offsite programs. Many of these functions obviously overlap, and can be performed by a single staff member.

PRODUCT RESPONSIBILITIES

Harpers Ferry Center

Audiovisual Arts:
- Random-access-projector program
- Onsite film
- Offsite film
- Taped flint-working program

Publications:
- Overview publication
- Free folder

Exhibits:
- Artistic theme statement
- Orientation map
- Native materials/crafts exhibits
- Plains Village Indian dwelling reconstruction
- Plains Village Indian exhibits
- Flint exhibits
- Portable fiberglass illustrations

Waysides:
- 5 or 6 exhibits

Southwest Regional Office
- Legislative compliance review
- Research

Monument
- Collections
- Interpretation newsletter
- Changing exhibits

Southwest Parks and Monuments Association
- Trail guide booklets
- Activities scheuule

COSTS

The following cost figures for the use of the Harpers Ferry Center are based upon the assumption that planning will proceed in Fiscal Year 1977, and production will proceed in Fiscal Year 1978. If the project is delayed significantly, they may have to be revised.

Planning

Audiovisual	$10,500
Exhibits	15,000
Waysides	2,500

Production

Audiovisual

Film/equipment	60,000
Sound/light program and controls	15,000
TV equipment and taped demonstration program	75,000

Museums

Exhibits	75,000
Waysides	2,500

SUGGESTED READING

Anonymous

1962 "Alibates Flint Quarries, A National Monument." Manuscript on file at the Potter County Historical Society. Amarillo.

1966 "Texas Alibates Flint Quarries Declared a National Monument." *Lapidary Journal* 9:10:1117-1131.

Archambeau, E. R.

1963 *The Valley of the Canadian River.* Panhandle Geological Society Field Trip, September 1973.

Baerreis, D. A., and Reid A. Bryson

1965 "Historical Climatology of the Southern Plains." *Oklahoma Anthropological Society Bulletin* 13:69-75.

1966 "Dating the Panhandle Aspect Cultures." *Oklahoma Anthropological Society Bulletin* 14:105-116.

Baker, E., and J. Baker

1941 "Final Report Archaeological Survey — O. P. 655-66-3-404, State Application 30976." Unpublished manuscript on file at Lake Meredith Recreation Area.

1941 "Final Report W.P.A. West Texas State Archaeological Project 9249." Unpublished manuscript on file at Lake Meredith Recreation Area.

Baker, W. E., T. N. Campbell, and G. L. Evans

1957 "The Nall Site: Evidence of Early Man in the Oklahoma Panhandle." *Oklahoma Anthropological Society Bulletin* 5:1-20.

Bell, E. H.

1939 "Great Plains Area." *American Antiquity* 5:355-357.

Bell, R. E.

1962 "Precolombian Prairie Settlements in the Great Plains." *Great Plains Journal* 2:1.

Bell, R. E., and D. A. Baerreis

1951 "A Survey of Oklahoma Archaeology." *Bulletin of the Texas Archeological and Paleontological Society* 22:7-100.

Blair, W. F.
1950 "The Biotic Provinces of Texas." *Texas Journal of Science* 2:1:93-117.

Bousman, C. B.
1973 *Archeological Assessment of Alibates National Monument.* Archeology Research Program of Southern Methodist University. Dallas, Texas.

Bryan, Kirk
1950 "Flint Quarries – The Source of Tools and, at the same time, the Factories of the American Indians." Papers of the Peabody Museum, Harvard University.

Campbell, R. C.
1969 "Prehistoric Panhandle Culture of the Chaquaqua Plateau, Southeast Colorado." Unpublished Ph.D. dissertation. Department of Anthropology, University of Colorado, Boulder.

Corbyn, Ron
1967 "Archeological-Geomorphic Survey of Big Canyon – Canadian River Confluence." Unpublished manuscript on file at Lake Meredith Recreation Area.

1967 "Big Canyon Burial, Site 84 Park Service." Unpublished manuscript on file at Lake Meredith Recreation Area.

Crabb, M. L.
1968 "Some Puebloan Trade Pottery from Panhandle Aspect Sites." *Bulletin of the Texas Archeological Society* 38:83-89.

Cummings, C. R.
1969 "Alibates Development Outline." Unpublished manuscript on file at Lake Meredith Recreation Area.

1969 "Archeological Site Survey for Bugbee Canyon Access Road Right-of-way, Sanford Recreation Area, Texas." Unpublished manuscript on file at Lake Meredith Recreation Area.

Davis, W. A.
1962 "Appraisal of the Archeological Resources of Sanford Reservoir, Hutchinson, Moore, and Potter Counties, Texas." Unpublished manuscript on file with the National Park Service.

Duffield, L. F.

1962 "Archeology of the Sanford Reservoir in the Texas Panhandle." *Plains Anthropology* 7:16-79.

1964 "Three Panhandle Aspect Sites at Sanford Reservoir, Hutchinson County, Texas." *Bulletin of the Texas Archeological Society* 35:19-82.

1970 "Some Panhandle Aspect Sites in Texas: Their Vertebrates and Paleoecology." Unpublished Ph.D. dissertation. Department of Anthropology, University of Wisconsin, Madison.

Ellzey, T. S.

1967 *A Panhandle Aspect Site* (Preliminary Report). Transactions of the Second Regional Archeological Symposium for Southeastern New Mexico and Western Texas, South Plains Archeological Society Guidebook.

Eyery, T. L.

1907 *Archaeological Work in the Texas Panhandle.* Canadian Academy Bulletin 1.

1907 *The Wolf Creek Expedition.* The Student 2.

Fischel, H. E.

1939 "Folsom and Yuma Culture Finds." *American Antiquity* 4:3:232-264.

Gladwin, H. S.

1934 "The Archaeology of the Southwest and its Relation to the Cultures of Texas." *Bulletin of the Texas Archeological and Paleontological Society* 5:19-35.

Glasscock, Keith and Alma

1955 "Report on CR-1, an Indian Campsite in Moore County, Texas." *Panhandle-Plains Historical Review* 28:96-106.

Gould, F. W.

1962 *Texas Plants — A Checklist and Ecological Summary.* Texas Agricultural Experiment Station MP-585.

Green, F. E.

1967 "Archeological Salvage in the Sanford Reservoir Area." Unpublished manuscript copy 2, National Park Service. Memo of Agreement No. 14-10-0333-1120.

Green, F. E., and J. R. Kelley

1960 "Comments on Alibates Flint." *American Antiquity* 25:3:413-414.

Green, J. H.

1955 "Some Flint Caches, the Alibates Quarry, and a Stone and Pestle." *Panhandle-Plains Historical Review* 28:78-81.

Hertner, H. E. (Editor)

1963 *Alibates Flint Quarries, A National Monument.* Potter County Historical Survey and Panhandle Geological Society, 1.

1964 *Alibates Flint Quarries, A National Monument, Supplement.* Potter County Historical Survey Committee and Panhandle Geological Society, 2.

Hesse, C. J.

1945 "Some Archeological Material in the Museum of the A and M College of Texas." *Bulletin of the Texas Archeological and Paleontological Society* 15:80-91.

Hobbs, H. R.

1941 "Two Texas Panhandle Ruins." *El Palacio* 48:121-129.

Holden, W. C.

1929 "Some Recent Exploration and Excavations in Northwest Texas." *Bulletin of the Texas Archeological and Paleontological Society* 1:25-35.

1930 "The Canadian Valley Expedition of March 1930." *Bulletin of the Texas Archeological and Paleontological Society* 2:21-32.

1931 "Texas Tech Archeological Expedition, Summer 1930." *Bulletin of the Texas Archeolgical and Paleontological Society* 3:43-52.

1932 "Recent Archeological Discoveries in the Texas Panhandle." *Southwestern Society Science Quarterly* 13:3:287-293.

Holden, W. C.
1933 "Excavation of Saddleback Ruin." *Bulletin of the Texas Archeological and Paleontological Society* 5:39-52.

Huges, J. T.
1955 "Little Sunday: An Archaic Site in the Texas Panhandle." *Bulletin of the Texas Archeological and Paleontological Society* 28:55-74.

1959 "Archeological Survey of Greenbelt Reservoir, Doney County, Texas." Unpublished report on file with the National Park Service.

1959 "In Notes and News." *American Antiquity* 24:4:454.

1961 "Lake Creek: A Woodland Site in the Texas Panhandle." *Bulletin of the Texas Archeological Society* 32:65-84.

1973 "Data for Archeology Section of Environmental Impact Statement on Blue West and Bates Canyon Areas, Lake Meredith Recreation Area, Texas." Manuscript on file with Ecology Audits, Inc., Dallas.

Hyatt, Robert D.
1968 "The Evidence for Plains-Southwestern Cultural Contacts." Unpublished Master's thesis. Department of Anthropology, University of New Mexico, Albuquerque.

Jackson, A. T.
1938 *Picture-writing of Texas Indians.* University of Texas Publication No. 3809. Austin.

Johnson, C. S.
1939 "A Report on the Antelope Creek Ruin." *Bulletin of the Texas Archeological and Paleontological Society* 11:190-202.

Krieger, A. D.
1946 *Culture Complexes and Chronology in Northeastern Texas.* University of Texas Publication No. 4640. Austin.

1947 "Certain Projectile Points of the Early American Hunters." *Bulletin of the Texas Archeological and Paleontological Society* 18:7-27.

1947 "The Eastward Extension of Puebloan Datings Toward Cultures of the Mississippi Valley." *American Antiquity* 12:3:141-148.

Kelley, J. H.
1964 "Comments on the Archeology of the Llano Estacado." *Bulletin of the Texas Archeological Society* 35:1-18.

Kendrick, Judson
1966 "The Alibates National Monument." In *West Texas State University Geological Society Guidebook for 1966.* Southwestern Association of Student Geological Societies Annual Field Trip. Canyon, Texas.

Kirkland, Forrest
1942 "Indian Pictographs and Petroglyphs in the Panhandle Region of Texas." *Bulletin of the Texas Archeological and Paleontological Society* 14:9-26.

Lowery, E. J.
1932 "The Archeology of the Antelope Creek Ruin." Unpublished Master's thesis. Texas Tech University, Lubbock.

Malone, James M.
1970 *Archeological Reconnaissance in the Mackenzie Reservoir Area of Tule Canyon.* Texas State Historical Survey Committee and Texas Water Development Board, Archeological Survey Report No. 8.

Mason, J. A.
1929 "The Texas Expedition." *University of Pennsylvania Museum Journal* 22:318-338.

1930 "Archeological Field Work in North America During 1929." *American Anthropologist* 32:2:361-371.

1935 "The Place of Texas in Pre-Colombian Relationships Between the United States and Mexico." *Bulletin of the Texas Archeological and Paleontological Society* 7:20-46.

McKern, T. W.
1964 "Indian Skeletal Material from the Jim Arnold Site." *Bulletin of the Texas Archeological Society* 35:95-100.

Mewhinney, H.
1965 "Alibates Flint Quarry." *Texas Parks and Wildlife* 23:8:20-25.

Moore, Ray

1966 "Archeology of Palo Duro Canyon." In *West Texas State University Geological Society Guidebook for 1966.* Southwestern Association of Student Geological Societies Annual Field Trip. Canyon, Texas.

Moorehead, W. K.

1920 *The Origin and Development of the Pueblo Cliff Dweller Culture.* Andover: Phillips Academy.

1921 "Recent Exploration in Northwestern Texas." *American Anthropologist* 23:1-11.

1931 *Archeology of the Arkansas River Valley.* New Haven: Yale University Press.

1933 "The Importance of Texas as an Archeological Field." *Bulletin of the Texas Archeological and Paleontological Society* 5:9-13.

National Park Service

1953 "Project Report, Recreation Use and Development, Sanford Reservoir." Unpublished report on file with the National Park Service.

1963 "A Public Use Plan, Sanford Reservoir, Canadian Project, Texas." Unpublished report on file with the National Park Service.

1964 "Sanford National Recreation Area, Texas; A Proposal; A Recreation Planning Report." Unpublished report on file with the National Park Service.

1965 "Sanford Recreation Area, Texas." Unpublished report on file with the National Park Service.

1975 *Environmental Assessment of Four Alternatives for Preservation and Development.* Southwest Regional Office, Santa Fe.

1976 *Resouces Management Plan.* Southwest Regional Office, Santa Fe.

1976 *Statement for Management.* Southwest Regional Office, Santa Fe.

Panhandle Geological Society
1963 "Field Trip, September 14, 1963, Alibates Flint Quarries, Alibates Indian Ruin, Santa Fe Trail, Sanford Dam." Unpublished manuscript on file at Panhandle Geological Society.

Pearce, W. M.
1936 "A Survey of the Sand-Hill Camp Sites of Lamb and Bailey Counties." *Bulletin of the Texas Archeological and Paleontological Society* 8:184-186.

Pearson, F. J.
1965 "University of Texas Radiocarbon Dates III." *Radiocarbon* 7:296-314.

Poteet, Sybil
1938 "The Occurrence and Distribution of Beveled Knives." *Bulletin of the Texas Archeological Society* 10:245-262.

Potter County Historical Survey Committee
1963 "Alibates Flint Quarries, A National Monument." Unpublished manuscript on file at Potter County Historical Society 1.

1964 "Alibates Flint Quarries, A National Monument, Supplement." Unpublished manuscript on file at Potter County Historical Society 2.

Sayles, E. B.
1935 *An Archaeological Survey of Texas.* Medallion Papers, No. 777. Gila Pueblo.

Schaeffer, J. H.
1958 "The Alibates Flint Quarry, Texas." *American Antiquity* 23:2:189-191.

Schroeder, A. H.
1961 "A Re-analysis of the Routes of Coronado and Onate into the Plains in 1541 and 1601." *Plains Anthropology* 7:15:2-23.

Schultz, C. B.
1943 "Some Artifact Sites of Early Man in the Great Plains and Adjacent Areas." *American Antiquity* 8:242-249.

Sellards, E. H.

1938 "Artifacts Associated with Fossil Elephant." *Bulletin of the Geological Society of America* 49:999-1010.

1947 "Fossil Bison and Associated Artifacts from Plainview, Texas." *Bulletin of the Geological Society of America* 58:927-954.

Smith, Victor J.

1936 "The Pottery Horizons of Texas." *Bulletin of the Texas Archeological and Paleontological Society* 8:94-112.

1938 *A Survey of Indian Life in Texas.* West Texas Historical and Science Society, No. 5.

Studer, Floyd V.

1931 "Archeological Survey of the North Panhandle of Texas." *Bulletin of the Texas Archeological and Paleontological Society* 3:70-75.

1931 "Some Field Notes and Observations Concerning Texas Panhandle Ruins." In *Archeology of the Arkansas River Valley,* Edited by W. K. Moorehead. New Haven: Yale University Press.

1934 "Texas Panhandle Culture Ruin No. 55." *Bulletin of the Texas Archeological and Paleontological Society* 6:80-96.

1955 "Archeology of the Texas Panhandle." *Panhandle-Plains Historical Review* 28:87-95.

Suhm, D. A., A. D. Krieger, and E. B. Jelks

1954 "An Introductory Handbook of Texas Archeology." *Bulletin of the Texas Archeological Society* 25.

Tunnell, C. D.

1964 "Two Burials from the Jim Arnold Site in Northwest Texas." *Bulletin of the Texas Archeological Society* 35:83-94.

Tunnell, C. D., and J. T. Hughes

1955 "An Archaic Bison Kill Site in the Texas Panhandle." *Panhandle-Plains Historical Review* 28:63-70.

U.S. Congress

1965 *Alibates Flint Quarries and Texas Panhandle Pueblo Culture National Monument, Legislative History.* House Report 148, Senate Report 581, Public Law 89-154, Congressional Record III, 89th Congress.



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