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# Research Design and Methodology for A Phase I Cultural Resources Survey of the Illinois Segment of the Proposed Keystone Pipeline Project Corridor, Madison, Bond, Fayette, and Marion Counties, Illinois

*Prepared for*
ENSR International
Fort Collins, Colorado

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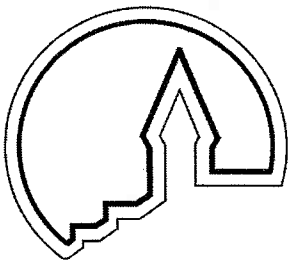

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# Research Design and Methodology

*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 I cultural resources survey of the Illinois Segment of the Keystone Pipeline Project corridor. The proposed pipeline-construction corridor passes through four counties in its 56.15-mile transect of southern Illinois (Figure 1).

After characterizing the environmental setting of the project corridor, previous research in the region is briefly summarized, and the results of the records check and literature review are presented. The previously recorded archaeological sites and cultural features identified through the records and literature review are displayed on the accompanying USGS topographic maps. The field and laboratory methods that will be employed during the survey are 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 Illinois Segment of the Keystone Pipeline Project passes through the southwestern Illinois counties of Madison, Bond, Fayette, and Marion (Figure 1). The Keystone Pipeline Project corridor enters the state of Illinois at Mile Post 1017.1 and ends at Mile Post 1073.25, a distance of 56.15 miles (90.4 km). Virtually the entire length of the 56.15 miles (90.4 km) of the proposed, 200-foot-wide (60-m-wide) pipeline corridor parallels existing pipeline and utility corridors, thus minimizing the amount of new land that will be affected by the pipeline construction.

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 U.S. Department of State 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.

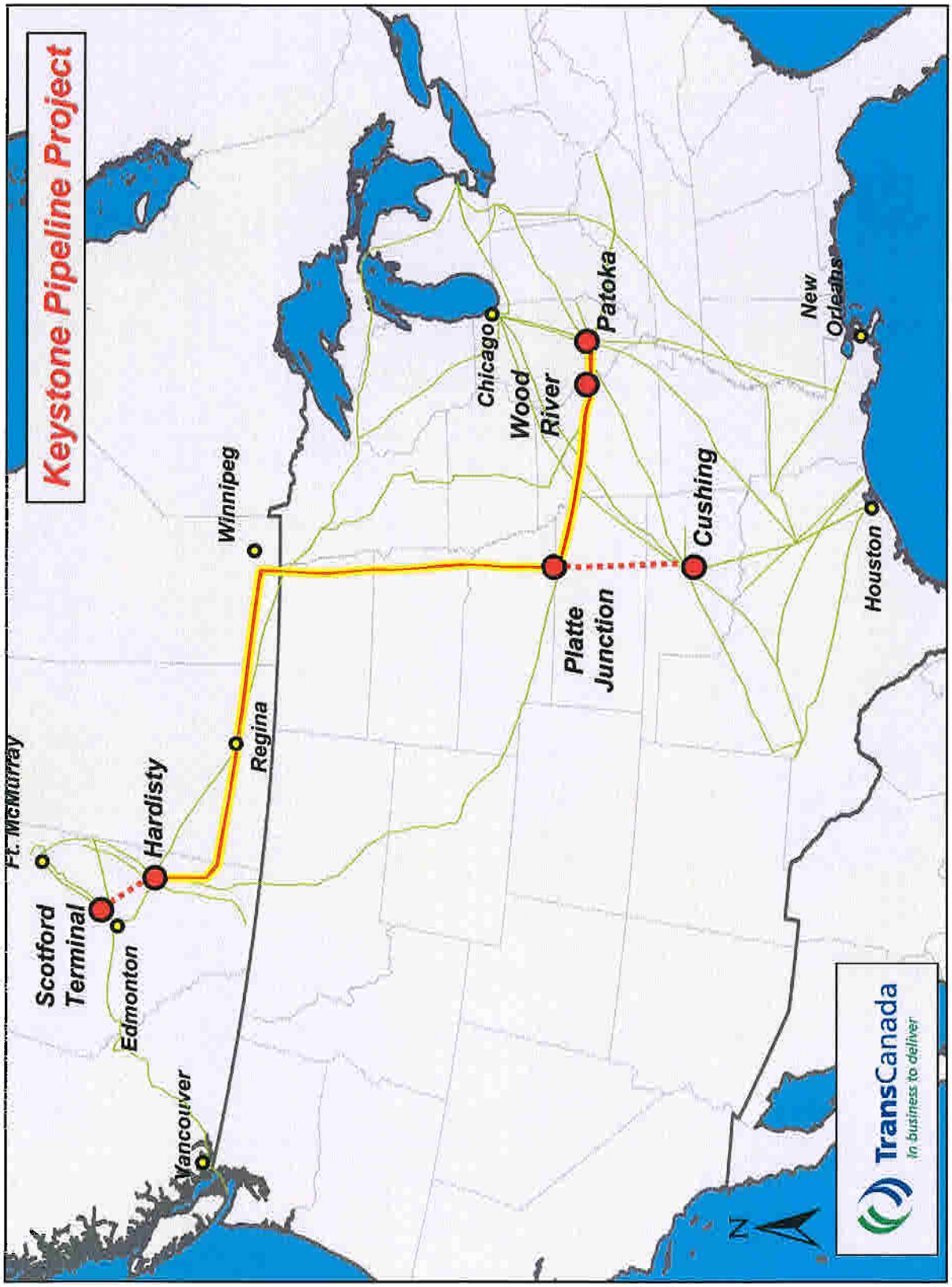


Figure 1. General location of the Keystone Pipeline Project.

*Environmental Setting*

The Illinois segment of the project corridor traverses the Till Plains Section of the Central Lowland Province, a physiographic division of the United States which encompasses the glaciated portions of central Illinois, Indiana, and Ohio (Chapman 1975; Fenneman 1938). The Till Plains Section is characterized by low relief and a glacial till mantle, and the region is underlain by broadly warped sedimentary rock formations. The portion of the Mississippi River valley contained within the Till Plains Section lies within the north-central portion of the geographical area known as the American Bottom. The American Bottom consists of three major geologic structures: the Illinois Basin, the Ozark Dome, and the Mississippi Embayment (White et al. 1984). The primary geologic zones present within the American Bottom include the uplands, the colluvial veneers and alluvial fans, and the Mississippi River floodplain.

Schwegman has developed a detailed physiographic system for classifying the natural environments and biotic communities of the state of Illinois on the basis of differences in topography, soils, bedrock, glacial history, and the distribution of plants and animals (Schwegman 1975). The project corridor crosses three of the natural divisions distinguished by Schwegman: the Lower Mississippi River Bottomlands Division, the Middle Mississippi Border Division, and the Southern Till Plain Division of Illinois (Schwegman 1975) (Figure 2).

The bottomlands comprising the Lower Mississippi River Bottomlands Division were formed by glacial floodwaters and, since the last glaciation, have been shaped by the migrations of the river and its tributaries across the broad valley. The floodplain is topographically varied and includes ridges, swales, sloughs, meander scars, terraces, and other fluvially developed landforms. The Middle Mississippi Border Division entails a relatively narrow band of forested, heavily dissected topography and river bluffs bordering the Mississippi River between St. Clair and Rock Island counties (Schwegman 1975).

Within the northern portion of the American Bottom, near South Roxana, the Wood River Terrace stretches about 1.5 miles across the Mississippi River floodplain. The Wood River Terrace has been characterized as "a heavily dissected, sandy terrace that is higher in elevation than the adjacent floodplain." (Linder et al. 1978:10). The abundant natural resources of the Wood River Terrace—well-drained soils, oak-hickory forest, and associated fauna—provided optimal settlement conditions for the prehistoric inhabitants of the area.

East of the American Bottom region, the project corridor enters the Southern Till Plain, a glaciated upland characterized by low relief beyond the valleys of the Kaskaskia River and its major tributaries. Despite the well-developed, dendritic drainage pattern of the Southern Till Plain, the level topography of the uplands results in their draining slowly, while the narrow, shallow valleys of the Kaskaskia and its tributaries are prone to flooding (Norton et al. 1936:7). The extensive meandering of the Kaskaskia River has produced numerous backwater marshes and oxbow lakes within the lower areas of its floodplain (Fortier 1978).

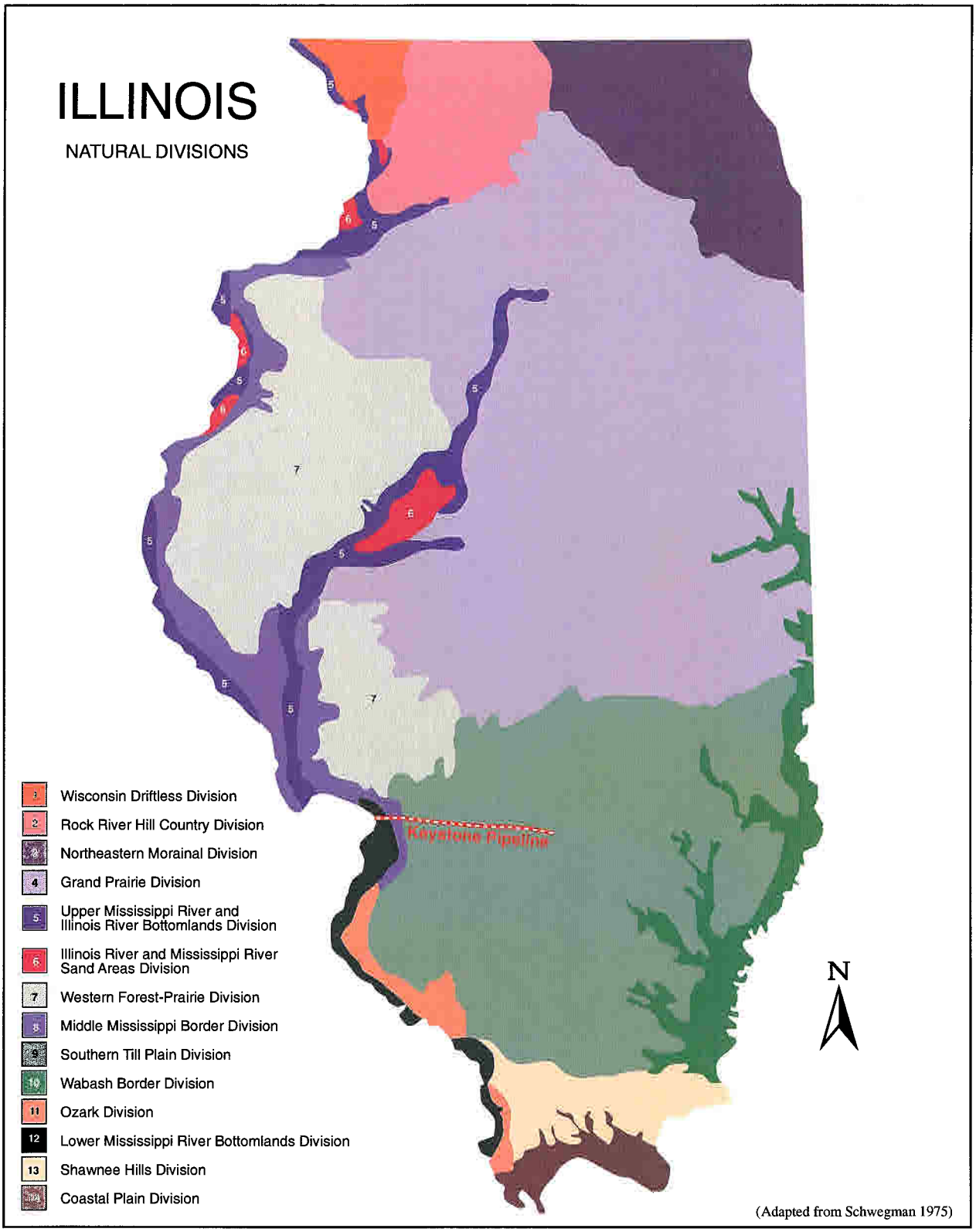


Figure 2. Location of the Keystone Pipeline Project corridor in relation to the natural divisions of Illinois.

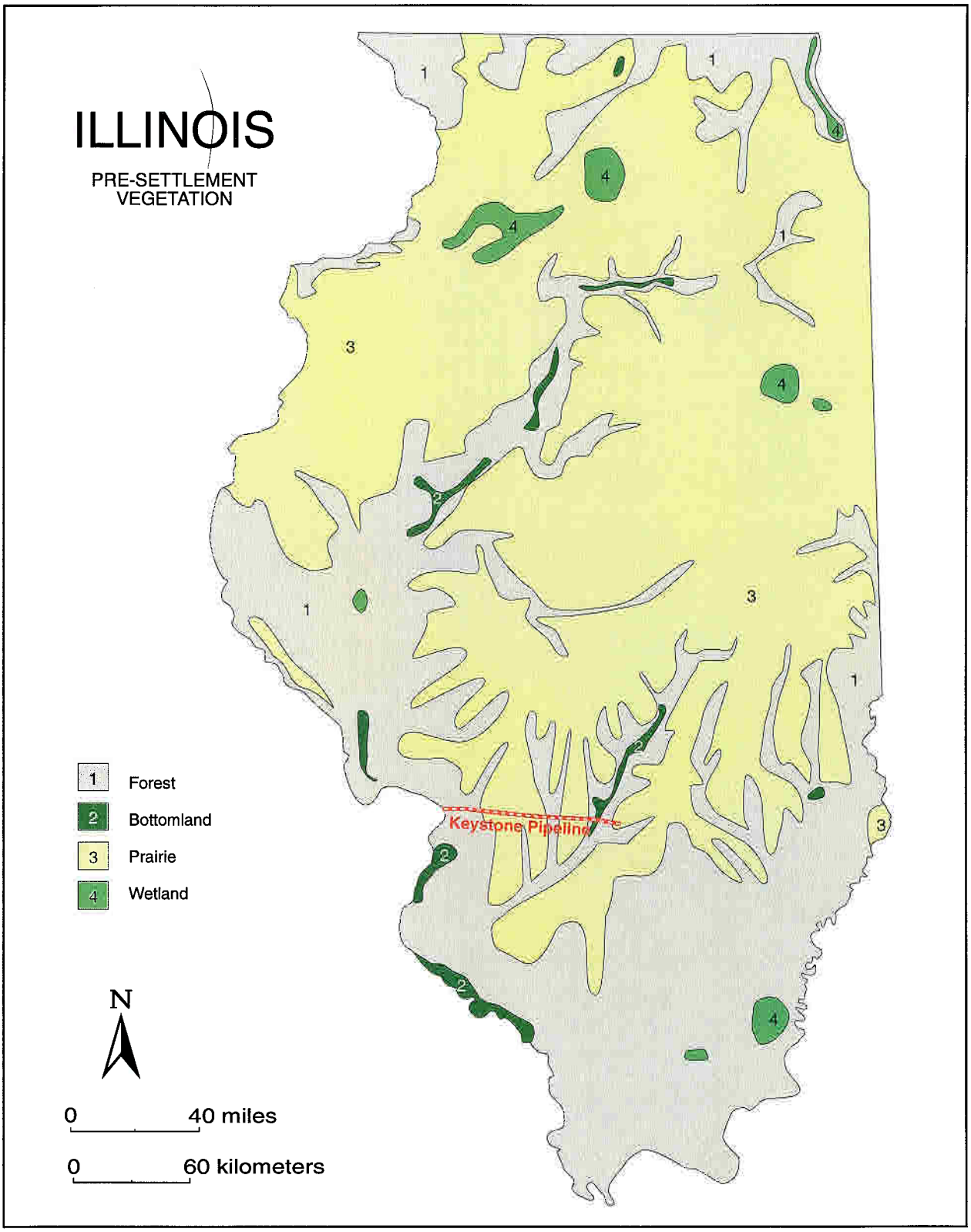


Figure 3. Location of the Keystone Pipeline Project corridor in relation to the pre-settlement vegetation of Illinois.

Much of the project area lies within the Kaskaskia River drainage basin, a major tributary of the Mississippi River. The Kaskaskia River flows into the Mississippi River approximately 60 miles (96.5 km) south of the pipeline corridor.

The pre-settlement vegetation of the project area comprised a mix of bottomland, forest and prairie plant species (Figure 3). Each zone contained varying floral and faunal assemblages. The prairies, lakes, streams, backwaters, and forests of the floodplain produced a rich assortment of habitats rich in floral and faunal species. The bio-diversity of this region, as well as that of the adjacent bluffs of the Middle Mississippi Border Division, later proved attractive to large numbers of humans, although ultimately this population influx had the effect of decreasing floral and faunal diversity by disrupting natural habitats through clearing, agricultural activities, damming, and pollution (White et al. 1984). Bottomland and uplands forests in this area were generally of the oak-hickory association, while river-edge zones consisted of the cottonwood-willow association and floodplain forests were dominated by elm, ash and hackberry.

Tall grass prairie (bluestem prairie), characteristic of the Grand Prairie Division, occurs away from the escarpments where flooding is infrequent enough to allow its development. This prairie is a warm-season grassland, and most of its grasses mature in late summer. In recent years these prairies have been encroached upon by oak-hickory forest, primarily due to man's activities in the area since the nineteenth century, which have limited the effect of periodic prairie fires. Now many areas that were once covered by prairie are in various stages of woodland development, a transition which explains the designation bluestem prairie/oak-hickory forest.

Plant species that are common to the bluestem prairie include big bluestem, little bluestem, Indian grass, switchgrass, brome grass, and forms like lead plant, butterfly milkweed, purple prairie clover, and various sedges.

Narrow bands of gallery forests also grow along streams crossed by the project corridor (Figure 3). Species common to this category include cottonwoods, hackberry, willow, and elm. In addition, poorly drained soils and shallow depressions found in the project corridor are excellent sites for wetland communities, which include species of chenopods, smartweeds, and prairie cordgrass.

The oak-hickory forest and upland prairie are hosts to a large variety of fish, fowl, and mammal species. Archaeological sites located near the project corridor have yielded the remains of riverine species which were available to the prehistoric inhabitants of the area. Specimens include catfish, flathead, gar, buffalo, white heel-splitter mussel, pink heel-splitter mussel, flat mucket mussel, and maple-leaf mussel (Bell 1976; Oman 1978).

Mammalian species characteristic of oak-hickory forests include wapiti, striped skunk, raccoon, beaver, western fox squirrel, southern gray squirrel, antelope, blacktailed deer, white-tailed deer, bobcat, coyote, badger, jackrabbit, bison, and wolf. Prairie environments supported box turtle, plains pocket gopher, prairie chicken, thirteen-lined ground squirrel, gray wolf, coyote, and badger.

**Confidential Information removed from document**

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