SURVEY FINDINGS

A total of 1061 hectares (2622 acres) was surveyed during this project resulting in the discovery or re-examination of 36 sites and 19 isolated finds in the Salt Fork River drainage basin. Of the 36 sites, six were previously recorded. Three of the six revisited sites and one newly recorded site have distinct subareas that potentially represent different prehistoric camps. Including the subareas, 40 occupation locations were examined during the survey. Approximately 380 hectares (940 acres) and 17 sites were in Kay County. The remaining 681 hectares (1682 acres) and 19 sites were in Grant County. Descriptions of sites and materials are provided in Appendix A.

Sites in the Salt Fork River basin were identified to chronological period, when possible, based on artifacts and features. In many cases, diagnostic items were not recovered due to the temporary nature of the occupations or poor visibility for cultural materials, either from dense ground cover or buried cultural deposits. These sites could only be identified as prehistoric or historic. Examination of other collections improved chronological placement of a few prehistoric sites, but, usually, collections were not located for sites in the study area. Information on a site's setting, its size, and the type of site was recorded and is used to evaluate the distribution of sites in the study area.

HISTORIC SITES IN THE MIDDLE SALT FORK BASIN

Fourteen of the 36 sites analyzed have historic components (Table 2). All but one of these consists of nothing else besides historic materials. The Young #1 site, 34KA410, has prehistoric and historic components. In addition, five prehistoric sites have a few historic items and four isolated finds contain historic materials. The historic finds on the prehistoric sites (other than 34KA410) appear to be isolated materials probably associated with nearby historic houses or dumps.

Historic sites are principally farmsteads, but a cemetery, a store, and a dugout are represented (Table 2). Farmsteads are found in all survey areas and several have standing structures. Collapsed houses, foundations, stone-lined wells, and scatters of glass, metal, and ceramics mark the location of other farmsteads. Most of the farmsteads date after the land run of 1893 and most appear to have been abandoned by the 1950s. The cemetery and store were in use during this same period. Dates on the cemetery show initial use in 1894 and most other graves date from 1900 to 1910, although the cemetery was still used as late as 1997. The store is not far from the cemetery, and the landowner reported that it was in use during the homestead period and for some time after statehood. These sites represent Euro-American settlement of the Cherokee Outlet. With the exception of school lands, each quarter section in the area was homesteaded in 1893.

Two historic sites may represent earlier occupations. The dugout at KA407 is reported by the property owner to be older than the land run. The property owner's father settled this quarter and built a house that was about 1/8 mile

Table 2: Attributes of historic sites in the Salt Fork survey areas.

Site #	Period of Occupation	Site Type	Setting	Size (sq. m)	Height Above Water (m)	Soil Assn.	Soil Type	Distance to Nearest Water (m)	Nearest Water
GT34	1920-1950s	Farmstead	Terrace	900	5	MDH	P	200	Intermittent stream
GT35	1890-1950	Farmstead	Terrace	3,750	5	MDH	P	50	Intermittent stream
GT38	1893-1950?	Store	Terrace	1,200	30	MDH	D	250	Coldwater Creek
GT39	1893-1930+	Cemetery	Terrace	2,500	15	MDH	R	40	Coldwater Creek
GT41	1890-1950	Farmstead	Terrace	1,600	15	MDH	D	30	Wild Horse Creek
GT42	1893-1950?	Farmstead	Terrace	2,500	15	MDH	M	50	Wild Horse Creek
GT43	1930-1950?	Farmstead	Terrace	2,000	25	MDH	K	30	Wild Horse Creek
GT44	1930-1950?	Farmstead	Terrace	3,750	20	MDH	D	30	Wild Horse Creek
KA403	1900-1950?	Farmstead	Terrace	2,000	10	KBRL	L	10	Intermittent stream
KA407	1870-1900?	Dugout	Terrace	900	10	KBRL	PT	10	Deer Creek
KA410	1870-1900	Farmstead	Terrace	6,075	15	KBRL	B	20	Deer Creek
KA415	1900-1950?	Farmstead	Terrace	1,600	15	KBRL	PT	30	Deer Creek
KA416	1930-1960?	Farmstead	High Terrace	2,000	25	KBRL	R	30	Salt Fork
KA417	1900-1950?	Farmstead	High Terrace	1,200	25	KBRL	R	30	Salt Fork

KBRL = Kaw-Brewer-Reinach-Lela association; MDH = McLain-Dale-Hawley association.
B = Brewer silty clay loam; D =Dale silt loam; M = McLain silt loam; P = Pond Creek silt loam; PT = Port silt loam; R = Reinach loam.

south of the dugout. Unfortunately, no cultural debris was visible in the dugout area and thus, we have no evidence of the age of this structure. The second old historic site is Young #1, KA410. A scatter of historic artifacts and sandstone suggests a possible house location, but landowners in the area do not recall any structures on this location. No structure is indicated on the 1968 topographic map. Square nails, purpled glass, and ceramics indicate a pre-1900 occupation, but no structure is evident on the early 1872 Government Land Office map.

Farmsteads, stores, and cemeteries in the project area are found on terraces in all survey settings, along tributaries and along the Salt Fork (Table 2). Farmsteads along the Salt Fork are on high terraces whereas those along tributary streams are on low terraces. These settings provide adequate protection from most floods, although some of the lower terraces have periodically flooded over the past 100 years. Historic site density in the study area is 3.4 sites per square mile. Homestead (farmsteads and dugouts) site density is 2.9 sites per square mile. The lowest density is along the Salt Fork River, but this may simply represent sampling error. Based on Euro-American settlement of every quarter section during the land run, the expected density of farmsteads should be 4 per square mile. The relatively low homestead density may result from several factors. First, sampling did not include complete square miles, but was spaced in various areas along streams and the river. Such sampling often included only portions of quarter sections and we probably missed many homestead locations that were placed near roads and away from streams. This error may be enhanced if settlers tended to concentrate homesteads near each other in one part of a section. At present, there is no evidence that most homesteads were situated near one another. Second, some homesteads may still be in use and were not recognized as early historic sites. This is less likely, because many farms and ranches have been combined and many people have

moved into town settings in the study area. Finally, removal of buildings and flooding may have obscured or completely destroyed evidence of some farmsteads.

Farmstead sites in the Salt Fork River valley are usually near streams and the river (averaging just under 60 meters from water), but wells and cisterns are documented at many of the farmsteads. The close relationship of farmsteads to streams is probably only a function of the selection of survey areas. We concentrated surveys near streams or the river to identify prehistoric camps that are more likely to be found in the vicinity of water. Farmsteads in the bottomlands would also be likely to be near the highly productive soils that are common in these settings. Homesteads range from about 900 square meters to a scatter of debris covering over 6,075 square meters (Table 2). The average farmstead size is 2,356 square meters. The variability in the size of farmsteads represents the extent of the buildings (e.g. if the site includes only a house or if there are out buildings) and the amount of scatter of debris from daily activities and post-occupation plowing or other disturbances to house sites. Farmsteads occur on a variety of soil types, but on only two soil associations in the study area. Most sites are on silty or clayey loams that are common on the river valley terraces. Native vegetation is grasslands or the mesic forests once found along the river and streams.

PREHISTORIC SITES IN THE MIDDLE SALT FORK BASIN

Twenty-seven prehistoric occupations have been identified at 23 sites examined during this survey (Table 3). Most of these sites yielded little or no temporally diagnostic materials and they are simply classified as unidentified prehistoric sites. However, points or pottery and occasionally other tools provide evidence of occupations dating to the Archaic, Woodland, and Late Prehistoric periods in the study area. Three types of prehistoric sites were defined including village/base camps, base camps, and camps (Table 3). The site type was determined by the variety, density, and types of artifacts observed at sites or in collections and on the size of the sites. The limited amount of artifacts on some sites restricted any refinement of this classification.

A primary concern of the survey is placing prehistoric occupations within general time periods. Table 4 provides a list of chipped stone tools from each prehistoric site in the survey area. Pottery, which can be diagnostic for different Late Prehistoric and Woodland groups in this area, was limited to sherds from eight sites, and four of these included only sherds previously collected by avocational archeologists (Table 5). The pottery is described with the site descriptions (see Appendix A). Projectile point types provide evidence for chronological placement but few points were recovered during the survey. Two collectors, however, had points from several sites examined during this project. The larger sites also had some other artifacts (celts, scrapers, manos, etc.) that can often be related to occupations dating from the Woodland through Late Prehistoric periods.

Chronological placement of sites in the study area rests primarily on the comparison of artifacts with similar materials from other dated sites in

Table 3: Attributes of prehistoric sites in the Salt Fork survey areas.

Site	*Cultural Affiliation	Site Type	Setting	Size (sq. m)	Height Above Water (m)	Soil Assn.	Soil Type	Distance to Nearest Water (m)	Nearest Water
GT3A	A/W/LP	Village/Base Camp	Terrace	15,000	10	MDH	D	10	Polecat Creek
GT3B	A/LP	Camp	Terrace	3,750	10	MDH	D	10	Pond Creek
GT3C	LP	Camp	Terrace	1,200	10	MDH	M	10	Pond Creek
GT4A	A/LP	Base Camp?	Terrace	15,000	15	MDH	D	10	Polecat Creek
GT4B	A	Base Camp?	Ridge	5,000	25	PBG	P	20	Polecat Creek
GT5	W/LP	Base Camp?	Ridge/ Terrace	32,600	5-45	PBG & MDH	N, P, & M	10	Deadman Creek
GT8	LA/W/LP	Base Camp	Ridge	102,000	10-25	PBG	N & P	200	Deadman Creek
GT9	LA/W/LP	Village/Base Camp	High Terrace	15,900	25	PBG	N	500	Wild Horse Creek
GT31	LP	Camp	Terrace	20+?	10	MDH	P	10	Polecat Creek
GT32	LP	Base Camp?	Terrace	15,000	15	MDH	P	30	Pond Creek
GT33A	U	Camp	Terrace	3,750	5	MDH	M	10	Deadman Creek
GT33B	U	Camp	Terrace	1,250	5	MDH	M	10	Deadman Creek
GT36	LA	Camp	Terrace	4,200	20	MDH	D	50	Salt Fork
GT37	U	Camp	Ridge	5,000	30	PBG	G	10	Salt Fork
GT40	U	Camp	Terrace	7,500	5	MDH	MD	30	Intermittent Stream
KA160	U	Camp	Terrace	3,000	20	KBRL	R	100	Salt Fork
KA402	U	Camp	Terrace	2,000	20	KBRL	R	20	Intermittent Stream
KA404	U	Camp	Terrace Knoll	35,000	5	KBRL	R	10	Intermittent Stream
KA405	U	Camp	Ridge	400	15	NV	N	20	Intermittent Stream
KA406	A?	Camp	Ridge/High Terrace	5,625	35	NV	V	60	Deer Creek
KA408	U	Camp	Terrace	900?	15	NV	N	30	Intermittent Stream
KA409	U	Base Camp	Ridge	700+?	30	NV	V	225	Deer Creek
KA410	LP	Base Camp	Terrace	6,075	15	KBRL	B	20	Deer Creek
KA411	LP	Camp	Terrace	1,500	15	KBRL	B	100	Deer Creek
KA412	LP	Camp	Terrace	1,250	15	KBRL	B	30	Deer Creek
KA413	U	Camp	Terrace	15,000	5	KBRL	B	10	Intermittent Stream
KA414	U	Camp	Terrace	600	10	KBRL	P	150	Deer Creek

* A = Archaic, LA = Late Archaic, W = Woodland, LP = Late Prehistoric, and U = unidentified.
KBRL = Kaw-Brewer-Reinach-Lela association; MDH = McLain-Dale-Hawley association; NV = Norge-Vanoss association; PBG = Pond Creek-Bethany-Grant association;
B = Brewer silty clay loam; D =Dale silt loam; G= Grant silt loam; M = McLain silt loam; MD = McLain-Drummond silt loam; N = Norge silt loam; P = Pond Creek silt loam; R = Reinach loam; V = Vanoss silt loam.

Oklahoma and Kansas. A radiocarbon sample was used to date one buried cultural deposit examined during this project. Archaic sites are primarily identified by the large projectile point styles that range from the basally notched Calf Creek points used about 5000 to 6000 years ago to corner-notched and contracting stem varieties common from 3000 to 1500 B.P. Pottery and small stemmed and triangular projectile points are typical of Woodland and Late Prehistoric occupations. Triangular notched and unnotched arrow points become increasingly common through time with unnotched Fresno points predominating by A.D. 1450. In contrast, corner-notched arrow points and small, corner-notched dart points are typical of Woodland period sites in the Kaw Lake area and at similar sites in southern Kansas and northern Oklahoma.

Pottery varies considerably at sites in northern Oklahoma and southern

Table 4: Chipped stone tools found during the Salt Fork of the Arkansas River survey.

Site	Material	Williams	Calf Creek Barb?	Frio	Gary	Morhiss-like	Corner-N. Dart	Dart Frag.	Scallorn	Fresno	Arrow Frag.	Beveled Knife	Knife Frag.	End Scraper	Scraper	Drill	Bifaces	Modified Flakes	Flake Tools	Total
GT3A	Wreford	1															1	1		3
	Florence-A																	2		2
	Ogallala																	1		1
GT3B	Florence-A																1	1		2
GT3C	Florence-A										1			1				1		3
GT4A	Florence-A						1										1			2
	Ogallala														1			1		2
GT4B	Wreford																1			1
	Florence-A						1										1	1	1	4
GT5A	Florence-A									1				1						2
	Alibates														1					1
GT5C	Florence-A													1						1
GT8	Wreford														1					1
	Florence-A								1	1			1		2		1	1		7
	Alibates								1											1
	Ogallala																	1		1
	Unid. Chert		1														1			2
GT9B	Wreford										1									1
	Florence-A																		1	1
	Unid. Chert																	1		1
GT31	Florence-A													3				3	2	8
GT32	Wreford																2		1	3
	Florence-A									1							1	1		3
	Unid. Chert																	2		2
GT33A	Wreford													1						1
	Day Creek?																1			1
	Dakota quartzite												1					1		2
GT33B	Alibates?												1							1
GT36	Florence-A			1	1			1						1			1			5
GT37	Florence-A														1					1
GT40	Ogallala																1			1
KA160*	Florence-A																	1		1
KA402	Unid. Chert																	1		1
KA405	Wreford							1												1
	Alibates															1				1
	Unid. Chert							1												1
KA409	Florence-A													1	1		1	5		8
KA410	Florence-A										1	1		1				1		4
KA411	Florence-A													1				1		2
KA412	Florence-A																	1		1

Site	Material	Williams	Calf Creek Barb?	Frio	Gary	Morhiss-like	Corner-N. Dart	Dart Frag.	Scallorn	Fresno	Arrow Frag.	Beveled Knife	Knife Frag.	End Scraper	Scraper	Drill	Bifaces	Modified Flakes	Flake Tools	Total
KA413A	Florence-A																	4		4
	Alibates																	3		3
KA413B	Florence-A					1									1		1	3		6
KA414	Florence-A																	1		1
Isolates	Wreford																	1		1
	Florence-A											1	1							2
	Day Creek?														1					1
Total		1	1	1	1	1	2	3	2	3	3	2	4	11	9	1	15	40	5	105

Florence-A Total = 70 (66.67%) 40 of the 70 are heat-treated
Wreford Total = 12 (11.43%)
Ogallala Quartzite Total = 5 (4.76%)
Alibates Total = 7 (6.67%)
Unidentified Chert Total = 7 (6.67%)
Day Creek? Total = 2 (1.9%)
Dakota Quartzite? Total = 2 (1.9%)

* KA160 includes the flake graver collected by the highway department in 1975 (Baugh 1975:556-557).

Kansas, but the few ceramics found during this survey are dominated by cordmarked, smoothed-over cord-marked, and smoothed sherds with very little decoration present. The sherds typically have a sandy paste and are tempered with bone, sand, or crushed stone. The relationship of these pottery types with ceramics from surrounding complexes is unclear because of the small sample. The dentate or rocker stamped pottery (Hopewellian-type sherds) of the Middle Woodland period identified in the Kaw Lake area is not documented in the ceramics found in the middle Salt Fork basin. Grit tempered cordmarked and smoothed wares, however, appear at many Woodland and Late Prehistoric complexes in this region. The small size of the sample and the small sherd size from Salt Fork sites limits the information available on vessel shape from the study area and restricts comparisons. Grit tempered cordmarked ceramics similar to those found at GT3 and other sites along the Salt Fork are reported from Woodland period Butler phase sites in south central Kansas and appear in small numbers at Woodland period I and II sites in the Kaw Lake area. These sites also typically have some plain sherds. Bone tempering is not common at any of these Woodland sites and it may represent a later occupation in the Salt Fork basin. Vehik (1984) notes some bone tempered, cordmarked sherds appear at transitional Woodland III (A.D. 800-1100) sites in the Kaw Lake area. However, the decorated and plain shell tempered pottery recovered at the Late Prehistoric Uncas site is not found in the Salt Fork collections.

Salt Fork ceramics show a close similarity to pottery from the nearby Bluff Creek sites. Vertically cordmarked and some smoothed globular jars are recorded from Bluff Creek sites near the Oklahoma and Kansas border and these sites date to about A.D. 1050-1250. These ceramics are typically tempered

Table 5: Temper and thickness for cordmarked and smoothed pottery from Salt Fork sites.

Cordmarked Pottery

Site	Bone	Sand	Bone/Sand	Bone/Stone	Stone/Sand	Stone/Sand/ Bone	Stone	Total
GT3 # Th*	2B[@] 6.6-8.0 (7.3)	10 4.6-9.0 (5.9)	-	1 4.1	19R, 1BS, 152B 3.1-11.4 (4.9), 11.7, 4.0-9.4 (6.5)	2 5.8-7.0 (6.4)	-	187 (6.7)
GT4 # Th	-	-	-	-	-	-	-	-
GT5 # Th	13B 4.4-10.5 (7.3)	1B 6.5	1R, 3B 5.3-7.8, 6.3-7.5 (7.0)	-	-	-	1R, 3B 6.9-7.3, 6.7-7.2 (6.9)	22 (7.1)
GT8 # Th	-	1B 6.5	-	-	-	-	-	1 6.5
GT9 # Th	-	13B 5.0-8.4 (6.2)	1R, 12B 4.2-5.1 (4.7) 4.4-9.1 (7.0)	-	11B 5.2-11.0 (6.2)	-	3B 4.8-5.9 (5.5)	40 (6.6)
KA410 # Th	1B 7.3	-	-	-	-	-	-	1 7.3
KA411 # Th	2B 6.6-6.9	-	-	-	-	-	-	2 (6.8)
KA412 # Th	-	-	-	-	-	-	-	-
Total	18	25	17	1	183	2	7	253

Smoothed Pottery

Site	Bone	Sand	Bone/Sand	Bone/Stone	Stone/Sand	Stone/Sand/ Bone	Stone	Total
GT3 # Th*	2N, 3R, 18B 7.3-9.9 (8.4), 5.1-9.9 (7.6), 6.3-9.8 (8.0)	1R, 7BS, 1B 4.0, 7.3-13.9 (10.6), 7.8		1B 6.3	5B 4.8-8.7 (6.7)	-	1B 8.0	39 (7.5)
GT4 # Th	1B 8.0-8.3 (8.2)	-	1R 6.5-9.2(7.9)	1B 8.7	-	-	-	3 (8.3)
GT5 # Th	4R, 1N, 35B 2.6-9.9 (10.3), (7.7), 4.4-10.9 (7.0)	4B 3.8-8.2 (7.0)	1H, 6B 8.3, 4.4-8.9 (7.1)	1R, 4B 2.0-6.4 (6.0), 4.8-8.2 (6.7)	-	-	1N, 20B 7.4-9.5 (7.7), 4.3-9.8 (6.9)	77*** (7.0)
GT8 # Th	-	-	-	-	-	-	-	-
GT9 # Th	-	3B 4.0-6.2 (5.0)	3R[a], 3B[a] 5.0-8.7(6.7) 5.5-8.8(7.1)	-	-	-	1B 8.2	10 (6.4)
KA410 # Th	-	-	-	-	-	-	-	-
KA411 # Th	-	-	-	-	-	-	-	-
KA412 # Th	1B** 7.2	-	-	-	-	-	-	1 7.2
Total	65	16	14	7	5	-	23	130

[@] B = body sherd, N = neck sherd, R = rim sherd, BS = base sherd, H = handle.

* Th = thickness given as a range in mm with the average in ( ).

** exterior of this sherd is eroded but it appears to be smoothed.

*** there is one sherd or burned clay piece with no temper from GT5; it is 10.6 mm thick.

[a] includes 2 rims and 1 body sherd decorated with parallel impressed lines.

with sand although some bone temper is also present. Vessel shapes may be similar to those from pots at Salt Fork sites, and tool impressed lips are found in both areas. A similar assemblage from Pratt complex sites (A.D. 1350-1450) in Kansas may indicate another close relationship. To the west and northwest, bone and sand tempered cordmarked and smoothed ceramics are found at Wilmore complex (Plains Border variant) sites and at a few unclassified sites in northwest Oklahoma. Although not common, some lip and rim decorations on these pots are also similar to those found on pottery at GT3 and GT9. A few Borger Cordmarked sherds noted in a collection from GT9 indicate some contact with Zimms or Buried City complex or Antelope Creek phase groups to the west.

In general, the ceramics from Salt Fork sites appear to most closely resemble Late Prehistoric wares from nearby sites in southern Kansas and northwestern Oklahoma. There is also some similarity to transitional Woodland ceramics from the Kaw Lake area to the east. A Woodland association, however, cannot be dismissed given the small sample size from most sites and the similarity in the use of temper through time. Also, several of the cordmarked vessels from GT3 are direct, conical shaped jars that most closely resemble Woodland vessels.

There is little evidence of Paleoindian or protohistoric occupations in the Salt Fork survey area. No artifacts that relate to these periods have been found or identified in collections from the study area.

Village/Base Camps

There are two village/base camps in the surveyed areas (Table 3). Both of these are large sites covering 15,000-16,000 square meters, but a few other camps or base camps are as large or larger. These are classified as village/base camps because of artifacts collected by us (Table 4) or those in a private collection, plus the possibility of houses or other structures that may be evidence of more permanent habitation than is evident at base camps or camps. Both of the villages were previously recorded and it is likely that they would have been identified as base camps without the extensive collections documented by previous investigations.

It should be noted that the landowner reports that topsoil was removed from one of these sites (GT3A) during a flood in the 1970s and many of the artifacts were collected from this site in the years following this flood and deep plowing of the site. Coring of GT3A suggests that cultural deposits may still extend to over 30 cm beneath the current surface. This may indicate that other village/base camps could be partially buried and are not well exposed in the river valley. Both village/base camps are on terraces along larger tributaries. One is on a high terrace along a southern tributary and one is on a second terrace along a northern tributary.

Area A of the Porter site, GT3, is one of the possible villages based on the large number and diversity of materials in the Roy Patterson collection. This site, however, may include more than one component. The principal occupation appears to be during the Woodland

period and is marked by corner-notched arrow points and dart points. The crushed stone tempered, cordmarked pottery from this site might indicate a late Woodland or Woodland Period II occupation similar to those in the Kaw Lake/Salt Creek area to the east. Many of the Kaw Lake Woodland II sites, however, have predominantly smoothed pottery (Vehik 1984:188), whereas there are few smoothed sherds from GT3A. Cordmarked pottery occurs at several Late Prehistoric complexes in southern Kansas and northern Oklahoma, but these ceramics are usually tempered with sand or bone and vessels are globular and often have constricted necks. These characteristics are not present in the GT3A collection. One smoothed pot from GT3A is tempered with crushed bone, possibly indicating a Late Prehistoric occupation. The presence of many Fresno points also indicates some Late Prehistoric use of this site. Washita and Harrell points, celts, and beveled knives are additional evidence of Late Prehistoric occupation. Burned clay or daub indicates possible permanent structures, although no features could be identified from the surface evidence.

Roy Patterson collected from this site for many years and his artifacts provide the basis for identifying a village/base camp occupation. The collection is divided into three areas and it is possible that some artifacts from other areas were mixed in with Area A sometime before the collection was catalogued. Area C appears to be a Late Prehistoric, possibly even protohistoric, camp, and some of the Late Prehistoric artifacts recorded for Area A may have come from Area C. In general, GT3A seems to be a large, principally Woodland site with many activities represented.

The second possible village/base camp is the Stalker site, GT9. This site was tested in 1980, 1981, and 1982 and a local collector has an extensive collection from the field. The excavated material has not been analyzed but the field notes report burned clay and daub, evidence for structures. A small hearth and shallow pit are also recorded. Artifacts from surface collections include a great variety of materials, but these are reported from an extensive area in the field around GT9. The principle occupation seems to be Late Prehistoric based on arrow points and bone tempered cordmarked pottery. A few sherds from the Reynold's collection can be identified as sand tempered, Borger Cordmarked pottery, a ware found at Late Prehistoric villages in the Oklahoma and Texas panhandles. Beveled knives, numerous end scrapers, celts, grinding basins and manos, and other tools are additional evidence of a Late Prehistoric occupation. However, collections also include some corner-notched arrow points and corner-notched and contracting stemmed dart points. These suggest that a Late Archaic/Woodland camp is in the same field, if not on the same location as GT9.

Our survey did not obtain diagnostic materials necessary to identify different occupations at GT9. In fact the density of materials visible in this wheat field was not high. This may be the result of extensive collecting over a 70-year period. Based on a brief examination of excavated materials and excavation notes, GT9 can be identified as a probable Late Prehistoric base camp or seasonally occupied village/hamlet.

Two other sites reported by Roy Patterson in the study area may also

represent village/base camps, but they were not visited during this survey. GT2 is on a Pond Creek terrace and has many diverse artifacts and bone tempered cordmarked and plain pottery suggesting a Late Prehistoric occupation. GT7 is on a hill in the upper Deer Creek drainage. Pottery from this site is smoothed and tempered with bone, shell, or sand. At least one vessel has a constricted neck. The tools from the site are primarily scrapers and knives, which may indicate a specialized base camp rather than a village location.

Base Camps

Seven sites are considered base camps or possible base camps due to their large size and the number or variety of items recovered (Tables 3 and 4). These sites lack the evidence of permanent structures that mark the village/base camps and often they have fewer tools. This may, however, simply reflect the fact that more extensive collections were available for the village/base camps. Several of the base camps appear to represent repeatedly occupied camps and some of the artifact diversity may simply reflect this repeated use. No temporally diagnostic materials were found on one of the base camps, but the amount of debris and the size of the site suggest a base camp. Five of the other sites have evidence of Late Prehistoric occupations and two of these may also have Archaic components. One base camp seems to represent only an Archaic occupation. These are large sites averaging over 29,000 square meters. They occur on terraces and ridges in the Pond Creek and Deer Creek areas north of the Salt Fork.

Camps

Smaller sites with less evidence of extensive occupation have been classified as camps. We found few artifacts at these sites, although exposure of cultural materials was limited in some areas. The 18 camps vary considerably in size, ranging from 20+ square meters to 35,000 square meters. The latter site consists predominantly of a scatter of burned sandstone along a ridge and it may represent several small camps. Most of the camps are less than 4000 square meters (Table 3). Usually, collectors and landowners had no information on these sites. Diagnostic artifacts are absent or rare. Cordmarked pottery from two sites may indicate Late Prehistoric camps. A radiocarbon date from the buried deposit at GT31 indicates a Late Prehistoric occupation, and arrow points from GT3B and GT3C suggest Late Prehistoric components. An Archaic component may also be present at GT3B and dart points from GT36 indicate a Late Archaic camp (Table 4). Many of the camps may represent short-term occupations related to specialized activities such as hunting or collecting. However, the identification of buried soils and cultural materials on terrace settings suggests that some of these camps may represent more substantial occupations that are buried. For instance, the camp at GT36 is only exposed on the terrace slopes where there has been some artificial terracing. Much of this Archaic camp may be buried several feet beneath the plow zone on this Salt Fork terrace. Poor surface exposure in some locations also limits the utility of the camp classification. Time restrictions did not permit extensive shovel testing, thus we

have little information on the extent and density of most cultural deposits. Therefore, many of the sites classified as camps are potentially larger sites that are either buried or had reduced artifact visibility during our survey. The classification of sites as camps in this study should be considered tentative until further testing. Camps are recorded in all zones within the study area, including on terraces and ridges near the river.

Isolated Finds

Nineteen isolated finds represent other prehistoric activities in the study area. These are finds of a few items, usually a flake or two, or an isolated tool or tested cobble. Many of these are found on terraces not far from known camps. They may represent some limited activity associated with the camps. Others may indicate buried camps or activity areas, but insufficient information is available to identify the locations as camps. The finds generally do not include temporally diagnostic artifacts, but one diamond beveled knife fragment indicates Late Prehistoric activity. Some of these finds need testing to evaluate the potential for buried deposits.

Chronology and Site Distribution

Evaluation of the distribution of sites in the middle Salt Fork is difficult with the relatively small sample of sites for each prehistoric period. Within the larger Salt Fork basin in Grant and Kay counties there are 115 previously recorded prehistoric sites, excluding those re-examined during the survey (Table 1). The sample of sites found during the survey reflects, roughly, the same time periods reported for this larger river basin area. Prehistoric components from previously reported sites include Middle (Calf Creek) to Late Archaic camps, Archaic/Woodland camps or village/ base camps, Late Prehistoric camps and village/base camps, and at least one protohistoric camp. These temporal assignments are based on artifacts and features reported on site forms at the Oklahoma Archeological Survey. Many of these (47, 40.9%) are unassigned prehistoric components, and many (12, 44.4%) of the sites recorded during the survey also cannot be assigned to a time period.

Archaic/Woodland

Archaic components are suggested at eight sites (29.6%, Table 3) in the study area, but many of these could be better classified as representing Late Archaic to Woodland occupations. All of the study area sites with potential Woodland occupations include possible Archaic components with the possible exception of GT5. Evidence from the Kaw Lake area and other nearby regions indicates that many of the dart points and tools found on Late Archaic sites continue in use at Woodland sites. Identification of Late Archaic sites is thus problematic with only limited artifacts from a surface survey. An exception may be the buried camp at GT36. The presence of dart points apparently deeply buried in a high terrace may indicate an early Late Archaic component.

Archaic/Woodland sites are found throughout the surveyed area, but they are most common in the Pond Creek zone north of the Salt Fork. Only one partially buried Archaic site (GT36) is on a Salt Fork terrace. Thirty-six or 52.9% of the classifiable sites in the larger Salt Fork area have similar

Archaic (Late?) or Woodland components. The majority of these sites are found along stream terraces with a little more than a third (36.1%) occurring on uplands or high terraces. Only one of these sites is on a terrace above the Salt Fork River. In general, it appears that Late Archaic/Woodland base camps and camps are found principally along tributaries in the middle Salt Fork basin. However, evidence of deeply buried Late Archaic materials at GT36 suggest that these sites are present along the river, but would be buried and difficult to locate. Two unidentified prehistoric camps found on a terrace and a ridge near the river provide additional evidence of prehistoric use of these settings.

There is insufficient information on the Late Archaic/Woodland sites in the study area to evaluate their distribution in relation to similar sites to the east in the Kaw Lake and Salt Creek areas. Relatively few strictly Archaic occupations could be distinguished in the surveyed areas. This is similar to the sparse number of Archaic sites found to the east. We could not distinguish different Woodland periods with confidence other than to note that there is no evidence for Middle Woodland occupations. This may indicate that these early Woodland groups did not occupy the Salt Fork basin, occupied upper stream or upland settings not surveyed, or, their use of the basin was oriented toward specialized activities such as bison hunting where the characteristic stamped (Hopewellian) pottery of this period was not brought to the area.

The Woodland II and III periods cannot be distinguished in the study area, although some of the camps that also have been suggested to have Late Prehistoric components may be Woodland III occupations (see Vehik's discussion on the use of Florence-A in this report). Many of the Late Archaic/Woodland sites appear to be smaller camps compared to the hamlets and villages to the east along the Arkansas River and some nearby tributaries. This may indicate that the middle Salt Fork basin was only used for hunting/gathering camps, probably in the winter/spring. Hamlets and even villages, however, may be present in the middle Salt Fork basin at sites such as GT3A. Further testing and evaluation of sites and materials is needed to determine the type of occupation in the Salt Fork basin during this time.

The Roy Patterson collections from GT3 and several large possible Woodland sites in the Pond Creek area appear to be dominated by scrapers and knives. He also collected many projectile points but relatively few pottery sherds at each site. This type of tool assemblage suggests use of the area for specialized procurement, probably bison hunting. Such sites could have included temporary camps or larger, seasonally occupied base camps. Based on the predominance of Florence-A lithics at the Salt Fork camps, these groups may have inhabited summertime horticultural villages along the Arkansas or Chikaskia rivers, moving out into the Salt Fork basin in the winter or periodically sending out hunting expeditions to this area.

Middle Archaic, Calf Creek, occupation of the middle Salt Fork basin has been documented (at GT6) by Brooks (1995), and a possible Calf Creek point barb found at GT8 appears to be additional

evidence for occupation 4,000-5,000 years ago. Only four (5.9%) Calf Creek camps and one Early Archaic site are known for the larger Salt Fork basin (Table 3). GT6 and GT8 are on a high ridge above Polecat/Deadman creeks, and the four Calf Creek sites to the east are also on high terraces or uplands near smaller streams. The upland location of these sites may be significant in Calf Creek settlement, but evidence from the Kubik site near Kaw Lake indicates that these people also camped on stream terraces. If Late Archaic/Woodland sites are buried several feet deep on high terraces of the Salt Fork, it is likely that Calf Creek camps along streams in the Middle Salt Fork basin are deeply buried or have been removed by stream migration or other episodes of erosion. Profiles of the river and stream bank indicate several deeply buried soils representing old surfaces along each of the surveyed creeks and the river. None of these soils is currently dated, but their presence suggests extensive deposition in the valley. The 700-year-old radiocarbon date for a cultural deposit buried over three meters deep at GT31 is evidence of the extent of soil deposition in a tributary setting (although this portion of Pond/Polecat Creek cuts through the Salt Fork bottomland).

Late Prehistoric

Late Prehistoric village/base camps and camps are present on terraces and ridges near tributary streams in the study area, but they are not recorded along the river. Late Prehistoric villages and camps are situated in similar settings in the eastern end of the Salt Fork River basin. Forty-eight or 70.6% of previously recorded sites in the basin appear to have Late Prehistoric occupations. In the surveyed areas, only 44.4% (12) of the sites include Late Prehistoric materials. Although lower than the percentage from the larger river basin area, Late Prehistoric sites are the most frequently identified occupation in the surveyed zones. The 700-year-old buried Late Prehistoric component at GT31 is evidence that many other Late Prehistoric sites may be buried in terrace settings along major creeks. The frequency of Late Prehistoric sites could indicate a significant increase in use of the Salt Fork basin in Grant and Kay counties during this period. It could, however, result from other factors such as less deeply buried cultural deposits that are more likely to be discovered. The relatively large size of Late Prehistoric villages and camps in the study area, plus plowing of most terraces (favored Late Prehistoric camp locations) along the creeks may have made these sites more visible to both professionals and avocational archeologists than earlier sites. Thus, they would be more likely to be discovered and recorded. In addition, temporally and functionally diagnostic artifacts may be concentrated at these late sites if they were longer-term occupations.

The permanency of the Late Prehistoric occupations in the Salt Fork valley is difficult to evaluate with the current data. Items such as celts, bone digging tools, and decorative bone or shell that might be present at more permanent agricultural villages are uncommon in the basin although a few have been found. Grinding basins and manos are more common, but may not be evidence of permanent occupations. Late Prehistoric sites are found on fertile terrace settings that would be productive for crops, but these are also preferred

camp locations for many nonagricultural activities. Late Prehistoric groups to the east in the Arkansas River basin seem to have preferred to place their more permanent villages on high terraces of the Arkansas River and along terraces of larger tributary streams (Vehik 1985b:11). No evidence of permanent Late Prehistoric villages has been found along Salt Fork high terraces or ridges, although there is the possibility that these sites are buried. A few large villages are also situated east of the Arkansas River along streams near the Florence-A quarries to control access to this material. No high quality chert sources are located in the Salt Fork basin and only one possible Late Prehistoric base camp has been identified in an upland setting during the survey. Temporary camps of this period are distributed in upland and bottomland settings in the Arkansas River basin. Only temporary camps have been discovered in the Salt Creek basin east of the Arkansas River (Vehik 1985b:321). Both Late Prehistoric base camps and smaller camps are situated along tributary streams in the Salt Fork study area. In general, there is little evidence to indicate large, permanent habitation sites in the middle Salt Fork basin during the Late Prehistoric period. Semi-permanent village/base camps and camps are present, but these may be seasonal or temporary occupations, perhaps oriented toward bison hunting and other hunting/gathering activities. Possible semi-permanent villages are reported along Bois d'Arc Creek and the Chikaskia River in the eastern part of the drainage basin, and these may be closely related to the nearby Arkansas River villages.

Summary

In general, there is evidence of prehistoric occupation of the middle Salt Fork basin from at least Middle Archaic times to the Late Prehistoric and possibly protohistoric periods. Sites are concentrated along tributary streams for all periods, but there is evidence that Archaic and possibly more recent prehistoric sites occur along terraces of the Salt Fork but are deeply buried. Information is not sufficient to indicate variation in the density of occupations through time, but Late Archaic/ Woodland and Late Prehistoric camps may be the most abundant. Use of the area may have been oriented toward bison hunting or some other activity involving temporary camps or seasonal base camps. Artifact densities appear fairly low at most sites (see Table 7), although the burial of cultural deposits may be an important factor. Ceramics and other items that may indicate permanent habitation sites are not abundant in the project area. The predominance of Flint Hills cherts in the collections is evidence that groups using this area may have come from the east in the Arkansas River basin area close to Florence-A and other Flint Hills cherts. Evidence of possible structures at two of the larger sites may indicate some longer-term seasonal occupation, but further subsurface testing is needed to evaluate these sites.

LITHIC MATERIAL USE IN THE MIDDLE SALT FORK BASIN

Lithic material types found at sites in the study area provide some information on chipped stone tool manufacture and the

use of resources by various prehistoric groups. Locally available lithics identified during the project include only Ogallala gravels containing quartzites and undefined cherts. Deposits of these local gravels occur on most of the uplands near the streams, but the areas examined during the project yielded generally small cobbles/pebbles that would not be suitable for use in manufacturing most tools. Some of the local materials are knappable and were used, but it appears that inhabitants would have to hunt extensively for cobbles of sufficient size to manufacture many items other than flake tools. Based on the chipped stone assemblages (Table 6) collected from the project area, inhabitants depended principally on Florence-A chert found to the east in the Flint Hills along the Arkansas River. Vehik discusses the use of this material in the following section and this discussion provides general information on lithic resource use.

Over 60% of the total chipped stone items collected during the survey are made from Flint Hills cherts with Florence-A dominating most assemblages (Tables 6 and 7). This is comparable to materials in the extensive Patterson collection. Detailed analyses of Patterson's collections were undertaken for only one site, GT3, although similar lithic materials appear to be present in his other collections. GT3, thus, seems to be representative of other sites collected by Patterson, and it provides materials for comparison with those that we collected. The Patterson assemblage from GT3A is the largest and includes 80% Florence-A materials (Table 8). This compares with 41% from our surface collection of the site. The difference may be due to the emphasis on tools in the Patterson collection, whereas our collection is dominated by debitage. Five of the six tools recovered from GT3A during our survey are made from Florence-A (the one exception is a modified Ogallala quartzite flake). GT3 is also marked by the variety of lithic materials used by these people. Materials in the Patterson collection include Alibates and Edwards chert with outcrop sources in Texas, Day Creek chert from west of the Salt Fork basin, Tesequite and Dakota quartzites found in the Oklahoma Panhandle, Niobrara chert from northwestern Kansas or southwestern Nebraska, a few Boone cherts from the Ozark Mountains to the east, and local Ogallala quartzites and other materials. Many of these materials are also included in our surface collection.

The diversity of lithic materials does not extend to all sites in the project area, but the larger, probably more intensively occupied, sites typically have a variety of materials (Table 6). Other than the Flint Hills cherts, local Ogallala quartzite is the only material represented in amounts greater than 10% for the project area. Those individual sites with only a few items sometimes have larger amounts of specific materials such as Alibates. This apparently represents sampling error from the small sample size. Other than the Flint Hills cherts, which are found 50-80 km from sites in the middle Salt Fork, the most common nonlocal materials for the total sites are Alibates and Day Creek chert from sources to the west or southwest of the project area. In contrast, Edwards chert from north central Texas and Dakota quartzite from the Panhandle are more common than Alibates or Day Creek in

see Table 6 in separate file.

see Table 7 in separate file.

see Table 8 in separate file.

the Patterson collection from GT3 (Table 8).

There is no major distinction in lithic material use by time period. Florence-A chert is the dominant material at Archaic through Late Prehistoric sites with minor use of Wreford and local quartzites and cherts. Florence-A is over 66% of the material from GT36, the Archaic site on the Salt Fork terrace. The larger collections from Late Archaic/Woodland sites have from 21% to over 55% Florence-A. Florence-A is found in even higher percentages at some Late Prehistoric sites, although many of these sites have multiple components. In general, it appears that all occupants of the middle Salt Fork sites relied heavily on Flint Hills cherts, primarily Florence-A. This reliance may have varied slightly through time (see Vehik's discussion on the use of Florence-A), but groups either included the Florence source area in their yearly round, periodically visited the area to obtain this chert, or concentrated their habitation near the Florence source bringing the chert to the middle Salt Fork area on periodic or seasonal hunting/gathering forays.

PREHISTORIC USE OF FLORENCE-A CHERT IN THE SALT CREEK AND SALT FORK VALLEYS

by

Susan C. Vehik

Introduction

The archaeological sites in Salt Fork valley demonstrate a heavy reliance on cherts from areas to the east, especially Florence-A chert. There are no deposits of Florence-A chert that are local to the project area. Florence-A must be obtained either from along the Arkansas River or to its east. Florence-A chert deposits occur in south central Kansas and north central Oklahoma (Figures 5 and 6). Florence-A is seldom found north of the Walnut River of southern Kansas (Haury 1985:24). In Oklahoma it does not occur south of the Beaver Creek juncture with the Arkansas River (Hruby 1955; Noll 1955). East of the Arkansas River, between Little Beaver and Beaver creeks in eastern Kay County and southern Cowley County, Kansas there are several large quarry pits associated with Florence-A chert (Figure 6). The quarries are on top of cuestas where the limestone that overlays Florence-A chert is thin. This limestone caprock thickens northward into Kansas and the quarry pits disappear. The quarry pits likely date to the Late Prehistoric period (Vehik 1986a, 1990). Beyond bedrock deposits, cobbles of Florence-A can be found in area streams, including the Arkansas River.

The Florence-A chert quarries and the surrounding valleys of Little Beaver and Beaver creeks were intensively surveyed in 1979 and 1980. In subsequent discussion this location is called the Florence-A source area or FAS. Salt Creek valley just to the east of Beaver Creek was surveyed in 1978, 1979, and 1980. Florence-A chert is not available in Salt Creek valley. Like Salt Fork, the use of Florence-A on Salt Creek was heavy. There is a locally available chert, Foraker, but it is inferior to Florence-A (Vehik 1985a; Vehik et al. 1979).

The surveys provide a great deal of information on lithic material use,

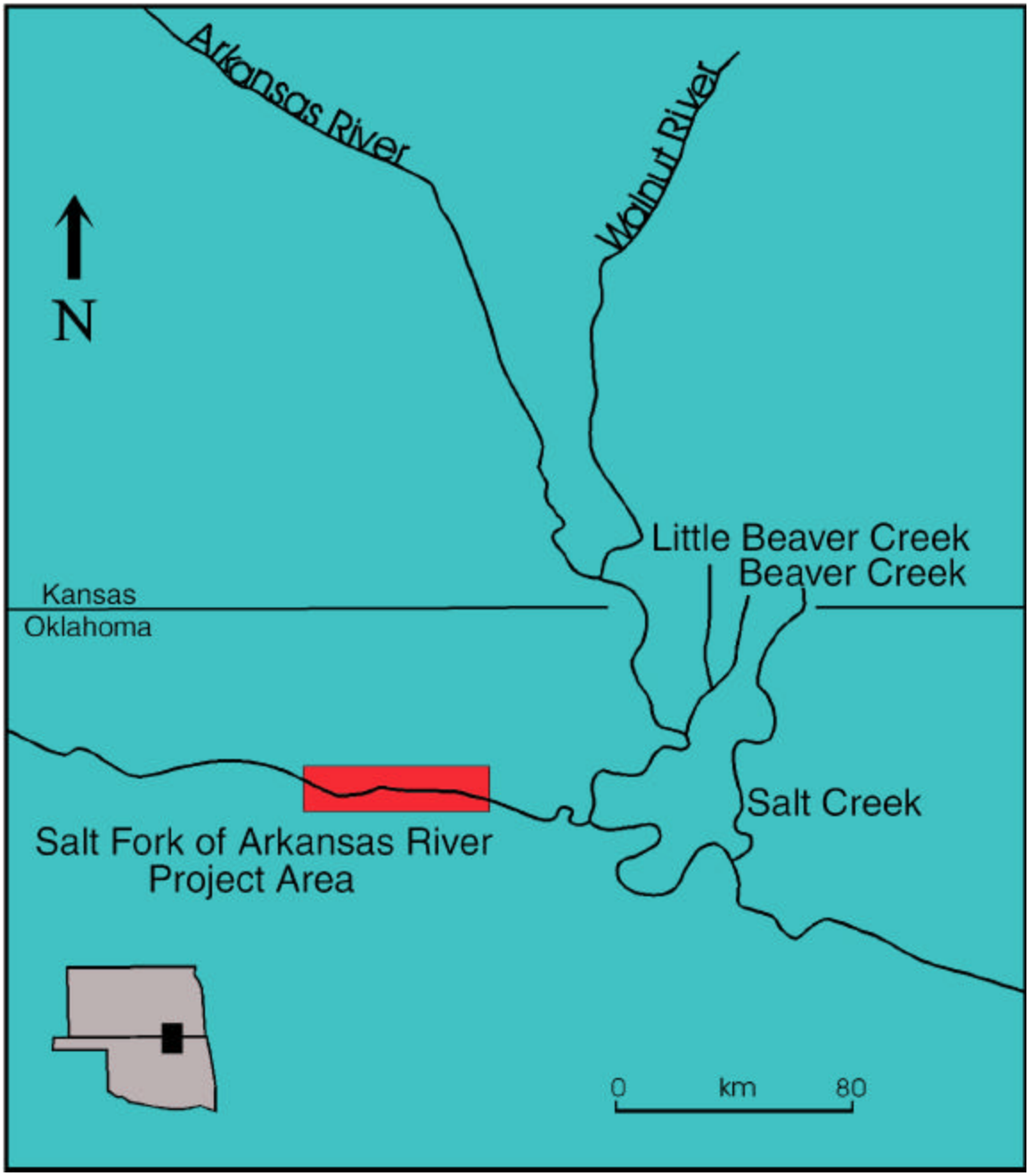

Figure 5: Salt Fork of the Arkansas River research area.

especially of Florence-A chert. Brief summaries of that information from the original reports are provided below for purposes of comparison to the Salt Fork results (Vehik 1985a; Vehik et al. 1979). Florence-A chert usage in Salt Creek valley is discussed in greater detail. The Salt Creek setting is most comparable to Salt Fork in that Florence-A is not locally available.

The importance of Florence-A in lithic assemblages from Salt Creek is assessed using the average percentage of Florence-A in the unutilized debitage assemblages. Unutilized debitage

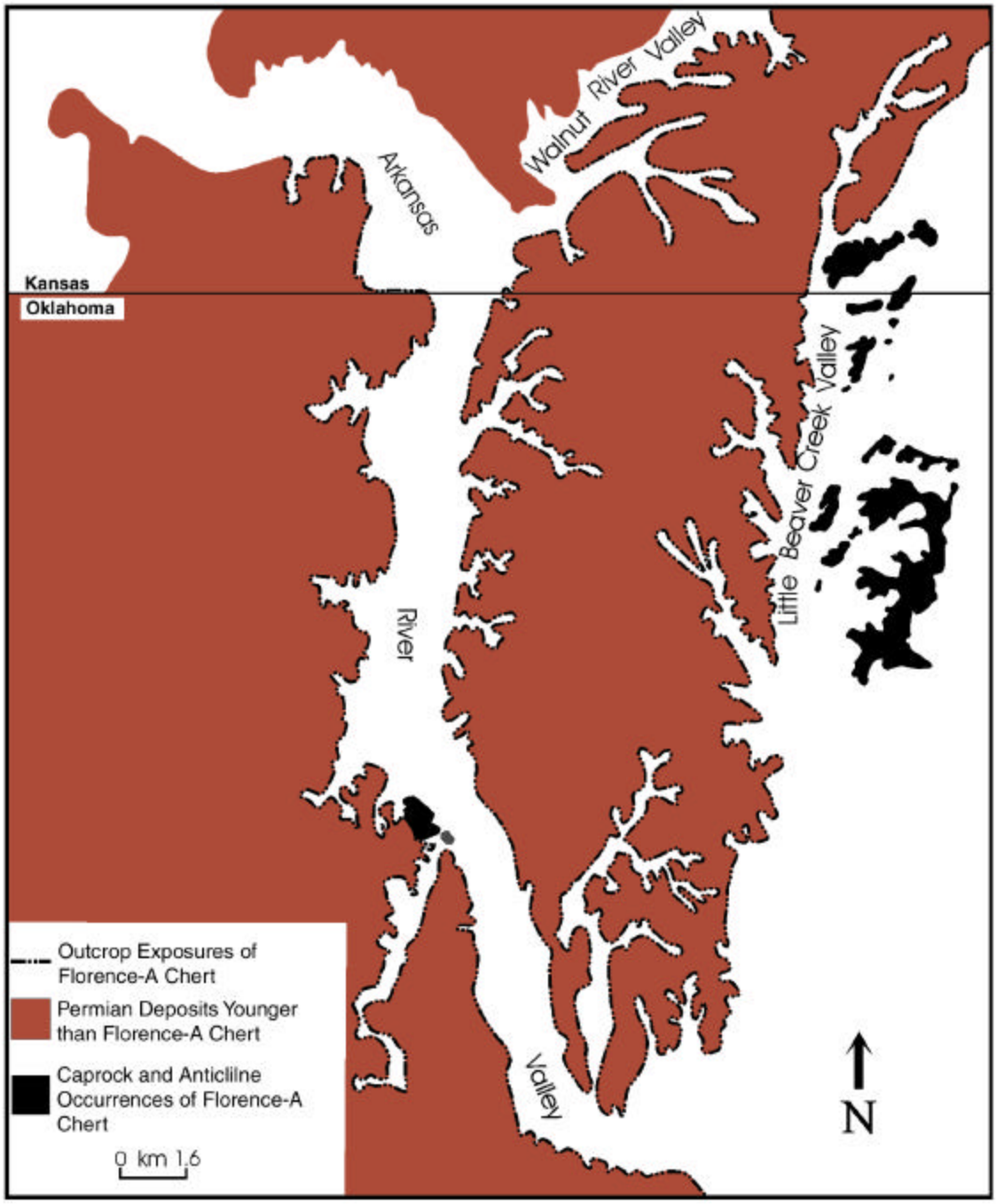

Figure 6: Surface geology of north central Oklahoma and south central Kansas.

constitutes the largest category of cultural remains at these sites. Utilized and modified flakes along with other lithic objects are not included because they are more likely to be saved and moved from site to site. By using unutilized or unmodified debitage as a measure of the importance of Florence-A both tool maintenance and production are considered.

The average percent of heat treated Florence-A in the unutilized debitage assemblages measures more than just the

role of heat treatment. Heat treatment is another step toward a production goal. The less heat treatment is in evidence, the less the commitment to a production goal.

The average percent of cortex on Florence-A chert unutilized debitage assemblages measures the role of early stage reduction. In general, the greater the percentage of cortex, the more likely it is that early stage reduction was taking place.

Also calculated are average percentages of stream gravel cortex within the cortex category. This provides a measure of the extent to which sources of Florence-A other than bedrock were important.

Theoretical Considerations

In general, as mobility increases there should be an increasing emphasis on the use of high quality lithics. Mobile populations need to be adequately prepared for a variety of tasks in different settings (Kuhn 1994). High quality lithics increase the efficiency with which those tasks can be accomplished. Florence-A chert is the highest quality lithic material available in north central Oklahoma and south central Kansas. During periods of greater mobility dependence on Florence-A should be higher than when mobility was less.

The quality, density, and predictability of lithics available in specific settings modify the relationship of high quality lithics with mobility. Where local lithic quality, density, and/or predictability are low there should be greater use of nonlocal, high quality lithics. In essence, necessary lithic supplies will be carried in and local lithics minimally used. For Salt Creek occupations, the local lithic is Foraker chert. Salt Creek cuts through Foraker limestone. Consequently both bedrock and stream rolled cobbles of Foraker are readily available. For Salt Fork, local lithics consist primarily of gravel originating from the Ogallala formation. The Ogallala formation stretches from South Dakota into Kansas, and on to west central Texas. Erosion has removed much of the Ogallala formation. Pleistocene erosion distributed gravel from the Ogallala formation eastward where these gravels were redeposited in terraces of streams draining the high Plains (Church 1994; Frye and Leonard 1959; Frye and Swineford 1946). Burial of these gravels in terraces and stream beds decreases their visibility.

Comparing Salt Creek and Salt Fork, the quality of Ogallala gravel may be higher on average than is that of Foraker chert, but Ogallala cobble density and predictability is lower given their burial. Thus, even with similar levels of mobility there should always be greater dependence on Florence-A among those occupying the Salt Fork valley.

There are other factors that will also influence the use of the different lithic resources. The greater the mobility and the larger the exploitation area the less the amount of time spent in any one location. As a result, with greater mobility and larger exploitation areas the less detailed may be the information about resource availability. During periods with greater mobility and larger exploitation areas, there should be greater dependence on Florence-A. This is particularly important for Salt Fork where local lithics are not as visible as

on Salt Creek. For Salt Creek its northern reaches are just about 10 km away from sources of Florence-A chert. Ten kilometers is generally considered to be the maximum limit within which a resource may be efficiently utilized from a certain location (Roper 1979:123). Also, for Salt Creek, its lower reaches bring Arkansas River cobbles of Florence-A within a day's walk.

Archaic Period

The Archaic period had the greatest degree of mobility for the time periods considered in this study. Exploitation area size was larger than during the later Woodland period. During the Archaic, especially the latter part, bison were the primary game source in the western Plains (Buehler 1997; Dillehay 1974; Hughes 1984). Bison are a mobile, clumped resource and move over a larger area than deer, the other primary game animal (McHugh 1958; Reynolds et al. 1982).

Only a few sites (n=3) are known from this period in FAS/Salt Creek. All probably date to around 500 B.C., and all are on Salt Creek. The Archaic period was associated with an episode of alluvial filling and so most sites are deeply buried and/or eroded. Of the known sites in Salt Creek valley, one is an upland site, another is on a second terrace, and the last is buried in the floodplain. All three sites appear to have been temporary camps. The floodplain site was occupied several times (Vehik 1985b:310-311).

Only two sites from Salt Fork appear to have single component Archaic occupations. A third site seems to have multiple components ranging from Archaic through Late Prehistoric periods. It has almost no cultural material, however, and is not considered further here. There are four other sites recognized as having two components, one of Archaic and the other of Late Prehistoric date. I have classified these sites as belonging to the Woodland period. They are discussed in greater detail later.

It is unknown whether all people in a residence group moved with the bison herds, but there are no sites in FAS, Salt Creek, Salt Fork, or the Arkansas River areas that suggest sustained residence in any one location. Both Salt Creek and Salt Fork should exhibit substantial use of Florence-A during the Archaic period. Heat treatment should be comparatively low because of the need to maintain flexibility in production goals. Because of a need for flexibility in production goals cortex should be relatively high. The values on all of these variables should be higher on Salt Fork than on Salt Creek because of the lower visibility of alternative lithic sources on Salt Fork.

Woodland Period

Mobility declines and exploitation area size decreases during the Woodland period. Partially responsible was a reduction in the availability of bison and, as a result, increased dependence on deer (Dillehay 1974). Also, during the Woodland period cultigens were added to the subsistence inventory, albeit most subsistence resources were hunted and gathered. Although it is quite possible to plant crops and leave them unattended, their productivity is less than when they are tended. Historically, farmers who abandoned villages for bison hunting suffered low horticultural productivity (Dunbar and Allis 1918:660, 667; Leduc 1815; Morse 1822:205). Crops thus tie

farmers to one location to a greater degree than do most hunting and gathering subsistence strategies. Another factor responsible for a reduction in mobility and also, perhaps, for the increased dependence on cultigens, was an increase in population during the Late Archaic (Lynott 1981; Skinner 1981; Story 1981).

For FAS and Salt Creek the Woodland period consists of three subperiods (Vehik 1984:186-192, 1985c:10-11). Because of sample size problems, two of these periods are lumped in this study. The earliest period is Woodland I, dating A.D. 0 to 300, and the later one is Woodland II/III, dating A.D. 300-1200.

The Woodland I period in FAS is associated with a variety of sites, but there is no evidence for permanent occupation (Vehik 1985b:311-317). Sites were created as a result of procurement activities occurring under different conditions, such as embedded and direct procurement (Binford 1979). In embedded procurement, lithics are obtained while conducting other activities, such as hunting or plant collecting. With direct procurement, trips are made especially to obtain lithics. The argument has been made that lithics were never directly procured (Binford 1979:259). However, there are a number of sites in the Florence-A source area that cannot be dated but which show no evidence of any activity other than lithic procurement. Also, as noted above, the upper reaches of Salt Creek are within 10 km of FAS. FAS could easily be targeted for direct exploitation from that location (Leonard et al. 1989:101).

On Salt Creek there are eight sites assigned to Woodland I. Settlements appear to fit together in a pattern. There are base camps that seem to be occupied seasonally, probably in the fall for deer hunting and nut gathering, given the consistent presence of projectile points and grinding equipment. Preservation in Salt Creek sites is very poor and few faunal and no floral remains were recovered during excavation (Buehler and Vehik 1985). There then are a series of sites occupied for shorter terms, usually for more limited purposes. They appear to have been satellites of the base camps (Vehik 1985b:311-317). That is, people were seasonally resident at base camps in Salt Creek valley and from these base camps, a series of logistical forays took place (Binford 1980).

Although it is not certain, it seems likely that some of those utilizing FAS and Salt Creek spent other seasons living along the Arkansas River. A large cache of Boone chert bifaces was found eroding out of a site along the Arkansas River where it is joined by Beaver Creek (George 1981). Boone chert is local to the Ozark Uplift of northeast Oklahoma. The bifaces are of a form identical to those associated with Cooper focus sites in northeast Oklahoma. Boone chert is rare in FAS and Salt Creek sites. When present it occurs as broken late stage bifaces or tools (projectile points and scrapers) and as debitage. Boone chert bifaces likely arrived as a trade item at sites along the Arkansas River and then were removed to sites in FAS, Salt Creek, and elsewhere where they were used for utilitarian activities (Vehik 1985b:313, 315). Several sites along the Arkansas River exhibit a wide range of

tool types. Daub is also present at these sites (Vehik 1984:187). These sites may have been occupied for more than one season.

Woodland II/III in north central Oklahoma is a time in which there seems to have been a slow transition in settlement behavior from that of Woodland I to that of the Late Prehistoric period. During this time there was a change in settlement pattern such that small streams tributary to the Arkansas River, such as Salt Creek, were occupied for shorter periods of time than earlier. Residence along the Arkansas River and elsewhere to the north and west may have slowly increased in permanence (Vehik 1985b:317-321).

Sites from FAS exhibit great variability in reduction activities. As earlier, they seem to reflect a mix of embedded and direct procurement (Vehik 1985b:318).

There are 13 Salt Creek sites assigned to Woodland II/III. Occupations on Salt Creek were of a shorter nature than earlier. Compared to Woodland I much less material occurs on these sites and density per square meter is less. Salt Creek was principally occupied for hunting purposes (Vehik 1985b:317-321).

I assigned the four Salt Fork sites designated as having Archaic and Late Prehistoric period occupations to the Woodland II/III period. The reason for that is sites occupied during the Woodland period in north central Oklahoma often have projectile points that resemble Archaic period styles. With time, arrow points became more common, first corner notched styles and then triangular side notched and unnotched styles. After A.D. 300 small arrow points increased in frequency relative to dart points. Rather than recognizing two components, I assign such sites to the later Woodland time slot. One of these sites, 34GT3A, was possibly a village or repeatedly occupied base camp.

With Woodland I, which brought the establishment of seasonal base camps in Salt Creek valley, the role of Florence-A should decrease. The greater degree of sedentism, as compared to the Archaic period, in the Salt Creek valley should have produced an increase in knowledge and use of local resources. More importantly, the cost of carrying large amounts of lithics may have become greater than the cost of using local materials. Given the possibility of season-long residence, flexibility in production could have remained important. Florence-A under those conditions would have been brought into the area primarily without heat treatment and with high cortex frequencies.

The Woodland II/III period may not exhibit a clear pattern of lithic use because it was a time of transition. As will be discussed in much greater detail next, there was a change toward the use of special task groups to exploit resources during the Late Prehistoric period. This was a substantial switch from the seasonal sedentism of Woodland I. Special task groups went out from increasingly sedentary villages established outside the Salt Creek and, probably, Salt Fork valleys. As Florence-A chert is the highest quality chert in the area these task groups should have been equipped with supplies of Florence-A necessary to accomplish intended tasks. If all they carried were

tools of Florence-A then Florence-A frequencies should be very high, there should be little cortex, and heat treatment rates should be high. However, because replacement lithics were more predictable on Salt Creek, use of Florence-A may be lower than on Salt Fork.

Late Prehistoric Period

Sedentary farming villages in north central Oklahoma mark the Late Prehistoric period. At the same time there was an increasing availability of bison beginning around A.D. 1200 (Baugh 1986; Creel 1991:40; Dillehay 1974; Huebner 1991:351, 354). From A.D. 1200-1400 or 1450 relatively small villages appear to have been the settlement norm. After A.D. 1400 or 1450, villages were fewer but much larger (Holder 1970:27; Johnson 1991:62; W. Wedel 1938:18, 1959:630-631, 639, 1961:100, 105).

A return to a dependence on the more mobile and clumped bison should have brought about an increase in exploitation area (Foley 1992:146; Vehik n.d.). Exploitation areas would also increase with relocation into large villages, as hunters would have to go farther to supply the larger numbers of people.

Historically many villagers on the Plains are documented as leaving their settlements, in mass, to go on summer and, especially, winter bison hunts (Holder 1970:29-30, 36; W. Wedel 1961:123). There is no evidence for abandonment of villages in order to engage in seasonal hunting excursions in the south central Kansas and north central Oklahoma area. In A.D. 1541, probably during August, Coronado encountered a small group of men and women out hunting bison at several days' distance from their home settlement (Winship 1990:197, 209). To Coronado this settlement was part of Quivira while to archaeologists it is known as Little River focus (Wedel 1942). The group was said to be out hunting bison for their village (Winship 1990:209).

The Lewis site is in the same general area in which Coronado encountered the hunters. Lewis is very obviously a specialized bison hunting camp that was repeatedly occupied over a period of several hundred years (Ranney 1994). Archaeological analyses of Little River focus village faunal assemblages indicate that bison were indeed predominantly hunted at some distance from the villages (Loosle 1991:92-95). Both history and archaeology suggest specialized task groups were responsible for supplying people of the Little River focus with bison.

In A.D. 1601, during October, Oñate visited south central Kansas, probably where the Walnut River joins the Arkansas River, just north of the Oklahoma/Kansas state line (Hammond and Rey 1953:755). The area was occupied by a large horticulturist settlement called the Great Settlement or Etzanoa (Vehik 1986b). Just to the west of this location, possibly along Salt Fork, he encountered a group of mobile, communal bison hunters known as the Escanjaque. The Escanjaque were hunting at quite some distance from their main settlements in western Oklahoma. The Etzanoans, however, were in their villages with no evidence that they would be abandoning that location for a communal hunt (Hammond and Rey 1953:755, 845, 880-881, 901; Vehik

1986b). Additional indication that villages were not likely abandoned for communal hunts comes from faunal analyses conducted on Lower Walnut focus assemblages. Lower Walnut focus is the archaeological representation of Etzanoa (Vehik 1986b). The faunal analyses indicate that bison were hunted close to the villages (Haury 1994). Even in the mid-eighteenth century when communal bison hunting can be documented for some farmers, the descendants of Lower Walnut focus were still living in the same area and were described as being in their villages year round (Hackett 1941:317, 322, 327; M. Wedel 1981:10, 72-73).

As noted earlier, tended crops produce better than untended crops. Thus for people having a strong commitment to horticulture, leaving crops unattended is not a good idea. The Coronado and Oñate expeditions were conducted during the growing and harvesting seasons. That leaves open the possibility that horticulturist villages were abandoned only for winter communal hunts. With one exception, there is no evidence that can be marshaled to support that idea. The Lewis site is not large; it seems to have accommodated a small group of people, at most a few work parties similar to what the Coronado accounts describe (Ranney 1994:32-42). As the houses have fireplaces (Ranney 1994:Figures 17-20) Lewis likely was used during cold seasons as well as during the warmer season in which Coronado's expedition occurred (the faunal assemblage has not been analyzed so seasonality of kill(s) is unknown). There are no known sites like Lewis that are as large as what would be expected with a communal hunt, given that at least some villages had around 200 houses (Winship 1990:198). The mid-eighteenth century description of the descendants of Lower Walnut focus as living in their villages year-round is not likely a hearsay comment. These villages were involved extensively with the French hide trade and were likely visited frequently and its residents' habits fairly well known.

The argument might be made that the use of storage pits reflects the practice of periodic site abandonment. That is, some attempt was being made to conceal valuable crop produce and other items by putting them underground. Subterranean storage is unlikely to be built principally for the purpose of hiding crops (or anything else) for the following reasons. First, as a practical matter subterranean storage reduces the amount of space used. The switch to large and often compact villages makes space a premium, and therefore the less surface clutter the better. Second, although comments were made during the later Historic period about putting things in storage pits prior to leaving a village (John 1983:422; McDermott 1944:108; McLean 1977:54, 515), records also indicate these storage pits could rather easily be located (Thwaites 1905:277). Third, more importantly, some people were still using storage pits in the relatively recent past. Comments suggest they were viewed much like root cellars (Schmitt 1948a). A properly prepared pit was quite impervious to the elements (Schmitt 1948b, 1950). People with an emphasis on farming very likely lived in their villages year round, using special task groups to procure bison, lithics, and other resources.

The exception to year round residence by farmers comes from the LaHarpe

expedition. In A.D. 1719 LaHarpe visited the Mento somewhere in the area where the Verdigris and Neosho rivers join the Arkansas River in east central Oklahoma (Vehik 1992). Once there he found out that the Mento would leave their village after October to go bison hunting and would not return until March (Smith 1959:531).

Communal abandonment of villages for bison hunting is seldom documented until later in the Historic period. Two factors were important in the abandonment of villages for communal bison hunting. The first factor was the distance of bison herds from a village. Bison were most strongly associated with the short grass prairie (Lynott 1979; Vehik and Kraft 1995). Historically bison were present in sizeable numbers only to the west of about 97 degrees longitude in Kansas and Oklahoma (Vehik and Kraft 1995). The farther herds were from a village, the greater the distance that must be traveled. Pursuit from a greater distance will take longer and cost more (Stephens and Krebs 1986:54). Increasing average distance from a central place should be matched by increasing load size of whatever resource is being sought (Kaplan and Hill 1992:185; Krebs and Davis 1993:50-52; Stephens and Krebs 1986:60). Societies more than 50% dependent on fauna cannot send a hunter beyond 20 km before starting to operate at a loss. Communal hunting at longer distances is a potential solution (Kelly 1991:138). Thus, rather than making multiple trips as Lower Walnut focus people could do, strategies are necessary to procure larger parcels with fewer trips as distance to the resource increases. Communal hunting provides a mechanism for procuring larger food packages. Presumably, the longer the distance to the resource and the less often trips are made, the larger the group will be that procures that resource.

The second factor enters at this point. Conflict was a prominent feature of the Late Prehistoric and early Historic periods. This conflict increased over time (Boyd 1997; Vehik n.d). The greater the threat of conflict the more dangerous it becomes for small groups. Anything that will decrease group size is potentially costly. A subset of villagers out hunting is not only in danger because of its small size but so is the home village whose population is reduced. The solution to the intersection of increasing distance from bison herds and increasing conflict is to have the maximum number of people available for both bison hunting and village defense. Abandoning a village for communal hunting accomplishes both hunting at a distance with the fewest possible trips while maintaining the best defense possible.

Most historically documented hunting behaviors in north central Oklahoma and south central Kansas can be accounted for by considering herd distance and defense. The Mento were about 154 km east of 97 degrees longitude. They were also, no doubt, 50% or more dependent on bison for food since they leave their villages for five months after apparently consuming most of their farm produce (Smith 1959:531). The Lower Walnut focus villagers were at 97 degrees longitude and were most likely less than 50% dependent on bison for food given their numerous storage facilities (Hawley and Holland 1996). Because of the differences in proximity to bison, the Mento abandoned their village to go bison hunting while Lower Walnut focus

people and their descendants did not. The Lewis site is about 93 km from the Little River focus villages. Little River focus was also likely less than 50% dependent on bison for food, again given numerous and very large storage pits (Metcalf 1971; W. Wedel 1971). As this group was hunting bison at a greater distance from their villages than appears to have been true for Lower Walnut focus, a task group composed of several individuals was out hunting. Lastly, the Escanjaque had minimal to no commitment to farming (Vehik 1986b:29). Their likely archaeological representation, the Wheeler phase, fortified at least some fall bison hunting facilities near their villages in western Oklahoma (Savage 1995). The threat of conflict, especially during late fall in this area, was high. The threat from conflict may be partially why Oñate found the Escanjaque on a communal hunt, but more important is that they were as much as 200 km east of their home settlements (Vehik 1986b:24, 29, 1992:328).

The idea that Plains farmers abandoned their villages to go bison hunting cannot be applied wholesale. The most important factor was distance of home settlements from bison herds. For those people closer to bison herds, task group and individual hunting were possible without having to leave crops, suffer possible losses of stored resources with village abandonment, or decrease horticultural production so as to leave no stores in abandoned villages. Even with close proximity to bison herds, increasing intensity of conflict (especially escalating losses from conflict) will require adjustments in hunting strategy, up to and including permanent abandonment of a locality. For example, Little River focus abandoned central Kansas by 1680, the Mento abandoned eastern Oklahoma by 1740, and the descendants of Lower Walnut focus left northern Oklahoma by 1758 because of conflict (Vehik1998).

The issue during the Late Prehistoric period is which mix of sedentism and mobility is applicable to what situation. For people who were heavily invested in farming, mobility involved either single individuals or multiple individual task forces. Seasonal, wholesale abandonment of villages is quite unlikely. For north central Oklahoma during the Late Prehistoric period, people were sedentary with bison and lithics, as well as other things, exploited by individuals and task forces.

At this point, the discussion will return to lithics. It is during the Late Prehistoric period that quarry pits were likely initiated into Florence-A deposits (Vehik 1986a, 1990). This was also the time, especially after A.D. 1450, of widespread trade in Florence-A chert. There were at least one and possibly three villages in FAS. All are on Beaver Creek. Their locations were determined by both proximity to Florence-A chert quarries and farmable land (Vehik 1990). There were other Late Prehistoric sites in FAS that were used for short term lithic extraction and hunting. After A.D. 1400 or 1450 local populations coalesced into a relatively few large villages, primarily in south central Kansas where the Walnut River joins the Arkansas and at other locations on up the Walnut River. By this time much of the lithic extraction and processing appears to be centered at one site in FAS, 34OS46. This site seems to have been a center for procuring and

processing Florence-A chert, both for trade and to meet at least some of the needs of villages outside FAS (Vehik n.d.).

Ten sites on Salt Creek are assigned to the Late Prehistoric period. These sites were temporary and used mostly for hunting (Vehik 1985b:321-324).

Ten sites on Salt Fork are also assigned to the Late Prehistoric period. No sites seem to have been villages, although 34GT9 may be an exception. No village sites are known for this general area. These sites therefore may be associated with horticulturist villages to the east in the vicinity of the Arkansas River.

Alternatively some could reflect the Escanjaque or similar groups out on a communal bison hunt. The Escanjaque were noted above as having been in the area in A.D. 1601. Although Wheeler phase ceramics are distinctive from those of people resident along the Arkansas River, ceramics are not a common feature of Salt Fork occupations. Compounding this, one of the lithic material types used by Wheeler phase was Florence-A chert, obtained in trade with Lower Walnut focus. Levels of Florence-A in Wheeler phase assemblages are lower than those of the Salt Fork sites, but of course, levels of Florence-A are structured by the time of Florence-A acquisition versus the time of its discard/loss (Vehik 1988:Table 4). If Wheeler phase communal bison hunters are represented in the Salt Fork collections, western lithics should be present in the sites. With two exceptions (34GT5A and 34KA412), western lithics such as Alibates and Day Creek are rare to nonexistent on Salt Fork sites. Other nonlocal lithics such as Reed Springs, Keokuk, and Boone-like (from northeastern Oklahoma) are also rare. As a result, it seems unlikely that communal bison hunters were important players in the Late Prehistoric period archaeological record of Salt Fork.

Salt Creek and Salt Fork were both likely exploited by individuals or special task forces operating out of horticulturist villages. Because these task groups will ultimately return to villages where lithic supplies were either stored or available nearby it can be expected that they will take sufficient lithic materials with them to accomplish necessary tasks. If all the special task groups do is carry their necessary tools, there should be high amounts of Florence-A, little cortex, and high heat treatment frequencies. However, the longer these task groups are gone the more likely it is that local lithics will be used. Because replacement lithics are more predictable on Salt Creek, use of Florence-A may be less than on Salt Fork.

Florence-A Chert Usage in the Salt Creek Valley

Late Archaic Period

The use of Florence-A is highest during this period (Table 9). Most of it is heat treated, however. The average percentage of cortex is low. Some of this cortex came from stream gravel, but it is of a percentage similar to most of the other periods. Overall, if the limited sample size is not a problem, the Archaic sites fit the expectation for a mobile population in that they depended heavily on a high quality lithic resource. At the same time, the extensive use of heat treatment and low percentage of cortex indicates a greater commitment to

Table 9: Florence-A chert and attributes by time period for Salt Creek and Salt Fork.

	% Florence-A	% Heat-Treated	% Cortex	% Gravel or Weathered Cortex
Salt Creek				
Late Archaic	68.0	86.0	3.7	8.0
Woodland I	25.5	91.3	7.6	6.7
Woodland II/III	28.8	81.5	9.4	29.4
Late Prehistoric	35.9	79.8	11.2	8.3
Salt Fork				
Archaic	69.1	77.5	23.4	0.0
Woodland II/III	58.0	57.9	9.7	66.7
Late Prehistoric	57.0	63.6	19.3	12.5

specific production goals than was expected.

Woodland I Period

As predicted, decreasing mobility is associated with a substantial drop from Archaic levels in the use of Florence-A. Heat treatment increases over Archaic levels as does cortex. While high cortex values were expected, the high percentage of heat treatment was unexpected. Considering the sites by settlement type alters percentages significantly. When broken down by site type, base camps show a higher amount (51.5%) of Florence-A and less of it is heat treated (85.1%). Cortex is present on 9.2%. Bifaces and/or cores as well as tools are made of Florence-A (Vehik 1985b:316).

At the more temporary sites Florence-A bifaces are rare. When present these bifaces are in relatively late stages of reduction. Finished tools of Florence-A are not common (Vehik 1985b:316). Florence-A debitage is also uncommon (9.8%) and cortex occurs on 6.5%. Almost all (95.9%) of it is heat treated. Tested cobbles, cores, early stage bifaces, and most debitage are of locally available materials (Vehik 1985b:316).

The heaviest use of Florence-A chert at Salt Creek sites is found at sites in the northern part of the valley. This area is closer to sources of Florence-A. These sites are associated with the greatest evidence for early stage reduction of Florence-A chert. Sites in the southern part of the valley have Florence-A bifaces in later stages of reduction and they relied more heavily on local materials (Vehik 1985b:316).

Most cortex comes from bedrock sources, 4.2% is from stream cobbles. Only two sites produced stream rolled cortex. One site in the northern part of Salt Creek valley averages 6.5% stream cortex (two samples). The other site has 33% of its cortex coming from stream gravel. This site is in the southern part of the valley nearer the Arkansas River. The Arkansas River is probably the source of much of the Florence-A at this site.

Woodland I sites in Salt Creek valley fit the expectation of a less mobile population in that they depended less heavily on Florence-A than during the Archaic period. Essentially supplies of Florence-A lithics were brought to base camps when they were established. It is

at those locations that Florence-A is most in evidence. If only base camps are considered, heat treatment was relatively low. Cortex levels are comparatively high. Florence-A was brought to Salt Creek in a less reduced state than during the Archaic, based on cortex levels and heat treatment at base camps. At this point production goals were flexible. At the more temporary locations, the low levels of Florence-A indicate it was little worked. The low percentage of cortex suggests what Florence-A there was, was in a fairly late stage of reduction. The high average percentage of heat treatment reflects an emphasis on tool maintenance more than anything else.

Woodland II/III Period

Florence-A increases in average frequency as expected, but only slightly. Heat treatment is less common and cortex increases. Neither of those trends was expected. There is a great increase in stream gravel cortex. Four sites have cortex indicating stream rolled sources. All sites are in the lower part of the valley where material could have been obtained from the Arkansas River.

If sites with access to Florence-A stream cobbles are removed from the sample, the percentage of heat treatment increases to 92.6. Excluding the stream cobble sites, the role of cortex declines to 5.3%. Only the very latest reduction stages are represented in the Florence-A bifaces from these sites (Vehik 1985b:319-320). Thus, it does appear that Florence-A was brought to the area in a more reduced state than earlier, probably reflecting shorter stays. Removing sites using Florence-A stream cobbles does not reduce the role of Florence-A at Salt Creek sites (in fact, it increases it slightly to 29.6%).

In general, the occupants of Woodland II/III sites used Florence-A as expected. Still, 31% of the sites were using alternative sources (stream gravel) of Florence-A. Stays in the valley were long enough to bring about the use of local lithics and that would include Florence-A stream gravels from the Arkansas River.

Late Prehistoric Period

The frequency of Florence-A chert increases as expected, but is not very high. Unexpectedly, heat treatment does not increase. If the one site that is processing a stream gravel source of Florence-A is excluded, the average percentage of heat treated material becomes 84.5, but this is still below earlier levels. Cortex increases over earlier levels as well, which is also not expected. However, if the site where stream gravel was worked and another site with only two pieces of Florence-A, one of which has cortex, are excluded, the average cortex percentage declines to 7.2. This is still higher than the 5.3% of Woodland II/III.

This period produces the poorest fit with the predictions. The reason for this is discussed below.

Florence-A Chert Usage in the Salt Fork Valley

Cultural materials are limited in number from Salt Fork. Number of items recovered is much below the sample sizes for sites on Beaver, Little Beaver, and Salt creeks. Average percentages of Florence-A, heat treatment, and cortex are calculated on entire assemblages, not just on unutilized debitage. Debitage accounts for most of the materials collected and so use of the entire

assemblage is not likely to alter percentages significantly.

Archaic Period

This period is the one with the highest use of Florence-A chert, as predicted. Also as expected, the role of cortex is high, much higher than on Salt Creek. The role of heat treatment is high, contrary to predictions. Heat treatment is less frequent than on Salt Creek as predicted. It seems people arrived in the Salt Fork area with Florence-A in relatively rough states compared to Salt Creek, but with heat treatment applied more extensively than later in time.

The roles of Florence-A in the Salt Fork and Salt Creek assemblages are essentially identical, based on the averages. It was thought that Salt Fork would be higher. For both areas, the Archaic period shows the highest reliance on nonlocal resources. Local lithics played a small role.

The average percentage of heat treated material is less on Salt Fork than on Salt Creek, while the role of cortex is greater. The lower percent of heat treatment and greater amounts of cortex indicate that Florence-A was brought into the Salt Fork area in a less extensively reduced condition, as was expected.

Woodland Period II/III Period

The role of Florence-A is not as high as earlier. However, if the Roy Patterson collection from 34GT3A, where Florence-A accounts for 80% of the assemblage, is included the percentage of Florence-A chert increases to 62.3.

The role of heat treatment is not high, unlike what was expected to happen. The role of heat treatment on Florence-A in the Roy Patterson collection is 83.3%. Inclusion of the collection in the calculations on heat treatment results in an increase to 63.1%.

The percentage of cortex is low, the lowest of the three periods. The low percentage of cortex is as predicted. The Roy Patterson collection cortex rate is 8.8%, less than the average for the survey sites. Weathered cortex is very high. Although percentages are not available, weathered cortex also dominates the Roy Patterson collection. Weathered cortex occurs when nodules are exposed for long periods of time. Residual cobbles occur in FAS where the Florence limestone containing the nodules has weathered away.

As predicted, Florence-A remains more important on Salt Fork than on Salt Creek. The relatively low frequency of heat treatment relative to Salt Creek suggests material went to Salt Fork in a less modified state. That idea receives limited support from cortex values.

Of the 164 bifaces in the Roy Patterson collection from 34GT3A, 69% are of Florence-A and 60% of the cores are of Florence-A. All Florence-A cores were heat treated, with one retaining cortex. Of the bifaces, 89.3% were heat treated. Six of the 12 that were not heat treated retain cortex as do six of the 101 that were heat treated. The greater percentage of cortex on bifaces that were not heat treated suggests the possibility that some Florence-A was brought to Salt Fork in a rough state.

Late Prehistoric Period

Unlike what was expected, the role of Florence-A did not increase over earlier levels. Heat treatment increased

somewhat. The role of cortex increased rather than decreased. In effect, there was continued use of local lithics, although Florence-A remained more important. Florence-A appears to have been brought to Salt Fork with limited commitment to a production goal compared to the Archaic period and to Salt Creek.

As on Salt Creek, the Late Prehistoric period has the poorest fit with predictions. The reason is discussed below. As expected, the role of Florence-A on Salt Fork is still greater than on Salt Creek.

Discussion

Some predictions made above were not confirmed. The role of heat treatment during the Archaic period in both valleys was high compared to subsequent periods instead of being low. The explanation of this discrepancy involves a more detailed consideration of exploitation areas. The larger the exploitation area the longer it will take to return to FAS. The early application of heat treatment lowers the cost of heat treatment induced breakage in comparison to later application at a greater distance from the source. Thus, it makes sense to heat treat while still in the source area as opposed to waiting until after the source area has been left. With large exploitation areas, it is probably more accurate to expect as much production effort as possible to take place at a lithic source area.

The difference between the two valleys during the Archaic period in the percentage of cortex is substantial. The cause is uncertain but may reflect occupation of Salt Creek soon after visiting FAS and acquiring new Florence-A tools. As a result, the Salt Creek occupants will be principally maintaining tools created at FAS. Salt Fork, because it is farther away from FAS, may be farther along in the process of using their Florence-A supplies. Having started to exhaust and break tools, they may be working core and/or biface supplies into replacement tools.

The role of Florence-A on Salt Fork is also not really higher than on Salt Creek during the Archaic period as expected. Occupants of both valleys had limited interest in lithics whose quality, quantity, and/or predictability did not exceed that of Florence-A. That should remain true as long as the supplies of Florence-A being carried were at acceptable levels.

The reduction in the heat treatment rate was not predicted for Woodland II/III on Salt Fork. This could reflect error in temporal assignment, but this seems unlikely, as the rate of heat treatment was also low during the Late Prehistoric period. If the Roy Patterson collection does represent a base camp then, as on Salt Creek during the Woodland I period, this may be the place to which supplies of Florence-A were brought. And, like Salt Creek, the more temporary sites rely on local materials. However, the role of heat treatment is higher in the Roy Patterson collection than in the temporary sites, unlike Salt Creek. That temporary camps would exhibit less heat treatment of Florence-A than a more permanent camp is unlikely. Consequently, there may be some temporal differences between the two site types, perhaps compounded by true multicomponent use of 34GT3A.

During Woodland II/III, both Salt Creek and Salt Fork had high percentages of cortex from alternative sources of Florence-A. Banks (1984) argues the availability of Florence-A decreased through time. When Woodland II/III is divided into its constituent subperiods, the role of gravel cortex in FAS/Salt Creek is actually highest during Woodland II (Vehik 1990:Table 2). So, it is not likely that resource exhaustion is reflected in the use of alternative Florence-A sources. As noted earlier, the Salt Creek sites with gravel cortex are in the lower valley, near Arkansas River gravel sources. In FAS several sites on Little Beaver Creek also have gravel cortex. Almost all are close to the creek and at a point where the Florence limestone that marks valley edges curves away from the stream. While a nonrenewable resource will decrease with use, the FAS/Salt Creek use of alternative Florence-A sources is explained by close proximity to such sources. The weathered cortex from Salt Fork may reflect a similar situation.

During the Late Prehistoric period, the levels of Florence-A were not as high as expected, although they did increase on Salt Creek over the two Woodland subperiods. The most likely reason is that special task groups stay out longer or take only highly specialized equipment with them, relying on local lithics to meet other needs.

The relatively low percentages of heat treatment and high percentages of cortex found in both valleys during the Late Prehistoric period may reflect changes in the procurement and processing of Florence-A chert, especially after A.D. 1400/1450. Around this date much, but not necessarily all, processing of Florence-A chert was centered on one site (34OS46) in FAS. Production was geared to large bifacial cores that were not heat treated and often retained cortex. These bifacial cores are found in local Lower Walnut focus contexts and in nonlocal settings such as the Little River focus in central Kansas and the Zickefoose site (34PW54) in northern Oklahoma. There are also several isolated finds of these bifacial cores in central and northern Oklahoma. The application of heat treatment was a matter left to those receiving the objects. Almost all bifacial cores recovered from Lower Walnut focus contexts broke during heat treatment. As there is almost no debitage lacking heat treatment (Hawley 1994:159), heat treatment was apparently applied as soon as the bifacial cores arrived on site. Two bifacial cores associated with Little River focus are heat treated. One of these has only a few flakes removed after heat treatment. The remaining bifaces (n=5) were not heat treated (Gattis 1998; Vehik n.d.). If large bifaces lacking heat treatment were also taken on special task force excursions, then the role of debitage that is not heat treated and the frequency of cortex will be greater than if only finished tools were taken along.

More generally, there are some consistent differences between Salt Creek and Salt Fork in the use of Florence-A chert. After the Archaic period, use of Florence-A is always higher in Salt Fork sites. This reflects the lower predictability of local lithics in the Salt Fork valley.

It is also the case that heat treatment is always less and cortex is always greater on Salt Fork sites. The primary cause is the need for greater flexibility in

production goals when occupying an area where replacement resources have low predictability.

Conclusions

Theoretical

When there is greater emphasis on mobility there is greater use of high quality lithics. Possibly the relationship is sufficiently strong that differences in the predictability of lithics available elsewhere will play little role, as is the case in the Archaic of both Salt Creek and Salt Fork. However, with increased sedentism, whether seasonal or permanent, it is clear that low lithic resource predictability does influence lithic resource use. Where resource predictability is low, needed lithic supplies will be carried in to that area to a greater degree than they will to a location with greater resource predictability, as they are to Salt Fork in comparison to Salt Creek.

During the two time periods (Archaic and Late Prehistoric) in which exploitation area size was likely the largest, the dependence on Florence-A was higher than when exploitation areas were smaller (Woodland). Thus, a lessened familiarity with resource availability in the area exploited may play a role in lithic resource use. The Late Prehistoric period on Salt Fork is an exception, though. The role of Florence-A was not as high during the Late Prehistoric period as during the Archaic when mobility was emphasized. Therefore, the influence of exploitation area size may be less than that of mobility, as during the Late Prehistoric period task groups will return to their village and resupply.

The importance of maintaining flexibility in order to accommodate various production goals turns out to be more important that originally anticipated. However, flexibility does not mean simply maintaining the most general state of the raw material (Kuhn 1994:437). What results in greatest flexibility under one set of conditions, such as with mobility and large exploitation areas, may not result in greatest flexibility under other conditions, such as seasonal sedentism and decreased exploitation area size. Changing political and social organizations can also play a role. In general, though, it does seem that the greater the distance traveled from a lithic source area the greater is the concern with having flexibility in using supplies from that source, thus the role of heat treatment is always less and the percentage of cortex generally greater on Salt Fork as opposed to Salt Creek.

Other factors can also influence lithic resource use. Heat treatment seems especially affected. Greater mobility was associated with earlier than expected heat treatment of Florence-A during the Archaic period. Although this results in an early commitment to a production goal, it reduces the cost of loss with heat treatment failure. However, reducing loss through early heat treatment does not apply during the Late Prehistoric period when large bifaces or bifacial cores were not heat treated at the source area before being sent elsewhere. Efficiency in production may come to outweigh efficiency in use as political and social controls come to be exercised over a resource.

Culture-Historical

During the Archaic, mobility and large exploitation areas resulted in a high dependence on Florence-A chert in both valleys. Heat treatment took place early in the reduction process in an attempt to minimize more costly losses of material later. Differences between the two valleys may reflect differences in when they were occupied relative to procurement of Florence-A.

Use of Florence-A on Salt Creek during Woodland I was influenced by decreased settlement mobility and smaller exploitation areas. The greater degree of sedentism was reflected in the increased use of local lithics. Florence-A was brought to Salt Creek valley base camps in a somewhat less finished state than earlier in time, allowing for greater flexibility in production goals given the greater length of time to be spent in the valley.

With Woodland II/III, both valleys were occupied for special task group activities. Local resources, however, continued to be important and probably indicate that stays were of more than a few days in length. At least on Salt Creek the concern with maintaining flexibility was less important than earlier as heat treatment was more common and cortex was less common (based on the modifications made for these values in the text, see page 63). Special task forces, likely operating out of increasingly sedentary villages, were less concerned with maximizing flexibility.

The Late Prehistoric period in both valleys shows the poorest fit with predictions. In general, Florence-A was taken to both valleys in a less reduced state than expected. Continued use of local lithics suggests stays were of more than a day or two in length. The less reduced state of Florence-A provided for some flexibility in production goals. More importantly, political factors were also influencing the structure of Florence-A production and distribution. It is not certain that the large Florence-A bifaces were taken on special task force excursions but it is possible. However, all but two of these bifaces occur in association with other cultural complexes. Thus, the majority of these large bifaces may be trade items. However, the Lewis site indicates that hunting locations were returned to repeatedly over a long period of time. In such instances these large bifacial cores could be usefully cached in areas with lithic inadequacies.

General

The preceding pages have outlined a wide variety of factors affecting the use of Florence-A chert over time in two stream valleys. The factors are many and varied ranging from settlement-subsistence to political to environmental. No doubt there are others as well. In the end, because lithics and their use is a deeply embedded aspect of human behavior unraveling influencing factors is not a simple task.

SUMMARY OF SURVEY FINDINGS

There is evidence of occupation of the middle Salt Fork River basin from at least Middle Archaic times into the historic. Euro-American occupation is documented for the homesteading period at the end of the 19th century and early in the 20th century. Most of the 14 historic sites are farmsteads occupied after 1893. Only a portion of the prehistoric sites

could be identified to a general period and most of these are associated with Late(?) Archaic/Woodland or Late Prehistoric occupations. Prehistoric site density is about 6.3/sq. mile (2.5/sq. km; based on spatially distinct components and not site designations). This density is probably a minimum given that there is evidence for deeply buried surfaces with some containing buried camps in most of the bottomland settings that were surveyed.

Prehistoric sites are concentrated along tributary streams for all periods, but this partly reflects the focus on survey areas along the river and its tributaries. Very few prehistoric camps were noted on terraces of the Salt Fork River, but the presence of one deeply buried Archaic site is evidence that other camps, including more recent prehistoric sites, are probably deeply buried in the river terraces. A Late Prehistoric site discovered over 1 meter deep in a terrace cut bank along a small stream indicates that sites can also be deeply buried in some tributary settings. Relatively low debris densities and the predominance of hunting/butchering and processing tools may indicate that prehistoric groups use of the Salt Fork area was oriented toward bison hunting or other activities involving temporary camps or seasonal base camps. Archaic groups probably included the Salt Fork area in their seasonal movements. There is little indication of permanent habitation sites in the project area for the later Woodland and Late Prehistoric groups, and these people appear to have employed special task groups sent from the Arkansas River area (based on the predominance of Flint Hills cherts in the collections). Their stays in the area may have lasted for more than a few days, but they apparently did not include long-term occupations. Larger camps and villages reported along the Arkansas and Chikaskia rivers to the east may have served as bases for exploiting the middle Salt Fork basin. Groups along the Arkansas River would have easy access to Florence-A chert, the major material used in chipped stone tools at Salt Fork sites.