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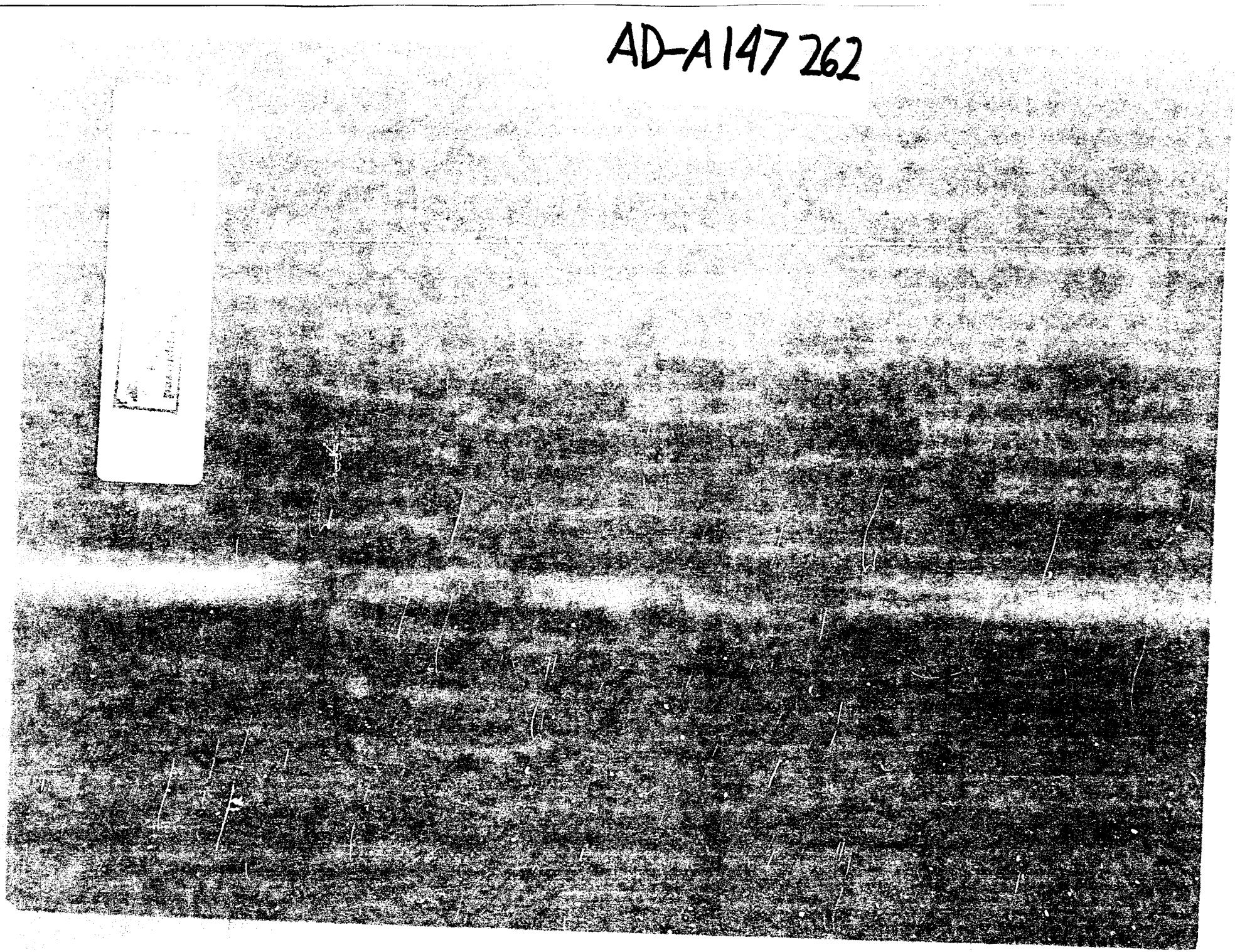

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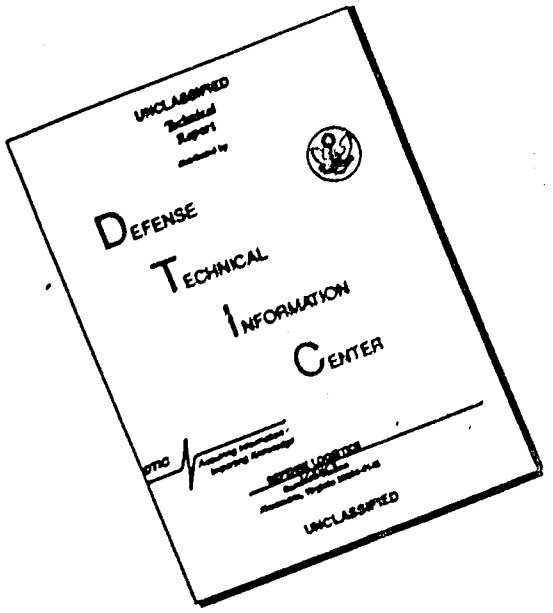

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South Grand River
Pomme de Terre River
Sac River
Bates County
Benton County
Cass County
Cedar County
Henry County
Hickory County
St. Clair County
Vernon County

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report describes reconnaissance survey for prehistoric cultural resources within the 50 year flood easement lands associated with the Harry S. Truman Dam and Reservoir, an area which crosscuts two major physiographic provinces, the Ozark Plateau and the Osage Plains.

Primary project goals were to survey a 15% sample of the study area, determine the types of sites likely to be present, make estimates concerning the number and distribution of sites, assess the probable impacts of the project on the resources, and establish priorities for additional survey and testing.

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Thirty-four previously unrecorded sites were located and there were 86 known sites in the study area. The majority of the identified components are associated with Archaic and Woodland cultures. One protohistoric site in the area, an Osage Indian village was later used by Europeans as a trading post.

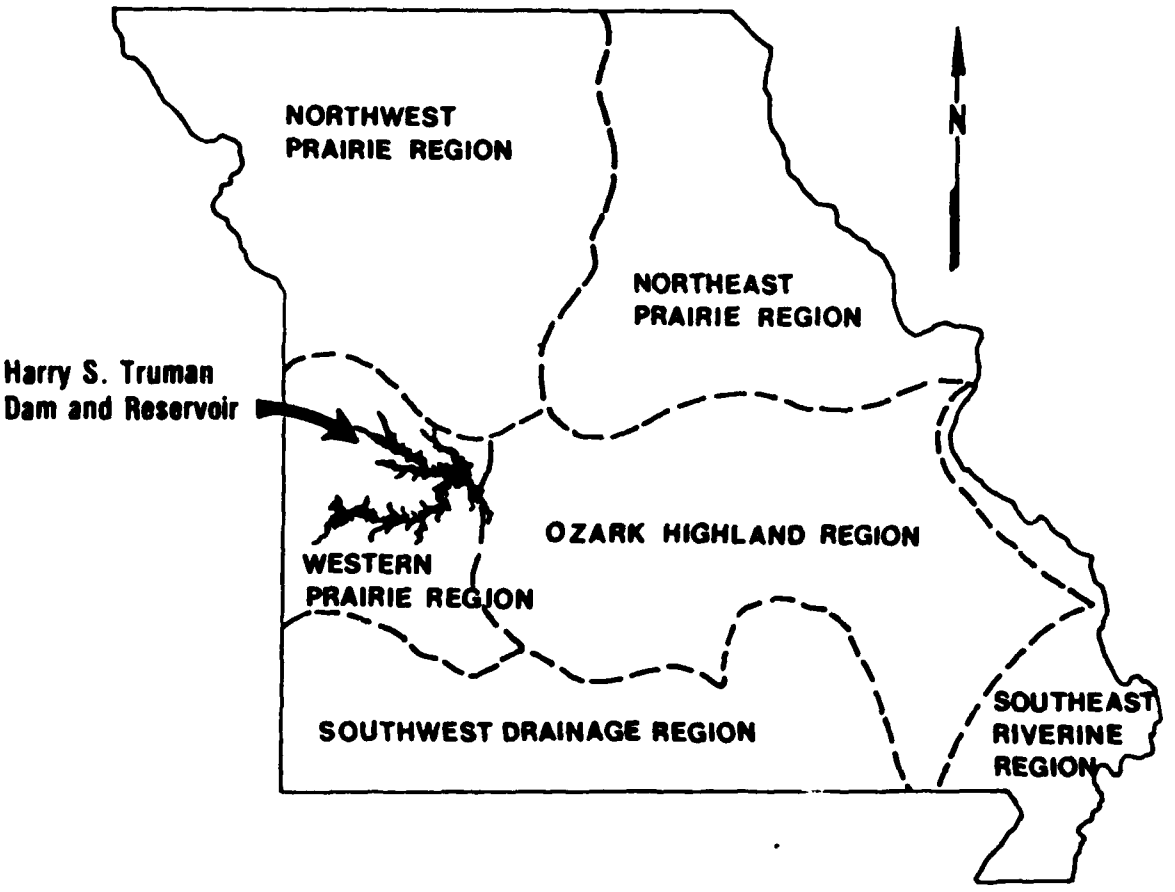
Estimates of the total number of prehistoric sites likely to be present in the entire study area range from 275 to nearly 2,000. Reconnaissance data indicate that there are more sites per square mile in the Ozark Plateau than in the Osage Plains.

US Army Corps
of Engineers
Kansas City District

Harry S. Truman Dam and Reservoir, Missouri

Iroquois Research Institute
Fairfax, Virginia

Archaeological Reconnaissance in the 50 Year Flood Easement Lands



January 1983

DACW41-79-C-0073

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ABSTRACT

A reconnaissance survey for prehistoric cultural resources within the 50 year flood easement lands associated with the Harry S. Truman Dam and Reservoir, located in southwestern Missouri, was conducted by Iroquois Research Istitute under a contractual agreement with the U.S. Army Corps of Engineers, Kansas City District. The study area crosscuts two major physiographic provinces, the Ozar Plateaus and the Osage Plains.

The primary goals of the project were to survey a 15% sample of the study area, determine the types of sites likely to be present in the study area, make estimates concerning the number and distribution of sites within the entire study area, assess the probable impacts of the project on the resources, and establish priorities for additional survey and testing. The study methods included a review of published literature, a review of state and federal archival records, field examination of selected portions of the study area, study of privately owned artifact collections, and consultation with archaeologists having a research interest in the Ozarks and the eastern Plains.

Thirty-four previously unrecorded sites were located during the field investigations, and there are currently 86 known sites in the study area. Although most sites could not be associated with a particular prehistoric period or culture, the majority of the identified components are associated with Archaic and Woodland cultures. A few late prehistoric components were located, but their association with either Mississippian or Plains Village cultures is uncertain. There is one protohistoric site in the area, an Osage Indian village which was later used by Europeans as a trading post.

Estimates of the total number of prehistoric sites likely to be present in the entire study area range from 275 to nearly 2,000. The reconnaissance data indicate that there are more sites per square mile in the Ozark Plateaus than in the Osage Plains.

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INTRODUCTION

Scope of the Present Study

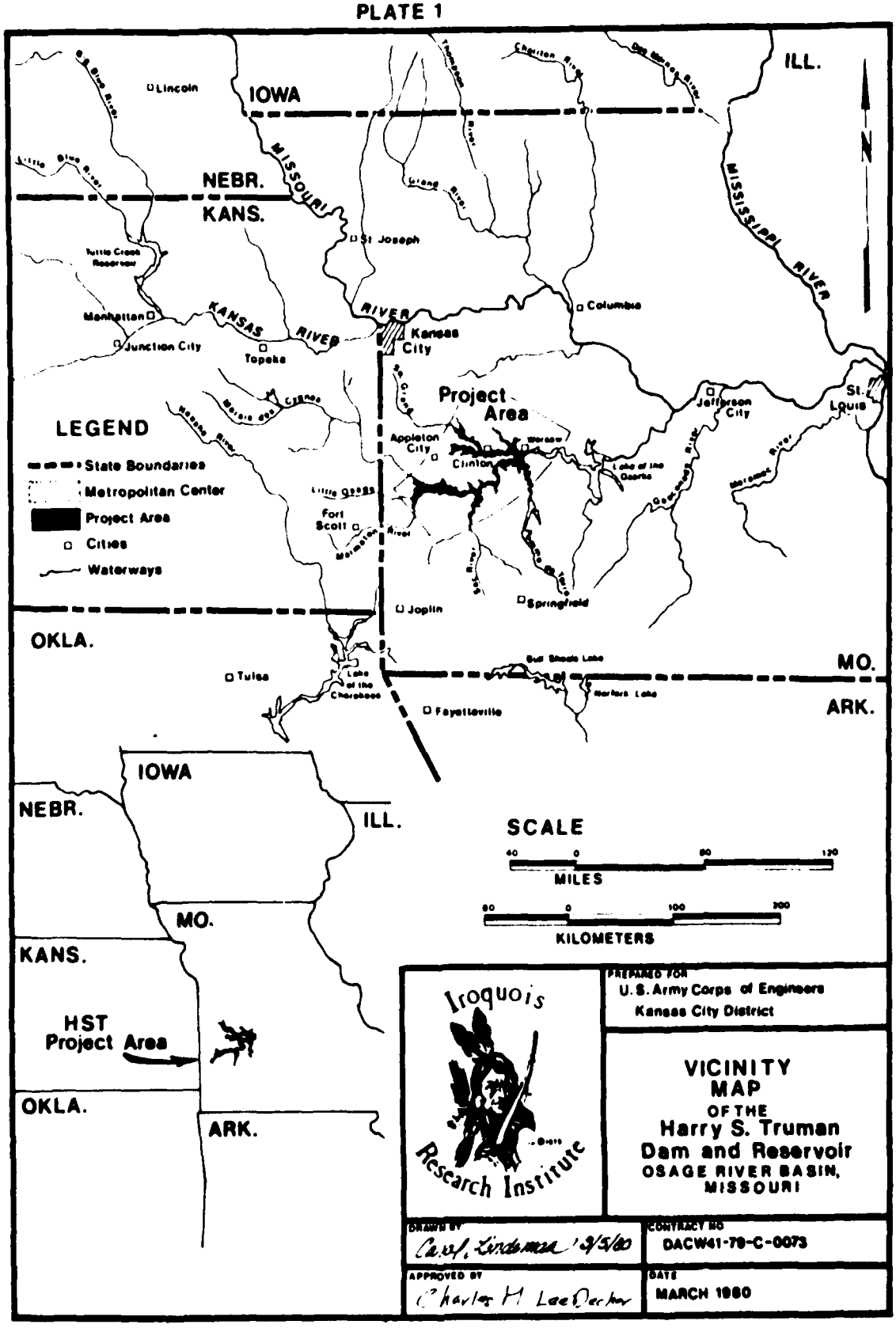
The present study is a reconnaissance survey for prehistoric cultural resources of the easement lands between 222.8 and 226.2 meters elevation (731 to 742 feet) at the Harry S. Truman Dam and Reservoir project, Missouri (Plate 1). This project was performed by Iroquois Research Institute of Fairfax, Virginia under a contractual agreement with the U.S. Army Corps of Engineers, Kansas City District. In accordance with Contract DACW41-79-C-0073 (Appendix A), this investigation included a literature search, a records review, and on-the-ground surface examination of portions of the study area. The field investigations were limited to a 15% sample of the total study area while the records review was conducted for the entire study area. The reconnaissance level of cultural resource investigation is defined by the Corps of Engineers' guidelines "Identification and Administration of Cultural Resources" (36 C.F.R. 305) and by the Office of Historic Preservation, Missouri Department of Natural Resources (MOHP) in nearly identical terms:

> A literature search and records review plus an on-the-ground surface examination of selected portions of the area to be affected, adequate to assess the general nature of the resources probably present and the probable impact of alternative plans under consideration (33 C.F.R. 305.4).
>
> A literature search and records review plus an on-the-ground surface examination of limited portions of the area to be affected, adequate to assess the general nature of the resources probably present and the probable impact of a project (MOHP 1978:11).

A prenegotiation meeting was held in Kansas City in late March 1979 to review the scope of work, and negotiations were held over a period from March to May 1979. After the contract was signed in early June, a research design (Iroquois Research Institute 1979a) was prepared and submitted in late June to the Corps of Engineers and the Missouri Department of Natural Resources, Office of Historic Preservation. After reviews of the research design were received, a final research design (Iroquois Research Institute 1979b) was prepared and submitted to the Corps of Engineers and the Missouri Office of Historic Preservation in August 1979. The field investigations for this project were performed between early July and late September 1979.

Because of the preliminary nature of the scope of investigation and because the study area consists entirely of privately-owned land, no detailed investigations were conducted at particular sites and no artifacts were removed from the field. The study required field inspection of a small sample of the total area of investigation. This formed the basis for an evaluation of the

PLATE 1


IOWA
ILL.
NEBR.
KANS.
MISSOURI
MISSISSIPPI RIVER
KANSAS RIVER
Lincoln
St Joseph
Manhattan
Junction City
Topeka
Kansas City
Columbia
Jefferson City
St. Louis
Project Area
Appleton City
Clinton
Fort Scott
Joplin
Springfield
OKLA.
Tulsa
MO.
ARK.
Fayetteville
LEGEND
State Boundaries
Metropolitan Center
Project Area
Cities
Waterways
N
IOWA
NEBR.
ILL.
MO.
KANS.
HST Project Area
OKLA.
ARK.
SCALE
40 0 80 120
MILES
80 0 100 200
KILOMETERS
Iroquois Research Institute
PREPARED FOR
U.S. Army Corps of Engineers
Kansas City District
VICINITY MAP
OF THE
Harry S. Truman Dam and Reservoir
OSAGE RIVER BASIN, MISSOURI
DRAWN BY
Carol Lindeman 3/5/80
CONTRACT NO
DACW41-79-C-0073
APPROVED BY
Charles H Lee Archer
DATE
MARCH 1980

types and frequency of prehistoric resources which are likely to exist within the defined study area. The major anthropological research objectives of the project were to study the culture history, settlement patterns, and patterns of aboriginal lithic resource utilization within the project area.

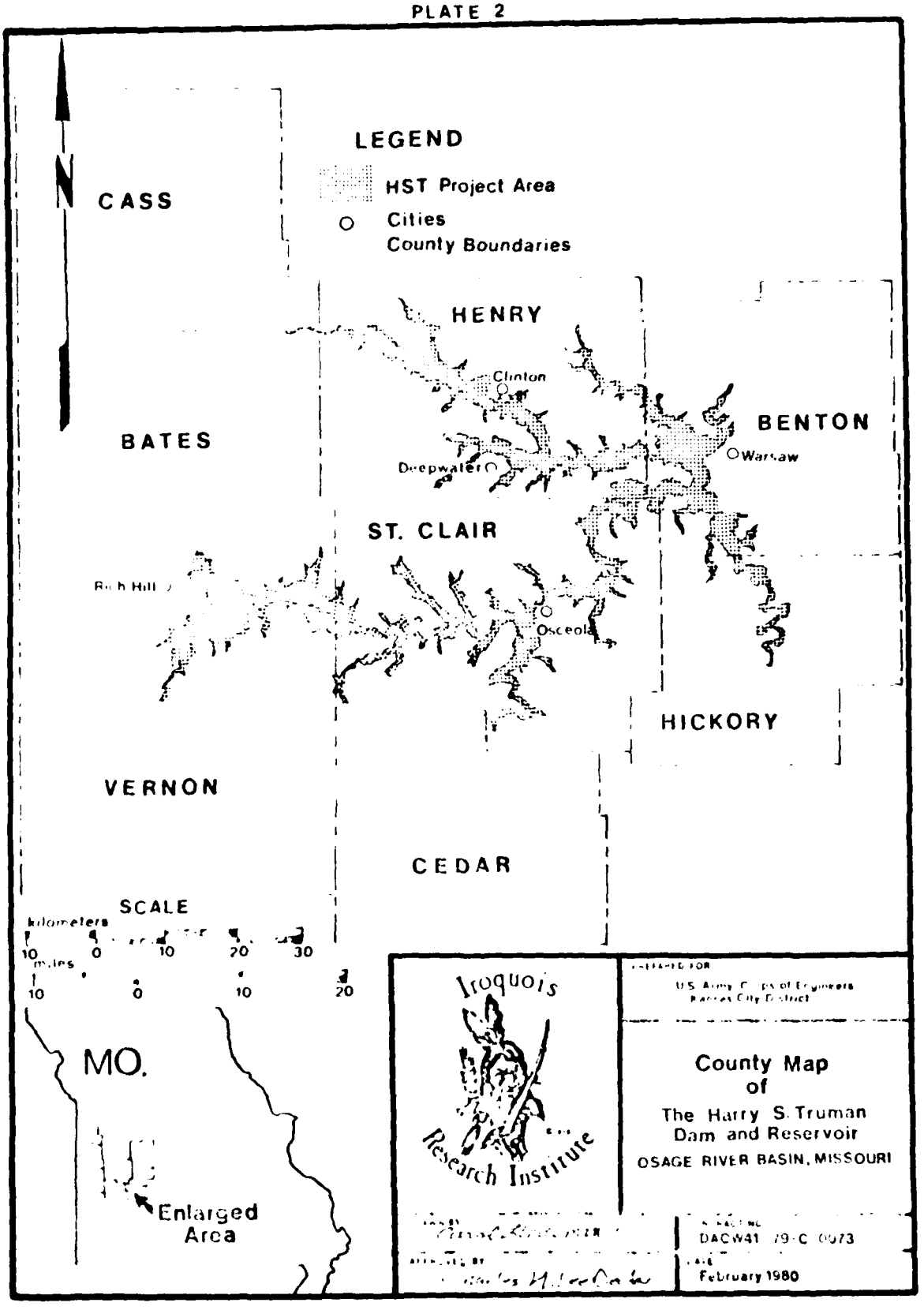
This study is authorized under the National Historic Preservation Act (Public Law 89-665), the Reservoir Salvage Act (Public Law 86-523), the Preservation of Historical and Archaeological Data Act (Public Law 93-291), and Executive Order 11593, "Protection and Enhancement of the Cultural Environment."

Project Location and Description

The Harry S. Truman Dam and Reservoir project (HST) is located in southwestern Missouri (Plate 1). The project includes approximately 67,180 hectares (166,000 acres) of government-owned land and an additional 44,516 hectares (110,000 acres) of flood easement land. Currently under construction, the dam is located on the Osage River near the town of Warsaw at the headwaters of Lake of the Ozarks. At the normal pool level of 215 meters (706 feet) above mean sea level, the reservoir will cover 22,493 hectares (55,579 acres) of land with a shoreline length of 1,541 kilometers (958 miles). The crest of the flood control structure is at an elevation of 225.4 meters (739.6 feet).

The study area for this project is the 50 year flood pool which is located between the 223 meter (731 foot) and 226 meter (742 foot) elevations above mean sea level. This area includes approximately 24,282 hectares (60,000 acres). The entire 50 year flood easement area is spread out over an area which measures roughly 96 kilometers (60 miles) east-west and 80 kilometers (50 miles) north-south and includes portions of eight counties: Bates, Benton, Cass, Cedar, Henry, Hickory, St. Clair, and Vernon (Plate 2).

PLATE 2


LEGEND
HST Project Area
Cities
County Boundaries
N
CASS
BATES
HENRY
Clinton
Deepwater
BENTON
Warsaw
ST. CLAIR
Osceola
HICKORY
VERNON
CEDAR
SCALE
kilometers
10 0 10 20 30
miles
10 0 10 20
MO.
Enlarged Area
Iroquois Research Institute
PREPARED FOR
U.S. Army Corps of Engineers
Kansas City District
County Map
of
The Harry S. Truman
Dam and Reservoir
OSAGE RIVER BASIN, MISSOURI
DACW41 79-C 0073
February 1980

ENVIRONMENTAL SETTING

Physiography

According to the USGS map of the physical divisions of the United States (1946), the survey area covers parts of two major physiographic provinces: about 73% of the survey area falls within the boundaries of the Osage Plains and the remainder is within the Ozark Plateaus (Plate 3; Table 2).

Most of the survey area which is located in the Ozark Plateaus is within the Springfield Plateau subdivision. The undissected uplands of this area rise to elevations slightly above 290 meters M.S.L. The gently rolling uplands rise as much as 90 meters above the valley floors. Adjacent to the streams, the topography is dissected by steep to moderate slopes with as much as 55 meters of relief. To the east, the Salem Plateau possesses higher relief and elevations. It is separated from the Springfield Plateau by the poorly developed Eureka Springs Escarpment (Brezt 1965; Ward and Thompson 1977).

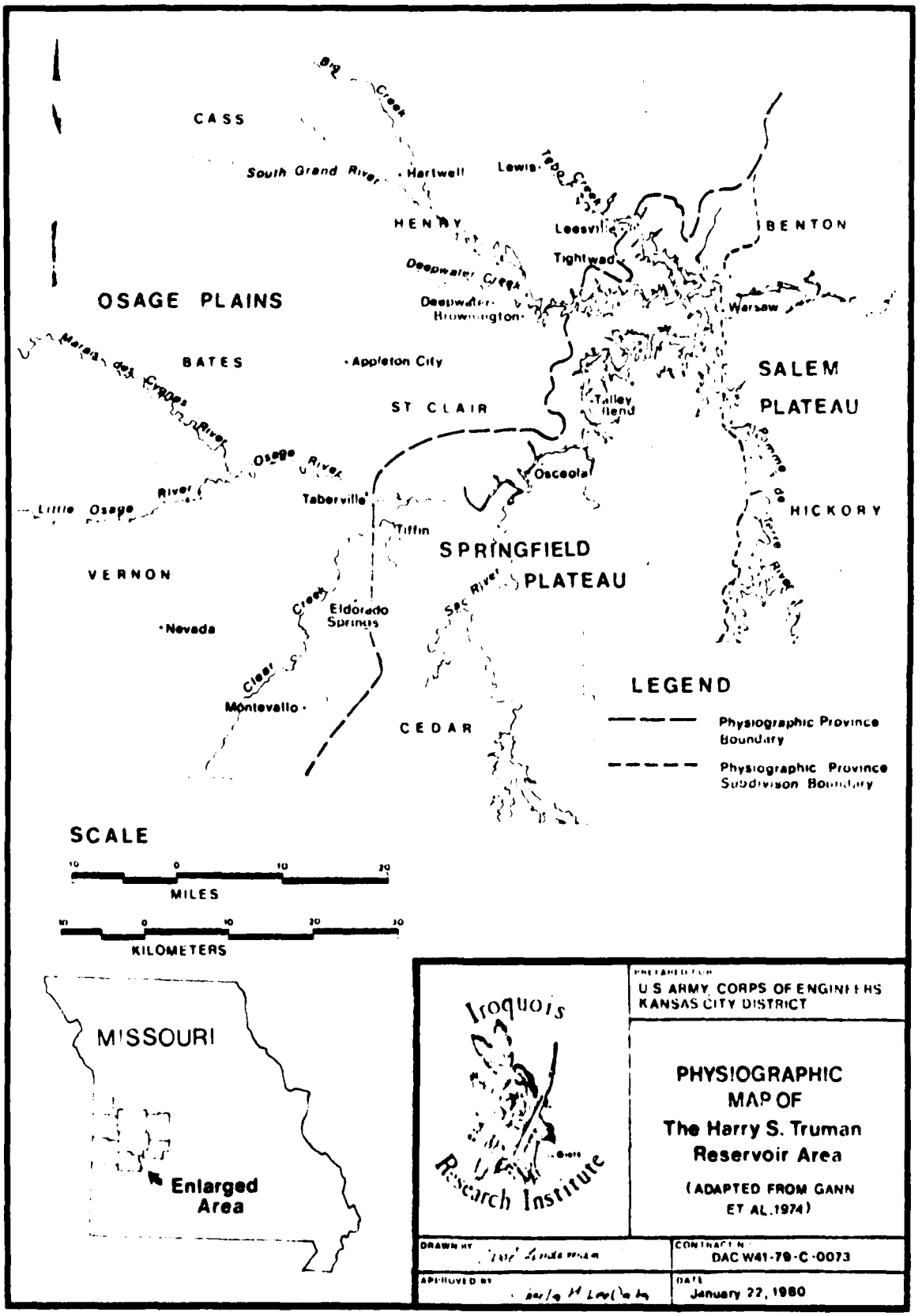
Within the Ozark Plateaus, the channels of the Osage, South Grand, Pomme de Terre, and Sac Rivers are deeply incised into bedrock. Well developed, entrenched meanders with asymmetrical valley walls known as slip-off slopes are present. Prominent terraces not associated with the floodplain are lacking. Only the gravel-veneered remnants of former valley floors, called straths, are present as dissected flats within meander loops and adjacent upland. Abandoned, incised meander loops occur sporadically along the major river courses and along some tributaries such as Tebo Creek. Rock shelters and caves are present along the precipitous bedrock banks and valley walls of the rivers and streams (Brezt 1965; Tarr 1924).

In the transition zone between the Ozark Plateaus and Osage Plains, the valleys are just under one kilometer wide. The valley walls are planed straight from the lateral movement of meander loops. Prominent terrace-like features are very rarely present.

The Osage Plains is a scarped plain of variable relief. The plains bevel gently inclined sandstones, shales, and limestones forming rolling, undulating, and occasionally hilly plains. The Osage Plains possess a local relief of 45 meters and a regional relief within a four county (Henry, St. Clair, Vernon, and Bates) area of 100 meters. Considerable areas of poorly drained, flat upland which exist within the plains are outside the survey area (USDA 1910, 1977).

In contrast with the Ozark Plateaus, in the Osage Plains the major rivers and some of their tributaries are freely meandering. The major rivers occupy alluvial valleys 1.5 to 2.5 kilometers wide incised into the surrounding plains. Oxbow lakes (abandoned meander loops) are very common. Fragments of loess-covered terraces or benches are recognizable on 1:4,800 and 1:24,000 topographic maps. Caves and rock shelters are absent in the Osage Plains.

PLATE 3


CASS
HENRY
BENTON
OSAGE PLAINS
BATES
ST CLAIR
SALEM PLATEAU
HICKORY
VERNON
SPRINGFIELD PLATEAU
CEDAR
Hartwell
Leesville
Tightwad
Deepwater
Warsaw
Appleton City
Osceola
Taberville
Tiffin
Eldorado Springs
Nevada
Montevallo
South Grand River
Big Creek
Lewis and Clark Creek
Deepwater Creek
Marais des Cygnes River
Osage River
Little Osage River
Clear Creek
Sac River
LEGEND
Physiographic Province Boundary
Physiographic Province Subdivison Boundary
SCALE
10 0 10 20
MILES
30 0 10 20 30
KILOMETERS
MISSOURI
Enlarged Area
Iroquois River Research Institute
PREPARED FOR
U S ARMY CORPS OF ENGINEERS
KANSAS CITY DISTRICT
PHYSIOGRAPHIC MAP OF
The Harry S. Truman Reservoir Area
(ADAPTED FROM GANN ET AL.,1974)
DRAWN BY
CONTRACT N
DAC W41-79-C-0073
APPROVED BY
DATE
January 22, 1980

Hydrology

Stream flow in the survey area is generally toward the east and northeast. However, the Pomme de Terre River and many other tributaries of the Osage River flow from the south. The Osage River itself drains entirely into the Missouri River (USDA 1976, 1977).

The stream flow of the rivers is highly variable. The Osage River at Osceola for the years 1931 to 1970 had a maximum flow of 12,400 cubic meters per second, a minimum flow of 0.3 cubic meters per second, and a mean flow of 430 cubic meters per second. The South Grand River for the period 1922 to 1970 at Brownington varied from zero to 5,430 cubic meters per second. Its mean stream flow for the period was 90 cubic meters per second. The discharge of these and other streams is less than mean flow 80% of the time. In the Osage Plains the discharge of the streams depends on the weather since the impermeable bedrock lacks appreciable ground water storage. In the Ozark Plateaus, however, ground water storage exists in the cavernous limestones and dolomites, and springs serve as the primary source of base flow for rivers and streams (Gann et al. 1974).

The 10 year flood stage of the South Grand River reaches an elevation of 216 meters (710 feet) which is a little more than 5 meters above the bankfull stage. The 10 year flood stage of the Osage River at Osceola is 217 meters (712 feet), 3.3 meters above the bankfull stage (Ibid.).

The distribution of springs in the project area is uneven. Springs in the Osage Plains are rare and small, generally yielding less than 38 cubic meters (10,000 gallons) per day. In the Springfield Plateau there are many springs of intermediate size with discharge of 38 cubic meters (10,000 gallons) to 380 cubic meters (100,000 gallons) per day. Near the border between the Osage Plains and Springfield Plateau the springs are small. Large springs are present in the Salem Plateau (Ibid.).

Bedrock Geology

Within the survey area, bedrock consists of four sedimentary rock sequences. From oldest to youngest these are:

a. Dolomite, sandstone, and sandy, cherty dolomites that belong to the Ordovician System;

b. Limestone and cherty limestone of the Mississippian System;

c. Shale and sandstone with minor limestone and coal of the Pennsylvanian System; and

d. Alternating shale and limestone with minor sandstone of the Pennsylvanian System (Ward and Thompson 1977).

The distribution of the various geological units is illustrated in Plate 4.

The sedimentary strata all dip gently toward the northwest. Faulting has altered the outcrop pattern in places. The sedimentary rocks of the Pennsylvanian System rest on an ancient erosional surface cut into the underlying Mississippian strata.

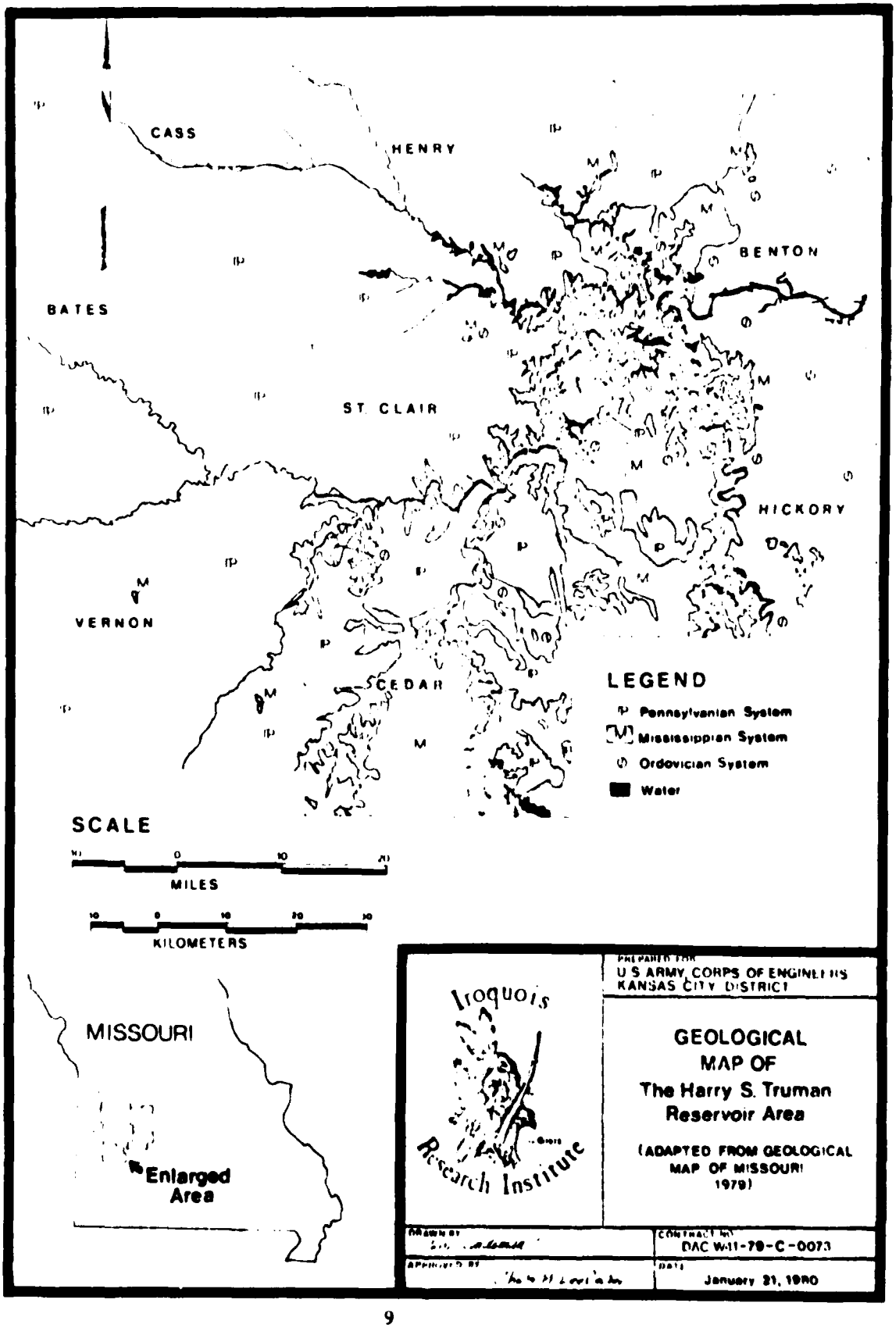
The Ordovician System consists of four formations: Gasconade Dolomite, the Roubidoux Formation, Jefferson City Dolomite, and Cotter Dolomite. Brown to buff dolomite and cherty dolomite predominate in all four formations. The formations differ from one another in the amount of quartz sand present as sandstone beds or as free grains in the dolomite. There is also some variation in the amount of chert present. The Roubidoux Formation contains thick, resistant beds of chert (Ibid.). Although the major outcrop of the Ordovician System is in the Salem Plateau, is it exposed along the Sac River and some of its tributaries in Cedar and St. Clair Counties. Small inliers are present between the towns of Taberville, Tiffin, and Eldorado Springs in St. Clair and Cedar Counties and 6.5 kilometers (4.0 miles) south of Deepwater in Henry County. Ordovician rocks are exposed from the east along the Osage River and its tributaries to within 5.5 kilometers (3.4 miles) of Osceola, along the South Grand River to just south of Tightwad, and along Tebo Creek east of Leesville (Plates 3 and 4) (Geologic Map of Missouri, 1979).

The Mississippian System in the project area consists of 90 meters of limestone and cherty limestone. Within the upper part, the Burlington and Keokuk limestones of the sequence are characteristically fossiliferous and this is reflected in the cherts present. The limestones of the Kinderhookian Series in the lower part of the Mississippian System contain little chert (Ward and Thompson 1977). Rocks of the Mississippian System outcrop over most of the Springfield Plateau. Small exposures are present north of Nevada, west of Montevallo, south of Deepwater, and elsewhere. Sporadic exposures occur along the Osage River and its tributaries to just past the Vernon County line. These rocks are exposed on Tebo Creek as far north as Lewis and as far west as Brownington on the South Grand River (Plates 3 and 4) (Geologic Map of Missouri, 1979).

The rocks of the Pennsylvanian System are predominately shale, with some limestone and sandstone stratified in cyclic units. The Cherokee Group of the Desmonian Series, the lower part, contains several thick sandstones with some "heavy oil" and commercial coal. The coal has been mined in this area for several years. Above the Cherokee Group there is an alternating sequence of shale and limestone with little coal. The strata consist of various groups of the Desmonian Series. No chert is present in the Pennsylvanian System except in the Kansas City Group in the very northernmost corner of Bates County (Ward and Thompson 1977).

Along the previously described Mississippian and Ordovician System outcrops, chert is available as bedrock (in situ) chert, residual chert and as redeposited, stream tansported chert in the streams and rivers that flow through

PLATE 4


CASS
HENRY
BENTON
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HICKORY
VERNON
CEDAR
LEGEND
Pennsylvanian System
Mississippian System
Ordovician System
Water
SCALE
MILES
KILOMETERS
MISSOURI
Enlarged Area
Iroquois Research Institute
PREPARED FOR
U S ARMY CORPS OF ENGINEERS
KANSAS CITY DISTRICT
GEOLOGICAL MAP OF
The Harry S. Truman Reservoir Area
(ADAPTED FROM GEOLOGICAL MAP OF MISSOURI 1979)
CONTRACT NO.
DAC W-41-79-C-0073
DATE
January 31, 1980

or are downstream of outcrops of the chert-bearing formations. Chert is available in the Ozark Plateau from all three of these sources. The bluffs contain abundant in situ chert that is weathered out in relief from the limestone matrix and the talus from the bluffs contain abundant chert. In situ chert is also present in the scattered bedrock exposures along the secondary streams. The upland slopes and plateaus are covered with residual chert-bearing soils and contain frequent, thin, chert gravel straths (Haynes 1977; USDA 1976). Chert is also noted in the residual soils of cherty limestones (USDA 1976). Redeposited chert occurs as gravel in stream and river alluvium. Haynes (1976, 1977) has recorded the presence of chert-pebble gravel in all of the gravel-bearing alluvium and colluvium deposits he described along the Pomme de Terre River.

The in situ chert in bluffs and secondary stream banks is easily accessible in part but is soon exhausted. The supply depends on the slow weathering of the limestone matrix. The associated chert in the talus slopes probably is too thoroughly fractured and shattered to be useful (Meyers 1970).

Along the major rivers, chert generally occurs at the base of the point bar sediments which themselves are covered with overbank sediments (Haynes 1977). Except possibly for the chert in active point bars, the chert in these sediments is unavailable for use. In the secondary streams, abundant and seasonally replenished chert is easily available (Haynes 1976; Meyers 1970).

The uplands contain abundant and accessible chert in the straths and residual soils. The chert above the shallow frost line in these soils is often too fractured to be useful. However, the supply which lies below it is inexhaustible even though not replenished (Meyers 1970; Ward and Thompson 1977). The upland residual and strath gravels, together with the secondary stream alluvium, would have been the best sources of chert for artifacts in the Ozark Plateaus region during prehistoric times.

Except for small outcrops of the Mississippian and Ordovician Systems, the only source of chert in the Osage Plains is the major river alluviums. Some of this chert was possibly derived from chert-bearing Pennsylvanian rocks to the west. However, the chert in the alluvium of rivers such as the Osage and South Grand is for the most part buried under fine-grained overbank and sandy point bar deposits and was unavailable for use by prehistoric peoples (Ward and Thompson 1977).

Only 10 formations in the study area contain significant amounts of workable chert. The chert-bearing formations of the Mississippian System are the Warsaw, Burlington, Keokuk, Elsey, Reed Springs, and Pierson Formations. In the Ordovician System, the Gasconade Dolomite, Jefferson City Dolomite, Cotter Dolomite, and Roubidoux Formation contain workable chert. The Pennsylvanian System contains no significant chert resources in the survey area. From northwesternmost Bates County north to Kansas City, however, cherts in the

Pennsylvanian Kansas City Group have been reported (Groves 1979a; Ward and Thompson 1977).

For purposes of rough field identification, the cherts of each formation were characterized on the basis of color, inclusions, luster, and texture (see Table 1). A more detailed description and classification was not attempted because of a lack of outcrop data. The chert types identified are for informal and preliminary usein this report only; much work would need to be done before they could or should be used as formal chert types.

TABLE 1

PRELIMINARY FIELD CLASSIFICATION OF CHERT TYPES
IN THE SURVEY AREA

[illegible] BEARING FORMATION	[illegible]	COLOR*	INCLUSIONS	[illegible]
[illegible] Formation	[illegible]	Mottled grey	Crinoids, bryozoa, and spicules	[illegible]
[illegible] and [illegible] Formations	[illegible]	Generally white, can be blue or red to the south	Abundant crinoid columnals, some brachipods, and other fossils	[illegible]
[illegible] Formation	[illegible]	Blue, blue-grey, or grey mottled	Spicules	[illegible]
[illegible] Springs Formation	[illegible]	Brown or grey	Some spicules	[illegible]
[illegible] Formation	[illegible]	Brown or grey	None?	[illegible]
[illegible] Limestone	[illegible]	Variable	Oolites (some sand centered)	[illegible] and granular
[illegible] Limestone	[illegible]	Mottled and variable	Oolites (some sand centered), sand, dolomite rhombs, and spicules	[illegible]
[illegible] Formation	[illegible]	Mottled grey and variable	Oolites (some sand centered) and sand	[illegible]
[illegible] Dolomite	[illegible]	Mottled grey or white	Oolites (some up to 1 millimeter or deformed) and spicules	[illegible]

*[illegible] Munsell color.

As can be observed from Table 1, many of the cherts in the Ozark Plateaus are very similar in gross hand specimen characteristics. Considering the variation that can occur within a single formation, the assignment of cherts to individual formations without better petrographic, trace element, and hand specimen information might be inaccurate (Luedtke 1979). However, the assignment of oolitic cherts to the Ordovician System and crinoidal cherts to the Burlington or Keokuk Formations is relatively certain (Groves 1979a, 1979b; Hank Groves, personal communication; Paul Knauth, personal communication).

Quaternary Geology

The Quaternary sediments and soils of the Ozark Plateaus have been studied only in the Lower Pomme de Terre River Valley by Haynes (1976, 1977) and Johnson (1977). Haynes (1977) recognized three main terrace levels and undifferentiated strath gravels. Haynes (1977) and Johnson (1977) agree that there are three main terrace levels but disagree on the exact association of these terraces with the underlying informal rock-stratigraphic units of Haynes (1976).

The oldest sediments found by Haynes are the strath gravels. They are relatively thin (about 1 meter thick) layers of stream rounded, tan gravels which occur on the relatively higher and flat surfaces of the Paleozoic bedrock. So far they have been reported only from the Ozark Plateaus and not from the Osage Plains (Haynes 1976, 1977).

The highest and oldest of the terraces in the Ozark Plateaus is Terrace T-3. It rises approximately 6 to 7 meters above Terrace T-2 and is underlain by the reddish brown, subrounded, chert-pebble gravel of the Breshear Formation which fills part of a relict meander of the Pomme de Terre River. It overlies residual clay and chert and is covered by colluvium associated with Terrace T-2. Its surface and sediments predate human occupation of the area (Haynes 1977).

The next lowest terrace is Terrace T-2. Its surface is approximately 3 to 4 meters above Terrace T-1. The surface is underlain by interbedded grey clay, silt, and thin gravel lenses. It predates 32,000 B.P. to 29,000 B.P. and therefore probably predates the earliest human occupation of the project area (Haynes 1976, 1977).

The lowest and youngest terrace is Terrace T-1. It is a compound terrace composed of Terraces T-1a and T-1b. Brown clayey silt and sand of the Rogers Alluvium with beds of chert and rotten dolomite gravel underlie the terraces. The period of T-1a net aggradation was from 28,000 B.P. to 26,000 B.P. and then from 23,000 B.P. to 16,500 B.P. The river downcut sometime between 13,000 B.P. and 11,000 B.P. Terrace T-1b then aggraded between 10,500 B.P. and 6000 B.P. and possibly remained stable until it was abandoned sometime before 1000 B.P. The present day floodplain is underlain by greyish brown clayey silt, sand, and cherty gravel. It was aggraded between 800 B.P. and 400 B.P. (Haynes 1976, 1977).

Within the Osage Plains, no studies of the Quaternary sediments and landforms have been undertaken in the survey area, except for the soil surveys of

Bates, Henry, and Vernon Counties (USDA 1910, 1976, 1977). A close inspection of the 1:4,800 Corps of Engineers maps and 1:24,000 USGS topographic maps reveals the presence of possible terrace levels within the valleys of the South Grand, Osage, and Little Osage Rivers.

The terraces occur as dissected flats preserved along the valley wall, much like the strath terraces of the Ozark Plateaus. An exception is the three terrace fragments that rise out of the valley floor in Sections 13 and 24 of T38N,R30W. Three possible terrace levels dipping to the east can be tentatively reconstructed from the fragmentary and scattered surface remnants. One is above, another is partially in, and the third is entirely within the easement area. However, the existence of these terraces can be confirmed only by additional field work.

The terraces are presently tentatively considered to be true terraces and not bedrock supported benches for two major reasons. First, the terrace levels slope to the east almost parallel with the floodplain of the Osage, Little Osage, and South Grand Rivers. If they were bedrock benches, these surfaces would dip upstream to the west and would not be parallel to the surface of the floodplain. Furthermore, the field observations and soil surveys on the terraces and their slopes have not yielded evidence for the presence of a lithified, bench-forming stratum or the weathered rubble from such a stratum.

All the terraces are described as having deep soils with loess over "shaley material" or "shale residuum" parent material (USDA 1976, 1977). However, the "shaley material" and "shale residuum" probably are weathered alluvium of local origin. The weathered alluvium would be indistinguishable from the residuum and slopewash that covers the adjacent slopes. The presence of loess indicates that the slopes and terraces are Woodfordian or older.

Although it is impossible to precisely correlate these terraces with those identified and described by Haynes (1976, 1977), it can be said that, like Terraces T-2 and T-3, they predate occupation of the area by a human population. It is very improbable that stratified or buried sites will be found in these three terraces. Rather, the floodplain and low, indistinct terraces associated with it will contain buried and stratified sites. However, surface sites of Paleo-Indian and more recent cultures can be expected on the three terraces and their slopes.

Buried Archaic and Dalton Period occupations along the Osage River are evidence that the river aggraded during the Late Pleistocene; Archaic materials at the Wolf Creek site occur at a depth of 2.5 meters while the Dalton remains at the Hand site are 2 meters below the surface (Piontkowski 1977). In Benton County at the Muller site, Woodland and Late Archaic cultural material was encountered to depths of 3.2 meters. Even at that depth, sterile sediment had not been encountered (Vehik 1974). The sediments at these three sites correspond to what Haynes (1976) has identified as Rodgers Alluvium. The sites are beneath the present day floodplain or in low-lying, indistinct terraces associated with the floodplain. This suggests that sites of early prehistoric cultures are buried within the floodplain and its terraces.

Soils

The distribution of the soils in the project area is known only from published soil surveys which are available for Bates County (USDA 1910), Cedar County (USDA 1909), Henry County (USDA 1976), and Vernon County (USDA 1977). The soil surveys cover primarily the Osage Plains. Soils there differ considerably from the soils of the adjacent Ozark Plateaus; the prairie soils, Mollisols, dominate the Osage Plains while the older and more weathered forest soils, Alfisols and Ultisols, dominate the Ozark Plateaus (USDA 1975). The older soil surveys for Bates and Cedar Counties (USDA 1909, 1910) are not used in the discussion that follows because of the gross scale and inaccuracy of their mapping as well as their use of obsolete definitions of soil types which have since been narrowed and changed.

Due to differences in slope, bedrock, and surficial geological materials, the climate and vegetation associations have produced soils with a wide range of characteristics in the project area. The limestones, dolomites, and shales which predominate in the area have weathered to form soils that are predominantly silty or clayey in texture and contain residual chert. The small areas of sandstone and conglomerate have given rise to localized areas of loamy and sandy soils. Residual soils over sandstones and shales on slopes are usually shallow and produce relatively sparse plant growth. Windborne and deposited silt and clay, called loess, lightly blanket the surface of the northern part of the study area in places. This material was carried over from the Missouri River during the periods of continental glaciation (Ward and Thompson 1977; USDA 1976, 1977).

The soils in Vernon and Henry Counties can be divided into two main groups, the residual soils and the alluvial soils. These groups can be further subdivided into various series.

In Henry County along the South Grand River, Big Creek, and Deepwater Creek, there are more than 11,000 acres of alluvial lands in the HST 50 year flood easement lands. The alluvial soils in these areas are in the Lightning, Osage, Quarles, Urich, Muldrow, and Verdigris series (USDA 1976). The first four of these series are poorly drained and make up over half of the study area in the county. Muldrow is somewhat poorly drained and occurs in small amounts. The moderately well drained Verdigris soil occurs adjacent to stream channels and on natural levees. It is estimated to make up less than 10% of the easement area in Henry County.

The Osage and Verdigris soil series are also common on floodplains in Vernon County (USDA 1977). In addition to these two series, the Lanton, Hepler, Radley, Dubbs, and Cleora series also occur in alluvium in Vernon County. The Lanton series is poorly drained and developed under native vegetation of water-tolerant hardwood trees. The Hepler series is somewhat poorly drained and occurs on floodplains between natural levees and the upland. The Radley soil series is well drained and developed in the silty alluvium of the bottomland. The Dubbs and Cleora soils are loamy and well drained but occupy a smaller acreage in the study area than the fine textured, poorly drained soils. The Lanton, Cleora, Radley, and Verdigris soil series have poorly developed soil horizons relative to the other alluvial soils.

The residual soils found in the study area are generally well drained, moderate to shallow residuum soils whose textures are determined by the underlying bedrock. Two exceptions are the Mayes and Zaar soil series which are deep, poorly drained soils present on the flat uplands. Very small proportions of these soils occur in the study area. The Barden, Deepwater, Hartwell, and Parsons soil series have a loess layer overlying the bedrock residuum and possibly weathered alluvium in rare cases. The surfaces in which these soils are developed are old and stable. Although stratified and buried sites are very unlikely, surface sites from as early as the Paleo-Indian Period could be expected to occur on these loessal soils. The age of the surface of the other soils could be quite variable due to slope erosion (USDA 1976, 1977).

Johnson (1977), using the terrace definitions developed by Haynes (1976, 1977) conducted a study of the soils and soil-geomorphic relationships in the Lower Pomme de Terre River Valley in connection with cultural resource surveys of the Harry S. Truman Dam and Reservoir Project. He inventoried the soils and established the relationship between soils and the occurrence of particular types of cultural sites in Benton and Hickory Counties. His conclusions are as follows:

1) Buried sites and artifacts occur only in the deposits of terraces covered by Fluvents and Ochrepts, respectively, the floodplain and T-1 Terrace (Haynes 1976) of the Pomme de Terre River;

2) In situ Archaic and Paleo-Indian cultural material will not be found in the Holocene floodplain sediments and soils; and

3) No Woodland materials should be found beneath the upper 50 centimeters of the Ochrept profiles and beneath the surface of the T-2 Terrace (Haynes 1976, 1977).

Climate

The survey area has a warm, continental climate characterized by frequent changes in humidity, temperature, wind, and precipitation. The winters are short and mild with spells of below freezing weather lasting only a few days. Thunderstorms and extended dry spells are common during the long and warm summers. Spring and autumn weather is highly variable (USDA 1976, 1977).

Hot, moist Tropical Maritime air masses from the Gulf of Mexico and warm, dry Pacific air masses from the west dominate the area and determine the regional climate and vegetation. The Pacific air masses bring warm, dry weather, often as extended dry spells. Thunderstorms and other precipitation are associated with the Tropical Maritime air masses. Infrequent intervals of cold, dry Artic air in the winter create spells of dry and often below freezing weather. Precipitation often occurs along the front separating the Arctic air from the Tropical Maritime air. Very rare incursions of Tropical Continental air masses from the southwestern United States bring periods of very hot and dry weather to the area (Bryson 1966).

Appleton City, Missouri is located 18 kilometers (11 miles) northwest of the study area. (Plate 3). Weather records for this city from 1951 to 1974 are typical for the part of the survey area that lies in the Osage Plains. January is the coldest month with an average daily high of 5.5°C (42°F). The hottest months are July and August with an average daily high of 33°C (91°F). The mean annual precipitation is 100 centimeters (39.4 inches) and the mean monthly precipitation ranges from 3.6 centimeters (1.4 inches) in January to 11.9 centimeters (4.7 inches) in June. An average of 56.4 centimeters (22.2 inches) of snow and sleet falls during the year (U.S. Department of Commerce 1978).

The climate of the adjacent Ozark Plateaus differs slightly from that of the Osage Plains. Winds are more subdued and variable. The average annual precipitation is 102 centimetrs (40.2 inches). Water loss from evapotranspiration is the same for both areas, being around 74 centimeters (29 inches) annually with the remainder becoming runoff. The rugged topography creates a wide variety of microenvironments with varied microclimates (Gann et al. 1974; U.S. Department of Commerce 1978).

Ecosystems

The project area lies within a broad transitional zone between two vegetatively defined ecosystems, the oak-hickory forest (Quercus-Carya) and the tall grass prairie (Andropogon-Panicum-Sorghastum). Although the ecosystems are not sharply separated, the rolling to hilly topography of the Ozark Plateaus is characterized by widespread forest while the flatter Osage Plains is characterized by prairie and forested stream margins and valleys. Climatic factors (principally precipitation), fire, and geology (topography, bedrock, and soils) determine the type of vegetation present within the study area (F. King 1977).

The broad transition zone between the oak-hickory forest and the tall grass prairie contains a large diversity of fauna, as generally occurs in the transition zone between two or more diverse floral communities. During the historic period, 54 species of mammals, 22 species of amphibians, 43 species of reptiles, 98 species of fish, and numerous untallied molluscs and birds were resident to the area. Of the mammals, all but seven are still present in the area. Some of the mammals no longer present in Missouri are the grey wolf, elk, and bison. Animals of economic importance still in the area are white-tail deer, squirrel, rabbit, raccoon, wild turkey, various fish, bobwhite, and prairie chicken (McMillan 1976; Vehik 1974).

From 17,000 B.P. to approximately 12,000 B.P., the survey area was covered by a spruce forest containing scattered deciduous trees. Associated with the boreal spruce forest were megafauna such as mastodon, tapir, deer, ground sloth, giant bever, and horse. The spruce forest was replaced by some type of deciduous (oak-hickory) forest by the early Holocene (King and Allen 1977). Since then, the area has been an ecotone between prairie and deciduous forest, with periods when either prairie or forest was dominant inthe ecosystem.

During the Atlantic Climatic Period (8500 B.P. - 5000 B.P.), the climate was considerably warmer and drier than it had been previously (Wendland 1978). The result was that the forest was probably eradicated from all but the most mesic of localities and was replaced by prairie. In many places the prairie became well established and was able to prohibit forest encroachment even after the climate had ameliorated. In many places the absence of trees is probably the result of prairie fires (F. King 1977). The Atlantic climate greatly limited the diversity and distribution of edible plants. Except in the major bottomlands, the potential food resources from plants were dramatically reduced (F. King 1978). Not much is known about changes in regional fauna except at the Rodgers Shelter site where a noticeable increase in prairie animals occurs during this time period (Ahler 1971).

Approximately 5000 B.P., the present oak-hickory forest probably reestablished itself in the Ozark Plateaus of the survey area. Modern faunas which have existed until the historic period probably came into existence at that time. Remains from the Rodgers Shelter site indicate that climatic changes have caused slight fluctuations in the flora and fauna since then (McMillan 1976).

The Saba Shelter site contained the bones of 25 identifiable species, not including several species of fishes, turtles, frogs, pelecypods, gastropods, and snakes. Except for elk and bison, all are found in the survey area today. The preferred and secondary habitats of the majority of the species were forest border, barrens, bottomland forest, and oak-hickory forest. Aquatic species such as beaver and muskrat and prairie species such as bison, Eastern mole, and Plains Pocket Gopher were also found. The predominant large animal remains were white-tail deer. Overall this is suggestive of an environment much like that of today (Vehik 1974).

At the time of Euro-American settlement, the survey area and many places in the Prairie Peninsula were showing signs of forest invasion. This event has been attributed to relatively moister conditions during the neoglacial or "Little Ice Age" from 400 B.P. to 100 B.P. Also, historic settlement brought a decrease in widespread fires, so fire intolerant species such as sugar maple and red cedar have been assuming greater dominance in the forest composition recently, despite unfavorable climatic conditions (F. King 1977; Bryson et al. 1970).

The floodplains of higher-order streams were probably less affected by the climatic fluctuations of the past or by burning than were the uplands, gentle slopes, or floodplains of lower rank intermittent streams. The terraces occupied by the "bottomland prairies" might be an exception. These "prairies" possibly were the result of the drying out of the terraces during the Holocene or of bottomland agriculture by the prehistoric inhabitants (F. King 1977).

Stratification of the Project Area

The easement areas between 731 and 742 feet above mean sea level (the 50 year flood pool) were classified into nine discrete terrain categories which were defined on the basis of major physiographic province, slope, geomorphological

setting, and soil drainage. This was done to establish baseline data for a model to estimate the number of resources present in the total survey, as required by the scope of work, and to provide baseline data to answer specific anthropological research objectives.

The nine discrete terrain categories are defined as follows:

OZARK PLATEAUS

"A" Floodplains and Terraces: Slopes range from zero up to about 10% where older terraces have been eroded. Soils range from shallowon eroded areas to very deep on the nearby level floodplains.

"B" Gentle Slopes: The slopes range from zero up to 10%. Soils range from shallow to moderately deep. The areas of gentle slope are usually along the smaller streams. of both major and secondary streams.

"C" Moderate Slopes: This terrain occurs on valley sides of both major and secondary streams. Soils range from very shallow to moderately deep. The slope ranges from 10% to 30%.

"D" Precipitous Slopes: These slopes range from 30% to vertical. Rock outcrops are common in the steepest portions and there is some potential for the occurrence of rock shelters. The soils are shallow to bedrock.

OSAGE PLAINS

"E" Gentle Slopes: The slopes range from zero to 10%. The south facing slopes are partially cultivated. North facing slopes are partially wooded in the steepest portions. Soils range from moderately shallow to deep.

"F" Moderate Slopes: These slopes range from 10% to 30%. Current uses are for rangeland or tame pastures.

"G" Undifferentiated Bottomlands: This terrain is usually level floodplains and terraces which contain a mixture of poorly drained to moderately well drained soils.

"H" Poorly Drained Alluvial Land: This terrain occurs on floodplains and terraces with fine textured, slowly permeable soils. Oxbow lakés and sloughs are common and the water table is normally near the surface.

"I" Moderate to Well Drained Alluvial Land: This terrain occurs on the floodplains and terraces along both major and secondary streams. Soils are moderately deep to deep. Slopes range from zero to approximately three percent.

The acreage encompassed within each terrain category was delineated by analysis of USGS topographic maps and measured with a planimeter. First, the

boundaries of the easement lands were traced from Corps of Engineers real estate maps onto topographic maps. The 731-foot contour line was then drawn in its estimated position between mapped contour lines, since none of the available maps indicate its precise location. After the 50 year flood easement land was thus delimited, the easement areas were characterized according to their terrain. In areas where a soil survey map was available, it was possible to distinguish the terrain categories with some accuracy; however, in many areas the terrain was categorized simply by visual inspection of the topographic maps. The overall distribution of the 50 year flood easement land in these nine terrain categories is presented in Table 2. Since an intensive land survey was not possible within the scope of this project, the amount of land indicated in each terrain category should be considered to be an unverified estimate of the actual field conditions in the study area. Figures 1 and 2 illustrate the relative placement of the nine terrain categories across the landscape.

Of the two major physiographic zones, the majority of the study area, approximately 73%, is encompassed by the Osage Plains while the Ozark Plateaus include the remaining 27%. Roughly 75% of the total study area (terrain categories A, G, H, and I) is covered with either colluvial or alluvial soils. The largest single terrain category, poorly drained alluvial land (terrain category H), accounts for 36% of the survey area. Nearly level ridge and hilltops where the potential natural vegetation is prairie are not represented in the study area. Former areas of natural prairie may be present on some bottomlands and south facing slopes, but prairie is not well represented in the 50 year flood easement land study area.

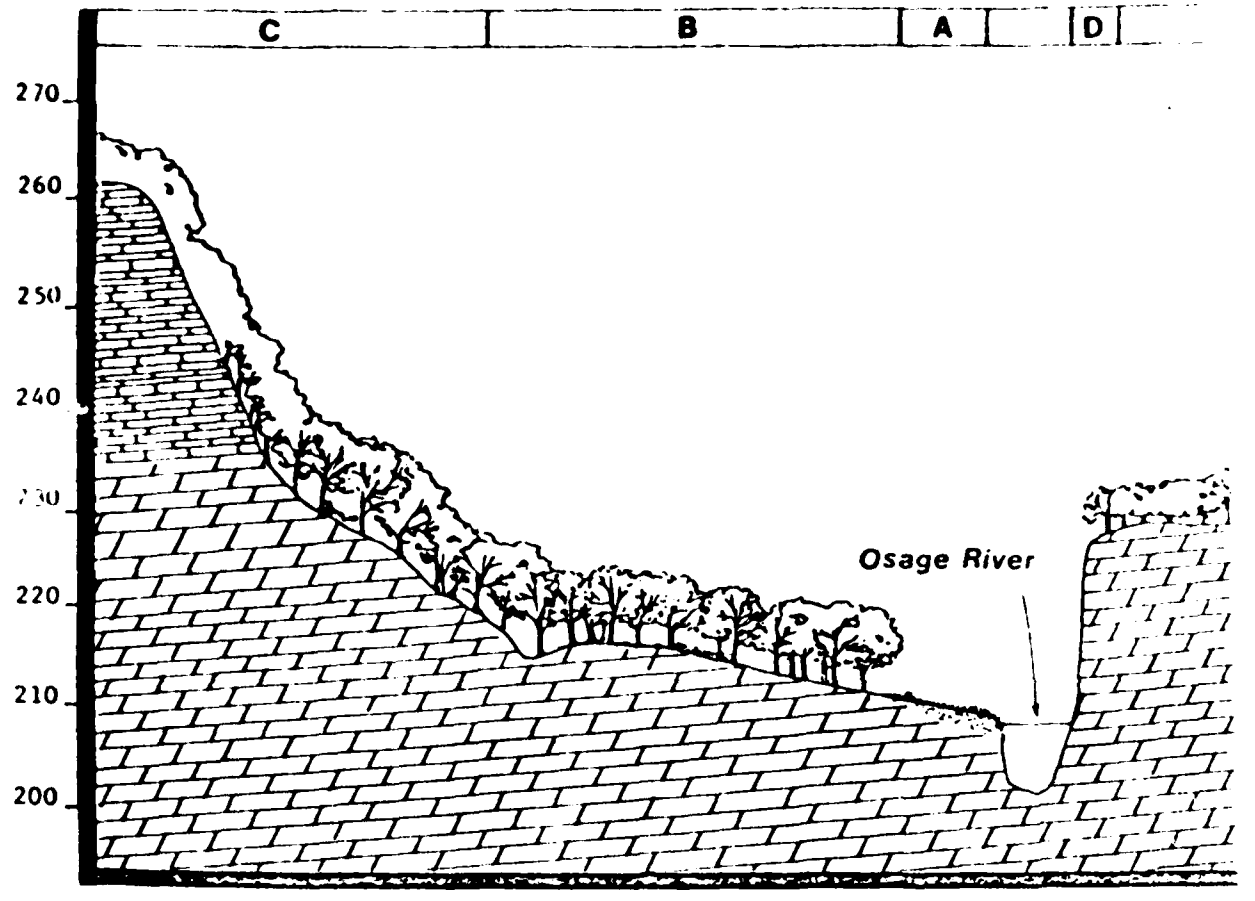
It was expected that different types of prehistoric resources would be found in the two major physiographic provinces, the Ozark Plateaus and the Osage Plains. It was also expected that there would be a higher rate of site occurrence in the bottomlands than in the valley walls. Within the bottomlands, it was expected that there would be a higher rate of site occurrence on well drained and moderately well drained soils than on poorly drained soils.

The study area may also be divided into the 22 stratum categories established by Dr. Donna C. Roper (1977a) for the archaeological survey of the HST fee lands (Table 3). Roper's strata represent geographically defined portions of stream drainages which include heterogeneous physiographic, geomorphological, and pedological features. As shown in the table, approximately 80% of the 50 year flood easement land is contained in two of these strata, the Upper Osage (Stratum No. X) and the Upper South Grand (Stratum No. XX).

TABLE

DISTRIBUTION OF 50 YEAR FLOOD EASEMENT LAND
BY TERRAIN CATEGORY,
HARRY S TRUMAN DAM AND RESERVOIR

TERRAIN CATEGORY	ACREAGE	PERCENT OF TOTAL
OZARK PLATEAUS		
"A" Floodplains and Terraces	8,932	14
"B" Gentle Slopes (0-10%)	4,727	7
"C" Moderate Slopes (10-20%)	2,971	5
"D" Precipitous Slopes (over 30%)	647	1
SUBTOTAL	17,277 ac	27%
OSAGE PLAINS		
"E" Gentle Slopes (0-10%)	7,311	11
"F" Moderate Slopes (10-20%)	449	1
"G" Undifferentiated Bottomlands	13,191	21
"H" Poorly Drained Alluvial Land	23,112	36
"I" Moderate to Well Drained Alluvial Land	2,313	4
SUBTOTAL	46,376 ac	73%
GRAND TOTAL	63,653 ac	100%



Geomorphological, Geological,

Cross Section Across Meand

Vertical Exaggeration = 20X

Horizontal Scale – Meters 0

Terrain Category "A" Floodplains and Terraces: Slopes range from zero up to 10% where older terraces have been eroded. Soils range from on eroded areas to very deep on the nearly level floodplains

Terrain Category "B" Gentle Slopes: The slopes range from zero up to 10%. T of gentle slope are usually along the smaller streams.

Terrain Category "C" Moderate Slopes: This terrain occurs on valley sides of Major and secondary streams. Soils range from very shallow moderately deep. The slope ranges from 10% to 30%.

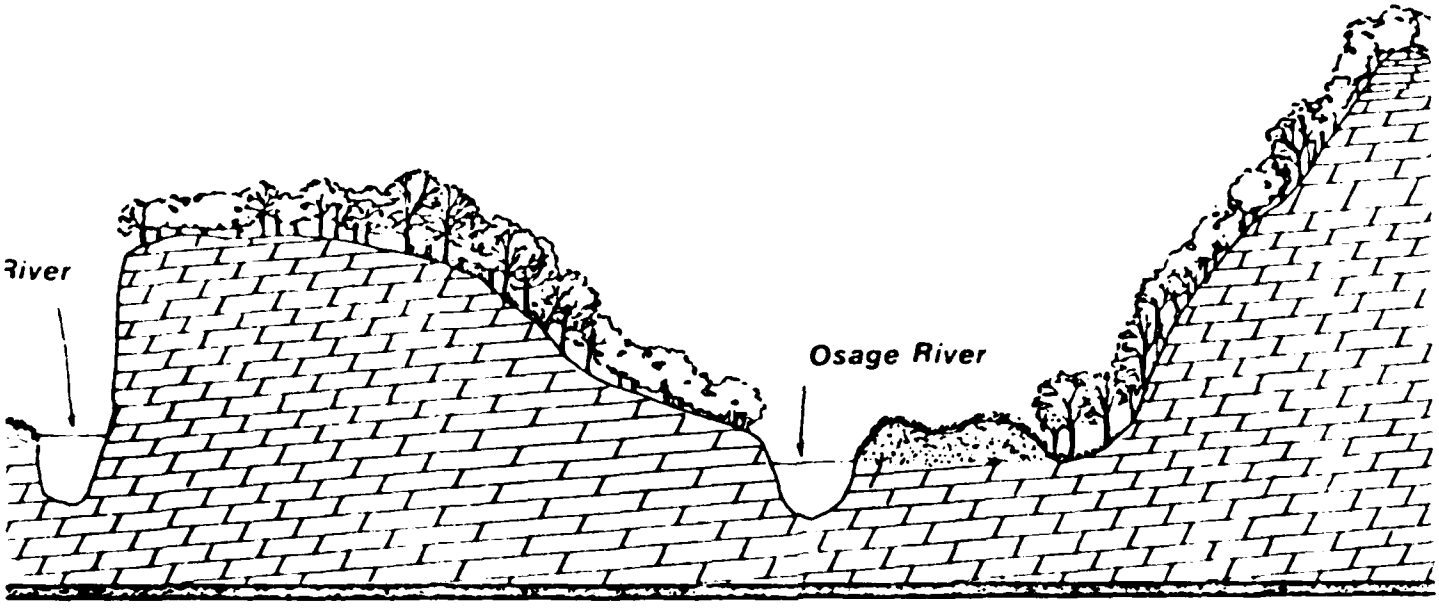
Iroquois Research Institute

February 1980

FIGURE 1

TERRAIN CATEGORIES OF THE OZARK PLATEAUS

	D	B		A	



l, Geological, and Ecological Section of the Osage River Valley \cross Meander Loop Just Upstream of Talley Bend, Missouri

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LEGEND

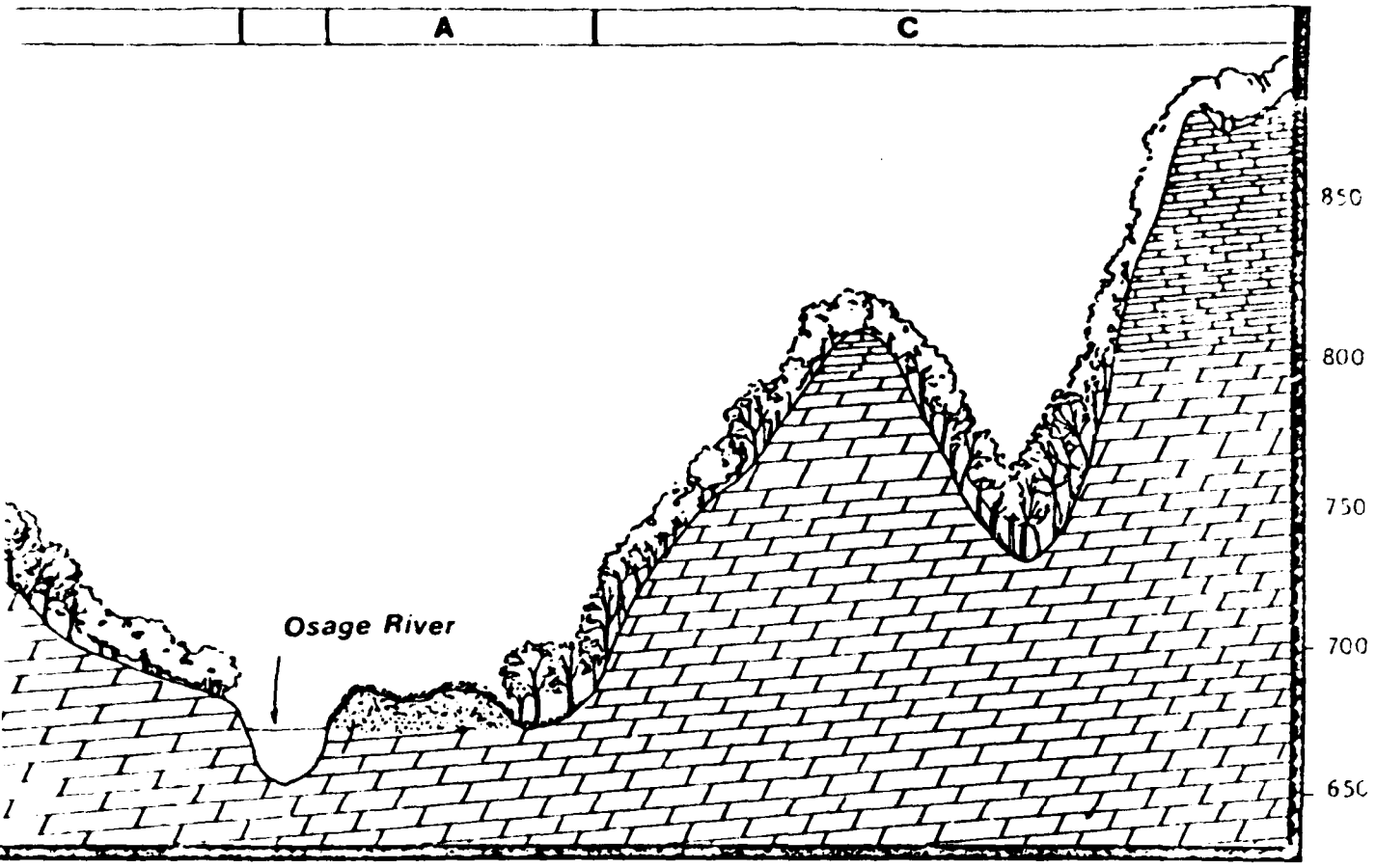
es range from zero up to about eroded. Soils range from shallow nearly level floodplains.

e from zero up to 10%. The areas he smaller streams.

occurs on valley sides of both range from very shallow to from 10% to 30%.

Terrain Category "D" Precipitous Slopes: These slopes range from 30% to vertical. Rock outcrops are common in the steepest portions and there is some potential for the occurrence of rock shelters. The soils are shall to bedrock.

Alluvium Limestone Dolomite



Elevation Above Sea Level - Feet

cal Section of the Osage River Valley
st Upstream of Talley Bend, Missouri

1,000

Horizontal Scale – Feet

0 1000 2,000 3 000

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errain Category "D" Precipitous Slopes: These slopes range from 30% to vertical. Rock outcrops are common in the steepest portions and there is some potential for the occurrence of rock shelters. The soils are shallow to bedrock.

lluvium Limestone Dolomite

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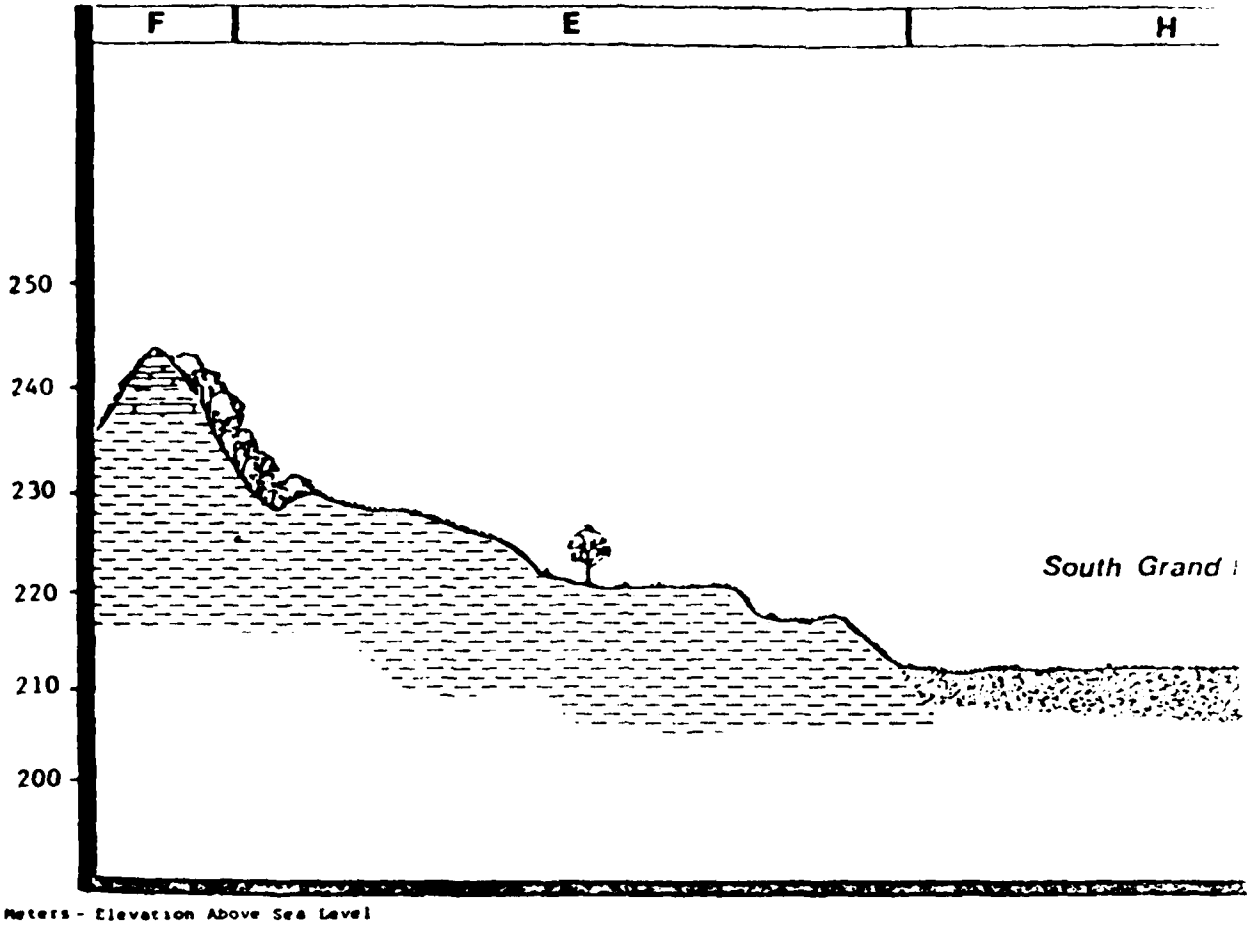

Meters - Elevation Above Sea Level

Geomorphological, Geological, and
Cross Section

Vertical Exaggeration = 20X

Horizontal Scale – Meters 0

Terrain Category "E" Gentle Slopes: The slopes range from zero to 10%. The facing slopes are partially cultivated. North facing slopes partially wooded in the steepest portions. Soils range from moderately shallow to deep.

Terrain Category "F" Moderate Slopes: These slopes range from 10% to 30%. uses are for rangeland or tame pastures.

Terrain Category "G" Undifferentiated Bottomlands: This terrain is usually l floodplains and terraces which contain a mixture of poorly dr to moderately well drained soils.

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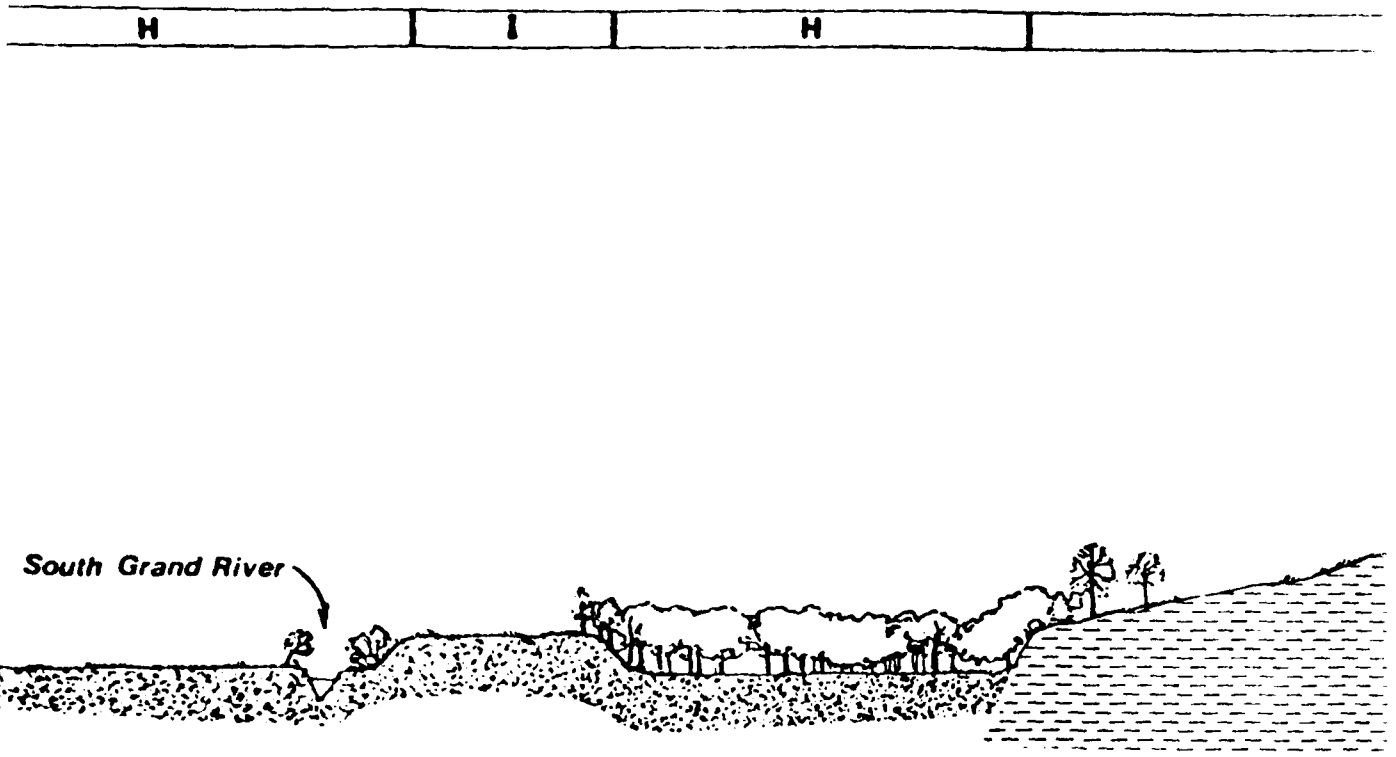
February 1980

FIGURE 2

TERRAIN CATEGORIES OF THE OSAGE PLAINS



ological, and Ecological Section of the South Grand River Valley

ss Section Just Upstream of Hartwell, Missouri

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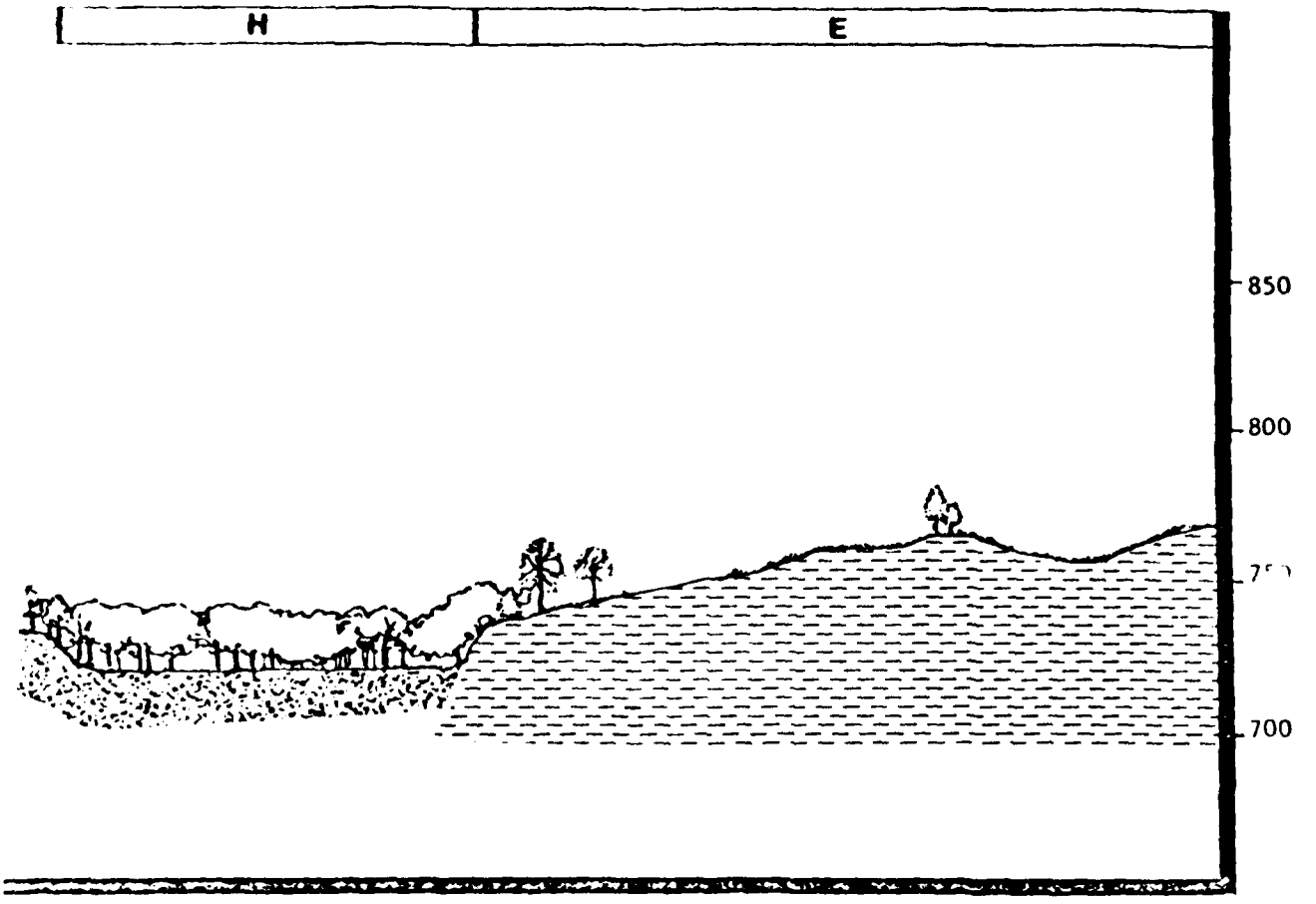
a mixture of poorly drained

Terrain Category "H" Poorly Drained Alluvial Land: This terrain occurs on the floodplains and terraces with fine textured, slowly permeable soils. Oxbow lakes and sloughs are common and the water table is normally near the surface.

Terrain Category "I" Moderate to Well Drained Alluvial Land: This terrain occurs on the floodplains and terraces along both major and secondary streams. Soils are moderately deep to deep. Slopes range from zero to approximately three percent.

Limestone Alluvium Shale

E PLAINS



ction of the South Grand River Valley of Hartwell, Missouri

Horizontal Scale – Feet

1,000

0 1000 2000 3,000

tegory "H" Poorly Drained Alluvial Land: This terrain occurs on the floodplains and terraces with fine textured, slowly permeable soils. Oxbow lakes and sloughs are common and the water table is normally near the surface.

tegory "I" Moderate to Well Drained Alluvial Land: This terrain occurs on the floodplains and terraces along both major and secondary streams. Soils are moderately deep to deep. Slopes range from zero to approximately three percent.

tone Alluvium Shale

2 3

TABLE 3

DISTRIBUTION OF 50 YEAR FLOOD EASEMENT LAND
BY STRATA ESTABLISHED BY DONNA C. ROPER (1977a)
HARRY S. TRUMAN DAM AND RESERVOIR

	STRATUM	ACREAGE	PERCENT OF TOTAL
I	Middle Pomme	289	0.45
II	Lower Pomme	119	0.19
III	Little Pomme	64	0.10
IV	Hogles Creek	62	0.10
V	Bear Creek	174	0.27
VI	Weaubleau Creek	701	1.10
VII	Sac River	4,692	7.37
VIII	Salt River	142	0.22
IX	Gallinger Creek	16	0.03
X	Upper Osage	40,079	62.96
XI	Upper Middle Osage	535	0.84
XII	Lower Middle Osage	338	0.53
XIII	Lower Osage	95	0.15
XIV	Little Tebo	155	0.24
XV	Lower Tebo	106	0.17
XVI	Upper Tebo	1,347	2.12
XVII	Lower South Grand	57	0.09
XVIII	Middle South Grand	377	0.59
XIX	Confluence Area	138	0.22
XX	Upper South Grand	10,718	16.84
XXI	Deep Water Creek	3,263	5.13
XXII	Coopers Creek	186	0.29
TOTALS		63,653 ac	100.00%

BACKGROUND STUDIES

Archival Review

There are several archaeological properties listed in the National Register of Historic Places in the HST project vicinity: the Rodgers Shelter site (23BE125) in Benton County, the Montgomery site (23CE261) in Cedar County, the Coal Pit site (23VE4) in Vernon County, the Brown site (23VE3) in Vernon County, and the Halleys Bluff site (23VE2) in Vernon County. Except for a proposed multiple resource district which could include all federally-owned land at the HST project, there are no prehistoric properties pending a determination of eligibility for the National Register (William Brabham, personal communication; Michael Weichman, personal communication; Kim Rafter, personal communication). Since the multiple resource district would include only government-owned land, it is outside the scope of the present study.

The Halleys Bluff site, which was nominated in 1974, is located within the HST 50 year flood easement lands. Observations of this site have been made over the past 160 years. The site was examined by G. C. Broadhead in 1874 (Broadhead 1874) and was tested in 1941 (Berry et al. 1944) and 1962 (Chapman 1965f).

Located on the point of a bluff, the Halleys Bluff site has been identified as the probable site of Auguste Chouteau's trading post, Fort Carondelet. Chouteau built Fort Carondelet in 1794 to trade with the Osage Indians. The site was characterized by the presence of 28 bell shaped pits dug into the sandstone at the base of the bluff and remnants of a stone wall or embankment. The artifacts recovered from the site include large scrapers, manos, pitted hammerstones, ground hematite, small triangular points, and trade items such as beads, gun flints, bits of copper and brass, ear ornaments, iron axes, and cut sheet-copper projectile points.

As of June 1979, more than 2,000 cultural sites had been recorded with the Archaeological Survey of Missouri (ASM) in the eight counties associated with the HST project. Roughly 80% of these sites have been recorded in conjunction with the survey of the HST project area under the direction of Dr. Donna C. Roper of the University of Missouri-Columbia. Data on previously recorded sites in the HST 50 year flood easement land were obtained from the ASM site files and from the site data files maintained by the University of Missouri-Columbia for the HST project.

The data search of the ASM site files was initiated by a request for a listing of sites which are located in Sections partially or wholly within the contour interval (731 to 742 feet) that defines the study area. The results of this data search indicated that there are a total of 465 recorded cultural sites in these Sections, with approximately 85% of those sites being located in Henry and St. Clair Counties. Following receipt of the site listing, the ASM site files in Columbia, Missouri were examined and all recorded information for the 465 sites was transcribed.

The HST site data maintained by the University of Missouri-Columbia are stored on computer tape which is retrieveable by the SELGEM program. A search of

these files was performed by generating the entire data file for each site between the elevations of 729 and 750 feet. Data for 222 sites were obtained in this manner. With the exception of 23 sites in Benton County, data from these sites had also been obtained from the ASM files.

In addition, site survey forms submitted to the ASM by Terrell Martin of the Kaysinger Bluff Regional Planning Commission were reviewed to determine the relation of these sites to the HST 50 year easement land. The sites discovered by Martin are all located in Henry County, and they have all been registered by the Archaeological Survey of Missouri.

All site data were compiled and all the sites were plotted on project maps to determine their relation to the HST project. Because a large portion of the land between 731 and 742 feet is actually within the HST fee land, many sites were eliminated from consideration in this study.

There are 98 previously recorded sites in the HST easement land (Table 4), and the locational information available for these sites indicates that 52 of them are within the 50 year flood easement area (between 731 and 742 feet MSL). Some of the other sites listed in Table 4 may be partially within the 50 year easement area, since the locational data available for many previously recorded sites is inexact. Elevations of most of the previously recorded sites were recorded to the nearest 10-foot contour line using USGS quadrangle maps.

Twenty of the previously recorded sites in the 50 year easement area are located in the Ozark Highlands and 32 of the sites are in the Osage Plains. Two of the 52 sites are typed as rock shelters; these are located in the Highlands . The remainder are open sites. Only six of the 52 sites have a known cultural affiliation. These include: one possible Dalton site (23SR322); one Archaic site (23HE231); one site with Late Archaic and Woodland components (23SR275); one Woodland site (23HE128); one site with a Woodland component and a possible Mississippian component (23HE233); and one protohistoric and historic site, the Halleys Bluff site (23VE2).

Previous Investigations in the Truman Reservoir Area

Although systematic professional archaeology within the Truman Reservoir area is almost entirely a recent phenomenon brought about the exigencies of salvage and contract situations, there has been a relatively long history of antiquarian and archaeological interest in central and western Missouri.

In 1880, G. C. Broadhead of the Smithsonian Institution reported his observations of numerous bluff-top cairns or mounds along the Missouri River, but his descriptions and locations were generally too vague to be of use in subsequent explorations of the region (Klippel 1965a). In 1908, legal descriptions were given for several mounds in Cole and Osage Counties east of the project area (Houck 1908, cited in Klippel 1965a). Following these sporadic efforts, Gerard Fowke conducted the first relatively systematic and intensive survey of central and western Missouri in the early decades of the 20th century. Among the sites reported by Fowke were the Ewing Mounds near the mouth of the Osage River as well as many sites along the Missouri River (Klippel 1965a). In 1922, Fowke described an open site and a cave site along the Osage River in

TABLE 4

PREVIOUSLY RECORDED SITES
IN THE HARRY S. TRUMAN FLOOD EASEMENT LANDS

SITE NUMBER	CULTURAL AFFILIATION	SITE TYPE	ELEVATION (Feet M.S.L.)	SITE SIZE IN SQUARE METERS	REMARKS
23HE130*	Unknown	Open	740	500	Roper 1977a
23HE132*	Unknown	Open	740	800	Roper 1977a
23HE460*	Unknown	Open	731	1,250	-
23HE1**	Unknown	Open	730-750	Unknown	-
23HE**	Unknown	Open	720-750	Unknown	-
23HE34*	Unknown	Open	735	6,689	-
23HE101*	Unknown	Open	735-745	Unknown	Keller 1965, McMillan 1965b
23HE127*	Unknown	Open	740-745	Unknown	Keller 1965
23HE128**	Woodland	Open	740	Unknown	Keller 1965
23HE129*	Unknown	Open	730	2,500	Mound, auger tested Keller 1965
23HE185	Unknown	Open	720	1,500	Roper 1977a
23HE186	Unknown	Open	720	700	Roper 1977a
23HE187	Woodland	Open	720	1,250	Roper 1977a
23HE188	Woodland	Open	720	250	Roper 1977a
23HE193	Unknown	Open	720	60	Roper 1977a
23HE194	Unknown	Open	720	1,500	Roper 1977a
23HE195	Unknown	Open	720	1,200	Roper 1977a
23HE217	Unknown	Open	720-730	150	-
23HE218	Unknown	Open	720-730	300	-
23HE219	Unknown	Open	720-730	200	-
23HE220*	Unknown	Open	730-740	100	-
23HE221	Unknown	Open	720	100	Roper 1977a
23HE231*	Archaic	Open	730-750	Unknown	-
23HE232*	Unknown	Open	740-770	Unknown	-
23HE233*	Woodland, Mississippian (?)	Open	730-750	Unknown	-
23HE235	Unknown	Open	710-730	400	-
23HE276	Unknown	Open	730	100	Roper 1977a
23HE280	Unknown	Open	720	150	Roper 1977a
23HE283*	Unknown	Open	740-750	300	Roper 1977a
23HE284	Unknown	Open	720-730	200	Roper 1977a
23HE544*	Unknown	Open	730-740	Unknown	Not tested
23HE551*	Unknown	Open	740-745	5,000	Not tested
23HE554*	Unknown	Open	740-745	6,000	Not tested
23HE849*	Unknown	Open	740	1,050	Martin Survey
23HE851*	Unknown	Open	740	4,050	Martin Survey

TABLE 4 (continued)

PREVIOUSLY RECORDED SITES
IN THE HARRY S. TRUMAN FLOOD EASEMENT LANDS

SITE NUMBER	CULTURAL AFFILIATION	SITE TYPE	ELEVATION (Feet M.S.L.)	SITE SIZE IN SQUARE METERS	REMARKS
23HI852*	Unknown	Open	740	5,000	Martin Survey
23HI853*	Unknown	Open	735	5,000	Martin Survey
23HI854	Unknown	Open	740	4,000	Martin Survey
23HI855*	Unknown	Open	735	10,000	Martin Survey
23HI856*	Unknown	Open	740	Unknown	Martin Survey
23HI857*	Unknown	Open	735	22,000	Martin Survey
23HI858	Unknown	Open	740	9,000	Martin Survey
23HI859	Unknown	Open	740	8,100	Martin Survey
23HI860*	Unknown	Open	735	5,050	Martin Survey
23HI266*	Unknown	Shelter	740-760	300	Not tested
23HI268*	Unknown	Shelter	740-760	300	Not tested
23SR23	Unknown	Shelter	710	400	Partially excavated, Keller 1965
23SR103	Woodland, Archaic	Shelter	730	Unknown	Partially excavated Keller 1965 Chapman and Pangborn 1965, Roper 1977a
23SR106*	Unknown	Open	740	Unknown	Keller 1965
23SR114	Unknown	Open	725	Unknown	Partially excavated McMillan 1965b, Pangborn 1965b
23SR140	Archaic, Woodland	Shelter	715	Unknown	Partially excavated McMillan 1965b, Sudderth and Chapman 1965
23SR145*	Unknown	Open	735	Unknown	-
23SR146	Woodland	Open	720	400	-
23SR149	Unknown	Open	715	Unknown	-
23SR150	Unknown	Open	715	60,703	-
23SR152*	Unknown	Open	730-750	Unknown	McMillan 1965b
23SR153	Woodland	Open	710-715	4,000	Roper 1977a
23SR158*	Unknown	Open	730-740	Unknown	-
23SR159	Unknown	Open	721-730	Unknown	-
23SR201	Archaic	Open	710	4,181	-
23SR221	Archaic	Open	720	Unknown	-
23SR223	Unknown	Open	710	Unknown	-
23SR226*	Unknown	Open	730-740	Unknown	-
23SR274*	Unknown	Open	740-750	4,200	-

TABLE 4 (continued)

PREVIOUSLY RECORDED SITES
IN THE HARRY S. TRUMAN FLOOD EASEMENT LANDS

SITE NUMBER	CULTURAL AFFILIATION	SITE TYPE	ELEVATION (Feet M.S.L.)	SITE SIZE IN SQUARE METERS	REMARKS
23BR[illegible]*	Late Archaic, Woodland	Open	740	800	-
23BR276	Unknown	Open	745	3,600	-
23BR283	Woodland	Open	720-730	1,600	-
23BR290	Unknown	Open	720	Unknown	-
23BR291*	Unknown	Open	740-760	120	-
23BR292*	Unknown	Open	740	400	-
23BR295	Unknown	Open	710-720	4,000	-
23BR296	Unknown	Open	710-720	1,000	-
23BR312	Archaic	Open	720	6,000	Roper 1977a
23BR313	Unknown	Open	720	1,600	Roper 1977a
23BR314	Unknown	Open	720	1,200	Roper 1977a
23BR317	Unknown	Open	720	Unknown	Roper 1977a
23BR322*	Dalton (?)	Open	735-745	4,000	Quarry/Workshop
23BR326*	Unknown	Open	740-750	1,500	Quarry, Roper [illegible]
23BR327	Unknown	Open	720-725	700	-
23BR328*	Unknown	Open	730-740	Unknown	-
23BR382	Unknown	Open	750 (?)	120	Roper 1977a
23BR386	Unknown	Open	710-720	100	-
23BR412	Unknown	Open	710-720	4,500	Roper 1977a
23BR413*	Unknown	Open	730	30	Roper 1977a
23BR414	Unknown	Open	710-720	1,000	Roper 1977a
23BR415	Unknown	Shelter	720-730	5	-
23BR421	Unknown	Unknown	725	40	-
23VE2*	Historic/ Protohistoric	Open	731-800	Unknown	On NRHP, partially excavated Chapman 1965b
23VE11*	Unknown	Open	734-740	Unknown	Gas mound
23VE13*	Unknown	Open	738-750	Unknown	-
23VE15*	Unknown	Open	730-740	Unknown	-
23VE16*	Unknown	Open	725-750	Unknown	-
23VE17*	Unknown	Open	730-810	Unknown	-
23VE18*	Unknown	Open	735-860	Unknown	-
23VE24*	Unknown	Open	740-750	Unknown	-
23VE32**	Unknown	Open	725-735	1,800	-
23VE34*	Unknown	Open	730-731	Unknown	-
23VE107*	Unknown	Open	730-735	Unknown	-

*Located in 50 flood year easement area.

**Located during 1979 Iroquois Research Institute survey.

western Miller County. According to Klippel (1965a), these two sites have been subsequently investigated by numerous individuals in the last 40 years. In 1943, E. A. Hoebel of the American Museum of Natural History investigated 13 cave sites near Bagnell Dam east of the project area (Ibid.).

Even before these investigations, however, the Pomme de Terre River Valley within the HST project area was the focus of intense professional interest by virtue of the presence of many springs and bogs yielding the remains of Pleistocene megafauna. In the mid-19th century, Albert Koch (1857) reported one such spring that appeared to yield man-made artifacts in association with mastodon remains. Although Koch's original claims have failed to withstand critical review, the Pomme de Terre spring sites continued to arouse paleontological, paleoecological, and archaeological interest, culminating in a series of excavations at Jones and Trolinger Springs in Hickory County (J. King 1972, 1973; Saunders 1975). In 1974 the Missouri State Parks Board nominated these two springs along with a third to the National Register of Historic Places, but the nomination was rejected because no cultural material was found in the deposits.

Prior to the first systematic survey of the Truman Reservoir area in the 1950's, fewer than 40 archaeological sites in the area had been officially recorded with the Missouri Archaeological Society and of these, only two, 23SR20 (Vista Shelter) and 23HI172 (Blackwell Shelter), had been professionally investigated and reported (Wood 1961, 1968).

In the Pomme de Terre Reservoir area just south of the Truman Reservoir, professional archaeological work began in 1947 as part of the River Basin Projects and continued with a contract between the University of Missouri and the National Park Service in 1952 (Chapman 1954). During this work a total of 179 sites were located within the general Pomme de Terre Reservoir area, and six open sites in the lower part of the reservoir were subjected to subsurface testing. On the basis of data recovered from the six tested sites and 19 surface collections, Chapman (Ibid.) hypothesized that the Pomme de Terre Reservoir was inhabited prehistorically by small groups of nomadic hunters and gatherers. Based almost entirely upon projectile point typologies, it was argued that several Archaic and Woodland complexes were represented in the collections. Chapman further suggested (Ibid.) that relationships could be seen between certain collections in the Pomme de Terre Reservoir and local Woodland complexes such as the Highland aspect in east-central Missouri (Chapman 1948) and the Moreau focus (Upp 1953). Chapman (1954) further remarked upon typological similarities between points found in the Pomme de Terre Reservoir and specimens reported from Archaic assemblages in northeastern Oklahoma (Baerreis 1951) and Middle Woodland (Hopewellian) complexes to the north and east. During a subsequent analysis of material from the Pomme de Terre survey, Wood (1967) defined the Fristoe Complex, a local Woodland complex in southeastern Missouri.

The initial survey work within the HST Reservoir area was the result of a series of contracts between the University of Missouri and the National Park Service. The first (1959-1960) phase of work in the reservoir (then called the Kaysinger Bluff Reservoir) resulted in the location of 86 sites (Keller 1965).

While records delineating the surveyed areas were apparently not kept, it appears that the bulk of the survey was concentrated along the Osage and South Grand Rivers in St. Clair and Henry Counties, with some additional work in Benton County (Roper 1975). As mentioned by Keller (1965), the 1959-1960 survey design emphasized the location and evaluation of mounds, cairns, cave sites, and large open sites because these types of sites were believed most likely to be vandalized by unauthorized digging in the future. Of the 86 sites reported by Keller, 19 were located in caves or rock shelters, 10 contained either earth mounds or cairns, and 57 were referred to simply as "open sites.

During the 1961-1962 phase of work, another 54 prehistoric sites were located in the HST Reservoir area, including among them Rodgers Shelter, 23BE125. (McMillan 1965a; Wood and McMillan 1976). Unfortunately there has never appeared a complete summary and analysis of the results of the 1961-1962 survey, although McMillan (1965b) has described the artifacts recovered during the period in a summary volume covering both phases of work

A number of open, mound, and shelter sites located during the 1959-1962 field seasons were subsequently tested or excavated by the University of Missouri. The most intensive work has been undertaken at Rodgers Shelter. These excavations were carried out between 1963 and 1968 and have resulted in the most complete cultural chronology available for the Ozark Highlands, a region which includes the eastern portion of the HST project area (Plate 5) (McMillan 1965a, 1976; Ahler 1971). The deep profile at Rodgers Shelter spans over 9,000 years and consists of well-stratified deposits attributed by McMillan (1976) to the Dalton (8500 B.C. - 7500 B.C.), Middle Archaic (6600 B.C. - 4300 B.C.), Late Archaic (1000 B.C. - 50 B.C.), and Woodland (A.D. 200-A.D.950) Periods. In addition, studies based on material recovered from Rodgers Shelter have furnished important information relevant to other research problems such as prehistoric subsistence patterns (Parmalee et al. 1976) and lithic tool form and function (Ahler 1971). Rodgers Shelter has been placed on the National Register of Historic Places.

A number of other shelters or caves were included within the University of Missouri's testing and excavation program. Brounlee Shelter, 23SR103, contained evidence for seven or eight prehistoric components spanning from the Archaic through the Mississippian Periods (Chapman and Pangborn 1965). The Gray Shelter, 23SR122, was also excavated, but the deposits were badly disturbed (Chapman 1965a). Harrison Shelter, 23SR117, revealed two Archaic components and three ceramic (Woodland or Mississippian) components (Sudderth 1965). Woody Shelter, 23SR140, apparently contained four ceramic components and two Archaic assemblages (Sudderth and Chapman 1965). Cat Hollow Shelter, 23SR126, revealed an unclear sequence that included a Late Archaic and a Late Woodland or Mississippian occupation (Chapman 1965d). The Carved Rock Shelter, 23SR127, contained a late prehistoric occupation, along with a petroglyph of possibly aboriginal origin (Chapman 1965e). Woodland and Late Archaic occupations were reported from the Robins Hill Cave, 23SR116 (McMillan and McNair 1965). Blackwell Cave, 23HI172, was excavated in 1966. This shelter revealed a long

sequence of occupation with the most intense occupation occurring in the late prehistoric period (Falk 1969).

A number of earth mound or cairn sites discovered during the 1959-1962 survey were tested, most of which were assigned by Chapman (1965f) to the Fristoe Burial Complex. Among these are the Fairfield Mound Group (23BE6), Karr's Camp Mound (23BE117), Wray Martin Mounds I and II (23BE3 and 23BE128), Devils Bluff Mound (23BE118), Melanin Mounds I and II (23BE135 and 23BE136), Mandrake Mound (23HE139), Montiverdi Mound (23SR111), Magistrate Bluff (23SR138), Woody Cairn (23SR135), and Gist Ridge Cairn (23BE112). One site, Barren Mound (23BE137), did not yield enough diagnostic material to allow an identification with any previously established complex (Ibid.).

In 1966, Falk excavated the Gobblers Knob Cairn, 23HE147, which was also assigned to the Fristoe Complex (Falk 1969). Other mound locations discovered during the 1958-1962 survey were excavated later, including the Briley Creek Mound (23SR141) (Wood 1967), the Mount Ilo Cairns (23HE148) (Falk and Lippincott 1974), and the Eckhardt Cairn (23HE150) (Ibid.). All of these mounds are also probably classifiable within the Fristoe Burial Complex.

A number of important open sites discovered during the 1958-1962 survey were also tested. The Halleys Bluff site, 23VE2, was identified as an historic Osage village and possibly the location of Auguste Chouteau's trading post, Fort Carondelet (Chapman 1965b). The Coal Pit site, 23VE4, was identified as another historic Osage settlement (Chapman 1965c). Both sites have been placed on the National Register of Historic Places. The Don Bell site, 23HE1, yielded a generalized Woodland occupation (Grimshaw 1965). Site 23HI172 exhibited Archaic and Woodland materials (Mori 1965), as did the Kelso site, 23VE24 (Klippel 1965b). Archaic components alone were recognized at 23SR145 (Pangborn 1965a). In 1966, Falk excavated several open sites discovered during the 1958-1962 survey. The Merideath site, 23SR129, exhibited a Late Archaic or Woodland component (Falk 1969). The Chauncey site, 23HE145, revealed several components, but the deposits were badly disturbed (Ibid.). At site 23HE164, Falk (Ibid.) recognized several components spanning from the Early or Middle Archaic Period into the Woodland Period. No diagnostic material was recovered from the testing operation at 23BE106 (Ibid.). Additional testing has been undertaken at the Karr site (23BE121) (Lippincott 1972), the John Brown site (23HE138) (Falk and Lippincott 1974), and 23SR142 (Ibid.), all of which were initially discovered during the 1958-1962 project.

During 1961-1962, concurrently with the latter stages of the initial HST Reservoir survey, the University of Missouri undertook an archaeological survey in the proposed Stockton Reservoir, just south of the HST Reservoir on the Sac River (Chapman et al. 1962, 1963). The initial pedestrian survey resulted in the collection of material from 36 sites including rock shelters, cairns, and open sites. Most of these sites, however, lacked sufficient diagnostic material for a "full evaluation of the components represented on them" (Powell 1962:12). Nevertheless, it appeared that nine of the surveyed sites contained ceramic components, while Middle and Late Archaic components predominated at the rest.

Seven sites (three presumed mounds and four rock shelters) were tested during the 1961-1962 Stockton project. Two mound sites, 23CE104 (Bradham 1962) and 23CE123 (Chapman and Pangborn 1962), were identified as Late Woodland to Early Mississippian rock and earth burial mounds. A third site, which was initially suspected to be a mound, was identified upon testing to be largely the remains of a ruined historic cabin (Chapman 1962a). Three of the rock shelters revealed relatively undisturbed deposits. Site 23DA240 contained an undefined Archaic assemblage and a Late Woodland to Early Mississippian transitional complex (Chapman 1962b). Four Archaic and Woodland components were defined at site 23DA245 (Chapman 1962c). Four tentative late complexes were identified at 23CE105 (Chapman 1962d).

In 1966 and 1967, University of Missouri contract work in the Stockton Reservoir continued with the excavation of three open village sites, Flycatcher (23CE153) (Pangborn et al. 1971), Dryocopus (23CE120) (Calabrese et al. 1968), and Shady Grove (23PO309) (Ward 1968). Recently, contract work in the Stockton Reservoir area has continued with a cultural resource survey in downstream areas (Roper 1979). A number of additional sites have been discovered and the results of the survey have been used to develop general preliminary interpretations of the prehistoric settlement pattern in the lower Sac River.

In 1969 and 1971, the University of Missouri and the National Park Service conducted a series of archaeological surveys in the Butler, Freeman, and Nevada Reservoirs which are located west of the HST project area (Wood and Pangborn 1971). Seven open campsites were located in the Butler Reservoir vicinity; 26 in the Freeman Reservoir; and five campsites, one rock shelter, a bedrock mortar site, and an early blacksmith shop in the Nevada Reservoir area. While analyses were limited due to sparse surface collections, the three reservoirs appeared to contain generalized Archaic and Woodland occupations; sites of Mississippian affiliation were rare or absent.

During the 1962-1966 period, professional activity in the HST project area lagged, but excavation and survey programs were resumed in 1967 with the excavation of the Thurman site, 23HE151, and a survey of the general area around the site (Falk and Lippincott 1974; Lippincott 1972). During this project, 20 additional sites were located and one, 23HE162, was subjected to limited testing. As Roper (1975) indicates, Lippincott's small survey represents the first instance of survey work in the HST Reservoir area in which methodology is expressed explicitly enough to allow an estimation of the actual ground covered. Even so, since certain areas were unsurveyed, not enough information was presented to allow a complete evaluation of the archaeological potential of the survey area (Ibid.).

In 1968, 14 additional sites were recorded within the HST area in Benton, Hickory, and St. Clair Counties, including two rock shelters, four mounds, four spring bogs, and four open sites. Although this survey was never fully reported, subsequent testing and excavations were undertaken at one shelter, 23BE149 (Vehik 1974); two open sites, 23BE151 (Ibid.) and 23BE152 (Falk and Lippincott 1974); and all four Pleistocene bogs (J. King 1973, 1975).

In 1975, Roper (1975) stated that all of the previous surveys in the HST project area were of little use in assessing the significance of the cultural

resources of the HST Reservoir for at least two reasons. First, with the partial exception of Lippincott's 1969 survey (Lippincott 1972), no previous survey report gave any information detailing the actual amount and location of terrain covered. This made it impossible to adequately determine if the absence of reported sites from a particular area of the reservoir indicated that sites are absent in that area or that the area had not been examined.

Second, all previous surveys were done without explicitly stated research paradigms. Hence, it is difficult to assess the significance of many sites reported from 1959 to 1968 with regard to the kinds of research goals adopted in the 1970's. Because of these shortcomings, it was recommended that the entire reservoir be systematically resurveyed within an overall research paradigm stressing analysis of prehistoric settlement and subsistence patterns (Roper 1975).

In 1975-1976, the University of Missouri carried out an extensive survey for archaeological, paleontological, historical, and architectural resources within the fee lands of the HST project area. The results of these investigations are included in a 10 volume draft report submitted to the U.S. Army Corps of Engineers, Kansas City District (Archaeological Research Division, Department of Anthropology, University of Missouri 1977).

The archaeological survey was carried out in two stages. The first stage, carried out in 1975, was intended to be a traditional intensive reconnaissance of the entire reservoir area. In addition to the general survey, Stage I work included an emergency survey of construction borrow areas and relocation spots. At the conclusion of the Stage I survey, about 60 square miles had been surveyed. A total of 887 prehistoric sites were located, of which only 38 had been previously reported (Roper 1977a).

In view of the logistical difficulties involved with a complete survey of the entire HST project area and the continued potential for unintentional survey bias toward particular natural zones in the reservoir, survey methodology and research aims were refined in the Stage II survey to ensure a representative coverage of all major ecological and physiographic situations that occur in the HST region. Twenty-two natural divisions or "strata" were defined within the reservoir, largely by major streams or stream segments. These strata were characterized by the configuration of each stream and its attendant natural resource zones (Ibid.). Within each natural division, one-eighth mile wide transects were laid out perpendicular to the stream, cutting though all of the resource zones. A 10% sample of all the potential transects within each stratum was subjected to an intense pedestrian survey (Ibid.). During Stage II operations, another 25 square miles within the reservoir were surveyed, resulting in the discovery of an additional 476 archaeological sites.

During the Stage II survey, the University of Missouri conducted limited test excavations at six rock shelter sites in St. Clair County: 23SR122, 23SR127, 23SR628, 23SR631, 23SR473, and 23SR626. These six shelters were felt to represent the remains of Late Archaic and Mississippian Period "short term habitation sites" at which a relatively wide variety of subsistence and

maintenance activities were carried out (Novick and Cantley 1977). It may be noted that two of these sites, 23SR122 and 23SR127, had been previously tested during the 1959-1962 survey of the HST Reservoir (Chapman 1965f). In addition to the six shelters, two buried Early and Middle Archaic sites, 23SR567 and 23SR569, were tested by the University of Missouri in 1976 (Piontkowski and Joyer 1977).

Also within the HST Reservoir area, the University of Missouri conducted an intensive archaeological, historical, and architectural survey within the lower Pomme de Terre River arm in 1975. During this survey, a total of 65 sites were located, but as the scope of work called for no analysis of either sites or artifacts, none was presented in the final report (Roper et al. 1976). Nevertheless, it was reported that 41 of the sites could not be chronologically identified; Middle Archaic, Late Archaic, Woodland, and Late Woodland components occurred in the remainder (Ibid.).

In conjunction with the University of Missouri two-stage survey of the HST reservoir, Terrell Martin of Clinton, Missouri conducted a survey of approximately 50 square miles of the fee lands and easement areas in the vicinity of Clinton and Deepwater. Martin visited a total of 256 sites, all of which are located in Henry County. He made extensive collections of lithic materials from the sites and donated them to the University of Missouri. More recently, in September and October 1979, Martin surveyed additional areas in Henry County and located 11 additional sites in the HST easement area. This survey was funded by a grant from the Department of Housing and Urban Development (Terrell Martin, personal communication).

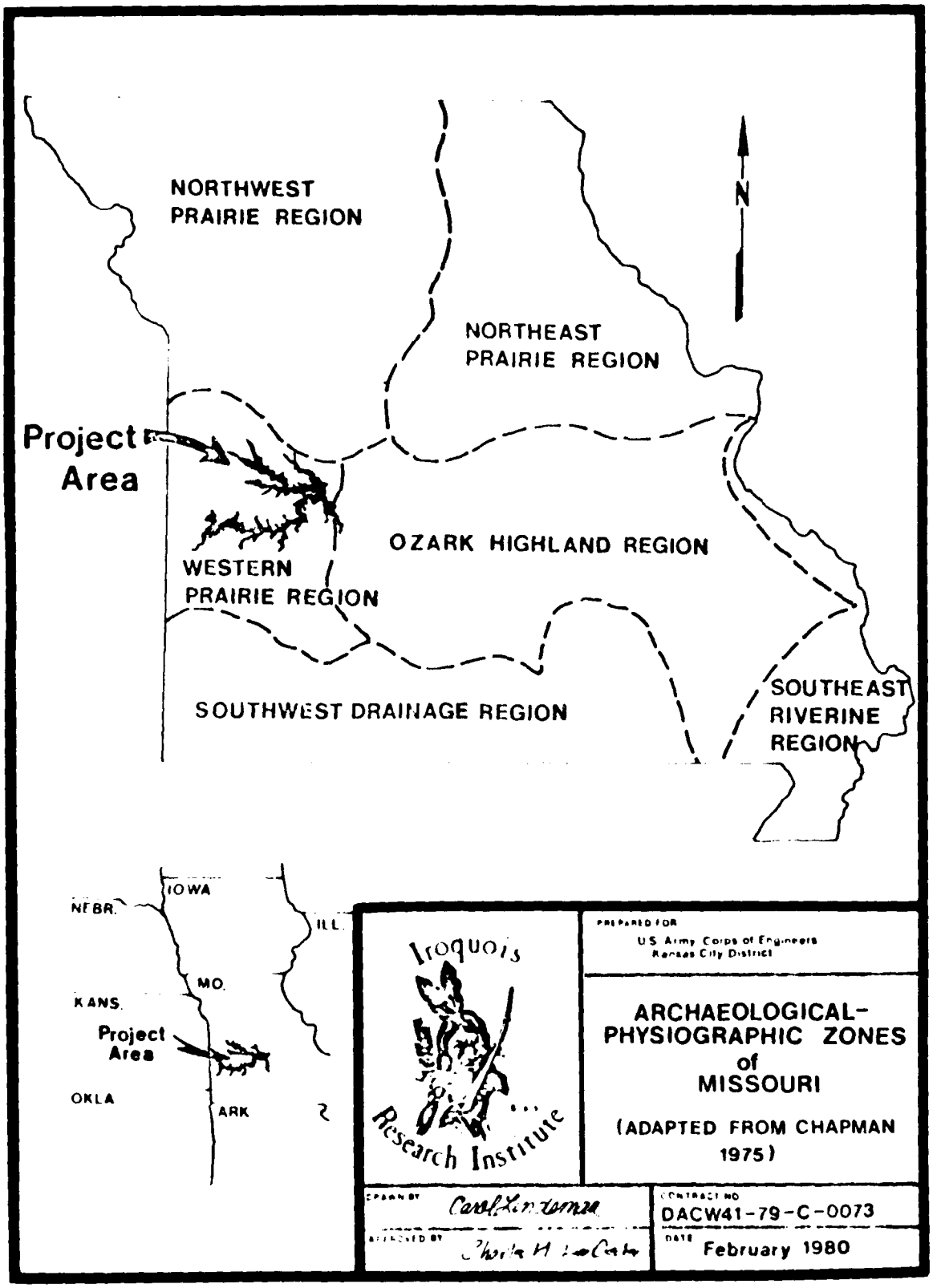
Recently, the University of Missouri has surveyed the upland and public use areas of the HST project area and inventoried 400 additional archaeological sites, but no report of this recent survey activity is available at present. Gilbert Commonwealth Associates, Inc. will soon begin survey and testing in the fee lands and 10 year flood easement areas of the reservoir.

Culture History of the Study Area

Introduction

The HST project area straddles two of the archaeological-physiographic regions of Missouri recognized by Chapman (1975), the Western Prairie Region and the Ozark Highland Region (Plate 5). Additionally, the likely archaeological relationships of the project area extend further into the Central Plains and surrounding portions of Missouri. By virtue of the study area's location within an environmental and cultural ecotone, a summary of its archaeology must take into account cultural developments in adjacent regions. Understandably, a great diversity of archaeological classificatory schemes, research interests, and theoretical frameworks have existed, and continue to exist, for areas in and surrounding the HST project vicinity. Table 5 illustrates this diversity, showing classification schemes for the eastern United States and the Plains (Griffin 1967; Lehmer 1971; Willey 1966), for smaller regions within them

PLATE 5


NORTHWEST
PRAIRIE REGION
N
NORTHEAST
PRAIRIE REGION
Project
Area
OZARK HIGHLAND REGION
WESTERN
PRAIRIE REGION
SOUTHWEST DRAINAGE REGION
SOUTHEAST
RIVERINE
REGION
IOWA
NEBR.
ILL.
MO.
KANS.
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Area
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ARK
Iroquois
Research Institute
PREPARED FOR
U.S. Army Corps of Engineers
Kansas City District
ARCHAEOLOGICAL-
PHYSIOGRAPHIC ZONES
of
MISSOURI
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1975)
DRAWN BY
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TABLE 5

Archaeological and Environmental Sequences in the Harry S

ABSOLUTE DATE	PLAINS AREA						
	CENTRAL PLAINS (CALDWELL AND HENNING 1978)	NORTH-CENTRAL PLAINS (WEDEL 1959)	KANSAS CITY AREA (JOHNSON 1974)	KANSAS ANTIQUITIES COMMISSION (REYNOLDS 1979)	S.E. KANSAS (MARSHALL 1972)	PLAINS (LEHMER 1971)	PLAINS (WILLEY 1966)
1500	MIDDLE MISSOURI / CENTRAL PLAINS TRADITION / PLAINS VILLAGE	ONEOTA ASPECT	—	LATE CERAMIC	POMONA FOCUS	PLAINS VILLAGE	PLAINS VILLAGE
1000		NEBRASKA ASPECT	STEED-KISKER FOCUS	MIDDLE CERAMIC	HOPEWELL PHASE CUESTA PHASE		
500		HOPEWELLIAN	LATE WOODLAND	EARLY CERAMIC		PLAINS WOODLAND	PLAINS WOODLAND
0 A.D. B.C.	PLAINS WOODLAND		KANSAS CITY HOPEWELL		GROVE FOCUS		
500			LATE ARCHAIC				ARCHAIC
1000							
1500							
2000	PLAINS ARCHAIC	ARCHAIC		ARCHAIC		FORAGING	
2500							
3000			MIDDLE ARCHAIC				
3500							
4000							PALEO-INDIAN
4500					—		
5000							
5500							
6000		PALEO-INDIAN	EARLY ARCHAIC			PALEO-INDIAN	
6500							
7000							
7500	LATE PALEO-INDIAN						
8000			—	PALEO-INDIAN			
8500							

* Culture/time stratigraphic unit

** Recently identified as Early Archai

TABLE 5

in the Harry S. Truman Reservoir Area and Surrounding Regions

		HST PROJECT AREA				EASTERN UNITED STATES	CLIMATIC EPISODES		ABSOLUTE DATE
	PLAINS (WILLEY 1966)	MISSOURI (CHAPMAN 1975)	RODGERS SHELTER (WOOD AND McMILLAN 1976)	C/TSU*		GRIFFIN (1967)	BRYSON, BAERREIS AND WENDLAND (1970)	WENDLAND (1978)	
	PLAINS VILLAGE	LATE MISSISSIPPI		1	STRATUM 4	MISSIS-SIPPIAN	—	NEO-BOREAL	
		MIDDLE MISSISSIPPI						PACIFIC	1500
		EARLY MISSISSIPPI							1000
	PLAINS WOODLAND	LATE WOODLAND	WOODLAND			LATE WOODLAND		NEO-ATLANTIC	
								SCANDIC	500
		MIDDLE WOODLAND		2		MIDDLE WOODLAND	SUB-ATLANTIC	SUB-ATLANTIC	A.D. 0 B.C.
			LATE ARCHAIC						500
		EARLY WOODLAND		3		EARLY WOODLAND			
	ARCHAIC	LATE ARCHAIC		4	STRATUM 3	LATE ARCHAIC	SUB-BOREAL	SUB-BOREAL	1000
									1500
									2000
									2500
							ATLANTIC IV		3000
		MIDDLE ARCHAIC						ATLANTIC	3500
							III		4000
			MIDDLE ARCHAIC II	5	STRATUM 2	MIDDLE ARCHAIC			4500
				6			II		5000
				7					5500
	PALEO-INDIAN	EARLY ARCHAIC	MIDDLE ARCHAIC I **	8	STRATUM 1		I		6000
				9		EARLY ARCHAIC			6500
				10			BOREAL II	BOREAL	7000
		DALTON					I		7500
			DALTON	11			PRE-BOREAL	PRE-BOREAL	8000
		PALEO-INDIAN		12		PALEO-INDIAN			8500

as Early Archaic by Joyer and Roper (in press)

(Caldwell and Henning 1978; Wedel 1959; Reynolds 1979; Chapman 1975), and for particular localities in Kansas and Missouri (Johnson 1974; Marshall 1972; Wood and McMillan 1976).

This summary of the study area's cultural history is divided into three subsections. First, a brief discussion and comparison of the archaeological unit concepts employed in the general area surrounding the HST Reservoir will be presented. Second, the established chronology for the eastern portion of the reservoir, largely based upon excavations at Rodgers Shelter, 23BE125 (McMillan 1965a; Wood and McMillan 1976), and the general cultural historic framework provided by Chapman (1975) will be presented. Finally, previously described archaeological complexes from surrounding portions of Missouri, eastern Kansas, and northeastern Oklahoma will be discussed as a framework for the understanding of prehistoric developments in the western portions of the reservoir which, as mentioned by Roper (1977a), appear to share greater affinities to the Central Plains and prairies than to the eastern United States.

Archaeological Systematics in the Regions Surrounding the HST Reservoir

The archaeology of Missouri has usually been synthesized within a general temporal framework developed during the 1940's which, in modified forms, remains the major means of chronologically ordering archaeological complexes throughout the eastern United States and the Plains. This system employs a four-fold division of the entire cultural sequence into Paleo-Indian, Archaic, Woodland, and Mississippian Periods. As these terms were originally developed within the framework provided by the Midwestern Taxonomic System (McKern 1939), they did not initially imply chronological ordering. This usage soon gave way to one where the four "patterns" were seen as chronological periods, and for many areas this nomenclature remains useful. For areas such as the Lower Mississippi Valley, Atlantic coast, eastern Plains, and Northeast, however, it was found that some of these periods were either absent or apparently contemporaneous with one another. As a partial remedy for this problem, the four periods have also been characterized as gross evolutionary stages following the lead of Willey and Phillips (1958). This permits the retention of relative temporal significance when dealing with the whole of the eastern United States but also allows for localized variations from the scheme. As has been stated by Stoltman (1978), the confusion arising from these three ways of defining Paleo-Indian, Archaic, Woodland, and Mississippian has formed a major stumbling block in an overall chronological synthesis of eastern and Plains prehistory.

As one moves out onto the Central Plains, it becomes increasingly difficult to correlate local archaeological manifestations with formal and temporal constructs defined in the midwestern United States. As a result, the characterization of the HST project area within any one chronological or developmental scheme is nearly impossible.

The most recently developed framework for Missouri (Chapman 1975) incorporates the traditional eastern nomenclature, with the addition of a fifth (Dalton) period. While it has been suspected that this scheme is of limited value for ordering the archaeology of the western portion of the HST area (Roper 1977a), it forms the basis for cultural historical integration in the eastern

portions of the reservoir, which have been more intensively investigated. While the archaeology of the western portions of the HST project area are less well known, it is suspected that a Central Plains framework may be more relevant (Ibid.).

Another difficulty in summarizing the archaeological manifestations in the HST Reservoir area with respect to complexes elsewhere is the noncomparability of various taxonomic schemes used to define local assemblages in Missouri, Kansas, and Oklahoma. The Midwestern Taxonomic System (MTS) formed the original basis of archaeological systematics in the Midwest and Plains, and throughout the 1940's and 1950's, excavated archaeological complexes in Missouri were identified with a large number of formally defined foci and aspects. Other archaeological manifestations such as the Fristoe Burial Complex were never fully integrated within the MTS framework, and for many excavated assemblages data were lacking to permit the assignment of focus or aspect designations. In recent years the McKern system has largely been abandoned as a means of classifying cultural complexes in Missouri. However, it is still occasionally employed in Plains archaeology. In addition to the use of McKern taxonomic units (particularly focus, aspect, and phase) in Plains research, other classificatory systems have come into recent use whose asumptions differ greatly from the MTS, but which bear a degree of superficial similarity (Reynolds 1979). For example, since 1960, the Willey and Phillips (1958) model which incorporates temporal and geographic considerations has been the dominant synthesizing framework for archaeology in the Plains and Eastern Woodlands. While this model represents an improvement, its terminological overlap with the MTS has resulted in some confusion.

Together with the general lack of well-reported, stratified deposits spanning thousands of years in the eastern Plains, the classificatory approaches used in Plains archaeology have generally resulted in particularistic descriptions of local phases or foci, amenable to only broad-stroke temporal or spatial generalizations. This interpretation should not be taken as a criticism of Plains archaeology, but rather it is offered simply to illuminate some of the difficulties in attempting a comparison of archaeological manifestations in the western Missouri, eastern Kansas, and northeastern Oklahoma regions.

Cultural Chronology of the HST Project Area

For the most part, this discussion will be based upon the traditional framework established for Missouri by Chapman (1975) (Table 5) and utilized with reservations by Roper (1977a) in her previous synthesis of the culture history in the HST Reservoir project area.

The Paleo-Indian Period in the eastern United States and the Great Plains is usually defined by the occurrence of a number of varieties of fluted and parallel-flaked lanceolate projectile points. The earliest reputed evidence of man in the New World, however, is associated with what Krieger (1964) calls the "Pre-Projectile Point Stage" and is apparently characterized by an assemblage of crude core and flake tools. While surface finds of these artifacts abound in the South and Midwest, the Pre-Projectile Point Stage has yet to be verified in a stratified and unambiguous situation.

The Paleo-Indian Period is frequently identified as a period of specialized big game hunting. However, while this may be a valid characterization for the Great Plains area, it can be argued that in many eastern environments, where alternative resources were available, an exclusive hunting economy was probably unlikely (see Byrd and Neuman 1978). In spite of the widespread distribution of fluted (Clovis and Folsom) projectile point forms in the eastern United States and Plains, they are virtually non-existent within the HST project area (Roper 1977a). It is suspected (Joyer and Roper, in press) that Paleo-Indian remains within the project area may have been scoured away by the downcutting action of rivers 13,000 to 10,500 years ago. The possibility also exists (Ibid.) that such remains are presently buried at the base of Holocene alluvial deposits or that they exist on remnant Pleistocene terraces. Chapman (1975) brackets the duration of the Paleo-Indian Period in Missouri from 12,000 B.C. to 8000 B.C.

The Dalton Period is in many ways viewed as a time of transition between the Paleo-Indian and Early Archaic Periods (Ibid.). Technologically, it is characterized by the replacement of fluted projectile points with the distinctive large, lanceolate Dalton point form identified by a strongly concave base set off from the blade by lateral and basal grinding (see Bell 1958). Although not truly fluted, many Dalton points exhibit thinned bases produced by the removal of several large flakes on both faces. Chapman (1975) suggests that basal thinning may represent a technological transition from fluting. As originally defined, Dalton points are generally limited in distribution to the Missouri-Arkansas region, but the presence of similar point styles (e.g., Meserve) throughout the Great Plains suggests that the technological transition from fluting to gradually reduced basal thinning was occurring over a wide area from 8000 B.C. to 6000 B.C.

Although undoubtedly present throughout the reservoir, Dalton remains are generally limited to a few open sites along the major streams (Joyer and Roper, in press). The fact that many of the sites found thus far were buried under up to three meters of alluvial deposits suggests that many Dalton components may be presently undiscovered.

It is generally assumed (Chapman 1975) that the Dalton Period represents a transition from big game hunting to a more diversified hunting and gathering economy. Data recovered from excavated Dalton components at Rodgers Shelter, 23BE125, support this assertion as a wide variety of large and small game were apparently exploited in addition to hickory and black walnuts (McMillan 1976). It should be pointed out, however, that there is little evidence that a specialized big game hunting economy ever characterized the preceding Paleo-Indian Period in the eastern United States. The Dalton Period occupation at Rodgers Shelter consists of a series of small campsites, each about 10 meters in diameter and centered around a hearth (Ibid.). Together with the faunal, floral, and technological information gained at the site, McMillan (Ibid.) has interpreted these campsites to be the transient settlements of small, mobile bands. Based on two radiocarbon age determinations for these deposits, a time span of from 8500 B.C. to 7500 B.C. has been estimated for the Dalton occupation at Rodgers Shelter (Ibid.). In addition to Rodgers Shelter, 10 open sites in the HST Reservoir and one just downstream from the Stockton Dam on the Sac River have yielded Dalton or other transitional Paleo-Indian to Archaic points. Two of the presumed Dalton components have been tested. The Montgomery site, 23CE261, on the Sac River yielded over 100 Dalton period artifacts (Collins et al. 1977) and

may represent an occupation similar to those at Rodgers Shelter (Joyer and Roper, in press). Similarly, the Hand site, 23SR569, on the Osage River appears to be the remains of a small Dalton campsite (Piontkowski 1977).

Based on an analysis of Dalton sites in the Mississippi Lowlands of northeast Arkansas, Morse (1973, 1977) has hypothesized that Dalton populations were divided into virtually sedentary bands, each occupying a distinct drainage. Within each drainage, the settlement pattern for each band is hypothesized to have consisted of a central base camp plus short term special purpose camps for hunting, butchering, food collecting, and chert collecting (Ibid.). This view has been countered by Schiffer (1975), who suggests that a seasonal wandering pattern crosscutting several drainage areas was more likely for Dalton populations in the Mississippi Lowlands. While to date the published work in the HST Reservoir area has not been designed specifically to test either Morse's or Schiffer's hypothesis, it can be noted that none of the Dalton components tested in the HST area appear to be the remains of large base camps comparable to those hypothesized by Morse. Of course, the Ozark Plateaus and Osage Plains physiography in the HST Reservoir is not really comparable to the situation described for northeastern Arkansas and it might be expected that Dalton settlement in western Missouri would differ from the Arkansas pattern. In a 1975 study of Dalton occupations in southeastern Missouri, Price and Krakker (1975) find support for the existence of seasonally occupied base camps and special purpose sites. This apparent settlement pattern is taken by Price and Krakker (Ibid.) to support Schiffer's model in this area of Missouri.

According to Joyer and Roper (in press), the identified Dalton components in the HST Reservoir area tend to be located in relatively narrow segments of bottomland very close to major streams such as the Osage, South Grand, Sac, and Pomme de Terre Rivers. These locations would have provided the inhabitants of the sites ready access to both floodplain and upland faunal and floral resources (Ibid.). While any interpretations based on the limited distributional data available from the HST Reservoir must be tempered by the realization that many Dalton Period sites are probably buried beneath meters of overbank deposition, it does appear that the locations of the known sites are more indicative of base camps than of camps having special purpose extractive functions. In view of the greater environmental diversity near the river courses in the HST area, it may be suspected that special purpose camps such as those postulated by Morse in the Mississippi Lowlands would be unnecessary in western Missouri.

The Archaic Period is usually conceptualized as the period of readaptation by prehistoric populations in eastern North America to the post-Pleistocene environment. The development of a diversified hunting and gathering economy (Caldwell 1958) is presumably indicated by an increased diversity of artifact forms. The Archaic Period is seen as a time of stable adaptations to a rich, diverse, but relatively unchanging natural environment. In the western fringes of the Eastern Woodlands, however, periodic fluctuations in temperature and rainfall (the most significant of which is the Atlantic Episode, lasting from about 6500 B.C. to 3000 B.C.) presumably had an effect on the nature of Archaic occupations (Bryson et al. 1970; Wendland 1978; Joyer and Roper, in press). Although similar ecological adaptations characterize the entire Archaic Period

(as well as the preceding Dalton Period), presumed changes in projectile point styles allow it to be divided into three chronological subdivisions.

Early Archaic occupations in the Ozarks and Western Prairies are indicated by several large projectile point forms. These include Graham Cave Side Notched points; several bifurcated base forms such as St. Albans, LeCroy, and MacCorkle points; Hidden Valley Contracting Stemmed points; Hardin Barbed and Hardin Stemmed points; and a variety of other large, side notched points. Early Archaic projectile points have been reported in 37 sites in the HST Reservoir (Roper 1977a), but only two components dating to the period have been subjected to subsurface testing or excavation.

The major excavated Early Archaic component is located at Rodgers Shelter, 23BE125. Joyer and Roper (in press) identify Culture/time stratigraphic units 9, 8, and lower 7 with an Early Archaic occupation dated at 7050 B.C. to 6150 B.C. McMillan (1976) places these same units in his Middle Archaic occupation and dates them at 6650 B.C. to 5050 B.C. For the purposes of this summary, the more recent interpretation by Joyer and Roper will be followed. All or most of the Early Archaic "type fossils" mentioned above occur in these levels at Rodgers Shelter. According to McMillan (Ibid.), these levels appear to represent a radically different kind of occupation than that reconstructed for the Dalton occupation of the site. The material recovered suggests that the shelter served as a base camp for people carrying out a wide variety of subsistence activities, with a special emphasis upon tool manufacture and maintenance and plant food processing (Ibid.). Hunting and butchering activities were apparently limited and, although large animals like bison and deer were available, the faunal procurement system emphasized small bottomland forest animals. The presence of prairie species like bison in the faunal assemblage is significant in that it may offer evidence for the eastward expansion of the tall grass prairie during the Early Archaic Period.

In addition to Rodgers Shelter, small test excavations have been undertaken at the Wolf Creek site, 23SR567, which also apparently exhibits an Early Archaic occupation (Piontkowski 1977). The limited nature of the excavation precludes a complete characterization of this occupation, but the excavated sample included one diagnostic bifurcated base point and a light scatter of debitage. Joyer and Roper (in press) suggest that the Early Archaic occupation at Wolf Creek may be similar to the Dalton occupation at Rodgers Shelter.

Chapman (1975) has estimated the span of the Early Archaic Period at roughly 7000 B.C. to 5000 B.C. in western Missouri. In the HST Reservoir area, the Early Archaic sites tend to occur in narrow segments of bottomland, continuing the Dalton pattern (Joyer and Roper, in press).

The succeeding Middle Archaic Period, estimated by Chapman (1975) to fall between 5000 B.C. and 3000 B.C., is associated with a number of projectile point styles, the most important of which is the Big Sandy Notched, a medium to large, side notched form. Other point styles which have been assigned to a Middle Archaic context in Missouri by Chapman (Ibid.) include Agate Basin, Rice, and Nebo Hill lanceolate types, and a range of stemmed and notched forms including Jakie Stemmed, Rice Contracting Stemmed, Rice Lobed, Stone Square Stemmed, and

possibly Table Rock Stemmed. It should be noted that few of these point styles are limited to the Middle Archaic, so their utility as chronological markers is limited.

Roper (1977a) identifies 14 Middle Archaic components from the survey data. The major excavated component is at Rodgers Shelter. As indicated previously, McMillan (1976) has postulated the presence at Rodgers Shelter of two separate Middle Archaic occupations spanning over 2,000 years. The first of these, Middle Archaic I from Culture/time units 7, 8, and 9, has subsequently been redefined as Early Archaic on the basis of projectile point typology and other considerations (Joyer and Roper, in press). The other component, Middle Archaic II, was identified in Culture/time units 5 and 6, with some possible overlap into unit 7 (McMillan 1976). The dates for this Middle Archaic component fall between 5000 B.C. and 4350 B.C. (Ibid.).

During the Middle Archaic occupation of the site, the drying and warming effects of the Atlantic Climatic Episode (Bryson et al. 1970; Wendland 1978) which began during the Early Archaic occupation appear to have peaked. While the occupation still probably represents the remains of a seasonal base camp, there was a lack of any major hunting activity, and the hunting which was in evidence was apparently focused upon small animals outside of the bottomland forest (McMillan 1976). Also during this period, the first systematic exploitation of fresh-water mussels began (Ibid.). Plant food processing was apparently of much less importance during this period than during the preceding Early Archaic occupation.

Other important Middle Archaic Period components have been tested or excavated in the HST Reservoir area. Phillips Spring, 23HI216, has yielded a small Middle or Late Archaic assemblage in the lowest levels which has been dated as early as 2360 B.C. (Chomko 1978). Middle Archaic components are also identified or suspected at Blackwell Cave, Stratum I (Wood 1961; Falk 1969), the Miller site (Vehick 1974), Saba Shelter (Ibid.), and several small shelters in the HST, Stockton, and Pomme de Terre Reservoir areas (Chapman 1954, 1975; McMillan 1965b; Powell 1962; Wood 1961).

Locational analysis of Middle Archaic sites in the HST Reservoir area indicates that the majority of sites are on the bottomlands, but instead of being merely in narrow sections as during the Early Archaic Period, they are situated in wide floodplain areas as well (Joyer and Roper, in press). The distribution of Middle Archaic sites is taken to indicate that the exploitative emphasis was on bottomland and aquatic resources (Ibid.). A similar distributional pattern is reported in the downstream Stockton segment of the Sac River Valley (Roper 1977b). Together with the environmental data from Rodgers Shelter (Ahler and McMillan 1976), the distribution of Middle Archaic sites supports McMillan's (1976) hypothesis that the Atlantic (Hypsithermal) Episode had a great effect upon the prehistoric exploitative and settlement patterns in the HST area (Joyer and Roper, in press). It appears, however, that the 3,000 year hiatus at Rodgers Shelter between the end of the Middle Archaic occupation and the succeeding Late Archaic occupation does not reflect a complete abandonment of the area in spite of the presumed severity of the Atlantic environment (Roper 1977a). Late Archaic

components, some of which probably date to this 3,000 year period, have been identified at 35 surveyed sites in the HST Reservoir area but, as indicated by Roper (Ibid.), accurate identification of each component is hampered by the relatively non-diagnostic nature of the stemmed and corner notched projectile forms that comprise many of the collections.

The Late Archaic occupation at Rodgers Shelter is apparently separated from the earlier occupations by a 3,000 year hiatus and is estimated to span from about 1000 B.C. to 50 B.C. (McMillan 1976). These dates are considerably more recent than the estimated 3000 B.C. to 1000 B.C. temporal span given by Chapman (1975) for the period. Among the projectile point forms recovered from the Late Archaic levels at Rodgers Shelter are Afton, Smith Basal Notched, Etley, Sedalia Lanceolate, and other unnamed points. Most of these types are not limited in duration to the Late Archaic. This occupation, which was found in Culture/time units 3 and 4, appears to be the remains of a base camp (McMillan 1976). In contrast to the previous Middle and Early Archaic occupations, deer hunting was apparently quite important as was the exploitation of aquatic turtles and mussels. McMillan (Ibid.) interprets the increased reliance upon deer as indicative of a return to a more humid and heavily forested environment in the general vicinity of the shelter.

Two Late Archaic occupations are in evidence at the Phillips Spring site, 23HI216. The first occupation has been dated between 1100 B.C. and 960 B.C. and the second from roughly 390 B.C. to 40 B.C. (Roper 1977a). Chomko (1978) suggests that the first occupation was more intense and that deer, hickory nuts, and mussels were heavily exploited. The same exploitative pattern apparently continued through the second occupation (Ibid.). In addition, a feature associated with an earlier Middle or Late Archaic assemblage at the site contained the remains of squash seeds that have been dated to a period from 2360 B.C. to 1977 B.C. (Ibid.). These dates, which fall within Chapman's (1975) estimation for the Late Archaic, appear to document the presence of tropical cultigens well within the Archaic Period in central Missouri. If these associations are valid, then some modification of current models of Archaic adaptation in the central United States may be in order.

At Blackwell Cave, a Late Archaic occupation has been reported that is characterized by the presence of Afton points (Wood 1961) as well as by other large, basal notched and corner notched point forms (Falk 1969). Like Rodgers Shelter and Phillips Spring, a woodland/riverine adaptation of the Blackwell Cave occupation is suggested by the faunal remains. Other Late Archaic components in the HST Reservoir vicinity include the initial occupation of the Merideath site, 23SR129; the Thurman site, 23HE151; Saba Shelter, 23BE149; and other shelters in the Ozark Plateaus. Late Archaic occupations have also been reported from the Stockton and Pomme de Terre Lakes (Powell 1962; Chapman 1954; Wood 1961).

Joyer and Roper (in press) indicate that several significant shifts in prehistoric cultural relationships may have occurred during the Late Archaic Period in the HST project area. There was an apparent increase in regional differentiation between the Ozark Highland and Western Prairie Regions of the reservoir as exemplified by the apparently dichotomous distribution of Etley and

Nebo Hill points. Additionally, they suggest that the HST reservoir area shifted away from being a marginal expression of southeastern lithic complexes and became during the Late Archaic and succeeding periods an interface of Midwestern traditions centered in the lower Missouri and central Mississippi River basins (Ibid.). Furthermore, they note that there apparently is an increased diversification of Late Archaic site types and locations in the HST area. They note, however, that an understanding of these developments requires greater temporal and spatial control than presently exists (Ibid.).

In much of eastern North America, the Woodland Period is generally identified by the introduction of ceramics into the artifact inventory. Additionally, it has been assumed that significant exploitative changes centering around the cultivation of native and tropical plants occurred during the Woodland Period. However, recent opinion is that horticulture was of only limited importance during much of that time (Jennings 1974). Chapman (1975) offers the customary tripartite division of the Woodland pattern into Early, Middle, and Late periods. Most recent discussions of the HST Reservoir, however, emphasize that such a neat division is impossible or impracticable in the project area (Roper 1977a, 1978).

Johnson (1968) has defined three phases in the Clinton Reservoir area near Lawrence Kansas, two of which, the Wakarusa and the Deer Creek phase, belong to the Woodland period. The Wakarusa phase, with an estimated span of A.D. 1-1,000 is characterized by grit and sand tempered pottery with cord marked exteriors and by stemmed and corner notched points (Ibid.) The Deer Creek phase is characterized by thick, grit tempered, cord marked pottery, large stemmed and corner notched points which are similar to the Wakarusa as well as small corner notched points which are identified as Scallorn (Ibid.) The identification of the small Scallorn points suggests that the Deer Creek phase postdates the Wakarusa (Ibid.)

Although isolated finds of diagnostic Middle Woodland ceramics have been reported in the HST Reservoir vicinity (McMillan 1976; Wood 1961; Falk 1969; Chapman 1965f), the nature of the Middle Woodland presence in the study area is poorly understood. Zoned and dentate or rocker stamped "Hopewellian" pottery sherds have been recovered from a few sites, as have some typical broad and expanding stemmed, corner notched projectile point forms. Roper (1977a) identifies 12 possible Middle Woodland components in the HST Reservoir, all in shelters, and suggests the possibility that the Middle Woodland occupation in the central Osage basin may represent special purpose sites of groups centered elsewhere, such as in the Kansas City area, the lower Missouri River Valley, or northeast Oklahoma and southeast Kansas.

The preponderance of the ceramic occupations in the HST Reservoir cannot be assigned to any particular subdivision of the Woodland Period, nor can they be easily seriated despite their prevalence. These occupations are identified by the presence of various large point forms such as Gary and Langtry Contracting Stemmed points, Rice Side Notched points, and other unnamed corner notched and stemmed forms (Ibid.). In addition, the lithic assemblage is characterized by the apparent introduction of various small points such as Scallorn and several unnotched triangular forms (Ibid.). Ceramics are found in a wide variety of

undecorated forms. To date, it has been impossible to neatly subdivide this generalized Woodland occupation into more narrowly defined periods. Roper (Ibid.) has suggested the possibility that two non-Middle Woodland (Late Woodland?) complexes may be isolable, the earlier consisting of the large points and the later including the small points. As she herself mentions, however, this supposition does not appear to be supported by comparative data from the nearby Pomme de Terre Reservoir (Ibid.). As of 1977, more than 130 generalized Woodland components had been identified within the HST project area (Ibid.).

The third phase described by Johnson (1968), the Clinton phase is similar to the Central Plains tradition and ranges from roughly A.D. 1,000 to A.D. 1,500. Globular jars with straight or flaring rims and hemispherical bowls, as well as clay or shale tempered, cord marked and knotted pottery are considered to be the diagnostic ceramics from this period. The Clinton phase is also characterized by small, triangular side notched, side and basal notched, or unnotched points (Ibid.)

Although Chapman (1975) offers a tripartite Mississippian sequence for the State of Missouri, readily identifiable Mississippian remains are rare in the HST area and are more likely to be related to marginal Central Plains complexes to the west (Roper 1977a). These external relationships will be presented in more detail in the following section. As Roper (1978) suggests, intensive Mississippian settlement in the Truman Reservoir area may have been precluded by local environmental constraints such as rugged topography upon the typical Mississippian horticultural pattern. In most of the area, it is likely that typologically Woodland cultures persisted throughout the Mississippian time period.

Archaeology of Surrounding Regions

The HST Reservoir occupies an environmental and cultural ecotone between the Great Plains and the Eastern Woodlands. Within the reservoir itself, there is enough variation between the Ozark Highland and Western Prairie Regions that Roper (1977a) summarized late prehistoric developments separately for the two areas. Furthermore, it appears that portions of the reservoir area fell at several times in the past within the exploitative range of prehistoric groups centered elsewhere (Roper 1977a, 1978; Joyer and Roper, in press). Consequently, an understanding of prehistoric developments in the reservoir area requires familiarity with surrounding regions, especially in post-Archaic periods. In view of the fact that the survey area for the present study falls largely within the Western Prairie Region, the emphasis in this section will be on the description of archaeological complexes in nearby portions of western Missouri and the Central Plains.

Since Paleo-Indian remains are largely absent from reported sites in the HST area, scattered Dalton occupations represent the earliest identified prehistoric complexes along the Osage River. Little is known of the complete nature of the Dalton presence in the project area, however, and linkage to other areas of Dalton "culture" remain largely undefined. As indicated by Roper (1977a),

however, Dalton sites are found in both the Ozark Highland and Western Prairies, and the geographical distribution of Dalton points suggests that the focal area of Dalton culture is in southeast Missouri and northeast Arkansas (Morse 1973; Bell 1958). Morphologically similar points, however, are distributed widely throughout the eastern plains and prairies and extend into the western Plains (Ibid.).

A number of Archaic complexes have been defined in the central United States in regions surrounding the HST Reservoir. The Nebo Hill complex which was defined in the region of Kansas City (Shippee 1948) is characterized by the presence of long, narrow, lanceolate projectile points with diamond-shaped cross sections. Other artifacts associated with the Nebo Hill complex are chipped stone perforators, adzes, axes, and preforms. Ground stone tools occur in the form of three-quarter grooved axes and deep mortars. Although the only excavated Nebo Hill components occur in the immediate vicinity of Kansas City, Nebo Hill points are reported from hilltop sites near rivers and creeks throughout the Western Prairie Region of Missouri (Perino 1968) and into eastern Kansas (Rohn and Woodman 1976). In Kansas, Rohn and Woodman (Ibid.) report that sites with Nebo Hill artifacts tend to occur in river valley bottoms where they are buried by stream alluviation. Recent radiocarbon determinations have placed the Nebo Hill complex of the Kansas City area in a Late Archaic time period (circa 1600 B.C. to 1000 B.C.) (Kenneth Reid, personal communication). In southwestern Missouri, the Nebo Hill complex is usually considered to be Middle Archaic (Roper 1977a).

Similar projectile points occur in the Sedalia complex which extends eastward from Kansas City to the confluence of the Mississippi and Missouri Rivers. In Missouri this complex is considered to be a Late Archaic manifestation (Ibid.). On typological grounds Perino (1968) suggests that Sedalia points represent the Early Archaic Period, but this view represents a minority opinion.

Generalized Archaic complexes lacking the distinctive lanceolate points occur throughout western Missouri, eastern Kansas, and northeastern Oklahoma. The Grove focus in extreme northeastern Oklahoma (Bell and Baerreis 1951) and southeastern Kansas (Marshall 1972) is typical of Archaic complexes on the Ozark-Prairie interface. The focus has been divided into three stages that presumably span most of the Archaic Period. The Grove focus is characterized by a variety of large, contracting and expanding stemmed points that tend to become smaller toward the end of the sequence (Bell and Baerreis 1951). Although ceramics never appear in the Grove focus inventory, small points, presumably for arrows, occur toward the end of the sequence (Ibid.). Grove focus sites occur both in open localities alongside rivers and streams and in caves or rock shelters (Ibid.). Similar unnamed complexes are reported throughout eastern Kansas (Rohn and Woodman 1976). These generalized Archaic complexes are characterized by the presence of large, side notched points such as Ensor and Ellis; Gary, Langtry, and other contracting stemmed forms; and several kinds of large, expanding stemmed points. Unfortunately, many of these point forms also occur in Woodland contexts, so their utility as chronological markers is limited.

Most available evidence (Bell and Baerreis 1951; Schmits 1976; Root 1979) suggests that the subsistence pattern of eastern prairie and plains Archaic

groups was oriented toward a seasonal round in the gallery forests and bottomlands, rather than the surrounding grasslands. This is apparently not always the case, however, as indicated by the presence of an Archaic bison kill site in Iowa (Agogino and Frankforter 1970) and the scattered presence of bison remains in Archaic sites throughout the eastern prairies and plains. Generally, however, Archaic complexes in the eastern prairies of Kansas, Missouri, Iowa, and Oklahoma apparently exemplify an attenuated form of the diversified ecological adaptation that was fully developed in the Eastern Woodlands (Caldwell 1958).

The recognition of local complexes and interregional relationships becomes easier for post-Archaic assemblages because of the introduction of ceramics into the artifact inventory. In view of the general lack of well-stratified Woodland and Plains Woodland components in the prairies and plains, however, there is still much uncertainty concerning the detailed chronology of non-Middle Woodland complexes.

Apparently the transition from an Archaic adaptation to the presumably more sedentary Woodland pattern occurred much later in the plains and prairies than in the Eastern Woodlands; in some marginal Plains areas, the Plains Archaic pattern persisted until white contact. Roper (1978) suggests that most of the major economic changes in the HST Reservoir area occurred during the Archaic Period, and for most of the succeeding periods the central and western Osage drainage was peripheral to developments along the Missouri River and in the Central Plains. Furthermore, although many generalized Woodland sites appear in the area, fully sedentary Mississippian occupations in the HST Reservoir are absent.

Although ceramics appear and the cultivation of squash, goosefoot, and pigweed occurs in several areas of the Eastern Woodlands by 1000 B.C., Woodland intrusion into the Plains did not occur until about the birth of Christ. The best known center of initial Woodland penetration into the Plains is along the Missouri River near Kansas City where strong Middle Woodland (Hopewellian) influences are in evidence. Other centers of supposed Hopewellian influence in the eastern prairies and plains have been recognized in northeastern Oklahoma (Bell and Baerreis 1951) and in southeastern Kansas (Marshall 1972).

The Hopewellian complex in the Kansas City area extends roughly from Kansas City to Saint Joseph along the Missouri River and westward into northeastern Kansas. The "Hopewellian" nature of this complex is most visible near Kansas City at large villages like the Renner site (23PL1). In the Midwestern Taxonomic System, Hopewellian material near Kansas City has been designated the Renner phase. Among the Hopewellian traits present in the Renner phase are zoned and rocker stamped pottery; platform pipes; large, broad based, expanding stemmed points; and earthen burial mounds containing stone lined chambers (Willey 1966; Wedel 1961). The Missouri floodplain is quite wide between Kansas City and Saint Joseph, and some cultivation of plant foods was probably practiced. The evidence indicates, however, that corn and squash horticulture was never a significant factor in Kansas City Hopewell subsistence (Johnson 1976a). Kansas City Hopewell culture persisted from about A.D. 1 to A.D. 500 when it was superseded by late Plains Woodland groups occupying small, widely spaced settlements. At this time, small arrow points appear in the artifact inventory. Johnson (Ibid.) has suggested that the dispersal of population in the late Plains Woodland Period is

a reflection of increased reliance upon slash and burn agriculture, but there is little direct evidence for such a subsistence shift.

More attenuated "Hopewellian" influences are apparent in southeastern Kansas and northeastern Oklahoma. The Cooper complex, as the Oklahoma variant is called, contains zoned, dentate stamped pottery; large, broad based, expanding stemmed points; clay figurines; and isolated trade sherds from the Kansas City area (Bell and Baerreis 1951). The Oklahoma Middle Woodland material occurs in both large open sites and rock shelters, but unlike the Renner phase, no burial mounds occur (Ibid.). In southeastern Kansas, similar Middle Woodland material has been grouped into two phases, Cuesta and Hopewell, both of which are seen as exemplifying the widespread Havana tradition (Marshall 1972). Of the two phases, Hopewell is apparently very short-lived. The Cuesta phase is identified by a variety of dentate stamped ceramic styles and a mixture of large, contracting and expanding stemmed points together with small, corner notched points. Radiocarbon dates suggest a span of roughly A.D. 700 to A.D.1050 for the Cuesta phase (Ibid.). As in the Kansas City area, these Middle Woodland complexes were subsequently replaced by a generalized Late Woodland occupation. Further west in central Kansas and Oklahoma, isolated Middle Woodland artifacts occur as trade items in Plains Woodland assemblages, but no indigenous Middle Woodland components exist.

Throughout the rest of the plains and prairies of eastern Kansas, north-central Oklahoma, and western Missouri, generalized Woodland complexes occur in great profusion, but they often resist inclusion within the traditional tripartite Woodland taxonomy. The same is true for most of the Woodland assemblages in the HST Reservoir and the surrounding portions of the Ozark Highland Region. In general terms, these Woodland assemblages are characterized by a mixture of generally undiagnostic large, expanding and contracting stemmed points; small, corner notched and unnotched points; and a profusion of cord marked and smoothed pottery styles. Sites are generally small, and as in many areas of the Plains, little evidence for horticulture exists. It is generally assumed that most of these generalized Woodland components postdate Middle Woodland complexes (Roper 1977a), but secure chronological information is lacking.

A large number of local generalized Woodland complexes have been defined within the Western Prairie and Ozark Highland Regions of western Missouri, usually within the framework provided by the MTS or the Willey and Phillips schemes. Since virtually all sites lack deep stratigraphy and many are undated, chronological separation of these complexes is difficult.

In the Ozark Highlands, most of these Woodland assemblages have been grouped into the Highland aspect (Chapman 1948). As originally defined, the Highland aspect was characterized by limestone tempered, cord marked pottery and a wide variety of large and small point styles. In recent years, the Highland aspect concept has largely dropped out of the literature. The Moreau focus (Upp 1953) and Maramec focus (McMillan 1963) are two manifestations of the Highland aspect. The Maramec focus of south-central Missouri was defined on the basis of a variety of large projectile point forms along with plain and cord marked pottery (Klippel 1965a). The Moreau focus artifact inventory was recognized as similar to that of the Boone focus described immediately below, although lacking any evidence of

burial mounds (Ibid.).

Along the Missouri River in central Missouri, Chapman (1948) defined the Boone focus, an apparently post-Middle Woodland complex characterized by earthen burial mounds, some containing stone lined burial chambers. Village areas are usually associated with the mound groups. Ceramics characteristic of the Boone focus are undecorated and often cord marked. The lithic industry is characterized by large, contracting and expanding stemmed points; small, corner notched points; and a variety of other chipped and ground stone artifacts. Late Woodland mound sites are relatively common in central and southwestern Missouri, and many of them have been grouped within the Fristoe Burial Complex (Wood 1967). Although as a classificatory device for ordering burial sites the Fristoe Burial Complex appears to have validity (Vehik 1977), the overall utility of the concept is clouded by its specific nature and by the apparently long duration of the complex. In general terms, the Fristoe Burial Complex has been defined as a Woodland burial complex characterized by low, circular, rock or rock and earth burial mounds situated on sloping ridges, bluffs, or hills. Artifacts recovered from the mounds indicate that the complex endures from Middle Woodland to Mississippian times. Wood (1967) suggests that the complex represents the mortuary customs of long-term, but relatively isolated inhabitants of the northwestern margin of the Ozark Highland Region. At one time, another taxon, the Lindley focus, was presumed to be the village sites of the same people who erected the Fristoe mounds (Wood 1961). This unit was subsequently abandoned, as was the Nemo complex, its presumed successor (Roper 1977a).

In recent years, virtually all of the above taxa based on the MTS have dropped from the literature, as exemplified by Roper's (Ibid.) discussion of the Woodland archaeology of the HST Reservoir area. Currently, the non-Middle Woodland occupations in central and southwestern Missouri are seen as reflective of a generalized pattern not easily subdivided into chronologically meaningful units (Ibid.).

Moving onto the Central and Southern Plains, chronological and spatial ordering of non-Middle Woodland manifestations remains difficult. In Kansas and north-central Oklahoma, a number of similar non-Middle Woodland complexes have been established, generally within the framework of the MTS or systems evolved from the Willey and Phillips model. Often referred to as Plains Woodland, these complexes are usually considered to postdate the scattered Middle Woodland occupations in the prairies and plains. For the most part, Plains Woodland occupations are found in sheltered river valleys and they appear to represent an adaptation to bottomland and gallery forest environments. Evidence for horticulture is scanty, but maize does appear in some late Plains Woodland contexts (Barr 1966).

A number of Plains Woodland complexes are recognized in eastern Kansas. The Keith focus, originally defined in Nebraska (Kivett 1949), is typical of Plains Woodland complexes in Kansas west of the Flint Hills. Keith focus sites are thought to consist of small numbers of simple, perishable houses, with little evidence for long-term occupation (Wedel 1961). Relatively large ossuaries characterize the burial patterns of Keith focus peoples, and pottery is typically a sand or calcite tempered, cord marked ware. Among the lithic artifacts characteristic of the Keith focus are small to large, stemmed and barbed

projectile points (Kivett 1953).

In east-central Kansas, an important Plains Woodland manifestation has been termed the Greenwood phase (Thomas Witty, personal communication, cited in Reynolds 1979). The Greenwood phase artifact inventory includes limestone tempered, cord marked pottery and large and small, stemmed and corner notched points. Sites are small and consist of small, perishable dwellings adjacent to dependable streams. Some evidence for the existence of smaller, special purpose campsites also exists (Reynolds 1979).

The Grasshopper Falls phase represents another Plains Woodland complex in northeast Kansas (Ibid.). Like the Keith focus and the Greenwood phase, this complex consists of small settlements located on terraces adjacent to secondary streams. The artifact assemblage recovered from Grasshopper Falls sites conforms to the general Plains Woodland pattern of cord marked and smoothed over pottery and large and small, expanding stemmed or corner notched points. As with the other Plains Woodland complexes in Kansas, a basically hunting and gathering economy is presumed for the Grasshopper Falls phase (Ibid.).

Unnamed Plains Woodland complexes occur elsewhere in Kansas and into north-central Oklahoma. These assemblages share much in common with the named complexes, although as one moves south into Oklahoma, large, contracting stemmed points become the dominant large point style, supplanting the large, corner notched forms more common in Kansas. Other noteworthy aspects about some of the Oklahoma Plains Woodland complexes are the relative lack of cord marked pottery and the early radiocarbon determinations for several components, suggesting a pre-Middle Woodland occupation (Rohrbaugh 1974; Hartley 1974).

Several other complexes in the Central and Southern Plains are considered to be transitional between the Plains Woodland Period and the later Plains Village Period. Generally speaking, these sites are larger and their artifact inventories include a larger percentage of small points. Typical of these presumed transitional complexes is the Pomona focus in southeastern Kansas (Marshall 1972) and the Pruitt complex in central Oklahoma (Barr 1966).

Although it appears that a basically Woodland adaptation persisted in the Ozark Highland Region of Missouri until protohistoric times (Roper 1978), many surrounding areas underwent significant developmental changes in the centuries after A.D. 1000. The Mississippian pattern arose in various portions of the East and Southeast beginning at about A.D. 1000, eventually coalescing along the Mississippi River and its major tributaries in the central and southern United States. There is conflict within the literature concerning the nature of Mississippian expansion during the early phases of the period. A traditional view recently expressed by Morse (1977) holds that the Mississippian pattern arose in and near the American Bottoms and the Cairo Lowlands and spread through trait diffusion and outright movement of peoples into surrounding portions of the Southeast and Midwest. It is clear that some Mississippian sites at the margins of the core area such as Aztalan in Wisconsin or Hiwassee Island in Tennessee appear to represent outposts placed in hostile areas (Willey 1966). There is good evidence, however, for the in situ development of certain Mississippian

traits in the Caddoan area (Newell and Krieger 1949), the Lower Mississippi Valley (Ford 1951), and the Southeast (Sears 1956). It may be safe to assume that both expansion from core areas and local evolutionary trends contributed to the widespread development of Mississippian culture. Mississippian culture apparently reached its height between about A.D. 1200 and A.D. 1500. During this period, truncated pyramidal earth mounds became widespread in the East and the population tended to aggregate into large villages concentrated in alluvial valleys. In suitable areas, the cultivation of maize, beans, and squash, in addition to a wide variety of native North American cultigens, became an important part of the economy. In these areas, social integration reached a relatively high level, resulting in the formation of large chiefdoms or incipient states (Morse 1977; O'Brien 1978). In the Southeast, the Mississippian Period is associated with the spread of the Southeastern Ceremonial Complex, which may have assisted the interregional integration of southern Mississippian culture (Brown 1976).

Probably due to environmental constraints, fully developed Mississippian culture never penetrated into the Ozark Highland or Western Prairie Regions of western Missouri (Roper 1978). However, Mississippian complexes arose in the American Bottoms associated with the Cahokia site and extended influences along the Missouri River into the Central Plains. O'Brien (1978) argues that the Steed-Kisker focus of the Central Plains tradition represents an outright migration of Mississippian farming peoples into the wide valley bottoms in the Kansas City area, but others (Wedel 1978; Henning 1978) take a more conservative view, noting the essential similarity of Steed-Kisker sites to other Central Plains Village complexes. With the exception of the Mississippian ceramic styles present at Steed-Kisker, direct Mississippian influences on Central and Southern Plains cultures is very limited, although Caddoan influences are present on some southern Plains Village groups in Oklahoma (Bell and Baerreis 1951). Caddoan material also occurs in small quantities in the Western Prairie Region of Missouri (McMillan 1966; Wood and Pangborn 1968). Additionally, scattered Mississippian or Plains Village material occurs in western Missouri, indicative of intermittent occupations by these groups (Roper 1977a).

In the eastern Plains, the Woodland pattern was gradually replaced by the Plains Village pattern during a time period roughly equivalent with the rise of Mississippian culture in the East. Compared to the earlier Woodland complexes, Plains Village sites are large, permanent or semi-permanent hamlets or villages supported to some extent by the cultivation of maize, beans, and squash. Hunting and gathering remained important in the subsistence pattern of most Plains Village groups, however, and there is evidence for group fission and fusion in response to the seasonal availability of wild food resources (Henry et al. 1979). As opposed to the earlier Woodland exploitative patterns, a much greater utilization of grassland fauna characterized most Plains Village cultures.

In eastern Kansas, the Plains Village pattern is represented by the Central Plains tradition. Central Plains-like complexes have been reported from north-central Kansas yielding radiocarbon determinations as early as A.D. 600 to A.D. 900 (Steinacher and Ludwickson 1972), suggesting that the tradition evolved *in situ* from local Woodland antecedents, rather than by stimulation from

Mississippian cultures. This interpretation is supported by the presence of apparently transitional Woodland-Plains Village complexes in Oklahoma (Hofman 1978) and eastern Kansas (Marshall 1972).

In eastern Kansas, the Central Plains tradition is represented by a number of local variants. The Nebraska aspect is located along the Missouri River in northeastern Kansas and eastern Nebraska (Wedel 1961). Extending to the south into eastern Kansas is the Smoky Hill phase (Ibid.). The Pomona focus, which may begin as a transitional Woodland-Plains Village complex, continues well into the Plains Village Period and exhibits many Plains Village traits. Although there are minor differences that serve to distinguish these complexes (the predominance of smooth pottery in the Nebraska aspect and cord marking in the Pomona focus and Smoky Hill phase; the apparent absence of earth lodges in the Pomona focus; the generally higher incidence of "Mississippian" traits in the Smoky Hill phase), they share many Central Plains traits in common. These traits include partial dependence upon the cultivation of maize, squash, and beans; unplanned villages, hamlets, and small homesteads situated on bluffs or ridges overlooking perennial streams; and the introduction of small, triangular, side notched arrow points, quite distinct from the corner notched types present in Plains Woodland complexes. Plain and cord marked pottery predominate in most complexes, and shell tempering occurs in some contexts. Related to the Central Plains tradition is the Oneota aspect in the Prairie Peninsula of western Iowa which exhibits evidence of interaction with the Central Plains and Mississippian groups (Caldwell and Henning 1978).

In the HST Reservoir area small points that resemble typical Plains Village styles occur relatively frequently. It is difficult to determine the kind of occupation represented by these artifacts, but it is assumed that the area falls within the hunting territories of Central Plains groups to the west (Roper 1977a). It is possible that during the late prehistoric period the area fell within the exploitative range of several distinct groups such as Mississippian peoples from the Missouri River, Late Plains Woodland groups in eastern Kansas, Central Plains peoples, and Caddoan peoples from the Arkansas River drainage in eastern Oklahoma. To date, however, insuffient diagnostic material has been recovered from the HST Reservoir area to illuminate in detail these outside relationships.

RESEARCH OBJECTIVES

One of the more significant advances in the state of the art of cultural resource management (CRM) has been the increased attention now being paid to the development and explicit use of research designs in conjunction with reconnaissance, intensive survey, and mitigation projects. The movement toward more explicit research designs in CRM projects has developed partially as a result of criticism on the part of academic archaeologists that "contract archaeology" consistently failed to produce substantive research results. The employment of individuals with training in archaeology and anthropology in CRM administrative positions has also contributed to a better integration of research designs into CRM projects.

The contractual scope of work for the present project (Appendix A) expressed the need for an explicit research approach and required that a research design report be submitted to the government and the Missouri Department of Natural Resources, Office of Historic Preservation (MOHP) for review and comment prior to the initiation of field work. Accordingly, a research design (Iroquois Research Institute 1979a) was prepared and submitted to the appropriate parties in late June 1979. In addition, certain members of the Missouri Association of Professional Archaeologists (MAPA) were given an opportunity to review and comment on the research design. Verbal and written comments on the research design were received in July and August 1979 and a final research design report (Iroquois Research Institute 1979b) was prepared and submitted to the government, the MOHP, and the MAPA reviewers in early August 1979.

The research objectives for this project include CRM objectives and anthropological objectives. CRM objectives include goals related to fulfillment of specific requirements of the scope of work which are ultimately derived from the government's need to demonstrate compliance with federal regulations including the National Historic Preservation Act of 1966 (Public Law 89-665), Executive Order 11593 ("Protection and Enhancement of the Cultural Environment"), and others. The primary CRM objectives of this project are: (1) to locate and inventory prehistoric resources within selected portions of the study area, (2) to make general estimates concerning the number and distribution of prehistoric resources within the unsurveyed portion of the study area, (3) to determine the probable effects the project will have on the prehistoric resources known and likely to be present in the project area, (4) to determine which identified sites require testing or mitigation, and (5) to outline a plan for additional survey within the project area.

The types of anthropological research questions that can be addressed in a particular CRM project depend on the scope of the project and on the state of prior knowledge of the particular area, that is, the kinds of questions that have already been answered by previous investigators. The anthropological research objectives for this study were formulated after a review of published literature, study of available research designs for the area (Roper and Wood 1975; Schmits 1979), and consultation with archaeologists having active research interests in the area. The following questions were proposed in the final research design report (Iroquois Research Institute 1979b):

1. What are the rates of site occurrence per square mile in each of the nine terrain categories defined for the survey area?

2. What is the total number of sites estimated to be present in the entire study area?

3. Are there any settings or locations in the survey area where sites seem to be concentrated?

4. Are there more sites located on well drained and moderately well drained soils than on poorly drained soils?

5. What are the lithological characteristics and probable source areas for the aboriginally used cherts in the survey area?

6. Are Dalton sites in the Osage Plains located more frequently along major streams than along seco dary and tributary streams as they are in the Ozark Plateaus (Joyer and Roper, in press)?

7. Does the geographic distribution of bifurcated base projectile points extend into the Osage Plains?

8. Is there evidence of Nebo Hill components (Shippee 1948, 1964) in the survey area?

9. Are sites with Nebo Hill components located in rock shelters, in the valley bottoms of major streams, or in the valley bottoms of secondary and tertiary streams?

10. Does the analysis of Late Archaic site sizes reveal a bimodal distribution which would suggest a functional classification of these sites as special sites and base camps?

11. Are large Late Archaic sites typically found along major streams and are small Late Archaic sites found in a greater variety of environmental settings?

12. Does the survey area contain evidence of Plains Woodland and Central Plains complexes similar to known complexes in eastern Kansas such as the Cuesta phase (Marshall 1972), the Pomona focus (Wilmeth 1970; Witty 1967), the Grasshopper Falls phase (Reynolds 1979), the Wakarusa phase (Johnson 1968), the Deer Creek phase (Ibid.), and the Clinton phase (Ibid.)?

13. Are there any Middle Woodland Period sites within the study area which are affiliated with the Kansas City Hopewell (Johnson 1976a)?

14. To what extent do Steed-Kisker sites (Wood 1968) occur within the study area and what are their functional-locational characteristics?

15. What further study is warranted and what future investigatory tasks have priority?

METHODOLOGY

Field Methods

The overall approach to the field survey was controlled by several factors, including specific requirements of the contractual scope of work, the topographic and geographic distribution of the study area, and the necessity to obtain permission to survey from private landowners. The principal factors which influenced the survey sampling strategy are given below.

(1) The 50 year flood easement is comprised of 102 noncontiguous parcels of land which are spread over an area which measures approximately 96 kilometers (60 miles) east-west by 80 kilometers (50 miles) north-south.

(2) None of the flood easement land at the HST project is owned by the government; therefore, permission to conduct the field reconnaissance had to be obtained from private landowners. The average size of an individual holding in the HST flood easement area is approximately 27 acres (Donald Campbell, personal communication).

(3) The scope of work did not require subsurface testing or the surface collection of artifacts. Due to the time required to secure the permission of landowners for such procedures, subsurface testing and surface collections were not undertaken.

The scope of work for this project also required that the field approach be based on the survey strata and transects established by Roper (1977a) for the intensive survey within the HST fee lands (Table 3). Within each of her strata, Roper laid out one-eighth mile wide transects perpendicular to the stream, running in either a north-south or east-west direction. These transects were her survey sampling units.

A coordinated field approach involving Roper's strata was developed by the initial classification of the 50 year flood easement land according to these strata (Table 3). However, Roper's transects could not be utilized in the present study with any degree of success. First, almost none of the 50 year flood easement is within or adjacent to defined transects and second, a division of the flood easement land between 731 and 742 feet above mean sea level into one-eighth mile wide transects would not have achieved the same results obtained by Roper in the reservoir area. One reason for Roper's choice of transects as sampling units was to crosscut several environmental zones within each stratum (Ibid.). Had the entire 50 year flood easement area been divided into one-eighth mile wide transects bounded by the 731-foot and 742 foot contour lines, the estimated mean size of these sampling units would be approximately four acres; such small sampling units would generally not exhibit the environmental variability which characterized the transects in the fee lands of the reservoir.

The strategy adopted for use in this project was to attempt to survey a fixed 15% proportional sampling of each of the major physiographic provinces and terrain categories. The Corps of Engineers had estimated that the 50 year flood easement lands encompassed a total of 60,000 acres, so a 15% sample of the area was equivalent to 9,000 acres. During the research design phase of this project, the proportional representation of each of the nine terrain categories was estimated (Iroquois Research Institute 1979a, 1979b) and the amount of acreage in each terrain category necessary for a 15% sample was computed from these estimates.

Random selection of sample units was not attempted because of the amount of time that would have been necessary to obtain permission to survey from the landowners. The particular tracts surveyed were selected by criteria designed to (1) minimize the time spent acquiring permission to survey and thereby maximize the time available for field investigations, and (2) maximize the productivity of the field investigations.

In order to minimize the time necessary for obtaining permission to survey, permission was sought from owners of large tracts in preference to owners of small holdings. It was expected that more time would be available for the field investigations if permission to survey adequate acreage could be obtained from a few rather than from many landowners. Also, large tracts were preferred because it was judged more efficient to send a field crew to a tract which would require at least one whole day for investigation rather than to have the crew attempt to survey several small tracts in a single day, since the tracts could be miles apart.

The files maintained at the Corps of Engineers' Real Estate Office in Clinton, Missouri were used as the initial source in locating landowners for requesting permission to conduct the field examinations. The Corps of Engineers' files contain landowners' names, addresses, and telephone numbers. Owners who lived in Clinton and the immediate area were contacted personally and others were contacted by telephone.

The tracts for which permission to survey was granted ranged in size from three acres to 3,000 acres, and the mean size of these tracts was approximately 190 acres, much larger than the mean tract size for the entire 50 year flood easement area. Nonetheless, the actual time spent acquiring permissions from 76 landowners was about seven man-weeks, approximately 3.5 times the amount of effort allowed for this task in the project budget.

During an intensive archaeological survey, shovel tests or rake tests are normally done in areas where ground surface visibility is obscured by vegetation. However, the survey procedures for this study were effectively restricted to walkover inspection only. Consequently, the sampling strategy assigned priority to areas where the most favorable ground surface visibility existed for the detection of surficial cultural materials. The best ground surface visibility was obtained in actively cultivated fields.

The field investigations were carried out by archaeological crews which ranged in size from two to six persons. After driving to the selected parcel of land, the crew began field investigations by locating a landmark from which either of the limiting topographic lines (731 or 742 feet above sea level) could be fixed. In most cases this was the 742-foot line, since this was the more frequently mapped contour on the project maps. Brunton pocket transits were used as levels to establish and follow the limits of the study area. Any uncertainty concerning the precise location of either contour line was offset by a liberal estimate of the study area boundaries in order to ensure complete coverage of the 50 year flood easement within a given parcel.

Crew members positioned themselves at 30 meter intervals and walked straight or nearly straight transects with their eyes focused on the ground. The pace among crew members was uniformly maintained and was sufficiently slow to permit the eye to scan an area several meters wide. Vegetative cover and the degree of ground surface visibility was recorded for each tract surveyed, regardless of whether or not any sites were discovered. Ground surface visibility was estimated by reference to a hypothetical one meter wide transect centered about each observer and was estimated to fall within one of the following categories: zero to 25%, 26% to 50%, 51% to 75%, and 76% to 100%.

All surveyed areas were mapped using tracings from project maps scaled at 1:12,000. The acreage of each parcel surveyed was computed using a transparent overlay with a fixed number of dots per square inch. By counting the number of dots in the surveyed area, an accurate square inch area was determined for any shape. Square inch areas were then converted to acreage. Using the 1:12,000 maps, one square inch is equivalent to 22.96 acres. The acreage surveyed by each crew and the cumulative total acreage were computed on a daily basis.

Field personnel were instructed to record any <u>in situ</u> evidence of prehistoric activity at a site, even if it were only a single sherd or flake. Once a site was discovered, the walkover was temporarily suspended and site examination procedures were initiated. First, a quick examination of the site area was made to determine the approximate size and content of the site. Then a temporary datum such as a tree or fence post was established and the crew members delimited the site area by pacing distances from that point. All field personnel were required to calibrate their paces before participating in the field activities and they were instructed to compare their paces among themselves in the field. Site mapping included delineation of the site boundaries and plotting diagnostic artifacts and features such as mounds or concentrated artifact scatters. Each site's elevation was carefully determined by reference to project maps, and the site locations were plotted on USGS quadrangle maps and on the 1:12,000 scale project maps.

During each site examination, an intensive search was made for diagnostic artifacts and, if found, they were sketched and photographed and notable contextual information was recorded. A special addition to the Iroquois Research Institute field manual containing illustrations of projectile points found in the southwestern Missouri area was prepared and distributed to field personnel to aid in the field identification of diagnostic artifacts which were expected to be

present in the HST area. Illustrated point types included Dalton, Graham Cave, Hardin, Hidden Valley, St. Albans Side Notched, MacCorkle, LeCroy, Big Sandy, Jakie Stemmed, Afton, Smith Basal Notched, Sedalia, Etley, Nebo Hill, Cupp, Table Rock, Gary, Langtry, Snyders, Scallorn, and Young points.

Midway through the field investigations, Dr. Hank Groves, a retired USGS geologist whose specialty is paleozoic carbonates and cherts of the mid-continent region, was enlisted to aid in the identification of various lithic materials present at the discovered sites. Dr. Groves visited most of the sites that had been located and instructed all the field personnel in identification of various cherts and other materials. Lithic materials which were identified included Warsaw chert, Burlington chert, Grand Falls or Elsey chert, Reed Springs chert, Pierson chert, Cotter chert, Jefferson City chert, Roubidoux chert, Gasconade chert, sandstone, and limestone. After receiving this instruction, field members systematically recorded the presence of these materials at all sites in the surveyed areas. Unidentified lithic materials were described by their color, texture, and luster.

Private artifact collections were also examined as a source of data. During the field investigations, eight collections were studied. Most of the collections had been made by the landowner, or members of the landowner's family, as the land was farmed. It was possible in some cases to determine the specific site location by interviewing the collection owner; in other cases only very general site location data was known. None of the collections had been made systematically. The collections were photographed.

All field data were recorded on forms developed by Iroquois Research Institute. A field manual describing the proper completion of the forms was supplied to the field personnel to ensure that uniform procedures were utilized by all members of the project. Data were transferred to Archaeological Survey of Missouri site forms in compliance with the background data requirements of the contract. Finally, photographs were taken of all sites.

Laboratory Methods

To facilitate the storage, retrieval, and analysis of information gathered during the project, a system of data coding was devised for eventual computer processing. Data from the 39 sites identified in the present study were systematically recorded, as were data obtained from the Archaeological Survey of Missouri and from the University of Missouri-Columbia for all previously recorded sited located in the Sections which are partially or wholly within the defining contour interval (731 to 742 feet) of the HST project area. A separate file was established for each of the 490 sites.

The available information was systematically coded for 72 variables which pertain to each site's identification, sources of information, location, cultural characteristics, and environmental parameters. The data were prepared according to the format requirements for the Statistical Package for the Social Sciences computer program package (Nie et al. 1975).

The identification data included the official trinomial site numbers as well as the field numbers assigned to the sites which were located by Iroquois Research Institute. Four major sources were utilized in compiling the data files: the Archaeological Survey of Missouri site survey records; the data stored on the University of Missouri-Columbia SELGEM computer file; the site survey records compiled by Terrell Martin; and the data compiled by Iroquois Research Institute. Codes were established for each of these sources so that separate analyses could be performed on the information derived from different sources and so that information from different sources could be compared.

The locational information which was coded included each site's legal description in the Township-Range-Section locational system, the Universal Transverse Mercator (UTM) grid coordinates for each site located by Iroquois Research Institute, the county in which each site is located, each site's elevation above mean sea level, and whether or not each site is located within the 50 year flood easement land.

The bulk of the information recorded pertains to the cultural characteristics of the sites and includes: chronological position; site size; site type and function; and characteristics of the assemblage. Nearly all of the cultural information was recorded on the nominal scale of measurement and coded as "present" or "absent." The major occupational periods (Paleo-Indian, Dalton, Archaic, Woodland, and Mississippian) were indicated as present or absent for each site; this information was obtained by a review of prior documentation and by typological identification of diagnostic artifacts observed in the field. The majority of sites could not be placed into one of the major occupational periods and were recorded as "general prehistoric."

Site size information was recorded in both interval and ratio scales. Site sizes expressed in square meters were recorded directly and they were also classified into the following categories: 1 to 100 square meters; 101 to 1,000 square meters; 1,001 to 5,000 square meters; 5,001 to 20,000 square meters; 20,001 to 40,000 square meters; larger than 40,000 square meters; and unknown.

The general site characteristics indicated on the Archaeological Survey of Missouri site survey forms were transcribed and recorded as site type (open, shelter, bog, cairn, or unknown) and site function (habitation, mounds, burial area, petroglyph/pictograph, quarry, cave/shelter, cairn, trail/trace/road, other, or unknown).

Information pertaining to the artifact assemblages observed at the sites was characterized by the major material components of the assemblages (lithic and ceramic) and by a number of more specific formal/functional artifact categories and raw material types. The artifact categories consist of: points, bifaces, unifacially flaked tools, scrapers, spokeshaves, cores, debitage, ground stone tools, burnt limestone, and fire cracked rock. The lithic types include: Warsaw chert, Burlington chert, Elsey chert, Reed Springs chert, Pierson chert, Cotter chert, Jefferson City chert, Jefferson City or Cotter chert, Roubidoux chert, Gasconade chert, other chert, unidentified chert, chert outcrop, residual chert, sandstone outcrop, residual sandstone, limestone outcrop, and residual limestone. All of these data were recorded on the nominal scale of measurement (presence/absence).

A total of 17 variables pertaining to the environmental settings of the sites were defined as the basis for settlement pattern analysis and for development of a predictive model for site locations within the entire study area. These variables included the sites' physiographic settings, soils conditions, hydrographic associations, catchment areas, and miscellaneous environmental data. Several of the environmental variables defined by Roper (1977a) were utilized in this study so that the results of the two projects could be compared.

For each site, the major physiographic associations were recorded. The physiographic associations include the survey strata defined by Roper (Ibid.) for the Truman Reservoir area and the two major physiographic provinces, the Ozark Plateaus and the Osage Plains. Furthermore, the terrain category defined on the basis of slope, geomorphology, and soil drainage (Figures 1 and 2) was recorded for each site.

The soil series and soil drainage associated with each site located during the survey were recorded and coded for analysis. For sites in Vernon and Henry Counties, the soil series were obtained from the modern soil surveys that have been compiled for these counties (USDA 1976, 1977). Older soil surveys for Bates and Cedar Counties (USDA 1909, 1910) were not used because of the gross scale and inaccuracy of mapping and because the definitions of soil types have since been narrowed and changed. The general drainage of the soil was classified as well drained, intermediate, or poorly drained. These designations were determined from available soil surveys.

Several variables concerning the hydrographic associations of the sites located in this project and of previously recorded sites in the study area were measured. These include: distance to nearest water source; rank of stream; elevation of water source; and elevation of river. Some of these variables are identical to those used by Roper (1977a). The distance to water is the distance in meters to the nearest water body. The water sources included swamps, lakes, streams, and rivers. The measurements were taken from Corps of Engineers project maps scaled at 1:4,800 or the data were transcribed from existing data records. The rank of stream variable was the rank of the stream nearest to the site. It was determined by the Strahler (1964) stream ranking method from USGS quadrangle maps. The elevation of water variable is the elevation of the nearest water source in feet above mean sea level. This measurement was determined from the Corps of Engineer project maps scaled at 1:4,800. Elevations of streams and rivers were determined by mathematical extrapolation between defined contour lines. The elevation of river is the elevation above sea level of the tributary nearest a site at its confluence with the nearest river (ninth or higher order stream). If a site was on any ninth or higher order stream, the elevation on that river was used. For many sites, the measurements for elevation of water and elevation of river were the same. The elevation of river variable was also determined from the 1:4,800 scale Corps of Engineer project maps. The elevation of river variable used in this study is not the same as the elevation of river variable used by Roper who measured river elevation at a point nearest each site (1977a).

Three variables defined by Roper (Ibid.) to describe certain attributes of the site catchment areas were measured for each site located in the study area.

Each of the three variables is a quantitative measurement of the land within a radius of one mile of the site location. The first catchment variable is the amount of land within one mile of the site that is on the same side of the river as the site. The second catchment variable is a measure of the total amount of bottomland within one mile of the site, and the third catchment variable is a measure of the amount of bottomland within one mile of the site that is on the same side of the river as the site. These variables were measured from the USGS quadrangle maps by the use of a transparent overlay with a one mile radius circle. The appropriate area was first measured in square inches with a planimeter and this value was then converted to acreage.

Finally, several miscellaneous variables reflecting environmental factors or survey conditions were coded: exposure, land use, ground surface visibility, erosion, and elevation. A site's exposure was defined as the compass direction from which it is the least protected by the local topography. For example, if a site is surrounded by ridges on the north, east, and west, then it is exposed to the south. The exposure for each site was determined by analysis of 1:24,000 scale project maps and was coded as north, northeast, east, southeast, south, southwest, west, northwest, or open. The land use variable is a classification of the present land use of the site area, based on field observations. The land use categories utilized were: cropland, pasture, woodland, and other. The estimated amount of ground surface visible was recorded as one or more of the following categories: zero to 25%, 26% to 50%, 51% to 75%, 76% to 100%. The erosion of the land surface was subjectively classified to express the depth and extent of erosion into the soil horizon at each site. The erosion classifications were: little to none, moderate, and severe. This was determined by field observations and the appropriate soil survey, if applicable. Care was taken to use the terms as they are defined by the soil surveys of Henry and Vernon Counties (USDA 1976, 1977). The elevation of the sites above sea level was taken from the 1:4,800 scale Corps of Engineers project maps of the easement area or from USGS quadrangle maps if project maps were not available. The mean elevation was used if a site extended over a range of values. For previously recorded sites in the study area that were not surveyed in the present study, the available survey data were used as the source of information.

SURVEY RESULTS

Field Conditions

Tables 6, 7, and 8 summarize the types of ground cover and degree of ground surface visibility observed in the survey area. The field survey was completed in an 11 week period from mid-July through mid-September of 1979, and approximately 60% (5,418 acres) of the area surveyed was under cultivation at that time. Fallow land was the next most common category with 1,712 acres, and pasture land was third with 1,136 acres, while only 769 acres of wooded area were surveyed (Table 6).

Ground surface visibility was recorded for each survey transect. Table 7 shows that approximately 79% of the surveyed area had either very low (zero-25%) or very high (76%-100%) ground surface visibility, with the latter condition being the more common one. The amount of ground surface visible was dependent primarily on the type of ground cover. As shown in Table 7, cultivated land generally had a high ground surface visibility, and this was particularly true of soybean fields, which comprised the bulk of the cultivated land. Both pasture land and wooded areas fairly consistently fell into the lowest ground surface visibility category. Overall, approximately 61% of the surveyed area had ground surface visibility greater than 50%. However, the generally favorable visibility conditions recorded in the surveyed area partially reflect the bias in the survey design toward areas with good visibility. The visibility conditions observed in this project cannot therefore be considered representative of the entire HST 50 year flood easement lands.

Visibility Indexes were calculated in order to compare the visibility conditions observed in the different physiographic provinces and terrain categories. Visibility Index values may range from zero to 100, with the higher values indicating a greater degree of ground visibility, hence more favorable survey conditions. In order to compute the Visibility Index, ordinal values are assigned to each range of surface visibility as follows:

Percent Visibility	Ordinal Value
0-25%	0
26-50%	1
51-75%	2
76-100%	3

Each ordinal value is multiplied by the percentage of the surveyed area falling within the corresponding visibility range, and these products are summed. The sum of the products divided by three is the Visibility Index.

The various types of terrain categories were associated with varying ground surface visibilities, as summarized in Table 8. Land in the Osage Plains had much higher visibility than land in the Ozark Plateaus. The Moderate Slopes (terrain category F) and Poorly Drained Alluvial Land (terrain category H) in the

TABLE 6

GROUND COVER ACREAGE
ACCORDING TO TERRAIN CATEGORIES

GROUND COVER	TERRAIN CATEGORIES									TOTAL
	A	B	C	D	E	F	G	H	I	
CULTIVATED										
Corn	0	0	0	0	170	0	375	72	236	853
Soybeans	282	71	0	0	325	0	680	1,790	233	3,381
Wheat	0	0	0	0	6	0	27	437	0	470
Alfalfa	24	0	0	0	0	0	0	0	0	24
Milo	105	47	11	0	122	20	87	298	0	690
SUBTOTAL	411	118	11	0	623	20	1,169	2,597	469	5,418
PASTURELAND										
Pasture	224	57	31	0	103	0	66	5	54	540
Hay	0	15	0	0	13	0	96	98	51	273
Grass	136	0	83	0	39	0	25	40	0	323
SUBTOTAL	360	72	114	0	155	0	187	143	105	1,136
FALLOW										
Weeds	164	17	54	35	92	0	134	393	0	889
Disced	0	11	0	0	0	8	49	390	0	458
Clear	0	0	0	0	0	0	98	267	0	365
SUBTOTAL	164	28	54	35	92	8	281	1,050	0	1,712
WOODED										
Pecan	0	0	0	0	52	0	0	30	0	82
Woods	34	13	34	1	72	0	337	30	166	687
SUBTOTAL	34	13	34	1	124	0	337	60	166	769
GRAND TOTAL	969	231	213	36	994	28	1,974	3,850	740	9,035

TABLE 7

GROUND SURFACE VISIBILITY
ACCORDING TO GROUND COVER CATEGORIES

GROUND COVER	DISTRIBUTION OF ACREAGE BY VISIBILITY CATEGORIES				TOTAL ACREAGE
	0-25%	26-50%	51-75%	76-100%	
CULTIVATED					
Corn	16	63	238	536	853
	2%	7%	28%	63%	
Soybeans	187	75	583	2,536	3,381
	6%	2%	17%	75%	
Wheat	64	348	58	0	470
	14%	74%	12%	0%	
Alfalfa	24	0	0	0	24
	100%	0%	0%	0%	
Milo	25	91	239	335	690
	4%	13%	35%	48%	
SUBTOTAL	316	577	1,118	3,407	5,418
	6%	11%	20%	63%	
PASTURELAND					
Pasture	540	0	0	0	540
	100%	0%	0%	0%	
Hay	223	35	15	0	273
	82%	13%	5%	0%	
Grass	323	0	0	0	323
	100%	0%	0%	0%	
SUBTOTAL	1,086	35	15	0	1,136
	96%	3%	1%	0%	

TABLE 7 (continued)

GROUND SURFACE VISIBILITY
ACCORDING TO GROUND COVER CATEGORIES

GROUND COVER	DISTRIBUTION OF ACREAGE BY VISIBILITY CATEGORIES				TOTAL ACREAGE
	0-25%	26-50%	51-75%	76-100%	
FALLOW					
Weeds	738 83%	31 3%	120 14%	0 0%	889
Disced	0 0%	0 0%	0 0%	458 100%	458
Clear	0 0%	0 0%	0 0%	365 100%	365
SUBTOTAL	738 43%	31 2%	120 7%	823 48%	1,712
WOODED					
Pecan	82 100%	0 0%	0 0%	0 0%	82
Woods	687 100%	0 0%	0 0%	0 0%	687
SUBTOTAL	769 100%	0 0%	0 0%	0 0%	769
GRAND TOTAL	2,909 32%	643 7%	1,253 14%	4,230 47%	9,035

Osage Plains stand out noticeably as having the best visibility of all. The Visibility Index for the Moderate Slopes (terrain category F) in the Osage Plains, may, however, be misleading, because it is based on a survey of only 28 acres. Similarly, while the Moderate Slopes (terrain category C) and Precipitous Slopes (terrain category D) in the Ozark Plateaus have very low Visibility Indexes, these figures may not be representative of these types of terrain since they are based on surveys of only a small amount of land.

The differences in the Visibility Indexes of the different terrain categories do not appear to have been caused by the fact that some were surveyed later in the summer than others. For example, the Undifferentiated Bottomlands (terrain category G) and Moderate to Well Drained Alluvial Land (terrain category I) in the Osage Plains both have Visibility Indexes in the mid 50's, yet the former was surveyed throughout the summer while the latter was surveyed during the first month only.

The interrelationship between type of ground cover and degree of ground surface visibility is more useful in explaining the Visibility Indexes for the various terrain categories. Areas in the Ozark Plateaus were most frequently in pasture, grass, weeds, and woods (Table 6), all low visibility ground covers. The Gentle Slopes (terrain category B) were an exception, with most of this land being cultivated, and this resulted in a Visibility Index of 31, the highest in the Ozark Plateaus (Table 8). Land in the Osage Plains was mostly cultivated, disced, or clear during the survey (Table 6), and Visibility Indexes were relatively high. The areas exhibiting the highest ground surface visibilities in the Osage Plains were the Moderate Slopes (terrain category F) and the Poorly Drained Alluvial Land (terrain category H) (Table 8).

Visibility conditions may have had an influence on the rate of site discovery. Nine sites were located in areas where ground surface visibility ranged from zero to 50%, 29 sites were located in areas where the ground surface visibility was greater than 50%, while one site was in an area of varied ground cover which ranged from very low to very high. A site occurrence rate of 1.6 sites per square mile was calculated for the areas of low (zero to 50%) surface visibility, while the rate of site occurrence in areas of high surface visibility was 3.4 sites per square mile.

Site Descriptions

Thirty-nine prehistoric sites were identified in the surveyed areas. Three sites (23BT1, 23HE128, and 23VE32) had been previously recorded. Two sites (23HE693 and 23SR790) were determined to be outside of the HST 50 year flood easement area as they are located at elevations slightly above the 742 foot contour elevation. Thus, the present study resulted in the identification of 34 previously unrecorded sites in the HST 50 year easement lands.

All 39 sites located during the field survey are described in the following pages. Specific details of individual site locations are not included in these descriptions in order to protect the resources from destruction. The site

TABLE 8

GROUND SURFACE VISIBILITY
ACCORDING TO TERRAIN CATEGORIES

TERRAIN CATEGORY	DISTRIBUTION OF ACREAGE BY VISIBILITY CATEGORIES				VISIBILITY INDEX
	0-25%	26-50%	51-75%	76-100%	
OZARK PLATEAUS					
"A" Floodplains and Terraces	593 61%	69 7%	222 23%	85 9%	27
"B" Gentle Slopes (0-10%)	142 61%	4 6%	19 8%	56 24%	11
"C" Moderate Slopes (10-30%)	202 95%	0 0%	11 5%	0 0%	3
"D" Precipitous Slopes (over 30%)	36 100%	0 0%	0 0%	0 0%	0
SUBTOTAL	973 67%	83 6%	252 17%	141 10%	23
OSAGE PLAINS					
"E" Gentle Slopes (0-10%)	451 45%	75 8%	117 12%	351 35%	46
"F" Moderate Slopes (10-20%)	0 0%	0 0%	20 71%	8 29%	26
"G" Undifferentiated Bottomlands	740 37%	85 4%	190 10%	959 49%	57
"H" Poorly Drained Alluvial Land	474 12%	400 11%	473 12%	2,503 65%	77
"I" Moderate to Well Drained Alluvial Land	271 37%	0 0%	201 27%	268 36%	54
SUBTOTAL	1,936 26%	560 7%	1,001 13%	4,089 54%	65
GRAND TOTAL	2,909 32%	643 7%	1,253 14%	4,230 47%	59

designations used throughout the text are the official trinomials assigned by the Archaeological Survey of Missouri and coordinated with the University of Missouri-Columbia Harry S. Truman Dam Mitigation Project. Each number consists

of three parts: a prefix "23" which indicates that the site is in Missouri, a two letter abbreviation for the county ("BT" for Bates County, "HE" for Henry County, "SR" for St. Clair County, or "VE" for Vernon County), and a series of numerals which are unique to the site in that particular state and county. The following site descriptions are arranged in the alphanumeric order of the official trinomials.

23BT1

Province: Osage Plains
Stratum: X (Upper Osage)
Prior Documentation: ASM site record

This site was discovered along the left descending bank of the Marais des Cygnes River. It is on a dissected terrace and extends across two rises which are separated by a small gully. At the time of the survey, the site was covered with milo and was surrounded by various weeds, hickory trees, and oak trees (Plate 6). The nearest water source is a small pond approximately 20 meters to the south. The Marais des Cygnes River is located 30 meters to the west, beyond the wooded area. The site is exposed to the west. The soil at the site is an unclassified sandy loam.

The site has been recorded by the Archaeological Survey of Missouri and is known as the "Papinsville" site. The ASM records a collection from the site consisting of one side notched and expanding stemmed point, one chopper fragment, one blank, and one flake.

The site covers an estimated area of 22,400 square meters and measures approximately 150 x 180 meters. The artifacts observed at the site included biface fragments, a unifacially flaked tool, utilized flakes, cores, and debitage. A few of the biface fragments appeared to be point fragments and two were identified as spokeshaves. The majority of the flakes were small interior flakes and the remainder were larger thinning flakes and decortication flakes. The cherts in the assemblage included Jefferson City chert, Burlington chert, Pierson chert, and possibly Roubidoux and Cotter cherts. A few flakes had a lustrous red color and may have been heat treated. Also, residual chert and residual sandstone were scattered over the site area. Historic artifacts including ceramics, brick, glass, and metallic objects were observed on the site and are probably related to nearby farm buildings.

No diagnostic prehistoric artifacts were identified in the assemblage; therefore, the temporal position of the site is unknown.

23BT28

Province: Osage Plains
Stratum: X (Upper Osage)
Prior Documentation: None

This site is a lithic scatter located on a stream terrace with a southern exposure. The site is at the edge of a soybean field approximately 70 meters

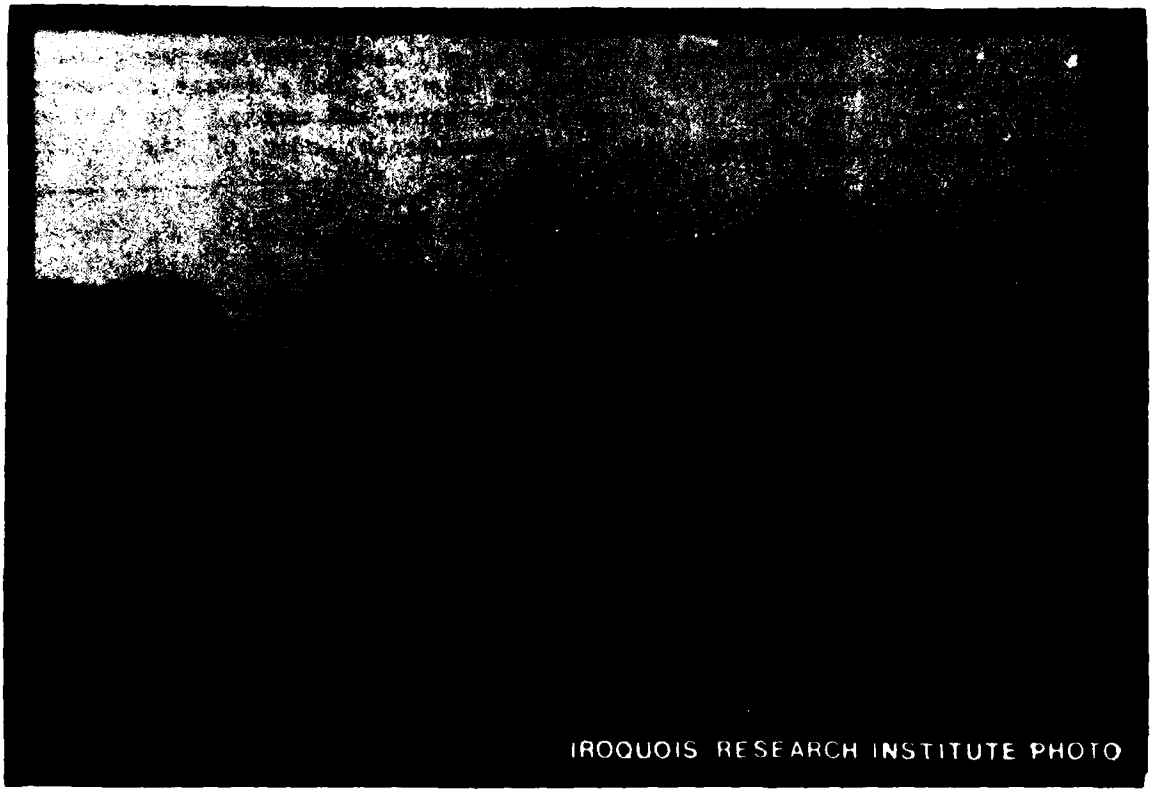


Plate 6. Site 23BT1. This eastern view of site 23BT1 shows the milo field in which the site is located. The site is situated on two small ridges separated by a gully. One ridge is seen in the foreground while the second can barely be seen in the right of the photograph adjacent to the oak and hickory treeline. The gully between the two ridges is obscured in this view by the vegetation. No. 1299-3

north of Collins Lake and close to sites 23BT29 and 23BT30 (Plate 7). An oak-hickory forest including poison ivy, ragweed, and briars lies directly south and east of the site. The soil at the site is an unclassified silt loam.

The vegetative cover at the site allowed for good visibility within the cultivated field; however, the southern and eastern borders of the site could not be precisely delimited because of the heavy vegetative cover there. The observed surface scatter covered an area of approximately 4,190 square meters and measured approximately 40 x 110 meters. A variety of artifacts were observed in the surface scatter including a stemmed projectile point, bifacially flaked tools and fragments, debitage, and fire cracked rock. A pecked and ground pitted stone and fragments of a hammerstone, all made of sandstone, were also found. The major portion of the surface scatter was composed of interior flakes, most of which were made of Burlington chert although a few pieces of Jefferson City or Cotter chert, Gasconade chert, and an unidentified grey chert were also found. Other

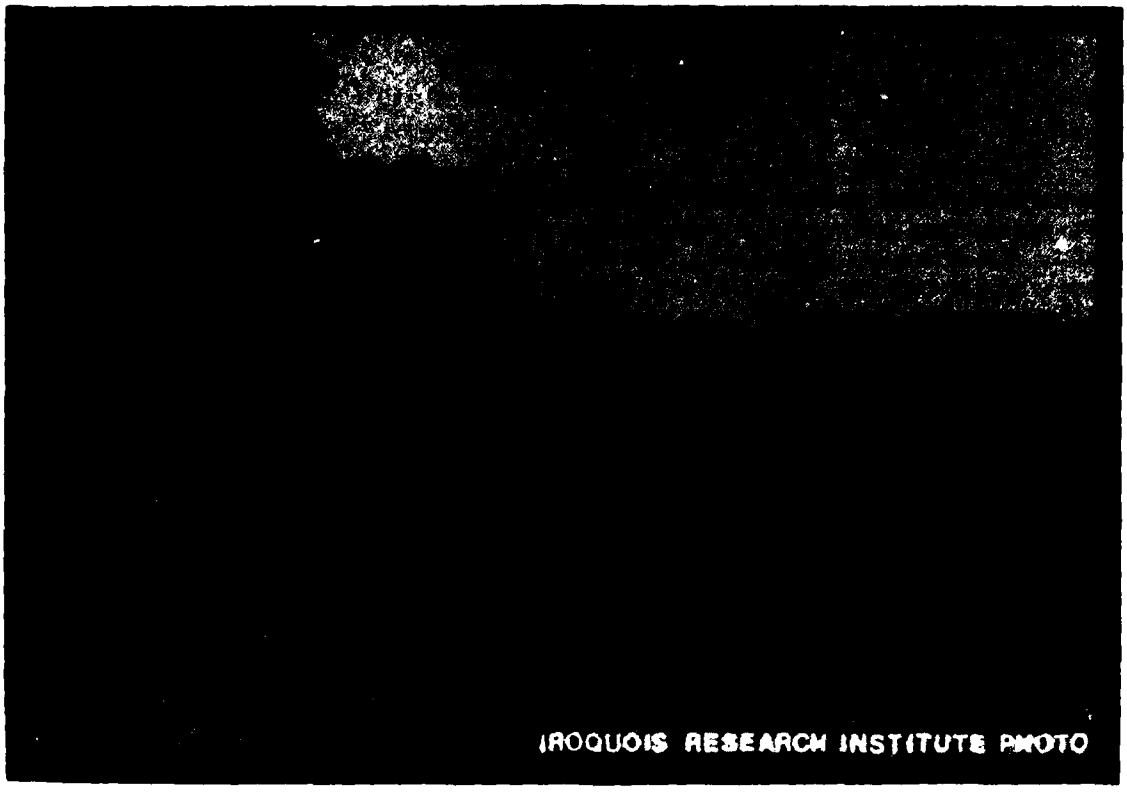


Plate 7. Site 23BT28. Site 23BT28 is located in this soybean field in the Osage Plains. The site area is confined to the foreground of this photograph which was taken facing west. No. 1303-4

artifacts observed included a scraper, a chopper, a graver, and several biface fragments which appeared to be projectile point or knife blade fragments.

The nearly complete stemmed point observed was characterized by roughly worked, straight blade edges, prominent shoulders, and a slightly thinned, straight basal edge. The point was made of Burlington chert and resembled the Rice Contracting Stem point type which is associated with Early to Middle Archaic occupations in Missouri (Chapman 1975). Thus, occupation of the site during the Early to Middle Archaic Periods is suggested by the one diagnostic point observed.

23BT29

Province: Osage Plains
Stratum: X (Upper Osage)
Prior Documentation: None

This site consists of a lithic scatter discovered on a stream terrace approximately 170 meters north of Collins Lake, a small oxbow lake. It is on the left descending bank of the Osage River which is approximately 140 meters to the west. The site is located on the edge of a soybean field surrounded by woods consisting primarily of oak trees and poison ivy vines. Visibility was excellent in the soybean field but decreased greatly in the surrounding woods. This site and two nearby sites, 23BT28 and 23BT30, are all situated on the 730 foot contour line and are exposed to the south. The soil is an unclassified silt loam.

The observed surface scatter covered an area of approximately 2,075 square meters and measured approximately 27 x 80 meters. The site may extend into the wooded area, hence its actual size may be larger than this estimate. The material observed included point fragments, a large unifacially flaked scraper, a hammerstone, a core, and debitage. The scraper was made of an unidentified banded chert and the hammerstone and core were made of Burlington chert. A distal fragment and blade section of the same point made of Burlington chert were observed; however, it was not possible to typologically identify the point. Several interior flakes observed were made from various cherts including Burlington and Elsey chert, an unidentified grey and orange banded chert, and an unidentified rough white chert with small crystal inclusions.

The temporal position for this site is unknown since no diagnostic artifacts were observed.

23BT30

Province: Osage Plains
Stratum: X (Upper Osage)
Prior Documentation: None

This site is a lithic scatter located in a soybean field on the left descending bank of the Osage River, approximately 400 meters east of the river and 100 meters north of an oxbow lake called Collins Lake. This site is exposed to the south and is located on the same stream terrace as sites 23BT28 and 23BT29. The soil is an unclassified, well drained silt loam.

At the time of the survey, ground surface visibility was excellent in the soybean field. However, the southern portion of the site is adjacent to a wooded area consisting primarily of oak trees and poison ivy, and surficial examination was hindered by these conditions. The artifact scatter measured approximately 15 x 20 meters, covering an estimated area of 190 square meters. The site may extend into the heavily vegetated area on the south, hence it may be larger than indicated on the basis of the surface inspection. The materials observed

consisted of about 20 pieces of debitage which were made of Burlington, Pierson, and unidentified cherts.

No cultural affiliation can be suggested for this site because of the lack of observed diagnostic artifacts.

23BT31

Province: Osage Plains
Stratum: X (Upper Osage)
Prior Documentation: None

This site is located 15 to 20 meters east of a meandering stream on the floodplain of the left descending bank of Camp Branch. It was discovered in a recently disced field surrounded by an oak-hickory forest. In the vicinity of the site, the gentle slopes of the Osage Plains are exposed to the southwest. The light brown soil observed at the site was an unclassified silt loam. Conditions for the survey were excellent, as it had recently rained.

The lithic scatter extended over an area of approximately 16,300 square meters and measured approximately 90 x 250 meters. During intensive examination of the site, the survey crew observed utilized flakes, a scraper, a spokeshave, debitage, and fire cracked rock. The most common artifacts were small waste flakes which were concentrated in two distinct areas at the northern and southern ends of the site. The lithic materials represented in the assemblage were Burlington chert, Pierson chert, and Jefferson City or Cotter chert. A few laterally retouched flakes made of Burlington chert were present but no diagnostic artifacts were observed. Also present at the site were various historic artifacts including ceramics, glass, one molded bottleneck, and nails.

Since no diagnostic artifacts were observed at the site, there is insufficient data to establish its temporal position.

23HE128

Province: Osage Plains
Stratum: XX (Upper South Grand)
Prior Documentation: ASM site record; Chapman (1965f)

The lithic scatter comprising this site is located on the right descending bank of Big Creek near the mouth of an unnamed tributary. This tributary stream is approximately 25 meters north of the site. The site is confined to a wheat field on a low terrace with a northern exposure. A wooded area of oak, hickory, and willow trees is immediately adjacent to the east and northeast while a ridge with similar vegetation borders the western site extremity. At the time of the initial survey, ground surface visibility in these wooded sections was poor, but it was good in the cultivated field. The site is on a light brown Lightning silt loam soil.

This site was previously recorded as 23HE128 by Chapman (1965f). It is also recorded on an ASM site survey form. The site was not excavated but was determined to be a Woodland campsite based on the types of ceramic and lithic artifacts both recovered and observed in the possession of two local residents.

When the site was examined during the present study, it was estimated to measure approximately 45 x 270 meters, with a total size of 8,800 square meters. The cultural material observed included bifacial and unifacial tools plus an assortment of small waste flakes. The lithic materials included Elsey chert, Burlington chert, Pierson chert, and unidentified oolitic cherts of the Ordovician system. The tools in the assemblage included a prismatic bladelet possibly utilized as a spokeshave, a thumbnail scraper, and two projectile point fragments. One of the point fragments exhibited corner notches, excurvate blade edges with barbs, an expanding stem, and a nearly straight basal edge (Plate 8:A). It was made of Burlington chert and resembled the Manker Corner Notched point type (Montet-White 1968) which is a Woodland Period diagnostic. The other point fragment was also made of Burlington chert; it was too incomplete for typological identification.

A local resident maintains a collection of artifacts from this site and from site 23HE695, although he could not say which particular artifacts were collected from either site. The point types in the collection include: Merom Expanding Stem (Winters 1969), Grand (Perino 1971), Afton (Chapman 1975), Gary (Bell 1958), Young (Bell 1960), Scallorn (Ibid.), Langtry (Bell 1958), Snyders Corner Notched (Montet-White 1968), Manker Corner Notched (Ibid.), Ansel (Ibid.), Gibson (Perino 1968), Steuben (Montet-White 1968), Cahokia (Perino 1968), Bonham (Bell 1960), Huffaker (Ibid.), and Graham Cave Side Notched (Klippel 1971).

A Woodland Period occupation for the site is indicated by the one Manker Corner Notched point found at the site. Additional Archaic and Mississippian Period components are possible, based on the privately collected material which may be from the site.

23HE693

Province: Osage Plains
Stratum: XX (Upper South Grand)
Prior Documentation: None

This lithic scatter is situated on a stream terrace, on the right descending bank of the South Grand River which has been ditched and the right descending bank of the Old Channel. The South Grand River is approximately 100 meters north of the site, which is in a narrow strip of pasture land and in the adjacent disced field. These fields were bounded by oaks and hickories (Plate 9). The site is on a Hartwell silt loam soil and has a northern exposure. The crew was informed of the site's location by the landowners.

Pasture grasses obscured the visibility in the site area reported by the landowners, and no cultural material was observed. The visibility was excellent to the south of the reported site, however, as the field had been recently

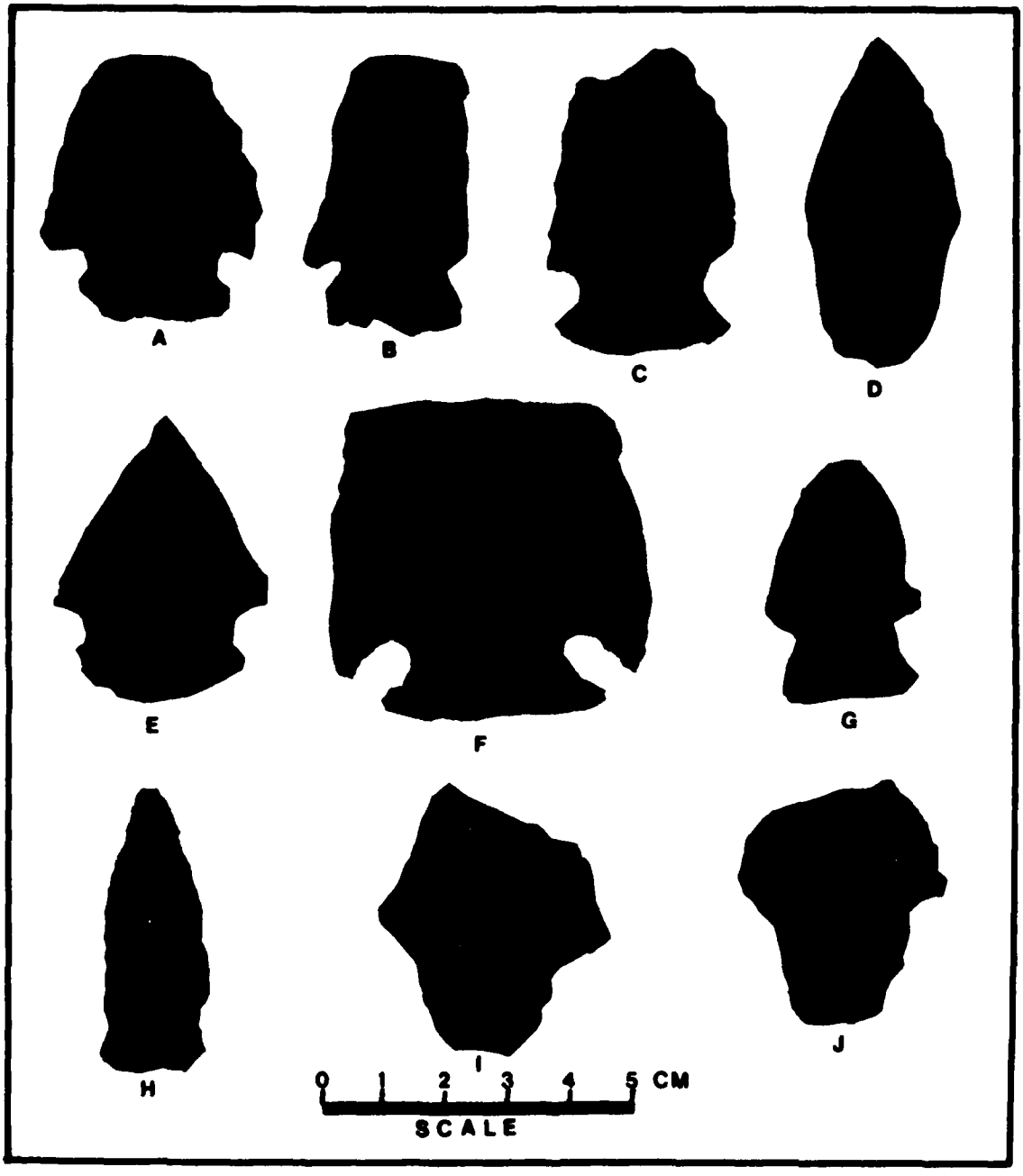


Plate 8. Woodland Points. (A) Manker Corner Notched point from site 23NE128. (B) Manker Stemmed point from site 23SR795. (C) Gibson point from site 23SR802. (D) Gary point from site 23SR792. (E) Snyders Corner Notched point from site 23NE695. (F) Snyders Corner Notched point from site 23SR793. (G) Steuben Stemmed point from site 23SR797. (H) Steuben Stemmed point from site 23VE39. (I) and (J) Langtry points from site 23SR792.

Plate 9. Site 23HE693. This photograph of site 23HE693 was taken facing north. The site is situated on the right descending bank of the South Grand River. At the time of the survey the site was located in a recently disced field and extended into the adjoining pasture visible in the background. No. 1375-15

disced. Only three Burlington chert flakes were observed. Based on these observed artifacts, the site size appears to be approximately 40 meters north-south by 35 meters east-west, covering approximately 1,100 square meters. The vegetative covering did not permit the total site area to be ascertained and the actual site dimensions may be larger. According to the field estimates, this site is above the 50 year flood pool and will not be adversely impacted by the reservoir.

An interview with the landowners disclosed the existence of a second site which is supposedly located approximately 600 meters west of 23HE693 along the banks of the South Grand River. This site, however, could not be located despite Iroquois Research Institute survey efforts.

The landowners have maintained a private collection of material gathered from both sites, including points which are associated with the Dalton, Archaic,

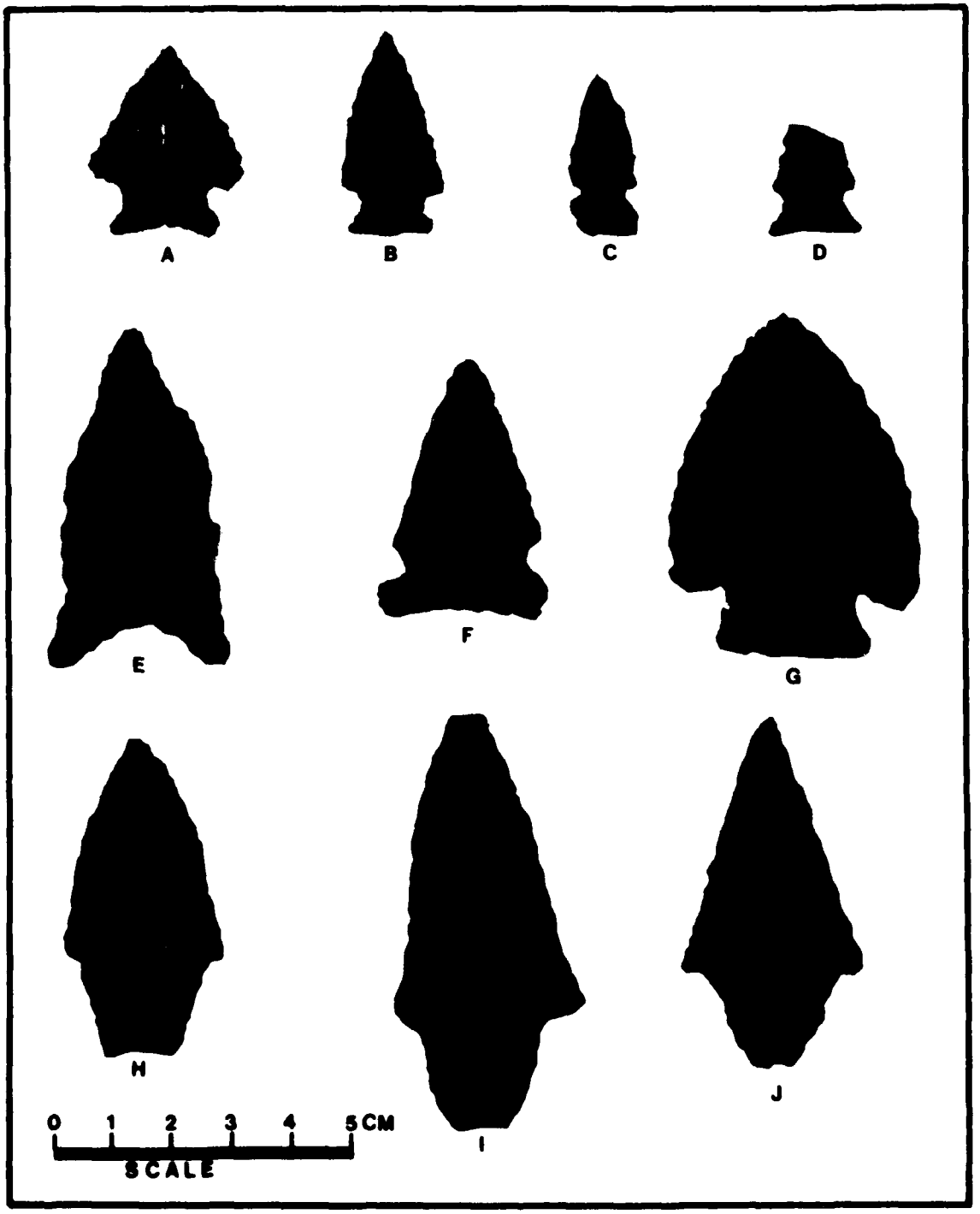


Plate 10. Privately Collected Points. The owner indicated that these points were collected from site 23HE693 or another site which has not been recorded. (A) Martindale point. (B) Meron Expanding Stem point. (C) Reed or Cahokia point. (D) Scallorn point. (E) Dalton point. (F) Graham Cave Side Notched or Big Sandy Notched point. (G) Snyders Corner Notched point. (H) and (I) Rice Contracting Stemmed points. (J) Langtry point.

Woodland, and Mississippian Periods. The collection includes points similar to the following point types: Dalton (Bell 1958) (Plate 10:E), Golondrina (Perino 1971) (Plate 11:B), Graham Cave Side Notched (Klippel 1971) or Big Sandy Notched (Chapman 1975) (Plate 10:F), Rice Contracting Stemmed (Ibid.) (Plate 10:H and I), Table Rock Stemmed (Ibid.), Afton (Ibid.), Martindale (Bell 1960) (Plate 10:A), Merom Expanding Stem (Winters 1969) (Plate 10:B), Langtry (Bell 1958) (Plate 10:J), Snyders Corner Notched (Montet-White 1968) (Plate 10:G), Scallorn (Bell 1960) (Plate 10:D), and Reed (Ibid.) or Cahokia (Perino 1968) (Plate 10:C).

Since the owners of the collection could not specify which points were collected from either of the two sites and because no diagnostic artifacts were observed in the field, specific occupational components cannot be identified for this site.

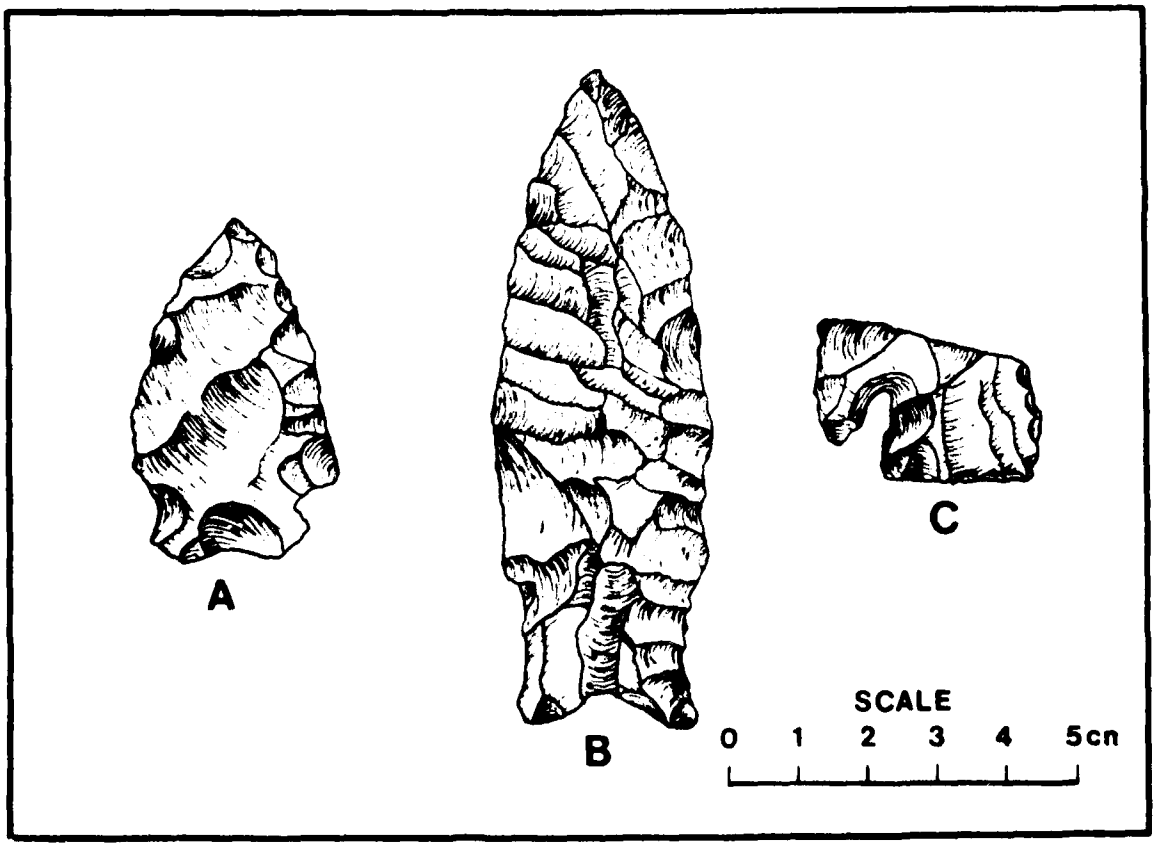


Plate 11. Miscellaneous artifacts. (A) Jakie Stemmed point from site 23HF695. (B) Privately collected Golondrina point, from site 23HF691. (C) Smith Basal Notched point fragment from site 23HF791.

23HE694

Province: Osage Plains
Stratum: XX (Upper South Grand)
Prior Documentation: None

This site consists of a lithic scatter located on the northwest slope of a terrace on the right descending bank of an unnamed intermittent stream which feeds Fields Creek. The intermit.ont stream is approximately 250 meters south of the site. At the time of the survey, the site was covered by a crop of mature soybeans and surrounded by a forest of oak and hickory. The site is situated on moderately well drained Deepwater silt loam.

The site measures approximately 30 x 30 meters and covers an area of approximately 700 square meters. The surface scatter was composed primarily of debitage, although some utilized flakes and a basal point fragment were also observed. The point fragment was made of an unidentified chert. It could not be typologically identified. The majority of the debitage was made of cherts of the Mississippian system (Burlington, Pierson, and Warsaw chert), and some cherts of the Ordovician system (Jefferson City or Cotter chert) were also present. Residual chert present throughout the general site vicinity was described as light yellowish brown chert and off-white, opaque, granular chert.

The temporal position of the site cannot be determined since no diagnostic artifacts were observed.

23HE695

Province: Osage Plains
Stratum: XX (Upper South Grand)
Prior Documentation: None

This site is located on a dissected terrace with an eastern exposure. Big Creek is 450 meters to the southwest and an unnamed intermittent stream is 160 meters to the south. The site was covered with corn and soybeans at the time of the survey and is crossed by two pin oak, hickory, and locust treelines (Plate 12). The site is on a poorly drained Lightning silt loam soil.

The site measures approximately 135 x 320 meters and covers an estimated area of 33,500 square meters. The artifacts observed included points and point fragments, scrapers, a ground stone tool, several sandstone abraders, debitage, cores, and a manuport (rubbed hematite). The majority of the assemblage was comprised of Burlington chert, while Elsey chert, Warsaw chert, Cotter chert, and unidentified chert were also present. In addition, one Arkansas novaculite core was observed and residual limestone was scattered over the site area.

Two potentially diagnostic bifaces were observed at the site. One was a stemmed point with excurvate blade edges, an expanded stem, and an indented, slightly ground base (Plate 11:A). The point was made of Burlington chert and it resembled the Jakie Stemmed point type (Chapman 1975) which is a Middle Archaic

Plate 12. Site 23HE695. The central portion of site 23HE695 is located on the soybean covered rise visible in the background. The site extends beyond the pin oak, locust, and hickory treeline seen on the right (west) and continues further to the left (east) as well. No. 1299-7

indicator. The other potentially diagnostic biface was a basal fragment of a side notched point. This specimen exhibited shallow side notches and a concave basal edge (Plate 13:E). It was made of Burlington chert and resembled the Graham Cave Side Notched point type (Klippel 1971) which is an Early Archaic diagnostic.

A local resident who farms the area has a point in his possession which he was confident was from this site. The point is corner notched with a convex basal edge and slightly excurvate blade edges (Plate 8:E). The point resembles the Snyders Corner Notched point type (Montet-White 1968; Perino 1968) which is associated with Woodland Period occupations. The farmer also has a number of artifacts collected from this site and from site 23HE128 but whose specific provenience is uncertain. These include: Merom Expanding Stem (Winters 1969), Grand (Perino 1971), Afton (Chapman 1975), Gary (Bell 1958), Young (Bell 1960), Scallorn (Ibid.), Langtry (Bell 1958), Snyders Corner Notched (Montet-White 1968), Manker Corner Notched (Ibid.), Ansel (Ibid.), Gibson (Perino 1968),

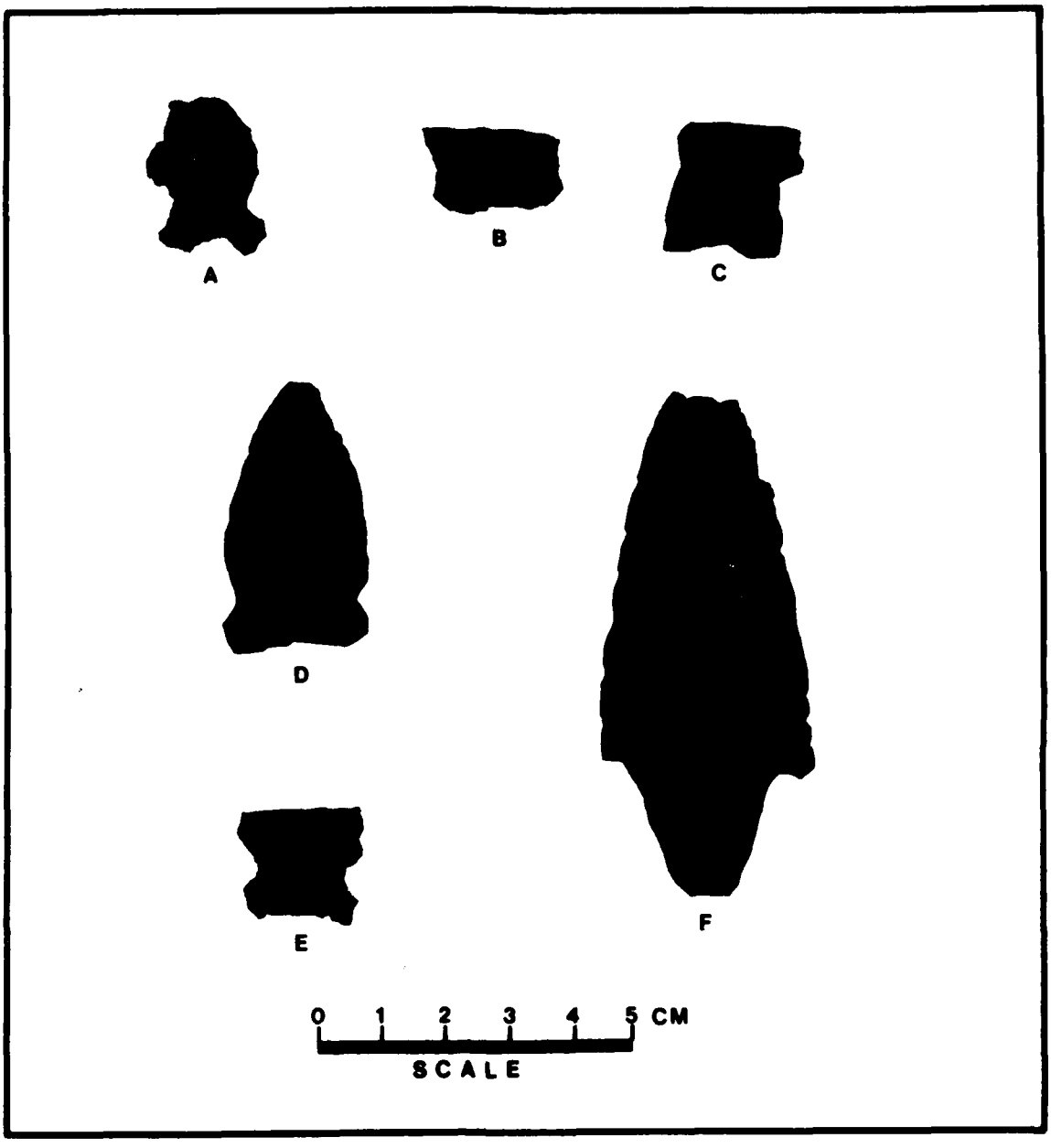


Plate 13. Early Archaic and Middle Archaic Points. (A) St. Albans Side Notched point from site 23VE43. (B) Rice Lobed point fragment from site 23VE40. (C) Jakie Stemmed point fragment from site 23VE39. (D) Big Sandy Notched point from site 23SR803. (E) Graham Cave Side Notched point fragment from site 23ME695. (F) Hidden Valley Stemmed point from site 23SR793.

Steuben (Montet-White 1968), Cahokia (Perino 1968), Bonham (Bell 1960), Huffaker (Ibid.), and Graham Cave Side Notched (Klippel 1971) points.

Occupation of the site during the Early to Middle Archaic Periods is indicated by the points observed at the site. Late Archaic, Woodland, and Mississippian components are suggested by the material in the private collection which may be from this site.

23HE696

Province: Osage Plains
Stratum: XX (Upper South Grand)
Prior Documentation: None

This site is possibly a prehistoric mound located on the right bank of Big Creek approximately 120 meters south of the topbank. Approximately 190 meters to the east is the confluence of an intermittent stream and Big Creek. The mound, surrounded by cultivated fields, is covered with a heavy forest of oak, hickory, basswood, elm, and brush. The soil is light brown Verdigris silt loam.

The local farmer reported the location of the site to the Iroquois Research Institute field crew and indicated that he had dug into the mound to a depth of four feet and recovered only lithic debris. The field crew observed the mound to be approximately 3.3 meters high and visible on the floodplain from a distance of 50 meters. The mound has an open exposure and is oblong in shape with the longer axis running east-west. The mound measures approximately 80 meters east-west by 40 meters north-south, covering an area of approximately 2,500 square meters. Two small depressions approximately 1 meter in diameter were in the mound, one at the center and one at the eastern edge. These may be the result of the farmer's digging.

Although the mound and the surrounding area were carefully inspected for artifacts, the heavy vegetative cover on the mound hindered this examination. The only cultural material observed was a small flake made of an unidentified light grey chert. A Woodland Period affiliation is suggested for this site since burial mounds in southwestern Missouri are usually considered to be associated with Woodland cultures. The mound is near site 23HE128 and may be associated with that site. Mound sites are rare in the Osage Plains, however, and in the absence of controlled testing, the assessment of 23HE696 as a cultural mound is only tentative.

23HE697

Province: Osage Plains
Stratum: XX (Upper South Grand)
Prior Documentation: None

This site is located approximately 900 meters west of Big Creek on a slight rise on a dissected terrace with an eastern exposure. The site is adjacent to a treeline of oak and hickory and is located 150 meters south of a small drainage ditch and 125 meters west of an intermittent stream. The site is on light brown

Quarles silt loam soil. At the time of the survey, the site area was planted in soybeans.

The site was estimated to cover an area of approximately 2,500 square meters, measuring approximately 60 x 65 meters. When the site was examined the soybeans were quite young, hence ground surface visibility was good. The materials observed consisted of a scatter of bifaces, utilized flakes, and debitage with a slightly heavier concentration of material on the eastern portion of the site. Two bifaces appeared to be distal fragments of projectile points made of Burlington chert and Pierson chert. Three utilized flakes made of Burlington chert were noted, and the debitage consisted of a variety of lithic materials including Burlington chert, Pierson chert, and novaculite. One medium sized, nearly complete point which was observed exhibited an expanding stem, a straight basal edge, and slightly concave blade edges (Plate 14:A). The point resembled the Ellis point type (Bell 1960) which has a temporal range from the Late Archaic through the Woodland Periods. Occupation of the site during the Late Archaic or Woodland Period is therefore indicated.

23SR785

Province: Osage Plains
Stratum: X (Upper Osage)
Prior Documentation: None

This site, a lithic scatter, was discovered in a milo field on the right descending bank of Monegaw Creek. The site is located on the floodplain eight meters south of the creek and is exposed to the northeast. A dirt farm road and an associated treeline run through the milo field and constitute the western site boundary. Assorted weeds and oak and willow trees are included in the surrounding vegetation. The milo field was intermixed with various weeds and grasses which obscured visibility over a large portion of the area. However, the visibility was excellent in the area immediately adjacent to the treeline where there was no vegetation. The soil is an unclassified silty sand.

The lithic scatter observed at the site included areas of apparently heavier concentration adjacent to the treeline; this may be attributable to the more favorable visibility in this area. After careful examination of the area, it was estimated that the site covered an area of approximately 3,050 square meters and measured approximately 48 x 65 meters. The cultural material found consisted of a distal fragment of a point and debitage. The most abundant lithic material observed was Burlington chert, although Pierson and Elsey chert were also present. Residual chert and sandstone were noted on the ground surface, but no outcrops were located at the site. The sandstone was more abundant in the southeast portion of the site.

The chronological position of this site is unknown because no diagnostic artifacts were observed.

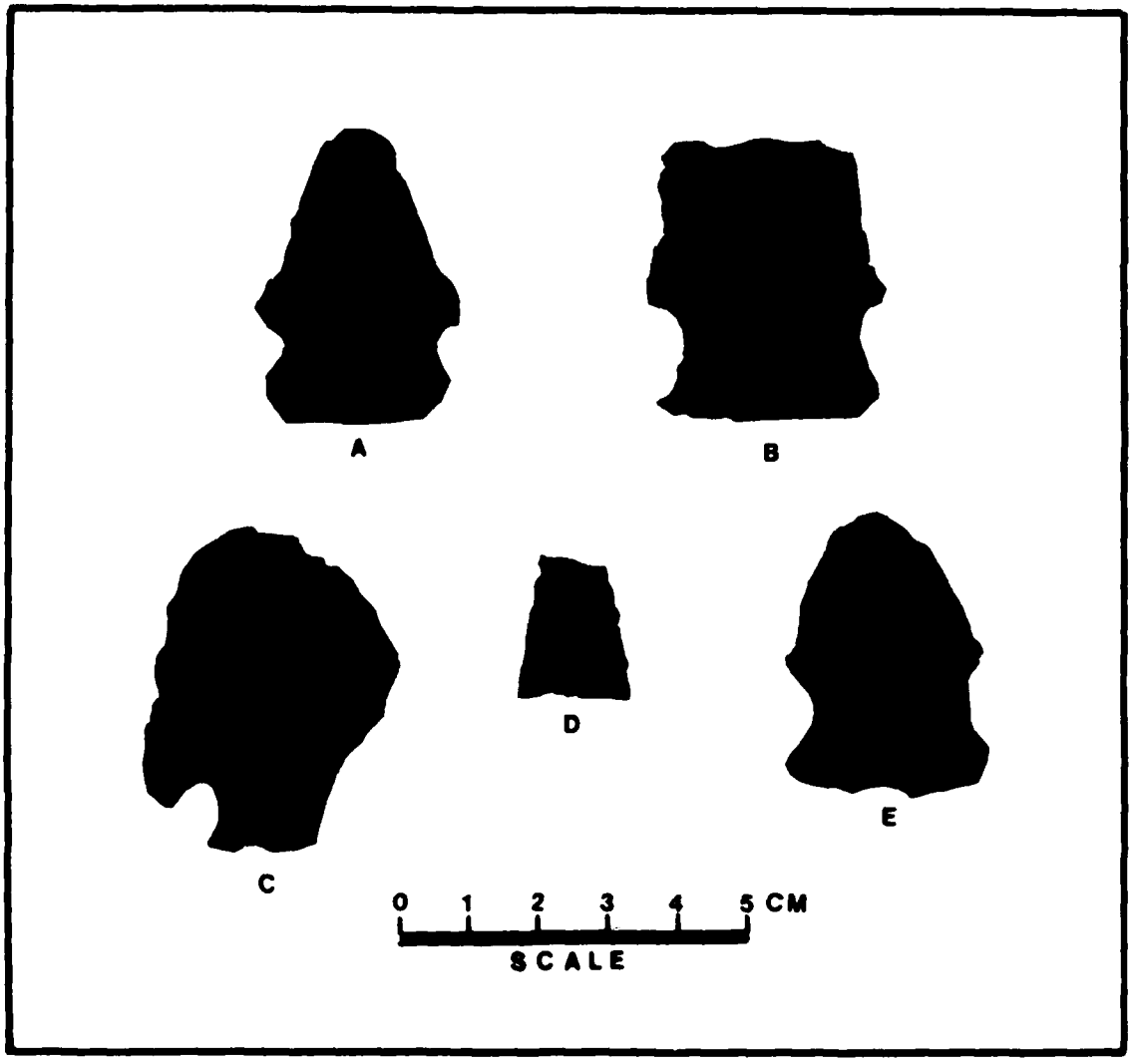


Plate 14. Miscellaneous Points. (A) Ellis point from site 23HE697. (B) King's Corner Notched point from site 23SR792. (C) Grand point from site 23SR792. (D) Madison point from site 23VE39. (E) Ensor point from site 23SR792.

23SR786

Province: Osage Plains
Stratum: X (Upper Osage)
Prior Documentation: None

The lithic scatter comprising this site is located on the left descending bank of Monegaw Creek. The site was found in a recently disced field five meters

east of the creek on a floodplain with a southern exposure. An oak and maple treeline defined the western edge of the site along the bank of Monegaw Creek. Visibility at the time of the intitial survey was excellent due to the sparse cover of grass and morning glories. The ground surface was apparently silted over by surface runoff from the adjacent upper terraces. The soil is an unclassified light greyish brown silty sand which contains some residual chert and sandstone float.

The site measures approximately 60 x 70 meters and covers a total area of approximately 4,200 square meters. Most of the cultural material was located within 25 meters of the treeline. The cultural material observed included several bifacially and unifacially flaked tools, utilized flakes, debitage, and several pieces of pitted or abraded sandstone. Also, the crew observed several pieces of sandstone that appeared to have been burned. The tools included a scraper made of Jefferson City or Cotter chert, a large retouched flake made of Gasconade chert, and a large blade of a point or knife made of Jefferson City or Cotter chert. This blade had slightly convex and serrated blade edges but it could not be typologically identified since the hafting element was completely missing. The flake assemblage included Jefferson City chert, Cotter chert, and Gasconade chert.

No temporal position for this site is suggested since no diagnostic artifacts were identified in the assemblage.

23SR787

Province: Osage Plains
Stratum: X (Upper Osage)
Prior Documentation: None

This site, a lithic scatter, was discovered in a disced field on the floodplain on the left descending bank of Monegaw Creek. It is approximately five meters north of the creek and is exposed to the south. The disced field was surrounded by oak and maple trees in addition to morning glories and other weeds. The soil on the site is an unclassified, well drained silty clay.

The site measured approximately 125 x 145 meters and covered an area of approximately 11,025 square meters. The visibility in the disced field was very good, and only a few small interior flakes were observed. The majority of the observed materials were made of Burlington chert although some unidentified chert was also present.

No diagnostic artifacts were found. Therefore, the chronological position of the site cannot be determined.

23SR788

Province: Ozark Plateaus
Stratum: X (Upper Osage)
Prior Documentation: None

This lithic scatter is situated on a slight slope on the right descending bank of the Little Monegaw Creek, approximately 90 meters south of this perennial stream. The site is confined to a cleared area which is exposed to the east. The ground surface was covered by a variety of weeds, grasses, and shrubs which provided fair visibility during the initial survey. A draw, approximately 7 meters wide, cuts across the site and is filled with vegetative debris. The recent disturbance of the area due to land clearing has accelerated runoff erosion. The soil is an unclassified sandy silt. Limestone and Cotter chert outcroppings were exposed on the slope.

The site was estimated to cover a total area of 13,200 square meters, measuring approximately 85 x 164 meters. Within the site area, three major areas of concentration were noted. The cultural materials observed at the site included projectile point fragments, biface fragments, a unifacially flaked tool, utilized flakes, and debitage. A variety of cherts were present including Burlington chert, Pierson chert, Warsaw chert, Gasconade chert, Roubidoux chert, Elsey chert, Jefferson City chert, and Cotter chert. Also observed was Atlas Powder chert, a relatively rare Cotter chert characterized by a blue color and brown oolites.

None of the artifacts were complete enough for typological identification; therefore, the temporal position of the site is unknown.

23SR789

Province: Ozark Plateaus
Stratum: X (Upper Osage)
Prior Documentation: None

This lithic scatter is located on a stream terrace 50 meters west of Little Monegaw Creek on the right descending bank. The site is exposed on the southeast and is approximately 40 meters north of an oak-hickory treeline. The soil is a light brownish grey, unclassified silt loam.

The site measures approximately 33 x 38 meters and covers an estimated area of 950 square meters. The cultural material observed at the site included a projectile point fragment, a unifacially flaked tool, utilized flakes, and debitage. The lithic materials in the assemblage included Burlington chert, Elsey chert, and other unidentified cherts of the Mississippian system. Also, residual Ordovician sandstone was observed at the site. The point fragment, made of Burlington chert, was a small, roughly triangular blade. Because the hafting element was missing from this specimen, it could not be typologically identified.

A specific period of occupation cannot be determined for this site since no diagnostic artifacts were found.

23SR790

Province: Ozark Plateaus
Stratum: X (Upper Osage)
Prior Documentation: None

This site, consisting of a lithic scatter, is located on a terrace on the left descending bank of an intermittent stream which is a tributary of Little Monegaw Creek. The site was discovered in a milo field approximately 75 meters east of the intermittent stream. The field is surrounded by a stand of oak and hickory and is exposed to the south. The soil is an unclassified silty clay.

During the examination of the site, it was determined to be entirely above the 742-foot contour line, hence it is outside the project area. The site covers an estimated area of 12,900 square meters, measuring approximately 88 x 150 meters. Two point fragments were located and photographed but could not be typologically identified because of their fragmentary nature.

There is insufficient data to determine the chronological position of the site at present.

23SR791

Province: Ozark Plateaus
Stratum: X (Upper Osage)
Prior Documentation: None

This site occupies a gentle slope which is bisected by an unnamed intermittent tributary stream of Clear Creek. The site is approximately 70 meters northeast of the creek. At the time of the survey, the eastern portion of the site was planted in milo while the western portion was overgrown with weeds and grasses. A forest of oak and hickory marked the southeastern boundary of the site. The soil is an unclassified sandy loam and the site is exposed to the south.

The site measures approximately 110 x 140 meters and covers an estimated area of 9,650 square meters. Included in the surface scatter were bifacial tools, unifacial tools, and debitage. The lithic assemblage was composed of Burlington chert, unidentified Ordovician chert, Elsey chert, and Pierson chert. The tools identified in the assemblage included a point fragment, a chopper, and two scrapers.

The point fragment was a basal section which exhibited a straight, squared stem and one prominent barb (Plate 11:C). This incomplete specimen had some of the characteristics of the Smith Basal Notched point type (Chapman 1975) which is primarily associated with Late Archaic assemblages. Occupation of the site during the Late Archaic Period is therefore tentatively suggested.

23SR792

Province: Ozark Plateaus
Stratum: X (Upper Osage)
Prior Documentation: None

This site is located at the base of a slope on the left descending bank of Little Clear Creek. Little Clear Creek is approximately 50 meters to the south and an unnamed intermittent stream is approximately 20 meters to the west. The site is bounded on the south and east by a forest of oak and hickory and was covered by milo at the time of the survey (Plate 15). The site is exposed to the south and the soil is an unclassified silty sand.

Plate 15. Site 23SR792. The eastern portion of site 23SR792 is in the milo field shown in this photograph. A forest of oak and hickory trees borders the field. No. 1300-21

The site measures approximately 100 x 400 meters and covers an estimated area of 39,600 square meters. The observed cultural material included bifacially flaked tools, unifacially flaked tools, debitage, and cores. Cherts of the Mississippian and Ordovician systems were noted, including Burlington, Pierson, Elsey, and Jefferson City or Gasconade chert, as well as some unidentified reddish cherts. The tools in the assemblage included projectile points, blade fragments, scrapers, and choppers, and the debitage included both decortication flakes and interior flakes.

Several diagnostic points were identified in the assemblage. A fragmentary corner notched or expanding stemmed point with a straight basal edge and protruding shoulders (Plate 14:B) resembled the King's Corner Notched point type (Powell 1962), a form which is found throughout southwestern Missouri but which does not have a well defined temporal range. A small side notched point with a slightly incurvate basal edge and excurvate blade edges (Plate 14:E) resembled the Ensor point type (Bell 1960). Bell (Ibid.) indicates that the Ensor point was used during the Archaic Period, while Suhm and Jelks (1962) indicate that its period of use extends into the Woodland Period. A complete stemmed point made of Burlington chert resembled the Gary point type (Plate 8:D). Montet-White (1968) places this point in the Woodland Period and Bell (1958) indicates that it was in use during the Late Archaic Period. Two Langtry points (Ibid.) were identified, each exhibiting a contracting stem, prominent shoulders, and a straight or slightly incurvate basal edge (Plate 8:I and J). Langtry points are considered to be Woodland Period diagnostics by Bell (Ibid.). A reworked point with a broad, ovate blade, broad corner notches, and a short expanding stem (Plate 14:C) resembled the Grand point type, a form whose temporal range spans the Late Archaic and Early Woodland Periods (Perino 1971). The site appears to have been utilized during the Late Archaic and Woodland Periods, based on the presumed temporal ranges of these six identified points.

23SR793

Province: Ozark Plateaus
Stratum: X (Upper Osage)
Prior Documentation: None

This site is located on the left descending bank of Little Clear Creek, approximately 40 meters south of this perennial stream. The site was found in a disced field with the eastern site edge defined by an oak and hickory forest. A narrow drainage ditch and milo field were directly south of the site, while a pasture bordered the site's northern edge (Plate 16). The site is exposed to the east, and the soil is an unclassified sandy loam which exhibits signs of recent surface erosion.

The site measures approximately 100 x 300 meters and covers an estimated area of 16,090 square meters. The cultural material observed included bifacial tools, unifacially flaked tools, debitage, and cores. The tools in the assemblage included projectile points, blade fragments, scrapers, a chopper, and utilized flakes. The lithic debitage included decortication debris and interior

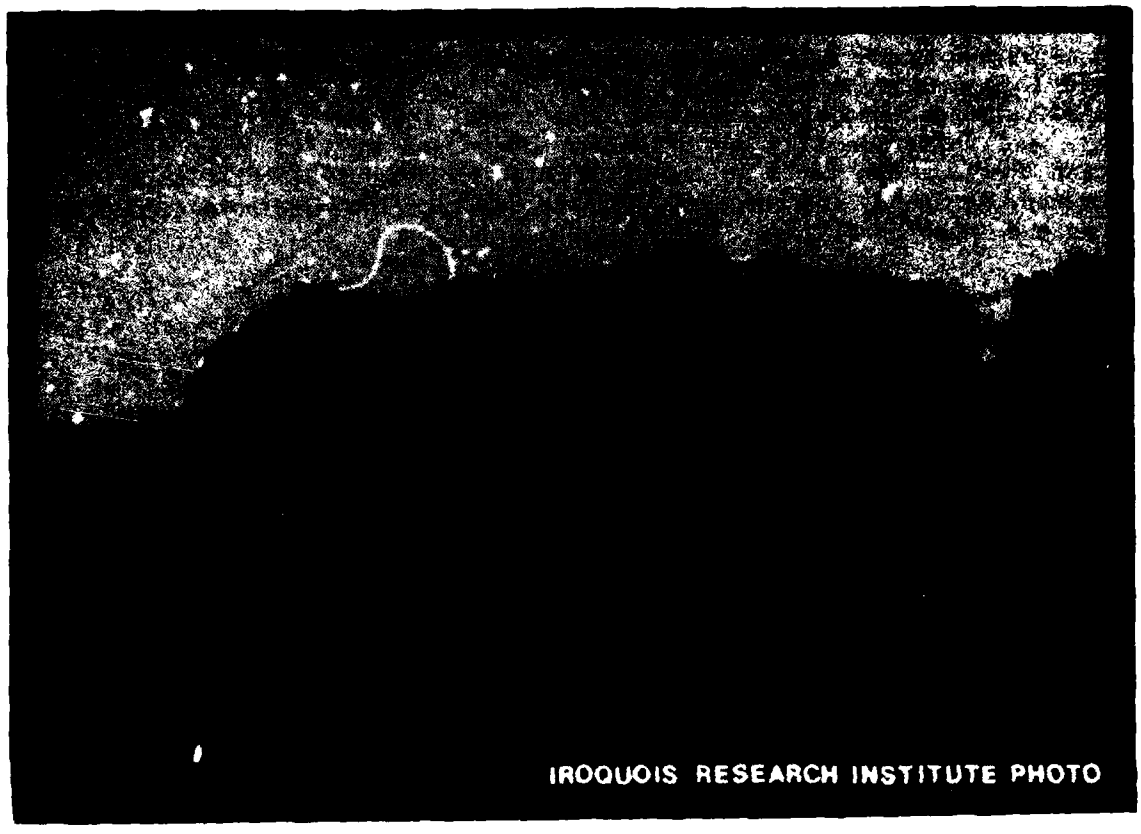


Plate 16. Site 23SR793. This view of site 23SR793 taken facing west shows the field in which the site is located. This field had been disced at the time of the survey. The oak and hickory treeline to the west of the site is visible in the background. No. 1300-32

flakes. A variety of cherts were represented by those items including Pierson, Elsey, Cotter, Burlington, Roubidoux, Warsaw, and Gasconade chert.

Three diagnostic projectile points were observed. One (Plate 13:F) resembled the Hidden Valley Stemmed point type (Chapman 1975) which is an Early Archaic diagnostic. Although distally incomplete, the point exhibited a contracting stem, a slightly concave basal edge, slightly convex blade edges, fine retouch flaking along the blade edges, and a biconvex cross section. The point is made of a grey, fossiliferous Gasconade chert. Also observed was a distally incomplete point (Plate 17:F) similar to the Afton point type (Chapman 1975) which is associated with the Late Archaic to Early Woodland Periods. This point exhibited prominent barbs and a short, broad stem which expanded slightly toward the basal edge. The point was made of a grey and white mottled Gasconade chert. A third distally incomplete point (Plate 8:F) was found which was similar to the Woodland associated Snyders point type (Bell 1958). This specimen

exhibited deep corner notches, an expanding stem, convex blade edges, a convex base, and a biconvex cross section. It was made of a grey Warsaw chert. Occupation of the site during the Archaic and Woodland Periods is indicated by the three diagnostic points in the assemblage.

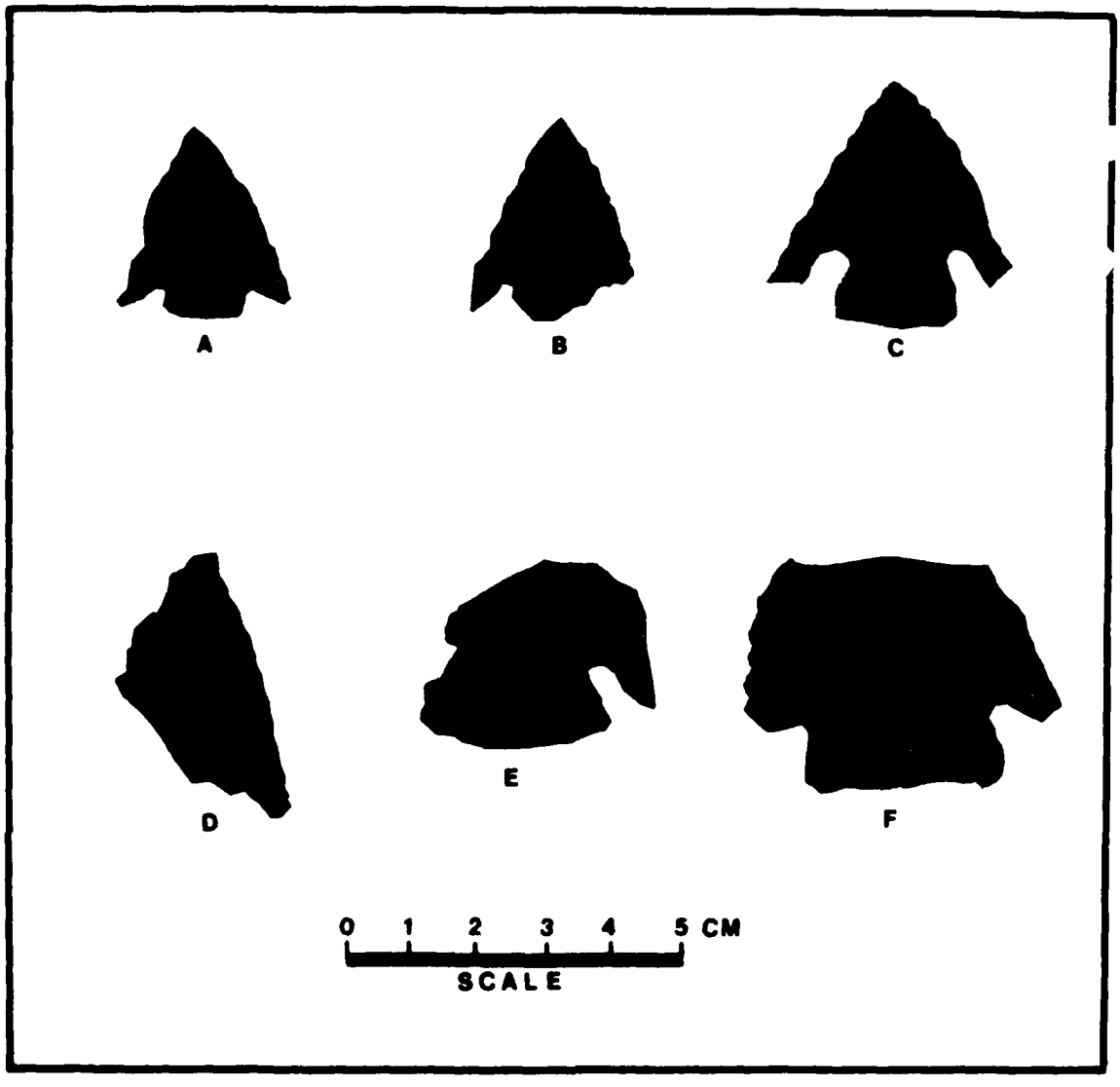


Plate 17. Afton Points. (A), (B), and (D) Afton points from site 23VE37. (C) Afton point from site 23SR794. (E) Afton point fragment from site 23SR796. (F) Afton point fragment from site 23SR793.

23SR794

Province: Ozark Plateaus
Stratum: VII (Sac River)
Prior Documentation: None

This site is located on a floodplain of the left descending bank of the Sac River. The site is 50 meters south of a pond and at the western edge of a soybean field. The western limit of the site is bordered by a forest of oak, maple, and hickory. The soil is characterized as a well drained, light brownish grey, unclassified silt loam. The site has an open exposure.

The observed surface scatter measured approximately 20 x 40 meters and covered an estimated area of 725 square meters. Ground surface visibility in the soybean field was good, although a heavy vegetative cover prevented an assessment of the site's extension into the forested area. Hence the site may be larger than presently estimated. Small retouch flakes and interior flakes, some of which appeared to have been utilized, were observed throughout the site area. The lithic materials in the assemblage included Burlington chert, Pierson chert, and Jefferson City or Cotter chert.

Two points were observed at the site. One was a small, side notched form which was not complete enough for typological identification. The second point was made of Pierson chert and exhibited prominent barbs, an expanding stem, a slightly convex basal edge, and excurvate blade edges (Plate 17:C). The point resembled the Afton point type (Chapman 1975) which is associated with Late Archaic to Early Woodland occupations in the midwestern states. Based on the identification of this point, the site was probably utilized during the Late Archaic to Early Woodland Periods.

23SR795

Province: Ozark Plateaus
Stratum: VII (Sac River)
Prior Documentation: None

This site is located on the floodplain on the left descending bank of the Sac River, approximately 10 meters west of the river. Lithic scatters were observed in two soybean fields which were separated by a hay field. Locust, elm, and sycamore trees were along the river bank and at the northern edge of the hay field. The site exposure is open, and the soil is an unclassified, moderately well drained, light brown silt loam.

The two areas of surface scattered covered a total estimated area of 1,100 square meters; the northern area measured approximately 22 x 35 meters and the southern area measured approximately 18 x 30 meters. The soybean fields afforded excellent surface visibility, whereas in the hay field between the concentrations visibility was extremely poor. Therefore, although no artifacts were observed in

the hay field, the site may extend through this area. The observed cultural material included a reworked projectile point or hafted scraper, a denticulated biface, scrapers, choppers, abraders, a hammerstone, utilized flakes, debitage, and cores. Several varieties of chert were present. The Ordovician system cherts represented were Jefferson City or Cotter chert and oolitic chert with a grey ground mass. Also found was a purple and red chert with thin brown bands and very small oolites which is an unusual Ordovician chert found in Maries County (Hank Groves, personal communication). The Mississippian system cherts included Pierson chert, Elsey chert, and Burlington chert. Many smooth, white cherts which lacked fossiliferous inclusions were present but unidentified. Several samples exhibited a pink or peach color which may indicate heat treatment. Burnt limestone fragments were also observed over the site area.

The one potentially diagnostic biface in the assemblage was a stemmed point which exhibited distal modification and possible utilization as a hafted scraper (Plate 8:B). It was made of Jefferson City or Cotter chert and was characterized by an expanding stem, slightly protruding shoulders, small barbs, an irregular basal edge, and nearly straight blade edges. The point was similar to the Manker Stemmed point type (Montet-White 1968) which is associated with Woodland cultures in southern Illinois. A Woodland occupation is therefore tentatively suggested for this site.

23SR796

Province: Ozark Plateaus
Stratum: VII (Sac River)
Prior Documentation: None

This site is located on the western slope of a slight rise in the floodplain on the left descending bank of the Sac River. The site is approximately 50 meters east of an intermittent stream and 350 meters from the Sac River. At the time of its discovery, the site area was covered with milo, Johnson grass, and broad leaf weeds, and ground visibility was fair. The soil is an unclassified greyish brown silt loam, and the site is exposed to the south.

The site covers a total estimated area of 770 square meters and measures approximately 20 x 40 meters. The cultural material was concentrated on the western slope of the rise where the surface runoff erosion was apparent. The materials observed included an incomplete projectile point, a biface fragment, two scrapers, utilized flakes, cores, and debitage. The lithic materials represented in the assemblage included Jefferson City chert, Cotter chert, Pierson chert, and Burlington chert.

The point fragment was characterized by a prominent barb, a flared stem with a convex basal edge, and a deep corner notch and was made of a light grey Pierson chert (Plate 17:E). Although the specimen was incomplete, it exhibited some similarity to the Afton point type (Chapman 1975) which is associated with the Late Archaic to Early Woodland Periods. A similar period of occupation is suggested for this site, based on the presence of the corner notched point fragment

23SR797

Province: Ozark Plateaus
Stratum: VII (Sac River)
Prior Documentation: None

This site is located on the floodplain on the right descending bank of the Sac River. A small pond is approximately 60 meters southwest of the site and the Sac River is approximately 140 meters west of the site. At the time of the survey, the site area was covered with a crop of soybeans, and treelines to the north, west, and south of the site were dominated by elm and hickory trees. The soil is an unclassified light greyish brown silt loam and the site exposure is open.

The site covers a total estimated area of 7,000 square meters and measures approximately 64 x 130 meters. When the site was examined, the soybeans were not fully mature and the ground visibility was good. The materials observed at the site included two points, a biface, utilized flakes, debitage, and cores. The lithic materials included Burlington chert, Jefferson City or Cotter chert, Elsey chert, Gasconade chert, and Pierson chert.

Both points were made of Burlington chert and exhibited expanding stems and convex basal edges. One of the points exhibited a triangular blade which appeared to have been reworked at the distal end (Plate 8:G). This point was similar to the Steuben Stemmed point type (Morse 1963; Montet-White 1968) which is associated with the Woodland Period. The other point, characterized by one barb and an irregular shaped blade, could not be typologically identified. A Woodland Period occupation is suggested, based on the Steuben Stemmed point observed at the site.

23SR798

Province: Ozark Plateaus
Stratum: X (Upper Osage)
Prior Documentation: None

This site is located on a terrace on the left descending bank of Clear Creek approximately 150 meters west of the creek. The site is in a pasture overgrown with weeds and is bordered by a stand of oak and hickory trees adjacent to the creek (Plate 18). Because of the dense vegetative cover, ground surface visibility was poor at the time of the survey, except in a gully which bisects the site. The soil is an unclassified sandy loam, and the site is exposed to the northeast.

A lithic scatter covered an estimated area of approximately 10,250 square meters, measuring approximately 120 x 130 meters. Two areas of concentration were observed, one in the washout gully and the other approximately 40 meters east of the gully. The cultural material observed included bifacial tools, unifacial tools, utilized flakes, debitage, and fire cracked rock. The lithic materials in the assemblage included Gasconade chert, Warsaw chert, Burlington

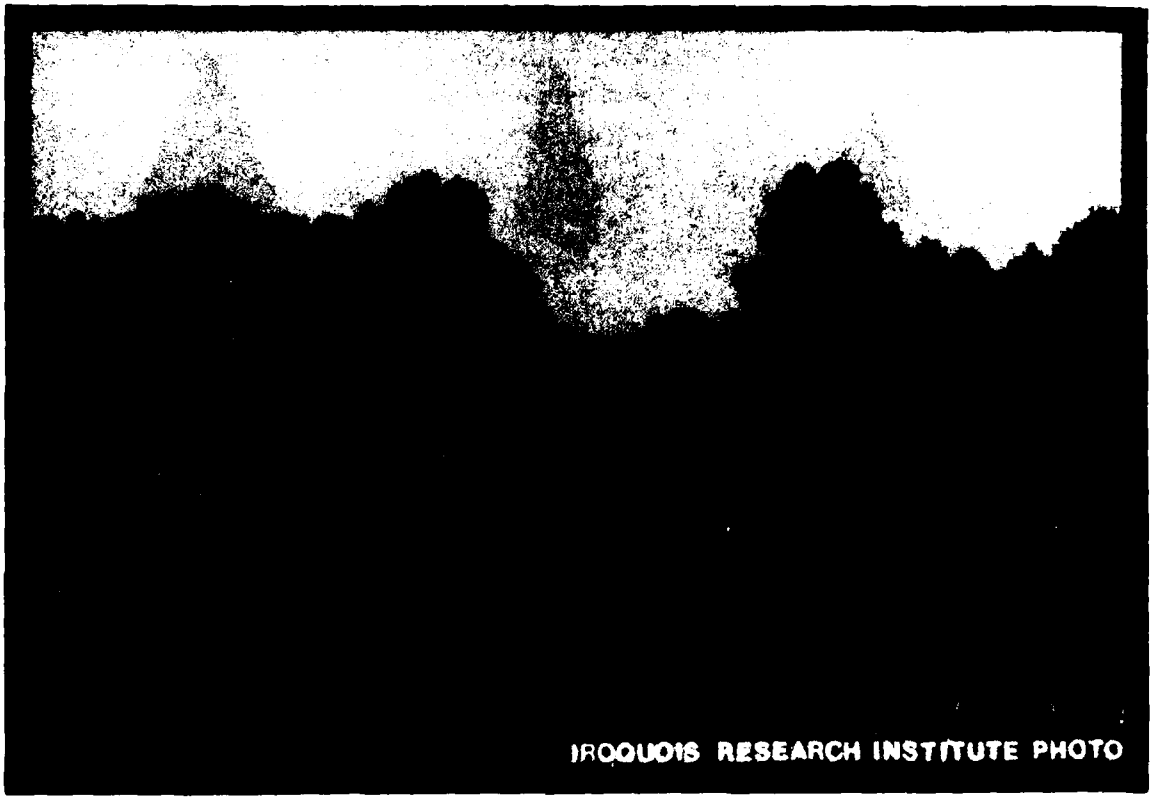


Plate 18. Site 23SR798. Site 23SR798 is located in the Ozark Plateaus. This photograph taken from the site datum reveals the northern portion of the site area in a weeded pasture with a peripheral oak and hickory forest. No. 1294-33

chert, Cotter chert, Elsey chert, unidentified chert, and quartzite. The tools observed at the site included a spokeshave, two end scrapers, one side scraper, one retouched blade, and several biface fragments. None of the bifacial tools were complete enough for typological identification.

A private collection of material supposedly obtained exclusively from this site contains a wealth of diagnostic and non-diagnostic artifacts. This collection includes a Sedalia Lanceolate point (Chapman 1975) (Plate 19:E), a Smith Basal Notched point (Ibid.) (Plate 19:F), a Rice Contracting Stemmed (Ibid.) or Langtry (Bell 1958) point (Plate 19:D), a Madison point (Perino 1968) (Plate 19:A), a Cahokia point (Ibid.) (Plate 19:B), two winged drills, (Plate 19:C and G), a celt, and an assortment of untyped stemmed and corner notched points. Based on the diagnostic points observed in the private collection, occupation of the site during the Archaic, Woodland, and Mississippian Periods is suggested.

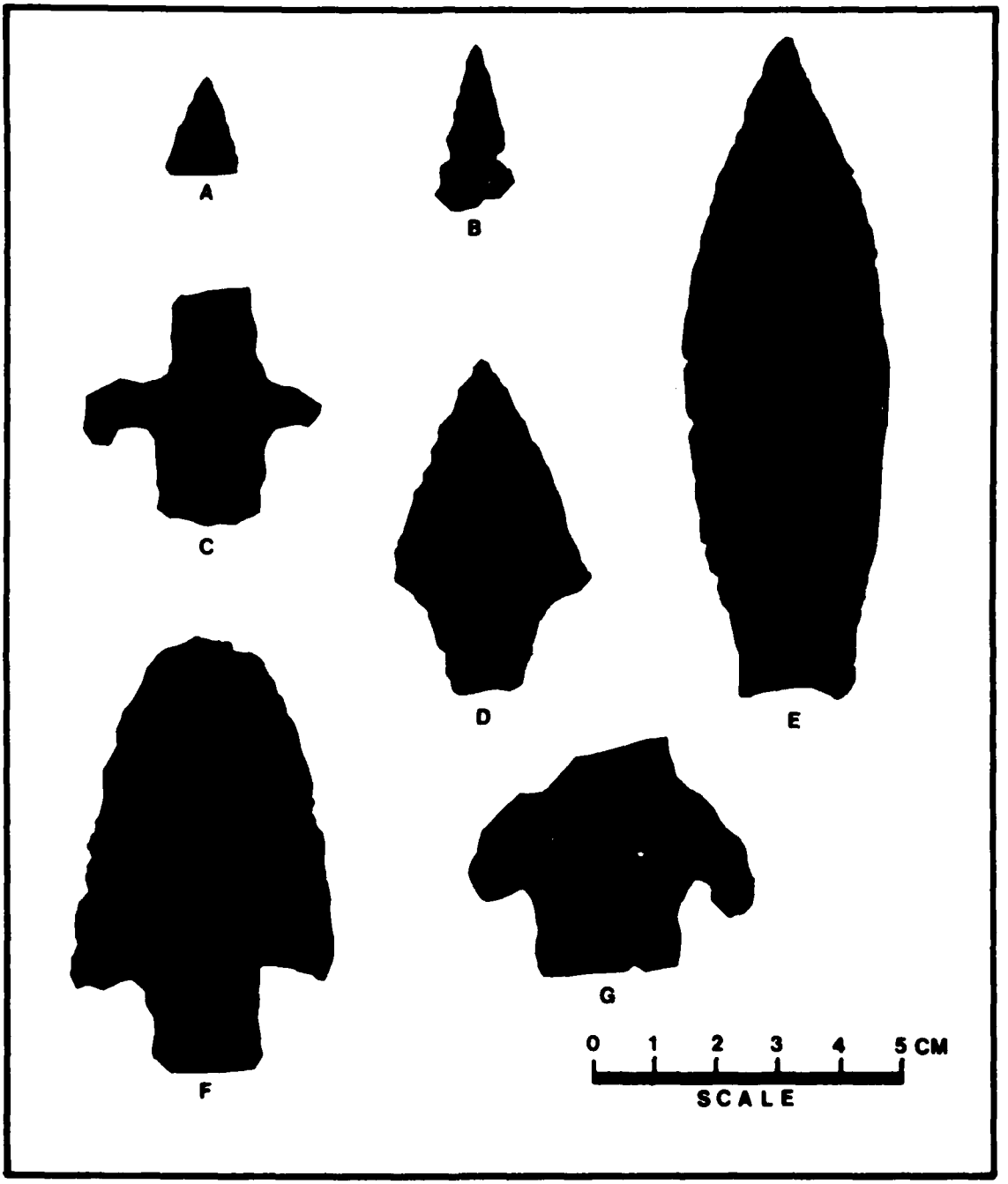


Plate 19. Privately Collected Artifacts from Site 23SR798. (A) Madison point. (B) Cahokia point. (C) and (G) Winged drills. (D) Rice Contracting Stemmed or Langtry point. (E) Sedalia Lanceolate point. (F) Smith Basal Notched point.

23SR799

Province: Ozark Plateaus
Stratum: X (Upper Osage)
Prior Documentation: None

This site is located on the first terrace of an intermittent stream which is a tributary of Clear Creek. The site is located in a cow pasture on the right descending bank, approximately seven meters west of the tributary. The pasture is bordered by Osage Orange, oak, and hickory trees (Plate 20). The site has a northeast exposure and the soil is an unclassified clay loam.

The site consists of a lithic scatter which covers an estimated area of 575 square meters and measures approximately 10 x 60 meters. The cultural material was found primarily along a narrow cow path along the stream bank and included several retouched flakes and debitage. One of the retouched flakes exhibited

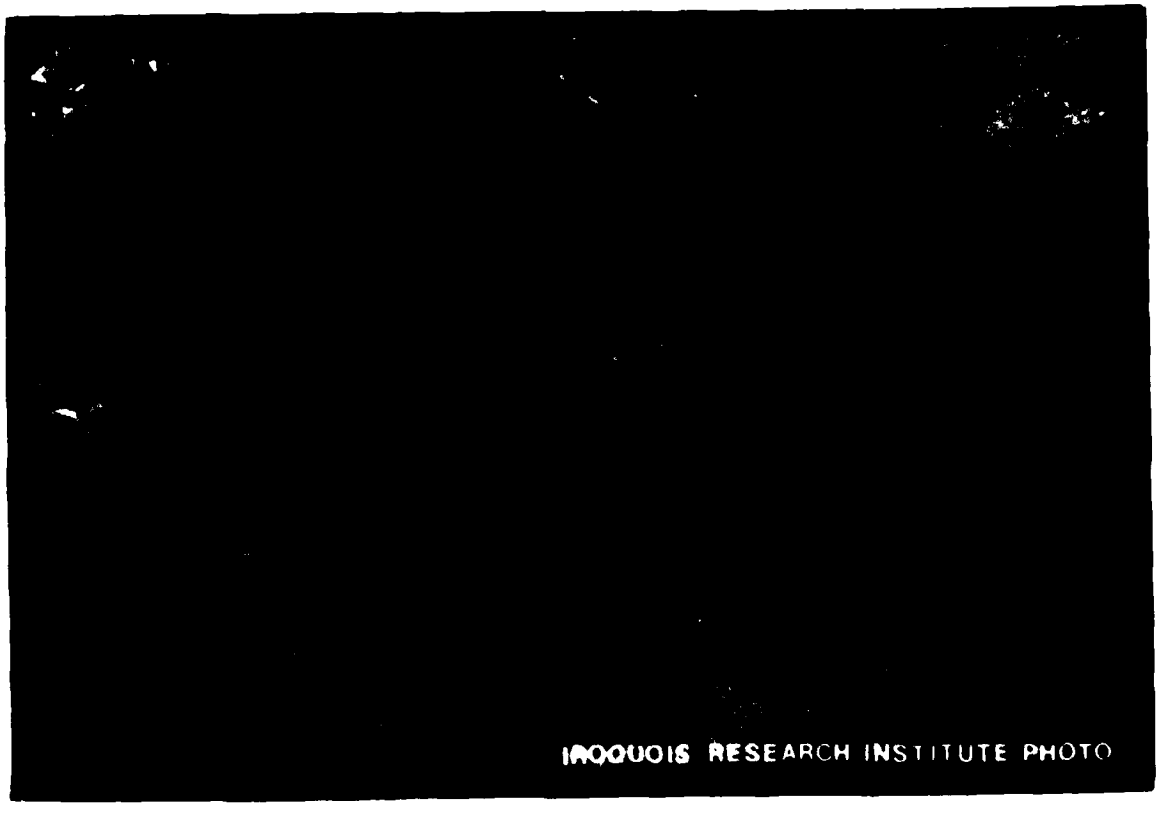


Plate 20. Site 23SR799. Site 23SR799 is on the right bank of a Clear Creek tributary in the Ozark Plateaus. It is located in a cow pasture surrounded by oak, hickory, and Osage Orange trees. This photograph of the site was taken facing south. No. 1297-14

serrations along one edge and two of the retouched flakes appeared to have been utilized as scrapers. The lithic materials in the assemblage included Burlington, Gasconade, and Pierson chert. Also, residual chert was observed throughout the site area and on the stream banks.

The temporal position of the site is unknown since no diagnostic artifacts were observed.

23SR800

Province: Ozark Plateaus
Stratum: X (Upper Osage)
Prior Documentation: None

This site is located on a second terrace and an adjacent slope along the right descending bank of Clear Creek. The creek is approximately 150 meters to the southeast and the site is exposed toward the creek. At the time of the survey, the site was overgrown with goldenrod, ragweed, and other weeds and the ground surface visibility was poor. The soil is an unclassified silty clay.

The site covers an estimated area of 4,120 square meters and measures approximately 60 x 87 meters. The observed material included a biface fragment, a unifacial tool, a bladelet, utilized flakes, cores, and debitage. The cherts consisted primarily of those exemplified by the six cores. Three of the cores were grey and white banded, oolitic Jefferson City or Cotter chert; one was a fossiliferous, light pink chert indicative of the Lower Pierson Formation; one was a fossiliferous, light greyish brown Pierson chert; and one was a chalky white Burlington chert. The debitage at the site was of the same material as the cores, and a few blue and tan mottled Elsey chert flakes were also found. An outcrop, possibly of Burlington chert, was exposed on the slope adjacent to the terrace.

A specific period of occupation for the site cannot be determined since no diagnostic artifacts were observed.

23SR801

Province: Ozark Plateaus
Stratum: X (Upper Osage)
Prior Documentation: None

This site is located on the left descending bank of Clear Creek approximately 120 meters north of the creek. Fescue grass and other assorted grasses and weeds comprise the dominant on-site vegetation. A treeline consisting of maple, chestnut, and butternut trees is adjacent to the site. The soil is an unclassified, light brown silty sandy loam, and the site is exposed to the southeast.

The ground surface visibility for the entire observed site area was very poor, and it could not be determined whether the site extended into or beyond the treeline. The site dimensions, determined from the observed artifacts, are approximately 13 x 25 meters and the total area of the site is approximately 250 square meters. The cultural material observed at the site consisted of debitage and burnt limestone. The lithic materials in the assemblage included Burlington chert, Pierson chert, and unidentified oolitic Ordovician chert. Burlington chert outcrops were observed on the opposite stream bank, approximately 150 meters southeast of the site.

No culturally diagnostic artifacts were found at the site. Its period of occupation is therefore unknown.

23SR802

Province: Ozark Plateaus
Stratum: X (Upper Osage)
Prior Documentation: None

This site is located on the banks of a natural spring fed pond on the terrace of the left descending bank of Clear Creek. The site was discovered in a natural clearing amidst a virgin cedar and oak forest. Queens Anne's Lace and various other grasses and weeds comprised the majority of the on-site vegetation (Plate 21). The soil is an unclassified silt loam, and the site is exposed to the east.

The site measures approximately 70 x 200 meters and covers an estimated area of 4,600 square meters. The observed artifacts included a projectile point, a biface fragment, a scraper fragment, and debitage. The lithic materials observed at the site included Burlington chert, Pierson chert, Jefferson City or Cotter chert, and unidentified banded and mottled cherts. The point was an incomplete side notched form which exhibited a finely retouched, convex basal edge and light grinding along the hafting element (Plate 8:C). The point was made of a lustrous, pinkish red chert and resembled the Gibson point type. Montet-White (1968) and Perino (1968) identify this point type as a Middle Woodland diagnostic.

A local landowner maintains a collection of projectile points and tools from this site and from two other sites, 23VE11 and 23VE13. The various point types represented in this collection include Graham Cave Side Notched (Klippel 1971) or Big Sandy Notched (Chapman 1975) (Plate 22:A, B, D, and E), Stone Square Stemmed (Ibid.) (Plate 22:F), Langtry (Bell 1958) (Plate 22:C), Marcos (Ibid.) (Plate 23:A), Scallorn (Bell 1960) (Plate 24:A, B, C, E, and G, and 23:B), Sequoyah (Perino 1968) (Plate 24:D and F), Madison (Ibid.) (Plate 24:K, L, M, N, and O), and Cahokia (Ibid.) (Plate 24:H, I, and J). Also, the collection includes several points with expanding stems, concave basal edges, pronounced barbs, and elongated, straight to slightly excurvate blades which are similar to the Uvalde point type (Bell 1960) (Plate 23:C, D, E, and F). Other artifacts in the collection include a celt and a stemmed or winged drill. These artifacts are associated with the Archaic, Woodland, and Mississippian Periods; however, their site provenience could not be determined.

Plate 21. Site 23SR802. This photograph was taken facing north from the southern extremity of site 23SR802. The site is located on the banks of a spring fed pond which is to the right of the trees pictured above. The site is in a natural clearing in a virgin oak and cedar forest and is covered with a variety of grasses and weeds. No. 1301-8

Based on the only point observed in situ, a Middle Woodland occupation is suggested for the site.

23SR803

Province: Osage Plains
Stratum: X (Upper Osage)
Prior Documentation: None

This site is located on a terrace on the right descending bank of the Osage River, approximately 130 meters southwest of the river. At the time of the survey, the site area was planted in corn and was partially overgrown with weeds. The site area is adjacent to a forest of oak and hickory trees. Visibility was good to excellent in the cultivated field. The soil type is an unclassified, light brown silt loam, and the site is exposed to the north.

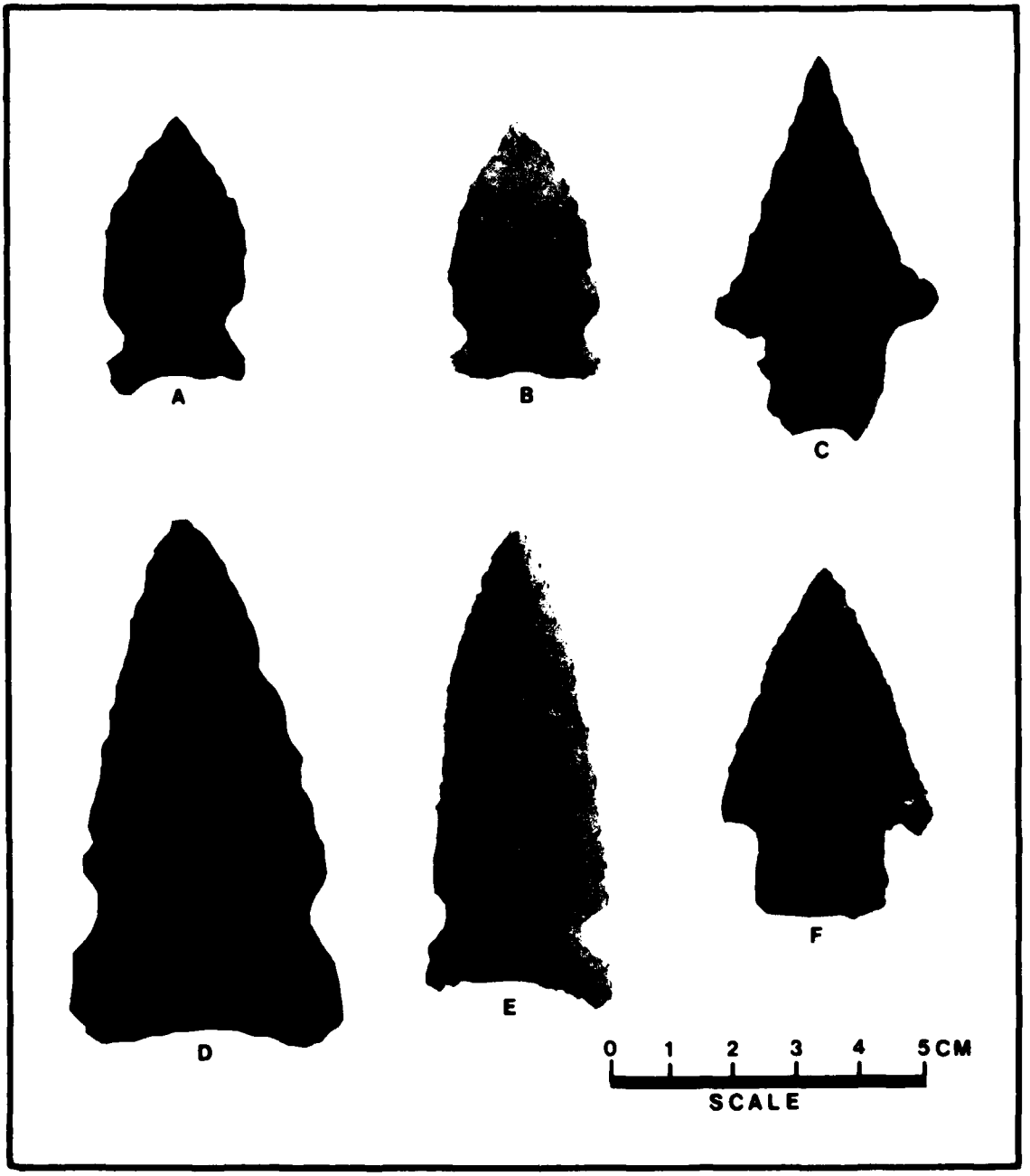


Plate 22. Privately Collected Points. The owner indicated that these points were collected from sites 23SR802, 23VE11, or 23VE13. (A), (B), (D), and (E) Graham Cave Side Notched or Big Sandy Notched points. (C) Langtry point. (F) Stone Square Stemmed point.

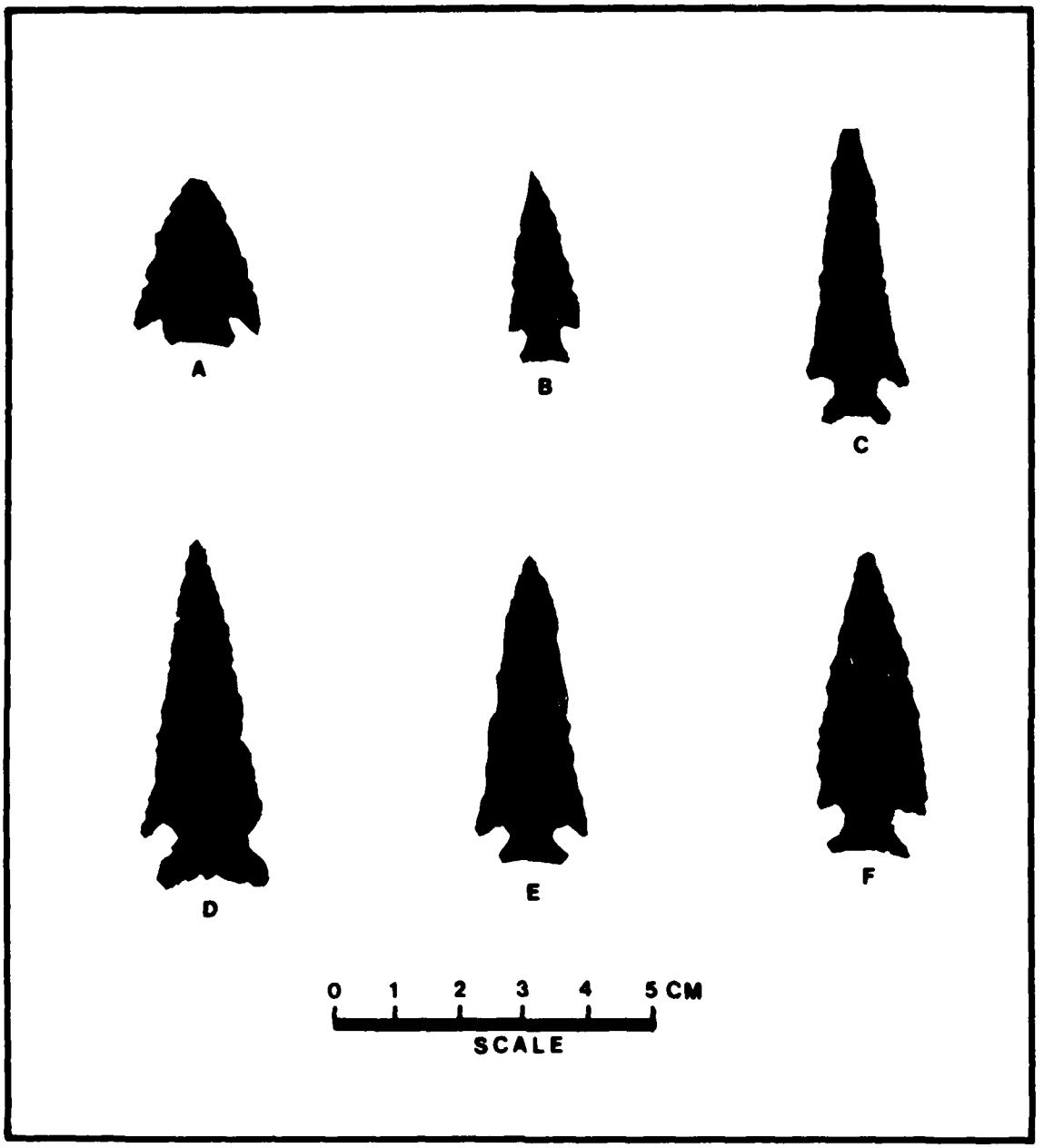


Plate 23. Privately Collected Points. The owner indicated that these points were collected from sites 23SR802, 23VE11, or 23VE13. (A) Marcos point. (B) Scallorn point. (C), (D), (E), and (F) Corner notched points similar to the Uvalde point type.

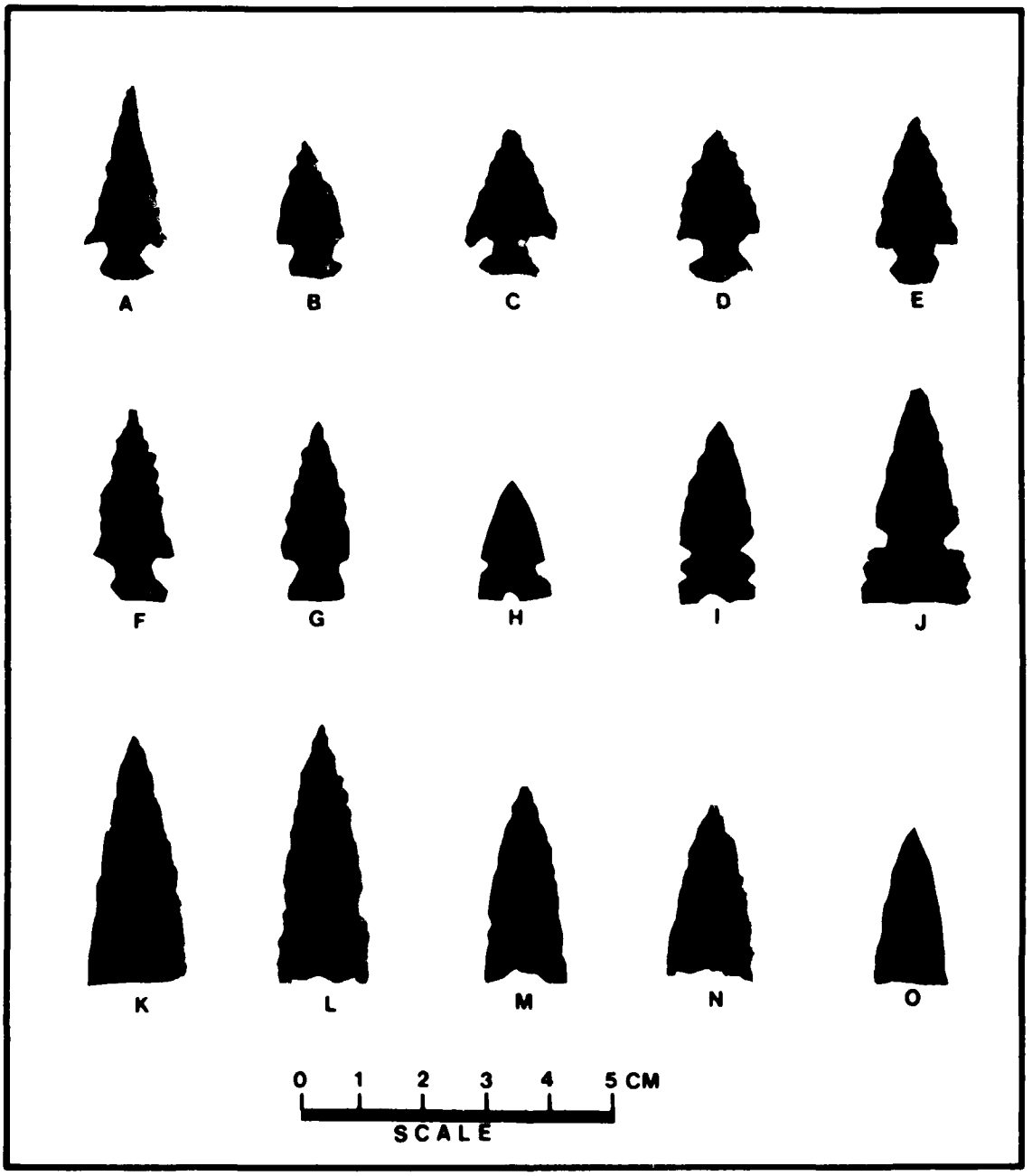


Plate 24. Privately Collected Points. The owner indicated that these points were collected from sites 23SR802, 23VE11, or 23VE13. (A), (B), (C), (E), and (G) Scallorn points. (D) Sequoyah point. (F) Scallorn point. (H), (I), and (J) Cahokia points. (K), (L), (M), (N), and (O) Madison points.

Given the poor visibility conditions in the woods, it was not possible to determine whether the site did extend northward into these woods. Therefore, the presently estimated site dimensions may not describe the total site area. The surface scatter covered an estimated area of 34,800 square meters and measured approximately 200 x 510 meters. Two major areas of lithic concentration were observed, separated by an apparently sterile area of approximately 30 square meters. The artifacts observed included one point, two biface fragments, one ground stone tool, cores, and debitage. A variety of lithic materials were present including Burlington chert, unidentified grey banded chert, unidentified blue oolitic chert of the Ordovician system, and tentatively identified Elsey chert. The ground stone tool was roughly rectangular in shape and exhibited pecking and grinding along two lateral edges. One projectile point was found which exhibited shallow side notches, excurvate blade edges, and a concave basal edge (Plate 13:D). The point was similar to the Big Sandy Notched point type (Chapman 1975) and was made of an unidentified oolitic chert of the Ordovician system. Occupation of the site during the Middle Archaic Period is suggested, based on the presence of this point.

23VE32

Province: Osage Plains
Stratum: X (Upper Osage)
Prior Documentation: ASM site record

This site is located on a hummock in the Osage River floodplain. The site is on the right descending bank of Lost Branch, a tributary of the Osage River. The site area was planted in corn at the time of the survey. Nearby are areas covered with swamp grass as well as some stands of pin oak, mulberry, and water hickory. The soil is Coweta fine sandy loam, which is commonly found on natural mounds near streams.

The site was previously recorded as a village site by the Archaeological Survey of Missouri. There is no record of any excavation at the site.

The site covers an estimated area of 18,000 square meters and measures approximately 130 x 140 meters. The cultural material observed at the site included biface fragments, scrapers, debitage, and fire cracked rock; historic brick and glass were also observed. The lithic assemblage was composed of Cotter chert, Jefferson City chert, Pierson chert, Elsey chert, Burlington chert, Warsaw chert, and unidentified chert of the Mississippian system. Burlington chert and Pierson chert accounted for the majority of the assemblage. Residual sandstone was also present on the surface, but none exhibited evidence of cultural modification

No diagnostic artifacts were identified in the assemblage, so the chronological position of the site cannot be determined.

23VE37

Province: Osage Plains
Stratum: X (Upper Osage)
Prior Documentation: None

This lithic scatter is located on a cuesta, or low ridge, in the floodplains of the Little Osage River. It is on the right descending bank of the Broad Waters of Muddy Creek, a perennial stream which feeds the Little Osage River. The nearest water source is the Broad Waters of Muddy Creek which is approximately 100 meters north of the site. A dirt road cutting lengthwise across the site provided excellent surface visibility in contrast to the surrounding area which was covered by ragweed, goldenrod, foxtails, and other weeds during the survey (Plate 25). The soil is light brown Coweta fine sandy loam.

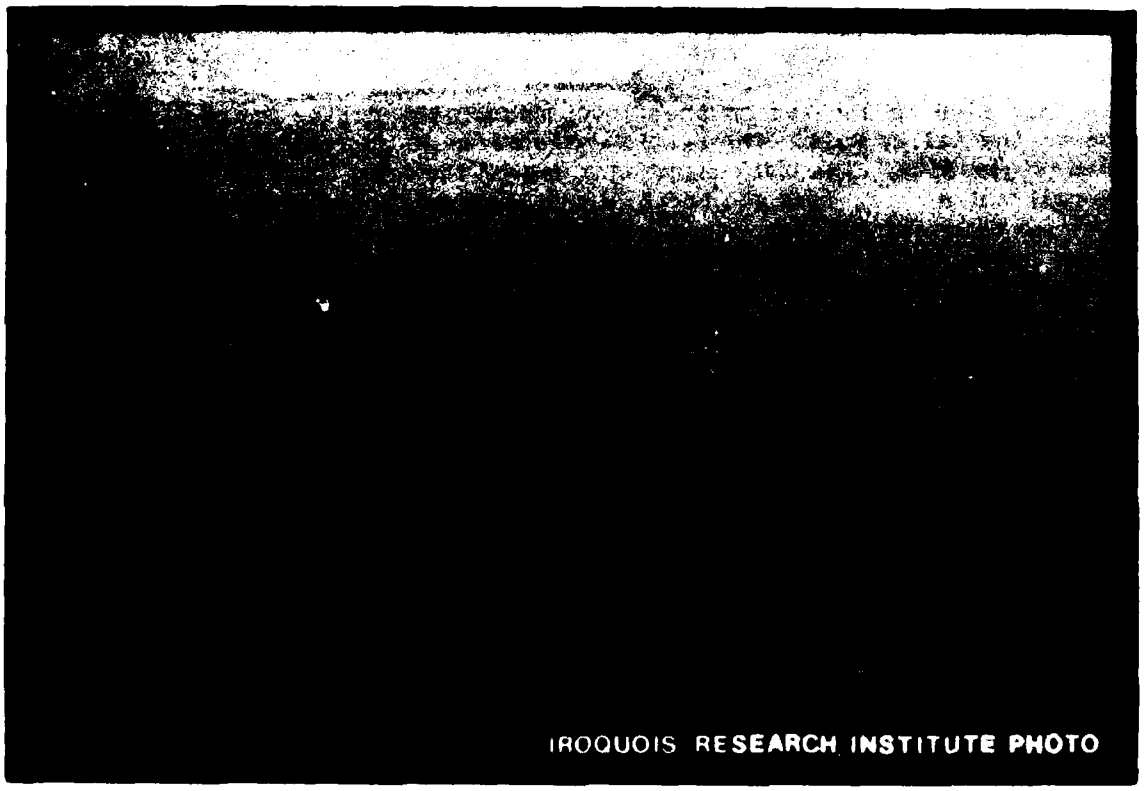


Plate 25. Site 23VE37. This photograph was taken from the easternmost boundary of site 23VE37. The site is situated atop a cuesta in the floodplains of the Little Osage River. It is located along both sides of the dirt road pictured above. No. 1296-23

The site is primarily confined to the cuesta and covers an area of approximately 14,000 square meters, measuring approximately 70 x 340 meters. An abundance of brown and yellow residual chert was present along with limestone and an angular, calcareous Pennsylvanian sandstone outcrop near the eastern edge of the site. Interior flakes, a few of which were utilized, accounted for the majority of the surface scatter and were made of Burlington, Elsey, Cotter or Jefferson City, and Reed Springs cherts. Some decortication flakes were also present. A variety of scraping tools were found in the western portion of the site, including several semi-circular scrapers and a crescent-shaped scraper. Three points similar to the Afton point type (Chapman 1975) were photographed (Plate 17:A, B, and D). They exhibited slightly convex blade edges, short stems, and prominent barbs, but they were slightly smaller than the typical Afton point. All three specimens were made of a highly fossiliferous Mississippian chert. Afton points are associated with Late Archaic to Early Woodland cultures in Missouri (Ibid.). A Late Archaic to Early Woodland occupation is therefore indicated for this site, based on the presence of these three points.

23VE38

Province: Osage Plains
Stratum: X (Upper Osage)
Prior Documentation: None

This site is located on the floodplain of the Little Osage River near the base of the valley wall. The Little Osage River is approximately 1.6 kilometers south of the site. The USGS quadrangle map of the area compiled in 1927 shows an intermittent stream, Back and Forth Slough, approximately 50 meters to the south. However, this channel and other streams in the surrounding floodplain are no longer present, presumably having been destroyed by modern agricultural practices and an artificial drainage system. At the time of the survey, the site was covered with soybeans, weeds, and grasses, and the ground surface visibility was good (Plate 26). The soil is Osage silt loam and the site is exposed to the south.

The site covers an estimated area of 18,800 square meters and measures approximately 100 x 260 meters. An unimproved road bisects the site and the immediate area appears to have been severely disturbed by construction of the road. The surface scatter included bifacial tool fragments, two choppers, cores, and debitage. Two of the biface fragments exhibited serration along their lateral edges, but neither was complete enough for typological identification. One of the serrated bifaces appeared to have been thinned by channel flaking. The lithic materials identified at the site included Reed Springs chert, Burlington chert, and Pierson chert. One mammalian long bone fragment and some historic material including ceramics, glass, and brick fragments were also discovered at the site. The historic materials may be associated with a nearby farm complex.

Because no diagnostics were identified in the prehistoric artifact assemblage, the period of occupation cannot be determined.

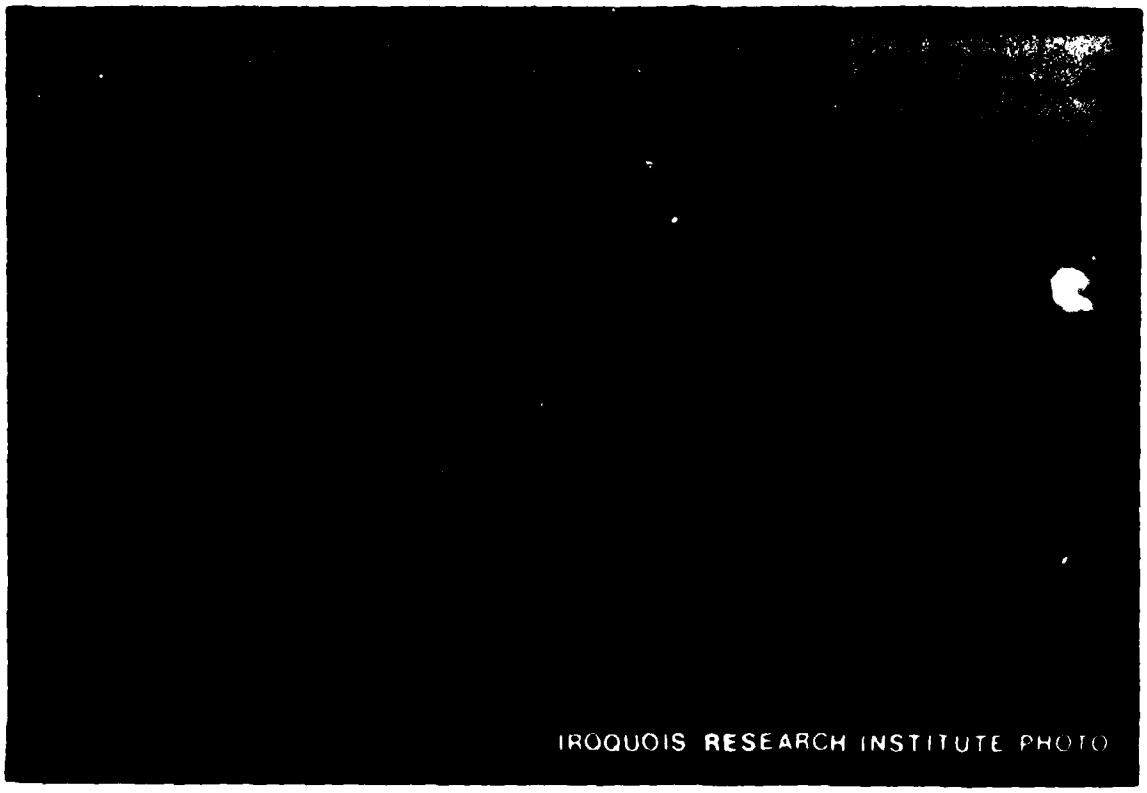


Plate 26. 23VE38. Site 23VE38 is located in the Osage Plains along a dirt farm road in a young soybean field. The site is concentrated at the base of the slight rise visible to the left in this view facing north. No. 1292-10

23VE39

Province: Osage Plains
Stratum: X (Upper Osage)
Prior Documentation: None

The lithic scatter which comprises this site is located on the left descending bank of the Little Osage River. The site area was discovered in a weed and grass covered stream terrace with a southern exposure. A hay field marked the observed northern site boundary. A fresh-water pond is located approximately 10 meters south of the site and a perennial stream, which is an offshoot of Willow Branch, flows 30 meters to the southwest. Surface visibility was quite good near the pond and stream where the vegetation was sparse but was very poor in the hay field. The soil is a reddish brown and dark brown Osage silty clay.

Nearby to the north is the Coal Pit archaeological site (23VE4), also known as the Hayes site, which is listed in the National Register of Historic Places. The site is a protohistoric village occupied by the Little Osage Indians between 1790 and 1815. It has been excavated and reported by Chapman (1965c).

The observed site area covered an estimated 19,700 square meters and measured approximately 80 x 270 meters. The site may be larger than now estimated since delineation of the site boundary through the hay field was hindered by the adverse visibility. The numerous surface depressions throughout the site area were evidence of previous pothunting expeditions. The materials observed included projectile points, biface fragments, a cobble tool, and debitage. The lithic materials represented in the assemblage included Reed Springs chert, Cotter chert, Cotter or Jefferson City chert, Pierson chert, Burlington chert, and other unidentified Ordovician cherts.

Several diagnostic points were observed at the site. Two specimens resembled the Steuben Stemmed point type (Morse 1963) (Plate 8:H) which is associated with the Woodland Period. Both points were stemmed forms made of Burlington chert. A small, finely chipped triangular point fragment with a straight base and straight blade edges (Plate 14:D) resembled the Madison point type (Perino 1968) which is found on Late Woodland and Early Mississippian sites in Missouri (Chapman 1975). Finally, a basal fragment with a slightly expanded stem, an indented base, and rounded corners (Plate 13:C) exhibited some of the traits of the Jakie Stemmed point type (Chapman 1975) which is a Middle Archaic Period diagnostic. Based on the points observed at the site, occupation during the Woodland Period and possibly during the Archaic and Mississippian Periods is suggested.

23VE40

Province: Osage Plains
Stratum: X (Upper Osage)
Prior Documentation: None

This site is located on the floodplain on the left descending bank of the Osage River. The site is adjacent to the southern edge of Deer Mound and is approximately 600 meters from an intermittent stream which feeds the Osage River. Deer Mound is a slightly elevated area which measures approximately 100 x 280 meters. Local rumors claim it was once an Indian mound. The mound was recently disturbed when approximately six feet of dirt and gravel were deposited on its surface in an effort to remove contemporary structures from the threat of flooding. Furthermore, the site area has been bisected by an artificial drainage ditch. The soil at the site is dark brown Barden silt loam.

When the site was initially located, it was covered with a crop of soybeans and visibility was excellent except for the areas immediately adjacent to the ditch which were covered with willow and pecan trees, cattails, sawgrass, and weeds. A lithic scatter was observed on both sides of the ditch with the greater concentration of material apparently on the southern side of the ditch. The site was estimated to cover 4,300 square meters and measured approximately 55 x 80 meters. The materials observed included a biface fragment and interior flakes. The raw materials identified were Jefferson City and Burlington chert.

The biface fragment appeared to be the hafting element of a point. The specimen was made of Burlington chert and exhibited a slightly concave, bifacially thinned, lobed base (Plate 13:B). It was similar to the hafting element which characterizes the Rice Lobed point type (Chapman 1975) which is associated with Early to Middle Archaic occupational components in Missouri. An occupation during the Early to Middle Archaic Periods is therefore tentatively suggested for the site.

23VE41

Province: Osage Plains
Stratum: X (Upper Osage)
Prior Documentation: None

This site is located at the base of a slope on the left descending bank of Crooked Branch. Crooked Branch, a perennial tributary of the Little Osage River, is located approximately 400 meters to the southwest. The site is bounded on the north by a forest of silver maple, hickory, willow, and sycamore and was covered by soybeans at the time of the survey. The soil is an Osage silty clay and the site has an eastern exposure.

A lithic scatter including bifaces and debitage covered an estimated area of 15,500 square meters and measured approximately 120 x 135 meters. The identified lithic materials included Burlington chert, Reed Springs chert, and an unidentified pinkish white chert of the Mississippian system. One biface appeared to have been used as a knife or scraper and another was the basal fragment of a point. Residual chert, residual limestone, coal, and brick were also observed at the site.

Due to the absence of diagnostic artifacts, the temporal position of the site cannot be determined.

23VE42

Province: Osage Plains
Stratum: X (Upper Osage)
Prior Documentation: None

This site is located on the edge of a terrace on the left descending bank of the Little Osage River. The nearest water source, Crooked Branch, is a perennial stream and is located approximately 800 meters south of the site. The site was discovered in a field covered with soybeans and weeds which was bordered by a forest of oak, hickory, and willows. The soil at the site is Barden silt loam and the site is exposed to the south. A network of intermittent streams and sloughs formerly ran through the floodplain adjacent to the site. However, the floodplain is now drained by a series of artificial drainage ditches and levees. The terrace on which the site is located has been eroded and there is a wide gully containing recently dumped spoil east of the site.

A scatter of lithic material covered an estimated area of 18,400 square meters, measuring approximately 150 x 160 meters. Most of the material was on the southeast slope of the terrace. Biface fragments, cores, utilized flakes, and debitage were observed and the identified lithic materials included Jefferson City chert, Burlington chert, and Reed Springs or Pierson chert. An unidentified oolitic chert was also observed.

No specific period of occupation can be suggested since no diagnostic artifacts were identified in the assemblage.

23VE43

Province: Osage Plains
Stratum: X (Upper Osage)
Prior Documentation: None

This site is located on the left descending bank of the Little Osage River on a terrace adjacent to the floodplain. The site is approximately 750 meters northwest of the river and is exposed to the south. The site area was planted in soybeans at the time of the survey. The soil is Barden silt loam. The terrace is dissected by a gully and site 23VE42 is on the same terrace on the other side of the gully. The floodplain below the site was formerly drained by a network of intermittent streams but is now drained by a series of artificial ditches. Residual chert, coal, and historic glass and ceramics were also scattered over the site area.

The surface scatter covered an estimated area of 5,800 square meters and measured approximately 90 x 90 meters. The materials observed included a point, a scraper, and interior flakes, some of which appeared to have been utilized. The lithic materials in the assemblage included Jefferson City chert, Burlington chert, and unidentified chert of the Mississippian system.

The single projectile point found at the site was similar to the St. Albans Side Notched point type (Broyles 1971), exhibiting broad, shallow side notches, a bifurcated base, and grinding along the basal edge (Plate 13:A). The blade had been reworked and may have been utilized as a scraper. The point was also similar to the MacCorkle Stemmed point type (Ibid.) and the Frio point type (Bell 1960). St. Albans Side Notched and MacCorkle Stemmed points are widely distributed throughout the Eastern Woodlands and these bifurcated base forms are associated with Early Archaic occupational components. Roper (1977a) has reported similar finds in the Ozark Plateaus. Frio points are distributed throughout Texas and Oklahoma and they are also temporally associated with the Archaic Period (Bell 1960). An Early Archaic occupation is suggested for this site, based on the presence of the bifurcated base point.

23VE44

Province: Osage Plains
Stratum: X (Upper Osage)
Prior Documentation: None

This site is located on a terrace adjacent to the floodplain of the Osage

River. The nearest water source is an intermittent tributary of the Osage River and is approximately 50 meters north of the site. At the time of the survey, the site was planted in soybeans, and the field was surrounded by stands of oak and hickory. The soil is Barden silt loam and the site is exposed to the north.

The site covers an estimated area of 6,000 square meters and measures approximately 95 x 120 meters. A scatter of approximately 30 pieces of debitage was the only cultural material found. Most of the material was observed at the base of the terrace and it may have been redeposited by erosion. A variety of materials were identified including Jefferson City or Cotter chert, Pierson chert, Burlington chert, Elsey chert, and Warsaw chert.

The chronological position of the site is unknown since no diagnostic artifacts were found.

Summary and Discussion

All together, 86 sites have been identified in the HST 50 year flood easement lands. Plate 27 indicates the locations of the identified sites in the study area and Plate 28 indicates the areas that have been surveyed. Table 9 summarizes the inventory of known prehistoric sites in the HST 50 year flood easement lands and identifies each site's cultural affiliation, size, and location with respect to major physiographic province, stratum, and terrain category.

The 39 sites identified in the present project, together with the previously recorded sites in the study area, comprise the data base used to address the major anthropological research objectives of this study: culture chronology, site functions, settlement patterns, and lithic resource utilization.

The majority of the 86 identified sites in the study area cannot be associated with a specific prehistoric time period. Clear-cut temporally or culturally diagnostic artifacts were completely lacking from the observed sample of material at 20 of the 39 sites examined in the present study, and only five of the previously recorded sites that were not examined in this project have been assigned a specific cultural affiliation. In addition, the state of cultural chronology in the eastern Plains and Ozarks is such that many of the sites at which diagnostic artifacts were observed are difficult to place within a temporal or cultural framework with any degree of accuracy. Unfortunately, the sample of potentially diagnostic artifacts at the 39 sites visited in this study was completely limited to projectile points. Ceramics, which would have facilitated the identification and differentiation of Woodland, Plains Woodland, Mississippian, and Plains Village components, were not observed. It is suspected, but not demonstrable, that the absence of ceramics from the observed material may be due to poor preservation, combined with functional factors at certain sites.

TABLE 9

SUMMARY OF PREHISTORIC SITES
IDENTIFIED IN THE 50 YEAR FLOOD EASEMENT LANDS

SITE	PROVINCE	SUBSECTION	TERRAIN CATEGORY	SITE SIZE (SQUARE METERS)	CULTURAL AFFILIATION
[illegible]	Ozark Plateaus	[illegible]	A	500	general prehistoric
[illegible]	Ozark Plateaus	[illegible]	A	800	general prehistoric
[illegible]	Ozark Plateaus	XXI	A	1,250	general prehistoric
[illegible]	Osage Plains	[illegible]	E	22,400	general prehistoric
[illegible]	Osage Plains	[illegible]		unknown	general prehistoric
[illegible]	Osage Plains	[illegible]	[illegible]	6,689	general prehistoric
[illegible]	Osage Plains	[illegible]		4,190	Early to Middle Archaic
[illegible]	Osage Plains	[illegible]		2,075	general prehistoric
[illegible]	Osage Plains	[illegible]	[illegible]	190	general prehistoric
[illegible]	Osage Plains	[illegible]	[illegible]	16,300	general prehistoric
[illegible]	Osage Plains	XXI	I	unknown	general prehistoric
[illegible]	Osage Plains	XX	[illegible]	unknown	general prehistoric
[illegible]	Osage Plains	XX	H	8,800	Archaic (?), Woodland, Mississippian(?)
[illegible]	Osage Plains	XX	H	2,500	general prehistoric
[illegible]	Osage Plains	XX	F	100	general prehistoric
[illegible]	Osage Plains	XX	F	unknown	Archaic
[illegible]	Osage Plains	XX	H	unknown	general prehistoric
[illegible]	Osage Plains	XX	H	unknown	Woodland, Mississippian
[illegible]	Osage Plains	XX	[illegible]	300	general prehistoric
[illegible]	Osage Plains	XX	F	unknown	general prehistoric
[illegible]	Osage Plains	XXI	I	5,000	general prehistoric
[illegible]	Osage Plains	XXI	I	6,000	general prehistoric
[illegible]	Osage Plains	XX	H	1,100	general prehistoric
[illegible]	Osage Plains	XX	[illegible]	700	general prehistoric
[illegible]	Osage Plains	XX	[illegible]	33,500	Early to Middle Archaic
[illegible]	Osage Plains	XX	H	2,500	Woodland (?)
[illegible]	Osage Plains	XX	I	2,500	Late Archaic, Woodland
[illegible]	Osage Plains	XX	F	1,050	general prehistoric
[illegible]	Osage Plains	XX	I	6,050	general prehistoric
[illegible]	Osage Plains	XX	E	5,000	general prehistoric
[illegible]	Osage Plains	XXI	E	5,000	general prehistoric
[illegible]	Osage Plains	XXI	I	10,000	general prehistoric
[illegible]	Osage Plains	XXI	E	unknown	general prehistoric
[illegible]	Osage Plains	XXI	E	22,000	general prehistoric
[illegible]	Osage Plains	XXI	E	5,050	general prehistoric

*site located outside 50 year flood easement land

TABLE 9 (continued)

SUMMARY OF PREHISTORIC SITES
IDENTIFIED IN THE 50 YEAR FLOOD EASEMENT LANDS

SITE	PHYSIOGRAPHIC REGION	QUADRANT	TERRAIN CATEGORY	SITE SIZE (SQUARE METERS)	CULTURAL AFFILIATION
[illegible]	Ozark Plateaus	[illegible]	A	900	[illegible]
[illegible]	Ozark Plateaus	[illegible]	A	900	[illegible]
[illegible]	Ozark Plateaus	[illegible]	A	unknown	[illegible]
[illegible]	Ozark Plateaus	[illegible]	A	unknown	[illegible]
[illegible]	Ozark Plateaus	[illegible]	A	unknown	[illegible]
[illegible]	Ozark Plateaus	[illegible]	A	unknown	[illegible]
[illegible]	Ozark Plateaus	[illegible]	A	unknown	[illegible]
[illegible]	Ozark Plateaus	[illegible]	A	4,250	[illegible]
[illegible]	Ozark [illegible]	[illegible]	A	800	Late Archaic, Woodland
[illegible]	Ozark Plateaus	[illegible]	A	120	[illegible]
[illegible]	Ozark Plateaus	[illegible]	A	400	[illegible]
[illegible]	Ozark [illegible]	[illegible]	A	4,000	[illegible]
[illegible]	Ozark [illegible]	[illegible]	A	1,500	[illegible]
[illegible]	Ozark [illegible]	[illegible]	A	unknown	[illegible]
[illegible]	Ozark Plateaus	[illegible]	A	30	[illegible]
[illegible]	Ozark Plateaus	[illegible]	A	3,[illegible]	[illegible]
[illegible]	Ozark Plateaus	[illegible]	A	4,[illegible]	[illegible]
[illegible]	Osage Plains	[illegible]	A	11,025	[illegible]
[illegible]	Ozark Plateaus	[illegible]	B	11,200	[illegible]
[illegible]	Ozark [illegible]	[illegible]	A	950	[illegible]
[illegible]	Ozark [illegible]	[illegible]	A	12,900	[illegible]
[illegible]	Ozark Plateaus	[illegible]	B	9,650	Late Archaic
[illegible]	Ozark Plateaus	[illegible]	A	19,600	Late Archaic, Woodland
[illegible]	Ozark Plateaus	[illegible]	A	16,090	Archaic, Woodland
[illegible]	Ozark Plateaus	[illegible]	A	725	Late Archaic, Woodland
[illegible]	Ozark Plateaus	[illegible]	A	1,100	Woodland
[illegible]	Ozark Plateaus	[illegible]	A	320	Late Archaic, Woodland
[illegible]	Ozark Plateaus	[illegible]	A	7,000	Woodland
[illegible]	Ozark Plateaus	[illegible]	A	10,250	Archaic, Woodland, Mississippian
[illegible]	Ozark Plateaus	[illegible]	A	575	General prehistoric
[illegible]	Ozark Plateaus	[illegible]	A	4,120	General prehistoric
[illegible]	Ozark Plateaus	[illegible]	A	250	General prehistoric
[illegible]	Ozark Plateaus	[illegible]	A	4,600	Woodland
[illegible]	Osage [illegible]	[illegible]	[illegible]	14,800	Middle [illegible]
[illegible]	Osage Plains	[illegible]	B	unknown	[illegible]
[illegible]	Ozark Plateaus	[illegible]	A	unknown	General prehistoric
[illegible]	Ozark Plateaus	[illegible]	A	unknown	General prehistoric

*Site located outside 50 year flood easement land

TABLE 9 (continued)

SUMMARY OF PREHISTORIC SITES
IDENTIFIED IN THE 50 YEAR FLOOD EASEMENT LANDS

SITE	PROVINCE	[illegible]	TERRAIN CATEGORY	SITE SIZE (SQUARE METERS)	CULTURAL AFFILIATION
[illegible]	Osage Plains	X	I	unknown	general prehistoric
[illegible]	Osage Plains	X	I	unknown	general prehistoric
[illegible]	Osage Plains	X	I	unknown	general prehistoric
[illegible]	Osage Plains	X	II	unknown	general prehistoric
[illegible]	Osage Plains	X	II	unknown	general prehistoric
[illegible]	Osage Plains	X	I	18,000	general prehistoric
[illegible]	Osage Plains	X	II	unknown	general prehistoric
[illegible]	Osage Plains	X	II	14,000	Late Archaic, Woodland
[illegible]	Osage Plains	X	II	18,800	general prehistoric
[illegible]	Osage Plains	X	II	19,200	Middle Archaic, Woodland, Mississippian
[illegible]	Osage Plains	X	II	4,300	Early to Middle Archaic
[illegible]	Osage Plains	X	II	15,500	general prehistoric
[illegible]	Osage Plains	X	II	18,400	general prehistoric
[illegible]	Osage Plains	X	II	5,800	Early Archaic
[illegible]	Osage Plains	X	I	6,000	general prehistoric
[illegible]	Osage Plains	X	I	unknown	general prehistoric

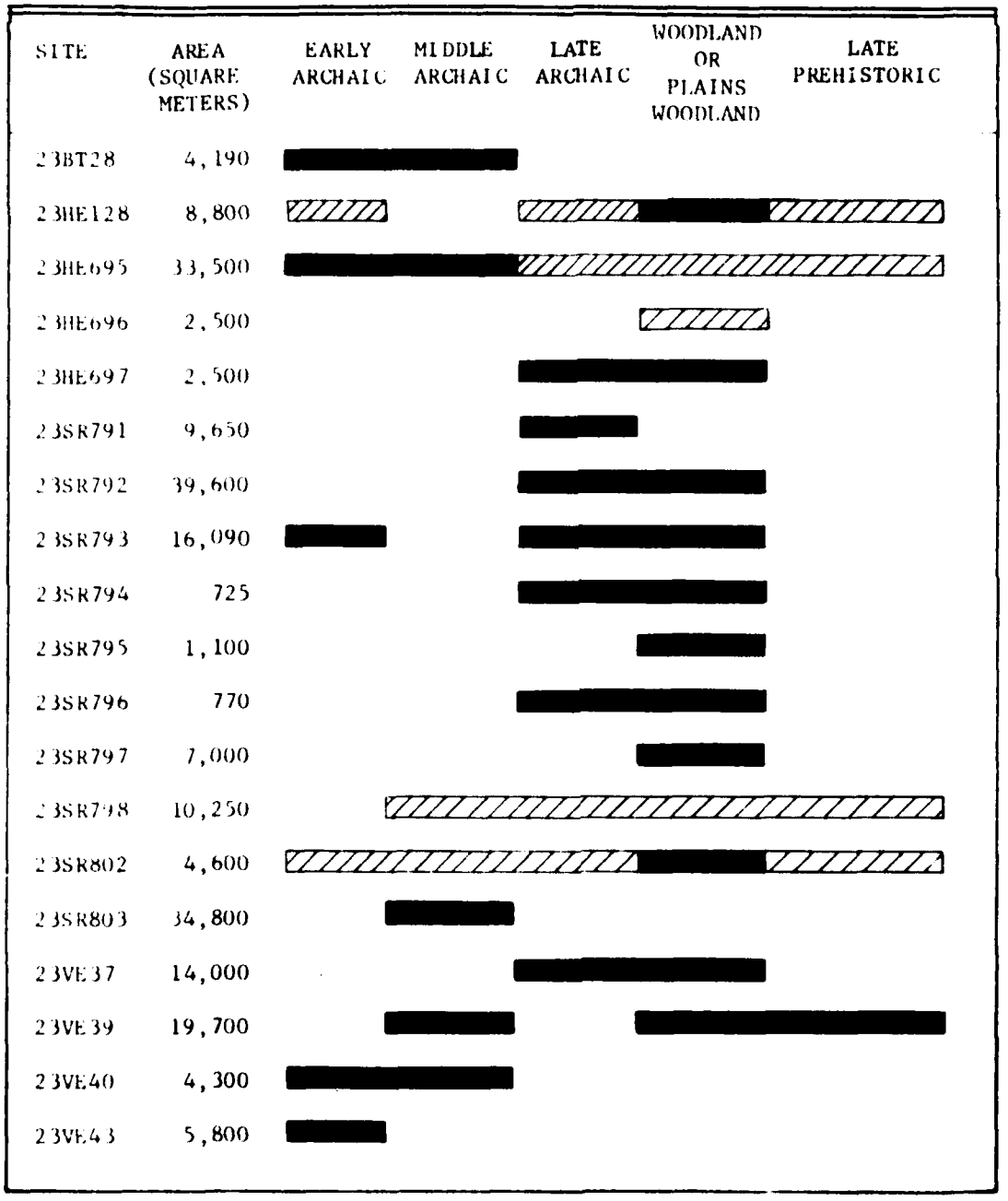
*[illegible] flood easement land

The temporal and cultural historical placements of the sites are based almost solely upon a "type fossil" approach. For this purpose, a number of sources were utilized, including Chapman (1975), Perino (1968, 1971), Montet-White (1968), Bell (1958, 1960), Suhm and Jelks (1962), Klippel (1971) and Roper (1977a). As summarized in Table 10, artifacts observed in the field and in private collections associated with visited sites give evidence of human occupation ranging from the Early Archaic to the Mississippian or Plains Village Periods. At least 10, and possibly 13, sites that yielded potentially diagnostic data were apparently multicomponent assemblages.

It is difficult to determine if these apparently multicomponent sites in fact were occupied during the periods suggested by the diagnostic artifacts. It may be that the artifacts are not sufficiently accurate indicators of temporal placement. In a number of instances, for example, the projectile point

TABLE 10

CULTURAL COMPONENTS RECOGNIZED AT SITES
IDENTIFIED BY IROQUOIS RESEARCH INSTITUTE



= diagnostic artifacts observed in the assemblage

= presence of component suspected on other grounds

information was insufficient to allow a distinction to be made between possible Late Archaic components and Woodland components lacking ceramics or other diagnostic tools.

No evidence of Dalton occupation was observed at any of the sites examined in the present project. However, a Dalton point was observed in a private collection of materials that were reportedly recovered from either site 23HE693 or another nearby unrecorded site. Both sites are in the Osage Plains and are near the South Grand River. A possible Dalton component was reported from site 23SR322, which is in the 50 year easement land but was not examined in the present study.

Because no conclusive evidence of Dalton occupation was obtained in this project, little can be added to the existing knowledge of Dalton settlement patterns in southwestern Missouri. It may be noted that Dalton sites encountered elsewhere in the HST Reservoir area tend to be deeply buried below alluvium and located very close to the major streams in narrow bottomland segments (Joyer and Roper, in press). The areas surveyed in the present project tended to be in upland terraces in the Ozark Plateaus province and along wide river bottoms and terraces in the Osage Plains province; the absence of Dalton components may therefore offer some degree of support to Joyer and Roper's model. It should also be noted that the relative absence of Dalton and other Early Archaic components from the survey area may be due to an increase in upland erosion accompanying the conclusion of the Atlantic Episode.

Based upon presumed diagnostic point styles observed on the surface, Early Archaic components were recognized at five sites examined in the present project. A possible Graham Cave Side Notched point, which is identified with the Early Archaic Period by Chapman (1975), was observed on the surface of 23HE695. A possible Hidden Valley point, which is also identified with the Early Archaic Period by Chapman (Ibid.), was observed at 23SR793. Early Archaic or possible Middle Archaic components were identified at 23BT28 and 23VE40 by the presence of Rice Contracting Stemmed and Rice Lobed points, respectively, which appear to relate to a transition bridging the Early and Middle Archaic Periods in Missouri (Ibid.).

The extension of the Early Archaic eastern bifurcate projectile point tradition (J. Chapman 1975) into western Missouri is strongly suggested by the presence of a possible St. Albans point at 23VE43, in addition to the Rice Lobed point at 23VE40. Both 23VE40 and 23VE43 are located in the Osage Plains, which suggests that the typical association of the bifurcate tradition with the humid eastern forests may not be completely accurate. It should be noted, however, that similar points which occur in Texas are not considered to be related to the bifurcate tradition (Ibid.). Consequently, an identification of these artifacts in the western Missouri prairies with the eastern bifurcate tradition may be premature until more is understood concerning the relationship of the eastern bifurcate tradition to central Texas point types such as Montell (Bell 1958) and Frio (Ibid.).

In addition to material observed on the surface, certain points in several local private collections suggest the possibility of Early Archaic components at

two other sites, 23HE128 and 23SR802. The specific site associations are unclear, however, so little use can effectively be made of this data.

Possible Middle Archaic components were identified at five sites examined in the present project. With two exceptions, 23SR803 and 23VE39, these sites also apparently contain Early Archaic components. As indicated above, the Rice Lobed and Rice Contracting Stemmed points observed at 23BT28 and 23VE40 may be associated with both the Early and Middle Archaic Periods in Missouri. Middle Archaic components at 23HE695 and 23VE39 are indicated by the presence of Jakie Stemmed points (Chapman 1975). A Middle Archaic component is indicated at 23SR803 by the presence of a Big Sandy point (Ibid.). This identification may be in error, however, as other researchers (e.g., J. Chapman 1975) associate Big Sandy points with the Early Archaic Period. What emerges, therefore, is the fact that a clear differentiation between the Early and Middle Archaic Periods on the basis of the present survey data may be lacking.

In addition to material observed on the surface at these sites, private collections from the area contain Middle Archaic artifacts reputedly from 23SR798 and 23SR802. In the case of 23SR798, the association is probably accurate. As indicated by Alfred Johnson (personal communication), there is still much to be learned about Early and Middle Archaic complexes in the eastern plains and prairies before they can be effectively seriated into temporally and culturally meaningful phases.

Possible Late Archaic components were identified at seven sites examined during the present project. These sites are: 23HE697, 23SR791, 23SR792, 23SR793, 23SR794, 23SR796, and 23VE37. The diagnostic artifacts observed at six of these sites could also be associated with the generalized Woodland cultures in the eastern plains and prairies; it is therefore difficult to relate any of these sites solely to the Late Archaic Period at this time. In addition, private collections examined by the survey crews suggest the possible presence of Late Archaic components at sites 23HE128, 23HE695, 23SR798, and 23SR802. Of these possible occurrences, sufficient provenience control is available only for 23SR798. Among the previously identified sites not examined in the present project, one site, 23SR275, is listed as having a Late Archaic component.

Significantly, the Late Archaic component at 23SR798 is reflected in part by the only known occurrence of a Sedalia phase lanceolate point in the areas surveyed in the present project. The Sedalia phase is closely related to or identical with the Nebo Hill phase centered in the Kansas City area in western Missouri, northeastern Kansas, and southeastern Nebraska. No evidence of Nebo Hill phase occupations were observed in this survey. The survey included areas in the Ozark Plateau where rock shelters may have been located. Although Iroquois Research Institute did not discover any rock shelters, several projectile point types which are similar to the lanceolate Nebo Hill form have been recovered from Rodgers Shelter (Ahler 1971). Based upon previous studies of Nebo Hill compexes (Rohn and Woodman 1976; Kenneth Reid, personal communication) it may be expected that Nebo Hill sites in the HST area would be limited to valley bottoms and hilltop sites near rivers and creeks. These regional cultures are in turn hypothesized to be related to other Late Archaic complexes as far away as Louisiana and Illinois (Kenneth Reid, personal communication; Donald Blakeslee, personal communication; Marvin Kay, personal communication). Site 23SR798

covers an area of 10,250 square meters and is located on a terrace approximately 150 meters west of a tributary of the Osage River. For the most part, however, the recognition of Late Archaic components at investigated sites is based upon the occurrence of less diagnostic projectile point forms such as Ellis, Afton, Ensor, Gary, and Grand, all of which also may occur in Woodland contexts.

The sizes of the Late Archaic sites discovered in the present study range from 725 to 39,600 square meters. Within this range, a bimodal or trimodal distribution can be observed, as can be seen in Figure 3. Sites 23HE697, 23SR794 and 23SR796 range in size from 725 to 2,500 square meters with a mean size of 1,332 square meters. A possible second cluster includes four sites, 23SR791, 23SR793, 23SR798, and 23VE37, which range in size from 9,650 to 16,090 square meters, with a mean of 12,7498 square meters, The third cluster is composed of the largest site, 23SR792, which occupies a surface area of 39,600 square meters.

If these size differences are indicative of functional distinctions among the three clusters, with the small sites probably being special purpose areas, it might be expected that other factors such as assemblage variability and environmental location would vary in a related way. It might be expected, for example, that the smaller Late Archaic components would exhibit a more narrow range of cultural material than the larger sites. To some extent, this appears to be the case. Two of the smaller sites, 23HE697 and 23SR794, contained only debitage, cores, or points on the surface. The third site 23SR796, contained a relatively wide assortment of chipped stone tools including points, bifaces, scrapers, and debitage. Significantly, however, none of these three sites contained ground stone artifacts or surficial evidences of fire such as fire cracked rock, burnt limestone, or burnt sandstone. On this admittedly sketchy evidence, it may be hypothesized that the small Late Archaic sites, 23HE697, 23SR794, and 23SR796, represent special purpose activity areas, possibly hunting, meat pocessing, chert collection, or chert reduction stations.

All three small Late Archaic sites are located upon well drained soils along eighth and ninth order streams. Two sites, 23SR794 and 23SR796, are situated on low bottomland terraces in the Ozark Plateaus province and are surrounded by 946 and 862 acres of bottomland, respectively, within a one mile radius. As shown in Table 18, for sites in the Ozark Plateaus, this range represents a relatively large amount of bottomland within a one mile radius. The third site, 23HE697, is located in the Osage Plains province. In spite of the fact that the Osage River is in the prairies and surrounded by a relatively wide floodplain, only 119 acres of the land surrounding the site within a one mile radius are bottomland. This might suggest that there is an adaptational difference between the two small Late Archaic sites in the Ozark Plateaus and the single small Late Archaic site in the Osage Plains. However, there is no appreciable difference in the observed artifact assemblages at the three sites.

All of the larger Late Archaic sites contained on the surface a wider range of cultural material than debitage and points, suggesting a broader range of activities at these sites, and they may be tentatively interpreted as camps or habitation sites. There is no significant distinction, however, between the single very large site and four medium size sites. Ground stone artifacts were present in the surface assemblages at 23SR791, 23SR792, 23SR798, and 23VE37.

Four of the five large Late Archaic sites are located in the Ozark Plateaus province. Interestingly, the total amount of bottomland surrounding these sites within a one mile radius is in each case considerably less than is the case for the two small Late Archaic sites in the Ozark Plateaus. These figures range from 262 to 690 acres, suggesting that the larger, more permanently occupied Late Archaic campsites are situated in locales offering a somewhat different spectrum of resources. The large sites are located along first, third, and fifth order streams and are possibly less likely to be subject to flooding from the major streams than the smaller sites.

It must be emphasized that these interpretations are extremely speculative since they are based on a very small sample of sites. In addition, most of the sites with identified Late Archaic components are represented by multicomponent assemblages which may also be attributable to non-ceramic Woodland occupations. The preceding interpretations of Late Archaic site functions are therefore open to question.

One site in the 50 year easement land that was not examined in the present project is identified as having an Archaic component, based on two points in the collections. The site, 23HE231, is located in the Osage Plains province and is of unknown areal extent.

Woodland components in the 50 year easement area are recognized by the occurrence of a number of presumably diagnostic point styles. Most of the points are, however, also characteristic of the Late Archaic Period, so an accurate estimation of the presence of Woodland components in the area is impossible, lacking ceramics. Judging from the artifacts observed in the field by the survey crew, it is estimated that 11 sites may have Woodland components: 23HE128, 23HE697, 23SR792, 23SR793, 23SR794, 23SR795, 23SR796, 23SR797, 23SR802, 23VE37, and 23VE39. Examination of a well controlled private collection from one site resulted in the identification of another Woodland component at 23SR798. In addition, although no diagnostic artifacts were observed in association with the mound at 23HE696, it is considered very likely that the feature is related to a Woodland culture. Of these 13 assemblages, six could be equally accurately identified as Late Archaic, based solely upon the projectile points observed on the surface.

The overall Woodland chronology in the Ozarks and Plains has yet to be well defined (Donna Roper, personal communication; John Reynolds, personal communication; Alfred Johnson, personal communication). Therefore, the placement of these assemblages within a more detailed cultural historical framework is currently impossible.

The data currently available are inadequate to allow the definite recognition of Plains Woodland complexes in the survey area. Most of the large corner notched and contracting stemmed points that probably indicate a generalized Woodland occupation are equally likely to occur in certain Plains Woodland contexts. Small corner notched points are also characteristic of many Plains Woodland components in eastern Kansas and northern Oklahoma. Such artifacts were not observed in great quantity at the surveyed Woodland sites,

although Scallorn points (Bell 1960) reputedly from 23SR802, 23HE695, and 23HE128 were seen in private collections.

Analyses of the lithic materials observed on the surface of the sites in the 50 year easement lands give little evidence for the widespread occurrence of important chert types originating in Kansas and Oklahoma such as Flint Hills, Florence, or Foraker chert. This negative evidence may suggest that the area was infrequently exploited by Plains Woodland or Plains Village groups from those regions. It is also possible, however, that such materials were among the unidentified cherts examined in the surveyed areas.

Similar problems occur in attempting to determine the possible nature of contacts between the study area and surrounding Middle Woodland complexes such as the Renner phase in the Kansas City area or the Cooper phase in northeastern Oklahoma. There is significant disagreement concerning the nature of Middle Woodland components in the entire HST study area, as is discussed in "Significance of the Resources" in the following chapter. The data to assess Middle Woodland cultural relationships with respect to the present project are currently unavailable.

Artifactual evidence for late prehistoric Mississippian or Plains Village components was virtually absent from the assemblages observed at the 39 sites examined in the present study. A small, finely chipped triangular point was observed in situ at 23VE39. Such artifacts, under a variety of different type names, are characteristic of Mississippian, Plains Village, and early protohistoric complexes throughout the eastern prairies and plains, as well as into the Mississippi Valley. Site 23VE39 is located very close to 23VE4, the Coal Pit or Hayes site, which has been identified as a late 18th and early 19th century Little Osage village location (Chapman 1965c); it is therefore tempting to relate the small point found at 23VE39 to a protohistoric horizon. However, while this is possible, no European artifacts of the protohistoric period were recorded by the field crew.

Based upon observation of local private collections, late prehistoric components may be present at 23HE128, 23HE695, 23SR798, and 23SR802. Of these four possible components, provenience information is adequate to definitely assign a likely Mississippian Period component to only one site, 23SR798. This assignment can be made on the basis of the occurrence of small unnotched and multiple notched triangular points in a private collection from the site.

Given the total absence of ceramic artifacts from the material observed during the survey, it is virtually impossible to assign specific cultural provenience to the two accepted late prehistoric components. The unnotched triangular points could easily be the product of true Mississippian complexes, many Plains Village cultures, or possible Plains Village-Mississippian interface complexes in the plains and prairies such as the Steed-Kisker focus or the Oneota aspect. In addition, similar point styles occur in the Mississippian-influenced Caddoan cultures of Oklahoma and Arkansas, although they occur less frequently than small, triangular, corner notched points in these manifestations. The multiple notched Cahokia point observed in the private collection from 23SR798 is

more likely to stem from a Mississippian source to the east. In addition to the few late prehistoric or Mississippian components possibly recognized in this project, information on file at the Archaeological Society of Missouri indicates that one additional site in the 50 year flood easement land, 23HE233, may possess a Mississippian Period component.

Roper (1977a) indicates that Mississippian-like components, while rare throughout the HST area, occur more frequently in the Osage Plains than in the Ozarks and tend to be represented by Caddoan decorated and undecorated pottery and shell tempered Mississippian Period pottery. Additionally, it is suspected (Ibid.) that Steed-Kisker and other Plains Village groups exploited the area on an intermittent basis, but the delineation of these contacts is difficult.

As a prerequisite for the successful modeling of a prehistoric settlement and subsistence system, it is necessary to develop a useful site typology that reflects both cultural historical and functional reality. Ideally, such a typology is derived, in part, from a detailed analysis of site size and locational characteristics, in combination with functional and descriptive analyses of a statistically valid sample of artifacts, cultural debris, and non-cultural remains recovered from each site. The current study was a surface reconnaissance, and no artifacts were collected. Therefore, only relatively crude temporal-cultural control is possible for each site. With the exception of projectile points and a few other tool classes, artifact occurrence at each site was recorded on a presence-absence basis. Nevertheless, reconnaissance data may be sufficient to suggest patterns which may serve as hypotheses to be tested in later stages of research.

The Iroquois Research Institute survey resulted in the discovery or further description of 39 sites. The following discussion of site functions is limited to these 39 sites, since they were all analyzed by a standard set of methodological procedures.

Both in the field and during laboratory analysis, an effort was made to derive locational information with respect to key environmental and physiographic variables that are potentially relevant to site function. These factors include, but are not limited to, a determination of the location of each site with regard to the amount of bottomland within a radius of one mile, surface drainage characteristics, exposure, physiographic province, and rank of nearest stream.

The 39 prehistoric sites in the sample range in size from 190 to 39,600 square meters, as shown in Table 11. One assumption that governs analysis of site function where detailed information may be lacking is that the areal extent of a surface scatter may be related to the range of activities undertaken at the site or to the intensity and duration of the occupation. In short, assuming that chronological and cultural historical variables can be controlled, it may be hypothesized that base camps or other more permanently and intensively occupied locales are represented in the archaeological record by relatively large surface

TABLE 11

IROQUOIS RESEARCH INSTITUTE SITES
SITE SUMMARY TABLE

SITE	SIZE (SQ. LAKE METERS)	PROVINCE	DRAINAGE	STREAM RANK	EXPOSURE	VISIBILITY	ELEVATION ABOVE NEAREST WATER (FEET)	ELEVATION ABOVE RIVER (FEET)
[illegible]	[illegible]	Osage	2	[illegible]	W	3	10	10
[illegible]	[illegible]	Osage	3	[illegible]	S	4	17	17
[illegible]	[illegible]	Osage	3	[illegible]	S	4	17	17
[illegible]	[illegible]	Osage	3	[illegible]	S	4	17	17
[illegible]	[illegible]	Osage	1	[illegible]	SW	4	12	17
[illegible]	[illegible]	Osage	1	[illegible]	N	3	8	8
[illegible]	[illegible]	Osage	2	[illegible]	N	4	25	25
[illegible]	[illegible]	Osage	1	[illegible]	NW	1	15	26
[illegible]	[illegible]	Osage	1	[illegible]	E	4	15	16
[illegible]	[illegible]	Osage	1	[illegible]	open	1	7	7
[illegible]	[illegible]	Osage	1	[illegible]	open	4	7	11
[illegible]	3,050	Osage	1	[illegible]	NE	3	1	25
[illegible]	[illegible]	Osage	2	[illegible]	S	3	7	31
[illegible]	[illegible]	Osage	1	[illegible]	S	4	9	34
[illegible]	[illegible]	Ozark	2	[illegible]	E	3	26	33
[illegible]	950	Ozark	1	[illegible]	SE	3	12	28
[illegible]	[illegible]	Ozark	1	[illegible]	S	3	18	42
[illegible]	9,850	Ozark	2	[illegible]	S	1,4	15	30
[illegible]	[illegible]	Ozark	2	[illegible]	S	4	7	20
[illegible]	[illegible]	Ozark	2	[illegible]	E	4	4	4
[illegible]	[illegible]	Ozark	1	9	open	3	3	15
[illegible]	[illegible]	Ozark	2	9	open	3	2	9
[illegible]	[illegible]	Ozark	2	9	SW	2	6	18
[illegible]	[illegible]	Ozark	1	9	open	4	4	13
[illegible]	[illegible]	Ozark	2	[illegible]	NE	1	10	20
[illegible]	[illegible]	Ozark	2	[illegible]	NE	1	13	17
[illegible]	[illegible]	Ozark	2	[illegible]	SE	1	16	19
[illegible]	[illegible]	Ozark	1	[illegible]	SE	1	16	30
[illegible]	[illegible]	Ozark	2	[illegible]	E	2	18	35
[illegible]	[illegible]	Osage	2	[illegible]	N	4	16	16
[illegible]	[illegible]	Osage	2	[illegible]	NE	2	13	13
[illegible]	[illegible]	Osage	1	[illegible]	S	4	1	3
[illegible]	[illegible]	Osage	1	[illegible]	S	3	4	5
[illegible]	[illegible]	Osage	2	[illegible]	S	4	3	4
[illegible]	[illegible]	Osage	1	[illegible]	S	4	2	3
[illegible]	[illegible]	Osage	1	[illegible]	S	4	2	3
[illegible]	[illegible]	Osage	1	[illegible]	S	4	7	8
[illegible]	[illegible]	Osage	1	[illegible]	N	4	7	12
[illegible]	18,000	Osage	1	10	open	4	8	12

Soils - Drainage
1 = Well Drained
2 = Intermediate
3 = Poorly Drained

Visibility
1 = 0-25%
2 = 26-50%
3 = 51-75%
4 = 76-100%

Stream Rank
[illegible] = Strahler Stream Rank

scatters, while special purpose sites such as lithic collection stations or hunting camps are smaller.

In the absence of any related supporting information, however, site size alone is probably not an adequate measure of function, even with respect to the most general functional categories. Apparent site size can be affected by methodological problems such as inter-observer variability and ground surface visibility and by post-depositional factors such as erosion and amateur artifact collecting. In addition, even when a site is readily visible and apparently undisturbed, the possibility exists that a large surface scatter may be the result of repeated, short-term special purpose occupations of a favorable locale.

It is presumed that the procedures used for estimating site size, applied consistently in the field, present an adequate control for the problems associated with inter-observer variability. However, inter-observer variability remains a significant stumbling block to the comparison of the results of different surveys.

Data are presented in Table 11 which suggest the extent to which surface visibility conditions may have influenced estimation of site sizes. Although optimum visibility conditions of 76-100% prevailed in only 48% of the cases where archaeological sites were discovered, 82% of the sites larger than 15,000 square meters exhibited ideal visibility. Nevertheless, it is felt that site size can be used as an indicator of site function when it correlates with other variables.

The artifacts and cultural material observed at the sites have been grouped into a number of categories and are summarized in Table 12. These groupings are, of necessity, the result of rather general field observations, and it is doubted that much emphasis can be placed upon the assemblage characteristics in assigning probable functions to the sites. Since no quantitative field analysis was done, only presence-absence statements can be made concerning the components of individual assemblages. Nonetheless, making use of a number of different variables allows the provisional identification of several types of sites.

Tables 11 and 12, which indicate the cultural and environmental attributes relating to each site examined during the present project, and Figure 3 form the basis for the following discussion. Based upon data recovered during the survey, the 39 sites may be tentatively organized into four presumed functional categories: chert reduction or collection stations, other special purpose short-term camps, habitation sites, and possible burial locations. Unfortunately, due to the nature of the data available, there is probably a great deal of overlap among these four categories, and with one or two possible exceptions, relatively certain assignments of function are impossible.

One site, 23HE696, consists of a possible earth mound. On the basis of comparison with prehistoric mound complexes in the region (Chapman 1948; Wood 1967; Klippel 1965a), it may be assumed that this site is, at least in part, a burial area. The surface examination of the site resulted in the discovery of only a single flake. By comparison with reported prehistoric mounds in the area, however, the 23HE696 mound is unusually large and is situated in an atypical

TABLE 12

ARTIFACT CATEGORY OCCURRENCE RATE AT IROQUOIS RESEARCH INSTITUTE SITES IN THE HST RESERVOIR AREA

Site	Area (Square Meters)	Points	Bifaces	Unifacial Tools	Scraping Tools	Spokeshaves	Cores	Debitage	Ground Stone	Fire Cracked Rock	Burnt Limestone	Other	Category Total
[illegible]	[illegible]	-	X	X	-	-	X	X	-	-	-	X	[illegible]
[illegible]	[illegible]	X	-	-	X	-	-	-	X	-	-	X	4
[illegible]	[illegible]	X	-	-	X	-	-	X	X	-	-	X	[illegible]
[illegible]	[illegible]		-	-	-	-	-	X	-	-	-	-	[illegible]
[illegible]	[illegible]	-		-	-	X	-	X	-	X	-	-	4
[illegible]	[illegible]	-	-	X	X	X	-	X	-	-	-	-	[illegible]
[illegible]	[illegible]			-	-	-	-	X	-	-	-	-	[illegible]
[illegible]	[illegible]	-	-	-	-	-	-	X	-	-	-	-	[illegible]
[illegible]	[illegible]	-	-	-	-	-	X	X	X	-	-	-	[illegible]
[illegible]	[illegible]	-	-		-	-	-	X	-	-	-	-	[illegible]
[illegible]	[illegible]	-	-	-	-	-	-	X	-	-	-	-	[illegible]
[illegible]	[illegible]	-	-	-	-		-	X	-	-	-	-	[illegible]
[illegible]	[illegible]		-	-	-	-	-	X	X	-	X	-	[illegible]
[illegible]	[illegible]	-		-			-	X	-	-	-	-	1
[illegible]	[illegible]	-	-	-		-	-	X	-	-	-	-	4
[illegible]	[illegible]	-	-	-			-	X	-	-	-	-	[illegible]
[illegible]	[illegible]	-	-	-	-	-	-	X	-	-	-	-	[illegible]
[illegible]	[illegible]	-	-	-	-	-	-	X	X	-	-	X	[illegible]
[illegible]	[illegible]	-	-	-	X	-	X	X	X	-	-	-	[illegible]
[illegible]	[illegible]	X	X		X	-	X	X	-	-	-	X	[illegible]
[illegible]	[illegible]	X		-	-	-	X	X	-	-	-	-	[illegible]
[illegible]	[illegible]	-		-	-	-	X	X	X	-	-	X	[illegible]
[illegible]	[illegible]	-	-		-	-	X	X	-	-	-	-	[illegible]
[illegible]	[illegible]	X	-	-	-	-	X	X	-	-	-	-	[illegible]
[illegible]	[illegible]	X	X	X	X	X	X	X	X	X	-	-	9
[illegible]	[illegible]	-	-	X	X	-	X	-	-	-	-	-	[illegible]
[illegible]	[illegible]	-	-	-	-		X	X	-	-	-	X	4
[illegible]	[illegible]	-	-	-	-	-	-	X	-	-	X	-	[illegible]
[illegible]	[illegible]	-	-	-	-	-	-	X	-	-	-	-	4
[illegible]	[illegible]	X	-	-		-	X	X	X	-	-		[illegible]
[illegible]	[illegible]	-	-	-	-	-	-	X	-	X	-	-	[illegible]
[illegible]	[illegible]	X	X	X	-	X	-	X	X	-	-	-	[illegible]
[illegible]	[illegible]	-	-		-	-	X	X	-	-	-	X	4
[illegible]	[illegible]	X	-	-	-	-	-	X	X	-	-	-	4
[illegible]	[illegible]	X	-	-	-	-	-	X	-	-	-	-	[illegible]
[illegible]	[illegible]	X	X	-	X	-	-	X	-	-	-	-	[illegible]
[illegible]	[illegible]	X	-	-		-	X	X	-	-	-	-	[illegible]
[illegible]	[illegible]	X	-	X	X	-	-	X	-	-	-	X	[illegible]
[illegible]	[illegible]	-	-	-	-	-	-	X	-	-	-	-	1
SITE TOTAL		25	19	20	15	4	14	37	11	3	2	9	149

physiographic location. In view of these facts, it is considered quite possible that the 23H696 mound may be an erosional remnant rather than a purposely erected structure. Only subsurface testing will determine with certainty the nature of this feature.

In addition to 23HE696, sites 23BT30, 23HE693, 23SR787, and 23VE44 were characterized by the presence of only debitage in their assemblages. On the basis of this information, these four sites may be hypothesized to have been primarily chert collection or reduction stations. Partial support for this hypothesis is offered by the observation that all four sites are relatively small in size as illustrated in Table 12. Table 19 shows, however, that none of the sites are located in areas where either chert outcrops or residual lithic materials were apparent, so it is not certain that these four sites were utilized primarily as lithic collection or processing stations. In addition, analysis of the lithic materials observed in the assemblages at three of the sites indicates that a variety of different lithic materials were utilized at each site (Table 19), which would not be expected at sites that are purely chert collection stations. Therefore, while the presence of debitage or cores at these sites is indicative of reduction and lithic tool manufacture, there is no clear evidence that the sites are specifically collection stations.

By contrast, Table 19 shows that sites 23BT1, 23HE694, 23SR785, 23SR799, 23SR800, 23SR801, 23VE37, and 23VE41 are located in areas near chert outcrops or where substantial amounts of residual chert were apparent on the surface. Most of these sites, however, exhibited greater variety of artifacts in their assemblages, and they range in size from 250 to 22,400 square meters. It is likely that chert collection played a part in the range of activities undertaken at these sites, but to characterize all of them as chert collection stations would blur an important difference between small sites with limited assemblages such as 23HE694 and 23SR785 and sites with apparently more diversified assemblages such as 23BT1 and 23VE37.

Sites contained only projectile points or bifaces in addition to the nearly ubiquitous debitage, as can be seen in Table 12. It may be suggested that these sites, which range in size from 700 to 18,400 square meters with a mean size of 6,082 square meters, represent sites at which less than a full range of domestic or habitation activities took place. Two of these sites, 23HE694 and 23SR785, were probably in part chert collection stations, based on the occurrence of residual chert on the surface. The other sites may have been hunting stations or other specific activity camps, but any such interpretations are purely speculative at this stage.

Based upon available data, 28 sites lack ground stone. It may be hypothesized that they were occupied for a limited duration of time at which activities including, and possibly limited to, chert extraction, lithic tool manufacturing, faunal resource exploitation, and animal processing may have taken place.

On the other hand, sites 23BT28, 23BT29, 23HE695, 23SR786, 23SR791, 23SR792, 23SR795, 23SR798, 23SR803, 23VE37, and 23VE39 all contained evidence of grinding stones or other lithic items modified by pecking, pounding, or grinding (Table

12). Based upon ethnographic analogy, it may be hypothesized that prehistoric activities at these 11 sites included the processing of plant foods such as seeds or nuts, in addition to lithic tool manufacture or hunting and animal processing. There is a broad range of sizes in this group, from 1,100 to 39,600 square meters, with a mean size of 15,733 square meters. Within this group, it may be further hypothesized that two subgroups of sites are represented: special purpose collecting stations and habitation sites.

A habitation area or base camp would be expected to occur where a number of environmental conditions are met. Presumably base camps should be situated in locations which promise relatively comfortable surroundings and which allow the exploitation of a relatively wide range of natural resources and ready communication with any satellite activity areas. Also, it is expected that base camps should yield a relatively wide range of artifacts and debris and that base camps or repeated habitation areas should be represented in the archaeological record by relatively large surface scatters.

Three of the sites with ground stone artifacts in their assemblages stand out as extremely large. Two of these sites, 23HE695 and 23SR792, are situated on slopes exposed to the south and east, directions that are relatively sheltered from the prevailing severe weather patterns in this part of Missouri. Site 23SR803, however, is exposed to the north. Two of the sites, 23HE695 and 23SR792, occur in settings that offer excellent surface drainage, while the third, 23SR803, exhibits only average surface drainage characteristics. Little patterning is apparent in the location of these three sites with respect to stream order. Site 23SR803 is situated near the Little Osage River, a major, tenth order stream. An eighth order stream is nearest to 23HE695, while 23SR792 is located adjacent to a relatively small, third order stream. As indicated in Table 12, five to seven categories of cultural material were observed at these sites. Sites 23HE695 and 23SR803 each exhibited five categories of material, and 23SR792 displayed seven. However, since the categories were recorded on a presence-absence basis, these observations cannot provide sufficient evidence to definitely support a base camp or habitation area function for sites 23HE695, 23SR792, and 23SR803.

The remainder of the sites with ground stone tools may be hypothesized to be short-term camps at which plant food processing played a part in subsistence activities. However, this hypothesis must be considered extremely tenuous, because there is much variation in size and artifact assemblage among the eight sites, 23BT28, 23BT29, 23SR786, 23SR791, 23SR795, 23SR798, 23VE37, and 23VE39. One of these sites, 23SR798, stands out as exhibiting the greatest assemblage variability of any site in the sample; it may, in spite of its relatively modest size of 10,150 square meters, be a more permanent camp.

Sites 23BT31, 23SR786, 23SR798, 23SR801, and 23VE32 displayed evidence of fire on the surface (Table 12). These five sites range in size from 250 to 18,000 square meters with a mean of 9,800 square meters. The indications of fire at these sites consist of burnt limestone or sandstone and fire cracked rock, usually heat-shattered chert. The presence of these materials does not correlate well with other possible indicators of site function in the survey data.

The available data may be exploited more effectively by attempting to infer a range of activities that may have occurred at each site rather than by attempting to assign each site to a specific functional category. Table 13 illustrates the activities that may be inferred at each site, based on the available data. These activities doubtless do not reflect the full range of archaeologically visible activities undertaken at each site, and it must be emphasized again that the available data do not permit definitive assessments of site functions. Nonetheless, the results of this analysis, although limited in scope, may form a partial basis for future research in the region, especially in combination with other sources of information.

The following discussion of the prehistoric settlement patterns in the study area consists of an analysis of the distribution of sites with respect to key environmental variables that may be presumed to have been important factors affecting the placement of sites across the landscape. The environmental variables that are considered in this discussion include the major physiographic subdivisions of the study area, site exposure, soil characteristics, hydrography, and catchment area. For much of this discussion, the total sample of 88 sites is used, but in some cases, data omissions necessitate a smaller working sample.

As shown in Table 14, the majority of the identified sites are within the Ozark Plateaus (53 sites) and the remaining 35 sites are within the Osage Plains. The higher number of sites in the Ozark Plateaus probably reflects a preference on the part of prehistoric populations for the somewhat different resources, exploitative niches, and potential settlement areas of this physiographic province; the survey data obtained in the present study summarized in Table 20 indicate a higher rate of site occurrence (number of sites per square mile) in the Ozark Plateaus than in the Osage Plains.

In the total sample, the prehistoric sites occur in physiographic situations that expose them to all cardinal directions, as can be seen in Table 14. As would be expected, however, there is a tendency for certain exposures to be favored as places for settlement. Twenty-five sites occur in situations where the prevailing relief offers no appreciable protection in any direction. Of the remaining 61 sites for which site exposure can be discerned, 34 (56%) are exposed to the south, southeast, or east, thereby offering them a degree of protection to the west, northwest, and north, the directions from which much of the severe frontal weather in the southwestern Missouri area originates. Conversely, only 16 sites (26%) are in physiographic situations exposed to the west, northwest, and north.

If protection from the prevailing severe weather actually does constitute a determining factor in the location of archaeological sites in the region, then it might be expected that the tendency observed in the entire study area would be exaggerated in the Ozark plateaus, where the relatively more dissected terrain may offer comparatively greater protection to occupation areas. Of the sites located in the Ozark Plateaus with a non-open exposure, 18 are protected to the north, northwest, and west while only two are exposed toward those directions. Proportionally more sites in the Ozark Plateaus are protected from the north, northwest, and west than in the Osage Plains. In the Osage Plains, where the

TABLE 13

INFERRED ACTIVITIES PRESENT AT
SITES EXAMINED BY IROQUOIS RESEARCH INSTITUTE

SITE NUMBER	AREA IN SQUARE METERS	LITHIC COLLECTION	LITHIC REDUCTION	SCRAPING, CUTTING	VEGETAL, SEED PROCESSING	FIRE, BURNING	BURIAL
23SR792	39,600	-	X	X	X	-	-
23SR803	34,800	-	X	X	X	-	-
23HF695	33,500	-	X	X	X	-	-
23BT1	22,400	X	X	X	-	-	-
23VE39	19,700	-	X	X	X	-	-
23VE38	18,800	-	X	-	-	-	-
23VE42	18,400	-	X	-	-	-	-
23VE32	18,000	-	X	X	-	X	-
23BT31	16,300	-	X	X	-	X	-
23SR793	16,090	-	X	X	-	-	-
23VE41	15,500	-	X	X	-	-	-
23VE37	14,000	X	X	X	X	-	-
23SR788	13,200	-	X	X	-	-	-
23SR790	12,900	-	X	X	-	-	-
23SR787	11,025	-	X	-	-	-	-
23SR798	10,250	-	X	X	X	X	-
23SR791	9,650	-	X	X	X	-	-

X = Present
- = Not Present

TABLE 13 (continued)

INFERRED ACTIVITIES PRESENT AT
SITES EXAMINED BY IROQUOIS RESEARCH INSTITUTE

SITE NUMBER	AREA IN SQUARE METERS	LITHIC COLLECTION	LITHIC REDUCTION	SCRAPING, CUTTING	VEGETAL, SEED PROCESSING	FIRE, BURNING	BURIAL
23HE128	8,800	-	X	X	-	-	-
23SR797	7,000	-	X	-	-	-	-
23VE44	6,000	-	X	-	-	-	-
23VE43	5,800	-	X	X	-	-	-
23SR802	4,600	-	X	X	-	-	-
23VE40	4,300	-	X	-	-	-	-
23SR786	4,200	-	X	X	X	X	-
23BT28	4,190	-	-	X	X	-	-
23SR800	4,120	X	X	X	-	-	-
23SR785	3,050	X	X	-	-	-	-
23HE696	2,500	-	X	-	-	-	X
23HE697	2,500	-	X	-	-	-	-
23BT29	2,075	-	X	X	X	-	-
23HE693	1,100	-	X	-	-	-	-
23SR795	1,100	-	X	-	X	-	-
23SR789	950	-	X	X	-	-	-

X = Present
- = Not Present

TABLE 13 (continued)

INFERRED ACTIVITIES PRESENT AT
SITES EXAMINED BY IROQUOIS RESEARCH INSTITUTE

SITE NUMBER	AREA IN SQUARE METERS	LITHIC COLLECTION	LITHIC REDUCTION	SCRAPING, CUTTING	VEGETAL, SEED PROCESSING	FIRE, BURNING	BURIAL
23SR796	770	X	X	X	-	-	-
23SR794	725	-	X	-	-	-	-
23HE694	700	X	X	X	-	-	-
23SR799	575	X	X	X	-	-	-
23SR801	250	X	X	-	-	X	-
23BT30	190	-	X	-	-	-	-

X = Present
- = Not Present

topography frequently does not offer significant protection, only 44% of the sites exposed to particular directions are on slopes which protect them from the north, northwest, and west. These studies suggest, but certainly do not prove, that the avoidance or reduction of the impacts of severe weather was a factor in the location of prehistoric sites in the HST Reservoir area.

It might be further hypothesized that sites exposed to the south, southeast, and east may represent more intensive occupations, and as a corollary, they may be larger than those exposed to the north, northwest, and west. Using the data in Table 11 for the 39 sites examined by Iroquois Research Institute, for which it

TABLE 14

FREQUENCY OF SITE OCCURRENCE
WITH RESPECT TO PROVINCE AND EXPOSURE

PHYSIOGRAPHIC PROVINCE	DIRECTION OF EXPOSURE										TOTAL
	OPEN	N	NE	E	SE	S	SW	W	NW	NO DATA	
Ozark Plateaus	8	2	3	8	4	6	2	-	-	2	35
Osage Plains	17	8	4	4	1	11	2	2	4	-	53
TOTAL	25	10	7	12	5	17	4	2	4	2	88

may be assumed that the size estimates are comparable, this hypothesis cannot be supported. The mean size for the 21 sites exposed to the south, southeast, and east is 11,841 square meters while the mean size for the six sites exposed to the north, northwest, and west is 12,300 square meters. The mean size of the 14 sites exposed to the south is 11,896 square meters, and the mean size of the three sites exposed to the southeast is only 1,773 square meters. The four sites exposed to the east have a mean size of 16,848 square meters. The mean size of the four sites exposed to the north is surprisingly high (12,675 square meters), but this is due to the presence of one extremely large site, 23SR803, in this group. The one site exposed to the west is 23BT1, with an estimated size of 22,400 square meters. Site 23HE694 is exposed to the northwest and covers 700 square meters.

Table 11 presents the field assessments of surface drainage which were obtained for the 39 sites examined in the Iroquois Research Institute survey. Not surprisingly, an overwhelming majority of 29 sites (74%) are located in situations that facilitate surface runoff and drainage. Curiously, however, half of the 10 sites with intermediate or poor surface drainage are relatively large, with sizes greater than 15,000 square meters.

In addition to the surface drainage characteristics determined by field observations, information was available to allow the placement of 46 sites in Henry and Vernon Counties with regard to soil drainage characteristics mapped by

the U.S.D.A. This information is displayed in Table 15. Seven of the sites overlap two soil series with different drainage characteristics and these are listed as "Indeterminate" in Table 15. For the remaining 39 sites that can be associated with soils of a particular drainage class, a clear majority, 31 sites, are in well drained settings. The simple frequency of sites associated with particular soil series, however, may not be a valid measure of the actual importance of soil drainage in determining site location. Since detailed survey information is lacking for many of the sites included in this analysis, it is possible that the high proportion of sites on well drained soils reflects only the preponderance of well drained soils in the areas surveyed.

For the 15 sites examined by Iroquois Research Institute in Henry and Vernon Counties, it was possible to determine actual site density with respect to soil drainage characteristics. These observations are presented in Table 16. The data indicate that the site occurrence rates are higher on well drained soils than on soils with intermediate or poor drainage, thus supporting the interpretations based on the larger sample of 46 sites. It should be noted, however, that this distribution may well be related to geological factors affecting the archaeological record rather than to cultural factors. Most of the well drained soils are located on elevated terraces and are not regularly subjected to the fluvial erosion and deposition that affect the poorly drained alluvial soils. In situations of erosion and deposition, it might be expected that sites, especially small sites, would be more likely to have been buried or destroyed by floods. These fluvial processes may offer some explanation for the fact that the sites located on poorly drained soils are generally larger than those located on well drained and intermediately well drained soils.

Table 17 lists the site occurrences with respect to the rank of the stream nearest each site. With the exception of the absence of sites associated with sixth and seventh order streams, there is no obvious correlation between stream rank and the occurrence of sites. It is suspected that this exception is a result of the location of the areas surveyed, rather than actual ecological determinants. Otherwise, it cannot be said that any particular stream sizes or ranks are favored locales. It might be expected that large sites, which are possible base camps or long-term habitation sites, would be more frequently located along major streams. However, an analysis of the distribution of the 39 sites examined by Iroquois Research Institute field crews fails to offer significant support for this hypothesis. As can be seen from data presented in Table 11, only four (36.4%) of the 11 sites larger than 15,000 square meters are adjacent to eighth, ninth, and tenth order streams, the three highest Strahler stream ranks observed in the survey area. The remaining seven large sites are adjacent to first, second, and third order streams. These results may be somewhat misleading, however, since the survey areas were not randomly selected, and because the total sample of sites is relatively small.

Data were available from the 39 sites examined by the Iroquois Research Institute field crews to allow a determination of the elevations of the sites with respect to two hydrographic variables which may have had an influence upon site location. The relative elevation of the sites with respect to the nearest water source was measured and the 39 sites appear to be relatively evenly

TABLE 15

PREHISTORIC SITE OCCURRENCES ACCORDING TO SOIL DRAINAGE, HENRY AND VERNON COUNTIES

SOIL ENVIRONMENT	NUMBER OF SITES	PERCENT OF TOTAL
Well Drained Soil Series (Verdigris, Deepwater, Hector, Coweta, Barton)	31	67.4
Poorly Drained Soil Series (Urich, Quarles, Osage)	7	15.2
Intermediately Drained Soil Series (Bartwell)	1	2.2
Indeterminate	7	15.2
TOTAL	46	100%

TABLE 16

SITE OCCURRENCE RATES AND MEAN SITE SIZE ACCORDING TO SOIL DRAINAGE IN HENRY AND VERNON COUNTIES

SOIL DRAINAGE	ACRES SURVEYED	NUMBER OF SITES	SITES PER SQUARE MILE	MEAN SITE SIZE IN SQUARE METERS
Well	1,351	8	3.8	8,400
Intermediate	261	1	2.5	1,100
Poor	3,571	6	1.1	16,900
TOTAL	5,183	15	1.9	11,300

TABLE 17

FREQUENCY OF SITE OCCURRENCE
ACCORDING TO STRAHLER STREAM RANK

RANK	SITES
10	12
9	14
8	6
7	-
6	-
5	10
4	12
3	9
2	6
1	15
no data	4
TOTAL	88

distributed within a range of 1 to 26 feet above the nearest water with no significant clusterings about particular values (Table 11). With respect to the probability of flooding, site elevation in relation to the main regional rivers is more likely to be culturally significant. According to the U.S. Army Corps of Engineers, Kansas City District, Engineering Hydraulics Branch, in an undammed state, the Osage River should flood to 10 feet above normal level once every 10 years. The South Grand River should reach 15 feet above normal level every 10 years. These flood levels may have affected the location of sites, especially large and possibly more permanently occupied sites. The available data do not support this hypothesis, however, since only five of the 11 sites larger than 15,000 square meters are more than 15 feet above the Osage and South Grand Rivers. Among the six large sites within the 10 year flood zones, four are five feet or less above the main rivers.

In view of the obvious effects of the physiographic differences between the Osage Plains and the Ozark Plateaus, it is to be expected that the catchment variables will differ greatly between the two provinces. With respect to the total amount of bottomland within one mile of each site, Table 18 shows that the steep topography and narrow floodplains characteristic of the Ozarks result in a situation where no site catchments contain more than 50% bottomland and 24 of the 33 sites for which data are available have 30% or less bottomland in their catchment areas. This can be contrasted with the Osage Plains, where 33 of 53

TABLE 18

SITE DISTRIBUTION ACCORDING TO CATCHMENT AREAS

ACRES	BOTTOMLAND WITHIN ONE MILE OF SITE		BOTTOMLAND WITHIN ONE MILE OF SITE, ON SAME SIDE OF RIVER		LAND WITHIN ONE MILE OF SITE, ON SAME SIDE OF RIVER	
	Ozark Plateaus	Osage Plains	Ozark Plateaus	Osage Plains	Ozark Plateaus	Osage Plains
1-201	7	2	15	5	0	0
202-402	8	1	11	6	0	0
403-603	9	2	4	16	1	1
604-804	5	10	1	10	0	1
805-1,006	4	5	2	4	11	10
1,007-1,207	0	14	0	3	8	9
1,208-1,408	0	9	0	3	7	6
1,409-1,610	0	4	0	2	3	6
1,611-1,811	0	4	0	3	1	3
1,812-2,011	0	2	0	1	2	17
No Data	2	0	2	0	2	0
TOTALS	35	53	35	53	35	53

sites are in locations where 50% or more of the catchment area consists of bottomland. In the Osage Plains, 38 of the 55 sites (69%) have between 30% and 70% of their catchment areas composed of bottomland.

If sites were located in order to facilitate the exploitation of bottomland resources, it might be expected that most of the bottomland in the catchment areas would be on the same side of the river A comparison between the amount of bottomland accessible without crossing a major stream and the total amount of bottomland in the catchment area suggests that sites are not situated in order to maximize available floodplain. For a majority of the sites in the Ozark Plateaus (26 of 33 sites), 20% or less of the catchment area on the same side of the river is bottomland, as can be seen in Table 18. For 32 out of 53 sites in the Osage Plains, the catchment areas include 10% to 40% bottomland on the same side of the river.

When the total amount of land on the same side of the river is compared for the catchment areas associated with sites in the two provinces, much of the apparent difference between the provinces disappears. In both provinces, no sites are located so that less than 20% of the catchment area is on the same side of the river. As indicated in Table 18, the only significant difference between the two provinces involves a group of 17 sites in the Osage Plains which are located so far from major streams that 90% to100% of their catchment areas are on the same side.

In conclusion, it must be admitted that the preceding discussion of settlement patterning was beset with numerous problems, among which can be listed the relatively small sample of sites, the fact that results of several different survey programs had to be combined to form a larger data base, the lack of artifact collections, and the fact that the total area which has been subjected to controlled survey is composed of numerous small parcels which are scattered over several counties. Anthropologically valid settlement pattern analyses are ideally based on intensive examination of individual sites and assemblages, and these types of investigations were not possible under the limitations of the project. The foregoing site distribution analysis does not pretend to offer any significant observations regarding the nature of prehistoric settlement systems in southwestern Missouri. However, these analyses may be useful in the development of a predictive model for site locations within the HST Reservoir area.

In terms of geography and locally available chert resources, the areas surveyed in the present study which contain sites may be divided into three major areas: (1) the South Grand drainage in northwestern Henry County, (2) the Osage River drainage east of the St. Clair-Vernon County line, and (3) the Osage River drainage west of the St. Clair-Vernon County line. There are few chert sources in northwestern Henry County or in the Osage River drainage west of the St. Clair line, but east of the St. Clair County line in the Osage River drainage there are chert-bearing rocks and residual soils near the identified sites.

In the South Grand drainage, field analysis revealed a predominance of Mississippian cherts at the six sites in northwestern Henry County, as shown in Table 19. Burlington and Pierson cherts dominated the Mississippian System chert

TABLE 19

CHERT TYPE OCCURRENCE AT SITES
IDENTIFIED BY IROQUOIS RESEARCH INSTITUTE

SITE	CHERT TYPE: Local Mississippian System: Warsaw	Burlington	Elsey	Reed Springs	Pierson	Local Ordovician System: Cotter	Jefferson City Cotter	Jefferson City	Roubidoux	Gasconade	Unidentified Oolitic	Foreign: Atlas Powder	Maries County	Novaculite	Unidentified	Total Chert Types Present	Nearby Chert Sources: Residual	Outcrop
[illegible]		x	-	-	x	P		x	P	-	-	-	-	-	-	3	X	-
[illegible]		x					x			x	-	-	-	-	X	4	-	-
[illegible]		x	x	-						-		-	-	-	X	3	-	-
[illegible]		x		-	x		-							-	X	3	-	-
[illegible]		x			X										X	3	-	-
[illegible]		x	x		x						X		-	-	-	4	-	-
[illegible]		x									-	-	-	-	-	1	-	-
[illegible]		x		-	x		x		-	-	-	-	-	-	X	5	X	-
[illegible]		x	x		-					-			-	x	X	6	-	-
[illegible]					-						-	-	-	-	X	1	-	-
[illegible]		x		-	x	-		-	-		-	-	-	X	-	3	-	-
[illegible]		x	x		x								-	-	-	3	X	-
[illegible]						x		x		x				-	-	3		-
[illegible]		x								-			-	-	X	2	-	-
[illegible]		x	x		x	x		x	x	X	-	x	-		-	9	-	
[illegible]		x	x	-	-							-	-		X	3	-	-
[illegible]	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
[illegible]		x	x	-	x		-			-	x	-	-		X	5	-	-
[illegible]		x	x	x	X			P		P	x	-	-		-	5	-	-
[illegible]	x	x	x	-	x	x			x	X	x			-	-	8	-	-
[illegible]		x	-		X		x		-		-	-	-	-	-	3	-	-
[illegible]		x	x	-	X		x					-	X		X	6	-	-
[illegible]		x		-	x	x	-	x				-	-	-	-	4	-	-
[illegible]	-	x	x		X		x			x	-	-	-	-	-	5	-	-
[illegible]	x	X	x		-	x	-			X	x	-	-	-	X	6	-	-
[illegible]		x		-	X		-		-	X	-	-	-	-	-	3	X	-
[illegible]		x	x		x		x	-				-	-	-	-	4	-	X
[illegible]		x	-	-	X	-				-	x	-	-	-	-	3	X	X
[illegible]		x		-	X	-	x			-		-	-	-	X	4	-	-
[illegible]		x			-						X		-	-	X	3	-	-
[illegible]			x	-	x	X		x						-	X	7		
[illegible]		x	x		-	-	x				x			-	X	5	X	-
[illegible]		x	x	x	X								-	-		4	-	
[illegible]		x		x	X	x	X				x	-	-		X	7	-	-
[illegible]		x			-			x	-	-	-	-	-	-	-	2	-	-
[illegible]		x		x	-		-		-	-	-	-	-	-	X	3	X	-
[illegible]		x		x	X			x		-	x	-	-	-	X	6	-	-
[illegible]		X	-	P	P	-	-	x	-	-	X	-	-	-	X	4	-	-
[illegible]	X	X	x	-	X	-	X		-	-	-	-	-	-	-	5	-	-
TOTAL	6	36	16	5	24	8	10	8	2	7	11	1	1	2	20		7	2

x = Chert Type or Source Present
\- = Chert Type or Source Not Present
P = Chert Type Possibly Present, Identification is Tentative
• = No Data

assemblage with lesser amounts of Warsaw and Elsey cherts being present. Three sites contained only one Ordovician System chert type each, which was either Cotter, Jefferson City-Cotter, or unidentified oolitic chert. Also, at sites 23HE695 and 23HE697, Arkansas Novaculite was found.

Since the rocks of the Pennsylvanian System surround all the sites in northwestern Henry County, the cherts used at these sites must have been imported into the area from outcrops or residual soils of the Mississippian System to the east or southeast from a distance of at least 24 kilometers (15 miles). The paucity of Ordovician System cherts may reflect a great distance to their sources, the availability of closer Mississippian System cherts, or both. The Arkansas Novaculite is the only identifiable chert foreign to the Harry S. Truman Reservoir area. Its source is in the Ouachita Mountains of Arkansas. Other foreign cherts were possibly present and placed in the category of unidentified cherts.

Table 19 shows that, in the Osage River drainage west of the St. Clair-Vernon County line in Vernon and Bates counties, there are noticeable variations in how many types of chert are present from one site to another. Generally, Burlington and Pierson cherts predominate in the assemblages of these 14 sites. The sites north of the Osage River and along the Marais de Cygnes River contained only one other Mississippian System chert, Elsey chert. The sites along the Little Osage River in Vernon County possessed Elsey, Reed Springs, and Warsaw cherts in various combinations. Ordovician System cherts are relatively rare in this area, and except for one site with Gasconade chert, consist of only Cotter, Jefferson City, Jefferson City-Cotter, or unidentified oolitic cherts. Unless they are among the unidentified cherts, cherts foreign to the Harry S. Truman area were not observed at these sites.

The available data suggest that most of the cherts utilized at sites in the Osage River drainage west of the St. Clair County line were imported, since the underlying bedrock of the Pennsylvanian System in this area generally lacks chert and because most of the identified cherts at these sites were derived from the chert-bearing carbonates of the Mississippian and Ordovician Systems to the east. How far to the east or southeast these cherts came from is yet to be determined. The general lack of Ordovician System cherts other than Cotter, Jefferson City-Cotter, or Jefferson City types suggests that cherts were not brought into the sites from a great distance away. These cherts possibly came from only as far east or southeast as the Ordovician System outcrops along Clear Creek or the Sac River shown in Plate 4.

East of the St. Clair-Vernon County line in the Osage River drainage, the survey found an abundance of Mississippian and Ordovician System cherts, as can be seen in Table 19. Out of 19 sites, all but two contained Burlington chert, while 13 sites contained Pierson chert and 10 sites contained Elsey chert. Only two sites, 23SR788 and 23SR793, possessed Warsaw chert. Every identified type of Ordovician System chert was found at these sites including Atlas Powder and Maries County chert. Of the identifiable Ordovician System cherts, the most abundant was Gasconade chert, which was found at six of the surveyed sites. Cotter and Jefferson City-Cotter cherts were present at five sites each. The remaining chert types were found at three sites or less. At 23SR788, Atlas

Powder chert was found in addition to eight other chert types, including four Mississippian System and four Ordovician System cherts. The single occurrence of Maries County chert was at 23SR795.

The predominance of Mississippian and Ordovician System cherts close to outcrops and residual soils containing these cherts suggests that most of the cherts at these sites could be of local origin. The presence of non-local Ordovician cherts, especially Maries County chert from central Missouri and Atlas Powder chert from southwestern Missouri, indicates that some importation of cherts from the south and east has occurred. Unfortunately, because of the sketchy and possibly questionable identification of the cherts present at each site, more specific conclusions cannot be drawn.

Predictive Model for the Unsurveyed Portion of the Study Area

Estimates of the total number of sites in the HST 50 year easement lands may be derived from the survey data obtained in the present project and from the data available from the University of Missouri survey of the HST fee lands (Roper 1977a).

Table 20 presents the site occurrence rates in the major physiographic provinces and terrain categories, using the survey data from the present project. A total of 39 sites were recorded in the 9,035 acres surveyed, which is equivalent to a site occurrence rate of 2.8 sites per square mile. By extrapolation, a total of 275 sites are estimated for the entire 50 year flood easement lands, which have been estimated to include 63,653 acres.

Data in Table 20 indicate a higher rate of site occurrence in the Ozark Plateaus, 6.6 sites per square mile, than in the Osage Plains, 2.0 sites per square mile. By extrapolation from the separate site occurrence rates calculated for the two major physiographic zones, 179 sites are estimated for the 17,277 acres in the Ozark Plateaus and 147 sites are estimated for the 46,376 acres in the Osage Plains, a total of 326 sites in the entire 50 year flood easement areas.

By projection from the individual site occurrence rates for each of the nine terrain categories shown in Table 20, a total of 301 sites is estimated for the entire HST easement land, as shown in Table 21. Data in Table 20 indicate that, within each major physiographic province, the higher site densities are found in the bottomland areas of terrain categories A, G, H, and I rather than in the valley walls or slopes, terrain categories B, C, D, E, and F. In the Osage Plains, a higher site density was observed in the moderate to well drained alluvial land, terrain category I, than in the poorly drained alluvial land, terrain category H. The bottomlands in the Ozark Plateaus were not differentiated according to soil drainage characteristics because of a lack of modern soil surveys in the Ozark counties.

Estimates of the total number of sites in the HST 50 year flood easement land may also be derived from the site occurrence rates calculated from the

TABLE 20

PREHISTORIC SITE OCCURRENCE RATES
ACCORDING TO TERRAIN CATEGORIES

TERRAIN CATEGORY	ACREAGE SURVEYED	NUMBER OF SITES RECORDED	SITES PER SQUARE MILE
OZARK PLATEAUS			
"A" Floodplains and Terraces	969	13	8.6
"B" Gentle Slopes (0-10%)	231	2	5.5
"C" Moderate Slopes (10-30%)	213	0	0
"D" Precipitous Slopes (over 30%)	36	0	0
SUBTOTAL	1,449	15	6.6
OSAGE PLAINS			
"E" Gentle Slopes (0-10%)	994	1	0.6
"F" Moderate Slopes (10-20%)	28	0	0
"G" Undifferentiated Bottomlands	1,974	9	2.9
"H" Poorly Drained Alluvial Land	3,850	10	1.7
"I" Moderate to Well Drained Alluvial Land	740	4	3.5
SUBTOTAL	7,586	24	2.0
GRAND TOTAL	9,035	39	2.8

TABLE 21

PROJECTED NUMBER OF SITES
IN THE HST 50 YEAR FLOOD EASEMENT LAND
ACCORDING TO TERRAIN CATEGORIES

TERRAIN CATEGORIES	ACREAGE SURVEYED	NUMBER OF SITES	ESTIMATED TOTAL ACREAGE	ESTIMATED NUMBER OF SITES
A	969	13	8,932	120
B	231	2	4,727	41
C	213	0	2,971	0
D	36	0	647	0
E	994	1	7,311	7
F	28	0	449	0
G	1,974	9	13,191	60
H	3,850	10	23,112	60
I	740	4	2,313	13
TOTALS	9,035	39	63,653	301

University of Missouri survey of the HST fee lands (Ibid.). Table 22 lists the estimated amount of 50 year flood easement land within each of the survey strata defined by Roper (Ibid.). Using the site occurrence rates of these strata obtained in the University of Missouri survey (Ibid.), a total of 1,998 sites may be estimated for the entire HST 50 year flood easement area.

The estimates based on the University of Missouri survey data are much higher than those based on data obtained in the present study. There are several possible reasons for this, some related to differences in the areas surveyed in the two projects and some related to differences in the survey methods used. The University of Missouri survey was conducted within the fee lands of the HST

TABLE 22

PROJECTED NUMBER OF SITES
IN THE HST 50 YEAR FLOOD EASEMENT LAND
ACCORDING TO STRATA (ROPER 1977a)

STRATUM	ESTIMATED TOTAL ACREAGE	SITES PER SQUARE MILE*	ESTIMATED NUMBER OF SITES
I	289	29.35	13
II	119	20.62	4
III	64	53.31	5
IV	62	19.42	2
V	174	38.89	11
VI	701	47.73	52
VII	4,692	18.09	133
VIII	142	34.48	8
IX	16	25.50	1
X	40,079	25.75	1,613
XI	535	40.24	34
XII	338	10.06	6
XIII	95	18.50	3
XIV	155	15.39	4
XV	106	28.73	5
XVI	1,347	23.00	48
XVII	57	10.05	1
XVIII	377	7.56	4
XIX	138	15.76	3
XX	10,718	2.44	41
XXI	3,263	2.74	5
XXII	186	7.41	2
TOTAL	63,653 ac		1,998

*Source: Roper (1977a)

Reservoir, which, in comparison to the easement lands, include a higher proportion of land along major streams and a higher proportion of land in the Ozark Plateaus. Data presented in the University of Missouri draft survey report (Ibid.) indicate that sites occur more frequently along major streams than along tributary streams, and data from the present project indicate a higher rate of

site occurrence in the Ozark Plateaus than in the Osage Plains. Different survey techniques may also account for the higher rate of site discovery obtained in the University of Missouri survey. In the present study, the survey was accomplished by walkover transects with field crew members positioned at 30 meter intervals while the University of Missouri was accomplished with crew members spaced at 20 to 25 meter invervals (Ibid.). Also, shovel testing was used during the University of Missouri survey (Ibid.), but not in the Iroquois Research Institute reconnaissance survey. The use of narrower transect intervals (i.e., with field crew members closer together) gives more intensive ground coverage and presumably increases the probability that small sites will be discovered. Also, it has been demonstrated that shovel testing in conjunction with walkover surface inspection increases survey effectiveness, particularly in areas of heavy ground cover (Ibid.).

Estimates of the total number of sites in the entire HST 50 year flood easement land range from 275 to 1,998. The actual number of sites that will be discovered in the study area will depend on the selection of survey methods. The data obtained in the Iroquois Research Institute reconnaissance survey support several statements regarding the distribution of sites in the HST 50 year flood easement lands:

1. Sites are more densely concentrated in the Ozark Plateaus than in the Osage Plains;

2. Sites are more densely concentrated in bottomlands than on slopes or valley walls; and

3. Sites are more densely concentrated on moderately well drained and well drained soils than on poorly drained soils.

The types of sites that are likely to be discovered in the HST 50 year flood easement lands can be classified according to the categories established by the Archaeological Society of Missouri. The easement area includes portions of both the Osage Plains and the Ozark Plateaus, and the probability of discovering specific types of sites may be expected to vary between these two major physiographic provinces. Cave sites, rock shelters, and petroglyphs may be expected to occur in the Ozark Plateaus, but it is unlikely that these types of sites will be found in the Osage Plains. One site, 23HE696, was tentatively identified as a mound although it has not been tested. It was located in the Osage Plains. However, virtually all of the reported mound or cairn sites that occur in southwestern Missouri are located in the northwestern margins of the Ozark Plateaus in dissected upland areas. On this basis, it is unlikely that many mound or cairn sites will be found in the HST 50 year flood easement area. In both major physiographic provinces, the majority of all the known prehistoric sites would be classified as open sites. It is therefore expected that mostly open sites will be found in the 50 year flood easement area in the future.

RECOMMENDATIONS

Significance of the Resources

In recent years there has been a considerable amount of discussion among professional archaeologists regarding the meaning of "significance" in cultural resource management (CRM). Within the context of CRM, the term "significant" is synonymous with "eligible for the National Register." Nearly all archaeological resources which are determined to be eligible for the National Register qualify under criterion "d" (Davis et al. 1979) which states that the quality of significance is present in properties "that have yielded, or may be likely to yield, information important in prehistory or history" (36 C.F.R. 60.6). Given the generality of National Register criterion "d," most CRM practitioners now agree that the significance of particular archaeological resources must be assessed with regard to explicitly defined research objectives (Goodyear, Raab and Klinger 1978; Iroquois Research Institute 1977; Raab and Klinger 1979; House and Schiffer 1975; Wendorf 1978; but see Sharrock and Grayson 1979).

In view of the need to develop more explicit criteria for evaluation of archaeological properties, many states are developing preservation plans which will outline important local and regional research problems and include recommendations for preservation of certain types of resources. In Missouri, a preservation plan for archaeological resources is being developed by the Missouri Association of Professional Archaeologists and the Office of Historic Preservation, Department of Natural Resources. As this master plan is not yet complete, Iroquois Research Institute contacted individuals with active research interest in the states of Missouri, Kansas, Oklahoma, Nebraska, and South Dakota in order to develop a framework of regional research objectives to evaluate the potential significance of the archaeological resources in the HST project area. Because the HST 50 year easement lands are mostly within the Osage Plains, the major emphasis of this undertaking was placed upon current archaeological work in the eastern prairies and plains rather than the Ozarks.

Based upon the interviews and a literature review, a number of major research priorities that are relevant to a wide area of the eastern plains and prairies were identified. Others are more limited in scope but have theoretical ramifications beyond their region of origin. Many of the researchers interviewed indicated that important aspects of the cultural chronology in western Missouri are still poorly understood, as might be expected in a region which presents a rather diverse array of prehistoric cultures and adaptations. This problem is most acute when dealing with the Woodland Period. Donna Roper (1977a, 1979, personal communication) notes that it is impossible to use the traditional Woodland/Mississippian framework when dealing with the late prehistoric archaeological remains of the Ozarks in southwestern Missouri. Furthermore, she suggests that the tripartite Woodland sequence developed in the Midwest is inapplicable to the archaeology of the Ozarks. In the Plains, where a generally agreed-upon temporal ordering of the Plains Woodland complexes is lacking (Alfred Johnson, personal communication; John Reynolds, personal communication), and in the Ozarks, there is a definite need for improved control over the cultural chronology of the Woodland Period.

In addition to the very real confusions brought about by the archaeological data, other problems appear to be more the result of terminological and methodological differences among various archaeologists. In response to Roper's (1979) assertion that a separate Middle Woodland Period cannot be isolated in the Missouri Ozarks, Marvin Kay (personal communication) argues that the evidence for such an occupation comes not from presumed diagnostic artifacts but from radiocarbon-dated components in the Pomme de Terre Reservoir. It can be suggested, however, that there is actually not much substantative difference between the views of Kay and Roper, although their methodological emphases differ. Nowhere does Roper assert that the Ozarks were uninhabited during periods when classic Middle Woodland cultures arose elsewhere (see Roper 1977a, 1979). Rather, she seems to suggest that the area was inhabited during the Middle Woodland Period, but by people who had little contact with, or use for, many of the innovations characteristic of the Middle Woodland Period in surrounding areas (Roper 1979). Much of this problem is probably a result of terminological or taxonomic confusion concerning the use of the term "Middle Woodland" in the Ozarks.

Various approaches have been suggested to resolve the Woodland problem, both in the Ozarks and in the Plains. Clearly, an emphasis should be placed upon those sites which promise to offer a deep stratigraphic sequence and features which will yield material for isotopic dating (John Reynolds, personal communication; Donna Roper, personal communication; Alfred Johnson, personal communication). In areas lacking such sites, such as the Western Prairie portions of the HST Reservoir and much of the Plains, these kinds of investigations are difficult or impossible. Additionally, many archaeological sites which probably date to the Woodland Period apparently lack ceramics, either due to their nature as special purpose sites or because of poor preservation. Consequently, it is often difficult to distinguish these components from those of the Late Archaic Period.

Roper (personal communication) notes that, in response to the problems presented by these kinds of sites, the University of Missouri is undertaking an exhaustive stylistic analysis of all of the possible Woodland material which has been recovered during their previous and current work in the HST Reservoir in order to develop a stylistic seriation of the relatively non-diagnostic lithic and ceramic components. In addition, due to the fact that many of these components are plowzone sites where radiocarbon determinations are largely useless, the University of Missouri is anticipating a major emphasis upon thermoluminescence dating of ceramic artifacts (Ibid.). Other researchers express an interest in pursuing stylistic analyses of non-diagnostic Woodland artifacts, but doubt the utility of the traditional stylistic approaches followed in the past (Alfred Johnson, personal communication; John Reynolds, personal communication; Burt Purrington, personal communication; David Ives, personal communication; Kerry McGrath, personal communication). Among other potential means of dealing with the artifact variability presented by these Woodland complexes are various kinds of detailed attribute analyses, studies focusing upon the reductive technologies utilized in manufacturing finished lithic artifacts, and analyses of wear patterns and post-manufacturing modification of lithic artifacts. In addition to the purely technical and functional interests that such approaches serve, it is possible that these studies may be useful in discriminating between variations in artifact shape and form which are the result of use or manufacture and those which result from purely stylistic considerations.

Considerable interest exists among researchers in the Midwest and Plains concerning the nature of Late Archaic developments in the eastern Plains and Missouri (as well in regions further to the east). These concerns represent a combination of cultural chronological and taxonomic interests with a realization that a number of apparently fundamental economic and social changes occurred during the Late Archaic Period. In view of the results of excavations at the Phillips Spring and Koster sites indicating the likely presence of cultigens in Archaic contexts dating as early as 2360 B.C. (Chomko 1978; Reid n.d.), increased emphasis should be placed upon the investigation of the possibility that horticulture of both tropical and native cultigens was practiced during the Late Archaic Period (Alfred Johnson, personal communication; Kenneth Reid, personal communication; Donald Blakeslee, personal communication; Lee Douthit, personal communication; Larry Grantham, personal communication; Marvin Kay, personal communication).

In addition to the excavation of sites, middens, and features for the retrieval of material suitable for botanical analysis, a number of indirect approaches exist for the investigation of this problem. Analyses of Late Archaic settlement systems could offer indirect evidence of an increased emphasis on the cultivation of floodplain plant resources, but a number of investigators (David Ives, personal communication; Dick Taylor, personal communication) express a degree of dissatisfaction with traditional settlement pattern approaches. Other techniques which could be of use in indicating the existence of horticulture during the Late Archaic Period include the detailed analysis of artifact assemblages with attempts to identify horticultural tools or indications of wear on lithic artifacts indicative of grass cutting (Lee Douthit, personal communication).

In addition to the possible presence of horticulture, there is new evidence that ceramics were introduced into the eastern Plains in the Late Archaic Period. Fiber tempered potsherds have reportedly been recovered from the Late Archaic component at the Nebo Hill site (Reid n.d.). Although this is currently the only reported instance of ceramics in such an early context in the eastern plains and prairies, a number of researchers suspect that such material probably occurred in other Late Archaic components in the region such as the Titterington and Sedalia phases (Kenneth Reid, personal communication; Donald Blakeslee, personal communication; Marvin Kay, personal communication; Kerry McGrath, personal communication). Clearly, a major emphasis of Late Archaic studies in the region will be on the determination of the actual extent of the fiber tempered ceramic tradition into the eastern Plains and Midwest.

There is increasing interest among a number of researchers concerning the great amount of interaction among eastern Plains and Midwestern Archaic groups as represented by evidence of interaction between the Nebo Hill, Sedalia, and Titterington phases (Donald Blakeslee, personal communication; Marvin Kay, personal communication; Larry Grantham, personal communication; Kenneth Reid, personal communication; Kerry McGrath, personal communication). Some actual evidence in the form of trade copper in a Nebo Hill component in Hillsdale Lake, Kansas (Donald Blakeslee, personal communication) exists for such interaction, and some would argue that the exchange network involving these complexes extended even further to the south and southeast (Marvin Kay, personal communication; Kenneth Reid, personal communication; Donald Blakeslee, personal communication).

Several researchers have indicated a degree of dissatisfaction with current understanding of the variability represented by Late Archaic complexes in the region. A number of studies have used settlement and subsistence models in order to gain insight into this variability (Joyer and Roper, in press; Grantham 1977). Others (Kerry McGrath, personal communication; Alfred Johnson, personal communication) indicate that it is equally important to place these complexes within a more accurate and useful chronological taxonomic scheme. As McGrath (personal communication) indicates, the ongoing modification of our notions concerning the Late Archaic Period brings into question the entire basis of the traditional Archaic/Woodland division in cultural taxonomy. Clearly, in addition to the more specific research questions concerning the Late Archaic Period noted above, increasing emphasis needs to be placed upon developing a new or modified overall model for organizing the prehistory of the eastern United States, including the Plains.

Among researchers who have worked in the Ozark region, there is considerable interest in the description and explanation of the cultural ecological nature of prehistoric cultural developments in the Ozarks. A commonly held view is that the local ecology of the Ozarks prevented or inhibited the development or introduction of more complex cultural forms characteristic of the Hopewellian or Mississippian climaxes elsewhere. Much recent interest (Joyer and Roper, in press; Roper 1979; David Ives, personal communication; Dick Taylor, personal communication; Lee Douthit, personal communication; Burt Purrington, personal communication) has focused upon detailed studies of the ecological adaptations of Ozark groups. In addition to the more traditional settlement and subsistence pattern studies which often emphasize more readily visible factors such as site size and artifact assemblage variability, technological and functional analyses of site artifact assemblages as well as catchment studies are being given increasing emphasis by a number of researchers (Dick Taylor, personal communication; Lee Douthit, personal communication; David Ives, personal communication; Burt Purrington, personal communication).

Related to questions dealing with the nature of cultural adaptations in the Ozarks is the delineation and explication of the role that the Ozark region played in the overall prehistory of surrounding areas. In this regard, a number of hypotheses that should be tested present themselves. These hypotheses are in turn directly related to an understanding of the effects that various climatic episodes had on the human ecology of the region. With regard to the effects of climatic fluctuation upon human occupation of the Ozarks, two conflicting hypotheses exist. It has been suggested (David Ives, personal communication) that the Ozarks represent a region that was comparatively immune to the fluctuations in rainfall and climate (such as the Atlantic Episode and later short-term fluctuations) that affected surrounding areas, particularly the prairies and plains. During periods of climatic stress, the population of the Ozarks would increase as groups from the plains and prairies took refuge there because of its environmental stability. The opposite view has been expressed by Roper (personal communication); rather than arguing for an increase in the Ozark population during periods of environmental stress in the prairies, she suggests that population increase in the Ozarks probably coincided with periods of optimum climate and population increase in the prairies, due partially to the movement of people out of the prairies in response to a degree of overpopulation. Future research in the Ozark and prairie areas should attempt to resolve this problem.

A number of researchers are interested in the degree and nature of cultural contacts between the Ozarks and surrounding regions. Roper (Ibid.) suggests the possibility that the Ozarks were exploited at one time or another by Caddoan groups from Oklahoma and Arkansas, Steed-Kisker and other Central Plains groups to the west and northwest, and Plains Woodland and Pomona groups to the west. She suggests (Ibid.) that among the particular resources exploited by these and other peoples were chert, galena, hematite, and deer. There is general agreement, however, that the recognition of special purpose camps relating to outside groups is hampered by the general lack of particular diagnostic artifacts in the assemblages likely to be left by such visits (Donna Roper, personal communication; Marvin Kay, personal communication; John Reynolds, personal communication). With regard to chert exploitation, however, recent work by the University of Missouri (Mike Reagan, personal communication) appears to indicate that relatively little use of the chert resources of the HST area was made by outsiders. This might be indicated by the presence of local HST Reservoir area cherts in areas outside of the survey area, but such evidence has not yet been systematically compiled. Relating the Ozarks (including the HST Reservoir area) to other regions remains a significant research topic, but in the absence of agreed upon sequences and cultural taxonomies in much of the surrounding area, the recognition of specific relationships is difficult. Non-local cherts including materials from northwestern Missouri, Kansas, and Oklahoma do apparently occur in some amounts (Ibid.), however, indicating possible interaction between the HST Reservoir area and surrounding regions, but further investigations are necessary before definite conclusions can be drawn.

Several additional research topics are relevant to the HST Reservoir area. As indicated by several researchers (Roper 1977a; Dick Taylor, personal communication) the HST area presents an ideal laboratory for the comparison of cultural adaptations in the Ozarks and the Western Prairies. Another research topic (and one that was touched upon earlier) involves the effects of the Atlantic Climatic Episode upon human adaptations in the eastern Plains (Alfred Johnson, personal communication). Relating to this topic, it is also necessary to determine the erosional effects the end of the Alantic Episode may have had upon previously deposited archaeological remains. Several researchers suspect that scouring and diposition may have been considerable, and that they may greatly affect our ability to properly assess the demography and settlement pattern of pre-Late Archaic complexes (Alfred Johnson, personal communication; Lee Douthit, personal communication). Comparatively little is known about the early cultural horizons at present. In 1978, the University of Missouri undertook a subsurface backhoe testing program in Holocene terraces in order to locate early sites, but although many sites were uncovered by this work, it was almost impossible to date them due to the absence of diagnostic artifacts (Donna Roper, personal communication). Such studies, coupled with detailed geomorphological analyses, should be of use in locating and assessing the importance of possible early cultural horizons in the region.

Stemming from Ahler's work at Rodgers Shelter (1971) there is a continued interest among researchers in the area in all facets of lithic technology, including source analysis, functional studies, and technological studies (Mike Reagan, personal communication; Kerry McGrath, personal communication). Inasmuch as such studies are potentially valuable for both cultural historical and settlement-subsistence analyses, future work in the area should incorporate

One protohistoric Osage Indian site, Halleys Bluff, 23VE2, falls within the easement area, and another, the Coal Pit site, 23VE4, is just outside the HST easement. Both of these sites are listed on the National Register of Historic Places. In view of the fact that the project area falls within the early historic range of the Osage tribe, all late prehistoric and early protohistoric sites in the area would be of potential importance in archaeologically documenting social and ecological changes that accompanied the introduction of the horse, firearms, European trade networks, and European traders into the area.

The significance of the archaeological resources in the HST project area should be evaluated with regard to the possibility that these resources may provide useful data for fulfillment of the research objectives discussed above. Clearly, there is a diversity of research interests in the Ozark Highlands and the eastern Plains, and the preceding discussion is not intended as an exhaustive listing of all the potential research objectives that might be pursued in the HST project area. Certain research objectives stand out as particularly relevant in the HST project area, and these are summarized below, in no specific order of importance.

1. Because the HST project area crosscuts the Ozark Plateaus and Osage Plains, the prehistoric resources may be suitable for illuminating adaptational and cultural historical differences between the two regions. Specifically, the area would be of use in the investigation of alternative hypotheses concerning prehistoric ecological and demographic relationships between the Ozarks and the Plains in response to changing climatic conditions.

2. There is a growing body of data which suggests the presence of plant management techniques, ceramic technology, and widespread trade networks during the Late Archaic Period in the eastern Plains. Some of the prehistoric resources in the HST project area may provide data relative to a better understanding of Late Archaic cultures.

3. The Woodland and Plains Woodland chronologies of southwestern Missouri and eastern Kansas are poorly defined. Archaeological resources in the HST project area which have the potential to define Woodland and Plains Woodland cultural sequences more securely should be considered significant.

4. Several archaeological resources which are associated with the Osage Indians during the protohistoric period are already listed on the National Register of Historic Places. Additional resources which can furnish archaeological evidence relating to the economic and social changes that accompanied the spread of Euro-American trade and influence into the eastern Plains should be preserved.

5. In view of the fact that relatively little is known of pre-Late Archaic occupations in the Eastern Plains, an attempt

should be made to assess the western HST easement areas with regard to the possiblity that early cultural remains have been destroyed or buried by alluvial deposition.

In addition, many of the more methodological, technical, and theoretical research interests not specifically indicated in the above list (such as settlement pattern theory, catchment analysis, and lithic technology) would play a significant role in response to the substantive cultural historical and cultural ecological research goals presented in the list above and elsewhere in this discussion.

Evaluation of particular sites with respect to National Register criteria is beyond the scope of this project, and the significance of individual sites should be assessed only after a program of testing and evaluation has been completed. As already mentioned, one site within the HST 50 year flood easement area, the Halleys Bluff site, 23VE?, is already listed on the National Register. All other sites in the study area should be evaluated against the National Register criteria of eligibility.

Anticipated Adverse Impacts

Assessment of the probable effects of the HST project on the prehistoric resources in the 50 year flood easement lands requires consideration of direct, project related impacts and secondary, long-term impacts which may result from development of the project area and its environs.

Within the 50 year flood easement land, the direct impacts to prehistoric resources are related to the hydrological effects of flood control. The multi-purpose pool level of the HST reservoir will be maintained near the 706-foot elevation, and since the lower limit of the 50 year easement land is 25 feet above this elevation, the effects of erosion at the multipurpose pool shoreline will not be a serious threat to resources located in the 50 year flood easement land.

Sites in the 50 year flood easement land will be subject to direct, project related impacts only during severe floods. During periods of severe flooding, the pool level may rise as high as 742 feet, a few feet above the dam spillway crest elevation of 739.6 feet. The sites will be inundated beneath the floodwaters for short periods and subject to episodic erosion along the shoreline of the flood pool.

The degree of impact to prehistoric sites attributable to occasional inundation and episodic shoreline erosion will vary according to the particular elevation of each site. Estimates developed by the Corps of Engineers shown in Figure 4 indicate that the floodpool will rise to 731 feet once every 9.3 years, on the average, and to 742 feet less frequently than once every 100 years.

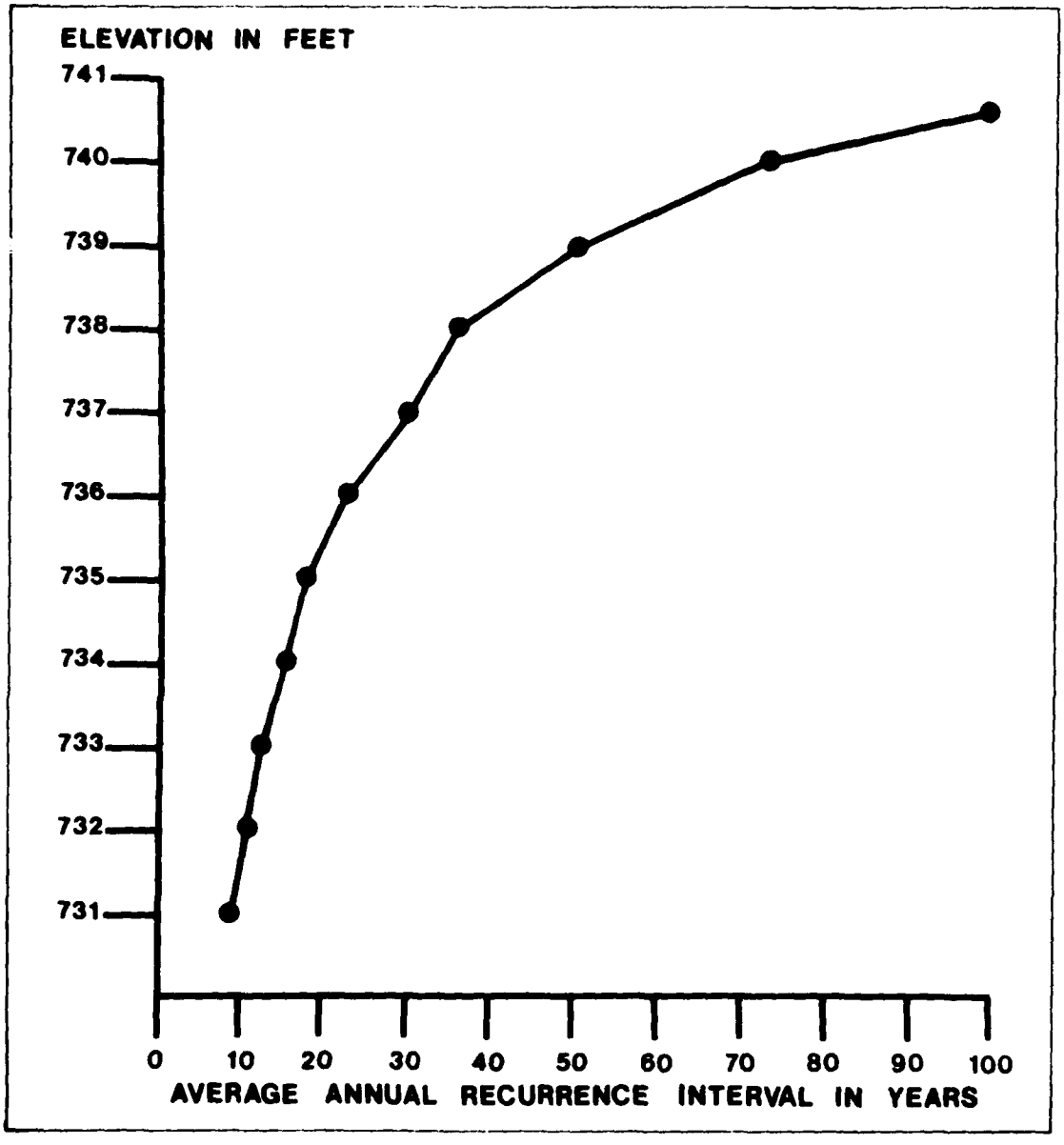


Figure 3. Expected flood frequency intervals. The average recurrence interval between floods reaching certain elevations in the 50-year flood easement land may be read from this graph. Elevations are indicated on the vertical scale while the horizontal scale indicates the average number of years between floods of varying intensity. Floods which reach an elevation of 731 feet are expected to occur, on the average, once every 9.3 years. Floodwaters will rise to 739 feet only once in 50 years, and floods will reach 741 feet less frequently than once every 100 years.

(Source: U.S. Army Corps of Engineers, Kansas City District, Engineering Hydraulics Branch).

Therefore, within the 50 year flood easement land, sites in the lowermost elevations will be directly affected 11 times more frequently than sites in the uppermost elevations.

The 86 known sites in the 50 year flood easement land are listed in Table 23, together with their elevations. A range in elevation rather than a single value is given for many of the sites. In some cases, field examination indicated that the site actually did extend over an appreciable range in elevation. In other cases, particularly among the previously recorded sites that were not examined during this study, the existing survey data indicated a range of values or the available locational information was not precise enough to determine a narrow range or a single elevation.

Using the elevation of a particular site, the frequency of hydrological impacts to that site may be ascertained by cross reference to Figure 4. For example, the elevation of site 23BE330 listed in Table 23 is 740 feet. Figure 4 indicates that the flood pool will rise to 740 feet approximately once every 70 years.

In the Kaysinger Basin Region which includes the HST project area, a population increase of over 70% is expected between 1970 and the year 2000. A major stimulus for this increased population is the development of the Truman, Stockton, and Pomme de Terre Reservoirs, and the most dramatic growth is expected near the reservoirs and on the fringes of cities (Kaysinger Basin Regional Planning Commission 1979). Along with the increased population, the HST project is expected to stimulate tourism and an attendant retail tourist industry in the area (Terrell Martin, personal communication).

While the HST project may indirectly cause adverse effects to prehistoric resources in the southwestern Missouri region by stimulating development, the government will not allow significant development to occur within the HST easement lands. The Corps of Engineers will have the right to flood the easement lands and to provide mosquito control within those areas. The government will prohibit human habitation within the easement land and will require that permission be obtained from the district engineer to construct any type of structure. Structures designed for agricultural purposes may be permitted within the easement area, and the landowners will be permitted to use their land for agricultural purposes. Modifications of the existing topography that may interfere with flood control such as dams will be forbidden (Cecil Rider, personal communication). Therefore, the restrictions on development of the easement land may serve to protect prehistoric resources from indirect adverse effects.

While the known and potential prehistoric sites in the HST 50 year flood easement area represent a significant scientific data base, the HST project will cause relatively mild adverse effects to these resources. The direct impacts will be limited to brief, episodic periods of inundation and erosion. The indirect effects of the project will be almost negligible, and the legal restrictions on construction within the easement area may effectively prevent significant resource losses that could be caused by private development.

TABLE 23

ELEVATIONS OF SITES
IN THE HST 50 YEAR FLOOD EASEMENT LAND

SITE	ELEVATION	SITE	ELEVATION
23BE330	740	23SR291	740-760
23BE331	740	23SR292	740
23BE460	731	23SR322	735-745
23BT1*	740-750	23SR326	740-750
23BT2	720-750	23SR328	730-740
23BT4	735	23SR413	740
23BT28*	738	23SR785*	741
23BT29*	738	23SR786*	737
23BT30*	738	23SR787*	740
23BT31*	737	23SR788*	739
23HE101	735-745	23SR789*	734
23HE127	740-745	23SR791*	740
23HE128*	740	23SR792*	731
23HE129	740	23SR793*	734
23HE220	730-740	23SR794*	736
23HE231	730-750	23SR795*	735
23HE232	740-770	23SR796*	740
23HE233	730-750	23SR797*	732
23HE283	740-750	23SR798*	733
23HE544	730-740	23SR799*	737
23HE551	740-745	23SR800*	739
23HE554	740-745	23SR801*	740
23HE694*	732	23SR802*	735
23HE695*	742	23SR803*	734
23HE696*	738	23VE2	731-800
23HE697*	740	23VE11	734-740
23HE850	740	23VE13	738-750
23HE851	740	23VE15	730-740
23HE852	740	23VE16	725-750
23HE853	735	23VE17	730-810
23HE855	735	23VE18	735-860
23HE856	740	23VE24	740-750
23HE857	735	23VE32*	725-735
23HE860	735	23VE34	730-731
23HI266	740-760	23VE37*	740
23HI268	740-760	23VE38*	739
23SR106	740	23VE39*	742
23SR145	735	23VE40*	734
23SR152	740-750	23VE41*	732
23SR158	730-740	23VE42*	732
23SR226	730-740	23VE43*	737
23SR274	740-750	23VE44*	732
23SR275	740	23VE107	730-735

*Recorded by Iroquois Research Institute

Recommendations for Testing and Intensive Survey

A survey and evaluation of cultural resources within the easement lands at the HST project is required by several federal mandates including the National Historic Preservation Act of 1966, Executive Order 11593, the Archaeological and Historic Preservation Act of 1974, and the National Environmental Policy Act of 1969. Accordingly, and in compliance with the contractual scope of work for this project, recommendations for intensive survey and site evaluation within the HST easement land have been developed.

The Corps of Engineers' approach to the HST easement lands has been to divide the entire 110,000 acre easement area into two major survey areas which are defined on the basis of elevation: the 10 year flood easement land and the 50 year flood easement land. The two areas are divided by the 731-foot contour line. At present, it is impossible to precisely delineate the two study areas, since none of the available maps indicate the 731-foot contour. Since the boundaries of the two major survey units are uncertain, it is likely that some areas near the 731-foot elevation may be repetitiously surveyed by different investigators, especially if accurate maps of areas surveyed are not available to all investigators working in the easement area. It is equally likely that some areas near the 731-foot contour will not be surveyed, because of the uncertain location of this contour line. For these reasons, it would be desirable to adopt a survey strategy which can be more easily implemented.

The Corps of Engineers has estimated that there are approximately 110,000 acres within the entire easement land. Approximately 9,000 acres of the 50 year flood easement land were surveyed in the present study. Under a current contract, Commonwealth Associates is to survey approximately 7,000 acres in the 10 year flood easement land and approximately 9,000 acres of the fee land along the permanent pool shoreline (Dick Taylor, personal communication). Terrell Martin of Clinton, Missouri has surveyed within the HST project area for a number of years, but there is no reliable estimate of how much easement acreage he surveyed. Therefore, a rough estimate of the amount of the HST easement land that has not been surveyed is 8,500 acres.

The recommended plan for completion of the easement survey is to divide the entire easement area into four major survey units which are defined primarily by county lines. The four easement survey units are listed below according to order of priority:

1. Benton and Hickory Counties;

2. St. Clair and Cedar Counties;

3. Henry County and those portions of Cass and Bates Counties along the South Grand River; and

4. Bates and Vernon Counties along the Osage River.

In general, the recommended plan for the easement survey is to begin in the eastern portion of the reservoir and conclude in the western portion. Based upon predictive models and site locational information developed as a result of this survey and other research in the Truman Reservoir (Roper 1977a; Donna Roper, personal communication, Dick Taylor, personal communication) a sample of the easement area should be subjected to an intensive survey. The priority of the four survey units is based on two considerations. First, the survey data from this survey indicate a higher rate of site occurrence in the Ozark Plateaus than in the Osage Plains. Second, the western portions of the reservoir easement are generally higher in elevation and therefore will be less severely impacted by fluctuations of the reservoir level than the eastern portions of the reservoir.

As part of the intensive survey phase, individual sites should be tested and evaluated to determine whether or not they meet the criteria of eligibility for inclusion in the National Register of Historic Places. Because of the large number of sites likely to be present in the HST easement area, it is recommended that the testing be scheduled according to a priority sequence derived from the relative severity of potential adverse effects. That is, resources which are likely to be impacted most severely or most frequently should be tested before those that will be only mildly or infrequently impacted.

Sites which may be directly impacted by construction such as highway building or utility relocation should be tested as soon as those impacts can be defined. All other sites should be scheduled for testing according to their relative susceptibility to adverse effects related to the fluctuations of the reservoir pool. In Table 24, the recorded sites in the 50 year easement land have been placed into priority groups for testing according to their relative elevational position. Group 1 includes 37 sites whose lowest elevations range from 731 to 735 feet. Group 2 includes 45 sites whose lowest elevations range from 736 to 740 feet. Group 3 includes three sites whose elevations are 741 to 742 feet. Sites located in the 10 year flood easement land, from 706 to 731 feet, should receive a higher priority for testing than the sites in the 50 year easement land.

The Halleys Bluff site, 23VE2, has been excluded since it is already listed on the National Register. Also, two sites inventoried in the present project, 23HE693 and 23SR790, are not recommended for testing since they are outside the easement area.

The priority groups listed in Table 24 reflect the fact that sites located at higher elevations will be impacted less frequently than sites at lower elevations in the reservoir. As can be determined from Figure 4, the sites in Group 3 will be impacted by flooding less frequently than once every 100 years. The mean recurrence interval for flooding of the sites in Group 2 ranges from 22.2 to 71.4 years, and the mean recurrence interval for flooding of the sites in Group 1 ranges from 9.3 to 18.5 years.

In summary, it is recommended that a sample of the HST easement area be surveyed in stages, beginning with those counties located in the Ozark Plateaus.

TABLE 24

PRIORITY OF SITES FOR TESTING
OF NATIONAL REGISTER ELIGIBILITY

GROUP 1 -- HIGHEST PRIORITY			
23BE460	23HE855	23SR795	23VE32
23BT2	23HE857	23SR797	23VE34
23BT4	23HE860	23SR798	23VE40
23HE101	23SR145	23SR802	23VE41
23HE220	23SR158	23SR803	23VE42
23HE231	23SR226	23VE11	23VE44
23HE233	23SR322	23VE15	23VE107
23HE544	23SR328	23VE16	
23HE694	23SR792	23VE17	
23HE853	23SR793	23VE18	
GROUP 2 -- SECONDARY PRIORITY			
23BE330	23HE551	23SR274	23SR796
23BE331	23HE554	23SR275	23SR799
23BT1	23HE696	23SR291	23SR800
23BT28	23HE697	23SR292	23SR801
23BT29	23HE850	23SR326	23VE13
23BT30	23HE851	23SR413	23VE24
23BT31	23HE852	23SR786	23VE37
23HE127	23HE856	23SR787	23VE38
23HE128	23HI266	23SR788	23VE43
23HE129	23HI268	23SR789	
23HE232	23SR106	23SR791	
23HE283	23SR152	23SR794	
GROUP 3 -- LOWEST PRIORITY			
23HE695	23SR785	23VE39	

Previously recorded and newly discovered sites should be tested and evaluated according to a priority schedule based on the relative severity of potential adverse impacts. Identified sites should be evaluated with respect to the National Register criteria of eligibility and according to their potential to furnish information regarding substantive research objectives. The Corps of Engineers should consult with the Missouri Historic Preservation Officer regarding the significance of particular sites and the need for mitigation of adverse effects should any sites be determined eligible for the National Register.

The recommended priority order for fulfillment of these objectives is given below:

1. Survey the easement land in Benton and Hickory Counties;

    a. Test and evaluate sites in the easement land below 731 feet;
    b. Test and evaluate sites in the easement land between 736 and 740 feet;
    c. Test and evaluate sites in the easement land above 740 feet.

2. Survey the easement land in St. Clair and Cedar Counties;

    a. Test and evaluate sites in the easement land below 731 feet;
    b. Test and evaluate sites in the easement land between 736 and 740 feet;
    c. Test and evaluate sites in the easement land above 740 feet.

3. Survey the easement land in Henry County and those portions of Bases and Cass Counties along the South Grand River;

    a. Test and evaluate sites in the easement land below 731 feet;
    b. Test and evaluate sites in the easement land between 736 and 740 feet;
    c. Test and evaluate sites in the easement land above 740 feet.

4. Survey the easement land in Bates and Henry Counties along the Osage River;

    a. Test and evaluate sites in the easement land below 731 feet;
    b. Test and evaluate sites in the easement land between 736 and 740 feet;
    c. Test and evaluate sites in the easement land above 740 feet.

5. Mitigate adverse effects at sites which are eligible for the National Register of Historic Places.

DISPOSITION OF BACKGROUND DATA

In addition to this narrative report, background data pertaining to this project have been separately bound and submitted to the U.S. Army Corps of Engineers, Kansas City District and to the Office of Historic Preservation, Missouri Department of Natural Resources. This background data includes:

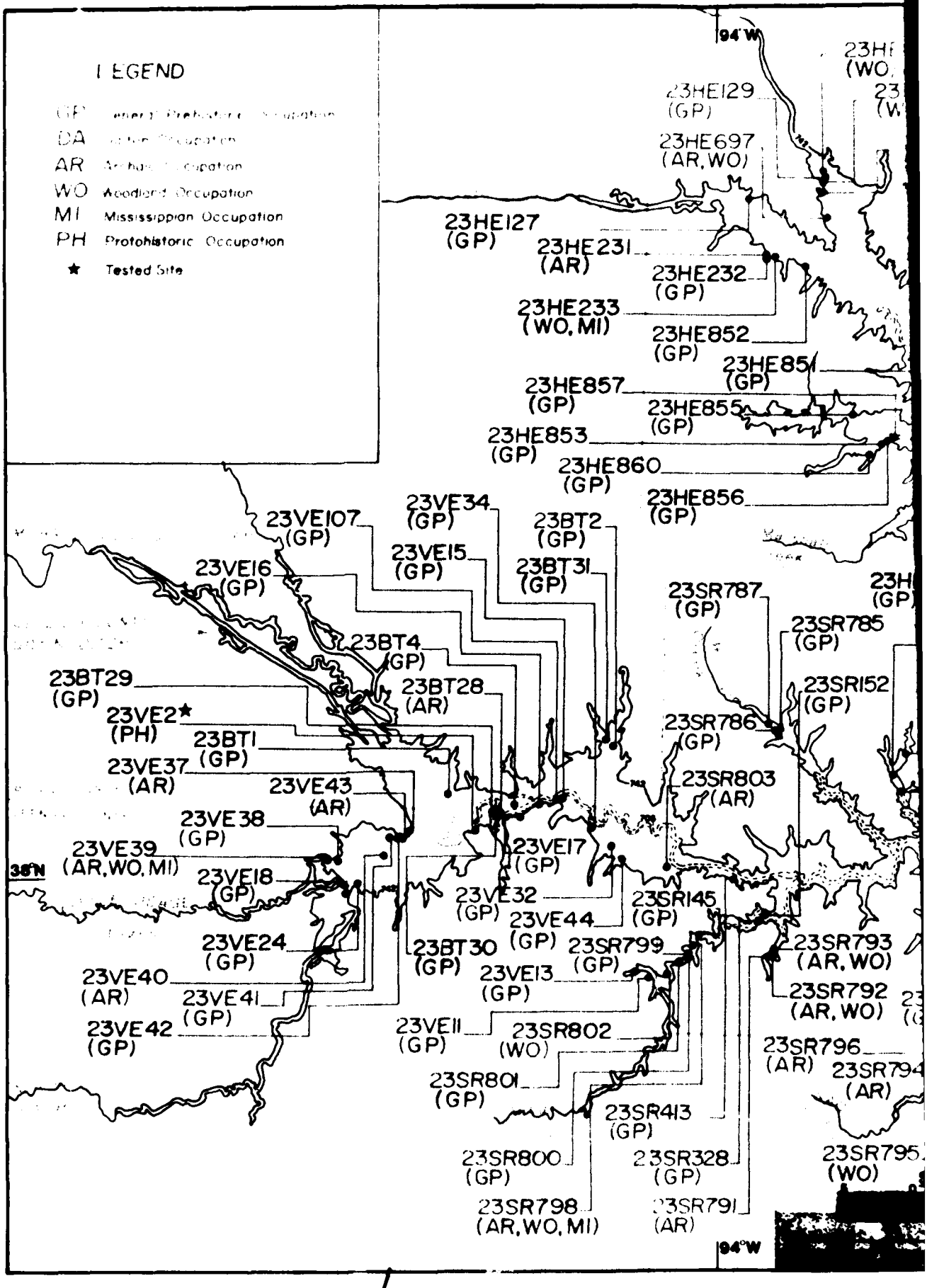
1. Archaeological Survey of Missouri site survey forms for all sites located during this project;

2. Iroquois Research Institute site survey forms, site vicinity maps, site sketches, artifact sketches, interview records, and contact prints of all photographs taken in connection with this project;

3. USGS topographic maps indicating areas surveyed during this project and the location of all known sites in the survey area; and

4. Corps of Engineers project maps indicating the boundaries of the survey area, the actual areas surveyed in this study, and locations of all known sites in the survey area.

The original site survey forms, maps, sketches, field notes, daily records of the survey, and photographic negatives are being curated at Iroquois Research Institute, Fairfax, Virginia.


LEGEND
GP Generic Prehistoric Occupation
DA Archaic Occupation
AR Archaic Occupation
WO Woodland Occupation
MI Mississippian Occupation
PH Protohistoric Occupation
★ Tested Site
94°W
23HE129 (GP)
23HE697 (AR,WO)
23HE127 (GP)
23HE231 (AR)
23HE232 (GP)
23HE233 (WO, MI)
23HE852 (GP)
23HE851 (GP)
23HE857 (GP)
23HE855 (GP)
23HE853 (GP)
23HE860 (GP)
23HE856 (GP)
23VE107 (GP)
23VE34 (GP)
23BT2 (GP)
23VE15 (GP)
23BT31 (GP)
23VE16 (GP)
23SR787 (GP)
23SR785 (GP)
23BT4 (GP)
23BT29 (GP)
23BT28 (AR)
23SR152 (GP)
23VE2★ (PH)
23BT1 (GP)
23SR786 (GP)
23VE37 (AR)
23VE43 (AR)
23SR803 (AR)
23VE38 (GP)
23VE39 (AR,WO,MI)
23VE17 (GP)
38°N
23VE18 (GP)
23VE32 (GP)
23SR145 (GP)
23VE44 (GP)
23SR793 (AR,WO)
23VE24 (GP)
23BT30 (GP)
23SR799 (GP)
23VE40 (AR)
23VE41 (GP)
23VE13 (GP)
23SR792 (AR,WO)
23VE42 (GP)
23VE11 (GP)
23SR802 (WO)
23SR796 (AR)
23SR801 (GP)
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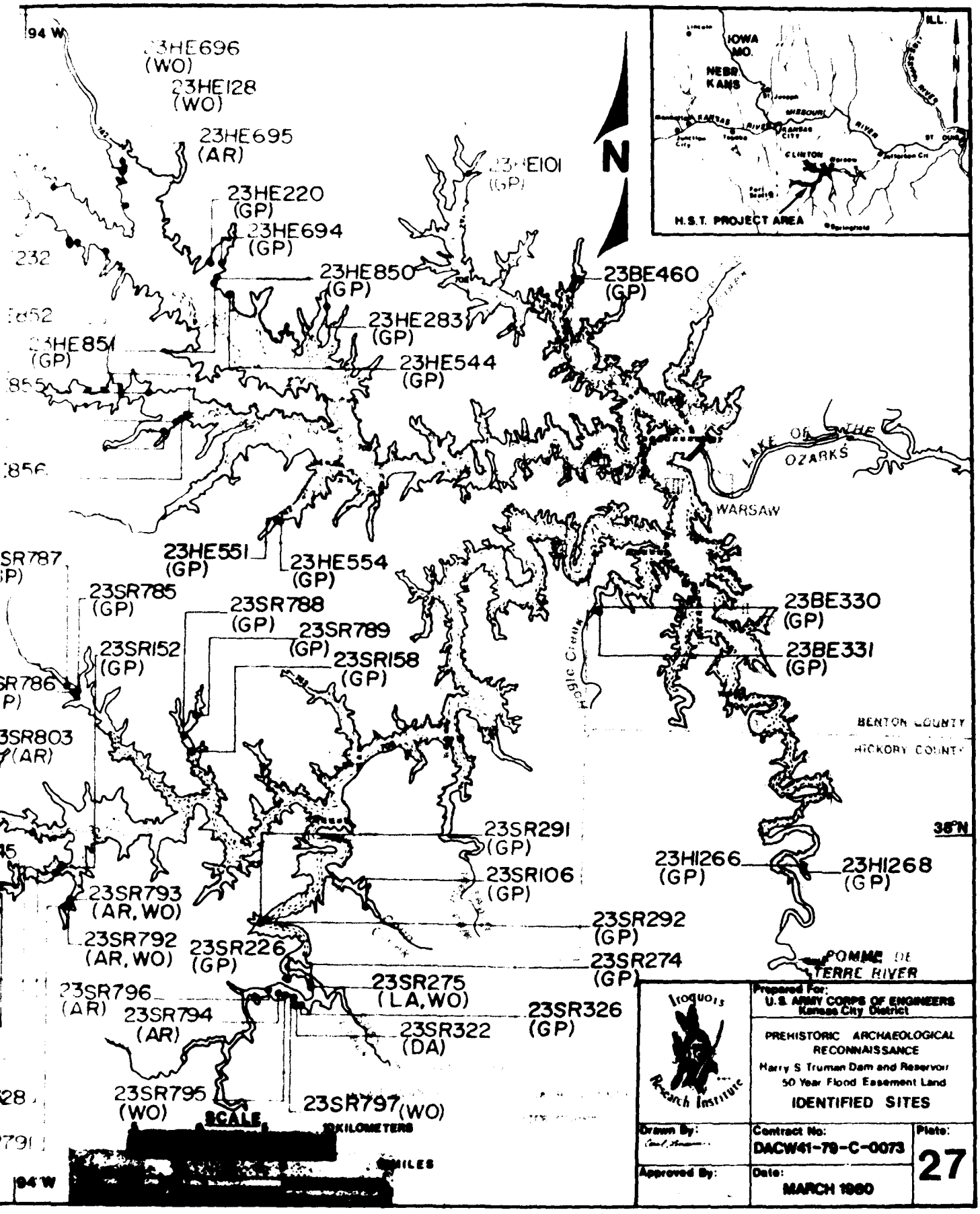
23SR798 (AR,WO,MI)
23SR791 (AR)
94°W



Iroquois Research Institute

Prepared For:
U.S. ARMY CORPS OF ENGINEERS
Kansas City District

PREHISTORIC ARCHAEOLOGICAL RECONNAISSANCE
Harry S Truman Dam and Reservoir
50 Year Flood Easement Land
IDENTIFIED SITES

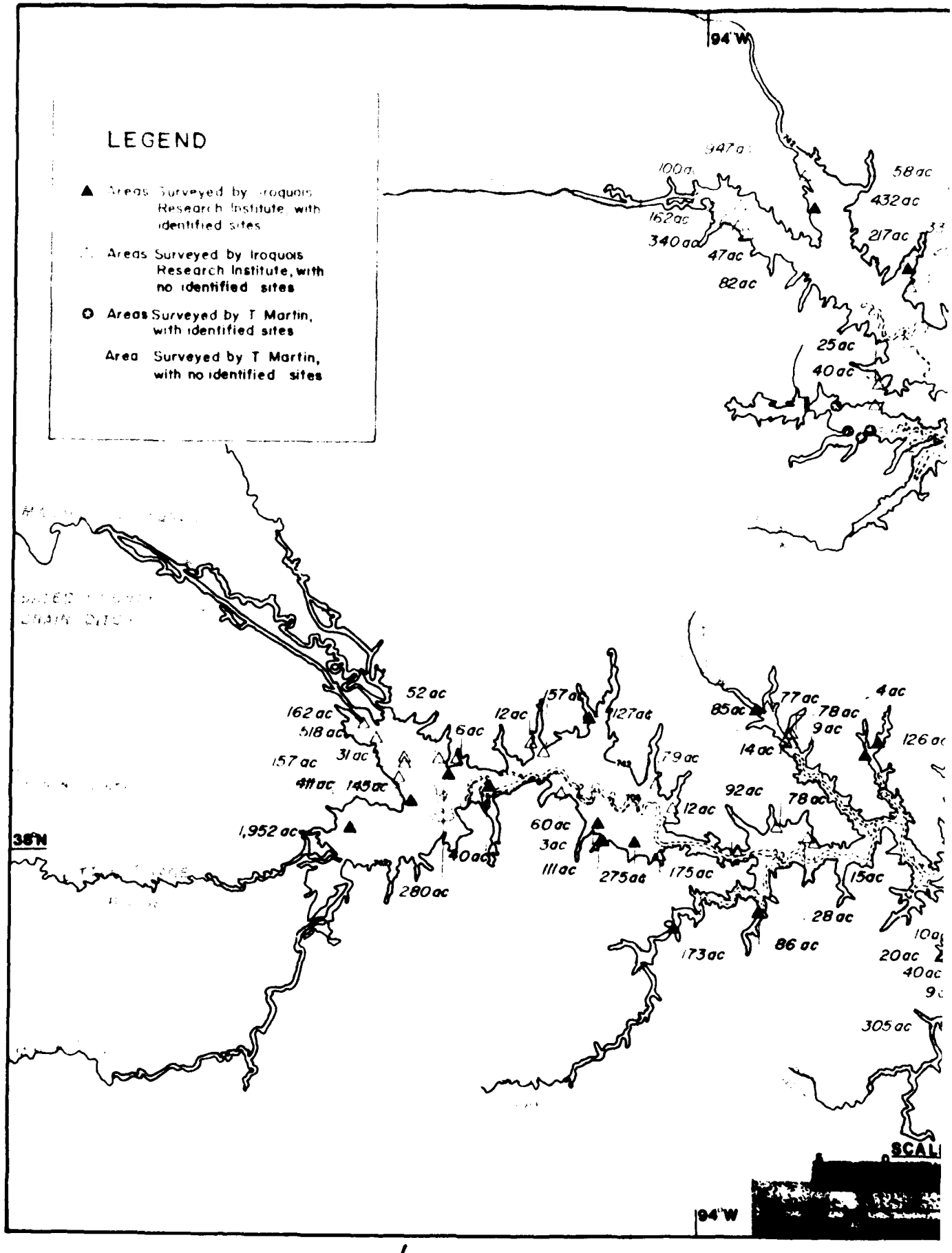
Drawn By:

Contract No:
DACW41-79-C-0073

Plate:
27

Approved By:

Date:
MARCH 1980


LEGEND
▲ Areas Surveyed by Iroquois Research Institute, with identified sites
Areas Surveyed by Iroquois Research Institute, with no identified sites
Areas Surveyed by T Martin, with identified sites
Area Surveyed by T Martin, with no identified sites
94°W
38°N
947ac
100ac
58ac
432ac
162ac
340ac
217ac
47ac
82ac
25ac
40ac
52ac
162ac
518ac
31ac
157ac
411ac
145ac
1,952ac
6ac
12ac
57ac
127ac
79ac
60ac
3ac
111ac
275ac
40ac
280ac
85ac
77ac
78ac
4ac
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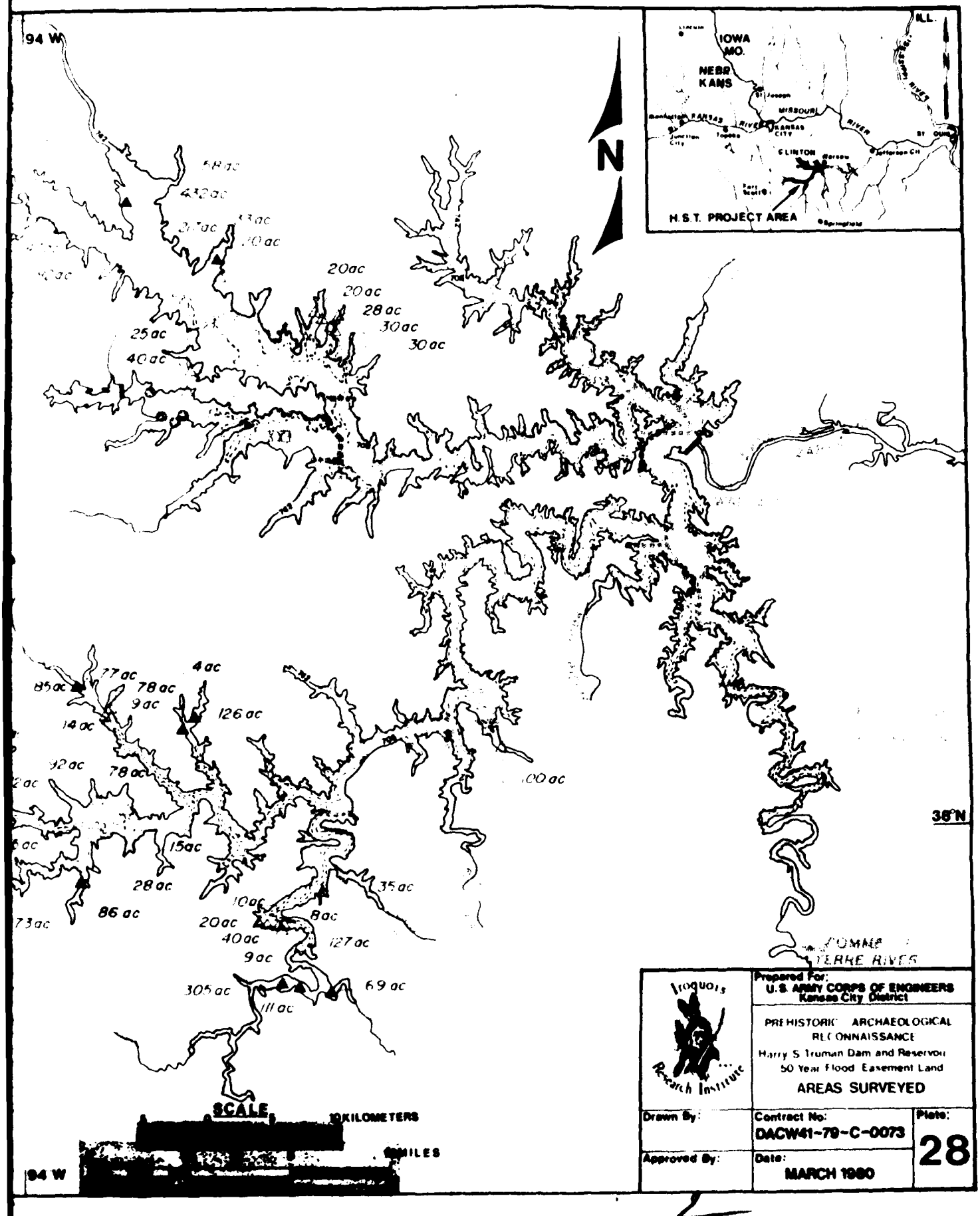

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Prepared For:
U.S. ARMY CORPS OF ENGINEERS
Kansas City District

PREHISTORIC ARCHAEOLOGICAL RECONNAISSANCE
Harry S Truman Dam and Reservoir
50 Year Flood Easement Land

AREAS SURVEYED

Drawn By:	Contract No: DACW41-79-C-0073	Plate: 28
Approved By:	Date: MARCH 1980	

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APPENDIX A

SCOPE OF WORK

Contract No. DACW41-79-C-0073

APPENDIX A

This Appendix A supplements ARTICLE 1 of the contract and delineates the services to be performed by the Contractor under this contract.

1. INTRODUCTION

a. The Government is currently engaged in the construction of the Harry S. Truman Dam and Reservoir project (HST) on the Osage River, Missouri. The project consists of about 166,000 acres of Government-owned land (project land). An additional 110,000 acres is flood easement land of which approximately 60,000 acres are between elevations 731 m.s.l. and 742 m.s.l. (50 year flood pool) (the study area).

b. Numerous reports referring to cultural resources at the Harry S. Truman project have resulted from work funded by the National Park Serv and the Corps of Engineers. A listing of these reports is available f the Contracting Officer.

c. The work defined herein to be performed by the Contractor is called for in the National Historic Preservation Act of 1966 (PL 89-665) and its authorized for funding under Public Law 86-523 as amended by Public Law 93-291. Accomplishment of this work will provide documentation evidencing compliance with Executive Order 11593 "Protection and Enhancement of the Cultural Environment" dated 13 May 1971, Section 2(a).

2. SCOPE

a. This study encompasses archeological reconnaissance of approximately 15 percent of flood easement lands at HST (approximately 9,000 acres) (the study area) and identification of materials observed. The Contractor shall conduct this study in a professional manner, using accepted methodology in accordance with 33CFR305 and the proposed 36CFR66.

b. The Contractor shall be responsible for the preparation of a report of findings fulfilling the requirements stated below. In addition to these requirements, the survey area report shall contain all information required for reconnaissance reports by 33CFR305 and shall meet the format standards specified in the Missouri Office of Historic Preservation (M.O.H.P.) "Guidelines for Contract Cultural Resource Survey Reports and Professional Qualifications".

3. STUDY APPROACH

The Contractor shall perform the following activities as the requirements of the contract to complete the 15 percent archeological reconnaissance of HST flood easement lands.

1. Preliminary Work. Conduct an indepth review of literature, Governmental reports, and other sources of information to accumulate, develop, and interpret the acquired scientific and technological data.

(1) Review the survey forms for all known archeological sites in the study area and determine their relationship to the flood pool and relative susceptibility to impacts resulting from water level changes.

(2) Review all previous and on-going reports, records and pertinent library sources concerning archeological resources within the study area.

(3) A list of principal investigators and field personnel shall be supplied to the M.O.H.P.

b. Survey. The reconnaissance (15 percent survey) for archeological resources shall be accomplished by scientific investigation based on a research design as stated in 33CFR305.18. The Contractor's research design shall be reviewed by the Missouri State Historic Preservation Officer and approved by the Government before initiation of field work.

(1) Problem Orientation. Past and concurrent work has concentrated on survey of fee lands. This study is to be oriented toward 15 percent survey sample of the study area to locate and evaluate archeolcgical sites within unsurveyed portions of the flood easement lands of HST. The field approach shall be based on survey strata and transects established by Dr. Donna C. Roper of the University of Missouri - Columbia, Division of American Archeology.

(2) Methodology. In order to investigate sites the Contractor shall, in accordance with the research design, use accepted and appropriate field and lab methods in accordance with the proposed 36CFR66 including but not limited to the following:

(a) Conduct a reconnaissance of 15 percent of the study area as described above and record all sites found on Missouri Archeological Survey (MAS) site forms.

All pertinent information must be provided, including site boundary map(s), UTM coordinates and legal provenience. Site numbers shall be coordinated with the MAS. The draft report, as well as the final report, and all site forms must contain official MAS site numbers.

(b) No testing to obtain data for determination of eligibility for the National Register is required.

(c) Photograph and illustrate diagnostic features and artifacts by either black and white photography or line drawings.

(d) Record provenience of features, including maps and graphs when applicable.

(e) Make identifications of cultural materials to answer the research design.

(f) Perform all measures using the metric system.

(g) Coordiante, as best as possible, with other HST contract archeologists about conditions and relative significance of known or newly discovered archeological sites.

(h) Determine which new sites require further testing of any kind and indicate relative significance for ranking priorities in accomplishing recommended work.

(i) Identify and outline a plan of intensive survey for the study area lands. Construct a predictive model for prehistoric cultural resources in the unsurveyed portion of the study area. Indicate which parts of the survey area should have priority for future studies, if any, and why.

4. SCHEDULE OF WORK

a. Coordination and Meetings. The Contractor shall pursue the study in a professional manner to meet the schedule specified. Prior to the initiation of actual field work, the Contractor shall submit a research design for review and approval as stated in Section 3b. He also shall coordinate all field schedules and activities with the appropriate cultural resources coordiantor, SHPO's representative, the project office, and other archeological contractors as required.

During the course of the study, the Contractor shall submit a monthly progress report. In addition, the Contractor shall review the progress of work performed with representatives of the Corps of Engineers and the State Historic Preservation Officer (SHPO) at meetings as follows:

(1) Coordination meetings with the Government to include at least one during the field season at field headquarters and one during the laboratory and analysis period at the Contractor's facilities.

(2) One meeting, early in the report-writing phase, at the SHPO's office with representatives of the SHPO, the Contractor, and the Government to discuss findings, and report content and format.

(3) One meeting at the Kansas City District office to discuss the review of the draft of the report.

(4) By written request, the Contracting Officer may require the Contractor to furnish the services of technically qualified representatives to attend coordination meetings in addition to those specified above. Payment for such services will be made at a rate per hour for the discipline(s) involved plus travel expenses computed in accordance with Government Joint Travel Regulations in effect at the time travel is performed.

b. Report Content and Schedule.

(1) A report of findings shall be prepared by the Contractor and his staff and shall comply with the MOHP "Guidelines". The main text of the report shall be written in a manner suitable for reading by persons not professionally trained as archeologists. Detailed presentation and discussion

of data of interest to the archeological profession shall be included in a second part of the report or as appendices. The report is intended to be of use and interest to the general public as well as of value to the profession. Use of illustrations is encouraged

(2) The report shall be authored by either the principal investigator or project director. If the project director is not the author, he shall review and edit the report prior to submission of the draft and final versions.

(3) Thirteen (13) copies of a complete draft of the report shall be submitted to the Contracting Officer for purposes of Governmental review within twenty-four (24) months after receipt of notice to proceed. (If excessive inclement weather or other delays occur, this date may be extended to one mutually agreed upon between the Government and the Contractor). In addition to standard review procedures, the Government may (at its discretion) send the draft report and Scope of Work to three qualified professionals not associated with a State or Federal Governmental agency for peer review of the merits and acceptability of the report. After a review period of approximately four (4) months, the Government will return the draft to the Contractor. The Contractor then shall complete necessary revisions with approval of M.O.H.P. and submit the final report, which shall be professionally edited, within sixty calendar days after receipt of the reviewed draft. The Contractor shall submit one set of originals and two copies of the final report of findings to the Government. The copies shall include all plates, maps, and graphics in place so that they may be used as patterns for assembling the final report. The Government will edit the final report and after approval, will reproduce this report and provide the Contractor ten (10) copies for personal use, plus two (2) copies for each major contributing author. Total contract time shall not exceed thirty (30) months from the date of receipt of the notice to proceed.

(4) The report shall include the following:

(a) Description and culture history of the study area;

(b) A discussion of each site investigated and identification of data mentioned above. A detailed description of sites and limited discussion of the observed artifacts, presented both in support of the discussion in the text and also as valuable data for professional use of the report;

(c) A detailed description of the methods used in field and lab work;

(d) A detailed discussion of recommendations for protection and management of sites found during this investigation including:

1. Action or no-action to be applied to all sites.

2. Brief narrative describing the relative significance of sites located and mitigation priorities for work to be done at a later date including suggestions for shoreline inspections.

3. Provide a summary and inventory of known/recorded sites discovered by others within the study area.

(e) A discussion of each type of archeological resource encountered or which may reasonably be expected to occur in the remaining unsurveyed portion of the study area; site types should be defined as Tables;

(f) Illustrations, photos, maps, tables, and graphic representations of data appropriate to the text, such as illustrations of diagnostic artifacts;

(g) One map or set of maps showing those areas that were surveyed for archeological resources during this study and those which were previously surveyed in other studies. These maps shall indicate which sites were previously surveyed in which no sites were found;

(h) One map or set of maps of the project area with known sites in the study area, indicating those sites which were tested and/or excavated in previous studies, cultural affiliations, and other pertinent information. (Color overlay reproduction is available). Maps for inclusion in the report must be presented in such a manner that exact site locations are not disclosed;

(i) A glossary of terms;

(j) Reference section with all sources referred to in text or used for report, personal communications, interviews, bibliography, etc;

(k) Copies of all correspondence pertaining to review of the draft report. These are to include the comments of the State Historic Preservation Officer, Heritage Conservation and Recreation Service, and peer reviews (if applicable) by professional archeologists requested by the Government, together with the contractor's responses to each of the comments given. The Scope of Work is to be included in this section; and

1. List of principal investigators and field and lab personnel with their qualifications, as an appendix.

(5) The final originals and two copies of the report shall be typed single-spaced on one side of paper with the margins set for reproduction on both sides of 8½ x 11 inch paper. One of the copies shall be assembled in accordance with the attached style sheet.

c. Other Information. Six copies of materials not suitable for publication in the report shall be submitted with the draft. These materials include feature maps, large amounts of specialized statistical analysis data, repetitious photographs, and where records are maintained, and other documentation not of interest to most readers of the report. Averages, graphs, or summaries of statistical data are to be included in the publishable report. Large masses of specialized statistical data, such as certain artifact measurements, shall be stored on computer tapes or microfilm so that it can be made readily available to interested persons. Publication of such bulk statistics in the report is not appropriate.

d. Materials Not for Release. Materials dealing with exact archeological site locations are considered confidential and are not to be published or released. Materials which shall accompany the draft report but which are not to be included in the report consist of:

(1) Six (6) copies of 7½ minute USGS and base maps indicating exact locations of all archeological resources and areas which were physically surveyed, including one of which will be furnished directly to the SHPO. If 7½ minute USGS maps are unavailable, 15 minute maps are to be used.

(2) Six (6) copies of survey forms for each newly recorded site surveyed under this contract, including one copy each to be furnished directly to the SHPO and the Archeological Survey of Missouri.

5. FURTHER RESPONSIBILITIES OF THE CONTRACTOR AND GOVERNMENT

a. Contract Modifications.

(1) Because of the complex nature of the prehistoric resources being investigated, it is recognized that testing or excavation of sites may be required. If in the opinion of the Contracting Officer such additional work is warranted, the contract may be modified pursuant to the provision of Article 2, Changes, of the Contract.

(2) The work identified in this Scope shall be complete in itself and there is no assurance from the Government that additional work will follow, nor should such work be anticipated.

b. Data Availability. The Government shall provide the Contractor with available background information, maps, remotely sensed data reports (if any), and correspondence as needed. In addition, the Government will provide support to the Contractor regarding suggestions on data sources, format of study outline and report, and review of study progress.

c. Right-of-Entry and Crop Damages. The Contractor shall have right-of-entry on all property owned by the Government. Compensation for damages to crops planted on Government property leased to various individuals shall be the responsibility of the Contractor. It will be the responsibility of the Contractor to obtain right-of-entry on lands not in Government ownership and for those lands acquired through flood easement only.

d. Publication. It is expected that the Contractor and those in his employ, may during the term of the contract, present reports of the work to various professional societies and publications. Outlines or abstracts of those reports dealing with work sponsored by the Corps of Engineers shall be sent to the Kansas City District Office for review and approval prior to presentation or publication. Proper credit shall be given for Corps of Engineers' sponsored work, and the Corps of Engineers shall be furnished six (6) copies of each paper presented and/or published report.

e. Court Testimony. In the event of controversy or court challenge, the Contractor shall make available, as appropriate, expert witnesses who performed

work under this contract and shall testify on behalf of the Government in support of the report findings. If a controversy or court challenge occurs and testimony of expert witnesses is required, an equitable adjustment shall be negotiated.

f. Safety Requirements. The Contractor shall provide a safe working environment for all persons in his employ as prescribed by EM 385-1-1, "General Safety Requirements," a copy of which will be provided by the Government.

6. STAFF AND FACILITY REQUIREMENTS

a. Project Director and Archeologist. Minimum qualifications are set forth in proposed 36CFR66, Appendix C, which is provided on page 5381 in the Federal Register, Vol. 42, No. 19, January 28, 1977.

b. Consultants. Personnel hired or subcontracted for their special knowledge and expertise must carry academic and experiential qualifications in their own fields of competence.

c. Equipment and Facilities. The Contractor also must provide or demonstrate access to:

(1) Adequate permanent field and laboratory equipment necessary to conduct operations defined in the Scope of Work; and

(2) Adequate laboratory and office space and facilities for proper treatment, analysis, and storage of records likely to be obtained from the project. This does not necessarily include such specialized facilities as pollen, geochemical, or radiological laboratories, but does include facilities sufficient to properly preserve or stabilize specimens for any subsequent specialized analysis.

APPENDIX B

GLOSSARY

Aboriginal	Pertaining to the first inhabitants of a country especially as opposed to foreign invaders or colonists; used in this report when referring to Native Americans (American Indians) and their antecedents.
Abrader	A piece of hard, abrasive stone exhibiting a flat, grooved, or concave working surface. The presumed use of this tool is for grinding or sharpening bone or stone tools (Faulkner and McCollough 1973; House 1975).
Active Point Bar	The inside of an active meander loop where coarse sediment is being deposited.
Adze	An artifact used in the working or carving of wood in which the working edge is oriented perpendicular to the handle; a chipped or ground stone tool presumed to have been used as an adze.
Aggrade	For a river to build the surface of its valley upward in elevation by the deposition of sediment along its banks and in its floodplain.
Air Mass	A body of air with uniform temperature, humidity, and other physical characteristics.
Alluvial Soil	A soil developed in the sediments deposited by a river or stream.
Alluvial Valley	A valley whose floor is covered by a relatively thick layer of alluvium.
Alluviation	The processes by which a river deposits sediments along its banks and in its floodplain.
Alluvium	Sediments deposited by a stream or river along its banks or upon its floodplains.
American Bottom	The riverine lowland area of Missouri and Illinois near the confluence of the Missouri and Mississippi Rivers. The largest and most complex Mississippian Period cultures arose in this area, centered around the Cahokia site.
Arrow Point	A tool manufactured for use in tipping an arrow. The use of the bow and arrow in North America is generally limited to relatively recent times (circa A.D. 200-A.D. 1700).

Artifact	Any object or part of an object that was made or altered by human activity.
Aspect	A term in the Midwestern Taxonomic System used to class together a number of related foci. The components grouped into an aspect share many traits in common although they are not as nearly identical as the components which comprise a focus.
Assemblage	The total inventory of artifacts and other archaeological material from a site, region, or culture period. As opposed to the term complex, the artifacts grouped into an assemblage need not be demonstrably related to one another.
Atlantic Climatic Period	A period of above average temperatures worldwide and dry climate in the U.S. Midwest beginning about 8500 B.P. and lasting until 5000 B.P. (Wendland 1978).
B.P.	Before present; a label applied to dates which is read as "years before 1950."
Band	In the terminology of cultural evolution, the band is the smallest level of social organization, consisting of a small number of family groups and rarely exceeding 50 to 100 people. The families in a band are relatively autonomous and decisions are usually made by group consensus.
Bankfull Stage	The elevation of the water surface in a river when its channel is filled to capacity.
Barbed Point	A projectile point characterized by pointed extensions from the body angled away from the tip and separated from the base by a deep notch.
Barrens	Small areas relatively devoid of a region's dominant vegetation, especially trees.
Basal Notched Point	A projectile point which has a notch or notches extending into the body of the point from the base.
Base	The lower portion of a projectile point at the opposite end from its tip.

Base Camp	A camp or settlement occupied by hunting and gathering peoples and used as a location for a relatively wide range of activities. A base camp is frequently or regularly occupied for an extended period of time. Base camps can be contrasted to special purpose sites which are generally used for a relatively limited purpose (e.g. hunting, butchering, or chert collecting) and to campsites which are usually not necessarily revisited on a regular basis.
Bed	A layer of rock or other material separated from the adjoining material by a plane of weakness or abrupt change in physical characteristics.
Bedrock	Rock that has undergone no major change through the effects of weathering and erosion at the surface of the earth. Bedrock is commonly overlain by surficial material.
Bedrock Mortar	A single conical or saucer-like depression in bedrock used as a receptacle for the grinding of food.
Bench, Bedrock Bench	A level or gently sloping surface usually narrow and inclined toward a stream, valley, lake, or sea; distinguished from a terrace by not being composed predominantly of alluvium, although it may have a thin cover of alluvium over bedrock.
Biface	A chipped stone artifact exhibiting two flaked faces in which at least one edge is defined by the intersection of the chipped surfaces.
Bifurcated Base Point	A projectile point in which the base is separated into two distinct lobes by the creation of either a notch or a strong concavity in the center of the base.
Big Game Hunting Economy	The life style of certain prehistoric hunting peoples which focused on the hunting of and extensive use of the products from such large animals as bison, elk, elephants, and other mammals.
Bimodal Distribution	A frequency distribution characterized by two distinct clusters of observations, each centered about a different value.

Blade	The main portion of a projectile point, including the tip but excluding the portions of the point devoted to hafting it to a shaft. Or, any flake which is at least twice as long as it is wide and which exhibits flake scars indicative of production from a specially prepared core.
Bladelet	A small blade that often possesses characteristics indicating that it was struck from a deliberately prepared core.
Blank	An amorphous biface without a well defined cutting edge or evidence of utilization. Blanks could be converted to finished tools such as projectile points or knives by thinning and retouch flaking (House 1975; Faulkner and McCollough 1973).
Bluff	A high vertical bank along a river.
Boreal Forest	A forest similar to that found in southern and central Canada in which pine, spruce, or both predominate.
Borrow Area	Land excavated for fill material to be used for construction.
Bottomland	The lowland, usually a floodplain, adjacent to a stream or river.
Brachiopod	A member of a group of marine animals which are symmetrical along the plane bisecting their closed shells and which have two dissimilar or unequal shells.
Brunton Pocket Transit	A compass-like device used in surveying and mapping.
Bryozoan	A member of a group of fresh-water and marine animals who live in colonies built of calcareous materials.
Burial Mound	A mound of earth or earth mixed with stone in which one or more burials are placed.
Burnt Limestone	Limestone which has been exposed to extreme heat and exhibits changed physical characteristics such as a change in color or texture.
Caddoan Area	A region in southeast Oklahoma, southwest Arkansas, northwest Louisiana, and northeast Texas characterized by similar prehistoric cultures through time, culminating in Mississippian-influenced mound-building cultures.

Cairn	A mound of stones piled up as a memorial, burial marker, or landmark.
Cairo Lowlands	The lowland riverine area near the confluence of the Mississippi and Ohio Rivers, primarily in the state of Illinois.
Calcareous	Containing calcium carbonate ($CaCo_3$).
Campsite	An archaeological site characterized by the presence of an artifact assemblage implying varied domestic activities occurring over an extended period.
Catchment Area	As used in archaeology, a defined region in the vicinity of an archaeological site which is sometimes delineated by a circle centered on the site and which includes all of the biological and physical resources which could have been readily exploited by the site's inhabitants.
Cave	Generally, an opening into a hill or a mountain. An endogene cave extends further into the earth than the width of its entrance. An exogene cave, also referred to as a rock shelter, is shallow and does not extend as far into the earth as its width at its entrance.
Celt	A stone artifact which is shaped like a chisel or axe and is thought to have been used for woodworking activities.
Central Plains	The archaeological subarea of the Great Plains which is usually defined as centering in Kansas and Nebraska and occasionally defined as including the immediately adjacent portions of surrounding states.
Ceramic	Pertaining to pottery.
Ceramic Complex	A complex of pottery types. Or, the total artifact complex of a prehistoric culture which includes pottery. Or, a Woodland or Mississippian Period cultural complex.
Channel Flaking	The removal of long, thin flakes parallel to the longitudinal axis of a biface, usually associated with the manufacture of lanceolate projectile points.
Chert	A compact and dense rock primarily composed of silicon and oxygen which can be fractured and worked to form sharp edges. Chert was a preferred material for lithic tool making by aboriginal North Americans.

Chiefdom	A system of social organization which is characterized by social stratification (class system) based on kinship and a chief ruler whose major function, among others, is to redistribute goods within the society.
Chipped Stone Technology	The system of stone tool manufacture emphasizing the controlled flaking and fracturing of a piece of stone by striking it with another stone or other hard object or by applying gradual pressure to selected points on the stone with a pointed object. Chipped stone technology is usually, but not solely, limited to materials like flint, chert, and volcanic glass which fracture easily in predictable ways.
Chopper	A core or cobble with bifacial flake removals along one edge to produce a cutting edge. This type of tool could be quickly made and used for a variety of tasks such as chopping, hacking, and cleaving, and may indicate butchering, plant food processing, and woodworking (House 1975: Faulkner and McCollough 1973).
Chronology	A time scale used to date general and specific events. Chronologies can be absolute (based on calendar years) or relative (not tied to calendar dates).
Clay	Any rock or mineral particles having a maximum diameter of less than 0.002 millimeter (0.00008 inch). Also, that class of sediment which contains 40% or more clay and not more than 40% of either sand or silt (USDA 1975).
Cobble Tool	A cobble which exhibits modification through hammering, grinding, abrading, or battering.
Colluvial Soil	A soil that has developed in colluvium.
Colluvium	Sediments that have been deposited on a slope or at its base from further up the same slope by processes other than stream or river flow.
Complex	A group of related traits or characteristics that combine to form a complete activity, process, or culture unit. Cultural complexes are usually identified by the presence of several key implements or tool types in association.
Component	An archaeological site or subdivision within a site that represents a local manifestation of a larger scale cultural unit such as a focus or aspect.

Compound Terrace	A terrace whose surface is formed by two alluviums of distinctly different ages.
Conglomerate	A sedimentary rock composed of gravel.
Continental Climate	A climate characterized by large daily and annual variations in temperatures.
Contract Archaeology	Archaeological research performed under contract to a company, state, or government agency which is limited as to scope of research, funding, and time framework by specific requirements of the contract.
Cord Marked	The surface treatment of pottery resulting from the use of cord wrapped sticks or paddles to construct, shape, or decorate a vessel.
Core	A stone or large piece of stone which has had flakes removed from it by chipping during the process of tool making.
Core Tool	A finished artifact or tool made on a core.
Corner Notched Point	A projectile point having notches cut into the two corners at the sides of the base and extending at an angle toward the center of the point. The corner notches usually result in a point that is barbed and has a stem expanding toward the base.
Cortex	The natural or weathered surface of flint or chert. Cortex can consist of a thin zone of chemically altered (weathered) patina or it may consist of the lithic material (such as limestone) that often surrounds beds of chert in an outcrop.
Crinoid Columnal	A disk-shaped plate from the stem of a crinoid.
Crinoidal	Composed of or containing the fragments of fossil crinoids. A crinoid is a marine animal having a cup-shaped body with radiating arms attached to the top and a jointed, elongate stem attached to the base. The stem attaches the animal to the sea floor.
Cuesta	An unsymmetrical ridge with a steep slope on one side and a shallow slope on the other.
Cultural Ecology	An anthropological approach emphasizing the study of relationships between culture and environment.

Cultural Horizon	A soil layer in a site which exhibits cultural debris or evidence of human occupation. Or, a large scale archaeological cultural unit, often defined by a few key artifact types or styles, which has relatively little time depth but which appears to extend over a wide geographical area.
Cultural Resource	A physical manifestation of man's past, specifically a site, building, structure, or object of archaeological or historical significance.
Culture	All that is non-biological and transmitted socially in a society. Culture includes artistic, social, ideological, and religious patterns of behavior and techniques for adapting to the environment. An archaeological culture refers to the archaeological remains which are presumed to be the product of people having the same general culture.
Culture/Time Stratigraphic Unit	One of several vertical divisions developed during the excavation of Rodgers Shelter, a deeply stratified site in the Truman Reservoir, which are used to order prehistoric remains according to the time period they represent.
Culture History	The study of the change in prehistoric cultures through time in a geographically defined area. Culture history usually results in the definition and description of the sequence of cultural periods in a region.
Datum	A reference point for mapping a site from which measurements are taken.
Debitage	Lithic debris produced as a by-product of the manufacture of chipped stone tools.
Deciduous Tree	A tree which sheds its leaves annually.
Decortication Flake	A flake removed from a core which exhibits cortex over part of its surface and which has not been modified or utilized subsequent to its production.
Demographic	Relating to the distribution of human populations over the landscape and to internal composition of such populations.
Dentate Pottery, Dentate Stamped Pottery	Pottery exhibiting a surface treatment resulting from the use of a stamping device which produces serrated or "tooth-like" impressions in the clay.

Denticulation	A series of notches or tooth-like projections, producing a jagged or serrated edge. Tools with denticulated edges may have been used for a variety of tasks including sawing, shredding, or ripping (Faulkner and McCollough 1973: House 1975).
Diagnostic Artifact	An artifact belonging to a distinctive type which correlates with a specific time period or culture and can therefore be used as a time marker or cultural identifier.
Diffusion	The spread of traits from one culture to another without the actual migration of people.
Dissected	Cut by erosion into flat areas separated by valleys or gullies.
Distal	With respect to projectile points and other lithic artifacts, the distal end is that portion including the tip.
Dolomite	A layered sedimentary rock which consists chiefly of magnesium calcium carbonate ($MgCa(CO_3)_2$).
Dolomite Rhomb	A crystal of dolomite which has the shape of a parallelogram.
Downcut	To erode a valley or channel in the underlying rock or sediment.
Drill	A bifacially flaked implement with a long, narrow, and thick rod-like blade which tapers to a point, presumably associated with drilling, piercing, and perforating operations.
Earth Lodge	The characteristic house type of the Plains Village Period in the Central Plains. An earth lodge is usually square or rectangular and partially below ground. It may have a central fireplace or hearth. The wooden framework is covered with mud and a small hole is left in the sloping roof for the fire smoke to exit.
Eastern Woodlands	Generally, the entire eastern portion of the United States with its western border running through Louisiana, eastern Texas, eastern Oklahoma, central Missouri, and western Iowa and into the Great Lakes area. The area is often divided into northern and southern divisions on the basis of the aboriginal cultures.
Ecological	Relating to or having to do with the study of the relationships between organisms and their environments.

Ecosystem	The unit consisting of organisms and their non-living environment interacting and influencing one another. It has characteristic vegetation with associated animal or human communities or both.
Ecotone	A transitional community lying between two or more different ecosystems.
End Scraper	A unifacial or bifacial tool which has one or more convex working edges with relatively steep retouch perpendicular to the long axis of the tool.
Euro-American	Associated with Americans of European descent.
Evapotranspiration	The loss of water into the air from the ground surface by evaporation and from the leaves and stems of plants by transpiration.
Extractive Functions	Processes whereby human groups exploit the natural environment, e.g., hunting, food collection, and chert collecting.
Fallow Land	Agricultural land which is left unseeded for a season or more.
Faulting	The movement of strata along a fracture in them.
Fauna	A collective term for the animals found in a particular region, time period, or environment.
Feature	A stationary physical attribute of an archaeological site such as a hearth or storage pit.
Fescue Grass	A group of short, tough grasses used extensively for pasturage.
Fire Cracked Rock	Stone which displays shattering or fracturing resulting from subjection to fire.
Flake	A fragment of stone usually removed purposely from a larger stone by striking a blow or by applying pressure.
Flake Tool	Generally, any tool fashioned from a flake. Specifically, a tool fashioned on a flake which still exhibits morphological characteristics characteristic of the original flake.
Float	Pieces of rock which have moved only downslope from their bedrock source.
Floodplain	The area bordering a stream over which water spreads in time of flood.

Flora	A collective term for the plants found in a particular region, time period, or environment.
Fluted Point	A projectile point characterized by the removal of a number of flakes from the base, creating a channel extending from the base toward the tip. It has been suspected that fluting facilitates the insertion of the point into a split cane or wood shaft.
Fluvial Processes	Those processes which involve the movement of water and sediment in a stream or river.
Fluvents	A soil suborder of the USDA (1975) classification characterized by the presence of weak or no soil horizons in an alluvium.
Focus	A term originally used in the Midwestern Taxonomic System (MTS) to denote a small archaeological cultural unit comprised of a number of similar sites or components. In MTS usage, the term focus carries no temporal or geographic significance but is instead a formal or typological characterization. The focus is the most specific level of classification in the MTS; foci in turn are combined into aspects.
Formal Construct	A classification defined solely on the basis of shared descriptive and stylistic attributes of the phenomena included. In archaeology, a formal construct is a class which does not use distribution in space or time in its definition.
Formation	A unit of rock which has distinct physical characteristics and is mappable in the field.
Fossiliferous	Possessing the remains of ancient plants or animals (fossils).
Front	A line separating dissimilar air masses.
Frost Line	The depth in the soil below which the ground does not freeze or drop below freezing in the winter.
Gallery Forest	A forested area confined to narrow strips in and adjacent to river valleys. Gallery forests are characteristic of the eastern Plains.
Gastropods	A group of molluscs which typically have coiled shells.
Geology	The science that studies the rocks and other materials which compose the earth and the changes the earth and these materials have undergone.

Geomorphic	Of or pertaining to the form of the earth's surface.
Geomorphological	Relating to the full scientific interpretation of the origin of topographic features.
Glaciation	The covering and alteration of a large portion of the earth's surface by an ice sheet which is over a kilometer thick.
Granular	A term used to describe a rock composed of interlocking grains visible to the naked eye.
Gravel	Any rock or mineral fragment having a diameter greater than 2 millimeters (0.08 inches) (USDA 1975).
Graver	A unifacial or bifacial tool that exhibits one or more small, sharp, pointed projections formed by localized retouch flaking. Gravers may have been used for incising and engraving activities (Faulkner and McCollough 1973).
Great Plains	Generally, the intermontane grassland area of central and western North America. As usually defined, the Great Plains includes the eastern tall grass prairie and the western short grass plains. It includes an area extending from north and west Texas in the south to southern Manitoba and Saskatchewan in the north and from western Minnesota, Iowa, western Missouri, and central Oklahoma in the east to the Rocky Mountains in the west. A wide variety of cultural adaptations characterized the prehistoric people of the Great Plains.
Grinding	The process of shaping an artifact by rubbing it with a harder object. Or, the process of pulverizing a material by pounding or rubbing it in a basin or on a slab.
Ground Stone Technology	A stone tool technology which involves shaping by grinding as opposed to flaking, resulting in the production of a smooth surface without distinct flake scars.
Ground Water	Fresh water beneath the earth's surface; the source of water found in wells and springs.
Hafting Element	The portion of a knife, scraper, or projectile point which was bound to a handle or shaft.

Hammerstone	A generally rounded stone artifact that exhibits signs of battering and is often assumed to have been used in the manufacture of chipped stone artifacts.
Heat Treatment	The preparation of raw materials such as flint or chert for manufacture by the controlled application of heat. Heat treatment results in a change in the crystalline structure of chert that is beneficial to certain flaking qualities and is often indicated on an artifact by color and texture changes.
Heavy Oil	Oil in sedimentary rock which is too viscous to move through the pores in the rock.
Hematite	An iron-ore mineral used for coloring purposes that is either red or brown.
Higher-Order Stream	A stream or river with a high stream ranking according to the Strahler (1964) ranking method. A higher-order stream is a stream into which several levels of tributaries flow (i.e., its tributaries have tributaries which have tributaries, etc.).
Historic	Generally, refers to cultural developments which occurred after the development of written records. In North America, the term historic refers to cultural developments which occurred after the arrival of literate peoples into a region.
Holocene Age	The interval of time which begins about 7000 B.P. and extends into the present (Willman and Frye 1970). It is a subdivision of the Pleistocene Epoch.
Horticulture	The cultivation of domesticated plants.
Hummock	A knoll or natural mound, especially if the knoll occurs on an otherwise flat, usually swampy, surface.
Hunting and Gathering Economy	A subsistence pattern in which all food and raw materials are obtained by hunting wild animals and gathering wild plants.
Hydrographic	Of or pertaining to the earth's water.
Hydrology	The science that studies the earth's water.
Inclusion	A fragment of material in a mass of dissimilar material.
In Situ	Refers to in place conditions, as when an object is found in the place where it was first placed or formed.
Intensive Survey	An intensive, systematic field inspection (sometimes including subsurface testing) for the purpose of determining the number and importance of the cultural resources present in an area.

Interior Flake	A flake exhibiting no cortex on its surface.
Interbedded	Composed of alternating layers of different materials.
Intermittent Stream	A stream that contains water only seasonally, being dry part of the year.
Isotopic Dating	A technique for the dating of archaeological materials that is based upon measurement of the decay of radioactive isotopes present in the specimens. C-14 dating is the most widely accepted and used form of isotopic dating.
Johnson Grass	Another name for sorghum.
Knife	A unifacial tool with a relatively sharp edge, or a thinned lanceolate biface exhibiting blade asymmetry or a finished cutting edge on only one blade edge.
Lanceolate Point	A projectile point which is narrow and tapers to a point at the peak.
Landform	Any one of the many topographic features that together compose the earth's surface.
Lens	A localized layer of rock or sediment which is thick in the middle and thin at the edges. Lenses generally have maximum diameters ranging from one meter up to 100 meters.
Limestone	A layered sedimentary rock which consists chiefly of calcium carbonate ($CaCO_3$).
Lithic	Pertaining to or composed of stone.
Lithic Complex	A complex of stone artifacts and debris. Or, the total artifact and debris complex of a prehistoric culture which predates the introduction of pottery.
Lithic Industry	A technological tradition of stone tool manufacture, as exemplified in the archaeological record by the total assemblage of artifacts and debris.
Lithified	Having been turned into rock.
Lithological	Of or pertaining to the physical characteristics of any rock type.
Loam	Soil or sediment material that contains seven percent to 27% clay, 28% to 50% silt, and less than 52% sand (USDA 1975).

Loess	A well sorted, homogeneous sediment composed of silt and lesser amounts of sand, clay, or both initially transported and deposited by wind.
Lower Rank Stream	A stream with a low stream ranking according to the Strahler (1964) ranking method. A lower rank stream is not fed by a long chain of tributaries which feed into one another.
Major Stream	Any stream ranked 8 or higher by the Strahler (1964) ranking method. Major stream is a subcategory of higher-order stream.
Mano	A handstone used for grinding seeds, usually maize, in a stone basin called a metate.
Manuport	A culturally introductd stone which does not exhibit evidence of particular utilization or modification.
Matrix	The smaller size particles in a rock composed of two or more distinct groups of differing particle sizes.
Meander, Meander Loop	One of a series of somewhat regular loop-like bends in the course of a stream or river.
Meandering Stream	A stream that, in the process of migrating laterally on its floodplain, has developed regularly spaced loops in its course.
Megafauna	A collective term for those animals whose average individual adult weight is 1,000 kilograms (2,200 pounds) or more.
Mesic	Retaining moderate amounts of moisture, even during the driest conditions.
Microclimate	The climate of a very localized area (e.g., valley bottom, particular side of a stream) that differs from the regional climate because of local topography, flora, or other factors.
Microcrystalline	A term used to describe a rock composed of interlocking grains which can be distinguished only under a microscope.
Microenvironment	The environment of a very localized area (e.g., valley bottom, particular side of a stream) which is distinctive in its topography, geology, and other environmental features.

Midden	Accumulated refuse indicating former human habitation. Midden debris usually contains decayed organic material, bone fragments, and artifacts.
Midwestern Taxonomic System (MTS)	A system developed in the 1930's to hierarchically classify the prehistoric remains and cultures then known in the eastern United States. The MTS is a purely descriptive classification and originally no attempt was made to place the categories into a temporal or geographical perspective. The MTS was popular in the 1930's-1950's in Plains and Eastern archaeology but has now been largely abandoned in favor of more temporally or geographically useful schemes.
Mitigation	The alleviation of harmful effects, especially effects of construction or development, on cultural resources.
Mortar	An object, usually exhibiting a depression, in which substances are pulverized by pounding or rubbing.
National Register of Historic Places	The Register was authorized under the 1935 Historic Sites Act and expanded under the 1966 Historic Preservation Act. It was designed to be an authoritative guide to be used by Federal, State, and local governments, private groups, and citizens to identify the nation's cultural resources of local, state, and national significance and to indicate what properties should be considered for protection from destruction or impairment.
Native North American Cultigens	Local North American plants domesticated or cultivated by North American Indians before or in addition to the introduction of maize, beans, and squash from Mesoamerica. An example of a native American cultigen is the sunflower.
Natural Levee	A long ridge present on each bank of a river formed by the deposition of sediment from the river during periods of flooding.
Neoglacial	A period of time from circa 400 B.P. to 100 B.P. which was characterized by a climate generally cooler than today by approximately 1°C. Also called the Little Ice Age.
Nomadic	Applies to people who travel on a regular basis to obtain food and other necessities and who do not have a permanent residence.

Novaculite	A very fine textured chert often used for whetstones and found in the Ouachita Mountains of Arkansas.
Occupation	The material remains of an archaeological culture at a site or within a defined area. Or, the inhabitation of a site or other area by people.
Ochrepts	A soil type of the USDA (1975) classification characterized by a surface layer that is light colored, low in organic matter, or both and which does not possess a clay-enriched subsurface horizon.
Oolitic	Containing oolites. An oolite is a round to oval object 0.25 to 2.00 millimeters (0.01 to 0.08 inches) in diameter and made out of calcium carbonate ($CaCO_3$). In chert the original material of the oolites is replaced by chert, but the internal structure of the oolites remains.
Open Site	An archaeological site which is situated on open, high, or flat ground, lacking any surrounding landforms which offer a degree of shelter. Or, any site situated outside of a rock shelter or cave.
Ossuary	A place where human bones are buried after the flesh has been removed.
Outcrop	Solid rock exposed at the ground surface without a cover of soil.
Overbank	That part of a floodplain, including the natural levee, which is outside of a river's bank.
Overbank Deposition	The accumulation of sediments on the part of a floodplain outside of a river's bank.
Oxbow Lake	A crescent-shaped lake formed when a stream or river abandons a meander loop as it cuts a straighter course.
Ozark Highland	One of six archaeological-physiographic regions defined by Carl Chapman (1975) for the characterization of Missouri. The Ozark Highland is located in the Ozark Plateaus and is primarily in the southern portion of Missouri.
Paleoecology	The science which studies the relationship between ancient plants and animals and their environment.
Paleontology	The science which studies fossil remains.

Paleozoic Era	A unit of time beginning 520 million years ago and lasting until 185 million years ago (Willman and Frye 1970). Also, the rocks deposited during that time interval.
Parallel-Flaked Artifact	A chipped stone tool in which the scars produced by the removal of flakes are parallel with one another and usually roughly perpendicular or slightly angled to the long axis of the tool.
Parent Material	The original rock, dirt, or other material that has been altered to form soil.
Pattern	The most generalized level in the Midwestern Taxonomic System which groups prehistoric cultures together. The four patterns recognized (Paleo-Indian, Archaic, Woodland, and Mississippian) are now typically viewed as periods or stages.
Pedestrian Survey	A walking survey; an archaeological field methodology in which investigators search for sites as they walk over the land.
Pedological	Relating to the scientific study of soil.
Pelecypods	A group of molluscs with two-part shells generally equal in size.
Perennial Stream	A stream that contains flowing water throughout the year.
Perforator	Any chipped stone tool consisting of or possessing a pointed projection for use in drilling or perforating softer materials.
Period	A defined span of time. An archaeological period is defined by calendar or relative dates in which the material diagnostic of the period occurs.
Petroglyph	Any drawing, incision, or inscription on a rock.
Petrographic	Relating to the physical character of a rock and its internal structure, whether visible to the naked eye or observable only by microscope.
Phase	A term in the Midwestern Taxonomic System (MTS) which groups together similar aspects. Or, a term used in the Willey-Phillips (1958) classification system to denote an archaeological culture which occurs in a

Phase (continued)	geographically limited area for a relatively short span of time. Although there has been a tendency to equate this use of the term with "focus" in the MTS, the two are not truly interchangeable due to differences in the assumptions of the two classification systems.
Physiographic Province	A region exhibiting similar topography and climate and having similar geomorphic history.
Physiography	The study of the origin and changes in physical features of the earth's surface.
Plains	A region of the earth's surface characterized by a relatively uniform slope and the lack of markedly depressed or elevated features. The Great Plains are often referred to as the Plains.
Planimeter	A mechanical device used for measuring irregular areas on maps.
Plateau	A level, often dissected region of elevated land that is bounded on at least one edge by an abrupt shift to land at a lower elevation.
Platform Pipe	A smoking pipe, usually either carved from stone or made of pottery, in which the tobacco bowl is situated on a thin, solid platform. The bowl is often formed into an animal or human effigy. Platform pipes are a common trait of Hopewellian or Hopewell-influenced cultures.
Pleistocene Epoch	The period of time extending from two and one-half million years ago until the present, of which the most recent subdivision is the Holocene Age (Willman and Frye 1970).
Poorly Drained Soil	A soil with inadequate internal or surface drainage that remains wet for long periods of time.
Point Bar	The inside of a meander loop where sediment is or has been deposited.
Prairie	An extensive area of flat or rolling grassland. The eastern portion of the Great Plains is prairie.
Prairie Peninsula	The eastward extension of prairie into the midwestern United States bordered to the north and south by forested land.

Preform	Specifically, a stone artifact which has received preliminary flaking for the fabrication of finished items such as projectile points, knives, or other artifacts; in general, an unfinished tool.
Prehistoric	Generally, refers to any cultural developments which occurred prior to the development of written record keeping. In North America, the term is used to refer to cultural developments which occurred prior to the arrival of literate peoples in a region.
Prismatic Bladelet	A bladelet exhibiting a four-faceted (sided) cross section.
Profile	A vertical section of a soil which includes all of its various layers.
Projectile Point	An implement which probably served as the tip of a dart, lance, spear, arrow, or other weapon.
Protohistoric	Refers to cultural developments occurring during the early phases of European intrusion into North America when actual direct European contacts were minimal or when contacts between Europeans and aboriginal groups were carried out by native intermediaries.
Quarry	An open excavation where rocks and minerals of economic importance are removed.
Quartz	A transparent, hard mineral composed of silicon and oxygen.
Quaternary Period	The period of time beginning approximately two and one-half million years ago and extending to the present day (Willman and Frye 1970). The Pleistocene Epoch is its only subdivision on the next level of classification.
Radiocarbon Age Determination	A determination of the age of an organic specimen by measuring the degree of disintegration of its radioactive carbon (C-14) atoms.
Rake Test	A means of clearing vegetational growth from portions of an archaeological site by use of a rake in order to see more clearly artifacts and debris which may be on the ground surface.

Random Sampling	A sampling strategy that attempts to ensure a representative sample by selecting a sufficient number of sample units randomly from the total population of interest.
Range	An east-west locational divisional corridor within state boundaries. Usually townships are six miles or six sections wide.
Rangeland	Open prairie used for cattle grazing.
Reductive Technology	A technological system such as flint working that is characterized by the manufacture of artifacts through removal of pieces or fragments from a larger item.
Relict Meander	A meander loop which a stream or river abandoned when it cut a new course.
Relief	The difference in elevation between the high and low points on the land's surface.
Research Design, Research Paradigm	The application of scientific method to the solution of a specific problem or set of problems. The research design commonly includes a statement of the problems and the strategy for obtaining an answer to them; hypotheses may be formulated and data are sought to support or disprove them.
Residual (Chert, Etc.)	Applies to rock which is left after the disintegration and dissolution of its enclosing bedrock.
Residual Soil	Soil formed in place by the disintegration and dissolution of the underlying bedrock by weathering.
Residuum	The material remaining after the in situ dissolution, disintegration, and decomposition of bedrock at the surface due to weathering.
Resistant Bed of Chert	A bed of chert that forms a ledge because it resists erosion better than the surrounding rock.
Retouch	The process of shaping or sharpening a stone tool by removal of small flakes from the edge.
Retouch Flake	A very small flake produced as a by-product of retouching a larger lithic artifact.
Rocker Stamped Pottery	Pottery exhibiting a ceramic decoration technique in which a stamp fashioned from the edge of a shell or some similar object is rocked across the surface of the vessel so as to produce a design. It is a diagnostic Hopewellian trait.

Rock Shelter	An exogenous cave.
Rotten Dolomite Gravel	Dolomite gravel that has been weathered to the point of being readily crushable.
Salvage Archaeology	Emergency archaeological investigations or excavations conducted in situations where the destruction of the site or region is imminent.
Sampling Unit	A portion or part of something or an item from a group which is selected in order to assess the characteristics of the whole.
Sampling Strategy	The way in which an investigator determines the criteria for choosing individuals within a total population (e.g., small acres within a geographical region) in order to study them and make projections which are valid for the entire population.
Sand	Any rock or mineral fragment whose maximum diameter ranges from 0.05 to 2.0 millimeters (0.002 to 0.08 inches). Also, that class of sediment that contains 85% or more sand and not more than 10% clay (USDA 1975).
Sand Centered Oolite	An oolite which has a grain of sand at its center.
Sandstone	A sedimentary rock composed primarily of sand.
Scarped Plain	A plain crossed by a continuous escarpment. An escarpment is a low, steep slope between two levels of flat or gently sloping land.
Scraper	An artifact type defined as possessing a relatively steep angle on the working edge and subsequent modification of the working edge attributable to use in a scraping fashion.
Secondary Stream	A lower rank stream in Strahler's (1964) ranking method. A secondary stream is a tributary of a stream or river that is a major drainage for an area.
Section	An area usually one mile square, or 1/36th of a specific township-range combination.
Sediment	A material consisting of particles which have been formed by the erosion of preexisting rock, the separation of chemical compounds out of solution, and the deposition of bones and shells of animals and plants.

Sedimentary Rock	A rock composed of sediment which has been turned into rock.
Seriate	To arrange in proper order. Archaeological seriations attempt to place archaeological remains in proper chronological order.
Settlement Pattern	The spatial arrangement of a specific culture's sites as classified by size, function, and location.
Shale	A sedimentary rock composed of clay which breaks along horizontal plates parallel to the original layers in which it was deposited.
Sherd	A piece of broken pottery.
Shoulder	The portion on a stemmed or barbed point where the blade joins the hafting element.
Shovel Test	The excavation of a small and shallow shovel hole in order to assess the presence or density of archaeological materials in the upper levels of a site.
Side Notched Point	A projectile point with two or more notches cut into the side edges roughly perpendicular to the long axis of the point.
Side Scraper	A flake or biface with one or both of the lateral edges retouched to form a working edge suitable for scraping.
Silt	Any rock or mineral fragment whose maximum diameter ranges from 0.002 to 0.05 millimeter (0.00008 to 0.002 inches). Also, that class of sediment that is 80% or more silt and not more than 10% clay (USDA 1975).
Site	The basic spatial unit studied by the archaeologist, either large or small, at which evidence of human habitation, activity, or action has survived.
Slash and Burn Agriculture	A system of shifting agriculture in which fields are cleared of vegetation which is then burned. Fields are planted without fertilizer for as long as they remain productive and then stand fallow while new plots are prepared and planted. Slash and burn agriculture requires the utilization of a relatively large area and often results in shifting populations.

Slip-Off Slope	An eroded, streamward sloping land surface which has developed on the bend of a river as a result of the sideways movement of the river as it erodes downward.
Slopewash	Sediment that is being or has been moved down a slope mainly by the action of gravity assisted by unchannelized water flow.
Slough	A local, restricted area covered by swamp and quagmire.
Smoothed Pottery	Pottery which is manufactured with a smooth surface or which exhibits evidence that other surface treatments have been smoothed over before firing.
Soil	The natural, three-dimensional material on the earth's surface which is the medium in which plants grow. A soil's properties reflect the integrated effect of the local climate, living matter, and local relief on alluvium, colluvium, or bedrock.
Soil Horizon	A layer of soil with distinct characteristics produced by soil forming processes.
Soil Series	The lowest unit of soil classification which groups soils together according to their overall physical properties.
Southeastern Ceremonial Complex	A complex of specific artistic styles which occur on a relatively widespread basis during the Mississippian Period in the southeastern United States and appear to link together sites as far apart as Oklahoma and Georgia. Also known as the "Southern Cult."
Southern Plains	The subdivision of the Plains including most of Oklahoma and northern Texas as well as portions of eastern New Mexico.
Spicule	A tiny object contained in the tissues of sponges which is composed of silicon dioxide (SiO_2) or calcium carbonate ($CaCO_3$) and is rod-shaped or branched.
Spokeshave	A tool exhibiting a concave working edge, presumably for the scraping of tubular items such as long bones or wooden sticks.
Stage	A general subdivision of prehistory or history which is characterized by a specific set of technological, economic, or social conditions. A stage as opposed to a period is not defined strictly by specific intervals of time although there can be a general temporal element in its definition.

State	The highest and most complex system of social organization characterized in part by a stratified or "class" society, a central government which has the power to coerce other elements of society, and many organizations which crosscut kinship lines. States are also characterized by the presence of large settlements or cities and occupational specialization with a nonagricultural elite.
Stemmed Point	A projectile point which exhibits a basal extension sometimes delineated by notches which is presumably used to aid in attaching the haft to a shaft. The stem may expand or contract in width toward its basal end.
Sterile Sediment	Sediment which does not contain any cultural material or features.
Strath	As used in this report, the floor of a broad river valley, often recurring as small, elevated, eroded, and dissected remnants.
Stratified	Having cultural or natural deposits which are layered with each layer presumably being older than the one immediately above it.
Stratigraphy	The levels of natural, often differing, deposits that have accumulated in one place over a period of time and now lie layered in the earth's surface, the oldest deposits being the deepest. Cultural materials are dated relative to each other by their position in the stratigraphic layers.
Stratum	A horizontal layer that consists essentially of a single type of rock or sediment. Or, a division of any total entity into smaller units for the purpose of more accurate sampling or testing, as in Roper's (1977a) 22 strata for the HST project area.
Subrounded	A category of particle roundness which indicates considerable wear.
Subsistence Pattern	The ways in which a human group exploits the surrounding environment in order to obtain the necessities of life.
Subsurface Testing	Small scale excavation at an archaeological site in order to determine the presence, density, and location of archaeological material or features beneath the ground surface.

Surface Find	An artifact or other indication of past human activity located on the surface of a site.
Survey	The gathering of background data on the cultural and environmental character of an area through field work and historical research.
Talus	Fallen material which has collected at the base of a cliff or bluff.
Tame Pasture	Land specifically planted in a particular crop such as alfalfa to be eaten by the livestock grazing on that land.
Temper	Any hard material added to clay paste so as to improve its modeling or firing properties. Usually this material is either sand, grit, shell, plant fiber, fired clay, or dried clay.
Temporal Construct	A classification of archaeological phenomena which is defined partially or wholly with reference to the time period that the phenomena represent.
Terrace	A relatively flat, horizontal portion of the land surface bounded by a relatively steep ascending slope on one side and a relatively steep descending slope on the other. As used in this report, a terrace is of alluvial origin.
Tertiary Stream	A tributary of a secondary stream.
Thermoluminescence Dating	The dating of pottery and other ceramic artifacts that have been fired by a measurement of the amount of energy collected and retained by the objects since their manufacture. This energy, which is released by the application of heat, is received by ceramic items at a regular rate and can be measured by observing the amount of light given off when an archaeological specimen is reheated.
Thinning Flake	A thin flake with minimum thickness at the distal end, exhibiting evidence of previous flake removal on its dorsal surface (Faulkner and McCollough 1973).
Three-Quarter Grooved Axe	A ground stone axe which exhibits a hafting groove which extends three-quarters of the way around the butt end.
Thumbnail Scraper	A round scraper made on a small flake.

Topography	The earth's physical features in a particular district or region.
Township	A north-south locational divisional corridor within state boundaries. Usually townships are six miles or six sections wide.
Trace Element	An element present in only minor amounts in the earth's crust.
Tradition	A large scale archaeological classificatory unit which is usually defined as enduring or developing over a relatively long period of time in a geographically limited area.
Tributary Stream	A stream that flows into a larger stream.
Transect	A linear survey unit, often followed by a pedestrian survey crew or an aerial reconnaissance.
Trimodal Distribution	A frequency distribution characterized by three distinct clusters of observations centered about three different values.
Tropical Cultigens	Plants cultivated during the prehistoric period in the New World which were originally domesticated in Central or South America and spread to adjacent areas. The main tropical cultigens cultivated in eastern North America were several varieties of maize, beans, and squash.
Truncated Pyramidal Mound	A mound of earth shaped like the base of a pryamid and having a flat top rather than coming to a point. Such mounds were constructed by the people of the Mississippian Period and often used as bases for dwellings and ceremonial structures.
Type Fossil	In archaeological terminology, a specific artifact type that is limited to a specific time period or culture and can be used to date or identify archaeological assemblages.
Typology	A system by which a scientist orders and classifies his data, often with specific research problems or questions in mind.
Unifacial Tool	A tool which displays flaking on a single face.
UTM	Universal Transverse Mercator. A locational system based on the metric system.

Utilized Flake	A flake which exhibits no purposeful modification in terms of retouch but which exhibits edge shatter or polish as a result of use for cutting or scraping.
Valley Wall	The steep, ascending slope at the edges of a river valley or floodplain.
Waste Flake	A flake which exhibits no evidence of utilization or modification subsequent to its production.
Water Table	The upper surface of the zone where ground water is present.
Weathering	The process by which the atmosphere and living organisms chemically and physically alter rocks which are exposed or near the land surface.
Well Drained Soil	A soil with adequate drainage such that it dries out quickly.
Western Prairie	One of six archaeological-physiographic regions defined for the State of Missouri by Carl Chapman (1975). The Western Prairie is characterized by an extension of plains into west-central Missouri.
Woodfordian	The subdivision of the Pleistocene Epoch which spans from 22,000 B.P. to 12,500 B.P. (Willman and Frye 1970).
Zoned Decoration	A means of decorating pottery in which the decorative treatment is confined within well delineated zones. Certain kinds of zoned pottery are characteristic of Hopewellian or Hopewellian-influenced cultures.

APPENDIX C

ABOUT THE AUTHORS AND CONTRIBUTORS

Iroquois Research Institute is one of the most active private research centers for archaeological and historical investigations in North America. The firm is headquartered in Fairfax, Virginia, outside Washington, D.C., and maintains branch offices in Memphis, Tennessee; New Orleans, Louisiana; and Los Angeles, California. The Institute has attracted a highly skilled staff organized in the research services of Anthropology, History, Architecture, and Environment and Engineering. In addition to the full time staff, visiting scholars are invited to participate in specialized and complex research projects.

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Carol E. Lindeman, Graphic Artist and Cartographer, received her B.F.A. in Sculpture from Boston University in 1975. She is responsible for the production of graphs, maps, illustrations, and other visuals for publication. She has experience as a free-lance artist and has designed and illustrated historic preservation publications and promotional materials.

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