FINAL DRAFT REPORT

A Phase I Cultural Resources Survey and Assessment on Residual Lands at Union Electric Company's Callaway Nuclear Power Plant, Callaway County, Missouri

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ABSTRACT

A Phase I cultural resources survey and assessment on 5,848 acres of residual lands at Union Electric Company's Callaway Nuclear Power Plant, located in Callaway County, Missouri, is presented.

A total of 129 cultural resources sites was identified and evaluated during the Phase I survey and assessment: 79 prehistoric archaeological sites, 29 historic archaeological sites, and 21 architectural sites. Twenty-three prehistoric archaeological sites are recommended as potentially eligible for nomination to the National Register of Historic Places, and two historic sites are recommended as potentially eligible. None of the historic architectural resources is considered eligible for nomination to the National Register of Historic Places. The remaining resources are considered not eligible for nomination and require no further assessment.

Recommendations presented in a separate management document (McNerney 1983) are to carry out Phase II testing as an aid to determining eligibility when and if the 23 archaeological sites are threatened with adverse impacts.

ACKNOWLEDGMENTS

The entire staff at American Resources Group, Ltd., would like to thank the personnel of Union Electric Company Environmental Services Department, Nuclear Engineering Department, and Real Estate Department for their cooperation and assistance throughout the project. Special thanks to Mr. David J. Wambold for his patience, perseverance, and good-natured cooperation. Additionally, we would like to thank our professional consultants during this project: Dr. Dale R. Henning, Consulting Archaeologist, and Dr. George Fraunfelter, Consulting Geologist/Geomorphologist.

As Principal Investigator, I would like to thank all of the staff members of American Resources Group, Ltd., for their fine contributions to this report, especially the two who always bear the brunt of final deadlines -- Debra Tayes, word processing, and Fran Poirier, final editing. Also my thanks to Kurt Moore for his work in compiling, editing, and statistical applications.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF MAPS

LIST OF PLATES

LIST OF TABLES

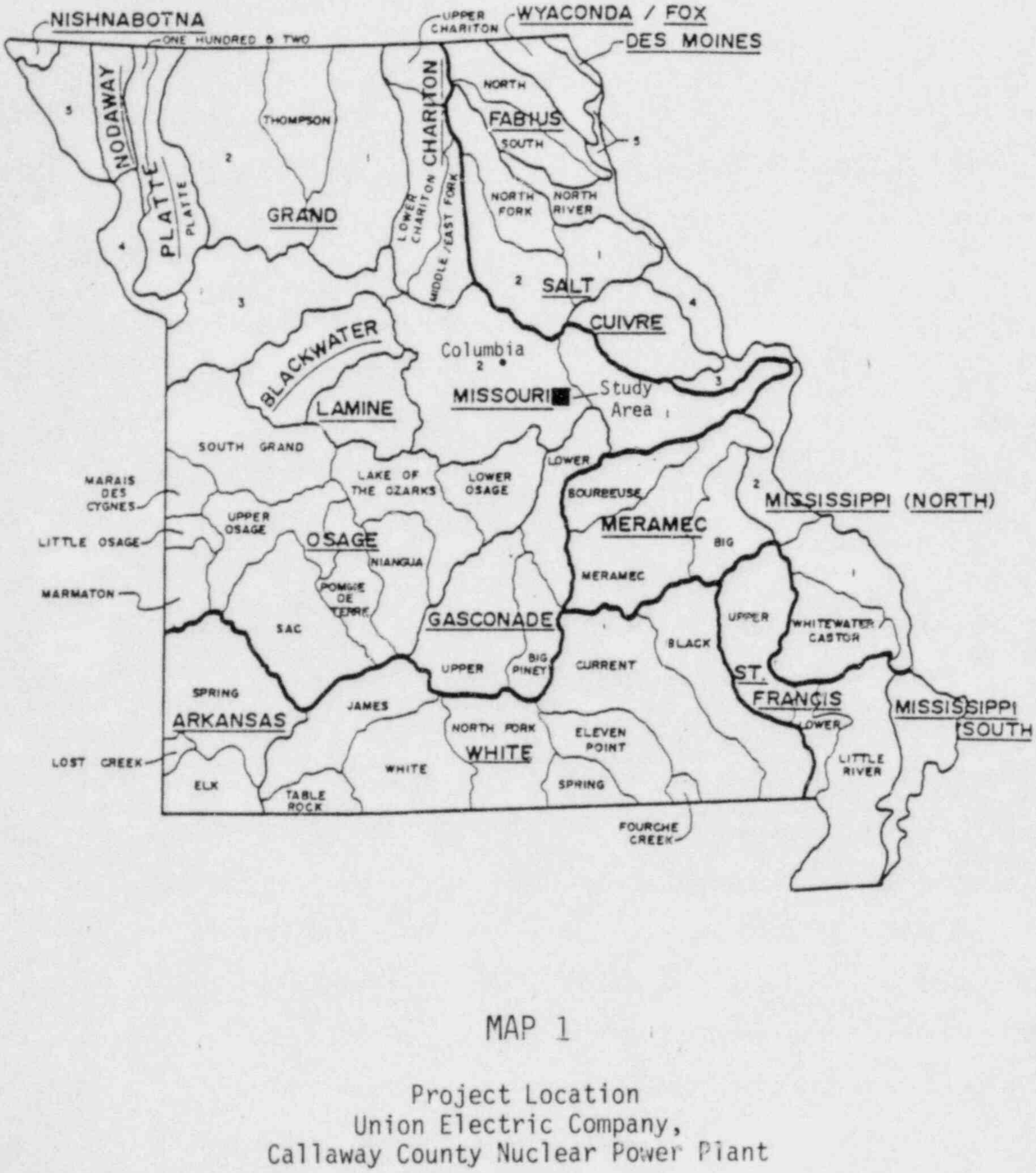
INTRODUCTION

The following report presents the results of an intensive cultural resources survey and assessment of approximately 5,848 acres (2,366 ha) for Union Electric Company at the Callaway Nuclear Power Plant Site, Callaway County, Missouri, in compliance with Regulatory Guide 4.2, Section 2-6, July 1976, of the Nuclear Regulatory Commission. This survey was conducted on the residual lands surrounding the plant site, which are managed by the Missouri Department of Conservation, and selected direct impact zones as identified by Union Electric Company. Previous archaeological surveys on Union Electric Company property were conducted (Evans and Ives 1973, 1979) in the vicinity of the plant site and related construction corridors.

The project area is located approximately 24 mi northeast of Jefferson City near the village of Steedman on Highway 94. The study area occupies a small portion of the Missouri-2 Watershed Management Unit (Map 1) (Weichman 1979:Appendix D), 6 mi northeast of the confluence of Auxvasse Creek and the Missouri River. The area is also located in the Lower Missouri Valley II locality of the Northeast Prairie archaeological-physiographic region (Chapman 1975:3-4).

The location and assessment of cultural resources is authorized by the National Historic Preservation Act of 1966 (16 U.S.C. 470 et seq.), National Environmental Policy Act of 1969, Executive Order 11593, the Archaeological and Historical Conservation Act of 1974 (Public Law 93-291), and the Nuclear Regulatory Commission's Regulatory Guide 4.2, Section 2-6, July 1976.

The primary objectives of this project are: 1) conduct an intensive pedestrian survey of previously unsurveyed areas to locate and



MAP 1

Project Location
Union Electric Company,
Callaway County Nuclear Power Plant

(Missouri Watershed Management Plan,
Missouri State Historic Preservation Office)

identify cultural resources, 2) evaluate and assess all cultural resources based on National Register criteria of significance, and 3) prepare a cultural resources management plan.

The field work was conducted between August 26 and December 16, 1981. Much of the laboratory processing of artifactual material and site information was carried out concurrently with the field work and completed during January and February 1982. Michael J. McNerney was principal investigator of the project. Patrick M. Tucker was supervising archaeologist from August 26 to October 23. Jack H. Ray served as supervising archaeologist from October 23 to the end of the field work, analyzed the prehistoric artifacts, and is principal author. Edward M. Morin conducted historical research, analyzed historic artifacts, and prepared historical sections of the report. The historic architectural survey and report was written by R. Gail White. Kurt R. Moore conducted statistical analyses, authored portions of the archaeological overview, and served as general editor. Dale R. Henning served as consulting archaeologist, George Fraunfelter was consulting geologist/geomorphologist, and Mark E. Phillips and Gwen K. Holder prepared the maps and illustrations for the report. Archaeological technicians who participated in the field and laboratory work were Thomas Holland, Gwen Holder, Johanna Blank, and Pat Trader.

All artifactual material recovered from the survey and catalog forms will be curated with the Division of American Archaeology, Department of Anthropology, University of Missouri-Columbia.

ENVIRONMENTAL SETTING

The study area is located in the southeast portion of Callaway County in east-central Missouri. Physiographically the project area consists of flat-to-gently rolling glaciated prairie (Coat's Prairie) in the north, heavily dissected upland with narrow ridges and valleys to the south, and fertile bottomlands of Logan Creek and the Missouri River along the southern boundary.

The Missouri River flows in an eastwardly direction, 5 mi south of the plant site. The floodplain in this area is 2.4 mi wide with contour elevations of 520 ft bordering the north and south sides of the river. Logan Creek flows in a southwesterly direction entering onto the Missouri River floodplain, forming the eastern physiographic boundary of the project area. The western boundary is demarcated by three westward flowing tributaries of Auxvasse Creek and by Mud Creek, which flows southeast before entering the Missouri River floodplain. State route "O," a hard-surface road running east to west, serves to delimit the northern boundary of the project area.

Topography

The Callaway Nuclear Power Plant site area is situated between the southern border of the Dissected Till Plains modified by glaciation and the northern boundary of the Ozark (Salem) Plateau (Fenneman 1946). The Dissected Till Plains were formed by erosion of a mantle of drift and till deposited during the Quaternary period. In the southern portion of the Till Plains, gently rolling and hilly topography was created by geophysical processes. The hilly-to-mountainous topography of the Ozark Plateau was developed by erosion of the Ozark uplift.

The surface geology of the area is one of gently rolling upland in the northern part of the project area. Glaciation of this region resulted in relatively level plains; however, erosion and downcutting of the Missouri River and its tributary streams have deeply dissected the plain in the southern half of the project area, leaving a nearly isolated plateau of approximately 8 mi^2 called Coates Plateau (Union Electric Company 1979a). This plateau has a maximum elevation of 858 ft msl and the Missouri River base level is approximately 505 ft msl; therefore, maximum topographic relief between the crest of the plateau and the Missouri River is approximately 350 ft msl.

Geology

The geological stratigraphy (Figure 1) exposed in the project area is composed of seven sedimentary Paleozoic formations and three Quaternary deposits - mantles of glacial till and loess on the uplands and alluvial deposits in the valleys. Each of these strata are discussed chronologically with an emphasis on those containing geological resources potentially usable by prehistoric peoples.

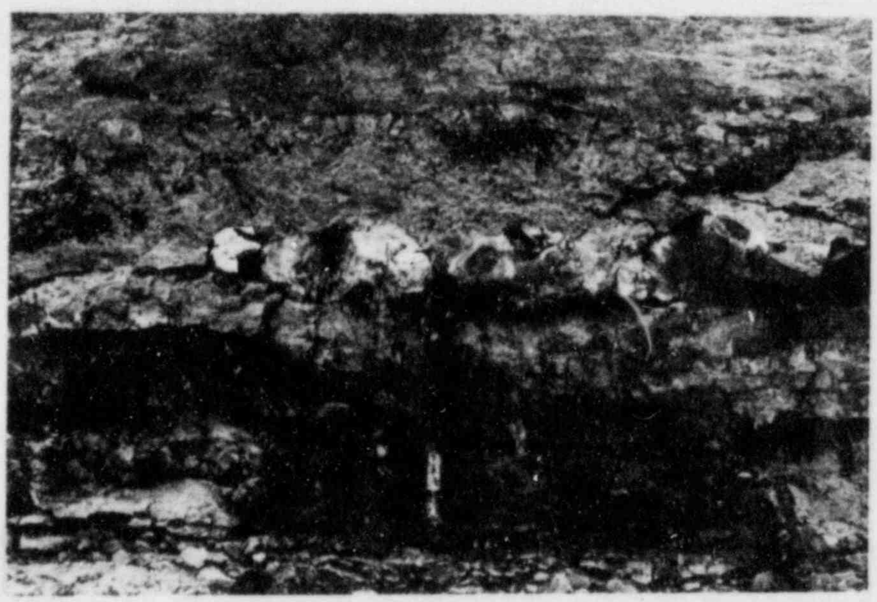
The oldest of the seven formations is a chert-bearing, Ordovician-aged Jefferson City dolomite (a magnesium rich limestone). This formation underlies all of the project area but is exposed only in the highly dissected southern portion of the research area. The Jefferson City formation (Figure 1) outcrops from the Missouri River base level to as high as 760-780 ft (reaching a maximum thickness of 225 ft) and forms the prominent dolomite bluffs at the south end of the project area along the Missouri River (Plate 1a). The Jefferson City formation is used here in an unrestricted sense to include the sometimes distinguished but very similar upper Cotter dolomite section. Although the Jefferson City is predominantly a fine-grained dolomite, it contains up to 40% chert (Conselman 1934:104) and small amounts of shale and sandstone. The sandstone lenses which are limited in extent and seldom exceed a few

SYSTEM	SERIES	STAGE	FORMATION OR UNIT	LITHOLOGIC COLUMN	DESCRIPTION	RANGE OF THICKNESS (FEET)
QUATERNARY	PLEISTOCENE	WISCONSINAN AND/OR ILLINOIAN	LOESS		WIND-BLOWN SILT - ALTERED TO BROWN SILTY CLAY BY WEATHERING	3–17
		KANSAN	ACCRETION-GLEY		GRAY SILTY CLAY - MODERATELY PLASTIC.	4–28
		KANSAN	GLACIAL-TILL		REDDISH-BROWN SILTY CLAY WITH SOME SAND AND GRAVEL (GLACIAL TILL)	3–27
PENNSYLVANIAN			GRAYDON CHERT CONGLOMERATE		REDDISH-BROWN, BUFF, PURPLE, AND GREEN CLAY CONTAINING 20% TO 65% ANGULAR TO ROUNDED, GRAVEL TO BOULDER SIZE CHERT PARTICLES. INDURATED SANDSTONE AND SANDY CHERT CONGLOMERATE DEVELOPED LOCALLY	4–61
MISSISSIPPIAN			BURLINGTON		GRAY TO TAN LIMESTONE, COARSE GRAINED, CHERTY, CRYNOIDAL	0–42
			BUSHBERG		GREENISH TO YELLOWISH-BROWN SANDSTONE, FINE TO MEDIUM GRAINED, FRIABLE	0–6
DEVONIAN			SNYDER CREEK		BROWN LIMESTONE, SILTY, FOSSILIFEROUS; GRADES DOWNWARD TO PURPLE AND GREEN, CALCAREOUS SILTSTONE WHICH IS UNDERLAIN BY GRAY SILTY SHALE	10–47
			CALLAWAY		BROWNISH-GRAY LIMESTONE - FINE TO COARSE GRAINED, FOSSILIFEROUS, PYRITE AT TOP, SANDY AT BASE	11–49
ORDOVICIAN			JOACHIM		BROWN DOLOMITE, SILTY, CALCITIC, SANDY AT BASE	0–10
			ST. PETER		WHITE SANDSTONE, FINE GRAINED, MASSIVE TO CROSS BEDDED, FRIABLE, WEATHERS TO BROWN	0–11
			COTTER-JEFFERSON CITY		LIGHT GRAY DOLOMITE - FINE TO MEDIUM GRAINED, THIN BEDDED, NUMEROUS GREEN SHALE STRINGERS IN ZONES, GRAY BANDED CHERT	~200

Figure 1

Generalized Columnar Section of the Geological Stratigraphy in the Project Area (adapted from Union Electric Company 1979b)

a. Jefferson City dolomite bluffs



b. Nodular Jefferson City chert

inches in thickness (Miller 1951:15; Unklesbay 1955:2) were probably insignificant for aboriginal uses.

Jefferson City chert occurs in discontinuous lenticular beds, as "free" nodules, and sometimes in thin bands or seams 3-5 cm thick within the dolomitic matrix. The nodular chert (Plate 1b) may be ellipsoidal, round, or irregular. Although ellipsoidal nodules are generally less than 10 cm in length, irregular nodules occur up to 25 cm in diameter. Orthoquartzite (hard sandy chert) is commonly associated with Jefferson City chert occurring in seams and nodules and occasionally as inclusions within a chert matrix.

Jefferson City chert is generally fine-grained and chalcedony-like with thin flakes often being translucent. This Ordovician chert is highly variable in color usually occurring in light to dark shades of blue, gray, brown, and white, although pink, purple, reddish-brown, and black have also been noted. While some white and gray-brown varieties might be confused with Burlington chert, most of the Jefferson City chert is usually very distinctive and readily identifiable.

Jefferson City chert usually occurs in three varieties: oolitic, banded, and mottled, although many nodules in the project area exhibit a combined banded and mottled appearance. Oolitic Jefferson City is a common variety. The oolites, small spherical grains, generally average 0.75 mm in diameter (Conselman 1934:104); they may be sand centered, concentrically banded, or unstructured. The oolites may be the same or different color than the matrix, densely or widely dispersed, and some may be elongated or disk shaped. Oolites are a diagnostic trait of Jefferson City chert since they do not occur in other major chert types in the area.

Banded Jefferson City chert is common to ellipsoidal nodules and is often concentric in cross section; the bands are usually white alternating with blue, brown, or gray. Banding is relatively diagnostic of Jefferson City since Callaway and Burlington cherts are rarely banded.

Mottled Jefferson City chert is more common to irregular nodules; the mottling may be a combination of any of the dominant colors. The mottled Jefferson City chert usually exhibits a swirled and jumbled pattern or disturbed banded appearance. Although mottled Jefferson City is the least diagnostic variety, this feature, in combination with the characteristic smooth, fine-grained, glass-like texture and the absence of fossils, is a fairly reliable indicator.

Probably the most diagnostic characteristic of Jefferson City chert is the near absence of fossils. The only definite fossil identified in Jefferson City chert from the project area was a single gastropod in a nodule sampled from Logan Creek. Beveridge (1951:27) and Ray (1981a:16) working with Jefferson City chert in southwest-central Missouri also noted that fossils were very scarce and that gastropods were the only rare forms found. Fossils common to Devonian and Mississippian cherts in the research area are totally absent in Jefferson City chert.

The Ordovician St. Peter sandstone formation (Figure 1) occurs throughout the southeast portion of Callaway County in isolated masses often more than 100 ft thick. These sandstone monoliths are thought to be ancient stream channels or karstic depression fillings in the top portion of the Jefferson City formation (Conselman 1934:107; Miller 1951:10; Unklesbay 1955:2). Only one sandstone monolith occurred in the project area. These localized deposits of the St. Peter may have been aboriginal sources for sandstone abraders, manos, and metates.

Union Electric Company (1979b:2.5-13) recognizes a nonchert-bearing Joachim dolomite formation (Figure 1) overlying the St. Peter or Jefferson City formation. Since it is thin (0-10 ft) and discontinuous, it is considered archaeologically insignificant to the research area.

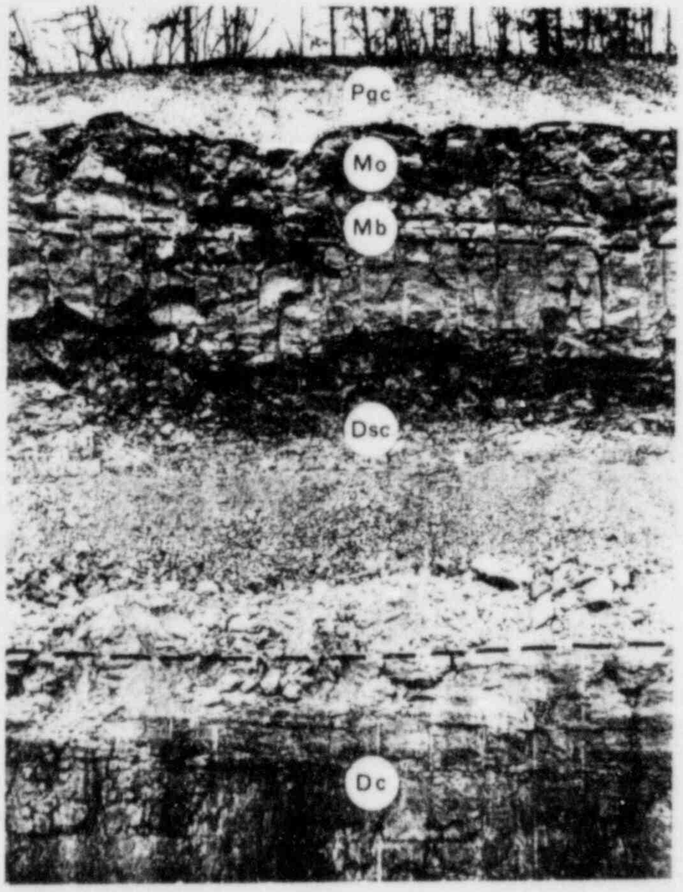
The Callaway formation (Figure 1; Plate 2a), a Devonian limestone,

Plate 2

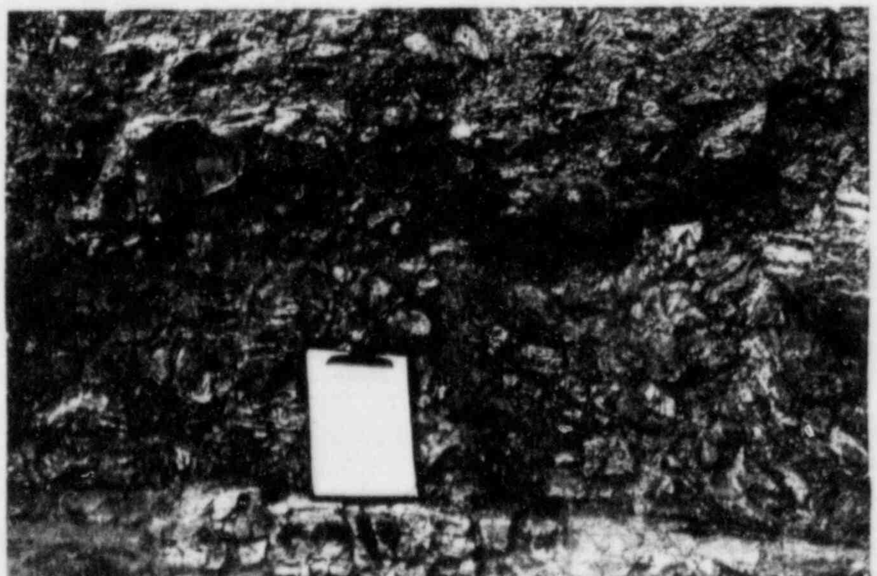
a. Upper portion of the geological sequence as exposed by an historic limestone quarry in the northeast corner of the project area. From bottom to top: Callaway limestone (Dc), Snyder Creek shale and limestone (Dsc), Bushberg sandstone (Mb), Burlington limestone (Mo), and Graydon Chert Conglomerate (Pgc).

b. Graydon Chert Conglomerate: redeposited Burlington chert nodules consolidated in a sand and clay matrix.

Plate 2



a



b

unconformably overlies the Jefferson City or St. Peter formation if the latter is present. The Callaway formation averages about 10.5 m thick in the study area and consists predominantly of fine-grained limestone, although a sandy limestone or sandstone up to 1.5 m thick is common in the basal beds (Union Electric Company 1979b:2.5-12). The sandy member at the base may have been exploited aboriginally for sandstone tools.

The Callaway formation also provides another, although minor, source of chert in the project area. This chert which is neither a common nor widespread constituent of the limestone does occur in quantity in localized areas (Conselman 1934:112; Unklesbay 1955:3). Callaway chert was located and sampled at one location (NW 1/4, SE 1/4, SW 1/4, Sec 10, T46N, R8W) in an unnamed tributary of Auxvasse Creek in the west portion of the project area. The chert generally occurs in small elliptical nodules less than 12 cm in diameter, with a thin cortex, commonly brown or white, and chalky if highly weathered. Callaway chert is basically a fine- to coarse-grained light and dark gray fossiliferous chert. The fossils are primarily small and white and consist of sponge spicules, crinoids, ostracods, and forams. Some nodules also contain abundant oolites interpersed between the fossils.

The Snyder Creek formation (Figure 1; Plate 2a), which conformably overlies the Callaway limestone, is also a Devonian deposit. This formation, composed of shale and limestone, contains no chert resources.

A relatively thin but widespread Mississippian-aged sandstone formation known as Bushberg (also called Bachelor sandstone) unconformably overlies the Snyder Creek formation. The fine- to medium-grained, poorly sorted sandstone (Figure 1; Plate 2a) ranges in thickness from 10 cm to a maximum of about 2 m with an average of 0.5 m (Union Electric Company 1979b:2.5-11). This moderately cemented and readily available sandstone was probably a major source for the procurement and manufacture of groundstone tools such as manos, metates, and abraders.

Although the Chouteau Group of formations does not occur in the project area, Unklesbay (1955:5) notes that Callaway County is on the margin of the Chouteau outcrop belt occurring in localized areas, 0.5 m to 8 m thick, in the west and north sections of the 15' Fulton Quadrangle along Auxvasse Creek. The undifferentiated Chouteau limestone in southwest-central Missouri produces a mottled light and dark gray chert (Ray 1981a:16), which probably occurs in the Chouteau limestone that Unklesbay (1955) refers to 13-22 km west and north of the study area.

The youngest Mississippian formation in the stratigraphic sequence is the chert-bearing Burlington limestone (Figure 1; Plate 2a) which is limited to and caps the plateau in the northern half of the project area. This coarse-grained, highly fossiliferous limestone varies drastically in thickness (due to extensive post-Burlington erosion) from 0-13 m with an average of approximately 6 m (Union Electric Company 1979b:2.5-11). Although the Burlington is predominantly limestone, chert constitutes a major portion of the upper section of the formation.

Burlington chert occurs in the form of continuous layers and discontinuous lenses, but more commonly in irregular nodules, often quite large. Intense weathering produces dull tripolitic chert, which, if highly fossiliferous, is especially porous (Conselman 1934:117). Burlington chert ranges in color from white, cream, buff, tan, brown, and light gray to pinkish and red hues due to iron staining. Some weak banding and mottling does occur, but it is relatively rare. The chert ranges from fine to predominantly coarse grained and is generally opaque. The coarse texture can be easily altered since Burlington chert responds very favorably to heat treatment, often obtaining a waxy luster and turning deep pink and red due to iron oxidation (cf. Streuver 1973:64).

A distinctive trait of Burlington chert is its abundant and large crinoid fossils, which contrast sharply with the smaller more simple crinoids of Callaway chert. These Burlington fossils are often twice as large as Callaway crinoids (commonly 5 mm in diameter) and are much more abundant. Another characteristic of Burlington crinoid fossils is that they often occur as portions of intact columnal stems. Other fossils commonly found in Burlington chert are brachiopods and bryozoa.

The basal portion of the Burlington formation was probably the major source of hematite in the project area. Conselman (1934:117) states that, "Near the base the brown member may contain a good deal of hematite . . . and that two miles west of Reform, basal Burlington exhibits . . . varying additions of hematite and increased reddishness to soft red ochre."

Probably the greatest unconformity in the stratigraphic sequence occurs between the Burlington limestone and overlying deposits. A conglomeration of gravel to boulder-sized (30 cm) Burlington chert nodules embedded in a sand or clay matrix rests upon an extensive post-Burlington erosional surface. This conglomerate, referred to as the Graydon Chert Conglomerate (Figure 1; Plate 2a), is thought to be Pennsylvanian in age (Miller 1951:61, 69; Union Electric Company 1979b:2.5-9, 10). The chert conglomerate, which often has a sandstone cap, varies in thickness from 0-15 m in the project area with an average of about 8 m; however, exposures as thick as 20 m were observed in a cut bank in nearby Fulton, Missouri (Plate 2b). The majority of the thick deposit of chert nodules probably was produced by long, intensive erosive processes on the upper portion of the Burlington limestone during a period of uplift in Late Mississippian times, followed by deposition of the chert lag in a conglomerate. A portion of the Graydon chert, however, may be residual material weathered in place (Union Electric Company 1979b:2.5-10).

This chert conglomerate provides a bountiful supply of Burlington chert nodules in the north half of the study area. Thick zones of residuum can often be found eroding out of ridge slopes, and upland creeks are choked with chert gravel bars.

Although many Graydon chert nodules are loaded with incipient fracture planes probably incurred during redeposition and are thus easily frost fractured, good quality material can be found in the deposits. The only significant visual distinction between Burlington chert proper and the Graydon (Burlington) chert is a color difference; the latter chert is often stained red and purple, probably due to association with a mineral rich clay and sand matrix. Such staining in redeposited cherts is known to result from prolonged contact with iron oxides in sand matrices as in the Plio-Pleistocene Grover Gravel cherts from western Illinois (Moore 1981:13; Willman et al. 1975:209).

A deposit of blue, gray, and red Pennsylvanian clay known as Cheltenham clay overlies the Graydon Chert Conglomerate (Miller 1951:70). The thicker deposits in depressions and sinkholes are sources of modern commercial clay (Unklesbay 1955:7). This clay source which occurs only on the plateau in the north half of the project area may have been exploited by prehistoric ceramicists during the Woodland period.

A mantle of Kansan glacial till (Figure 1) 0-8 m thick (Union Electric Company 1979b:2.5-9) generally masks the Cheltenham clay. The till has a heterogeneous composition and contains material of local and nonlocal geological origin (Unklesbay 1955:9). This till, which has eroded into local creeks, provided prehistoric peoples with hard igneous rocks for the manufacture of groundstone tools and may have contained various redeposited chert types originating (geologically) outside of the project area. Any cherts included in the till probably were derived from geological source areas in northern Missouri or further north. It was noted that Kentucky Spring Hollow Creek just south of Coates Plateau contained several diorite cobbles and boulders large enough to be utilized by aboriginal people.

A deposit of moderately plastic, gray, silty clay referred to as accretion-gley (Figure 1) which ranges from 0-8 m thick may also have been a clay source for prehistoric pottery.

A blanket of modified loess (Figure 1) 1-4.5 m thick deposited during either the Wisconsinan or Illinoian glacial stages (Union Electric Company 1979b:2.5-8) is the youngest deposit in the stratigraphic sequence.

A brief summary of the available lithic resources within the project area follows. Strata with potentially usable sandstone resources include localized deposits of the St. Peter formation in the southern half of the study area and the sandy basal portion of the Callaway formation, the sandstone cap of the Graydon formation, and the Bushberg sandstone formation (the primary source) in the northern half of the project area.

Glacial till mantling Coates Plateau and igneous till stones in creeks draining the plateau provided groundstone resources. The basal portion of the Burlington limestone formation limited primarily to the northern half of the research area probably contained the major source of hematite iron ore.

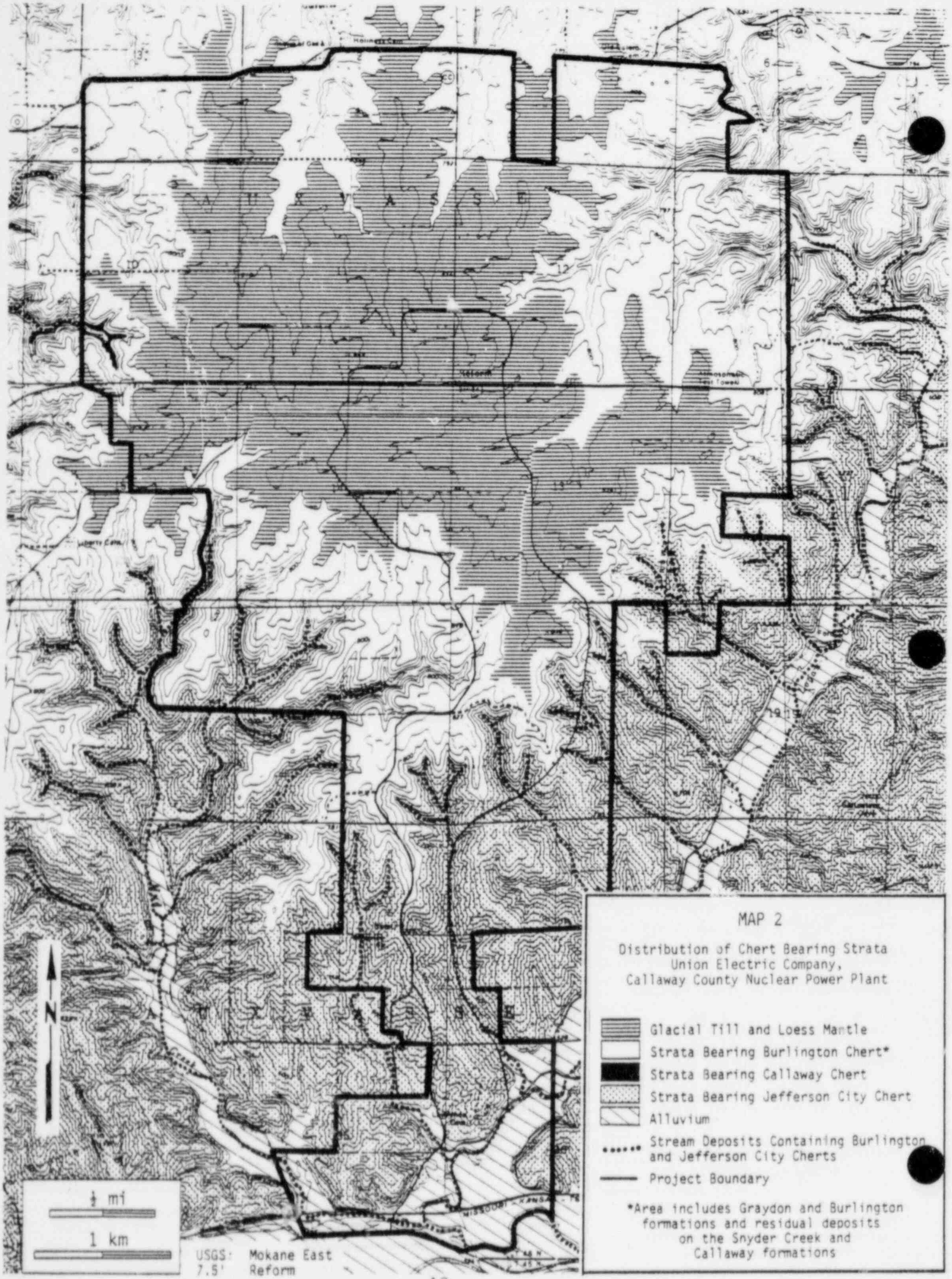
Pottery clay probably was obtained primarily from the Cheltenham clay and accretion-gley deposits limited to the north half of the project area on Coates Plateau. Sand, used as a tempering agent, was available in sand bars of the local creeks or it could have been made by crushing sandstone rocks. Particles of dolomite, known to have been used occasionally for temper, were probably produced by crushing chunks of dolomite from the Jefferson City formation.

The two major chert resources within the project area are Jefferson City and Burlington, available in residual and stream deposits. Jefferson City chert is located primarily in the highly dissected southern portion of the study area, although limited sources also flank the east and west sides of Coates Plateau comprising the northern half of the project area (Map 2). Burlington chert, on the other hand, is found predominantly on Coates Plateau in the northern portion of the study area, although it can be found in tributary streams of Logan and Mud creeks in the southern portion of the project area (Map 2). A third minor chipped stone resource is Callaway chert which is not common to the Callaway limestone but does occur in localized areas; a single source was located in the northwest portion of the project area (Map 2). A possible fourth chert source would include various nonlocal and exotic cherts in glacial till deposits mantling the upland plateau (Map 2).

An additional chert resource is located just outside the project boundaries 10 - 18 km to the north in Pinch Creek. This creek contains a previously unidentified Pennsylvanian chert called Excello, which has a bluish-black to black matrix and a light or dark gray cortex. The black matrix often contains white microfossils as well as narrow bluish-white chalcedony veins. The parent formation from which this black chert derives has recently been identified as the Excello shale formation (Searight et al. 1953).

Chert Sources

The preceding section included detailed descriptions and characterizations of the various chert types located in the project area. The following discussion logically proceeds to the various chert sources from which these chert types are found and from which prehistoric procurement of chert resources must have taken place.


MAP 2
Distribution of Chert Bearing Strata
Union Electric Company,
Callaway County Nuclear Power Plant
Glacial Till and Loess Mantle
Strata Bearing Burlington Chert*
Strata Bearing Callaway Chert
Strata Bearing Jefferson City Chert
Alluvium
Stream Deposits Containing Burlington and Jefferson City Cherts
Project Boundary
*Area includes Graydon and Burlington formations and residual deposits on the Snyder Creek and Callaway formations
N
½ mi
1 km
USGS: Mokane East
7.5' Reform

There were four distinct types of chert sources potentially available to prehistoric peoples in the project area, each manifested in a different context. These were: (1) in situ bedrock outcroppings, (2) residual chert deposits, (3) stream redeposits (gravel bars), and (4) glacial deposits.

In Situ Chert

In situ bedrock chert refers to nodules or layers of chert still embedded or consolidated in a limestone matrix. Bedrock outcroppings can be found in natural stream cuts (cut banks), earthslide exposures, or hillside outcropping resulting from little or no regolith. Procurement of in situ bedrock chert may involve laborious mining or quarrying into the surrounding limestone matrix to dislodge the chert. Such quarrying has been documented in the Flint Ridge area of east-central Ohio where pits up to 8 m deep were sunk through the soil overburden and into the flint-bearing bedrock (Holmes 1919:173-181) and at the Mill Creek quarries in southern Illinois where similar quarrying techniques were employed (May 1979:28; Phillips 1900:37-52).

Residual Chert

Residual chert refers to chert nodules removed from the original limestone matrix via chemical and physical weathering. These free nodules occur on or in the ground and are often referred to as residual "float." Residual chert may be procured directly from the ground surface with the least amount of effort or less weathered, better quality subsurface residuum may be quarried from the regolith below the frost-line.

Ives (1975:7) reports that the famous Crescent quarries in eastern Missouri were probably the result of shallow quarrying for subsurface residual Burlington chert. Reid (1978:65-66) also believes this technique was the one best suited and most economical for procuring large quantities of shallowly-buried Kansas City cherts. He documents a large quarry for residual Westerville chert 4 km north of the Nebo Hill site.

Stream Deposited Chert

Redeposited chert in stream bed gravel bars is chert which has been transported and secondarily redeposited by stream action. These alluvial gravels, which have been eroded from primarily residual sources upstream, typically choke small intermittent streams and are especially concentrated at the confluences of low order streams. Redeposited chert is identified by its water-worn smooth abrasion surface or cortex. Unfortunately, most well-made tools knapped from stream chert seldom have this water-worn cortex left on the artifact, thus making quantitative analysis of redeposited chert very difficult. Redeposited chert is procured directly from stream bed gravel bars with a minimal expenditure of effort. However, the majority of stream chert has been weathered more extensively than either residual or bedrock chert due to freezing and fluvial corrasion and corrosion, which causes hydration and the development of a brown patina.

Meyer (1970:34) speculated that stream bed gravels were probably the major chert source in the lower Illinois Valley, although he did not sample and test them. A test conducted on Jefferson City, Chouteau, and Burlington stream deposited chert nodules in a large gravel bar of a creek in the Truman Reservoir (Ray 1982) demonstrated that, although the stream deposited chert should have provided a viable, readily accessible, and virtually inexhaustible supply of chert, the quality and quantity of the nodules varied widely according to chert type.

Glacial Chert

Glacial chert refers to well-rounded cobbles transported and secondarily redeposited as till stones by glacial processes. These till cobbles, which are well-rounded due to long abrasive action, are generally small and highly weathered. Due to their small, round, and highly weathered condition, glacial chert is often poor quality knapping material. Chert included in glacial till probably was transported from geological source areas far north of the site of deposition and probably comprises several chert types of nonlocal origin. Peters (1980:24) describes two sites in southern Illinois in which over 90% of the chipped stone artifacts were manufactured from glacial chert obtained from a nearby source.

Drainage

Surface drainage follows a general flow pattern from north to south. Logan Creek to the east and northeast of the site area has severely downcut the local terrain, forming a floodplain that is approximately 1,000 ft wide. This creek extends some 6 mi north of its confluence with the Missouri River.

Auxvasse Creek, a major tributary of the Missouri River, is located about 2 mi west of the project area. This creek drains the western and northern flanks of the plateau. It is more than 30 mi in length with a number of large tributary branches.

Mud Creek drains the southern and southwestern side of the project area. Intermittent branches of this creek have cut deeply into the southern flank of the plateau, forming steep stream gradients.

The rugged relief of the southern half of the project area is due to numerous lateral streams of Logan and Mud creeks that have deeply downcut the plateau. In the northern half of the project area, dissection of the landscape is not as severe. Surface drainage in this area is intercepted by Cow Creek, a major tributary of Auxvasse Creek. Gradients along intermittent streams flowing into Cow Creek are relatively low.

Soils

Soils in the project area vary from fertile soils on the Missouri River floodplain to less fertile, cherty soils on weathered limestone bedrock along steep ridge slopes. High plasticity clays are found on the lower elevations of the plateau, while eroded loess deposits are found at higher elevations. The Missouri river floodplain is composed of alluvial deposits containing large amounts of silt and sand. The steep slopes of th dissected upland contain rock debris of various types and sizes.

There are five major soil groups within the project area: the Mexico, Putnam, Menfro, Goss, and Sarpy series (Missouri Department of Conservation 1976). The Mexico and Putnam soils have developed in thin (2.5 to 5.5 ft) loess deposits overlying glacial till with a prairie vegetation cover. Both soils have "clay pans" about 14 to 17 in below the soil surface (Scrivner et al. 1966:16). During rainy seasons, the slow permeable subsoils combine with the nearly level topography to create a soil saturation problem, forming ponds and shallow muddy areas.

The Menfro soils are light colored, having developed under a forest cover on narrow ridge tops and steep slopes bordering the Missouri River. These soils are well drained and have a high moisture storage capacity. Their use for agricultural crops is seriously affected due to their location on steep slopes and erosion of the soil.

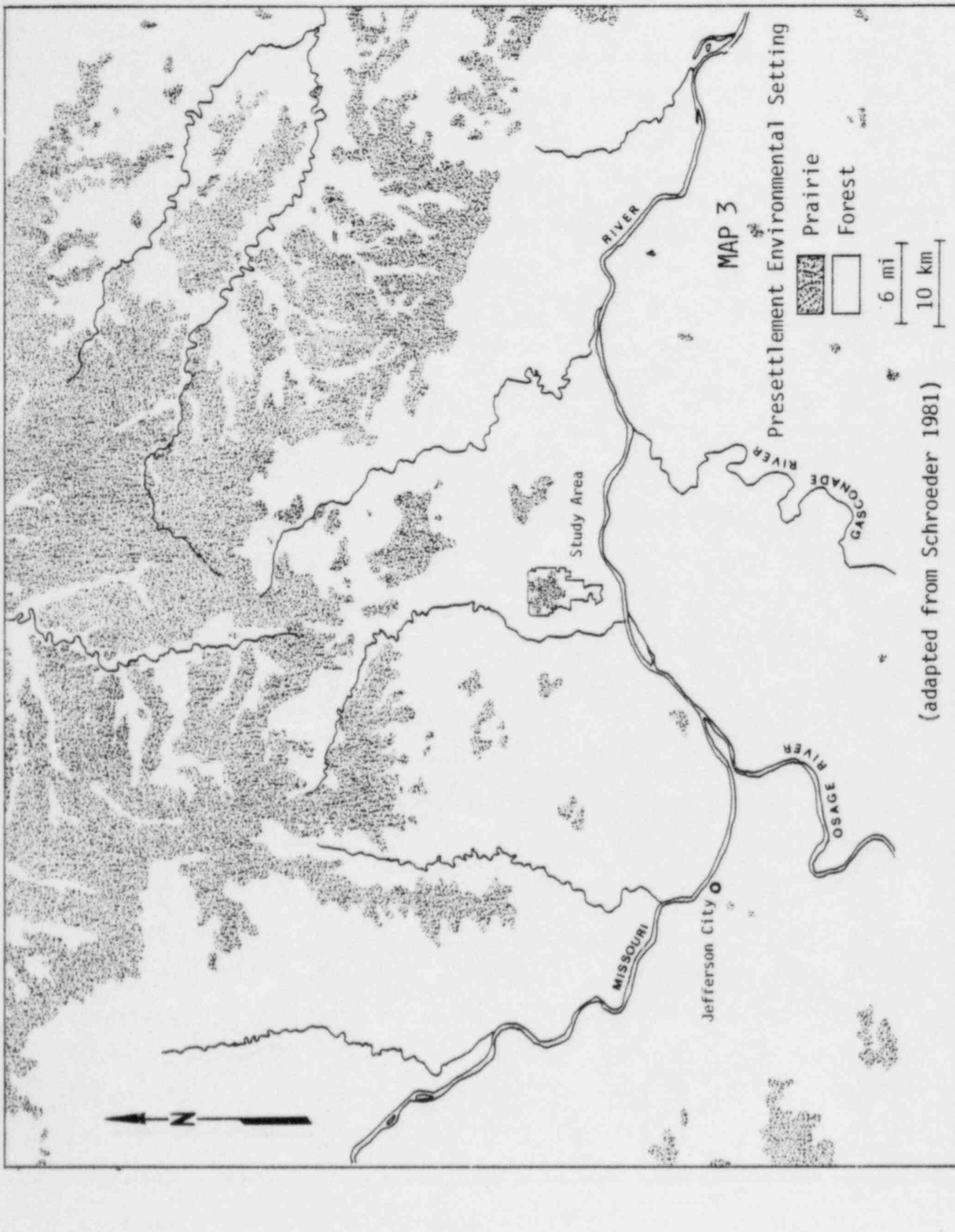
Goss soils are characterized by moderate permeability and rapid runoff, having formed from weathered, cherty limestone. Sarpy soils occupy the alluvial Missouri River floodplain. These soils are very fertile and are intensively farmed. The USDA Soil Conservation Service estimates that approximately 50% are subject to extreme flooding, 40% are not subject to serious overflow, and 10% are subject to overflow so frequently that their usefulness is doubtful.

Flora

Tall grass prairie and oak-hickory forest (Missouri Department of Conservation 1976) compose the two major vegetation communities in the project area. The tall grass prairie occupies the high, relatively flat portion of Coates Plateau. This land is presently being used for agricultural purposes, but historic records and accounts (Boone 1816-1817:227-248; Kucera 1961) indicate that presettlement climax vegetation (Map 3) was a tall grass prairie dominated by little bluestem, big bluestem, and Indian grass.

On the ridge tops and slopes to the south, where moisture is generally more available, the dominant vegetation is an oak-hickory forest (Steyermark 1940). Several oak species are present, including white oak, black oak, and northern red oak. Shagbark is the major hickory on the drier areas, while bitternut hickory occupies the moister areas. Other tree species that occur in the project area include dogwood, persimmon, white ash, hackberry, hornbeam, black cherry, sumac, sassafras, maple, slippery elm, and cedar (Union Electric Company 1979a).

Historical models of past plant communities that were present in Missouri before the onslaught of the Euro-American period often can be constructed by the use of early General Land Office (GLO) survey records. Land surveyors usually were required to record vegetation information such as the species, diameter, and bearing of "witness" trees occurring along section lines and at section corners. From this relatively random selection procedure, the reconstruction of pioneer vegetation is often possible. The technique was developed by ecologists (Bourdo 1956) but has been utilized in several archaeological studies in Missouri (Grantham 1977; Haas 1978; Kay 1980; Klippel 1971b; McMillan 1976; Warren 1976). However, one must be cautious when utilizing GLO data for prehistoric vegetative reconstructions. In the context of



MAP 3
Presettlement Environmental Setting
Prairie
Forest
6 mi
10 km
(adapted from Schroeder 1981)
Study Area
Jefferson City
MISSOURI
RIVER
GASCONADE
RIVER
OSAGE
RIVER
N

archaeologically related reconstructions, it has been noted (Billings 1981:169) that discrepancies may occur if reconstructions from GLO based data are compared to reconstructions based on soils maps. This may be attributable to climatic change through time or observer bias on the part of early surveyors. As Wood has pointed out, it must be remembered that "many of the General Land Office Sur[illegible], especially those in the Midwest, were made at a climatically [illegible]e" (1976:206).

The Neo-Boreal, ca. 400 B.P. - [illegible]., represented a cooler, moister climatic episode in the [illegible]endland 1978:281), with the consequence of forest encroachm[illegible] prairie communities (cf. Wood 1976:207). Therefore, one must use GLO based reconstructions with some caution, since such reconstructions may be more appropriate for the Late Woodland rather than earlier periods such as Late Archaic or Early Woodland. This may be especially important in archaeological study areas containing forest-edge environments. However, "knowledge of the climatic conditions under which surveys were made should make there constructions even more productive" (Wood 1976:207).

An account of pioneer or presettlement vegetation in the project area is provided by Federal Land Office Survey notes of Nathan Boone (1816-1817:141-248), and a brief overview will be presented here. For an in-depth treatment of presettlement vegetation communities in east-central Missouri, consult Klippel (1971b). During 1816-1817, Nathan Boone surveyed the eastern portion of Callaway County; and, in the fall of 1816, he conducted a survey of the tract of land encompassing the project area between Logan and Auxvasse Creeks. Four vegetation communities or environmental zones tentatively were defined according to descriptions in Boone's survey notes: Bottomland Forest, Bottomland/Swamp (presumably slough areas), Dissected Upland Forest, and Level Upland Prairie. In each zone, individual species as noted by Boone were totaled, using witness trees along section lines and a general timber description at the end of each section as the data base (Table 1).

Within the Bottomland Forest zone, hackberry and elm (American?) were the dominant tree species comprising one-half of the 57 trees recorded. Other species in significant numbers included walnut, cottonwood, and sycamore. Spicebush and pawpaw were the dominant undergrowth species along with occasional grapevines.

Bottomland/Swamp trees are underrepresented in Boone's sample with only eight trees noted. Hackberry and elm are represented twice with one each for swamp ash, coffeenut (Kentucky coffeetree?), maple, and an unspecified oak. Blackberries and spicebush constituted the undergrowth.

The Dissected Upland Forest was an oak-hickory association. The white oaks (38.8%) and black oaks (28.5%) dominated the ridge tops and slopes. In combination with red and bur oaks, the genus Quercus made up over three-quarters of the tree count (165) in this zone. Hickory was the next most numerous specie followed by cedar, sugartree (sugar maple?), and American elm. Spicebush, hazel, and oak was the predominant undergrowth with minimal amounts of pawpaw.

Boone made no reference to trees in the Level Upland zone but only mentioned "perrary" (prairie) as the vegetation community. Because of the lack of witness trees in this prairie area, Boone erected rock mounds for section markers. Most of these mounds erected by Boone have been destroyed subsequently via road construction along section lines. However, one possible quarter section rock mound was located on a quarter section line in the center of the W 1/2, Sec 25, T46N, R8W.

Within the project area, approximately 36% of the land is forested, 28% is in cultivation, and 36% is pasture or is early successional. The level upland (Coates Plateau) is primarily used for cropland and grazing.

Table 1

Presettlement Vegetation Counts as Recorded
by Nathan Boone (Fall 1816)

Bottomland Forest

Trees	No.	%
†*Hackberry	16	28.1
*Elm	13	22.8
†*Walnut	9	15.8
†*Cottonwood	7	12.3
Sycamore	5	8.8
*Boxelder[1]	3	5.3
†*Bur Oak	2	3.5
†*Hickory	1	1.7
*Ash	1	1.7
Total	57	100.0

Undergrowth	No.	%
Spicebush	9	47.4
*Pawpaw	9	42.1
†*Grapevine	2	10.5
Total	19	100.0

Bottomland Swamp

Trees	No.	%
†*Hackberry	2	25.0
*Elm	2	25.0
*Coffeenut[2]	1	12.5
*Maple	1	12.5
†*Oak	1	12.5
Swamp Ash	1	12.5
Total	8	100.0

Undergrowth	No.	%
Spicebush	1	50.0
*Blackberry	1	50.0
Total	2	100.0

Dissected Upland Forest

Trees	No.	%
†*White Oak	64	38.8
†*Black Oak	47	28.5
*Red Oak	15	9.1
†*Hickory	12	7.3
Cedar	9	5.5
*Sugartree[3]	6	3.6
*American Elm	3	1.8
*Boxelder[1]	2	1.2
†*Black Walnut	2	1.2
†*White Walnut[4]	1	0.6
†*Mulberry	1	0.6
†*Bur Oak	1	0.6
*Ash	1	0.6
*Linden[5]	1	0.6
Total	165	100.0

Undergrowth	No.	%
Spicebush	13	39.4
†*Oak	9	27.3
†*Hazel	8	24.2
*Pawpaw	3	9.1
Total	33	100.0

[1] Ashland Maple

[2] Kentucky Coffeetree

[3] Sugar Maple

[4] Butternut

[5] Basswood

*Potentially exploitable food bearing plants (after Zawacki and Haustater 1969). For seasonality, see Steyermark (1963).

†These plants may leave identifiable remains in an archaeological context (Moore and Burge 1981:170-180).

Fauna

The study area provides sufficient water, food, and ground cover for wildlife in the vicinity. The predominant game species are white-tailed deer, wild turkey, bobwhite quail, cottontail rabbit, fox and gray squirrel, and mourning dove. Furbearing and nongame animals species include opossum, long-tailed weasel, raccoon, fox, coyote, striped skunk, field rodents, pond and predatory birds, amphibians, and reptiles. Waterfowl are found along the Missouri River. An extensive list of bird species observed in the project area is presented by Union Electric Company (1979a:Table 2.2-34). Rare or endangered species of the immediate project area include the bald eagle, ruffed grouse, osprey, and long-tailed weasel.

A complete listing of fish species found in the Missouri River and Logan Creek is given by Union Electric Company (1979a:Table 2.2-18). Some of the more common present-day species include large- and small-mouth bass, crappie, shad, sunfish, bluegill, catfish, carp, and shiners. Two species of mussels were found in the Missouri River, and a third mussle species was collected from Logan Creek.

Climate

The contemporary climate of the study area is continental and is characterized by warm, humid summers with considerable convective rainfall and highly variable winter weather with moderate amounts of rain and snow (Union Electric Company 1979a:2.3-1). The climatic pattern is dominated by warm and moist maritime tropical air from the Gulf of Mexico during late spring and summer and by cold, dry continental polar air during the winter months.

Mean seasonal temperature and precipitation data recorded in nearby Fulton, Missouri, are presented in Table 2.

Most of the precipitation in the research area falls during the spring and summer months; however, the character of the rains in the two

Table 2

Mean Seasonal Temperatures (1888-1960)

Months	Mean Temperature
Jan. - March	35.2°F
April - June	64.1°F
July - Sept.	74.5°F
Oct. - Dec.	44.8°F
Annual Mean Temperature	54.7°F

(Adapted from Union Electric Company 1979a:Table 2.3-4)

Mean Seasonal Precipitation (1941-1970)

Months	Mean Precipitation
Jan. - March	5.88 in
April - June	12.83 in
July - Sept.	11.35 in
Oct. - Dec.	7.38 in
Annual Mean Precipitation	34.44 in

(Adapted from Union Electric Company 1979a:Table 2.3-8)

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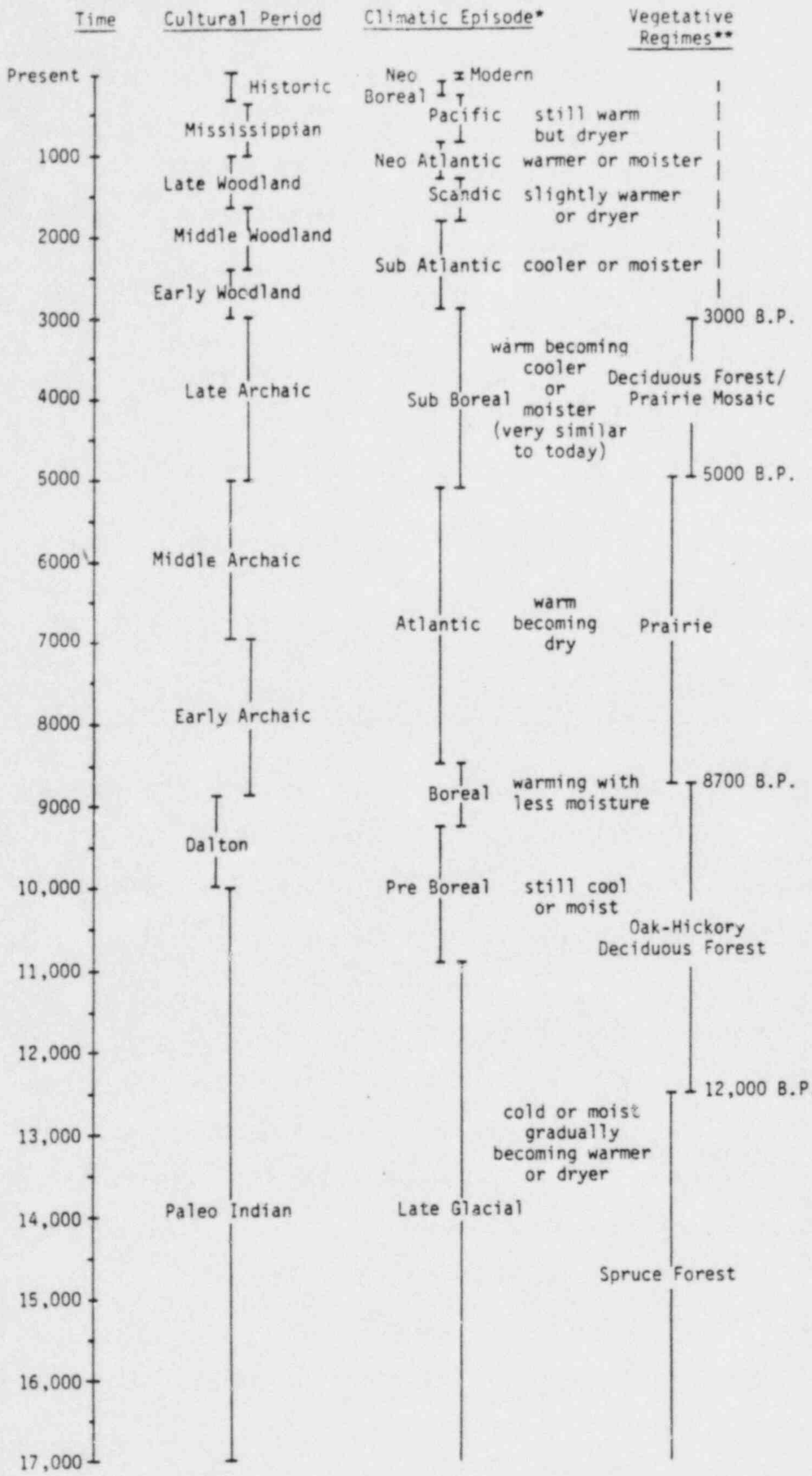
periods is usually quite different. Spring rains are generally light but of long duration, whereas summer precipitation often comes in the form of heavy thunderstorms of relatively short duration. The average growing season in east-central Missouri is from early April to late October.

Paleo-climatic studies in recent years (Bryson et al. 1970; Wendland 1978) have indicated variability and sometimes dramatic changes in the climatic pattern during the past 12,000 years in mid-continental North America. These climatic shifts have been supported by archaeological data in Missouri from Rodgers Shelter and the Pomme de Terre River area (Wood and McMillan 1976) and at Graham Cave (Klippel 1971b) 15 mi northeast of the project area. Figure 2 is a schematic chart of paleo-climatic periods and vegetative regimes in relation to archaeological cultural periods.

In brief, the data suggest a gradual warming period after the close

Figure 2. Cultural and Environmental Sequences of Missouri



*After Wendland, 1978
**After King (1981), King and Allen (1977), King and Lindsay (1976)

of the last Wisconsinan glaciation approximately 12,000 B.P. to about 9000 B.P. This climatic warming resulted in a succession of vegetative regimes. Late glacial spruce forests had disappeared from the Ozarks ca. 12,000 B.P. (King 1973), being replaced by oak-hickory deciduous forests which persisted until ca. 9000-8700 B.P. (King and Allen 1977:321).

Between nine and five thousand years ago, a warm, dry period called the Hypsithermal prevailed, during which prairie vegetation expanded across Missouri and Illinois creating the Prairie Peninsula (Wright 1976). Evidence from Old Field, southeastern Missouri (King and Allen 1977), indicates drought conditions were reached by 8700 B.P., resulting in prairie species encroaching on the mesic deciduous forest and marking the beginning of the Hypsithermal (King 1981:59). This period of reduced effective precipitation persisted until ca. 5000 B.P. in Missouri, when increased moisture spurred the renewed development of deciduous forest coverage (King and Allen 1977:320-321). However, the return of moister conditions did not spur the disappearance of the prairie; it only reduced its margins, with interior grasslands remaining essentially unchanged. In forest/prairie border regions, the effect of the late Holocene increases in precipitation resulted only in the rearrangement of the forest/prairie mosaic rather than a succession from forest to prairie vegetative regimes.

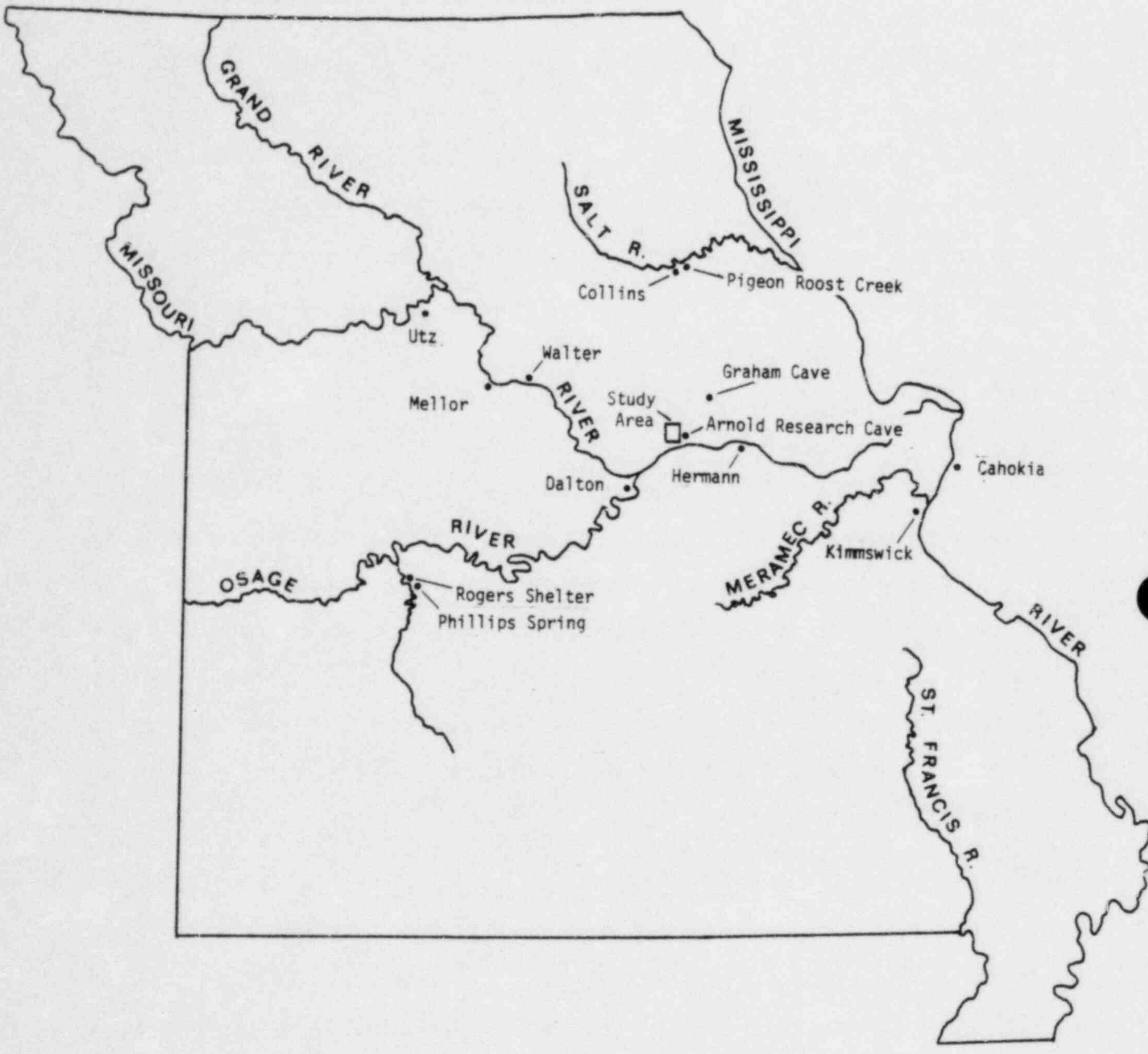
ARCHAEOLOGICAL CONTEXT

Prehistoric

The following is a brief synopsis of prehistoric cultural periods of the Missouri-2 Watershed Management Unit as disclosed by archaeological investigations in Missouri. Settlement-subsistence adaptations and site locational patterns attributable to certain periods are also presented. The data discussed encompass large scale syntheses concerning the state as a whole, surveys of major drainage areas, published and unpublished site reports, and information extracted from site files of the Archaeological Survey of Missouri. The cultural sequence relies heavily on work conducted at nearby Graham Cave (Klippel 1971a; Logan 1952) and at Arnold Research Cave (Shippee 1966), and the chronological framework used in the temporal constructions is based largely on Chapman (1975); however, all dates in this report are given in years before present (B.P.). Certain archaeological sites central to understanding the prehistory of the project area and Missouri in general are presented in Map 4.

Paleo-Indian (14,000-10,000 B.P.)

Current evidence indicates that man arrived in the New World some 15,000 years ago. Most archaeologists believe that bands of Asiatic hunters traversed what is now the Bering Sea on a land bridge which connected the two continents during the final stages of the last Ice Age. These first Americans were hunters of big-game animals and probably wandered here while following herds of the now extinct mammoth. Artifacts found in direct association with these and other extinct species have established the antiquity of man in the New World. These



MAP 4

Selected Prehistoric Sites
in Missouri

early hunters are referred to as Paleo-Indians, and their sites mark the beginning of a long cultural development which continued until the arrival of the Europeans.

The Paleo-Indian period is best known from the western United States where numerous archaeological sites have produced cultural material in association with late Pleistocene fauna. These are the well known Clovis and Folsom complexes which are associated with extinct mammoth and bison. Major Paleo-Indian sites are also distributed throughout parts of eastern North America. However, the incidence of Paleo-Indian artifacts in association with extinct big-game animals is rare in the East. This raises the possibility of differing cultural adaptations in the East, possibly due to differing environmental and climatic conditions. Paleontologists and archaeologists working near Kimmswick, Missouri, recently documented Clovis fluted projectile points in direct association with the bones of the American mastodon (Mammut Americanum) (Graham 1979, 1980). This exciting new discovery represents the most easterly location of Paleo-Indian tools in association with extinct fauna and the first concrete evidence of man hunting the forest-dwelling mastodon.

Paleo-Indian peoples probably lived in small bands or family units, pursuing a nomadic existence related to big-game hunting. This high degree of mobility, combined with low population levels, produced highly dispersed camp sites with low densities of cultural debris. In central Missouri, as elsewhere in the Midwest, sites of this period are characterized by scattered surface finds of fluted and unfluted lanceolate projectile points. According to Shippee (1966:8), three Clovis points were found on a hill top site near Arnold Research Cave.

Paleo-Indian sites are frequently located on high bluffs or high ridge tops along major stream valleys such as the Missouri and Mississippi rivers. In a distributional survey of fluted points

(Chapman 1967a, 1967b, 1973), the majority of reported finds came from counties bordering the lower Missouri River. From Howard and Cooper counties in the west to St. Charles and St. Louis counties in the east, 15 times as many finds were reported for this area than from the rest of Missouri's counties (Chapman 1975:75). Although there are problems with this type of survey (i.e., nonprobabilistic sampling, bias towards upland site locations, buried bottomland sites, etc.), enough information was gathered to suggest this site location pattern.

Dalton (10,000-9000 B.P.)

With the glacial recession some 10,000 years ago and the disappearance of the big-game animals previously exploited, man shifted his economic pursuits in response to changing environments. These cultural adaptations are manifested in the Dalton period, when there was a change in subsistence techniques from primarily hunting large mammals to foraging (Chapman 1975:45). Subsistence activities expanded to include trapping of small-game animals and collecting of nuts, berries, seeds, fruits, and shellfish. This pattern probably continued into the subsequent Early Archaic period; however, the transition for the most part took place in approximately 1,000 years.

The Dalton complex is generally considered a transitional Late Paleo - Early Archaic cultural manifestation which is evident in Dalton assemblages. Lanceolate projectile point forms and specialized tool kits reflect Paleo-Indian origins; however, subsistence activities are clearly Early Archaic in emphasis.

Along the Ozark border in northeast Arkansas, Dalton occupations were situated in territories that crosscut major physiographic and resource zones irrespective of drainage boundaries (Price and Krakker 1975:35; Schiffer 1974:220-244). The Dalton complex is represented at several locations in Missouri, including the lowest levels of Graham Cave (Klippel 1971a), Arnold Research Cave (23 CY 64) (Shippee 1966), Rodgers Rock Shelter (Wood and McMillan 1976), the Walter site (Biggs et al. 1970; Chapman 1975:79), the Dalton site (Chapman 1975), the Pigeon Roost Creek site in Monroe County (Teter and Warren 1979), the Bergfried No. 4 site at the confluence of the Gasconade and Missouri rivers (Diaz-Granados 1980), several open sites in the Columbia area (Schmits and Wright 1981), and along the Loutre and Little Femme Osage rivers in Montgomery and St. Charles counties (Haas 1978).

Early Archaic (9000-7000 B.P.)

The diversification of subsistence activities begun during the Dalton era continued into the Early Archaic period when people began to exploit an even greater variety of ecological niches, using base camps as points to return to from hunting-gathering excursions. Having analyzed vertebrate fauna from the lower deposits of Arnold Research Cave, Falk (1970:28) suggests an unspecialized mixed game adaptation as characteristic of the early subsistence base. Social units were small but probably organized occasionally into extended families.

Early Archaic peoples also began to alter their stone tool manufacturing techniques. Although the lanceolate shape was generally retained, fluting was no longer practiced as new hafting attributes appeared, such as side and corner notching.

Sites containing Early Archaic components in the Lower Missouri Valley II locality include Graham Cave (Klippel 1971a; Logan 1952), Arnold Research Cave (Shippee 1966), the Dalton site at the mouth of the Osage River (Chapman 1975), 23 GA 142 (the Hermann site) (Schmits 1982) and 23 GA 130 (Diaz-Granados 1980) in Gasconade County, the Pigeon Roost Creek site in the Salt River Valley (Teter and Warren 1979), the Dalton period in the Cannon Reservoir (Teter and Warren 1979), and seven sites along the Loutre and Little Femme Osage rivers (Haas 1978).

Middle Archaic (7000-5000 B.P.)

Between 8000-5000 B.P., climatic changes in the form of reduced rainfall and warmer temperatures started a trend toward drier environments and the expansion of grasslands (Klippel 1971b). Middle Archaic peoples responded to these changing conditions by intensifying their hunting and trapping of small animals and the collection of vegetal foods, especially nuts, berries, and seeds. By the end of the period, there may have been a complete economic adaptation from a mesic to a moderately dry environment with a greater utilization of the expansive prairies that had formed over much of western and northern Missouri (Chapman 1975:158).

Stone tool assemblages and lithic technologies changed from the earlier periods with the introduction of the full-grooved groundstone ax, smaller triangular blade side-notched and stemmed projectile points which frequently show evidence of thermal alteration, and milling stones. Middle Archaic occupations are represented at Graham Cave (Klippel 1971a), Arnold Research Cave (Shippee 1966), the Loutre River and Little Femme Osage River areas (Haas 1978), the Hermann site (Schmits 1982) and 23 GA 131 (Diaz-Granados 1980) on the northern border of Gasconade County, the Cannon Reservoir area (Hunt 1976; Teter and Warren 1979), and in Long Branch Reservoir (Grantham 1977).

Late Archaic (5000-3000 B.P.)

Around 5000 B.P., the climate began to change toward more moist conditions, a trend which has continued to the present (Klippel 1971b). The effect of this trend appears to be a reduction of grasslands and an expansion of forest environments in east-central Missouri. Late Archaic peoples responded to these environmental shifts by expanding into newly created environmental zones, utilizing a wide range of wild plant and animal products. Tool assemblages, although varying from site to site, again reflect this shift and include an apparent increase in manos, grinding slabs, mortars, pestles, and digging implements suggesting an increased use of wild plant foods. Cultigens have been reported from the Phillips Spring site and dated to 4280 B.P. (Chomko 1978:251), suggesting that Late Archaic populations were experimenting with squash (*Cucurbita pepo*) and wild sunflower (*Compositae* spp.). Squash remains have also been found at two Late Archaic sites in Kentucky (Chomko and Crawford 1978:405-407), providing additional evidence for incipient horticulture during the Late Archaic period.

Site densities increase and sites are found in a variety of locations. Ridge and hill top locations are common and often contain hammerstones, drills, gouges, and woodworking tools. Occupations of this period are represented throughout east-central Missouri as reported by Chapman (1975), Haas (1978), Klippel (1971a), Teter and Warren (1979), and Grantham (1977). Radiocarbon dates from buried cultural deposits in the Hinkson-Perche Creek valley in Boone County revealed two Late Archaic components 80 cm (Wright 1981:137) and 130 cm (Powell 1982:51) below the surface.

The best known complex of this period is the Sedalia phase which is represented at the Geiger and Booth sites (Chapman 1975:203) in northeastern Missouri. The Booth site produced Clear Fork gouges, Sadalia diggers, Etley and Stone Square Stemmed knives, and was probably used primarily as a base of operations for collecting and processing vegetal materials (Klippel 1969 cited in Chapman 1975:211). If we consider the Sedalia and Etley complexes, it would appear that there is considerable cultural diversity during Late Archaic times, possibly more than is evident at the present time.

Early Woodland (3000-2500 B.P.)

Early Woodland cultural processes and adaptations are not clearly defined in east-central Missouri at this time. Here, as in other parts of the Midwest, Midsouth, and East, the first appearance of pottery generally marks the beginning of the Early Woodland period. Often this pottery accompanies a Late Archaic tool assemblage. Sites from this time period often exhibit Middle Woodland traits as well. Thus, evidence for the period is blurred by traits of these earlier and later cultural manifestations. The presence of pottery and the possibility of incipient horticulture suggest a more sedentary lifestyle.

The blending of Late Archaic and Early Woodland cultural traits is clearly indicated in the Salt River locality of northeastern Missouri (Angus and Ruppert 1977; Klippel 1972; Ruppert 1976; Teter and Warren 1979). The Collins site reported by Klippel (1972) was the first site to shed light on the nature of Early Woodland period manifestations in the Northeast Prairie Region. Although no early pottery was found, a radiocarbon date of 2500 B.P. was obtained from two refuse pits (Klippel 1972:51). Logan (1952:60) reported finding a possible Early Woodland fiber-tempered sherd at Graham Cave, and 23 MN 243 in the Salt River locality contained a possible Black Sand Incised rimsherd (Chapman 1980:15). Haas (1978:169) reported three possible Early Woodland sites in the Loutre River and Little Femme Osage River areas based on contracting stemmed projectile points. It should be noted that neither the temporal nor cultural dimensions of the period are well established in Missouri.

Middle Woodland (2500-1500 B.P.)

Pottery became more elaborate, stone tool assemblages showed greater diversity, and lithic technology became more sophisticated with the emergence of the Middle Woodland period about 2500 B.P. Local and regional groups appeared to be linked by a rich religious and economic exchange system which Struever (1964:89) has called the Hopewellian Interaction Sphere. Conical burial mounds, a trait that made its first appearance in Late Archaic times (Klepinger and Henning 1976:133), were now commonly constructed for the interment of important leaders, and these burials often contained elaborate grave goods. This practice and the related socioeconomic developments stimulated an extensive trade in copper from the Lake Superior area; obsidian from the Rocky Mountains; shark teeth, conch shells, and pearls from the Gulf coast; mica from the Carolinas; and high quality chert from various parts of the Midwest.

Maize is known from the period, but there is little evidence to support extensive cultivation of this domesticate which was to prove so important in later times. Subsistence was still predominantly dependent upon intensive wild plant food harvesting and hunting.

In Missouri, the period is best known from Hopewell sites near the junction of the Grand and Missouri rivers (Big Bend area), Lamine River locality, and the Kansas City area (Johnson 1979; Kay 1975, 1979, 1980). Kay (1980:46) suggests a nodal settlement pattern with a village center and less complex satellite communities surrounding the center (Mellor) for the Lamine locality as opposed to a closely knit network of less complex settlements for the Big Bend area.

Middle Woodland sites, several lacking Hopewellian material, are reported from the Northeast Prairie Region. These include 23 MA 3 on the west bank of the Mississippi River (Chapman 1980:47), the Creve Coeur site in the Greater St. Louis locality (Chapman 1980:47), eleven sites along the Loutre and Little Femme Osage rivers (Haas 1978:166), and 23 CY 30 and 23 CY 20 in Callaway County. Site 23 CY 30, a small camp on Cedar Creek approximately 35 km west of the study area, produced Havanna type dentate-stamped pottery sherds along with Snyder points and may represent a Hopewell intrusion into the area (Chapman 1980:52). A somewhat less definite Middle Woodland component was reported by Evans and Ives (1973:9) for 23 CY 20 within the study area on the basis of grit tempered pottery and heat treated chert.

Late Woodland (1500-1000 B.P.)

Sometime around 1600-1500 B.P., the socioeconomic and ceremonial ties which had linked Middle Woodland populations began to wane. For reasons not fully understood at this time, Late Woodland peoples developed locally oriented societies, dispersed settlement patterns, and began to intensively exploit a wider variety of environments. Fishing, hunting, and gathering of wild plant foods provided a broad economic base.

Ceramic decorations and burial practices became less elaborate, with the emphasis now on utilitarian pottery forms and small earthen or rock mounds with sparse burial goods. The introduction of the bow and arrow, combined with changing subsistence patterns, produced a marked change in the chipped stone tool assemblage, most notably small side- and corner-notched arrow points.

In east-central and northeast Missouri, this period is represented by the Boone phase and Ralls phase, respectively (Chapman 1948, 1980; Denny 1964). Stone filled, stone chambered, and earthen burial mounds occupying prominent bluff tops along major rivers and creeks are characteristic of these complexes. Villages and base camp sites are often located on terraces and ridges near burial mounds. To the south, various Late Woodland phases of the Ozark Highlands have replaced the old taxonomic unit "Highland Aspect" (Chapman 1948:100-110, 1980:100). In the Meramec Valley, the Kimberlin component (Geier 1973, 1975) of the Meramec phase shows extensive overlap along the Northern Ozark border region with the Boone phase (Denny 1964) to the north and the Lindley phase and Fristoe burial complex (Wood 1961, 1967) to the southwest in the Pomme de Terre Reservoir area. While there are marked regional distinctions, there also appears to be an area of cultural and ecological overlap shared by all three. These phases exist in similar environments sharing similarities in technology, seasonal subsistence cycles, and slightly different variations of mortuary interment centering on the construction of mounds and cairns. According to Geier

(1975:25), these phases "apparently reflect regional interpretations of similar culture patterns, coupled with variation, in the source, duration and effects of contact with external societies."

An early stage of Late Woodland Boone phase development is probably a direct outgrowth of an unrecognized Hopewellian base (Denny 1964:158-159). This would indicate that mound groups were consistently oriented towards high upland bluff and hill tops along major river systems and secondary tributary streams during the Woodland period. Surveys of the lower Osage and central Gasconade rivers would tend to support this contention. Rock cairns containing limestone slab chambers with burials are frequently found on the highest point of escarpment locations at the confluence of a smaller tributary stream with the Gasconade River (McMillan 1963:15). In the lower Osage River valley, all rock cairns or tumuli located were found to be situated on elevated areas directly over large escarpments and ridge spurs at the confluence of two or more streams and on narrow divides between two streams (Klippel 1965:32).

Open habitation sites during the Late Woodland period are usually situated in floodplain environments on knolls, terraces, and terrace remnants at the junction of smaller streams and major rivers (Klippel 1965:32) or at the base of hills and bluff tops paralleling river floodplains (McMillan 1963:15) and at the mouth of a hollow or spring.

Late Woodland peoples also inhabited nearby Arnold Research Cave which contained a rich inventory of perishable materials such as wooden and woven artifacts (Henning 1966; Shippee 1966) in the upper levels of the dry cave deposits. One wooden dart foreshaft with a Rice side-notched projectile point hafted in place attested to the affiliation with the Late Woodland period. Other wooden artifacts, cordage, matting, fabrics woven from bast and other vegetal fibers, as well as bark and woven sandals and leather moccasins have given tremendous insight into a portion of Woodland material culture usually lost in humid climates of the Midwest.

Additional Late Woodland sites in east-central Missouri, not previously mentioned, have been reported from the Cannon Reservoir (Hunt 1977; O'Brien and Warren 1979), Long Branch Reservoir (Grantham 1977), along the Loutre and Little Femme Osage rivers (Haas 1978), lower portion of the Moreau and Missouri rivers (Sturdevant 1977, 1978, 1980), Boone County (Schmits and Wright 1981), Graham Cave (Klippel 1971a), and within the general vicinity of the Callaway Plant site (Evans and Ives 1973). Based on previous work in central Missouri, Evans and Ives (1973:2, 5) state that the Mealy Mounds group (23 CY 202) located just north of Mokane, Missouri, and 23 CY 74 within the study area probably represent Late Woodland mounds.

Several investigators in the central portion of the state, north (Angus 1976; Henning 1979; Teter and Warren 1979) and south (Klippel 1965; McMillan 1963; Vehik 1978) of the Missouri River, have noted that Late Woodland phases probably persisted well beyond 1000 B.P. Although Mississippian type artifacts occur occasionally throughout the region, Late Woodland components are interpreted as persistent manifestations, contemporary with but only slightly affected by peripheral contacts with the Mississippian cultural center in the Mississippi River valley.

Mississippian/Oneota (1000-500 B.P.)

Urban centers, central plazas, platform mounds, fortified villages, and exotic and sophisticated art forms are archaeological traits which have become synonomous with the Mississippian period. Beginning about 1000 B.P. and continuing until about 500 B.P., Mississippian culture flourished throughout the midwestern and southeastern United States. As in the preceding Middle Woodland period, regional expressions of Mississippian culture were linked by an elaborate socioreligious system known as the Southeastern Ceremonial Complex or the Southern Cult. We see much of the same kind of ceremonial elaboration as in the earlier Hopewellian complexes, but now the economic basis for food surplus and settled village life is clearly evident. Domesticated seeds of maize, beans, and squash are found in most Mississippian archaeological sites. When we combine this kind of stable economic base with archaeological evidence in the form of fortified villages, organized urban plans with rows of houses and open plazas, high status burials with rich grave offerings, and evidence of long distance trade in exotic goods, inferences regarding social stratification, chiefdom-type political organization, and organized warfare during Mississippian times is on firm theoretical ground.

Of course, the best known sites of this period are the spectacular remains of the Cahokia Mound Group in East St. Louis, Illinois, and the associated satellite villages in the surrounding American Bottom. A similar mound group was destroyed in St. Louis, Missouri, during the eighteenth and nineteenth centuries. Mississippian developments in western Missouri are represented by the Steed-Kisker complex in the Kansas City area (O'Brien 1978; Wedel 1943).

Important to the present study is the absence of major Mississippian villages or hamlets in central Missouri. Mississippian artifacts are known from rock shelters and a few open sites in central Missouri and the Ozark Highlands, but they usually consist of small amounts of shell tempered pottery and small side-notched triangular projectile points. Such materials have been reported for Boulder Cave (Chapman 1948), Merrell Cave (McMillan 1963:25-31), and Wet Hollow Cave to name a few in the Meramec and Gasconade River valleys. At Doyle Cave, 23 PU 40, a Mississippian burial associated with a shell tempered vessel was excavated (McMillan 1963:77). A few shell tempered pottery sherds have been found on sites along the lower Osage River (Klippel 1965:147) and in the upper levels of Graham Cave (Chapman 1952:89) and

Arnold Research Cave (Shippee 1966:36), but they were not well represented. Shell tempered pottery and small side-notched triangular point forms have also been found on sites in the Pomme de Terre, Truman, and Stockton reservoir areas. The "Nemo Complex" (Wood 1961:108) was defined as predating Stead-Kisker in the Pomme de Terre basin on the basis of cord marked and smooth shell tempered pottery from Fairfield Mound 1, Blackwell Cave, and the Mount India and Lytle cairns. Such sparse remains, however, suggest minor contact and influence of Mississippian societies situated in the St. Louis and Kansas City areas on local Late Woodland populations (Schneider 1974:28; Vehik 1978:40-42).

Somewhat contemporaneous with Mississippian cultural developments in Missouri and Illinois are the well-known Oneota cultural manifestations centered in Iowa and southern Wisconsin. The complex has fairly well-defined limits on the eastern plains border and over much of the Prairie Peninsula. Subsistence was based on hunting, fishing, and gathering and was supplemented by gardening (Henning 1969:3). The artifact assemblage includes shell tempered ceramic vessels with punctations and parallel incised lines placed on the upper body. Other tools include small triangular projectile points, bifacial blades, grooved mauls, abraders, bison scapula hoes, and socketed antler projectile points. Gibbon (1972:181) suggests that the Oneota lifeway emerged from a Woodland base about 1000 B.P. in Wisconsin, participated in the Mississippian pattern for some time and persisted into the seventeenth and eighteenth centuries, being reflected in historic Winnebago culture (Gibbon 1972:182). Henning (1969:4) also notes the close relationship of the Oneota archaeological complex with a number of historic tribal groups including the Ioway, Missouri, and perhaps the Oto, Kansas, and Osage.

Oneota sites of the Missouri River valley show far ranging external contacts primarily with Orr phase sites along the upper Iowa River valley and Correctionville-Blue Earth phase sites along the Little Sioux River in western Iowa (Henning 1970:165). From the Utz site in west-central Missouri, items indicative of an extensive prehistoric trade system include catlinite from quarries in southwest Minnesota, marine shells from the Gulf Coast, turquoise from the American southwest, and native copper from the Lake Michigan area. In addition, engraved artifacts containing various zoomorphic and anthropomorphic motifs of the southeastern ceremonial complex from Utz (Bray 1963:39-40) suggest diffusion and trade relationships with contemporary Mississippian populations near Cahokia.

Unfortunately, little comparable data are offered for Mississippian or Oneota site settlement patterns within the lower Missouri River drainage basin. Mississippian sites appear to be concentrated in the St. Louis and Kansas City areas and are apparently lacking in the valley between the two cities (Henning 1969:97). Most well-known and excavated Oneota sites are located within the Big Bend region (Bray 1963; Henning 1970:14).

Protohistoric and Historic (500-100 B.P.)

In the Missouri River valley near the mouths of the Grand and Chariton rivers, late prehistoric and protohistoric sites known as "Oneota" are common. Some of these such as Utz, McRoberts, Plattner, and Gumbo Point are historic contact sites while Old Fort, Dowell Site No. 1, Dowell No. 2, Guthrey, and other smaller Oneota sites lack European trade goods indicative of contact. Precontact Oneota sites in this area date prior to A.D. 1683 (Bray 1978:23). A series of radiocarbon dates from Utz (Henning 1969:300-301) established it as a long-term site with repeated occupations from A.D. 1400-1723 that probably represented a culture continuum through time.

Plattner has been identified as the village site occupied by the

Little Osage between A.D. 1727-1777 (Chapman 1959:6) while Gumbo Point appears to represent the Missouri village visited by Bourgmond between A.D. 1714-1724 (Bray 1978:72). Utz may represent a Missouri Indian village prior to A.D. 1750 (Berry and Chapman 1942).

Numerous eastern and midwestern Indian groups passed through the lower Missouri region with the westward expansion of the nation. Two Indian tribes were native to Missouri: the Osage and the Missouri. The Kaskaskia, an Illinois tribe, lived occasionally on the west side of the Mississippi River. Prior to 1825, the Kickapoo, Delaware, and Shawnee were moved to reservations in the southern part of the state, retaining them until 1832. The Sauk and Fox, primarily residents of what is now Iowa, also hunted and raided in Missouri (Chapman and Chapman 1964:15). There is reference that a band of Miami resided in what is now Saline County along the Missouri River near the town of Miami (Chapman 1946:15), but little information is available regarding this occupation. There is no information on historic Indian groups residing in the Callaway research area.

A chart outlining the chronological sequence for the Callaway Nuclear Power Plant project area is presented in Table 3. Sites assignable to a particular cultural period(s) are included.

Archaeological Survey of Missouri Site Records Check

Site records of the Archaeological Survey of Missouri at Columbia, as well as the Missouri Office of Historic Preservation, Jefferson City, Missouri, were reviewed to provide additional information concerning site location and distribution within a 10 mi radius of the Callaway Nuclear Power Plant site. Site information was noted as to temporal/cultural affiliation, site type, and relevant environmental variables. A total of 114 sites was recorded. Twenty-nine were assessed a time period with 17 described as "Woodland" or "Archaic" with no subsequent information to further clarify their temporal position.

Table 3

Chronological Sequence for Project Area

Time (B.P.)	Period	Project Sites	
100	Protohistoric/Historic		
500	Mississippian/Oneota	23 CY 304	23 CY 322
1000	Late Woodland	23 CY 304 23 CY 356 23 CY 350 23 CY 353	23 CY 322 23 CY 352 23 CY 359 23 CY 74 23 CY 20
1500	Middle Woodland	23 CY 20	23 CY 359
2500	Early Woodland	23 CY 328	
3000	Late Archaic	23 CY 328 23 CY 257(?) 23 CY 20 23 CY 353 23 CY 359	23 CY 309 23 CY 356
5000	Middle Archaic	23 CY 256 23 CY 345	23 CY 356 23 CY 353
7000	Early Archaic	23 CY 359	23 CY 303
9000	Dalton	23 CY 346	
10,000	Paleo-Indian	23 CY 267	
14,000			

The remainder included two Paleo-Indian, one Early Archaic (Dalton), one Late Archaic, four Late Woodland, two Mississippian, and two historic sites. Middle Archaic, Early Woodland, and Middle Woodland are conspicuously absent. Site type is equally difficult to assess. Forty-seven were recorded as habitation sites (listed either as village or camp sites with no clear distinction as to differentiating criteria), 40 as mound groups (usually listed as rock cairns with or without burials), 9 as habitation sites with associated mound groups, 1 as a specialized activity site, and 17 of unknown site type affiliation.

No clear and consistent association between site type and environmental variables was established, primarily due to inconsistencies and incompleteness of the site records. The quality of information on site forms is variable. Land form, elevation, site size, distance to nearest water source, and cultural/temporal affiliation are either lacking or too vague for the most part. Most sites appear to have been reported by local collectors who provided little information other than the presence of a site. The majority of the mound groups was tentatively reported as Late Woodland rock cairns containing stone chambers with or without burials. Presumably, these are representative of the Boone phase (Denny 1964) which is noted to occur throughout Boone and surrounding counties. What information does exist for environment variables of these mound groups seems to suggest that they are frequently located on sloping ridge spurs or bluff tops along the Missouri River and tributary streams, particularly Auxvasse Creek.

Two sites within a 5 mi radius of the Callaway Nuclear Power Plant site are listed on the National Register of Historic Places. Arnold Research Cave (23 CY 64) located 3 mi to the southeast was designated a National Historic Landmark in 1964 and was entered on the National Register in 1966; however, the cultural deposits at the cave were badly damaged during the summer of 1966 due to bulldozing operations by the landowner. The Mealy Mounds Group (23 CY 202) located 5 mi to the southwest was nominated to the National Register in 1970. The site consists of 14 probable Late Woodland mounds situated along a ridge system near Mokane, Missouri. Graham Cave located 15 mi northeast of the project area in Montgomery County is also listed on the National Register of Historic Places.

Only two sites located within the study area on Union Electric Company property have been previously recorded in the site files of the Archaeological Survey of Missouri - both in Sec 35, T46N, R8W. A large circular earthen mound designated 23 CY 74 is situated on a bluff overlooking the Missouri River Valley, and a habitation site, 23 CY 20, is located on a second terrace 300 m north of the confluence of Mud and Logan creeks. The only previous archaeological survey and/or excavation within the project area was conducted by Evans and Ives (1973, 1979) in the vicinity and on 23 CY 20. Site 23 CY 20 was nominated to the National Register in 1972; the nomination is pending. Extensive excavations, however, have been conducted at Graham Cave (Chapman 1952; Klippel 1971a; Logan 1952) and at nearby Arnold Research Cave from 1955-1958 (Shippee 1966) and again during the summer of 1981 by the University of Missouri-Columbia archaeological field school under the direction of Michael J. O'Brien.

Historic

To date, no formal archaeological work has been conducted on historic sites within the immediate project area. Evans and Ives (1973) performed a cultural resources survey within a 5 mi radius of the Callaway Nuclear Power Plant site and did not locate any historic sites. In addition, the survey of the right of way of a proposed power line from the plant site to Florence, Montgomery County, provided the same results (Evans and Ives 1978). Therefore, the present project is the first work being conducted on historic sites within Callaway County.

In recent years, archaeologists have recognized that settlement archaeology has proven to be an effective tool in attempting to understand past human behavior and cultural processes. The application of historic settlement patterns concepts to Missouri archaeology is evident in the work of Ekberg et al. (1981), Miller (1979), O'Brien and Warren (1979), Price and Price (1978a, 1978b), and Waselkov (1979).

In 1980, Illinois State University conducted a cultural geographical and historical study of the Pine Ford Lake Project in southeast Missouri (Ekberg et al. 1981). Schematic models based on economic and environmental factors were formulated in order to explain and interpret changes in cultural/geographical patterns within the study area. At present, the testing of the predictive capabilities of these proposed models based on archaeological evidence has yet to be implemented.

In the lower Pomme de Terre River valley area of the Truman Dam and Reservoir Project, Miller (1979:passim) proposed a vegetational zone model and a form of site catchment analysis in order to explain the relationships between Euro-American settlements and their natural resources. Preliminary results indicated that settlers selected particular types of environmental situations and that these selections appear to be chosen in a patterned manner in regards to the resource potential available.

Like Miller's study, the Cannon Reservoir Human Ecology Project, located in northeast Missouri, examined the adaptation of historic sites to the environment as reflected by their site locations (O'Brien and Warren 1979:passim). Emphasis was placed on determining the factors which conditioned rural settlement between 1818 to 1859 in the Salt River area. The study used a combination of site survey, excavation, and documentary research methods. Unlike Miller's results, preliminary data did not correspond to Hudson's (1969) colonization and competition phases. A more detailed analysis was suggested in order to refine the study's results and interpretations.

The studies of Price and Price (1978a, 1978b) and Waselkov (1979) were concerned with the development of general models of frontier settlement. Although these studies were particularistic in nature, they both stressed the utilization of particularistic data in testing hypotheses of broader scope in order to explain frontier adaptive systems. Investigations were based on archaeological excavation and documentary research.

In 1978, two historic sites were chosen for initial excavation in the Cannon Reservoir project. The two sites are part of a 160 acre tract of land entered in 1828 and represent a 100-year occupation period by the same family. The sites provided an opportunity to "examine the processes of colonization and economic advancements, and the existence of possible patterning in the expression of farmstead layout and use of living space within a single family through time" (Saunders 1979:116).

Preliminary fieldwork at the two house sites revealed that both structures exhibited several architectural similarities and utilization of activity areas. In addition, both revealed similarities in the configuration of outbuildings. At present, data collected from the excavations are still in the process of being analyzed.

HISTORICAL OVERVIEW

Columbus' voyage to the New World in 1492 offered enormous opportunities for European expansion and the accumulation of vast amounts of wealth. At the same time, his discovery brought new threats. The idea of the balance of power among European nations took on a new range of meanings. States which did not seize a share of the New World resources would find their status quickly subverted.

The effect in Europe was to force each of the main maritime countries into making at least one foray into the New World. Spain, France, and England dominated exploration during the sixteenth, seventeenth, and eighteenth centuries. much as they had done on the European continent. Each had the prerequisites to support an overseas empire: large population, wealth, and an effective central government (Tepaske 1967:2).

In addition to meeting the above criteria, Spain possessed the largest and most powerful navy in the world. This enabled Spain to carve an immense empire without any competition from France or England. It was not until the seventeenth century that these two powers were able to challenge Spain's New World monopoly. By that time, the only considerable land mass open to latecomers was North America.

The first adventurers to North America came looking for the gold and silver that the Spanish conquistadors had found in Mexico and Peru. Instead they found furs. The potential profits to be made from exploiting this resource was quickly realized by the mercantile class. Europe at this time had developed an insatiable demand for beaver pelts. The fur trade not only became the economic lifeblood of the colonies (especially Canada) but also laid the cornerstone of European imperialism stimulated by the mercantile class. Most importantly, it strongly influenced the outcome of the imperialistic struggle for the continent by France and England (Hale 1959:vii).

Exploration Period (1541-1700)

In 1541, a group of Spanish conquistadors and missionaries led by Hernando de Soto discovered and crossed the Mississippi River somewhere near the present site of Memphis, Tennessee (March 1967:1). Around the same time, Francisco Coronado was searching the southwest for the mythical golden "Seven Cities of Cibola." Coronado quickly abandoned the search after only encountering an Indian village of grass huts in central Kansas. Both of these expeditions failed to find the inducements (gold or silver) necessary to encourage further exploration and settlement. The only value Spain saw in the area would be using it as a buffer zone against encroachment by other powers into her more valuable areas to the south. Therefore, Mexico and Peru became the focal points of Spain's empire in the sixteenth century (Foley 1971:1).

It was not until the 1600s that any European power succeeded in challenging Spain's monopoly in the New World. Both France and England took an active role in exploration by establishing permanent colonies in North America just after the turn of the century. The English confined themselves to a strip of settlements along the Atlantic coast while the French slowly spread across North America. Initially, the French focused their activities in the vicinity of Quebec, founded in 1608 by Samuel de Champlain. From Quebec, trappers and missionaries had easy access to the interior through the St. Lawrence River and the chain of Great Lakes. By 1650, these explorers had established outposts on the lakes (Foley 1971:2).

France's accomplishments on the mainland of North America were under the patronage of private enterprise seeking commercial profits in the fur trade and the French branch of the Roman Church. Both depended on the Indians for the desired resources: fur and souls. By 1652, the fur trade had superseded missionary activity as the dominant factor in the colony's existence (Eccles 1972:37).

Canada, more than the English colonies, depended on the fur trade for her economic livelihood. The seemingly endless supply of fur-bearing animals, an easy access to the interior through an interconnecting river system, and a European demand for fur products insured the success of the trade. It formed the pattern of French exploration in North America for the next 150 years.

It was the search for new trade routes and converts that led Louis Joliet and Father Jacques Marquette down the Mississippi River in 1673. They were the first white men to reach the Mississippi in 130 years and the first known to have set foot on Missouri's soil. Marquette and Joliet terminated their journey down the river at the mouth of the Arkansas when they realized that the Mississippi emptied into the Gulf of Mexico and not the Pacific Ocean. Fearing interception by the Spanish if they continued further south, they decided to turn back.

Nine years later, Robert Cavelier, Sieur de La Salle, became the first Frenchman to explore the Mississippi to its mouth. In 1682, he took possession of all the territory drained by the river and its tributaries in the name of Louis XIV in addition to naming the territory Louisiana in his honor. On his return trip, LaSalle began construction of Fort St. Louis of Illinois at Starved Rock on the Illinois River. By the spring of 1683, approximately 20,000 Indians from various tribes had settled near the post. Later that year, LaSalle wrote to the Governor of Canada that he was attempting to induce different tribes to settle near the fort, including the Missouri (Parkman 1965:298-300).

Information on French activities and contacts with the Missouri Indians and other tribes in the area are very vague and sketchy between 1682 and 1700. No organized or officially sanctioned explorations into the Mississippi Valley took place during this period because of the King William's War (1689-1697). The French had to utilize all their resources in North America to win and hold their Indian allies. The war forced the suspension of operations in the Mississippi Valley by the French officials in Quebec. It is probable that some occasional contacts were made, but there is no narrative or relation which states who made them and with what tribe. One reason for this lack of information is that only a few explorers or trappers were literate (Bray 1978:4-5).

The French once again became active in the West, continuing their search for furs and souls. In 1698, three missionaries sailed down the Mississippi and established a mission in 1699 at the Indian village of Cahokia on the Illinois side of the river. A few trappers and merchants became permanent settlers at the village, while the majority of the white population was transient.

In 1699, Pierre Le Moyne, Sieur de Iberville, sailed to the mouth of the Mississippi and built Fort Maurepas on Biloxi Bay. The fort was the beginning of permanent settlement by the French on the Gulf coast. It acted as an anchor for French claims on the Gulf and in the Mississippi Valley.

Colonial Period (1700-1803)

The Colonial period is characterized by economic competition and political turmoil. France, Spain, and Britain bartered for furs, land, and the allegiance of diverse native American groups. The period is marked with constant warfare between France and England. In the mid Mississippi Valley, it began with the founding of the village of Kaskaskia (1703) and culminated with the Louisiana Purchase (1803).

In 1703, Jesuit missionaries, Kaskaskia Indians, and a group of fur traders moved from a site on the north bank of the River des Peres to the east side of the Mississippi and established the village of

Kaskaskia. It soon became the leading French settlement in the region (March 1967:6).

The early 1700s were also a time of French fort construction in the area extending from the Great Lakes down the Mississippi River. By the mid-1750s, the French had built a line of forts from the Great Lakes to the mouth of the Mississippi River in an effort to secure their possessions from the English and Spanish (Smith 1912:64-65).

Plans for the further development of French Louisiana were interrupted for the next 12 years by the Queen Anne's War (1702-1713). Even though the majority of fighting was to the north along the New England frontier, the growth of Louisiana was slow. Once again the resources of France were diverted from developing Louisiana to fighting a war.

French interest in Louisiana was renewed with the appointment of Antoine La Mothe Cadillac as governor of Louisiana in 1710. He returned to France in order to promote the development of the region; and Cadillac persuaded Antoine Crozat, a wealthy merchant, to invest in its development. In return, Crozat received a charter granting him an economic monopoly over a vast area for a period of 15 years (March 1967:8).

In 1713, Cadillac returned to Louisiana with high expectations for success. Over the next four years, various expeditions searched for the silver mines believed to be located in upper Louisiana. What they found instead were lead deposits on the west side of the river near Ste. Genevieve. The disappointment in failing to locate silver deposits, coupled with the inability to establish trade with the Spanish, forced Crozat to surrender his charter in 1717.

The failure of Crozat's venture convinced French officials that the development of Louisiana was too great for one individual. Therefore, a complete monopoly of Louisiana's trade was given to the newly created

Company of the West in 1718. In return, the company was to colonize Louisiana with 6,000 whites and 3,000 Blacks within two years.

In 1718, the director appointed Pierre Duque, Sieur de Boisbriant, as commandant of the Illinois Country and instructed him to initiate mining operations. Expeditions on both sides of the river revealed that the mining sites on the west bank appeared to be the most promising. Therefore, an attempt was made at mining and smelting operations producing only a small quantity of lead.

The first serious effort at mining operations in Upper Louisiana began with the arrival of Phillipe Francois Renault in 1720. He had been appointed by the directors (now the Company of the Indies) to oversee mining operations. Renault established temporary headquarters near Fort Chartres and sent out exploring parties to select the best site. He finally chose a location on the west side of the Mississippi near the Meramec River. The mines soon began to produce on a fairly regular basis until 1742, when he sold his holdings to the government and returned to France. By then, lead mining had become an important part of the local economy.

In addition to mining, the Indian trade lured French trappers from Illinois to cross the Mississippi and travel up the Missouri (Foley 1971:10; March 1967:17-18). The first officially authorized visitor to reach the tribes along the Missouri was Charles Claude Du Tisne. In 1719, he visited the Osage and then traveled on to the Panis (Pawnee) villages in Oklahoma. In all likelihood, numerous unofficial traders had preceded him. Etienne Veniard de Bourgmond (Bourgmont) was known to have lived with the Missouri Indians and other tribes on the Missouri from 1712-1719 (Bray 1978:7). In addition, the proximity of the settlement of Cahokia and Kaskaskia would suggest contact prior to Du Tisne's visit.

To date, no evidence has been found as to when the first Frenchman penetrated into what is now Callaway County. However, three facts point to the possibility of Frenchmen being in the project area or its vicinity at an early date: (1) French fur traders were known to have been trading along the Missouri River as early as 1712, (2) Du Tisne had to have passed just south of the project area during his expedition in 1719, (3) and De Bourgmond was also in the vicinity on his way to establishing Fort Orleans in 1723.

Spanish incursions into the Missouri Valley and the growing restlessness of the tribes Du Tisne visited thoroughly alarmed the French officials. Therefore, in 1720, the Company of the Indies commissioned De Bourgmond commandant of the Missouri River. He was ordered to build a fort on the Missouri in order to curb unauthorized trade and discourage the Spanish from moving into the area. De Bourgmond was also to negotiate a treaty with the Padouca (Plains Apache) for their support against the Spanish.

De Bourgmond arrived in New Orleans in 1722 but was unable to start up the Mississippi until February 1723. The force reached its destination in November and immediately began construction of the fort on the Missouri in what is now southwestern Carroll County. The fort was completed the following spring and named Fort Orleans in honor of the Duke of Orleans.

The first part of his assignment completed, De Bourgmond began plans to visit the Padouca. The expedition departed Fort Orleans in July, but illness forced De Bourgmond to return to the fort. He dispatched a company employee to the Padouca with presents, followed by De Bourgmond two months later. De Bourgmond stopped at the Kansa village and met with other tribal representatives. He then went on to Padouca country and successfully negotiated a treaty with them.

De Bourgmond returned to France in 1725 with chiefs of various tribes. In return, he received the promised title of nobility and spent the remaining five years of his life in Paris.

A small garrison was maintained at Fort Orleans for about two years after De Bourgmond left. Finally, the Company of the Indies, feeling that the fort was a liability, ordered it abandoned in 1727. This was finally accomplished in the spring of 1728 (March 1967:23).

The abandonment of Fort Orleans marked the second time the French had withdrawn from a settlement in Missouri. It was the French settlement in the Illinois country that remained the focus of activity in Upper Louisiana. Traders, trappers, miners, and saltmakers found it possible to conduct business in Missouri and reside in Illinois. The French did not establish a permanent settlement in Missouri until the founding of Ste. Genevieve.

The date usually given for the founding of Ste. Genevieve is 1732 or 1735. However, a recent study has concluded that there is no substantial documentary evidence that supports the existence of the settlement prior to 1752 (Ekberg et al. 1981:19). Since no one person or group of colonists specifically came to that location to establish a settlement, it makes it difficult to pinpoint an exact date.

The founding of Ste. Genevieve marked the last important development of Upper Louisiana during the French period. The intermittent wars between France and England during the eighteenth century culminated with the signing of the Treaty of Paris in 1763, ending the Seven Year's War (French and Indian War in North America). By the terms of the treaty, France surrendered all of Canada along with her territories east of the Mississippi to England. In addition, France ceded Louisiana to Spain in the secret Treaty of Fontainbleau in 1762 in order to compensate Spain for its losses to England. Thus, France's humiliating defeat forced her to completely withdraw from the North American continent.

News of Louisiana's transfer from France to Spain did not reach the province for two years. During this time, the French established the second permanent settlement in Missouri. In August 1763, Pierre Laclede and his 13 year old clerk, August Chouteau, left New Orleans to establish a trading post in Upper Louisiana. Laclede selected a site on the west bank of the river near the mouth of the Missouri. The following April he visited the trading post and named it St. Louis in honor of the reigning King Louis XIV.

Around the time Laclede's trading post was being constructed, official orders were received by the commandant of the Illinois Country to evacuate Fort de Chartres and return to New Orleans. As a result, most of the residents east of the Mississippi resettled in New Orleans or in other parts of Louisiana, while a substantial number crossed the river and settled in Missouri (Brackenridge 1962:235). Laclede took advantage of the resentment toward English rule and promoted St. Louis as a place for settlement. By the time news of the cession of Louisiana to Spain was learned by the residents of Upper Louisiana, St. Louis was an established village containing between 40 and 50 families (Foley 1971:18).

In October, 1765, the Illinois Country was formally transferred to English control. The French garrison at Fort de Chartres withdrew across the Mississippi and established its new headquarters at St. Louis. Louis St. Ange, the garrison's commandant, assumed both civil and military control of the territories west of the Mississippi until the Spanish arrived to take command of the area. St. Ange did not formally surrender control of Upper Louisiana to the Spanish until May 20, 1770.

At the end of the French period, Missouri remained an unsettled wilderness with only two permanent settlements being established on the banks of the Mississippi. It was not until the Spanish period that

Missouri began to be developed. Even though the western area had received little attention from the French, the region remained French in language, customs, and outlook during the 40 years of Spanish rule.

Spain saw the acquisition of Louisiana as a means of protecting her valuable possessions in Mexico from foreign intrusion. The primary objective was to establish Louisiana as a buffer colony against British and later American penetration. In attempts to accomplish this, Spanish authorities imitated the French administrative system and maintained a flexible attitude in dealings with the colony.

In order to prevent incursions by unauthorized traders into upper Louisiana, Fort Don Carlos was built in 1767 at the mouth of the Missouri. It was felt that this would retain Spanish control over the interior of Upper Louisiana.

An intense campaign was waged by the British to break Spain's efforts to monopolize the fur trade in the Mississippi Valley. British agents regularly crossed the Mississippi to trade with the Indians and encourage them against Spain.

This intense rivalry came to a head when Spain declared war on England in 1779. Spain saw the war as an opportunity to regain control of Gilbraltar, recover Florida, and end all illicit commerce with her colonies. The British, on the other hand, saw a chance to gain control of the fur trade west of the Mississippi.

By the end of the American Revolution, Great Britain had a virtual monopoly on the fur trade in the Upper Mississippi Valley on both sides of the river. Spain lacked the money, men, and goods necessary to gain control of the trade. Many of the Indian tribes turned to the well-stocked British traders because of the inability of Spanish officials to provide the necessary merchandise.

In addition to British domination of the fur trade, Spanish authorities were concerned by the threat of American migration. The end of the American Revolution reopened the land west of the Alleghenies. As the settlers moved into lands adjacent to the Spanish territories, Spain began a campaign to stop this expansion.

The first step in this campaign was to close the Mississippi to American commerce in 1784. It was hoped that the western settlements would be ruined by shutting off their only commercial outlet. This was modified three years later by reopening the river to American produce after payment of a duty.

The second step entailed allowing American Protestants to settle in Louisiana. By luring settlers from the western territories of the United States and transforming them into loyal Spanish subjects, it was believed that this would weaken the American settlements from which they migrated. To entice settlers, the Spanish government promised that if they took the oath of liberty and became residents each would receive free lands, religious tolerations, and the same commercial privileges as other Spanish subjects.

By 1789, the large numbers of settlers that Spain had hoped to attract had not materialized. Therefore, further attempts were no longer made to recruit American immigrants. Instead, alliances were sought and made with southern Indian tribes to resist further American expansion. Also, plans to promote a separatist movement in the western territories were contemplated by Spanish authorities.

For the next six years, this policy was carried out but never fully succeeded because in 1795 the Spanish government reversed itself. Spain realized that all attempts had failed to develop Louisiana as a buffer against Anglo-American penetration. For this reason, Spain was willing to make concessions to the United States in the Treaty of San Lorenzo (Pinkney Treaty). By the terms of the treaty, Spain granted the free navigation of the Mississippi, the right of deposit in New Orleans, and agreement of the thirty-first parallel as the southern boundary of the United States.

With the opening of the Mississippi, Spain also realized that further efforts to prevent American migration westward would be impossible. In addition, it was felt that the colony needed a larger population to stop it from becoming an economic burden. Therefore, each married immigrant was offered two hundred arpents (168 acres) with an additional 50 for each child and 20 for each slave up to a maximum of 800 arpents. The cost was $41 plus minor fees for surveying (March 1967:70).

Spain put Louisiana on the international trading block with the conclusion of the Treaty of San Lorenzo. It had become a "white elephant" which Spain was prepared to sell, for a good price. In addition, Spain sought to utilize the colony as a tool in diplomatic negotiations.

During the 1790s, France and Spain discussed the possible retrocession of Louisiana, but they could not reach an agreement. It was not until after Napoleon had come to power that serious negotiations took place. A preliminary agreement was reached whereby France would expand the Italian province of Tuscany into the Kingdom of Etruria and give it to the Duke of Parma in return for Louisiana. The agreement was incorporated into the Treaty of San Ildefonso on October 1, 1800.

Three years later, Louisiana was sold to the United States for $15,000,000. This unexpected offer by France was brought on by France's failure to regain control of San Domingo. This caused Napoleon to lose interest in reviving the French Empire in the New World. Also, Napoleon needed more funds to help finance the renewal of war with Great Britain. Not only would the sale provide the funds, but it was also hoped to retain the United States' friendship believed vital to France's national interest.

The transfer of Louisiana to American control took place on December 20, 1803, in New Orleans. Three months later, a ceremony was held in St. Louis formally terminating Spanish authority in Upper Louisiana. More importantly, it marked the beginning of the Americanization of the region that was to become Missouri.

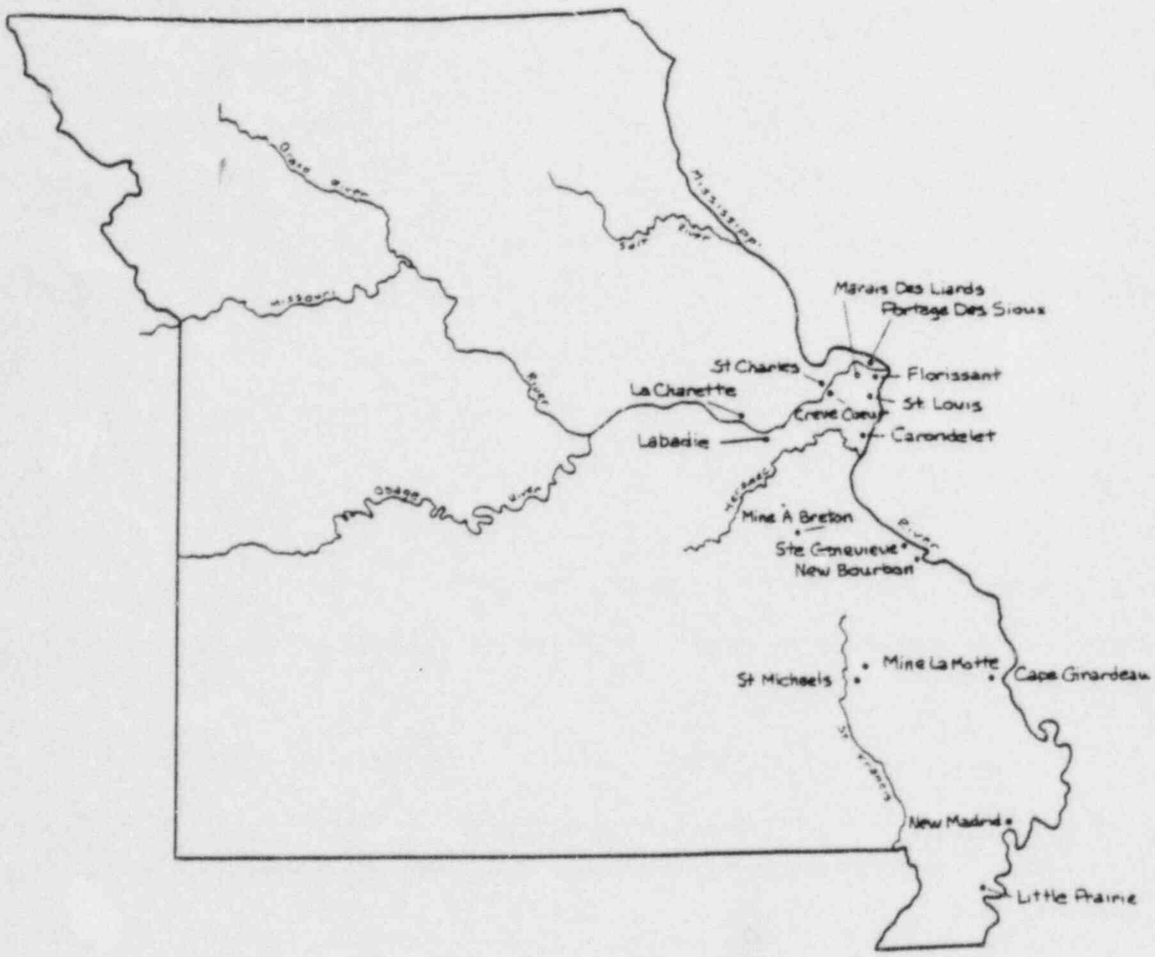
At the time Louisiana was formally transferred to the United States, there were slightly more than a dozen permanent settlements in the present limits of Missouri (Map 5), the majority of which was established under Spanish rule. These settlements were located in a strip of land about 50 miles wide and extending along the Mississippi a few miles north of the mouth of the Missouri to the southern boundary of present day Mississippi County (Violette 1907:43).

The 40 years of Spanish rule had little influence on life in Upper Louisiana. Very few Spaniards resided in the territory after the expiration of their military or governmental terms. As a result, Upper Louisiana remained French in character until its transfer to the United States. Nevertheless, the province did experience a gradual increase in population under the Spanish.

The economy of the territory remained fairly primitive. Agriculture, the fur trade, lead mining, and saltmaking were the main sources of revenue. But the lack of a large population, distances from markets, and primitive agricultural methods prevented economic development (Foley 1971:58).

The inhabitants of Louisiana fell into two broad classes: trapper/hunter and farmer. Unlike the Americans, the French labored in common fields with their interests in horticultural pursuits. The Americans, on the other hand, cultivated their individual acreage.

The fur trade ranked second to agriculture in overall importance to the economy. The decreasing importance in the fur trade was mainly due



MAP 5

Settlements in Missouri, 1735-1804
(adapted from March 1967:n.p.)

to the growing competition. Spain's monopolistic system allowed a small number of traders to grow rich at the expense of others.

Lead mining, like agriculture, changed very little until the end of the Spanish period. Lead continued to be dug in shallow pits with crude smelting processes yielding only about 35% of the lead from the ore.

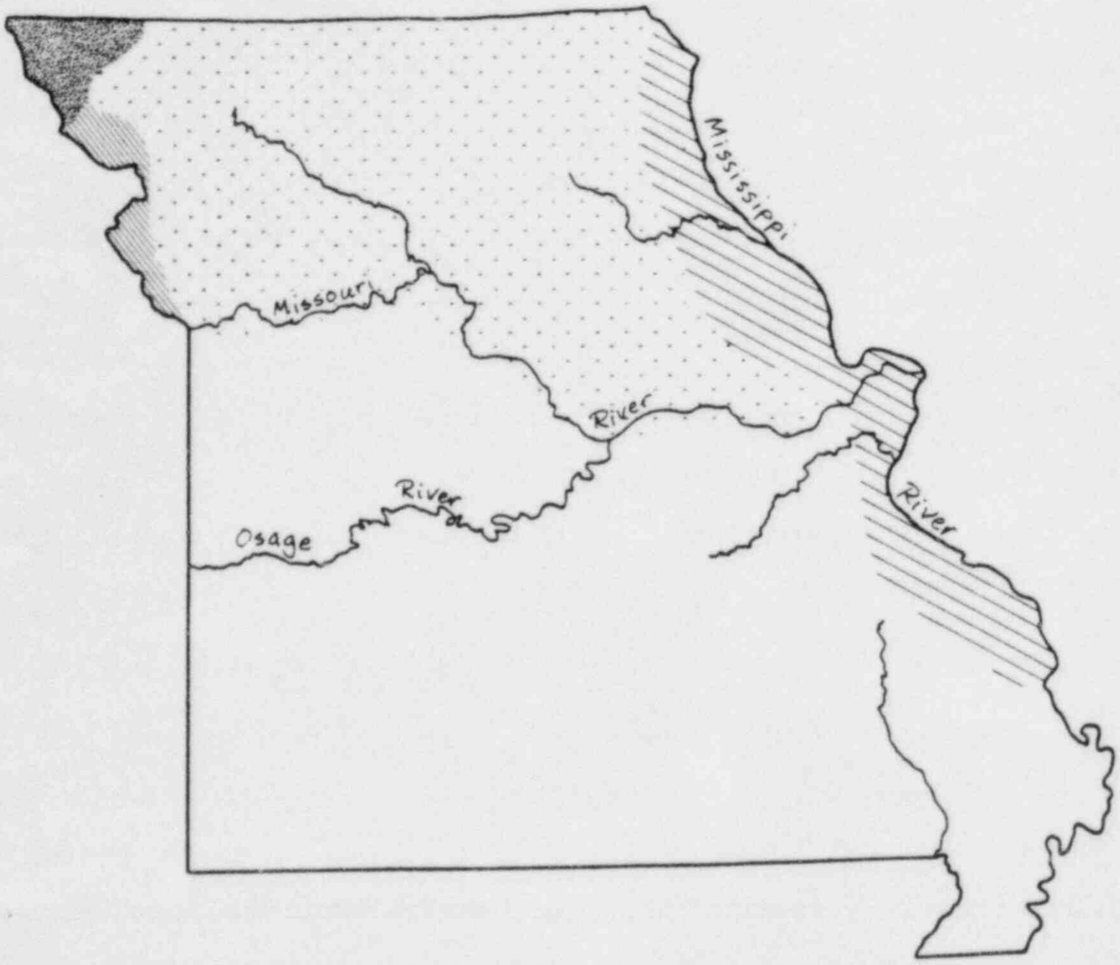
The production of salt was another important contribution to the local economy. Nearly all the salt for Upper Louisiana, the settlements on the east bank of the Mississippi, and western Kentucky was produced along the Saline River. Another salt works located on the Salt River in northeast Missouri produced salt for a short period until Indian hostilities forced its abandonment.

Indian History in the Colonial Period

On the eve of French settlement, the native Missouri Indian population was composed mainly of the Siouan-speaking Osage and Missouri (Map 6). Later, the Pottawatomie, Miami, Kickapoo, Iowa, Sauk, Fox, Delaware, Shawnee, and Illinois spent brief periods in the state. All of these eastern tribes were being displaced by either white settlement into their territories and/or pressures from Indian tribes east of them.

The most important and most powerful of these Indian tribes was the Osage. They were the major supplier of hides and furs to St. Louis. The governments of France, Spain, and the United States were not able to effectively control the Osage. They could only manage to curb their action through threats of trade withdrawal or by inciting other tribes to war upon them. In the end, the most effective control of the Osage was the fur trade and the Chouteau family which, by 1795, had established firm ties with the tribe (Voget 1974:114).

The Osage were mentioned as early as 1673 when Marquette and Joliet learned about them from other Indians. No precise location was given for the tribe, but it appears that they were west of the Missouri Indians and south of the Missouri River (Chapman and Chapman 1964:94;



MAP 6

Indian Tribes of Missouri, 1673-1750*

- Osage
- Missouri
- Kansa
- Oto
- Illinois

(adapted from Rafferty 1982:25)

*It is impossible to verify the exact location of historic Indian groups. The locations presented are only approximations.

Wedel 1959:54). Hennepin, in 1687, stated that the Osage occupied 17 villages on the river bearing their name. Five years later, Tonti placed them in some prairies 400 mi up the Missouri River near the Otos and Missouri Indians (Houck 1908:142-145).

It was not until 1719 that Claude Charles Du Tisne made the first recorded visit by a Frenchman to the tribe. He located the village of the Grand or Big Osage 240 mi above the mouth of the Osage River. In that same year, Bernard de La Harpe visited the Little Osage at their village on the Missouri River (Chapman 1946:16).

Prior to 1714, the Osage were wholly located in the upper Osage valley. Sometime around 1717, one group, the Little Osage, split from the tribe and settled near a Missouri Indian village on the Missouri River in present Saline County, Missouri (Chapman 1974:289). Both tribes had a working alliance until the Missouri were decimated by epidemic diseases and attacks from other tribes. The Little Osage remained there completely autonomous from the Big Osage, who were still living on the upper Osage River until 1777. After that date, the Little Osage returned to the upper Osage River Valley (Chapman 1974:289). Thus, between 1777 and 1804, the Big and Little Osage concentrated their activities in the upper Osage River Valley and in the Neosho and Verdigris branches of the Arkansas River. Their hunting territories were primarily located west and southwest of the upper reaches of the Osage River (Chapman 1974:293).

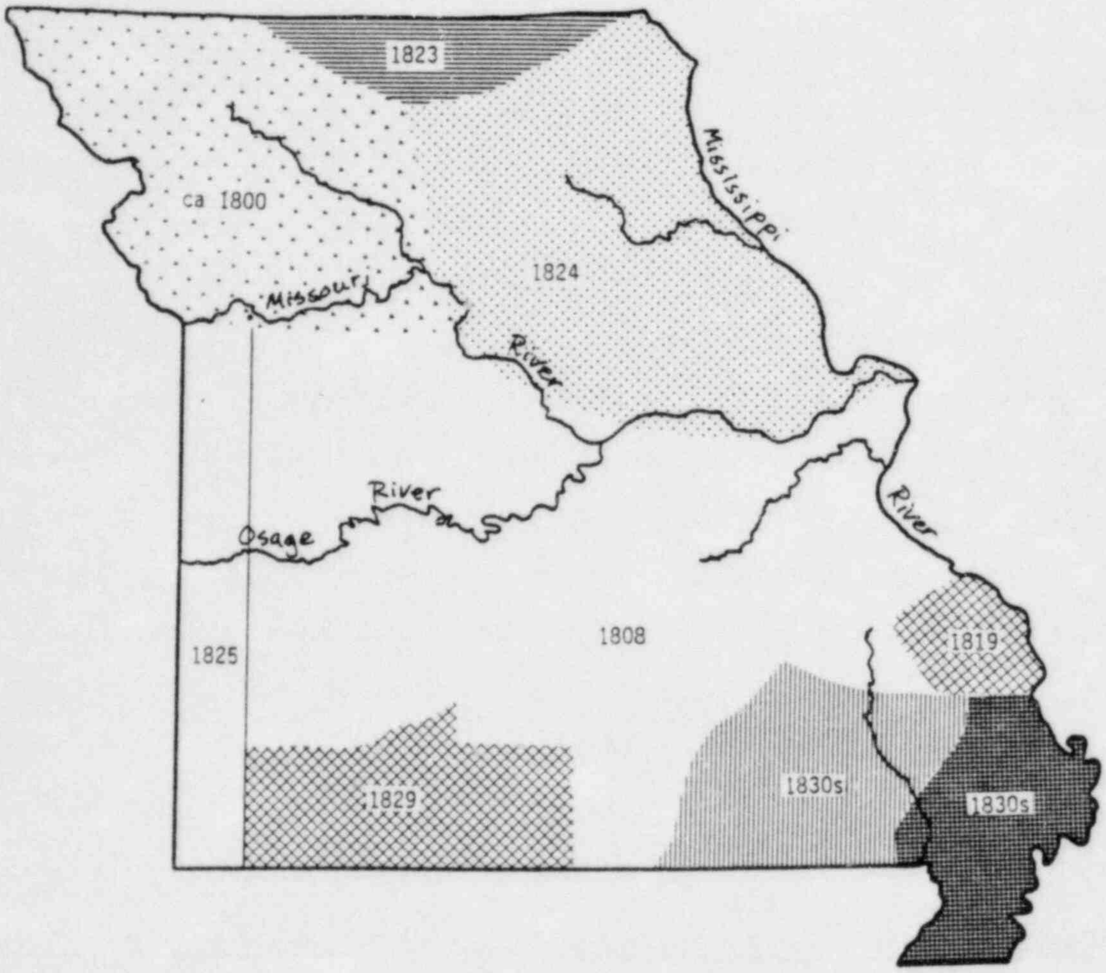
The only other native tribe, the Missouri, belonged to the Chiwere group of Siouan stock, which also included the Winnebago, Iowa, and Oto. The Missouri, Iowa, and Oto separated from the Winnebago at some early period and moved southwest to the Iowa River. The Iowa remained there while the others continued toward the Missouri River. A dispute arose between two chiefs, and the tribe split again with the Missouri remaining and the Oto continuing up the Missouri River (Map 6) (Swanton 1952:269).

As with the Osage, Joliet and Marquette made the first reference to the Missouri in 1673. However, the first recorded meeting did not occur until 1714, when De Bourgmond visited a Missouri village on the Pinnacles near present Miami, Missouri. Nine years later, 1723, he established Fort Orleans as a trading post near the village (Chapman and Chapman 1964:91). The Missouri proved to be loyal allies of the French from the initial contact made by De Bourgmond until the French withdrawal from the Louisiana Territory.

The latter half of the eighteenth century (1790s) marked the beginning of the downfall of the Missouri. Their ranks were soon depleted by smallpox epidemics and attacks by the Sauk and Fox. Around 1798, an ambush by these two groups nearly wiped out the Missouri. The tribe was eventually forced to abandon their territory and seek the protection of the Oto and other friendly tribes (Brewton 1936:115-119).

In 1789, large numbers of Delaware and Shawnee began to move into Missouri at the invitation of the Spanish governors. These groups saw this invitation from the Spanish as a means of escaping the constant encroachment of American settlers into their territories. The Spanish, on the other hand, envisioned them as a deterrent and buffer between her settlements and the hostile Osage. They settled in the Cape Girardeau area, far enough from Osage villages (200 mi) and close enough to receive Spanish aid, if necessary (Map 7). During the 1790s, they joined the Sauk, Fox, and other tribes in making sanctioned raids on the Osage (Chapman and Chapman 1964:113; Foley 1971:38).

The Iowa, Sauk (Sac), and Fox began to cluster in the Des Moines River Valley around 1765 (Map 7). This move from their traditional hunting grounds in Wisconsin was prompted by more favorable trade relations, new hunting/trapping lands, and pressures from enemy groups



MAP 7

Indian Tribes of Missouri, 1750-1832*

- Osage
- Missouri
- Iowa
- Fox and Sauk
- Delaware and Shawnee
- Chickasaw
- Quapaw

(adapted from Rafferty 1982:25)

*It is impossible to verify the exact location of historic Indian groups. The locations presented are only approximations.

east of them. The Sauk and Fox claimed most of northeastern Missouri and appear to have extended their hunting/trapping territory to the Missouri River in a narrow band running south along the Mississippi River. The Iowa, on the other hand, hunted mostly in northern Missouri concentrating around the upper reaches of the Grand River (Map 7) (Chapman and Chapman 1964:113, 114; Voget 1974:57).

About 1770, the Sauk and Fox started to trade at St. Louis. This marked the beginning of a harassing type of warfare between them and the Osage over hunting/trapping lands. These hostilities against the Osage were openly sanctioned by the Spanish after an increase in Osage deprivations in 1792 and 1793. The Sauk and Fox were unable to deny the Osage, particularly the Little Osage, access to the hunting/trapping lands north of the Missouri River. They could do no more than eliminate an Osage ally, the Missouri, leaving the Osage as defiant as ever (Foley 1971:38).

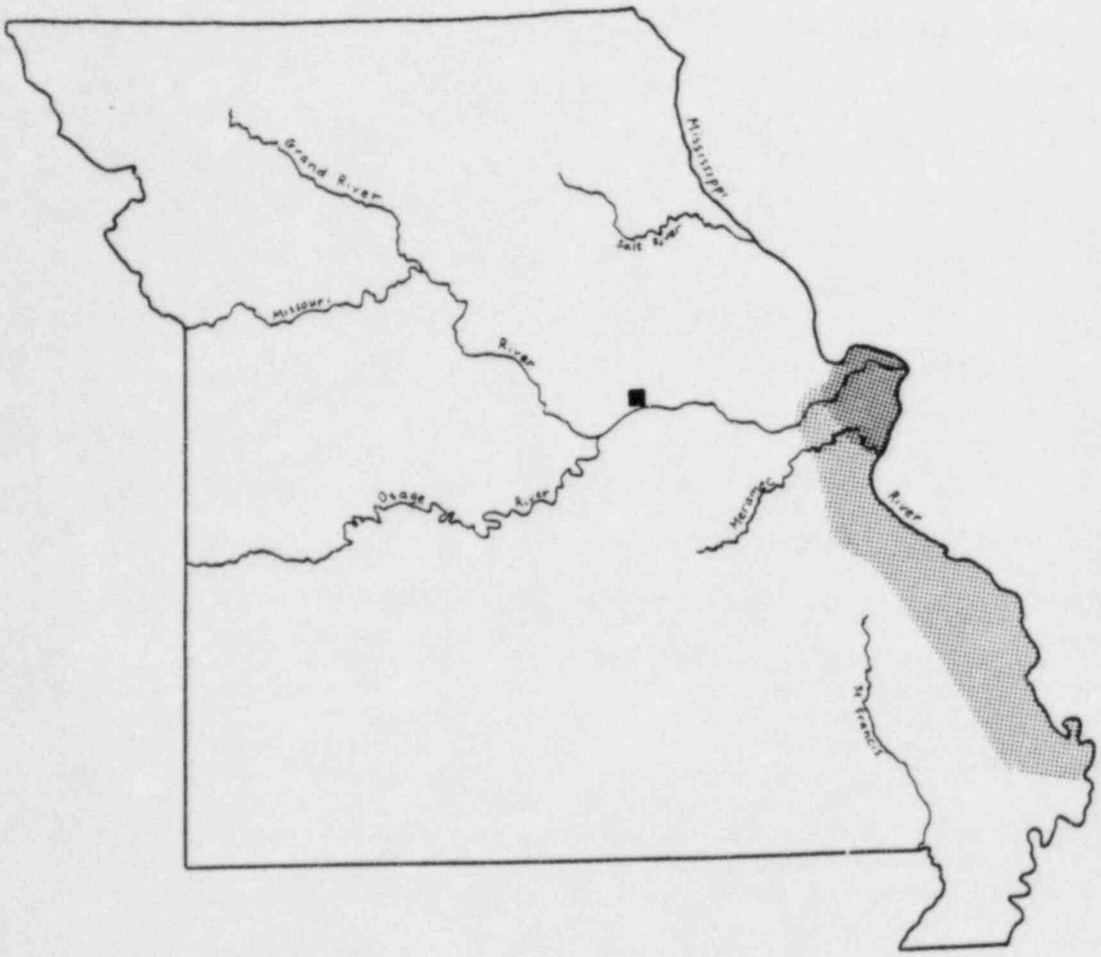
Pioneer Frontier Period (1803-1830)

The transfer of Louisiana from Spain to France and then to the United States was peaceful and orderly. Since Congress had as yet to provide a permanent government. Captain Amos Stoddard was appointed commandant of Upper Louisiana by President Jefferson to serve during the interim. After months of debating, a compromise agreement finally was approved by the House and Senate on the governmental structure for the territory. The bill was signed into law on March 26, 1804.

Under the provisions of the new bill, the Louisiana Purchase was divided into two territories at the thirty-third parallel. The Territory of Orleans comprised the area south of the line and the District of Louisiana north of it. In addition, the District of Louisiana was placed under the jurisdiction of the governor and judges of the Indiana Territory. The following year an act was passed establishing a territorial government for the District. When Louisiana was admitted into the Union in 1812, the territory north of the northern boundary of the state was renamed the Territory of the Missouri and advanced to a territorial government of the second class. In 1816, Congress advanced the Missouri Territory to the highest grade of territorial government. On August 10, 1821, after two years of stormy debate, Missouri was formally admitted into the Union.

Immigration to the present state of Missouri was stimulated by its formal acquisition from France in 1804 by Captain Amos Stoddard of the United States Army. Settlers could now enter the territory as citizens of the United States and still acquire land under liberal terms. Between 1804 and 1810, the population of Missouri almost doubled from 10,000 to 20,000 (Meyer 1963:163). The vast majority of settlers migrating to Missouri came from the southern states of Kentucky, Virginia, Tennessee, and North Carolina. The remainder came from New England, the Middle Atlantic states, and Europe.

At first, American settlers located within the limits of the original areas of settlement, either in previously established settlements or in the unoccupied territory within the frontier line (Map 8). As this area was quickly settled, the first major movement into the interior began in earnest around 1810. This movement was up the Missouri River with secondary movement along its creeks and smaller rivers (Ronnebaum 1936:79; Shoemaker 1943:241; Violette 1907:49). Several physical factors accounted for this migration: easy transportation, rich soil suitable for agricultural pursuits, and available water supply. In addition, expansion directly west of the original strip of settlements was prevented by natural barriers. The southeast part of the state was rough and hilly, while north of this area was the swampy region of present day Bollinger and Stoddard counties. Also, all areas west of the Mississippi River were not suited to agriculture. The



MAP 8

Missouri Population Density, 1810

Density per Square Mile

- 0-2
- 2-6
- 6-18
- Study Area

(adapted from Smith 1957:26)

Missouri River offered a natural route into the interior of the state where the richest and most abundant land was found along its banks.

The nullifying of Indian land titles also helped to stimulate immigration to Missouri. The process began with a general treaty signed by the Sauk and Fox Indians in St. Louis, November, 1804. They relinquished all claims to their lands east of the Mississippi, but were allowed to live and hunt there until the United States disposed of these lands. The treaty was questioned by certain Sauk and Fox chiefs because, it was argued, the representatives did not have the authority to make such vast concessions. The treaty resulted in strained and bitter relations between these two tribes and the United States for the next 30 years (Foley 1971:92-93; Thomas 1926:24).

A treaty between the Great and Little Osages was signed at Fort Osage (Fort Clark) on November 10, 1808. The Osage gave up all claims to land east of the Osage line drawn due south from Fort Osage but continued to use much of this area until around 1820 (Map 7) (Chapman and Chapman 1964:113). Many of the chiefs disapproved of the terms in the treaty and petitioned the territorial governor in St. Louis. The petititon was denied, and the treaty stood.

As white settlement continued to expand, pressure for complete Indian removal intensified by 1821. Therefore, between 1823 and 1832, the U. S. government negotiated a series of treaties for their removal. Treaties with the Iowas in 1823 and with the Sauk and Fox in 1824 secured the land north of the Missouri. The following year the Osage ceded their right to the strip about 25 mi wide along the western boundary of the state south of the mouth of the Kansas River. The Shawnee relinquished their claims in the southeast in 1825 and 1832; the Delaware surrendered their land in the southwest in 1829 and 1832; and, in 1832, the Kickapoo ceded the last Indian claims in the state (McCandless 1972:54-55).

Prior to migration up the Missouri, only a few settlements existed west of St. Charles (Map 5). The Lewis and Clark expedition recorded in May, 1804, that La Charette was the farthest settlement up the Missouri. Two years later they reported seeing cattle feeding on the banks of the river near the mouth of the Gasconade. Pike reported no settlements on the Osage during his trip up that river in 1808. Côte Sans Dessein was established on the north bank of the Missouri River near the mouth of the Osage in 1807 or 1808. Pace (1928:89) suggested that it was established as early as 1773 as a trading post, while Smith (1957:91) indicated that it was not laid out as a town until 1808. If Côte Sans Dessein was established at the earlier date, it seems strange that neither Lewis and Clark nor Pike made note of the settlement. Brackenridge during his travels up the Missouri in 1811 mentioned the settlement having been in existence for three years (1962:208). Therefore, it appears that it was not settled until 1807 or 1808. According to Brackenridge, the last settlement on the Missouri in 1811 was the Boonslick settlement (1962:34).

For all practical purposes, the entire Missouri Valley west of St. Charles remained unsettled prior to 1810. Settlement into the interior did not spread gradually up the Missouri but first clustered in the "Boone's Lick Country" and second in the Kansas City area. The name Boone's Lick was first used to describe the area where Nathaniel and Daniel M. Boone (Daniel Boone's sons) manufactured salt around 1807 in present day Howard County.

The great rush of settlers into the Boone's Lick Country did not occur until 1815, with the peak years occurring in 1818 and 1819. Immigration was discouraged prior to this period for three reasons: first, news of the rich land available took time to circulate among prospective immigrants; second, sickness spread throughout the new settlements, causing some to be abandoned; and, third, Indian hostilities during the War of 1812 prevented immigration and, in some cases, abandonment of settlements (Thomas 1926:30; Violette 1907:50).

The flow of incoming settlers suddenly became a flood with the end of the war in 1815. Peace initiated a period of rapid growth and expansion in the territory with Missouri's population doubling between 1815-1820. The vast majority of immigrants during this time settled in the Boone's Lick Country due to its many advantages (Map 9). These included salt, rich soil, and a mixture of timber and wood considered ideal by the settlers.

A tidal wave of immigrants into the Boone's Lick Country occurred in 1818. This may be due in part to the fact that land offices were opened in St. Louis and Franklin. The sale was to be at auction and on credit under the provision of the Land Act of 1800. The following year the United States experienced a depression due to post-war speculation and general world financial stress; therefore, a large number of settlers migrated to Missouri in order to seek relief in "the land flowing with milk and honey" (Boone's Lick). Immigrants arrived in droves with one estimate that 12,000 people passed through St. Charles during the two weeks prior to November 1 (Anderson 1937:169).

The large influx of settlers in 1818-1819 caused the Legislature of 1820 to create eight new counties along the north and south banks of the Missouri to the state's western border, although settlement had not reached that far (Anderson 1937:171). This flow was nearly stopped before the end of 1819. It appears that the effects of the Panic of 1819 were being felt by would-be settlers. In addition, a new land act was passed in 1820 that put an end to the credit system. Payment for land now had to be made in cash, a luxury many prospective settlers could not afford. A noticeable increase in immigration did not occur until 1821. By 1824, a steady flow of immigrants was once again arriving in Missouri, although not in as large numbers as in 1818-1819.

MAP 9

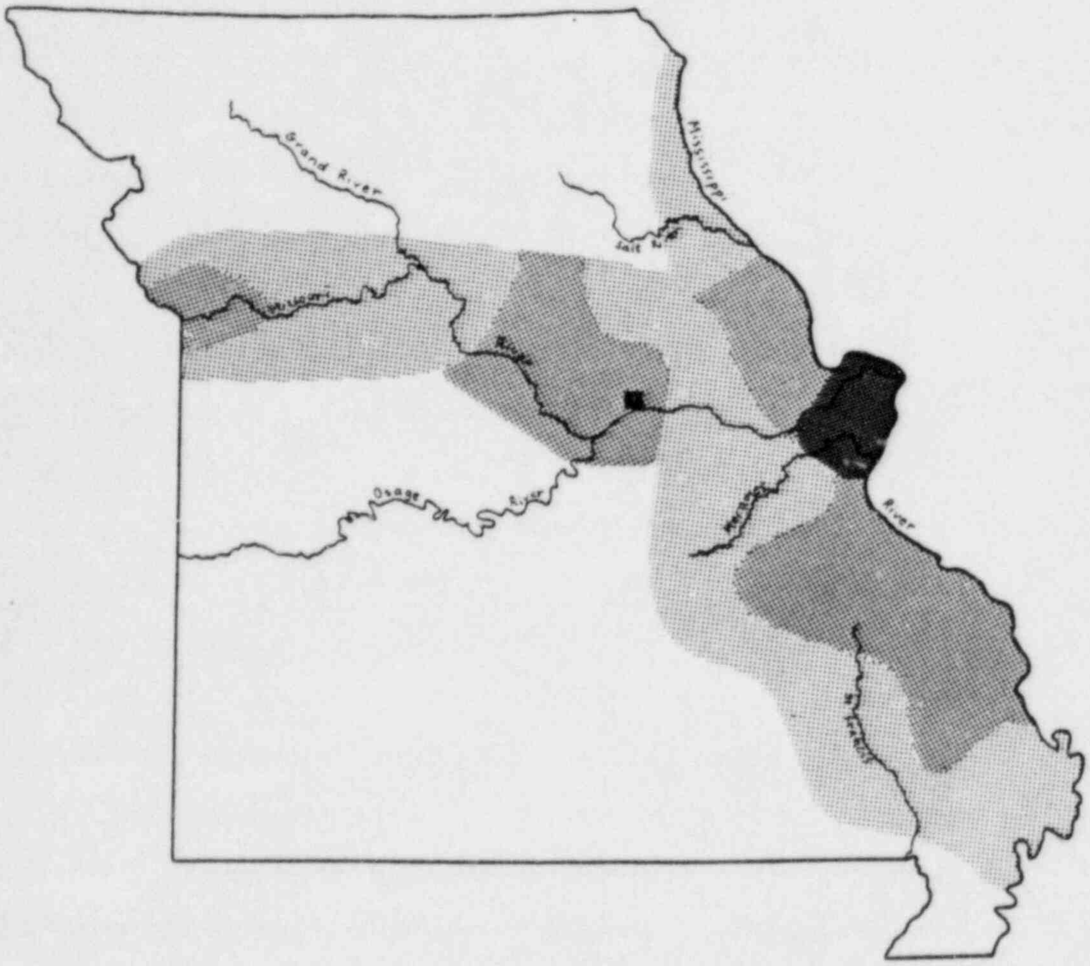
Settlements in Missouri, 1805-1830
(adapted from March 1967:n.p.)

During the 1820s, settlers, largely from Kentucky and Tennessee, were arriving in considerable numbers. Settlements began to dot the Missouri between St. Louis and Boone's Lick. By 1830, settlement in Boone's Lick had become fairly populous so that settlement continued up the Missouri to the western boundaries of the state (Map 10). Between the three centers of population, St. Louis, Boone's Lick, and the Kansas City area, sparse settlements were established along the Missouri. There was now some sort of continuous occupation from the mouth of the Missouri to the western boundary.

The fur trade remained the single most important commercial activity during the period. Prior to 1804, various individual trappers carried on the trade mostly with the tribes south of the Missouri River and its tributaries. The return of Lewis and Clark and their reports of abundant fur-bearing animals in the northwest stimulated the expansion of the trade and promoted changes in the way it was conducted. The leading traders realized that large profits could be gained by trapping the upper Missouri region. In order to accomplish this, a large amount of capital was needed, too great for one individual to handle. Only a large organization with capital and efficient management could gather the trade goods, keep the trappers supplied, and operate a transit system to move the hides to world markets. It was not long before a few large companies monopolized the trade.

Early manufacturing in Missouri consisted of the simple processing of local raw materials into finished goods for local consumption. Production took place mostly in the household by individual craftsmen in small shops, local mills, etc. As local markets grew and as transportation improved, local firms were able to process the increasing amount of local raw materials for home consumption and export.

The Santa Fe trade also contributed to Missouri's economic development. The first successful trading contact was made in 1821 by



MAP 10

Missouri Population Density, 1830

Density per Square Mile

- 0-2
- 2-6
- 6-18
- 18-45
- Study Area

(adapted from Smith 1957:31)

William Becknell, a Franklin trader. This initial success was followed by various expeditions over the next 10 years. By 1831, the center of the trade was moved from Franklin to Independence, a hundred miles closer to Santa Fe. The trade continued to play an important role in the economy of Missouri into the next period. In addition, it played a part in the advance of Americans westward.

Missouri was primarily an agricultural state during this period, in which the vast majority of farmers strove for self-sufficiency. This trend continued throughout the period with a shift toward growing cash crops occurring around 1830 (March 1967:626), although, due to fertility of the area, the Boone's Lick Country produced sizeable amounts of flour, meal, rope, and pork for shipment to southern markets via the Missouri and Mississippi Rivers.

Although rivers provided a convenient means of transportation for settlers living near them, roads were an absolute necessity for settlement into the interior. Land transportation developed slowly in early Missouri due to the high cost of road construction and maintenance. Those few existing roads were little more than poorly cleared paths. Such was the case for the Boone's Lick Trail. The majority of settlers into the area traveled by this route because it was cheaper than using the river. The trail started in St. Charles and ran west near or through the present towns of Warrenton, Danville, Williamsburg, and then almost straight west 7 mi north of Fulton and Columbia to Franklin. Later it was extended to Fort Osage (Map 9).

Callaway County in the Pioneer Frontier Period

The first white settlers in the Callaway County are not known but were probably French voyageurs. It was this type of individual who established trading posts along the Missouri River, one of which was Côte Sans Dessein around 1808 (Bell 1930:9). The post is recognized as the first permanent settlement within the present limits of Callaway

County. French trappers and traders built a blockhouse, chapel, and a few cabins on a hill near the confluence of the Missouri and Osage rivers (Bell 1927:156).

Brackenridge, on his travels up the Missouri with the Manuel Lisa expedition in 1811, noted that

> the name is given to the place from the circumstance of a single detached hill filled with limestone standing on the bank of the river about six hundred yards long and very narrow. The village has been established about three years. There are 13 French families and 2 or 3 Indian (Brackenridge 1962:209).

Eight years later, Edwin James, a botanist and geologist for the Long expedition, noted that the settlement contained about 30 families, mostly French (James 1966:80).

In 1821, the village was considered by the Missouri General Assembly as the best site for the state capital. It had been specified that the capital was to be located on the Missouri River within 40 mi of the Osage River. In spite of favorable geographic features, there was some confusion over the validity of land titles and the activities of land speculators anticipating the choice of Côte Sans Dessein as the capital. Therefore, the Legislature rejected it and chose the present site of Jefferson City (Bell 1930:57).

The only other settlers known in the area at this time (1808) were at Boone's Lick, who made salt from a saline spring in present-day Howard County. Very few settlers came to the Boone's Lick Country because Indian hostilities prevented further settlement of the area. In addition, information about the richness of the Boone's Lick Country spread slowly through the settled areas. Indian hostilities came to a peak with the War of 1812. Since the British did not have an army to send into the upper Mississippi Valley, the war took on the character of a series of Indian raids, skirmishes, and atrocities.

Due to the remoteness of the area, the Boone's Lick settlers were somewhat isolated. They organized themselves into militia units and erected five stockade-forts for protection. Scouting parties were in constant patrol around the settled areas. The inhabitants of Côte Sans Dessein erected two forts and two blockhouses at either end of the hill. A log house, used as a powder magazine, was erected between the forts. In 1815, the village was attacked by a band of Sauk and Fox. The French villagers repelled the attack, losing 5 and killing 14 Indians (Houck 1908:125-137). In the same year, ranger units were organized and sent to the Boone's Lick to protect the settlers.

While the frontier areas were closed to settlement, the richness of the Boone's Lick Country spread. As soon as hostilities ceased, migration to the area began in earnest. Settlement was helped by Nathan Boone and 50 men who marked out a trail (Boone's Lick Road) from St. Charles to Old Franklin (Bell 1913:5).

It is uncertain who the first permanent American settler was in the county. Campbell (1874:94) and Bryan and Rose (1876:265) state that John Ham and Jonathan Crow, who built log bark cabins 10 mi south of Fulton on Auxvasse Creek in the fall of 1815, were the first. Later, Bryan and Rose (1876:328) contradict themselves in a brief sketch of James and John Estens (Estes) by claiming them to be the first settlers. In another sketch (Bryan and Rose 1876:384), they say Asa Williams settled here in the spring of 1815. If this is true, then Williams would be the first American settler in Callaway County. These early settlers were joined in the next few years by other Americans, so that, by 1817, a number of families were established within the area comprising Callaway County.

Between 1816 and 1817, Nathan Boone and Joseph Evans conducted the government land survey of the county. Evans noted that 4 Spanish grants and 27 New Madrid claims were located in the western portion of the county. The four Spanish grants comprised an area of 11,760 acres, three of which were near the Missouri River (National Historical Company

1884:93). In December 1818, the lands in the eastern half of the county were offered for sale in St. Louis; and, by 1819, all lands in the western half were sold (Conrad 1901:472).

Immigration into the area was intense during the period between 1818 to 1819. This was in part due to a rapidly expanding demand for goods in the east, thus raising the prices for agricultural goods. Therefore, the offering of land for sale at a time when the price and demand for wheat were rising induced a heavy movement of settlers into the county (North 1966:80-81).

With this influx of settlers, the need arose for a governing agency. Therefore, on November 25, 1820, Callaway County was organized by an act of the Territorial Legislature. It was named in honor of Captain James Callaway, a grandson of Daniel Boone, who was killed by Indians in an ambush while crossing Loutre Creek in Montgomery County.

The first county seat was located on Ham's Prairie, approximately 6 mi south of present-day Fulton City and was called Elizabeth. Five years later (1825), George Nichols donated 50 acres to the county for the purpose of establishing a new county seat. By order of the county court, the land was laid out into town lots and named Volney. It was later changed to Fulton in honor of Robert Fulton and formally named the county seat in 1826 (Conrad 1901:472).

The first land grant in Auxvasse Township and Callaway County was obtained on January 25, 1798, by August Chouteau (French and Spanish Land Grants, Vol. A:118-119). The Chouteau track, Survey #1712, contains 7,056 arpens (6,002.5 acres) of land and is known locally as the "Big Survey" (Bell 1930:12). It appears that Chouteau obtained the land for speculative purposes not ever having been a resident of the county. About 1856, Chouteau assigned the grant to Daniel Clarke. Prior to 1876, Clarke's heirs then sold the tract to Eden Benson for

$25,000, and he in turn sold the property to James Harrison (Edwards Brothers 1876:7).

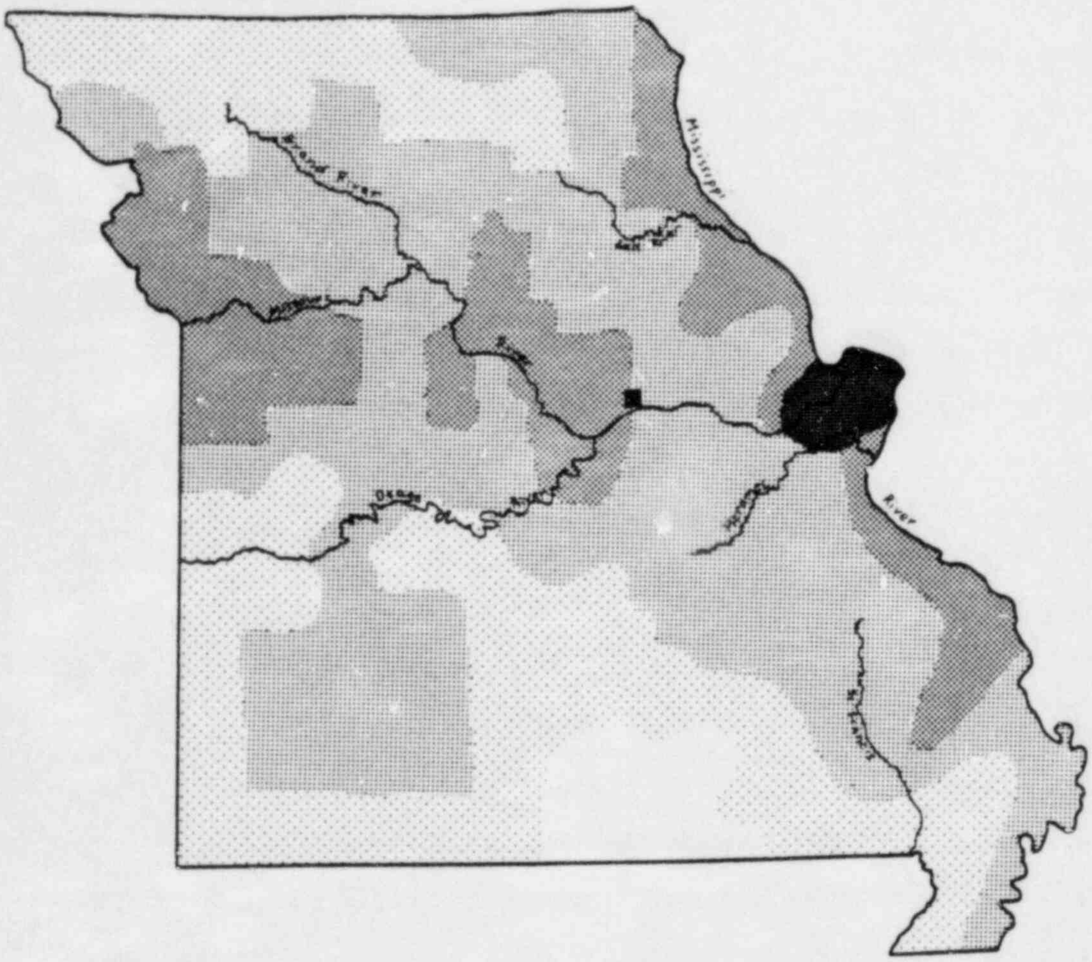
Reverend William Coats was one of the early settlers in the township. In 1817, he built a cabin on the south side of a prairie, which was named after him. That same year, Mathew and Tilman Agee, Joseph Callaway, Thomas Kitchen, Robert Read, Nathaniel Ferrier, and William Pratt settled on or near Coats Prairie. These early inhabitants, and the others soon to follow, were predominantly southern in culture (National Historical Company 1884:133-138). Very few other settlers moved into the area of Coats Prairie before 1830.

Early Agricultural Period (1830-1860)

A heavy surge of migration during the 1800s opened new areas of Missouri and pushed settlement away from the original river corridors (McCandless 1972:36). It marked the beginning of a flanking movement to the southern and northern areas of the state. Once the land along the Mississippi and Missouri rivers had been claimed, immigration was deflected to the uplands, prairies, and areas more remote from the rivers.

The rate of settlement during the 1840s declined from that of the 1830s. Several possible factors might account for this decline. The remaining open lands in Missouri were possibly perceived as being less desirable. In addition, Iowa and Texas entered the Union, affording settlers and speculators better opportunites than in Missouri.

The greatest surge in frontier settlement in Missouri history occurred during the 1850s, concentrating in the years 1854 through 1858 (Map 11). The prairies in northern and west-central Missouri contributed most of the nearly contiguous block of land taken up in the 1850s. It appears that the passing of the Graduation Act in 1854 caused the Missouri land boom. The act progressively lowered the sale price from the previous minimum of $1.25/acre for public lands that had been on the



MAP 11

Missouri Population Density, 1850

Density per Square Mile

- 0-2
- 2-6
- 6-18
- 18-45
- 45-90
- Study Area

(adapted from Smith 1957:35)

market for 10 years or more. If it had remained unsold for 30 years, the price dropped to 12 1/2 cents/acre. There was an immediate rush for land in 1854; and, by 1862, 62% of the available 13,850,020 acres was sold (Shortridge 1980:84).

Prior to 1850. immigration into Missouri was southern in origin. Three areas dominated as sources: Kentucky, Tennessee, and Virginia in that order (Gerlach 1976a:12). After 1850. there was an influx of settlers from the northern areas, as well as foreign born. This shift would eventually change the social, political, and economic fabric of this part of Missouri.

Germans composed the largest group of foreign immigrants during this period. They began entering Missouri during the 1830s and reached a peak by the 1850s. The second largest group was the Irish. The potato famine of the 1840s forced many to immigrate to the United States. The majority that came to Missouri during the 1840s to 1850s had meager resources. Therefore, they generally settled in the urban areas and hired themselves out, quickly becoming an important source of labor on the river boats and later the railroads (McCandless 1972:41). By 1860, Missouri's population had reached 1,063,509, a ninefold increase since 1830 [U. S. Census (Preliminary Report of the Eighth Census)].

The frontier settlement had passed through the state and reached the plains of Kansas. In addition, every county had surpassed the population density of two people/mi^2. However, many areas of the state, even parts of long established counties, still remained unsettled (Shortridge 1980:83).

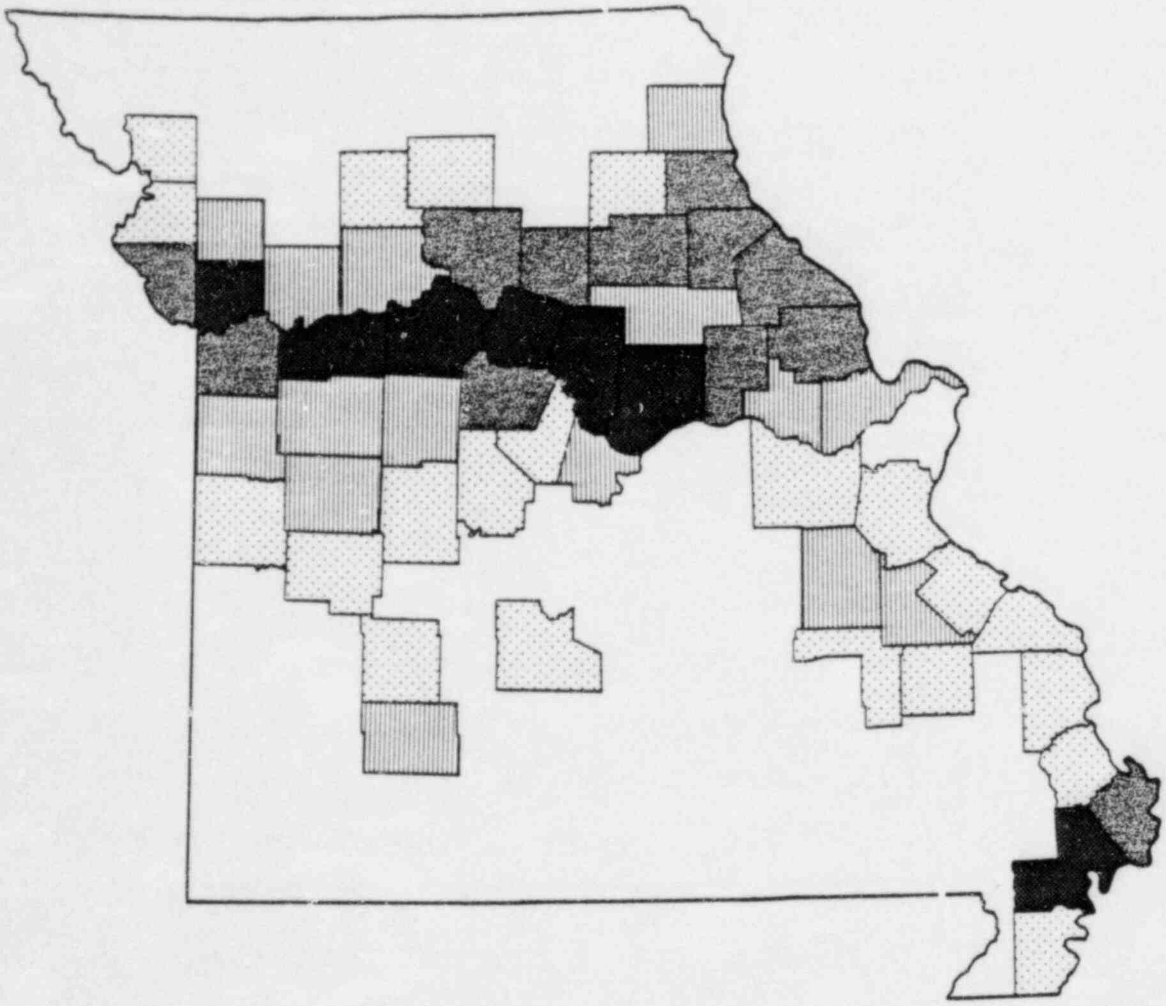
The number of Black slaves increased from 25,091 to 114,931 during the Early Agricultural period (Ellis 1929:106). This rise parallels the increased production of hemp, an industry which relied heavily on slave labor. Slavery was introduced to Missouri at a very early date. Prior to 1720, an attempt was made by the French to use native Indians as a labor force. Their reluctance to accept the yoke of slavery forced the French to turn to another source, the Black. In 1720, Renault brought the first Black slaves to Missouri to work in the lead mines. It quickly became the policy of both the French and Spanish regimes to either allow or encourage the growth of Black slavery but to discourage the enslavement of Indians (Meyer 1963:325).

The influx of southern immigrants after the Louisiana Purchase increased the number of slaves in the territory. The institution quickly became an intrinsic part of Missouri society during the early years of settlement and growth, especially in central Missouri. Slaves provided a large majority of the labor needed to clear the land, erect homes, and plant, hoe, and harvest the crops. Settlers from the upper South considered the slaves they brought with them more a part of a way of life than as a profitable source of labor.

Slavery was heavily concentrated in the 20 counties along the Missouri River, from its mouth to Buchanan County (Map 12). The five counties having the largest slave population, Lafayette, Howard, Boone, Saline, and Callaway, were settled early by southerners and were all leading producers of hemp, the single most important crop dependent on slave labor.

Very few slaves were found south of the Osage River or within 60 mi of the Iowa border. The economy in these areas was based on general farming which was not dependent on slave labor. In addition, most of this land was settled by northerners, Europeans, and southerners too poor to own slaves (March 1967:812).

Slavery in Missouri was well protected by tradition, the state constitution, statute laws, and the vested interests of a politically powerful minority -- most of whom were born and reared in a slave state. Slavery was never to become a political issue in the state. Few in the



MAP 12

Slave Population Density, 1860

Percentage of Population by County

- 0-4.9
- 5.0-9.9
- 10.0-14.9
- 15.0-24.9
- 25.0 and above

(adapted from Gerlach 1976b:32)

Whig or Democratic parties wished to disturb the existing situation. The question that Missourians did not agree on was whether slavery should be permitted by law to expand into the territories of the United States.

The period between 1830 to 1860 was a time of transformation of agriculture from self-sufficiency farming to a money-making business. In the new system, the farm primarily was cultivated for the purposes of accumulating wealth and secondarily for providing necessities for the immediate family. In addition, farm machinery was invented, and its use began to expand along with transporting farm products by railway (Mumford 1920:277-297).

Hemp and tobacco enabled Missouri farmers, especially in central Missouri, to transform their farms into a money-making business. They became the main cash crops for pre-Civil War Missouri. Both crops allowed slave owners to use this form of labor to its greatest advantage. Hemp required year-round use of labor, many long hours, heavy loads to lift, and operation of simple hand machines by large groups of laborers. Although tobacco production did not use as large a labor force as hemp, slaves were still utilized in fields and warehouses (Voss 1970:201-202). It is no coincidence that the principal hemp producing counties were those with the highest slave populations.

Of the two crops, hemp was the most important crop for Missouri farmers in the first half of the nineteenth century. The primary force behind hemp growing was the migration of a large number of settlers from Kentucky and Virginia, both of which grew hemp. The peak year of hemp production was reached in 1860. In that year, 19,267 tons were produced but dropped the following year to the lowest since 1840. This decline in production appears directly related to the cutbacks of the Civil War. Since the hemp industry depended largely on the cotton industry, the severing of trade with the South removed the market for Missouri hemp. Even after the war, no great revival occurred within the industry.

The period between 1840 to 1860 marked an important time of growth in the manufacturing sector. During that period, capital investment rose from $3,000,000 to $20,000,000. It was not until Missouri was in the position of exploiting her resources more fully that manufacturing would become an important part of the economy, the impetus for which was created during the Civil War.

The increase in manufacturing and the cultivation of cash crops created a need for better transportation networks. By the late 1830s, the steamboat was fast becoming the most important means of transportation. Throughout the period, especially after 1850, the amount of freight and passenger traffic steadily increased. The steamboats on the Missouri and Mississippi rivers were entering a "golden age." By 1858, 60 regular packets operated on the upper Missouri, in addition to nearly 40 transient boats that made occasional trips. The coming of the railroad and its expansion during the post-Civil War years forced steamship lines out of business. They were unable to compete with the more efficient railroads (Hattering 1980:297).

Missouri's inability to exploit her resources more efficiently prevented the state from adopting a program of internal improvements until the 1850s. Prior attempts had been made at railroad construction during the 1830s and 1840s, but the lack of capital investment assured failure. The first railroad construction in the state began in 1851 on the Pacific Railroad that was to be built from St. Louis to the western border of the state. By 1856, the railroad had reached Jefferson City, and 10 years later it was extended to Independence. The company was assisted by a generous subsidy from the state and a land grant from the federal government. Since the line was going to be built through the most thickly settled areas of the state, it was taken for granted that it would be completed before any of the other projected lines. However, this honor was given to the Hannibal and St. Joseph Railroad.

The Hannibal and St. Joseph was a parallel road further to the north, which began construction in 1856. It was built simultaneously from both ends and was completed by 1859. Unlike the Pacific Railroad, the Hannibal and St. Joseph was built through a relatively unsettled area. As a result, it secured almost five times more land granted by Congress than the Pacific Railroad (611,323 acres vs. 125,000 acres). The land was also more valuable because vast areas had not been settled, such as those lands along the Pacific route. Thus, in 1859, the Hannibal and St. Joseph Railroad received an average of $10.24/acre and well over this price during the 1860s (Gates 1932:131). In addition, the line was able to attract outside capital investment that greatly aided construction efforts.

Callaway County in the Early Agricultural Period

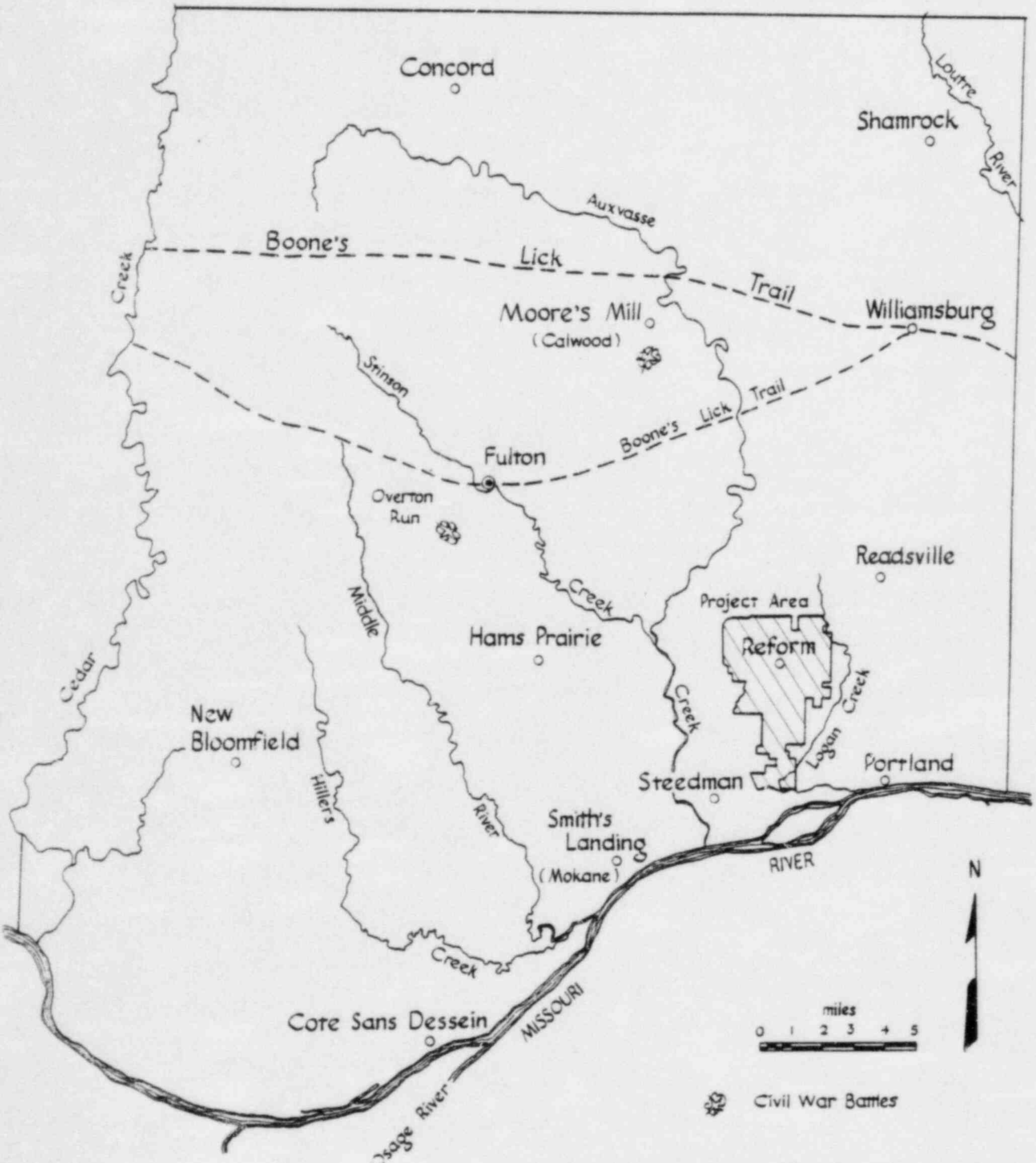
The Early Agricultural period was one of tremendous growth within Callaway County. The population increased rapidly from 6,159 in 1830 to 17,449 by 1860. In addition, a number of new towns were laid out throughout the county especially during the first decade of the period (Map 13). Portland, located on the Missouri River, flourished as a trading point and as the center of the tobacco market. The town became the focal point of steamboat trade and as a distribution center for goods arriving from St. Louis (Williamson 1967:4).

The 1840s was a decade of financial distress in the county as the area began to feel the effects of the Panic of 1837. Land sales plummetted as did farm prices. As a result, many businesses failed and immigration from the other states was checked during the period (Edwards Brothers 1876:7). The county, as well as the state, did not recover fully until the boom period of the middle 1850s.

One of the towns that flourished during this period was Fulton. The community secured one private and two public institutions between

MAP 13

HISTORIC MAP OF CALLAWAY COUNTY



1847 and 1853. These institutions enabled Fulton to keep pace with her rival Columbia during this period. An asylum for the insane was established in 1847 and has been in continual use except during the Civil War. Four years later, an act of the General Assembly approved the Asylum for the Education of the Deaf and Dumb at Fulton. Finally, in 1853, Westminster College was chartered by the General Assembly of the Missouri Presbyterian Church. It was the only college outside of St. Louis that did not suspend operations during the Civil War (Provisional League of Women Voters 1965:4-5).

The county's mineral deposits began to be investigated during the 1850s. Large coal deposits were located in the central and southwestern portions of the county. In 1855, a railroad about 7 mi in length was built from Côte Sans Dessein to a large cannel coal mine 7 mi away. The line was built by the Callaway County Mining and Manufacturing Company. This was the first railroad in the county and one of the first in the state (Provisional League of Women Voters 1965:7). The coal could then be transported to the river, loaded onto barges, and unloaded at St. Louis. The mines ceased operations in 1859, due to the high cost of transporting the coal.

This same decade of economic growth was also one of tension, uncertainty, distrust, and violence over the question of state's rights and slavery. Callaway was definitely proslavery and southern in sympathy as evidenced by Abraham Lincoln receiving only 16 votes in the entire county during the presidential election of 1860. Life long friends would soon become enemies; and, in many instances, families would experience divided loyalties.

Agricultural-Industrial Period (1860-1920)

By 1860, Missouri and the rest of the nation were faced with the growing controversy of slavery. In November, Abraham Lincoln was elected President of the United States. Immediately, southern slave states, fearing that their property rights and the institution of slavery were in jeopardy, began to secede from the Union. By March 1861, seven states of the lower South broke their ties with the United States, even though Lincoln asked them to return and promised not to destroy slavery where it already existed. His pleas proved to be futile.

Those slave states that had not yet seceded were now forced to make a difficult decision -- especially the border states. Since a large percentage of Missourians came from southern states, sympathies naturally leaned toward the South. However, it was generally felt that secession was only to be used as a last resort.

When the South fired on Fort Sumter on April 12, 1861, every state was now forced to take a stand, even though some of the border states (among them Missouri) had hoped to remain neutral. The opening of hostilities made involvement inescapable.

The only other question remaining was on whose side would Missouri fight. This question was not settled until March 6-8, 1862, at the Battle of Pea Ridge, Arkansas. Union victory insured federal control of Missouri which was never relinquished for the remainder of the war. Even though small bands of Confederate raiders operated throughout the state until the end of the war, Missouri was won for the Union at Pea Ridge. After the defeat, the Confederacy no longer felt Missouri was of strategic importance to warrant a major effort to gain control of the state.

Settlement in Missouri was restricted during the Civil War years. In fact, residents migrated from Missouri, especially the southern portions of the state where the fighting was heaviest. Between 1860 to 1864, Missouri lost 212,771 people (Ellis 1929:144). This trend was reversed over the next five year period when over 450,000 settlers immigrated to Missouri. Unlike the immigrants prior to the Civil War, the largest percentage of settlers came from the northern states of Illinois, Indiana, Ohio, Pennsylvania, and New York.

This new movement was more wave-like and spread over all parts of the state rather than as a directed flow. In addition, settlers were influenced less by geographical features than in earlier periods. Railroads and highways directed the flow of population rather than natural waterways and trails. This made the contact between immigrants and the natural forces which controlled their movements somewhat less direct. It may also be observed in the establishment of settlements which no longer represented the deliberate selection of the most favored areas but rather a filling in process by which the state was developed. Of course, the natural advantages which characterized the different regions of Missouri were as important as ever, but their preferences in regard to choice lands and sites could not always be fulfilled (Ellis 1929:151, 157-158).

The majority of immigrants to Missouri was naturally disposed to settle in areas which were counterparts of their previous surroundings. They settled on lands which were best adapted to their agricultural pursuits. Those that preferred growing grain usually settled in the river bottoms and lowlands, the fruit growers chose the Ozark border and hills, and those that raised livestock found that the plains fulfilled their needs.

Settlement was not the only area affected by the Civil War. The war had a devastating effect on Missouri agriculture, particularly in the southern half of the state where the fighting was more frequent. Those farms that were not destroyed had years of hard labor cancelled through neglect and weeds. The return of veterans, displaced residents, and the influx of new settlers rejuvenated Missouri agriculture over the next 30 years. In 1860, 45.5% of the state's total land was in use; by 1890, 70% was under cultivation (Meyer 1963:452).

The middle 1870s to the first half of the 1890s was a period filled with protesting farmers. They had much to complain about: low prices for products, high and discriminatory freight rates by the railroads, oppressive mortgages, high interest rates, and drought. In order to improve their situation, cooperatives were established for buying and selling products but did not offer the necessary relief. Therefore, the major effort was directed toward the legislature. A succession of four protest parties of farmers was formed in Missouri during this time: (1) the People's Party, created by the Grange for the election of 1874; (2) the Greenback Party of 1876-1878; (3) the Greenback Labor Party for 1880, 1882, and 1884; and (4) the Union Labor Party for 1888 and 1890. None of these parties was ever powerful enough to control Missouri's government, but they were able to focus the attention of the major parties on their demands (Meyer 1963:526-529).

In 1892 the People's Party, often called the Populist Party, was organized in Missouri and called for an eight hour work day, liability laws to make an employer responsible to injuries of workers, outlaw child labor, reduce salaries of state officials, and grant the franchise to women.

In addition to the Populist movement during the 1890s, Missouri and the rest of the nation were faced with the prospects of war. Throughout the period, the American press reported vivid details of the rebellions, concentration camps, starvations, and brutalities of the Spanish in Cuba. Finally, a reluctant President McKinley asked for and received a declaration of war on Spain on April 25, 1898 (March 1967:1208; Meyer 1963:531-533).

The war had important economic and political results for Missouri. Economically, the war produced higher prices and helped the farmers who had been suffering from depressed prices for nearly a decade. The most striking development in agriculture was the increase in the use of new machinery. Machinery, such as sully plows with wheels and a seat for the driver, corn planters, end gate seeders, spring tooth rakes, binders, threshing machines, hay ballers, hoisting forks, and corn shellers, made farming much more productive. Increased yields due to the use of machines and improved techniques, rapid developing systems of transportation, and the breakdown of isolation encouraged production for the market (Meyer 1963:453).

Besides the increase in production of the leading crops in Missouri (corn, wheat, and oats), a new interest developed in dairying, poultry production, and fruit growing. The Ozark highland region, although not suited for corn and wheat, was excellent for grazing and for the growing of certain fruits, i.e., apples and grapes. The breeding of livestock also expanded rapidly during the latter nineteenth century. The number of cattle tripled between 1860 to 1890, while the number of swine and mules doubled (Ellis 1929:158).

The impetus for mining did not occur until the Civil War when more than 3,500 tons of lead were produced for military purposes and iron was used for cannonballs and river gunboats. For several decades after the war, Missouri gave promise of becoming an iron state. During the 1860s and 1870s, iron production increased rapidly with the replacement of charcoal furnaces with coke furnaces. The peak of production reached 400,000 tons in 1877. The exhaustion of richer ores in two of the state's largest mines contributed to the decline in production (March 1967:1059-1060).

Lead mining emerged into the modern era with the formation of the St. Joseph Lead Company by a group of New York investors. At this time, little improvement had been made in the mining and processing of lead since the early 1800s. The company soon introduced new machinery and methods which increased the amount of lead yielded by the ores.

A large local demand was created for Missouri's coal from the growing preference of coal to heat homes, as well as in the use of steam to drive locomotives and to operate machines in mines and factories. Coal production rose from 100,000 tons in 1850 to 3,540,103 tons in 1900. Missouri's deposits were never great enough to make it a leading producer.

By the turn of the century, Missouri was the leading producer of barite and tripoli. The former was used in the manufacture of paint, while the latter was used in polishing powder, bottles, and filters.

The rapid development of the railroad stimulated the growth of Missouri's economy. By the turn of the century, the railroad had replaced the steamboat as the main means of transportation in the state. Steamboats were still in use, but the railroad took over the crown of transportation. Railroads could be operated through the winter, travel faster, were easier to keep on schedule, less dangerous to passengers, and did not need a highly paid pilot to guide them (Meyer 1963:467).

As the railroads spread across the state, those river towns not served by them went into a rapid decline. Therefore, it was vital for these communities to obtain rail connections. Those that did benefited from the several advantages offered by those living in the vicinity of the railroad: increase in land prices, cheaper and faster transportation of goods and passengers, and the development of industries and growth of cities.

The Missouri River, once so vital as a highway for transporting goods and people, became an obstacle with the arrival of the railroad. Many wooden bridges had been built over the smaller rivers prior to the Civil War, but none spanned the Mississippi or Missouri rivers. The railroad boom of the post-war years renewed interest in bridge building. The first bridge spanning the Mississippi River to Missouri was built at Quincy, Illinois, and was first crossed by trains in 1868. In 1871, a bridge was built at Hannibal; and, three years later, James Eads built his masterpiece across the Mississippi from St. Louis to Illinois. The Missouri was spanned in 1869 at Kansas City and later at St. Charles (1871), Leavenworth (1872), and Glasgow (1879) (Meyer 1963:473).

Missourians were so caught up in developing railroads that little attention was paid to improving roads. As late as 1910, 95% of Missouri's highways were still dirt. Motivation to develop roads did not occur until the advent of the automobile (Meyer 1963:477).

Callaway County in the Agricultural-Industrial Period

Just before the Civil War, the residents of Callaway County were almost solidly in support of the South. Approximately 800 to 1,100 Callawegians fought on the Confederate side but only 350 for the Union, all of whom fought in engagements outside the county (Williamson 1967:31-32).

The first exchange of fire occurred on July 17, 1861, at the Overton farm, 2 mi southwest of Fulton (Map 13). When it was learned that Federal troops from Jefferson City were approaching Fulton, a force of several hundred men and boys was hastily organized to meet the enemy. The homeguard fired once on the Federal troops and ran. The Federals returned the fire and also ran (Bell 1913:25). This could possibly be the reason why the skirmish was called Overton Run.

The following October, word reached Callaway County that the Union militia from Pike County was marching on Fulton. Jefferson F. Jones, a large land owner, appointed himself a Colonel and hastily organized a homeguard. Since the majority of young men was off to war, all that Jones could muster was a motley group of poorly armed old men and boys. The Federal forces, under the command of General John Henderson, were much more superior and experienced than Jones' force. For some reason, Henderson agreed to leave Callaway County alone if Jones would disband his force. Henderson's offer was accepted, but five days later Fulton was occupied by Federal forces (Williamson 1967:32-33).

According to W. Frances English, Professor of History (Kingdom Daily News 1973), the Callaway legend was concocted in 1901 by a Fulton banker and a local editor from the above related incident. The news story claimed that Colonel Jones had negotiated a binding treaty with Henderson. Since Henderson was a representative of the United States and had agreed to respect the territorial integrity of Callaway County, he had treated the county as an absolute equal with a sovereign power. Therefore, it was argued that Callaway County had negotiated a separate peace and remained outside the Union as a distinct kingdom. Thus, Callaway County has been calling itself a kingdom for the last 81 years.

The only battle fought in the county during the war was at Moore's Mill on July 28, 1862 (Map 13). A Confederate force of 250 men under the command of Colonel Joseph Porter entered the county from the north and camped near McCredie. Word of the Confederate force reached Jefferson City; and, as a result, General Oden Guitar, with a force of equal size, marched toward McCredie. While Guitar paused at Fulton, Porter took up a position near Moore's Mill and waited for the Federal forces. In the meantime, Guitar was reinforced with approximately 900 men and engaged the Confederates. The battle started around 12:00 noon and continued until 4:00 p.m.

The fortunes of battle swayed back and forth throughout the afternoon. By 4:00 p.m., the Confederates had exhausted their supply of ammunition and were forced to disengage from the battle, and Guitar made no attempt to follow. Since the Confederates held off a much larger Federal force and only retreated due to a lack of ammunition, they considered the battle a victory (Williamson 1967:34-35). The Confederates lost 6 men and had 21 wounded, while the Federals lost 13 men and had 55 wounded (Bell 1913:25). No other organized engagements occurred during the remainder of the war as Federal troops occupied the county and hostilities moved southward.

The county's economy declined and stagnated during the war. The southern states had always been Callaway County's major markets for its surplus products. The opening of hostilities totally disrupted trade. It was not until the next decade that the economy of Callaway County began to recover.

During the 1870s, the economic development proceeded at a fairly rapid pace. The county's population increased from 19,202 in 1870 to 23,670 in 1880 (Switzler 1881:493). This represented the largest increase during a 10-year period since 1830 to 1840 and could have possibly resulted from the building of the Louisiana and Missouri Railroad in 1872. The line went from Mexico in Audrain County across Callaway County to Cedar City. The railroad now linked the county to newer and larger markets for its surplus.

In order to raise the capital necessary to build the railroad, the county court issued $640,000 worth of 9% bonds. The residents of Callaway County refused to pay the interest on the bonds because members of the court were appointed and therefore not obligated to the residents of the county for their position. Five years of litigation ensued to test the legality of the debt. The case was decided in the United States Supreme Court by a vote of five to four in favor of the bonds' validity. A convention was held in Fulton to work out a compromise with the bondholders. It was agreed that since only five members of the court believed the bonds to be valid the county should assume only five-ninths of the debt. The debt was finally discharged on September 29, 1906 (Bell 1913:25-26; Williamson 1967:40-41).

During 1892 and 1893, the Missouri, Kansas, and Texas Railroad was built across the southern part of the county, following the course of the Missouri river. This railroad helped to revive the economy in some of the old river towns that had declined in importance with the demise of the steamboat.

Industry was still on a small scale and dependent on agriculture. In 1882, cattle and swine production was listed as the leading industry in the county (National Historical Company 1884:490). This was followed by horse, mule, and sheep production. There is no mention of manufacturing within the county at this time. It was not until the 1890s and the turn of the century that manufacturing gained a firm foothold in the county.

In 1894, Ambrose Ismay established a pottery at Fulton in order to utilize the clay deposits in the area. It soon was learned that the clay was better adapted to making fire bricks. The company was readapted to manufacture bricks and named the Fulton Fire Brick Company. The company owned its own coal mine and clay pit, which was located three-fourths of a mile south of Fulton (Black n.d.:42; Kingdom of Callaway County Historical Society 1981). Other industries soon moved into the county, especially the Fulton area, so that by the 1920s industry had become an important part of the county's economy.

Recent Period (1920-Present)

The decade of the 1920s was an era of improvement in the material well being of the American people and of standardization in their lives. It was an era in which horses and mules were replaced by automobiles and tractors; paving of streets and roads; increased use of electric lights and appliances; construction of water and sewer systems in towns, rendering cisterns, wells, and outhouses obsolete; and a gradual decline of small industrial and mining enterprises and the concentration of manufacturing companies.

Economic advancements in Missouri were made on most fronts due to the stimulus provided by the expansion of the construction industry, demand for consumer goods, and development in technology. However, the bituminous coal industry and agriculture did not participate in the economic boom. Coal production dropped sharply between 1916 to 1923 because of the competition from electricity and natural gas (March 1967:1308).

Farmers were excluded from the prosperity of the 1920s; they were producing more than the market could absorb. The European demand for American foodstuffs was reduced, and prices began to fall, especially since wartime price supports had been removed by federal and state governments. A majority of Missouri farmers had over extended themselves by buying additional lands to take advantage of the high prices of farm products. When the prices fell, those farmers who had gone into debt to purchase land and equipment were the hardest hit. Farm foreclosures became common. On the national level, approximately 1,200,000 farmers had left their farms by 1930.

The 1920s also witnessed an increasing interest in road construction. Several reasons accounted for this: the beginning of rural free delivery demanded a need for better roads, the introduction and growth in automobiles, and offers of federal assistance encouraging highway development. In Missouri, the tradition of local responsibility, provincialism, antiquated tax structure, and rural/urban antagonisms were all obstacles in formulating an adequate system of roads and highways. Therefore, complete control of construction was passed to the state in 1920 (March 1967:1326-1332).

In the political arena, the Republicans regained supremacy in 1921 because Missouri and the rest of the country became unhappy with the Democratic party. The country was disillusioned by Wilson's idealism and was tired of crusades, both foreign and domestic; and, on the local level, the rural community was unhappy with the Democrats for raising state taxes and blamed them for the drop in farm prices. This attitude prevailed until the stock market crash in 1929, when the blame was placed on the Republicans, allowing the Democrats to regain control in 1932.

The crash caused employers to cut production and wages, creditors began calling in loans and refusing new ones, unemployment rose rapidly, the number of bank failures increased, and prices continued a downward spiral. Legislation was enacted on the state and local level to help relieve the situation. It was not until 1933 that the Missouri legislature made any attempt at relieving the acute problem of a large number of unemployed. Reforms were made in the administration of state and county finances by reducing the number of employess and their salaries. The most significant reform was establishing an executive budget and a centralized purchasing system. These two systems allowed the state to more effectively become a junior partner in the relief and recovery program of the New Deal (March 1967:1366-1368).

Although the alphabet agencies of the Roosevelt administration brought about some reform in Missouri and the nation, recovery from the economic hardships of the Depression were not realized during the eight years of the New Deal. It was not until World War II that the nation was placed on the economic road to recovery (Meyer 1963:667).

The postwar World War II era was a period of prosperity for the country and Missouri. Rapid advances were made in the fields of science, technology, transportation, industry, and agriculture. Since the pioneer days, agriculture had always been the principal employer of labor and the chief source of wealth in Missouri. After 1940, it was overtaken and surpassed by manufacturing. Industries within Missouri have remained diversified from the beginning. Today the major industrial areas are transportation equipment, food, chemicals, printing and publishing, metal products, leather and leather goods, and lumber products (March 1967:1403).

An increase in the mechanization of agricultural production after World war II accelerated the trend in Missouri toward fewer and larger farms that began around 1900. The basic problem of contemporary agriculture in Missouri is the plight of the small farmer, caught between increasing living and production costs and a stable or sometimes decreasing income. The lack of capital prevented small farmers from mechanizing or purchasing large tracts of land. The result was a decrease in the number of farms and a decline in tenancy. Between 1900 to 1945, the number of farms decreased by 16%. From 1945 to 1960, farms decreased by 30.6%, and the average size farm increased from 145 to 197 acres. During the same period, farms comprising 500 or more acres increased by 54%. The expense of mechanization also caused migration of the rural population to urban areas (March 1967:1524; Meyer 1963:720). Today, the two key words that describe Missouri in this period are mechanization and urbanization.

Callaway County in the Recent Period

The history of Callaway County during this period, for the most part, parallels that of the state. A sharp decline (3,000) in population occurred between 1920 and 1930, continuing the shift from rural to urban communities that began at the turn of the century. The decline in farm prices, as well as the Depression, was the major cause of this shift. Even though the population in Callaway County returned to the 1920 level (23,000) by 1940, this increase was evident in the urban communities rather than the rural areas.

Over the next 20 years, various industries were developed and became an important part of the county's economy. The vast majority of these industries was located in Fulton due to its central location within the county. In 1967, the major employers were the Danuser Machine Company, Ovid Bell Press, the Mon-Con Concrete Company, Harbison-Walker Refractories, H. K. Porter Refractories, Ellis Electric, Backer Potato Chip Factory, and Samuels Shoe Company (Williamson 1967:73).

Agriculture still forms the economic basis for the county. The majority of the populous is engaged in farming, providing services and supplies to farmers, and in marketing agricultural products. The main source of income comes from grain crops and livestock production (hogs and cattle), supplemented by dairy products and poultry. The main crops are corn, soybeans, wheat, and milo (Doane 1974:7).

HISTORIC ARCHITECTURAL OVERVIEW

General

The objectives of this study are the identification and evaluation of sites which are historically and/or architecturally significant. While not all sites and structures meet the eligibility criteria for nomination to the National Register of Historic Places, their study and documentation strengthens the body of knowledge regarding man's cultural heritage. This increase in the body of knowledge concerning development patterns generally enables us to more clearly evaluate the degree of significance of material culture as both individual and collective artifacts.

One effective method of increasing our understanding of cultural processes is through the study of man-made resources, such as buildings and other structures, which have required substantial investments of creativity and resources. While ordinary objects reveal much about mankind's needs, wants, and whims, more nearly permanent artifacts, such as buildings, are especially suitable for in-depth study. Functional requirements, aesthetic preferences, material availability, and financial limitations are frequently evident in the final product known as "architecture."

Architectural resources do not always represent purity of lineage or clarity of development. Frequently they reflect evolving tastes, changing needs, and varied capabilities of owner and builder. The distinct advantage which architectural features provides researchers is that they are relatively permanent and are generally suitable for in-depth observation and quantification.

For purposes of this study, architecture has been considered in broad terms. That is, all man made structural resources, including buildings and bridges, have been considered worthy of investigation. No attempt has been made to exclude resources from examination because of lack of complexity or sophistication. Rather, all structures which resulted from construction or composition "in the field" have been considered within the realm of architecture.

Previous Work

Previous study of architecture in Callaway County includes two known works. A detailed survey of significant buildings located in Fulton has been conducted (Strawn 1980); however, this study dealt exclusively with architecture within the city of Fulton. More recently, a study of folk architecture in that part of mid-Missouri commonly known as "Little Dixie" (see Crisler 1948, 1949, and 1950) has been completed by Marshall (1981). Marshall's study presents information concerning general architectural patterns in those central Missouri counties which were settled primarily by southerners. Architectural types found commonly in Little Dixie, as well as their source origins, were explored. Although no structures in the Callaway plant site were included in Marshall's study, it was useful in evaluating the architectural resources at the plant site from a regional perspective.

Other detailed inventories of buildings near Callaway County have been conducted through the historic preservation program of the state of Missouri. The most comprehensive of these include surveys of Gasconade County (Toway n.d.) and Dent and Maries counties (Meramec Regional Planning Commission 1981). The survey of Gasconade County reveals the Germanic influence on that county's development. Architecturally, Gasconade stands in contrast to Callaway County. However, the study of Dent and Maries counties identified a number of buildings which are stylistically similar to those found in Callaway County. For example, buildings reflecting the Federalist, Greek Revival, and Romantic styles were recorded by these surveys. In addition, vernacular forms of buildings such as the "I" house and utilitarian structures were recorded.

Studies of other aspects of mid-Missouri have also been useful in developing an understanding of Callaway County. Although the orientation of these studies is not architectural, oblique references in them to communities and especially farmstead characteristics in Callaway County are illuminating. Among these are Count Baudissin's treatise on Missouri towns (Gregory 1971) and Meyers and Hammar's (1942) study of agricultural success in Callaway County. Meyers and Hammar's study was helpful in potentially associating farmsteads and farm buildings with the owner's level of economic achievement. Meyers and Hammar's study is referred to later in this section.

Architectural Traditions of the Historic Period

The following discussion is presented as an overview of architectural styles and structural types which were predominant in the Callaway plant area. The temporal periods considered have also been expanded in an effort to round out the picture of "architecture." Because this study is limited in terms of geographical area and the quantity of buildings examined, the contribution of this research effort to the field of architecture will be rather localized.

Settlement of the area during the historic period dates from the late eighteenth century in the Missouri River Valley and the early nineteenth century in the upland portion of Callaway County. Throughout much of the Midwest, distinct phases of settlement can be identified. Central Missouri is similar in this respect.

The earliest phase of development was generally characterized by livelihoods based on hunting and trapping. Hunters and trappers who inhabited the region during this period tended to be somewhat transient, following the line of retreating frontier and retreating from the influx of settlers who came in search of land for agricultural use. These frontiersmen generally practiced subsistence-level agriculture, concentrating more of their efforts on hunting and trapping than on improving and cultivating the land.

Shelters built by this class of early settler likewise tended to be temporary in nature and of subsistence level. Many were quite primitive and intended for temporary use. While some early accounts of pioneer settlement speak of lean-tos, tents, and other temporary quarters, the one which is most commonly described is the log cabin. These early structures generally consisted of a single room or pen formed by laying-up logs horizontally to form a nearly square plan-form. The logs of these primitive lodges were commonly left unhewn. Notches cut into the ends of the logs allowed for structural interlocking of the walls. Gable type roofs of boards weighted down by poles, fire pits or clay-lined wood fireplaces, and earthen floors were trademarks of these early cabins.

The yeoman class which followed was generally a poor but hard working group in search of good land and a place to settle with their families. Many of these settlers bought the holdings of the hunter/trapper frontiersmen who followed the receding line of the frontier. The farmers in turn cleared the land, built fences, upgraded the log cabins or built better houses of log or frame construction, and erected farm service buildings.

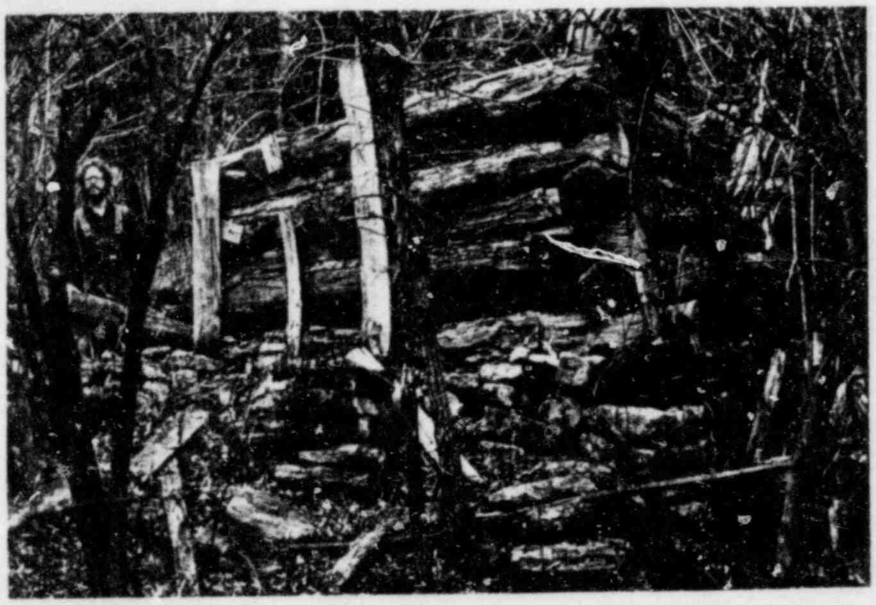
Prior to 1850, immigrants of southern heritage (Kentucky, Virginia, Tennessee, North Carolina, and Maryland) constituted the majority of settlers to Callaway County. The period from the late 1820s through the 1830s saw the greatest increase in the county's population which included white farmers, slaves, and free Blacks (Scarpino 1976:28-29). Although German settlers immigrated to the area in the 1840s, their influence was felt more strongly in the Missouri River Valley, while the Anglo-American influence predominated in the uplands.

The southern heritage of the settlers to the upland portions of present-day Callaway County was manifested in many ways. From speech patterns to political sentiments, the image of the south was evident in Little Dixie. No where were southern traditions more apparent than in the forms of the buildings erected for residential and agricultural usage.

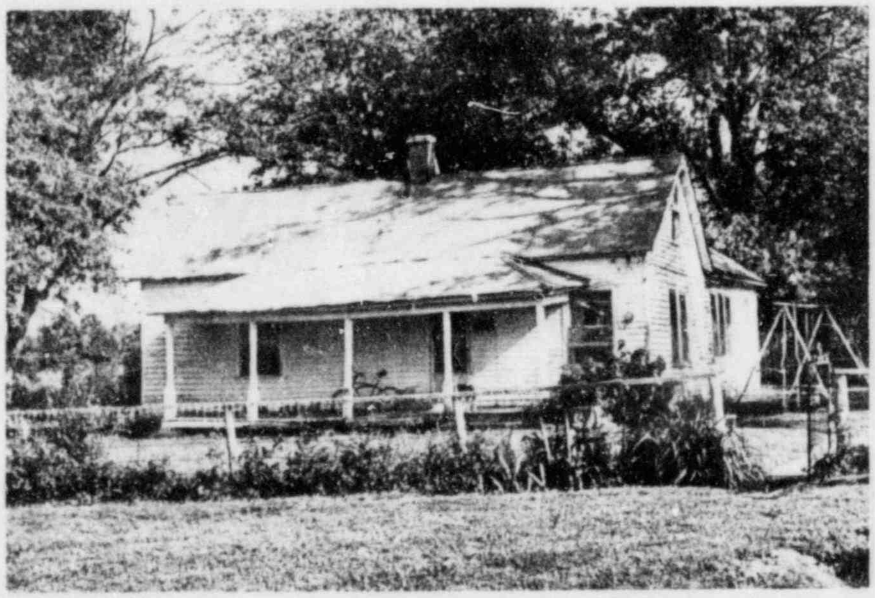
The permanent class of settlers employed both log and wood frame construction methods for their residences and agricultural buildings. Houses of log construction were generally more carefully made than were the cabins of the hunter/trapper. Logs were hewn flat on two sides, and ends were prepared with "v," half dovetail, or square type notches. Chimneys were substantial, being built of stone or combined brick and stone. Weather boarding of walnut or pine was frequently applied over the logs upon completion of construction or added at a later date. Interior walls were either left bare and whitewashed, papered over vertical boards, or plastered over rived oak lathing. Floors of wide planks were common, although narrow tongue and grooved flooring became popular as materials became more obtainable. Gable type roofs formed of poles butted at the ridge were common. Handrived shingles overlying wide plank sheathing were effective barriers to rain intrusion.

The ruins of a log house (Site 21, Plate 3a) illustrate many of these characteristics. Now in relict form, several structural details may still be observed. Worthy of note are the logs, hewn only at the ends, "v" type corner notching, and continuous stone foundation.

Use of log construction flourished in Missouri from the settlement period until the mid-nineteenth century. Development of industrialized processes for manufacturing building materials and improved transportationsystems by the 1850-1860s period greatly encouraged



3a. Log House Ruins (23 CY 339)



3b. Schulte House

adoption of balloon frame, wood construction. It should be noted, however, that log construction continued to be employed in Missouri in the twentieth century and even persists today as premanufactured house kits.

House types of log construction most frequently observed by Marshall (1981:93-100) in Little Dixie include the single-pen, double-pen, central-hall "I," and stack houses. Although houses of these basic architectural types were built of both log and of wood frame construction, the basic form of each type is generally consistent. regardless of construction materials. The single-pen has been previously mentioned. The characteristics of the type are its square or rectangular plan-form (generally measuring 16-18 ft each side), a single room space, 1 or 1 1/2 story height, and laterally oriented gable roof. The single-pen form is generally considered the building block of architecture (Montell and Morse 1976). While the single-pen house was built as an autonomous unit, expansion was frequently anticipated in the form of an adjoining room(s) or a second story.

The double-pen house essentially is one characterized by a floor plan of two rooms, having approximately the same size proportions and being laterally arranged. The spatial arrangement and fenestration of the units are frequently similar to the single-pen. Variations on the basic form result in distinctive house forms such as the hall-and-parlor and saddle-bag.

The hall-and-parlor varies from the essential double-pen house in the unequally sized rooms and single front door rather than two. The saddle-bag type is formed by adding a second room to the chimney end of a single-pen, the resulting central chimney serving both rooms.

Double-pen houses persisted as a common architectural type through the nineteenth century and into the early twentieth century. Although no example of a double-pen log house was identified within the immediate vicinity of old Reform, examples of the type in wood frame construction are evident. Two examples are located within the project area.

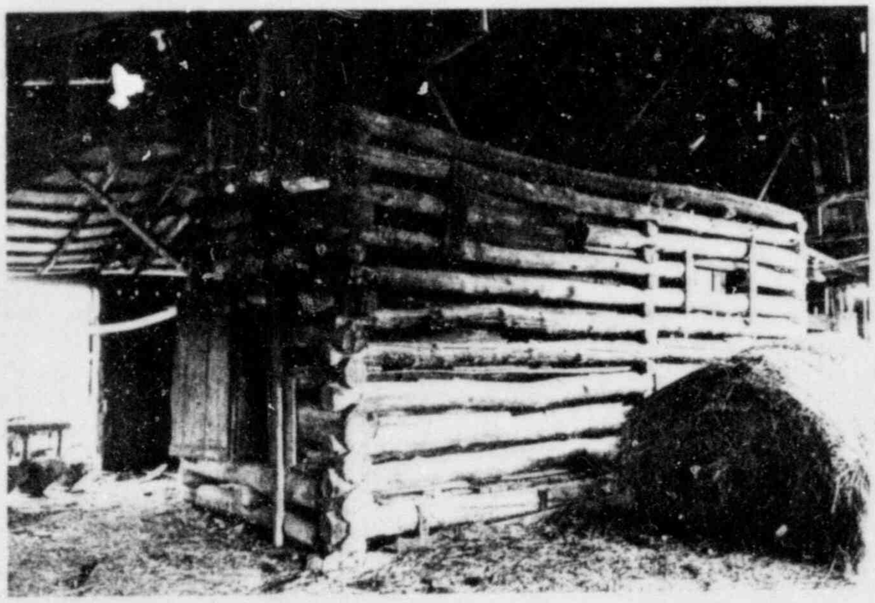
The Vernon Bezler house (Site 11) is a good example of the essential double-pen type. Both rooms of the house are equally sized and proportioned. Chimneys are located in the gables, and fenestration of the principal facade is evenly spaced and symmetrical.

The Schulte house (Site 4, Plate 3b) is a good example of the saddle-bag variation of the double-pen type. Rooms are nearly equally sized and proportioned. The flue for the house is in the center of the house.

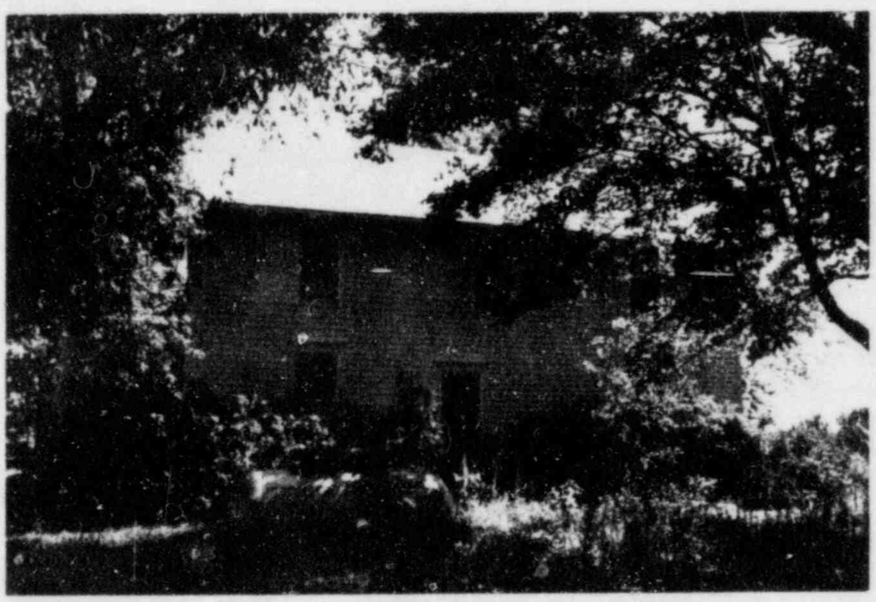
Barns, granaries, and outbuildings of log construction were also built by the early pioneer farmer. Log barns varied in size and complexity. Although no evidence of large scale log barns remains in the project area, four examples of barns were recorded by this study. Each example is distinct in its form or details. For example, the barn located on the Vernon Bezler farmstead is a two-story structure of hewn log construction with a single crib at each level. This structure is a unique example within the study area of a nonresidential structure of hewn log construction. The logs of the lower and upper sections of this structure differ in size and construction detail. The structure may have been built in two distinct phases, i.e., lower level followed by the upper, or it may be a composite of two separate structures.

Two other barns of log construction are located on the Hadley Bezler farmstead (Site 12). Both of these structures are of unhewn log construction with "v" notched corners. A partition of logs formerly subdivided barn "c" into two adjoining cribs of approximately equal size (Plate 4a).

By the mid-nineteenth century, a strong sense of permanency characterized Callaway County. The agricultural potential of the area had been recognized and was being intensively exploited. Agricultural



4a. Log Barn, Hadley Bezler Farmstead



4b. Lawrence Farmstead House

censuses from the 1850-1860 period reflect a significant increase in improved acreage, as well as general farm values. Agricultural products during this period were diversified and included livestock, grains, and tobacco, as well as fruits, wool, and flax.

Farms during this period were generally small and self-sufficient with about 50% of white farmers owning slaves in 1850 (Scarpino 1976:32-33). The slave labor force was no doubt a significant factor accounting for the labor intensive orientation of pre-Civil War agriculture in Callaway County. The latter nineteenth and early twentieth centuries were marked by consolidation and subdivision of farmsteads. It was similarly marked by increased importance placed on livestock raising over crop production. Improved mechanization and the changing labor force brought about by the Civil War were no doubt significant in prompting this transition from small to larger farms. Importation of stock as practiced by groups such as the Central Missouri Stock Importing Company (organized 1855) would also have served as a catalyst for increased involvement in this aspect of agricultural trade.

Farmsteads in Callaway County during the late nineteenth and early twentieth centuries no doubt reflected the degree of economic success enjoyed by the farmer/owner. A study by Meyers and Hammar (1942) assessed the land use of Callaway County for the period 1900-1940. They developed five classifications for farmland in the county based on productivity potential.

Other than in the river valley, the areas of highest production capacity were in the prairie areas of the county. Livestock raising and general farming prevailed in these areas at the time of the study. One specialized aspect of their study was the assessment of general farming success based on size of farmsteads and the number and quality of buildings. In general, their results indicated greater economic achievements in the prairie areas as reflected in the numbers and conditions of buildings on farmsteads. The farmsteads considered successful by this study generally consisted of a substantial number of buildings and included a large house and barn. Farmsteads rated successively less prosperous were characterized by smaller-scale buildings. Maintenance of farm buildings in each class also generally reflected the inspection levels of economic achievement.

Observations made while conducting field work for this study would generally support the findings of Meyers and Hammar. Farmsteads in the prairie areas appeared to be more extensively developed than those in the more rugged portions of the county. Houses and barns in the prairie areas appeared to be larger and better built than their counterparts in the marginal farmland areas.

Illustrations in the Meyers study, again supplemented by field observations of this author, indicate the prevalence of wood frame construction in both houses and farm buildings during the late nineteenth and early twentieth centuries. Larger houses of the "I" type, with L- and T-shaped plan-forms are most notably associated with farmsteads in the prairie zones. Transverse crib and general purpose barns were also common features of the prairie zone farmsteads.

The "I" house frequently associated with more successful farms in the area is characterized by its rectangular plan-form. a floor plan consisting of two rooms on either side of a central hallway, and its full two-story height. Fenestration of the main facade is symmetrical with respect to a central doorway and generally consists of three, five, or seven bays. The "I" house was a common architectural type in the south where it generally reflected agricultural affluence and gentility. The prototype of the "I" house is the Georgian style which was common in England during the American Colonial period. Although the Georgian mode was more elaborate than the "I" house. the symmetry and generally formal fenestration patterns of the Georgian style can be seen in the "I" house.

Three houses of the "I" type were recorded in the study area (sites 2, 12, and 15). Of the three, the characteristics of the "I" type are more clearly seen in the Lawrence house (Site 15, Plate 4b). The extended temporal popularity of the "I" house as an architectural tradition in Callaway County is evident in this house, which was built as late as 1901 to replace an earlier structure.

The Hadley Bezler House, Site 12, represents the transition from the basic building block, or single-pen of log construction, towards the "I" type house. This structure has been expanded by the addition of an adjoining room and full upper story of wood frame construction. Although lacking the central hallway and stairway, this structure exhibits the general tendency towards the "I" form.

The late nineteenth century saw considerable national expansion and development. With the advent of railroads, standardized industrial processes, and general optimism of the period, the ground work was laid f r economic development. The vitality and energy of the period were particularly evident in architectural design.

While the more formal Georgian, Federalist, and Greek Revival styles of the late eighteenth and early nineteenth centuries were generally associated with the affluent, the Victorian styles were often within the reach of even the working classes. During this period, the common man could aspire to his own Victorian cottage or chalet. Pattern books, such as those of Andrew Jackson Downing, became readily available for use by carpenters and mechanics.

Industrial processes were sufficiently advanced that building materials could be standardized, increasing product availability and affordability. Similarly, as population centers like Fulton, Columbia, and Jefferson City became increasingly stable, more skilled workers became available for the building construction industry.

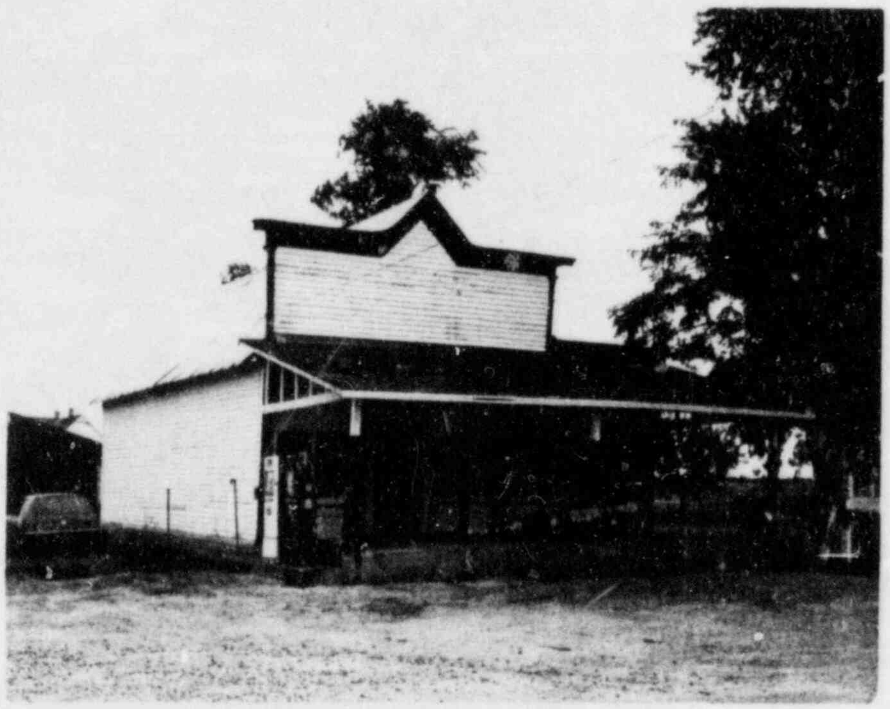
Victorian architecture can be best characterized as eclectic. Prior to the Civil War, architecture rather closely followed the Classical, Greek, and Romanesque styles. After the war, however, motifs were frequently borrowed and combined or freely interpreted to produce rich and varied visual effects.

The influence of the Victorian period on the architectural development of Callaway County is evident in the cottages and farmhouses which can be observed in the areas surrounding the project area. Frame cottages and large farmhouses as well as commercial, educational, and religious buildings in the area were built having irregular plan-forms, picturesque profiles, and ornamental gables and porches. The improvements made in industrialized production, general availability of building materials, and changes in aesthetic tastes facilitated the transition from the earlier traditional modes of building (i.e., single- and double-pen, "I" type, and hall-and-parlor houses) to the more modern and romantic Victorian styles. Adoption of these stylistically oriented modes of building indicate a trend towards integration of Callaway County with the nation and expanded cultural contact.

Within the study area, buildings such as the McCall House (Plate 5a) and the Reform store (Plate 5b) symbolized the association of rural Callaway County life with mainline national development. The general simplicity of these two buildings, enlivened by embellished gable and porch trim, indicates a definite appreciation of stylistic trends even in this rural setting.

The post-Civil War architectural resources in the Callaway plant site and immediate area are most closely associated with the Queen Anne and Eastlake styles. The Queen Anne style is characterized by the use of bay windows, various exterior wall materials and/or patterns, and

5a. W. S. McCall Farmstead,
as Illustrated in the 1876 Historical Atlas
of Callaway County, Missouri



5b. Reform (General) Store

irregularity to plan and profile. It was a genuinely flexible mode of building which afforded the owner a personalized sort of picturesqueness.

The Eastlake style, named for the British architect Charles Locke Eastlake, is characterized by ornate wood trim such as turned posts and spindles, jigsaw cut patterns, shallow incising, and delicate ironwork. While the degree of elaboration of buildings in the vicinity of the plant site is generally less than found in Fulton or even Portland, the imprint of Victorianism is visible in the architecture of rural Callaway County.

Rural Callaway County experienced a number of changes during the first quarter of the twentieth century. The numbers of farms decreased, although the acreage per farm increased; likewise, the rural population decreased during this period, and farming operations became increasingly mechanized, all allowing and encouraging these trends.

Construction activities in the survey area seem to have been concentrated more on farm service buildings to accommodate farming activities than on any other building type. No example of residential construction from approximately the 1910s-1950s was observed in the study area. However, construction of farm service buildings as well as remodeling and additions to existing houses was noted.

Farm service buildings which were identified represent the diversification of the economy of rural Callaway County. Transverse crib and general purpose barns were the largest utility structures observed. Originally used for hay storage and stock shelter, these structures have been modified in use and sometimes in structure for storage of modern machinery.

The transverse crib barn is characteristically rectangular in plan-form, with the ridge of the roof oriented parallel to the long axis of the building. Primary entrances are located in the gabled facades and provide access to a central aisle. Various cribs and stalls are located on either side of the central aisle.

The transverse crib barn is believed to have originated in the southern Tennessee Valley during the nineteenth century. The basic barn type probably developed from an earlier tradition of constructing parallel log cribs facing into a central passageway with the roof ridge parallel to the long axis of the structure (Glassie 1968:89).

The general purpose barn varies in floor plan but frequently resembles the transverse crib barn in exterior appearance. The significant differences are the absence of the central aisle in the general purpose barn and a greater degree of irregularity in its arrangement of stalls, cribs, and machine storage bays. Both types of barns vary in size and structural systems. In the project area. examples of both building types are of heavy timber construction. The addition of lean-to sheds on either side is a common modification of barns which was observed. Roof types are also varied, the gable, broker gable, and gambrel types being most common.

Farmsteads in the area generally consisted of the house, one or more barns, and various outbuildings. Pole frame barns, granaries, smokehouses, chicken coops, privies, pumphouses, and fruit cellars were generally associated with the house and main barn on farmsteads which were active from the nineteenth century to the present day.

It can generally be concluded that architectural patterns of Callaway County, and particularly in the study area, parallel those found in the southern uplands. The basic forms reflect the persistence of traditional methods of design and building which were familiar to settlers who came from the south to occupy and develop the region. The results of this study generally support the findings of previous researchers who have observed the similar vernacular characteristics of buildings located in Little Dixie.

RESEARCH DESIGN

In September 1981, American Resources Group, Ltd., submitted a research design to Union Electric Company and the Missouri Office of Historic Preservation. After review, this document became the framework for the problem-oriented research in the Callaway Nuclear Power Plant study area. Research questions and hypotheses addressed issues relevant to both prehistoric and historic archaeological concerns. The questions and hypotheses outlined below represent the final format statement of these questions as they were addressed during field investigations and subsequent laboratory analysis.

The following research design is guided by rather diverse yet interrelated variables which are inherent to the practice of cultural resources management. These variables include contract requirements and objectives as outlined in Specification No. ESD-104 (Appendix A), topographic and vegetational conditions in the study area, and the level of the proposed effort, in this case, a Phase 1 survey and assessment.

The primary study objectives identified by Union Electric Company in Specification No. ESD-104 (Appendix A) are as follows: 1) conduct an intensive on-the-ground survey and report evaluation of an area sufficient to determine the number of cultural resources present, their spatial and temporal extent, and their potential eligibility for the National Register of Historic Places and 2) develop an appropriate management plan for all cultural resources sites within the project area.

In keeping with the primary objectives as stated in this scope of work and the intent of Union Electric Company, this research effort will focus primarily on the location, assessment, and evaluation of all cultural resources (prehistoric, historic, and architectural) within the residual lands surrounding the Callaway Nuclear Power Plant site. The evaluation will be for the determination of the potential eligibility for nomination to the National Register of Historic Places. This type of survey effort is referred to as a Phase 1 survey by the Missouri Office of Historic Preservation.

Prehistoric Research Design

Archaeology attempts to answer questions about human adaptations to varying habitats through time. Cultural and biological adaptations which are susceptible to archaeological investigation include technology, subsistence, settlement patterns, social organization, ideology, and human biology (Morse et al. n.d.). Since understanding changing environments is a key element in the investigation of these adaptive strategies, the study of ecology and geomorphology plays a major role in archaeological research today.

A cultural-ecological approach stressing the relationship between a prehistoric group and its natural environment will be employed in implementing the above study objectives. A prehistoric group is viewed as a cultural system consisting of functionally interrelated and interdependent subsystems or parts (Binford 1965:205-207) that articulates with its biophysical environment through a highly complex set of patterned relationships (Struever 1968:135). Change in one subsystem may precipitate directly a change in another subsystem or have the potential for affecting other aspects of the total cultural system. Likewise, the biophysical environment within which a cultural system operates may precipitate adjustments (e. g., adaptations) reflecting particular modes of behavior or a range of substitutable behavior patterns geared toward efficient exploitation of critical resources. It is these kinds of adjustments that provide a basis from which a culture may achieve higher levels of growth and complexity through time.

From this brief overview, it is clear that there is a direct relationship between the types of research problems that can be investigated and the nature, intensity, and duration of any given research project. Research questions which are appropriate to a Phase 1 archaeological survey relying primarily on shovel testing as a means of data recovery are addressed. Questions relating to topics requiring large amounts of data (e.g., human biology and ideology) are not appropriate, since hypotheses relating to these areas are not testable or only marginally testable in a Phase 1 effort. However, research questions relating to technology and settlement patterns in relation to the natural environment can be addressed in a Phase 1 survey. The research design and problem orientation for this study will pose questions relating to two of mankind's important strategies: technology and settlement location.

The ecotone concept (Odum 1965:278) is useful to an ecological approach focusing on site location and distribution. However, it is recognized that the ecotone-edge effect concept is still open to debate on ecological grounds. Rhoades (1978:608-612) questioned the validity of applying this ecological concept to archaeological data suggesting it be modified or discarded. He reasons that species diversity is a function of "continuous" environmental gradients where populations blend into one another rather than a junction between discrete communities. Conversely, Davy (1980:346-348) argues that the ecotone-edge effect concept is still valid and widely accepted by ecologists. Although Davy agrees with the continuum point of view, he maintains that it does not deny necessarily the existence of ecotones or edge areas, noting that "the edge effect [although revised] is still a viable concept" (Davy 1980:348). The ecotone concept is employed in this report both as an aid in hypotheses testing and in order to assess its applicability to future archaeological research in the prairie forest regions of the midwestern United States.

The plant site survey area encompasses approximately 5,848 acres (2,367 ha) of deciduous forest/tall grass prairie that bordered the Missouri River prior to Euro-American migration and settlement. It is an excellent example of a marginal transition zone (Collier 1953:9) that possesses a degree of regional unity. This zone is 20 mi wide north of the Missouri River and generally parallels the river as it flows from west to east in central Missouri. Physiographically, this zone borders the more rugged Ozark highlands to the south and the dissected till plains to the north. Although it is lower in elevation, less intricately dissected, and with slopes less steep than the interior highlands, it is considerably more rolling and hilly than the till plains to the north.

Such a biophysical environment is not uniform with respect to exploitable resources at any given time or through time. Distribution and seasonal availability of resources (Flannery 1968:74) is perhaps the most crucial factor. The diversity and density of biotic communities within ecotones usually are characterized as being greater within such transition areas than in the major overlapping communities (e.g., Fitting 1966; Gumerman et al. 1976:5-6; King and Graham 1981:132), producing the "edge effect" (Odum 1965:278). Therefore, it is expected that such a transition zone reflecting greater species diversity and density will reflect an increased utilization and occupancy by prehistoric groups, resulting in a greater density and complexity of archaeological sites.

Although a variety of site types may be expected due to a wide a variety of floral and faunal types present in the area, the physical aspects of its topography make the area more conducive for exploitation by mobile hunter/gatherer groups or temporary specialized task groups from more sedentary groups outside the research area. Much of the area consists of a rolling topography, restricting its potential use for sedentary horticulturalists. The lack of an extensive arable floodplain within the immediate area would suggest that horticultural groups, if they were in the general area. would have emphasized exploitation of game, wild plant resources, and, perhaps, chert. Further, since the prehistoric aboriginal inhabitants of the area remained hunter/gatherers until the Woodland period, and still pursued these activities through post-contact times, it is expected that hunter/gatherer sites will be the most frequently occurring site types.

If the assumption that the material remains of cultural groups that presently exist within the survey area is the product of a general hunting and gathering mode of existence, then certain other observations concerning present-day ethnographic accounts of hunters and gatherers are applicable.

Societies with an extractive (energy capturing) subsistence base economy normally maintain a surplus of potential food within their domain by consistently keeping themselves below the maximum short-term carrying capacity of their environment (Birdsell 1968; Casteel 1972). However, this is dependent upon the type of extractive technology employed and the amount of resources available. Generally, it is conceded that extractive societies accomplish this "below carrying capacity" effect through a combination of regulating the size of their exploited domain or territory and increasing their reliance on gathering when other resource bases fail. In other words, human exploitation and procurement activities reflect an ordered adjustment to the factor of distance based on the principle of "minimal time expended/maximum return of resources" (Judge 1971).

The distribution and seasonal availability factor has a direct effect on the density and yield of edible resources. If density and yield are low, the exploited territory will be increased to accommodate minimal threshold requirements for survival (Hassan 1979:141-142; Wilmsen 1973:22-25). Likewise, if density and yield are high, the size of the exploited territory will be decreased to meet critical resource needs.

The strategy outlined in this section is directed towards the implementation of the primary research objective -- to investigate the relationships between site location and distribution with respect to environmental resource zones contained within the section of prairie/oak-hickory forest that crosscuts the survey area. Defining the association between site category and environmental variables is thought to provide potentially useful information for future investigations within the survey tract. The advantage to locational analysis is that it can be used inductively to generate hypotheses from a set of data with specified geographical and cultural parameters or deductively to solve specific problems or hypotheses (Trombold 1977:86).

Four procedural steps will be followed in achieving this objective. These are:

1. Formulation of hypotheses
2. Conduction of field survey and data collection
3. Data analysis and hypothesis testing
4. Interpretation and evaluation of results

Formulation of Hypotheses

Introduction. Although it is recognized that a number of cultural and ecological factors in addition to resource potential affect the location and distribution of prehistoric human settlements, it is assumed that:

> throughout prehistory archaeological sites were located to capitalize on the presence of certain discernible features and resources; examining the intersection of

various environmental variables should therefore provide insights into the patterning of archaeological site locations (Benchley et al. 1981:3).

The temporal/cultural dimension of sites has been relegated to a secondary role in favor of site type (often based on morphological attributes). This was done for the following reasons. Since the initial field investigations were restricted to a Phase 1 survey (intensive surface reconnaissance and subsurface shovel testing), the quantity, quality, and range of cultural materials recovered were highly variable. Sites ranged from a few dense and extensive scatters of cultural debris (primarily lithics) to a predominance of sites with less dense and less extensive artifact scatters, yielding only a few artifacts per m^2. Thus, the degree of consistency that one can achieve in obtaining temporally diagnostic cultural items (e.g., projectile points and ceramics) from a Phase 1 survey are extremely variable.

Problems of data quality and recovery also exist for local artifact collections. Access to, recording, and photographing private collections are dependent upon the wishes of the local collector. All collectors are selective of the artifacts they collect from sites. Some collect only projectile points, others collect projectile points and ceramics, and still others may collect items that are not particularly diagnostic temporally. Another problem with local collections is provenience. Artifacts accumulated from years of collecting without detailed notes and records relating to site location and provenience are limited to the kind of information sought in establishing a cultural/chronological framework for the research domain. Suffice it to say that the temporally diagnostic artifacts that were recovered will be dealt with using the traditional methods of establishing cultural types and delineating time-space relationships to existing cultural complexes within the region.

Likewise, specific site functions (e.g., hunting camps, butchering stations, nut processing stations, etc.) are equally difficult to assess for each habitation and limited activity site based on survey data. This usually requires test excavations and/or full-scale excavations involving faunal and floral analyses of recovered remains and microscopic examination of chipped stone tools to determine wear or use patterns. This is not meant to ignore the use of "innovative" approaches utilizing tool index ratios (e.g., Fish 1978; Taggart 1967) as a reflection of subsistence activities, only that problems in obtaining adequate lithic samples from survey data severely limit the use and underlying assumptions of this approach.

Although pedestrian survey and shovel testing techniques do pose certain limitations outlined above, site typologies can be constructed using survey data. It is suggested that site categories based on morphological attributes (Wood 1978) can be an effective measure of determining site complexity with regard to implementing the primary research objective under consideration.

Before presenting the different categories by which sites located in the study area can be classified, a distinction should be made between site and isolated find. The term "site" is defined here as any circumscribed place where two or more artifacts are found due to human occupation or activity. Each site was duly recorded in the field and eventually assigned an Archaeological Survey of Missouri site number. However, any area in which only one artifact was found was assigned a field number and designated an "isolated find." Due to their limited nature, isolated finds are not included in the discussion of site location and hypotheses testing but are discussed separately.

<u>Variables</u>. The following general categories will be used to define different types of sites.

1. Habitation sites -- contain cultural deposits related to seasonal occupation and may include subsurface features. Organic

staining indicative of residential structures and task specific activities may be represented. Site size is moderate to extensive. Density of cultural debris and diversity of artifact classes are moderate to large. Two kinds of habitation sites may be defined.

a. Residential base camp or village -- the hub of subsistence activities, the locus out of which foraging parties originate and where most processing, manufacturing, and maintenance activities take place (Binford 1980:9). Residential base camps may be manifested in the archaeological record as large sites with a high artifact density and a wide diversity of tools and other artifacts. Cultural features are usually present.

b. Field camp -- a temporary operational center for a task group which maintains itself while away from the residential base and may be expected to be further differentiated according to the nature of the resources to be procured (Binford 1980:10). The task groups may function to procure resources for social groups much larger than themselves; sites may vary considerably, depending upon the size of the group and the nature of the tasks to be performed. Subsurface features may be present.

2. Limited activity sites -- contain no subsurface features or structures nor cultural deposits of substantial integrity related to seasonal occupation of the site. Organic staining is absent. Site size is generally small and the area is occupied for only a short period of time. Density of cultural debris and diversity of artifact classes are limited severely due to the extractive nature of the limited activity.

3. Mounds -- are noted to occur within and at the western edge of the survey area along Auxvasse Creek. Mounds within the lower Missouri River drainage basin have been described as earth covered circular or rectangular shaped stone chambers containing burials (Broadhead 1880; Chapman 1948; Denny 1964; Fowke 1910; Harrington 1938; Klippel 1965).

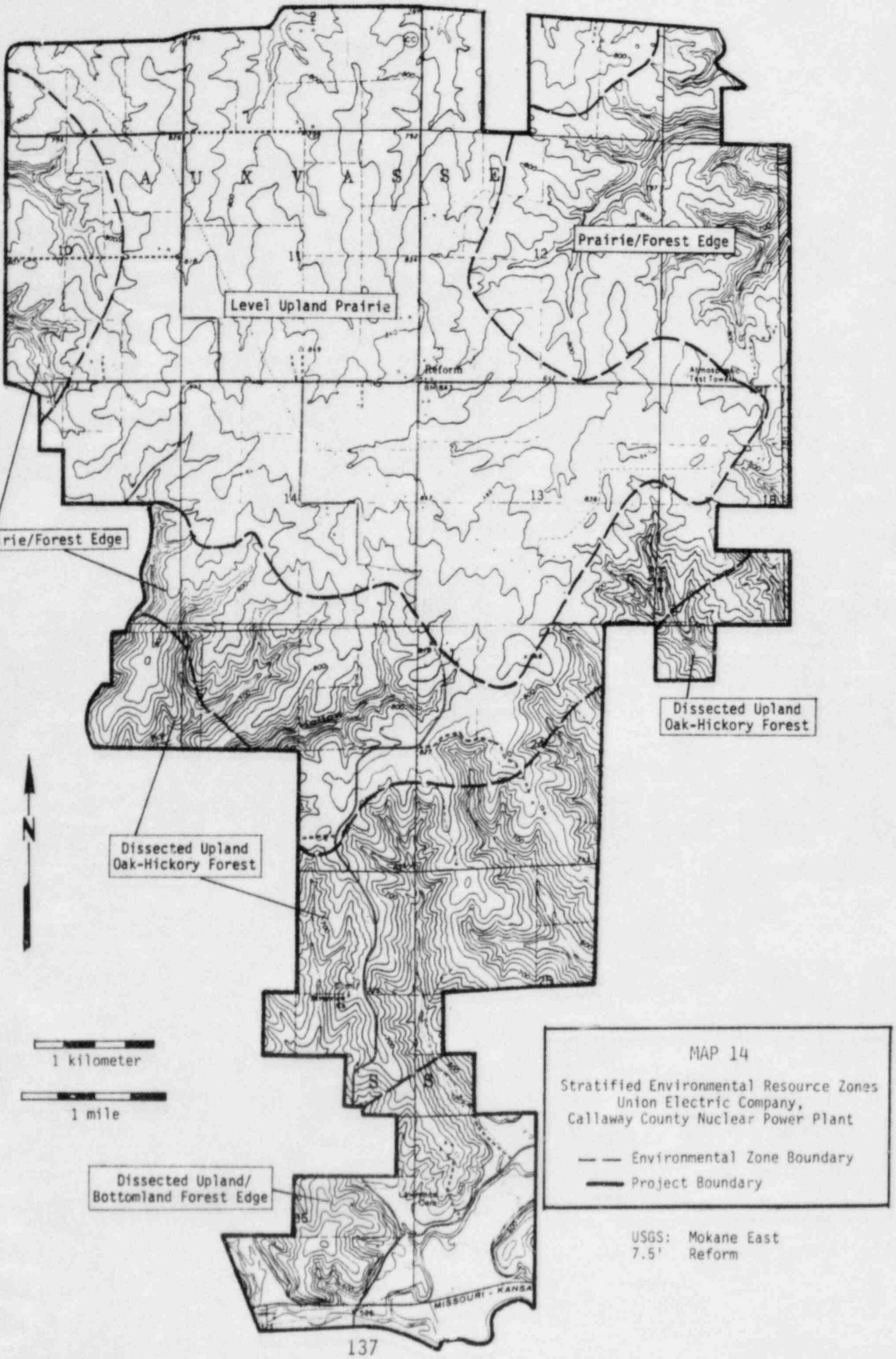
In a sense, their function as burial mounds used to inter and preserve the dead is a highly specialized activity. Although burial mounds do not relate directly to settlement-subsistence activities, they were once part of a larger settlement-subsistence system. Hence, a separate category will be used to refer to these sites.

Potentially meaningful environmental variables include topography (or landform), vegetation zone, type and distance to nearest water source, stream rank order, type and quantity of potentially exploitable resources, and distance from sites to those resources. The general usefulness of environmental variables has been established by previous locational studies (Brown 1981; Plog and Hill 1971).

Environmental variables isolated for use in hypothesis testing include vegetative (resource) zones, chert resources, distance to these resources, and topographic zones. Discussion of topographic and vegetative variables appears below; chert types have been discussed previously in the Environmental Setting.

Inspection of the local topographic and vegetational features indicates that the study area may be classified into four physiographic zones: Level Upland Prairie, Prairie/Forest Edge, Dissected Upland Oak-Hickory Forest, and Dissected Upland/Bottomland Forest Edge. Additionally, a bottomland forest zone is located just south of the southern border of the project area on the 3.8 km wide alluvial plain of the Missouri River. Map 14 and Figure 3 illustrate these zones with respect to the survey area. As can be seen from the map, these zones have a general north-south orientation, progressing from relatively flat upland plains in the northern portion of the tract through heavily dissected ridges and narrow valleys containing oak-hickory forest to flat alluvial bottoms of the Missouri River floodplain.

It is also apparent that a hierarchical scaling of these zones with respect to number and diversity of faunal and floral species could be



A U X V A S S E
10
11
12
Level Upland Prairie
Prairie/Forest Edge
Reform
13
14
Prairie/Forest Edge
Dissected Upland
Oak-Hickory Forest
N
Dissected Upland
Oak-Hickory Forest
1 kilometer
1 mile
Dissected Upland/
Bottomland Forest Edge
MAP 14
Stratified Environmental Resource Zones
Union Electric Company,
Callaway County Nuclear Power Plant
Environmental Zone Boundary
Project Boundary
USGS: Mokane East
7.5' Reform
MISSOURI - KANSAS

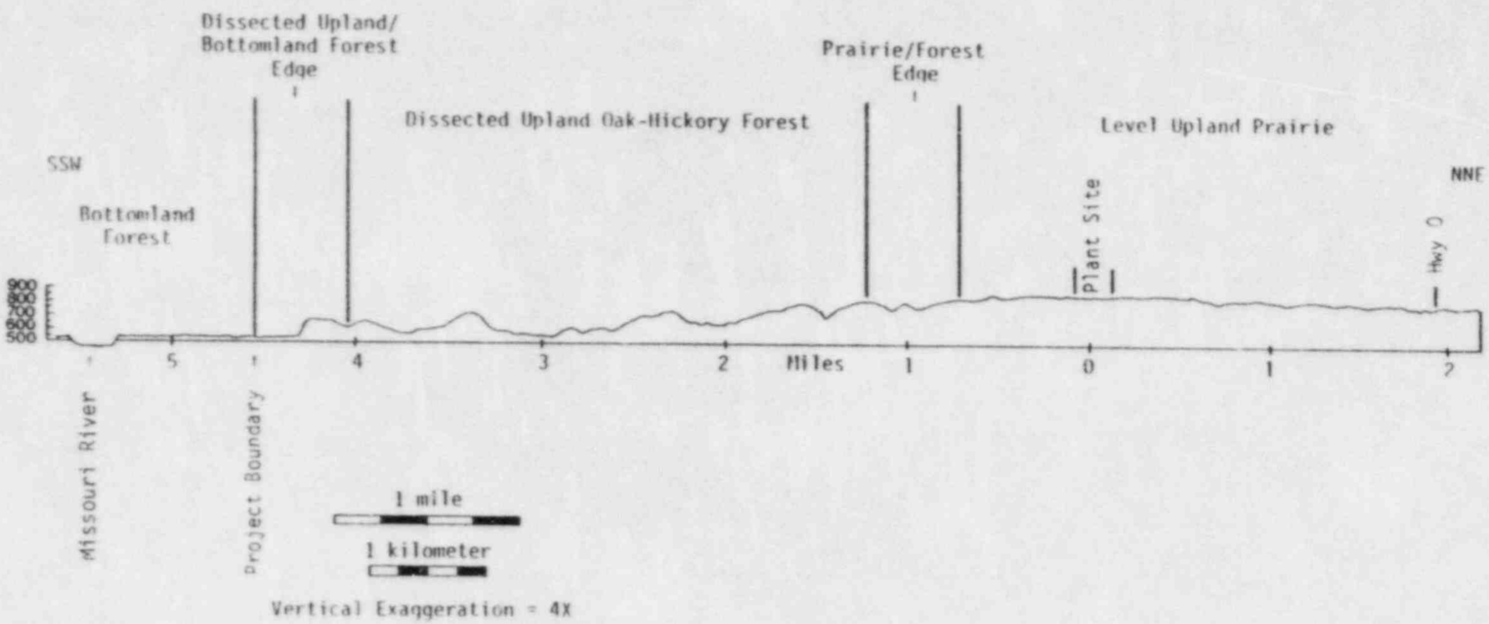


Figure 3

Topographic Cross Section of Project Area constructed suggesting differential use and importance to past prehistoric groups. A preliminary assessment of government land office records, coupled with existing published data (Howell and Kucera 1956; Kucera 1961; McComb and Loomis 1944; Schwartz and Schwartz 1959; Steyermark 1940. 1963; Wuenscher and Valiumas 1967) on faunal and floral resources, suggests that these zones may be ranked in order of food resource importance. A tentative scaling in order of decreasing resource potential would be: Dissected Upland/Bottomland Forest Edge, Prairie/Forest Edge, Dissected Upland Oak-Hickory Forest, and Level Upland Prairie.

The Dissected Upland/Bottomland Forest Edge covers 395 acres and contains marsh, swamp, and small oxbow lakes, resulting from seasonal flooding, as well as several creeks and stream terraces. This lacustrine belt was ideal for a variety of small and large mammals, waterfowl, freshwater fish, and mussels. In addition, on the north, this zone encompasses sheer vertical cliffs or bluffs and ridge tops containing oak-hickory forest species. A variety of nuts and berries would have been available during the fall.

The Dissected Upland Oak-Hickory Forest zone covers 860 acres and would have contained a variety of nuts, seeds, and berries as well as small and large game mammals. Large game animals, such as deer, tend to congregate in this interior woodland area during the fall and winter months.

The Prairie/Forest Edge is basically an eastward trending belt but also flanks the Level Upland Prairie on the east and west sides. This belt which encompasses 2,038 acres would have contained both prairie and woodland species, offering a variety of nuts, seeds, and tubers and primarily small game mammals that favor open woodland stands interspersed with grassland.

The Level Upland Prairie which covers 2,555 acres was conceivably the least favored zone in terms of food resource potential, containing seeds and edible grasses.

Chert resources were also identified and collected from creek beds throughout the project area as well as from residual sources on eroding hill slopes to assess the distribution and quality of locally available chert materials. The results of this chert survey will be discussed in a separate section.

Hypotheses

The following hypotheses are proposed for testing cultural/environmental variables and relationships. These hypotheses were derived from a general consideration of ecotone characteristics and hunter-gatherer subsistence/procurement strategies.

Hypothesis 1: If exploitation and procurement of critical food resources by a prehistoric group within its local environment operated under the principle of "minimum distance traveled/maximum return of resources," then site density will correlate positively with the food resource potential of the environmental zones in the project area.

Test Implication:

Higher site density will occur in zones of high resource potential, and site density will decrease as food resource potential decreases.

Hypothesis 2: If exploitation and procurement of critical food resources by a prehistoric group within its local environment operated under the principle of "minimum distance traveled/maximum return of resources," then site complexity will correlate positively with the food resource potential of the environmental zones in the project area.

Test Implication:

Zones with higher resource potential will reflect a greater overall site complexity, and site complexity will decrease as food potential decreases.

Hypothesis 3: If exploitation and procurement of chert resources by a prehistoric group within its local environment operated under the principle of "minimum distance traveled/maximum return of resources," the selection and acquisition of suitable raw materials for fabricating stone tools will favor locally available chert resources as opposed to nonlocal or imported lithic resources.

Test Implication:

A greater frequency of the locally available vs. nonlocal chert(s) will be represented in recovered debitage and tool collections.

Hypothesis 4: If exploitation and procurement of critical resources by a prehistoric group within its local environment operated under the principle of "minimum distance traveled/maximum return of resources," then sites representing initial stages of lithic reduction will be located closer to the source area(s) than sites representing secondary and final stages of lithic reduction or modification of selected raw materials.

Test Implication:

Sites located closer to identified chert source areas should possess a proportionally greater debitage-to-tool ratio (i.e., cores, primary and secondary decortication flakes, and shatter numerically greater than projectile points, scrapers, drills, interior flakes, pressure flakes, etc.).

Historic Research Design

Theoretical Background

Settlement archaeology has proven to be a productive tool in attempting to understand past human behavior and cultural processes. Redman (1973:11-16) commented on how several kinds of settlement data bear on a wide variety of problems and questions. The application of historic settlement pattern concepts to Missouri archaeology are evident in the work of Price et al. (1975), Price and Price (1978a, 1978b), O'Brien and Warren (1979), Miller (1979), and Ekberg et al. (1981).

Position, form, structure, and distribution of human occupation in relationship to natural and cultural environments are utilized in the analysis of settlement patterns. It is recognized that analytical studies within settlement archaeology represent an attempt to identify and interpret patterns by examining factors related to settlement origin, function, and development. Settlement is defined here as "the geographic and physiographic relationships of a contemporaneous group of sites within a single culture" (Winters 1969:10).

Two sets of conditions must be taken into account when examining a settlement, "site" and "situation" (Miller 1979:10). Site characteristics are "the features of the local environment on which settlements are established and over which they grow" (Eschman and Marcus 1972:28), while the situation refers "to the physical conditions relative to the site that extend over a wider area than the actual settlement occupies" (Eschman and Marcus 1972:28). Therefore, a site may be represented as a structure used for shelter as well as the natural resources directly available to the occupants, while the situation of the settlement is the total physical environment that interrelates with the settlement. When integrated, these characteristics of settlement provide the framework within which patterns of regularity and variability may be constructed. They also assist in developing models to explain some facets of cultural dynamics.

The geographic relationships characteristic of settlement patterns refer to those man-land relationships involving sites. Physiographic relationships refer to those between "sites and features of the biophysical environment, such as streams, landforms, vegetation zones, and soils" (Roper 1979:17-18). Which set of relationships is emphasized is determined by the theoretical bias of the investigator and the nature of the problem. This bias also determines the method used to examine the relationship, determines the data to be collected, and the techniques used to analyze them. This study focuses upon man-land (physiographic relationships), analysis of settlement patterns, and changing spatial distribution through time.

Objectives

The general objectives and methods for historical research are similar to those for the prehistoric survey and assessment. Specific historical research and historic archaeological survey objectives include:

1. Locate and evaluate historic occupations within the survey area.

2. Identify historic sites by functional type. Site type designation can be used as a tool to gain insight into the manner in which the survey area was utilized by historic populations, as it is essential in determining settlement patterns. The model used in this study is based upon surface scatter size and shape and artifact density and diversity.

3. Study historic settlement patterns through time using spatial and environmental variables. Similar environmental factors affected both prehistoric and early historic populations. Such factors as access to water, arable land, and other resource zones were desired by both populations.

4. Integrate these historic archaeological and historical research data using a cultural-historical framework to evaluate the historical resources.

Historic Site Types

The site type model to be used in this study (Powell et al. 1982:22-51), within the framework of site formation processes, attempts to improve the analytical and interpretive clarity of both high and low visibility historic sites. Most rural historic archaeological sites in the midwestern United States have no above-ground structural remains and few subsurface features by which to identify the site, appearing as surface scatters of refuse (Merritt and Butler 1980:1). Few historical documents exist which can be used to identify the use of the site as a habitation structure, outbuilding, or discard area. Site type is difficult to identify because cultural features have been altered continuously by natural and cultural formation processes since the time they were built in systemic context. The importance of formation processes upon the quality of site content has been recognized only recently (Schiffer 1976:passim; 1977:13-40).

Site Formation Model. The model is designed to identify site function and intra-site structural patterns not regional settlement patterns. Evaluation and refinement of the model is accomplished by its comparison to the results of the historic architectural study conducted for this project.

The site type model is designed to be general in scope in order to test its applicability in the Midwest. In this manner, modifications of the model could be made to fit the characteristics of a particular study area.

Most rural cultural features in the Midwest enter the archaeological record through four main stages: abandonment, scavenging/decay, final destruction/removal, and cultivation. When a habitation or outbuilding structure is abandoned, unwanted items remain at the site, often in large quantities ranging in size from very small items, e.g., buttons, nuts, and bolts, to large items such as vehicles and farm equipment. The abandonment of a cultural feature subjects it to scavenging, an important agent in the reduction of the number of artifacts remaining on the site and decay of high-profile features (buildings). Unrecorded observations indicate that scavenging usually occurs continually until the site enters the archaeological record. Late in the scavenging/decay stage, wooden structural members decay to an extent where salvaging is no longer desirable.

In the third stage, the structure is destroyed and removed when the landowner chooses to use this land, usually for farming. Burning, a common method of reducing structural remains, minimizes the cost and labor input of removing structures. In recent years, heavy equipment has been used to demolish the structures. Alternatively, a structure may be deposited in a nearby ravine or presently uncultivated area. Sites from which structures have been removed by heavy equipment may vary enormously in the amounts of material present, the shape of the surface scatter, and the degree to which admixture of items and features occur. All large items which could damage agricultural equipment, such as portions of a foundation, are removed. Thus, the site becomes a surface scatter of primarily small broken items.

Site Type Model. Although many habitation sites can be identified from their surface scatters, others, because of the formation processes discussed above, are of questionable identity. The basis of the scheme presented below is reminiscent of South's artifact patterns (1977:93-102). Habitation sites have been divided into three groups.

Type A Habitation Site. This type of site functioned as a house and often is readily identifiable in the field. The house was usually of medium to large size and of substantial construction. The foundation generally was made of sandstone, limestone, or brick and was under the entire perimeter of the house. The structure was made of log, wood frame, stone, and, sometimes, brick. Since the structure was of substantial construction, it probably was occupied for a relatively long period of time and by more than two people. Outbuildings were numerous; a cistern or well usually was present, and a basement was common. This type of house was constructed by people of middle or upper economic status and is typical for the period between ca. 1850-1930.

The geographical site which is produced by Type A habitation generally is located on level to gently sloping terrain, has a circular or surface artifact scatter, and is relatively medium to large in size. Artifact density and diversity on a Type A habitation site can range from medium to high.

Artifacts which are present on this type of site usually are nails and other metal construction materials, brick, sandstone, limestone, earthenware, stoneware, window glass, bottles, canning jars, pressed glass containers, metal objects, toys such as marbles, slate pencils and boards, pipes, buttons, and various domestic items. Ceramics usually represent a sizable percentage of the total number of artifacts with a larger ratio of earthenware to stoneware. A relatively high percentage of earthenware is generally a good indicator of a habitation site. The quantity and quality of artifacts reflect the economic status of the site.

Type B Habitation Site. This type of house was smaller and of less substantial construction than a Type A habitation structure. The foundation often consists of stone or brick supports under the four corners and midway along the length of the house, although they could occur under the entire perimeter of the house. The structure was usually of wood frame construction, rarely made of brick. Outbuildings would be less numerous and of less substantial construction than those associated with the Type A structure, and a cistern or well was present. This type of house generally was constructed by people of low or middle economic status but housed the same number of people as a Type A structure and was occupied for a similar duration.

An archaeological site of this type is located on level or gently sloping terrain but may occupy smaller landforms than the Type A habitation. The site is generally a small to medium circle or oval with low to medium artifact density and diversity. The classes of artifacts present on this type of site are the same as those for the Type A site although fewer in number, of lesser quality, and lower diversity than those of a Type A site due to the lower economic status of the occupants. Objects recovered tend to be more multifunctional, and broken items may be repaired more often than on Type A sites. Ceramics constitute a higher percentage of the artifact assemblage, with a higher percentage of stoneware, redware, and yellow ware than those for a Type A site.

Type C Habitation Site. This site is smaller in structure and less substantial than Type A and Type B. This type of structure often is constructed with little investment of time and money and considered to be temporary until a more spacious and substantial structure could be afforded by its inhabitants. The structure was usually supported only on the four corners and midway along the length by stone blocks, rarely by brick.

The occupants were not necessarily of low economic status. Occupants of a high economic status may have brought with them highly valued items, especially earthenware, which would be indicative of their economic status in their former locality. A habitation site of this type produces an archaeological site of small size occupying a level to gently sloping terrain with low artifact density and diversity and a small constituent percentage of building materials, earthenware, and glass.

Nonhabitation Site. Nonhabitation structures generally are referred to as outbuildings, including barns; garages; tool sheds; animal houses; smoke, wash, or milk houses; corn cribs; root cellars; and outside toilets. These structures were constructed predominantly of wood with a few constructed of brick. Structural clay tile and cement blocks were commonly used in construction after ca. 1900. Roofs were often covered with tin, and foundations were often nonexistent. Support on the four corners and midway in the length was common, although stone and cement foundations appear to increase in occurrence through time. Floors usually were made of wood and were of bare ground. The number of gravel or cement floors appears to have increased with time and higher economic status of the occupants. Outside toilets always had subsurface features, while milk houses occasionally had a shallow subsurface feature. Other types never had them. Most nonhabitation structures occur relatively close to habitation sites.

The variables for nonhabitation sites produce archaeological sites which vary in size and associated terrain, with circular to oval configurations. Some types of nonhabitation sites, e.g., outside toilets and root cellars, are located near a habitation structure while barns, machine sheds, and animal shelters are found further from the habitation site. There can be a wide range of artifact diversity and density among combinations of various types of outbuildings.

Earthenware, stoneware, glass, and metal objects occur in low percentages at all of these sites. Stoneware vessels should be more common than earthenware. Glass bottles and canning jars, often used as containers for material other than food, occur at these structures. Metal hinges and window glass are the most common structural remains. Items such as marbles, buttons, pressed glass, and domestic utensils are rare at these sites.

Dump or Discard Locations. These sites originate strictly for the purpose of depositing refuse from other sites. Dump areas generally consist of larger objects such as worn-out machinery parts, portions of demolished buildings, and large household items. Gulleys, ravines, or steep slopes are likely places for dumps. Smaller items such as broken ceramics are often discarded closer to the activity area.

The above variables produce archaeological sites varying widely in size, configuration, and content. Small discard locations can be confused with nonhabitation sites.

Discussion. The site type scheme for habitation sites does not accommodate stages of additions and destructions a building may undergo during its life span. The Type C structure is often remodeled or expanded by the addition of rooms. The "growth" of the Type C structure may transform it into a Type A or Type B structure and may be occupied for a relatively long period of time. Cultural transformations of a structure during a lengthy occupation may produce an archaeological site consisting predominantly of cultural material from the later occupation with only a small percentage representing the earlier, shorter occupation. However, if the Type C structure is abandoned and a new structure built on a different location, then the Type C structure may be archaeologically identifiable.

Historical Settlement Model

In recent years, various attempts have been made to delineate patterns of historic settlement. This has resulted in various models proposed by Hudson (1969:365-381), Lewis (1977:151-201), O'Brien and Warren (1979), and Smith (1979). Hudson, Lewis, and O'Brien and Warren concentrate on spatial and geographical variables, while Smith places emphasis on environmental variables. The analysis of historic settlement draws heavily upon the works of Hudson (1969) and Smith (1979) for theoretical background, while a cultural-historical sequence adapted from Higgins et al. (1983) is used to frame the temporal development of settlement in the project area.

Hudson (1969) proposed that rural settlement underwent three stages in its development: colonization, spreading, and competition. These three stages have a distinct relationship to space through time. The selection of a potential living space would be dependent upon environmental variables from which independent variables will be selected. This forms a niche which can be mapped in terms of geographical space. It follows that the niche size will be regulated by the adaptive fitness of individuals to different environmental restrictions.

The colonization phase is characterized by an expansion into environments which previously had supported small aboriginal populations and generally were not utilized intensively by them. The first individuals will establish the realized niche. Population density will be low and land holdings small. Hudson suggests that homestead sites will be spaced independently of one another within this zone.

The second stage of development is termed spreading/budding. During this period, population and settlements increase. Successive generations tend to move short distances and establish homes. An obvious clustering pattern develops, referred to as budding. Concurrently, immigration occurs, resulting in "spreading." Hudson noted that by this stage in his study area (mid 1800s) land had been parceled into townships and sections. As a result, settlements tend to be spaced regularly (Hudson 1969:370).

At the onset of the competition period, all available land within the realized niche will have been purchased, and farmsteads will be at their lower operable limits. Two dynamic factors dominate the changes in settlement patterns during this period. First is the desire to increase land holdings in order to maximize economic return from the farm. The second is fluctuating market prices which may force marginal operations into bankruptcy. As land becomes available, competition between larger operations is manifested. Some land continues to be made available due to developing technology, although this happens less frequently. Acquisition of land is requisite for the maintenance of the homestead. Roads and railroads are an important consideration for transporting crops to market.

Smith (1979), on the other hand, utilized physiographic variables in determining the historic settlement pattern. He identified four major microenvironmental zones that influenced nineteenth century settlement: Bottom Zone (floodplain), Intermediate Zone (consisting of talus slope), Bluff Crest Zone (upland forest), and Upland Prairie Zone (flat to gently undulating grasslands). Through archaeological evidence and physiographic variables, it was demonstrated that the zone providing the optimal access to this zone because of its access to water, transportation and communication routes, arable land, and the remaining zones was settled first. The remainder of the zones were settled in descending order of physiographic and cultural variables: Bluff Crest, Upland Prairie, and Bottom.

The environmental zones within the study area are similar to those identified by Smith (1979): upland prairie -- flat to gently rolling terrain, upland forest -- dissected ridges and rugged terrain, and floodplain. All three of these zones correspond to zones proposed by Smith for his Intermediate Zone.

Cultural-Historical Framework

A cultural-historical framework developed by Higgins et al. (1983), presented earlier, was adapted and refined for central Missouri and utilized to assess and evaluate the historical resources. Five successive periods are delinated: Explorer (1541-1735), Colonial (1735-1800), Pioneer Frontier (1800-1860), Early Agricultural (1860-1900), and Agricultural-Industrial (1900-present). This approach is intended to aid in organizing historical information, developing and refining research problems, and integrating archaeological data. Of course, much local and regional research must be conducted to refine this scheme and to establish its utility for future research in the study area.

Explorer Period (1541-ca. 1700). This period encompasses the intrusion into the area by Spanish and French explorers, missionaries, and fur traders beginning in 1541. The establishment of the first permanent white settlement in the mid-Mississippi Valley by the French at Cahokia in 1699 marks the end of the period. The cultural history of native American groups also is included in this period.

Colonial Period (ca. 1700-ca. 1803). The Colonial period is characterized by economic competition and political turmoil. During this time span, the "Louisiana Territory" passed from French to Spanish to French and finally American control.

Pioneer Frontier Period (1803-ca. 1830). The Territory of Louisiana underwent many changes in its status over the next three decades, one of which was Missouri's entry into the Union as a state in 1821. Migration of settlers into the area was promoted by various land distribution acts, reduction of the Indian danger, publicity guaranteeing infinite opportunities, and a lucrative fur trade. The rate of settlement in and near the project area declined around 1830.

Early Agricultural Period (ca. 1830-1860). Farm operations in Missouri advanced beyond the simple self-sufficient pioneer state prior to 1830. Towns and villages developing along strategic transportation routes became well established and thrived economically. The introduction of railroads in Missouri and particularly Callaway County in the 1850s contributed towards both population and economic growth.

Agricultural-Industrial Period (ca. 1860-1920). This period marks the preeminence of agriculture and industry to the socioeconomic growth of Missouri. Of the early industrial activities, those that emerged as important to the livelihood of Missouri are agriculture, mining, and lumber. By the 1920s, industry had become an important part of Callaway County's economic base.

Recent Period (ca. 1920-present). Beginning in the 1920s, social and economic growth in Callaway County, the State of Missouri, and in the United States in general is characterized by increased standardization. Growth was reflected in the rapid increases in industry, agricultural mechanization, transportation, and urban development.

Data Categories

The present study utilizes a combination of data categories -- archaeological, documentary, and ecological -- to investigate historic period sites and to address research problems within the study area. A breakdown of each category follows:

A. Archaeological
    - Intensive field survey

B. Documentary
    - County histories
    - Travel journals
    - Government land office surveyors' notes and plats
    - Land records
    - Agricultural census records
    - Population census records
    - Maps and atlases
    - Historic chronology
    - Oral history - local informants
    - Ethnohistory

C. Environmental Data
    - Soil maps and data
    - Area geomorphology and hydrology
    - Vegetation zones
    - Animal population
    - Government land office records

Data Collection

Survey collection techniques for historic sites within the research area follows the same guidelines described for prehistoric sites. Historical documentation is utilized in conjunction with survey data to provide additional data on historic sites and settlement patterns. Emphasis is placed on general land office (GLO) surveyors' notes and plats, land records, journals, census records, and county histories and atlases. Interviews of past and present residents of the study area are incorporated.

Hypotheses

The following hypotheses were tested during the Phase 1 survey:

Hypothesis 1: If the spatial and temporal sequence of post-Explorer period settlement was a response to an area's natural constraints, then settlement of the stratified environmental zones within the study area occurred in the following order: (1) Prairie/Forest Edge, (2) Upland Prairie. (3) Dissected Upland Oak-Hickory Forest, and (4) Dissected Upland/Bottomland Forest Edge.

Hypothesis 2: During the competition process, if settlement distribution patterns of relatively high density subsequently have declined, then settlement patterns will be more regular rather than clustering.

Test implication:

Site location will exhibit a regular (non-clustering) pattern.

METHODOLOGY

Field Methods

The goal of this Phase 1 survey was to locate and record all prehistoric and historic archaeological and architectural resources within Union Electric Company's residual lands (approximately 5,850 acres). Field work was carried out during the fall (August-December) of 1981. The survey crew consisted of four survey technicians and one supervising archaeologist.

Traditional archaeological surveys depended heavily on modern cultivation to expose archaeological sites. Of course, this practice produced biased results, limited survey coverage, and often tied field work to the plowing and planting seasons. Today, cultural resources surveys and assessments must proceed regardless of vegetative cover, field conditions, and terrain. To cope with varying vegetational coverings, the systematic survey was conducted using two basic transect sampling techniques -- interval and continuous.

Transect/interval sampling (Judge et al. 1975:980-103; Lovis 1976:364-371) was used as the survey technique in areas with substantial ground cover (greater than 60%). This was the more common technique employed since approximately 36% of the survey area was wooded with a heavy leaf cover, and about 36% was in pasture with a thick sod. Over half (15%) of the cultivated land (28%) also required the transect/interval sampling technique due to poor ground visibility. This technique included constructing transects spaced 15 m apart and shovel testing at intervals of 15 m within each transect. Shovel tests averaging 15 x 15 cm were dug to a depth of 30 cm or into sterile subsoil, adequate enough to ascertain the presence or absence of cultural materials. Each shovel test was carefully inspected for cultural materials and evidence of prehistoric and/or historic occupation. When a shovel test produced positive results of cultural debris, the interval was reduced to 5 m or less, and additional shovel tests were placed in the cardinal directions to determine the horizontal limits of the site. All transects, the number of shovel tests in each transect, and positive shovel tests were recorded on sketch maps for each field section.

Pocket-sized field note cards were used for recording shovel test transects. A positive (+) or negative (-) sign was placed beside each shovel test number within a transect to indicate presence or absence of cultural material. Information recorded on the reverse side of the card at the end of each transect included: field section number; transect letter; sampling interval; direction of transect; average depth, color, and texture of the topsoil (A horizon); average depth, color, and texture of the subsoil (B horizon); number of shovel tests in the transect; average depth of the shovel tests; comments; recorder's initials; date; and field site number, if a site was located.

Transect/continuous sampling was used as the survey technique in areas such as plowed and disced fields where surface visibility was good (greater than 40%). This technique involved walking transects while continually surveying the surface of the ground for evidence of human activity. Although the survey/sample area was continuous within a single transect, intervals between transects varied from 15 m to as close as 3 m due to strip plowing.

Each artifact encountered in a transect was recorded via meter pace from one end of the transect and collected. All diagnostic or potentially diagnostic artifacts occurring on the surface were piece plotted on a sketch map. In addition to continuous surface survey, fields containing artifactual scatter were shovel tested to determine site depth. Approximately 13% of the project area exhibited favorable survey conditions enabling transect/continuous surface sampling due to cultivation.

All sites were recorded on USGS 7.5' topographic maps of the Mokane East and Reform quadrangles. Sketch maps were also prepared for all sites, showing all relevant topographical, drainage, and man-made features. Black and white photographs, using a 35 mm camera, were taken of each site.

All prehistoric artifacts encountered during shovel testing and surface surveys were recorded and collected; however, although all historic sites were recorded, only pre-1930 historic artifacts were collected. All cultural materials were bagged with provenience information consisting of a field site number, field section number, transect letter, shovel test interval number or meter pace measurement and direction, and date of collection on the bag.

A mobile field laboratory stationed just north of the plant site, which served as the headquarters during field operations, allowed much of the preliminary analysis and material processing to be conducted concurrently with the field survey.

A restatement of site and isolated find definitions is as follows: a site was designated and recorded for any location where two or more artifacts were found, as opposed to any area in which a single artifact was found, called an isolated find.

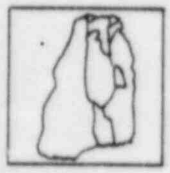
Prehistoric Analytical Methods

All prehistoric artifacts collected from the field were washed, cataloged, and analyzed in the laboratory. During preliminary analysis and cataloging procedures, artifacts were separated by class, numbered, counted, and weighed. During a second and final analysis, each item within a particular artifact class was analyzed as to chert type, presence or absence of heat treatment attributes, presence/absence and type of cortex present, and size graded.

Detailed descriptions of each chert type that occurs within the project area were presented in the geology section of the Environmental Setting. Identification of heat treated specimens was usually based on two or more attributes commonly ascribed to heat-altered chert (Collins and Fenwick 1974; Mandeville 1973; Purdy 1974; Ray 1981b; Rick 1978). If cortex was present on some portion of an artifact, it was examined for residual or stream deposited cortex attributes. Water-worn and well-rounded, smooth abrasion surfaces are indicative of redeposited stream bed chert, whereas angular, sugary textured or grainy surfaces are generally representative of residual cherts. All flakes were sorted into three size grades (Fig. 4): $<2\ cm^2$, which roughly corresponds to tertiary retouch or pressure flakes; $2\ cm^2 \leq x \leq 5\ cm^2$, which generally correlates with hard or soft hammer secondary percussion flakes; and $>5\ cm^2$, which usually correlates with initial or primary hard hammer percussion flakes. All of the above analyses helped define and assess site type, determine raw material procurement and utilization patterns, discover lithic technology practices, and determine lithic reduction activities conducted on particular sites. Artifact inventories for sites with 50 or more artifacts are presented in Appendix B. The inventory forms include data pertaining to chert type, lithic source type, heat treatment, and size grades.

Ahler's (1971) work at Rodgers Shelter and Semenov's work (1964) have demonstrated that functional diversity may exist within a single morphological or formal category (e.g., projectile points); however, such a formal/functional study of artifacts from the Callaway research area is beyond the scope of this project. Therefore, with this in mind, the following artifact classes were constructed on the basis of

Figure 4
Selected Flake Size Grades



Size grade 1, 2cm^2

Size grade 2, 5cm^2

traditional morphological attributes to distinguish general artifact types and should be considered tentative upon further research.

Artifacts were initially grouped into one of three broad categories: chipped stone, groundstone and pottery. Chipped stone artifacts were further subdivided into two main categories: tools and debitage. Artifact types considered as different classes of tools are presented below:

1. Utilized Flake - an unmodified flake with uniform use wear along one or more edges (Figure 5A).

2. Uniface - a tool that has been purposefully flaked on one side (Figure 5B).

3. Biface - a tool that has been purposefully flaked on two (ventral and dorsal) surfaces (Figure 5C). Fragments such as bases, midsections, and distal ends (tips) are generally included under this heading.

4. Sidescraper - a tool that is generally unifacially worked along one edge -- the long axis; intentional flake scars are usually steep and give a beveled appearance (Figure 5D).

5. Endscraper - a tool that is unifacially worked on the distal

(often rounded) end; flake scars are steep and exhibit a beveled appearance (Figure 5E).

6. Spokeshave - a unifacial tool with a purposefully flaked semicircular concave notch (Figure 5F).

7. Graver/Burin - an unmodified or modified flake with an acute, sharp incising projection or spur (Figure 5G).

8. Drill - a biface with a base and a narrow, parallel-sided blade with steep-angled lateral edges and a bi-trangular cross section (Figure 5H).

9. Preform - a carefully flaked biface that is unfinished but suggestive of the final product (e.g., a relatively thin, percussion flaked, square-based biface which basically lacks only final shaping and notching via pressure flaking to become a projectile point/knife (Figure 5I).

10. Projectile Point/Hafted Knife - a biface exhibiting a pointed blade and a stem or hafting element; the blade edges may be straight, excurvate, incurvate, incurvate/excurvate, excurvate/incurvate, serrated, or beveled and may exhibit shoulders or barbs; the stem or haft element may be expanding, contracting, straight, incurvate, excurvate, laterally ground, corner notched, side notched, or basal notched and exhibit a concave, convex, or straight base (figures 11-15).

Most nonfunctional waste or discarded material produced during all stages of tool manufacture is referred to as debitage. Because of the sequential nature of its production, different kinds of debitage generally represent separate stages in lithic reduction. Artifact types considered as different classes of debitage include:

1. Flake - any relatively thin piece of siliceous stone removed from a larger mass by the application of force. Flakes exhibit a platform and bulb of force at the proximal end. They may be of varying sizes and shapes.

Figure 5

Scale: Actual Size

a. Decortication flake - a flake which has the dorsal surface partially or entirely covered by the unmodified cortex or outer surface of the raw material.

(1) Primary decortication flake - a decortication flake with the entire dorsal surface covered with cortex (Figure 6A).

(2) Secondary decortication flake - a decortication flake with cortex covering only a portion of the dorsal surface (including the platform) (Figure 6B).

b. Interior flake - a flake with no cortex on the dorsal surface.

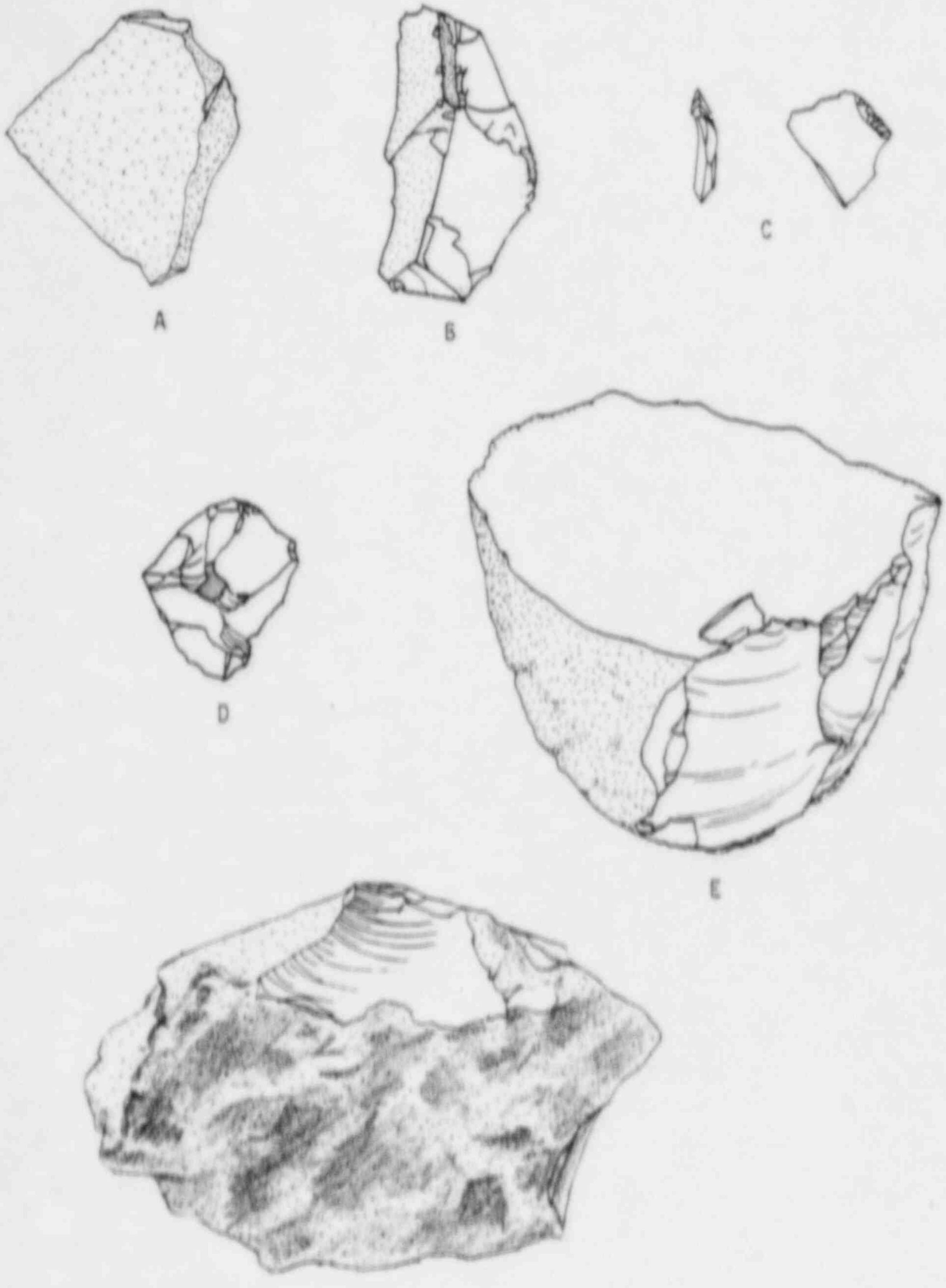
c. Bifacial thinning flake - flakes removed from bifacial blanks or large bifacial tools wh'ch exhibit bifacial flake scars over the entire dorsal surface and a small bifacial surface on an overhang which constitutes the striking platform (Figure 6C).

d. Polished flake - a flake which has a high degree of use-wear polish on all or a portion of the dorsal surface (Figure 6D). Polished flakes are generally considered flakes from bifacial digging or woodworking tools such as hoes or adzes.

2. Shatter - angular, cubical, or other irregularly shaped chunks or pieces having few or no definitive characteristics such as bulb of force, platform, etc.; all shatter pieces were separated according to present/absence of cortex. Shatter is generally the result of heavy percussion techniques or the cleavage of raw material along incipient fracture planes such as frost cracks. However, due to the absence of diagnostic man-made attributes (such as a bulb of force), some naturally fractured and/or heat fractured pieces may have been included under this heading.

3. Core - any block, nodule, or nodule fragment from which two or more flakes have been purposefully removed; it exhibits a striking

Figure 6



Scale: Actual Size

platform(s) and two or more negative bulbar scars (Figure 6E). All cores were separated according to presence/absence of cortex.

4. Modified Raw Material - any block or nodule which was modified slightly and discarded -- generally by the removal of a single flake (Figure 5F). This class probably represents raw material tested for knapping quality.

5. Manuport - any piece of unmodified raw material transported to a site but subsequently unaltered; a manuport is identified by the unnatural occurrence of a stone type at a particular location. This category may include sandstone, hematite, metamorphic, igneous, or other rocks, as well as chert.

Artifacts grouped into the groundstone category were identified as to rock type and classified into one or more (multipurpose) of the following tool types:

1. Mano - a hand-sized stone with one or more flat, smooth grinding surfaces.

2. Metate - a slab of rock with a broad, shallow cavity worn smooth via grinding/abrasion.

3. Pitted Stone - a stone with small rounded concavities on one (single-pitted) or two (bi-pitted) surfaces (Figure 7A).

4. Anvil Stone - a stone with a flat surface that exhibits multiple cone fractures (Figure 7C).

5. Hammerstone - a hard stone that exhibits battering and crushing on one or more ends, surfaces, or edges.

6. Worked Hematite - an iron ore chunk with one or more ground, faceted surfaces (Figure 7B).

7. Abrader - a rock (usually sandstone) with one or more linear grooves produced by abrasion (Figure 12B).

Pottery artifacts were classified as to tempering agent (sand, grit, or crushed dolomite particles) and surface finish (plain or

Figure 7

Scale: Actual Size

undecorated, smooth, brushed, or cord marked). Two cord marked sherds collected from the project area are illustrated in Figure 7D. Although seldom differentiated in the literature, those sherds with calcareous tempering particles were tested and differentiated as to dolomite or limestone. This was deemed important due to differential procurement distances from the site to dolomite and limestone sources. All sherds containing calcareous tempering particles were determined to be crushed dolomite obtained from the nearby Jefferson City dolomite formation.

All 4,881 prehistoric artifacts and 307 historic artifacts collected and analyzed during the Phase I survey were placed in plastic ziplock bags and are permanently curated at the University of Missouri-Columbia.

Historic Analytical Methods

Historic artifacts were washed, labeled, and cataloged in the laboratory. During the cataloging procedure, artifacts were separated into five classes, counted, and weighed. These classes consisted of ceramics, glass, domestic miscellaneous, metal, and building materials. These classes were used to describe and quantify material and to aid in determining the site type. Diagnostic characteristics were identified by using reliable sources. The breakdown of historic material into these five classes is based on the composition material of the artifacts themselves in addition to their functions. A brief description of each class is provided below.

Ceramics. Ceramics from the collection were examined using a combination of the classification system suggested by Price (1979), McKay (1979), and Pilling (1977;personal communication). Some modifications and additions were needed in order to describe materials from this area. Categories which are recognized include whiteware, yellowware, stoneware, and porcelain. Pearlware and creamware were excluded from these categories due to their absence in the project area.

Ceramic objects such as figurines, door knobs, doll parts, and pipe fragments were placed in the domestic miscellaneous class. Ceramic types were classified based on paste color, paste texture, and glaze. These types have generally been accepted as temporal indicators for historic ceramics (Hume 1978; Price 1979).

Glass. Glass was classified into two categories: bottle and miscellaneous glass. The bottle category was subdivided into intact and fragmented bottles. Due to the use of canning jars as utilitarian containers, they were placed in the bottle category. The miscellaneous category consisted of (in descending frequency) pressed or decorative glass, zinc lid liners, and melted glass.

Domestic Miscellaneous. This category comprises the personal objects used by the inhabitants to carry out daily chores. Some of the artifact classes contained in this category are: kitchen utensils, pipe bowls and stems, buttons, and toys, i.e., marbles, porcelain doll parts, etc.

Metal. All metal objects, except for nails, were divided into identifiable and nonidentifiable classes. Those objects which were able to be identified were assigned dates of manufacture whenever applicable.

Building Material. Building material was subdivided into window glass, nails, brick, stone. and cement. Several sources have suggested that window glass may be a temporal indicator (Demeter and Lowery 1977; Martinez 1977). These investigations suggest that window glass became increasingly thicker and uniform through time as manufacturing methods improved and as demands increased. Demand for thicker glass became greater in the west as areas became more settled. Rough transportation also required that glass be as durable as possible. For the purpose of this study, window glass, in addition to the other classes, was used in determining site types.

Nails were classified as square cut or wire. Only a general time span can be assigned unless the entire nail is intact. Cut nails began to be manufactured in 1790 until 1895 when wire nails replaced them. A resurgence in the square cut nail industry took place around 1900 but decreased in demand by 1902. Both types of nails are still made today with square cut nails used for special purposes (Fontana and Greenleaf 1962:44-50).

The brick, stone, and cement tabulated in the field on each site were not useful for chronological purposes. They were, however, used in conjunction with the other artifact classes in determining site types.

CHERT RESOURCES SURVEY

In order to discuss Hypotheses 3 & 4 and procurement/utilization patterns of chert resources within the study area. it was necessary to conduct a systematic study or survey of these lithic resources. This chert survey, which was conducted concurrently with the archaeological survey, involved a structured sampling strategy designed to determine the distribution of the different types of cherts that were available to prehistoric peoples within the project area. A detailed description of the chert types and the chert sources in which they occur was presented in the Environmental Setting. This section will focus on the availability/distribution of these chert resources and the methodology used to conduct the survey and obtain the necessary data.

Very few chert studies have been conducted in east-central Missouri. One notable exception was a preliminary study made by Klippel (1971a, 1971b). Appendix I of Klippel's dissertation is a small descriptive study of the chert resources within a 5 km radius of Graham Cave. A few chert samples collected from the two major chert-bearing formations (Jefferson City and Burlington) in the area were described according to prominent colors, presence/absence of fossils, and luster; also noted were certain internal characteristics such as banding, mottling, and presence of oolites.

Two other studies related to chert research in the project area include a brief report by Ives (1975) on the Crescent variety of Burlington chert from the famous Crescent Quarries in eastern Missouri and an integrated study of the availability and utilization of chert resources in the Harry S. Truman Reservoir area of southwest-central Missouri (Ray 1981a). Ray conducted an intensive survey of Jefferson

City, Chouteau, and Burlington chert resources within delimited territories around several archaeological sites and then analyzed artifacts as to chert type to determine chert procurement and utilization patterns.

The chert survey and sampling program conducted within the project area was designed to obtain the maximum amount of chert availability and distributional data during a limited Phase 1 archaeological survey. To accomplish this task, the survey was primarily oriented toward systematically sampling stream drainages or water catchments. A "catchment" is defined here in the geological sense as the total watershed area from which a stream receives its water and depositional load. Each tributary of Auxvasse, Cow, Mud, and Logan creeks that drained a portion of the study area was defined as a particular catchment, and its deposits were sampled at one or more locations.

Although several residual and in situ sources were also sampled, the chert survey concentrated on stream deposited sources for several reasons. First of all, stream deposits are easily accessible for sampling purposes. A quick random sample is obtainable from a gravel bar with a minimal amount of effort. More importantly, however, is the fact that stream deposits consist of eroded and secondarily redeposited nodules derived from source areas upstream within the drainage basin. Because of this fact, an examination and sample of the deposits in a stream provide information as to the variety of chert types present within that particular catchment as well as indications of the quality and quantity of each chert type present. Other advantages to focusing on stream deposits are visual clues to the geological stratigraphy provided by nick points, cut banks, and steep slopes along a creek valley. These clues are necessary for the determination of formation thicknesses and location of contact points between formations for mapping purposes. Other than historic quarries and railway and road cuts, natural stream cuts provide the only surficial information on local geology.

Before going into the field, a chert survey form (Figure 8) was devised for recording chert data at each sample location. Included on the chert survey form was information such as sample location number, provenience, quadrangle, elevation, type of chert source, formation name (chert type), a detailed description of the chert, its knappability or quality, and a comments section.

A brief discussion of the particular techniques used to map the chert-bearing strata within the project area is presented below. As previously mentioned, this chert resource survey was conducted simultaneously with the archeological survey as each section containing a catchment was completed.

In each section of the study area in which a major tributary was present, at least one chert sample location was established. Samples were taken from gravel deposits at the lowermost portion of the catchment or that point where the creek crossed the project boundary. Once the various chert types that occurred in a creek had been sampled and recorded at a location, the next step was to interpret the particular stratigraphy and determine the thicknesses of the various formations within the catchment for mapping purposes. As the archaeological survey progressed up and down each stream drainage or catchment, cut banks, steep slope outcrop exposures, and nick points were examined for stratigraphic information. Notes were kept on formation outcrop elevations, and contacts between formations were plotted on 7.5' USGS topographic maps. Although a particular emphasis was placed on chert-bearing strata, certain prominent nonchert-bearing features, such as the resistant Bushberg sandstone unit, greatly aided in field mapping.

The sampling procedure at each chert location was quick but

Figure 8
CHERT SITE SURVEY FORM

Site No. ____________________ Date ____________________

Surveyors ______________________________ Recorded by ________________

Legal Location ____1/4 ____1/4 ____1/4 Sec ____ T ____ R ____

Landmark: Located __________ ____________ from ________________
(distance) (direction) (landmark)

Quadrangle ____________________ County ____________ Elevation ______

Closest Watersource ________________________ Stream Rank __________

Type of Chert Source: Stream cut Residuum Stream Deposit

Quarry Roadcut Historic Quarry Other ________________

Formation - Chert Type(s) ____

Outcrop-Gravel Bar: Thickness ___________' Extent _____________'

Chert Density (% estimate): ________ Accessibility ______________

Chert Description (color, nodular form, weathering, etc):

Photographs: Frame No. ____________________ Direction ________________

Remarks:

thorough. A few minutes were spent at each sample location by the chert surveyor, striking off fresh flakes from several nodules of each chert type until a sample weighing about 1-1.5 kg had accumulated. An effort was made to sample all variations within each chert type as well as the more typical chert.

Roadcuts and historic quarries were deemphasized during the chert survey in favor of the natural sources potentially available to prehistoric people; however, some were sampled and studied, mainly for observing stratigraphic relationships, formation thicknesses, and chert densities.

After each catchment within the study area had been surveyed and the field work was completed, a chert resources distribution map (Map 15) was constructed. The map construction was based primarily on chert survey field notes and maps and a geology map of the Callaway Nuclear Power Plant area (Union Electric Company 1979b).

A total of 31 locations was sampled for chert in the study area. The distribution of these sample locations is presented in Map 15. For each of these locations, Table 4 indicates the chert types found and the particular chert source(s) from which each sample was taken. Twenty-three locations were situated on stream deposited sources, five were located on residual chert sources, and three were situated on in situ bedrock sources.

A summary of the distribution of chert resources within the project area as determined by the chert survey is presented below. The chert-bearing Jefferson City formation outcrops from the Missouri River base level (505 ft msl) to generally 720-740 ft; however, at one location, it was noted to occur as high as 780 ft msl. Due to the nature of the dissection of the plateau and the location of the project area, Jefferson City chert is basically limited to the southern half of the study area, although source areas in Logan Creek and two tributaries of

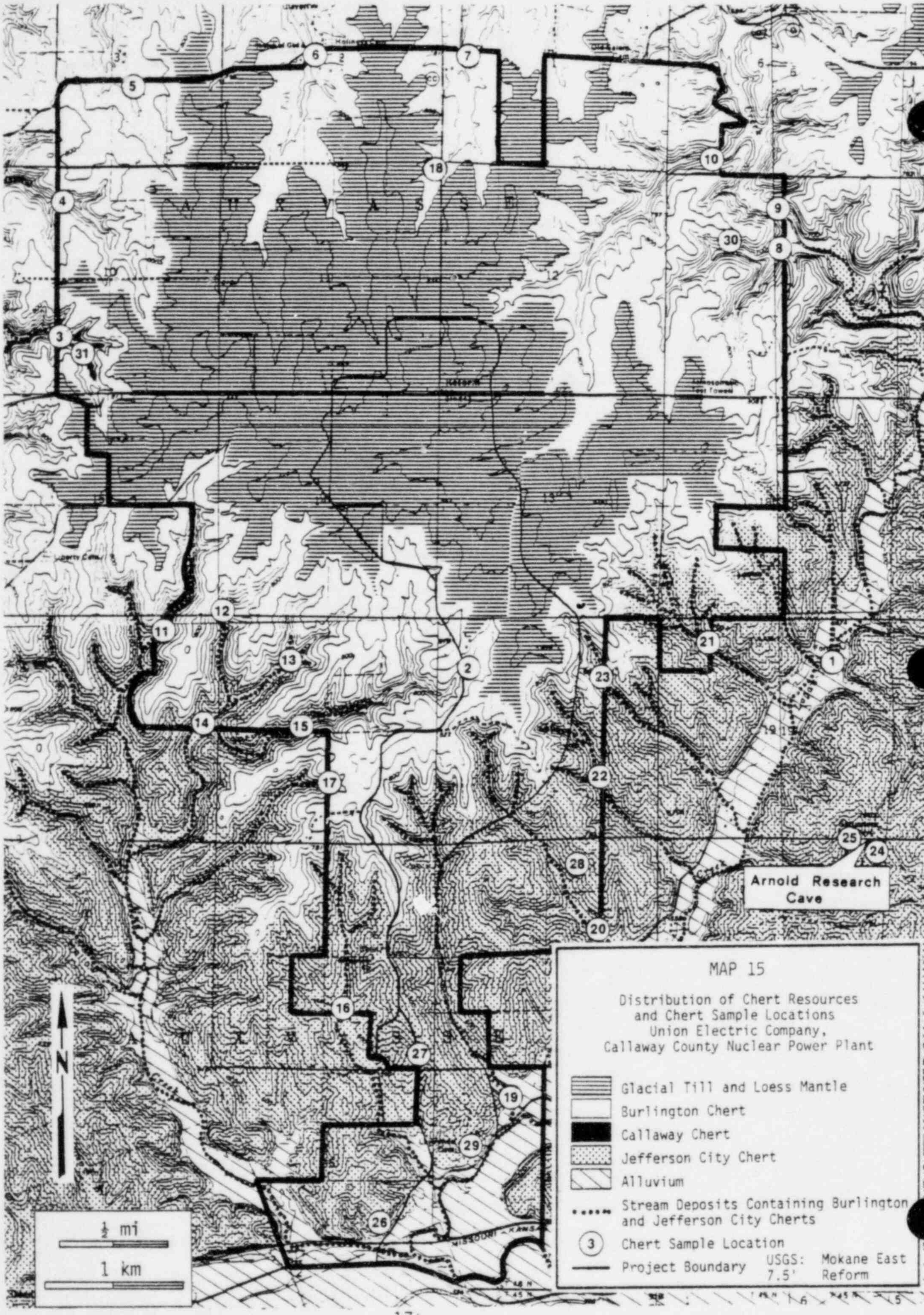

MAP 15
Distribution of Chert Resources
and Chert Sample Locations
Union Electric Company,
Callaway County Nuclear Power Plant
Glacial Till and Loess Mantle
Burlington Chert
Callaway Chert
Jefferson City Chert
Alluvium
Stream Deposits Containing Burlington and Jefferson City Cherts
Chert Sample Location
Project Boundary
USGS: 7.5' Mokane East Reform
Arnold Research Cave
½ mi
1 km
N

Table 4

Chert Survey Sample Locations

Chert Types		Jefferson City			Burlington		Callaway	
Chert Source		Str. Dep.	Resid.	In Situ	Str. Dep.	Resid.	Str. Dep.	In Situ
	1	X			X			
	2				X			
	3	X			X		X*	
	4				X			
	5				X			
	6				X			
Chert	7				X			
	8				X			
Sample	9				X			
	10				X			
Locations	11	X			X			
	12	X			X			
	13	X			X			
	14	X			X			
	15	X			X			
	16	X			X			
	17	X			X			
	18				X			
	19	X			X			
	20	X			X			
	21	X			X			
	22	X			X			
	23	X			X			
	24		X					
	25		X					
	26		X	X				
	27			X				
	28		X					
	29			X				
	30					X		
	31						X	X

Key

Str.Dep. - Stream Deposited
Resid. - Residual

*Callaway chert does occur in creek bed (as determined by sample site 31) but was not found due to small quantity

Auxvasse Creek flank the east and west sides of the northern portion of the project area.

Chert from the Callaway formation is rare but does occur in localized areas. It was found at only one location directly above the Jefferson City formation at 740 ft in a tributary of Auxvasse Creek in the northwestern portion of the project area. Chertless Snyder Creek and Bushberg formations outcrop between the Callaway and Burlington formations at approximately 770-785 ft. Although these formations are nonchert bearing, residual Burlington nodules can often be found on slopes of Bushberg, Snyder Creek, and Callaway strata due to mass wasting or downslope erosion. Because Burlington chert is present on these formations, the availability of Burlington chert resources as shown in Map 15 includes the vertical extent of these formations as well as Burlington and Graydon Chert Conglomerate strata.

Although a mantle of glacial till and loess covers the central portion of the upland plateau, Burlington chert outcrops and source areas dominate the northern half of the study area. Primary sources of Burlington chert are generally limited to the north half of the study area between approximately 785 and 800 ft. Secondary sources, on the other hand, are found throughout the northern <u>and</u> southern halves of the project area in stream deposits of creeks draining the upland plateau. The vast majority of the Burlington chert in the project area is supplied by the Graydon Chert Conglomerate formation which varies greatly in thickness but generally outcrops between 800-825 ft. This formation consists of large quantities of Burlington chert nodules eroded from the Burlington formation and consolidated in a clay and sand matrix (Plate 2b). Where this formation has been exposed by erosion, extremely cherty slopes result along with chert-clogged creek beds.

As mentioned above, the central portion or the highest and most level area of the upland plateau is covered by a mantle of glacial till and loess which varies in thickness but usually occurs between 825-850 ft msl. Chert resources from these Pleistocene deposits are minimal but potentially include glacial till chert cobbles of nonlocal and exotic origin.

A distinction is made in this report between nonlocal and exotic cherts; these in turn are compared to the above local chert types. A definition of each of these terms is as follows: "local" refers to chert known to occur within or immediately surrounding the project area; "nonlocal" is defined here as any chert that does not occur within the study area but which is known to exist within Callaway County or any of the surrounding counties; and "exotic" refers to any chert that probably does not occur in the State of Missouri.

One nonlocal chert resource important to this study due to its proximity to the project area is a recently identified Pennsylvanian chert called Excello. Excello chert is derived from the black fissle Excello shale formation (Searight et al. 1953), which outcrops primarily in Macon, Randolph, and Chariton counties northwest of Callaway County and the project area. Although the core area in which chert-bearing Excello strata outcrop is apparently along the East Fork of the Chariton River (Work et al. 1982:17), other areas to the east (Salt River locality) and south that contain major stream drainages also probably supply Excello chert but in more limited quantities. One limited source of Excello chert was located by the author just outside the project boundaries, 10-18 km to the north in Pinch Creek. A fist-sized nodule of Excello chert was found on a gravel bar of Pinch Creek, and a head-sized nodule was found in a nearby first order tributary. These Excello chert nodules exhibited bluish-black to black matrices containing narrow bluish-white calcitic (silica replaced) or chalcedony veins and occasional white microfossils. Some fossils had been replaced by pyrite and limonite. The cortext of the large nodule was a dark gray fissle shale which graded gradually into the black highly siliceous chert matrix. This source along Pinch Creek, a tributary of Auxvasse Creek, and a reported source along a small tributary of the Loutre River (Tandarich 1983:personal communication) are the only known source areas of Excello chert in Callaway County.

RESULTS OF SURVEY

Introduction

The Union Electric Company residual lands (project area) targeted for Phase 1 survey consisted of approximately 5,848 acres (2,366 ha). The goal of the intensive archaeological survey was to survey the entire tract. As with most survey areas of this size, land use and vegetational cover varied widely within the project area requiring occasional adjustments in survey techniques. Of the total 5,848 acres within the study area, approximately 28% of the land was cultivated, 36% was in pasture and/or in a fallow (early successional) state, and 36% was wooded. Only a small portion (13%) of the cultivated land presented conditions favorable enough to allow surface survey sampling. The rest of the cultivated land and all of the pasture/fallow and wooded areas (87% of the project area) was surveyed via 15 m interval shovel test sampling.

A total of 79 prehistoric and 29 historic archaeological sites (Map 16) and 21 architectural sites were located and recorded during the Phase 1 survey. An additional 30 prehistoric isolated finds (single artifact locations) were located during the survey (Map 16). All of the prehistoric and historic archaeological sites located on the residual lands of Union Electric Company are summarized in Table 5. This summary correlates environmental variables such as topographic setting, nearest stream and its rank order, and elevation with site variables such as site type/activity, cultural affiliation, and site size.

Prehistoric Site Descriptions

Of the 79 prehistoric sites located during the survey, only two (23

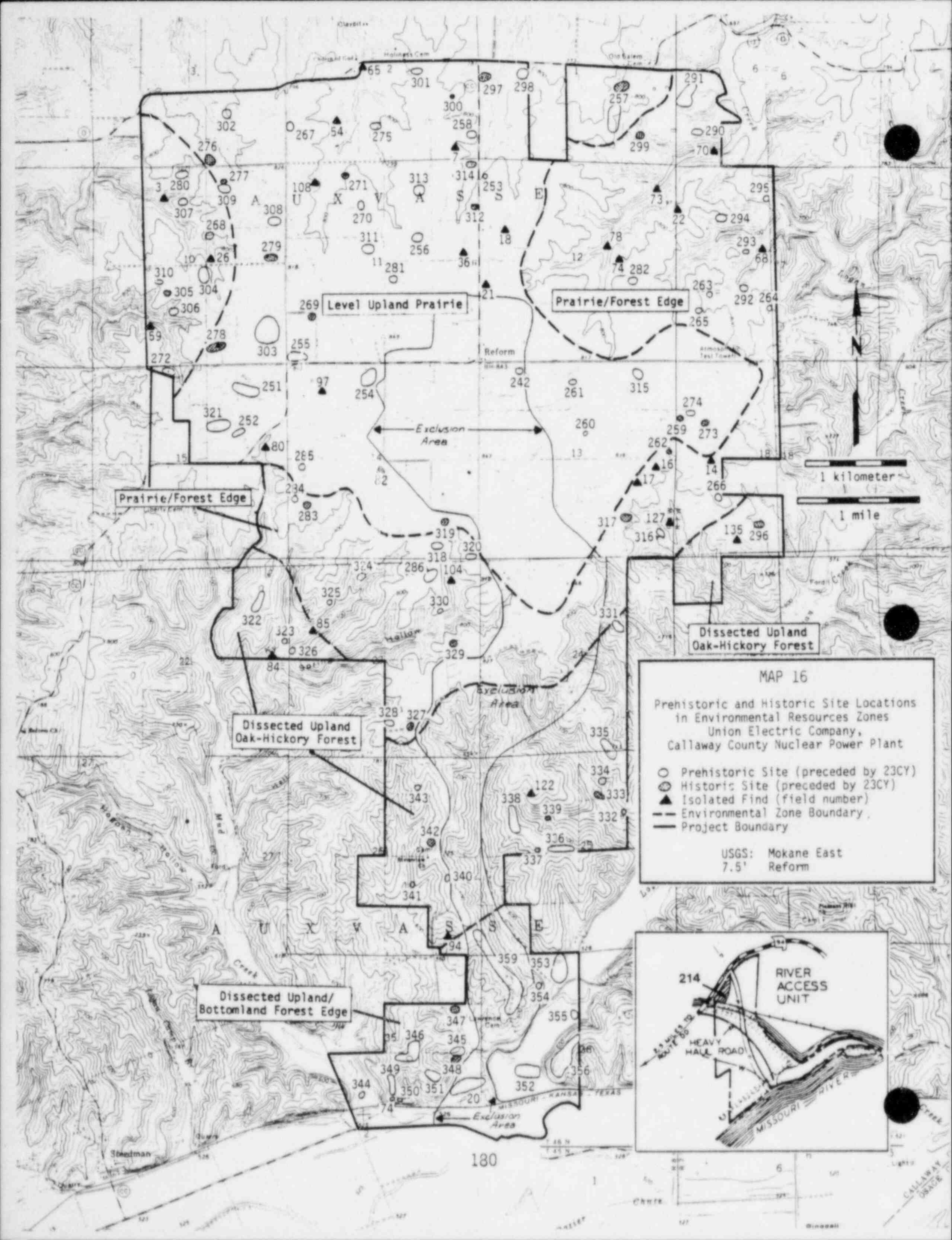

MAP 16
Prehistoric and Historic Site Locations
in Environmental Resources Zones
Union Electric Company,
Callaway County Nuclear Power Plant
Prehistoric Site (preceded by 23CY)
Historic Site (preceded by 23CY)
Isolated Find (field number)
Environmental Zone Boundary
Project Boundary
USGS: Mokane East
7.5' Reform
Level Upland Prairie
Prairie/Forest Edge
Prairie/Forest Edge
Exclusion Area
Exclusion Area
Exclusion Area
Dissected Upland
Oak-Hickory Forest
Dissected Upland
Oak-Hickory Forest
Dissected Upland/
Bottomland Forest Edge
A U X V A S S E
A U X V A S S E
Reform
1 kilometer
1 mile
RIVER
ACCESS
UNIT
214
HEAVY
HAUL ROAD
MISSOURI RIVER
MISSOURI - KANSAS - TEXAS

Table 5

Cross Reference of
Summary of Archaeological Sites Located on Residual Lands
Union Electric Company, Callaway Nuclear Power Plant

Site Number 23 CY-	Environmental Zone
20	Dissected Upland/Bottomland Forest Zone
74	Dissected Upland/Bottomland Forest Zone
242	Level Upland Prairie
251	Level Upland Prairie
252	Level Upland Prairie
253	Level Upland Prairie
254	Level Upland Prairie
255	Level Upland Prairie
256	Level Upland Prairie
257	Level Upland Prairie
258	Level Upland Prairie
259	Level Upland Prairie
260	Level Upland Prairie
261	Level Upland Prairie
262	Prairie/Forest Edge
263	Prairie/Forest Edge
264	Prairie/Forest Edge
265	Prairie/Forest Edge
266	Prairie/Forest Edge
267	Level Upland Prairie
268	Prairie/Forest Edge
269	Level Upland Prairie
270	Level Upland Prairie
271	Level Upland Prairie
272	Prairie/Forest Edge
273	Level Upland Prairie
274	Level Upland Prairie
275	Level Upland Prairie
276	Level Upland Prairie
277	Level Upland Prairie
278	Level Upland Prairie
279	Level Upland Prairie
280	Prairie/Forest Edge
281	Level Upland Prairie
282	Prairie/Forest Edge
283	Prairie/Forest Edge
284	Prairie/Forest Edge
285	Level Upland Prairie
286	Prairie/Forest Edge
290	Prairie/Forest Edge
291	Prairie/Forest Edge
292	Prairie/Forest Edge
293	Prairie/Forest Edge
294	Prairie/Forest Edge
295	Prairie/Forest Edge
296	Dissected Upland Oak-Hickory Forest
297	Level Upland Prairie
298	Level Upland Prairie
299	Prairie/Forest Edge
300	Level Upland Prairie

Table 5
(continued)

Site Number 23 CY-	Environmental Zone
301	Level Upland Prairie
302	Level Upland Prairie
303	Level Upland Prairie
304	Prairie/Forest Edge
305	Prairie/Forest Edge
306	Prairie/Forest Edge
307	Prairie/Forest Edge
308	Level Upland Prairie
309	Level Upland Prairie
310	Prairie/Forest Edge
311	Level Upland Prairie
312	Level Upland Prairie
313	Level Upland Prairie
314	Level Upland Prairie
315	Level Upland Prairie
316	Prairie/Forest Edge
317	Prairie/Forest Edge
318	Prairie/Forest Edge
319	Level Upland Prairie
320	Prairie/Forest Edge
321	Level Upland Prairie
322	Dissected Upland Oak-Hickory Forest
323	Dissected Upland Oak-Hickory Forest
324	Prairie/Forest Edge
325	Prairie/Forest Edge
326	Dissected Upland Oak-Hickory Forest
327	Prairie/Forest Edge
328	Prairie/Forest Edge
329	Prairie/Forest Edge
330	Prairie/Forest Edge
331	Dissected Upland Oak-Hickory Forest
332	Dissected Upland Oak-Hickory Forest
333	Dissected Upland Oak-Hickory Forest
334	Dissected Upland Oak-Hickory Forest
335	Dissected Upland Oak-Hickory Forest
336	Dissected Upland Oak-Hickory Forest
337	Dissected Upland Oak-Hickory Forest
338	Dissected Upland Oak-Hickory Forest
339	Dissected Upland Oak-Hickory Forest
340	Dissected Upland Oak-Hickory Forest
341	Dissected Upland Oak-Hickory Forest
342	Dissected Upland Oak-Hickory Forest
343	Dissected Upland Oak-Hickory Forest
344	Dissected Upland/Bottomland Forest Edge
345	Dissected Upland/Bottomland Forest Edge
346	Dissected Upland/Bottomland Forest Edge
347	Dissected Upland/Bottomland Forest Edge
348	Dissected Upland/Bottomland Forest Edge
349	Dissected Upland/Bottomland Forest Edge
350	Dissected Upland/Bottomland Forest Edge
351	Dissected Upland/Bottomland Forest Edge
352	Dissected Upland/Bottomland Forest Edge
353	Dissected Upland/Bottomland Forest Edge
354	Dissected Upland/Bottomland Forest Edge

Table 5
(continued)

Site Number 23 CY-	Environmental Zone
355	Dissected Upland/Bottomland Forest Edge
356	Dissected Upland/Bottomland Forest Edge
359	Dissected Upland/Bottomland Forest Edge

Table 5

Summary of Archaeological Sites Located on Residual Lands
Union Electric Company, Callaway Nuclear Power Plant

Site No 23CY-	Sec/ Topo	Elevation (feet)	Nearest Stream	Nearest Stream Order	Approx Size (meters)	Cultural Affiliation	Site Type/Activity
				LEVEL UPLAND PRAIRIE (n=41)			
242	13 / level	835	250	1	$<1 m^2$	Prehistoric	/Knapping
251	15 / level	840	100	1	400x400	Prehistoric	/Knapping
252	15 / level	830	200	1	345x100	Prehistoric	/Knapping
253	12 / level	800	100	1	25x25	Prehistoric	/Knapping
254	14 / level	840	350	1	225x350	Prehistoric	Camp /Knapping

Legend:

Sec	- Section Number	D	- Discard
Topo	- Topographic Setting	U	- Unable to Evaluate
A	- Habitation Type A	H	- Habitation, Type Unknown
B	- Habitation Type B	EAg	- Early Agricultural
C	- Habitation Type C	Ag/I	- Agricultural/Industrial
N	- Nonhabitation Type	RH	- Recent Historic

Table 5
(continued)

Site No 23CY-	Sec/ Topo	Elevation (feet)	Nearest Stream	Nearest Stream Order	Approx Size (meters)	Cultural Affiliation	Site Type/Activity
255	11 / level	840	230	1	350x140	Prehistoric	/Knapping
256	11 / level	820	150	1	120x200	Middle Archaic	Camp /Knapping
257	1 / level	800	225	1	450x450	Late Archaic? Historic	A/Camp /Knapping Fabricating Processing
258	2 / level	805	230	2	112x84	Prehistoric	/Knapping
259	18 / level	820	500	1	4x4	Ag/I	N
260	13 / level	825	200	1	1x1	Prehistoric	/Knapping
261	13 / level	820	200	1	30x15	Ag/I	A
267	2 / level	820	400	2	180x185	Paleo-Indian	Camp /Knapping
269	11 / level	840	200	1	37.2x56	Ag/I	A

Table 5
(continued)

Site No 23CY-	Sec/ Topo	Elevation (feet)	Nearest Stream	Nearest Stream Order	Approx Size (meters)	Cultural Affiliation	Site Type/Activity
270	11 / level	820	160	1	245x285	Prehistoric	Camp /Knapping
271	11 / level	800	150	1	14x17	RH	A
273	18 / level	840	300	1	30x30	Historic	C
274	18 / level	820-840	300	1	280x35	Prehistoric	/Knapping
275	2 / level	790	145	2	135x75	Prehistoric	/Knapping
276	3 / level	810	150	1	100x100	Ag/I	A/B, N
277	10 / level	820	240	1	90x40	EAg-Ag/I	N /Burial
278	10 / level	820	160	1	64x37	Ag/I-RH	A/B
279	10 / level	830	430	1	19x8	RH	A

Table 5
(continued)

Site No 23CY-	Sec/ Topo	Elevation (feet)	Nearest Stream	Nearest Stream Order	Approx Size (meters)	Cultural Affiliation	Site Type/Aci .ty	
281	11 / level	820	140	1	10x5	Prehistoric		/Knapping
285	14 / level	820	270	1	18x15	Ag/I	A/B	
297	1 / level	780	100	2	50x25	Historic	U	
298	1 / level	790	150	2	150x90	Prehistoric		/Knapping
300	2 / level	805	375	2	60x65	Ag/I	A/B	
301	2 / level	800	400	2	30x90	Prehistoric		/Knapping
302	3 / level	800	100	1	40x45	Prehistoric	Camp	/Knapping
303	10 / level	840	200	1	800x100	Early Archaic	Camp	/Knapping Food processing
308	10 / level	825	200	1	230x180	Prehistoric		/Knapping

Table 5
(continued)

Site No 23CY-	Sec/ Topo	Elevation (feet)	Nearest Stream	Nearest Stream Order	Approx Size (meters)	Cultural Affiliation	Site Type/Activity
309	10 / level	810	200	1	275x200	Late Archaic	Camp /Knapping Hunting and Butchering
311	11 / level	820	150	1	280x345	Prehistoric	Camp /Knapping
312	11 / level	815	80	1	30x30	Ag/I	A/B
313	11 / level	820	50	1	500x500	Prehistoric	Camp /Knapping
314	11 / level	820	40	1	50x20	Prehistoric	Camp /Knapping (feature)
315	13 / level	820	300	1	20x140	Prehistoric	/Knapping
319	14 / level	845	100	1	50x70	Ag/I-RH	A
321	15 / level	840	500	1	105x405	Prehistoric	Camp /Knapping Food processing

Table 5
(continued)

Site No 23CY-	Sec/ Topo	Elevation (feet)	Nearest Stream	Nearest Stream Order	Approx Size (meters)	Cultural Affiliation	Site Type/Activity
				PRAIRIE/FOREST EDGE (n=34)			
262	13 / ravine	800	120	1	15x30	Historic	D
263	7 / ridge slope	800	150	1	50x150	Prehistoric	/Knapping
264	7 / ridge slope	800	275	1	45x300	Prehistoric	/Knapping
265	7 / level	805	110	1	90x60	Prehistoric	/Knapping
266	18 / ridge	800	390	1	25x15	Prehistoric	/Knapping
268	10 / ridge slope	800	100	1	85x80	Prehistoric	/Knapping
272	15 / ridge slope	820	75	1	100x30	Prehistoric	/Knapping
280	10 / level	780	300	1	35x10	Prehistoric	/Knapping

Table 5
(continued)

Site No 23CY-	Sec/ Topo	Elevation (feet)	Nearest Stream	Nearest Stream Order	Approx Size (meters)	Cultural Affiliation	Site Type/Activity
282	12 / level	815	240	2	60x100	Prehistoric	/Knapping
283	14 / level	780	300	1	35x10	Ag/I	N
284	14 / ridge slope	800-820	0	1	40x30	Prehistoric	/Knapping
286	23 / ridge	820	240	1	50x5	Prehistoric	/Knapping
290	6 / level	780	150	2	100x30	Prehistoric	/Knapping
291	6 / level	790	300	3	500x500	Prehistoric	Camp /Knapping Fabricating Processing
292	7 / ridge slope	780	80	1	100x30	Prehistoric	/Knapping
293	7 / ridge slope	780	80	1	30x15	Prehistoric	/Knapping
294	7 / ridge slope	770	150	1	200x250	Prehistoric	/Knapping

Table 5
(continued)

Site No 23CY-	Sec/ Topo	Elevation (feet)	Nearest Stream	Nearest Stream Order	Approx Size (meters)	Cultural Affiliation	Site Type/Activity	
295	7 / creek slope	640	0	2	25x25	Prehistoric		/Chert procurement Knapping
299	1 / slope	760	30	1	15x15	Historic	U	
304	10 / level	800-820	100	1	400x225	Late Woodland/ Mississippian	Camp	/Knapping Hunting Food processing Fabricating
305	10 / level	810	225	1	30x30	Historic	U	
306	10 / ridge slope	790	40	1	80x80	Prehistoric		/Knapping
307	10 / ridge	790	100	1	70x70	Prehistoric		/Knapping
310	10 / level	810	300	1	60x20	Prehistoric		/Knapping
316	13 / ridge	740	75	1	20x15	Prehistoric		/Knapping

Table 5
(continued)

Site No 23CY-	Sec/ Topo	Elevation (feet)	Nearest Stream	Nearest Stream Order	Approx Size (meters)	Cultural Affiliation	Site Type/Activity	
317	13 / level	820	100	1	30x30	Ag/I	U	
318	14 / level	820	300	1	150x150	Prehistoric		/Knapping
320	14 / level	820	150	1	120x50	Prehistoric		/Knapping
324	[illegible] / ridge slope	780	50	1	15x10	Prehistoric		/Knapping
325	23 / ridge slope	730	100	2	15x15	Prehistoric		/Knapping
327	23 / ridge	820	300	1	60x100	RH	A	
328	23 / ridge	810	150	1	120x30	Late Archaic/ Early Woodland	Camp	/Knapping (biface manufacture) Cutting and Butchering
329	23 / ridge	820	200	2	20x20	Ag/I	A/B	

Table 5
(continued)

Site No 23CY-	Sec/ Topo	Elevation (feet)	Nearest Stream	Nearest Stream Order	Approx Size (meters)	Cultural Affiliation	Site Type/Activity
330	23 / ridge	800	100	2	40x15	Prehistoric	/Knapping
				DISSECTED UPLAND OAK-HICKORY FOREST (n=17)			
296	18 / ridge slope	700	150	1	30x20	Historic	A
322	22 / ridge	790	200	2	75x220	Late Woodland/ Mississippian	Camp /Knapping Hunting
323	22 / ridge slope	660	50	2	15x40	Prehistoric	/Knapping
326	23 / ridge slope	680	50	2 3	30x60	Prehistoric	/Knapping
331	24 / ridge	770	100	1	40x30	Prehistoric	/Knapping
332	25 / slope	620	130	1	15x10	Prehistoric	/Knapping
333	25 / upland valley	580	50	1	150x50	Historic	A/B

Table 5
(continued)

Site No 23CY-	Sec/ Topo	Elevation (feet)	Nearest Stream	Nearest Stream Order	Approx Size (meters)	Cultural Affiliation	Site Type/Activity
334	25 / slope	640	100	1	100x45	Prehistoric	Chert source /Chert procurement Knapping
335	24/25/ ridge	740	250	1	300x250	Prehistoric	/Knapping
336	25 / ridge slope	730	450	1	290x80	Prehistoric	/Knapping
337	25 /	730	500	1	2x1	Historic	
338	25 / ridge	750	300	1	40x240	Prehistoric	/Knapping
339	25 / slope	650	50	1	20x24	Historic Architectural	A/B
340	26 / ridge slope	720	350	-	10x25	Prehistoric	/Knapping
341	26 / ridge slope	630	80	1	10x15	Prehistoric	/Knapping
342	26 / ridge	735	240	1	15x15	Ag/I-RH	H

Table 5
(continued)

Site No 23CY-	Sec/ Topo	Elevation (feet)	Nearest Stream	Nearest Stream Order	Approx Size (meters)	Cultural Affiliation	Site Type/Activity
343	26 / ridge	740	150	1	5x5	Prehistoric	/Knapping
DISSECTED UPLAND/BOTTOMLAND FOREST EDGE (n=16)							
20	35 / terrace	530	50	4	300x100	Late Archaic Middle? and Late Woodland	Village /Knapping
74	35 / ridge top	660	100	3	15x15	Middle? or Late Woodland	Mound /Burial?
344	35 / terrace	520	50	3	65x65	Prehistoric	/Knapping
345	35 / ridge slope	580	150	1	100x50	Middle Archaic	Camp /Knapping Drilling
346	35 / ridge top	700	450	1	400x100	Dalton	Camp /Knapping Hunting and Butchering
347	35 / slope	540	10	4	100x40	Ag/I	A/B
348	35 / slope	560	200	1	50x50	Historic	A/B

Table 5
(continued)

Site No 23CY-	Sec/ Topo	Elevation (feet)	Nearest Stream	Nearest Stream Order	Approx Size (meters)	Cultural Affiliation	Site Type/Activity	
349	35 / ridge top	670	300	3	50x200	Prehistoric	Camp	/Knapping Food processing
350	35 / ridge top	650	80	3	18x18	Late Woodland	Mound	/Burial?
351	35 / ridge top	660	300	4	100x200	Prehistoric	Camp	/Knapping Food processing
352	36 / terrace	530	150	4	250x100	Late Woodland	Village	/Knapping Food processing Hematite processing Pottery making Groundstone manufacture
353	36 / terrace	530	50	1	185x185	Middle-Late Archaic Late Woodland	Camp	/Knapping Food processing Hunting
354	36 /	570	75	1	45x20	Prehistoric	Camp	/Knapping
355	36 /	530	150	4	40x160	Prehistoric		/Knapping

Table 5
(continued)

Site No 23CY-	Sec/ Topo	Elevation (feet)	Nearest Stream	Nearest Stream Order	Approx Size (meters)	Cultural Affiliation	Site Type/Activity	
356	36 / ridge top	660	300	4	340x130	Middle Archaic Late Woodland	Mound Camp	/Knapping Food processing Burial Hunting Drilling
359	25/26/36/ ridge top	580-710	200	4	100x1200	Early Archaic Middle Archaic Middle? and Late Woodland	Camp	/Knapping Food processing Hunting

CY 20 and 23 CY 74) were previously recorded and on file with the Archaeological Survey of Missouri, University of Missouri-Columbia. A total of 4,881 prehistoric artifacts was found and collected. In relation to environmental (topographic/vegetational) setting, 26 sites were located in the Level Upland Prairie, 27 sites were found in the Prairie/Forest Edge, 12 were discovered in the Dissected Upland Oak-Hickory Forest, and 14 were found in the Dissected Upland/Bottomland Forest Edge. Although 70% of the prehistoric sites were located by surface finds, nearly one-third (30%) were discovered by shovel testing.

Based on diagnostic artifacts and comparative information available from regional studies, cultural affiliation has been suggested for 17 sites ranging in age from Paleo-Indian to Late Woodland/Mississippian; at least four sites are multicomponent. However, due to the limited quantity and type of diagnostic artifacts recovered, some of the cultural affiliations are tentative at this time. The vast majority of sites (62) located during the survey did not yield enough information to permit assignment to a particular cultural period; in fact, 42 sites yielded fewer than 10 artifacts. In regard to site type, 50 sites were classified as limited activity sites, 24 sites were identified as small habitations or field camps, 2 sites were classified as large habitations or villages, 2 sites were identified as mounds, and 1 site consisted of a field camp and a mound group.

The following site description categories were constructed and based on intensive site sampling and field observations, 7.5' USGS topographic maps, and artifactual analyses.

1. Topographic Setting: Includes information on landforms, site elevation, and distance and direction to the nearest stream.

2. Description: Includes data on artifact density, land status at the time of survey, ground visibility, site size, and a description of subsurface features, if present.

3. Artifact Sample: discusses the number and types of artifacts collected with observations on heat treatment.

4. Chert Availability and Utilization: describes the availability (distance to nearest sources) and utilization of local chert resources.

5. Comments/Discussion: discusses site type and cultural affiliation.

A detailed description of each prehistoric site located within the project area is presented below according to environmental zones.

Level Upland Prairie

23 CY 242

Topographic Setting: The site is situated on a broad level area of the upland prairie at an elevation of 840 ft msl and is located 300 m west of an unnamed tributary of Logan Creek.

Description: An isolated flake was found in a shovel test in a fallow field (0% visibility). Shovel testing revealed no subsurface features.

Artifact Sample: The isolated find consisted of one interior flake.

Chert Availability and Utilization: The site is located on a mantle of loess, clay, and glacial till; however, Burlington chert is available 400 m to the east and southeast. The interior flake was knapped from Burlington chert.

Comments/Discussion: The site is a limited activity knapping station recorded during an archaeological survey for the proposed sanitary landfill area (Tucker and Morin 1981). Cultural affiliation is unknown.

23 CY 251

Topographic Setting: The site is situated on one of the highest points on the upland prairie at an elevation of 850 ft msl and is located 300 m west of Mud Creek.

Description: A light scatter of artifacts was found over a large area (39 acres or 160,000 m^2) of cultivated land along this low ridge. Ground visibility varied from 5-25% in milo, maize, and foxtail millet fields. Shovel testing revealed no subsurface features.

Artifact Sample: A total of 28 artifacts was collected which included 1 primary decortication flake, 13 secondary decortication flakes, 13 interior flakes, and 1 piece of shatter. Five artifacts had been heat treated.

Chert Availability and Utilization: The site is located on a mantle of loess, clay, and glacial till; however, Burlington chert is available 200 m southeast and 300 m northwest of the site. The nearest Jefferson City chert sources are located 800 m northwest and 900 m south. A source of Callaway chert is also located 800 m to the northwest.

Twenty-seven of the flakes were knapped from Burlington chert, and one shatter piece was identified as Jefferson City chert, which indicates predominant utilization of the closer Burlington chert resources.

Comments/Discussion: The site is a limited activity knapping station with no evidence of habitation. Cultural affiliation is unknown.

23 CY 252

Topographic Setting: The site is situated on a gentle slope at an elevation of 830 ft msl and is located 200 m west of Mud Creek.

Description: A sparse scatter of artiflacts was found in bare spots and a shovel test in a pasture with 0-10% visibility. Surface finds and shovel tests delimited site size to be 34,500 m^2, and no subsurface features were found.

Artifact Sample: One side scraper with a graver tip (Figure 5G) and two interior flakes were collected.

Chert Availability and Utilization: The site is located on the edge of a mantle of loess, clay, and glacial till; however, Burlington chert is available 100 m east and south of the site. The nearest Jefferson City chert is located 600 m south in Mud Creek. The scraper/graver and one interior flake were made from Burlington chert, and the other interior flake was knapped from Jefferson City chert.

Comments/Discussion: The site is a limited activity knapping station. This site is probably related to 23 CY 321, a camp site located immediately to the northwest. Cultural affiliation is unknown.

23 CY 253

Topographic Setting: The site is situated on a gentle slope at an elevation of 805 ft msl and is located 100 m east of an unnamed tributary of Cow Creek.

Description: A small number of artifacts was found in shovel tests in a fallow portion (0% visibility) of a cultivated field. Shovel testing delimited site size to be 625 m^2 and revealed no subsurface features.

Artifact Sample: Three artifacts were collected, which included two interior flakes and one secondary decortication flake.

Chert Availability and Utilization: The site is located on the edge of a mantle of loess, clay, and glacial till; however, Burlington chert is located only 100 m west in the tributary of Cow Creek. All three flakes were knapped from Burlington chert.

Comments/Discussion: The site is a limited activity knapping station with no evidence of habitation. Cultural affiliation is unknown.

23 CY 254

Topographic Setting: The site is situated on a broad level area of the upland prairie at an elevation of 850 ft msl and is located 350 m southeast of an unnamed tributary of Cow Creek.

Description: A light scatter of artifacts was found in disced rows (approximately 70% visibility) between grass strips of a cultivated field. Surface finds delimited site size to be 78,750 m^2. Shovel testing revealed no subsurface features.

Artifact Sample: A total of 14 artifacts was collected from the surface of the site; 3 were identified as tools and 11 were classified as debitage. The tools consisted of two biface midsections and one side scraper. The debitage consisted of one primary decortication flake, five secondary decortication flakes, three interior flakes, one piece of shatter, and one bifacial thinning flake. Both biface fragments and one interior flake were heat treated.

Chert Availability and Utilization: The site is located on a mantle of loess, clay, and glacial till; however, Burlington chert is available 600 m southwest and 800 m south of the site. The nearest Jefferson City chert is located 1.4 km to the southwest. Twelve artifacts were made from Burlington chert and two (one biface midsection and a secondary decortication flake) were knapped from Jefferson City chert.

Comments/Discussion: The site is a small field camp and knapping station with no evidence of substantial habitation. The Jefferson City biface fragment and flake indicate procurement of that chert from sources at least 1.4 km distant. Cultural affiliation is unknown.

<u>23 CY 255</u>

Topographic Setting: The site is situated on one of the highest points on the upland prairie at an elevation of 850 ft msl and is located 250 m north of Mud Creek.

Description: A light scatter of artifacts was found in disced rows (approximately 75% visibility) between grass strips of a cultivated field. Surface finds and shovel testing delimited site size to cover an area of 49,000 m^2; however, the majority of artifacts was confined to an area of about 1,575 m^2. No subsurface features were found.

Artifact sample: A total of 50 artifacts was collected, which included 4 tools and 46 pieces of debitage. The tools consisted of three utilized flakes and one thumbnail end scraper (Figure 5E). The debitage consisted of 1 primary decortication flake, 14 secondary decortication flakes, 25 interior flakes, 5 pieces of shatter, and 1 core. Five flakes and the end scraper had been heat treated.

Chert Availability and Utilization: The site is located on a mantle of loess, clay, and glacial till; however, Burlington chert is available 400 m south in Mud Creek and 750 m west in an unnamed tributary of Auxvasse Creek. The nearest sources of Jefferson City chert are located 1.2 km south and west of the site. All but three of the artifacts were knapped from Burlington chert; two interior flakes and one core were made from Jefferson City chert.

Comments/Discussion: The site is a small field camp and knapping station with no evidence of substantial habitation. The Jefferson City core and two flakes indicate procurement and transportation of chert from sources at least 1.2 km distant. Cultural affiliation is unknown.

<u>23 CY 256</u>

Topographic Setting: The site is situated on a gentle slope at an elevation of 820 ft msl and is located 150 m east of an unnamed tributary of Cow Creek.

Description: A light scatter of artifacts was found in disced rows (approximately 40% visibility) between grass strips of a cultivated field. Surface finds and shovel testing delimited site size to be 24,000 m^2, and no subsurface features were detected.

Artifact Sample: A total of seven artifacts was found which included one projectile point and six flakes (two secondary decortication and four interior). The projectile point (Figure 11A) was identified as a Big Sandy Notched point (Chapman 1975:165, 174, 178, 242). The Big Sandy Notched point and two flakes were heat treated.

Chert Availability and Utilization: The site is located on a mantle of loess, clay, and glacial till; however, Burlington chert is available 200 m northwest and 350 m northeast of the site in intermittent creek beds. The nearest Jefferson City chert sources are located approximately 3 km to the southeast and southwest. All seven artifacts were manufactured from Burlington chert.

Comments/Discussion: The site is a small field camp and knapping station with no evidence of substantial habitation. The Big Sandy Notched point is suggested to date 7000-5000 B.P. (Chapman 1975:242). Thus, the site is affiliated with the Middle Archaic period.

23 CY 257

Topographic Setting: The site is situated on a low ridge at an elevation of 800 ft msl and is located 225 m northeast of an unnamed tributary of Logan Creek.

Description: A light to moderate scatter of artifacts was found in disced rows (approximately 75% visibility) between grass strips of a cultivated field. A sparse scatter of artifacts covered an area of 202,500 m^2; however, a moderate lithic scatter which contained the majority of artifacts was confined to an area of approximately 60,000 m^2 on top of the ridge. Shovel tests in and around the surface scatter revealed no subsurface features.

Artifact Sample: A total of 89 artifacts was recovered from the surface of the site. Fifteen artifacts were identified as tools and 74 were classified as debitage. The tools consisted of eight utilized flakes, three biface fragments (including one possible projectile point distal end), three side scrapers, and one spokeshave; one-third of the tools had been heat treated. The debitage consisted of 2 primary decortication flakes, 23 secondary decortication flakes, 40 interior flakes, 2 pieces of shatter, 3 cores, and 4 pieces of modified raw material; nearly one-third of the flakes had also been heat treated.

Chert Availability and Utilization: The site is located on a small strip of loess, clay, and glacial till; however, Burlington chert is available immediately south, east, and northwest of the site. The nearest Jefferson City chert is located approximately 1 km southeast in Logan Creek.

All of the tools and 97.3% of the debitage were made from Burlington chert. One flake was identified as Jefferson City chert, and one flake was indeterminate as to chert type. It is possibly heat treated Burlington chert; it is amber colored with small white fossil inclusions. Of those artifacts with identifiable cortex, 61.9% were determined to be knapped from stream deposited Burlington nodules, and 38.1% were knapped from residual Burlington nodules.

Comments/Discussion: The site is a small field camp and knapping station with no evidence of substantial habitation. The high percentage (84.6%) of flakes greater than 2 cm^2 suggests an initial lithic reduction station, and the almost exclusive use of Burlington chert indicates procurement of nearby chert resources. The tool types suggest fabricating and processing activities. Cultural affiliation is unknown.

Site 23 CY 257 was revisited in May of 1982. A surface inspection of the main portion of the site revealed a moderate scatter of predominantly large secondary decortication flakes concentrated at the head of a ravine. Also located were three large bifaces, one large preform, one mano, and a probable platform preparation abrader; only the preform and the platform preparation abrader were collected. It was noted that many of the secondary decortication flakes and one of the large bifaces were knapped from stream deposited chert. The high percentage of secondary decortication flakes, the relatively high number of bifaces (6 total) for a small field camp, the preform, and the platform preparation abrader all suggest the site was primarily used for initial reduction and biface manufacture. The fact that the majority of artifacts with cortex surfaces were knapped from stream deposited nodules suggests that most of the chert was probably procured from the nearby ravine and transported to the top of the ridge for reduction. The large preform (Figure 12A), which was not heat treated, exhibits several attributes that are highly suggestive of an intended Etley Stemmed projectile point/knife (Chapman 1975:246) including the large form (14 cm in length), an incurvate excurvate blade shape, and the preliminary shaping of the hafting element. Because of these Etley-like attributes, a Late Archaic affiliation has been tentatively assigned to the site. The probable platform preparation and/or antler flaker abrader (Figure 12B) is a sandstone slab 12 x 18 cm and exhibits two parallel, slightly sinuous grooves on one surface.

23 CY 258

Topographic Setting: The site is situated on a gentle slope at an elevation of 805 ft msl and is located 230 m west of an unnamed tributary of Cow Creek.

Description: A light scatter of artifacts was found in disced rows (approximately 70% visibility) between grass strips of a cultivated field. Site size was delimited to be 3,850 m^2. Shovel testing revealed no subsurface features.

Artifact Sample: Four secondary decortication flakes and one utilized flake were collected. One flake had been heat treated.

Chert Availability and Utilization: The site is located on the edge of a mantle of loess, clay, and glacial till; however, Burlington chert is available 50-100 m east and south in tributaries of Cow Creek. The nearest Jefferson City chert sources are located more than 3 km southwest and southeast of the site. Four of the five flakes were knapped from Burlington chert, and one secondary decortication flake was knapped from Jefferson City chert.

Comments/Discussion: The site is a limited activity knapping

station with no evidence of habitation. The Jefferson City chert flake indicates transportation of the chert to a distance greater than 3 km. Cultural affiliation is unknown.

<u>23 CY 260</u>

Topographic Setting: The site is situated on a level area of the upland prairie at an elevation of 825 ft msl and is located 200 m south of an unnamed tributary of Logan Creek.

Description: A small number of artifacts was found in a bare spot (1 m^2) of a hay field with 0-10% visibility. Shovel testing revealed no additional material or subsurface features.

Artifact Sample: Three interior flakes were collected.

Chert Availability and Utilization: The site is located on a mantle of loess, clay, and glacial till; however, Burlington chert is available approximately 300 m north in the tributary of Logan Creek. All three artifacts were knapped from Burlington chert.

Comments/Discussion: The site is a limited activity knapping station. Cultural affiliation is unknown.

<u>23 CY 267</u>

Topographic Setting: The site is situated on a low ridge at an elevation of 820 ft msl and is located 450 m west of an unnamed tributary of Cow Creek.

Description: A light scatter of artifacts was found partially in a harvested milo field with approximately 40% visibility and partially in disced rows (10-75% visibility) between grass strips. The light artifactual scatter covered an area of 208,000 m^2; however, there did appear to be areas where artifacts were more concentrated. One area, designated Locus A, that contained a fluted projectile point and 21 associated artifacts covered an area of 625 m^2. Shovel testing revealed no subsurface features. Plowzone depth in Locus A was 23 cm.

Artifact Sample: A total of 137 artifacts was collected from the site: 22 from Locus A and 115 lightly scattered throughout the rest of the field, designated Locus B. Each will be discussed separately.

Locus A included 3 tools and 19 pieces of debitage. The tools consisted of one fluted projectile point base (Figure 11B) and two utilized pieces of shatter (Figure 11C). The point base has been identified as a Clovis Fluted point (Chapman 1975:243). It was manufactured from Burlington chert but does not appear to have been heat treated. The broken point measures 4.3 cm long, 0.7 cm thick, 2.3 cm wide at the base, and 2.7 cm wide at the broadest point near the transverse fracture. The point has two long channel flutes and one guide flute. The longest flute runs the entire length of the point fragment and has a companion guide flute 2.3 cm long to the right. The flute on the opposite side is shorter (3.0 cm long) and is truncated by two lateral flake scars. Upon closer inspection of the point fragment, it was discovered that the artifact was broken during manufacture and probably never used. The point was apparently being thinned after removal of the channel flutes and broken during the process. This is evidenced by two lateral flake scars near the transverse fracture (Figure 11B) which override the short (truncated) flute. It was the second and largest lateral flake next to the fracture that snapped the point in two. Additional evidence for the breakage during manufacture is the fact that there is no lateral grinding for hafting.

The debitage from Locus A consisted of four secondary decortication flakes, eight interior flakes, six pieces of shatter. and one piece of modified raw material, none of which was heat treated.

The other artifacts scattered lightly over the rest of the large site (Locus B) included 4 tools and 111 pieces of debitage. The tools consisted of two bifaces and two utilized flakes. The debitage consisted of 1 primary decortication flake, 21 secondary decortication flakes, 73 interior flakes, 11 pieces of shatter, 4 cores, and 1 bifacial thinning flake. Eight flakes were heat treated.

Chert Availability and Utilization: The site is located on a mantle of loess, clay, and glacial till; however, Burlington chert is available 300 m to the east and 400 m to the west. The nearest sources of Jefferson City chert are located 1.5 to 2 km southwest of the site.

All of the artifacts from Locus A were made from Burlington chert. Three artifacts with identifiable cortex were knapped from stream deposited chert, and one was probably knapped from a residual nodule.

Of the 115 artifacts collected from Locus B, all but two were made from Burlington chert; two secondary decortication flakes were knapped from Jefferson City chert. Thirteen artifacts had identifiable cortex present: ten were made from stream deposited chert and three were knapped from residual chert.

Comments/Discussion: The site is a small field camp and knapping station with no evidence of substantial habitation. Analysis of the chert sample from 23 CY 267 indicates an almost exclusive use of local Burlington chert, mostly procured from stream deposits; however, the two Jefferson City flakes indicate transportation of that chert from at least 1.5 km distant.

The artifactual data from Locus A suggest it is a Clovis flint knapping station with evidence of the (aborted) manufacture of at least one Clovis Fluted point. The Clovis Fluted projectile point is affiliated with the Paleo-Indian period (Chapman 1975:60-61, 243) which ranges from 14,000-10,000 B.P. Several fluted points have been found in Callaway County. According to Chapman (1975:67), Callaway County ranks second in the number of fluted points found in the state of Missouri. The greatest concentration of fluted points is in the Lower Missouri Valley II and Greater St. Louis localities (Chapman 1975:243).

Site 23 CY 267 was revisited in May of 1982. A surface inspection of Locus A revealed a light scatter of 12 Burlington flakes within an area only slightly larger (900 m^2) than that delineated by the original survey.

23 CY 270

Topographic Setting: The site is situated on a low ridge at an elevation of 820 ft msl and is located 150 m west of an unnamed tributary of Cow Creek.

Description: A light scatter of artifacts was found in disced rows (approximately 80% visibility) between grass strips of a cultivated field. Surface finds delimited site size to be 69,825 m^2. Shovel testing revealed no subsurface features.

Artifact Sample: A total of 27 artifacts was collected which included 2 tools and 25 pieces of debitage. The tools consisted of one biface fragment (possible projectile point fragment) and one utilized flake. The debitage consisted of 6 secondary decortication flakes, 18 interior flakes, and 1 core. The biface fragment and three flakes had been heat treated.

Chert Availability and Utilization: The site is located on a mantle of loess, clay, and glacial till; however, Burlington chert is available 200 m east and west in tributaries of Cow Creek. All 27 artifacts were made from Burlington chert.

Comments/Discussion: The site is a small field camp and knapping station with no evidence of substantial habitation. Cultural affiliation is unknown.

23 CY 274

Topographic Setting: The site is situated on a broad level area of the upland prairie at an elevation of 830 ft msl and is located 300 m west of an unnamed tributary of Logan Creek.

Description: A sparse scatter of artifacts was found in a harvested soybean field with approximately 20% visibility. Surface finds delimited site size to be 9,800 m^2. Shovel testing revealed no subsurface features.

Artifact Sample: Eight artifacts were collected which included one utilized interior flake, five secondary decortication flakes, and two cores.

Chert Availability and Utilization: The site is located on a mantle of loess, clay, and glacial till; however, Burlington chert is available 150 m and 250 m east. The nearest Jefferson City chert sources are located 600 m south and southeast of the site. Seven of the artifacts were knapped from Burlington chert, and the one utilized flake was knapped from Jefferson City chert. Four Burlington artifacts with identifiable cortex were made from stream deposited chert.

Comments/Discussion: The site is a limited activity knapping station with no evidence of habitation. Cultural affiliation is unknown.

<u>23 CY 275</u>

Topographic Setting: The site is situated on a gentle upland slope at an elevation of 800 ft msl and is located 150 m east of an unnamed tributary of Cow Creek.

Description: A sparse scatter of artifacts was found in a harvested soybean field with approximately 40% visibility. Surface finds delimited site size to be 55,200 m^2. Shovel testing revealed no subsurface features.

Artifact Sample: A total of nine artifacts was collected which included two tools and seven pieces of debitage. The two tools were side scrapers, one of which was heat treated. The debitage consisted of three interior flakes and four pieces of shatter.

Chert Availability and Utilization: The site is located on the boundary between a mantle of loess, clay, and glacial till and chert-bearing Burlington strata. Abundant Burlington chert nodules are available in creeks south, west, and north of the site. All nine artifacts were knapped from Burlington chert.

Comments/Discussion: The site is a limited activity knapping station with no evidence of habitation. Cultural affiliation is unknown.

23 CY 281

Topographic Setting: The site is situated on a gentle upland slope at an elevation of 825 ft msl and is located 140 m west of an unnamed tributary of Cow Creek.

Description: Two flakes were found in a harvested soybean field with approximately 30% visibility. The artifacts were located in an area of 50 m^2. Shovel testing revealed no subsurface features.

Artifact Sample: One utilized interior flake and one primary decortication flake were collected.

Chert Availability and Utilization: The site is located on a mantle of loess, clay, and glacial till; however, Burlington chert is available 500 m north and 600 m northwest in tributaries of Cow Creek. Both artifacts were knapped from Burlington chert.

Comments/Discussion: The site is a limited activity knapping station with no evidence of habitation. Cultural affiliation is unknown.

23 CY 298

Topographic Setting: The site is situated on a gentle slope of a low ridge at an elevation of 790 ft msl and is located 200 m east of an unnamed tributary of Cow Creek.

Description: A light scatter of artifacts was found in a harvested milo field with approximately 20% visibility. Surface finds delimited site size to be 13,500 m^2, and shovel testing revealed no subsurface features.

Artifact Sample: A total of 18 artifacts was collected which included 3 secondary decortication flakes, 14 interior flakes, and 1 piece of modified raw material. Three interior flakes had been heat treated.

Chert Availability and Utilization: The site is located on the boundary between a mantle of loess, clay, and glacial till and chert-bearing Burlington strata. Burlington chert is available in the creek west of the site. The nearest sources of Jefferson City chert are located approximately 3 km to the southeast and 3.5 km to the southwest.

Seventeen artifacts were made from Burlington chert and one interior flake was identified as Jefferson City chert. All three secondary decortication flakes were knapped from stream deposited chert.

Comments/Discussion: The site is a limited activity knapping station with no evidence of habitation. The Jefferson City chert flake indicates transportation of the chert to a distance of at least 3 km. Cultural affiliation is unknown.

23 CY 301

Topographic Setting: The site is situated on a low ridge at an elevation of 805 ft msl and is located 475 m east of an unnamed tributary of Cow Creek.

Description: A small number of artifacts was found in a harvested milo field with approximately 15% visibility. Surface finds delimited site size to be 4,050 m^2, and shovel testing revealed no subsurface features.

Artifact Sample: Four artifacts were collected which included three interior flakes and one piece of shatter.

Chert Availability and Utilization: The site is located on a mantle of loess, clay, and glacial till; however, Burlington chert is available approximately 200 m west and 300 m east of the site. All four artifacts were made from Burlington chert.

Comments/Discussion: The site is a limited activity knapping

station with no evidence of habitation. Cultural affiliation is unknown.

23 CY 302

Topographic Setting: The site is situated on a gentle slope at an elevation of 800 ft msl and is located 150 m east of an unnamed tributary of Auxvasse Creek.

Description: A light to moderate scatter of artifacts was found in a plowed field with 95% visibility. Surface finds delimited site size to be 36,000 m^2; however, the main scatter was concentrated in an area of 1,800 m^2. Shovel testing revealed no subsurface features.

Artifact Sample: A total of 70 artifacts was collected which included 4 tools and 66 pieces of debitage. The tools consisted of two bifaces and two utilized flakes. The debitage consisted of 9 secondary decortication flakes, 45 interior flakes, 7 pieces of shatter, 1 core, and 4 bifacial thinning flakes. One utilized flake and 19 pieces of debitage had been heat treated.

Chert Availability and Utilization: The site is located on chert-bearing Burlington strata; stream deposited Burlington nodules are available in the tributary of Auxvasse Creek 150 m to the west. The nearest source of Jefferson City chert is located approximately 1 km southwest of the site.

Of the 70 artifacts collected, 92.9% were made from Burlington chert, 4 artifacts or 5.7% (1 biface and 3 secondary decortication flakes) were knapped from Jefferson City chert, and 1 core was made from nonlocal Excello chert. The core has a bluish-black matrix full of minute white fossils and a light brown or tan cortex. Two Burlington flakes with identifiable cortex were knapped from stream deposited chert, one was knapped from residual chert. and two Jefferson City secondary decortication flakes were knapped from residual nodules.

Comments/Discussion: The site is a small field camp and knapping station with no evidence of substantial habitation. Analysis of the chert sample from 23 CY 302 indicates predominant utilization of nearby Burlington chert; however, the four Jefferson City artifacts indicate transportation and secondary decortication of chert located at least 1 km distant from the site, and the closest source of Excello chert from which the core was made is located 10 km north of the site. Four bifacial thinning flakes suggest biface manufacture and/or maintenance activities. Cultural affiliation is unknown.

23 CY 303

Topographic Setting: The site is situated on the top and gentle slope of a broad ridge at an elevation of 840 ft msl and is located 150 m east of an unnamed tributary of Auxvasse Creek.

Description: A light scatter of artifacts was found in harvested soybean and maize fields with approximately 60% visibility. Surface finds delimited site size to be 456,000 m^2; however, the majority of artifacts was concentrated in an area approximately 60,000 m^2. Shovel testing revealed no subsurface features.

Artifact Sample: A total of 44 artifacts was collected which included 5 tools and 39 pieces of debitage. The tools consisted of two utilized flakes, one serrated biface midsection, one projectile point base, and one multipurpose groundstone artifact. The projectile point base (Figure 11E) is lanceolate in form with a contracting stem and concave base and exhibits lateral grinding the entire length of the point fragment. This point base has been tentatively identified as a Rice Lanceolate point, known to occur in the Northeast Prairie region (Chapman 1975:253), because: (1) it fits most of the criteria for the base of this point type (Chapman 1975:253; Ahler 1971:17) and (2) the serrated biface midsection (Figure 11D) also found on the site corresponds to serrations often found along the midportion of Rice Lanceolate points (Chapman 1975:253; Ahler 1971:17). The multipurpose groundstone tool is a single-pitted quartzite stone with hammerstone battering at one end and one grinding surface (Figure 7A).

The debitage consisted of 2 primary decortication flakes, 5 secondary decortication flakes, 21 interior flakes, 2 pieces of shatter, 6 cores, and 3 bifacial thinning flakes. Only two interior flakes had been heat treated.

Chert Availability and Utilization: The site is located on a mantle of loess, clay, and glacial till; however, Burlington chert is available 600 m west and 700 m south. The nearest sources of Jefferson City chert are located 900 m west and 1.4 km south of the site. A source of Callaway chert is also located approximately 800 m to the west.

Of the 43 chert artifacts collected, 36 or 83.7% were knapped from Burlington chert, 6 or 14% were made from Jefferson City chert, and 1 secondary decortication flake was knapped from a highly patinated dark gray nonlocal chert with bluish-white chalcedony veins. This chert has been identified as Excello and is known to occur 11 km north of the site. Five Burlington and two Jefferson City artifacts with identifiable cortex were procured and knapped from stream deposited chert.

Comments/Discussion: The site is a small field camp and knapping station. The projectile point base and serrated biface midsection suggest activities related to hunting and butchering, and the pitted/hammer/grinding stone indicates plant processing activities. The Rice Lanceolate component suggested by the point base and serrated midsection is affiliated with the Early Archaic period (9000-7000 B.P.) and possibly continues into the Middle Archaic (Chapman 1975:253).

23 CY 308

Topographic Setting: The site is situated on a low ridge at an elevation of 825 ft msl and is located 300 m west of an unnamed tributary of Cow Creek.

Description: A light scatter of artifacts was found in a harvested soybean field with approximately 25% visibility. Surface finds delimited site size to be 41,400 m^2. Shovel testing revealed no subsurface features.

Artifact Sample: Six artifacts were collected which included one primary decortication flake, two interior flakes, two pieces of shatter, and one core.

Chert Availability and Utilization: The site is located on a mantle of loess, clay, and glacial till; however, Burlington chert is available 300 m to the east and northwest. The nearest sources of Jefferson City chert are located 1.3 km west and southwest of the site. All six artifacts were manufactured from Burlington chert. Two artifacts with identifiable cortex were made from stream deposited chert.

Comments/Discussion: The site is a limited activity knapping station with no evidence of habitation. Cultural affiliation is unknown.

23 CY 309

Topographic Setting: The site is situated on a low ridge at an elevation of 820 ft msl and is located 200 m west of an unnamed tributary of Auxvasse Creek.

Description: A moderate to dense scatter of artifacts was found in a plowed field with 100% visibility. Surface finds delimited site size to be 55,000 m^2, although the main concentration of artifacts was confined along the low ridge trending northwest-southeast. Shovel tests revealed a plowzone depth of 23 cm but no subsurface features.

Artifact Sample: A total of 246 artifacts was collected, which included 19 tools and 227 pieces of debitage. The tools consisted of 13 utilized flakes, 5 bifaces, and 1 projectile point/knife. The projectile point/knife (Figure 11F) was identified as an Etley Stemmed (Chapman 1975:214, 246).

The debitage consisted of four primary decortication flakes, 57 secondary decortication flakes, 151 interior flakes, 14 pieces of shatter. and 1 bifacial thinning flake. Four tools and 31 flakes were heat treated.

Chert Availability and Utilization: The site is located on the boundary between a mantle of loess, clay, and glacial till and chert-bearing Burlington strata. Residual Burlington chert occurs north and west of the site, and stream deposited nodules are available in tributaries of Auxvasse Creek 450 m to the southwest and north. The nearest source of Jefferson City chert is located approximately 900 m west of the site.

All of the tools (including the Etley point) and 96.5% of the debitage were manufactured from Burlington chert. Seven pieces or 3.1% of the debitage were made from Jefferson City chert, and one small dark gray interior flake was knapped from Excello chert, located 10 km north of the site. Twenty-two Burlington artifacts with identifiable cortex were knapped from stream deposited chert, and three were made from residual chert.

Comments/Discussion: The site is probably a seasonal or reoccupied field camp and knapping station. Analysis of the chert sample from 23 CY 309 indicates a predominant use of local Burlington chert, mostly procured from stream deposited sources. Activities other than flint knapping suggested by the tool types include hunting and butchering.

The Etley Stemmed projectile point/knife is affiliated with the Late Archaic period (5000-3000 B.P.) and is a diagnostic artifact of the Booth assemblage and Culvre River ceremonial complex in northeast Missouri (Chapman 1975:246).

23 CY 311

Topographic Setting: The site is situated on a low ridge at an elevation of 830 ft msl and is located 250 m west of an unnamed tributary of Cow Creek.

Description: A light scatter of artifacts was found in a harvested soybean field with approximately 15% visibility. Surface finds and shovel testing delimited site size to be 96,600 m^2, and no subsurface features were found.

Artifact Sample: A total of 57 artifacts was collected which included 4 tools and 53 pieces of debitage. The tools consisted of three utilized flakes and one biface. The debitage included 7 secondary decortication flakes, 40 interior flakes, 4 pieces of shatter, and 2 cores. Nine flakes were heat treated.

Chert Availability and Utilization: The site is located on a mantle of loess, clay, and glacial till; however, Burlington chert is available 300 m to the west and northeast in tributaries of Cow Creek. All 57 artiflacts were made from Burlington chert. Four Burlington artifacts with identifiable cortex were knapped from stream deposited chert; one flake was probably knapped from a residual nodule.

Comments/Discussion: The site is a small field camp and knapping station with no evidence of substantial habitation. The high percentage (78.7%) of flakes greater than 2 cm^2 indicates an initial lithic reduction station, and the exclusive use of Burlington chert indicates procurement of nearby chert resources. Cultural affiliation is unknown.

23 CY 313

Topographic Setting: The site is situated on a low ridge at an elevation of 825 ft msl and is located 300 m east of an unnamed tributary of Cow Creek.

Description: A light scatter of artifacts was found in a harvested milo field with approximately 25% visibility. Surface finds delimited site size to be 250,000 m^2, and shovel testing revealed no subsurface features.

Artifact Sample: A total of 19 artifacts was collected which included 2 tools and 17 pieces of debitage. The tools consisted of 1 biface fragment and 1 spokeshave, and the debitage included 3 secondary decortication flakes, 13 interior flakes, and 1 piece of modified raw material. The biface fragment, spokeshave, and three interior flakes had been heat treated.

Chert Availability and Utilization: The site is located on a mantle of loess, clay, and glacial till; however, Burlington chert is available 300 m east and west in tributaries of Cow Creek. The nearest sources of Jefferson City chert are located 2.5 km west and southwest, 3 km south-southwest, and 3.5 km southeast of the site.

All but one of the artifacts from the site were made from Burlington chert; one interior flake was knapped from Jefferson City chert. Three Burlington artifacts with identifiable cortex were made from stream deposited chert.

Comments/Discussion: The site is a small field camp and knapping station with no evidence of substantial habitation. The artifactual data indicate a predominant use of Burlington chert (probably from stream deposited sources); however, the Jefferson City artifact indicates transportation of the chert from a source at least 2.5 km distant. Cultural affiliation is unknown.

23 CY 314

Topographic Setting: The site is situated on a gentle slope at an elevation of 790 ft msl and is located 40 m west of an unnamed tributary of Cow Creek.

Description: A fire-cracked rock feature with an associated light scatter of artifacts was found in a harvested milo field with approximately 20% visibility. The artifactual scatter was determined to cover an area of 1,000 m^2; however, the main feature was limited to an area of 4 x 7 m and concentrated in an area of 2 x 2 m. The feature, a fire hearth or possible chert heat treatment pit, consisted of several fire-cracked chert nodules and fragments with a few flakes scattered in and about the feature. A shovel test 40 cm deep encountered fire-cracked rock 15 cm below the surface and revealed a conical stain to a depth of 35 cm. Another scatter of fire-cracked chert (possible feature) located approximately 10 m northwest of the above feature was confined to an area of 5 x 7 m.

Artifact Sample: A total of 166 artifacts was collected, which included 4 secondary decortication flakes, 13 interior flakes, 7 pieces of shatter. 2 cores, 1 chunk of modified raw material, and 139 large and small unmodified, fire-cracked pieces of Burlington chert. Twenty-three of the 27 pieces of modified chert had been heat altered.

Chert Availability and Utilization: The site is located on chert-bearing Burlington strata. The Cow Creek tributary 40 m east of the site contains tan, buff, and brown stream deposited Burlington nodules which differ markedly from the red and black fire-cracked chert.

All of the unmodified fire-cracked artifacts and all but one of the modified artifacts were made from Burlington chert. One small interior flake was indeterminate as to chert type. The chert is amber colored with many small fossil inclusions and may represent a nonlocal or exotic chert type obtained from local glacial till. A stratum of glacial till mantles the top of a low ridge 100 m to the west. Two secondary decortication flakes with identifiable cortex were knapped from stream deposited nodules. Most of the unmodified pieces of fire-cracked chert with cortex present appeared to be stream deposited chert.

Comments/Discussion: The site is probably a small field camp and knapping station with one and possibly two features visible on the surface. The feature(s) may be a simple fire hearth(s) or possibly a chert heat treatment pit(s). The chert heat altered was exclusively Burlington chert probably procured from the nearby creek. Cultural affiliation is unknown.

23 CY 315

Topographic Setting: The site is situated on a broad level area of the upland prairie at an elevation of 820 ft msl and is located 300 m east of an unnamed tributary of Logan Creek.

Description: Two artifacts were found in a harvested milo field with approximately 10% visibility. Surface finds delimited site size to be 2,800 m^2, and shovel testing revealed no subsurface features.

Artifact Sample: One secondary decortication flake and one interior flake were collected from the site.

Chert Availability and Utilization: The site is located on a mantle of loess, clay, and glacial till; however, Burlington chert is available a short distance to the west in the tributary of Logan Creek. Both flakes were knapped from Burlington chert.

Comments/Discussion: The site is a limited activity knapping station with no evidence of habitation. Cultural affiliation is unknown.

23 CY 321

Topographic Setting: The site is situated on a broad ridge top at an elevation of 840 ft msl and is located 400 m northwest of Mud Creek.

Description: A light scatter of artifacts was found in a harvested soybean field with approximately 30% visibility. Surface finds and shovel tests delimited site size to be 42,525 m^2; however, the majority of artifacts was located in the southeast portion of the site (6,750 m^2). Shovel testing revealed no subsurface features.

Artifact Sample: A total of 26 artifacts was collected which included 4 tools and 22 pieces of debitage. The tools consisted of two bifaces, one utilized flake, and one sandstone mano or grinding stone, which has two grinding surfaces. The debitage consisted of 2 primary decortication flakes, 6 secondary decortication flakes, 11 interior flakes, and 3 cores. One biface and one flake were heat treated.

Chert Availability and Utilization: The site is located on a mantle of loess, clay, and glacial till; however, Burlington chert is available 300 m to the east, south, west, and northwest. The nearest sources of Jefferson City chert are located 800 m south and 1 km west and northwest of the site. A source of Callaway chert is also located approximately 1 km to the northwest.

Of the 25 chert artifacts, 17 or 68% were manufactured from Burlington chert, and 8 or 32% were made from Jefferson City chert. The Jefferson City artifacts included one primary decortication flake, two secondary decortication flakes, three interior flakes, and two cores; these Jefferson City artifacts indicate procurement and transportation of this chert from sources approximately 1 km distant -- largely for initial reduction purposes. Of the Jefferson City artifacts with identifiable cortex, two were knapped from residual chert, and two were made from stream deposited chert; three Burlington decortication flakes with identifiable cortex were knapped from stream deposited chert.

Comments/Discussion: The site is a small field camp and knapping station with evidence of plant food processing activities. Based on available data, chert procurement was predominantly from the closer Burlington sources; however, one-third of the artifacts were made from Jefferson City chert located at least twice as far away. Cultural affiliation is unknown.

Prairie/Forest Edge

23 CY 263

Topographic Setting: The site is situated on the top and eastern slope of a ridge at an elevation of 780 ft msl and is located 150 m west of an unnamed tributary of Logan Creek.

Description: A light scatter of artifacts was located on the surface and in shovel tests in a pasture with 0-20% visibility. Surface finds and shovel testing determined the scatter covers an area of 90,000 m^2; however, the majority of artifacts was collected from an area of 5,625 m^2. Shovel tests revealed no subsurface features.

Artifact Sample: A total of 27 artifacts was collected which included 1 primary decortication flake, 14 secondary decortication flakes, 8 interior flakes, 2 cores, and 2 pieces of modified raw material. Six flakes had been heat treated.

Chert Availability and Utilization: The site is located on chert-bearing Burlington strata. Numerous residual nodules are present on the ridge slopes, and stream deposited Burlington nodules occur in nearby creeks. The nearest Jefferson City chert is located approximately 1 km east and southeast of the site. All 25 artifacts were knapped from Burlington chert; 8 flakes with cortex were knapped from residual nodules, and 5 other artifacts were made from stream deposited nodules.

Comments/Discussion: The site is a limited activity knapping station with no evidence of habitation. The high percentage (71.4%) of large decortication flakes (>2 cm^2) suggests an initial lithic reduction station, and the exclusive use of Burlington chert indicates procurement of nearby chert resources. Cultural affiliation is unknown.

<u>23 CY 264</u>

Topographic Setting: The site is situated on a ridge at an elevation of 800 ft msl and is located 275 m east of an unnamed tributary of Logan Creek.

Description: A light scatter of artifacts was located via shovel tests in a pasture with 0% visibility. Shovel testing delimited site size to be 11,250 m^2, and no subsurface features were found.

Artifact Sample: Nine artifacts were collected which included two secondary decortication flakes, three interior flakes, three pieces of shatter, and one chunk of modified raw material. One interior flake had been heat treated.

Chert Availability and Utilization: The site is located on chert-bearing Burlington strata. Residual Burlington nodules are present on the ridge slopes, and stream deposited Burlington nodules occur in the nearby creeks. The nearest Jefferson City chert is located approximately 500 m east and southeast of the site. All nine artifacts were knapped from Burlington chert, two from residual nodules and three from stream deposited nodules.

Comments/Discussion: The site is a limited activity knapping station with no evidence of habitation. Cultural affiliation is unknown.

23 CY 265

Topographic Setting: The site is situated on a small ridge at an elevation of 805 ft msl and is located 100 m southwest of an unnamed tributary of Logan Creek.

Description: A light scatter of artifacts was found in bare spots (approximately 15-20% visibility) of a hay field. Surface finds and shovel testing delimited site size to be 5,625 m^2, and no subsurface features were found.

Artifact Sample: A total of 38 artifacts was collected which included 8 secondary decortication flakes, 28 interior flakes, 1 bifacial thinning flake, and 1 utilized flake. Eight interior flakes had been heat treated.

Chert Availability and Utilization: The site is located on chert-bearing Burlington strata; numerous residual nodules occur on nearby ridge slopes. The nearest Jefferson City chert sources are located approximately 1 km to the east and southeast. All 38 artifacts were knapped from Burlington chert.

Comments/Discussion: The site is a limited activity knapping

station with no evidence of habitation. Cultural affiliation is unknown.

23 CY 266

Topographic Setting: The site is situated on a ridge top at an elevation of 820 ft msl and is located 400 m east of an unnamed tributary of Logan Creek.

Description: A sparse scatter of artifacts was found in a plowed but undisced field with approximately 15-20% visibility. Surface finds delimited site size to be 375 m^2. Shovel testing around the surface scatter revealed no subsurface features.

Artifact Sample: A total of six artifacts was collected which included two interior flakes, two cores, and two pieces of shatter.

Chert Availability and Utilization: The site is located on chert-bearing Burlington strata; however, Jefferson city chert is available 150 m east and southwest of the site in tributaries of Logan Creek. Four artifacts were knapped from Burlington chert, and two artifacts were knapped from Jefferson City chert. One of the cores was identified as a stream deposited Burlington nodule and the other as a residual Jefferson City nodule.

Comments/Discussion: The site is a limited activity knapping station with no evidence of habitation. Cultural affiliation is unknown.

23 CY 268

Topographic Setting: The site is situated on the top and slope of a small ridge at an elevation of 800 ft msl and is located 30 m north of an unnamed tributary of Auxvasse Creek.

Description: A light scatter of artifacts was found on the edge of a wooded area and a pasture; ground visibility varied between 0-30%. Surface finds delimited site size to be 6,800 m^2. Shovel testing revealed no subsurface features.

Artifact Sample: Fourteen artifacts were collected, which included 1 primary decortication flake, 2 secondary decortication flakes, 10 interior flakes, and 1 chunk of modified raw material. Two interior flakes were heat treated.

Chert Availability and Utilization: The site is located on chert-bearing Burlington strata; numerous nodules are available on the ridge slopes and in nearby creek beds. The nearest sources of Jefferson City chert are located approximately 800 m northwest and southwest of the site. All but one artifact were knapped from Burlington chert; one interior flake was identified as Jefferson City chert. Two artifacts with identifiable cortex were knapped from residual nodules, and two others were knapped from stream deposited nodules.

Comments/Discussion: The site is a limited activity knapping station with no evidence of habitation. Cultural affiliation is unknown.

23 CY 272

Topographic Setting: The site is situated on the east slope of a ridge at an elevation of 810 ft msl and is located 75 m west of an unnamed tributary of Auxvasse Creek.

Description: A sparse scatter of artifacts was found in shovel tests and on the surface in a cattle pasture with 0-10% visibility. Surface finds and shovel testing delimited site size to be 3,000 m^2, and no subsurface features were found.

Artifact Sample: Two secondary decortication flakes and three interior flakes were collected. One interior flake had been heat treated.

Chert Availability and Utilization: The site is located on a narrow lobe of loess, clay, and glacial till; however, Burlington chert is available immediately to the north, east, and south. Jefferson City chert is located 450 m north of the site. All five artifacts were knapped from Burlington chert.

Comments/Discussion: The site is a limited activity knapping station with no evidence of habitation. Cultural affiliation is unknown.

<u>23 CY 280</u>

Topographic Setting: The site is situated on a gentle ridge slope at an elevation of 780 ft msl and is located 300 m north of an unnamed tributary of Auxvasse Creek.

Description: A small number of artifacts was found in a fallow field (early successional) with 0-10% visibility near the edge of a deep ravine. Site size was determined to be 350 m^2. Shovel testing revealed no subsurface features.

Artifact Sample: Two secondary decortication flakes and two interior flakes were collected.

Chert Availability and Utilization: The site is located on chert-bearing Burlington strata; numerous nodules are available in the nearby ravine. All four flakes were knapped from Burlington chert; one large secondary decortication flake was removed from a stream deposited nodule.

Comments/Discussion: The site is a limited activity knapping station with no evidence of habitation. Cultural affiliation is unknown.

<u>23 CY 282</u>

Topographic Setting: The site is situated on a ridge top at an elevation of 815 ft msl and is located 240 m east of an unnamed tributary of Logan Creek.

Description: A light scatter of artifacts was found in a harvested soybean field with approximately 35% visibility. Surface finds delimited site size to be 15,300 m^2; however, the majority of artifacts was concentrated in an area of 6,000 m^2. Shovel testing revealed no subsurface features.

Artifact Sample: A total of 46 artifacts was collected which included 3 tools (utilized flakes) and 43 pieces of debitage. The debitage consisted of 1 primary decortication flake, 6 secondary decortication flakes, 17 interior flakes, 9 pieces of shatter, 5 cores, and 5 pieces of modified raw material. One utilized flake and two interior flakes were heat treated.

Chert Availability and Utilization: The site is located on chert-bearing Burlington strata; numerous chert nodules occur on steep slopes and in nearby tributaries of Logan Creek. The closest sources of Jefferson City chert are located 1.6 km east and southeast. All but one of the artifacts were made from Burlington chert; one core was identified as Jefferson City chert. Nearly 50% of the Burlington artifacts and the Jefferson City core were identified as derived from stream deposited chert sources.

Comments/Discussion: The site is a limited activity knapping station with no evidence of habitation. The high percentage (87.5%) of flakes greater than 2 cm^2 suggests an initial lithic reduction station. The artifactual data indicate that Burlington was the main chert type used and that redeposited chert was the main chert source exploited. The presence of the Jefferson City core also indicates procurement of a Jefferson City nodule from a stream approximately 1.6 km distant from the site. Cultural affiliation is unknown.

<u>23 CY 284</u>

Topographic Setting: The site is situated on a ridge slope at an elevation of 800 ft msl and is located 200 m east of Mud Creek.

Description: A small number of artifacts was collected from an intermittent drainage in a wooded area with 0-10% visibility. The location of the artifacts in the ravine may be the result of erosion from an adjacent knoll. Site size was determined to be 1,200 m^2. Shovel testing revealed no subsurface features.

Artifact Sample: Five secondary decortication flakes and two interior flakes were found.

Chert Availability and Utilization: The site is located on chert-bearing Burlington strata; numerous nodules are available in local creek beds. All seven artifacts were made from Burlington chert. Four of the secondary decortication flakes with identifiable cortex were knapped from stream deposited chert. It is interesting to note that three secondary decortication and two interior flakes were so similar in appearance that it suggests they were knapped from the same nodule.

Comments/Discussion: The site is a limited activity knapping station with no evidence of habitation. The fact that all five secondary decortication flakes were larger than 5 cm^2 suggests an initial reduction station. Cultural affiliation is unknown.

<u>23 CY 286</u>

Topographic Setting: The site is situated on a ridge top at an elevation of 820 ft msl and is located 150 m west of Kentucky Spring Hollow Creek.

Description: A light scatter of artifacts was found partially in a fallow field (early successional) and partially in a milo field; ground visibility varied from 0-40%. Surface finds delimited site size to be 33,000 m^2. Shovel testing revealed no subsurface features.

Artifact Sample: A total of 30 artifacts was collected, which included 1 utilized flake and 29 pieces of debitage. The debitage consisted of 2 primary decorticalton flakes, 10 secondary decortication flakes, 12 interior flakes, 2 pieces of shatter, 1 core, and 2 pieces of modified raw material. Three flakes were heat treated.

Chert Availability and Utilization: The site is located on chert-bearing Burlington strata; numerous nodules are available on nearby ridge slopes and in local creek beds. The nearest sources of Jefferson City chert are located 500 m south and west of the site.

All but two artifacts were made from Burlington chert; two interior flakes were knapped from Jefferson City chert. Of eight artifacts with identifiable cortex, one was knapped from residual chert and the remainder were made from stream deposited chert.

Comments/Discussion: The site is a limited activity knapping station with no evidence of habitation. Cultural affiliation is unknown.

<u>23 CY 290</u>

Topographic Setting: The site is situated on a ridge top at an elevation of 790 ft msl and is located 150 m north of an unnamed tributary of Logan Creek.

Description: A small number of artifacts was found in a fallow (early successional) field with approximately 20% visibility. Surface finds and shovel testing delimited site size to be 3,000 m^2, and no subsurface features were found.

Artifact Sample: A total of six artifacts was collected, which included one secondary decortication flake, four interior flakes, and one bifacial thinning flake.

Chert Availability and Utilization: The site is located on chert-bearing Burlington strata; numerous residual nodules are present on ridge slopes, and redeposited Burlington nodules occur in local creeks. All six artifacts were knapped from Burlington chert.

Comments/Discussion: The site is a limited activity knapping station with no evidence of habitation. Cultural affiliation is unknown.

<u>23 CY 291</u>

Topographic Setting: The site is situated on a ridge top at an elevation of 790 ft msl and is located 350 m west of Logan Creek.

Description: A light to moderate scatter of artifacts was found in a partially harvested milo field with approximately 15-70% visibility. The artifact scatter covered an area of 250,000 m^2; however, the artifactual debris was basically confined to three loci of approximately 8,000 m^2 each. Shovel testing revealed no subsurface features.

Artifact Sample: A total of 159 artifacts was collected which included 6 tools and 153 pieces of debitage. The tools consisted of three utilized flakes, two bifaces, and one end scraper.

The debitage included 3 primary decorticaiton flakes, 38 secondary decortication flakes, 101 interior flakes, 8 pieces of shatter, 2 cores, and 1 bifacial thinning flake. Three tools and 35 pieces of debitage were heat treated. It was noted that a much higher percentage of artifacts from loci A and B had been heat treated than those from Locus C.

Chert Availability and Utilization: The site is located on chert-bearing Burlington strata; numerous residual nodules occur on ridge slopes, and redeposited Burlington nodules are available in Logan Creek and its nearby tributaries. The nearest source of Jefferson City chert is located approximately 1.8 km southeast of the site.

All but one artifact were made from Burlington chert; one bifacial thinning flake was knapped from Jefferson City chert. Of those artifacts with identifiable cortex present, 18 were knapped from stream deposited chert, and 10 were knapped from residual chert.

Comments/Discussion: The site is a small field camp with three discrete knapping stations. The relatively high percentage (63.4%) of flakes greater than 2 cm^2 indicates initial reduction lithic workshops. The artifactual data also indicate an almost exclusive use of local Burlington chert, procured from both stream deposited and residual sources; however, the Jefferson City flake indicates transportation of that chert from approximately 1.8 km distant. The tool types suggest fabricating and processing activities. Cultural affiliation is unknown.

23 CY 292

Topographic Setting: The site is situated on a ridge slope at an elevation 780 ft msl and is located 80 m east of an unnamed tributary of Logan Creek.

Description: A small number of artifacts was found in a wooded area with approximately 15% visibility. Surface finds delimited site size to be approximately 100 m^2. Subsurface features were not present on the rocky, steep slope.

Artifact Sample: A total of nine artifacts was collected which included four secondary decortication flakes, one interior flake, one core, and three chunks of modified raw material.

Chert Availability and Utilization: The site is located on chert-bearing Burlington strata; numerous residual nodules occur on ridge slopes, and redeposited Burlington chert is available in local creeks. Jefferson City chert is located approximately 700 m east of the site.

All nine artifacts were knapped from Burlington chert. Of those artifacts with identifiable cortex, four were made from stream deposited chert, and one was knapped from residual chert.

Comments/Discussion: The site is a limited activity knapping station. An initial lithic reduction station is suggested since all the artifacts were greater than 2 cm^2. Cultural affiliation is unknown.

23 CY 293

Topographic Setting: The site is situated on a ridge top at an elevation of 780 ft msl and is located 120 m west and scuth of unnamed tributaries of Logan Creek.

Description: A small number of artifacts was found in a wooded area with approximately 10% visibility. Surface finds delimited site size to be 450 m^2. Shovel testing revealed no subsurface features.

Artifact Sample: Three artifacts were collected which included two secondary decortication flakes and one piece of modified raw material. One flake was heat treated.

Chert Availability and Utilization: The site is located on chert-bearing Burlington strata; numerous residual nodules are present on ridge slopes, and redeposited Burlington nodules occur in nearby creeks. Jefferson City chert is available approximately 700 m east of the site. All three artifacts were made from Burlington chert.

Comments/Discussion: The site is a limited activity knapping station with no evidence of habitation. Cultural affiliation is unknown.

23 CY 294

Topographic Setting: The site is situated on the top and slope of a ridge at an elevation of 780 ft msl and is located 100 m north of an unnamed tributary of Logan Creek.

Description: A small number of artifacts was found in a wooded area with 10% visibility. Shovel testing and surface finds delimited site size to be 50,000 m^2, and no subsurface features were found.

Artifact Sample: Four artifacts were collected which included two secondary decortication flakes and two interior flakes. One interior flake had been heat treated.

Chert Availability and Utilization: The site is located on chert-bearing Burlington strata; numerous residual nodules are present on ridge slopes, and redeposited Burlington nodules occur in local creeks. All four artifacts were knapped from Burlington chert.

Comments/Discussion: The site is a limited activity knapping station with no evidence of habitation. Cultural affiliation is unknown.

23 CY 295

Topographic Setting: The site is located on a large linear gravel bar of Logan Creek at an elevation of 640 ft msl.

Description: A small number of artifacts was found among creek gravel on a large gravel bar of Logan Creek. The location of the artifacts in the creek bed may be the result of erosion from adjoining steep ridge slopes, or it may indicate a procurement station. Site size was delimited to be 625 m^2.

Artifact Sample: A total of seven artifacts was collected from the stream, which included one primary decortication flake, three secondary decortication flakes, two interior flakes, and one core.

Chert Availability and Utilization: The site is located on a gravel bar made up entirely of redeposited Burlington chert nodules; Jefferson City chert was not located in the immediate area. All seven artifacts were made from Burlington chert, and all the artifacts with cortex present (5) were knapped from stream deposited chert. In addition, each artifact was greater than 5 cm^2.

Comments/Discussion: All the evidence suggests the site is a chert procurement and initial reduction knapping station on the chert source -- in this case, a stream deposited gravel bar. Cultural affiliation is unknown.

23 CY 304

Topographic Setting: The site is situated on a ridge top and gentle slope at an elevation of 810 ft msl and is located 100 m west of an unnamed tributary of Auxvasse Creek.

Description: A light to dense scatter of artifacts was found in a harvested soybean field with 25-75% visibility. Surface finds delimited site size to be 90,000 m^2; however, the heaviest or densest portion of the scatter was confined to an area of 12,000 m^2 in the northeast corner of the field. Shovel testing revealed no subsurface features.

Artifact Sample: A total of 221 artifacts was collected, which included 25 tools and 196 pieces of debitage. The tools consisted of 1 triangular arrow point, 3 biface fragments, 16 utilized flakes, 2 side scrapers, 1 spokeshave, 1 cleaver or chopping tool, and 1 multipurpose quartzite hammerstone. The arrow point (Figure 13A) was identified as a Mississippi Triangular (Chapman 1980:165, 310) or Madison (Perino 1968:52). One biface fragment was probably a preform base. The bellshape, three grinding surfaces, and extensive battering at one end of the large (8 x 9.5 cm) quartzite stone suggest sequential multiple uses as a pestle, mano, and finally flint knapping hammerstone.

The debitage included 4 primary decortication flakes, 49 secondary decortication flakes, 102 interior flakes, 20 pieces of shatter, 10 cores, and 11 pieces of modified raw material. Six tools, including the arrow point, and 25 pieces of debitage had been heat treated.

Chert Availability and Utilization: The site is located on the boundary between a mantle of loess, clay, and glacial till and chert-bearing Burlington strata. Residual Burlington chert occurs north of the site, and an abundant supply of stream deposited nodules is available in the creek along the east side of the site. Jefferson City and Callaway cherts are available 500 m southwest of the site in a valley of another tributary of Auxvasse Creek.

All of the chipped stone tools and 98.5% of the debitage were manufactured from the nearby Burlington chert. Two secondary decortication flakes were made from Jefferson City chert, and one secondary decortication flake was indeterminate as to chert type. The chert is amber colored with many small crinoid fossils and may represent a nonlocal or exotic chert type obtained from local glacial till. Of those Burlington artifacts with identifiable cortex present, 90.7% were procured and manufactured from stream deposited nodules.

Comments/Discussion: The site is probably a seasonal field camp and knapping station. The high percentage (69.7%) of flakes greater than 2 cm^2 indicates initial lithic reduction; two secondary decortication flakes actually had diameters of 16 cm. Other activities suggested by the tool types include hunting and butchering, fabricating and processing, and plant food preparation.

Analysis of the chert sample from 23 CY 304 indicates a predominant utilization of Burlington chert, mostly procured from the nearby creek bed. The Mississippi Triangular arrow point is affiliated with the Late Woodland/Mississippian period which ranges from 1200-500 B.P. in the study area.

23 CY 306

Topographic Setting: The site is situated on the slope and top of a small ridge lobe at an elevation of 800 ft msl and is located 100 m northeast of an unnamed tributary of Auxvasse Creek.

Description: A light scatter of artifacts was found in a fallow field (early successional) with 0% visibility; a few artifacts were located on the surface of an adjacent steep slope in a wooded area. Shovel testing and surface finds delimited site size to be 6,400 m^2, and no subsurface features were found.

Artifact Sample: A total of seven artifacts was collected which included one secondary decortication flake and six interior flakes. One interior flake had been heat treated.

Chert Availability and Utilization: The site is located on chert-bearing Burlington strata; numerous residual nodules are present on the ridge slopes, and redeposited Burlington nodules occur in nearby creeks. Jefferson City and Callaway cherts are available 100 m southwest in the tributary of Auxvasse Creek. All seven flakes were knapped from Burlington chert.

Comments/Discussion: The site is a limited activity knapping

station with no evidence of habitation. Cultural affiliation is unknown.

23 CY 307

Topographic Setting: The site is situated on top of a small ridge lobe at an elevation of 790 ft msl and is located 100 m northeast of an unnamed tributary of Auxvasse Creek.

Description: A small number of artifacts was found in a wooded area with approximately 10% visibility. Shovel testing and surface finds delimited site size to be 4,900 m^2, and no subsurface features were found.

Artifact Sample: Five artifacts were collected which included three secondary decortication flakes and two interior flakes. One interior flake had been heat treated.

Chert Availability and Utilization: The site is located on chert-bearing Burlington strata; numerous residual nodules are present on ridge slopes, and redeposited Burlington nodules occur in nearby creeks. A source of Jefferson City chert is located approximately 500 m west of the site. All five artifacts were knapped from Burlington chert.

Comments/Discussion: The site is a limited activity knapping station with no evidence of habitation. An initial lithic reduction station is suggested since all the artifacts were greater than 2 cm^2. Cultural affiliation is unknown.

23 CY 310

Topographic Setting: The site is situated on a ridge top at an elevation of 810 ft msl and is located 310 m north of an unnamed tributary of Auxvasse Creek.

Description: A small number of artifacts was found in a milo field with 0-25% visibility. Surface finds delimited site size to be 1,200 m^2, and shovel testing revealed no subsurface features.

Artifact Sample: Three interior flakes were collected from the site; one had been heat treated.

Chert Availability and Utilization: The site is located on the boundary between a mantle of loess, clay, and glacial till and chert-bearing Burlington strata. Numerous residual Burlington nodules occur on ridge slopes south of the site, and the tributary of Auxvasse Creek 300 m south contains redeposited Burlington, Jefferson City, and Callaway chert nodules. All three flakes were knapped from Burlington chert.

Comments/Discussion: The site is a limited activity knapping station with no evidence of habitation. Cultural affiliation is unknown.

23 CY 316

Topographic Setting: The site is situated on a narrow ridge top at an elevation of 740 ft msl and is located 50 m west of an unnamed tributary of Logan Creek.

Description: A small number of artifacts was found in a wooded area with approximately 10% visibility. Surface finds delimited site size to be 300 m^2, and no subsurface features were found.

Artifact Sample: Three artifacts were collected which included one primary decortication flake, one interior flake, and one piece of shatter.

Chert Availability and Utilization: The site is located on chert-bearing Jefferson City strata, and numerous residual nodules occur on the local ridge slopes. Abundant stream deposited Jefferson City and Burlington chert is available in nearby creek beds. All three artifacts were made from Jefferson City chert; the primary decortication flake was identified as knapped from a residual nodule.

Comments/Discussion: The site is a limited activity knapping

station with no evidence of habitation. Cultural affiliation is unknown.

23 CY 318

Topographic Setting: The site is situated on a ridge top at an elevation of 820 ft msl and is located 150 m west of Kentucky Spring Hollow Creek.

Description: A light scatter of artifacts was found in a milo field with approximately 25% visibility. Surface finds delimited site size to be 22,500 m^2. There were no subsurface features found.

Artifact Sample: A total of nine artifacts was collected, which included one utilized flake and eight pieces of debitage. The debitage consisted of two secondary decortication flakes, five interior flakes, and one bifacial thinning flake. One interior flake and the bifacial thinning flake were heat treated.

Chert Availability and Utilization: The site is located on chert-bearing Burlington strata; numerous residual nodules occur on nearby ridge slopes, and abundant stream deposited nodules are available in Kentucky Spring Hollow Creek. The nearest sources of Jefferson City chert are located 700 m southwest of the site. All nine artifacts were made from Burlington chert. The two secondary decortication flakes were knapped from stream deposited chert.

Comments/Discussion: The site is a limited activity knapping station with no evidence of habitation. Cultural affiliation is unknown.

23 CY 320

Topographic Setting: The site is situated on a gentle slope at an elevation of 820 ft msl and is located 150 m east of Kentucky Spring Hollow Creek.

Description: A sparse scatter of artifacts was found in a milo field with approximately 25% visibility. Surface finds delmited site size to be 6,000 m^2. There were no subsurface features found.

Artifact Sample: A total of four artifacts was collected which included one utilized flake, one secondary decortication flake, and two interior flakes. The utilized flake had been heat treated.

Chert Availability and Utilization: The site is located on chert-bearing Burlington strata; numerous residual nodules occur on nearby ridge slopes, and abundant stream deposited nodules are available in Kentucky Spring Hollow Creek. The nearest source of Jefferson City chert is located 700 m southwest of the site. All four artifacts were made from Burlington chert; the secondary decortication flake was knapped from a stream deposited nodule.

Comments/Discussion: The site is a limited activity knapping station with no evidence of habitation. Cultural affiliation is unknown.

23 CY 324

Topographic Setting: The site is situated on the point of a small ridge at an elevation of 780 ft msl and is located 50 m east of an unnamed tributary of Mud Creek.

Description: A small number of artifacts was found in a wooded area with 0% visibility. Shovel testing delimited site size to be 150 m^2 and revealed no subsurface features.

Artifact Sample: Four artifacts were collected which included one secondary decortication flake, two pieces of shatter, and one chunk of modified raw material. One shatter piece was heat treated.

Chert Availability and Utilization: The site is located on strata with residual Burlington chert; however, the chert-bearing Jefferson City formation outcrops only 50 m south of the site. Nearby creek beds to the south contain predominantly Burlington but also some Jefferson

City stream deposited chert nodules. All four artifacts were made from Burlington chert; one was a modified redeposited nodule.

Comments/Discussion: The site is a limited activity knapping station with no evidence of habitation. Cultural affiliation is unknown.

23 CY 325

Topographic Setting: The site is situated on the slope of a ridge spur at an elevation of 725 ft msl and is located 50 m northwest of an unnamed tributary of Mud Creek.

Description: Two artifacts were found in a wooded area with 0% visibility. Shovel testing delimited site size to be 225 m^2 and revealed no subsurface features.

Artifact Sample: One secondary decortication flake and one chunk of modified raw material were collected.

Chert Availability and Utilization: The site is located at the contact between strata containing residual Burlington nodules and chert-bearing Jefferson City strata. The nearby tributary of Mud Creek contains predominantly Burlington but also some Jefferson City stream deposited chert. Both artifacts were made from Burlington chert; one was a modified redeposited nodule.

Comments/Discussion: The site is a limited activity knapping station with no evidence of habitation. Cultural affiliation is unknown.

23 CY 328

Topographic Setting: The site is situated on a ridge top at an elevation of 810 ft msl and is located 180 m southeast of Hall Hollow Creek, a tributary of Mud Creek.

Description: A light scatter of artifacts was found in a harvested sunflower strip with approximately 30% visibility. Surface finds delimited site size to be 3,600 m^2 within the cultivated strip; however, the site probably extends north, east, and south within project boundaries and to the west outside the project boundary. Shovel testing revealed no subsurface features.

Artifact Sample: A total of 22 artifacts was collected which included 5 tools and 17 pieces of debitage. The tools consisted of two projectile points, one large preform or knife, one end scraper, and one utilized flake. One projectile point is an unidentifiable midsection fragment, although it was probably a stemmed point. The other projectile point/knife (Figure 13B) is a relatively large (8 cm long) corner-notched/expanding stem point with a straight base. It is very similar to Category 4 points from the Miskell Site in the Cannon Reservoir area which are generally considered Late Archaic (Angus and Ruppert 1977:23, 83). It also resembles Early Woodland period points from the Collins site in Monroe County (Chapman 1980:14; Klippel 1972:70). A dull remnant platform preparation surface on one edge of the tip suggests the artifact was used as a knife rather than a projectile; the relatively blunt tip is in sharp contrast to the well-thinned blade midsection. The 4 x 10 cm preform (Figure 5I) would make another excellent hafted knife with slight retouch and corner-notching.

The debitage consisted of four secondary decortication flakes, nine interior flakes, one piece of shatter, two cores, and one bifacial thinning flake. The unidentifiable projectile point fragment, the preform, and two interior flakes were made from very waxy heat-treated Burlington chert.

Chert Availability and Utilization: The site is located on chert-bearing Burlington strata; numerous residual nodules occur on local ridge tops and slopes. Chert-bearing Jefferson City strata outcrop 150 m northwest of the site. A stream deposited source in Hall Hollow Creek contains predominantly Burlington but also Jefferson City chert nodules.

Of the 22 artifacts collected, 4 tools and 11 pieces of debitage were made from Burlington chert, and the corner-notched projectile point/knife along with 6 pieces of debitage were manufactured from Jefferson City chert. Three Burlington and three Jefferson City artifacts with identifiable cortex were knapped from stream deposited nodules.

Comments/Discussion: The site is a small field camp and knapping station with no evidence of substantial habitation. The artifactual evidence indicates bifacial tool manufacturing, probably for cutting and butchering purposes. The corner-notched, hafted tool is probably affiliated with the Late Archaic/Early Woodland transition period, which ranges from 4000-2500 B.P. in the study area.

23 CY 330

Topographic Setting: The site is situated on the end of a ridge lobe at an elevation of 800 ft msl and is located 100 m north of Kentucky Spring Hollow Creek.

Description: A small number of artifacts was found in a cleared strip in the woods under a high tension powerline with approximately 25% visibility. Surface finds delimited site size to be 800 m^2, and shovel testing revealed no subsurface features.

Artifact Sample: A total of seven artifacts was collected, which included one biface distal end and six pieces of debitage. The debitage consisted of three secondary decortication flakes and three interior flakes. The biface tip and three secondary decortication flakes had been heat treated.

Chert Availability and Utilization: The site is located on chert-bearing Burlington strata; numerous residual nodules are present on local ridge slopes. Chert-bearing Jefferson City strata outcrop approximately 150 m southwest of the site. Local creeks contain predominantly Burlington chert, but some Jefferson City chert is available to the southwest in Kentucky Spring Hollow Creek. All seven artifacts were made from Burlington chert; one secondary decortication flake was knapped from stream deposited chert.

Comments/Discussion: The site is probably a limited activity knapping station. Cultural affiliation is unknown.

Dissected Upland Oak-Hickory Forest

23 CY 322

Topographic Setting: The site is situated on a ridge top at an elevation of 790 ft msl and is located 250 m west of an unnamed tributary of Mud Creek.

Description: A light scatter of artifacts was found in a fallow field (early successional) with approximately 35% visibility. Surface finds and shovel testing delimited site size to be 16,500 m^2, and no subsurface features were found.

Artifact Sample: A total of 43 artifacts was collected which included 3 tools and 40 pieces of debitage. The tools consisted of one triangular arrow point, one biface, and one utilized piece of shatter. The arrow point (Figure 13C) was identified as Mississippi Triangular (Chapman 1980:165, 310) or Madison (Perino 1968:52).

The debitage included 14 secondary decortication flakes, 17 interior flakes, 6 pieces of shatter, 1 core, 1 bifacial thinning flake, and 1 piece of modified raw material. Three flakes and a piece of shatter had been heat treated.

Chert Availability and Utilization: The site is located on chert-bearing Burlington strata; however, chert-bearing Jefferson City strata outcrops only 150 m east and west downslope on the lower portions of the ridge. Thus, residual Burlington chert occurs along the ridge top, and residual Jefferson City chert occurs on the lower ridge slopes. Local creeks to the east and west contain predominantly Burlington but also some Jefferson City stream deposited chert nodules.

Of the 43 artifacts collected, 34 (79.1%) were made from Burlington chert, and 9 were knapped from Jefferson City chert. Three Burlington artifacts with identifiable cortex were made from stream deposited chert, and one was knapped from residual chert, whereas three Jefferson City artifacts were made from residual chert, and one was knapped from a redeposited nodule.

Comments/Discussion: The site is a small field camp and knapping station with no evidence of substantial habitation. The relatively high percentage of secondary decortication flakes and flakes in general with dimensions greater than 2 cm^2 (61.3%) indicates initial lithic reduction. The triangular arrow point suggests the site was also used as a hunting camp.

Analysis of the limited chert sample from 23 CY 322 indicates a preference for Burlington chert. Both stream deposited and residual chert sources were utilized. The Mississippi Triangular arrow point is affiliated with the Late Woodland/Mississippian period which ranges from 1200-500 B.P. in the study area.

23 CY 323

Topographic Setting: The site is situated on the end of a ridge spur at an elevation of 660 ft msl and is located 50 m northwest of an unnamed tributary of Mud Creek.

Description: Two artifacts were found in a wooded area with 10% visibility. Surface finds delimited site size to be 600 m^2, and no subsurface features were present on the rocky slope.

Artifact Sample: Two cores were found on the surface of the cherty slope.

Chert Availability and Utilization: The site is located on chert-bearing Jefferson City strata, and numerous residual nodules occur along the lower slopes of the local ridges. Residual Burlington chert occurs near the top of the ridge system 150 m north and west, and stream deposited sources in nearby creeks contain abundant Burlington and some

Jefferson City chert nodules. Both cores were modified Jefferson City nodules; one was identified as a residual nodule and the other as a redeposited nodule.

Comments/Discussion: The site is a limited activity knapping station, and the two cores suggest procurement and initial reduction of local resources. Cultural affiliation is unknown.

23 CY 326

Topographic Setting: The site is situated on the point of a ridge at an elevation of 670 ft msl and is located 140 m east-northeast of the confluence of an unnamed tributary and Kentucky Spring Hollow Creek.

Description: A small number of artifacts was found in a wooded area with approximately 10% visibility. Surface finds delimited site size to be 1,800 m^2, and shovel testing revealed no subsurface features.

Artifact Sample: Five artifacts were collected which included one primary decortication flake, one secondary decortication flake, one core, and two pieces of modified raw material.

Chert Availability and Utilization: The site is located on chert-bearing Jefferson City strata, and numerous residual nodules occur along the lower slopes of the local ridges. The nearest residual Burlington chert occurs approximately 300 m east of the site. Stream deposited sources in Kentucky Spring Hollow Creek and its tributary contain predominantly Burlington chert, but Jefferson City chert is also present.

Four of the five artifacts collected were made from Jefferson City chert; the one Burlington flake was knapped from a stream deposited nodule. Three Jefferson City artifacts with identifiable cortex were made from residual chert.

Comments/Discussion: The site is a limited activity knapping station, and the artifacts suggest procurement, testing, and initial reduction of local resources. Cultural affiliation is unknown.

23 CY 331

Topographic Setting: The site is situated on a ridge top at an elevation of 770 ft msl and is located 100 m southwest of an unnamed .outary of Logan Creek.

Description: A small number of artifacts was found in a pasture with approximately 10% visibility. Shovel testing and surface finds delimited site size to be 1,200 m^2. There were no subsurface features found.

Artifact Sample: Three artifacts were collected which included one secondary decortication flake, one piece of shatter, and one core. The piece of shatter had been heat treated.

Chert Availability and Utilization: The site is located just above the contact between strata containing residual Burlington nodules and chert-bearing Jefferson City strata. Numerous residual Burlington nodules are available on slightly higher ground to the northwest, and residual Jefferson City nodules are plentiful on ridge slopes east, south, and west of the site. Stream deposited sources in two tributaries of Logan Creek 100 m to the northeast and 225 m to the southwest contain abundant Burlington and Jefferson City chert.

The flake and shatter piece were knapped from Burlington chert, but the core was made from Jefferson City chert. The secondary decortication flake was knapped from a redeposited nodule, whereas the core was made from a residual nodule.

Comments/Discussion: The site is a limited activity knapping station with no evidence of habitation. Cultural affiliation is unknown.

23 CY 332

Topographic Setting: The site is situated on a ridge slope at an elevation of 620 ft msl and is located 150 m northeast of an unnamed tributary of Logan Creek.

Description: A small number of artifacts was found in a wooded area with 5% visibility. Surface finds and shovel testing delimited site size to be 150 m^2, and no subsurface features were found.

Artifact Sample: Four artifacts were collected which included two secondary decortication flakes and two interior flakes.

Chert Availability and Utilization: The site is located on chert-bearing Jefferson City strata, and numerous residual nodules occur on the ridge slopes. A stream deposited source in the nearby tributary of Logan Creek 150 m to the southwest contains Jefferson City and Burlington chert. All four artifacts were made from Jefferson City chert; the two secondary decortication flakes were knapped from local residual chert.

Comments/Discussion: The site is a limited activity knapping station with no evidence of habitation. Cultural affiliation is unknown.

23 CY 334

Topographic Setting: The site is situated on a southwest facing ridge slope at an elevation of 640 ft msl and is located 100 m east of an unnamed tributary of Logan Creek.

Description: A dense scatter of artifacts was found on a rocky slope with an open scrub/cedar understory; ground visibility varied between 10-40%. Surface finds delimited site size to be 4,500 m^2. There were no subsurface features on the rocky slope.

Artifact Sample: A total of 396 artifacts was collected, which included 1 utilized flake and 395 pieces of debitage. The debitage consisted of 17 primary decortication flakes, 203 secondary decortication flakes, 106 interior flakes, 16 pieces of shatter, and 53 cores. The shatter category is probably underrepresented due to the difficulty in distinguishing it from the abundant naturally (frost) fractured chert in the area; generally, only chert pieces with positive/negative bulbs of force were collected. None of the nearly 400 artifacts had been heat treated.

Chert Availability and Utilization: The site is located on chert-bearing Jefferson City strata. Numerous residual nodules cover the slope; this residual chert in the immediate vicinity of the site is made up of the mottled variety of Jefferson City chert. The chert is fine-grained and usually consists of a mottling of light and dark gray, blue, and white. The Logan Creek tributary 100 m west of the site contains Jefferson City and Burlington chert.

All 396 artifacts were knapped from Jefferson City chert, and 98.7% of these were made from the local mottled variety. Five artifacts were knapped from the oolitic variety of Jefferson City chert, probably obtained from the nearby stream deposited source. Of those artifacts with identifiable cortex present, 93.3% were knapped from residual chert, whereas only 6.7% were made from stream deposited chert.

Comments/Discussion: The site is a chert procurement and initial reduction knapping station with no evidence of habitation. The presence of 53 cores, the near absence of worked/utilized artifacts, the fact that 67.5% of the flakes recovered were decortication flakes, and that 85.9% were greater than 2 cm^2 are all consistent with what would be expected at an initial reduction lithic workshop. Quarrying was unnecessary at the site since the residual chert readily outcrops on the southwest exposure of the ridge; thermal pretreatment was also unnecessary due to the inherent fine-grained nature of the chert. The artifactual evidence supports a near exclusive use of this residual Jefferson City chert source. Cultural affiliation is unknown.

<u>23 CY 335</u>

Topographic Setting: The site is situated on a ridge top at an elevation of 740 ft msl and is located 275 m east of an unnamed tributary of Logan Creek.

Description: A light scatter of artifacts was found in a pasture with thick sod and 0% visibility. Shovel testing delimited site size to be 75,000 m^2 and revealed no subsurface features.

Artifact Sample: A total of 12 artifacts was collected, which included 5 secondary decortication flakes, 5 interior flakes, and 2 cores. One interior flake had been heat treated.

Chert Availability and Utilization: The site is located on chert-bearing Jefferson City strata, and numerous residual nodules occur on the ridge slopes. Stream deposited sources in two tributaries of Logan Creek 300 m west and 350 m northeast of the site contain abundant Jefferson City and Burlington chert nodules.

Of the 12 artifacts collected, 7 were made from Jefferson City chert and 5 were knapped from Burlington chert. Three Jefferson City artifacts with identifiable cortex were made from residual chert, one was made from redeposited chert, and one Burlington secondary decortication flake was knapped from stream deposited chert.

Comments/Discussion: The site is a limited activity knapping station with no evidence of habitation. The artifact inventory suggests an intial reduction site. Cultural affiliation is unknown.

23 CY 336

Topographic Setting: The site is situated on a ridge top at an elevation of 730 ft msl and is located 450 m southwest of an unnamed tributary of Logan Creek.

Description: A light scatter of artifacts was found in a pasture with approximately 10% visibility. Shovel testing and surface finds delimited site size within project boundaries to be 23,200 m^2; however, the site probably continues south of the project boundary along the ridge top. There were no subsurface features found.

Artifact Sample: A total of 28 artifacts was collected which included 1 biface fragment, 1 primary decortication flake, 5 secondary decortication flakes, 13 interior flakes, 6 pieces of shatter, and 2 cores. Five interior flakes and one piece of shatter had been heat treated.

Chert Availability and Utilization: The site is located on chert-bearing Jefferson City strata, and numerous residual nodules occur on the surrounding ridge slopes. Stream deposited sources in two tributaries of Logan Creek 450 m northeast and 650 m west of the site contain abundant Jefferson City and Burlington chert.

Of the 27 chert artifacts collected, 17 were made from Burlington chert, 9 were knapped from Jefferson City chert, and the 1 biface fragment was made from Chouteau chert. The Chouteau chert is mottled light and dark gray in color with small white fossil inclusions, some of which appear to be crinoids and bryozoa. It is very similar to Chouteau chert in southwest-central Missouri (Ray 1981a:16-18). The nearest outcroppings of chert-bearing Chouteau limestone occur 22 km north of the study area along Auxvasse Creek (Anderson 1979). Unklesbay (1955:5-6) states that Chouteau strata outcrop in Crows Fork and Stinson Creek valleys approximately 15 km to the northwest; however, he does not mention any inclusive chert. Two Jefferson City artifacts with identifiable cortex were procured and knapped from residual chert, two were knapped from redeposited chert, and five Burlington artifacts were made from stream deposited chert.

A large hematite primary decortication flake was removed from a steam deposited nodule, probably procured from a local creek after redeposition from the Burlington formation to the north; the basal portion of the Burlington formation sometimes contains fair quantities of hematite (Conselman 1934:117). A large nodule (4.5 x 4.5 cm) of hematite was found near a small tributary of Logan Creek 275 m north of the site.

Comments/Discussion: The site is a limited activity knapping station. The analysis of the limited chert sample from 23 CY 336 indicates a preference for Burlington chert, probably procured from local redeposited sources, over readily available residual and stream deposited Jefferson City chert. The biface made from Chouteau chert indicates procurement and transportation of that chert artifact from a source approximately 20 km distant. The hematite flake indicates some working of iron ore at the site. Cultural affiliation is unknown.

23 CY 338

Topographic Setting: The site is situated on a ridge top at an elevation of 750 ft msl and is located 300 m east of an unnamed tributary of Logan Creek.

Description: A small number of artifacts was found in a pasture with 0% visibility. Shovel testing delimited site size to be 9,600 m^2 and revealed no subsurface features.

Artifact Sample: Two secondary decortication flakes and one interior flake were collected from shovel tests. One interior flake had been heat treated.

Chert Availability and Utilization: The site is located on chert-bearing Jefferson City strata, and numerous residual nodules occur on local ridge slopes. The tributary of Logan Creek 300 m west of the site contains abundant stream deposited Jefferson City and Burlington chert. Two flakes were knapped from Burlington chert, and one flake was knapped from Jefferson City chert. One flake of each chert type was made from stream deposited chert.

Comments/Discussion: The site is a limited activity knapping station with no evidence of habitation. Cultural affiliation is unknown.

23 CY 340

Topographic Setting: The site is situated on a ridge top at an elevation of 720 ft msl and is located 350 m east of an unnamed tributary of Logan Creek.

Description: A small number of artifacts was found in a small grassy strip adjacent to the Heavy Haul road with 0% visibility. Shovel testing delimited site size to be 300 m^2 and revealed no subsurface features.

Artifact Sample: Eight artifacts were collected which included four secondary decortication flakes, three pieces of shatter, and one core.

Chert Availability and Utilization: The site is located on chert-bearing Jefferson City strata, and numerous residual nodules occur on the ridge slopes. Stream deposited sources in two tributaries of Logan Creek 350 m east and west of the site contain abundant Jefferson City and some Burlington chert nodules.

Of the eight artifacts collected, three were made from Burlington chert and five were knapped from Jefferson City chert; all eight artifacts were derived from stream deposited chert.

Comments/Discussion: The site is a limited activity knapping station with no evidence of habitation. Cultural affiliation is unknown.

23 CY 341

Topographic Setting: The site is situated on a ridge slope at an elevation of 650 ft msl and is located 80 m east of an unnamed tributary of Logan Creek.

Description: A small number of artifacts was found in a wooded area with approximately 10% visibility. Shovel testing and surface finds delimited site size to be 150 m^2, and no subsurface features were found.

Artifact Sample: Four artifacts were collected which included two secondary decortication flakes, one piece of shatter, and one chunk of modified raw material.

Chert Availability and Utilization: The site is located on chert-bearing Jefferson City strata, and numerous poor to good quality residual nodules occur on the ridge slopes. A stream deposited source in the nearby tributary of Logan Creek 80 m to the west contains predominantly Jefferson City chert; however, some Burlington nodules also occur. All four artifacts were made from Jefferson City chert, and three of those with identifiable cortex were knapped from residual chert.

Comments/Discussion: The site is a limited activity knapping station with no evidence of habitation. The available data suggest procurement and initial reduction of local residual Jefferson City chert. Cultural affiliation is unknown.

23 CY 343

Topographic Setting: The site is situated on a small ridge top at an elevation of 740 ft msl and is located 150 m east of an unnamed tributary of Logan Creek.

Description: Two artifacts were found in a wooded area with 0% visibility. Shovel testing delimited site size to be 100 m^2, and no subsurface features were found.

Artifact Sample: One primary decortication flake and one secondary decortication flake were collected from shovel tests.

Chert Availability and Utilization: The site is located at the contact between strata containing residual Burlington nodules and chert-bearing Jefferson City strata. Many residual Jefferson City nodules occur along the lower slopes of the local ridges. A stream deposited source in the nearby tributary of Logan Creek 150 m to the west contains

Jefferson City and some Burlington chert. Both flakes were knapped Jefferson City chert -- one from a residual nodule.

Comments/Discussion: The site is a limited activity knapping station with no evidence of habitation. Cultural affiliation is unknown.

Dissected Upland/Bottomland Forest Edge

23 CY 20

Topographic Setting: The site is situated on a second terrace at an elevation of 530 ft msl and is located 100 m west of Logan Creek and 300 m north of the confluence of Mud and Logan creeks.

Description: A light to moderate scatter of artifacts was found in a fallow (seeded) field with approximately 15% visibility. Previous investigations (Evans and Ives 1973:10) determined site size to be 3,000 m^2; however, the site may cover as much as 30,000 m^2. Subsurface testing was not conducted on the site by the present archaeological survey, only a controlled surface collection for chert identification and analysis purposes. The site was previously tested and partially mitigated by Evans and Ives (1979) who found three subsurface features: one possible post mold and two "concentrations of materials at the base of the plowzone," one of which may be a pit feature (Evans and Ives 1979:17, 20).

Artifact Sample: A total of 80 artifacts was collected from the surface of the site, which included 4 tools, 74 pieces of debitage, and 2 pottery sherds. The tools consisted of three utilized flakes and one possible graver. The debitage consisted of 2 primary decortication flakes, 28 secondary decortication flakes, 38 interior flakes, 1 piece of shatter, 3 cores, and 2 bifacial thinning flakes. Three utilized flakes and 30 pieces of debitage had been heat treated. The two pottery sherds were identified as grit tempered, smooth, and undecorated (one rim and one body sherd) or Graham Plain pottery (Chapman 1980:281).

None of the material collected by Evans and Ives was available for analysis (O'Brien 1982:personal communication).

Chert Availability and Utilization: The site is located on alluvium; however, the surrounding ridges are composed of chert-bearing Jefferson City strata, and residual nodules occur on slopes as close as 30 m to the west. Jefferson City and Burlington chert nodules are available in stream deposited sources in Logan Creek and an unnamed tributary 200 m north of the site.

Of the 78 chert artifacts collected, 58 or 74.4% were made from Burlington chert, and 20 or 25.6% were knapped from Jefferson City chert. All of the Burlington artifacts with identifiable cortex were made from stream deposited chert; however, four Jefferson City artifacts were made from residual chert and three were knapped from redeposited chert.

Comments/Discussion: The site is a village or residential base camp and may be associated with the large earthen mound (23 CY 74) and/or low rock mound (23 CY 350) located on top of the adjacent ridge system or the mound group (23 CY 356) on the opposite ridge 700 m to the east. Similar pottery sherds suggest 23 CY 20 is at least contemporaneous if not affiliated with 23 CY 352, another village site located on a similar terrace 500 m east of the site.

An analysis of the chert sample from 23 CY 20 indicates an unexpected selection for Burlington chert, probably procured entirely from stream deposited sources, and a supplemental role for Jefferson City chert. The preference for Burlington chert may be due to its susceptibility and responsiveness to heat treatment. Over 50% of the Burlington artifacts had been heat altered.

Based on reported materials from the site, Evans and Ives (1973:10) suggest the site is a multicomponent occupation, spanning 10,000 years including a Middle Woodland component; however, the pottery recovered from the site, a Scallorn arrow point, and other possible Woodland artifacts (Evans and Ives 1979:19) indicate that the major occupation was probably Late Woodland (1500-1000 B.P.).

<u>23 CY 74</u>

Topographic Setting: The site is situated on a bluff (elevaton 660 ft msl) overlooking the Missouri River Valley and is located 100 m north of Mud Creek.

Description: A previously recorded relatively large earthen mound (Plate 6a) was relocated in a wooded area with 0% visibility. Although potted in the center approximately .5 m deep, the conical mound measured 2 m high and 15 x 15 m wide at the base. In this report, 23 CY 74 refers only to the mound itself; a possible associated scatter of artifacts along the ridge top north, east, and south of the mound was designated 23 CY 349. North-south and east-west soil probe transects were set up across the mound to determine soil stratigraphy, color, texture, consistency, etc. Individual probe depths averaged about 35 cm and were interspaced 1 m along each transect. A soil profile of the east-west transect is presented in Figure 9. Although the probe depths were relatively shallow, no rock was encountered in the mound.

Artifact Sample: Three small interior flakes were found in different probe holes; one had been heat treated.

Chert Availability and Utilization: The site is located on Jefferson City strata which consist mostly of dolomite with inclusive chert and some sandstone and shale impartings. Residual Jefferson City chert nodules occur on nearby ridge slopes, and Jefferson City chert as well as Burlington chert are available in stream deposited sources in local creeks. All three flakes were knapped from Burlington chert.

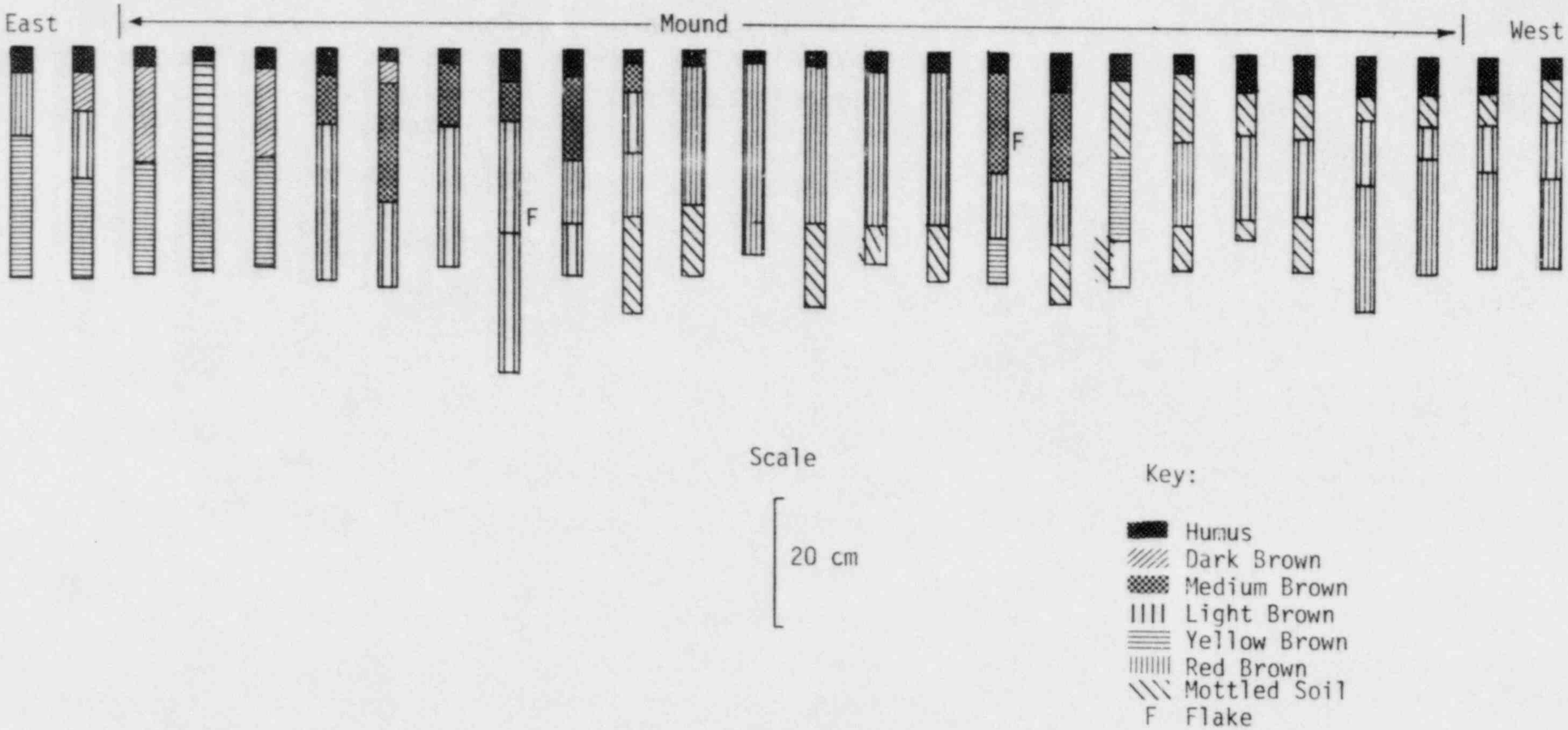
Comments/Discussion: The site is apparently a burial mound and is probably representative of Boone Phase in central Missouri. The setting high on a bluff overlooking the Missouri River Valley is consistent with

6a. 23 CY 74, a probable Late Woodland earthen burial mound

6b. 23 CY 356, probable Late Woodland earthen burial mounds

Figure 9

23 CY 74
Soil Core Profile
(1-meter intervals)



the location of Boone Phase mounds (Denny 1964:137), and the mounds are sometimes constructed entirely of earth (Chapman 1980:112). This probable mortuary site may be associated with the village site (23 CY 20) located on a terrace 600 m to the east. The Boone Phase is largely confined within the Lower Missouri Valley Locality II (Chapman 1980:121; Denny 1964:154), and it is firmly affiliated with the Late Woodland period (Chapman 1980:112; Denny 1964:158) which ranges from 1500-1000 B.P.

23 CY 344

Topographic Setting: The site is situated on a first terrace at an elevation of 530 ft msl and is located 50 m east of Mud Creek.

Description: A small number of artifacts was found in a fallow field (early successional) with 0% visibility. Shovel testing delimited site size to be approximately 4,250 m^2 and revealed no subsurface features.

Artifact Sample: Three artifacts were collected which included one secondary decortication flake and two interior flakes. One interior flake had been heat treated.

Chert Availability and Utilization: The site is located on alluvium; however, residual Jefferson City chert is available on ridge slopes 100 m to the east and west, and stream deposited Jefferson City and Burlington chert is available 50 m west of the site in Mud Creek. Two flakes were knapped from Burlington chert, and one (stream deposited) secondary decortication flake was knapped from Jefferson City chert; thus, all three artifacts were manufactured from stream deposited chert.

Comments/Discussion: The site is a limited activity knapping station with no evidence of habitation. Cultural affiliation is unknown.

23 CY 345

Topographic Setting: The site is situated on a ridge slope at an elevation of 590 ft msl and is located 150 m west of an unnamed tributary of Logan Creek. The site probably continues to the top of the small ridge lobe at an elevation of 640 ft msl.

Description: A light scatter of artifacts was found partially in a razed house lot (0% visibility) and partially in a dirt road leading up into a hay field (0-30% visibility). Shovel testing and surface finds del ~ited site size to be 5,000 m^2, and no subsurface features were found.

Artifact Sample: A total of 29 artifacts was collected which included 3 tools and 26 pieces of debitage. The tools consisted of one hafted drill base, one biface fragment, and one utilized piece of shatter. The hafted drill base (Figure 5H) is similar to and probably represents a reworked Graham Cave Notched or Big Sandy Notched point.

The debitage consisted of 1 primary decortication flake, 16 interior flakes, and 9 pieces of shatter. The hafted drill base, biface fragment, and four interior flakes had been heat treated.

Chert Availability and Utilization: The site is located on chert-bearing Jefferson City strata, and residual Jefferson City chert occurs along the local ridge slopes. The nearby tributary of Logan Creek and Logan Creek itself, located 150 m and 250 m east, respectively, provide additional stream deposited chert sources which contain both Jefferson City and Burlington chert nodules.

Seventeen or 58.6% of the artifacts (including the hafted drill and biface fragment) were manufactured from Burlington chert, and 12 or 41.4% were made from Jefferson City chert. It is interesting to note that one-third of the Burlington artifacts had been heat treated, whereas none of the Jefferson City artifacts had been heat altered. Two of the four Jefferson City artifacts with identifiable cortex were knapped from redeposited chert, and all of the Burlington artifacts were probably procured from local stream deposited sources.

Comments/Discussion: The site is a small field camp and knapping station. The hafted drill indicates activities such as stone, bone, and/or wood boring, and the chert analysis indicates a heavy reliance on Burlington and, thus, stream deposited chert resources. Suggested cultural affiliation for the site based on the hafted drill is Middle Archaic (7000-5000 B.P.).

23 CY 346

Topographic Setting: The site is situated on a ridge top at an elevation of 700 ft msl and is located 500 m southwest of an unnamed tributary of Logan Creek, as well as 600 m east of Mud Creek and 600 m west of Logan Creek.

Description: A moderate to dense scatter of artifacts was found in a pasture with approximately 10% visibility. Shovel testing and surface finds delimited site size to be 40,000 m^2, and no subsurface features were detected.

Artifact Sample: A total of 190 artifacts was collected which included 4 tools, 1 manuport, and 185 pieces of debitage. The tools consisted of one lanceolate projectile point, one biface, and two utilized flakes. The projectile point (Figure 13D), which was found in a shovel test 12 cm below ground surface, belongs to the unfluted, lanceolate technological tradition and has been identified as an unserrated Dalton point. The point exhibits irregular parallel flaking along with basal and lateral ground edges. The base is moderately concave (0.7 cm) and thinned, and its sides are slightly concave. The broken point measures 6.8 cm long, 0.75 cm thick, 3.0 cm wide at the base, and 3.24 cm wide at its broadest point near the longitudinal fracture. One side of the point has greater basal thinning than the other, exhibiting three small flake scars each about 1.5 cm long, whereas the opposite side is thinned only 0.6 cm deep. It was manufactured from an unidentified exotic chert and appears to have been heat treated.

A small chunk of unworked hematite iron ore is a manuport since hematite is uncommon to the Jefferson City formation upon which the site rests; it was probably procured from Mud or Logan Creek after redeposition from the Burlington formation upstream, the basal portion of which sometimes contains fair quantities of hematite (Conselman 1934:117).

The debitage consisted of 4 primary decortication flakes, 25 secondary decortication flakes, 125 interior flakes, 27 pieces of shatter, 2 cores, 1 bifacial thinning flake, and 1 piece of modified raw material. One utilized flake and 54 pieces of debitage (42 Burlington, 12 Jefferson City) had been heat treated.

Chert Availability and Utilization: The site is located on chert-bearing Jefferson City strata, and numerous residual nodules occur on the local ridge slopes. The nearest outcroppings of Burlington chert are located approximately 1.7 km to the north; however, Burlington chert nodules along with Jefferson City nodules are available in stream deposited sources in Logan and Mud creeks and other local tributaries. The one known source of Callaway chert is located in a tributary of Auxvasse Creek 6.5 km northwest of the site.

Of the 189 chert artifacts collected, 76.7% were manufactured from Burlington chert, 20.6% were made from Jefferson City chert, 3 interior flakes or 1.6% were knapped from Callaway chert, and the Dalton point and 1 interior flake (1.1%) were made from an unidentified exotic chert.

The material from which the Dalton point is made and the interior flake are similar in appearance and may represent the same exotic chert type. They were found approximately 90 m apart. The chert is amber colored and nearly translucent with occasional small white specks which may be fossils. In some respects, the chert resembles Knife River flint from North Dakcta and some varieties of Kaolin chert from southern Illinois; however, it most closely resembles a chalcedony-like material from Texas.

All of the Burlington artifacts with identifiable cortex were made from stream deposited chert, whereas five Jefferson City artifacts were knapped from redeposited chert, and four were knapped from residual chert.

Comments/Discussion: The site is probably a seasonal camp and knapping station. A chert analysis of the artifacts from 23 CY 346 indicates a selection for and predominant utilization of Burlington chert, probably procured entirely from stream deposited sources, over readily available residual and redeposited Jefferson City chert. The fact that 74% of the flakes collected were less than 2 cm^2 suggests primary or initial reduction at the chert sources (creek beds) and tertiary reduction or finishing/resharpening on the site.

The three Callaway chert flakes, all found in one shovel test, indicate some use, although minimal, of this scarce chert known to occur 6.5 km away. It is possible, however, that this chert occurs outside the project/survey area and thus closer to the site. In any case, Callaway chert would not outcrop any closer than 2 km, although it may occur in gravel bars of Mud and/or Logan creeks. The exotic chert exemplified by the Dalton point indicates some mode of transportation of this foreign material into the study area, probably via seasonal/periodic movements and wide-range wanderings. Activities other than flint knapping suggested by tool types include hunting and butchering.

The Dalton point is often considered to represent a transitional period between Paleo-Indian and Archaic times or Late Paleo/Early Archaic. Chapman (1975:96) designated the transitional period in Missouri as the Dalton period, spanning approximately 1,000 years

(10,000-9000 B.P.). Dalton points have been found in situ in the earliest levels of nearby Arnold Research Cave and Graham Cave (Chapman 1975:245). Two additional Dalton points were found on the surface outside Arnold Research Cave during the summer of 1981.

23 CY 349

Topographic Setting: The site is situated on a narrow north-south trending ridge top at an elevation of 670 ft msl and is located 200 m north of Mud Creek.

Description: A light to moderate scatter of artifacts was found in a wooded area with 0% visibility. Shovel testing delimited site size to be 10,000 m^2, and no subsurface features were detected.

Artifact Sample: A total of 53 artifacts was collected which included 4 tools, 1 manuport, and 48 pieces of debitage. The tools consisted of one biface fragment, one utilized flake, one mano, and one pecking/grinding stone. The 8 cm long broken sandstone mano has four grinding surfaces, and the chert pecking/grinding stone fragment appears to have been heat treated.

A 9 cm long chunk of unworked hematite iron ore is a manuport since hematite is uncommon to the Jefferson City formation upon which the site rests; it was probably procured from Mud Creek after redeposition from the Burlington formation upstream, the basal portion of which sometimes contains fair quantities of hematite (Conselman 1934:117).

The debitage consisted of 10 secondary decortication flakes, 19 interior flakes, 6 pieces of shatter, and 3 cores. The biface fragment and five flakes had been heat treated.

Chert Availability and Utilization: The site is located on chert-bearing Jefferson City strata, and residual Jefferson City chert occurs along the local ridge slopes. The nearest outcroppings of Burlington chert are located approximately 3 km to the north; however, sufficient quantities of stream deposited Burlington and Jefferson City cherts are available in Mud Creek 300 m west of the site.

Of the 51 chert artifacts collected, 32 or 62.7% were manufactured from Burlington chert, and 19 or 37.3% were made from Jefferson City chert. Three Jefferson City artifacts with identifiable cortex were procured and knapped from residual chert, and one artifact was knapped from a stream deposited nodule. Although only two Burlington artifacts had identifiable stream deposited cortex present, all of the Burlington artifacts were probably procured from local stream deposited sources.

Comments/Discussion: The site is probably a reoccupied camp and knapping station with evidence of plant processing activities. The analysis of the chert sample from 23 CY 349 indicates a heavy reliance on or preference for Burlington chert, probably procured from local redeposited sources, over readily available residual or stream deposited Jefferson City chert. This small habitation site may be associated or affiliated with 23 CY 74, a Middle or Late Woodland mound located at the southern end of the site.

23 CY 350

Topographic Setting: The site is situated on a bluff (elevation 660 ft msl) overlooking the Missouri River Valley and is located 80 m north of Mud Creek. It is also located 50 m east-southeast (110°) of 23 CY 74, a large Middle or Late Woodland earthe mound.

Description: A small number of artifacts was found around a probable rock mound in a wooded area with 0% visibility. The low rock mound measured 9 x 7 m and approximately 15 cm high, and shovel tests encountered artifacts in an area of 348 m^2 around the mound. There were no subsurface features found around the mound.

Artifact Sample: A total of 14 artifacts was collected, which included 1 tool (biface fragment) and 13 pieces of debitage. The debitage consisted of 2 secondary decortication flakes, 10 interior flakes, and 1 piece of shatter. The biface fragment and three interior flakes were heat treated.

Chert Availability and Utilization: The site is located on Jefferson City strata which consist mostly of dolomite with inclusive chert and some sandstone and shale impartings. Residual Jefferson City chert nodules occur on nearby ridge slopes, and Jefferson City chert as well as Burlington chert is available in stream deposited sources in local creeks.

Of the 14 artifacts collected, 8 were made from Burlington chert, and 6 were knapped from Jefferson City chert. Most of the stones in the rock feature were Jefferson City dolomite, chert, or sandstone nodules, probably procured from the edge of the bluff.

Comments/Discussion: This small rock feature is probably a mortuary mound site and a variety of Boone Phase mounds. Flint knapping was evidently also a limited activity in the site vicinity. The setting, high on a bluff overlooking the Missouri River Valley, is consistent with the location of Boone Phase mounds (Denny 1964:137), and burials do sometimes occur under stone cairns (Denny 1964:141). The Boone Phase is largely confined within the lower Missouri Valley Locality II (Chapman 1980:121; Denny 1964:154), and it is firmly affiliated with the Late Woodland period (Chapman 1980:112; Denny 1964:158).

23 CY 351

Topographic Setting: The site is situated on a ridge top at an elevation of 660 ft msl and is located 300 m north of Mud creek and 300 m northwest of Logan Creek.

Description: A moderate scatter of artifacts was found in a pasture with approximately 10% visibility. Surface finds and shovel testing delimited site size to be 20,000 m^2. A possible feature was located on the crest of the ridge near the center of the site. Located by a shovel test, a dark brown stain 10-25 cm below the surface was noted in the wall of the probe hole. The shovel test yielded several flakes, burned sandstone chunks, some charcoal flecks, and one-half of a broken metate which appeared to have a burned surface; it may be a hearth or refuse pit. Charcoal flecks 10-15 cm below the surface were noted in another shovel test approximately 30 m southwest of the above feature. Cultural material occurs below the plowzone (20 cm) at this site; flakes were found to a depth of 26 cm below the surface.

Artifact Sample: A total of 172 artifacts was collected, which included 4 tools, 158 pieces of debitage, and 10 pieces of probable fire-cracked rock. The tools consisted of one broken sandstone metate and three biface fragments. The broken metate measured 27 x 14 cm and was 4.5 cm thick. The sandstone slab was probably obtained from the Bushberg sandstone formation located approximately 2.7 km north of the site. One biface fragment is possibly a slightly expanding stemmed projectile point base.

The debitage included 1 primary decortication flake, 30 secondary decortication flakes, 98 interior flakes, 22 pieces of shatter, 3 cores, 1 polished flake, and 3 pieces of modified raw material. A small area of polish was present in the center of the dorsal side of a resharpening flake 2 cm wide. The 10 pieces of probable fire-cracked rock were chunks from locally available Jefferson City chert and orthroquartzite. The 3 biface fragments and 27 pieces of debitage were heat treated.

Chert Availability and Utilization: The site is located on chert-bearing Jefferson City strata, and numerous residual nodules occur on the slopes north, east, and south of the site. The nearest outcroppings of Burlington chert are located approximately 3 km to the north; however, Burlington chert along with Jefferson City chert is available in stream deposited sources in Logan and Mud creeks and other local tributaries.

Of the 161 chert artifacts collected, 75.8% were manufactured from Burlington chert, and 24.2% were made from Jefferson City chert. All of the Burlington artifacts with identifiable cortex were made from stream deposited chert; however, all but one of the Jefferson City artifacts with identifiable cortex were knapped from residual chert.

Comments/Discussion: The site is probably a seasonal camp and knapping station with evidence of plant processing activities. There is also some evidence of a possible hearth on the site. Analysis of the chert artifacts from 23 CY 351 indicates a predominant use of and preference for Burlington chert, probably procured entirely from redeposited sources, over readily available residual or stream deposited Jefferson City chert. The bulk of the limited amount of Jefferson City chert that was used probably came from residual sources. Favorable responsiveness to heat treatment may have been a factor in chert selection since nearly a quarter of the Burlington artifacts were thermally altered, whereas only two flakes knapped from Jefferson City chert had been heat treated. The fact that three-quarters of the flakes were less than 2 cm^2 suggests primary reduction at the chert sources and tertiary reduction or finishing/resharpening on the site. Cultural affiliation is unknown.

23 CY 352

Topographic Setting: The site is situated on a second terrace (elevation 530 ft msl) at the junction of Logan Creek Valley and the Missouri River Valley. It is located 150 m southeast of a bend in Logan Creek, and the confluence of Logan and Mud creeks is 600 m southwest of the site.

Description: A moderate to dense scatter of artifacts was found in a harvested milo field with 5-25% visibility. Surface finds delimited site size to be 25,000 m^2. Random shovel tests yielded cultural material to a depth of 20 cm, and there is a good possibility of buried components in the alluvial deposits. Plowzone depth was measured to be 23 cm, and no subsurface features were detected.

Artifact Sample: A total of 190 artifacts was collected which included 19 tools, 150 pieces of debitage, and 21 pottery sherds. The tools consisted of nine utilized flakes, five biface fragments, one drill (Figure 13E), one uniface, one spokeshave, one quartzite mano, and one ground chunk of hematite. The mano is badly fractured but had at least one grinding surface. The hematite chunk (Figure 7B) is 5.5 cm long and is ground at the end on two surfaces. This hematite was probably procured from Logan Creek or one of its westward tributaries after redeposition from the Burlington formation to the north. The basal portion of the Burlington formation sometimes contains fair quantities of hematite (Conselman 1934:117).

The debitage consisted of 2 primary decortication flakes, 34 secondary decortication flakes, 92 interior flakes, 12 pieces of shatter, 7 cores, 1 bifacial thinning flake, 1 polished flake, and 1 chunk of modified raw material. Two of the shatter pieces were diorite chips which may represent the manufacture of groundstone tools. The polished flake was probably detached from a hoe, adz, or chipped stone celt via use or resharpening. Six tools and 28 pieces of debitage had been heat treated.

The 21 pottery sherds were classified into 5 categories which included 10 sand and grit tempered, cord marked body sherds or Darnell Cord Marked (or Graham Cord Impressed) pottery (Chapman 1980:230); 1 grit tempered, smooth, slightly brushed body sherd or Graham Plain pottery (Chapman 1980:281); 1 dolomite and grit tempered, cord marked body sherd or Moreau (Boone) Cord Marked pottery (Chapman 1980:288-289; Denny 1964:72, 75); 2 dolomite tempered, smooth, undecorated body sherds or Boone Plain pottery (Chapman 1980:276-277; Denny 1964:96, 99); and 7 sand and grit tempered indeterminate (surface finish) body sherds which are probably either Darnell Cord Marked or Graham Plain pottery. Two cord marked pottery sherds collected from 23 CY 352 are illustrated in Figure 7D.

Chert Availability and Utilization: The site is located on alluvium; however, the surrounding ridges are composed of chert-bearing Jefferson City strata, and residual nodules occur on slopes as close as 20 m to the east. Jefferson City and Burlington chert nodules are available in stream deposited sources in Logan Creek 150 m to the northwest and in other local tributaries. The one known source of Callaway chert is located in a tributary of Auxvasse Creek, 7 km northwest of the site.

Of the 165 chert artifacts collected, 83% were made from Burlington chert, 15.8% were made from Jefferson City chert, 0.6% was knapped from Callaway chert, and 0.6% was knapped from Excello chert. Nonlocal Excello chert is located approximately 18 km north of the site. All of the Burlington artifacts with identifiable cortex were made from stream deposited chert; however, four Jefferson City artifacts were made from residual chert, and four were knapped from stream deposited chert.

Comments/Discussion: The site is a village or residential base camp and is probably associated with the mound group (23 CY 356) atop the adjacent ridge. Similar pottery sherds suggest 23 CY 352 is at least contemporaneous if not affiliated with 23 CY 20, another village site located on a similar terrace 500 m to the west. Activities suggested by the tool types and debitage include secondary but predominantly tertiary flint knapping and tool maintenance, the manufacture of groundstone tools, butchering, drilling, hematite processing, plant food processing, and pottery making and food preparation/storage.

The chert analysis of the artifacts from 23 CY 352 indicates an unexpected predominant utilization of Burlington chert procured from stream deposited sources and a supplemental role for nearby Jefferson City chert. The preference for Burlington chert may be due to its susceptibility and responsiveness to heat treatment. At least one-quarter of all Burlington artifacts had been heat treated, whereas only one artifact made from Jefferson City chert had been annealed.

As evidenced by the sand, grit, and dolomite tempered pottery, the major component at 23 CY 352 is probably affiliated with the Late Woodland period and may be associated with the Boone Phase of central and east-central Missouri; suggested dates range from 1500-1000 B.P. Both Boone Plain and Moreau or Boone Cord Marked pottery types are identified as Boone Phase in the Late Woodland period (Chapman 1980:276-277, 288-289; Denny 1964: 96-99, 72-75), and Darnell or Graham Cord Marked and Graham Plain pottery types are probably associated with Late Woodland peoples (Chapman 1980:280-281). All four pottery types are found primarily in the Lower Missouri Valley II Locality (Chapman 1980:276, 280-281, 289).

23 CY 353

Topographic Setting: This site was divided into two loci located on different topographic features. Locus A is situated on a second terrace at an elevation of 530 ft msl, and Locus B is situated on the very end of a ridge spur (elevation 580 ft msl) immediately north of the terrace. The site is located 50 m east of an unnamed tributary of Logan Creek and 200 m north of the confluence of this tributary with Logan Creek.

Description: Locus A consisted of a dense scatter of artifacts found in disced rows (approximately 5-50% visibility) between grass strips on the cultivated terrace. Locus B consisted of a light to moderate scatter of artifacts collected from shovel tests in a heavy grass cover with 0% visibility. Surface finds determined that Locus A covered an area of 31,200 m^2. Shovel testing revealed that Locus B covered an area of 2,800 m^2; however, Locus B probably continues north along the ridge top outside the project area. Survey of this area north of the project boundary might distinguish Locus B from Locus A as an associated but separate site. Shovel tests in Locus A determined that the depth of most artifacts were between 0-15 cm below the surface; however, the possibility of buried components in these alluvial deposits is good. There were no subsurface features found.

Artifact Sample: A total of 811 artifacts was collected: 757 from Locus A and 54 from Locus B. Each locus will be discussed separately. Locus A included 31 tools and 726 pieces of debitage. The tools consisted of 4 projectile points, 11 biface fragments, 8 utilized flakes, 3 side scrapers, 1 chert hammerstone fragment, and 4 groundstone artifacts.

The projectile points included one side-notched, concave base point; one weak-shouldered, slightly expanding stem and slightly convex point base; one shallow side-notched and straight base point fragment; and one slightly expanding stem, straight base arrow point.

The side-notched, concave base point (Figure 14A) is Big Sandy-like (Chapman 1975:242) in many respects, but it also has some resemblance to Early Archaic Graham Cave Notched points (Chapman 1975:248). The point has two basal thinning scars on one side: one long (2.5 cm) narrow flake scar and one short (1.4 cm) but broad (1.3 cm) flake scar. The flake scars probably reflect intentional thinning of the steep ridge down the midline of the blade and stem, rather than fluting. The opposite side of the point has one small basal thinning flake scar.

The weak-shouldered, lanceolate-like artifact (Figure 14B) is unidentified as to point type. It is very similar to a point illustrated by Angus (1977:43) who referred to it as an Archaic point, and it is vaguely similar to another weak-shouldered point described by

Hunt (1977:89) as Late Archaic. There is also a good possibility it is a variant of the Sedalia Lanceolate point type (Chapman 1975:255).

The shallow side-notched point (Figure 14C) is unidentified as to type but resembles the Matanzas point (Late Archaic) found in Missouri and Illinois (Perino 1968:54).

The corner-notched arrow point (Figure 14D) is also unidentified as to type but is probably a Late Woodland point.

The groundstone tools included two manos (one diorite and one sandstone), each with two grinding surfaces, and two multipurpose artifacts. One sandstone tool was bipitted with two grinding surfaces and hammerstone battering at one end. The other quartzite tool was a combined mano/anvil/hammerstone (Figure 7C); it exhibited two grinding surfaces with overlapping cone fractures on both flat surfaces and hammerstone battering long the edge.

The debitage consisted of 11 primary decortication flakes, 183 secondary decortication flakes, 429 interior flakes, 59 pieces of shatter, 31 cores, 3 bifacial thinning flakes, and 10 pieces of modified raw material. Fifteen tools and 155 pieces of debitage had been heat treated.

Locus B included 1 biface fragment and 53 pieces of debitage. The debitage consisted of 1 primary decortication flake, 7 secondary decortication flakes, 35 interior flakes, and 10 pieces of shatter. The biface fragment and 14 pieces of debitage were heat treated.

Chert Availability and Utilization: Most of the site is located on alluvium; however, Locus B is located on chert-bearing Jefferson City strata. Numerous residual Jefferson City nodules are present on nearby ridge slopes. Jefferson City as well as Burlington chert nodules are available in stream deposited sources in nearby Logan Creek and its unnamed tributary 50 m west of the site.

Of the 753 chert artifacts collected from Locus A, 69.2% were manufactured from Burlington chert, 28.4% were made from Jefferson City chert, 2.3% were indeterminate as to chert type (too small for identification), and 1 artifact, the Big Sandy-like projectile point, was made from nonlocal Excello chert. The nearest known source area of Excello chert is located approximately 17 km north of the site along Pinch Creek. All of the Burlington artifacts with identifiable cortex were made from stream deposited chert, whereas 41 Jefferson City artifacts were knapped from stream deposited nodules, and 28 were knapped from residual chert nodules.

Of the 54 artifacts collected from Locus B, 75.9% were manufactured from Burlington chert, and 24.1% were made from Jefferson City chert. Two Burlington artifacts with identifiable cortex were knapped from stream deposited chert.

Comments/Discussion: The site is probably a reoccupied seasonal camp and knapping station. Analysis of the chert artifacts from 23 CY 353 indicates an unexpected predominant utilization of Burlington chert (71%), probably procured entirely from stream deposited sources, and a supplemental role (29%) for Jefferson City chert. Even among the Jefferson City chert that was used, there was a tendency to procure it from nearby stream deposited sources rather than from residual sources.

Examination of the debitage suggests primary, secondary, and tertiary reduction on the site. Activities other than flint knapping suggested by tool types include hunting and butchering, hide processing, and plant food preparation/processing. The incidence of heat treatment among Burlington chert tools was very high at this site -- 68% of the tools were thermally altered as compared to 23% of the debitage.

The diagnostic tools found at 23 CY 353 indicate a multicomponent site with predominantly Archaic and Woodland occupations. Although possibly inhabited during the Early Archaic period, the major components suggested by the surface collection have been tentatively affiliated with the Middle to Late Archaic (7000-2500 B.P.) and Late Woodland (1500-1000 B.P.) periods.

23 CY 354

Topographic Setting: The site is situated on the end of a ridge spur at an elevation of 570 ft msl and is located 100 m west of an unnamed tributary of Logan Creek.

Description: A light scatter of artifacts was found in a fallow field (early successional) with 0% visibility and in an adjacent disturbed area caused by powerline and pipeline construction with 50% visibility. Surface finds and shovel testing delimited site size within project boundaries to be 900 m^2; however, the site probably continues west up the ridge spur into the Exclusion Zone. There were no subsurface features found.

Artifact Sample: A total of 12 artifacts was collected which included 1 biface fragment and 11 pieces of debitage. The debitage consisted of one primary decortication flake, one secondary decortication flake, seven interior flakes, and two pieces of shatter. The biface fragment, five interior flakes, and one piece of shatter had been heat treated.

Chert Availability and Utilization: The site is located on chert-bearing Jefferson City strata; residual nodules are available on local ridge slopes. The nearby tributary of Logan Creek and Logan Creek itself, located 100 m and 180 m southeast, respectively, provide stream deposited chert sources which contain both Jefferson City and Burlington chert nodules.

Ten of the 12 artifacts collected from the site were manufactured from Burlington chert, and 2 artifacts were made from Jefferson City chert. None of the artifacts was identifiable as to chert source; however, over one-half had been subjected to heat treatment.

Comments/Discussion: The site is probably a small field camp and knapping station with no evidence of substantial habitation. The analysis of the limited chert sample from 23 CY 354 indicates a preference for Burlington chert, probably procured from local redeposited sources, over readily available residual or stream deposited Jefferson City chert. Cultural affiliation is unknown.

23 CY 355

Topographic Setting: The site is situated on a first terrace at an elevation of 530 ft msl and is located 100 m south of Logan Creek.

Description: Two artifacts were found in a recently plowed and disced field with 15-60% visibility. Surface finds delimited site size to be 6,400 m^2, and shovel testing revealed no subsurface features.

Artifact Sample: Two interior flakes were collected from the surface of the site.

Chert Availability and Utilization: The site is located on alluvium; however, residual Jefferson City chert is readily available on the ridge slopes 50-100 m south and east of the site, and stream deposited Jefferson City and Burlington chert is located 100 north of the site in Logan Creek. One flake was knapped from Jefferson City chert, and one was knapped from Burlington chert.

Comments/Discussion: The site is a limited activity knapping station with no evidence of habitation. Cultural affiliation is unknown.

23 CY 356

Topographic Setting: The site is situated on a ridge top and bluff (elevation 660 ft msl) overlooking the Missouri River and Logan Creek floodplains. It is located 350 m east and north of Logan Creek.

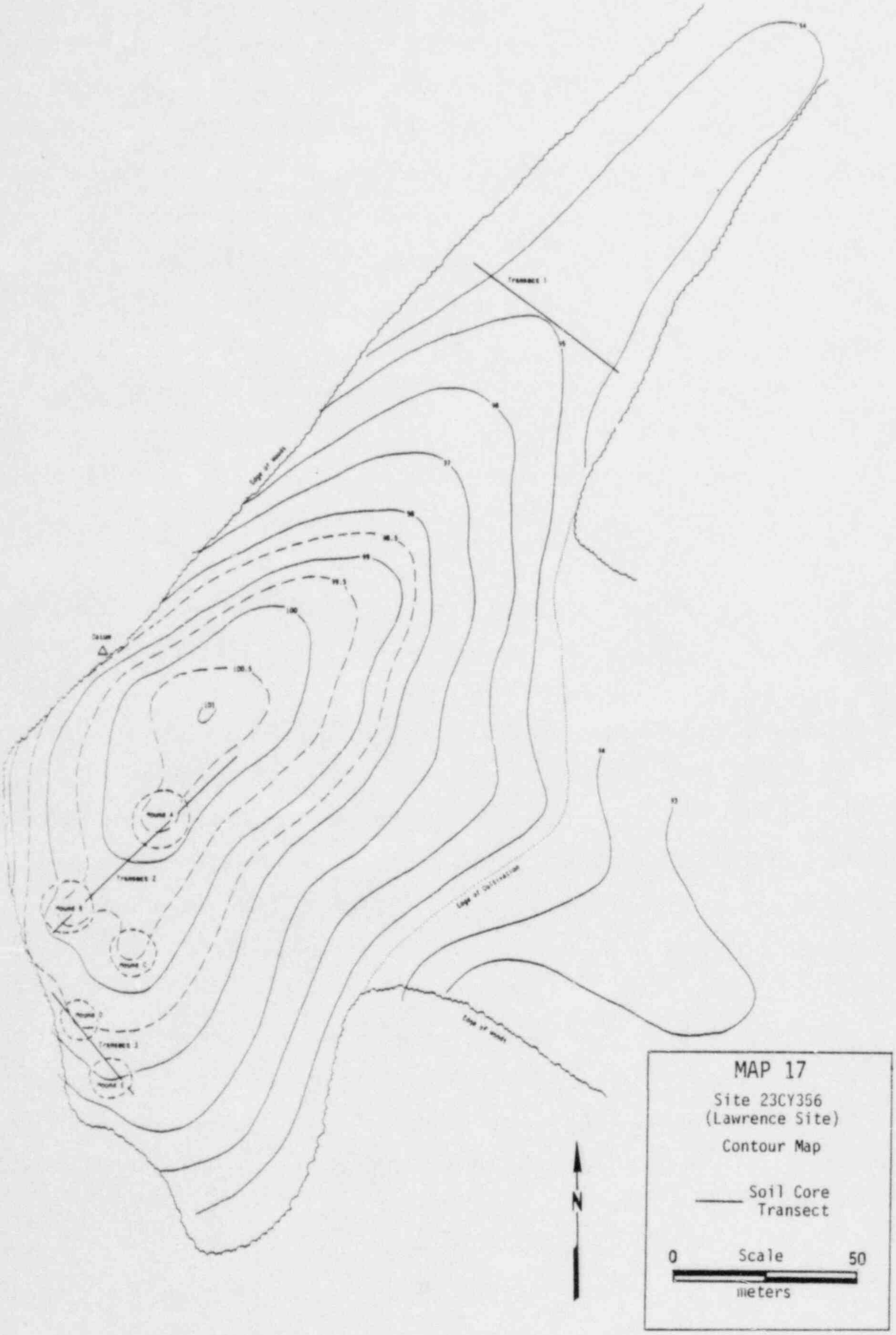
Description: A dense scatter of artifacts was found in seven 3 m wide disced transects (approximately 70% visibility) separated by 15 m wide grass strips. Surface finds and shovel testing established site size at 42,250 m^2. Five previously unrecorded low earthen mounds were located on the southwest end of the site near the bluff's edge (Plate 6b). Four of the five mounds were probed for soil profiles and evidence of stone chambers. Individual probe depths averaged 40-45 cm and the probes were interspaced 5 m along a transect. Stone was not encountered in the mounds; however, they appeared to be reduced somewhat in height due to years of cultivation. A soil probe transect was also placed across the north end of the site, but no subsurface features were detected. Map 17 is a contour map of 23 CY 356 with locations of the five mounds and three soil probe transects presented in Figure 10.

Artifact Sample: A total of 1,252 artifacts was collected from the surface of the site, which included 33 tools, 1,214 pieces of debitage, 1 pottery sherd, 3 pieces of fire-cracked rock, and 1 human tooth fragment.

The tools consisted of 7 projectile point fragments, 11 biface fragments, 11 utilized flakes, 1 drill fragment, 1 end scraper, 1 uniface, and 1 possible sandstone mano. The projectile points included: four side-notched point agments, of which two are probable Big Sandy Notched points (Figure 14G, H) (Chapman 1975:174, 242) and two are Big Sandy Notched-like points (Figure 14E, F); one Rice Side Notched point (Figure 14I) (Chapman 1980:88, 101, 311); one possible Steuben Expanded Stemmed point (Figure 15A) (Chapman 1980:116, 313); and one Scallorn Corner Notched arrow point (Figure 15B) (Chapman 1980:312). One Big Sandy point base was found on the edge of mound B.

The debitage consisted of 7 primary decortication flakes, 175 secondary decortication flakes, 825 interior flakes, 155 pieces of shatter, 26 cores, 22 bifacial thinning flakes, and 4 pieces of modified raw material. One piece of shatter had polish on two surfaces. Twenty-three tools and 448 pieces of debitage had been heat treated.

One pottery sherd and one human tooth fragment collected from the top of the largest mound A indicate the presence of a human burial in


MAP 17
Site 23CY356
(Lawrence Site)
Contour Map
Soil Core
Transect
0
Scale
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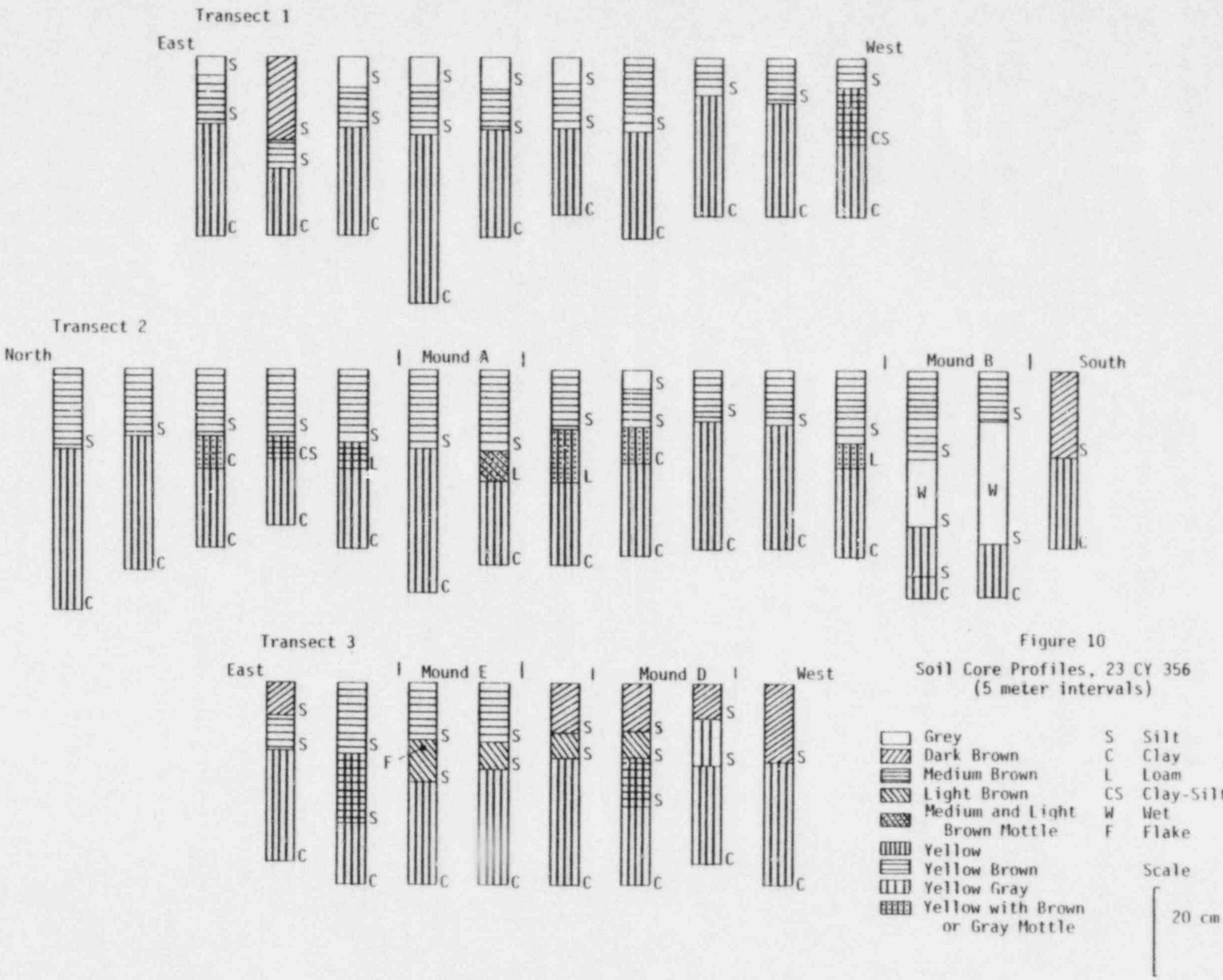


Figure 10

Soil Core Profiles, 23 CY 356
(5 meter intervals)

this mound. The pot sherd was a grit tempered, smooth, undecorated body sherd, probably representative of Graham Plain pottery (Chapman 1980:281). The human tooth fragment is probably a portion of a premolar tooth.

Chert Availability and Utilization: The site is located on chert-bearing Jefferson City strata, and numerous residual nodules occur on the local ridge slopes. The nearest Burlington chert outcroppings are located approximtely 3 km northwest of the site; however, Burlington chert nodules along with Jefferson City nodules are available in stream deposited sources in Logan Creek and other local tributaries to the north and west. The one known source of Callaway chert is located in a tributary of Auxvasse Creek 7 km northwest of the site; however, it is possible this chert occurs outside the project/survey area and thus closer to the site, In any case, Callaway chert would not outcrop any closer than 2.3 km, although it may occur in gravel bars of Logan Creek and some of its tributaries.

Of the 1,246 chert artifacts collected, 67.2% were manufactured from Burlington chert, 29.1% were made from Jefferson City chert, 3.5% were indeterminate as to chert type (too small for identification), 2 flakes were knapped from Callaway chert, and 1 flake was knapped from Excello chert. Nonlocal Excello chert is located approximately 18 km north of the site.

All (72) of the Burlington artifacts with identifiable cortex were made from stream deposited chert, whereas 34 Jefferson City artifacts were knapped from stream deposited chert, and 38 were made from residual chert.

Comments/Discussion: The site is a seasonal camp and knapping station with a probable mortuary mound complex located on the south end of the site. Five low earthen mounds were located, recorded, and tested with a soil probe. Rock was not encountered; however, one probe into mound A and two probes into mound B encountered very wet (almost soupy) silt in a "loose pocket" which presented little resistance to the soil probe (Figure 10). These loose pockets are suggestive of burial chambers. The presence of a pottery sherd and human tooth fragment on mound A indicates the partial remains of at least one burial in this largest mound.

Analysis of the chert artifacts from 23 CY 356 indicates an unexpected preference for Burlington chert, probably procured entirely from stream deposited sources, and a supplemental role for nearby Jefferson City chert. Among the Jefferson City chert that was used, there was evidently an equal exploitation of residual and stream deposited sources. The fact that 80% of the flakes collected were less than 2 cm^2 suggests primarily initial lithic reduction at the chert sources and tertiary reduction or finishing/resharpening on the site. On the other hand, 7 Burlington cores, 118 Burlington decortication flakes, and 34 stream deposited Jefferson City artifacts indicate some transportation of unmodified raw material from stream deposited sources at least 350 m distant from the site and 50 m upslope to the top of the ridge.

Heat treatment of chert was evidently an important part of lithic technology at the site, although used differentially in regard to chert type. Nearly one-half (45.2%) of all the Burlington artifacts and three-quarters (74.1%) of the Burlington tools had been heat treated, whereas only one-quarter (25.4%) of the Jefferson City artifacts were heat treated. The inherent fine-grained nature of Jefferson City chert and a particular susceptibility and responsiveness of Burlington chert to thermal alteration may account for this difference. Burlington chert is often transformed from a grainy, porous mass into a very waxy and glass-like material after heat treatment. The favorable reaction of

Burlington chert to heat treatment may even account for its selection (3:1) over Jefferson City chert.

Other activities suggested by the tool types and debitage include hunting and butchering, drilling, plant food processing, and burial of the dead. Twenty-two bifacial thinning flakes indicate a fair amount of biface manufacture/maintenance, and at least three pieces of fire-cracked rock suggest the presence of a hearth on the site.

The diagnostic artifacts found at 23 CY 356 indicate a multi-component site with predominantly Archaic and Woodland occupations. The two Big Sandy Notched points and two Big Sandy-like points located by the survey are associated with the Middle Archaic period (7000-5000 B.P.) (Chapman 1975:242). These Archaic occupations probably account for most of the camping and knapping debris on the site.

The mortuary component at 23 CY 356 is affiliated with the Late Woodland period (1500-1000 B.P.) and may represent a manifestation of the Boone Phase in east-central Missouri. The setting high on a bluff overlooking the Missouri River Valley is consistent with the location of Boone Phase mounds (Denny 1964:137), and the mounds are sometimes constructed entirely of earth (Chapman 1980:112). The grit tempered pot sherd (Graham Plain) found on mound A is similar to Late Woodland pottery found at Graham Cave and Arnold Research Cave (Chapman 1980:121). In addition, the Rice Side Notched, Steuben Expanded Stemmed, and Scallorn Corner Notched projectile points found on the site are all characteristic of Late Woodland Boone Phase (Chapman 1980:115). This Late Woodland mortuary component is probably associated with the village or residential base camp (23 CY 352) located on the adjacent terrace directly below or west of the ridge and 23 CY 356.

23 CY 359

Topographic Setting: The site is linear in shape, situated along a narrow ridge top at an elevation of 580-710 ft msl; the south end is located 200 m northwest of Logan Creek.

Description: A light scatter of artifacts was found in bare spots and a dirt road along the ridge top (fallow/pasture) during a preliminary reconnaissance in the fall of 1981. Ground visibility was approximately 20% in the dirt road but 0% in the surrounding fallow field. Surface finds delimited site size to be 120,000 m^2. Although site 23 CY 359 is not located within the project area, it was discovered during historic architectural and historic background research for the present report. Union Electric Company subsequently gave permission to fully investigate and evaluate the site (June 1982).

Artifact Sample: A total of 14 artifacts was collected during the preliminary reconnaissance which included 4 projectile points, 7 biface fragments, 1 utilized flake, 1 interior flake, and 1 pitted stone.

The projectile points included two side-notched points, one slightly expanding stemmed point, and one Scallorn Corner Notched arrow point (Figure 15F). One side-notched point/knife (Figure 15C) with a concave base and U-shaped notches has been tentatively identified as a Graham Cave Notched point (Chapman 1975:144, 248). The other side-notched point (Figure 15D) has a straight base and rather broad notches; it may represent a variant of Big Sandy Notched points. The slightly expanding stemmed point (Figure 15E) with a straight to slightly convex base has been tentatively identified as a Steuben Expanded Stemmed point (Chapman 1980:116, 313).

The groundstone artifact is made of sandstone and has a single shallow pit on one surface. All four projectile points and five of the six biface fragments had been heat treated. The possible Graham Cave Notched point exhibits luster contrast between pre-heated flake scars (from the preform) and post-heated flake scars -- the most diagnostic visual characteristic of a heat-treated artifact (Collins and Fenwick

1974:137; Rick 1978:57). The relicit area (1.6 x 1.0 cm) above the left shoulder (Figure 15C) is dull with a gray or smoked appearance and stands in sharp contrast to the highly lustrous, pinkish flake scars on the rest of the artifact, which were made subsequent to thermal alteration.

Chert Availability and Utilization: The site is located on chert-bearing Jefferson City strata, and numerous residual nodules occur on the local ridge slopes. The nearest outcroppings of Burlington chert are located approximtely 2 km north of the site; however, Burlington chert nodules along with Jefferson City nodules are available in stream deposited sources in tributaries of Logan Creek 250 m east and 500 m west and in Logan Creek 200 m to the southeast. All but one of the chert artifacts were made from Burlington chert; one biface fragment was knapped from Jefferson City chert.

Comments/Discussion: From the small (selective) amount of material collected during the preliminary reconnaissance, it is evident that the site is probably a seasonal camp and knapping station. Although the small selective sample is biased toward tools, there was no bias in collecting artifact chert types. A chert analysis indicates that there may have been a preference for making tools out of Burlington chert since all of the projectile points and all but one biface were knapped from this fossiliferous chert. Activities other than flint knapping suggested by the tool types include hunting and butchering and plant food processing.

The diagnostic artifacts indicate the site is multi-component with predominantly Archaic and Woodland occupations. The side-notched point tentatively identifed as Graham Cave Notched suggests the site may have been occupied during the Early Archaic (9000-7000 B.P.) period (Chapman 1975:249), and the Big Sandy-like point is probably associated with the Middle Archaic period (7000-5000 B.P.). The expanding stemmed Steuben point is restricted to the Middle Woodland and Late Woodland periods (Chapman 1980:313), and the Scallorn Corner Notched arrow point is a Late Woodland (1500-1000 B.P.) point type (Chapman 1975:312).

A resurvey of 23 CY 359 was conducted on June 11-12, 1982, to define site boundaries via shovel testing after permission was given by Union Electric Company to fully investigate the site. Site boundaries were found to be essentially the same as those defined earlier during the preliminary survey, extending from Lawrence Cemetery on the south to approximately 150 m south of the Heavy Haul road on the north; however, site boundaries were expanded slightly in two areas. A light scatter of artifacts was discovered to extend down a southwest trending ridge lobe on the north end of the site and down an eastward trending lobe toward 23 CY 354 near the south end of the site. Due to the continuance of the light artifact scatter down the latter ridge lobe, 23 CY 354 may actually be part of site 23 CY 359. There were no subsurface features located during the shovel test resurvey. Ground visibility was 0% except for bare areas in the dirt road along the top of the ridge.

For the purposes of the resurvey, only diagnostic artifacts were collected; however, a sample of the artifacts in a 75 m transect was recorded as to artifact type and chert type. A total of 48 artifacts was recorded, which included 28 Burlington interior flakes, 13 Jefferson City interior flakes, 3 Burlington secondary decortication flakes, 1 Jefferson City secondary decortication flake, 1 Jefferson City primary decortication flake, 1 Burlington piece of shatter, and 1 Burlington biface fragment. Other artifacts noted in the road included 1 Burlington core, 1 Jefferson City core, 1 Burlington biface fragment, 1 pitted stone/mano, and 2 projectile point bases. The point bases were side notched and Big Sandy-like. Both points were made from Burlington chert and each had been heat treated. These two side notched points, which provide additional evidence for a Middle Archaic component at the site, are probably associated with the Big Sandy Notched-like projectile point found during the preliminary survey.

Isolated Finds

Level Upland Prairie

UE 7

One interior flake knapped from Burlington chert was found in a cultivated field 300 m west of an unnamed tributary of Cow Creek.

UE 13

One interior flake knapped from Burlington chert was found in a barn lot 200 m west of an unnamed tributary of Auxvasse Creek.

UE 18

One secondary decortication flake knapped from Burlington chert was found in a cultivated field 150 m southwest of an unnamed tributary of Cow Creek.

UE 21

One interior flake knapped from Burlington chert was found in a cultivated field 300 m west of an unnamed tributary of Logan Creek.

UE 36

One interior flake knapped from Burlington chert was found in a plowed field 100 m east of an unnamed tributary of Cow Creek.

UE 54

One biface fragment knapped from a stream deposited Burlington chert nodule was found in a fallow field (early successional) 150 m west of an unnamed tributary of Cow Creek.

UE 65

One core made from Burlington chert was found in a creek bed of an unnamed tributary of Cow Creek.

UE 80

One isolated piece of utilized shatter made from Burlington chert was found in a wooded area 40 m east of Mud Creek.

UE 82

One interior flake knapped from Burlington chert was found in a pasture 350 m east of an unnamed tributary of Mud Creek.

UE 97

One secondary decortication flake knapped from Burlington chert was found in a cultivated field 300 m east of Mud Creek.

UE 108

An interior flake knapped from Burlington chert was found in a milo field 150 m west of an unnamed tributary of Cow Creek.

Prairie/Forest Edge

UE 3

One secondary decortication flake knapped from Burlington chert was found in a creek bed of an unnamed tributary of Auxvasse Creek.

UE 14

One utilized interior flake knapped from Burlington chert was found in a fallow field (early successional) 300 m east of an unnamed tributary of Logan Creek.

UE 16

One secondary decortication flake knapped from Burlington chert was found in a fallow field (early successional) 125 m west of an unnamed tributary of Logan Creek.

UE 17

One biface fragment made from Burlington chert was found in a fallow field (early successional) 200 m north of an unnamed tributary of Logan Creek.

UE 22

A secondary decortication flake knapped from Burlington chert was found in a fallow field (early successional) 300 m southeast of an unnamed tributary of Logan Creek.

UE 26

A chunk of a modified stream deposited Burlington nodule was found in a creek bed of an unnamed tributary of Auxvasse Creek.

UE 59

A heat treated interior flake knapped from Burlington chert was found in a wooded area 50 m south of an unnamed tributary of Auxvasse Creek.

UE 68

One secondary decortication flake knapped from a stream deposited Burlington chert nodule was found in a creek bed of an unnamed tributary of Logan Creek.

UE 70

One secondary decortication flake knapped from a stream deposited Burlington nodule was found in a creek bed of an unnamed tributary of Logan Creek.

UE 73

A core made from a stream deposited Burlington chert nodule was found in a creek bed of an unnamed tributary of Logan Creek.

UE 74

One heat treated interior flake knapped from Burlington chert was found in a cultivated field 150 m east of an unnamed tributary of Logan Creek.

UE 75

A chunk of a modified stream deposited Burlington nodule was found in a creek bed of an unnamed tributary of Logan Creek.

UE 104

A core made from a stream deposited Burlington chert nodule was found in the creek bed of Kentucky Spring Hollow Creek.

UE 127

One interior flake knapped from Jefferson City chert was found in a wooded area 75 m east and west of unnamed tributaries of Logan Creek.

Dissected Upland Oak-Hickory Forest

UE 84

One broken and unidentifiable projectile point/knife (Figure 15G) made from Jefferson City chert was found in a gravel bar at the confluence of Kentucky Spring Hollow Creek and an unnamed tributary. Although unidentifiable, the artifact was a stemmed projectile point/knife.

UE 85

A biface fragment made from Burlington chert was found in a small branch of an unnamed tributary of Kentucky Spring Hollow Creek. This broken biface (Figure 15H) may represent a production failure of a fluted point preform. One face of the biface has what appears to be an expanding flute that terminated in a reverse hinge fracture, and both faces of the blade exhibit parallel flaking.

UE 94

One core made from Jefferson City chert was found in a wooded area 250 m northeast of an unnamed tributary of Logan Creek.

UE 122

A core fragment knapped from a residual Jefferson City chert nodule was found in a wooded area 400 m east of an unnamed tributary of Logan Creek.

UE 135

One interior flake knapped from Burlington chert was found in a wooded area 450 m east of an unnamed tributary of Logan Creek.

Local Amateur Collections

Two collectors were contacted for information concerning sites

Figure 11

A. Big Sandy Notched projectile point (23 CY 256).

B. Clovis Fluted projectile point (23 CY 267); arrows indicate lateral thinning flake scars made subsequent to fluting; large arrow indicates applied force probably responsible for breakage.

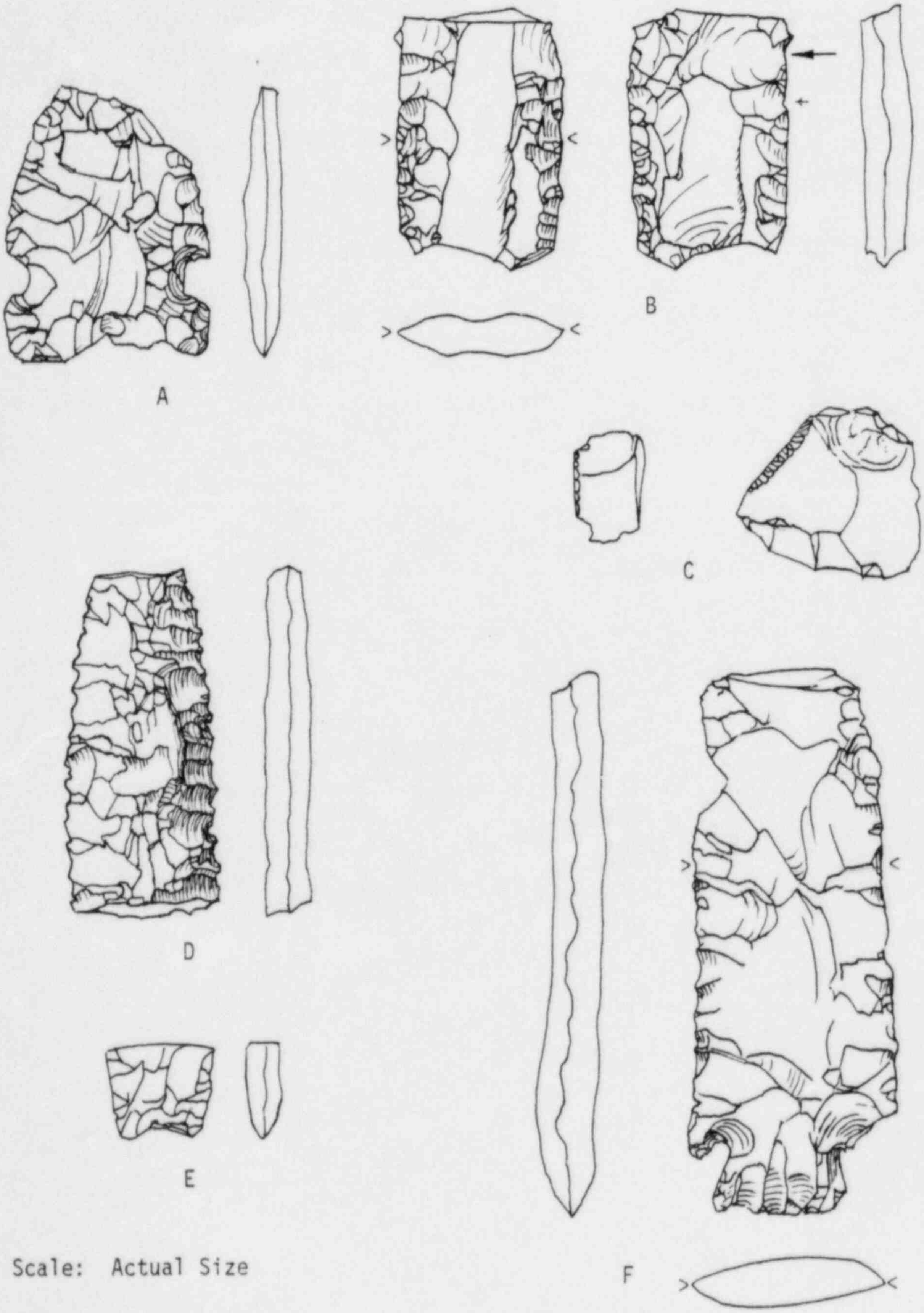
C. Utilized shatter (23 CY 267).

D. Possible Rice Lanceolate midsection (23 CY 303).

E. Possible Rice Lanceolate projectile point base (23 CY 303).

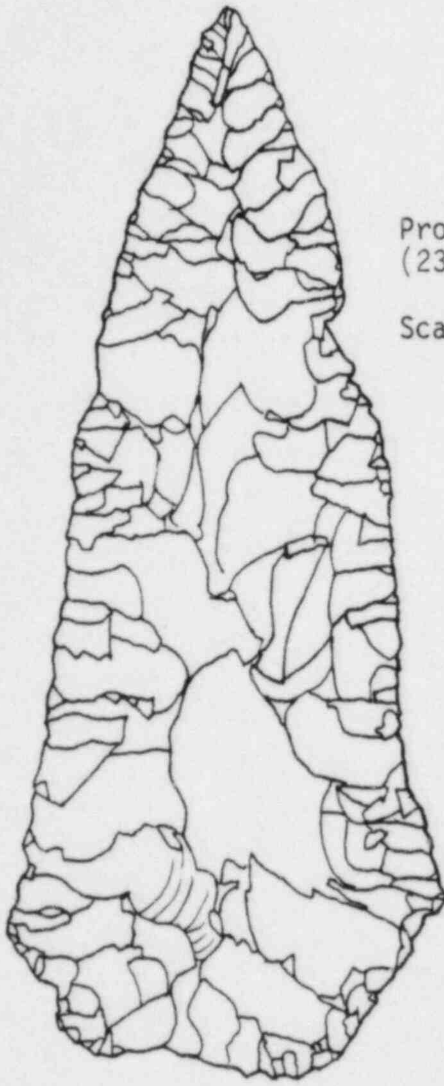
F. Etley Stemmed projectile point/knife (23 CY 309).

Figure 11



Scale: Actual Size

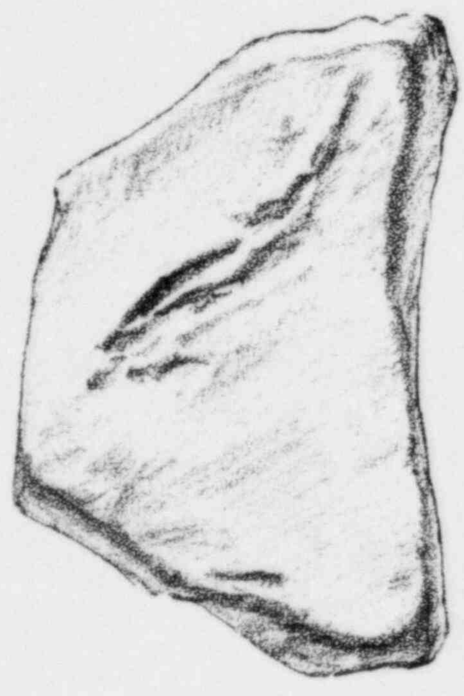
Figure 12



Probable Etley Stemmed preform
(23 CY 257)

Scale: Actual Size

A



Sandstone abrader; probably used as a platform preparation and/or antler flaker abrader
(23 CY 257)

Scale: One-fourth Actual Size

B

Figure 13

A. Mississippi Triangular arrow point (23 CY 304).

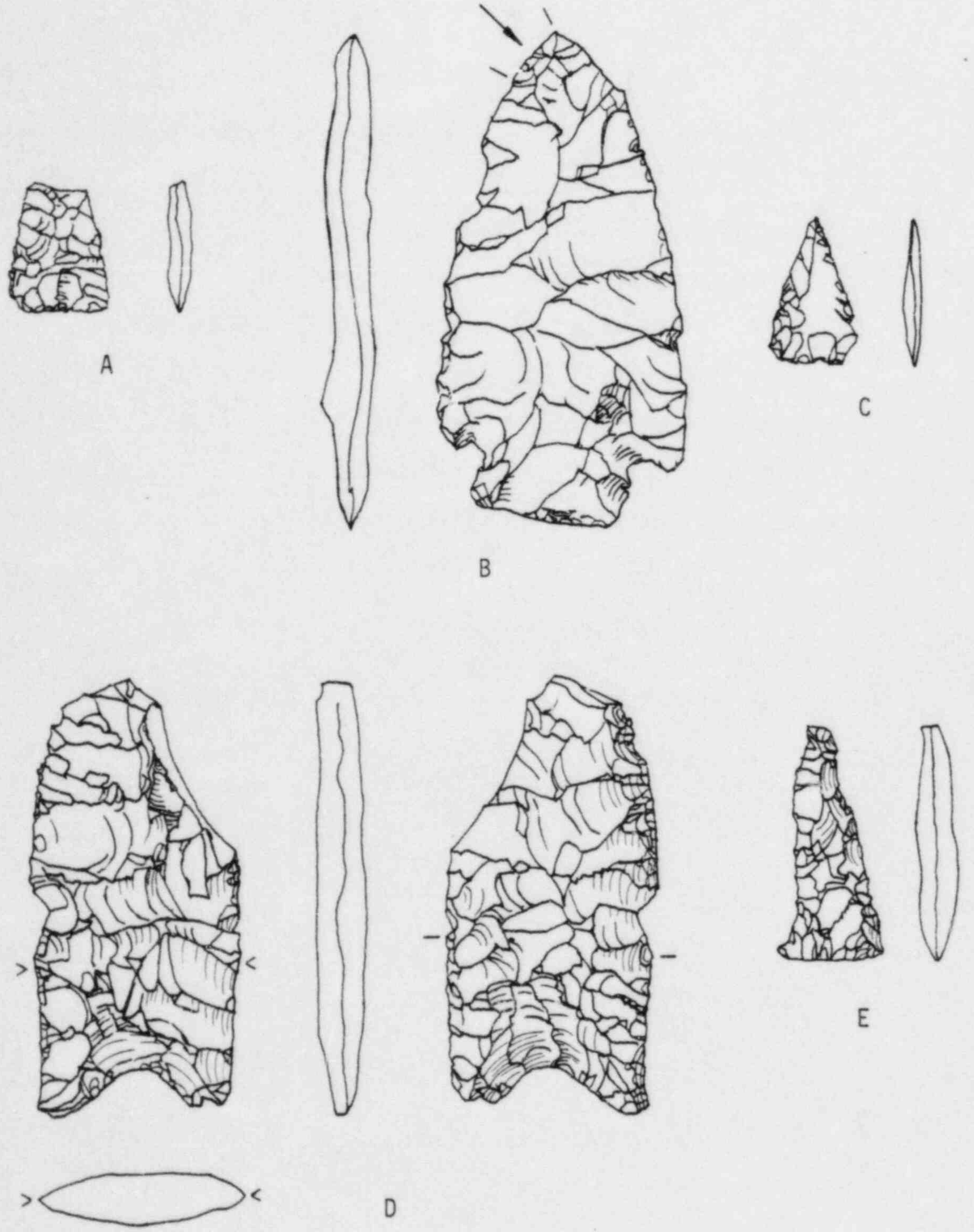
B. Unidentified corner notched projectile point/knife (23 CY 328); it probably dates Late Archaic/Early Woodland; arrow and tick marks indicate a dull remnant platform preparation (abraded) surface.

C. Mississippi Triangular arrow point (23 CY 322).

D. Unserrated Dalton projectile point (23 CY 346); tick marks indicate extent of lateral grinding.

E. Drill (23 CY 352).

Figure 13



Scale: Actual Size

Figure 14

A. Big Sandy Notched (or possibly Graham Cave Notched) projectile point (23 CY 353).

B. Unidentified lanceolate projectile point (possibly Sedalia Lanceolate) (23 CY 353).

C. Possible Matanzas projectile point (23 CY 353).

D. Unidentified Late Woodland arrow point (23 CY 353).

E. Possible Big Sandy Notched projectile point (23 CY 356).

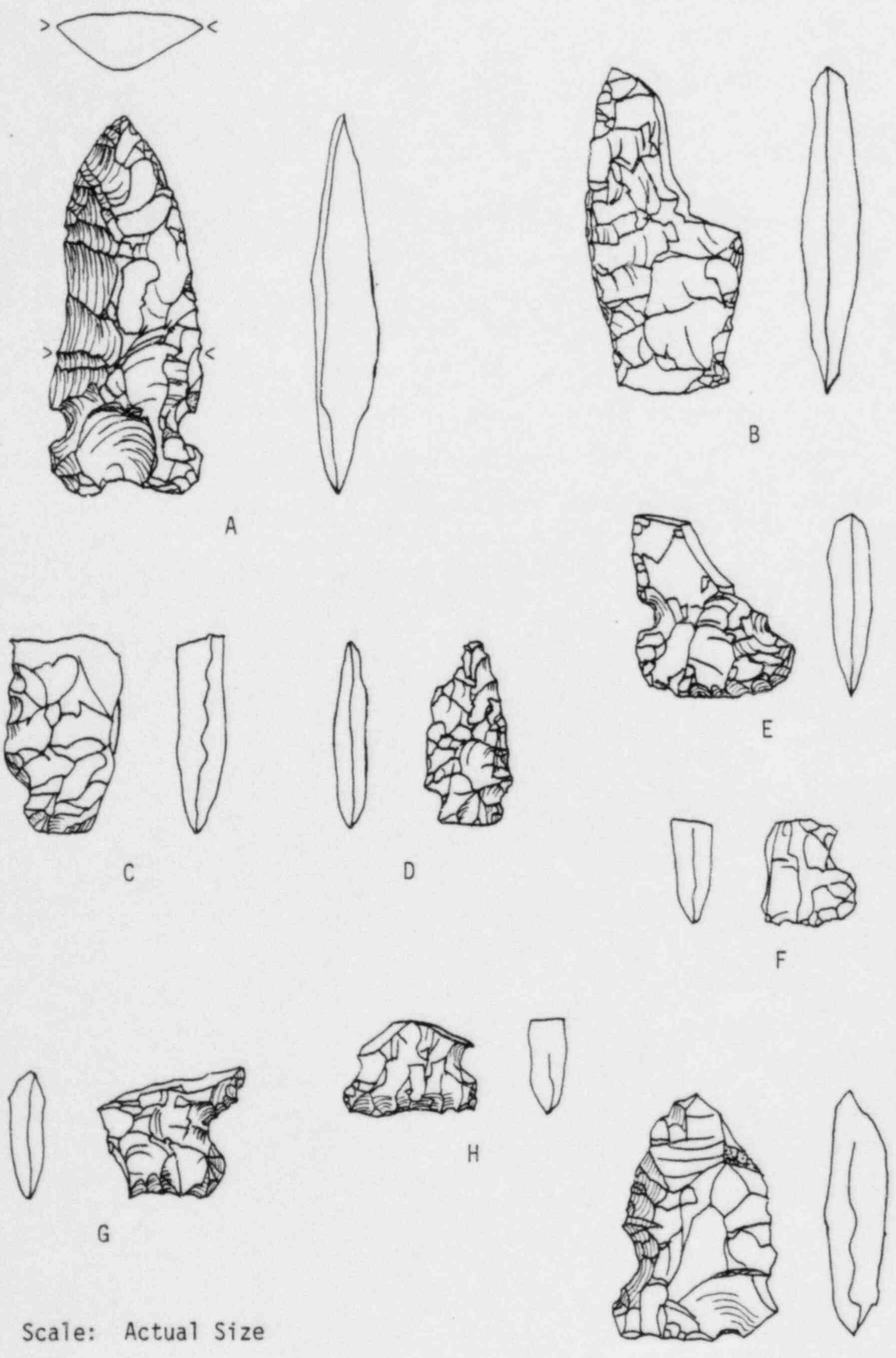
F. Possible Big Sandy Notched projectile point (23 CY 356).

G. Big Sandy Notched projectile point (23 CY 356).

H. Big Sandy Notched projectile point (23 CY 356).

I. Rice Side Notched projectile point (23 CY 356).

Figure 14



Scale: Actual Size

Figure 15

A. Possible Steuben Expanded Stemmed projectile point (23 CY 356).

B. Scallorn Corner Notched arrow point (23 CY 356).

C. Graham Cave Notched projectile point/knife (23 CY 359); arrow indicates relicit surface unflaked after heat treatment.

D. Possible Big Sandy Notched projectile point (23 CY 359).

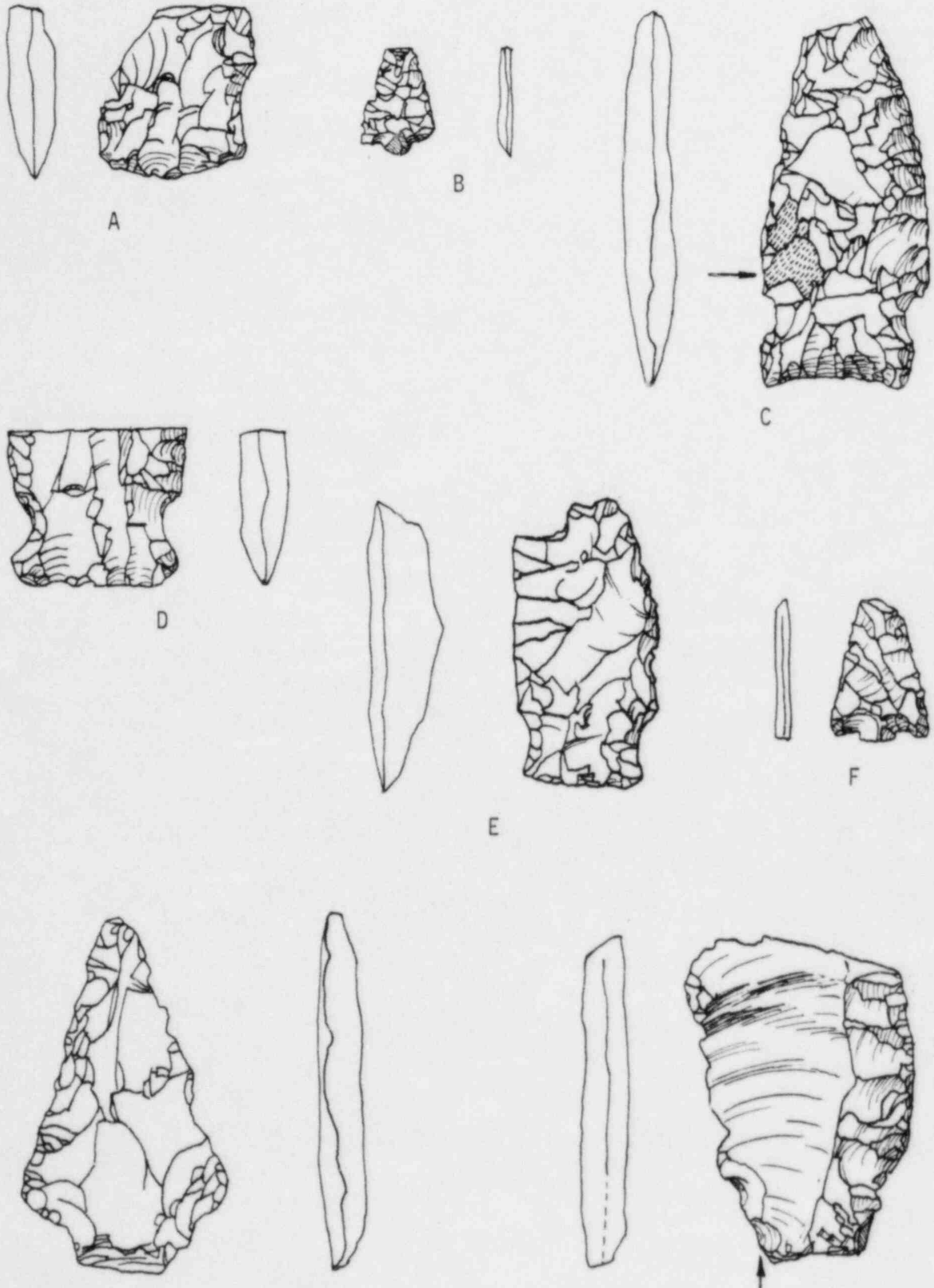
E. Probable Steuben Expanded Stemmed projectile point (23 CY 359).

F. Scallorn Corner Notched arrow point (23 CY 359).

G. Unidentifiable stemmed projectile point/knife (Isolated Find UE 84).

H. Biface fragment which may represent failure of a fluted point preform; arrow indicates point of applied force to the preform (Isolated Find UE 85).

Figure 15



Scale: Actual Size

located in the project area. Although it was discovered that none of the sites collected by the two amateurs was actually located within the project boundaries (with the possible exception of 23 CY 20), some useful comparative (temporal) information was obtained.

C. F. Loutenschlager owned a small collection of projectile points (80) which he claimed were found on his farm bordering the southwest portion of the study area. The points ranged in age from Early Archaic to Late Woodland/Mississippian. Representative specimens from the Loutenschlager collection are presented in Plate 7. Archaic point types included Hardin Barbed (Plate 7a), Big Sandy Side Notched (Plate 7b), and Etley Stemmed (Plate 7c). Woodland point types included a possible Early Woodland stemmed point (Plate 7d), Steuben Expanded Stemmed (Plate 7e), probable Middle to Late Woodland points (Plate 7f), Late Woodland arrow points (Plate 7g), Scallorn Notched arrow points (Plate 7h), and Late Woodland/Mississippian arrow points (Plate 7i).

According to Mr. Loutenschlager, the "majority" of the points in his collection was found on a terrace in a field immediately north of 23 CY 347 and the project boundary. Since 65% of the projectile points were Scallorn Notched or other Late Woodland arrow points, the major component at this site may have been Late Woodland.

The other collection inspected was owned by Edward Beahan who hunted artifacts on the north bank of the Missouri River in Callaway County. Among others in his large collection, representative point types from Paleo-Indian to Late Woodland/Mississippian included Clovis Fluted, Dalton, Hardin Barbed, Rice Lanceolate, Graham Cave Notched, Big Sandy Side Notched, Etley Stemmed, Stone Square Stemmed, Sedalia Lanceolate, Snyders Corner Notched, Steuben Expanding Stemmed, Rice Side Notched, Scallorn Notched, and Mississippi Triangular.

Historic Site Descriptions

Twenty-nine historic components were defined in the study area

Plate 7. Loutenschlager Collection

A. Hardin Barbed projectile point.

B. Big Sandy Notched projectile points.

C. Etley Stemmed projectile points.

D. Probable Late Archaic/Early Woodland projectile point.

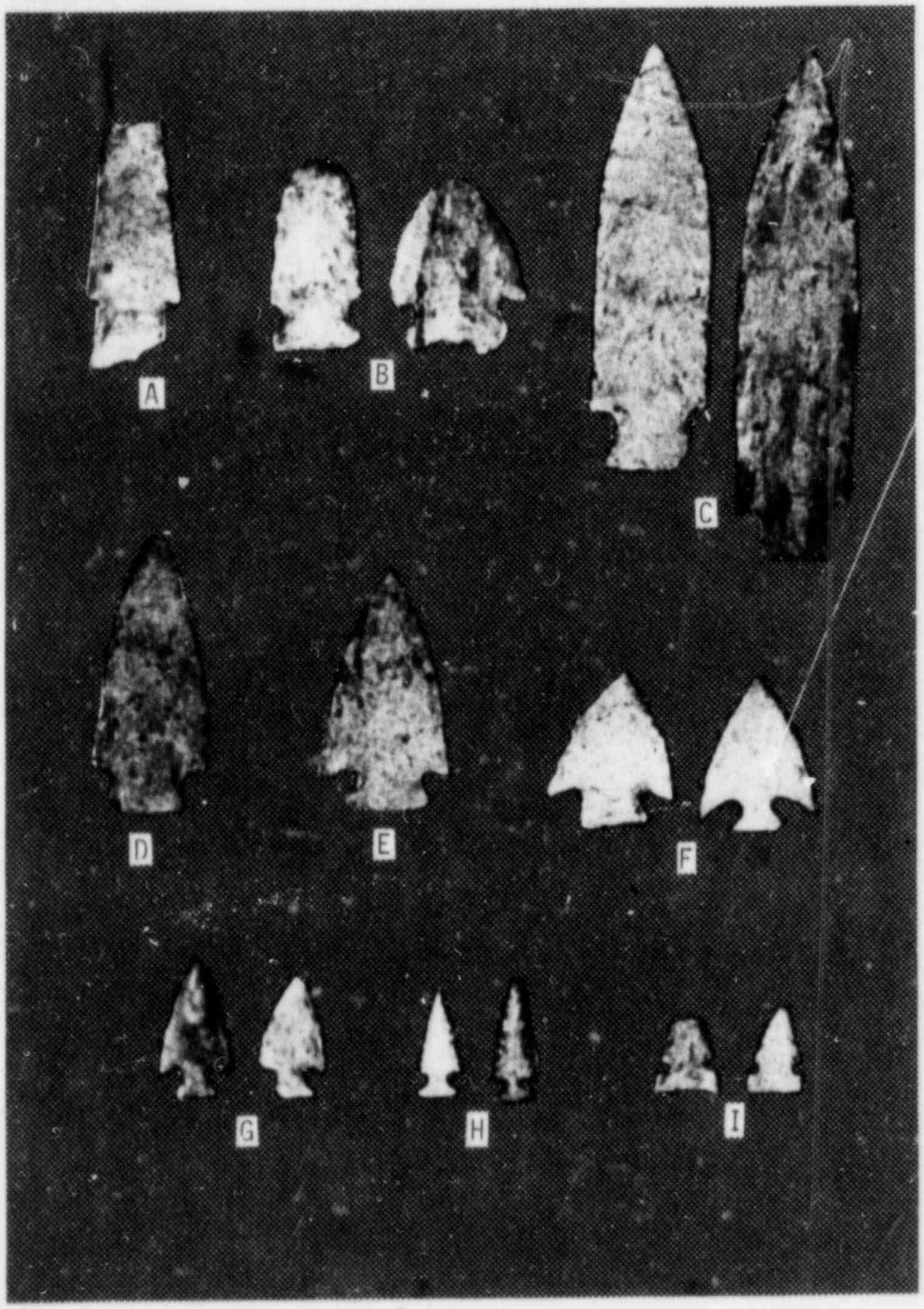
E. Steuben Expanded Stemmed projectile point.

F. Probable Middle to Late Woodland projectile points.

G. Late Woodland arrow points.

H. Scallorn Notched arrow points.

I. Late Woodland/Mississippian arrow points.



A-E 0 6 cm

Scale:

F-I 0 5 cm

(Table 5, Map 16). The criteria used to define historic occupation were discussed earlier in the report. Based on the historic site type model, outlined in a previous section, most of the historic sites, 19 (66%), appear to be habitations. These 19 habitation sites represent 7 (37%) Habitation Type A, 10 (53%) Habitation Type A-B, 1 (5%) Habitation Type C, and 1 (5%) undefined habitation type. Nine (31%) sites consisted of 4 (44%) Nonhabitation Types, 1 (12%) Discard/Dump area, and 4 (44%) were unable to be evaluated. The remaining site (23 CY 276) consisted of a distinct habitation and nonhabitation type scatter. This site contained a Habitation Type A and a Nonhabitation Type. In addition, 15 (52%) sites were located within the Upland Prairie zone, 7 (24%) within the Prairie/Forest Edge zone, 5 (17%) within the Dissected Oak-Hickory Forest zone, and 2 (7%) within the Dissected Upland Forest/Bottomland Edge zone.

Archaeological evidence and historical documentation aided in assigning an historic chronological period to 19 (66%) sites. Of these, 10 (35%) were from the Agricultural/Industrial period, 5 (17%) from the Agricultural-Industrial/Recent Historic periods, 3 (10%) from the Recent Historic period, and 1 (3%) from the Early Agricultural/ Agricultural-Industrial periods. An insufficient amount of material prevented assigning an occupation period to ten sites.

Level Upland Prairie

23 CY 257

Topographic Setting: The site is situated in a flat upland prairie at an elevation of 880 ft msl, 225 m east of an intermittent tributary of Cow Creek.

Description: An historic material scatter of low density of earthenware, stoneware, and glass covered an area of 1,650 m^2. The scatter was located in a disced field with 75% visibility.

Artifact Sample: Nine artifacts were collected which included five undecorated whiteware fragments, three fragments of undecorated stoneware, one bottle fragment, and three fragments of miscellaneous glass. This material is located adjacent to a razed house structure and is in all likelihood associated with it.

Comments/Discussion: The lack of diagnostic material and an insufficient amount of artifactural material prevented assigning a chronological period. The site is a Habitation Type A based on the razed remains of the structure.

23 CY 259

Topographic Setting: The site is situated in a flat upland prairie at an elevation of 820 ft msl, 500 m north of an intermittent tributary of Logan Creek.

Description: A cemetery was located covering an area of 16 m^2 in a harvested soybean field with a collapsed rough cut stone wall covering the graves.

Comments/Discussion: Informant C. W. Garrett stated that he had built the stone wall around the graves sometime in the 1940s. Mr. Garrett said that the cemetery consisted of four family members who had reportedly died during a cholera epidemic in the late 1870s. Additional information concerning the identities of those interred was unable to be located. The site is of the Agricultural-Industrial period.

23 CY 261

Topographic Setting: The site is located in a flat upland prairie at an elevation of 820 ft msl, 200 m south of an intermittent tributary of Logan Creek.

Description: A material scatter of low density covered an area of 450 m^2. The site was located in a wooded area with 5% visibility.

Artifact Sample: Forty-five artifacts were collected of which 38% are earthenware/porcelain, 20% are stoneware, 22% are bottle glass, 16%

are miscellaneous glass, 2% are domestic miscellaneous, and 2% are metal. Diagnostic material consisted of:

1 Whiteware, base, maker's mark, American China Company, Toronto, Ohio 1894-1910 (Lehner 1978:91-92).
1 Whiteware, rim, molded geometric design, plate, 1850 or 1855-1880 (McKay 1979:37).
1 Bottle base, amethyst tint, maker's mark, Illinois Glass Company, Alton, Illinois, 1916-1929 (Toulouse 1971:264).
1 Bottle base, clear, maker's mark, Illinois Glass Company, Alton, Illinois, 1916-1929 (Toulouse 1971:264).
1 Body, green, embossed: Fulton Bottling Works, Fulton, Missouri.
1 Top, clear, applied lip, pre-1880 (Stewart and Consentino (1976:27).
1 Top, blue, post 1903 (Stewart and Consentino 1976:27).
1 Whole bottle, clear, medicinal, post 1903 (Stewart and Consentino 1976:27).

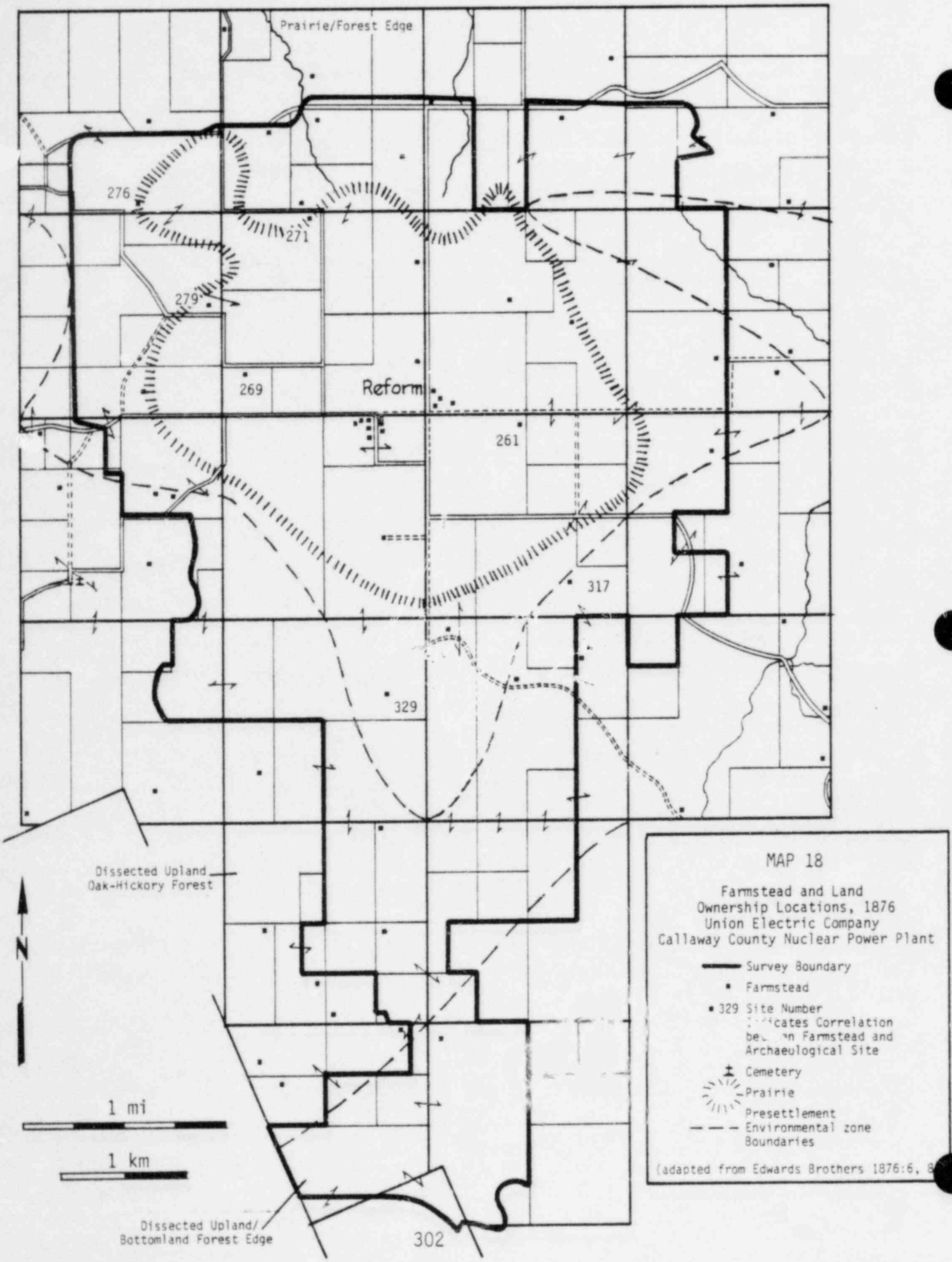
Comments/Discussion: The diagnostic artifact assemblage ranged from 1850-1929, clustering post 1903-1929. In addition, the site is located on the 1876 (Edwards Brothers 1876:6), 1897 (Ogle 1897:22), and the 1919 (Ogle 1919:10) atlases (maps 18, 19, and 20). The site also consists of a house foundation composed of brick and a stone-lined cistern. Cultural material within the house area appears to be in situ with no post-depositional disturbance. The majority of artifactual material was located within the remains of a galvanized bucket. The site is a Habitation Type A of the Agricultural-Industrial period.

23 CY 269

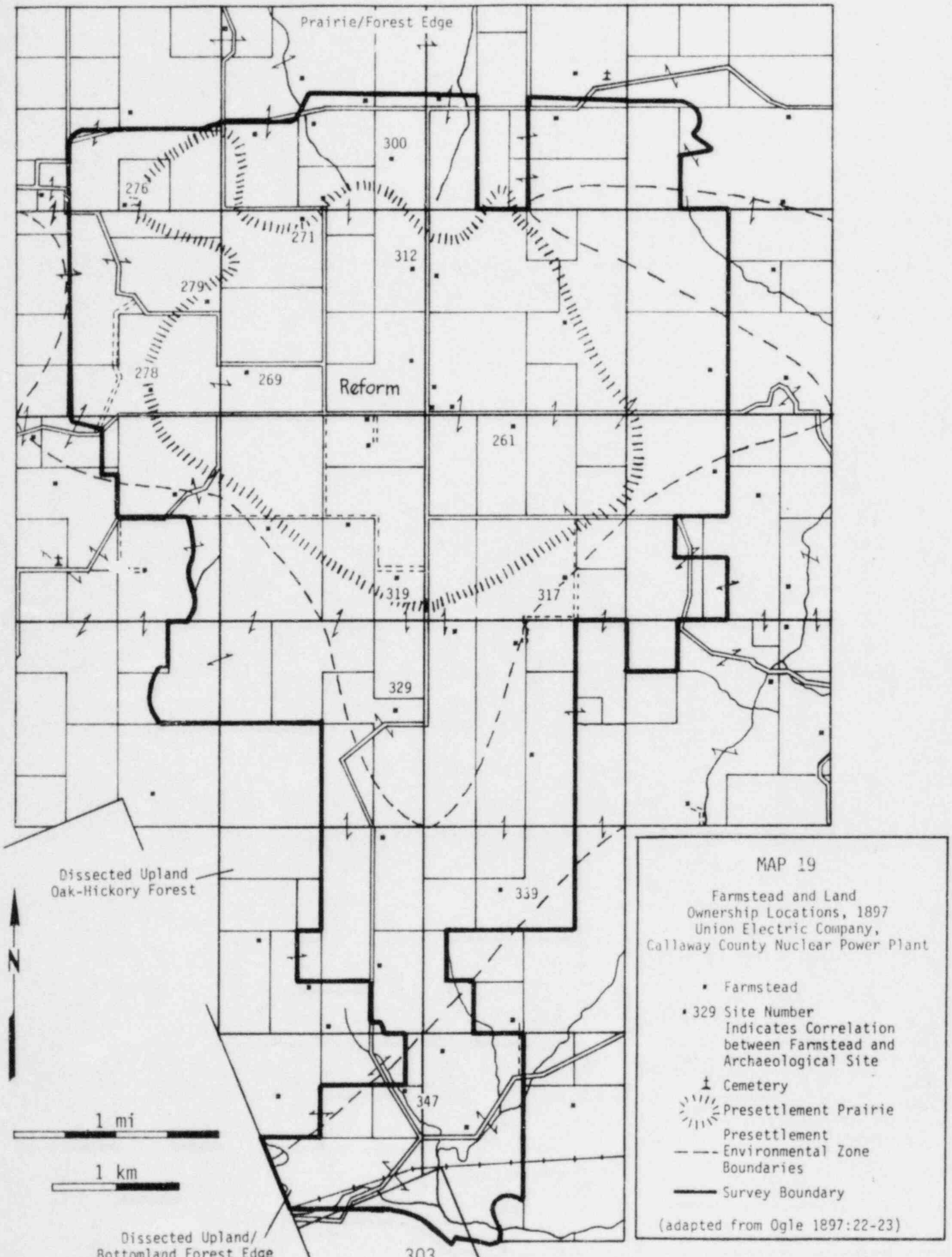
Topographic Setting: The site is situated in a flat upland prairie at an elevation of 840 ft msl, 200 m west of an intermittent tributary of Cow Creek.

Description: A T-shaped house foundation composed of poured concrete and brick was located in a wooded area with secondary growth. A scatter of low density covered an area of 2,083.2 m^2 along the edge of a disced field with 10-40% visibility.

Artifact Sample: Seventy-nine artifacts were collected of which 41% are earthenware/porcelain, 19% are stoneware, 14% are bottle glass,



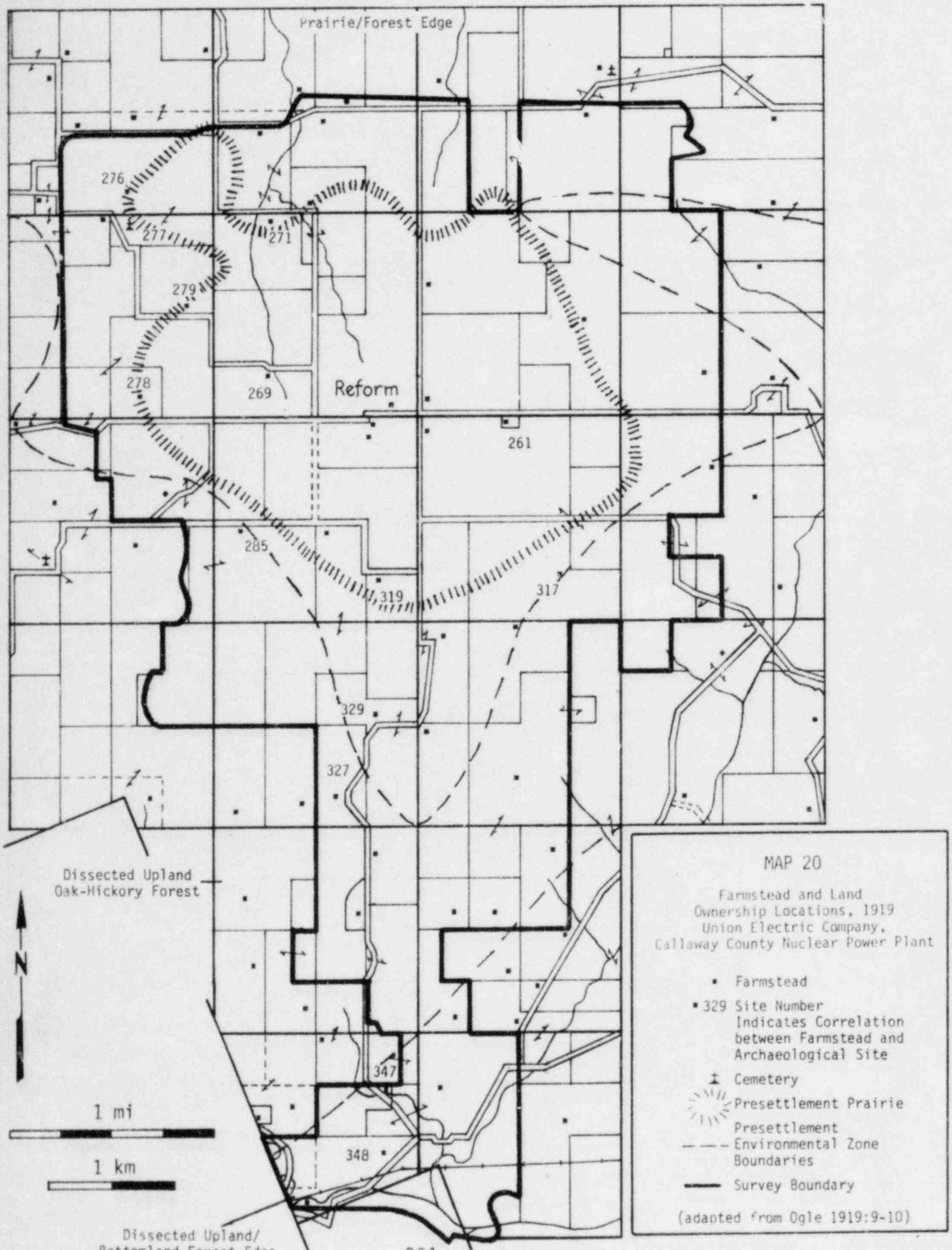
Prairie/Forest Edge
276
271
279
269
Reform
261
317
329
Dissected Upland
Oak-Hickory Forest
N
1 mi
1 km
Dissected Upland/
Bottomland Forest Edge
MAP 18
Farmstead and Land
Ownership Locations, 1876
Union Electric Company
Callaway County Nuclear Power Plant
Survey Boundary
Farmstead
329 Site Number
cates Correlation
Farmstead and
Archaeological Site
Cemetery
Prairie
Presettlement
Environmental zone
Boundaries
(adapted from Edwards Brothers 1876:6, 8



MAP 19

Farmstead and Land
Ownership Locations, 1897
Union Electric Company,
Callaway County Nuclear Power Plant

(adapted from Ogle 1897:22-23)


Prairie/Forest Edge
276
277
271
279
278
269
Reform
261
285
319
317
329
327
347
348
Dissected Upland
Oak-Hickory Forest
N
1 mi
1 km
Dissected Upland/
Bottomland Forest Edge
MAP 20
Farmstead and Land
Ownership Locations, 1919
Union Electric Company,
Callaway County Nuclear Power Plant
Farmstead
329 Site Number
Indicates Correlation
between Farmstead and
Archaeological Site
Cemetery
Presettlement Prairie
Presettlement
Environmental Zone
Boundaries
Survey Boundary
(adapted from Ogle 1919:9-10)

18% are miscellaneous glass, 1% are building material, and 7% are metal. Diagnostic material consisted of:

1 Whiteware, body, green and pink floral design, 1880-1900 (McKay 1979:37).
2 Ironstone, rims, embossed designs, 1860-1900 (Freeman 1954:8).
2 Bottle body, amethyst tint, 1880-ca 1918 (Munsey 1970:55).
1 Bottle top, clear, standardized threads, machine made, 1919-present (Lief 1965:29).
1 Bottle top, aqua, semi-automatic bottle machine, 1880-1913 (Newman 1970:72).
1 Bottle base, clear, maker's mark, Illinois Glass Company, Alton, Illinois, 1916-1929 (Toulouse 1971:264).

Comments/Discussion: The diagnostic assemblage ranged from 1860-1929, clustering between 1880 and 1913. The site is located on the 1876 (Edwards Brothers 1876:6), 1897 (Ogle 1897:12), and 1919 (Ogle 1919:10) (maps 18, 19, and 20) atlases. This places the site in the Agricultural-Industrial period.

In addition to the artifact scatter located around the house foundation, another light scatter was situated within the foundation. This scatter consisted of fairly recent material, i.e., 1967 license plate, that was recorded rather than collected. The house structure had been bulldozed in 1973 for safety reasons when it was acquired by Union Electric Company. The site is a Habitation Type A.

<u>23 CY 271</u>

Topograhic Setting: The site is situated in a flat upland prairie at an elevation of 800 ft msl, 145 m east of an intermittent tributary of Cow Creek.

Description: A material scatter of low density covering an area of 238 m^2 was found within a concrete foundation. The site was located within a wooded area in a pasture with 10% visibility. The site consists of a concrete house foundation with a poured concrete porch. The remnants of a fireplace and chimney were located at the extreme northern end of the house. A root cellar, with a brick foundation, was situated at the northeast corner of the house. The house site was bulldozed in 1973 for safety reasons when it was acquired by Union Electric Company.

Artifact Sample: Thirty-three artifacts were collected of which 27% are stoneware, 46% are bottle glass, 3% are miscellaneous glass, 15% are building material, and 9% are metal. Diagnostic material consisted of:

1 Bottle, amber, machine made with maker's mark used by the Owens Illinois Glass Company, Toledo, Ohio, between 1929-1954 (Toulouse 1971:403).
1 Bottle, clear, machine made with Owens' scar, 1903-present (Kendrick 1968:84).
1 Bottle, clear, machine made, KKK embossed on sides, maker's mark: used by Owens Illinois Glass Company, Toledo, Ohio, between 1929-1954 (Toulouse 1971:403).
1 Bottle base, clear, showing valve scar, 1930s into 1950s (Toulouse 1969:583).

The diagnostic assemblage ranged from 1903 to the present, clustering 1930-1954. In addition, the site is located on the 1919 (Ogle 1919:10) (Map 20) atlas. A house structure, located in the general vicinity of 23 CY 271, is also located on the 1876 (Edwards Brothers 1876:6) (Map 18) and 1897 (Ogle 1897:22) (Map 19) atlases but probably represents an earlier structure. It also appears unlikely that these are the same structures based on archaeological evidence. The site is a Habitation Type A of the Recent Historic period.

23 CY 273

Topographic Setting: The site is situated in a flat upland prairie at an elevation of 840 ft msl, 300 m west of an intermittent tributary of Logan Creek.

Description: A material scatter of low density of foundation stone, ceramics, glass, and metal covered an area of 900 m^2. The site was located within a thinly wooded area in a bean field with approximately 20% visibility.

Artifact Sample: Thirteen artifacts were collected of which 54% are earthenware, 23% are stoneware, 15% are miscellaneous glass, and 8% are metal. Only four diagnostic artifacts comprised the collection.

1 Whiteware, scalloped rim, molded blue shell edge, prior to 1840 (Pilling 1980:334)
1 Bottle, aqua, machine made with seam to top and ring seam around base, 1920-present (Newman 1970:72)
2 Milk bottle, clear, "Roberts" embossed in script on neck, seam to top and ring seam around base, 1920-present (Newman 1970:72). Probably does not date past 1940.

Comments/Discussion: The lack of a sufficient amount of diagnostic and artifactual material prevented assigning a chronological period to the site. In addition, the site is not located on any of the atlases. It appears that the site had been destroyed at one time, most likely by the farmer who cultivates this section. Since there is no evidence of any kind of substantial foundation, the site is probably a Habitation Type C.

23 CY 276

Topographic Setting: The site is situated in a flat upland prairie at an elevation of 810 ft msl, 150 m west of an intermittent tributary of Auxvasse Creek.

Description: A material scatter of very low density of earthenware and stoneware covered an area of 10,000 m^2. The scatter was located in a wooded area with 0% visibility.

Comments/Discussion: Four artifacts were collected of which 25% are earthenware and 75% are stoneware. The site consists of a bulldozed house structure, with wooden beams and planking from the roof and walls covering the foundation. A shed composed of a brick foundation with wood planking and a corrugated tin roof is associated with the house structure. The entire site is enclosed by a partially intact wooden fence.

A lack of a sufficient amount of diagnostic and artifactual material prevents assigning an historical period to the site based on archaeological evidence. However, historic documentary evidence shows the site's location on the 1876 (Edwards Brothers 1876:6), 1897 (Ogle 1897:22), and 1919 (Ogle 1919:10) (maps 18, 19, and 20) atlases, as well as the Mokane East Quad, 1975, 7.5', topographic map. This places the site in the Agricultural-Industrial/Recent Historic periods. The site is a Habitation Type A/B and Nonhabitation Type.

23 CY 277

Topographic Setting: The site is situated in a flat upland prairie at an elevation of 820 ft msl, 240 m west of an intermittent tributary of Auxvasse Creek.

Description: A cemetery was located covering an overgrown area of 3,600 m^2 in a pasture with 0% visibility.

Comments/Discussion: The cemetery consists of approximately seven graves ranging in date of interment from 1840-1925. The majority of gravestone are in good condition with no signs of vandalism. The site is the location of the Holland family cemetery and is located in the 1919 (Ogle 1919:10) (Map 20) atlas. The site is a Nonhabitation Type of the Early Agricultural/Agricultural-Industrial periods.

23 CY 278

Topographic Setting: The site is situated in a flat upland prairie at an elevation of 820 ft msl, 160 m southwest of an intermittent tributary of Auxvasse Creek.

Description: A material scatter of low density covered an area of 2,368 m^2. The site was located in a pasture with approximately 25% visibility.

Artifact Sample: Thirty-three artifacts were collected of which 73% are earthenware/porcelain, 21% are stoneware, and 6% are miscellaneous glass. Only three artifacts comprised the diagnostic material.

2 Whiteware, rim, flow blue, embossed.
1 Whiteware, rim, beaded, 1850 or 1855 and 1880 (McKay 1979:32).

Comments/Discussion: The lack of a sufficient amount of diagnostic as well as artifactual material prevented assigning an historic period to the site. However, historical documentation indicates a house was located on the site as early as 1897 (Ogle 1897:22). It also appears to have been present as late as 1973 when Union Electric Company bulldozed the site for safety reasons. A pile of bricks was located at the southeast corner of the site and was probably associated with the foundation. It is uncertain whether the present site and the 1897 structure are one and the same, but the probability does exist. The diagnostic material dates to an early period of occupation, in addition to the site being located on the 1897 (Ogle 1897:22) (Map 19) and 1919 (Ogle 1919:10) (Map 20) atlases. Therefore, it is a Habitation Type A/B of the Agricultural-Industrial/Recent Historic periods.

23 CY 279

Topographic Setting: The site is situated in a flat upland prairie at an elevation of 830 ft msl, 450 m east of an intermittent tributary of Auxvasse Creek.

Description: A material scatter of low density covered an area of 152 m^2 within a concrete house foundation. The site was located in a field of weeds with 0% visibility.

Comments/Discussion: The site consists of a concrete foundation for a front porch and kitchen area. Rubble within the house consists of plaster fragments, glass, tile, and roofing shingles. No collection was made due to the recent nature of the material. A cistern was located approximately 5 m northeast of the house. The structure was razed by Union Electric Company for safety reasons after acquiring the property right in 1973.

The house is present in the 1919 (Ogle 1919:10) (Map 20) atlas, although the 1876 (Edwards Brothers 1876:7) (Map 18) and 1897 (Ogle 1897:22) (Map 19) atlases show a house in the general vicinity. It does not appear, based on archaeological evidence, that the present structure is the same as that shown on the two earlier atlases. The site is a Habitation Type A of the Recent Historic period.

23 CY 285

Topographic Setting: The site is situated in a flat upland prairie at an elevation of 820 ft msl, 300 m east of an intermittent tributary of Mud Creek.

Description: The remains of a house structure covered an area of 270 m^2 within a foundation. The site was located in a pasture with 5% visibility.

Comments/Discussion: The site consists of a stone foundation containing the remains of the roof and walls. The structure was bulldozed by Union Electric Company for safety reasons after acquiring the property rights in 1973. No collection was made due to the recent nature of the material. In addition, the house is present on the 1919 (Ogle 1919:10) (Map 20) atlas but not on the 1897 (Ogle 1897:22) atlas. This places the construction of the structure sometime between 1897 and 1919, the Agricultural-Industrial period. The structure is a Habitation Type A/B.

23 CY 297

Topographic Setting: The site is situated in a flat upland prairie at an elevation of 780 ft msl, 100 m west of an intermittent tributary of Cow Creek.

Description: The site consists of the remains of a razed house and barn covering an area of 1,250 m^2. The site was located in a wooded area with 0% visibility.

Comments/Discussion: No collection was made because very little remained of the site except a partially visible concrete slab foundation. The site was bulldozed by Union Electric Company for safety reasons after acquiring property rights in 1973. The lack of a sufficient amount of archaeological and documentary material prevented assigning an historic period or habitation type to the site.

23 CY 300

Topographic Setting: The site is situated on a flat upland prairie at an elevation of 805 ft msl, 375 m south of an intermittent tributary of Cow Creek.

Description: An historic scatter of low density covered an area of 3,900 m^2. The scatter was located at the edge of a grass strip in a harvested bean field with 0-60% visibility. The remnants of a house site were located in the grass strip.

Artifact Sample: Sixty-three artifacts were collected of which 49% are earthenware/porcelain, 20% are stoneware, 10% are bottle glass, 19% are miscellaneous glass, and 2% are metal. The diagnostic material consisted of:

- 1 Whiteware, rim green shell edge, prior to 1840 (Pilling 1980:334).
- 1 Whiteware, rim, scalloped, blue shell edge, prior to 1840 (Pilling 1980:334).
- 1 Whiteware, body, small light blue floral, 1830-1870 (Wood 1959:21).
- 1 Whiteware, black stipple, partial maker's mark unknown, 1810+ (Hughes n.d.:127).
- 1 Bottle top, clear, semi-automatic bottle machine, seam to within 1/4" of top, 1880-1913 (Newman 1970:72).
- 1 Bottle body, aqua, rectangular inset around embossing (slug plate), 1850-1915 (Newman 1970:72).
- 1 Bottle base, amethyst tint, 1880-ca. 1918 (Munsey 1970:55).
- 1 Body, clear, green, and white overlay, spangle glass, mid-1890s (Elbert 1982:personal communication).

Comments/Discussion: The diagnostic assemblage ranged from 1810-1918, clustering between 1870 and 1918. In addition, the house is located on the 1876 (Edwards 1876:6) (Map 18) and 1897 (Ogle 1897:22) (Map 19) atlases but not on the 1919 (Ogle 1919:10) atlas. This suggests that the site was occupied sometime prior to 1876 and abandoned by 1918. Thus, the site dates to the Agricultural-Industrial period.

The structure was apparently bulldozed with the foundation stones piled in an 8 m diameter mound. A cistern, which had been filled in, was located 5 m northwest of the foundation rubble pile. The evidence of foundation material suggests a Habitation Type A/B.

23 CY 312

Topographic Setting: The site is situated in a flat upland prairie at an elevation of 815 ft msl, 80 m east of an intermittent tributary of Cow Creek.

Description: The site consists of the remains of a house and associated well covering an area of 900 m^2 in woods with 0% visibility.

Comments/Discussion: All that remained of the site was the partial foundation of a house. The western edge of the foundation is still discernable as a raised terrace of soil with a line of rough hewn stone. The well has been filled in and is located 10 m from the southwest corner of the foundation. The immediate area around the structure is strewn with occasional foundation stones. No artifactual material was recovered from the site.

The house is present on the 1876 (Edwards Brothers 1876:6) (Map 18) and 1897 (Ogle 1897:22) (Map 19) atlases but not on the 1919 (Ogle 1919:10) atlas. This suggests that th site was abandoned sometime between 1897 and 1919, placing it in the Agricultural-Industrial period. However, there is no evidence that indicates whether or not it dates prior to 1876. The site is a Habitation Type A/B.

23 CY 319

Topographic Setting: The site is situated in a flat upland prairie at an elevation of 845 ft msl, 100 m west of an intermittent tributary of Mud Creek.

Description: The remains of a house, an overturned cistern, and a standing plank shack covered an area of 3,500 m^2. The site was located in milo stubble with 0% visibility.

Comments/Discussion: The house was razed by Union Electric Company for safety reasons after obtaining property rights. The house is present on the 1897 (Ogle 1897:22) (Map 19) and 1919 (Ogle 1919:10) (Map 20) atlases, as well as on the Reform Quad, 1975, 7.5', topographic map.

This places the site in the Agricultural-Industrial/Recent Historic periods. The site is Habitation Type A based on the foundation remains.

Prairie/Forest Edge

23 CY 262

Topographic Setting: The site is situated at the mouth of a ravine at an elevation of 800 ft msl, 120 m north of an intermittent tributary of Logan Creek.

Description: A material surface scatter of low density covered an area of 450 m^2. The site was located in a pasture with approximately 10% visibility.

Artifact Sample: Eight artifacts were recovered which included one decorated and two undecorated whiteware fragments and five bottle fragments. The diagnostic material consisted of:

1 Whiteware, rim-embossed geometric design, 1850 or 1855 and 1880 (McKay 1979:37).
1 Cone ink bottle, machine made, green, embossed on base Carter's, ca. 1904-1930 (Haskell 1981:48).

Comments/Discussion: The lack of a sufficient amount of diagnostic and artifactural material, in addition to a lack of historical documentation, prevented assigning a chronological period to the site. The site is a dump or discard type due to its location and the lack of evidence of a house structure in the immediate area.

23 CY 283

Topographic Setting: The site is situated in a flat upland prairie at an elevation of 820 ft msl, 300 m east of an intermittent tributary of Mud Creek.

Description: A cemetery was located within a thinly wooded area covering an area of 1,000 m^2 with 80% visibility.

Comments/Discussion: The cemetery consists of four gravestones probably representing a single family plot. Two of the gravestones marked the burials of Mary B. Law and Amanda F. Law. Both died between

May and June, 1871. The remaining two gravestones are too eroded to tell who was buried there. The cemetery has been vandalized in the past. All of the gravestones have been knocked over and are separated from their bases.

The 1876 (Edwards Brothers 1876:6) (Map 18) atlas shows the cemetery to be located on the G. W. Law estate. In addition, a house structure was located 250 m northwest of the cemetery but does not appear associated with it. This places the site in the Agricultural-Industrial period and is a Nonhabitation Type.

23 CY 299

Topographic Setting: The site is situated on a slope at an elevation of 760 ft msl, 460 m north of an intermittent tributary of Logan Creek.

Description: A stone lined well was located on a wooded slope above a small ravine with 0% visibility.

Comments/Discussion: A series of shovel tests in 10 x 10 m transects failed to locate any cultural material or structural foundations. In addition, the site was not located on any of the atlases. The lack of artifactual and doumentary evidence prevents assigning a site type or a chronological period to the site.

23 CY 305

Topographic Setting: The site is situated on a knoll at an elevation of 810 ft msl, 225 m north of an intermittent tributary of Auxvasse Creek.

Description: The site consists of the remains of a brick foundation and wooden privy covering an area of 900 m^2 in a wooded area with 0% visibility.

Comments/Discussion: No collection was taken because all that remained were several brick piles. The privy was the only structure that remained intact. It appears, based on the amount and size of undergrowth, the house was razed about 10 years ago. The lack of a sufficient amount of archaeological and documentary material prevented assigning an historic period and habitation type to the site.

23 CY 317

Topographic Setting: The site is situated in a flat upland prairie at an elevation of 820 ft msl, 100 m southwest of an intermittent tributary of Logan Creek.

Description: The site consists of the remains of a stone well and stone piles covering an area of 900 m^2 in a pasture with 0% visibility.

Comments/Discussion: The two rubble piles of stone could have at one time composed the foundation for a house. These two rubble piles along with the well suggest the presence of a house structure at one time. However, no artifactual material was found.

The structure does appear on the 1876 (Edwards Brothers 1876:6), 1897 (Ogle 1897:22), and 1919 (Ogle 1919:10) (maps 18, 19, and 20) atlases. This places the site spanning the Agricultural-Industrial period. The Habitation Type is unknown.

23 CY 327

Topographic Setting: The site is situated on a hilltop at an elevation of 820 ft msl, 300 m east of an intermittent tributary of Mud Creek.

Description: The remains of a house and barn covered an area of 6,000 m^2. The site was located in a fallow field with 0% visibility.

Comments/Discussion: All that remains of the site is bulldozed piles of rubble. The site appears on the Mokane East Quad, 1975, 7.5', topographic map but not on any of the atlases. This places the site in the Recent Historic period and is a Habitation Type A.

23 CY 329

Topographic Setting: The site is situated on a ridge top at an elevation of 820 ft msl, 200 m south of an intermittent tributary of Mud Creek.

Description: The remains of a house structure covered an area of 400 m^2. The site was located in an open grass area with 0% visibility.

Comments/Discussion: The structure was razed by Union Electric Company for safety reasons after obtaining property rights in the early 1970s. No collection was made at the site because the material consisted of building remains. The structure, however, is present on the 1876 (Edwards Brothers 1876:6), 1897 (Ogle 1897:22), and 1919 (Ogle 1919:10) (maps 18, 19, and 20) atlases and also the Mokane East Quad, 1975, 7.5', topographic map. Thus, the site spans the Agricultural-Industrial period and is a Habitation Type A/B.

Dissected Upland Oak-Hickory Forest

23 CY 296

Topographic Setting: The site is situated on the northeast face of a northwest-southeast ridge system at an elevation of 700 ft msl, 150 m west of an intermittent tributary of Logan Creek.

Description: A material scatter of low density covered an area of 600 m^2. The site was located in a wooded area with 0-10% visibility.

Artifact Sample: Two artifacts were collected of which 50% are bottle glass and 50% are miscellaneous glass. Only one of these was diagnostic:

1 Bottle, body, amethyst tint, 1880-ca 1918 (Munsey 1970:55).

Comments/Discussion: The site consists of a concrete house foundation and associated stone well located on a small leveled area. The two glass fragments were located 25 m east of the house foundation. The lack of sufficient archaeological and documentary material prevents assigning the site to a historic period. The foundation, however, does suggest a Habitation Type A.

23 CY 333

Topographic Setting: The site is situated in a floodplain in a dissected oak-hickory forest at an elevation of 580 ft msl, 50 m east of an intermittent tributary of Logan Creek.

Description: A scatter of low density covered an area of 7,500 m^2. The site was located in an open grass area within woods with 0-10% visibility.

Comments/Discussion: The site consisted of a razed sandstone house foundation (8 m x 5 m), a log structure (4.5 m x 4.5 m), and a standing wooden shed. A buried stoneware container (possible drain tile), with two copper tubes in the center and a top constructed from an enamelled metal container filled with concrete, was discovered approximately 120 m southeast of the house. It was located in a low ravine near an intermittent stream. This may represent some sort of still or water pump apparatus.

Only two artifacts were collected from the site: a stoneware jug and a Maytag motor oil can. A lack of artifactual and documentary material prevents assigning a culture historical period to the site. The site is a Habitation Type A/B based on the structure's foundation. There is no evidence to indicate whether or not the log structure was used as a habitation.

23 CY 337

Topographic Setting: The site is situated on a slope at an elevation of 730 ft msl, 500 m of an intermittent tributary of Logan Creek.

Description: The site consists of a small rock feature located within a woodline area. The feature measures approximately 2 m x 1 m and stands 15 cm high. No other cultural material was located in the immediate area.

Comments/Discussion: The rock feature appears to be a quarter section line marker, similar to those constructed by Nathan Boone during his 1816-1817 survey of the county. To date, it is uncertain as to whether or not the feature was constructed by him or erected at a later date by the landowner.

23 CY 339

Topographic Setting: The site is situated on a slope at an elevation of 650 ft msl, 45 m west of an intermittent tributary of Logan Creek.

Description: A material scatter of low density covered an area of 480 m^2. The site was located in a leveled wooded area of a slope with 0-10% visibility.

Artifact Sample: Eight artifacts were collected which included 38% stoneware, 50% bottle glass, and 12% building material. Only two artifacts comprised the diagnostic material.

1 Bottle, aqua, machine made, seam to top and ring seam around base, 1920-present (Newman 1970:72).
1 Milk bottle, clear, "Roberts" embossed in script on neck, machine made, 1920-present (Newman 1970:72); but probably does not date much past 1940s.

Comments/Discussion: The site consists of the remains of a two-story log structure with a continuous stone foundation. Only portions of three walls remain intact. A formed concrete foundation adjoined the southwest wall of the structure. Informant Dolph Corsey, of Portland, Missouri, stated that the structure was once a two-story log cabin. After purchasing the structure from Union Electric Company for $1.00, Mr. Corsey then tore down the structure and sold the majority of logs in 1975 or 1976. Mr. Corsey believed that the cabin was occupied in the early 1940s based on a newspaper he found while dismantling it. In addition, a stone foundation was located approximately 6 m northwest of the log structure.

The structure is present on the 1897 (Ogle 1897:22) atlas but not on the 1876 (Edwards Brothers 1876:6) or 1919 (Ogle 1919:10) atlases.

The lack of a sufficient amount of archaeological and documentary material prevented assigning a culture historical period. Foundation remains indicate a Habitation Type A/B.

23 CY 342

Topographic Setting: The site is situated on a ridge top at an elevation of 735 ft msl, 240 m east of an intermittent tributary of Logan Creek.

Description: The foundation remains of a house covered an area of 225 m^2 in a fallow field with 0% visibility.

Comments/Discussion: The structure was razed by Union Electric Company for safety reasons after obtaining property rights in the early 1970s. The house is present on the 1919 (Ogle 1919:10) (Map 20) atlas as well as the Mokane East Quad, 1975, 7.5', topographic map. This places the site in the late Agricultural-Industrial/Recent Historic periods. The site is a Habitation Type A based on the foundation remains.

Dissected Upland/Bottomland Forest Edge

23 CY 347

Topographic Setting: The site is situated on a floodplain at an elevation of 540 ft msl, 10 m north of an intermittent tributary of Logan Creek.

Description: The remains of a house and outbuilding covered an area of 4,000 m^2. The site was located on a relatively flat area that is overgrown with scrub and understory with 0-10% visibility.

Comments/Discussion: The house structure was razed at some time leaving a stone and concrete foundation. The foundation is approximately 8 x 8 m with a 4 x 4 m notch cut out of the northeast corner. A well or cistern is located 4 m south of the house foundation next to a pile of stone and concrete rubble. An intact log barn/shed is situated 40 m south of the cistern/well across the intermittent stream.

This structure measuring approximately 4 x 5 m has a corrugated metal roof and is divided into two rooms.

The house is present on the 1897 (Ogle 1897:22) (Map 19) and 1919 (Ogle 1919:10) (Map 20) atlases. This places the site in the latter half of the Agricultural-Industrial period and is a Habitation Type A/B.

<u>23 CY 348</u>

Topographic Setting: The site is situated on a slope at an elevation of 560 ft msl, 200 m west of an intermittent tributary of Logan Creek.

Description: The foundation remains of a house and barn covers an area of 2,500 m^2. The site was located in a pasture with 0% visibility.

Comments/Discussion: Both structures were razed in the early 1970s by Union Electric Company for safety reasons after obtaining property rights. The house is present on the 1919 (Ogle 1919:10) (Map 20) atlas and the Mokane East Quad, 1975, 7.5', topographic map, placing the site in the Agricultural-Industrial/Recent Historic period. Based on the foundation remains, the site is a Habitation Type A/B.

<u>Architectural Site Descriptions</u>

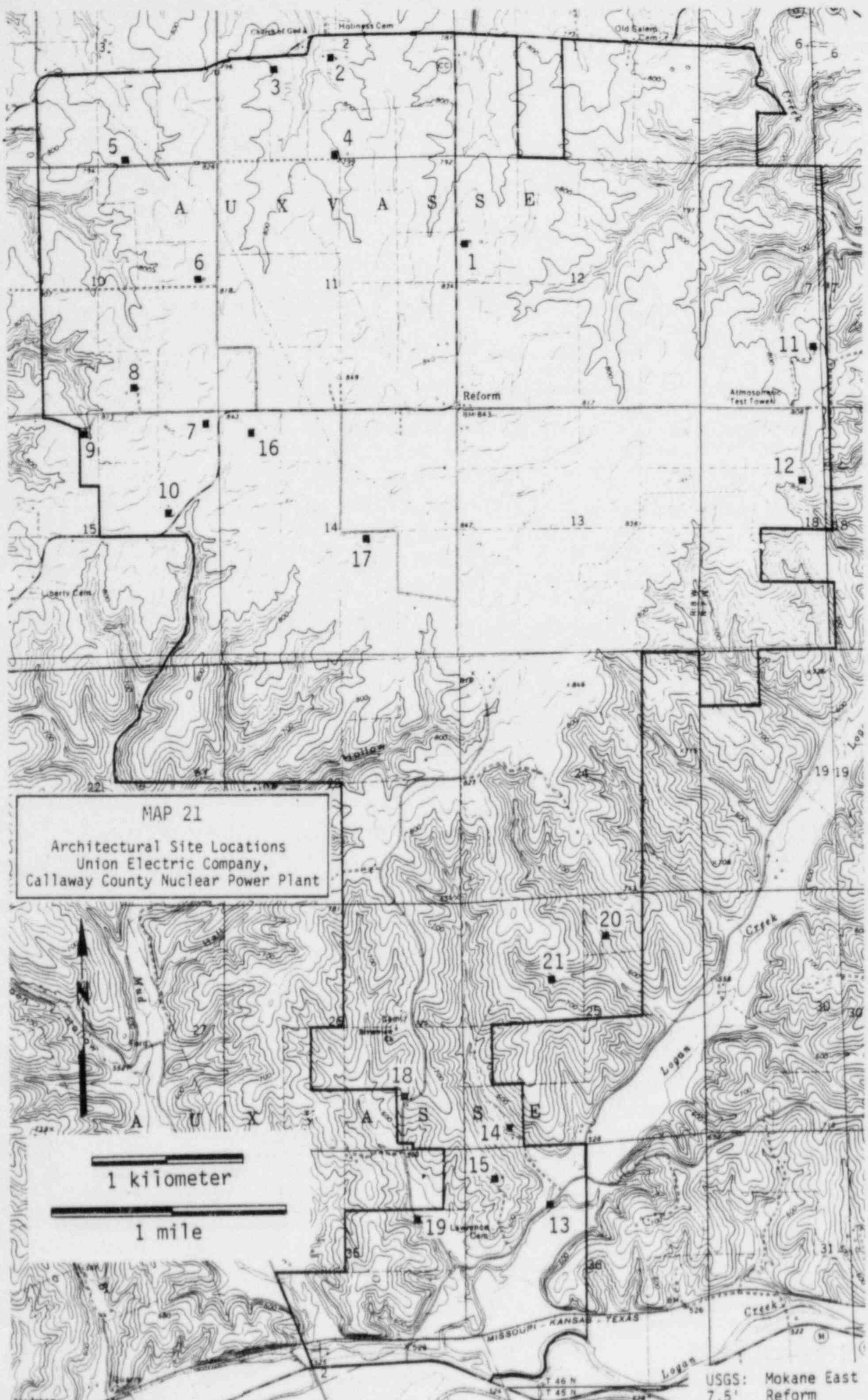
Results of the architectural inventory are presented below; individual sites and structures are described. The reader should refer to Map 21 for locational information.

<u>Site 1</u>

Setting: The site is in the uplands at an elevation of 825-830 ft msl. The site is along Highway CC, approximately .7 mi north of the plant site. Orientation of the buildings is towards Highway CC.

Description: The site is a rural residence. Two standing structures are located here. Descriptions of individual structures follow.

Structure A: A ranch type house of wood frame construction. The plan-form of the structure is irregular, consisting of an ell-shaped


MAP 21
Architectural Site Locations
Union Electric Company,
Callaway County Nuclear Power Plant
1 kilometer
1 mile
USGS: Mokane East
7.5' Reform
A U X V A S S E
A U X V A S S E
Holiness Cem
Old Salem Cem
Reform
Atmospheric Test Tower
Liberty Cem
Hollow
Creek
Logan
Logan
Logan
MISSOURI - KANSAS - TEXAS
T 46 N
T 45 N

main house with a second ell formed by a rear addition. Exterior wall treatment of the main house is brick veneer with horizontal siding in the gables while that of the rear addition is board and batten siding. The roof is a gable and valley type with asphalt shingle roofing. Period of construction is mid-twentieth century.

Structure B: A machine shed of pole frame construction. Roof type is a gable. Roofing and siding are ribbed sheet metal. Period of construction is mid-twentieth century.

Comments: The structures located at this site are standard architectural and structural types. They are of recent origin and are of no known historical significance. These structures do not appear to meet the eligibility criteria for nomination to the National Register of Historic Places.

Site 2: J. R. Meehan Farmstead

Setting: The site is in the uplands at an elevation of 780-795 ft msl. The site is on Highway O and is set back from the roadway approximately 500 ft. Orientation of the building is towards Highway O.

Description: The site is a farmstead. Seven standing structures are located here. Descriptions of individual structures follow.

Structure A: A two-story "I" type house of wood frame construction, with a one-story ell addition of frame construction to the rear. The roof form of the main house is a gable with asphalt shingles. The roof of the rear addition is a broken gable. Exterior wall treatment is horizontal aluminum siding. Upper story windows are double-hung units with 1/1 light sash patterns, while lower story windows are modern, awning type replacement units. Upper story windows have pedimented drip caps. Lower story fenestration is three bays in width and one bay in depth, while that of the upper story is two bays in width and one bay in depth.

A wall dormer in the center of the principal facade is elaborated with ornamental wood trim. The front entrance has been modified by the addition of a "colonial" frontispiece. A one-story, 3/4 width open porch extends across the front of the house. Estimated period of construction is late nineteenth century.

Structure B: A garage of wood frame construction. The structure has a rectangular plan-form, a gable roof with asphalt shingle roofing, and horizontal wood siding. Estimated period of construction is mid-twentieth century.

Structure C: Stone curbing of a cistern. Stone masonry is coursed rubble. A gable roofed open structure shelters the cistern. Estimated period of construction is late nineteenth century.

Structure D: A smokehouse/outbuilding of wood frame construction. Structural characteristics are a rectangular plan-form, a gable roof with corrugated sheet metal roofing, and exterior walls of vertical board siding. Estimated period of construction is early twentieth century.

Structure E: Two doghouses of wood frame construction. Both are characteristically rectangular in plan-form and have gable type roofs. Roofing is asphalt shingles on the larger structure, roll type asphalt on the smaller. Estimated period of construction is mid-twentieth century.

Structure F: A machine shed of pole frame construction, manufactured by Kamar Buildings, Pittsfield, Illinois. The plan-form is rectangular and is divided into four lateral structural bays. The structure is enclosed on three sides with ribbed sheet metal. The fourth side (south facing and longitudinal) is open. The building is of mid-twentieth century construction.

Structure G: A transverse crib type barn of nailed, post and beam construction. The interior of the barn is divided into three cribs on either side of a central aisle on the lower level and an open hay loft on the upper level. The roof is a gable type with corrugated sheet metal roofing on wooden slatting.

Comments: Structure A was originally a good example of an "I" type house. However, numerous modifications to the house have compromised its architectural integrity. The remaining structures at this site are standard architectural and structural types of no known historical significance. None of the structures appears to meet the eligibility criteria for nomination to the National Register of Historic Places.

Site 3: O'Neall Farmstead

Setting: The site is on the uplands at an elevation of 800-805 ft msl. The site is located along Highway O and is set back from the roadway approximately 200 ft. Orientation of the buildings is towards Highway O.

Description: The site is a farmstead. Five standing structures are located here. Descriptions of individual structures follow.

Structure A: A one-story tract-type house of wood frame construction. The plan-form is rectangular with a "U" shaped shed addition on the rear (south) side. The roof is a gable type with asphalt shingle roofing. Exterior wall treatment is asbestos siding. Windows are double-hung units with 2/2 light sash patterns. The period of construction is mid-twentieth century.

Structure B: A machine shed of pole frame construction. The plan-form is rectangular, with a lean-to rear addition. The roof type is a trussed gable with corrugated sheet metal over wooden slatting. Exterior wall treatment is corrugated sheet metal. Period of construction is mid-twentieth century.

Structure C: Ruins of a barn. The architectural form and details of this structure are indeterminate. From the ruins, however, the rectangular plan-form and post and beam structural system are discernable.

Structure D: A cellar of cast-in-place concrete construction. The structure is partially below grade, the remainder being bermed with earth. The above grade portion is vaulted in form. Estimated period of construction is mid-twentieth century.

Structure E: An outbuilding of wood frame construction. The building plan-form is rectangular. The roof is a longitudinal gable type with asphalt shingle roofing. A lean-to has been added to the south longitudinal side. Exterior wall finish is board and batten siding. Estimated period of construction is early twentieth century.

Comments: The buildings at this site are standard architectural and structural types of no known historical significance. None of the structures appears to meet the eligibility criteria for nomination to the National Register of Historic Places.

Site 4: V. Schulte Farmstead

Setting: The site is in the uplands at an elevation of 795-805 ft msl. The site is set back from Highway CC approximately .5 mi and is accessible via a graveled driveway. All structures are located on the northside of and are generally oriented towards the driveway.

Description: The site is a farmstead consisting of 10 standing structures. The farmstead complex incorporates several major structures including a residence, barn, and numerous outbuildings. With the exception of the garage, the barn and farm service structures are situated behind and subordinate to the house. Portions of an early twentieth century woven wire fence are in place around the yard area. Descriptions of each building follow.

Structure A: A one-story, double-pen type house of frame construction. Shed additions and enclosure of side porches have modified the basic rectangular plan-form of the original house into one which is an irregular ell. The roof of the main house is a gable type with corrugated sheet metal roofing. A brick chimney is centrally placed along the ridgeline of the roof. The roof of the rear portion of the house is an asymmetrical gable type. Exterior wall treatment is painted clapboard siding. Fenestration is three (originally four) bays in width and one bay in depth. Windows are wood, double-hung units with 1/1 light sash patterns. An open porch with a hipped roof supported by chamfered wood posts extend across two-thirds of the front facade.

Structure B: A two-story, transverse crib barn of frame construction. The roof of the main structure is a gambrel type. Lean-to sheds were added to the east and west sides of the main structure. Roofing is corrugated sheet metal; siding is vertical boards. A peaked, rainhood is located on the south side of the barn.

Structure C: A smokehouse/outbuilding of wood frame construction. The building plan-form is rectangular. The structure is supported on a continuous foundation of rock-face patterned concrete masonry. The roof form is a longitudinal gable, and the roofing is wood shingles. Exterior wall treatment is asphalt roll type siding with a brick pattern installed over wood siding.

Structure D: An outbuilding of wood frame construction. The plan-form is rectangular. The roof is a longitudinal gable type with wood shingle roofing. Exterior wall treatment is brick patterned asphalt roll type siding.

Structure E: A garage of wood frame construction. Characteristics include a rectangular plan-form and longitudinal gable roof. Roofing is corrugated sheet metal; siding is vertical boards. The structural sills are set directly on grade with no foundations.

Structure F: An outbuilding of wood frame construction. The building plan-form is rectangular. The roof form is a longitudinal gable.

Structure G: A pumphouse/outbuilding of wood frame construction. The plan-form is rectangular. The roof is a shed type with corrugated sheet metal roofing. Exterior wall treatment is brick pattern, roll type asphalt siding.

Structure H: A shed of pole frame construction. The building plan-form is rectangular. The roof form is a longitudinal gable. The structure is enclosed on three sides, the fourth being left open. Roofing and siding are of sheet metal.

Structure I: A shed of wood frame construction. The plan is rectangular. The roof is a longitudinal gable with corrugated sheet metal roofing. Exterior wall treatment is vertical board siding.

Structure J: A crib of wood frame construction. The building is characterized by its rectangular plan-form and shed roof. Roofing is corrugated sheet metal. Exterior wall treatment is vertical board siding.

Comments: The structures and landscaping features at this site represent the growth and modifications to an active farmstead over a period of approximately 80-100 years. While none of the buildings at this site is a unique example of an architectural or structural type, the complex as a whole is interesting for its composite value. The substantial number of buildings present, as well as the variety of uses and structural form they embody, provides a good impression of a regional farmstead.

Site 5: Farmstead

Setting: The site is in the uplands at an elevation of 805 ft msl. The site is located on a county road, approximately .4 mi east of Highway CC. Structures at this site are set back from the county road approximately 100 ft and are oriented towards the county road.

Description: The site is a former farmstead. Only one standing structure was identified at this site. The ruins of a second are visible southwest of and adjacent to the single extant building. Descriptions of each follow.

Structure A: A small general purpose barn of heavy timber construction. The west half of the barn is an open structure for drive through purposes, while the east half is sealed for use as a granary. A lean-to shed has been added to the west half of the building. The roof form is a longitudinal gable type with corrugated sheet metal roofing. Exterior wall treatment is vertical board siding.

Structure B: The ruins of a frame building. The form and details of this structure are undiscernable.

Comments: The extant structure at this site is a standard architectural and structural type. It is of no known historical significance. Thus, the site does not appear to meet the eligibility criteria for nomination to the National Register of Historic Places.

Site 6: Rudolph Masek Farmstead

Setting: The site is located in the uplands at an elevation of 830 ft msl. The site is at the intersection of Highway CC and a county road. Buildings are oriented towards the county road and are set back approximately 150 ft from the roadway.

Description: The site is a former farmstead. Two farm service buildings are the only remaining extant structures at this site. Descriptions of each follow.

Structure A: A transverse crib barn of post and beam construction. The barn has a partial loft above the main floor. The longitudinal gable roof is low pitched and broken to extend over shed additions to the east and west sides. Exterior wall treatment is vertical board siding.

Structure B: A shed of post and beam construction. Characteristics of this structure include a rectangular plan-form and longitudinal gable roof with corrugated sheet metal roofing. Exterior wall treatment is vertical board siding.

Comments: Both structures at this site are standard architectural and structural types of no known historical significance. They do not appear to meet the eligibility criteria for nomination to the National Register of Historic Places.

<u>Site 7: Kingdom Telephone Company</u>

Setting: The site is located in the uplands at an elevation of 840 ft msl. The site is located at the intersection of and Highway CC and Highway AD. The site is set back approximately 50 ft from the roadway.

Description: A premanufactured building of component steel construction. The building has a rectangular plan-form and gable roof. Siding and roofing are ribbed sheet metal.

Comments: This structure is of recent origin and of no historical significance. It does not meet the eligibility criteria for nomination to the National Register of Historic Places.

<u>Site 8: C. & P. Shiverdecker Farmstead</u>

Setting: The site is located in the uplands at an elevation of 825-830 ft msl. The site is along County Road 341 and is set back from the roadway approximately 500 ft. Orientation of the standing structures is with respect to the site of the former house structure.

Description: The site is a former farmstead. Three standing structures were identified at this location. Photographic files, Union Electric Real Estate Division, 1981, indicate that four other wood frame structures, including a double-pen house, an outbuilding, a shed, and a privy, were previously associated with the site. Descriptions of extant structures follow.

Structure A: A transverse crib type barn of post and beam construction. The structure has a gambrel roof with corrugated sheet metal roofing and a peaked rainhood. Lean-to sheds have been added to the north and south sides of the barn.

Structure B: A shed of post and beam construction. Characteristics of the building include a rectangular plan-form and longitudinal gable roof with corrugated sheet metal roofing. A lean-to shed has been added to the north side of the building. Exterior wall treatment is vertical board siding.

Structure C: An outbuilding of wood frame construction. The building plan-form is rectangular. The roof is a shed type with corrugated sheet metal roofing. Exterior wall treatment is vertical board siding.

Comments: The standing structures at this site are standard architectural and structural types of no known historical significance. They do not appear to meet the eligibility criteria for nomination to the National Register of Historic Places.

Site 9: V. Wagner Farmstead

Setting: The site is located in the uplands at an elevation of 810 ft msl. The site is along County Road 341 and is set back approximately 100-150 ft from the roadway. Buildings are askew with respect to the road.

Description: The site is a rural residence. Four standing structures were identified at this location. Individual building descriptions follow.

Structure A: A modular type house of wood frame construction. The house has a rectangular plan-form and a lateral gable type roof with asphalt shingle roofing. Fenestration is five irregularly spaced bays in width and one bay in depth. Exterior wall treatment is panelized hard/board siding.

Structure B: A cistern of concrete construction. The cistern is rectangular in plan-form and has a flat, concrete slab as a top.

Structure C: An outbuilding of wood frame construction. The building has a shed type roof with asphalt shingle roofing. Exterior wall treatment is horizontal board sheathing.

Structure D: A central type coop of wood frame construction.

Architectural characteristics include a rectangular plan-form, a shed type roof with corrugated sheet metal roofing, and horizontal wood siding with corner trim boards. Paired windows are located on the north and west sides.

Comments: The structures at this site are standard architectural and structural types of no known historical significance. They do not appear to meet the eligibility criteria for nomination to the National Register of Historic Places.

Site 10: J. P. Groner Farmstead

Setting: The site is located in the uplands at an elevation of 825-830 ft msl. The site is along State Highway CC and is set back approximately 50-150 ft from the roadway.

Description: The site is an abandoned farmstead. Four standing structures were identified at this site. Individual building descriptions follow.

Structure A: A grain bin of corrugated steel construction. Structural plan-form is round.

Structure B: A barn/granary of post and beam construction. The building plan-form is rectangular. The wall of the north longitudinal bay of the barn is of slatted construction for storage of ear corn. The central, longitudinal bay and the south side of the building are open for equipment storage. The roof is a longitudinal gable type with corrugated sheet metal roofing.

Structure C: An outbuilding of wood frame construction. Architectural characteristics include a rectangular plan-form and a longitudinal gable roof which projects forward over the east facade of the building. Exterior treatments are corrugated sheet metal roofing on spaced sheathing and vertical board siding.

Structure D: An outbuilding of wood frame construction. The building plan-form is rectangular. The roof is a shed type with corrugated sheet metal roofing. Exterior wall treatment is vertical board siding.

Comments: The structures at this site are standard architectural and structural types of no known historical significance. They do not appear to meet the eligibility criteria for nomination to the National Register of Historic Places.

Site 11: Vernon Bezler Farmstead

Setting: The site is in the uplands at an elevation of 805-810 ft msl. The site is accessible off County Road 335 and is set back approximately .35 mi from the roadway.

Description: The site is a farmstead used as a tenant residence. Three extant structures are located at this site. Descriptions of each follow.

Structure A: A double-pen type house of wood frame construction. The rectangular plan-form of the main house has been modified to an ell by addition of a kitchen and enclosure of porches on the rear of the main house. The roof of the main house is a laterally oriented gable intersected by the gable of the ell. Eaves are returned, and rakes are held flush against the gables. Fenestration is four bays wide by one bay deep. The two central bays of the front are doors providing separate access to each of the rooms of the main house. Windows are wood, double-hung units with 6/6 light sash patterns. Roofing is asphalt shingles; siding is painted wood clapboards. The house is supported on a foundation of rubble stone. A two bay wide, open front porch is centered on the front facade. The shed roof of the porch is supported by turned wood posts and has matching half columns at the wall. The estimated period of construction of the main house is mid-late nineteenth century and of the rear ell is late nineteenth century - early twentieth century.

Structure B: A garage of post and beam construction. The building is characterized by its rectangular plan-form, longitudinal gable roof with corrugated sheet metal roofing. Exterior wall treatment is vertical board siding. A shed addition has been added and is perpendicularly adjoined to the garage.

Structure C: A barn of hewn log and post and beam construction. The central portion of the structure is a two-story crib constructed of hewn logs with "v" notched, flush sawn corners. The crib consists of a single cell at each level and is set on stone pilings. Lean-to sheds have been added to all four sides of the main log structure, providing equipment storage space and stock pens. The gable roof of the main structure and other roofs of the additions are of common rafter construction. Floor joists for the loft support are logs stripped of bark and notched into wall logs. Estimated period of construction is mid-late nineteenth century for the log crib and early - mid-twentieth century for the frame enclosure.

Comments: Two structures (A and C) at this site are good examples of vernacular building types. Structure A is representative of the double-pen type house with Greek Revival detailing. Except for the rear addition and the front porch, the exterior of the house retains its early appearance.

Structure C is a good example of hewn, horizontal log construction. The present form of the structure with its surrounding sheds illustrates the changing methods of construction which accompanied the transition of this region from the settlement to development periods. The methods of construction (i.e., hewn log and post and beam) employed in this structure are further representative of structural framing techniques once traditional in the area.

Both structures reflect the uplands south heritage of settlers to the study area. The architectural and structural forms represented in the two buildings represent the transfer of cultural traditions from one geographical area to another.

These two structures are neither unique nor outstanding examples of their respective architectural and structural types, and they are of no known historical significance. Therefore, they do not appear to meet the eligibility criteria for nomination to the National Register of Historical Places. However, continued preservation of these two structures is recommended. As good examples of vernacular architecture of the area, they provide an opportunity for first-hand observation of building traditions which were once common to the area.

Site 12: Hadley Bezler Farmstead

Setting: The site is located in the uplands at an elevation of 810-820 ft msl. The location of this site is along and on both sides of County Road 335. The main farmstead structures are on the west side of the road and set back approximately 50-400 ft from the roadway.

Description: The site is a farmstead consisting of 11 extant structures. Descriptions of each follow.

Structure A: A two-story hall and parlor type house with a one-story ell addition to the rear. Information provided by the previous owner indicates that the east half of the main house is a single log pen which was incorporated into the expanded house by the addition of an adjacent pen and second story of wood frame construction. The roof of the main house is a laterally oriented gable with asphalt shingle roofing. The gable roof of the kitchen ell is broken where side porches adjoin. Fenestration of the principal facade consists of four bays on the lower level and three bays on the upper level. Fenestration of the gable walls consist of two bays in the east wall and one bay of paired windows in the west wall. Windows are wood double-hung units. Those of the main house and kitchen have 2/2 light sash patterns, while those of the enclosed porches have 1/1 light sashes. The open front porch is two bays in width, and the flat roof is supported by chamfered wooden posts. Exterior wall treatment is painted clapboard siding with plain base corner trim and frieze boards. Corner trim boards have restrained "capitals" of profile mouldings, simulating in appearance half columns or pilasters. Estimated period of construction is mid-nineteenth to early twentieth centuries.

Structure B: A shed of wood frame construction. Architectural characteristics include the rectangular plan-form and gable roof. Exterior treatments consist of asphalt shingle roofing and brick pattern asphalt roll type siding over vertical boards.

Structure C: A barn of log and frame construction. The core of the building is a double-pen crib of unhewn, horizontally placed logs with "v" notched, flush sawn corners. An enclosure of post and beam construction surrounds the log crib. Rafters of the main gable roof and interior structural posts are trimmed tree trunks stripped of bark. The original spaced plank sheathing and wood shingle roofing are overlain with corrugated metal sheets. The surrounding frame shell is of standard post and beam construction and serves as equipment storage space and stock pens.

Structure D: A barn of log and frame construction. The core of the barn is two-story crib of unhewn logs stripped of bark. Corners are "v" notched and sawn flush. The gable roof is formed with common rafters of stripped poles. Lean-to sheds surrounding the log core are of post and beam construction. Interior posts are of trimmed tree trunks stripped of bark.

Structure E: A colony type hog house of post and beam construction. Architectural features include a shed roof with corrugated sheet metal roofing, vertical board siding. The structure is enclosed on three sides, the fourth being open.

Structure F: A shed of wood frame construction. The building plan-form is rectangular. A lean-to shed has been added to the east side. The building is supported on a concrete foundation. The roof of the main structure is a longitudinal gable, that of the lean-to is a shed type. Roofing is corrugated sheet metal. Exterior wall treatment is board and batten siding.

Structure G: A central type coop of wood frame construction. Architectural characteristics include a rectangular plan-form and a longitudinal gable roof with corrugated sheet metal roofing. Exterior wall treatment is board and batten siding.

Structure H: A central type coop of wood frame construction. The building plan-form is rectangular. The roof is a longitudinal gable type with asphalt shingle roofing. Siding is asphalt roll type. A bank of windows is placed in the lower portion of the south facing wall.

Structure I: A coop of wood frame construction. The plan-form is rectangular, and the roof is a shed type. Exterior treatments consist of brick pattern, asphalt roll siding, and corrugated sheet metal roofing. A bank of windows is in the south facing facade.

Structure J: A general purpose barn of post and beam construction. The roof type is a gambrel with a peaked rainhood. Lean-to sheds have been added to the north and south sides of the structure. The main roof structure is broken and continues over the sheds.

Structure K: A shed of wood frame construction. Architectural characteristics include the rectangular plan-form, longitudinal gable roof, and lean-to shed addition on the east side of the building.

Comments: The structures at this site represent development of a farmstead from the mid-nineteenth through mid-twentieth century. A variety of functional, structural, and architectural types is evident in the farmstead complex. Functional categories range from residential to equipment storage and various types of stock shelters. Wood frame structural systems used in the buildings at this site represent the progression from horizontal log construction of the nineteenth century to post and beam and dimension lumber framing systems of the nineteenth and twentieth centuries. Architectural forms of the buildings are vernacular in character reflecting the upland south heritage of settlers of the study area, materials available from the local environment, and needs of the farming industry.

The structures at this site have been modified through various additions, alterations, or remodelings. No associations of historical significance have been identified with the farmstead or individual buildings. Consequently, the site does not appear to meet the eligibility criteria for nomination to the National Register of Historical Places. However, because the buildings are representative of regional vernacular architecture, and because of the number of surviving structures at the site, the farmstead offers an opportunity for first-hand examination. Their continued preservation is therefore encouraged.

<u>Site 13: Bridge</u>

Setting: The site is in the lowlands at an elevation of 520 ft msl. The site is on County Road 325 at a small tributary of Logan Creek and is approximately .6 mi northeast of the intersection of County Road 325 with County Road 324.

Description: The site is a deck type bridge of cast-in-place concrete construction. Decking, abutments, and curbing are of concrete. Railings are of welded angle iron attached to the curbings. The bridge is a single span structure. Estimated period of construction is mid-twentieth century.

Comments: This structure is a standard architectural/structural type and is of no known historical significance. The site does not appear to meet the eligibility criteria for nomination to the National Register of Historic Places.

Site 14: J. J. Byrnes Farmstead

Setting: The site is in the lowlands at an elevation of 545 ft msl. The site is accessible from County Road 325. The site is set back from the roadway approximately .3 mi.

Description: The site is an abandoned farmstead. One structure is located at this site. The building is a shed of post and beam construction. Characteristics of the building are its rectangular plan-form and shed roof. Exterior treatments include vertical board sheathing and corrugated sheet metal roofing. The building is in poor condition.

Comments: The site is a standard architectural/structural type. The building is of no known historical significance. The site does not appear to meet the eligibility criteria for nomination to the National Register of Historic Places.

Site 15: Ralph Lawrence Farmstead

Setting: The site is located in the uplands at an elevation of 660-670 ft msl. The site is located off County Road 325. The site is set back from the roadway approximately .3 mi.

Description: The site is a farmstead consisting of five extant structures. Descriptions of each follow.

Structure A: A two-story "I" type house of wood frame construction. The structure has a one-story ell containing a kitchen and side porches. The former owner of the property, informant Ralph Lawrence, indicated that the present two-story portion of the house was built (ca. 1900) on the foundations of an earlier, similar structure, the one-story portion having been retained in its original form and location. The extended chimney would indicate that the former structure was not as tall as the present one.

Structure B: A garage of wood frame construction. Architectural characteristics include a rectangular plan-form and longitudinally oriented gable roof. Exterior wall treatment is novelty type wood siding. Roofing is corrugated sheet metal.

Structure C: An outbuilding/smokehouse of wood frame construction. The south portion of the structure is supported above a cellar. The roof is a longitudinal gable type with asphalt shingle roofing.

Structure D: A privy of wood frame construction. The building plan-form is rectangular. The roof is a shed type with corrugated sheet metal roofing. Exterior wall treatment is vertical board sheathing.

Structure E: A central type coop of wood frame construction. The building plan-form is rectangular. The roof is a longitudinal gable type with corrugated sheet metal roofing. Exterior wall treatment is novelty type wood siding. Fenestration of the south facade consists of a bank of windows to the left of the entrance and of three irregularly spaced windows placed low in the west facade. The building is supported on a concrete foundation. Estimated period of construction is mid-twentieth century.

Structure F: A shed of pole-frame construction. The building plan-form is rectangular. The roof form is a gable; roofing is corrugated sheet metal. Exterior wall cladding is vertical boards.

Comments: Structure A is a good example of an "I" type house, common to Callaway County, Missouri, during the late nineteenth - early twentieth centuries. Although no events or persons of historical significance are known to have been associated with this property, the continued preservation of the house is encouraged.

Site 16: A. J. Garrett Farmstead

Setting: This site is in the uplands at an elevation of 840 ft msl. The site is along State Highway CC and is set back from the roadway approximately 700 ft.

Description: This site is a former farmstead. One extant structure remains on the site. The building is a barn/shed of pole frame construction. The plan-form is rectangular and consists of three lateral bays. The structure is enclosed on three sides only. Exterior wall treatment is ribbed metal sheets. The roof is a gable type with ribbed sheet metal roofing.

Comments: The building is a standard architectural/structural type and is of no known historical significance. It does not appear to meet the eligibility criteria for nomination to the National Register of Historic Places.

Site 17: Oran Garrett Farmstead

Setting: This site is in the uplands at an elevation of 840-845 ft msl. The site is along County Road 337 and is set back approximately 550 ft.

Description: The site is a former farmstead. One extant structure was identified at this location. The building is a barn of pole frame construction. Architectural characteristics of the building are its rectangular plan-form and low pitched gable roof. The roofing and siding are ribbed sheet metal.

Comments: This building is a standard architectural/structural type of no known historical significance. This site does not appear to meet the eligibility criteria for nomination to the National Register of Historic Places.

Site 18: J. S. Miller Farmstead

Setting: This site is in the uplands at an elevation of 665 ft msl. The site is along old County Road 324 and is set back from the roadway approximately 35 ft.

Description: The site is part of a farmstead. Only one structure of the farmstead complex is within the study area. The structure is a small barn of log and wood frame construction. The structure consists of a central core of unhewn logs stripped of bark. The logs are placed horizontally and corners are "v" notched. A shed of wood frame construction has been added to all four sides of the log core. Exterior walls of this enclosure are sheathed with vertical boards. Roofing is corrugated metal sheets.

Comments: This structure is in a deteriorated condition. It does not appear to be unique architecturally or structurally. No evidence of historical significance was found in association with this structure. It does not appear to meet the criteria of the National Register of Historic Places.

Site 19: Bridge

Setting: The site is in the lowlands at an elevation of 540 ft msl. The site is at the old County Road 324 crossing of a small tributary of Logan Creek. The site is .2 mi north of the intersection of old County Road 324 with State Highway CC.

Description: The site is a deck type bridge/culvert of cast-in-place construction. The deck abutments and curbings are of concrete. The structure has no guard rail.

Comments: This feature is a standard structural type and of no known historical significance. The site does not appear to meet the criteria for nomination to the National Register of Historic Places.

Site 20

Setting: The site is in the lowlands at an elevation of 600 ft msl. Access is off a tributary of Logan Creek. The site is set back approximately .35 mi northwest of Logan Creek.

Description: The site is a former residence. Two structures in relict condition are located at this site. Descriptions of each follow.

Structure A: The ruins of a log structure. Portions of the stone foundation are visible and indicate that the plan-form was rectangular, approximating 15 ft in length and 12 ft in depth. Logs are roughly hewn and stripped of bark. Corners of the logs are "v" notched. Period of construction is estimated at mid-late nineteenth century.

Structure B: An outbuilding of wood frame construction. The plan-form is rectangular. The roof is a shed type although no roofing remains. Exterior wall teatment is vertical board sheathing. Estimated period of construction is early - mid-twentieth century.

Comments: The log structure at this site is in ruins. The associated shed is of no architectural or historical significance. These structures do not appear to meet the eligibility criteria for nomination to the National Register of Historic Places.

Site 21

Setting: The site is in the uplands at an elevation of 700 ft msl. The site is remote being situated on a ridge approximately .5 mi northwest of Logan Creek.

Description: The site is a former residence. Part of a log structure remains at this location. The building plan-form was rectangular being approximately 20 ft in length and 17 ft 6 in in depth. Logs are stripped of bark, hewn only at the ends, and "v" notched at the corners. Logs are approximately 10 in in diameter and placed horizontally. The foundation is of limestone rubble. Evidence of wood chinking was observed. The estimated period of construction is mid - late nineteenth century.

Comments: The log house is partially collapsed and in relict condition. No evidence of the site's historical significance was found. The site does not appear to meet the eligibility criteria for nomination to the National Register of Historic Places.

Summary

The results of the architectural inventory are summarized in tables 6 and 7. For brief descriptions of individual buildings and their comparison with other sites within the study area, the reader is referred to Table 6. For a tabulation of architectural and structural types found in the study area, see Table 7.

Table 6

Summary of Architectural Resources Inventory
Residual Lands, Callaway Nuclear Power Plant Site
Union Electric Company

Site No.	Site Name	Resource	Characteristics[1]	Period[2]
1		a. House	Ranch, irregular, frame, gable/valley	Mid 20th C
		b. Shed	Equipment storage, rectangular, pole frame, long. gable	Mid 20th C
2	J. R. Meehan Farmstead	a. House	2-story, "I" type, ell, frame, gable	Late 19th C
		b. Garage	Rectangular, frame, long. gable	Mid 20th C
		c. Cistern	Square, stone masonry, gable	Late 19th C
		d. Smokehouse	Rectangular, frame, long. gable	Early 20th C
		e-1. Doghouse	Rectangular, frame, long. gable	Mid 20th C
		e-2. Doghouse	Rectangular, frame, long. gable	Mid 20th C
		f. Shed	Equipment storage, pole frame, long. gable	Mid 20th C
		g. Barn	Transverse crib, post and beam, long. gable	Early-Mid 20th C
3	O'Neall Farmstead	a. House	Tract, rectangular, frame, lat. gable	Mid 20th C

[1] Characteristics are presented in the following sequence: (1) architectural type or style, (2) building plan-form, (3) structural type or system, and (4) roof form. All structures are one story, except as noted.

[2] Period of construction is estimated from structural investigation and historic documentation. Dates of construction are given when documentation supported more specific chronological placement.

Table 6
(continued)

Site No.	Site Name	Resource	Characteristics[1]	Period[2]
		b. Shed	Equipment, rectangular, pole frame, lat. gable	Mid 20th C
		c. Barn	Ruins, rectangular, post and beam	Indeterminate
		d. Cellar	Rectangular, concrete, vaulted	Mid 20th C
		e. Outbuilding	Rectangular, frame, long. gable	Early 20th C
4	V. Schulte Farmstead	a. House	Double pen, ell, frame, lat. gable	Late 19th - Early 20th C
		b. Barn	Transverse crib, post and beam, long. gable	Late 19th - Early 20th C
		c. Smokehouse	Rectangular, frame, long. gable	Late 19th - Early 20th C
		d. Outbuilding	Rectangular, frame, long. gable	Late 19th - Early 20th C
		e. Garage	Rectangular, frame, long. gable	Mid 20th C
		f. Outbuilding	Rectangular, frame, long. gable	Early 20th C
		g. Pumphouse/ Outbuilding	Rectangular, frame, shed	Mid 20th C
		h. Shed	Equipment storage, pole frame, long. gable	Mid 20th C
		i. Shed	Rectangular, frame, long. gable	Early 20th C
		j. Crib	Rectangular, frame, long. gable	Early-Mid 20th C
5	Farmstead	a. Barn	General purpose, frame, long. gable	Early-Mid 20th C
		b. Shed	Ruins, frame	
6	Rudolph Masek Farmstead	a. Barn	Transverse crib, post and beam, long. broken gable	Early 20th C

Table 6
(continued)

Site No.	Site Name	Resource	Characteristics[1]	Period[2]
		b. Shed	Rectangular, post and beam, long. gable	Early-Mid 20th C
7	Kingdom Telephone Co.	a. Substation	Rectangular, component shed, gable	Mid 20th C
8	C. & P. Shiverdecker Farmstead	a. Barn	Transverse crib, post and beam, gambrel	Early-Mid 20th C
		b. Shed	Rectangular, post and beam, long. gable	Early-Mid 20th C
		c. Outbuilding	Rectangular, wood frame, shed	Early-Mid 20th C
9	V. Wagner Residence	a. House	Modular, rectangular, frame, lat. gable	Mid 20th C
		b. Cistern	Rectangular, concrete, flat	Mid 20th C
		c. Outbuilding	Rectangular, frame, shed	Mid 20th C
		d. Coop	Central type, rectangular, frame, shed	Mid 20th C
10	J. P. Groner Farmstead	a. Grain bin	Round, corrugated steel	Mid 20th C
		b. Barn/Granary	Rectangular, post and beam, long. gable	Mid 20th C
		c. Outbuilding	Rectangular, frame, long. gable	Early 20th C
		d. Outbuilding	Rectangular, frame, shed	Early-Mid 20th C
11	Vernon Bezler Farmstead	a. House	Double pen, "T," lat. gable	19th/Early 20th C
		b. Garage	Rectangular, long. gable	Early 20th C
		c. Barn	Single crib, horizontal log, frame, shed	19th/Early 20th C

Table 6
(continued)

Site No.	Site Name	Resource	Characteristics[1]	Period[2]
12	Hadley Bezler Farmstead	a. House	2-story, "I" house, ell, log/frame, lat. gable	19th/Early 20th C
		b. Shed	Rectangular, frame, gable	19th/Early 20th C
		c. Barn	Double crib, horizontal log frame, sheds	19th/Early 20th C
		d. Barn	2-story, single crib, horizontal log, frame sheds	19th/Early 20th C
		e. Hog House	Colony type, rectangular, frame	Early/Mid 20th C
		f. Shed	Rectangular, frame, long. gable	Early/Mid 20th C
		g. Coop	Central type, rectangular, frame long. gable	Mid 20th C
		h. Coop	Central type, rectangular, frame long. gable	Mid 20th C
		i. Coop	Colony type, rectangular, frame shed	Mid 20th C
		j. Barn	General purpose, rectangular, post and beam, gambrel	Mid 20th C
		k. Shed	Rectangular, frame, long. gable	Early/Mid 20th C
13	Bridge		Deck type, cast in place concrete	Mid 20th C
14	J. J. Byrnes Farmstead	a. Shed	Rectangular, post and beam	Mid 20th C
15	Ralph Lawrence Farmstead	a. House	2-story, "I" type, "T", frame lat. gable	19th/Early 20th C
		b. Garage	Rectangular, frame, long. gable	Early/Mid 20th C
		c. Outbuilding/ Smokehouse/ Cellar	Rectangular, frame, long. gable	Early/Mid 20th C
		d. Privy	Rectangular, frame, shed	Early/Mid 20th C

Table 6
(continued)

Site No.	Site Name	Resource	Characteristics[1]	Period[2]
		e. Coop	Rectangular, frame, long. gable	Early/Mid 20th C
		f. Shed	Rectangular, pole frame, long. gable	Early/Mid 20th C
16	A. J. Garrett Farmstead	a. Barn	Rectangular, pole frame, gable	Mid 20th C
17	Oran Garrett Farmstead	a. Barn	Rectangular, pole frame, gable	Mid 20th C
18	J. S. Miller Farmstead	a. Barn	Single crib, log, frame sheds	19th/Early 20th C
19	Bridge		Deck type, cast in place concrete	Mid 20th C
20	House site	a. House	Ruins, single pen, log	Mid-Late 19th C
		b. Outbuilding	Rectangular, frame, shed	Early-Mid 20th C
21	House site	a. House	Ruins, unhewn log construction	Mid 19th C

Table 7

Summary of Architectural Features
Callaway Nuclear Power Plant Site,
Union Electric Company

Resource	Frequency
House	
Log single pen	1
Log ruins	1
Frame double pen	2
Frame "I" type	3
Frame modular/tract/ranch	3
Garage	4
Smokehouse	2
Privy	1
Cellar	1
Pumphouse	1
Cistern	2
Doghouse	2
Barn	
Log single crib	3
Log double crib	1
Frame transverse crib	4
Frame general purpose	4
Pole Frame	2
Shed	
Frame general purpose	8
Pole frame	6
Coop	5
Hoghouse	1
Crib	1
Grain bin	1
Outbuilding	10
Other structures	
Telephone substation (component steel shed)	1
Bridge, concrete deck type	1
Total Structures	71

EVALUATION AND TESTING OF HYPOTHESES

Prehistoric

Four hypotheses concerning prehistoric exploitation of the study area were outlined earlier in the Research Design section. These hypotheses were designed to investigate relationships between archaeological site locations, chert resources, and environmental variables. The purpose is to identify what environmental variables are associated with site location and resource utilization. Since environmental zones are not uniform with respect to exploitable resources, diversity and density of biotic and geological resources are expected to vary between different environmental areas.

Hypotheses were formulated in recognition of certain limitations imposed by Phase 1 survey data. Specific site functions, season of occupation, and settlement/subsistence practices often cannot be determined based on shovel testing and surface survey data. These determinations (usually) require test excavations or full scale excavations involving recovery and analyses of faunal and floral remains, functional tool studies, and a variety of other archaeological and environmental data. Therefore, the hypotheses which relates to site location and environmental zones are designed to test general propositions regarding site distribution and potential food resources in each zone. The chert procurement and utilization hypotheses are somewhat more specific, the Phase 1 survey being more suitable for the investigation of this type of data. Subsequently, the hypotheses in the preliminary Research Design were adjusted and restated to accommodate the actual survey data.

Hypothesis 1: If exploitation and procurement of critical food resources by a prehistoric group within its local environment operated under the principle of "minimum distance traveled/maximum return of resources," then site density will correlate positively with the food resource potential of these environmental zones in the project area.

<u>Discussion:</u> Site density is defined as the number of sites/km^2 in each of the environmental zones. Calculated densities appear in Figure 16A.

Hypothesis 1 was evaluated by employing Kendall's Tau, a nonparametric rank order correlation coefficient that measures the degree of concordance/discordance between two ordered variables. This technique, outlined in Roscoe (1975:110-111) and discussed in depth by Marascuilo and McSweeney (1977:439-446), is deemed superior to Spearman's Rho (Roscoe 1975:106-110) because of its greater applicability to small samples and the rapid convergence of its sampling distribution to normality (Hays 1973:797). Kendall's Tau, τ, is defined as $\tau = \frac{2S}{N^2-N}$.

The environmental zones within the project area were ranked in decreasing order of food resource potential: Dissected Upland/Bottomland Forest Edge (1), Prairie/Forest Edge (2), Dissected Upland Oak-Hickory Forest (3), and Level Upland Prairie (4). Site densities for these four environmental zones were calculated (Figure 16A) and rank ordered. The ordering of the observed data was compared to the hypothesized ordering and tested with the Kendall's Tau (one-tailed, $\alpha = .05$, $n = 4$).

Expected:	1	2	3	4
Observed:	1	3	2	4

The resultant $\tau = .67$ was found not to be significant, with $p = .125$; therefore a statistically significant correlation between food resource potential and site density does not exist for the data.

While the Dissected Upland/Bottomland Forest Edge and the Level Upland Prairie zones respectively produced the most and least site

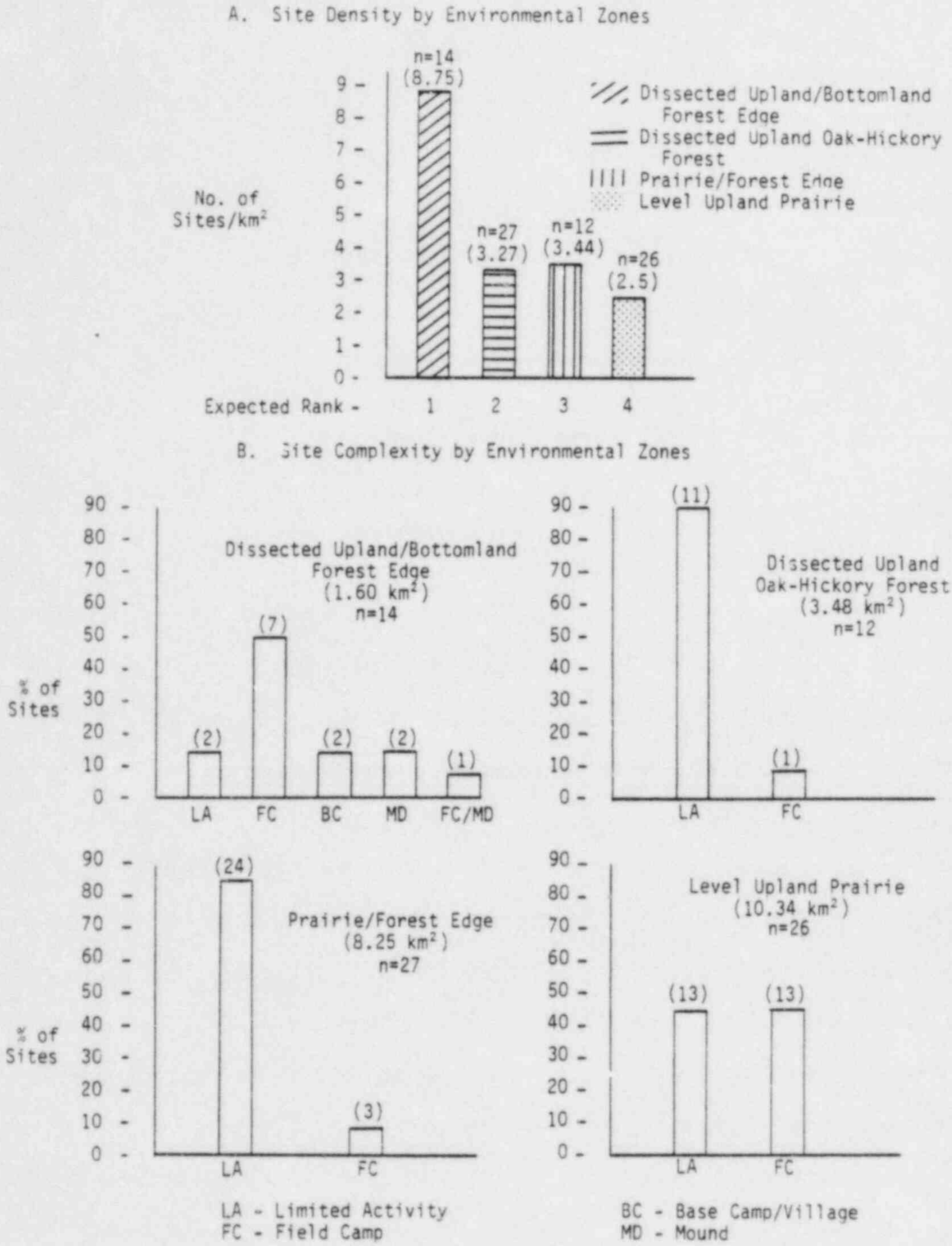


Figure 16

Site Density and Complexity
by Environmental Zones

density, as expected, the Prairie/Forest Edge and the Dissected Upland Oak-Hickory Forest zones produced results that were the inverse of expected density ranking. This discrepancy may be attributable to one of three reasons: (1) small sample size, (2) the distinction between Prairie/Forest Edge and Dissected Upland Oak-Hickory Forest may not be archaeologically valid, (3) the degree of correlation between food potential and site density may be affected by a third variable.

Small sample size may be eliminated in one of two ways, increasing the number of zones investigated or using multiple observations within each zone. The first alternative is the least feasible since the actual environment, and ecological research independent of archaeological considerations, dictates the ordering of the environment. The second alternative would lend to more rigorous testing of the hypothesis through increased sample sizes. Multiple observations within each zone would enable a researcher to employ parametric techniques that not only could test for significance but also delineate trends in the data. One-way ANOVA or a form of trend-line analysis would be well suited for such an experimental design.

Multiple observations and analysis of variance tests also would allow for testing for significant differences between environmental zones through the use of contrast statements. Environmental data may be used to assess the validity of differentiating between the Prairie/Forest Edge and the Dissected Upland Oak-Hickory Forest as discrete zones of differing food potential. Similarly, previously recorded site density figures from analogous situations may be employed to test for archaeologically significant distinctions between the two zones.

The last possibility, that the degree of correlation between food potential and site density may be affected by one or more variables, remains a viable proposition for future hypothesis testing. The research potential for this hypothesis as it relates to site density is of immediate concern to long-range development planning and cultural resource management (cf. Styles 1981:187). Factors affecting the development of predictive models of site distribution/density have been outlined previously (Lewis and Murphy 1979). Future research should take into account the conclusion of earlier attempts in the Midwest (Lewis and Murphy 1978; Styles 1981) and recommendations governing planning and sampling strategy presented by Lewis and Murphy (1979).

Hypothesis 2: If exploitation and procurement of critical food resources by a prehistoric group within its local environment operated under the principle of "minimum distance traveled/maximum return of resources," then site complexity will correlate positively with the food resource potential of the environmental zones in the project area.

Discussion: The problem of tied ranks in a small sample size of environments (n = 4) did not allow this question to be assessed statistically. Each category is examined critically. As indicated by Figure 16B, the data generally support the proposition that greater site complexity exists in areas of high food resource potential, and site complexity decreases with decreasing food potential. The Dissected Upland/Bottomland Forest Edge, the environment with the highest resource potential, produced the greatest variety of site types (5) and complexity (limited activity sites to base camps/villages). The other zones only produced two types of sites each (field camps and limited activity loci) and therefore expressed roughly equivalent degrees of social complexity.

Although a significant relationship appears to exist across all data, relative site complexity within zones differed greatly from *a priori* assumptions about the nature of the distribution of complexity within zones. The greatest diversity of site types was found to occur in the Dissected Upland/Bottomland Forest Edge, as expected. This edge area not only contained a high ratio of field camps to limited activity sites but also contained the only residential base camps and mound sites within the project area. The mounds located in the Dissected Upland/Bottomland Forest Edge are indicative of the cultural complexity that existed in this edge area by Late Woodland times. These burial mounds are located on ridge tops adjacent to two known village sites.

Site complexity in the Prairie/Forest Edge and Level Upland Prairie zones does not support the assumptions concerning the distribution of site complexity. Site complexity in the Prairie/Forest Edge was discovered to be slightly less than expected while that in the Level Upland Prairie seemed to be much greater than predicted. The relatively low number of field camps discovered in the Prairie/Forest Edge might be explained by the lack of a nearby permanent water source. Poor accessibility and greater distance to permanent water sources in this upland zone would have severely limited the number of permanent settlements and could account for the low frequency of habitation sites in this edge area. On the other hand, the relatively low site complexity in the Prairie/Forest Edge may be due to sampling bias. Since a heavy ground cover (pasture and woods) usually was present in this edge area, shovel testing was used as the predominant sampling technique. As a result, several of the 24 limited activity sites located in the Prairie/Forest Edge may in fact be field camps but could not be recognized as such due to poor survey conditions.

The unexpected high number of field camps found in the Level Upland Prairie may also be due to survey conditions resulting in sampling biases. Survey conditions in this zone, however, were quite different from those in the Prairie/Forest Edge. In this level upland area nearly one-half (approximately 700 acres) of the land was cultivated, which presented ground visibility conditions favorable enough for surface survey. It is suggested that these survey conditions helped skew the data by allowing a larger sample of artifacts to be collected (reflecting a greater diversity of artifact classes) than was possible in other zones. Because site type classifications in turn were largely based on artifact density and diversity, the field camp category and site complexity in the Level Upland Prairie may therefore be overrepresented.

Hypothesis 3: If exploitation and procurement of chert resources by a prehistoric group within its local environment also operated under the principle of "minimum distance traveled/maximum return of resources," the selection and acquisition of suitable raw materials for fabricating stone tools will favor locally available chert resources as opposed to imported nonlocal or exotic lithic resources.

Discussion: Hypothesis 3 was assessed by comparing the combined total of nonlocal and exotic chert artifacts with the total number of artifacts manufactured from chert types locally available within the project area (i.e., Burlington, Jefferson City, and Callaway). As Table 8 reveals, the chert data are overwhelmingly supportive of the hypothesis. Whereas 99.8% of all the chert artifacts found during the survey were made from local cherts, only 0.2% were made from nonlocal and exotic cherts. These data clearly indicate that prehistoric flint workers in the project area almost exclusively were procuring and utilizing local chert resources for the manufacture of chipped stone tools.

A further consideration of the 11 nonlocal and exotic chert artifacts reveals that 9 were made from nonlocal chert known to occur in counties surrounding the project area and that 2 were made from an exotic chert probably foreign to Missouri. Of the 9 nonlocal chert artifacts, 6 (including one projectile point) were made from a dark bluish-black Pennsylvanian chert recently identified as Excello chert known to occur in Macon, Randolph, Chariton, Audrain, and Monroe

Table 8

Local vs. Nonlocal and Exotic Chert Artifacts

	Total No. Artifacts	Percentage
Local Chert	4,832	99.8
Nonlocal/Exotic Chert	11	0.2
Total	4,843	100.0

counties and as close as 10 km north of the project area in Callaway County; 2 flakes were possibly knapped from glacial till chert; and 1 biface fragment was made from Chouteau chert located in north-central Callaway County between 13 and 22 km from the project area. All of these chert types are located within 40 km of the study area and would be considered local chert resources in some studies. The two exotic chert artifacts include an unserrated Dalton point and an interior flake. They were made from a very fine-grained translucent amber colored chert and both were found on the same site. This chert most closely resembles a chalcedony-like material from Texas.

Hypothesis 4: If exploitation and procurement of critical resources by a prehistoric group within its local environment operated under the principle of "minimum distance traveled/maximum return of resources," then sites representing initial stages of lithic reduction will be located closer to the source area(s) than sites representing secondary and final stages of lithic reduction or modification of selected raw materials.

Discussion: The hypothesis, as stated, implies an inverse relationship between distance to a chert source and the percentage of debitage reflecting initial reduction stages in lithic tool production.

The strength of this relationship was tested on data obtained from sites within the Callaway Nuclear Power Plant project area.

Before presenting the test result, it is necessary to preface the interpretations that follow from results of the experimental design. First, the experimental design did not presume the possibility of two or more usable chert types in the immediate vicinity of the project area. It is often the case that chert source localities are discrete bounded areas that exist outside of any given project area. Also, in cultural resources management generated projects, the selection of a project area (whether it be a highway corridor, hydroelectric dam, or nuclear power plant) is independent of archaeological considerations. While the presence of one usuable chert resource in a given area is a relatively uncommon occurrence, the presence of three spatially and typologically discrete prehistorically exploited chert sources (Burlington, Jefferson City, and Callaway cherts) within a medium-size project area is very rare.

The second complicating factor is that the presence of these three chert types allows for differential exploitation of the resources. This may be manifested as a preference for one type over another. Such preferences may be based on physical attributes of chert quality and its suitability to tool production, differential availability of the resources, differential access to resources, or purely sociocultural based preference criteria.

Two linear regression equations were run on sample data from 36 sites (having collections of 10 or more artifacts). The dependent variable is expressed as the percent of debitage (chert) in a collection indicating initial stages of lithic reduction (DCORTDNS), while the independent variable is defined as the distance from the chert source (DIST). The two types of chert present at each site also were recorded and classed as either Burlington chert (1) or Jefferson City chert (2).

Since the research hypothesis does not address chert type, this class-level variable was not included in the calculations.

The following data were inputted into an IBM 370 computer (Table 9). General Linear Models (GLMs) were run via the Statistical Analysis System package for the hypothesis. This resulted in two runs of the hypothesis.

The first run was a simple linear regression (and one-way ANOVA) of DCORTDNS = f(DIST). The output data in Table 10 were generated.

The output data indicate that distance from the chert source is a significant predictor of the percent of decortication flakes present at a site ($p = 0.0207$); a separate correlation (Pearson's r) indicates that an inverse linear relationship exists ($r = -0.2723105$). Although the hypothesis is supported by the test results, the overall strength of the relationship is somewhat weak, since the model accounts for only 7.4% of the overall variance.

A second run of the data in Table 9 was conducted to test a secondary hypothesis that DCORTDNS may be dependent on the quadratic function of DIST. Under this hypothesis, the nature of linear relationship between DCORTDNS and DIST was being examined. Specifically, this hypothesis would assess whether or not the significant decrease in the density of decortication flakes observed (as one moved further from the source) was a geometric function of distance or simply a linear function as suggested by the results of the linear regression.

The General Linear Model DCORTDNS=DIST DIST*DIST was run, and the first-order semi-partial correlation of the quadratic effect of distance was not found to be significant ($p=0.2465$, Table 10). The test results support the main hypothesis that sites representing initial stages of lithic reduction will be located closer to the source area(s) than sites representing secondary and final stages of lithic reduction or

Table 9

Input Data for Hypothesis 4

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

OBS	DCORTONS	DIST	TYPE
1	0.25	0.40	1
2	0.20	0.10	1
3	0.37	0.30	1
4	0.11	0.15	1
5	0.34	0.20	1
6	0.47	0.45	1
7	0.20	0.30	1
8	0.44	0.30	1
9	0.21	0.00	1
10	0.60	0.00	1
11	0.55	0.00	1
12	0.31	0.00	1
13	0.24	0.00	1
14	0.26	0.20	1
15	0.23	0.30	1
16	0.54	0.00	1
17	0.27	0.00	1
18	0.70	0.00	1
19	0.35	0.30	1
20	0.22	0.30	1
21	0.34	0.60	1
22	0.20	0.00	1
23	0.37	0.05	1
24	0.41	0.40	1
25	0.50	0.60	1
26	0.52	0.20	1
27	0.30	0.05	1
28	0.24	0.50	1
29	0.23	0.35	1
30	0.25	0.15	1
31	0.31	0.00	1
32	0.30	0.30	1
33	0.45	0.30	1
34	0.37	0.00	1
35	0.28	0.00	1
36	0.00	0.90	1
37	0.34	0.00	2
38	1.00	0.00	2
39	0.63	0.00	2
40	0.75	0.00	2
41	0.80	0.03	2
42	0.50	0.00	2
43	0.86	0.00	2
44	0.67	0.15	2
45	0.57	0.15	2
46	0.00	0.50	2
47	0.50	1.60	2
48	0.50	0.80	2
49	0.50	3.00	2
50	0.00	2.00	2
51	0.00	2.00	2
52	0.00	3.00	2
53	0.00	1.00	2
54	0.00	1.00	2
55	0.63	0.80	2
56	0.50	2.50	2

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

OBS	DCORTONS	DIST	TYPE
57	0.40	0.9	2
58	0.75	1.0	2
59	0.50	1.0	2
60	0.50	1.2	2
61	0.50	1.4	2
62	0.50	0.8	2
63	0.63	0.0	2
64	0.60	0.0	2
65	0.47	0.0	2
66	0.69	0.0	2
67	0.14	0.9	2
68	0.51	0.0	2
69	0.00	1.5	2
70	1.00	0.5	2
71	0.50	1.8	2
72	0.73	0.0	2

Table 10

Results of General Linear Models for Hypothesis 4

DEPENDENT VARIABLE: DCORTDNS

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	1	0.29867001	0.29867001	5.61	0.0207	0.074153	57.0683
ERROR	70	3.72910777	0.05327297		STD DEV		DCORTDNS MEAN
CORRECTED TOTAL	71	4.02777778			0.23080938		0.40444444

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
DIST	1	0.29867001	5.61	0.0207	1	0.29867001	5.61	0.0207

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M   13:24 THURSDAY, JUNE 10, 1982   6

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
TYPE	2	1 2

NUMBER OF OBSERVATIONS IN DATA SET = 72

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M   13:24 THURSDAY, JUNE 10, 1982   7

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: DCORTDNS

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	2	0.37106976	0.18553488	3.50	0.0356	0.092128	56.9196
ERROR	69	3.65670802	0.05299577		STD DEV		DCORTDNS MEAN
CORRECTED TOTAL	71	4.02777778			0.23020810		0.40444444

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
DIST	1	0.29867001	5.64	0.0204	1	0.20281829	3.83	0.0545
DIST*DIST	1	0.07239975	1.37	0.2465	1	0.07239975	1.37	0.2465

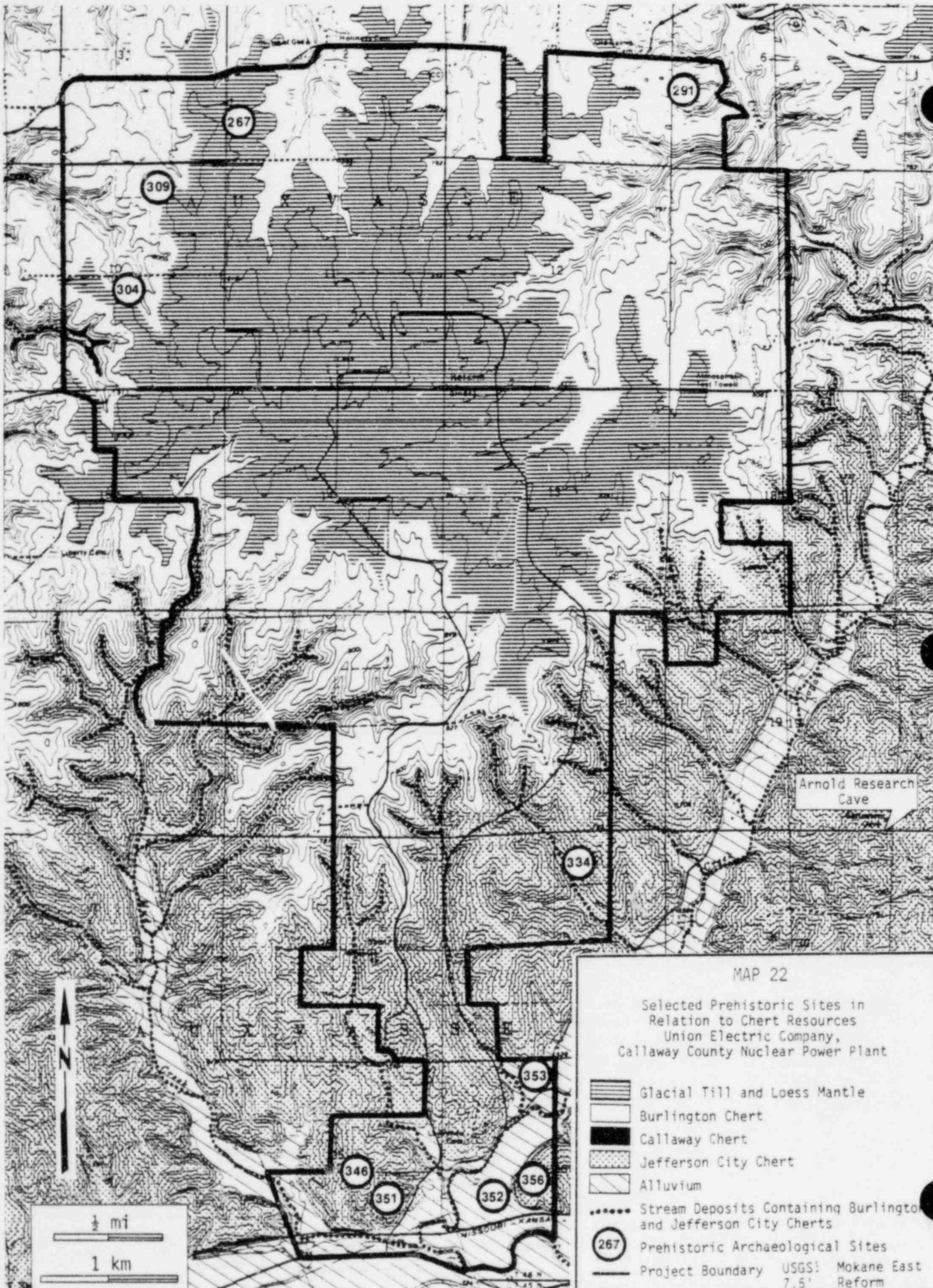
modification of selected raw materials and thus represents a linear relationship.

In view of the above test results, and the additional data on chert patterns observed in the field during data collection, the experimental design must be restructured for future research. The project area presents a rare opportunity to study an intriguing research problem engendering a multiplicity of technological and behavioral factors. The following discussion of observations that relate to this problem is intended to be used as the basis of future hypothesis testing.

Additional Observations: As the chert survey revealed, chert in one type or another is basically ubiquitous throughout the project area. Although the center of Coates Plateau (hereafter referred to as the upland plateau) is covered by a mantle of glacial till and loess, all sites located on this mantle were less than 600 m from one or more chert sources.

The project area is roughly divided into two chert resource areas (Map 22). Jefferson City chert is limited generally to the dissected upland zone in the southern half of the study area, although additional sources flank the east and west sides of the upland plateau. Conversely, primary sources of Burlington chert are limited to the upland plateau, but secondary sources also occur throughout the southern portion of the project area in stream deposits.

In an effort to delineate different patterns of raw material procurement and utilization between the two chert resource zones, certain sites were selected for comparative analysis. Only those sites with collection samples of more than 100 artifacts were consulted for the following observations. Four sites (23 CY 267, 23 CY 291, 23 CY 304, 23 CY 309) were located on or near Burlington chert sources on the upland plateau, and six sites (23 CY 334, 23 CY 346, 23 CY 351, 23 CY 352, 23 CY 353, and 23 CY 356) were situated on or very close to


Arnold Research Cave
MAP 22
Selected Prehistoric Sites in Relation to Chert Resources Union Electric Company, Callaway County Nuclear Power Plant
Glacial Till and Loess Mantle
Burlington Chert
Callaway Chert
Jefferson City Chert
Alluvium
Stream Deposits Containing Burlington and Jefferson City Cherts
Prehistoric Archaeological Sites
Project Boundary
USGS: 7.5' Mokane East Reform
½ mi
1 km
N
267
291
309
304
334
353
346
351
352
356

Jefferson City chert-bearing strata (in the dissected upland zone) with Burlington chert available nearby in stream deposited sources.

The first observation noted that chert use percentages of the total number of artifacts found on each site related to the distance to the nearest source of each chert type represented (figures 17 and 18). There was an almost exclusive use of Burlington chert at those sites located on or near Burlington sources on the upland plateau (Figure 17). Jefferson City chert, which ranged in distance from 0.5 - 1.8 km from the sites, was minimally exploited; the presence of the few Jefferson City artifacts probably represents discard from seasonal round activities rather than direct procurement. One artifact made from nonlocal chert was found at both 23 CY 304 and 23 CY 309.

A somewhat different pattern of chert use was practiced at those sites located on or near Jefferson City strata in the southern portion of the project area. Five of these sites (Figure 18) revealed a relatively consistent 3:1 preference for Burlington chert over Jefferson City chert. This selection for Burlington chert was unexpected since Burlington nodules are located only in stream deposited sources at a greater distance (up to 500 m) from each site than the more immediately available Jefferson City chert sources. The percentages of Burlington chert utilization at the five sites averaged 75.3% whereas Jefferson City averaged 23.9%. Callaway chert accounted for 1.6% of the artifacts collected from 23 CY 346, and one Callaway chert artifact was found at two other sites. One artifact made from nonlocal Excello chert was found on three sites, and two exotic chert artifacts were found at 23 CY 346.

A scattergram representing differential chert use at nine sites (Figure 19) depicts the general preference for and predominant use of Burlington chert regardless of increasing distance from Burlington source areas, whereas Jefferson City chert declines from a supplemental

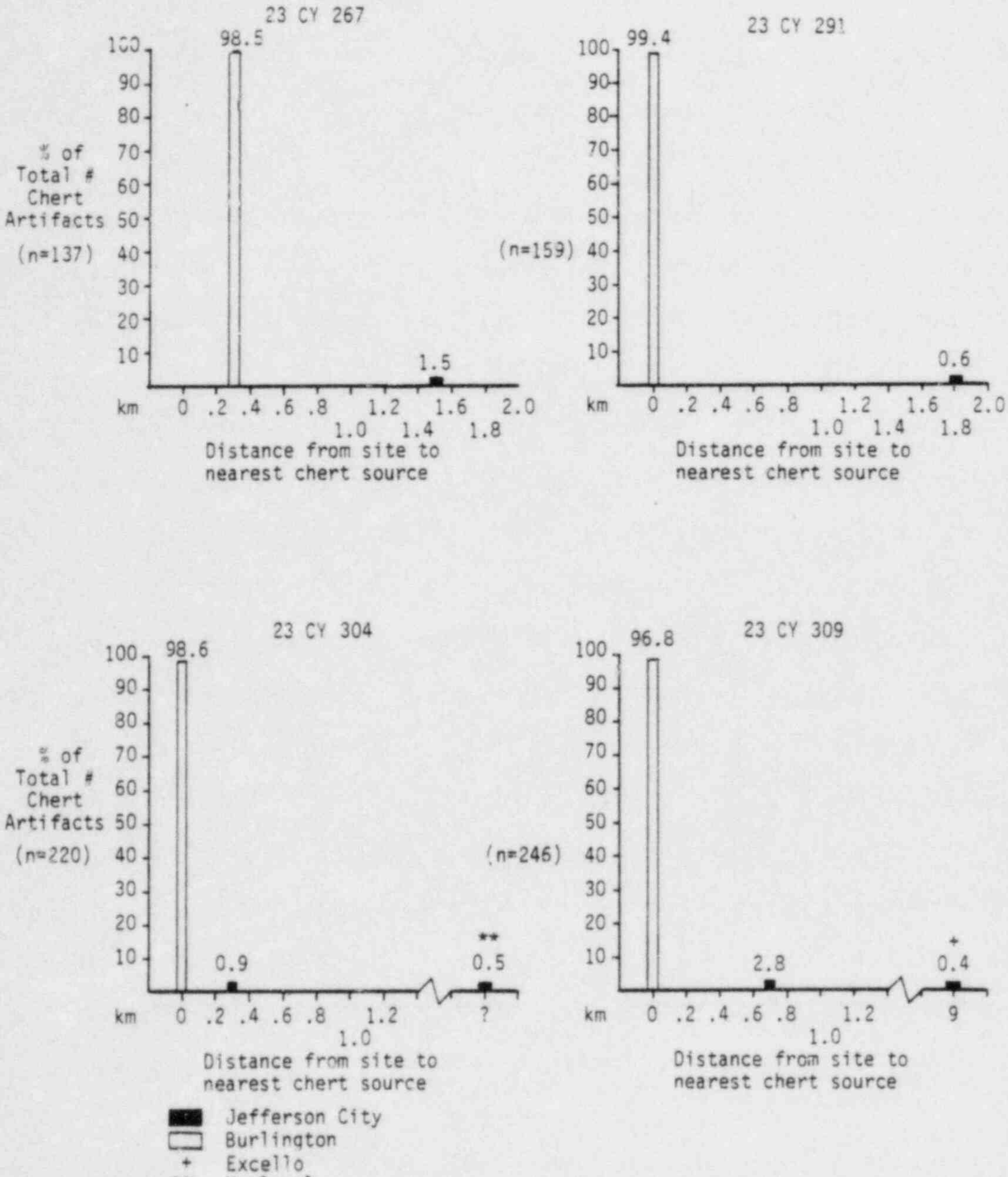


Figure 17. Chert Utilization at Sites Located on or Near Burlington Chert Sources on the Upland Plateau

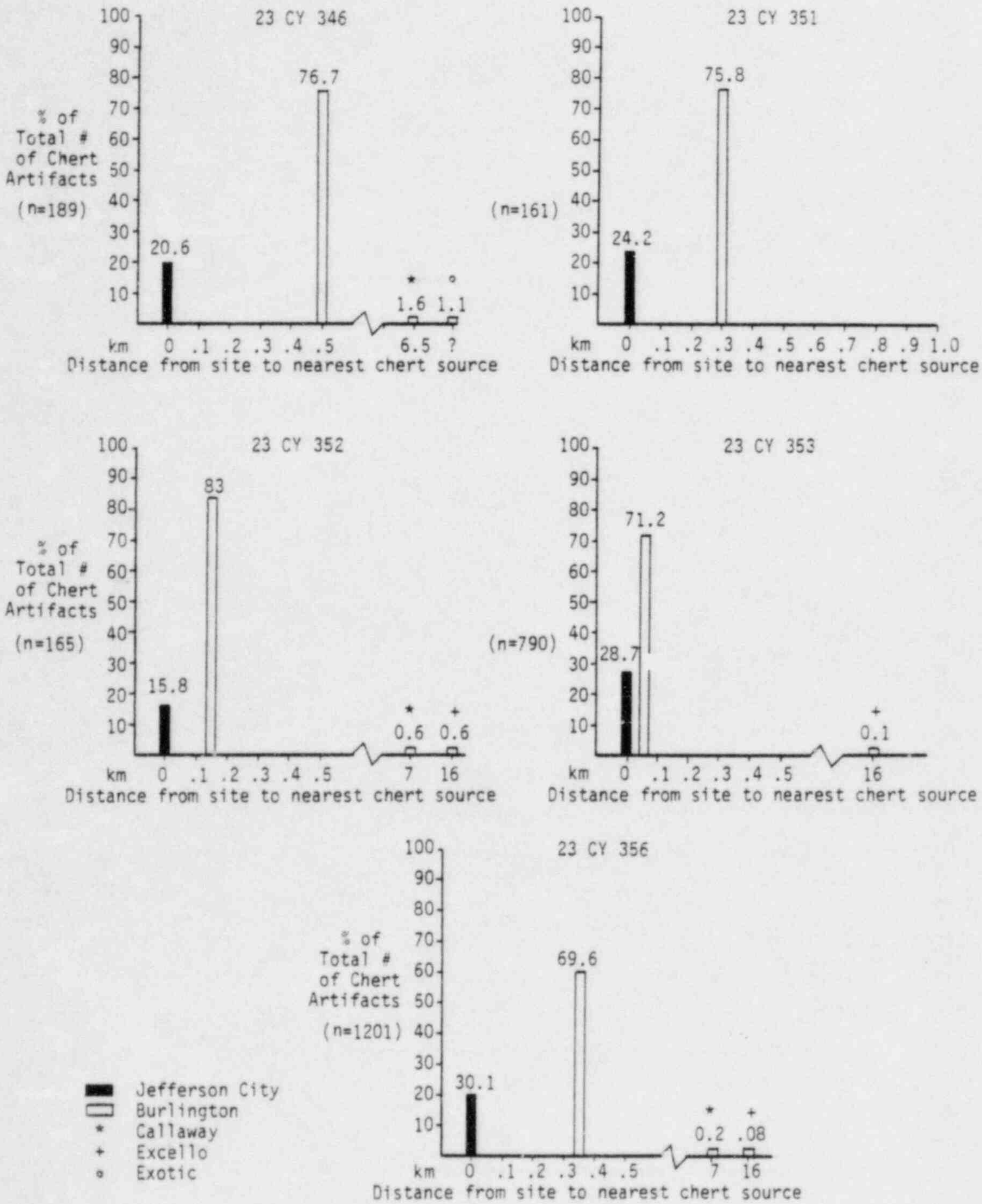
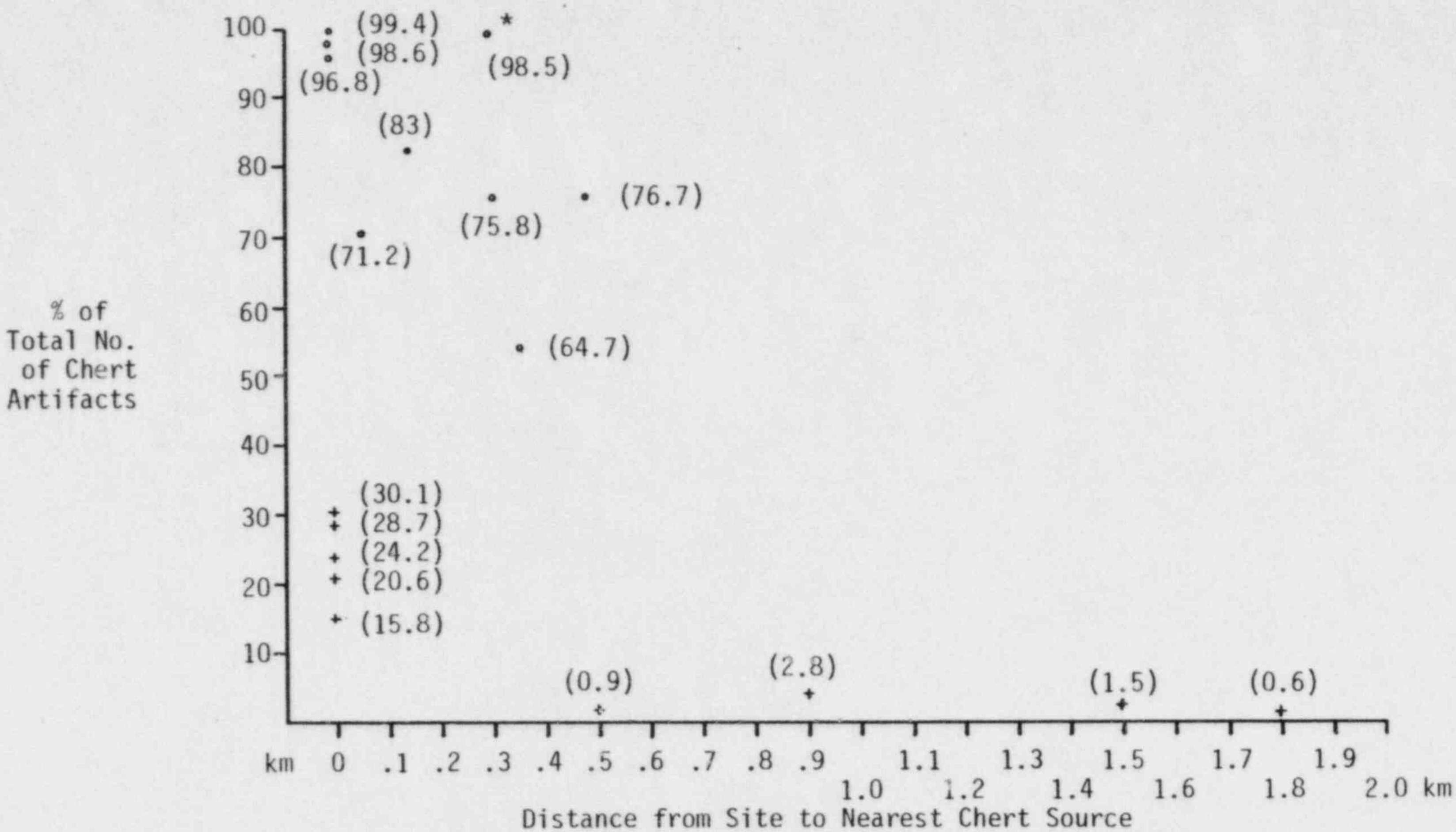


Figure 18. Chert Utilization at Sites Located on or Near Jefferson City Formation in the Dissected Upland/Bottomland Area

Figure 19. Scattergram of Chert Utilization, Burlington vs. Jefferson City



Jefferson City - +
Burlington - •

*Site located on mantle of loess and gl-cial till; closest source was Burlington .3km distant; closest Jefferson City source was 1.5km distant resource to a minimal resource with increasing distance from source areas.

The predominant selection for Burlington chert in the dissected upland area dominated by Jefferson City chert-bearing strata is somewhat surprising, especially in view of the fact that residual Jefferson City chert is available on or very near site locations. Although Jefferson City surface résiduum varies from poor to fair quality, less weathered, fair to good quality subsurface residuum is available immediately below the frost line (approximately 10 cm below ground surface).

A possible explanation may lie in procurement practices. There may have been a preference for procuring chert from stream deposited sources rather than residual or in situ bedrock sources. Although chert procurement from creek gravel bars would involve greater travel distance from sites located on ridge tops, the distance is not excessive. The raw material is readily accessible at stream deposited sources which provide a virtually inexhaustible supply of chert nodules. Initial reduction of the chert nodules at the gravel bars would have greatly reduced procurement loads.

Another possible factor may be quantity of Jefferson City chert nodules versus quantity of Burlington chert nodules. A greater percentage of the chert nodules in gravel bars of the local streams may be Burlington rather than Jefferson City. The Graydon Chert Conglomerate releases a great amount of Burlington nodules which choke intermittent creeks on the upland and are eventually transported downstream.

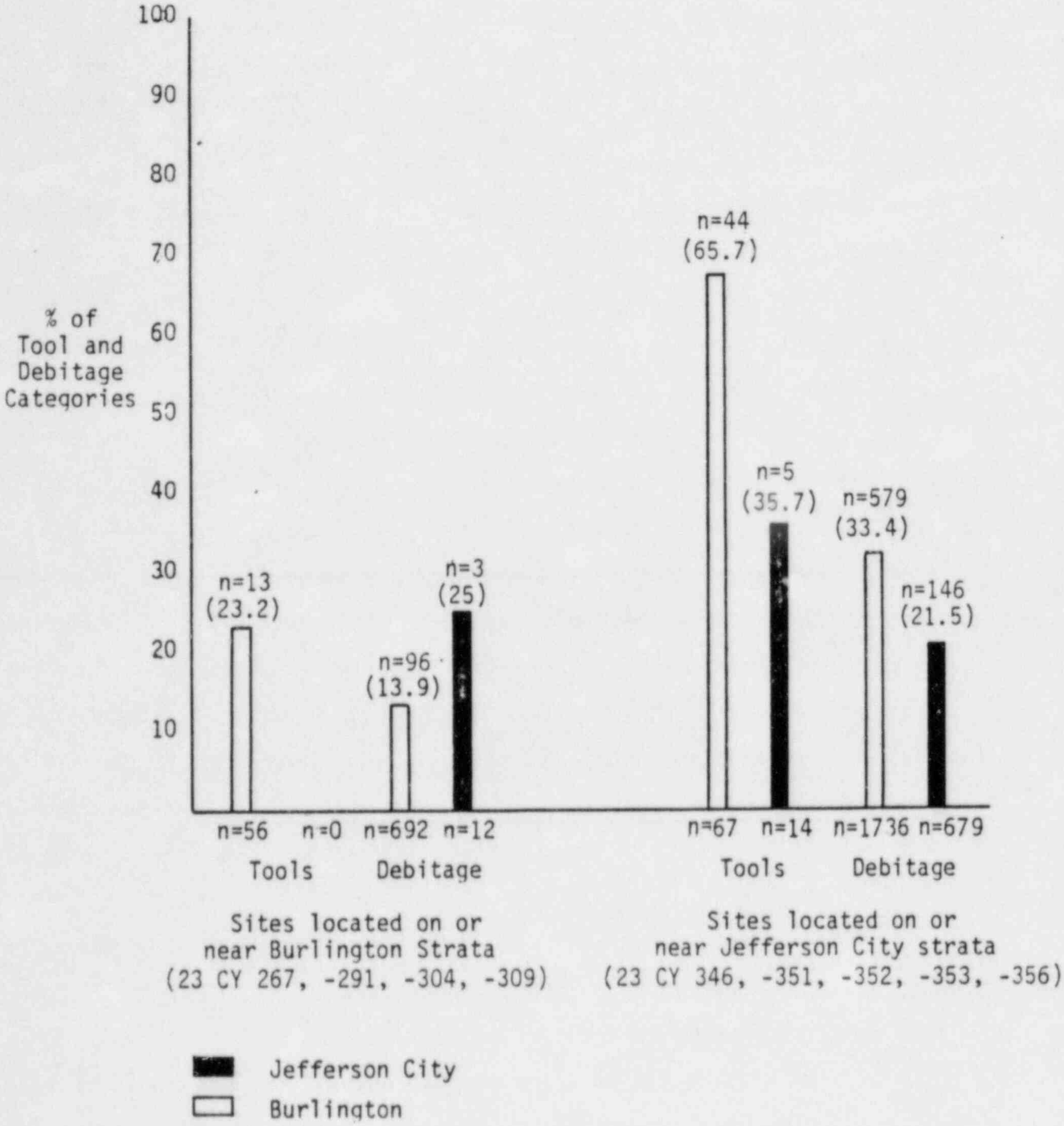
A quantifiable test of the percentages as well as the qualities of different types of chert nodules in stream deposited sources has been presented by Ray (1982) for stream deposited cherts in southwest-central Missouri. It was demonstrated that the quality and quantity of the nodules varied widely according to chert type. Future research could include such a test for the relative quantities and qualities of Jefferson City and Burlington chert nodules in representative streams in the project area.

Quality of stream deposited nodules is an equally important aspect to investigate. Although Burlington chert may occur in greater numbers, fluvial transportation may reduce the quality of this chert for flint knapping purposes. This would imply selection among nodules of a single chert type as well as between different chert types. Other possible qualitative factors involved in chert selection may include ideological preference, tensile strength, and susceptibility to heat treatment processes.

An exception to the above exploitation pattern occurred at 23 CY 334, a lithic workshop site located on a southwest facing slope on Jefferson City strata. All 396 artifacts collected from the site were knapped from Jefferson City chert, and 98.7% of those were made from the mottled variety, which occurs naturally on the slope in residual nodules. Five artifacts were knapped from the oolitic variety of Jefferson City chert, probably obtained from lower or higher elevations or from a nearby creek. The site is an initial reduction knapping station with no evidence of habitation or tool related activities. One possible utilized flake was the only tool identified among the 396 artifacts collected. The rest were cores, reduction waste flakes, and shatter with over half of these being secondary decortication flakes. The presence of 53 cores, the near absence of worked/utilized artifacts, the fact that 67.5% of the flakes recovered were decortication flakes, and that 85.9% were greater than 2 cm^2 are all characteristics of an initial reduction workshop site.

A second observation examined the incidence of heat treatment among tools and debitage made from Burlington and Jefferson City cherts at the same sites (Figure 20). A comparison of heat treatment between chert

Figure 20. Heat Treatment of Chert Types



types basically indicates that the practice was more common among Burlington artifacts than Jefferson City artifacts, especially in the tool category. This comparison is admittedly tenuous, due to the small sample size for Jefferson City artifacts which may skew the data.

More sound observations were made on Burlington chert artifacts. Widely different heat treatment practices occurred between sites located on the upland plateau and sites located in the dissected upland/bottomland area. Although heat treatment was nearly twice as common among Burlington tools than debitage in both areas, thermal pretreatment was practiced more regularly in the dissected upland/bottomland area than on the upland plateau. Whereas less than one-quarter of the tools and 13.9% of the debitage were heat treated on the upland plateau, over 65% of the tools and one-third of the debitage were heat treated in the dissected upland/bottomland area.

These differences in heat treatment practices may be a function of site diversity/complexity and related activities. Sites located on the upland plateau were probably temporary food or lithic procurement stations at which heat treatment was basically an unnecessary and time consuming activity. Conversely, a wider range of activities requiring a greater expenditure of energies may have occurred at larger, more permanent settlements located in the dissected upland/Missouri River bottomland interface. An additional factor may have been reduced knapping quality of Burlington raw material in the dissected upland/bottomland area due to fluvial weathering. Heat treatment may have been used frequently to increase the workability of the more highly weathered Burlington chert in this area.

A final observation was made on those artifacts with cortex present on one or more surfaces in an attempt to verify suspected chert procurement patterns. This analysis generally involved decortication flakes, cores, and shatter. Cortex surfaces were examined for stream deposited and residual cortex attributes such as smooth, water-worn surfaces and angular grainy surfaces, respectively. These data reveal that among the four sites located on the upland plateau 81.4% of the 113 Burlington artifacts with identifiable cortex were made from stream deposited chert, and 18.6% were knapped from residual chert. At the five sites in the dissected upland/bottomland area, all Burlington artifacts with identifiable cortex (174) were knapped from stream deposited nodules, whereas 50% of the 170 Jefferson City artifacts were made from stream deposited chert, and 50% were knapped from residual chert. These observations suggest a heavy to total dependence on stream deposited sources for the procurement of Burlington chert on both the upland plateau and dissected upland/bottomland areas. On the other hand, a more equal emphasis was probably placed on stream deposited and residual sources for the procurement of Jefferson City chert in the project area.

Historic

Two hypotheses, relating to historic period settlement in and around the project area, were outlined in the Research Design section. The first addresses the rate of settlement through physiographic zones, while the second addresses patterning of population aggregates through time.

The theoretical background for these hypotheses draws primarily upon ideas formulated by Hudson (1969) and Smith (1979). Hudson's (1969) work proposed a developmental sequence for rural settlement, in which people move into a new environment; their population density uses and exploitation patterns are maximized: colonization, spread, and completion. Smith (1979) approaches historic settlement through excavation of environmental zones. His model suggests that zones of optimum resource potential were occupied first and that later phases of settlement corresponded to the decreasing order of resource potential of other zones. Culture-historical and environmental variables were delineated based on these considerations, and data were gathered from historical documentation of the area. An assessment of these two hypotheses follows:

Hypothesis 1: If the spatial and temporal sequence of post-Explorer period settlement was a response to an area's natural constraints, then settlement of the stratified environmental zones within the study area occurred in the following order: (1) Prairie/Forest Edge, (2) Upland Prairie, (3) Dissected Upland Oak-Hickory Forest, and (4) Dissected Upland/Bottomland Forest Edge.

Discussion: Hypothesis 1 was evaluated by calculating the percentage of land sold (= settled) within each environmental zone across time which is expressed in sequential periods. Temporal periods were based on those culture-historical periods outlined in the research design section. The following results were observed (Table 11).

Table 11

Percent of Land Sales Within Environmental Zones Across Time

ZONE	Hypothesized Rank Order of Settlement	Pioneer 1803- ca.1830	Early Agric. ca. 1830- ca.1860	Ag.-Industrial ca. 1860- ca.1920	Recent ca. 1920-
Prairie/ Forest Edge	1	.258 (1070)	.742 (3070)	0	0
Prairie	2	.222 (480)	.778 (1680)	0	0
Upland Forest	3	.059 (290)	.912 (4550)	.029 (140)	0
Upland/ Bottomland Forest Edge	4	.133 (150)	.849 (960)	.018 (20)	0

The actual succession of settlement within areas across times coincides with the hypothesized trend (Table 11). Although some minor deviations appear, the overall hypothesized order of succession is upheld. The highest incidence of early settlement (Pioneer Frontier period) was observed in the Prairie/Forest Edge zone, the zone with the highest resource potential. The Early Agriculture period witnessed the highest proportional incidence of settlement across all zones, indicating rapid expansion into the area. The two zones with the highest potential resource base were settled completely by the end of this period.

By the Agricultural-Industrial period, all land had been settled within the study area through the completion of land sales in the two zones with the lowest resource potential, the Upland Forest and Upland/Bottomland Forest Edge.

The actual data collection for this hypothesis resulted in a somewhat more detailed chronology of land sales than indicated in the hypothesis. While the culture-historical periods are of varying length, data on land acquisition and settlement yielded time periods of 10-year spans. The results indicate that while the overall trend of settlement across culture-historical periods was ordered settlement growth within periods was discontinuous and erratic. These supplementary data reveal not only the variable growth patterns but also discuss local, regional, and national socioeconomic factors that affect actual land sales and settlement.

The pattern of land acquisition in the sections containing the study area appears in Figure 21 and Map 23. Both show the acreage of public land passing into the private sector during each year from 1818 through 1857, 1866, and 1902. Altogether, the area of study consisted of 12,310 acres, of which 5,848 acres comprised the immediate survey area.

<u>Pioneer Frontier Period (1803-ca. 1830)</u>

The location of nineteenth century homesteads depended upon their relationship to environmental variables such as arable land, wild food sources, fresh water, and access to trade and communication routes

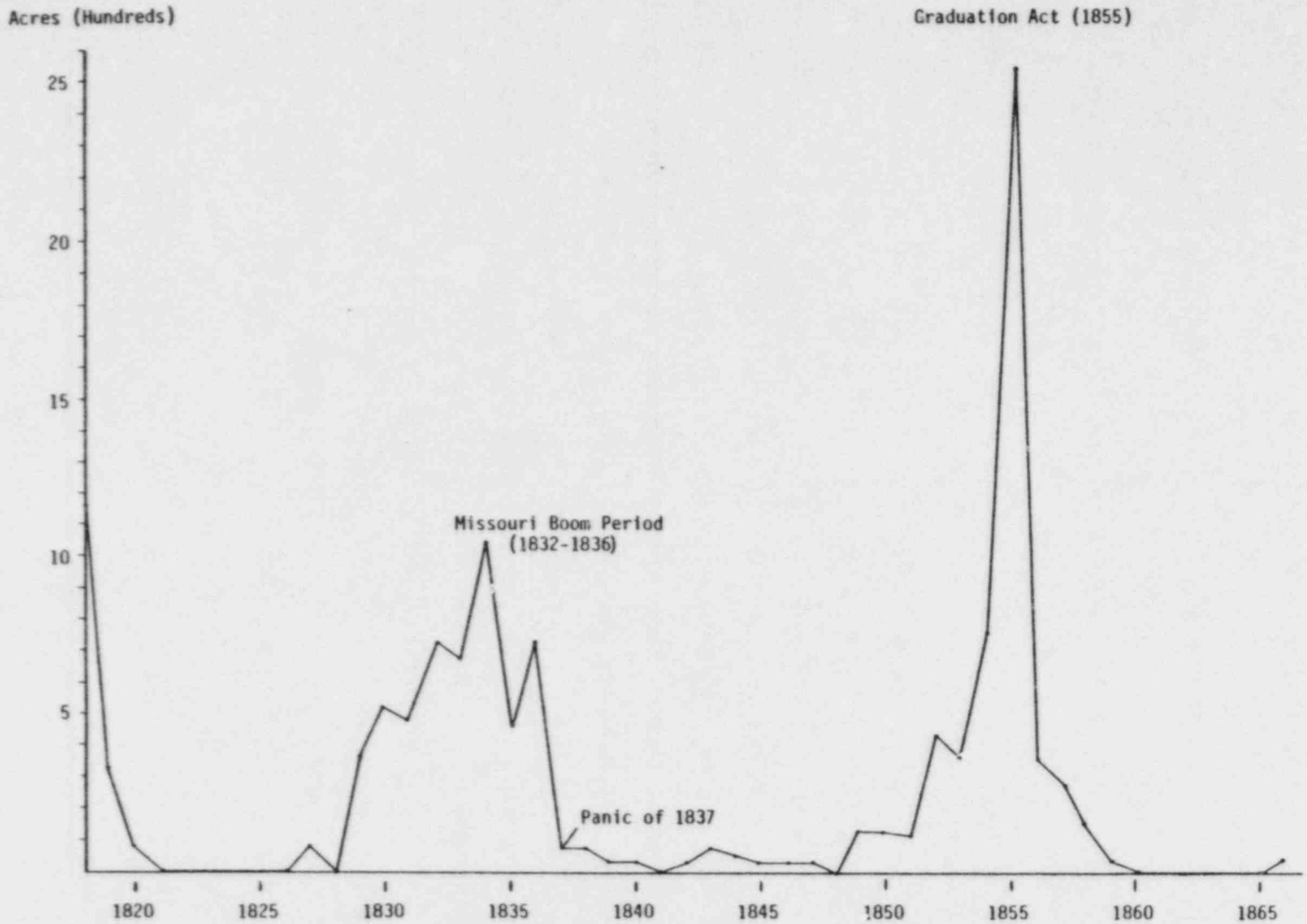
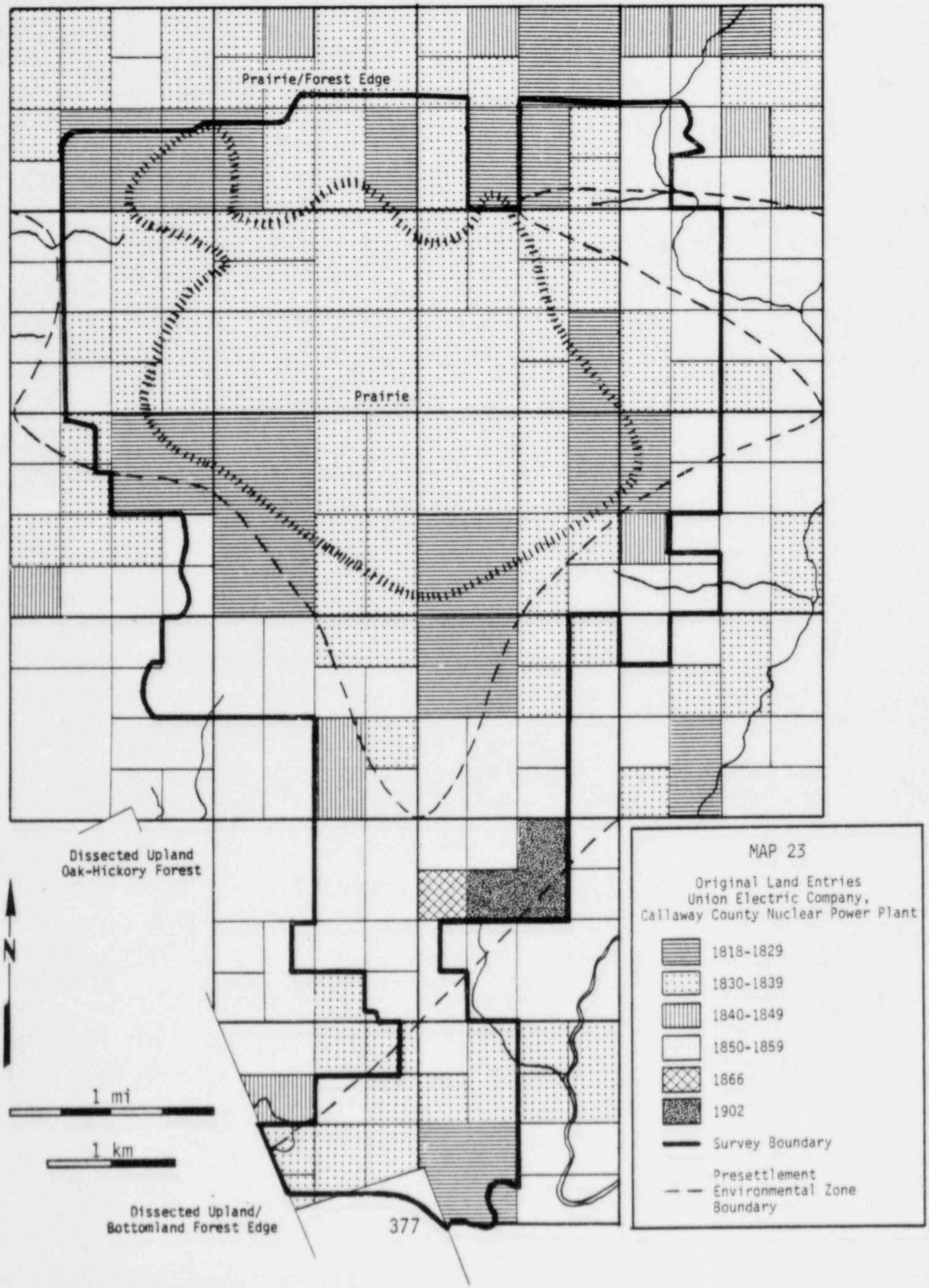


Figure 21. Union Electric Federal Land Sales*

*represents land sales in survey area and encompassing sections


Prairie/Forest Edge
Prairie
Dissected Upland
Oak-Hickory Forest
Dissected Upland/
Bottomland Forest Edge
N
1 mi
1 km
MAP 23
Original Land Entries
Union Electric Company,
Callaway County Nuclear Power Plant
1818-1829
1830-1839
1840-1849
1850-1859
1866
1902
Survey Boundary
Presettlement
Environmental Zone
Boundary

(House 1977:249). The ability of an area to meet these needs has a direct bearing on its settlement process. The project area met all of the above conditions at an early date in the history of Callaway County. Even though there were transportation and communication routes, these were not developed sufficiently enough to allow early settlers to participate in a market economy. Nevertheless, it appears that settlers were attracted to the region by the other advantages it had to offer.

Timber covered three-fourths of the area, affording early settlers the wood necessary for building and fuel. The forested areas also provided sufficient game for the pioneer. In addition, a fresh water source was available in the form of Auxvasse Creek and its tributaries. With these requirements met, it is not surprising that the first settlers entered the study area as early as 1817.

Theories on pioneer settlement to western lands contend that prior to 1830 prairies were avoided until population pressures necessitated their settlement. Prairies were a forbidding and empty environment to pioneer settlers from the East, who thought in terms of trees, not prairies. After two centuries of settlement, these pioneers had developed woodland farming techniques not readily adaptable to prairie farming. Settlers selected land on the basis of the forest growth covering it and assumed that land growing only grasses was not arable (Christisen 1967:168; Jordan 1964:206).

This theory of pioneer avoidance appears valid, if consideration is limited simply to just prairie and forest. The major disadvantages to settling on the prairies were the absence of timber for construction, fencing, and fuel; the lack of usable surface water; and the tough prairie sod, although this would be offset by the backbreaking job of forest clearance. Nevertheless, a choice was made between areas exclusively prairie or forest, the latter being the better choice. A third choice was available to settlers prior to 1850. This was the mixed prairie/forest area that offered the advantages of both forest and prairie. In these areas, settlers had the necessary timber for construction and fuel. In addition, the difficulty of forest clearance could be avoided with the much easier task of breaking a small section of the prairie sod. Finally, prairie grasslands also were immediately available for grazing cattle (Jordan 1964:206-207).

Edge areas appear to have offered more advantages for settlement than the prairie or forest. It seems that settlers recognized these advantages and apparently preferred them for settlement as long as they were available and accessible. This preference is evident in the study area; the first settlers located along the edge of Coats Prairie as early as 1817 (Bryan and Rose 1876:passim). The easy access to capital for land purchases facilitated early and increasingly rapid settlement. While environmental factors determined which areas were preferable, socioeconomic factors determined actual land sale rates. Land sales during 1818 amounted to approximately 1,150 acres and represented purchases made by settlers who had located these the year before (Figure 21). Out of this total, approximately 65% was entered by three individuals. Each of these tracts remained for a number of years in the possession of families who first purchased the land, suggesting that they were not speculators.

Over the next 10 years, 1819 to 1829, sales amounted to only 840 acres. This appears to be due in a large part to the Panic of 1819, brought on by the influx of settlers into western lands during 1818 and 1819. Liberal banking policies and a credit system giving purchasers up to four years to complete payment enabled settlers as well as speculators to buy large tracts of land by requiring little initial capital for land acquisition. By 1820, the credit system was repealed, and full payment was now required for a tract of land. Immigration was curtailed because of this; and, with no one to whom to sell their land, many speculators became over extended and defaulted on their loans. The lack of immigration to the study area is evident in the decline in land sales during the 1820s (Figure 21).

Early Agricultural Period (ca. 1830–ca. 1860)

The next area to be settled was the prairie. By 1834, all available land in Coats Prairie had been acquired with 77% being purchased in 1833 and 1834. These early purchases seem to indicate that the prairie and Prairie/Forest Edge environments provided resources early settlers deemed necessary for survival. Additionally, Coats Prairie and the adjacent tracts were more desirable than those highly dissected areas to the south. Early settlers appear to have felt that it was more economicalto settle in and deal with the prairie and Prairie/Forest Edge than the upland forest area. The majority of tracts in the upland forest area was not entered until 1855, when settlers finally felt the quality of land was equal to the purchase price.

Although the majority of land sales and settlement occurred during the Early Agricultural period, the rate of growth was disjointed. During the first decade of the period, rapid settlement was taking place only to level off during the 1840s. It was not until the late 1840s and through the 1850s that land sales and settlement increased. A complex interaction of environmental variables (determining the area's potential, hence, its worth) and socioeconomic variables (national and regional economy, credit policies, land tenure legislation, etc.), determined smaller, periodic trends during the Early Agricultural period.

In the decade between 1830 to 1840, land sales show a dramatic increase. Approximately 4,800 acres (38% of the study area) were purchased during this period (Map 23). This increase in land sales corresponds to a boom period experienced in the West during 1832 to 1836. Prosperity was due to an increase in productivity and trade along with the reckless printing and lending of money by banks. President Jackson encouraged this boom by depositing federal money in state banks (Meyer 1963:260). Loans on real estate, easily secured at inflated rates, enabled a larger portion of the population to participate in speculation.

During the 1840s, there was a tremendous decline in land sales within the project area. Only 456 acres (4%) were purchased during that period. This trend parallels what was happening on the national market where sales plummetted and appeared to be a backlash from the Panic of 1837. A variety of reasons for the crash included overspeculation in western lands and overtrading. Both of these factors resulted in a drain on specie, multiplication of "wildcat" banks, and Jackson's "Specie Circular" which accepted only gold or silver for land purchases (Gates 1963:358). The panic broke the market, stopping additional speculation. Lands could not be sold at any price, with interest, taxes, and land agent's costs further discouraging promoters (Gates 1963:354).

The Panic of 1837 was slow to reach Missouri. This was due to the state's conservative banking policies, the consistent influx of specie from the Santa Fe trade, and the stabilizing presence in St. Louis banks of large federal deposits, in addition to the funds received from land sales. Since the effects of the depression were not felt in Missouri until 1841, the state did not experience the great financial hardships placed on the majority of the West (Meyer 1963:260-263). However, land sales suffered mostly because of the tight credit policies of Missouri's banks and the lessening of immigration to the state.

The late 1840s marked the beginning of recovery on the national, state, and local levels. A new era of land speculation was being created by rising commodity prices, increased immigration, and an influx of new capital from a favorable balance of trade (Gates 1960:70). The peak years for the third major period of speculation were 1854 to 1858. Once again, the local conditions reflected national trends. Land sales throughout the decade of the 1850s exceeded 5,100 acres (41%); and, in 1855 alone, 2,400 acres were entered, comprising 17% of all land sold up to that time. The major factor was the passage of the Graduation Act (1855), which provided that lands which had not been sold at the government minimum price were not permitted to be sold at lower prices (North 1966:124).

Agricultural-Industrial Period (1860-ca. 1920)

The last lands to be entered in the study area were recorded in 1866 and 1902. The 1902 entry date originally occurred in 1855, but it was discovered that the original entry had been forged. Therefore, the tract was offered for resale and purchased by James N. Tate on March 1, 1902. This completed all land sales in the study area, with subsequent development dependent on partitioning and resale.

Hypothesis 2: During the competition process (see Hudson 1969), if settlement distribution patterns of relatively high density have subsequently declined, then settlement patterns will be more regular rather than clustering.

Discussion: The analysis of historical documentary sources does not support the hypothesis. Although the necessary preconditions of increased farm size and decreased relative density were met in the latter half of the competition phase (defined as 1879-present for the study area), the regular spacing of settlements does not appear as predicted by Hudson.

Hudson (1969) had proposed three phases of rural settlement: colonization, spread, and competition. For the study area, the colonization phase begins with the arrival of the first settlers in 1817 and ends with the formation of counties and towns in the region (1832). The spread phase (1832-1866) is characterized by settlement of the remaining tracts of land, ending with the last major land sale. The competition phase (1876-present) is hypothesized as a period where overall relative farm (settlement) density decreases as farm operations are maximized, resulting in larger and more regularly spaced settlement.

Preliminary analysis of the 1876 atlas of Callaway County indicates that the overall settlement regularity for all environmental zones hypothesized for the competition phase (1876-present) did not occur at the onset of the competition phase. Site density figures show a bias toward the upland prairie zone, with farmsteads not as common in bottomland locations. Settlement in the prairie/forest edge and dissected oak-hickory forest areas shows a regularity but only within these two zones (Table 12). This would seem to indicate that the prairie zone was still preferred by farmers in the area. In fact, site density within the prairie zone remained constant over a 43-year period, demonstrating that the carrying capacity for this zone may have been reached by 1876.

Hudson had predicted that for the competition stage population density would decline and the average farm size would increase. The opposite occurred within the study area during the first 43 years of the

Table 12

Farmsteads and Environmental Zones

Environmental Zones	Percent of Total Area	Densities of Rural Dwellings		
		1876	1897	1919
Dissected Upland Oak-Hickory Forest	41 (8.0 mi^2)	3.12/mi^2	2.50/mi^2	3.37/mi^2
Prairie/Forest Edge	32 (6.2 mi^2)	2.90/mi^2	3.70/mi^2	4.35/mi^2
Prairie	17 (3.4 mi^2)	3.42/mi^2	3.42/mi^2	3.42/mi^2
Dissected Upland/ Bottomland Forest Edge	10 (2.0 mi^2)	1.00/mi^2	2.50/mi^2	5.00/mi^2

competition stage. The average size farm in 1876 was 175 acres (n=72). By 1897 (Figure 22), mean farm size had decreased to 146 acres (n=86). This decline in farm size continued through 1919 (Figure 22) to an average of 127 acres (n=99).

Several reasons could account for this rise in density and decline in farm size from 1876 to 1920. Agriculture, in the long run, tends to produce only low profits because of its ease of entry. High prices induced a rapid expansion into the agricultural sector. This trend is evident within the study area, especially after 1896 which marked a period of generally rising prices. As prices and demand for agricultural goods rose, more people entered the market, thus increasing the number of farms. Additionally, farm machinery and techniques were not developed enough to permit large scale farming. Therefore, farm size was small.

This increase in the number of farms continued through 1919. The following year prices plummetted when the federal government discontinued guarantees on wheat prices. An agricultural depression occurred over the next three years. Recovery was further handicapped when depression struck in 1929. During the early 1930s, a readjustment took place because of the decline in farm prices. Marginal producers were forced to move out of the agricultural sector as competition among farm operations became more intense.

In 1934, average farm size began to increase, a trend that continued until 1970. By 1934, the average farm size in the study area had increased to 137 acres (n=92). A small decline occurred in 1958 to 134 acres (n=94) but had risen to 153.2 acres (n=82) by 1970 and 199.4 acres (n=63) by 1974. This decrease in the number of farms along with an increase in farm size demonstrates what Hudson had predicted for the competition phase. Farmsteads were in the process of adjusting to limits at which a farm could operate economically.

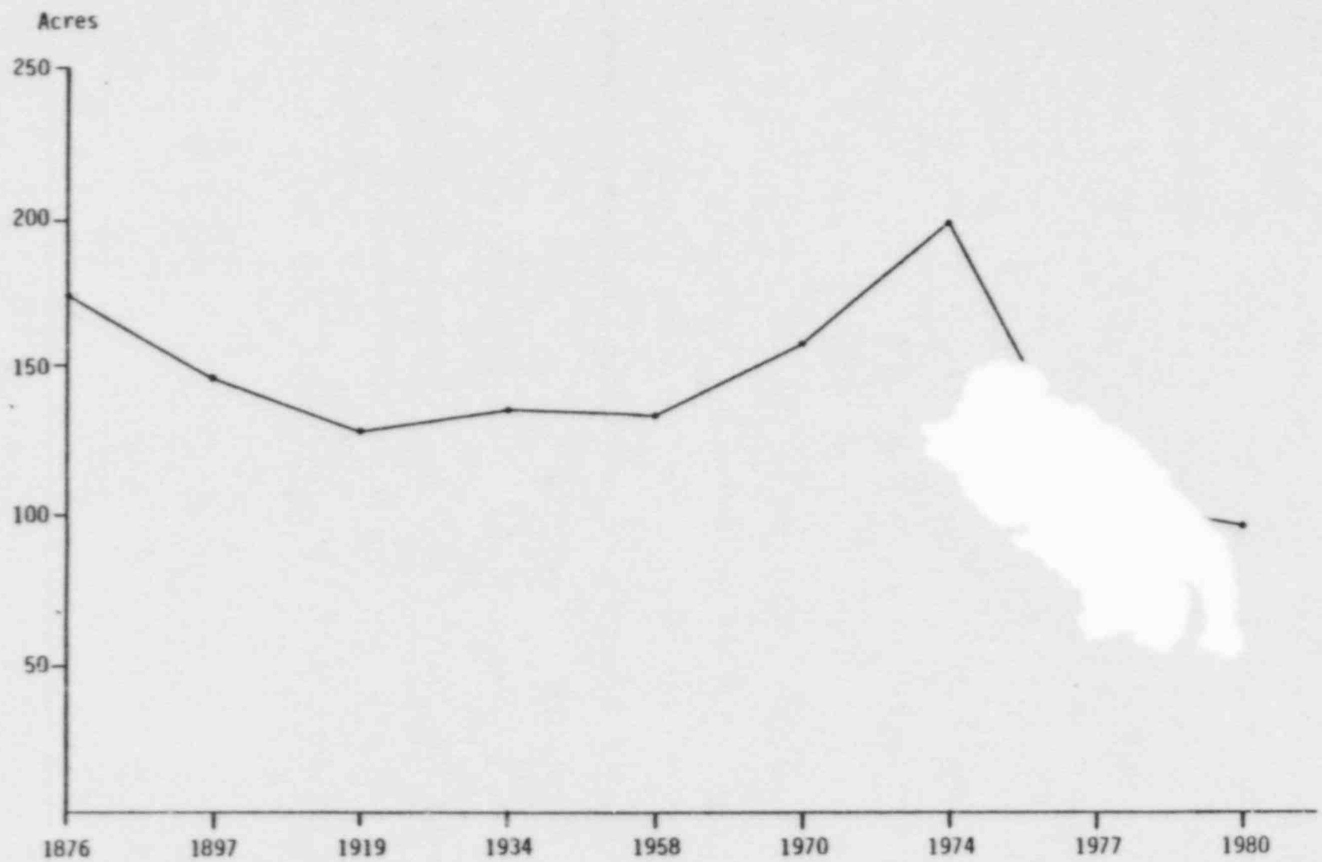


Figure 22. Average Farm Size (1876-1980)

By 1974, a different facet of competition entered the study area, reversing the trend of increased average farm size. Industry was now competing with farms for land. Union Electric Company began purchasing land in the study area for its Callaway Nuclear Power Plant site. Farmers found it economically more profitable to either sell their land, rent it from Union Electric Company, purchase a new farm, or pursue another career. The average farm size now dropped to 107 acres (n=52), with 16 individuals controlling 64% of the remaining land. This trend continued with no interruption to 1980.

Data from the study area only partially correspond to Hudson's findings. Hudson (1969:375) selected his study areas because little topographic influence is present. This permitted Hudson to interpret that clustering settlements is not due to environmental constraints but rather a contagious process of settlement growth. This was not the case in the study area where environmental constraints were a major influence in determining early settlement locations. The rugged terrain of the southern portion of the study area tends to skew settlement patterning for the overall study area.

In order to refine these interpretations, a more detailed analysis based on central place theory and/or nearest neighbor statistics and an expansion of the study area to include the whole of Auxvasse Township will be needed.

SUMMARY AND INTERPRETATIONS

Summary of Cultural Resources

A total of 129 cultural resources elements was identified and evaluated within the 5,848 acres (2,366 ha) of residual lands. The results of field investigations yielded 79 prehistoric archaeological sites, 29 historic archaeological sites, and 21 architectural sites. A brief synopsis of the prehistory and history of the project area followed by cultural resourcas management considerations concludes the report.

Prehistoric Use of the Study Area

A total of 79 prehistoric archaeological sites and 30 isolated artifact finds was located. Of the 79 prehistoric sites, 77 were previously unreported. Based on diagnostic artifacts and comparative information from other regional studies, cultural affiliation has been suggested for 17 sites spanning the entire prehistoric period from Paleo-Indian to Late Woodland/Mississippian (Table 5). At least four sites were determined to be multicomponent. Due to the limited quantity of culturally diagnostic artifactual material recovered, 62 sites could not be assigned to any cultural period. Based on artifact density, artifact diversity, and site size, 50 sites were classified as limited activity sites, 24 sites were identified as field camps, 2 sites were classified as residential base camps or villages, 2 sites were identified as mounds, and 1 site consisted of a field camp and a mound group. In relation to environmental zones, 26 sites were located in the Level Upland Prairie, 27 sites were found in the Prairie/Forest Edge, 12 were discovered in the Dissected Upland Oak-Hickory Forest, and 1-

were found in the Dissected Upland/Bottomland Forest Edge. A brief cultural history of the project area based on the data obtained from the Phase 1 survey is presented below.

The Paleo-Indian manifestation is represented in the project area by a surface find at 23 CY 267 located in the Level Upland Prairie environmental zone. The location of the site in the upland prairie environment, approximately 9 km from the Missouri River bottomland, initially was surprising. According to Chapman (1975:67, 225), Paleo-Indian camp sites were located primarily on hills and terraces adjacent to or within a few miles of major river systems. A probable explanation, however, lies in the highly mobile, nomadic lifestyle of Paleo-Indian peoples. The Paleo site probably functioned as a limited hunting/gathering location and knapping station. The site was the manufacturing location of at least one Clovis Fluted point which failed during lateral thinning. The debitage associated with the fluted point was basically restricted to an area of 30 x 30 m.

The transitional Late Paleo/Early Archaic Dalton period is represented by an unserrated Dalton point found 12 cm below the surface on a ridge top in the Dissected Upland/Bottomland Forest Edge. The site (23 CY 346) is probably a seasonal hunting and gathering camp and knapping station. The exotic chert from which the Dalton point was manufactured suggests wide ranging seasonal movements by Dalton groups. Dalton points have been excavated from the lowest levels of nearby Graham Cave (Logan 1952:67-68) and Arnold Research Cave (Shippee 1966:8) and from two open sites, the Pigeon Roost Creek site in Monroe County (Teter and Warren 1979:227) and the Bergfried No. 4 site in Gasconade County (Diaz-Granados 1980).

Two possible Early Archaic sites were found in different environmental settings in the project area -- a possible Rice Lanceolate component (23 CY 303) was located in the Level Upland Prairie zone, and a probable Graham Cave Notched point (23 CY 359) was located on a narrow ridge in the Dissected Upland/Bottomland Forest Edge. From the presence of pitted stones at both sites, a more diversified subsistence base is suggested for the Early Archaic; however, the evidence is inclusive since 23 CY 359 (and possibly 23 CY 303) is multicomponent. Support for the use of pitted stones during Early Archaic times comes from Arnold Research Cave (Shippee 1966:25) where single and bipitted stones were found at the bottom of the lowest cultural zones.

Four Middle Archaic sites were found in the project area, most of which were located in the Dissected Upland/Bottomland Forest Edge. One small site (23 CY 256), however, was located near the center of the Level Upland Prairie zone and may represent a temporary hunting and gathering location. Two of the Middle Archaic sites (23 CY 345, 23 CY 356) in the Dissected Upland/Bottomland Forest Edge area are located on ridges on either side of Logan Creek, and the third (23 CY 353) is situated on an alluvial terrace of the same stream. Sites 23 CY 353 and 23 CY 356 are interpreted as reoccupied seasonal camps, and 23 CY 345 is a smaller field camp but contained evidence of stone, bone, and/or woodworking activities. Middle Archaic components were well represented at Arnold Research Cave (Shippee 1966), Graham Cave (Logan 1952; Klippel 1971a), Rodgers Shelter (Wood and McMillan 1976), and at the Hermann site (Schmidts 1981) in Gasconade County.

Four Late Archaic sites were found in the project area; two were located in the Level Upland Prairie, and two were found in the Dissected Upland/Bottomland Forest Edge. The two sites in the upland prairie area (23 CY 257, 23 CY 309), which appear to be relatively temporary and specialized in nature, may have been used as locations for the collection and processing of vegetal material. The procurement and reduction of chert resources into bifacial forms also seems to have been a major activity at 23 CY 257. The two sites in the Dissected

Upland/Bottomland Forest Edge (23 CY 20, 23 CY 353), on the other hand, appear to be more permanent and may have served as bases of operation for excursions into the uplands for food and chert resources. Sites 23 CY 20 and 23 CY 353 may be comparable in function to the Booth site located in the Salt River locality (Klippel 1969, cited in Chapman 1975:211). The duration and intensity of the Late Archaic occupations at the latter sites are difficult to assess since both sites are multicomponent.

Preliminary geomorphological investigations indicate there is potential for buried cultural components from Paleo-Indian through Late Archaic times within certain alluvial deposits along Logan and Mud creeks (Fraunfelter 1982:personal communication). Particularly high potential exists for those terraces on which 23 CY 20, 23 CY 352, and 23 CY 353 are located; less potential for buried components exists for those terraces on which 23 CY 344 and 23 CY 355 are situated. These terraces are former floodplain areas built up by sediments carried downstream by Logan and Mud creeks and by sedimentation brought about by floodwaters of the Missouri River backing up into these tributary valleys. With the downcutting of the Missouri River in Holocene times, the resulting steepening of the tributary gradients caused the terraces in question to be reduced in size by the downcutting of the lower meandering reaches of Logan and Mud creeks, especially the former. Since the surfaces of these terraces apparently have not been subjected to extensive erosion, the parts of the terraces that remain should be very favorable locations for buried archaeological sites (Fraunfelter 1982:personal communication).

Buried archaeological deposits have been found in similar geomorphological settings in the Hinkson-Perche Creek valley in Boone County where radiocarbon dates of cultural material found 80 cm and 130 cm below the surface revealed two Late Archaic occupations (Powell 1982:51; Wright 1981:137).

The Early Woodland period is not clearly understood or well defined in east-central Missouri largely due to overlapping cultural patterns from both preceding and succeeding periods. The relevant data found in the project area was no exception as one probable transitional Late Archaic/Early Woodland camp site was located on a ridge top in the Prairie/Forest Edge area. Similar blending of Late Archaic and Early Woodland cultural traits has been well documented in the Salt River locality (Angus and Ruppert 1977; Klippel 1972; Ruppert 1976) as well as in the Long Branch Lake area (Grantham 1977:179).

Two possible Middle Woodland sites were located in the Dissected Upland/Bottomland Forest Edge area. Site 23 CY 20, situated on an alluvial terrace, was recognized by Evans and Ives (1973:9) as containing a Middle Woodland component, based on a Steuben Expanding Stemmed-like point, grit tempered pottery, and heat treated chert. A Middle Woodland affiliation was also suggested for 23 CY 359 located on a ridge top, based on a point tentatively identified as Steuben Expanding Stemmed. Most of the relatively few Middle Woodland sites reported from the Northeast Prairie Region are minor settlements with no known classic Hopewell sites. A small camp site (23 CY 30) located at the mouth of Cedar Creek in Callaway County (similar to the setting of 23 CY 20 at the mouth of Logan Creek), however, may represent an intrusion of Hopewell influence into the area (Chapman 1980:52).

Late Woodland sites are the most numerous and complex settlements in the project area. Seven Late Woodland sites were located by the survey, and all were found in the Dissected Upland/Bottomland Forest Edge. These sites included four habitation sites and three burial mound sites. Three of the habitation sites (23 CY 20, 23 CY 352, 23 CY 353) are located on alluvial terraces along Logan Creek near its junction with the Missouri River floodplain, and the fourth (23 CY 359) is situated on the top of a nearby ridge. Similar settlement patterns of Late Woodland habitation sites, located on terraces in floodplain environments at the junction of creeks with major rivers, were noted by Klippel (1965:32) along the Lower Osage River valley. All three mound sites (23 CY 74, 23 CY 350, 23 CY 356) are located on prominent bluffs overlooking the Missouri River floodplain. This type of setting on escarpments overlooking major stream valleys is consistent for Late Woodland mounds in central Missouri (Denny 1964:137; Klippel 1965:32; McMillan 1963:15). These mounds probably represent a manifestation of the Boone Phase of the Late Woodland period, which is basically confined to the Lower Missouri Valley II locality (Chapman 1980:112-121; Denny 1964:133-153).

Two of the alluvial terrace sites (23 CY 20, 23 CY 352) contained extensive occupational debris, including pottery sherds, and probably functioned as residential base camps or villages with ceremonial ties to the mounds located on bluff tops on either side of Logan Creek. This association of base camps near mound locations also has been noted for (Boone Phase) Late Woodland sites (Chapman 1980:115). Smaller habitation sites such as 23 CY 353 and 23 CY 359 probably were occupied seasonally and served as ancillary site locations. Although no Late Woodland sites per se were found north of the Dissected Upland/Bottomland Forest Edge zone, temporary hunting camps and collecting stations are probably represented in the other environmental zones by several of the unaffiliated limited activity sites located by the survey.

Late Woodland settlement patterns identified by Grantham (1977:200-201) in the Long Branch Reservoir area included a shift from an earlier concentration of site locations along stream drainages to a more broad pattern of site dispersal with larger centralized and structured sites in lower river valleys and smaller dispersed ancillary sites along the upper reaches of stream drainages. Haas (1978:12) noted increased sedentism and climax of site locations in the bottomlands during the Late Woodland period in the Loutre River/Little Femme Osage River drainages. Forthcoming reports from the Salt River locality will summarize settlement and subsistence patterns in northeastern Missouri.

The Late Woodland manifestation in Callaway County is well represented in the upper deposits of nearby Arnold Research Cave. The upper cultural deposits in this dry cave contain a rich inventory of perishable material such as wooden and woven artifacts (Henning 1966; Shippee 1966), which probably relate to the Late Woodland period. Late Woodland grit and sand tempered pottery from the cave compares favorably with that found at 23 CY 20 and 23 CY 352. Arnold Research Cave inhabitants were probably contemporaneous and closely associated with these village sites located 4 km to the southwest. Late Woodland hunting and gathering subsistence activities suggested by food remains from mostly the upper cultural deposits at Arnold Research Cave (Shippee 1966:26-27) include large (deer and elk) and small (turkey, turtle, fish) game hunting and intensive nut, fruit, and seed gathering (walnuts, hickory nuts, butternuts, hazelnuts, pecans, acorns, plums, pawpaw, persimmon, amaranth, and chenopodium). Plant cultivation is suggested by the occurrence of curcurbit seeds in the cave deposits (Ray 1981c; Shippee 1966:27).

It is important to note that several investigators (Chapman 1980; Henning 1979; Klippel 1965; McMillan 1963; Teter and Warren 1979; Vehik 1978) have suggested that Late Woodland phases probably persisted well beyond 1000 B.P. in the central portion of the state. Although Mississippian type artifacts occasionally occur throughout the region, Late Woodland phases are interpreted as persistent manifestations that were contemporaneous with but only slightly influenced by peripheral contacts with Mississippian centers in the Mississippi River valley and Kansas City area. Because of these and similar observations in the project area, two sites containing Mississippi Triangular arrow points were assigned temporal positions between the Late Woodland and Mississippian periods.

One Late Woodland/Mississippian site (23 CY 322) was located in the Dissected Upland Oak-Hickory Forest zone and one (23 CY 304) was found in the Prairie/Forest Edge area. Site 23 CY 322 is located on a narrow ridge top and probably represents a small hunting camp and knapping station. Site 23 CY 304, on the other hand, is a somewhat larger site and probably represents a seasonal field camp and knapping station. The site is located on the gentle slope of a low ridge near the edge of the upland prairie. Artifacts indicative of hunting and plant food preparation are possibly supportive of seasonal exploitation of the Prairie/Forest Edge area for faunal and floral resources with procurement forays into the adjacent prairie for seeds and grains.

Evidence for post-Mississippian aboriginal occupations in the study area was lacking. Oneota or protohistoric sites were not found during the survey, and none is known from the general vicinity surrounding the project area. Although historic period Amer-Indian groups inhabited Missouri well into the nineteenth century, their presence in the study area has not been demonstrated.

The survey was designed to examine two areas of prehistoric human behavior: the relationship between settlement patterns and potential food resources and chert procurement and utilization, both of which are suitable for investigation during this type of survey. The preliminary results of the Phase I survey suggests directions for future research in the study area.

In general, survey results indicated that site density and site complexity was greatest in edge areas of high food resource potential, as expected, particularly in the Dissected Upland/Bottomland Forest Edge area. A general trend of decreasing site density and site complexity for zones of progressively lower food resource potential also was observed, although not fully supported, possibly due to varying survey conditions or distance to permanent water sources.

Research problems for future study should include investigations of prehistoric settlement/subsistence patterns, particularly focusing on Late Woodland/Mississippian occupations. Such research may include study of the apparent emphasis on upland areas rather than bottomland zones, the usual focus of Late Woodland/Mississippian settlement. Also of interest is the persistence of Late Woodland manifestations and general lack of Mississippian villages or hamlets in this portion of Missouri.

Some general patterns of chert procurement and utilization were revealed by analyses of chert artifacts from selected sites located in different portions of the project area. These patterns include chert procurement practices, chert preference or selection patterns, lithic reduction strategies, and heat treatment practices. Although a temporal discussion of chert use through time would be tenuous based on Phase I survey data, a preliminary discussion of the spatial aspects of chert exploitation is both possible and informative.

Analysis of lithic artifacts collected from the project area (Table 8) firmly supported the proposition that prehistoric people in the study area utilized locally available chert resources as opposed to importing nonlocal cherts; however, use of local chert indicated differential exploitation patterns between the available types. Artifacts collected from four sites located on or near Burlington chert-bearing strata on the upland plateau indicated a nearly exclusive use of Burlington chert with only minimal amounts of Jefferson City (0.5 - 1.8 km distant) represented in the debitage. Examination of cores and decortication flakes with identifiable cortex surfaces revealed a strong preference (80%) for exploiting chert from stream deposited sources on this upland plateau in the northern portion of the project area.

An analysis of chert artifacts from five sites located on or near Jefferson City chert-bearing strata in the dissected upland/bottomland area revealed an unexpected consistent 3:1 preference for Burlington chert over Jefferson City chert. Although Burlington chert does occur in stream deposits a few hundred meters from the sites in this (southern) portion of the study area, residual Jefferson City chert sources are located on or adjacent to the sites. The preference or selection for Burlington chert and supplemental role for Jefferson City chert may be associated with procurement practices. There appears to have been a preference for procuring chert from stream deposited sources where chert occurs in larger quantities rather than procuring chert from residual sources sparsely scattered along ridge slopes. Although it has not been quantified, the possibility that Burlington chert occurs in larger quantities than Jefferson City chert in the local gravel bars could account for the higher precentages of Burlington artifacts found at the sites. On the other hand, if Jefferson City nodules are as numerous as Burlington nodules or if Burlington chert nodules in the southern portion of the study area are generally of poor quality (as preliminary observations suggest), then this would imply intensive selection for Burlington chert. Curiously, these patterns contrast sharply with those found to be operative in southwest-central Missouri (Ray 1981a). In the Harry S. Truman Reservoir area, there was typically a 3:1 selection for Jefferson City over Burlington in locations with equal access to Burlington and Jefferson City chert sources.

An analysis of debitage from sites in the dissected upland/bottomland area indicates that most of the initial decortication of Burlington chert occurred at the stream deposited sources and that only flake-blanks or bifaces were transported to the sites for secondary and tertiary reduction. Additional factors possibly contributing to the predominance of Burlington chert artifacts at sites in the dissected upland/bottomland area may be ideological preference for the fossiliferous Burlington chert or certain technological advantages such as susceptibility to heat treatment.

An analysis of heat treated lithic artifacts revealed that the practice of thermal alteration of chert is more common among Burlington artifacts than Jefferson City artifacts. Heat treatment was especially high among Burlington tools. A comparison between heat treated Burlington artifacts found on sites located on the upland plateau to sites located in the dissected upland/bottomland area indicated that heat treatment was more than twice as great in the latter area. This may be a function of different activities conducted at sites in different portions of the project area. Sites on the upland plateau were probably temporary, specialized sites at which heat treatment was not a major activity, whereas sites in the dissected upland/bottomland area were more permanent base camps where more diverse and time-consuming activities took place, including annealing chert. Reduced knapping quality due to accelerated weathering caused by the fluvial transportation also may have increased the need to heat treat Burlington chert in the dissected upland/bottomland area.

Further investigations of prehistoric chert exploitation should be considered as part of future research in the Callaway Nuclear Power Plant study area. The study area offers an opportunity to examine a situation not often encountered in studies of prehistoric technology, the presence of three high-quality cherts amenable to lithic tool production: Burlington, Jefferson City, and Callaway cherts. This situation invites a host of questions examining availability of and access to these materials, as well as questions regarding selection and preference as evidenced by actual exploitation patterns.

Historic Use of the Study Area

A total of 29 historic archaeological sites was located in the study area during the Phase I survey for Union Electric Company. All 29 historic sites were previously unreported. Based on diagnostic artifacts and historical documentation, cultural affiliation has been suggested for 19 sites spanning the Early Agricultural to Recent Historic periods. Due to an insufficient amount of artifactual material and historical documentation, the remaining 10 sites could not be assigned to any cultural period. Nineteen sites were identified as habitation sites based on foundation remains and artifact scatters consisting of ceramics, building materials, and domestic artifacts. The remaining 10 sites consisted of one nonhabitation site (outbuilding), one dump area, three cemeteries, and four sites whose function could not be identified. In relation to environmental zones, 15 sites were located in the Level Upland Prairie, 7 sites were found in the Prairie/Forest Edge, 5 were discovered in the Dissected Upland Oak-Hickory Forest, and 2 were located in the Dissected Upland/Bottomland Forest Edge.

The Exploration through Pioneer Frontier periods (1541-1830) are not represented archaeologically in the project area. Three reasons account for this: (1) permanent settlement within the project area did not occur until 1818, (2) modern agricultural practices in Missouri and throughout the Midwest usually destroy what little evidence remains of such sites, and (3) safety regulations required early demolition and bulldozing of 15 sites by Union Electric Company. This prevented any chance of determining whether or not any of these sites might have dated to an early cultural period (i.e., Pioneer Frontier: 1803 - 1830). However, the remaining three periods, Early Agricultural (1830 - 1860), Agricultural-Industrial (1860 - 1920), and Recent Historic (1920 to present) are all represented archaeologically in the project area.

The settlement of Callaway County and the project area was a direct result of the first major movement into the interior that began in earnest around 1810. This migration of settlers was up the Missouri River because it offered a natural route into the interior where the richest and most abundant land was found along its banks.

Three factors determined locality of early settlements: forests, game, and water. Prior to 1820, settlements were established along the rivers because they offered the conveniences of timber and water. Once the lands along the Mississippi and Missouri rivers were filled, the flow of immigration was deflected to the uplands and prairies. The smaller prairies were settled first because they were surrounded by forests and water, having an elevated, rolling, or undulating surface. They were close to a timber and water source, and the land did not have to be cleared (Ellis 1929:113-114).

Such a pattern occurred in the settlement of Callaway County and the project area. When the first settlers began arriving in 1815, they found the previously established (1808) trading post of Côte Sans Desseins. This small settlement was located along the Missouri River and consisted of about 30 families. In addition, a large section of land (6,002.5 acres) along the river had been granted to August Chouteau in 1798. Thus, even before the first major influx of settlers into the area, sections of land along the river had already been claimed.

Early land sale records for the project area indicate that settlers quickly moved into the edge area of mixed forest and prairie. In these areas, settlers had the necessary timber for construction and fuel without the difficulty of forest clearance. In addition, prairie grasslands also were immediately available for grazing livestock.

The next area to be settled was the prairie. This trend indicates that prairie lands were more desirable than the highly dissected areas to the south. It appears that the early settlers felt that it was more economical to settle in and deal with the prairie than the upland forest area. The majority of tracts in this area was the last to be settled.

Analysis of the historic settlement pattern for the project area revealed that environmental constraints were a major influence in determining early settlement locations. The rugged terrain of the southern portion of the study area tends to show settlement patterning for the overall study area. The early preference of settling within the prairie and prairie/forest edge is still prevalent today.

Future research potential of the historic period resources in the study area includes problems of both theory and method in historical archaeology. An expansion of the study area to include either all of Auxvasse Township or Callaway County would allow for a modeling of historic settlement patterns that may be applicable to other parts of the Midwest through comparison with other studies (e.g., Ekberg et al. 1981; Miller 1979; O'Brien and Warren 1979). Such an analysis may be based on a number of techniques relatively new to historical research, (e.g., central place theory, nearest neighbor statistics, trend-line analysis).

Of the 129 cultural resources identified and evaluated, 23 prehistoric sites and 2 historic sites are considered potentially significant and eligible for nomination to the National Register of Historic Places. None of the architectural sites is considered potentially eligible for nomination to the National Register. A discussion of the National Register criteria, the potentially significant sites, potential impacts, and management recommendations are presented in A Cultural Resources Management Plan for Residual Lands at the Union Electric Company Callaway Nuclear Power Plant, Callaway County, Missouri, which supplements this volume (McNerney 1983).

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APPENDIX A

Scope of Work

Specification No. ESD-104

Request for a Proposal to Conduct A Cultural Resource Survey At The Callaway Nuclear Power Plant, Callaway County, Missouri

Environmental Services Department
Union Electric Company
March 1, 1981

Table of Contents

Specification No. ESD-104

Request For A Proposal To Conduct A
Cultural Resource Survey At The
Callaway Nuclear Power Plant, Callaway County, Missouri

1.0 Introduction

In compliance with the National Historic Preservation Act of 1966 (P.L. 89-665), and Executive Order 11593 (Protection and Enhancement of the Cultural Environment), Union Electric Company (U.E. Co.) is soliciting proposals to perform cultural resource investigations at the Callaway Nuclear Power Plant, Callaway County, Missouri. Accomplishment of this work will provide documentation evidencing United States Nuclear Regulatory Commission compliance with the Advisory Council on Historic Preservation regulations, 36CFR800 "Protection of Historic and Cultural Properties" and other applicable federal and state regulations.

The scope of work for this project includes: (1) an architectural survey and analysis which evaluates the historic significance of original structures on the plant site; (2) an archaeological survey of the project area; and (3) development of an appropriate management plan for all cultural resource sites within the project area. Investigations will be coordinated with the Nuclear Regulatory Commission and the Missouri Department of Natural Resources, Division of Parks and Historic Preservation with regard to applicable state and federal guidelines:

2.0 Location and Description of Study Area:

The Callaway Plant is located approximatey 10 miles southeast of the City of Fulton in Callaway County, Missouri, and approximately 80 miles west of the St. Louis metropolitan area. The Missouri River flows in an easterly direction approximately 5 miles south of the site at its closest point. Of the total 7,230 acres owned by U.E. Co. at Callaway, the plant site contains approximately 3,188 acres; the plant site peripheral area occupies 2,040 acres; and the corridor area occupies an additional 2,002 acres. The plant property lines, locations of physical structures to be surveyed and survey exclusion areas are shown on the map in Appendix A.

3.0 Previous Research

Previous research within the Callaway Nuclear Plant project area was conducted to identify those cultural resources which could be potentially impacted by plant construction. Those areas surveyed included the plant site power block and lay down area, transmission line and pipeline corridors and the intake area.

The following reports are the result of previous work funded by Union Electric Company:

a. 1973 "Initial Archaeological Survey of the Proposed Union Electric Company Nuclear Reactor Near Reform, Callaway County, Missouri." David R. Evans and David J. Ives.

b. 1975 "Proposal for Mitigation of Impact on Archaeological Site 23CY20." David R. Evans.

c. n.d. "Archaeological Site 23CY20: Recommendations." David R. Evans and David J. Ives.

d. 1976 National Register of Historic Places Nomination Form, Union Electric Company Site (23CY20), David J. Ives.

e. 1979 "23CY20 The Preservation Plan for an Archaeological Site." David R. Evans and David J. Ives.

f. 1978 "A Cultural Resources Survey of the Proposed Union Electric Company Electric 345 KV Transmission Line

Right-of-Way, Callaway and Montgomery Counties, Missouri." David R. Evans and David J. Ives.

g. 1979 "A Cultural Resources Survey of the Proposed Union Electric Company Electric 345 KV Transmission Line Right-of-Way, Gasconade and Osage Counties, Missouri." David R. Evans and David J. Ives.

h. 1979 "A Cultural Resource Survey of the Proposed Bland Substation Site, Gasconade County, Missouri." David R. Evans.

4.0 Scope of Work

a. The Scope of Work encompasses an intensive on-the-ground survey and report evaluation of an area sufficient to determine the number of resources present, their spatial and temporal extent and their potential eligibility for the National Register of Historic Places, and the development of an appropriate management plan for all cultural resource sites within the project area. The Contractor and his staff shall conduct this study using accepted methodology in accordance with the Department of Interior's proposed 36 CFR Part 1210 (formally 36 CFR Part 66) and the Missouri Historic Preservation Program's "Guidelines for Contract Cultural Resources Survey Reports and Professional Qualifications" (Appendix B).

b. The Contractor shall be responsible for the preparation of a report of findings, and for fulfilling the requirements stated in the Scope of Work and the Missouri Historic Preservation Program's "Guidelines for Contract Cultural Resources Survey Reports and Professional Qualifications."

c. The Contractor may suggest alternative methodologies in his proposal which deviate from the procedures outlined in 5.0 but are acceptable to U.E. Co. and the Missouri Historic Preservation Program. If alternative methodologies are presented, they should be fully detailed and costed separately.

5.0 Study Approach

The Contractor shall investigate sites in accordance with the Scope of Work and the Research Design using accepted and appropriate field and laboratory methods (in accordance with the proposed 36 CFR Part 1210 and Missouri Historic Preservation Program's "Guidelines for Contract Cultural Resources Survey Reports and Professional Qualifications"). The Contractor will:

a. Conduct an extensive review of literature, reports, and other sources of information in the depth required for a comprehensive coverage of the study area and accumulate, develop, and interpret the acquired scientific and technological data.

b. Review the survey forms for all known local cultural resource sites and determine their relationship to existing project features, i.e., power plant, roads, power lines, public use areas, leased farming areas, or administration facilities.

c. Review all previous reports concerning cultural resources associated within or in close proximity to the project area.

d. Review records and research pertinent library sources concerned with cultural resources within the project boundaries for archaeological, architectural, or historical information. Consult with the Missouri Historic Preservation Program and other organizations and individuals knowledgeable of criteria in the general project area.

e. After completion of literature review and background research and prior to beginning of field investigations, submit a

Research Design for systematic subsurface evaluation for all areas, as appropriate, which will optimize the probability of revealing the presence of any cultural sites or remains. It is anticipated that a shovel-testing program will be most efficacious and cost-effective in locating cultural remains in some areas. However, the Contractor may opt for an augering, coring, or other program, if the proposed methodology is determined to be equally or more effective and efficient. It will be necessary to coordinate certain aspects with U.E. Co. regarding public uses and farming operations. The Research Design must be approved in writing by Union Electric Company, the Nuclear Regulatory Commission and the Missouri Historic Preservation Program and Union Electric Company before field investigations can begin. Approval coordination will be conducted by Union Electric Company.

f. Conduct an intensive cultural resource survey (archaeological, historical and architectural) of the project area shown in Appendix A. The survey will include an architectural survey of eight structures located on plant property. Investigations are to be conducted in a prioritized manner; project area priorities will be determined after award of Contract. Total area to be surveyed is approximately 7,000 acres, but the number of acres to be surveyed may be adjusted.

g. The Contractor shall also examine all exposed or disturbed areas for surface remains. If shovel testing is appropriate, then shovel test intervals shall be no less than 15 meters except in areas where closer spacing is required to define site boundaries or otherwise acquire needed site evaluation information. Shovel tests should be of sufficient size and depth to ascertain the presence or absence of cultural materials. When sites are located, it will be necessary to adjust the spacing, size and depth of shovel tests to accommodate the specifics of each situation and to define the spatial extent of each archaeological site. The following determinations are required:

1) Delineate site boundaries and ascertain subsurface components by limited testing, including shovel testing and/or core sampling.
2) Collect sample of surface materials at each site.
3) Photograph all phases of field work using black and white film. Illustrate diagnostic features and artifacts using either black and white photography or line drawings. Photographs are to be adequately cataloged and incorporated into the permanent records of the site excavations.
4) Record source of materials and features, including maps and graphs when applicable.
5) Collect materials for dating when appropriate.
6) Process, catalog and curate all recovered materials.
7) Make identifications of cultural materials to fulfill the requirements of Research Design and provide a base for future use by the archaeological profession as data for research.
8) Perform all measurements using the metric system.

h. When cultural materials are discovered, conduct sufficient investigations to satisfactorily evaluate such sites in terms of published criteria of eligibility for the National Register of Historic Places (36 CFR Part 1202, Federal Register, Vol. 45, No. 75, 16 April 1980). All sites located within the study area must be fully evaluated and complete documentation furnished in order to substantiate recommendations of eligibility (or non-eligibility) for the National Register. Site information which must be furnished will include a detailed description of the nature and extent of all deposits, alterations and disturbances, as well as a detailed statement of significance if any sites are deemed to meet National Register criteria. This information shall be used in developing the management plan.

i. Any new archaeological sites encountered shall be designated with site numbers in coordination with the Missouri HPP and the Archaeological Survey of Missouri (ASM). For architectural/historical sites, a Missouri HPP Inventory Form will be completed. Sites found but which are judged non-significant shall be documented to support that judgement.

6.0 Schedule of Work

a. Contract Schedule.

The Contractor shall diligently pursue the study in a professional manner to meet the schedule specified below. Prior to initiation of actual field work, the Contractor shall submit a Research Design for review and approval in writing by Union Electric Company, the NRC and the Missouri HPP as stated in 5.0 (e). He shall also coordinate field schedules prior to initiation of field work and all field activities during the study with the Union Electric cultural resources coordinator. The Contractor shall prepare the Research Design and make logistical arrangments within approximately 2 to 3 weeks after award of the contract. The field survey, where sites are identified (Phase I), should be completed by the end of the fourth (4th) month. If a need for additional field work is identified it can be scheduled for later during the Phase II studies. The Contractor shall complete all work in a timely manner and in accordance with the schedule of work stated below.

Project Schedule

Phase I		
	0	Contract award
Week	2	Complete background research
Week	3	Submit Research Design
Week	6	Begin field survey (after approval of Research Design by U.E. Co., NRC, and Missouri HPP)
Month	4	Complete field survey
Month	4-5	Begin analysis, draft outline and write-up of data
Month	5	Submit a brief summary of findings and and detailed outline of report content and format for review. Prepare Technical Report including detailed plan.
Month	7	Submit draft report to U.E. Co. for review
Month	7	Discuss review of the draft report and begin to rewrite.
Month	8	Submit final report
Phase II		The scope of Phase II studies will be determined from the results of Phase II studies.

b. Meetings

1) The Contractor shall review in writing the progress of the work performed every two weeks with the Union Electric cultural resources coordinator.

2) The Contractor shall attend coordination meetings with U.E. Co. and others as required to include at least one during the field season at his field headquarters and one during the laboratory and analysis period at his laboratory facilities.

3) The Contractor shall attend one meeting with U.E. Co. to discuss the review of the draft of the report.

4) Union Electric may require the Contractor to furnish the services of technically qualified representatives to attend coordination meetings in addition to those specified above.

c. Report Content and Schedule

1) A report of findings shall be prepared by the Contractor and shall comply with the Missouri HPP "Guidelines for Contract Cultural Resource Survey Reports." The main text of the report shall be written in a manner understandable by persons not professionally trained as archaeologists. Detailed presentation and discussion of data of interest to the archaeological profession shall be included in a second part of the report or as appendices. The report is intended for use by the non-archaeologist as well as be of value to the professional. The use of illustrations is encouraged.

2) The final report of findings shall be authored by either the principal investigator or project director. The principal investigator is the person responsible for day-to-day activities including field supervision, analysis of work, and write-up of the initial draft of the report. He shall spend 50 percent field time and 50 percent laboratory time which has been allocated to this contract for these activities. The project director is that person who oversees and administers the contract and who does the final editing of the report. The archaeologist (regardless of title) whose credentials are used to justify the assumption of performance of professional work shall be on-staff and the author or co-author of the report.

3) By the fifth (5th) month of the contract, in the report writing phase, the Contractor shall provide Union Electric Company with a brief summary of findings and an outline of the final report content and format. It is anticipated that this summary will also be reviewed by the Missouri HPP.

4) The Contractor shall submit a monthly progress report which is an informational guide to how much of the contract has been completed. A detailed monthly report shall accompany the progress report which shall contain an up-to-date account of all field work (including maps) and laboratory procedures and results. These reports shall be completed and forwarded to the Union Electric cultural resources coordinator by the 15th day of each month.

5) Twelve (12) copies of a complete draft of the report shall be submitted to Union Electric Company for the purpose of review within seven (7) months after receipt of notice to proceed. The draft shall have been edited by the Contractor for punctuation, spelling, grammatical, stylistic, and typographical errors.

   (a) After a review period of approximately one (1) month, Union Electric Company will return the draft to the Contractor.

   (b) The Contractor shall then complete necessary revisions. The report shall be professionally edited, and submitted within one (1) month after receipt of the reviewed draft. The Contractor shall submit one set of originals and 60 copies of the final report of findings to Union Electric Company. The copies shall include all plates, maps, and graphics assembled in place.

   (c) The final originals and two copies of the report shall be typed double spaced on one side of paper with the margins set for reproduction on both sides of 8 1/2" x 11" paper. Photographs, plans, maps, drawings, and type must be clean and clear.

   (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 report as an appendix but which are not to be included in the report consist of:

(1) Six (6) copies of 7.5 minute USGS maps and four (4) sets of original Union Electric Real Estate tract maps indicating exact locations of all archaeological resources and areas which were physically surveyed. (If 7.5 minute USGS maps are not available, 15 minute maps shall be used.)

(2) Table showing the location of each site, site designation, relation to study features, types of threats, and recommended actions.

(3) Photographs of representative cultural resource sites and collections from this study and all negatives of photos, if any.

(e) Other Information. Copies of materials not suitable for publication in the report shall be submitted with the final draft. These materials include feature maps, statistical analysis data (summaries of statistical data are to be included in the publishable report), repetitious photographs, a complete listing of all materials recovered, locations where records are maintained, and other documentation not of interest to most readers of the report. Large masses of specialized statistical data, such as certain artifact measurements, shall be presented as an appendix. Publication of such bulk statistics in the report may not be appropriate.

(f) Storage of Materials. Attached to the letter of transmittal for the final report shall be a listing of all cultural materials found during the field investigations. Collections shall be properly stored in containers clearly marked. These materials shall be stored at a qualified repository within Missouri mutually agreed upon by the Union Electric, and the Missouri HPP. If the materials are to be removed from the curatorial facilities, this action must be approved in writing by the Missouri HPP and Union Electric. A cumulative inventory of all collected materials shall be submitted with the final report.

6) Total time for report submitted shall not exceed 8 months from the date of receipt of notice to proceed.

7.0 Responsibilities of the Contractor and Union Electric

a. Data Availability. Union Electric shall provide the Contractor with Real Estate tract maps, available background information, remote sensing data reports (if any) and correspondence as needed. In addition, Union Electric will provide support to the Contractor regarding suggestions on data sources, format of study outline and report, and review of study progress.

b. Right-of-Entry and Crop Damages. The Contractor shall have right-of-entry to all property owned by the Union Electric but access will be coordinated with Plant Security, the Union Electric Cultural Resource Coordinator and others, when appropriate. Compensation for damages to crops planted on Union Electric property leased to various individuals shall be the responsibility of the Contractor.

c. Evaluation for National Register. The Contractor shall evaluate all known archaeological, historic and architectural resources located within the project area or impacted by the project directly or indirectly to determine their potential suitability for nomination to the National Register of Historic Places. The Contractor shall make recommendations for Phase II studies which will include the preservation, management, and nomination of those sites which appear to qualify. If potential National Register site(s) exists, the Contractor may be asked during Phase II to prepare all necessary Requests for National Register Eligibility Forms and National Register forms, and submit them to Union Electric for review and processing in cooperation with the Nuclear Regulatory Commission (NRC) and the Missouri HPP. After the investigations are completed, the Contractor shall document in writing the condition of the site in accordance with 36 CFR Part 1204.

8.0 Staff and Facility Requirements

a. Project Director and Archaeologist. Minimum qualifications are set forth in proposed 36 CFR Part 1210 and by the Missouri HPP - "Guidelines for Contract Cultural Resource Survey Reports and Professional Qualifications." These individuals shall be identified in the proposal. Once identified, their role will not change without written approval from U.E. Co.

b. Consultants. Personnel hired or subcontracted for their special knowledge and expertise must carry academic and experiential qualifications in their own fields of competence. These individuals must be approved by U.E. Co.

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

   1) Adequate permanent office, field, and laboratory equipment necessary to conduct operations defined in the Scope of Work.

2) Adequate laboratory and office space and facilities for proper treatment, analysis, and storage of specimens and 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.

9.0 Cost and Contract Information

The cost estimate data sheet found in Appendix D should be completed and returned with the proposal. In addition to the cost data sheet it is requested that you submit current billing rates and any other cost information you feel is appropriate.

It is noted that there may be better and equally acceptable ways to conduct part or all of the work outlined in the Scope of Work. If alternative methodologies are presented (See 4.0 c.), they should be supported with detailed cost information.

APPENDIX B

Artifact Inventory Forms

Appendix B

Artifact Inventory Forms

Appendix B includes inventory forms for sites from which 50 or more artifacts were collected. For the following sites which yielded fewer than 50 artifacts, refer to the Artifact Sample section within the respective site descriptions: 23 CY 74, -242, -252, -253, -256, -257, -258, -260, -261, -262, -264, -266, -269, -271, -272, -273, -274, -275, -276, -278, -280, -281, -284, -290, -292, -293, -294, -295, -296, -300, -301, -306, -307, -308, -310, -315, -316, -318, -320, -323, -324, -325, -326, -330, -331, -332, -333, -338, -339, -340, -341, -343, -344, and -355.

Tool Tabulation Form

Site Number 23CY20

Chert Types

Tools	Mo	HT	Ojc	HT	Ex	HT	Indet	HT	Total
Util Fl	3	3							3
G/B	1								1
Total	4	3							4

Legend:
- Mo - Burlington
- Ojc - Jefferson City
- Ex - Exotic
- Indet - Indeterminate
- HT - Heat Treated

- Util Fl - Utilized Flake
- PP - Projectile Point
- Scr - Scraper
- Spoke - Spokeshave
- G/B - Graver/Burin
- Cht Ham - Chert Hammerstone
- Util Shat - Utilized Shatter

Debitage Tabulation Form

Site Number 23CY20

Chert Types

Mo

Source Type	Res			Str Dep			Indet			Tot	HT
Size	1	2	3	1	2	3	1	2	3		
Debitage PD								1		1	
Debitage SD				2	6	1		4	1	14	2
Debitage Int							17	17		34	22
Debitage Shat Cort											
Debitage Shat Int											
Debitage Core Cort					2					2	
Debitage Core Int								1		1	1
Debitage Bif Thin								2		2	2
Debitage Pol Fl											
Debitage Mod R Mat											
Total					11			43		54	27

Ojc

Source Type	Res			Str Dep			Indet			Tot	HT
Size	1	2	3	1	2	3	1	2	3		
Debitage PD					1					1	
Debitage SD		3			2		2	6	1	14	2
Debitage Int							1	3		4	1
Debitage Shat Cort		1								1	
Debitage Shat Int											
Debitage Core Cort											
Debitage Core Int											
Debitage Bif Thin											
Debitage Pol Fl											
Debitage Mod R Mat											
Total		4			3			13		20	3

Ex

Source Type	Res			Str Dep			Indet			Tot	HT
Size	1	2	3	1	2	3	1	2	3		
Debitage PD											
Debitage SD											
Debitage Int											
Debitage Shat Cort											
Debitage Shat Int											
Debitage Core Cort											
Debitage Core Int											
Debitage Bif Thin											
Debitage Pol Fl											
Debitage Mod R Mat											
Total											

Indet

Source Type	Res			Str Dep			Indet			Tot	HT	Tot
Size	1	2	3	1	2	3	1	2	3			
Debitage PD												2
Debitage SD												28
Debitage Int												38
Debitage Shat Cort												1
Debitage Shat Int												
Debitage Core Cort												2
Debitage Core Int												1
Debitage Bif Thin												2
Debitage Pol Fl												
Debitage Mod R Mat												
Total												74

431

LEGEND

Chert Types:
Mo - Burlington
Ojc - Jefferson City
Ex - Exotic
Indet - Indeterminate

Chert Sources:
Res - Residual
Str Dep - Stream Deposited

Debitage Types:
PD - Primary Decortication
SD - Secondary Decortication
Int - Interior
Shat - Shatter
Cort - Cortex
Bif Thin - Biface Thinning
Pol Fl - Polished Flake
Mod R Mat - Modified Raw Material

Size 1 - $<2cm^2$
Size 2 - $2cm^2 \leq - \leq 5cm^2$
Size 3 - $>5cm^2$

Tot - Total
HT - Heat Treated

Pottery Tabulation Form

Site Number 23CY20

		Surface Finish			
		Smcoth/Undecorated	Cord Marked	Indeterminant	Total
Temper	Sand/Grit				
	Grit	2			2
	Dolomite/Grit				
	Dolomite				
	Total	2			2

Tool Tabulation Form

Site Number 23CY255

Chert Types

		Mo	HT	Ojc	HT	Ex	HT	Indet	HT	Total
Tools	Util Fl	3								3
	End Scr	1	1							1
Total		4	1							4

Legend:
- Mo - Burlington
- Ojc - Jefferson City
- Ex - Exotic
- Indet - Indeterminate
- HT - Heat Treated

- Util Fl - Utilized Flake
- PP - Projectile Point
- Scr - Scraper
- Spoke - Spokeshave
- G/B - Graver/Burin
- Cht Ham - Chert Hammerstone
- Util Shat - Utilized Shatter

Debitage Tabulation Form   Site Number 23CY255

Chert Types

Source Type	Mo Res 1	Mo Res 2	Mo Res 3	Mo Str Dep 1	Mo Str Dep 2	Mo Str Dep 3	Mo Indet 1	Mo Indet 2	Mo Indet 3	Mo Tot	Mo HT
Debitage PD								1		1	
Debitage SD	1	2	1		1	1	2	4	1	13	2
Debitage Int							18	5		23	3
Shat Cort					1			3		4	
Shat Int								1		1	
Core Cort											
Core Int											
Bif Thin											
Pol Fl											
Mod R Mat											
Total		4			3			35		42	5

Source Type	Ojc Res 1	Ojc Res 2	Ojc Res 3	Ojc Str Dep 1	Ojc Str Dep 2	Ojc Str Dep 3	Ojc Indet 1	Ojc Indet 2	Ojc Indet 3	Ojc Tot	Ojc HT
Debitage PD											
Debitage SD							1			1	
Debitage Int							1	1		2	
Shat Cort											
Shat Int											
Core Cort		1								1	
Core Int											
Bif Thin											
Pol Fl											
Mod R Mat											
Total		1						3		4	

Source Type	Ex Res 1	Ex Res 2	Ex Res 3	Ex Str Dep 1	Ex Str Dep 2	Ex Str Dep 3	Ex Indet 1	Ex Indet 2	Ex Indet 3	Ex Tot	Ex HT	Indet Res 1	Indet Res 2	Indet Res 3	Indet Str Dep 1	Indet Str Dep 2	Indet Str Dep 3	Indet Indet 1	Indet Indet 2	Indet Indet 3	Indet Tot	Indet HT	Tot
Debitage PD																							1
Debitage SD																							14
Debitage Int																							25
Shat Cort																							4
Shat Int																							1
Core Cort																							1
Core Int																							
Bif Thin																							
Pol Fl																							
Mod R Mat																							
Total																							46

LEGEND

Chert Types:
- Mo - Burlington
- Ojc - Jefferson City
- Ex - Exotic
- Indet - Indeterminate

Chert Sources:
- Res - Residual
- Str Dep - Stream Deposited

Debitage Types:
- PD - Primary Decortication
- SD - Secondary Decortication
- Int - Interior
- Shat - Shatter
- Cort - Cortex
- Bif Thin - Biface Thinning
- Pol Fl - Polished Flake
- Mod R Mat - Modified Raw Material

Size 1 - $<2cm^2$
Size 2 - $2cm^2 \leq$ - $\leq 5cm^2$
Size 3 - $>5cm^2$

Tot - Total
HT - Heat Treated

Tool Tabulation Form

Site Number 23CY257

Chert Types

Tools	Mo	HT	Ojc	HT	Ex	HT	Indet	HT	Total
Util Fl	8	1							8
Biface	3	2							3
Side Scr	3	2							3
Spoke	1								1
Total	15	5							15

Legend:
- Mo - Burlington
- Ojc - Jefferson City
- Ex - Exotic
- Indet - Indeterminate
- HT - Heat Treated

- Util Fl - Utilized Flake
- PP - Projectile Point
- Scr - Scraper
- Spoke - Spokeshave
- G/B - Graver/Burin
- Cht Ham - Chert Hammerstone
- Util Shat - Utilized Shatter

Debitage Tabulation Form

Site Number 23CY257

Chert Types

436

Source Type	Mo Res			Mo Str Dep			Mo Indet			Mo Tot	Mo HT
Size	1	2	3	1	2	3	1	2	3		
Debitage PD					2					2	
Debitage SD		5			4	1	2	3	6	21	5
Debitage Int							8	30	2	40	18
Debitage Shat Cort		1			1					2	
Debitage Shat Int											
Debitage Core Cort					3					3	
Debitage Core Int											
Bif Thin											
Pol Fl											
Mod R Mat		2			2					4	
Total		8			13			51		72	23

Source Type	Ojc Res			Ojc Str Dep			Ojc Indet			Ojc Tot	Ojc HT
Size	1	2	3	1	2	3	1	2	3		
Debitage PD											
Debitage SD		1								1	
Debitage Int											
Debitage Shat Cort											
Debitage Shat Int											
Debitage Core Cort											
Debitage Core Int											
Bif Thin											
Pol Fl											
Mod R Mat											
Total		1								1	

Source Type	Ex Res			Ex Str Dep			Ex Indet			Ex Tot	Ex HT
Size	1	2	3	1	2	3	1	2	3		
Debitage PD											
Debitage SD											
Debitage Int											
Debitage Shat Cort											
Debitage Shat Int											
Debitage Core Cort											
Debitage Core Int											
Bif Thin											
Pol Fl											
Mod R Mat											
Total											

Source Type	Indet Res			Indet Str Dep			Indet Indet			Indet Tot	Indet HT	Tot
Size	1	2	3	1	2	3	1	2	3			
Debitage PD												2
Debitage SD					1					1		23
Debitage Int												40
Debitage Shat Cort												2
Debitage Shat Int												
Debitage Core Cort												3
Debitage Core Int												
Bif Thin												
Pol Fl												
Mod R Mat												4
Total					1					1		74

LEGEND

Chert Types:
- Mo - Burlington
- Ojc - Jefferson City
- Ex - Exotic
- Indet - Indeterminate

Chert Sources:
- Res - Residual
- Str Dep - Stream Deposited

Debitage Types:
- PD - Primary Decortication
- SD - Secondary Decortication
- Int - Interior
- Shat - Shatter
- Cort - Cortex
- Bif Thin - Biface Thinning
- Pol Fl - Polished Flake
- Mod R Mat - Modified Raw Material

Size 1 - $<2cm^2$
Size 2 - $2cm^2 \leq - \leq 5cm^2$
Size 3 - $>5cm^2$

Tot - Total
HT - Heat Treated

Tool Tabulation Form

Site Number 23CY267 (Locus A)

Chert Types

Tools	Mo	HT	Ojc	HT	Ex	HT	Indet	HT	Total
PP/Knife	1								1
Util Shat	2								2
Total	3								3

Legend:
- Mo - Burlington
- Ojc - Jefferson City
- Ex - Exotic
- Indet - Indeterminate
- HT - Heat Treated

- Util Fl - Utilized Flake
- PP - Projectile Point
- Scr - Scraper
- Spoke - Spokeshave
- G/B - Graver/Burin
- Cht Ham - Chert Hammerstone
- Util Shat - Utilized Shatter

Debitage Tabulation Form

Site Number 23CY267 (Locus A)

Chert Types

Source Type / Size	Mo Res 1	Res 2	Res 3	Str Dep 1	Str Dep 2	Str Dep 3	Indet 1	Indet 2	Indet 3	Tot	HT
Debitage PD											
SD					1			3		4	
Int							4	4		8	
Shat Cort		2			2			2		4	
Shat Int								2		2	
Core Cort											
Core Int											
Bif Thin											
Pol Fl											
Mod R Mat		1								1	
Total		1			3			15		19	

Source Type / Size	Ojc Res 1	Res 2	Res 3	Str Dep 1	Str Dep 2	Str Dep 3	Indet 1	Indet 2	Indet 3	Tot	HT
Debitage PD											
SD											
Int											
Shat Cort											
Shat Int											
Core Cort											
Core Int											
Bif Thin											
Pol Fl											
Mod R Mat											
Total											

Source Type / Size	Ex Res 1	Res 2	Res 3	Str Dep 1	Str Dep 2	Str Dep 3	Indet 1	Indet 2	Indet 3	Tot	HT
Debitage PD											
SD											
Int											
Shat Cort											
Shat Int											
Core Cort											
Core Int											
Bif Thin											
Pol Fl											
Mod R Mat											
Total											

Source Type / Size	Indet Res 1	Res 2	Res 3	Str Dep 1	Str Dep 2	Str Dep 3	Indet 1	Indet 2	Indet 3	Tot	HT	Tot
Debitage PD												
SD												4
Int												8
Shat Cort												4
Shat Int												2
Core Cort												
Core Int												
Bif Thin												
Pol Fl												
Mod R Mat												1
Total												19

LEGEND

Chert Types:
Mo - Burlington
Ojc - Jefferson City
Ex - Exotic
Indet - Indeterminate

Chert Sources:
Res - Residual
Str Dep - Stream Deposited

Debitage Types:
PD - Primary Decortication
SD - Secondary Decortication
Int - Interior
Shat - Shatter
Cort - Cortex
Bif Thin - Biface Thinning
Pol Fl - Polished Flake
Mod R Mat - Modified Raw Material

Size 1 - $<2cm^2$
Size 2 - $2cm^2 \leq$ - $\leq 5cm^2$
Size 3 - $>5cm^2$

Tot - Total
HT - Heat Treated

Tool Tabulation Form

Site Number 23CY267 (Locus B)

Chert Types

Tools	Mo	HT	Ojc	HT	Ex	HT	Indet	HT	Total
Util Fl	2								2
Biface	2								2
Total	4								4

Legend:
- Mo - Burlington
- Ojc - Jefferson City
- Ex - Exotic
- Indet - Indeterminate
- HT - Heat Treated

- Util Fl - Utilized Flake
- PP - Projectile Point
- Scr - Scraper
- Spoke - Spokeshave
- G/B - Graver/Burin
- Cht Ham - Chert Hammerstone
- Util Shat - Utilized Shatter

Debitage Tabulation Form

Site Number 23CY267
(Locus B)

Chert Types

Mo

Source Type	Res 1	Res 2	Res 3	Str Dep 1	Str Dep 2	Str Dep 3	Indet 1	Indet 2	Indet 3	Tot	HT
Debitage PD						1				1	
Debitage SD		3		2	2	1	1	9	1	19	
Debitage Int	X	X	X	X	X	X	43	30		73	8
Debitage Shat Cort					3			3		6	
Debitage Shat Int	X	X	X	X	X	X		5		5	
Debitage Core Cort					1			2		3	
Debitage Core Int	X	X	X	X	X	X	1			1	
Debitage Bif Thin							1			1	
Debitage Pol Fl											
Debitage Mod R Mat											
Total		3			10			96		109	8

Ojc

Source Type	Res 1	Res 2	Res 3	Str Dep 1	Str Dep 2	Str Dep 3	Indet 1	Indet 2	Indet 3	Tot	HT
Debitage PD											
Debitage SD	1							1		2	1
Debitage Int	X	X	X	X	X	X					
Debitage Shat Cort											
Debitage Shat Int	X	X	X	X	X	X					
Debitage Core Cort											
Debitage Core Int	X	X	X	X	X	X					
Debitage Bif Thin											
Debitage Pol Fl											
Debitage Mod R Mat											
Total	1							1		2	1

Ex

Source Type	Res 1	Res 2	Res 3	Str Dep 1	Str Dep 2	Str Dep 3	Indet 1	Indet 2	Indet 3	Tot	HT
Debitage PD											
Debitage SD											
Debitage Int	X	X	X	X	X	X					
Debitage Shat Cort											
Debitage Shat Int	X	X	X	X	X	X					
Debitage Core Cort											
Debitage Core Int	X	X	X	X	X	X					
Debitage Bif Thin											
Debitage Pol Fl											
Debitage Mod R Mat											
Total											

Indet

Source Type	Res 1	Res 2	Res 3	Str Dep 1	Str Dep 2	Str Dep 3	Indet 1	Indet 2	Indet 3	Tot	HT
Debitage PD											
Debitage SD											
Debitage Int	X	X	X	X	X	X					
Debitage Shat Cort											
Debitage Shat Int	X	X	X	X	X	X					
Debitage Core Cort											
Debitage Core Int	X	X	X	X	X	X					
Debitage Bif Thin											
Debitage Pol Fl											
Debitage Mod R Mat											
Total											

Source Type	Tot
Debitage PD	1
Debitage SD	21
Debitage Int	73
Debitage Shat Cort	6
Debitage Shat Int	5
Debitage Core Cort	3
Debitage Core Int	1
Debitage Bif Thin	1
Debitage Pol Fl	
Debitage Mod R Mat	
Total	111

LEGEND

Chert Types:
Mo - Burlington
Ojc - Jefferson City
Ex - Exotic
Indet - Indeterminate

Chert Sources:
Res - Residual
Str Dep - Stream Deposited

Debitage Types:
PD - Primary Decortication
SD - Secondary Decortication
Int - Interior
Shat - Shatter
Cort - Cortex
Bif Thin - Biface Thinning
Pol Fl - Polished Flake
Mod R Mat - Modified Raw Material

Size 1 - $<2cm^2$
Size 2 - $2cm^2 \leq - \leq 5cm^2$
Size 3 - $>5cm^2$

Tot - Total
HT - Heat Treated

Tool Tabulation Form

Site Number 23CY291

Chert Types

Tools	Mo	HT	Ojc	HT	Ex	HT	Indet	HT	Total
Util Fl	3	1							3
Biface	2	2							2
End Scr	1								1
Total	6	3							6

Legend:
Mo - Burlington
Ojc - Jefferson City
Ex - Exotic
Indet - Indeterminate
HT - Heat Treated

Util Fl - Utilized Flake
PP - Projectile Point
Scr - Scraper
Spoke - Spokeshave
G/B - Graver/Burin
Cht Ham - Chert Hammerstone
Util Shat - Utilized Shatter

Debitage Tabulation Form

Site Number 23CY291

Chert Types

Mo

Source Type / Size	Res 1	Res 2	Res 3	Str Dep 1	Str Dep 2	Str Dep 3	Indet 1	Indet 2	Indet 3	Tot	HT
Debitage PD				1	2					3	
Debitage SD	1	7	1	2	9	2	3	11	2	38	3
Debitage Int							45	55	1	101	30
Shat Cort		1			1					2	1
Shat Int								6		6	1
Core Cort					1					1	
Core Int								1		1	
Bif Thin											
Pol Fl											
Mod R Mat											
Total		10			18			124		152	35

Ojc

Source Type / Size	Res 1	Res 2	Res 3	Str Dep 1	Str Dep 2	Str Dep 3	Indet 1	Indet 2	Indet 3	Tot	HT
Debitage PD											
Debitage SD											
Debitage Int											
Shat Cort											
Shat Int											
Core Cort											
Core Int											
Bif Thin								1	1		
Pol Fl											
Mod R Mat											
Total								1	1		

Ex

Source Type / Size	Res 1	Res 2	Res 3	Str Dep 1	Str Dep 2	Str Dep 3	Indet 1	Indet 2	Indet 3	Tot	HT
Debitage PD											
Debitage SD											
Debitage Int											
Shat Cort											
Shat Int											
Core Cort											
Core Int											
Bif Thin											
Pol Fl											
Mod R Mat											
Total											

Indet

Source Type / Size	Res 1	Res 2	Res 3	Str Dep 1	Str Dep 2	Str Dep 3	Indet 1	Indet 2	Indet 3	Tot	HT	Tot
Debitage PD												3
Debitage SD												38
Debitage Int												101
Shat Cort												2
Shat Int												6
Core Cort												1
Core Int												1
Bif Thin												1
Pol Fl												
Mod R Mat												
Total												153

LEGEND

Chert Types:
Mo - Burlington
Ojc - Jefferson City
Ex - Exotic
Indet - Indeterminate

Chert Sources:
Res - Residual
Str Dep - Stream Deposited

Debitage Types:
PD - Primary Decortication
SD - Secondary Decortication
Int - Interior
Shat - Shatter
Cort - Cortex
Bif Thin - Biface Thinning
Pol Fl - Polished Flake
Mod R Mat - Modified Raw Material

Size 1 - <2cm²
Size 2 - 2cm²≤ - ≤5cm²
Size 3 - >5cm²

Tot - Total
HT - Heat Treated

Tool Tabulation Form

Site Number 23CY302

Chert Types

Tools	Mo	HT	Ojc	HT	Ex	HT	Indet	HT	Total
Util Fl	2	1							2
Biface	1		1						2
Total	3	1	1						4

Legend:
Mo - Burlington
Ojc - Jefferson City
Ex - Exotic
Indet - Indeterminate
HT - Heat Treated

Util Fl - Utilized Flake
PP - Projectile Point
Scr - Scraper
Spoke - Spokeshave
G/B - Graver/Burin
Cht Ham - Chert Hammerstone
Util Shat - Utilized Shatter

Debitage Tabulation Form

Site Number 23CY302

Chert Types

		Mo											Ojc											Excello											Indet											
Source Type		Res			Str Dep			Indet			Tot	HT	Res			Str Dep			Indet			Tot	HT	Res			Str Dep			Indet			Tot	HT	Res			Str Dep			Indet			Tot	HT	Tot
· Size		1	2	3	1	2	3	1	2	3			1	2	3	1	2	3	1	2	3			1	2	3	1	2	3	1	2	3			1	2	3	1	2	3	1	2	3			
Debitage	PD																																													
	SD					2			4		6	1	1	1					1			3																								9
	Int							24	20	1	45	16																																		45
Shat	Cort								3		3																																			3
Shat	Int								4		4	1																																		4
Core	Cort																														1		1	1												1
Core	Int																																													
	Bif Thin	1							3		4																																			4
	Pol Fl																																													
	Mod R Mat																																													
Total		1				2			59		62	18		2						1		3									1		1	1												66

LEGEND

Chert Types:
Mo - Burlington
Ojc - Jefferson City
Ex - Exotic
Indet - Indeterminate

Chert Sources:
Res - Residual
Str Dep - Stream Deposited

Debitage Types:
PD - Primary Decortication
SD - Secondary Decortication
Int - Interior
Shat - Shatter
Cort - Cortex
Bif Thin - Biface Thinning
Pol Fl - Polished Flake
Mod R Mat - Modified Raw Material

Size 1 - $<2cm^2$
Size 2 - $2cm^2 \leq$ - $\leq 5cm^2$
Size 3 - $>5cm^2$

Tot - Total
HT - Heat Treated

Groundstone Tabulation Form

Site Number 23CY304

Rock Type

		Quartzite	Igneous		Hematite		Total
			Diorite	Gabbro			
Tools	Multipurpose*	1					1
	Total	1					1

*Pestle/mano/hammerstone

Tool Tabulation Form

Site Number 23CY304

Chert Types

Tools	Mo	HT	Ojc	HT	Ex	HT	Indet	HT	Total
Util Fl	16	3							16
Biface	3	1							3
Spoke	1								1
Side Scr	2	1							2
Cleaver	1								1
Arrow Point	1	1							1
Total	24	6							24

Legend:
- Mo - Burlington
- Ojc - Jefferson City
- Ex - Exotic
- Indet - Indeterminate
- HT - Heat Treated

- Util Fl - Utilized Flake
- PP - Projectile Point
- Scr - Scraper
- Spoke - Spokeshave
- G/B - Graver/Burin
- Cht Ham - Chert Hammerstone
- Util Shat - Utilized Shatter

Debitage Tabulation Form

Site Number 23CY304

Chert Types

Mo

Source Type / Size	Res 1	Res 2	Res 3	Str Dep 1	Str Dep 2	Str Dep 3	Indet 1	Indet 2	Indet 3	Tot	HT
Debitage PD					2	2				4	
Debitage SD		1	1	2	14	5	3	17	3	46	3
Debitage Int							40	58	4	102	20
Debitage Shat Cort					4			4		8	
Debitage Shat Int								12		12	
Debitage Core Cort		2			1			5		8	1
Debitage Core Int								2		2	
Debitage Bif Thin											
Debitage Pol Fl											
Debitage Mod R Mat					9			2		11	
Total		4			39			150		193	24

Ojc

Source Type / Size	Res 1	Res 2	Res 3	Str Dep 1	Str Dep 2	Str Dep 3	Indet 1	Indet 2	Indet 3	Tot	HT
Debitage PD											
Debitage SD	1								1	2	
Debitage Int											
Debitage Shat Cort											
Debitage Shat Int											
Debitage Core Cort											
Debitage Core Int											
Debitage Bif Thin											
Debitage Pol Fl											
Debitage Mod R Mat											
Total		1						1		2	

Ex

Source Type / Size	Res 1	Res 2	Res 3	Str Dep 1	Str Dep 2	Str Dep 3	Indet 1	Indet 2	Indet 3	Tot	HT
Debitage PD											
Debitage SD											
Debitage Int											
Debitage Shat Cort											
Debitage Shat Int											
Debitage Core Cort											
Debitage Core Int											
Debitage Bif Thin											
Debitage Pol Fl											
Debitage Mod R Mat											
Total											

Indet

Source Type / Size	Res 1	Res 2	Res 3	Str Dep 1	Str Dep 2	Str Dep 3	Indet 1	Indet 2	Indet 3	Tot	HT	Tot
Debitage PD												4
Debitage SD							1			1		49
Debitage Int												102
Debitage Shat Cort												8
Debitage Shat Int												12
Debitage Core Cort												8
Debitage Core Int												2
Debitage Bif Thin												
Debitage Pol Fl												
Debitage Mod R Mat												11
Total								1		1		196

LEGEND

Chert Types:
Mo - Burlington
Ojc - Jefferson City
Ex - Exotic
Indet - Indeterminate

Chert Sources:
Res - Residual
Str Dep - Stream Deposited

Debitage Types:
PD - Primary Decortication
SD - Secondary Decortication
Int - Interior
Shat - Shatter
Cort - Cortex
Bif Thin - Biface Thinning
Pol Fl - Polished Flake
Mod R Mat - Modified Raw Material

Size 1 - <2cm²
Size 2 - 2cm²≤ - ≤5cm²
Size 3 - >5cm²

Tot - Total
HT - Heat Treated

Tool Tabulation Form

Site Number 23CY309

Chert Types

Tools	Mo	HT	Ojc	HT	Ex	HT	Indet	HT	Total
Util Fl	13	3							13
Biface	5	1							5
PP/Knife	1								1
Total	19	4							19

Legend:
Mo - Burlington
Ojc - Jefferson City
Ex - Exotic
Indet - Indeterminate
HT - Heat Treated

Util Fl - Utilized Flake
PP - Projectile Point
Scr - Scraper
Spoke - Spokeshave
G/B - Graver/Burin
Cht Ham - Chert Hammerstone
Util Shat - Utilized Shatter

Debitage Tabulation Form Site Number 23CY309

Chert Types

Source Type	Mo Res			Mo Str Dep			Mo Indet			Mo Tot	Mo HT
Size	1	2	3	1	2	3	1	2	3		
Debitage PD		1		1	1	1				4	
Debitage SD		2		3	10	5	13	18	4	55	5
Debitage Int	X	X	X	X	X	X	68	68	9	145	24
Debitage Shat Cort					1			3		4	
Debitage Shat Int	X	X	X	X	X	X		10		10	
Debitage Core Cort											
Debitage Core Int	X	X	X	X	X	X					
Bif Thin								1		1	
Pol Fl											
Mod R Mat											
Total		3			22			194		219	29

Source Type	Ojc Res			Ojc Str Dep			Ojc Indet			Ojc Tot	Ojc HT
Size	1	2	3	1	2	3	1	2	3		
Debitage PD											
Debitage SD									1	1	
Debitage Int	X	X	X	X	X	X	3	3		6	2
Debitage Shat Cort											
Debitage Shat Int	X	X	X	X	X	X					
Debitage Core Cort											
Debitage Core Int	X	X	X	X	X	X					
Bif Thin											
Pol Fl											
Mod R Mat											
Total								7		7	2

Source Type	Excello Res			Excello Str Dep			Excello Indet			Excello Tot	Excello HT
Size	1	2	3	1	2	3	1	2	3		
Debitage PD											
Debitage SD											
Debitage Int	X	X	X	X	X	X	1			1	
Debitage Shat Cort											
Debitage Shat Int	X	X	X	X	X	X					
Debitage Core Cort											
Debitage Core Int	X	X	X	X	X	X					
Bif Thin											
Pol Fl											
Mod R Mat											
Total								1		1	

Source Type	Indet Res			Indet Str Dep			Indet Indet			Indet Tot	Indet HT	Tot
Size	1	2	3	1	2	3	1	2	3			
Debitage PD												4
Debitage SD												56
Debitage Int	X	X	X	X	X	X						152
Debitage Shat Cort												4
Debitage Shat Int	X	X	X	X	X	X						10
Debitage Core Cort												
Debitage Core Int	X	X	X	X	X	X						
Bif Thin												1
Pol Fl												
Mod R Mat												
Total												227

LEGEND

Chert Types:
- Mo - Burlington
- Ojc - Jefferson City
- Ex - Exotic
- Indet - Indeterminate

Chert Sources:
- Res - Residual
- Str Dep - Stream Deposited

Debitage Types:
- PD - Primary Decortication
- SD - Secondary Decortication
- Int - Interior
- Shat - Shatter
- Cort - Cortex
- Bif Thin - Biface Thinning
- Pol Fl - Polished Flake
- Mod R Mat - Modified Raw Material

Size 1 - <2cm²
Size 2 - 2cm²≤ - ≤5cm²
Size 3 - >5cm²

Tot - Total
HT - Heat Treated

Tool Tabulation Form

Site Number 23CY311

Chert Types

Tools	Mo	HT	Ojc	HT	Ex	HT	Indet	HT	Total
Util Fl	3	2							3
Biface	1								1
Total	4	2							4

Legend:
Mo - Burlington
Ojc - Jefferson City
Ex - Exotic
Indet - Indeterminate
HT - Heat Treated

Util Fl - Utilized Flake
PP - Projectile Point
Scr - Scraper
Spoke - Spokeshave
G/B - Graver/Burin
Cht Ham - Chert Hammerstone
Util Shat - Utilized Shatter

Debitage Tabulation Form

Site Number 23CY311

Chert Types

Mo

Source Type / Size	Res 1	Res 2	Res 3	Str Dep 1	Str Dep 2	Str Dep 3	Indet 1	Indet 2	Indet 3	Tot	HT
PD											
SD		1			3		1	2		7	1
Int	X	X	X	X	X	X	9	31		40	6
Shat Cort							1			1	
Shat Int	X	X	X	X	X	X	3			3	
Core Cort					1					1	
Core Int	X	X	X	X	X	X	1			1	
Bif Thin											
Pol Fl											
Mod R Mat											
Total	1			4			48			53	7

Ojc

Source Type / Size	Res 1	Res 2	Res 3	Str Dep 1	Str Dep 2	Str Dep 3	Indet 1	Indet 2	Indet 3	Tot	HT
PD											
SD											
Int	X	X	X	X	X	X					
Shat Cort											
Shat Int	X	X	X	X	X	X					
Core Cort											
Core Int	X	X	X	X	X	X					
Bif Thin											
Pol Fl											
Mod R Mat											
Total											

Ex

Source Type / Size	Res 1	Res 2	Res 3	Str Dep 1	Str Dep 2	Str Dep 3	Indet 1	Indet 2	Indet 3	Tot	HT
PD											
SD											
Int	X	X	X	X	X	X					
Shat Cort											
Shat Int	X	X	X	X	X	X					
Core Cort											
Core Int	X	X	X	X	X	X					
Bif Thin											
Pol Fl											
Mod R Mat											
Total											

Indet

Source Type / Size	Res 1	Res 2	Res 3	Str Dep 1	Str Dep 2	Str Dep 3	Indet 1	Indet 2	Indet 3	Tot	HT	Tot
PD												
SD												7
Int	X	X	X	X	X	X						40
Shat Cort												1
Shat Int	X	X	X	X	X	X						3
Core Cort												1
Core Int	X	X	X	X	X	X						1
Bif Thin												
Pol Fl												
Mod R Mat												
Total												53

LEGEND

Chert Types:
- Mo - Burlington
- Ojc - Jefferson City
- Ex - Exotic
- Indet - Indeterminate

Chert Sources:
- Res - Residual
- Str Dep - Stream Deposited

Debitage Types:
- PD - Primary Decortication
- SD - Secondary Decortication
- Int - Interior
- Shat - Shatter
- Cort - Cortex
- Bif Thin - Biface Thinning
- Pol Fl - Polished Flake
- Mod R Mat - Modified Raw Material

Size 1 - $<2cm^2$
Size 2 - $2cm^2 \leq$ - $\leq 5cm^2$
Size 3 - $>5cm^2$

Tot - Total
HT - Heat Treated

Tool Tabulation Form

Site Number 23CY334

Chert Types

		Mo	HT	Ojc	HT	Ex	HT	Indet	HT	Total
Tools	Util Fl			1						1
Total				1						1

Legend:

Mo - Burlington
Ojc - Jefferson City
Ex - Exotic
Indet - Indeterminate
HT - Heat Treated

Util Fl - Utilized Flake
PP - Projectile Point
Scr - Scraper
Spoke - Spokeshave
G/B - Graver/Burin
Cht Ham - Chert Hammerstone
Util Shat - Utilized Shatter

Debitage Tabulation Form

Site Number 23CY334

Chert Types

Mo

Source Type	Res			Str Dep			Indet			Tot	HT
Size	1	2	3	1	2	3	1	2	3		
Debitage PD											
Debitage SD											
Debitage Int											
Shat Cort											
Shat Int											
Core Cort											
Core Int											
Bif Thin											
Pol Fl											
Mod R Mat											
Total											

Ojc

Source Type	Res			Str Dep			Indet			Tot	HT
Size	1	2	3	1	2	3	1	2	3		
Debitage PD	2	7	6		2					17	
Debitage SD	3	90	29		5	1	11	56	8	203	
Debitage Int							30	74	2	106	
Shat Cort	3			1			5			9	
Shat Int							7			7	
Core Cort	40			4			3			47	
Core Int							6			6	
Bif Thin											
Pol Fl											
Mod R Mat											
Total	180			13			202			395	

Ex

Source Type	Res			Str Dep			Indet			Tot	HT
Size	1	2	3	1	2	3	1	2	3		
Debitage PD											
Debitage SD											
Debitage Int											
Shat Cort											
Shat Int											
Core Cort											
Core Int											
Bif Thin											
Pol Fl											
Mod R Mat											
Total											

Indet

Source Type	Res			Str Dep			Indet			Tot	HT	Tot
Size	1	2	3	1	2	3	1	2	3			
Debitage PD												17
Debitage SD												203
Debitage Int												106
Shat Cort												9
Shat Int												7
Core Cort												47
Core Int												6
Bif Thin												
Pol Fl												
Mod R Mat												
Total												395

LEGEND

Chert Types:
Mo - Burlington
Ojc - Jefferson City
Ex - Exotic
Indet - Indeterminate

Chert Sources:
Res - Residual
Str Dep - Stream Deposited

Debitage Types:
PD - Primary Decortication
SD - Secondary Decortication
Int - Interior
Shat - Shatter
Cort - Cortex
Bif Thin - Biface Thinning
Pol Fl - Polished Flake
Mod R Mat - Modified Raw Material

Size 1 - $<2cm^2$
Size 2 - $2cm^2 \leq - \leq 5cm^2$
Size 3 - $>5cm^2$

Tot - Total
HT - Heat Treated

Tool Tabulation Form

Site Number 23CY346

Chert Types

Tools	Mo	HT	Ojc	HT	Ex	HT	Indet	HT	Total
Util Fl	2	1							2
Biface	1								1
PP/Knife					1	1			1
Total	3	1			1	1			4

Legend:
Mo - Burlington
Ojc - Jefferson City
Ex - Exotic
Indet - Indeterminate
HT - Heat Treated

Util Fl - Utilized Flake
PP - Projectile Point
Scr - Scraper
Spoke - Spokeshave
G/B - Graver/Burin
Cht Ham - Chert Hammerstone
Util Shat - Utilized Shatter

Debitage Tabulation Form

Site Number 23CY346

Chert Types

Source Type		Mo											Ojc											Callaway											Exotic											Tot
		Res			Str Dep			Indet			Tot	HT	Res			Str Dep			Indet			Tot	HT	Res			Str Dep			Indet			Tot	HT	Res			Str Dep			Indet			Tot	HT	
Size		1	2	3	1	2	3	1	2	3			1	2	3	1	2	3	1	2	3			1	2	3	1	2	3	1	2	3			1	2	3	1	2	3	1	2	3			
Debitage	PD					2					2						1		1			2																								4
	SD				2	1		7	6		16	3		1				1	4	3		9	1																							25
	Int							90	16		106	36							7	8		15	8							2	1		3								1			1		125
Shat	Cort					1			4		5	2		2			2			3		7	3																							12
	Int								11		11									4		4																								15
Core	Cort					1					1						1					1																								2
	Int																																													
Bif Thin									1		1	1																																		1
Pol Fl																																														
Mod R Mat													1									1																								1
Total						7			135		142	42		4			5			30		39	12								3		3													185

LEGEND

Chert Types:
Mo - Burlington
Ojc - Jefferson City
Ex - Exotic
Indet - Indeterminate

Chert Sources:
Res - Residual
Str Dep - Stream Deposited

Debitage Types:
PD - Primary Decortication
SD - Secondary Decortication
Int - Interior
Shat - Shatter
Cort - Cortex
Bif Thin - Biface Thinning
Pol Fl - Polished Flake
Mod R Mat - Modified Raw Material

Size 1 - <2cm²
Size 2 - 2cm²≤ - ≤5cm²
Size 3 - >5cm²

Tot - Total
HT - Heat Treated

Groundstone Tabulation Form Site Number 23CY349

Rock Type

		Chert	Igneous		Hematite	Sandstone	Total
			Diorite	Gabbro			
Tools	Mano					1	1
	Pecking/Grinding Stone	1					1
	Total	1				1	2

Tool Tabulation Form

Site Number 23CY349

Chert Types

		Mo	HT	Ojc	HT	Ex	HT	Indet	HT	Total
Tools	Util Fl	1	1							1
	Biface	1	1							1
Total		2	2							2

Legend:
Mo - Burlington
Ojc - Jefferson City
Ex - Exotic
Indet - Indeterminate
HT - Heat Treated

Util Fl - Utilized Flake
PP - Projectile Point
Scr - Scraper
Spoke - Spokeshave
G/B - Graver/Burin
Cht Ham - Chert Hammerstone
Util Shat - Utilized Shatter

Debitage Tabulation Form

Site Number 23CY349

Chert Types

	Mo											Ojc											Ex											Indet											
Source Type	Res			Str Dep			Indet			Tot	HT	Res			Str Dep			Indet			Tot	HT	Res			Str Dep			Indet			Tot	HT	Res			Str Dep			Indet			Tot	HT	Tot
Size	1	2	3	1	2	3	1	2	3			1	2	3	1	2	3	1	2	3			1	2	3	1	2	3	1	2	3			1	2	3	1	2	3	1	2	3			
Debitage PD																																													
SD				1			5	3		9	2							1			1																									10
Int							12	5		17	2							9	3		12																									29
Shat Cort													1			1					2																									2
Shat Int								2		2									2		2																									4
Core Cort					1					1			2								2																									3
Core Int																																														
Bif Thin																																														
Pol Fl																																														
Mod R Mat																																														
Total					2			27		29	4		3			1			15		19																									48

LEGEND

Chert Types:
- Mo - Burlington
- Ojc - Jefferson City
- Ex - Exotic
- Indet - Indeterminate

Chert Sources:
- Res - Residual
- Str Dep - Stream Deposited

Debitage Types:
- PD - Primary Decortication
- SD - Secondary Decortication
- Int - Interior
- Shat - Shatter
- Cort - Cortex
- Bif Thin - Biface Thinning
- Pol Fl - Polished Flake
- Mod R Mat - Modified Raw Material

Size 1 - <2cm²
Size 2 - 2cm² ≤ - ≤5cm²
Size 3 - >5cm²

Tot - Total
HT - Heat Treated

Groundstone Tabulation Form

Site Number 23CY351

Rock Type

		Quartzite	Igneous		Hematite	Sandstone	Total
			Diorite	Gabbro			
Tools	Metate					1	1
	Total					1	1

Tool Tabulation Form

Site Number 23CY351

Chert Types

		Mo	HT	Ojc	HT	Ex	HT	Indet	HT	Total
Tools	Biface	3	3							3
Total		3	3							3

Legend:
- Mo - Burlington
- Ojc - Jefferson City
- Ex - Exotic
- Indet - Indeterminate
- HT - Heat Treated

- Util Fl - Utilized Flake
- PP - Projectile Point
- Scr - Scraper
- Spoke - Spokeshave
- G/B - Graver/Burin
- Cht Ham - Chert Hammerstone
- Util Shat - Utilized Shatter

Debitage Tabulation Form

Site Number 23CY351

Chert Types

Source Type	Mo Res			Mo Str Dep			Mo Indet			Mo Tot	Mo HT	Ojc Res			Ojc Str Dep			Ojc Indet			Ojc Tot	Ojc HT
Size	1	2	3	1	2	3	1	2	3			1	2	3	1	2	3	1	2	3		
Debitage PD														1							1	
Debitage SD				1	3	1	8	7		20	3		6			1		1	2		10	
Debitage Int							73	9		82	21							14	2		16	2
Shat Cort					1					1									3		3	
Shat Int								14		14	1								4		4	
Core Cort					1					1			2								2	
Core Int																						
Bif Thin																						
Pol Fl								1		1												
Mod R Mat													2						1		3	
Total					7			112		119	25		11			1			27		39	2

Source Type	Ex Res			Ex Str Dep			Ex Indet			Ex Tot	Ex HT	Indet Res			Indet Str Dep			Indet Indet			Indet Tot	Indet HT	Tot
Size	1	2	3	1	2	3	1	2	3			1	2	3	1	2	3	1	2	3			
Debitage PD																							1
Debitage SD																							30
Debitage Int																							98
Shat Cort																							4
Shat Int																							18
Core Cort																							3
Core Int																							
Bif Thin																							
Pol Fl																							1
Mod R Mat																							3
Total																							158

LEGEND

Chert Types:
- Mo - Burlington
- Ojc - Jefferson City
- Ex - Exotic
- Indet - Indeterminate

Chert Sources:
- Res - Residual
- Str Dep - Stream Deposited

Debitage Types:
- PD - Primary Decortication
- SD - Secondary Decortication
- Int - Interior
- Shat - Shatter
- Cort - Cortex
- Bif Thin - Biface Thinning
- Pol Fl - Polisned Flake
- Mod R Mat - Modified Raw Material

Size 1 - $<2cm^2$
Size 2 - $2cm^2 \leq$ - $\leq 5cm^2$
Size 3 - $>5cm^2$

Tot - Total
HT - Heat Treated

Groundstone Tabulation Form

Site Number 23CY352

Rock Type

		Quartzite	Igneous		Hematite		Total
			Diorite	Gabbro			
Tools	Ground Chunk				1		1
	Mano	1					1
	Shatter		2				2
	Total	1	2		1		4

Tool Tabulation Form

Site Number 23CY352

Chert Types

Tools	Mo	HT	Ojc	HT	Callaway	HT	Indet	HT	Total
Util Fl	9	3							9
Biface	3	2	2						5
Spoke			1						1
Uniface					1				1
Drill			1	1					1
Total	12	5	4	1	1				17

Legend:

Mo - Burlington
Ojc - Jefferson City
Ex - Exotic
Indet - Indeterminate
HT - Heat Treated

Util Fl - Utilized Flake
PP - Projectile Point
Scr - Scraper
Spoke - Spokeshave
G/B - Graver/Burin
Cht Ham - Chert Hammerstone
Util Shat - Utilized Shatter

Debitage Tabulation Form

Site Number 23CY352

Chert Types

Source Type	Mo										
	Res			Str Dep			Indet			Tot	HT
Size	1	2	3	1	2	3	1	2	3		
Debitage PD					1					1	
SD				2	6	1	5	10		24	3
Int	X	X	X	X	X	X	52	33	3	88	23
Shat Cort					1			2		3	1
Shat Int	X	X	X	X	X	X		4		4	
Core Cort					1					1	
Core Int	X	X	X	X	X	X		1		1	
Bif Thin								1		1	1
Pol Fl								1		1	
Mod R Mat					1					1	
Total					13			112		125	28

Source Type	Ojc										
	Res			Str Dep			Indet			Tot	HT
Size	1	2	3	1	2	3	1	2	3		
Debitage PD					1					1	
SD		2			2		2	3		9	
Int	X	X	X	X	X	X	2	2		4	
Shat Cort		1						1		2	
Shat Int	X	X	X	X	X	X		1		1	
Core Cort		1			1			1		3	
Core Int	X	X	X	X	X	X		2		2	
Bif Thin											
Pol Fl											
Mod R Mat											
Total		4			4			14		22	

Source Type	Excello										
	Res			Str Dep			Indet			Tot	HT
Size	1	2	3	1	2	3	1	2	3		
Debitage PD											
SD							1			1	
Int	X	X	X	X	X	X					
Shat Cort											
Shat Int	X	X	X	X	X	X					
Core Cort											
Core Int	X	X	X	X	X	X					
Bif Thin											
Pol Fl											
Mod R Mat											
Total								1		1	

Source Type	Indet											Tot
	Res			Str Dep			Indet			Tot	HT	
Size	1	2	3	1	2	3	1	2	3			
Debitage PD												2
SD												34
Int	X	X	X	X	X	X						92
Shat Cort												5
Shat Int	X	X	X	X	X	X						5
Core Cort												4
Core Int	X	X	X	X	X	X						3
Bif Thin												1
Pol Fl												1
Mod R Mat												1
Total												148

LEGEND

Chert Types:
Mo - Burlington
Ojc - Jefferson City
Ex - Exotic
Indet - Indeterminate

Chert Sources:
Res - Residual
Str Dep - Stream Deposited

Debitage Types:
PD - Primary Decortication
SD - Secondary Decortication
Int - Interior
Shat - Shatter
Cort - Cortex
Bif Thin - Biface Thinning
Pol Fl - Polished Flake
Mod R Mat - Modified Raw Material

Size 1 - $<2cm^2$
Size 2 - $2cm^2 \leq$ - $\leq 5cm^2$
Size 3 - $>5cm^2$

Tot - Total
HT - Heat Treated

Pottery Tabulation Form

Site Number 23CY352

Temper	Surface Finish: Smooth/Undecorated	Cord Marked	Indeterminant	Total
Sand/Grit		10	2	17
Grit	1			1
Dolomite/Grit		1		1
Dolomite	2			2
Total	3	11	2	21

Groundstone Tabulation Form

Site Number 23CY353

(Locus A)

Rock Type

Tools		Quartzite	Igneous		Hematite	Sandstone	Total
			Diorite	Gabbro			
Tools	Multipurpose	1+				1*	2
	Mano		1			1	2
	Total	1	1			2	4

+ bipitted stone/mano/hammerstone

* mano/anvil/hammerstone

Tool Tabulation Form

Site Number 23CY353

Chert Types

(Locus A)

Tools	Mo	HT	Ojc	HT	Excello	HT	Indet	HT	Total
Util Fl	6	2	2						8
Biface	9	7	2	1					11
PP/Knife	1	1	1		1				3
Arrow Point	1	1							1
Side Scr	3	2							3
Cht Ham	1	1							1
Total	21	14	5	1	1				27

Legend:

Mo - Burlington
Ojc - Jefferson City
Ex - Exotic
Indet - Indeterminate
HT - Heat Treated

Util Fl - Utilized Flake
PP - Projectile Point
Scr - Scraper
Spoke - Spokeshave
G/B - Graver/Burin
Cht Ham - Chert Hammerstone
Util Shat - Utilized Shatter

Debitage Tabulation Form

Site Number 23CY353

(Locus A)

Chert Types

Source Type		Mo										
		Res			Str Dep			Indet			Tot	HT
Size		1	2	3	1	2	3	1	2	3		
Debitage	PD					2	1	2			5	
	SD				8	50	4	15	36	3	116	14
	Int	X	X	X	X	X	X	213	125	2	340	92
Shat	Cort					4			4		8	3
	Int	X	X	X	X	X	X		17		17	5
Core	Cort					3			3		6	1
	Int	X	X	X	X	X	X		4		4	1
	Bif Thin								3		3	
	Pol Fl											
	Mod R Mat					1					1	
Total						73			427		500	116

Source Type		Ojc										
		Res			Str Dep			Indet			Tot	HT
Size		1	2	3	1	2	3	1	2	3		
Debitage	PD		2		2	1	1				6	
	SD		9	4	2	11	2	21	16	1	66	6
	Int	X	X	X	X	X	X	45	25	3	73	21
Shat	Cort		8			7			5		20	2
	Int	X	X	X	X	X	X		14		14	5
Core	Cort		3			8			2		13	1
	Int	X	X	X	X	X	X		8		8	4
	Bif Thin											
	Pol Fl											
	Mod R Mat		2			7					9	
Total			28			41			140		209	39

Source Type		Ex										
		Res			Str Dep			Indet			Tot	HT
Size		1	2	3	1	2	3	1	2	3		
Debitage	PD											
	SD											
	Int	X	X	X	X	X	X					
Shat	Cort											
	Int	X	X	X	X	X	X					
Core	Cort											
	Int	X	X	X	X	X	X					
	Bif Thin											
	Pol Fl											
	Mod R Mat											
Total												

Source Type		Indet											Tot
		Res			Str Dep			Indet			Tot	HT	
Size		1	2	3	1	2	3	1	2	3			
Debitage	PD												11
	SD							1			1		183
	Int	X	X	X	X	X	X	15	1		16		429
Shat	Cort												28
	Int	X	X	X	X	X	X						31
Core	Cort												19
	Int	X	X	X	X	X	X						12
	Bif Thin												3
	Pol Fl												
	Mod R Mat												10
Total									17		17		726

LEGEND

Chert Types:
Mo - Burlington
Ojc - Jefferson City
Ex - Exotic
Indet - Indeterminate

Chert Sources:
Res - Residual
Str Dep - Stream Deposited

Debitage Types:
PD - Primary Decortication
SD - Secondary Decortication
Int - Interior
Shat - Shatter
Cort - Cortex
Bif Thin - Biface Thinning
Pol Fl - Polished Flake
Mod R Mat - Modified Raw Material

Size 1 - $<2cm^2$
Size 2 - $2cm^2 \leq - \leq 5cm^2$
Size 3 - $>5cm^2$

Tot - Total
HT - Heat Treated

Tool Tabulation Form

Site Number 23CY353

Chert Types

(Locus B)

Tools	Mo	HT	Ojc	HT	Ex	HT	Indet	HT	Total
Biface	1	1							1
Total	1	1							1

Legend:
- Mo - Burlington
- Ojc - Jefferson City
- Ex - Exotic
- Indet - Indeterminate
- HT - Heat Treated
- Util Fl - Utilized Flake
- PP - Projectile Point
- Scr - Scraper
- Spoke - Spokeshave
- G/B - Graver/Burin
- Cht Ham - Chert Hammerstone
- Util Shat - Utilized Shatter

Debitage Tabulation Form

Site Number 23CY353

Chert Types

(Locus B)

Source Type		Mo											Ojc										
		Res			Str Dep			Indet			Tot	HT	Res			Str Dep			Indet			Tot	HT
	Size	1	2	3	1	2	3	1	2	3			1	2	3	1	2	3	1	2	3		
Debitage	PD				1						1												
	SD							1	3		4	1							1	2		3	1
	Int							18	10		28	9							6	1		7	3
Shat	Cort					1			1		2									1		1	
	Int								5		5									2		2	
Core	Cort																						
	Int																						
	Bif Thin																						
	Pol Fl																						
	Mod R Mat																						
Total						2			38		40	10								13		13	4

Source Type		Ex											Indet											Tot
		Res			Str Dep			Indet			Tot	HT	Res			Str Dep			Indet			Tot	HT	
	Size	1	2	3	1	2	3	1	2	3			1	2	3	1	2	3	1	2	3			
Debitage	PD																							1
	SD																							7
	Int																							35
Shat	Cort																							3
	Int																							7
Core	Cort																							
	Int																							
	Bif Thin																							
	Pol Fl																							
	Mod R Mat																							
Total																								53

LEGEND

Chert Types:
Mo - Burlington
Ojc - Jefferson City
Ex - Exotic
Indet - Indeterminate

Chert Sources:
Res - Residual
Str Dep - Stream Deposited

Debitage Types:
PD - Primary Decortication
SD - Secondary Decortication
Int - Interior
Shat - Shatter
Cort - Cortex
Bif Thin - Biface Thinning
Pol Fl - Polished Flake
Mod R Mat - Modified Raw Material

Size 1 - $<2cm^2$
Size 2 - $2cm^2 \leq$ - $\leq 5cm^2$
Size 3 - $>5cm^2$

Tot - Total
HT - Heat Treated

Groundstone Tabulation Form

Site Number 23CY356

Rock Type

		Quartzite	Igneous		Hematite	Sandstone	Total
			Diorite	Gabbro			
Tools	Mano					1	1
	Total					1	1

Tool Tabulation Form

Site Number 23CY356

Chert Types

Tools	Mo	HT	Ojc	HT	Ex	HT	Indet	HT	Total
Util Fl	9	5	2	1					11
Biface	9	7	2	1					11
PP/Knife	5	5	1	1					6
Arrow Point	1	1							1
Drill Frag	1	1							1
Uniface	1								1
End Scr	1	1							1
Total	27	20	5	3					32

Legend:
Mo - Burlington
Ojc - Jefferson City
Ex - Exotic
Indet - Indeterminate
HT - Heat Treated

Util Fl - Utilized Flake
PP - Projectile Point
Scr - Scraper
Spoke - Spokeshave
G/B - Graver/Burin
Cht Ham - Chert Hammerstone
Util Shat - Utilized Shatter

Debitage Tabulation Form

Site Number 23CY356

Chert Types

Mo

Debitage	Source Type / Size	Res 1	Res 2	Res 3	Str Dep 1	Str Dep 2	Str Dep 3	Indet 1	Indet 2	Indet 3	Tot	HT
	PD				1	1		1			3	
	SD				23	27	2	32	19		103	29
	Int							514	85		599	284
Shat	Cort					12			12		24	4
Shat	Int								54		54	29
Core	Cort					6					6	
Core	Int								1		1	1
	Bif Thin								20		20	11
	Pol Fl											
	Mod R Mat											
Total						72			738		810	358

Ojc

Debitage	Source Type / Size	Res 1	Res 2	Res 3	Str Dep 1	Str Dep 2	Str Dep 3	Indet 1	Indet 2	Indet 3	Tot	HT
	PD	1	1			2					4	
	SD	8	5		7	8		26	16		70	13
	Int							148	33		181	50
Shat	Cort		14			10			24		48	10
Shat	Int								29		29	15
Core	Cort		8			4			2		14	
Core	Int								5		5	
	Bif Thin								2		2	
	Pol Fl											
	Mod R Mat		1			3					4	1
Total			38			34			285		357	89

Excello

Debitage	Source Type / Size	Res 1	Res 2	Res 3	Str Dep 1	Str Dep 2	Str Dep 3	Indet 1	Indet 2	Indet 3	Tot	HT
	PD											
	SD								1		1	1
	Int							1			1	
Shat	Cort											
Shat	Int											
Core	Cort											
Core	Int											
	Bif Thin											
	Pol Fl											
	Mod R Mat											
Total									2		2	1

Indet

Debitage	Source Type / Size	Res 1	Res 2	Res 3	Str Dep 1	Str Dep 2	Str Dep 3	Indet 1	Indet 2	Indet 3	Tot	HT	Tot
	PD												7
	SD								1*		1		175
	Int							44			44		825
Shat	Cort												72
Shat	Int												83
Core	Cort												20
Core	Int												6
	Bif Thin												22
	Pol Fl												
	Mod R Mat												4
Total									45		45		1214

LEGEND

Chert Types:
Mo - Burlington
Ojc - Jefferson City
Ex - Exotic
Indet - Indeterminate

* identified as Winterset chert

Chert Sources:
Res - Residual
Str Dep - Stream Deposited

Debitage Types:
PD - Primary Decortication
SD - Secondary Decortication
Int - Interior
Shat - Shatter
Cort - Cortex
Bif Thin - Biface Thinning
Pol Fl - Polished Flake
Mod R Mat - Modified Raw Material

Size 1 - $<2cm^2$
Size 2 - $2cm^2 \leq$ - $\leq 5cm^2$
Size 3 - $>5cm^2$

Tot - Total
HT - Heat Treated