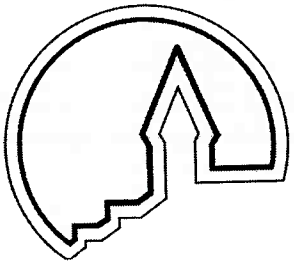
Research Design and Methodology For A Phase II Cultural Resources Survey of the Kansas Segment of the Proposed Keystone Pipeline Project Corridor, Marshall, Nemaha, Brown, and Doniphan Counties, Kansas

Prepared for
ENSR International
Fort Collins, Colorado

Prepared by
American Resources Group, Ltd.
Carbondale, Illinois



Principal Investigator
Steve Titus

January 2006

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

Research Design and Methodology

Introduction

This document is a response by American Resources Group, Ltd., Carbondale, Illinois, to a request by ENSR International, Fort Collins, Colorado, for a research design for conducting a Phase II cultural resources survey of the Kansas Segment of the Keystone Pipeline Project corridor. The proposed pipeline-construction corridor passes through four counties in its nearly 100-mile transect of northeastern Kansas (Figure 1). The results of previous surveys in the prairie uplands of this region indicate that prehistoric site density is low in this part of the state and that the prehistoric sites that do occur are concentrated in the valleys and adjacent uplands of the larger drainages. In view of this pattern, it appears that the most effective strategy for identifying sites during the proposed survey of the pipeline corridor will be to focus survey efforts on those portions of the pipeline corridor most likely to contain prehistoric sites, supplementing these efforts with limited upland survey targeting potential historic sites.

The sampling strategy proposed in this research design constitutes a probabilistic survey of an essentially random transect of the upland prairie of northeastern Kansas. After characterizing the environmental setting of the project corridor, the site-distribution pattern documented by previous research in the region is summarized, the results of the records check and literature review are presented, and the areas within the project corridor selected for archaeological survey and geomorphological investigation are identified. The areas within the project corridor selected for field investigation are tabulated by meter-post number and displayed on the accompanying USGS topographic maps. The survey methodology that will be employed is described in the concluding section of the document.

Project Description

The Keystone Pipeline Project is a proposed 1,870-mile-long crude oil pipeline extending from Hardisty, Alberta, to Patoka, Illinois (Figure 1). The Kansas Segment of the Keystone Pipeline Project corridor passes through the northeastern Kansas counties of Marshall, Nemaha, Brown, and Doniphan (Figure 1). The proposed pipeline corridor enters the state of Kansas at Meter Post 1036920 and exits the state at Meter Post 1194540, a distance of 157.6 km (98.4 mi.). Virtually the entire length of the proposed, 60-m-wide (200-ft-wide) pipeline corridor in Kansas parallels existing pipeline and utility corridors, thus minimizing the amount of new land that will be affected by the pipeline construction.

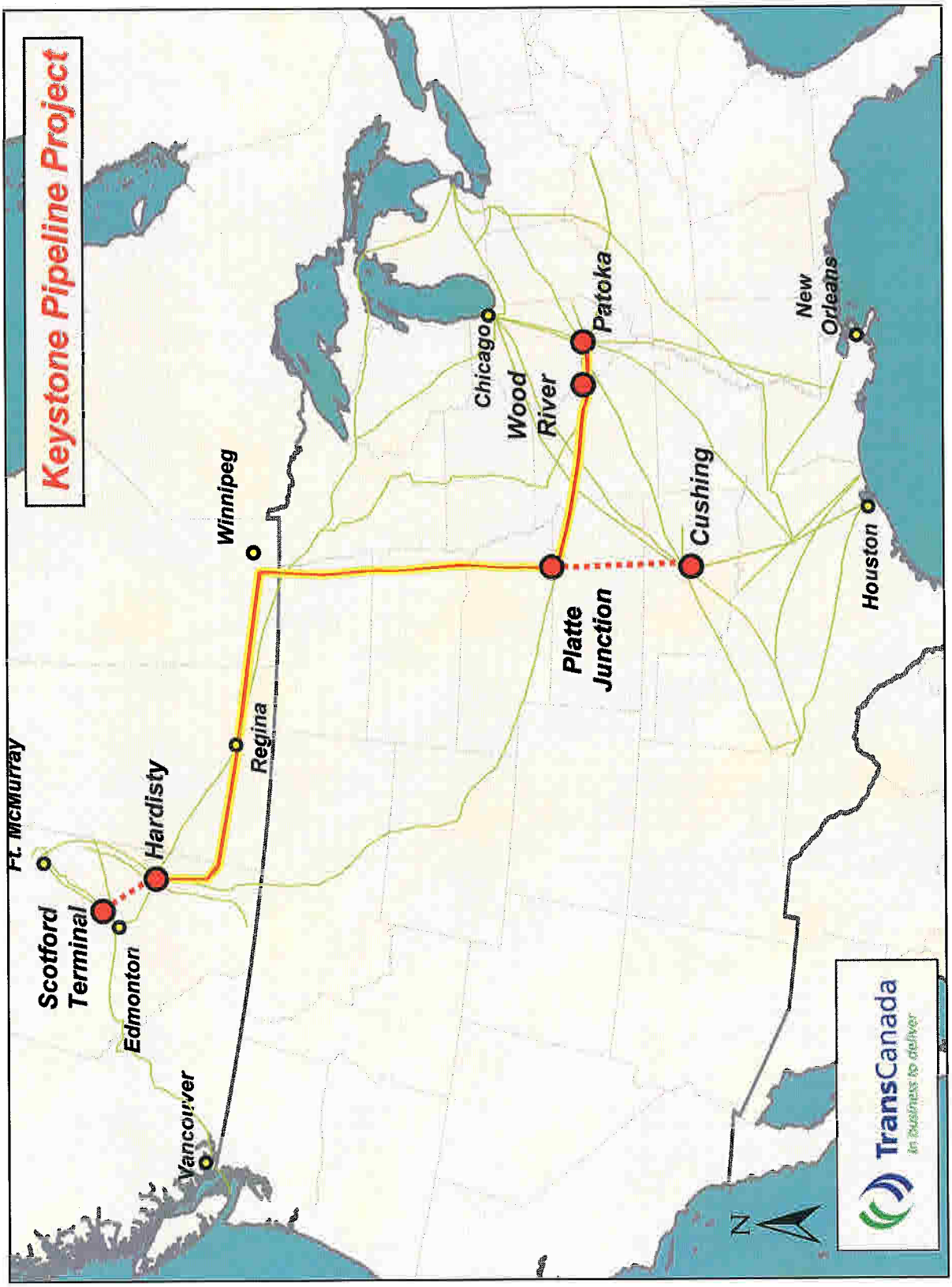


Figure 1. General location of the Keystone Pipeline Project.

The Keystone Pipeline will transport 400,000 barrels of heavy crude oil per day from Alberta, Canada, to Illinois. The pipeline will be a critical aid to the anticipated growth in Canada's crude oil production over the next decade. The project sponsor is TransCanada Corporation. The Federal Energy Regulatory Commission (FERC) will oversee the project and, as lead agency, coordinate the participation of the many other state and federal agencies that must also review relevant parts of the project.

Environmental Setting

The project corridor traverses the Glaciated Region of Kansas, a dissected drift plain bordered on the south by the Kansas River valley and on the west by the Flint Hills (Mandel 1987:III-2) (Figure 2). At least two continental ice sheets invaded northeastern Kansas during the Pleistocene, scouring stream valleys and leveling uplands throughout the drift plain. The advance of the ice sheet during the Kansan glacial episode left the underlying Pennsylvanian and Permian bedrock formations covered by thick, unconsolidated deposits of till, outwash, and loess. The topography of the uplands is characterized by broad, gently rolling hills which become much more dissected near the larger river valleys (Mandel 1987:III-2). The most rugged portion of the region is the heavily dissected uplands bordering the Missouri River valley.

The Glaciated Region is drained by the Big Blue, South Fork Big Nemaha, Delaware, and Missouri rivers. The Big Blue and Delaware rivers flow south through the region into the Kansas River, while the South Fork Big Nemaha flows north to the Big Nemaha River; both the Kansas and the Big Nemaha rivers in turn flow east to empty into the Missouri. The valleys of the these rivers are typically characterized by wide floodplains and steep valley walls (Mandel 1987:III-2). The project corridor crosses the upper reaches of the Big Blue, South Fork Big Nemaha, and Delaware rivers before crossing the Missouri River approximately 60 miles downstream of the mouth of the Big Nemaha and 70 miles upstream of the mouth of the Kansas River.

Most of the Glaciated Region, and, indeed, most of eastern Kansas, is covered by tall grass prairie (Figure 3). The dominant flora of this vegetation community include little and big bluestem, switchgrass, Indian grass, and brome grass. The tall grass prairie is bordered on the east by a mosaic of tall grass prairie and oak-hickory forest, and this transitional zone is in turn bordered by the oak-hickory forest of the Missouri River valley (Figure 3). The oak-hickory forest community found in the valleys of the Missouri and its tributaries in the Glaciated Region mark the western extension of the Eastern Deciduous Forest (Mandel 1987:III-11). Tree species represented include several varieties of oak, hickory, and elm, as well as sycamore, cottonwood, ash, willow, walnut, hackberry, locust, and maple species (Wagner et al. 1989:10). The flora of the deciduous forest complex have extended inland into the tall grass prairie along the valleys of the streams draining the region. Within the narrow band of prairie-forest mosaic along the eastern border of the region, tall grass prairie occurs on level to rolling uplands and the oak-hickory forest association is found on steep slopes and in ravines.

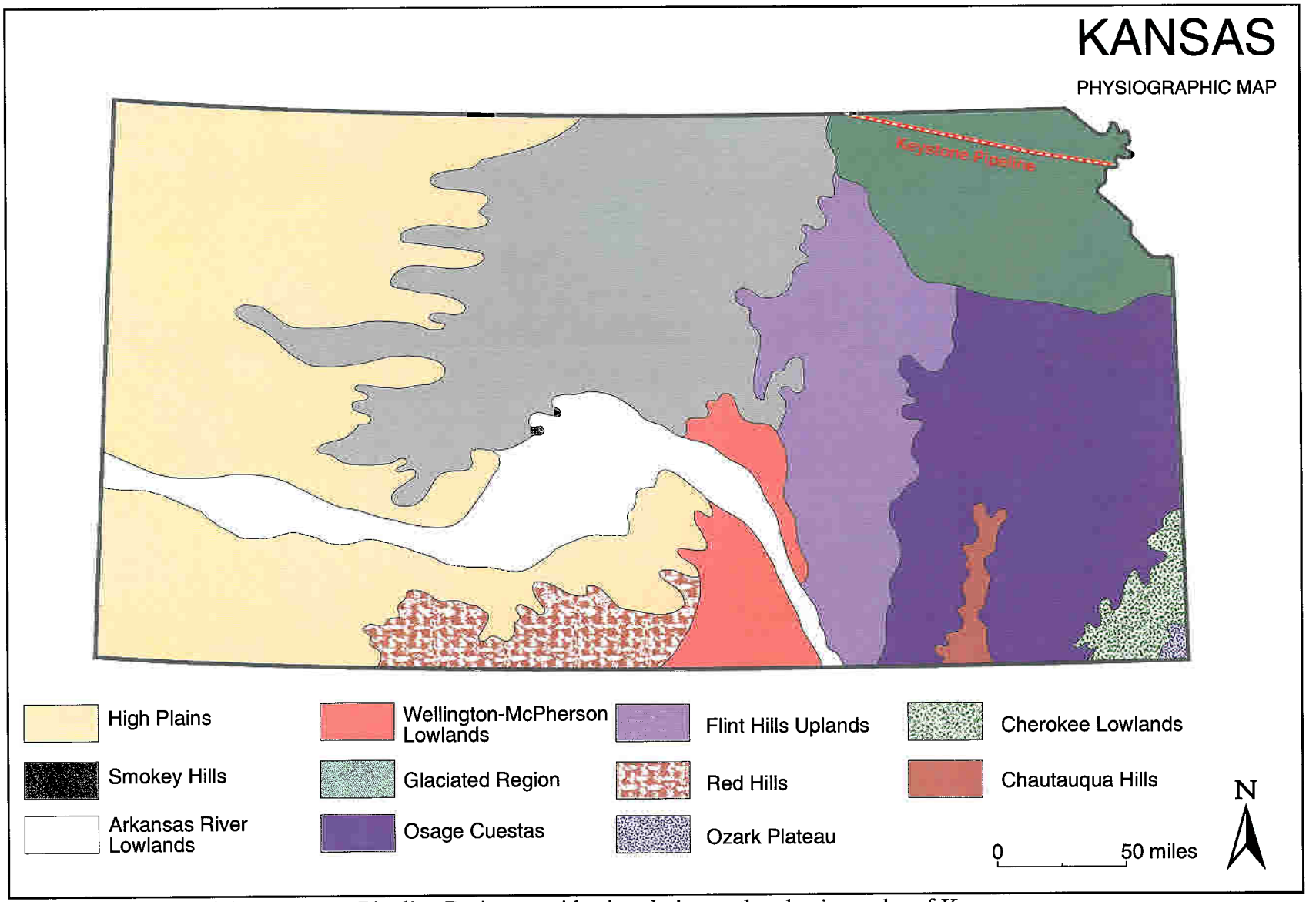


Figure 2. Location of the Keystone Pipeline Project corridor in relation to the physiography of Kansas.

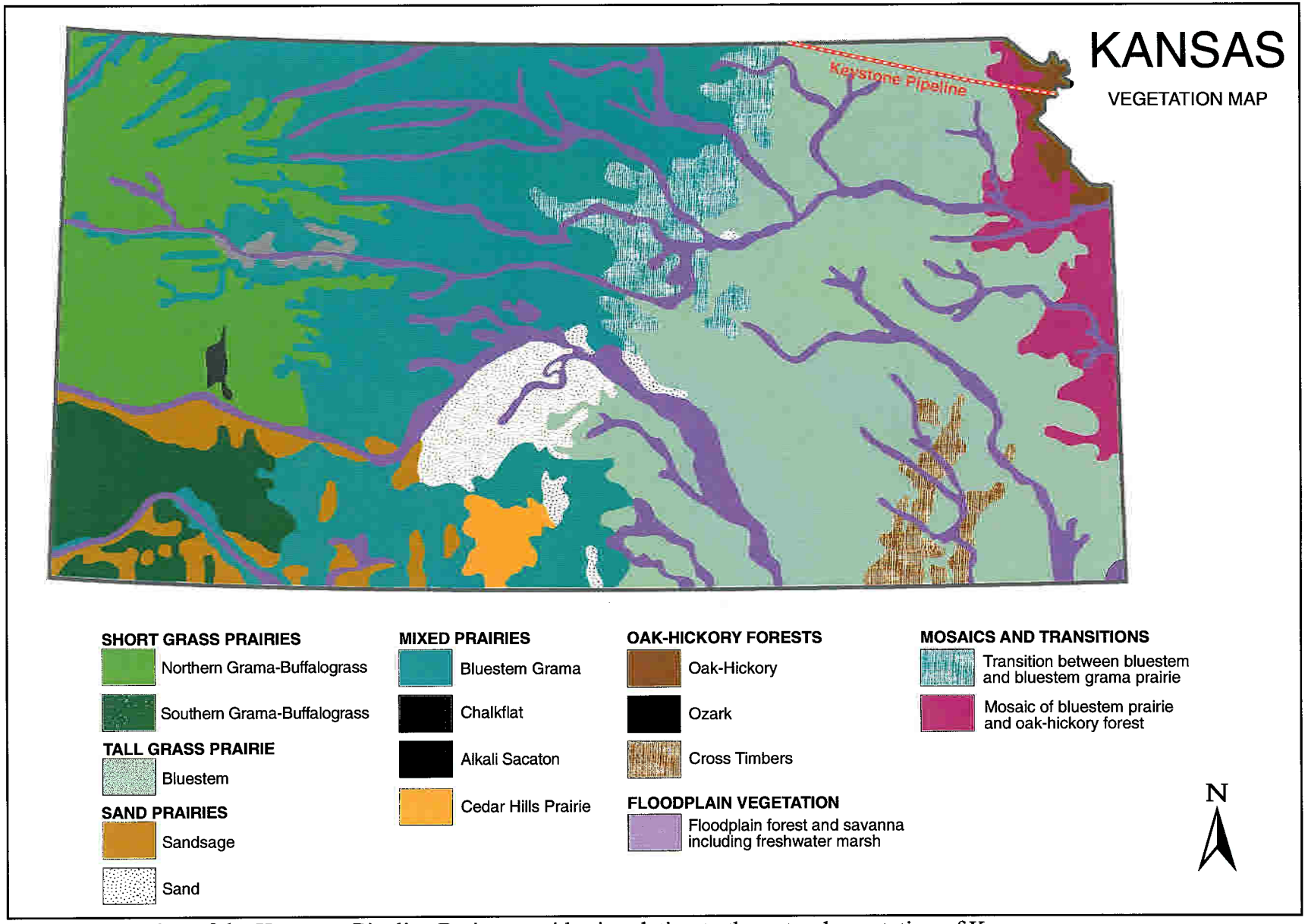


Figure 3. Location of the Keystone Pipeline Project corridor in relation to the natural vegetation of Kansas.

Modern day faunal species within the Glaciated Region of northeastern Kansas include deer, raccoon, coyote, fox, and numerous types of birds. Other fauna include amphibians, fish, turtles, and migratory and some resident waterfowl species (Wagner et al. 1989:10).

Previous Archaeological Investigations in the Region

The results of previous archaeological investigations in the Glaciated Region of northeastern Kansas indicate that prehistoric sites occurring in this part of the state are concentrated in the valleys and upland-valley margins of the larger streams draining the region. Mandel et al. (1991:72–78) provide a succinct summary of a number of large-scale watershed surveys that have helped to document the prehistoric site distribution pattern in the region.

The Stranger Creek drainage, a tributary of the Kansas River located in Atchison, Jefferson, and Leavenworth counties, Kansas (Figure 1), has been the subject of two major surveys conducted by archaeologists at the University of Kansas (Mandel et al. 1991). The earlier of the two investigations consisted of a survey along Nine Mile Creek (Johnson et al. 1972), a prominent tributary of Stranger Creek, while the later investigation consisted of a study of the broader Stranger Creek drainage (Logan 1981). The section of Nine Mile Creek that was surveyed consists of a limestone bluff-lined valley approximately one-third of a mile in width located about six miles upstream of Stranger Creek. The Nine Mile Creek survey consisted of an intensive survey of the valley and adjacent bluff tops along a 3-mile-long segment of this stream. A total of 55 sites was identified during the Nine Mile Creek survey, the majority of them on the valley floor and the balance on the surrounding bluff tops (Johnson et al. 1972). Because the site distribution pattern identified in their survey was consistent with a pattern of site concentration on valley floors identified by other surveys conducted in the region, Johnson et al. regard "the differential in site distribution recorded during the Nine Mile Creek survey [as] a fair representation of the real situation" (1972:308).

Fifty-nine additional sites were recorded during the later Stranger Creek survey (Logan 1981). As Mandel et al. (1991) point out, the overwhelming majority of these sites were found in cultivated fields adjacent to larger streams, suggesting that the prehistoric inhabitants of the area seldom occupied the bluff tops. An alternative explanation mentioned for the apparently low prehistoric site density of the bluff-top setting is that sites located here are simply difficult to recognize because of present conditions, most of these areas being in pasture rather than under cultivation (Mandel et al. 1991). Indeed, Logan (1981) cautions against dismissing the potential of the uplands for containing prehistoric sites given that this environmental zone has not been fully assessed. Logan also suggests the possibility that early prehistoric sites are present in the study area but are either buried by valley alluvium or are located in the un-surveyed uplands.

White and McNerney (1980) conducted a literature review and limited reconnaissance of four selected areas containing 403 acres along the Stranger and Tonganoxie creeks in Atchison and Leavenworth counties, Kansas (Mandel et al. 1991) (Figure 1). Fifteen prehistoric sites were

identified, almost all through the review of reports of previously conducted surveys. The prehistoric sites that were identified were located on ridge spurs bordering the creek channel floodplain, all being located within 1,000 feet of the main stream (Mandel et al. 1991). As Mandel et al. point out, McNerney and White (1980) mention that terraces in the study area may contain deeply buried sites that would not be identified by surface survey.

Lees (1986, 1987) surveyed the locations of 26 proposed floodwater retarding structures within the Pony Creek watershed in Brown and Nemaha counties, Kansas, and Richardson County, Nebraska (Figure 1). The selection of locations for intensive survey was based in part on "proximity to the main bottomlands of the creek" (Timberlake 1985:32), locations high in the drainage being eliminated from further consideration (Mandel et al. 1991). The field survey was restricted to areas within stream valleys to be affected by the construction of the structures, and poor field conditions (low ground surface visibility) reduced the effectiveness of the survey and, consequently, the number of sites recorded (Lees 1986). A total 38 of sites was recorded during the two surveys, including 24 sites containing prehistoric components and 21 containing historic components (Mandel et al. 1991). Prehistoric sites were typically found on high ground along Pony Creek and its larger tributaries, but sites were also identified on terrace remnants located near streams.

While acknowledging the nature of the Pony Creek watershed surveys biased the results toward stream valleys, Lees (1987) interprets the distribution pattern of the identified sites as indicating that Ceramic sites are expected to occur most frequently on terraces bordering the confluence of larger streams and their tributaries, but that the locations of earlier prehistoric sites could not be predicted with the available evidence. While the uplands of the Pony Creek watershed were not routinely surveyed, there is sufficient evidence of prehistoric sites occurring on upland divides to indicate this environmental setting was being utilized (Lees 1987). The distribution of historic sites, which constitute approximately 50 percent of the sites recorded during the Pony Creek watershed survey, indicates that earlier historic sites are far less common than later sites, and their locations are less apt to have been selected with respect to cultural features (roads and towns) than were later sites (Mandel et al. 1991).

A survey of proposed flood protection structures within the Wolf River watershed in Brown and Doniphan counties, Kansas (Figure 1), involved the survey of a representative sample of land within the watershed and examination of individual structures (Ashworth 1980). Surface survey supplemented with manual soil coring in areas of low ground surface visibility were the primary survey techniques employed. Forty prehistoric sites were recorded during the field survey, and an additional 21 sites were identified through a site file search (Mandel et al. 1991). The vast majority of the sites investigated in the Wolf River watershed during this survey were located on ridges and ridge spurs bordering major tributaries, and the remainder were located on terraces and floodplains (Ashworth 1980). Ashworth also recognized the potential for the investigated stream valleys to contain deeply buried sites that have gone unrecognized on surveys using standard archaeological techniques, and, as a consequence, calling into question the extent to which the Wolf River survey results accurately reflect the actual prehistoric resource base of the watershed (Ashworth 1980; Mandel et al. 1991).

Mandel et al. (1991) conducted a combined geomorphological and archaeological field study of the Upper Delaware River watershed in Nemaha, Brown, Jackson, and Atchison counties, Kansas (Figure 1). The primary goals of the investigation were "to generate a model of landscape evolution in order to better identify the context and content of the local archaeological record, to help archaeologists develop more effective means of predicting the potential distribution of prehistoric sites on and below the present landforms in different drainage elements of the watershed, and to assist the Soil Conservation Service in formulating cultural resource management strategies for the project area and northeast Kansas" (Mandel et al. 1991:ii). The goals of the investigation did not include intensive survey of proposed flood protection structures or clearance of areas from further assessment.

The geomorphological study undertaken by Mandel et al. (1991) focused on selected study areas, in both small and large stream valleys, representative of flood protection structure sites in the upper, middle, and lower parts the Upper Delaware River drainage basin. The geomorphological field investigation included an examination of stream cutbanks in an attempt to identify buried archaeological sites and/or deeply stratified fill sequences suitable for dating. The field investigation also included coring with a hydraulic soil probe at several locations in order "to determine the character, depth, and lateral extent of deposits that underlie the various landforms in the study area" (Mandel et al. 1991:14). An archaeological sampling strategy involving selection of 30 sections within the Delaware River/Cedar Creek drainage was implemented. Within the sections selected for survey, the archaeological investigation was conducted following a methodology described as "a stratified, opportunistic, and intuitive survey" (Mandel et al. 1991:16). In practice, this involved walking four transects in each section: one on either side of the largest stream in the section to examine cutbanks for buried cultural deposits and inspect the adjacent terraces; and, another transect on either side of the stream to examine areas beyond the immediate vicinity of the major stream, cutbanks of smaller streams, and the locations of historic structures depicted on historic atlases. No shovel testing or soil coring was attempted.

Mandel et al. investigated 29 prehistoric sites in the course of their Upper Delaware River study, including five that had been previously recorded (1991:114–115). Four of the prehistoric sites are buried sites that were identified in cutbanks of the Delaware River, three of them a relatively short distance upstream of the point where the Keystone Pipeline Project corridor crosses this drainage. The distribution of prehistoric sites identified during this investigation suggested that the extreme upper reaches of the drainage never provided a sufficiently reliable source of water to support any but the most ephemeral prehistoric occupations. The results of the survey also suggested that prehistoric sites could be expected to occur on all landforms along larger streams, although all those identified during the field investigation occurred on high terraces and in the uplands bordering the stream valleys. While each of the buried sites identified during the investigation were discovered in the cutbanks of larger streams, the potential for site burial also exists along smaller streams in the upper portion of the drainage (Mandel et al. 1991:115).

The archaeological survey of the Upper Delaware River watershed is also notable for its use of late nineteenth- and early twentieth-century atlases to identify the locations of potential historic

sites. A total of 122 historic farmsteads was recorded during the survey through the review of the early atlases and subsequent survey. While the results of the historic map review argue for making this practice a standard part of survey procedure, it is acknowledged that historic sites pre-dating the earliest maps can be found only through intensive archaeological survey (Mandel et al. 1991:114).

American Resources Group recently completed the Phase II survey of the Kansas Segment of the Rockies Express Pipeline Project (REX) corridor, a proposed pipeline-construction corridor abutting the southern edge of the existing pipeline corridor that the present project corridor parallels (Myers et al. n.d.). A sampling strategy identical to the probabilistic survey strategy proposed for the Keystone project corridor guided the survey of the REX corridor. Survey efforts were focused on the valleys and adjacent uplands of the larger drainages—which were the portions of the pipeline corridor judged most likely to contain prehistoric sites—and these efforts were supplemented by limited upland survey targeting potential historic sites (Myers et al. n.d.).

The survey of the REX corridor resulted in the identification of 23 archaeological sites, including 12 sites containing prehistoric components and 11 containing historic components (Myers et al. n.d.). Each of the 12 prehistoric sites recorded during the survey of the REX corridor is located in a stream valley or adjacent upland and, conversely, none of the upland sections of the project corridor that were surveyed were found to contain prehistoric sites. The distribution of prehistoric sites within the REX corridor conforms to the pattern documented by previous research, thus providing additional evidence in support of the hypothesis underlying the sampling strategy proposed for the survey of the Keystone Pipeline Project corridor.

Results of Records Check and Literature Review

A site file search and literature review were conducted online at the Kansas State Historical Society's website the week of November 14, 2005. The purpose of the records search and literature review were to determine the nature and extent of archaeological investigations conducted to date in the portions of northeastern Kansas that the proposed Keystone Pipeline Project corridor traverses and to identify the number and nature of previously recorded sites located within approximately a one-mile radius of the proposed pipeline. Historic maps and atlases were also consulted in order to identify potential historic sites within the pipeline corridor.

Previously Recorded Sites and Surveys

The results of the background study indicate that no previously recorded sites are located within the proposed Keystone Pipeline Project corridor. Twenty-nine sites have been recorded, however, within distances of between 190 and 2,050 m of the project corridor center line. The 29 previously recorded sites identified in the vicinity of the project corridor include 24 prehistoric sites, two historic sites, and three sites containing both prehistoric and historic components (Table 1). One of the prehistoric sites dates to the Archaic period, and the remainder are of unknown age and cultural affiliation. Two of the 29 previously recorded sites have been formally evaluated through

Confidential Information removed from document

BIBLIOGRAPHY

Anderson Publishing Company

1922 *Atlas of Marshall County, Kansas, Containing Maps of Townships of the County.* Anderson Publishing Company, Des Moines.

1927 *Atlas of Doniphan County, Kansas, Containing Maps of Townships of the County.* Anderson Publishing Company, Des Moines.

1992 *Atlas of Nemaha County, Kansas.* Anderson Publishing Company, Des Moines.

Ashworth, K.A.

1980 *An Archeological Survey of the Wolf River Watershed.* Archeology Department, KSHS, Topeka. Submitted to USDA Soil Conservation Service.

1981 *Phase III Testing of Three Prehistoric Sites within Wolf River Watershed, Brown and Doniphan Counties, Kansas.* Archeology Department, KSHS, Topeka. Submitted to USDA Soil Conservation Service.

Bird, J.S.

1882 *Historical Plat Book of Doniphan County.* Chicago, Illinois

Booth, R.C., Enterprises

1949 *The 1949 Atlas of Doniphan County, Kansas, with the Township Plats* Corrected to December 21, 1948. Harlan, Iowa: R.C. Booth Enterprises.

1949 *The 1949 Atlas of Nemaha County, Kansas, with Township Plats* Corrected February 11, 1949. Harlan, Iowa: R.C. Booth Enterprises

Cutler, W.G.

1883 *History of the State of Kansas.* A.T. Andreas, Chicago, Illinois.

Hesse, I., and L.W. Ritterbush

1995 *Phase II Archaeological Survey of Selected Areas of the Atchison County Rural Water District No. 5 Pipeline, Atchison and Doniphan Counties, Kansas.* Project Report Series Number 95, Museum of Anthropology, KU, Lawrence.

Johnson, A.E., D.D. Yaple, and L.E. Bradley
1972 Systemic Change and Lithic Debris: The Nine Mile Creek Survey. *Plains Anthropologist* 17(58):308–315.

Lees, W.B.
1986a Pony *Creek Archaeology: Results of a Phase II Cultural Resources Survey with the Pony Creek Watershed, Brown and Nemaha Counties, Kansas.* Kansas State Historical Society, Contract Archaeology Publication 5. Topeka, Kansas.

1987 *Results of Additional Archaeological Survey Within the Pony Creek Watershed, Brown Kansas, Kansas.* Ms. on file, Kansas State Historical Society, Topeka, Kansas.

Logan, B.
1981 *An Archaeological Survey of the Stranger Creek Drainage System, Northeast Kansas.* University of Kansas, Museum of Anthropology, Project Report Series 48, Lawrence, Kansas.

Mandel, R.D.
1987 Section III, The Environment of Kansas, In *Kansas Prehistoric Archaeological Preservation Plan,* edited by Kenneth L. Brown and Alan H. Simmons. Office of Archaeological Research Museum of Anthropology and Center for Public Affairs, University of Kansas, Lawrence, Kansas.

Mandel, R.D., J.D. Reynolds, B.G. Williams, and V.A. Wulfkuhle
1991 *Upper Delaware River and Tributaries Watershed: Results of Geomorphological and Archeological Studies in Atchison, Brown, Jackson, and Nemaha Counties, Kansas.* Contract Archeology Publication No. 9, Archeology Department, KSHS, Topeka, Kansas.

McNerney, M.J. and R.F. White
1980 *Cultural Resources Literature Review and Reconnaissance Survey, Stranger and Tonganoxie Creeks, Kansas.* American Resources Group, Ltd., Report submitted to Kansas City District, US Army Corps of Engineers.

Meacham, J.H.
1887 *Meacham's Illustrated Atlas of Brown and Nemaha Counties, Kansas.* Compiled by J.R. Dunham. Sabetha, Kansas.

Modern Argo
n.d. *Handbook of Marshall County, Kansas*. Kansas City, Kansas. Modern Argo.

Northwest Publishing Company

1904 *Plat Book of Doniphan County, Kansas.* Northwest Publishing Company, Minneapolis.

1904 *Plat Book of Marshall County, Kansas*, Compiled from County Records and Actual Surveys. Northwest Publishing Company, Minneapolis.

Ogle, Geo. A. & Co.

1919 *Standard Atlas of Brown County, Kansas, Including a Plat Book of the Villages, Cities, and Townships of the County.* George A. Ogle & Co, Chicago.

Schmits, L.J.

1990 *Phase II Cultural Resources Survey of the AT&T Omaha-Fairview F.T. "A" Cable Project, Brown County, Kansas.* Environmental Systems Analysis, Inc., Shawnee Mission. Submitted to HWS Engineering, Inc. and US Federal Communications Commission.

1992 *Cultural Resources Survey of Brown County Rural Water District No. 2's Proposed Distribution System.* Environmental Systems Analysis, Inc., Shawnee Mission. Submitted to Brown County Rural Water District No. 2.

Stinson, A.R.

1908 *Plat Book of Nemaha County, Kansas.* Seneca, Kansas.

Timberlake, R.D.

1985 *Phase I Review of Upper Delaware and Tributaries Watershed. Brown, Jackson, Nemaha, and Atchison Counties, Kansas.* Ms on file, Kansas State Historical Society, Topeka.

Wagner, M.J., et al.

1989 *Phase I, II, and III Archaeological Investigations at Fort Leavenworth, Kansas.* American Resources Group, Ltd., Carbondale, Illinois.

Williams, B.G.

1985a *Archeological Investigation of Site 14NH308 at Secondary Road Project C-2376 in Nemaha County, Kansas.* Archeology Department, KSHS, Topeka. Submitted to KDOT.

1985b *An Archeological Survey of a Bridge Replacement Project C-2376, Over Wildcat Creek in Nemaha County, Kansas.* Archeology Department, KSHS, Topeka. Submitted to KDOT.

1989 *Archeological Survey of Secondary Road Project 7 C-2700-01 in Brown County, Kansas*. Archeology Department, KSHS, Topeka. Submitted to KDOT.

CONFIDENTIAL