RECONSTRUCTING THE CHOCTAW NATION OF OKLAHOMA, 1894-1898: LANDSCAPE AND SETTLEMENT ON THE EVE OF ALLOTMENT

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CHAPTER 1

INTRODUCTION

Introduction

The manner in which people have occupied the land through time is tied both to cultural values and the physical environment. Geographers examine the relationships of the environment, settlement, and movement of people and goods. Although many factors influence how land is settled, the physical setting provides a backdrop for understanding cultural values and ethnic traditions. Brian Roberts (1996) writes that the components of the physical environment “influence the lifestyles which can be followed by human societies” (32). This research presents a new approach for studying historical geography by combining the use of geographic information systems (GIS) with the temporal cross section approach to historical geography to study settlement patterns in the Choctaw Nation during the 1890s. This new approach provides a more efficient analyses of settlement patterns and land use than were before possible.

Terry Jordan and Matti Kaups (1989) combined the concepts of ethnic tradition within the physical context in the tradition of *particularistic cultural ecology*, for study of ethnicity and settlement patterns of the American backwoods pioneer. The way in which land is settled may be heavily influenced by the cultural traditions and modifications to those traditions. Stephen Jett

(1978) called cultural traditions of the Navajo their *core characteristics*. These deeply rooted characteristics were brought with them from the original homeland to the American Southwest.

Settlement also has a component of movement. As people have become increasingly mobile through time, historical transportation studies have examined mobility across geographic space. Historical transportation may focus on mode, transportation patterns, or some combination of the two. Transportation studies, i.e., the movement of goods and people, have been closely tied to economic geography, however, historical transportation analysis fits well within the context of settlement geography and cultural landscape reconstruction.

Human settlement, like all geographic concepts, requires analysis at different scales. The regional approach, as Donald Meinig (1968) writes, favors geographical patterns over processes and attempts to find a "synthesis of the whole rather than just analysis of parts" (xii). Meinig's (1965) study of the Mormon culture region in Utah and surrounding states using the framework of *core, domain,* and *sphere* is an example of large-scale regional research. The study of local settlement can be used as a method to sub-sample large regions. Material features in the cultural landscape, such as houses, barns, and fences, often indicate cultural values and traditions and provide strong evidence for diffusion of settlement features. Terry Jordan (1966) wrote that settlement geography was "the study of the form of the cultural landscape" (27). Fred Kniffen (1936; 1965) used patterns in folk housing to identify settlement origin and paths.

Even early stages of settlement affect the physical environment, and technological innovations speed up the changes wrought by settlement. Settlement geography provides a way to identify people's motives in settling places, classify the manner in which people organize their surroundings and subsist, and analyze the results of their residence. Clyde Kohn (1954) describes settlement geography as the "facilities" that humans construct when settling places, and that "these facilities are designed and grouped to serve specific purposes, and so carry functional meanings" (125). Historical settlement features and patterns not only expand our current knowledge of history, but also provide benchmarks by which to understand contemporary culture. If historical evidence of settlement survives, in cartographic form, for example, it is an excellent resource for a greater understanding of historical settlement patterns and land use.

An examination of historical settlement may be conducted using some combination of the temporal framework scheme of historical geography (Figure 1.1). Techniques used by historical geographers to study the past depend on temporal scale, the spatial scale of the study area, the cultural phenomena addressed, and availability of source materials. The methods for studying the past in historical geography fall into four main categories: the temporal cross section, the successive cross sections, the vertical theme, and the relic theme (Estaville 1991). Approaches to studying time are not limited to one category, but often use some combination of these.

The temporal cross section (also known as the slice in time) focuses on a particular period in time, thus allowing for a detailed examination of a study area. Ralph Brown (1943) reconstructed life on the Atlantic Seaboard for 1810 using a variety of sources that would have been available only for that time. The depth of this study was only possible by limiting its period of time. The temporal cross section approach is useful when contemporaneous sources exist for reconstructing past cultural and physical landscapes. The vertical theme is used to examine cultural phenomena through time (Estaville 1991; Newcomb 1969). This provides historical research with a dynamic component. When used in combination, both approaches are enhanced. This complimentary relationship results in a solid foundation provided by the vertical theme as well as detailed geographical analysis provided by the temporal cross section.

Cartographic sources provide one of the most useful resources for reconstructing past cultural landscapes. Maps provide information that cannot be portrayed in text such as scale, spatial organization, geographic patterns, and the areal arrangement of place names (Rumsey and Williams 2002). In addition, maps offer clues on the way cartographers viewed the cultural or physical features. Certain cartographic devices, such as surveys, reflect adherence to strict standards making them a reliable source (De Vorsey 1971). Carl Sauer (1941) wrote that “the discovery of contemporaneous maps is the first thing hoped for, but rarely realized” (11). Sauer explained that for landscape reconstruction the historical geographer needs the “ability to see the land with the eyes of its former occupants, from the standpoint of their needs and capacities”

(10). The United States public land surveys conducted by the General Land Office in Indian Territory facilitate the ability to develop such reconstruction. Following the stipulations of the Land Ordinance of 1785, which called for the survey and allotment of land—commonly referred to as the township and range system, surveyors conducted surveys throughout the "Indian Territory" in the 1870s, except for the lands of the Choctaws, Muscogees, Seminoles, and Cherokees. They resurveyed all of Indian Territory in the 1890s including the land of the Choctaws, Chickasaws, Cherokees, Muscogees, and Seminoles. For Indian Territory, the public land surveys are the earliest, most accurate data sources for settlement patterns, cultural landscapes, and natural and human induced modification to land cover. Because the public land survey established a "grid" of township, range, and section lines rather than using natural or cultural features, the geographic coordinates for the survey plats are easily obtained. This allows the historical landscape to be compared to other data sources such as topography and hydrology. In addition, the public land surveys have complementary field notes. These provide extra details both for the physical and cultural landscape for each township.

Within the specialization of historical geography, my research may be adequately identified as *applied historical geography*. Craig Colten et al. (2003) define this as using historical geographic techniques to "solve practical problems" and present findings to an audience beyond the academy (156). The authors use thematic categories to discuss contributions made to applied historical geography. Topics include, among other things, work on historic preservation and landscapes as historical and cultural resources. Richard Francaviglia (1991; 1996) used city- and townscapes as historical and cultural resources to interpret American Main Streets and mining landscapes. Colten et al. also recognized geographic information systems (GIS) as a theme for research in historical geography, but few historical geographers have used GIS for a large scale landscape reconstruction, though Schroeder (1995) and Mires (1993) have used GIS techniques in conjunction with land surveys. My research follows the line of historical resources (pieced together from public land surveys, oral histories, government documents, diaries, and travel accounts); but adds the utility of GIS to reconstruct the cultural landscape. The result is a study that uses GIS to make historical resources more useable via cultural landscape reconstruction.

Statement of the Problem

United States General Land Office (GLO) surveys, as Fagin and Hoagland (2002) have shown, have been used by ecologists for years to reconstruct land cover patterns and study the character of pre-settlement vegetation. Their use by historians and historical geographers for settlement reconstruction, however, has been limited despite the great details that surveys provide on early settlement patterns and character. The use of GLO plats and notes have been limited in approach and scope with researchers examining a small number of townships at a time (Hewes 1950; Jung 1967; Wilms 1974; Hewes 1981; Hewes and Jung 1981; Schroeder 1981; Milbauer 1997; Schroeder 2002). Settlement patterns, locations of economic enterprises, and transportation networks have neither been studied in any great detail, nor at such a large scale using the GLO surveys. In the Choctaw Nation, most research for the period between the Civil War and 1889 focused on land allotment, not settlement patterns and land use. GLO surveys have not been used on a large scale to study historical settlement patterns or reconstruct cultural landscapes. Nor have land surveys been used under the combined temporal cross section/vertical theme framework. However, Douglas Wilms used Georgia land surveys of a different type to reconstruct the nineteenth-century Cherokee landscape in Georgia. The Choctaw Nation, Indian Territory, has received very little consideration of historical settlement patterns and land use. Only one author has provided an exception to the normally small scale studies utilizing the GLO surveys (Watkins 2002).

This research addresses these shortcomings through the development of a new approach to the temporal cross section/vertical framework. A new approach has been made possible only with the introduction of GIS and global positioning system (GPS) technology. GIS allows the assembly of larger data sets than ever before which easily can be appended as more data is discovered. For example, I have assembled the entire Choctaw Nation, 351 townships, into digital *layers*. Cartographic data is no longer static when using GIS because each feature on the map can contain a variety of related information. Data from cartographic sources become interchangeable “layers” of information that have enabled more complex analysis than has ever before been possible. For example, features related to the coal industry in the Choctaw Nation may easily be isolated or examined in the context of the surrounding geography. I have combined settlement reconstruction using GLO surveys with a digital elevation model to put the historical data in the context of the topographical challenges that settlers faced in the 1890s. In addition, I used data on soil quality and land capability to analyze agricultural settlements. GPS offered a way to connect the past landscape with contemporary features by providing absolute position. The benefits are two-fold: 1) GLO surveys/Choctaw Nation Geospatial Database (CNGD) has been field checked for accuracy by locating and comparing extant features on the contemporary landscape to those found on the surveys; 2) relic features found in the contemporary landscape can be added to the CNGD. These two technologies, when used together, offer advantages to the study of historical geography.

By analyzing primary sources (GLO surveys) using GIS, larger data sets can be analyzed. As a result the more extensive assembly of data provided a more comprehensive examination of the past cultural landscape of the Choctaw Nation. GIS also enables more efficient and large scale analyses of spatial information such as measurements of distance, polygonal areas, and feature shapes in addition to various thematic variables such as topography, soils, slope, and geology. Thus, these analyses transform the temporal cross section, which has been considered to have limited use, into a thorough examination, albeit of a specific, period in history. This research employs the use of GIS for historical geography research and combines the temporal cross section with the vertical approach. This combination eliminates the restrictiveness of solely using the temporal cross section by providing sufficient information on the development of settlement patterns through time. The results provide new views and descriptions of the historical development of settlement in the Choctaw Nation and its residents that was previously impossible.

Research Questions

This study addresses settlement patterns (i.e., the dispersion of settlements on the landscape), settlement forms (i.e., arrangement of buildings, fields, fences, at local scales), and land use perceived through a cultural landscape reconstruction (Roberts 1996). The questions are addressed using primary cartographic sources and supporting textual accounts such as survey field notes, oral histories, and federal reports. Each question is intended to extract data from the main cartographic source to elucidate the relationship between the social environment of residents in the Choctaw Nation and their physical environment. A main component of the research is to understand human-environment relationships through the examination of settlement patterns, settlement form, and land use practices. I attempt to answer six questions regarding settlement and land use in the Choctaw Nation. These questions can be segregated into categories of settlement pattern and form, fences, and transportation. All questions attempt to place the cultural landscape in context with the physical landscape.

The first question asks if there a relationship between areas with dispersed settlement patterns and areas deemed favorable for agriculture, either crop production or grazing? To answer this, patterns of rural settlement have to be determined. Specifically I determine whether settlements are *dispersed* or *nucleated*. It is necessary to analyze settlement elements in the context of physical circumstances in order to better understand settlement patterns. Thus, settlement patterns have been compared to the land's capability for agriculture. I obtained this from data on geomorphic provinces and land capability. In addition, cultural values of the residents, economic and industrial factors, settlement laws, and biases of surveyors who carried out the surveys have been considered for a more complete understanding of resulting settlement patterns.

The second question relates to settlement *form*, or, *morphology*, in hamlets, villages, and towns. Locations that exhibit a nucleation, or built structures in close proximity, also exhibit a local *form*. It is pertinent to ask: Of those settlements that exhibited a nucleated form, were the arrangements agglomerated or linear, regular or irregular? I first classified nucleated settlement as *linear* or *agglomerated*. Then, the degree of regularity was defined as *regular* or *irregular*. Linear arrangements occur when structures are strung out in a line, while agglomerated arrangements occur when structures are clustered. Regular plans exhibit a "systematic structure or order" whereas irregular plans do not exhibit such an order, though some culturally understood order may be present (Roberts 1996, 94). The problem of classifying form within hamlets, villages, and towns was aided by examining the transportation plan (local arrangement of the road network) within each nucleation.

The third and fourth questions focus on transportation in the Choctaw Nation. During the latter half of the nineteenth century, transportation became critically important for the conduct of business and access to natural resources. The detailed information surveyors collected and recorded facilitated the analysis of transportation networks for natural resource exploitation in the Choctaw Nation. The third question asks: How did different modes of transportation facilitate the extraction of coal and timber within the Choctaw Nation? The Choctaw Nation contained large towns as well as rural settlements in the 1890s. The fourth question asks: Do unique transportation patterns exist between towns and rural areas?

The fifth and sixth questions examine the importance of the fence in the cultural landscape. John Fraser Hart and Eugene Cotton Mather (1957) appropriately called the fence "a significant index of settlement stage and character…often being a clue to the physical environment" (4). As such, the arrangement of fences in the cultural landscape provided information on settlement patterns, division of property, and rural economy (Hewes 1981). It is necessary, therefore, to ask: What fences did surveyors encounter on the landscape? Because the fence may be linked to the physical characteristics of land, primarily vegetation, the sixth question asks: Is there a relationship between a specific type of fence and the land cover and land use on which it is located? Answering these questions requires large- and small-scale analyses.

My study of the Choctaw Nation in Indian Territory (Figure 1.2) provides an opportunity to utilize the temporal cross section/vertical theme in addressing these questions. Surveys were carried out from 1894-1898 under the direction of the General Land Office (GLO) and the United States Geological Survey.

Surveying protocols had been well established prior to the survey of the Choctaw Nation. Surveyors took oaths to execute faithfully their duties (Stewart 1935). Therefore, the accuracy and consistency achieved by GLO surveyors at the end of the nineteenth century was the greatest in the history of public land surveys. The mid- to late-1890s was an important decade for the residents of the Choctaw Nation. It was the decade before allotment. It was also a period during which the landscape of the Choctaw Nation changed dramatically. Unlike previous decades, the ethnic makeup had been reversed with whites far outnumbering Choctaws or Blacks. The detail and description found in these surveys show the cultural landscape in the context of this transition. For example, in a majority of the townships surveyors noted that the people in settlements were "mostly whites."

Historical transportation routes that once crossed the Choctaw Nation include the California Road, the Texas Road, and the Butterfield Overland Mail. Such prominent historical routes certainly affected early development of settlement patterns and perhaps even patterns that existed at the time of the surveys. They provided an early conduit for the movement of people and later provided strategic locations for the development of economic activity. These features of the physical and cultural history of the Choctaw Nation have been captured by the GLO surveyors.

Study Area

The study area includes the land located within the modern boundaries of the Choctaw Nation of Oklahoma, which is a product of three treaties with the United States (see Figure 1.2). The Treaty of Doak's Stand (1820) gave the Choctaws, at the time living in Mississippi and Alabama, the land between the Arkansas, Canadian, and Red rivers between Arkansas Territory west to the 100th meridian. The Treaty of 1825 initiated the resurvey of the eastern boundary of the Choctaw and Chickasaw land (then located in what is now Arkansas). As a result, the eastern boundary was moved west to the present boundary between Oklahoma and Arkansas. The Treaty of 1855 further reduced the western boundary of the Choctaw and Chickasaw lands to the 98th meridian to accommodate Federal Government removal of the Wichitas and other tribes. The Treaty of 1855 also separated Choctaw from Chickasaw land. Choctaw lands were now bounded on the west from the mouth of the Island Bayou at the confluence with the Red River to its headwaters, then running due north until reaching the Canadian River. The land from this western border east to the State of Arkansas and from the Canadian and Arkansas rivers south to the Red River forms the Choctaw Nation of Oklahoma (Morris, Goins, and McReynolds 1986).

Soon after arriving in Indian Territory, the Choctaws established three districts each overseen by district chiefs acting under the Principal Chief. The Choctaws brought the concept of towns from their eastern homeland, which were dispersed settlements sharing a common region and headman. The Choctaws from the towns in the eastern homeland became the residents of the districts in

Indian Territory. The districts took the names of the chiefs who controlled them. Thus, three districts formed in the Choctaw Nation in Indian Territory (Figure 2.1). The Moshulatubbee District is the northernmost district and was bound by the Canadian and Arkansas rivers to the north, by the drainage divide between the Arkansas River and Red River watersheds to the south, and stretching from the eastern and western extent of the Choctaw territory. The Pushmataha District was bounded by the Moshulatubbee District to the north, the Kiamichi River to the east, the Red River to the south, and the western boundary of the Choctaw territory to the west. The Apukshunnubbee District is bound by the Moshulatubbee District on the north, the state of Arkansas to the east, the Kiamichi River to the west, and the Red River to the south (Morris, Goins, and McReynolds 1986; Debo 1934). By 1850, the Choctaws established counties within each district as the basis for their judicial system (Wright 1930).

The Choctaw Nation contains some of the most variable terrain in Oklahoma. Relief ranges from 87.5 meters to a maximum of 365 meters above sea level (Spaeth, Thompson, and Eisenhart 1998; Morris, Goins, and McReynolds 1986). Three geologic provinces are represented in the Choctaw Nation: the Arkoma Basin, the Ouachita Mountain Uplift, and the Gulf Coastal Plain. The Ouachita Mountains, the most rugged portion of the Choctaw Nation, formed during the Pennsylvanian Period and exhibit ridge and valley topography that arcs from north-south, northeast-southwest, and east-west. These mountains, with their intervening shale valleys, not only influence the vegetation distribution but were factors in settlement and transportation patterns within the Choctaw Nation.

The Choctaw Nation contains eight geomorphic provinces as mapped by Curtis and Ham (Johnson et al. 1979) of the Oklahoma Geological Survey. In the extreme northeastern Choctaw Nation lies the *Arkansas Hill and Valley Belt*, which contains gently rolling plains and valleys and excellent soils. To the west is the *Eastern Sandstone Cuesta Plains* containing sandstone-topped hills that dip westward and have intervening shale valleys. The *McAlester Marginal Hills Belt* lies just north of the Ouachita Mountains and is characterized by sandstone capped mountains rising from 91 to 609.5 meters above wide plains. Three provinces coincide with the Ouachita Mountains. The *Hogback Frontal Belt* consists of limestone and sandstone ridges forming “hogbacks” (sharp ridges that dip steeply downward) that are 152 to 518 meters above valleys. The *Ridge and Valley Belt* contains the most conspicuous topography in the Choctaw Nation. This province contains most of the Ouachita Mountains with their characteristic sandstone ridges and intervening shale valleys. The *Beavers Bend Hills* make up only two rather small areas consisting of tightly folded sandstone hills. Two extremely small areas of the *Arbuckle Plains* enter into the extreme western Choctaw Nation and have little bearing on settlement patterns due to their size. The relatively level topography of the *Dissected Coastal Plain* stands in contrast to the Ouachita Mountains. However, dissected streams of the Red River watershed lead to the development of relief (Fenneman 1938; Johnson et al. 1979).

The topography in the Choctaw Nation sets the stage for various vegetation patterns, the most general of which are eastern forested lands transitioning westward to a mixture of forest and grasslands. The Oak-Pine vegetation type described by Duck and Fletcher is found in the most rugged portions of the Ouachita Mountain province. Shortleaf pine (*Pinus echinata*), post oak (*Quercus stellata*), blackjack oak (*Q. marilandica*), white oak (*Q. alba*), black locust (*Robinia pseudoacacia*), and sugar maple (*Acer saccharum*) are a few of the hardwood species associated with this type. An area of loblolly pine (*P. taeda*) is found in the southeastern portion of the Choctaw Nation due to increasing precipitation eastward in the Choctaw Nation. Various shrubs and grasses make up the undergrowth of the mountainous areas (Duck and Fletcher 1943). Rice and Penfound (1959) noted that in the Ouachita Mountains, several species occurred on the drier slopes (with a southern aspect) and ridges. These include eastern red cedar (*Juniperus virginiana*), blackjack oak, post oak, black hickory (*Carya texana*), and black oak (*Q. velutina*). Shortleaf pine also dominates on south facing slopes. Shumard oak (*Q. shumardii*), white oak, northern red oak (*Q. rubra*), loblolly pine, chinkapin oak (*Q. muehlenbergii*), sugar maple, eastern hophornbeam (*Ostrya virginiana*), and bitternut hickory (*C. cordiformis*) occupy mesic (moist) upland slopes.

The Post Oak-Blackjack vegetation type is considered the transition from forests to grasslands and is best described as a mosaic of forest and grassland. Post oak, blackjack oak, and black hickory dominate the forest cover while the understory consists of little bluestem (*Schizachyrium scoparium*) and big bluestem (*Andropogon gerardii*) grasses. The Tallgrass Prairie vegetation type is found mostly in the western portions of the Choctaw Nation. It consists of big bluestem, little bluestem, Indian grass (*Sorghastrum nutans*), switch grass (*Panicum virgatum*), and silver beard grass (*Bothriochloa saccharoides*) (Duck and Fletcher 1943).

The Bottomland Timber vegetation type is found along the major streams in the Choctaw Nation. It consists mostly of black oak, pecan (*C. illinoensis*), sycamore (*Platanus occidentalis*), bitternut, and walnut (*Juglans nigra*). In addition, bald cypress (*Taxodium distichum*), sweet gum (*Liquidambar styraciflua*), sour gum (*Nyssa sylvatica*), water oak (*Q. nigra*), and American holly (*Ilex opaca*) grow in the extreme southeastern portions of the Choctaw Nation due primarily to increased precipitation and low altitude of about 122 meters above sea level (Duck and Fletcher 1943).

The climate of the Choctaw Nation is temperate and characterized by an east to west gradient with both temperature and precipitation increasing westward. Annual precipitation ranges from 107 cm in the west to 132 cm in the east. The highest mean annual precipitation, 138 cm, occurred in Smithville in McCurtain County. The greatest annual precipitation, 214.5 cm, was recorded in McCurtain County. The area receives on average from 75 to 90 days with measurable precipitation (Johnson and Duchon 1995).

The mean annual temperature for the study area is 16.7º C. The temperature reaches 32.2º C or above on an average from 70 to 80 days. Fewer than ten days, however, exceed 38.7º C. For the Choctaw Nation, fewer than 70 days reach below freezing temperatures, and temperatures, on average, stay below freezing all day for only three days. The length of the growing season (from the last freeze in spring to the first freeze in fall) ranges from 30 to 32 weeks. The length of the growing season in northern Indian Territory, just 300 km away from the Choctaw Nation is an entire month shorter. This extended growing season, especially in the southern Choctaw Nation, has dramatic effects on the agricultural suitability for certain crops, especially cotton (Johnson and Duchon 1995).

March, April, May, and September are the wettest months of the year in the study area averaging 13 cm to 15 cm. of total monthly precipitation. Winter is the driest period, though most of the precipitation falls as rain rather than snow. Idabel, in extreme southeastern Choctaw Nation, in present McCurtain County, sees no extended period of consecutive below freezing temperatures (Johnson and Duchon 1995).

Availability of surface water in the Choctaw Nation relative to other parts of Oklahoma was noteworthy. A party of Choctaws exploring their new lands west of the Mississippi River in 1830 commented favorably on the size of the Red, Little, and Kiamichi rivers, specifically on the economic and transportation potential as well as water quality (Foreman 1932). The major streams of the northern Choctaw Nation drain into the Arkansas River watershed and include the Canadian, Arkansas, and Poteau rivers with Gaines Creek and Fourche Maline being of minor importance. The streams in the southern Choctaw Nation drain into the Red River watershed and include the Red, Kiamichi, Mountain

Fork, Little, and Blue rivers with the Clear Boggy and Muddy Boggy rivers being of minor importance. The Missouri, Kansas, and Texas (Katy) Railroad ran adjacent to much of the Kiamichi River creating a substantial settlement corridor through the Kiamichi Mountains.

Human occupation in what would become the Choctaw Nation and Indian Territory did not begin with Indian Removal. Early American Indians (Caddoan Mound Builders) and others prior to the arrival of the Choctaws (Osages and Quapaws) had used these lands for hunting grounds, though the Choctaws hunted there while still in the Southeast (Baird and Goble 1994). French explorer Benard de la Harpe crossed the Choctaw lands decades before Indian removal. There he found nine Caddoan villages between the Canadian and Red rivers, numerous groups of the Caddoan Confederacy, and parties of Osages. He also recorded excellent information on the physical setting (Gibson 1981; Lewis 1924). In the years prior to the Choctaws' arrival, white settlers resided in what was then Arkansas Territory. A boundary dispute settled in 1825, shifted the boundary eastward leaving white settlers in the Choctaw Nation. The Federal government forced them to relocate east of the new boundary of Arkansas Territory.

By 1890, the Choctaw Nation in Indian Territory had fewer Choctaws than Anglo-Americans and Europeans. The 1890 census found that whites made up 64.7 percent of the population compared to Choctaws (and other Indian groups) at 25.2 percent (Census 1894). This ethnic inversion was due largely to the increase in non-native population after the Civil War. The Choctaw's allegiance to the Confederacy during the Civil War lead to the Treaty of 1866 stipulating that the Choctaws would allow one north-south and one east-west railroad to cross their territory. The Permit Law of 1867 allowed non-citizens to work in the Choctaw Nation provided they obtained the required signatures for the application and pay a fee. Many more non-citizens began to enter and stay illegally while constructing railroads or engaging in activities supporting railroads such as timber production for ties and other supplies (Debo 1934; McReynolds 1954).

James McAlester used his permit to establish a store in the Choctaw Nation in 1870 and later he obtained Choctaw citizenship through intermarriage. McAlester's store was strategically located at the "Crossroads," an area known to have numerous coal deposits where he established a coal mining operation. This provided McAlester an early foothold in the Choctaw from which to build his business. McAlester's actions paved the way for more non-citizen intrusion into the Choctaw Nation. This time, however, the intruders were coal miners of mostly European stock. American, English, Irish, Scots, and Italians came first to mine coal in the Choctaw Nation, but later Italians would dominate (Brown 1980; Hale 1975).

African-Americans in the Choctaw Nation after removal were slaves from Mississippi. Once in Indian Territory, they were the labor force on the large plantations located along the Red River. Robert M. Jones, a mixed blood Choctaw residing on the Red River, reportedly owned over 500 slaves. Choctaw slave owners were often mixed bloods and considered an elite class. Because the Choctaws (as a political entity) supported the Confederacy during the Civil War, the federal government required the Choctaws to sign new treaties. The Treaty of 1866 forced the Choctaws either to grant freedmen (freed African-American slaves) full rights of citizenship or work out a plan to remove the freedmen from their territory. The Choctaws opted to give freedmen citizenship rights but managed to delay it for twenty years. The freedmen were made full citizens of the Choctaw Nation but were excluded from holding the offices of Principal Chief or District Chief. In addition to citizenship, the freedmen were granted 40 acres for settlement (Wickett 2000).

The Choctaw people are considered one of the "Five Civilized Tribes"[1] that were originally located in the southeastern United States. Remnants of the Mississippian (c. A.D. 750-A.D. 1600) tradition came together to form the Choctaw "tribe" circa 1700 (Galloway 1995; Kehoe 1992). The Choctaw People today comprise two North American Indian[2] groups located in the southeastern and south central United States—the Mississippi Band of Choctaw Indians and the Choctaw Nation of Oklahoma.[3]

The Choctaws arrived in what is now Oklahoma as a result of federal removal policy set into motion with the Indian Removal Act of 1830. The idea of Indian removal, however, began with Thomas Jefferson and the Louisiana Purchase of 1803. Moving Indian peoples west of the Mississippi River became the popular solution to "civilizing" the Indians while at the same time opening more land to settlement for white southerners (Calloway 2004). In 1829, Choctaws residing in the newly created State of Mississippi had the choice of becoming subject to Mississippi state laws or move to a predetermined location west of the Mississippi River (Carter 1999; Debo 1934). The location included what would eventually become the Choctaw Nation of Oklahoma.

The Indian Intercourse Act (1834) created an "Indian Territory" from the Louisiana Purchase. This became the land the United States ceded to the Choctaws and other tribes resulting from treaties. After the shock of removal, the Choctaws experienced relatively peaceful and prosperous times until the Civil War, after which the Choctaws residing in Indian Territory found themselves under immense pressure from non-Choctaws and those people of mixed Choctaw and Anglo-American ancestry residing on tribal lands, to open their territories to Anglo-American and European settlement on a larger scale. Congress created a commission in 1893, known as the Dawes Commission, whose goal was to convince the five Indian nations, including the Choctaws, to accept allotment.

In the following literature review, literature on human-environment interaction within the context of human settlement will be examined. Greater detail will be given on the temporal cross section and vertical concepts in historical geography. Studies in which authors have used the public land surveys for settlement reconstruction will be evaluated. Finally, the historical and geographical research about the Choctaw Nation will be evaluated. This progression will show how the GLO surveys of the Choctaw Nation in conjunction with the temporal cross section/vertical theme are an efficient approach for a large scale settlement analysis and descriptive landscape reconstruction.

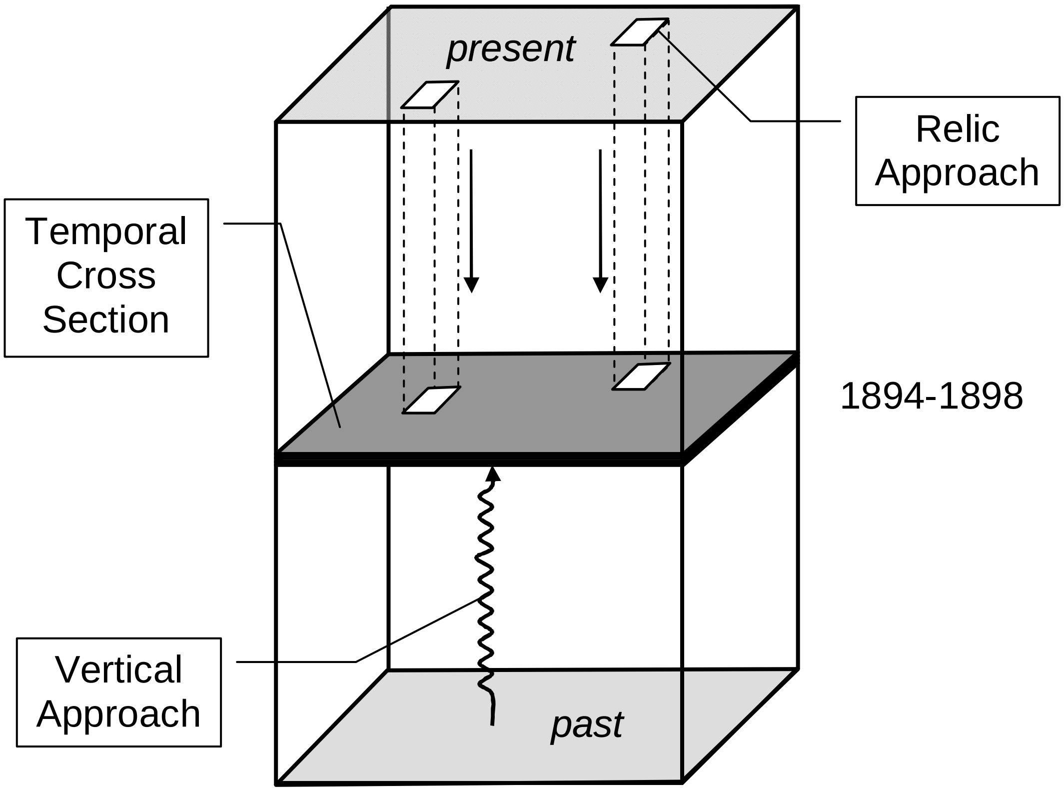

Figure 1.1: Theoretical framework showing the three approaches to historical geographic research: *temporal cross section, relic approach, vertical approach*. *(After Estaville 1991)*

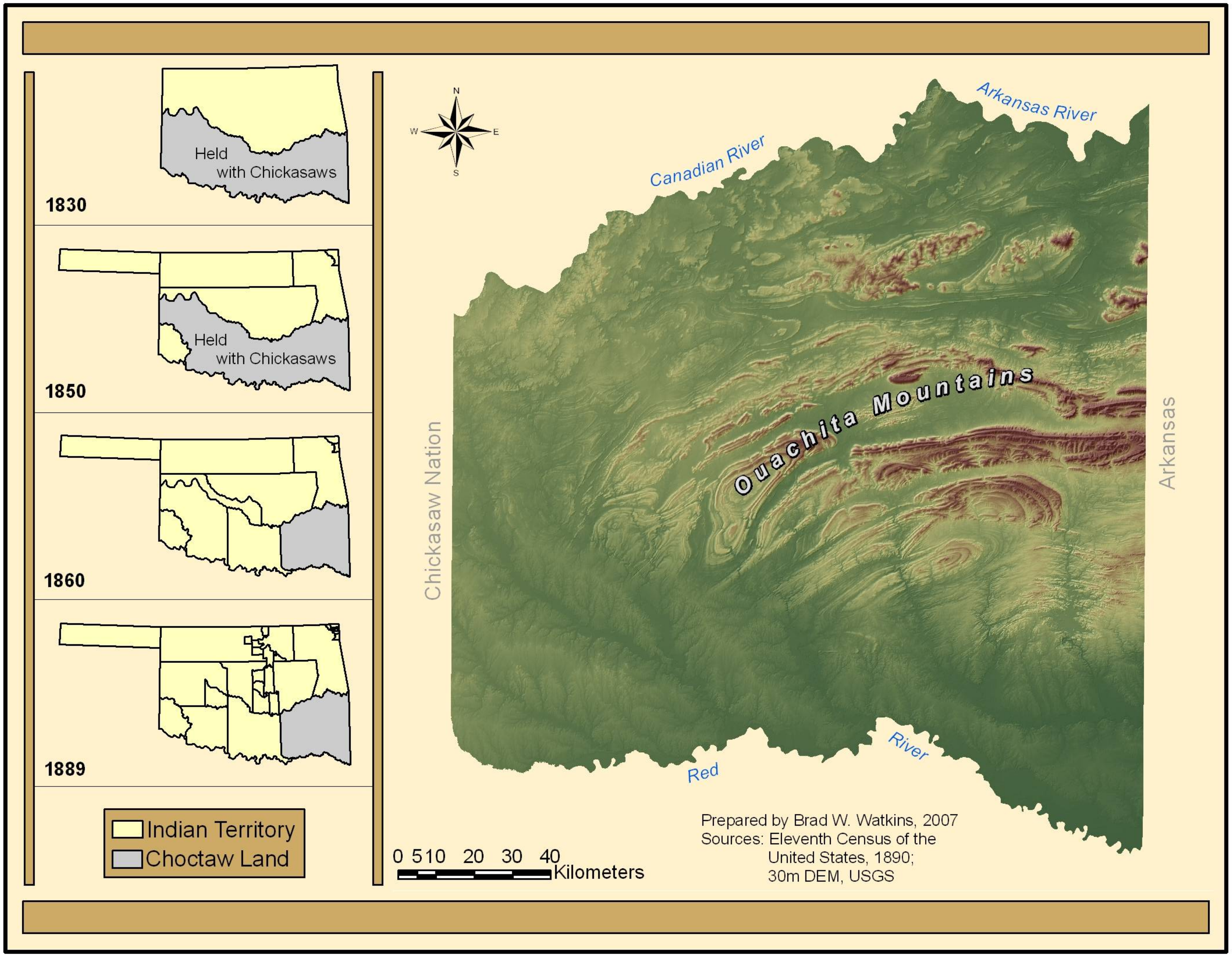

Figure 1.2: Boundaries and topography of the Choctaw Nation, Indian Territory

CHAPTER 2

LITERATURE REVIEW

Settlement Geography

The earliest work in settlement geography as we understand the concept today was conducted by German geographers August Meitzen and Otto Schlüter. Regarded by some as the founder of the cultural landscape theme in human geography, August Meitzen was interested in rural settlement geography, particularly agricultural field patterns. It was Meitzen's research that laid the groundwork for understanding the rural settlement landscape. Otto Schlüter is best known for developing the concepts of *Naturlandschaft*, or unaltered landscape, and *Kulturlandschaft*, or landscape shaped by human action—later known as the *cultural landscape*. Schlüter (West 1990), scrutinizing Meitzen's methodological contribution, writes that "it may be necessary to know the land as well as the people and their culture, and…to survey both the time of the founding of inhabited places and the relationship between man and the land, not just their status at a given moment but in their change and growth during the course of history" (24).

Settlement geography eludes simple definition. Perhaps this is because, as Clyde Kohn (1954) writes, settlement "runs like a thread through almost the whole fabric of geographic thought" (125). That settlement geography is intertwined into the cultural and physical fabric is perhaps the reason that Kirk Stone (1965) attempts to focus the definition of settlement on the location and distribution of buildings and the process by which they came to be so situated. Terry Jordan (1966) takes a broader approach, however, when defining settlement geography as the *vertical* (for example, the number of stories of a house), *horizontal* (distributions of settlement features or floor plans), and *material* (the “material composition”) components of a landscape (27). The horizontal and material aspects of the cultural landscape—and their inherent patterns—are the central theme of my research in the Choctaw Nation.

Brian Roberts (1996) provides a thorough resource for understanding the concepts and terminology of settlement geography. He addresses settlement at various scales, from the isolated farmstead to the market town and offers the “categories of influence” for explaining settlement patterns: the physical environment, technological and economic factors, social and demographic conditions, and historical circumstances. He provides examples of settlement patterns that are clearly affected by physical circumstances and demonstrates their value in understanding the “nucleation and dispersion balance” but is quick to state that physical circumstances alone are “never free of other, often more powerful, cultural influences, deriving from the character of human societies” (40).

In addition to Roberts’ attention to the factors affecting human settlement, his book is filled with useful terminology for studying the rural settlement landscape. Supporting his discussion are numerous diagrams and frameworks that graphically explain settlement concepts. Settlement concepts introduced by Roberts that I use for my research and have been defined below include: *settlement landscape*, *settlement elements (farmstead*, *hamlet*, *village, town)*, *nucleation* and *dispersion*, *settlement form (morphology)*, and *settlement patterns*.

Like Roberts, James Lemon (1972) stresses the importance of including the social conditions and experiences in historical geographic research. The way in which people “perceived their situation” influenced their settlement choices (xv). Physical factors in settlement choices for settlers in southeastern Pennsylvania, however, were not ignored. Lemon asked two pertinent questions: “What factors determined where the first settlers occupied sites?” and “Why did the settlers…organize space into dispersed farms and open country neighborhoods rather than agricultural villages?” (xiii).

Several authors have examined original land surveys in order to capture and reconstruct past cultural landscapes or to examine changing cultural landscapes. Each of these works contributes to a better understanding of land surveys, the advantages of using them for historical geography research, and even precautions to take when using them for particular types of research. Douglas C. Wilms (1974) used Georgia land surveys, conducted by the Georgia Surveyor-General Department, to reconstruct the cultural landscape occupied by the Cherokees of Georgia in the nineteenth century. The surveys provide excellent accounts of the pre-removal cultural landscape. Wilms discovered that Cherokee settlement patterns had changed from the clustered riverine system of prehistoric times to a dispersed and linear settlement pattern. He demonstrated the versatility of the surveys when examining settlement patterns at both large and small scales. The date of the data source (1831) is remarkable as well, because it provides a somewhat detailed view of the pre-removal landscape. The Georgia land surveys used by Wilms differed in methodology from the General Land Office (GLO) system used in the western territories (including Indian and Oklahoma territories). Wilms' research is not without its drawbacks, however. The plats he used were two inches square at a scale of one inch to two miles (1:126,720), whereas the GLO used a twelve inch square plat at a scale of two inches to one mile (1:31,680). Although it may be the best early source for settlement patterns in Georgia, the plat lacks the physical dimension to include as much detailed information as found in the GLO surveys. In addition to the disadvantage of little detail, Wilms fails to mention the degree to which non-Cherokees settled the Cherokee-occupied portion of Georgia, relying solely on what the surveyors termed as "Indian improvements" (48).

Ingolf Vogeler and Terry Simmons (1975), in their research and fieldwork on South Dakota reservations, found distinctive cultural landscape traits for Anglos and Indians' but did not find conclusive evidence for a distinctive settlement *morphography*.[4] Differences did exist, however, in Indian settlements between purely Indian communities and those communities containing BIA-planned housing (Anglo influence). Roads followed grid patterns, and settlements generally were larger. These differences, though not present in all aspects of morphology, reflect the different values held by ethnic groups. Differences between Anglos and Indians emerge in appearance to a greater degree than differences in settlement morphology. Besides Anglo settlements being located outside of reservation lands, their morphology possessed a planned style typical of a small town in the Midwest. That these differences exist in the landscape provides support for the further examination of settlement patterns among ethnic groups. Vogeler and Simmons (1975) found no distinction in agricultural practices between reservation and non-reservation lands. They attribute the similarity to Anglo practices of leasing Indian lands thereby applying their cultural stamp inside the reservation.

Martha L. Henderson (1990) found persistent settlement patterns on the Mescalero Apache Reservation in New Mexico since pre-contact times from the location of the reservation on land formerly occupied by the Mescalero and Lipan bands. This familiarity with the physical setting, along with the traditional settlement pattern of clustered dwellings in close proximity to streams allowed these bands to adapt to the changing Federal policies regarding American Indians. Although Henderson conducted fieldwork on the reservation, she did not provide detail on the larger scale settlement patterns found in each area but only provided population counts in each settlement on the reservation by time period. Although the text provides an idea of the proximal relationships of Apache dwellings to other buildings, good cartographic examples are lacking. She notes how the shifting of economic activity enabled the Apaches to settle in close proximity, thus fostering the traditional pattern of clustered settlements.

John A. Milbauer (1997) used General Land Office (GLO) surveys to study the effects of the public land survey system on settlement. His objective was to differentiate between settlement patterns prior to the GLO and those that developed in the subsequent hundred years. He chose one township he believed to be representative of the Cherokee Nation and quantified the features found on the survey plat by counting structures and measuring roads. To distinguish the differences between a landscape influenced by systematic versus unsystematic settlement, he counted roads that were oriented in the cardinal directions. He believed a systematic division of land would result in more north-south and east-west transportation corridors. In addition, he calculated land cover patch areas[5] for 1897 and 1994/95.

There are three shortcomings to Milbauer's work all attributable to the scope of his analysis. First, the comparison is based upon a single township but the results are interpreted at the regional scale, even though the region was not specified (Milbauer 1997, 20). Secondly, by focusing on one township, he fails to account for broader patterns that might exist in transportation and residential settlement. Third, he ignored the importance of ethnicity and natural resources on settlement patterns. Further, the township he chose contains the Illinois River in the southeast quarter. Because major streams influenced agriculture, trade, and transportation patterns, and since most of the townships in the Cherokee Nation do not contain major streams, this can hardly be considered a representative township. Leslie Hewes (1942b; 1943; 1944) demonstrated this in his articles on the Cherokee Nation. In addition, Milbauer discusses the fences in the 1897 township including their types and orientation. He assigns a specific portion of the township as being created by non-Cherokees and "mixed bloods"[6], but provides no basis for this conclusion. Although Milbauer's use of the GLO surveys is appropriate for the study of cultural landscape change, his analysis is too narrow in scope and area. By examining every township in the Choctaw Nation from 1894-1898, this research will present a more holistic portrayal of the settlement landscape, one that will take into account the influential role of the physical environment on settlement patterns.

Leslie Hewes (1940; 1942a; 1942b; 1943; 1944) has completed the most research on the historical geography of an American Indian group in Indian Territory. He shows how the Cherokee lands in Indian Territory varied considerably in settlement patterns, including transportation networks, and to a certain degree fences, due in part to the more traditional Cherokees preferring to settle in the mountainous eastern portion while non-Cherokees, mixed bloods, and Blacks tended to settle the western prairies. He stresses the importance of the physical environment in explaining the Cherokee settlement preferences in Indian Territory, particularly an affinity for lands resembling their southeastern homelands (forested uplands) and within proximity to necessary resources such as forests, coal, and salt licks (Hewes 1942b, 1944).

Hewes uses the approach in historical geography known as *sequent occupance* in which he examines settlement in an area in chronological order beginning with "pioneer settlement". He uses a variety of sources including the GLO surveys, Cherokee Census data, school enumerations, annual reports of the Commissioner of Indian Affairs, and appraisal records from which he was able to reconstruct in some detail the settlement patterns before, during, and after allotment. Hewes did not consult the Indian Pioneer Papers (oral histories) that today are considered significant components in reconstructing settlement patterns and cultural preferences. Despite this oversight, Hewes' methods for reconstructing settlement patterns provides a useful model. Hewes' use of the material landscape, especially fences, to understand settlement patterns corresponds closely to my research on the Choctaw Nation. Sequent occupance has disadvantages, however, because it tries to apply the same stages of settlement development for different locations. The factors affecting settlement, however, differ from place to place. Furthermore, it is almost impossible even to define when one stage truly begins and when it ends. These points in time, as well, will vary from place to place (Johnston et al. 2000).

Erich Schroeder (1995) used land office records in Illinois in conjunction with GIS to analyze the "progression of the frontier" in multiple stages from before 1815 to after 1964 (13). Although the land office records provide detailed information on land transactions, Schroeder simply plotted where and when property transactions occurred. He presented these maps as a series of five-year sequences which did little more than show broad transaction patterns. Only briefly did he mention that factors such as proximity to timber, water, arable land, and agricultural markets were considerations for settlers engaged in selling and buying land. Schroeder's use of GIS was limited. He created a township, range, and section map for the state of Illinois and plotted the transactions by section.

The resulting maps, though suitable for portraying general patterns for a statewide analysis, become grainy as geographic scale is enlarged.

Peter Mires (1993) demonstrates two useful techniques for combining land survey data with GIS to study historical geography. Mires examined French, Spanish, and British colonial land claims in Louisiana within the context of the potential natural vegetation, not actual vegetation patterns. Mires' goal was to determine which vegetation types contained the most land claims. This level of comparative spatial analysis was enabled using GIS. Mires also mapped "historic standing structures" (cultural relics) to validate the colonial land claim analysis, and found that 93 percent of historic standing structures occurred on colonial land claims.

Mires restricted his analyses to colonial land claims on the assumption that the American cadastral system was not "synonymous with actual settlement" (1993, 342). Mires' meaning is not clear on this point however, since General Land Office surveyors mapped all cultural features such as buildings on farmsteads, agricultural fields, and fences. Mires' use of potential natural vegetation as an indicator for other physical factors such as "climate, soils, hydrology, and elevation" may fall short of a thorough description of the physical setting (345). For example, what information is provided by the "Gallery Forests" category on soil composition and elevation? Mires' strengths lie in the two-way approach to historical geography (land claim data and historic standing structures) and not how physical factors related to settlement.

Walter Schroeder (1981) used GLO surveys to map presettlement (1815-1850) prairies in Missouri, though he used a less advanced approach. Using the field notes of surveyors, he drafted the prairie and forest boundaries onto country highway maps, only using survey plats for comparison. Using this data, he made a statewide map of presettlement prairie.

While Schroeder mapped a larger area than that of the Choctaw Nation, he lost some land cover detail provided by surveyors. For example, he considered “timbered draws” and “groves of timber” as prairie instead of timber because they were “integral parts of the total prairie environment” (Schroeder 1981, 7). Surveyors did not include information on timber density within each timber patch, therefore Schroeder misrepresents the survey data. By not including the small stands and narrow necks of timber in the map, he simplifies area calculations. The use of a geographic information system would eliminate such a modification of the data and would enable calculations of even small land cover types. Further, the surveys were conducted from 1815 to 1850, yet Schroeder includes all of the data on one map of timber and prairie. Finally, the majority of surveys conducted in Missouri were done so in advance of settlement, though a few townships contained settlers before surveyors arrived. While this provides useful data on presettlement vegetation, cultural data is largely absent. The Choctaw Nation surveys, because completed relatively late in the settlement of Indian Territory, provide an excellent window for analyzing the *settled* landscape.

Fences can be very descriptive material features in a settled landscape. They represent architectural styles, technological advancements, and the character of available natural resources. The settlement form of fences tells how property was arranged, and its material composition can be used to approximate the date of settlements. Geographers and historians have conducted a considerable amount of research on fences and the fenced landscape including everything from primitive palisade fences to the “fence wars” on the Great Plains (Gard 1947; Holt 1930).

Much of the fence literature has focused on descriptions, which is essential to understanding the varieties of fence form however slight modifications may be, and the reasons behind such choices (Report of the Commissioner of Agriculture 1871; Raup 1947; Leechman 1953; Mather and Hart 1954; Hart and Mather 1957; Symons 1958; Zelinsky 1959; Jung 1967; Hewes 1981; Hewes and Jung 1981; Jordan and Kaups 1989). Some works go beyond description and examine the functionality of fences in the landscape. John Fraser Hart and Eugene Cotton Mather (1954; 1957) have produced exceptional articles on the geographical distribution of fences. The 1871 Annual Report of the Commissioner of Agriculture is a culmination of responses to surveys sent to farmers across the United States (excluding U.S. territories). Respondents commented on the types of fences, their construction, the amount of specific fence types in their respective counties, and fence cost. This report provides the best benchmark for comparing fences as recorded by surveyors in the Choctaw Nation in the 1890s.

Leslie Hewes (1981) described the drawbacks of using GLO surveys for the study of fences. He found the surveys were “hit or miss” based upon instances of fences appearing on the plats to be “open,” when he believed that most of the fences would have been enclosed (499). In the Nebraska surveys, Hewes writes, surveyors often did not record the type of fence, which would diminish the quality of GLO surveys as a data source for fence study. In the Choctaw Nation, surveyors consistently noted a variety of fence types both on plats and in field notes.

Several authors noted that barbed wire became a major fence type in the 1870s and that its arrival brought about many changes in agricultural settlement. Walter Prescott Webb’s (1931) *The Great Plains* contains an analysis of these changes and a detailed history of the invention and modification of barbed wire. Along with the authors mentioned above, Earl W. Hayter (1939) and Clarence H. Danhof (1944) shed even more light on the barbed wire fence and what became known as the “fence problem.” All three authors discuss in detail the property issues that arose with barbed wire. None of these authors, however, provide a detailed *geographical* analysis of barbed wire fences or a comparison with other fence types, in relation to settlement features or the surrounding natural environment.

The role of transportation is central to a discussion of settlement geography. Methods of movement, transportation network density, and distance all play key roles in the settlement and occupation of land by people throughout the world. Alfred Meyer (1954; 1956) in two extensive articles on the Calumet

Region of Indiana and Illinois used GLO surveys to reconstruct the cultural landscape. He begins with the earliest version of the cultural landscape, which he calls the *fundament*, and takes the reader through various stages of occupation to the present day (c. 1950). He uses what he terms *circulation* to demonstrate how Indian trails circumventing Lake Michigan evolved to support other modes of transportation up through the automobile in large cities.

He uses the GLO surveys to map Indian trails in 1830. Then he conducted present-day transects on the contemporary landscape to tie the relict features to those appearing on the plats 124 years earlier. His *circulation* theme explains the evolution from Indian trails to the wagon roads and finally the automobile routes. Meyer's change through time approach is useful for showing early influences of human settlement and allows him to paint a more vivid picture of the early cultural landscape, thus telling the story of the land and its people. He incorporates other available data sources from the time period to support what surveyors platted. He describes shortcomings of GLO surveys, particularly the consistency of information they recorded. Meyer's analysis itself relies heavily on other landscape components: topography, vegetation, relief, and regional position, in a way similar to modern geographic information systems analysis. Although he alluded to specific settlement patterns of Anglos as compared to the Potawatomi, he stops short of a thorough or meaningful discussion on the matter. He writes, for example, that the Potawatomi tended to move about to several places throughout the year as opposed to the sedentary settlement of Anglos but gives no real information about the character of each group's settlement. A deeper discussion of this matter is warranted to provide a better understanding of primary transportation networks and their subsequent evolution and modification. Because the articles deal primarily with transportation, Meyer glosses over other settlement features in the landscape. He does, however, briefly identify patterns found in village sites along streams, wooded areas, and “Indian” trails (Meyer 1954, 267).

Choctaw History and Culture

Angie Debo (1934) wrote what is still considered the definitive account of the Choctaw Indians west of the Mississippi River and one of the earliest works to examine the tribe from its origin to the dissolution of tribal government. Her account, however, is lean on pre-removal history. As an historian, she focuses on Choctaw and non-Choctaw interactions that defined the political relationship between these groups, and spends considerable time describing Choctaw society, particularly economic conditions facing Choctaws from the time of Removal to statehood. Her thesis is that the Choctaws successfully created a thriving society in Indian Territory, with a working tribal government modeled after the political system of the United States government, educational system funded by tribal annuities from land sales, and a judicial system that promised law and order in their new land. She concludes, however, that the Choctaws “may be said to have passed out of existence as a separate political entity, and the history of the Choctaw people became fused with the greater history of the State of Oklahoma” (Debo 1934, 290). The title of her book, *The Rise and Fall of the*

Choctaw Republic, probably is more a reflection of the time in which she wrote it rather than her conviction that the Choctaws ceased being a separate and unique culture. Throughout the book, Debo provides brief descriptions of culture with glimpses of Choctaw land use and interactions with their physical setting. She did not make use of the General Land Office surveys of the Choctaw Nation, but she does provide very useful information on the political climate at various times during the tribal period.

Patricia Galloway (1995) in her book, *Choctaw Genesis, 1500-1700*, provides an excellent anthropological examination of the historical culture of the Choctaws from their ancestral beginnings in the Mississippian tradition to the ethnic group that became known as the Choctaw tribe by the early 1700s. As an anthropologist, she provides vital information on Choctaw social life and social structure using archaeological, documentary, and cartographic evidence. Late nineteenth-century settlement patterns cannot be fully understood without an understanding of earlier settlement history and evolution. In addition she provides a survey and evaluation throughout her book of existing source materials for study of the Choctaws including rarely used historical cartography from the southeastern region (Galloway 1995).

Jerome A. Voss and John H. Blitz (1988) completed an archaeological survey of the Choctaw homeland in which they discovered seventy-three previously unknown sites in Mississippi. Their work provides insight into pre-removal Choctaw settlements, which aids in comparing early and late settlement patterns. Of the sites they surveyed, they found the majority were situated on rolling upland ridges away from major floodplains. Choctaws chose level lower terraces for cultivated fields. Two sites described were found on “steep uplands” suggesting that at least some Choctaw towns adapted to farming in unfavorable conditions. Their findings suggest that the Choctaw perhaps positioned themselves at the periphery of the most productive agricultural land not only to safeguard against flooding but also to take full advantage of food sources in upland habitats where the deer population flourished. They conlcuded that topography was a substantial factor in settlement choice (Voss and Blitz 1988).

Horatio B. Cushman (1899), a missionary’s son who lived among the Choctaws in Mississippi prior to removal, wrote of his relationship with the Choctaws and provided an account of their agricultural practices. He concluded that the Choctaws never took for granted:

> …the fish of his beautiful streams, his fields of corn, potatoes, beans, with that of the inexhaustible supplies of spring and summer berries of fine variety and flavor, and winter nuts, [which] all united to consummate his earthly bliss in rendering him a successful huntsman, a good fisherman, and cheerful tiller of the ground (Cushman 1899, 194).

Despite Cushman’s use of sexist language that ignored the considerable role of women in agriculture, he gives an eyewitness account of the mixed agricultural system, a combination of cultivated crops, fruit and nut gathering, and hunting, noting that the Choctaws relied to a “considerable extent” on their farming (194).

Scholars of Indian Territory have analyzed agriculture in the collective sense of the Five “Civilized” Tribes, (in this study referred to as the Five Tribes) which under represents each group's cultural contributions. Studies of tribal agriculture focused on grains, fiber, and cattle. Norman Arthur Graebner (1945) focused on the land use practices of the Five Tribes, including policies enacted to protect their natural resources from unrestricted use. He also discussed land use practices, in particular, the full-blood[7] farmers working on a much smaller scale than the progressive farmer (larger operations such as cotton plantations), who preferred locations near streams but away from well traveled roads. "Indian" commercial farmers prefer the fertile bottom lands and prairies (Graebner 1945).

Gilbert C. Fite (1949), in his article on the cotton industry in Indian Territory, traced the use of cotton by the Choctaws from before removal to the end of the nineteenth century. Once in Indian Territory, he writes, they preferred the lowland areas along the Arkansas River and Red River. A few large cotton operations reminiscent of southern plantation agriculture, a practice the Choctaws had acquired from Southeast agriculturalists, developed in these areas. Most farmers, however, raised cotton on a small scale like other crops. Fite points out the successful development of the cotton industry in Indian Territory occurred at a time before the arrival of the railroad or development of substantial roadways. The Arkansas and Red rivers provided the vital transport route needed to ship cotton to southern markets. Fite contends that mixed-blood and intermarried citizens operated the large plantations, evidence that agricultural practices varied culturally. Cotton production continued to grow until the Civil War, which disrupted all types of agriculture in Indian Territory.

Michael F. Doran (1976) wrote about the importance of cattle herding in the Choctaw Nation, noting that the antebellum landscape of the Choctaw Nation was fit for open-range herding.[8] Cattle herding became especially important in the western Choctaw Nation where open grasslands provided the necessary food source. The land cover and fence data recorded by the surveyors reflects this pattern.

A Framework for Historical Geography

Historical geography is a subfield of geography in which time, or more specifically, the past, is the underlying theme in geographical analysis. Historical geographers study geography in a temporal context. As Andrew Clark (1972) put it: historical geographers are "concerned with the past character of the world of man and with how that character has changed through time" (130). There are numerous approaches to the study of time, including the *temporal cross section*. The temporal cross section approach analyzes a relatively short period of an area or region. The focus on a shorter period of time and allows for a detailed analysis of a given area (Estaville 1991; Brown 1943; Newcomb 1969). Ralph Brown (1943) used this method quite successfully in *Mirror for Americans: Likeness of the Eastern Seaboard, 1810*. Brown used only sources from 1790 to 1810 to reconstruct a specific period in time and wrote as if he were a geographer living on the east coast during that period.

The *vertical* or *genetic* approach studies phenomena from one moment in time, perhaps even their origin, to a more distant time. A variant to this approach is to select multiple phenomena (cultivated fields, sawmills, fences, etc.) and trace their development *continually* through several cross sections (Estaville 1991). The *relic* approach to historical geography, as opposed to the genetic and temporal cross section approaches, reconstruct historical settlement patterns through analysis of defunct features and/or features that now serve a function different from their original purpose. James Walter Goldthwait's (1927) "A Town That Has Gone Downhill" is the best example of this approach. In his reconstruction, he used old cellar holes, orchards, and abandoned roads to demonstrate that the historical location of Lyme, New Hampshire has slowly moved down slope.

Geographers began using multiple approaches to minimize the disadvantages inherent in any single approach. Richard L. Nostrand (1975) combined a temporal cross section approach with the vertical theme in his article "Mexican Americans Circa 1850" (Nostrand 1975). This research follows the temporal cross section/vertical theme approaches with the integration of the relic approach. The General Land Office surveys provide the ideal source for using the temporal cross section because they provide such a detailed record of settlement and physical description. The vertical theme allowed me to "build the foundation" from which the 1890s landscape (from the surveys) took shape. The vertical theme adds the *historical context* that Roberts (1996) sees as a necessary consideration for analyzing settlement patterns. The relic approach enabled me to use historical/defunct features in the contemporary landscape to better determine historically significant areas and provides a way to test the accuracy of the surveys.

Landscape Reconstruction and GIS

Applying GIS to research problems in historical geography is relatively new. Although historical geographers have been slow to adapt to computer based approaches, one collection of essays combining historical methods with GIS provides an exception. Results of this combination were published in a book edited by Anne Kelly Knowles (2002) titled *Past Time, Past Place: GIS for History*. The chapters include battlefield reconstructions, agricultural history, three dimensional modeling, population reconstructions, and a chapter on using historical maps in GIS. GIS enables historical researchers to analyze past environments and integrate multiple environmental variables simultaneously. It also aids in the effective graphical presentation of results. David Lowe's (2002) reconstruction of Civil War battlefields was particularly pertinent to my research. In this study, global positioning system (GPS) technology and GIS were used in a relic approach to historical geography by integrating both visible and hidden features on the land. He used GPS to locate and map over 35 miles of earthworks on the battlefield as well as record descriptive data directly into a GIS.

Whitney Durham (2003) used GIS techniques to create and analyze a map of the Civil War battle of Johnsonville, Tennessee. Durham used the GIS techniques of three dimensional modeling, *hill shading* (incorporation of sunlight and shadow calculated from a digital elevation model to show terrain variation), and line-of-sight analysis (determination of viewpoints in an area using digital elevation models) to provide a new perspective on an historic event. In addition, he used GPS technology to facilitate on-site analysis during fieldwork for a more complete reconstruction. Brad Watkins (2002) used GIS to reconstruct the cultural and physical landscape of the Moshulatubbee District of the Choctaw Nation in Indian Territory for the 1890s. Using GLO surveys, digital elevation models, hill shades, and soil capability analyses, he demonstrated the feasibility of using GIS to build an historical database. His results shed light on the relationships of terrain and soils to the arrangement of settlement features characterized by settlement density, natural resources, fences, land use, and transportation networks.

The literature on historical geography demonstrates the need for a large scale, while at the same time detailed, settlement analysis. This can be provided by combining the GLO surveys with GIS for a landscape reconstruction using the temporal cross section and vertical approaches. The lack of geographical research on the Choctaw Nation and the surveys that were conducted at a critical period in its history are the basis for choosing it in which to conduct this type of landscape reconstruction.

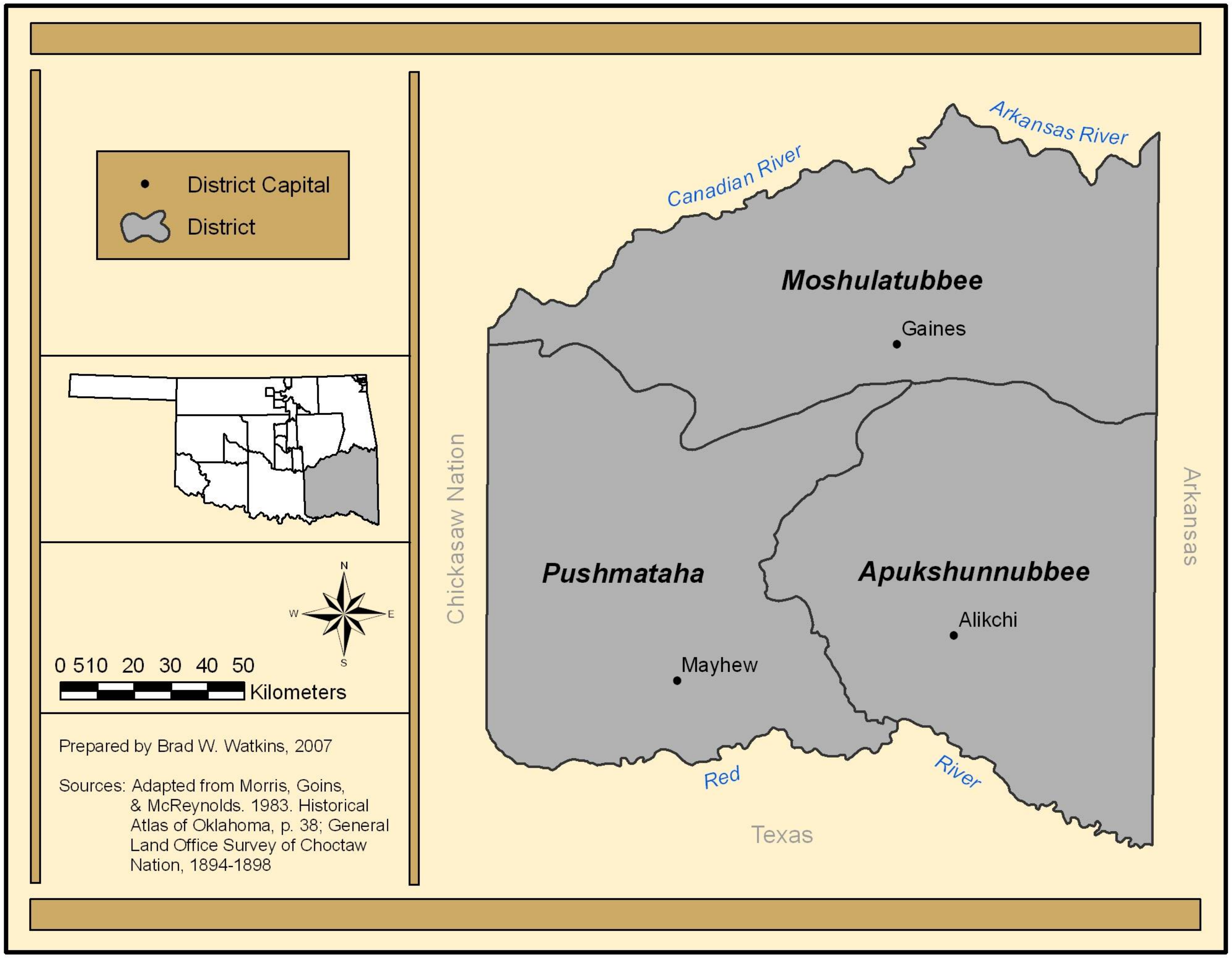

Figure 2.1: Historic political districts of the Choctaw Nation. Each district was named after the head of an eastern tribal town.

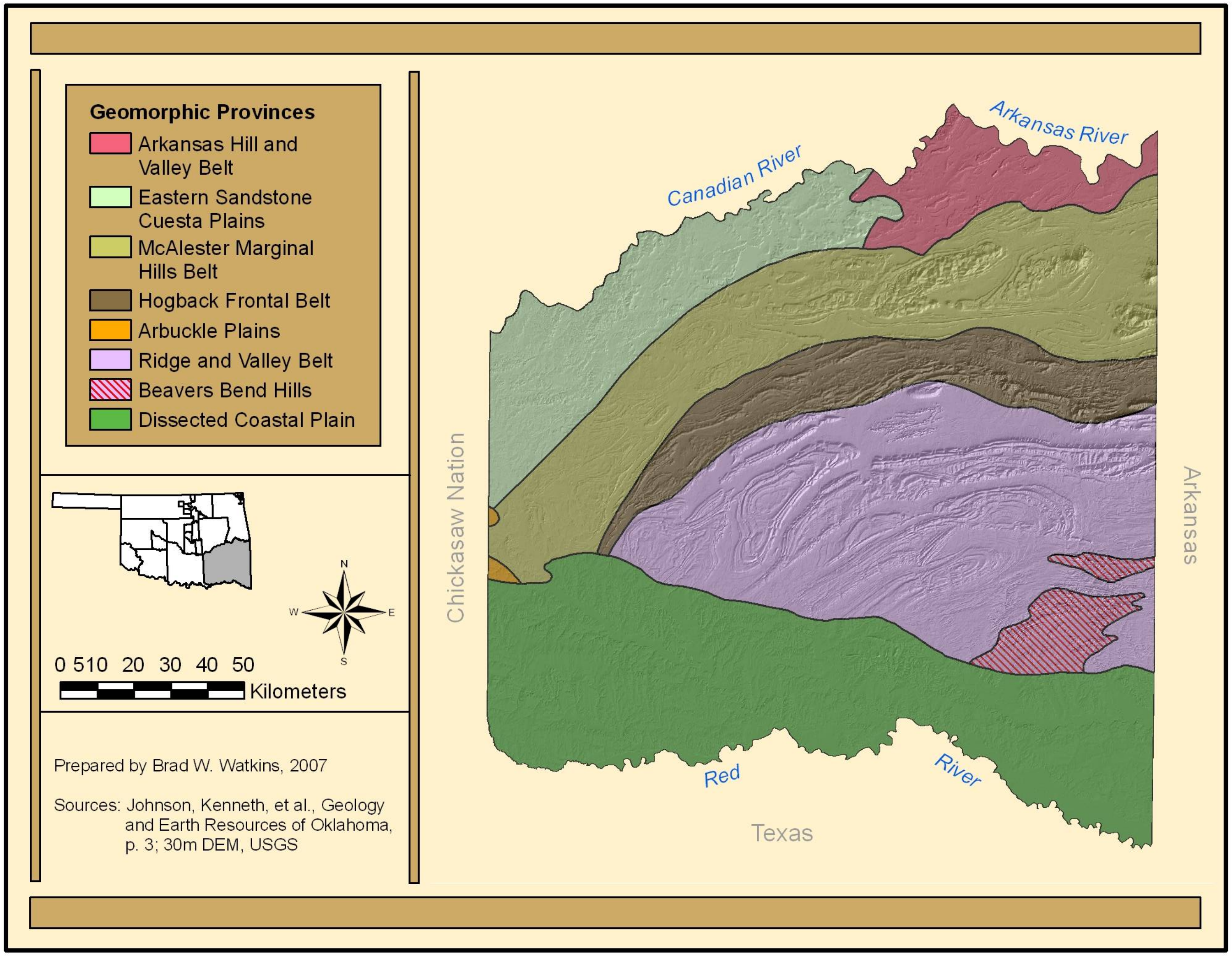

Figure 2.2: Geomorphic provinces of the Choctaw Nation overlaying a hill shade.

CHAPTER 3

METHODS

Methods employed in this research include use of archival material, creation of an historical spatial database, proximity analyses, analysis of transportation density/complexity, analysis of human-environment relationships, digital representation of data, and cultural and historical field-based techniques. The geographic information system (GIS) design and detailed explanation of the project follows. Finally, I discuss field techniques used in the dissertation—ground truthing surveys and identification of relic landscapes.

General Land Office Surveys

General Land Office (GLO) survey data consist of written notes and plats. Surveyors in Indian Territory used a system developed by the United States Geological Survey and adopted by the General Land Office, a branch of the Department of the Interior. The Choctaw Nation contains 351 townships of which eighty-six are what surveyors termed “fractional”, or townships that did not contain the full 36 mi^2. Surveyors marked any pertinent features by distance and bearing from known locations—either corner monuments or linear distance from the subdivision lines. Protocols required that distances be measured in chains and links.[9]

At each section corner and halfway between two section corners, called the quarter section corner, surveyors included information on specific trees. At each section corner (twenty-five corners inside the township and twenty-four corners along township boundaries), surveyors gave descriptive information on topography, soils, and predominant timber. At the end of the interior survey notes for each township, surveyors wrote a “General Description” of the township as a whole. The description usually began with a discussion of the topography, then geology if present, and concluded with information on the population and, at times, ethnic makeup of the township. The cartographer used the field notes to draw the plat.

Each plat consists of one township of thirty-six sections each 1 mi^2. This grid allows an intuitive transition from the analog plat to digital layer using a GIS. Using known points from the township and range grid found in the *Digital Atlas of Oklahoma* (Rea and Becker 1997), the digitized layer can be *georeferenced* to the known layer. This enables multiple data layers (terrain, soils, hydrology, settlement, transportation) to be analyzed in any combination.

Surveyors included information from a variety of landscape components both in the field notes and on township plats. The most beneficial way to use data in this form is to develop a thematic approach in which one can extract specific layers of information. Watkins (2002) and Shutler and Hoagland (2004) used such an approach when working with GLO surveys and GIS. In these cases, vegetation and land cover, hydrology, fences, settlement, and transportation constituted distinct layers of information that were mapped separately and analyzed using GIS. Other information was obtained from the plats and field notes and added to the GIS layers, for example toponyms (place names).

GIS for Historical Reconstruction

The Choctaw Nation consists of over 351 full and partial townships. I digitized data *layers* based upon predetermined categories from paper plats for each township (see Appendix A for GIS definitions). Specific categories for each township were joined into digital layers (e.g., the finished land cover layer will contain all of the land cover data digitized from the plats). I digitized five layers of data from each plat: transportation/communication (line), hydrology (point, line, and polygon), land use/land cover (polygon), settlement (point), and fence (line). A process known as *georeference* was used to assign true geographic coordinates (coordinates based on latitude and longitude) to each predetermined control point. Separate townships were combined through a process known as *mosaic*. I created a template *coverage* containing the true geographic coordinates by placing the previously georeferenced layer “under” the template coverage. Doing this allowed me to create control points in the template coverage from known geographic location. The digitized coverages were transformed from digitizer coordinates to the true geographic coordinates and adjacent townships joined into a single coverage. The process was tedious, but the RMS error (root mean square, or horizontal error) given for each transformation ensured that the transformation error remained acceptable (Chang 2008).

The *positional accuracy* and *feature definition* standards of the National Committee for Digital Cartographic Data Standards (Thapa and Bossler 1992) were adopted to create a GIS database from analog data. Positional accuracy refers to the changes in relative positions of features—in this case on the plat. This includes both feature-to-feature and feature-to-ground relationships. I determined an acceptable positional accuracy (maximum acceptable horizontal error) of 25 meters.[10] Feature definition is the interpretation of cultural or physical features that contain no descriptive text on the plats or in the field notes. For example, surveyors used a certain symbol for what they defined in the field notes as “picket fences.” In another township, however, the fence type may not be defined and fence type was determined based solely on symbology. Another example of feature definition is development of categories. For example, based on previously established protocols, “wetlands” are grouped with the land cover layer rather than with the hydrology layer (Shutler and Hoagland 2004; Anderson et al. 1976). I determined which features to capture in digital format based upon these protocols.[11]

All plats were reviewed prior to digitizing to insure that no feature was missed. At this time, uniform control points were selected to georeference the plat. These control points fall on the intersections of the township lines and section lines as previously discussed. Each layer of the GIS represents a major category of features. *Settlement* includes residential, certain agricultural, economic, political, religious, and natural resource extraction features. This is a point layer and contains the largest variety of features (see Appendix C). *Land* *use/land cover* includes vegetation, agricultural, and wetland features. Vegetation refers to broad categories such as forest/woodland or grassland. Agricultural features include gardens, cultivated fields, orchards, etc.. Wetlands include sloughs, bogs, marshes, and swamps (Henley and Harrison 2001). *Hydrology* includes ponds, lakes, springs, and streams. Springs were digitized as a point layer. Ponds, lakes, and high order streams were digitized in a polygon layer because they are represented on the plat as such. An additional layer holds high order streams converted to lines that will enable better cartographic representation. Low order streams were digitized as a line layer. *Fences* includes all types of enclosures documented by surveyors.

The GIS database includes extraneous information in addition to GLO data. Surveyors recorded the location and characteristics of the cultural and physical landscape, but they made no mention of detailed political boundaries *within* the Choctaw Nation, for example county or district boundaries. The Choctaw Nation consisted of three political districts, Moshulatubbee, Apukshunnubbee, and Pushmataha. Each district contained several counties. The CNGD includes this district and county information for each settlement feature, however this data was obtained from the *The Historical Atlas of Oklahoma* because it did not exist in digital format (Morris, Goins, and McReynolds 1986, 38).

GIS Analyses

A variety of GIS functions have been used to analyze settlement/ transportation patterns at the Choctaw Nation scale and settlement/transportation forms at the local level. In order to understand the relationship of settlement patterns (of residences, sawmills, coal features, etc.) to the physical environment of the Choctaw Nation, various components of the physical environment have been analyzed. This analysis includes topography, slope, and land capability, that provides an assessment of agricultural settlement suitability. Topography and slope are incorporated into geomorphic provinces, which have been mapped by the United State Geological Survey. GIS enabled the comparison of what settlement features from the GLO surveys coincided with suitable land. I used Patch Analyst extension in GIS to analyze cultivation field sizes across the study area. To analyze settlement pattern and form or field size in relation to physical factors only ignores the important components and contributions of human occupation. Additional sources such as the Indian-Pioneer Papers, diaries, travel accounts, and government reports provided data on social and political factors influencing settlement patterns.

Proximity analyses were used for patterns in settlement features (built structures) as well as transportation. Fence types have been analyzed based on their proximity to land cover types, e.g., grassland. I calculated percentages of a specific fence types falling within specific land cover categories. Buffer analysis was used to determine the proximity of board fences (constructed of dimensional lumber) to sawmills to determine if a relationship exists. Buffers were created on railroads (as the dominant mode of transport for goods) relative to distances to other settlement features.

An additional calculation, network density, was used to analyze transportation patterns. Network density provides an assessment of the spatial importance of transportation throughout the Choctaw Nation. It is calculated by dividing the distance of road segments by the area of the Choctaw Nation. Network density may vary depending on physical factors such as terrain and hydrology, cultural factors such as economic activities or proximity to large settlement nucleations, or historical factors such as post-Removal settlement development. I calculated the network density for each geomorphic province found in the Choctaw Nation. Each analysis has been conducted on the wagon roads in the Choctaw Nation.

Settlement patterns have been analyzed for the full extent of the Choctaw Nation and at the local level. Choctaw Nation settlement has been analyzed within the context of physical circumstances to explain nucleation and dispersion balances found in settlement patterns. *Nucleated* settlements occur when farmsteads are in close proximity. Roberts (1996) has defined close proximity as 150 meters or the “hailing distance”. *Dispersed* settlements are those beyond the hailing distance. Nucleated settlements require another level of analysis in that certain settlements constitute hamlets, villages, small towns or large towns. These nucleated settlements have internal settlement arrangements known as settlement *form* or *morphology*. Although difficult to define, settlement forms “have close and complex relationships with human culture, reflecting lifestyles and aspirations" (Roberts 1996, 87). Settlement form will be classified based upon Roberts' framework for classifying settlement forms. Classifications are the most efficient way to compare settlements. Because settlement size is one factor used to classify nucleations, I analyzed and classified each nucleation at the same scale (1:12,782). The *plan types* of the hamlets, villages, and towns in the Choctaw Nation are the most detailed settlement classifications possible when using the GLO surveys. Plan type consists of descriptive terms used to further classify settlement form: *linear*, *agglomerated (clustered)*, *regular*, and *irregular*. I classified all nucleations by plan type. I.H. Adams (1976) provides additional terms and clarification for features of rural settlement landscapes.

GPS-GIS Integration

GPS allows users to find their position on the Earth's surface using an system of orbiting satellites, ground control stations, and hand-held receivers (Steede-Terry 2000). GPS positioning, like certain analyses in GIS, uses absolute location (latitude and longitude). GIS-GPS integration is a key component in connecting what is found the GLO plats with what survives in the contemporary landscape. Coordinates for certain features in the CNGD were transferred to a GPS to facilitate the relic approach to historical geography in which extant features are located based upon coordinates from GLO surveys.

Supplementary Sources

Historical photographs provided ancillary data for the reconstruction of the cultural landscape. For example, GLO surveyors did not record construction details for fences, but photographs, as descriptive sources, helped to fill in these gaps. Several historical photograph collections cover many aspects of historical settlement. These photographic collections were especially useful for studying fences and because they are some of the most visible components on the material landscape. Photographs containing fences sometimes showed the type of fence used and, other times, its function. They may provide enough visual detail to enable an understanding of the construction method. For example, worm fences can be constructed with four to nine horizontal rails. Such information would be invaluable for estimating the amount of forest used for fencing. The most useful historical photographic collections were those that provide a location and date for the photograph. Such information provided a photographic link to the GLO surveys connecting historic plat to landscape image. Care was taken, however, when using historical photography for historical and geographical interpretation. As Schlereth (1980) explains, one must have developed skills in "visual literacy" in order to use historical photographs successfully (31). This includes an understanding of the pitfalls of using historical photography such as bias, distortion, and oversimplification of reality. Schlereth offers a number of elements of photographic vision to aid one in the interpretation of historical photographs. With these guidelines in mind, historical photographs may be used as "sources of meaning in and of themselves, rather than simply as illustrations that support what has already been established by other means" (Sandweiss 2002, 7).

Journals and oral histories complemented the GLO surveys. Relevant sources include the writings of naturalist Thomas Nuttall (1819), the topographic description and sketches of artist Heinrich Mollhausen on the Whipple expedition (Wright and Shirk 1953), and the recollections of those residing in the Choctaw Nation before allotment found in the Indian-Pioneer Papers. Other accounts of life and culture in the Choctaw Nation include: Benson (1860), Edwards (1932), Foreman (1939), Hitchcock (1996), Hudson (1932), Moffitt (1939), and Whipple (1941).

Historical Geography and Cultural Landscape Fieldwork

The historical geographer engaged in fieldwork, however, must add an extra layer to the analysis—one that connects the past with the present. Two field techniques are used in this study: data collection for GIS/GPS integration and relic geography. These techniques enabled a comparison of the contemporary landscape with that of the 1890s for accuracy assessment and for additions to the CNGD.

GPS allowed me to position myself within a few meters of features found in the CNGD (features from the land surveys). Even after taking into account errors associated with the transformation process, I could locate features that have not been inundated by one of the many lakes or reservoirs found today in the Choctaw Nation or otherwise destroyed. Local features were recorded using

GPS and added to the GIS database. Features were recorded using a Trimble GeoXT and GeoXH receivers, devices allowing me to take portions of the GIS database, and aerial images, into the field and add spatial data as needed. I used a data transfer software to move data to and from the receivers. I used a Magellan Meridian Gold GPS receiver to navigate to features in areas of sparse canopy cover where satellite signal degradation is greatly reduced.

Limitations of Sources and Methods

Any use of historical documents involves an evaluation of accuracy of historical sources. Similarly, current technology is prone to inaccuracies, be it user- or software-induced errors. Such errors should be considered mere limitations and not reasons to ignore data sources. The GLO surveys were conducted under the agreement to specific guidelines and procedures. Surveyors took oaths to execute faithfully their duties and responsibilities while in the field. That being said, the surveys contain obvious errors, oversights, and biases. Most of these errors were found in land cover polygons, usually where polygons on adjacent plats did not match. Oversights include annotations in field notes that were left off of plats. For a full discussion of such errors in the Choctaw Nation, see Watkins (2002).

Because the surveys consist of two components, plats and written notes, it was possible to interpret illegible features on the plats by reference to the field notes, which contain almost all of the necessary measurements for pinpointing features on the plats. Successful conversion of the plats into digital format for use in a GIS required that spatial error be minimized, such as mistakes made when digitizing from paper plats. Care was taken to examine each plat concurrently with the field notes to ensure that every necessary detail was converted to digital format. I personally completed all of the plat-to-digital layer conversion to eliminate error associated with various users. Finally, the protocols used have been refined greatly over the past six years so that many of the error-causing issues have been encountered and addressed.

Using GPS technology allowed me to check the spatial precision of the digital data (digitized plats). In an integrated project, GPS is only as good as the spatial precision of features in the GIS and vice versa. Accuracy assessments have shown that the surveys both accurately denoted features and that spatial precision exceeded expectations. I used cemeteries and historic standing structures to gauge precision. Positions for GLO survey features were obtained from the CNGD and uploaded onto a GPS receiver. I then traveled to the site and compared the destination from the GPS receiver to the location of the standing structure's true position. In addition, I found standing structures on the landscape and recorded it position using a GPS receiver. After differentially correcting the data, I compared those positions to the CNGD. In most cases, I found that the CNGD contained a high precision.

GPS precision is critical for the quality control of the research project. Using two GPS systems (one of which is mapping-grade), as well as differential correction and post processing, I eliminated much of the standard error that I would have otherwise encountered. However, because GPS works as a space to ground signal receiving device, interference from tree canopy and topography were issues in the forested mountains of the Choctaw Nation. Where and when GPS precision did not perform to tolerance standards, aerial photographs were used to locate larger features and/or patterns. Finally, local archives were essential to locating cultural relics in the field.

CHAPTER 4

SETTLEMENT IN THE CHOCTAW NATION

Introduction

Surveyors working in the Choctaw Nation during the 1890s simply were fulfilling their duties to conduct the most accurate measurement of land to their abilities. Today, a significant result of these surveys is data on the ways people organized space at various scales, or the settlement geography of the Choctaw Nation. This ranges from the general settlement patterns that are viewed at the scale of the Choctaw Nation to that of the settlement forms found within a concentration of built structures, a *nucleation*. This chapter covers settlement geography and seeks to answer two questions of the six research questions: 1) Is there a relationship between areas with dispersed settlement patterns and areas deemed favorable for agriculture, either crop production and/or grazing?; 2) Of those settlements that exhibited a nucleated arrangement, were the forms, or morphologies, agglomerated or linear, regular or irregular? In order to answer both questions, settlements first had to be classified as nucleated or dispersed (see Appendix B for definitions). The first question is answered in a human-environment interaction context, in which aspects of the physical environment such as land capability, or the capability of soils to produce crops, was mapped. Land capability was obtained largely from slope data found in the *United States*

General Soils Map for Oklahoma. The second question deals more with the arrangement of local space and therefore is viewed in relation to commerce, historical development, and transportation network. Transportation in the Choctaw Nation is treated in Chapter 5. Aspects of transportation, however, will be brought into settlement analysis because of the difficulty in separating these two closely related themes.

It is necessary to understand the settlement landscape within its historical context. The next section of this chapter examines the development of settlement within the Choctaw Nation from Indian Removal until the start of Civil War. Following that is a discussion of settlement from the Civil War through the 1890s, the main period of this study. The subsequent sections examine data obtained from the General Land Office (GLO) surveys for settlement landscape reconstruction. Finally, I answer questions related to agricultural settlements and settlement form.

Early Choctaw Nation Settlements

This section covers settlement in the Choctaw Nation from Indian Removal up until the Civil War. The subject of the Choctaws' removal from their eastern homeland has been covered in great detail and is not needed here (DeRosier 1970; Foreman 1932). Certain aspects of removal, particularly their arrival to the Choctaw Nation, deserves mention because it provides a starting point for the development and spread of people.

Choctaw Removal spanned several years during which time several groups traveled from what is today Mississippi and Alabama to present Oklahoma, but the first Choctaws arrived in 1831. They arrived in two ways, by steamboat and overland trail. Steamboats brought Choctaws to Ft. Smith, Arkansas and upstream to the vicinity of the mouth of Sans Bois Creek on the southern bank of the Arkansas River (Figure 4.1) (Foreman 1932). Because of the Red River Raft, a massive log jam on the Red River ranging from 161 km above Natchitoches to about 80.5 km above Shreveport, the farthest steamboats could reach was Ecor a Fabri on the Ouachita River in present Arkansas (Caldwell 1941; Foreman 1932). Immigrants traveled overland to arrive at Fort Towson and near the mouths of the Blue River and Muddy Boggy Creek. Others traveling overland along the southern route eventually settled on the Mountain Fork, the vicinities of Miller Courthouse and Fort Towson, and at or near Horse Prairie. Those who settled in the northern Choctaw Nation did so in the vicinities of the Choctaw Agency, Fort Coffee, and Skullyville on the Arkansas River, Pheasant Bluff on the Canadian River, and at various locations along the Poteau River (Foreman 1932; Morris, Goins, and McReynolds 1986). The majority of the Choctaws came to Indian Territory during the 1830s, though parties ranging from a few hundred to over 1,000 came as late as 1849 (Foreman 1932). Many of the locations settled by the new emigrants had met the approval of exploring parties who had assessed the quality of the new Choctaw and Chickasaw lands just prior to Removal. The parties found the land near Little River good enough to "hold several thousand families" (Foreman 1932, 32). On Clear Creek, to the

West, they reported water "of the best quality" and that "soil is good, plenty of timber, and stock range" (32). Near Gates Creek, on which Fort Towson was located, "the soil…is also very excellent, well adapted for cotton, corn, and wheat" (32).

Several locations became important places soon after Removal because they served as entry points for emigrants, were important politically, or both. For example, Skullyville, Doaksville, and Eagletown all were established upon Removal and remained thriving communities at the time the General Land Office surveys were conducted in the 1890s, though they varied in size. They persisted in spite of only one settlement being located on a railroad. The St. Louis and San Francisco Railroad was constructed near Skullyville, but not until 1886-1887 (Bray 1923). Doaksville would not receive a railroad until 1901-1903, and Eagletown not until 1910-1911 (Gardner 1958).

Under the terms of the Treaty of Doak's Stand (1837), the western portion of the Choctaw lands was sold to the Chickasaws as a district in the Choctaw Nation. The treaty further stipulated that Choctaws and Chickasaws had the right to settle in either the Chickasaw District or one of the three Choctaw Districts (Kappler 1904). Most Choctaws, however, arrived before formal Chickasaw removal began in June 1837, and they chose to settle in the eastern most part of the Choctaw Nation (Gibson 1971). The primary reason for this choice was the fear of Plains tribes whom occupied the western extent of the Chickasaw District. The exploring parties did not travel beyond the Blue River largely for this reason (Foreman 1932).

Settlements continued to expand around these original entry points and along already established transportation routes (see Chapter 5). Missionaries who traveled with the Choctaws during Removal established new schools and churches around which small communities grew. One of the first established was Wheelock Seminary west of Little River in southern Choctaw Nation (Wright 1921). Post offices were created throughout the Choctaw Nation to improve communication (Foreman 1928). Some of the settlements recorded by surveyors were annotated on plats as post offices, for example, “Alikchi P.O.”. The many transportation routes, mostly wagon roads, crossing the Choctaw Nation opened the door to future settlements.

The increase in education, communication, and general prosperity that occurred between the end of Removal and the Civil War contributed to what have been called the “Golden Years” of the Choctaw Nation (Gibson 1981). During this time few white settlers had entered (Table 4.1). It was not until the Choctaws’ involvement in the Civil War, and the strong mixed-blood support for slavery, that the tide in population shifted.

Settlement after the Civil War

The years after the Civil War ended, and not the Civil War itself, are far more significant for understanding the story of settlement in the Choctaw Nation. Though the Principal Chief of the Choctaw Nation, George Hudson, preferred neutrality in the conflict, the influential citizens, mainly intermarried whites and mixed-blood citizens, succeeded in getting the Choctaw Nation to side with the

Confederacy (McReynolds 1954). The Civil War produced three important changes in the Choctaw Nation. First, the labor force found in the slaves working plantations was eliminated. This forced plantation owners to find another source of agricultural labor. Second, Choctaw allegiance to the Confederacy had repercussions felt in the Treaty of 1866. This treaty reduced the size of Choctaw landholding (Choctaws ceded the "Leased District"—between the 98th and 100th meridians—to the United States) and provided a right of way for two railroads across the Nation. Third—related to the railroads—new transportation brought new immigration of whites (Fite 1949; Kappler 1904). An Indian Agent reported in 1894 that the "noncitizen or White" population dramatically increased in 1893 (Wisdom 1894, 140). Most of the new whites entered to build railroads, establish trade, or to work on an agricultural lease (Debo 1934).

Increasing non-citizen population prompted new laws to deal with intrusion. An 1877 law made it illegal to lease land to a non-citizen. Whites still entered the Choctaw Nation, however, under the classification of "laborer" (Debo 1934). These agricultural leases were the reason for the large increase in agricultural productivity after the Civil War. Evidence of agricultural growth is further measured by an 1888 law that required citizens to limit the amount of land they enclosed to 1 mi^2 and that citizens should not have more than one fenced pasture of this size in any one county (Nation 1973). The rise in land tenure regulation signifies a shift from communal practices to individual land holdings.

Some Choctaws had been practicing agriculture while still in Mississippi. After arriving in Indian Territory, the Choctaws began farming on productive soils associated with major streams. Sources suggest agriculture occurred at various scales. Debo reported that “poorer” Choctaws farmed the hills (Debo 1934). The Indian Agent to the Choctaws in 1892 stated: “A very few full bloods have secured homes upon first-class soil; the great majority of the live upon discarded and worthless lands but the half-breed and his white brother invariably…select the best bottom lands for their farms” (Bennett 1892, 251). Some of the “Progressive” Choctaws (mixed-bloods) established large cotton plantations along the Red River (McReynolds 1954). Some of these fields extended for miles by the time of the surveys (Figure 4.2).

Results

Settlement Features and the General Land Office Surveys

At first glance, settlement data taken from the GLO surveys seems overwhelming (Figure 4.3). Surveyors recorded a total of 6,970 individual built structures (points) for the entire Choctaw Nation (351 townships). *Built Structures* include all settlement classifications (see Appendix C). Because each point represents an absolute location, i.e., a position measured from a known origin, the patterns that emerge reflect true geographic relationships (Lo and Yeung 2007). Symbology on GLO plats varied little by settlement feature classification. Surveyors used a filled black square for most classes, but a number of features, such as cemeteries, carried a unique symbol. At times, surveyors provided annotation on plats for features other than residences, but not always. In towns, I cross referenced plats with field notes to ensure the highest possible accuracy in classifying settlement features. The “General Description” provided at the end of each township’s field notes on occasion provided another way to maintain accurate interpretations. The settlement data begins to reveal patterns when examined at a smaller scale. For this, I classified the number of built structures by Choctaw Nation county (Figure 4.4).

Settlement Patterns on Agricultural Lands

The first question asks if there is a relationship between dispersed settlement and areas suitable for agriculture. I assume that agricultural settlements consist of dispersed farmsteads rather than large clusters of built structures. That land suitability was a preference is evident from the descriptions of parties exploring the Choctaw lands prior to Removal (Foreman 1932). Participants noted soil conditions for several sites. I answer the question through the examination of two types of settlement data: 1) point data, which consists of individual built structures on the landscape; and 2) areal data, which consists of land cover classes. Both types of data were extracted from GLO survey plats and prepared according to the data collection and preparation protocols outlined in Chapter 3. The point data was classified based upon annotation found on GLO plats and in field notes. Certain features discussed in this and subsequent chapters have been grouped for clarity (Figure 4.5). Land cover polygons were classified based upon shading found on GLO plats and annotation in field notes. The four main land cover classes were forest/woodland, grassland, cultivation, and wetland.

I further classified the point data based upon dispersion. This is a measure of the proximity individual built structures. I used hailing distance and the method described in Chapter 3 to classify settlements as dispersed or nucleated. The task was to determine what relationships existed between dispersed settlements and land capability classification. Dispersed settlements were chosen over nucleated settlements because dispersion was more indicative of agricultural pursuits at the time of the surveys. Land capability classification (LCC) uses criteria to designate soils as suitable for cropland or not suitable for cropland. There are eight classifications, designated by roman numerals. Classes I through IV are "suitable" for cultivation, and classes V through VIII should not be used for cultivation, but may be suitable for pasture or grazing purposes (see Appendix D) (Helms 1992; STATSGO 1995). The distribution of the LCC in the Choctaw Nation is shown in Figure 4.6. The data for LCC was obtained from the *United States General Soil Map for Oklahoma* which was derived from soil surveys (STATSGO 1995). When these soil surveys were conducted in 1995, southeastern Oklahoma (formerly the Choctaw Nation) had several large lakes and reservoirs. These appear in Figure 4.6 as light blue polygons. I treated these polygons as a separate category not included in the analysis because it is impossible to know which LCC they would have been assigned.

There were 3,794 residential structures classified as dispersed out of a total of 6,534 residential structures. I used GIS to overlay dispersed structures and each land capability classifications (LCC) (Figure 4.7). LCCs I through IV, or arable classes, contained 2,002 (52.8 percent) dispersed settlement structures

(Table 4.2). The majority of these occurred on LCC II lands. LCC II occupies one-third of Choctaw Nation land. This LCC is found in low-lying areas along major streams such as the Canadian River, Poteau River, Sans Bois Creek, Brazil Creek, Fourche Maline, Blue River, Clear Boggy Creek, and along parts of Little River, Mountain Fork, Kiamichi River, and the Red River. These stream valleys coincide with early settlement nuclei, which perhaps played a role, along with high-quality agricultural land, in the large number of dispersed settlement structures found in the 1890s.

LCCs V through VIII, not suited for agriculture, accounted for 1,636 (43.2 percent) dispersed settlement structures (Table 4.2). Seven hundred fifty-two structures, the highest number on non-arable land, occurred on LCC VII. This class is considered to have “very severe limitations that make them unsuited for cultivation and that restrict their use to grazing, etc.” (see Appendix D) (STATSGO 1995, 62). LCCs V through VIII are generally considered to be useful for grazing. The majority of the western Choctaw Nation is classed as LCC V, VI, and VII. This coincides with the grasslands that surveyors recorded and mapped in the 1890s (Figure 4.8). This pattern of dispersed settlement on non-arable lands perhaps indicates the heavy participation in stock raising that has been well documented in the Choctaw Nation (Doran 1976; Graebner 1945; Debo 1934).

Several areas were classified as “no data” in the STATSGO soils map for the study area, ten of which corresponded to lakes or reservoirs. The total area inundated accounts for 575.95 km^2 (2 percent) of the study area. One hundred fifty dispersed settlement structures were located in these areas. One can only infer what LCCs would have occurred in these areas.

Examining dispersed settlement using LCC poses additional questions: Did early emigrants (post-Removal) settle in areas most suited to cultivation? If so, did this cause later emigrants to settle for areas with less agricultural potential? This question is impossible to answer with the current data, but rather calls for a additional analysis of various time periods. One possibility is that settlers were not solely concerned with agricultural potential, but rather preferred sites in close proximity to timber, thus, in some cases, putting them in closer proximity to uplands and away from productive soils. Hewes (1950) found similar early settlement patterns in certain Iowa counties.

Surveyors provided other data on agricultural settlement. They surveyed and mapped cultivated fields. I included this data in the land cover layer because it constitutes a part of the ground composition. In general, surveyors did not specify the crop type for cultivated fields, therefore I restricted the analyses to cultivated field area per LCC and individual field size. *Cultivated field area per LCC* was calculated by determining the percentage of cultivation in each land capability class. *Field size* provides information on the scale and intensity of individual operations.

I calculated the amount of cultivated area from the GLO surveys compared to LCC obtained from STATSGO data (Table 4.3). Land capability classes I through IV contained 60.1 percent of all cultivated land in the Choctaw Nation. Land capability classes V through VIII contained 32 percent of cultivated land. Land capability class II had the highest amount of cultivated land, 266.3 km^2, which was one-third of all cultivated land. LCC III contained 127.5 km^2 of cultivated land, which accounted for 8.2 percent of this LCC, the highest ratio of cultivated land to LCC. The arable classes I through IV contain the three highest percentages of cultivated land.

Land capability classes V through VIII contained 32 percent of all cultivated land. LCC VII contained the second highest amount of cultivated land at 16.5 percent, however, LCC VII occupies the largest amount of land at 41.8 percent of the Choctaw Nation. By comparison, LCC II occupies only 16.7 percent of land but contains one-third of the cultivated land in the Choctaw Nation.

The pattern of dispersed settlement structures and cultivated lands corresponds closely. It is surprising, however, to find that lands considered unsuitable for cultivation contained so many cultivated fields, almost half. It may be reasonable to assume that these areas were cultivated later than the better agricultural lands, perhaps related to the 1888 law that only one large field (up to 1 mi^2) could be worked by any one person per county (Nation 1973). As mentioned above, a more in-depth analysis of settlement stages is required to confirm this.

Field size may indicate the type of agriculture practiced or the intensity of the operation. The study of field size is analyzed at two scales. The first, a large scale examination, provides a generalized pattern of field size across the entire

Choctaw Nation (Figure 4.8). The second scale analyzes individual fields and cultivated field clusters based on their large areas.

Large scale analysis presents cultivated field pattern similar to that found in settlement structures (Figure 4.3). The majority of cultivation occurred in stream valleys or on relatively level plains, usually away from mountainous areas (Figure 4.9). The areas of continuous shading reflect large fields, numerous fields in close proximity, or a composite of both patterns. The figure indicates the level of agricultural activity especially along major streams such as the Canadian River, Arkansas River, Poteau River, Red River, and Fourche Maline. Other patterns emerge that are not explained by proximity to streams. The enclosed area in Figure 4.9 corresponds with two extremely large and contiguous grassland areas (see also Figure 4.8).

Because of the scale at which surveyors mapped data, one can obtain the size and shape of individual cultivated fields with high accuracy. In order to understand the character of the cultivated landscape in the Choctaw Nation, I analyzed fields (including “gardens”) using Patch Analyst. For the following discussion, a “patch” is a single cultivated field. There were 4,485 cultivated fields occupying 634 km^2 of land. The median patch size was 14.1 ha. The minimum patch size was 0.08 ha (two-tenths of an acre). The minimum is closer to representing cultivated patches near built structures, which could have served as gardens.

There were surveyors whom classified small land cover polygons as “garden,” however, this classification was used only fourteen times out of a total

6,652 land cover polygons. It is very likely, therefore, that many of the small land cover polygons near residential structures served as gardens. It is for this reason that gardens and cultivated fields were combined for the analysis. The maximum patch size was 404.7 ha. Figure 4.10 shows five areas with large cultivated clusters. These clusters contain the largest cultivated fields and are examples of the plantation agriculture that occurred along the Arkansas and Red Rivers (Doran 1978; Fite 1949; Graebner 1945; Wright 1930). Two of these clusters, shown in Figure 4.10b and 4.10e, have space between fields perhaps reflecting an 1881 law which required a lane to be constructed where fences crossed roads (Debo 1934).

Nucleated Settlement Form

Initially, nucleated settlements were created for better protection—the idea being that when more people located in a given area, the settlement would be safer (Scofield 1938). Nucleation also was suited to a communal way of life, which included land use practices. In the Yorkshire Wolds in northeastern England, people prior to 1850 would live in close proximity in hamlets and villages working farms clustered in the periphery (Gleave 1962). In other cases, nucleation may result form economic activity as in the case of the New Bright Tobacco Belt in North Carolina. Here, nucleations grew around intersecting roads to “facilitate exchange” of goods (Picklesimer 1946). The previous section treated settlement as an interaction with the physical environment through the examination of agricultural settlement patterns. The following sections describe results of an analysis of settlement form.

Settlement form may be studied in various ways. The most efficient analysis for this data, when considering the scale of the study area and the geo-technical approach is to categorize settlements based upon concentration, arrangement, and regularity. Brian Roberts (1996) used a similar framework for studying settlement landscapes and stresses the importance of classification used as a “framework for description and analysis, comparison and generalization” (87). *Concentration* measures proximity among settlement features. Settlement features are defined in this section as built structures, though GLO surveyors called these “residences”. I have divided settlement features into “nucleated” and “dispersed” categories. The remainder of this chapter deals only with nucleated settlements. *Arrangement* refers to the “shape” of the nucleations, which will be classified as “agglomerated”, “linear”, or “composite”. Composite exhibits aspects of both agglomerated and linear. *Regularity* measures “standardization” of the settlement plan using “regular”, “irregular”, and “composite”, which, again, reflects both aspects. Regular plans demonstrate the presence of a “systematic structure or order” (94). Irregular plans present no such visible order.

Nucleated settlement patterns are examined using: 1) point data, consisting of individual built structures; 2) polygon data resulting from proximity analysis; 3) line data, consisting of transportation networks. This section is presented in two parts. This first part deals with agglomerated settlements. The second part discusses linear settlements. Within each section, the examples of these types of settlement forms are presented followed by an additional analysis and discussion of regularity. Finally, implications for each of these settlement forms in the Choctaw Nation are discussed.

There were a total of ninety-five nucleations in the Choctaw Nation during the 1890s. Of these, surveyors did not provide names for seven. Nucleations were divided into four categories from largest to smallest: 1) large town; 2) small town; 3) village; 4) hamlet. These categories before have been defined in various ways. I have chosen the classification thresholds that I believe best suit the data and time period (see Appendix B). There were seven large towns, sixteen small towns, twenty-four villages, and forty-eight hamlets (Figure 4.11).

Agglomerated nucleations exhibit a “clustered” or “concentrated” arrangement. In the study area, thirty-nine (41 percent) nucleations were agglomerated. Another twenty-five (26 percent) were composite, meaning those nucleations exhibited at least some degree of agglomeration and linearity. Red Oak and Bokchito provide excellent examples of agglomerated nucleations (Figure 4.12a and 4.12b). Locations of agglomerated nucleations relative to transportation networks were examined to see if any relationships existed. I confined the comparison to railroads because wagon roads were located throughout the non-rugged portions of the Choctaw Nation and, therefore, would not have been adequate for comparison. Fourteen agglomerations occurred on railroads while twenty-four agglomerations were not located on railroads. Six of the nucleations on the railroad were *small towns* or *large towns*, the two largest categories of nucleations. Composite arrangements present a problem because they contain properties of both agglomerated and linear categories, and therefore, were not included in the count. Of the thirty-nine agglomerated nucleations, two-thirds were considered regular. The other one-third had irregular arrangements.

Linear nucleations have an elongated arrangement. This shape usually indicates settlement spread along a linear feature such as a roadway, whether a railroad or a wagon road, or along a stream. Thirty-one (33 percent) nucleations had a linear arrangement. Tuskahomma and Alikchi reflect linear arrangements (Figure 4.13A and 4.13B). Eighteen (58 percent) of the thirty-one linear nucleations occurred on railroads, while thirteen (42 percent) did not. Most of the linear nucleations (81 percent) had a regular arrangement. The other 19 percent had an irregular arrangement.

Implications

Agglomerated settlements in locations beyond the Choctaw Nation have been the result of need for protection, the result of large populations as in the case of urban centers, or the reflection of a communal way of life (Roberts 1996). In the Choctaw Nation, I wanted to see if nucleation plan types (linear, agglomerated) were related to the transportation network, especially railroads. Several of the agglomerated settlements located on railroads were small towns or large towns. The emphasis on urban activities rather than agricultural pursuits created a more clustered arrangement.

In every instance where a linear plan occurred, roads (wagon or rail), not streams, exhibited a relationship to the shape and orientation of the settlement. The plan types for a number of the linear nucleations were related to mining activity because of that industry's heavy reliance on the railroad, for example: Alderson, "No. 12", Johnstown, and Savanna. Other settlements in which mining activities dominated, such as McAlester, Krebs, Coal Gate[12], and Lehigh, possessed composite plans.

I found that the nucleations on railroads had a more agglomerated plan. Brad Bays (1998) found a similar pattern when examining townsite development in the Cherokee Nation. There, noncitizens began moving in closer proximity to post offices with the development of new railroads. Several agglomerated nucleations occurred on railroads that had been constructed just two to three years prior to the GLO survey and in one instance, construction was completed during the year of the survey. Hewes (1950) noted a similar pattern in Iowa in which the railroad did not necessarily reflect an increase in settlement within a close proximity. To simply examine the influence of railroads, however, would ignore historical routes. For example, at least some portion of every railroad followed an historic route or trail—in some cases this was the impetus for the railroad's location because these historic routes sometimes followed the most efficient pathway. Historical settlement patterns surely had some influence on the development of settlement plan types found in the 1890s.

No noticeable spatial pattern emerged in the regularity of nucleations. Regular arrangements—agglomerated and linear—were found throughout the

Choctaw Nation irrespective of topography or transportation network. The same can be said for irregular arrangements.

Conclusions

This analysis classifies settlement nucleations within specific temporal limits, i.e., the 1890s. These limits have been set by the use of the GLO surveys as the main source. It must be understood, however, that settlements change through time, and an agglomerated settlement can morph into a linear settlement in a decade's time and vice versa. In addition to the dynamic nature of settlements, one settlement may exhibit properties of more than one plan type, as in the case of the twenty-five composite nucleations. Unfortunately, the data provided by the GLO surveyors allows only speculation as to the root of settlement arrangements because such a detailed record of human settlement does not exist for the study area prior to the 1890s. What one is left with, then, is narratives of settlement patterns and land use that shine a spotlight on specific, and, at times, brief time periods.

The first task of this chapter was to determine if there was a relationship between dispersed settlement structures and lands suitable for crop production. An analysis of the data derived from GLO surveys and STATSGO data showed that a relationship did exist, but it was not compelling. There were patterns that could not be explained within the scope of this study, such as the cultivated fields that occurred on lands unsuitable for crop production. One explanation may be that these fields were the results of late settlement, when more arable lands had been taken or that prime agricultural land ranked below other settlement considerations.

The second question dealt with the classification of nucleated settlements. This question was approached from two different scales. For the large scale, a main ingredient in solving the problem of such a classification is the separation of dispersed from nucleated settlement structures. The small scale approach involved the examination and further classification of individual settlement nucleations. This included a careful examination of the size and arrangement of each nucleation. A classification of the settlement features was achieved that has provided the first detailed historical settlement reconstruction for the entire Choctaw Nation.

The nature of the data obtained from the GLO surveys used in conjunction with GIS allows for an efficient classification scheme. This scheme, though based upon the work of others, had to be modified to accommodate the temporal and spatial scale of this study. The four classes (sizes) of nucleated settlements and the plan types (arrangements) derived from using Roberts' (1996) classification framework present a new view of settlement in the Choctaw Nation that later can be augmented with change through time approaches.

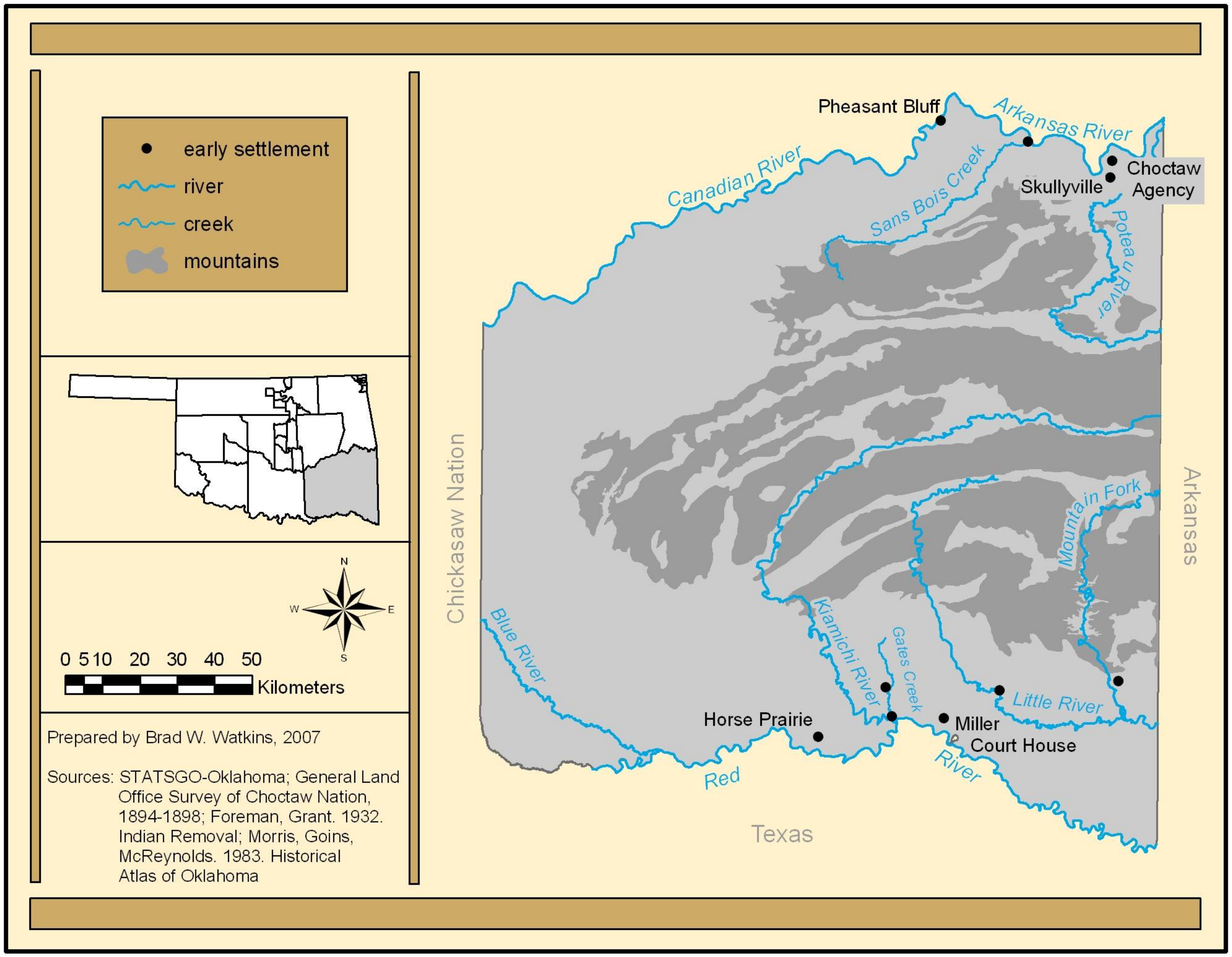

Figure 4.1: Early settlements in the Choctaw Nation

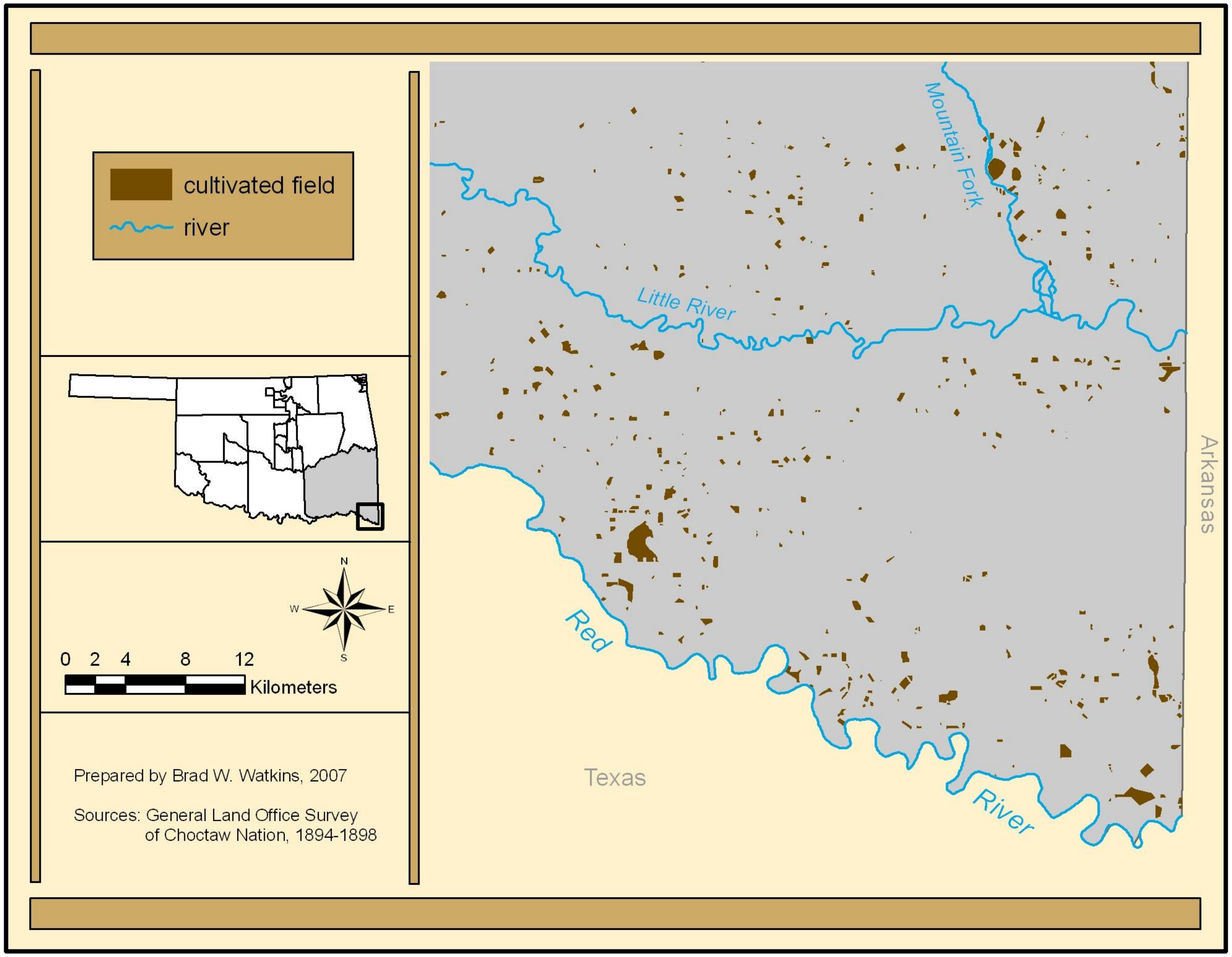

Figure 4.2: Large cultivated fields in the vicinity of the Red River

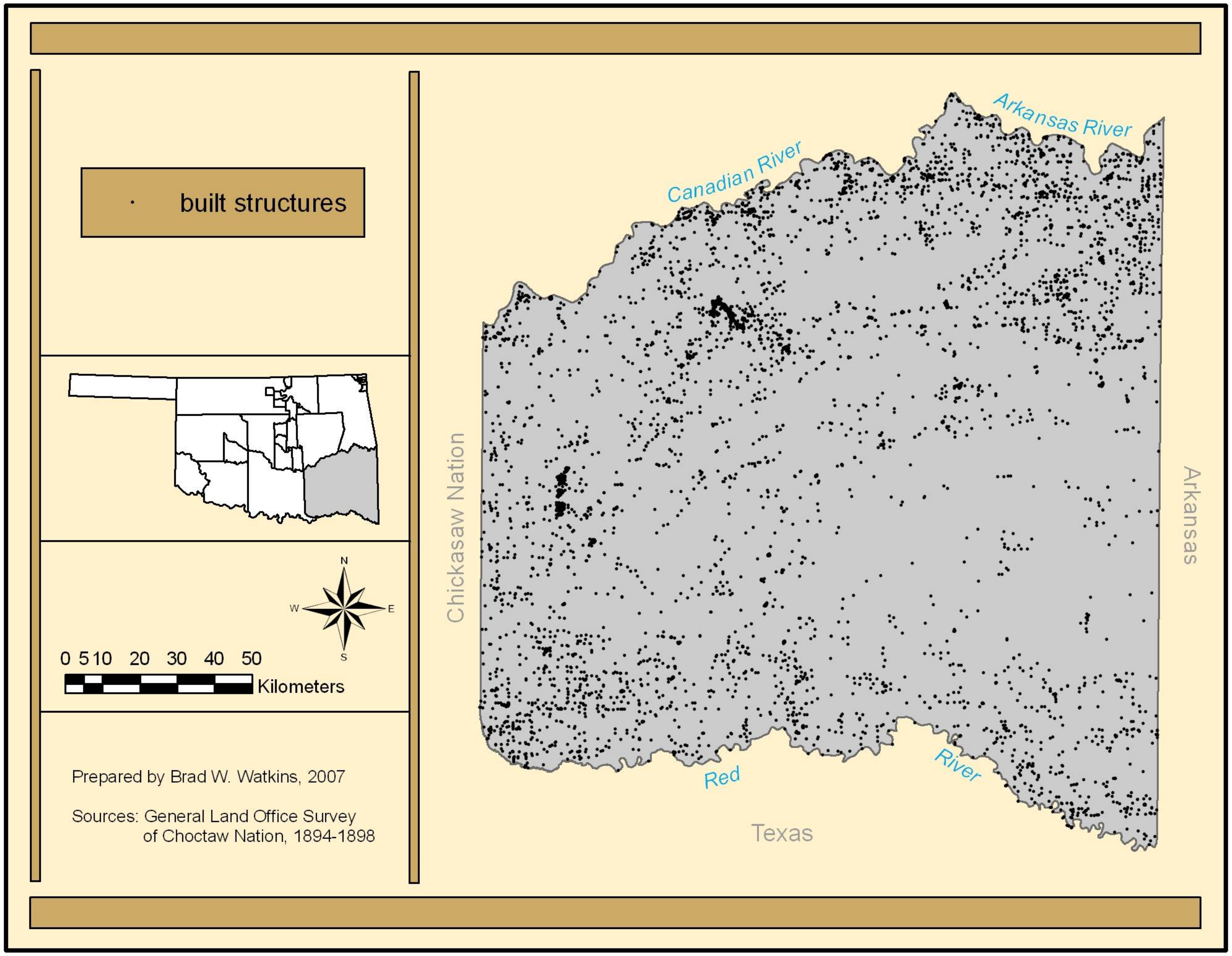

Figure 4.3: Built structures in the Choctaw Nation, 1890s

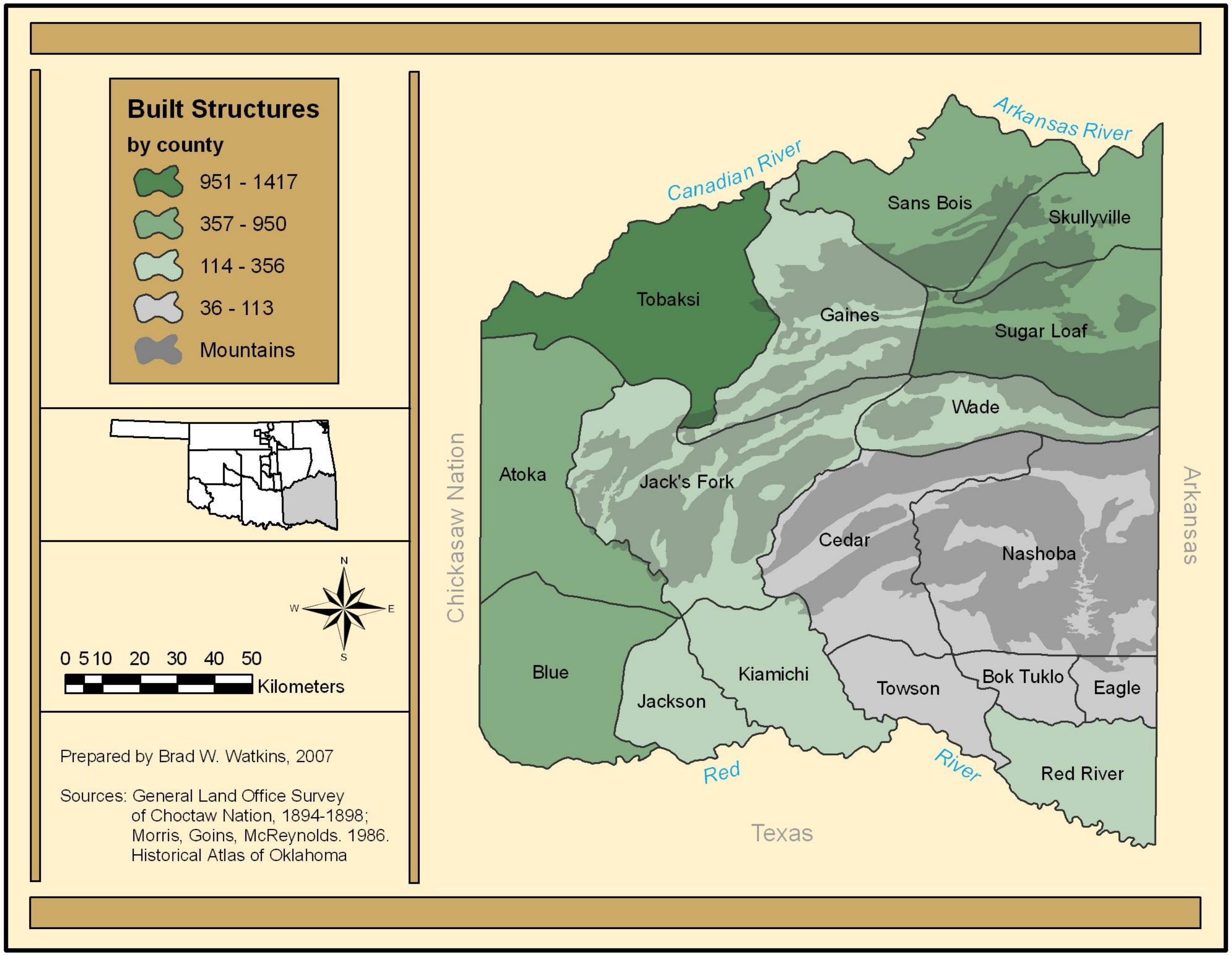

Figure 4.4: Built structures by Choctaw Nation county, 1890s

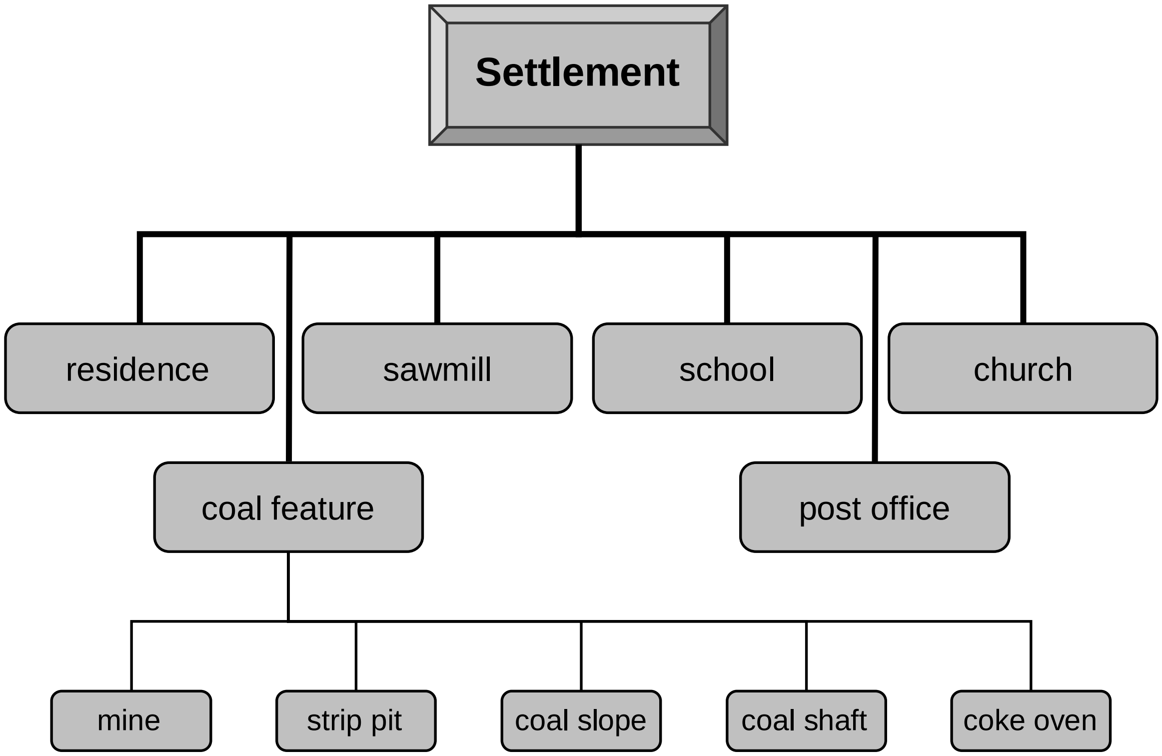

Figure 4.5: Settlement feature hierarchy. Feature types are obtained from General Land Office surveys.

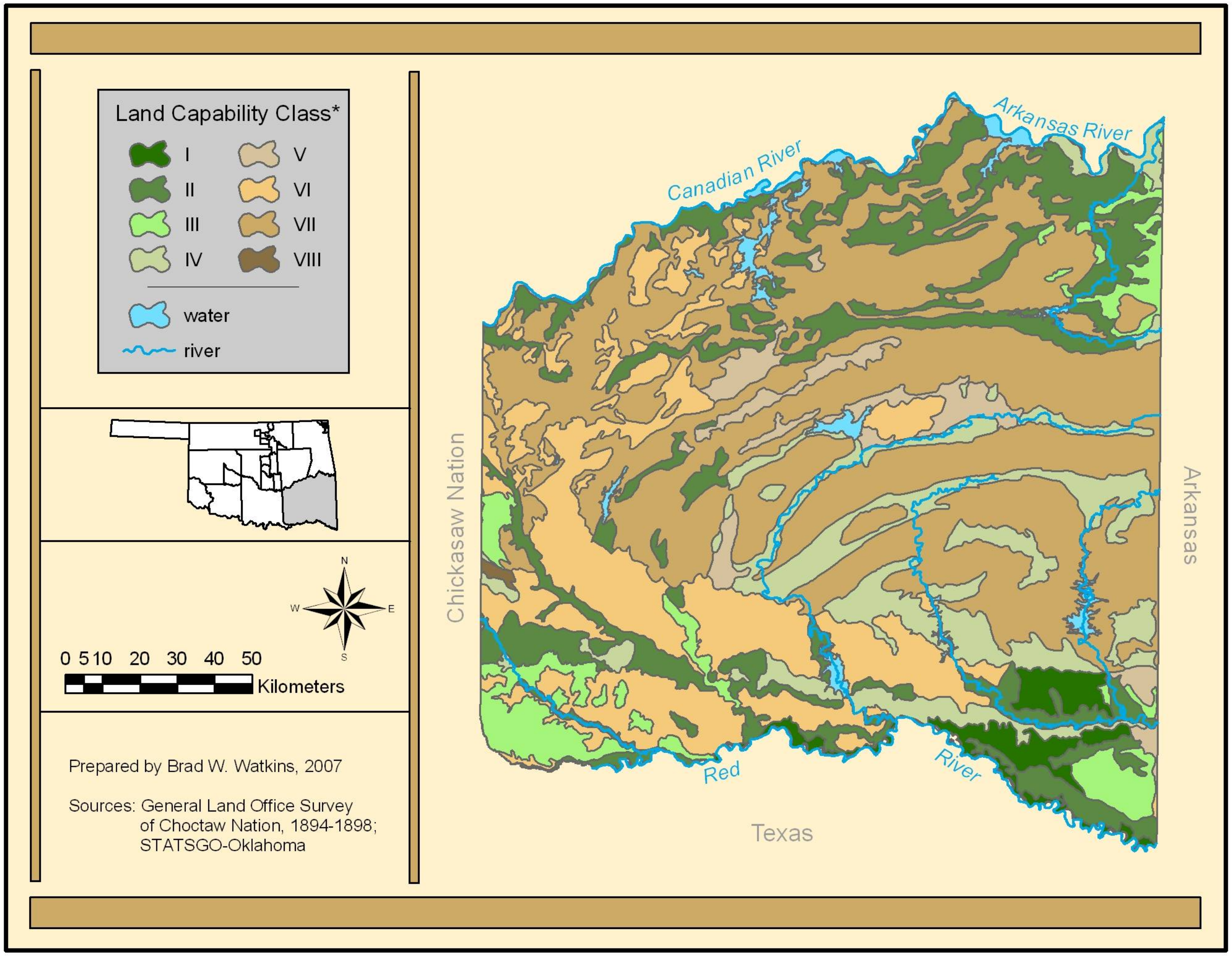

Figure 4.6: Land capability classes in the Choctaw Nation *see Appendix D for class definitions

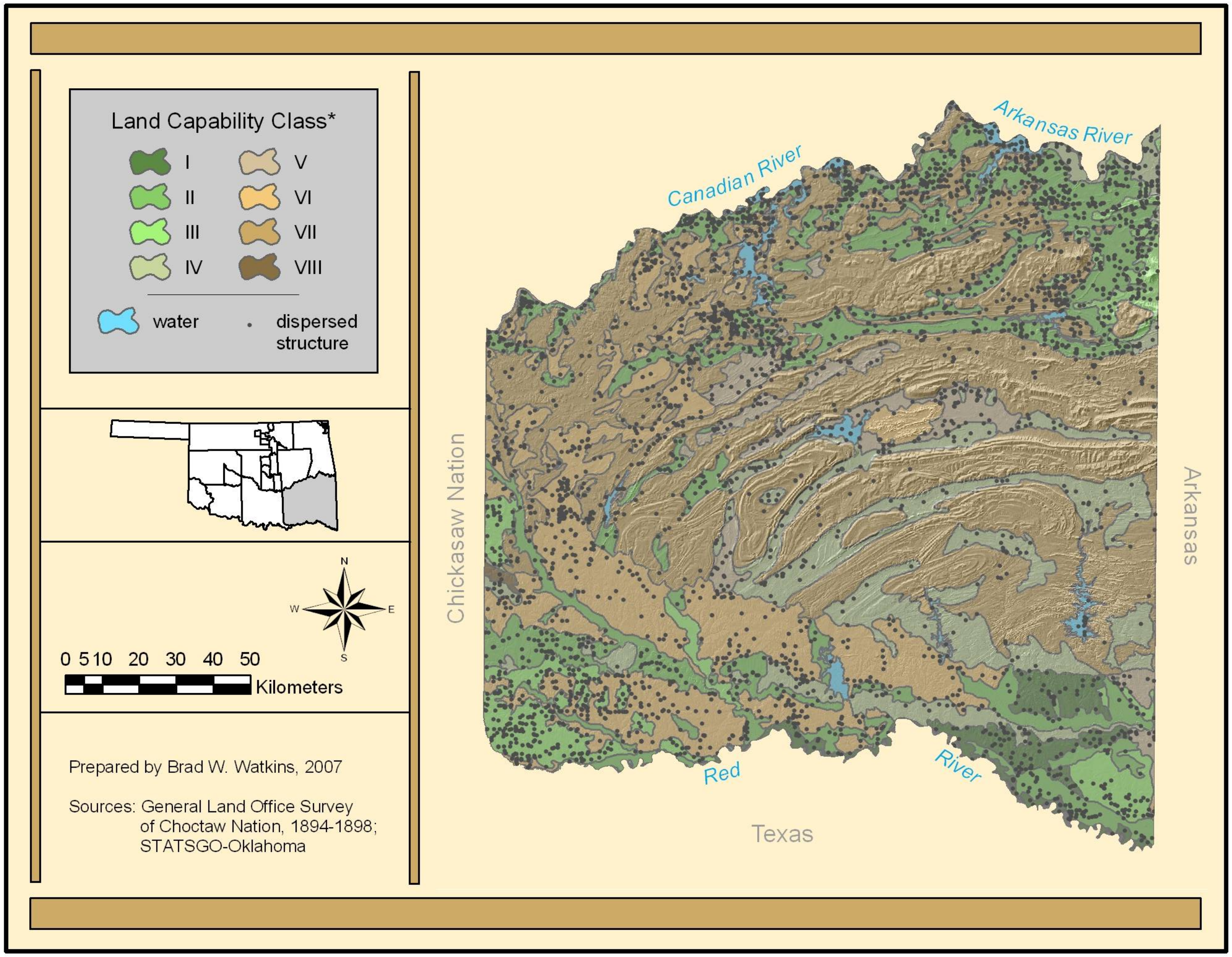

Figure 4.7: Dispersed settlement structures with land capability classes in the Choctaw Nation

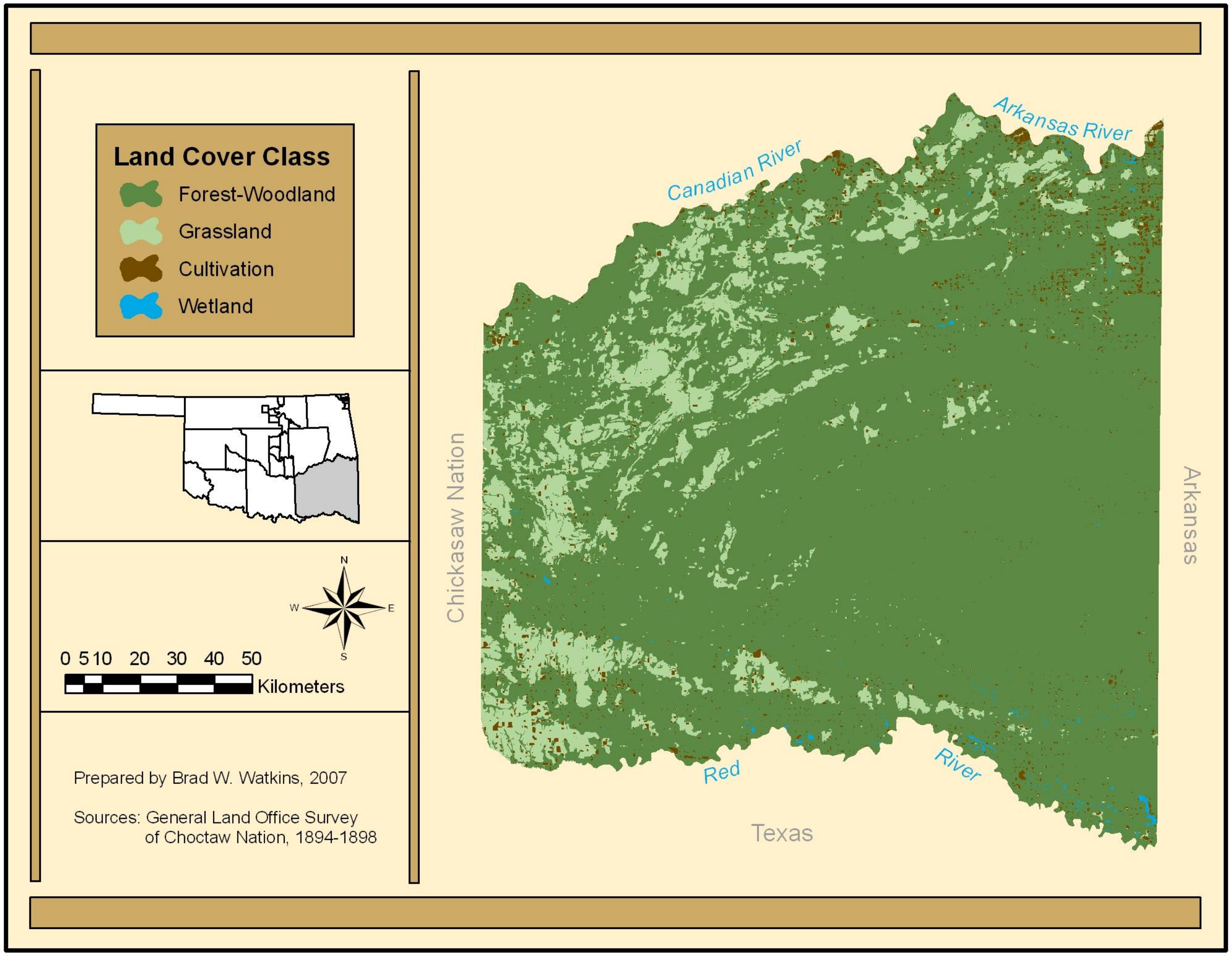

Figure 4.8: Land cover in the Choctaw Nation mapped from GLO surveys *Note the extensive grasslands in the western half of the Nation.

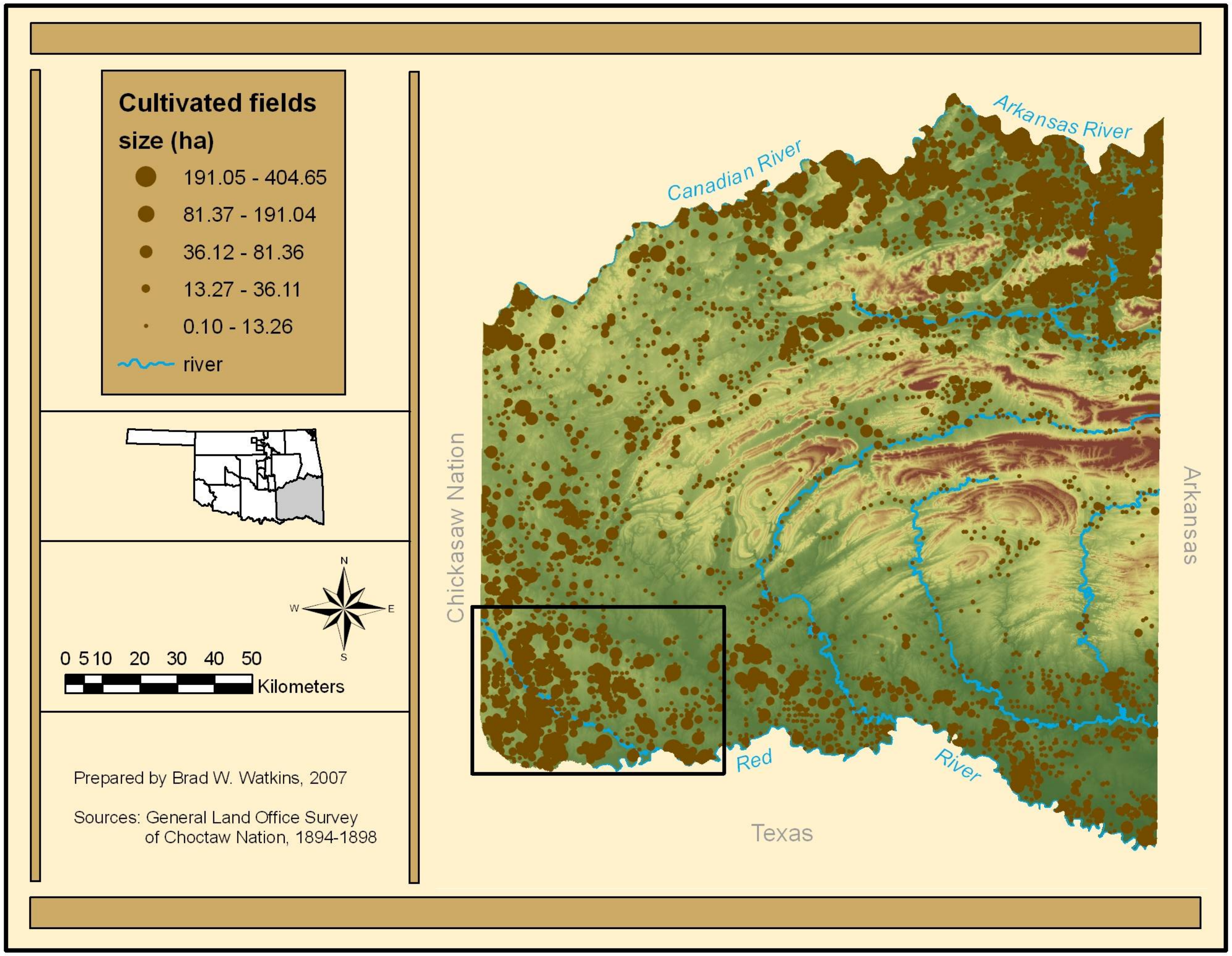

Figure 4.9: Cultivated field size in relation to major streams and terrain. The box encloses area of extensive grassland.

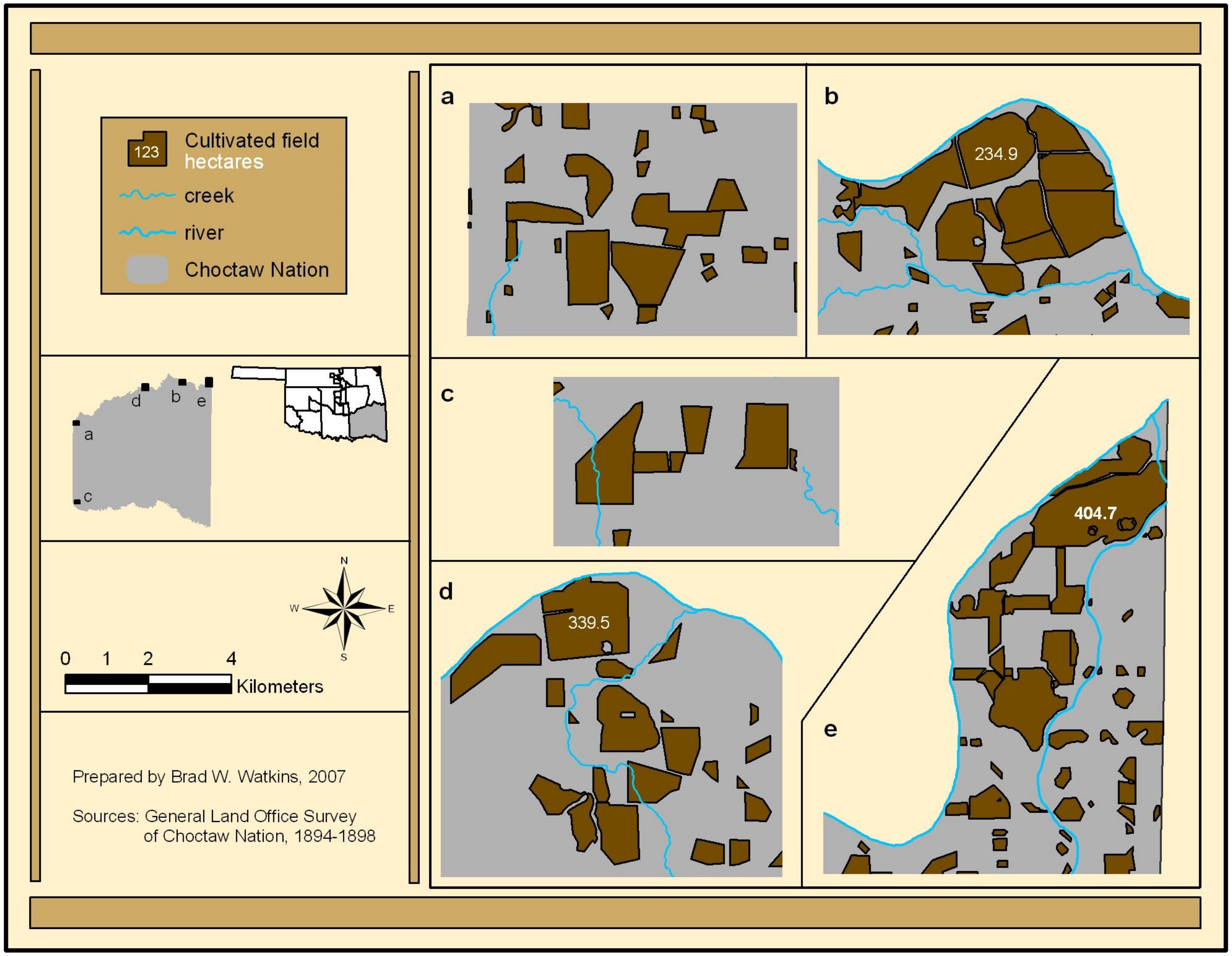

Figure 4.10: Clusters of large cultivated fields; selected fields have areas shown in hectares.

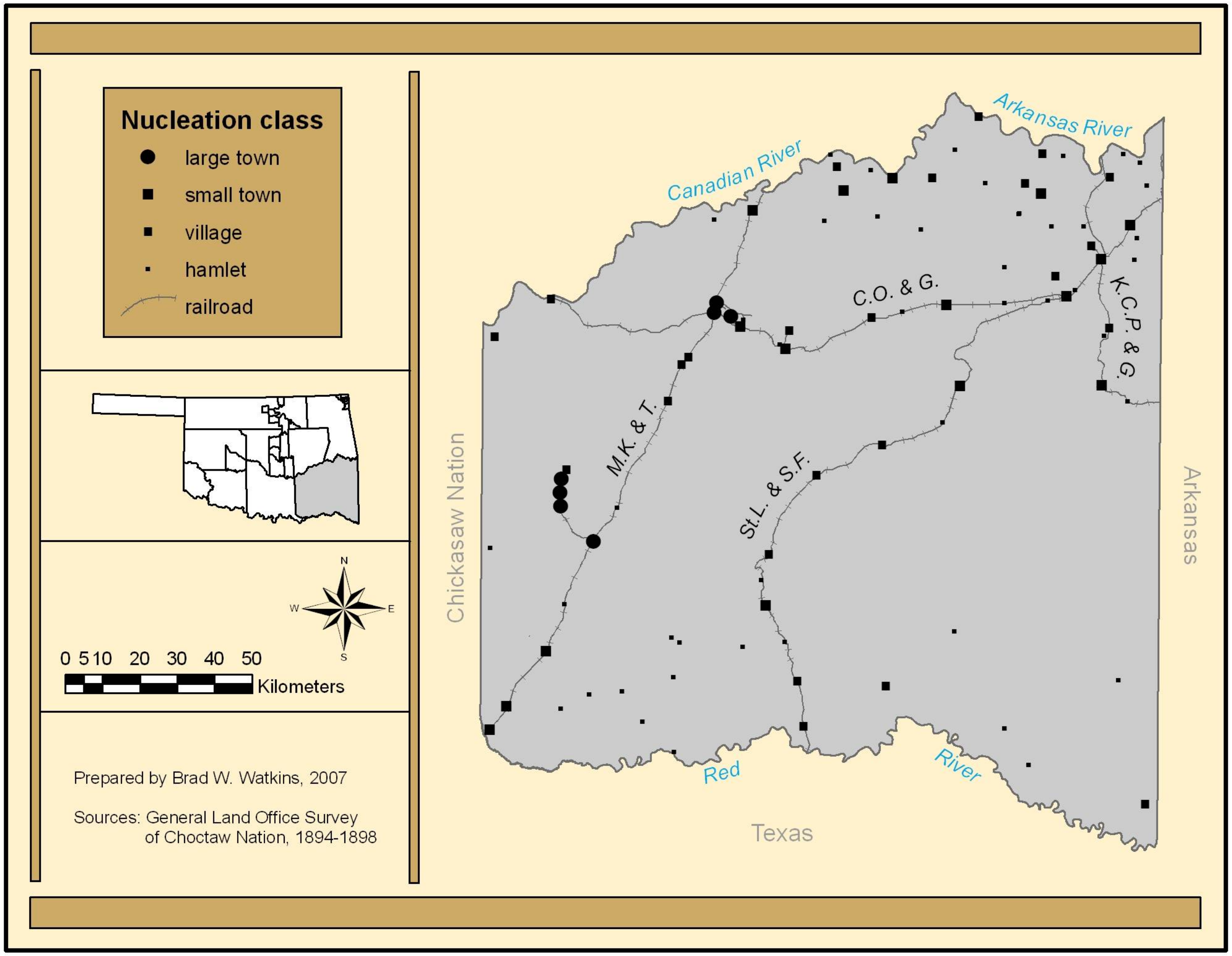

Figure 4.11: Nucleated settlements symbolized by nucleation size; Sizes are in order from largest to smallest

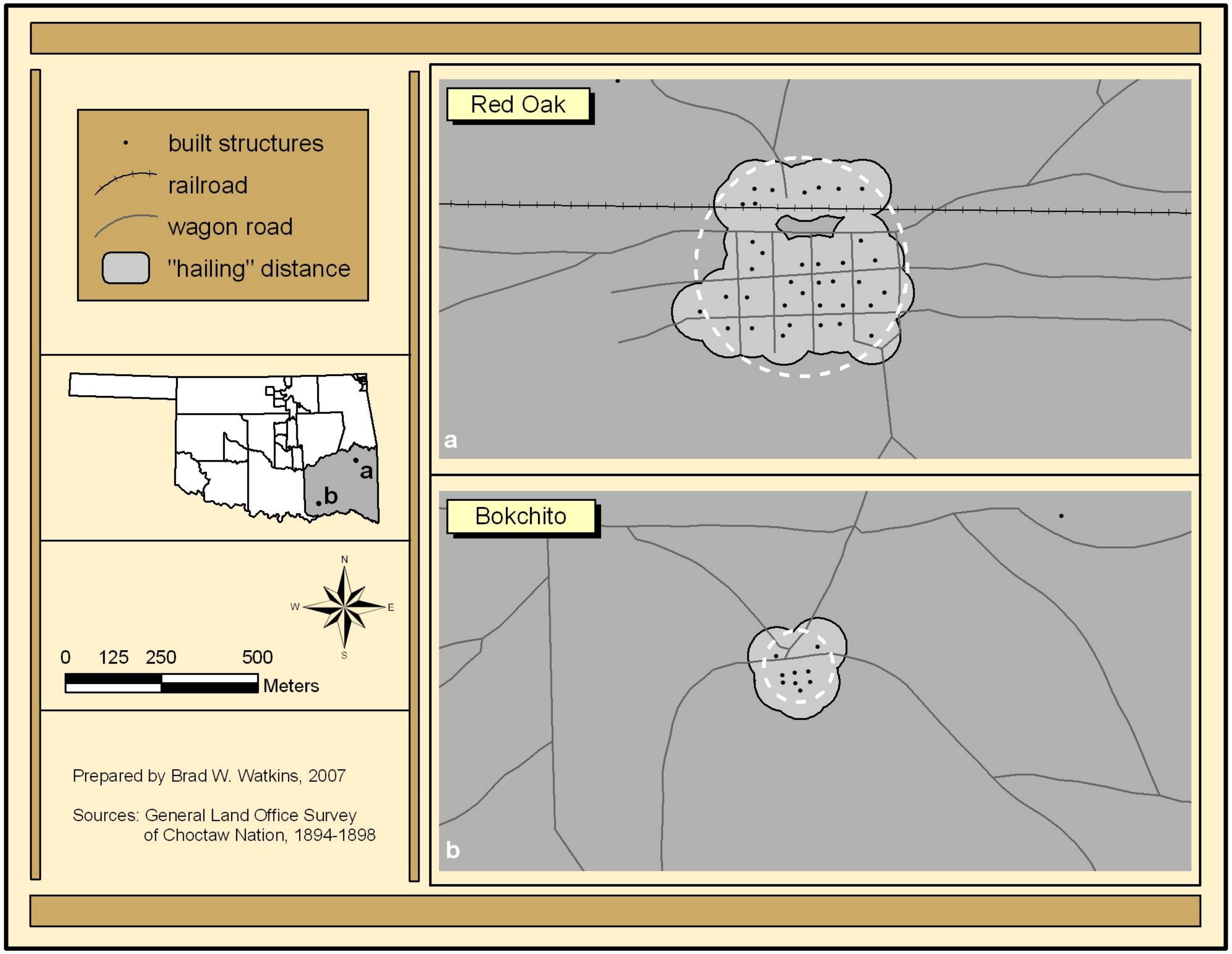

Figure 4.12: Examples of agglomerated nucleations. Agglomerated nucleations approach the shape of a circle. Both maps are presented at the same scale.

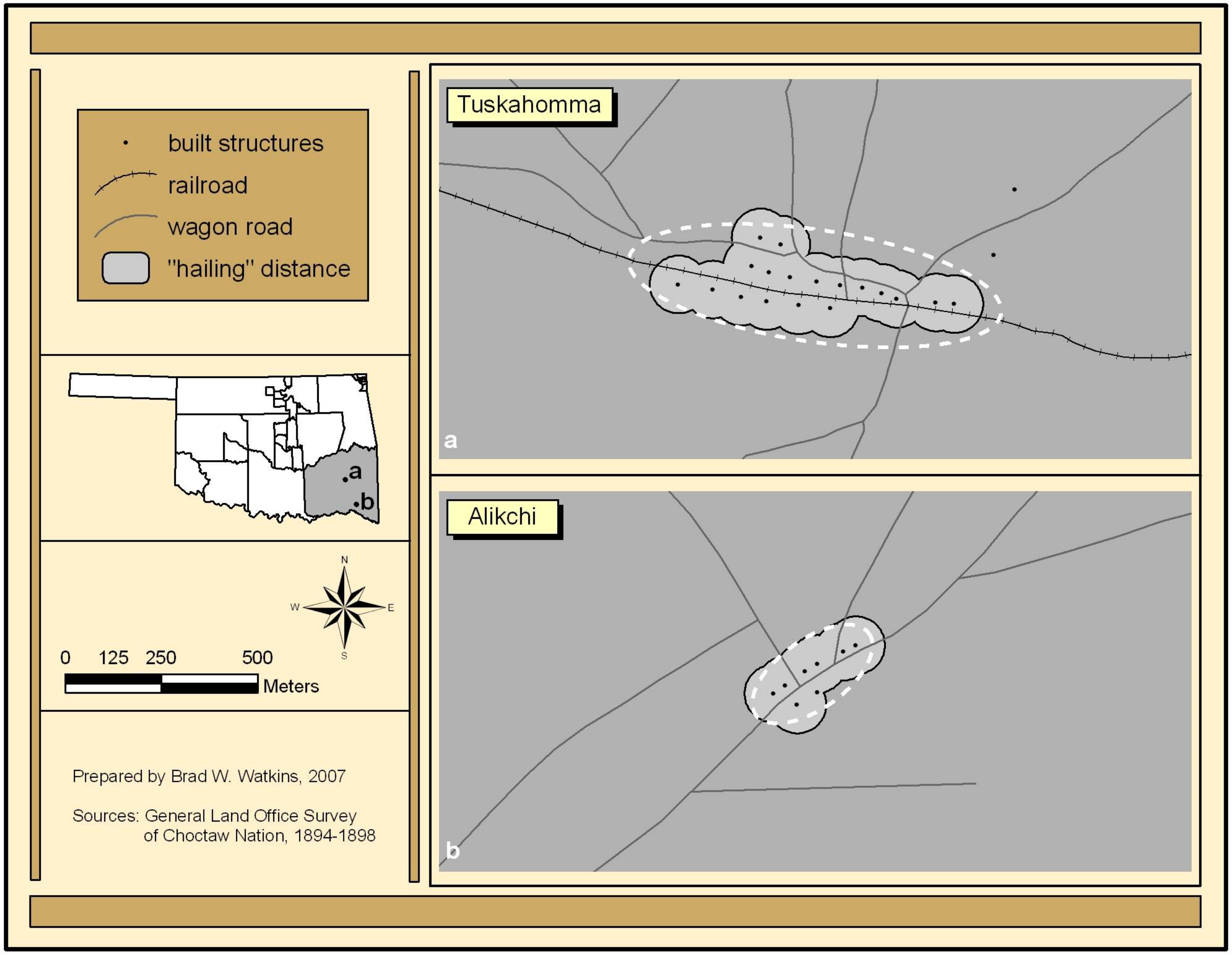

Figure 4.13: Examples of linear nucleations. Linear nucleations approach the shape of an ellipse. Both maps are presented at the same scale. (Names appear as they do on GLO plats)

Ethnicity	**1830s**[1]	**1860**	**1890**
Choctaw	96	81	25.2
White	1	5	64.7
Black	3	14	10.1

Table 4.1: Percent of ethnic makeup in eastern and western Choctaw lands.

(Source: Doran, Michael F. "Negro Slaves of the Five Civilized Tribes"; Debo, Angie. And Still the Waters Run: The Betrayal of the Five Civilized Tribes.*)*

[1]census taken before beginning of removal

Land Capability Class	# Dispersed Structures	Land Capability Class Area (km^2)	Dispersed Structure Density
I	122	714.2	0.171
II	1,198	4,701.4	0.255
III	411	1,555.1	0.264
IV	271	3,006.6	0.090
V	156	1,004.2	0.155
VI	726	4,752.1	0.153
VII	752	11,756.9	0.064
VIII	2	32.4	0.062
water[1]	150	576.0	0.260
Totals	3,788	28,098.8	---

Table 4.2: Dispersed settlement structures on land capability classes.

(Sources: STATSGO-Oklahoma; *General Land Office survey of Choctaw Nation)*

[1]The classification “water” is obtained from STATSGO database for Oklahoma. Land capability class data was collected after the construction of lakes and reservoirs in the study area.

Land Capability Class	Cultivated Area km^2	Number of Cultivated Fields	Percent LCC Cultivated
I	25.1	234	3.51
II	266.3	1,544	5.66
III	127.5	596	8.20
IV	66.9	494	2.22
V	17.5	215	1.74
VI	105.1	856	2.21
VII	132.5	1,001	1.13
VIII	1.0	4	3.15
water	57.8	221	10.04

Table 4.3: Cultivated fields per land capability class.

(Sources: STATSGO-Oklahoma; *General Land Office survey of Choctaw Nation)*

CHAPTER 5

TRANSPORTATION IN THE CHOCTAW NATION

The study of transportation, the movement of people and goods, ties directly to a discussion of settlement and land use. The transportation patterns that existed in the late nineteenth century Choctaw Nation developed in response to topography, soils, intergovernmental communication, market economy, and historic transportation routes. This chapter deals with two questions: 1) How did different modes of transportation affect the extraction of natural resources (coal and timber) within the Choctaw Nation?; 2) Do unique transportation patterns exist between urban and rural communities? The first question is answered in a human-environment interaction context, because transportation both enabled development of resource extraction and because the physical environment posed distinct challenges to different modes of transportation. In addition, evolving transportation networks enabled greater immigration into the Choctaw Nation, which increased scale and speed of extraction activities. The second question examines transportation at a different scale. I analyzed the local transportation plan for each settlement nucleation based upon its *arrangement* and *accessibility*. The results provide evidence of transportation planning and the connectivity to the areas surrounding nucleations. Before these questions can be answered, one must understand the development of transportation in the early Choctaw Nation.

Historic Transportation Routes

The earliest transportation routes in the Choctaw Nation consisted of little more than foot paths. Organized transportation in contemporary terms was unknown, though trade routes had been established between villages. Paths were traveled along the shortest distance possible. As early as 1832, Captain John Stuart constructed a road from Fort Smith to Horse Prairie located on the Red River 20 km north of the mouth of the Kiamichi. This road would provide a southern route for Choctaws arriving in Indian Territory from Mississippi. The route went from Fort Coffee (established in 1834 on the Arkansas River) south to the Red River valley (Figure 5.1). Though the route was not the most direct, it was constructed over several rugged mountain passes in order to shorten travel distance. In his account, Stuart notes on several occasions steep terrain, rocky slopes, and stony soils. The road crossed several large streams, the Kiamichi River, Fourche Maline, Jack Fork, and several other tributaries that caused some delays with construction. This road is an example of an early attempt to create a transportation system across the Choctaw Nation, and one that seemed to be desired by those living in the vicinity. Stuart reported that “Indians” were using it before it was even completed (Foreman 1927).

James Culberson (1927) traveled on what came to be known as the “Old Military Road” between Fort Smith, Arkansas located on the Arkansas River and

Fort Towson located near the Red River. This route, blazed in 1838, traversed the Choctaw Nation to the east of the trail to Horse Prairie. He traveled the road in 1884 on the way from Skullyville to Spencer Academy, a school for boys (Figure 5.1). This route took Culberson from the extreme northeastern to the south-central area of the Choctaw Nation-traversing the entire north-south extent. Culberson provides an excellent account of the difficulties in traveling even a surveyed military road by wagon and the physical demands such a road took on draft animals. He noted that the roads on Winding Stair Mountain were "compelled to be built through the best part of it but still lots of the roads were very rocky, rough and dangerous" (416).

Another early road through the Choctaw Nation began as a path for early indigenous groups such as the Wichitas, who previously occupied the land of the Choctaws, and the Osages to the north (Odell 2002). This path later became an important trade route for the exchange of goods between tribes and markets in St. Louis. As more people began using the route for immigration to Texas, it became known as the Texas Road. It was reported in 1845 that 1,000 wagons passed into Texas along this route in just six weeks. This was a major north-south route through the Choctaw Nation because it flanked the Ouachita Mountains unlike the Old Military Road and the Ft. Smith-Horse Prairie road. The pathway chosen was so well planned that the Missouri, Kansas, and Texas Railroad would later use almost its exact route (Foreman 1925, 1936).

The rush to the California gold fields was the impetus for another route through the Choctaw Nation, this time from east to west. The segment of the

California Road through the Choctaw Nation was created by Captain Randolph Marcy as the best route for emigrants traveling to California by way of Santa Fe. This highway was the principal east-west route before the establishment of the Choctaw, Oklahoma, and Gulf Railroad in 1891 (Bray 1923). J. J. McAlester would later establish his mercantile store at the intersection of the California Road and the Texas Road, around which the settlement of McAlester developed (Foreman 1925, 1939).

The Butterfield Overland Mail was constructed in 1858 to open lines of communication between the eastern and western United States. The road stretched 4,506 km from St. Louis to San Francisco and normally carried four passengers in addition to 500 to 600 pounds of mail. The trip took twenty-four days to complete because of the many stations located every 19 to 29 km. The distance between stage stands averaged 26 km (16.2 miles) through the Choctaw Nation (Figure 5.1) (Foreman 1931; Gunning; Wright 1957). George Butterfield, in charge of determining the route, used existing roads where available, but because he wished to find the most direct route, the road sometimes passed through forests. In forested areas, Butterfield chose pathways near streams, and in mountainous areas, he directed the route through valleys wherever possible (Gunning no date). This is the main reason for the route's transect through the Sans Bois Mountains at a place known as the Narrow's (Figure 5.2). These trails and roads served as highways between important places in the Choctaw Nation. While the majority of the trade traffic occurred along these pathways, an intricate system of wagon roads, with no regards to points of the compass, was being developed from the time of removal until the Civil War.

Choctaw Nation Railroads

Railroads did not enter the Choctaw Nation until after the Civil War. Because the Choctaws officially allied with the Confederacy, they were forced to enter into a new treaty with the United States abrogating previous treaties (McReynolds 1954). The Treaty of 1866 stipulated that the Choctaws would grant access to one north-south and one east-west railroad (Kappler 1904, 920). These new transportation routes introduced drastic changes in the Choctaw Nation dramatically increasing the non-Choctaw population (Gibson 1981). In addition, railroads provided the main mode of transportation for the extraction and transportation of natural resources and enabled these activities to occur with greater intensity. Planned townsites accompanied railroads. These townsites, as Bays (1998) found in the Cherokee Nation, were a largely responsible for the development of a transportation grid pattern on the landscape.

The first of the new railroads after the Civil War was the Missouri, Kansas, and Texas (Katy) Railroad, formerly the Union Pacific Railroad, Southern Branch, running from north to south in the western Choctaw Nation (Figure 5.3). It was completed in 1872 and extended 168.58 km. Its route approximately followed that of the Texas Road, which flanked the Ouachita Mountains. Most notable along the Katy Railroad through the Choctaw Nation was South McAlester (now McAlester, Oklahoma) at the intersection of the Katy Railroad and the Choctaw, Oklahoma & Gulf (C.O. & G.) railroads. This was the largest town in the Choctaw Nation and the center of its coal industry (Bray 1923).

The principal northeast-southwest and the longest railroad in the Choctaw Nation was the St. Louis & San Francisco Railway. This line, constructed in 1886-87, traversed the Ouachita Mountains along the Kiamichi River and extended from Texas to Arkansas. This was the only railroad with a tunnel, which was constructed through Backbone Mountain just west of the Arkansas border. The C.O. & G. Railroad was the principal east-west railway in the Choctaw Nation. The section from South McAlester to Wister was constructed in 1891 and the portion from South McAlester to Calvin on the Canadian River in 1895 (Bray 1923).

Smaller railroads in the Choctaw Nation were the Cavanal Coke and Coal built in 1893 up Cavanal Mountain from Poteau to Witteville. (Figure 5.3 inset). Another short line was the Kansas City, Pittsburg & Gulf Railroad, later called the Kansas City Southern Railway, that ran from Arkansas, east of Page, to the Arkansas River north of Skullyville (Figure 5.3) (Gardner 1958). The Kansas & Arkansas Valley Railroad barely entered the eastern Choctaw Nation along the Arkansas border.

Results

Transportation and the General Land Office Surveys

General Land Office surveyors recorded several transportation features in the surveys. Each mode of transportation had a distinct symbology and was noted in the field notes. Surveyors recorded wagon roads, railroads, and trails as linear transportation features. Other linear features included bridges, fords, ferries, and a railroad tunnel. Though recorded on the surveys as lines, I converted these features to points for better cartographic representation. The most frequent mode of transportation recorded by surveyors was the "wagon road," which presents an intricate transportation pattern (Figure 5.4). Surveyors did not provide information on traffic flows for any mode of transportation. In fact, they provided few descriptions of transportation. When they did, it was very general as in the description of T2S R10E: "Several large public highways [*sic*]. Atoka, Boggy Depot and Lehigh and Boggy Depot roads bring this township into close communication with the towns of Lehigh and Boggy Depot" (Havener and Beavers 1896). Eyewitness accounts, however, provide a better understanding of the nature of transportation. One who resident who lived in the vicinity of Tamaha and Iron Bridge recalled: "When I was a boy, there was [*sic*] only two main roads of importance. All other roads were just trails from neighbor to neighbor. Towns in those days were miles apart" (Perdue 1980, 152). The condition of some of these wagon roads was poor as one resident wrote of on the way to New Hope Seminary near Fort Coffee: "oh! horrors, such rough roads as we had to travel" (Christian 1931, 160).

Network Density

One way to approach the study of transportation in an area is by calculating the network density. This is the total distance of a road network in a given area. This gauges how well traveled an area is, and when examined in an historical context, can at least begin to answer questions about accessibility. Network density is calculated by dividing the linear distance of a transportation network by the land area under study. Depending on the study area, one can isolate factors that contribute to variations in density values. For example, if a transportation network appears particularly high along a major stream valley, one could isolate that stream valley, calculate its density, and compare it to an area with different topography.

For transportation in the Choctaw Nation, I calculated network densities at different scales. This analysis covers wagon roads only because this mode makes up the bulk of the data. I first calculated the network density for the entire Choctaw Nation. The Choctaw Nation occupies 28,151 km^2 of land according to the General Land Office (GLO) surveys. The network density for the entire Choctaw Nation, 0.824, serves as the index for network density in the Choctaw Nation. A low network density value indicates an area with fewer transportation features whereas a high network density indicates a complex transportation pattern.

The Choctaw Nation network density (0.824)—calculated for the full extent—is the largest area calculated. I calculated network density at an intermediate sized area using the geomorphic provinces outlined in Chapter 2 (Johnson et al. 1979). These provinces range in land area from 7,462.3 km^2 in the Ridge and Valley Belt to 48.4 km^2 in the Arbuckle Plains. The average area for geomorphic provinces is 3,513.8 km^2. The network density based upon geomorphic provinces is 0.823 (Table 5.1). This differs from the Choctaw National network density because the data was digitized from different sources; the differences, therefore, represent the error associated with georeferenced data discussed in Chapter 3. Geomorphic provinces are topographically generalized areas. Although generalized, these areas still provide a useful means for studying the various physical areas of the Choctaw Nation. As Figure 2.2 shows, geomorphic provinces correspond closely with the topography represented by the digital terrain model. Figure 5.5 shows network densities based upon geomorphic provinces. Darker colors represent higher network density values while lighter colors show lower density values. The dark shading represents the mountainous areas in the Choctaw Nation mapped from a combination of slope values and elevation. The highest network density (1.221) is found in the Arkansas Hill and Valley Belt (Table 5.1). The next highest network density (1.037) was found in the Dissected Coastal Plain. Both provinces have areas of historical importance as they were the locations settled by early parties of Choctaws arriving from Mississippi during Indian Removal. These early settlements included Skullyville and Sans Bois Creek near the Arkansas River in the north and Eagletown, Doaksville, Horse Prairie, Glover Creek, and the Kiamichi River near the Red River in the south (see Figure 4.1) (Foreman 1934; McReynolds 1954; Jordan 1976). These important places in early Choctaw settlement may have had some influence on later transportation developments in the same regions. Peter Hudson, a Choctaw principal at the Tuskahomma Female Institute, a school opened in 1892, wrote that the current highway (ca.

1932) from Bethel to Broken Bow follows an old wagon road used by Choctaws to travel north from the Red River (Hudson 1932). Both areas, along the Arkansas and Red rivers, possessed some of the most productive agricultural lands in the Choctaw Nation, and consequently, impacted future settlement (STATSGO 2006).

The McAlester Marginal Hills Belt contained the third highest network density with 1.033 (Table 5.1). This province corresponds with the major coal deposits found in the Choctaw Nation. The mining towns, of South McAlester, McAlester, Krebs, Alderson, Atoka, Coal Gate, Phillips, and Lehigh all fall within this geomorphic province. Their history and development centered around coal extraction resulted in a complex transportation network (discussed in a later section), which increased network densities.

The Ridge and Valley Belt, closely associated with the rugged Ouachita Mountains, had the third lowest network density at 0.464. The only two provinces with lower network densities were the two smallest provinces, one tenth the size of the Ridge and Valley Belt. Although the largest of the eight geomorphic provinces, transportation in the Ridge and Valley Belt province largely was confined to the valleys, usually coincident with major streams like the Kiamichi River (Figure 5.6). Few wagon roads traversed the mountain ridges, and of those that did, it is impossible to tell to what extent they were used based upon GLO data. Emma Christian, a resident of the Choctaw Nation in 1872 said that “there were no roads across the mountains that we came over, until we struck the stage line running from Fort Smith to Stringtown (probably the old Butterfield Overland

Mail) and other points south" (Christian 1931, 160). Writing of the southern Ouachita Mountains, one resident recalled that it was a rough country in which wagons had to stay on established roads (Hudson 1932).

The final level of network density analysis (and smallest scale) uses Choctaw Nation counties for calculating network densities. The first counties in the Choctaw Nation were established to facilitate the judicial system. Adopted in 1850, it consisted of nineteen county courts. After the Choctaw Nation's official division with the Chickasaw Nation in 1855, the counties were reorganized and names were changed to the seventeen shown in Figure 5.7 (Wright 1930). These have an average land area of 1,653.3 km^2 ranging from 376.8 km^2 to 3,262.5 km^2 (Table 5.2) (Morris, Goins, and McReynolds 1986). The network density for calculations based on counties is 0.844, which differs from the 0.824 obtained from the GLO surveys. This is due, in part, to the same georeferencing error above outlined. The results of the county network density show a similar pattern of low network density where terrain is most rugged. The six counties with the lowest network density, Nashoba, Cedar, Jack's Fork, Wade, Gaines, and Sugar Loaf, also have the greatest percentage of mountainous terrain (Figure 5.7). These six counties have network density values below the average of 0.844. Conversely, the highest network densities are found in counties along the Arkansas and Red rivers: Skullyville, Red River, Blue, Kiamichi, and Towson counties. This is similar to the density results found when calculating based upon geomorphic provinces (Figure 5.7; Table 5.2). Blue County stands out from the other counties, however, largely due to its high land capability. It also had the

Blue River, the Missouri, Kansas & Texas Railroad, and the historic Texas Road and the Butterfield Overland Mail route. Finally, the capital of the Choctaw Nation from 1863 to 1883 was Chahta Tamaha located in Blue County (Wright 1931).

Transportation network density analysis provides a very generalized picture of movement potential in the Choctaw Nation for the 1890s, but it does not explain the impetus for transportation development nor does it explain local transportation patterns. The following analyses address these problems. The next section explains the role of transportation in natural resource extraction, particularly timber and coal using proximity analysis. Finally, localized transportation patterns within and outside of towns are explained.

Transportation and Natural Resources

Timber and coal were two important natural resources extracted in the Choctaw Nation. One surveyor wrote that “the pine timber is rapidly being cut and converted to lumber” (Tatum and Shelley 1895). The main markets for both, however, lay beyond its borders. Large amounts of coal were shipped south to Texas for use on its railroads (Aldrich 1952). The principal means for transporting these goods was the railroad (Debo 1934). This was due mainly to the bulk of these products. Wagon roads were insufficient for carrying the heavy loads. The surveyors recorded data on sawmills and coal-related features that exhibit clustered patterns which correspond with railroads (Figure 5.8). To determine the degree of this correspondence, I used proximity analyses.

I created buffers around every railroad in the Choctaw Nation (see Appendix A). Buffers extend the defined distance from both sides and ends of the railroads. I used these to count how many coal-related features and sawmills were located within proximity to railroads. Features related to coal mining include coal mine, coal shaft, strip pit, coal slope, and coke oven. The proximity method indicates the importance that this transportation mode had in resource extraction.

Proximity analysis is used to calculate the distance from one feature location to another and is useful for visualizing relative location. I chose 9.6 km for the buffer distance because this has been established as the limiting factor for transporting goods overland in the nineteenth century (Williams 1989). Surveyors recorded thirty-six sawmills operating in the Choctaw Nation. Using the Choctaw Nation Geospatial Database, twenty-two sawmills (61 percent) were found to be within 9.6 km of railroads (Figure 5.8). Many sawmills also were found to be located near major streams, probably a result of the water requirement for operating steam-powered mills. There is no data from the GLO surveys, nor from other sources, that rivers in the Choctaw Nation were used for “rafting” logs (floating logs down river to sawmills). Of those sawmills that were not located within 9.6 km of railroads, seven (50 percent) were located within 9.6 km of a nucleated settlement. Perhaps these sawmills served local demands. If the buffer (limiting distance), however, was doubled to 19.2 km, all but two sawmills (94 percent) would be in close proximity to railroads. It is reasonable to assume that those sawmills that were beyond the 9.6 km limiting distance were located along, or at least near, well traveled roads. Unfortunately, this would be hard to verify because the GLO surveys do not provide data on traffic flow.

Coal mining was a major resource extraction activity in the Choctaw Nation. Coal-related features show a more clustered arrangement than sawmills. This is due to the isolated occurrence of coal resources along the Hartshorne Formation (Suneson 1998). Surveyors recorded thirty-nine coal-related features in the Choctaw Nation. Using the 9.6 km buffer, thirty-six (92 percent) of these features were within proximity to railroads. A majority of these features (59 percent) occur in the South McAlester-Krebs-Alderson vicinity (Figure 5.9). The close proximity of coal-related features to railroads suggests the importance of railroads in coal mining. In fact, 63.9 km of railroad were spurs and short lines built specifically for transporting coal from locations some distance away from trunk lines.

Urban vs. Rural Transportation Patterns

Transportation patterns in rural versus urban areas were markedly different in some instances. This section discusses local transportation patterns in the settlement nucleations identified in Chapter 4. I determined which nucleations possessed a transportation “grid” as opposed an irregular transportation network that did not exhibit a grid. For this analysis, a “grid” is defined as a transportation plan in which wagon roads within nucleations demonstrate a regular use of 90º angles. In addition to locating grids, I also counted for each nucleation the number of entrances and exits, i.e., pathways into and out of a nucleation. This method indicates accessibility for each nucleation within the larger transportation network.

There were a total of ninety-five nucleations in the Choctaw Nation. Thirty-six (38 percent) of those possessed a transportation grid (Table 5.3). Of the nucleations with grids, twenty-four had plans oriented to railroads. A grid that is oriented to a railroad has wagon roads running parallel and/or perpendicular to the railroad. Examples of transportation grids oriented to railroads include Red Oak, South Canadian, Cameron, Cale, Durant, South McAlester, and Poteau (Figure 5.10a, 5.10b). Grids in some instances indicate the development of settlements. It can be assumed that grid patterns probably were not a part of the early post-Removal landscape. The longer a settlement has been established, the more developed a grid pattern may appear, but this is not always true. Skullyville, one of the earliest northern settlements for emigrating Choctaws, has only a partial grid. However, in Eagletown, one of the earliest southern Choctaw settlements in Indian Territory, no grid exists, but one finds a complex network of wagon roads in the surrounding area (Figure 5.10d). The same circumstance is found at Tuskahomma (Figure 5.10c). Similar, but not identical situations existed at Fort Towson, Boggy Depot, and Chahta Tamaha, other long-time settlements, which had no grid and few surrounding wagon roads. In Doaksville, there is only a slight indication of a grid. Fort Towson, Doaksville, Boggy Depot, Chahta Tamaha, Skullyville, and Tuskahomma all served as capitals of the Choctaw Nation. This presents additional questions as to why these politically important locations had less developed transportation networks. Settlement nucleations with an economy centered around coal had well developed transportation grids. Coal Gate, Phillips, Krebs, Lehigh, South McAlester, McAlester, and Alderson serve as examples (Figure 5.10e). One settlement, Wapanucka, was not located on a railroad, but had a transportation grid that was oriented to the cardinal directions (Figure 5.10f).

The final transportation analysis involves measuring the connectivity of nucleations to the greater transportation system. To analyze this, I counted all of the transportation entrances and exits for all ninety-five nucleations. I established protocols for this analysis to ensure an accurate count. They are: 1) the hailing distance buffer (discussed in Chapter 4), used to help define nucleations; 2) only roads that connected to the surrounding transportation network were counted ("in town" roads and roads that terminated after extending short distances beyond the buffer were not counted); 3) a railroad was counted as two access points unless multiple railroads entered the nucleation in which case each additional railroad was counted as another access point.

Access points for settlement nucleations range from two to thirteen. One would expect a *large town*, which is the largest nucleation class, to have the most access points. Four of the seven large towns had the greatest number of access points, one town with thirteen access points and three towns with twelve access points. These were South McAlester with thirteen, Krebs, Lehigh, and McAlester with twelve, all of which played important roles in coal mining (Table 5.4). Two large towns, Atoka and Coal Gate, had ten access points. The final large town, Phillips, had six access points, two of which were railroad access. Three settlement nucleations classified as small towns ranked in the top nine for number of access points. One small town, Talihina, had eleven access points. Two small towns, Cameron and Poteau, had ten access points. These numbers show that larger "urban" areas did not necessarily mean better connection to the rest of the Choctaw Nation, and certain small communities were accessible. The same holds for small nucleations. For example, Albion, classified as a hamlet, had eight access points. Cavanal and Hamden, both hamlets, had seven access points.

In order to determine if the railroad was a factor in accessibility, I examined the number of access points for nucleations on railroads and for nucleations not on railroads (Table 5.5). Settlement nucleations located on railroads had greater numbers of access points, an average of 6.7, than did nucleations not on railroads, an average of 5.3. For comparison, forty-nine of ninety-five settlement nucleations (51.6 percent) were located on railroads. This indicates the presence of a railroad was a factor in the development of a transportation accessibility.

Conclusion

The transportation patterns in the Choctaw Nation in the 1890s appear chaotic at the largest scale. This is due primarily to a pre-township and range settlement landscape. Although surveyors were "laying out" the rectangular grid, the cultural features they recorded onto plats present a landscape free of rectangular influence (they mapped the features before township and range had any influence). It is only when one examines the small scale patterns, specifically those within nucleations, that one sees “order” amid chaos. Though the landscape was free of the rules of township and range, the people who had settled it may have had some experience with rectangular transportation plans prior entering the Choctaw Nation. Recall that many of the residents of the Choctaw Nation did not arrive until after the construction of first railroad in 1872. It is possible that this delay in settlement contributed to the spread of grids in nucleated settlements. Perhaps people who were building communities near railroads simply saw the grid as the most efficient plan.

Roads that were not oriented to railroads still were treated as part of the larger transportation system. This is evident in the enactment of a law that required citizens of the Choctaw Nation, between the ages of eighteen and fifty, to work six days out of a year to improve the roads under the supervision of court appointed overseers (Debo 1934).

Railroads provided the necessary means for transporting natural resources to markets located within and outside of the Choctaw Nation and Indian Territory. Coal-related features presented an especially clustered arrangement in relation to railroads. This concentrated pattern represents the need to transport bulky materials. The relationship is further supported when accounting for short line railroads and spurs that were built specifically for the coal extraction. Railroads played an important role in timber extraction as well. However, only a slight majority of sawmills in the Choctaw Nation were located within close proximity to railroads.

Settlement accessibility is intuitive with large towns generally containing more access points. There were exceptions, however, pointing to the fact that smaller communities could still be accessible and function as a part of the larger transportation structure. In general, railroads in the Choctaw Nation provided better access to settlement nucleations.

When examined at different scales, transportation patterns and plans tell different stories. The underlying message, however, is the same. The Choctaw Nation in the 1890s was in a period of immense transition. Older settlements, some as early as 1831, saw little change while much newer settlements rapidly developed transportation grids. The latter often occurred in response to the railroad, but also may have reflected a desire to break away from the less consistent—and less planned—transportation scheme.

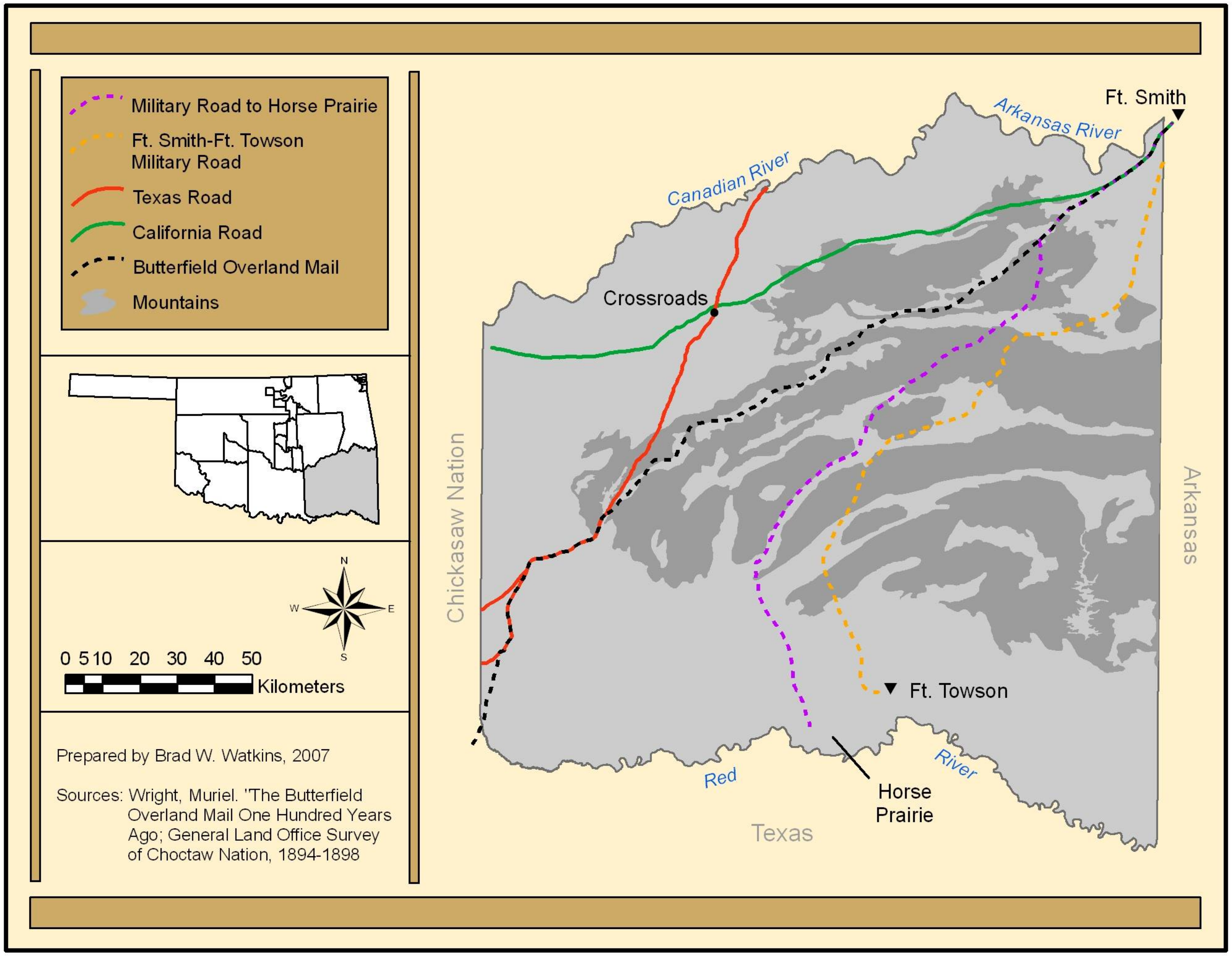

Figure 5.1: Historic Trails in the Choctaw Nation

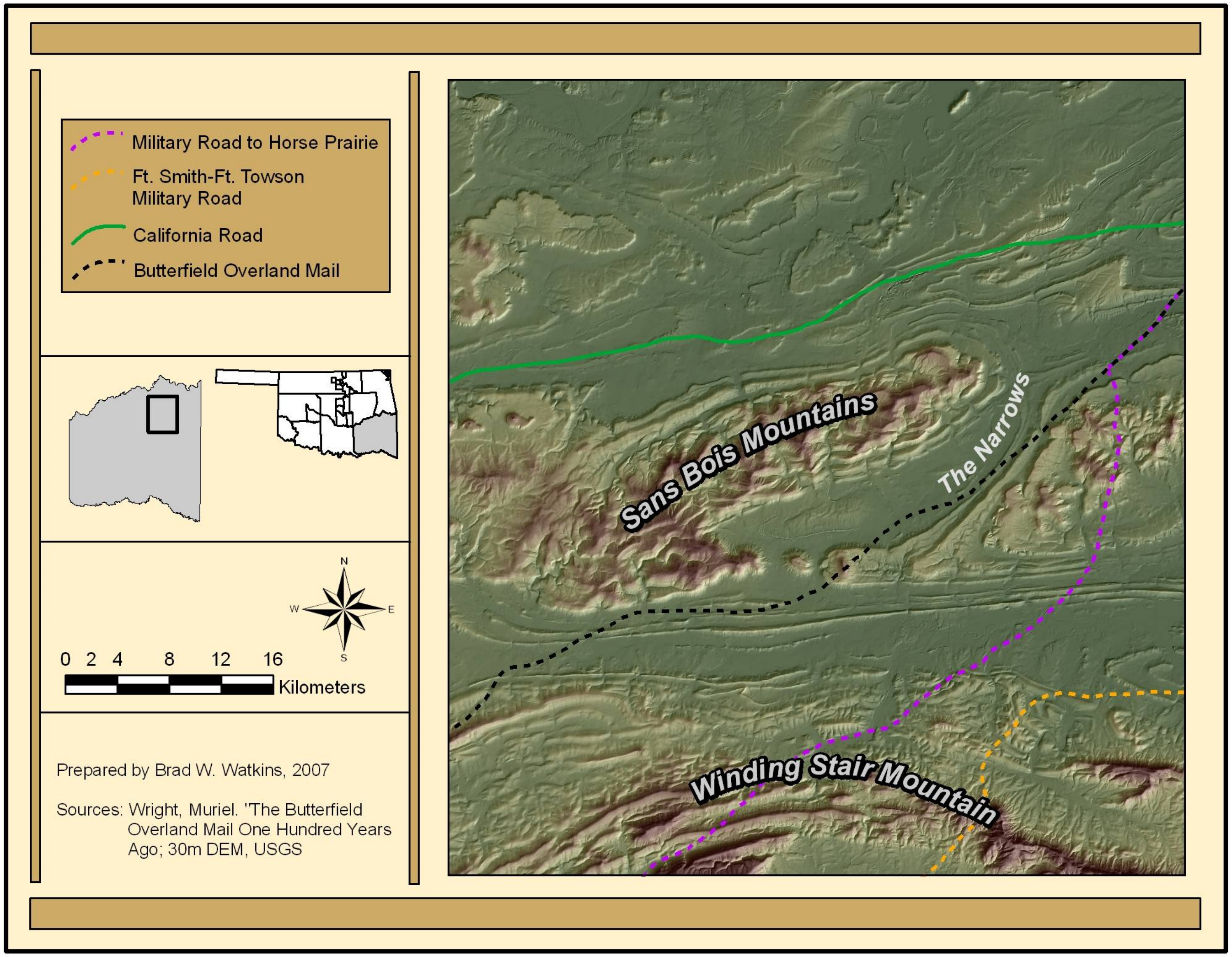

Figure 5.2: Historic transportation routes through the "The Narrows" and the Sans Bois Mountains

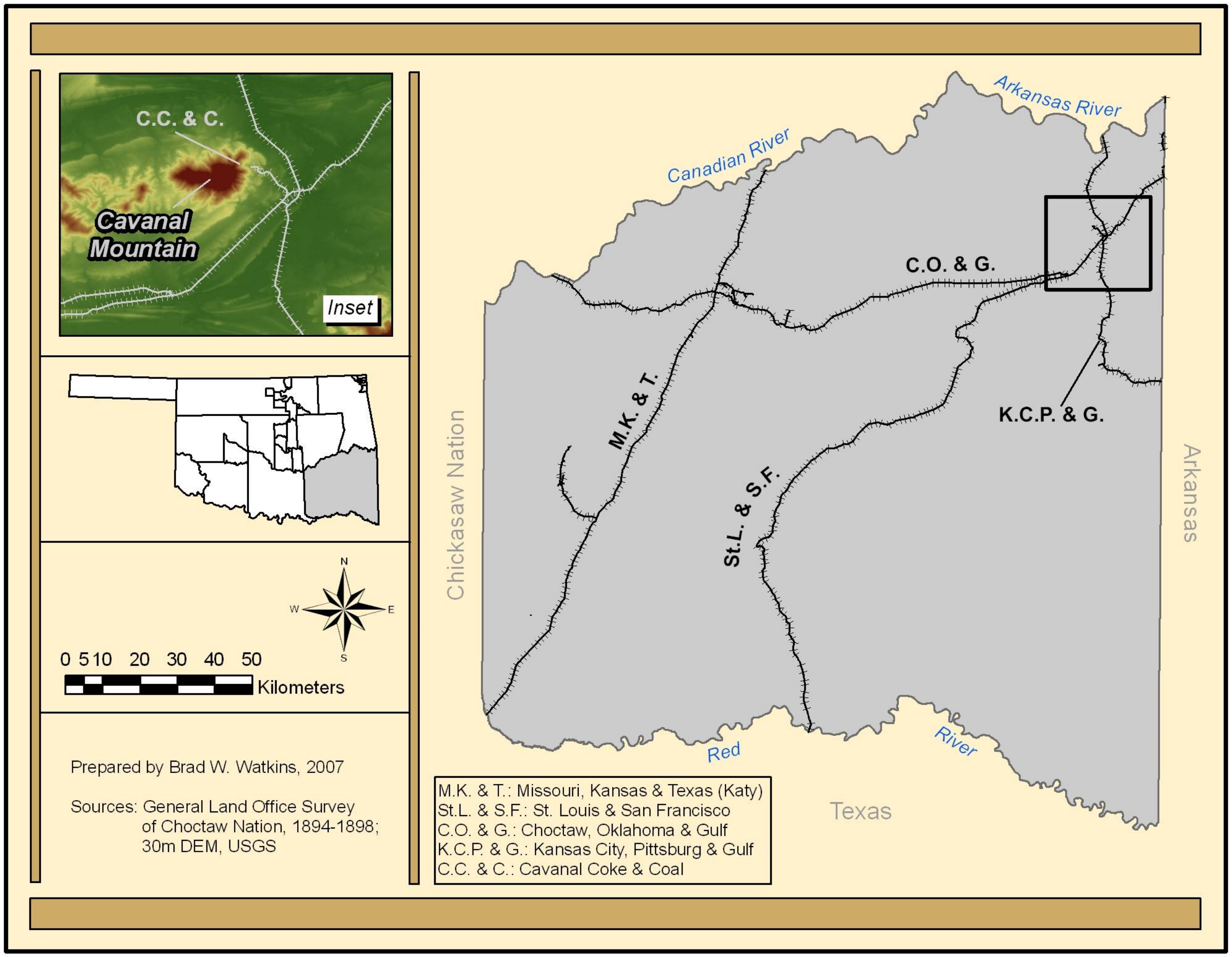

Figure 5.3: Railroads in the Choctaw Nation

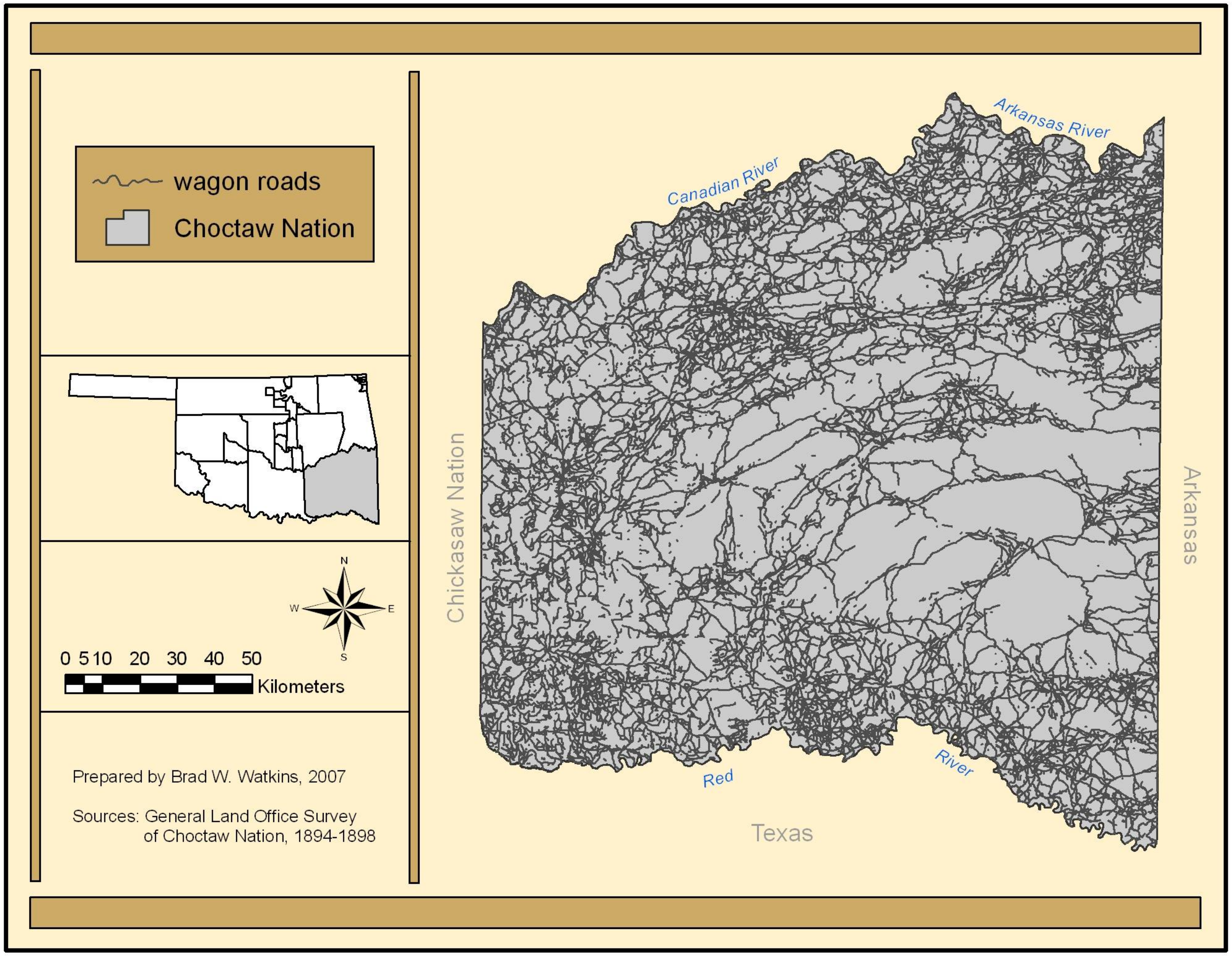

Figure 5.4: Wagon roads in the Choctaw Nation

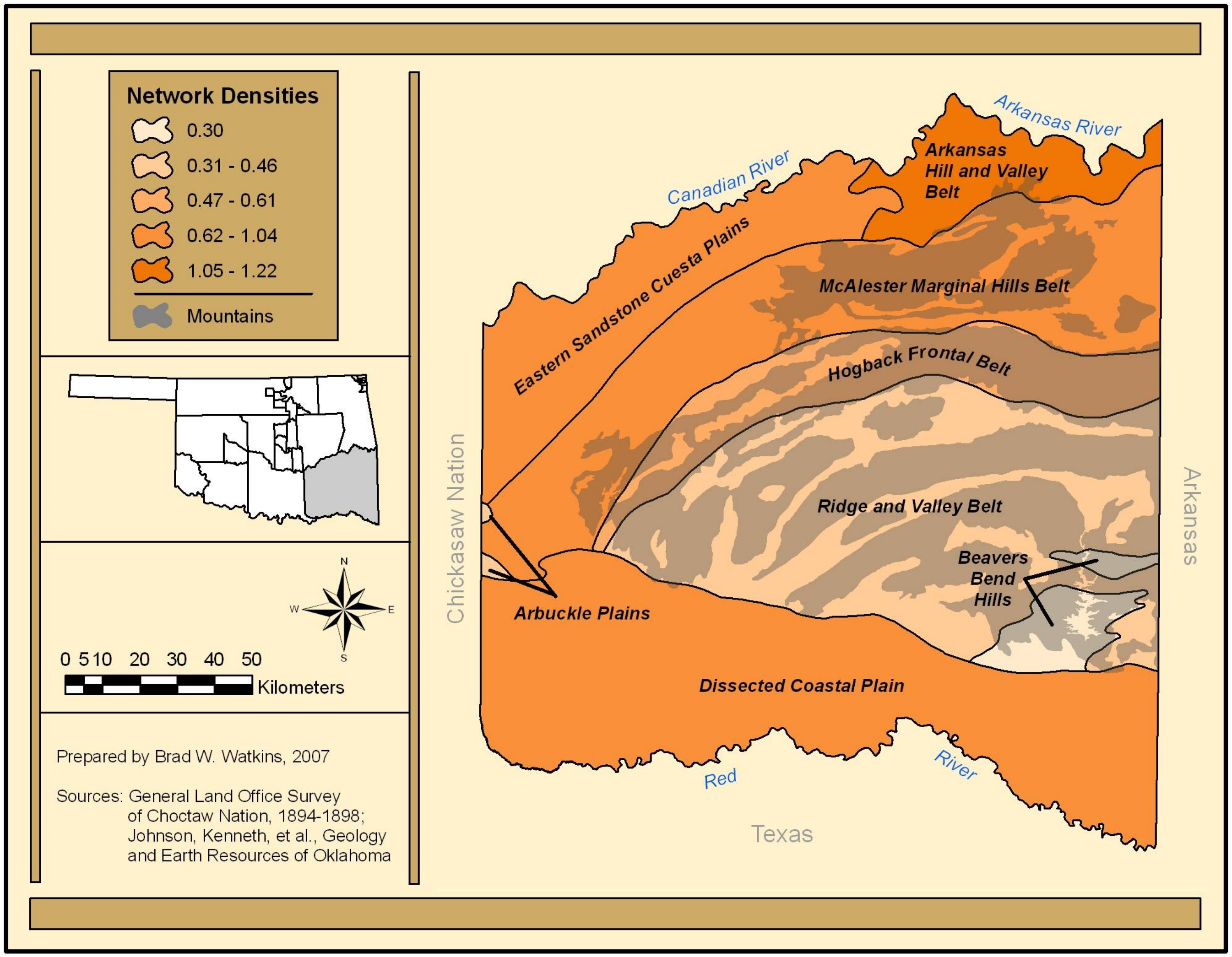

Figure 5.5: Netork density based upon geomorphic province

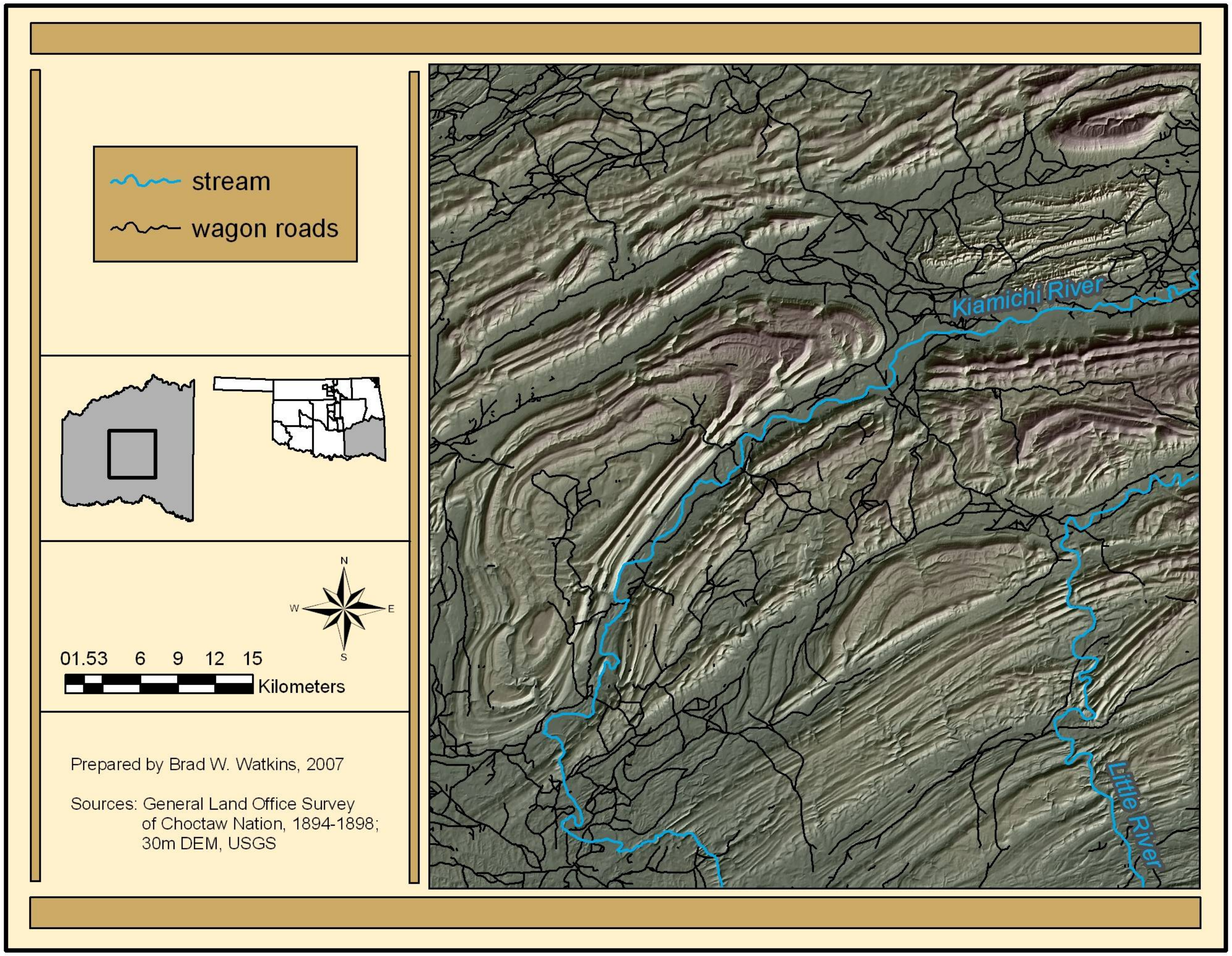

Figure 5.6: Wagon roads in the Kiamichi Valley in the center of the Ouachita Mountains

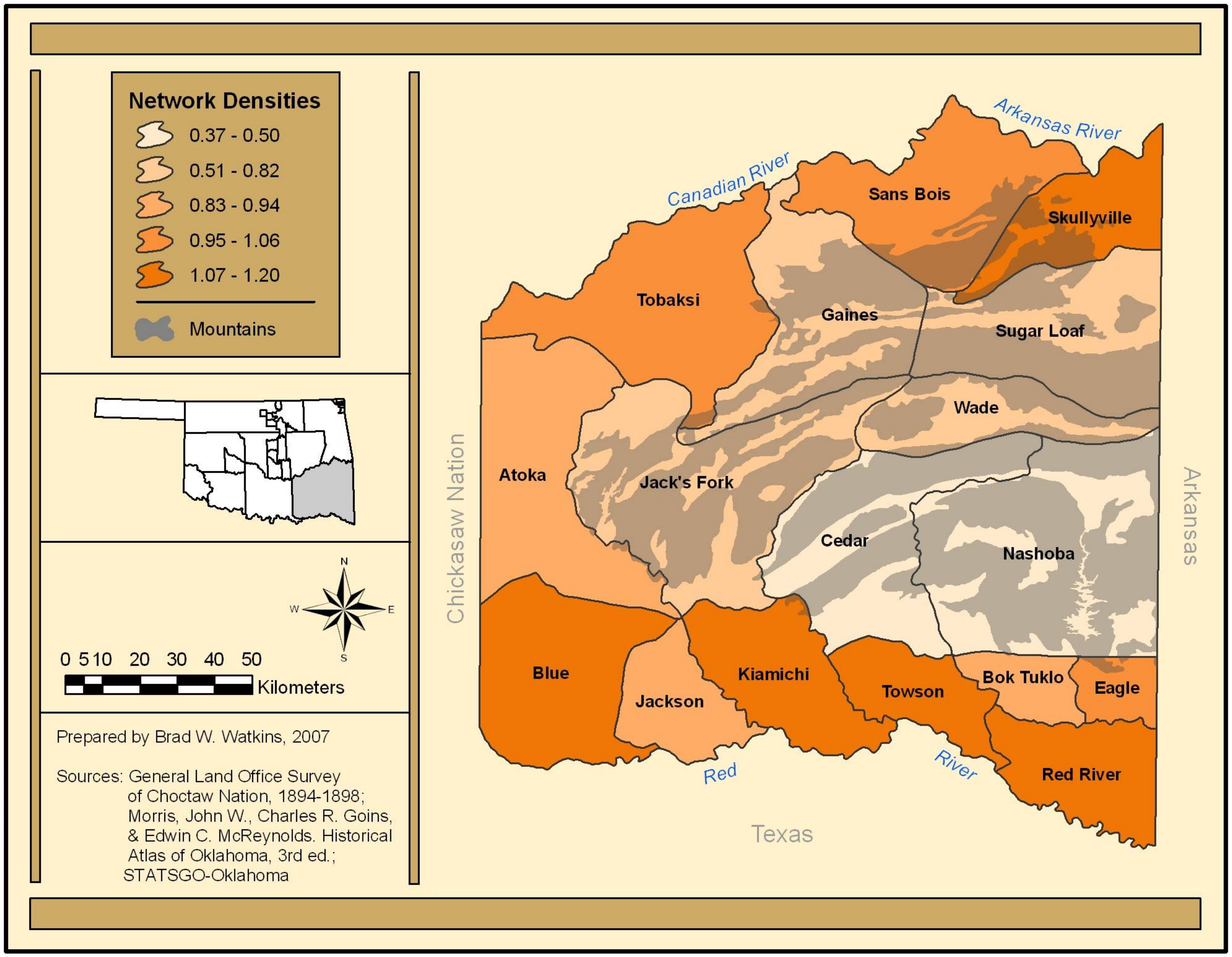

Figure 5.7: Netork density based on Choctaw Nation counties

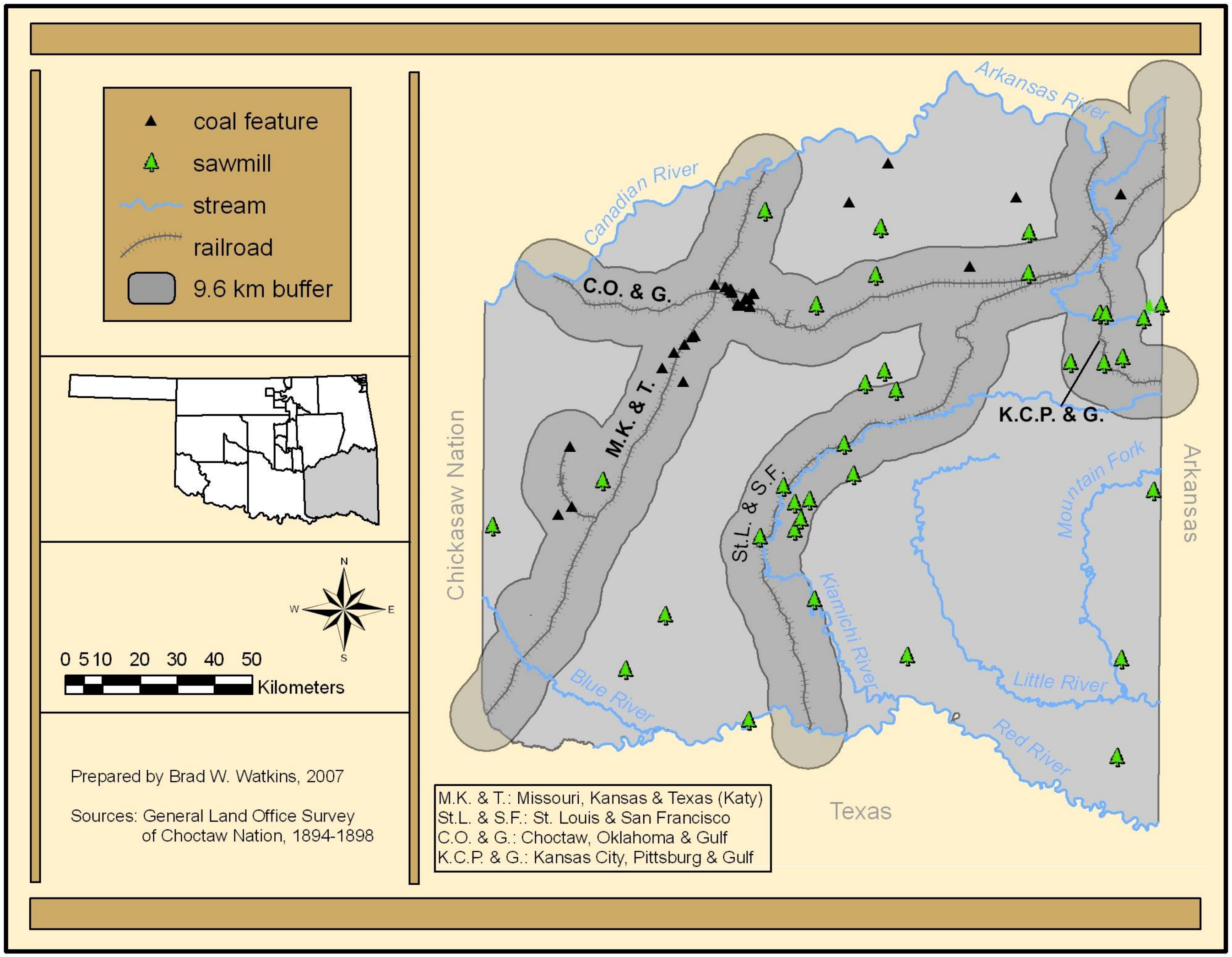

Figure 5.8: Sawmills and coal-related features in the Choctaw Nation. Buffer shows limiting distance for overland transport.

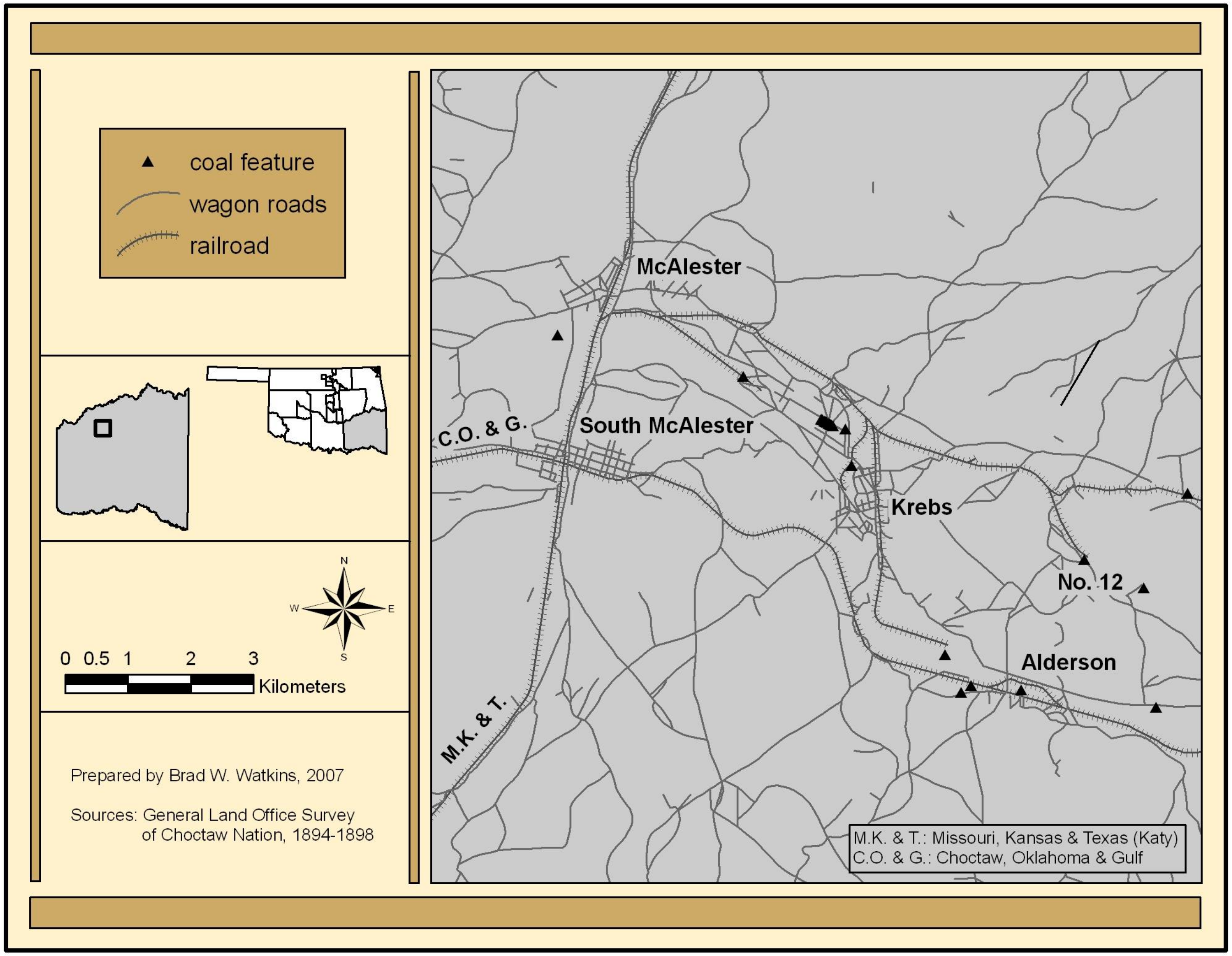

Figure 5.9: Major coal mining area of South McAlester, McAlester, Krebs, and Alderson. These towns exhibit transportation grid patterns.

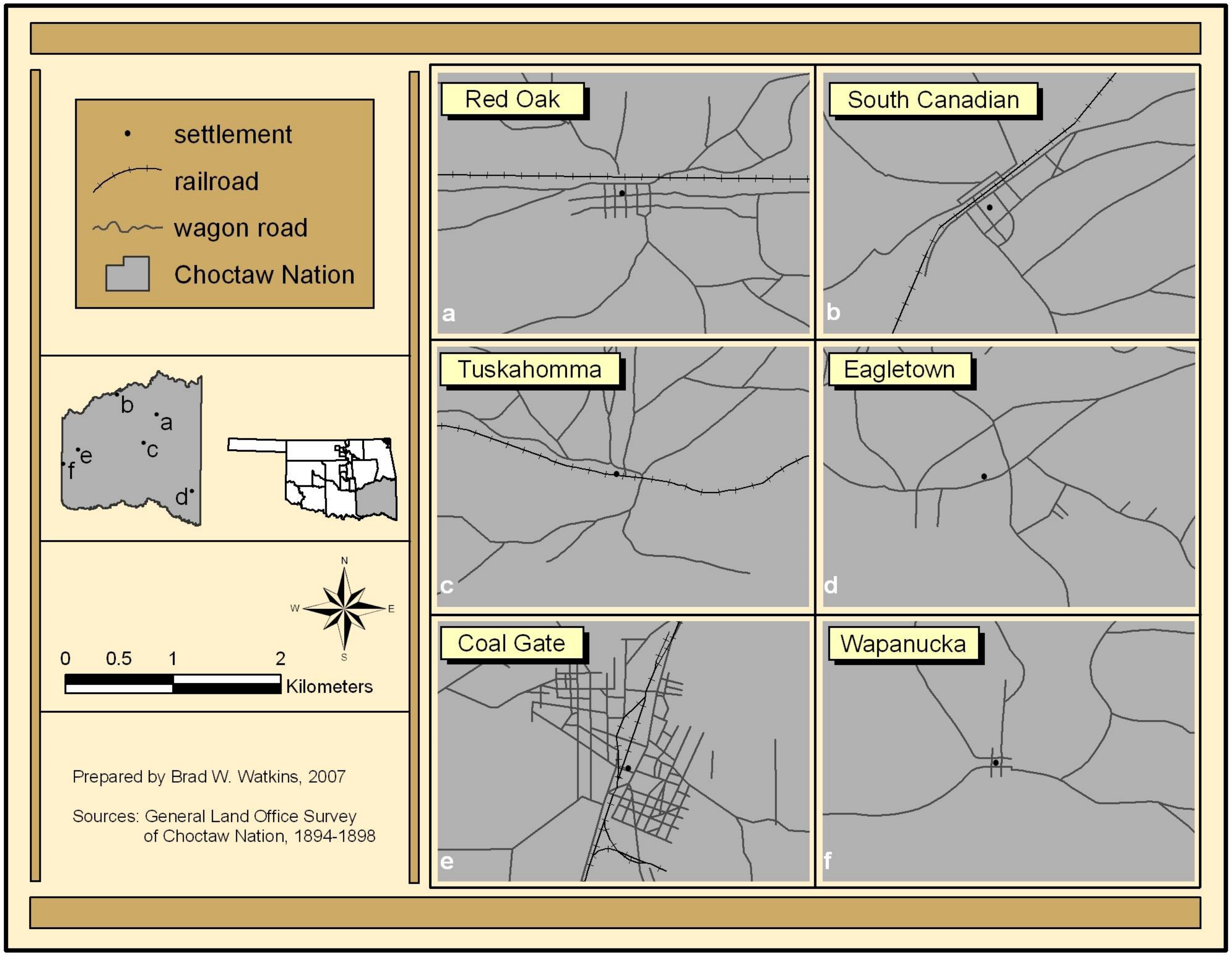

Figure 5.10: Transportation grids in the Choctaw Nation (all maps are the same scale)(Names appear as they did on the GLO plats)

Geomorphic Province	Wagon Roads (km)	Area (km^2)	Network Density
Arkansas Hill and Valley Belt	1,766.319	1,446.22	1.221
Dissected Coastal Plain	7,617.875	7,342.919	1.037
McAlester Marginal Hills Belt	5,845.645	5,660.12	1.033
Eastern Sandstone Cuesta Plains	2,731.977	3,014.52	0.906
Hogback Frontal Belt	1,468.831	2,391.8	0.614
Ridge and Valley Belt	3,459.825	7,462.33	0.464
Arbuckle Plains	19.335	48.414	0.399
Beavers Bend Hills	226.022	744.376	0.304
Total	**23,135.829**	**28,110.699**	---
Geomorphic Province Network Density			**0.823**

Table 5.1: Transportation network density values based upon geomorphic province. Values are based on wagon road lengths.

(Source: General Land Office Survey of the Choctaw Nation, 1894-1898; Johnson, Kenneth S., et al. 1972. "Geomorphic Provinces of Oklahoma." Geology and Earth Resources of Oklahoma*.)*

County	Wagon Roads (km)	Area (km^2)	Network Density
Skullyville	1,324.443	1,105.58	1.198
Red River	1,281.904	1,127.76	1.137
Blue	2,116.506	1,862.04	1.137
Kiamichi	1,486.173	1,311.98	1.133
Towson	912.609	823.94	1.108
Sans Bois	2,075.984	1,960.39	1.059
Eagle	390.699	376.808	1.037
Tobaksi	2,463.325	2,379.17	1.035
Jackson	792.339	838.407	0.945
Atoka	2,012.94	2,236.17	0.9
Bok Tuklo	409.894	461.726	0.888
Sugar Loaf	1,689.473	2,067.65	0.817
Gaines	1,662.117	2,058.58	0.807
Wade	830.463	1,109.44	0.749
Jack's Fork	2,017.577	3,009.97	0.67
Cedar	1,052.877	2,113.86	0.498
Nashoba	1,204.394	3,262.55	0.369
Total	**23,723.718**	**28,106.021**	---
County Network Density			**0.844**

Table 5.2: Transportation network density values by Choctaw Nation county. Values are based on wagon road lengths.

(Source: General Land Office Survey of the Choctaw Nation, 1894-1898; Morris, John W., Charles R. Goins and Edwin C. McReynolds. 1983. Historical Atlas of Oklahoma, 3rd ed.*)*

Settlement	Nucleation Class	RR Orientation
Atoka	large town	Y
Coal Gate	large town	Y
Krebs	large town	Y
Lehigh	large town	Y
McAlester	large town	Y
Phillips	large town	N
South McAlester	large town	Y
Antlers	small town	Y
Bokoshe	small town	N
Caddo	small town	Y
Cale	small town	Y
Cameron	small town	Y
Durant	small town	Y
Enterprise	small town	N
Hartshorne	small town	Y
Poteau	small town	Y
Red Oak	small town	Y
South Canadian	small town	Y
Talihina	small town	Y
Wister	small town	Y
Brooken	village	N
Calvin	village	N
Choctaw City	village	Y
Doaksville	village	N
Johnstown	village	Y
Kosoma	village	Y
Skullyville[1]	village	N
Savanna	village	Y
Stanley	village	N
Tamaha	village	N
(no name) T1N R10E	village	Y
Cavanal	hamlet	Y
Indianola	hamlet	N
Lona	hamlet	N
Page	hamlet	Y
Wapanucka	hamlet	N

Table 5.3: Settlement nucleations possessing transportation grids.

(Source: General Land Office Survey of the Choctaw Nation, 1894-1898)

1 Also labeled as Oak Lodge on GLO plat.

Settlement	Nucleation Class	Access Points
South McAlester	large town	13
Krebs	large town	12
Lehigh	large town	12
McAlester	large town	12
Talihina	small town	11
Atoka	large town	10
Cameron	small town	10
Coal Gate[1]	large town	10
Poteau	small town	10

Table 5.4: Accessibility for settlement nucleations with ten or more access points.

[1] spelling obtained from GLO survey plat and field notes

(Source: General Land Office Survey of the Choctaw Nation, 1894-1898)

Category	Nucleations	Access Point Total	Access Point Average
all nucleations	94[1]	498	5.3
railroad nucleations	49	330	6.7

Table 5.5: Accessibility for settlement nucleations in proximity to railroads.

[1] One nucleation was removed because surveys show no transportation access.

(Source: General Land Office Survey of the Choctaw Nation, 1894-1898.

CHAPTER 6

THE FENCED LANDSCAPE OF THE CHOCTAW NATION

Few features in the historical landscape reflect settlement patterns like fences. The fence, when studied as a component of the cultural landscape, acts as a cultural gauge when reconstructing an area's geography because it reflects the economy, settlement traditions and adaptations, and natural resource use The economic importance of fences in 1871 is clear. The U.S. Department of Agriculture estimated that a total of $1.7 billion was spent on fences in the United States, and that fencing constituted one of the primary expenses for the farmer—sometimes surpassing the cost of cattle (Report of the Commissioner of Agriculture 1871).

Not only was the fence a major factor in the overall function of a farm, but it was also a necessity for successful agricultural settlement. Fences primarily were constructed to protect crops from cattle, however, they also reflect cultural values. In areas settled by indigenous peoples, the increasing prevalence of fences indicated the change from communally based to individualistic land tenure (Raup 1947). When fences were constructed from local materials such as timber or stone, settlers simultaneously procured materials and cleared fields for crops.

Fences, therefore, indicate the intensity of land use from their tax on natural resources for their construction. The maintenance of wooden varieties required an almost constant depletion of natural resources. Through time, settlers may have enclosed several fields with fences. They became ubiquitous features in many mature agricultural landscapes (Hart and Mather 1957).

In 1871, there was an estimated 8.1 million km of fence in the United States, excluding Indian Territory according to the Report of the Commissioner of Agriculture (RCA) (1871). Yet, much of the research on fences deals simply with the evolution of the fence in the American landscape. Geographers and historians have given less attention to the fence as an object that was tied to the physical environment in which it was constructed. The General Land Office (GLO) surveys are excellent sources for this kind of detailed reconstruction. In this chapter, I attempt to ascertain the types of fence that existed in the Choctaw Nation, Indian Territory, and explore the relationship of land use and land cover to types of fences constructed. I will begin by reviewing previous studies of fences on the American Landscape and describe the various types and prevalence of fences that were in the Choctaw Nation during the 1890s.

The Fence in the American Landscape

A basic knowledge of fence types and trends is required to understand the fenced landscape in the Choctaw Nation in the 1890s. In 1871, the United States Department of Agriculture sent surveys to farmers and ranchers across the country regarding the nature of the fences in their county. The main questions in the survey asked participants to describe the types of fence in their county, including the proportions of each, if more than one existed, and the average height and method of construction. Other questions dealt with the price and type of materials used for construction, and estimates of areas enclosed by fencing. This survey was initiated to helps officials address the “fence problem” in the United States (Danhof 1944), the roots of which run deep into America’s past. The problem began with the massive use of wood by European settlers, mostly for fuel, although wood and wood products entered into almost every aspect of pioneer life. The incredible consumption of wood can be demonstrated by a comparison of presettlement forest cover estimates with contemporary figures. For example, it has been estimated that the original forest cover in the United States ranged from 332 to 344 million ha, or about 45 percent of the total land area. By 1920, the forest cover had been reduced to 190 million ha, of which only 56 million ha was original forest stands (Williams 1989). It should be noted that forests were used extensively, though not as intensively, by indigenous peoples prior to European contact (Denevan 1992). The fence problem was two-fold. As permanent white settlement emerged on the Great Plains, little to no suitable timber was present for the establishment of farmsteads. The situation was compounded by the greatly reduced supply of suitable timber in the eastern forests, thus the problem became a matter of invention by necessity. Reduced supplies prompted many to look for new fence materials or improve on old ideas. In the following paragraphs, I will describe the most prevalent fence types found in the Choctaw Nation, which represent a fraction of the variety of fencing used on the American landscape.

The types of fence recorded by surveyors in the Choctaw Nation were worm, post-and-rail, board fence, picket fences, and barbed wire. The worm fence, also known as the Virginia rail, snake, or zigzag, is the archetypal fence of the pioneer woodland settler (Hewes and Jung 1981; Jordan, Kilpinen, and Gritzner 1997). It consisted of interlocking rails (usually split) that were set at an angle to produce a zigzag pattern. So prevalent was this fence by the time of the RCA, that is was deemed the “National Fence” (Report of the Commissioner of Agriculture 1871, 506).

Construction of a worm fence consumed quantities of both labor and materials. The fence itself consisted of rails assembled into interlocking panels. Although the angle at which panels were set varied, sixty degrees was considered the most efficient angle for strength and to maximize the area enclosed (Leechman 1953). Although rail length, panel angle, and the number of rails per panel could vary considerably, Douglas Leechman (1953) calculated that a worm fence constructed with eleven foot rails, stacked ten high, at an angle of sixty degrees with one foot overlapping, took 6,600 rails per mile.

There were two disadvantages of the worm fence. First, when used to keep livestock out of cultivated fields, panels had to be built several rails higher, thus incurring greater expense. The second was that because construction used several split rails placed closely together, the greater surface area provided could easily topple a fence in high winds. This problem was averted by development of the “stake-and-rider” fence (Via 1962; Withers 1950), which was a worm fence with the addition of two long rails that crossed in the shape of an “x” at the each angle. A heavy top rail held these “stakes” in place (Figure 6.1). It, too, required massive amounts of timber.

Apart from the great amount of wood used in the initial construction of a worm fence, rails had to be replaced every eight to twelve years, depending on the type of wood used and whether the bottom rail was raised off of the ground to reduce exposure to moisture (Raup 1947). The nature of its construction, however, would be its demise. Worm fences required great amounts of timber. As settlement expanded onto the Great Plains in the 1850s, sufficient timber for fence construction was in short supply (Wishart 2001).

The post-and-rail fence began to replace worm and stake-and-rider fences in some areas of the United States (Long 1961). This fence consisted of two vertical posts set in the ground to support horizontal rails that overlapped at the ends. As a result, it was also known as the “straight rail” fence, since the panels were set in a straight line. The chief advantage of this fence over the worm was that it kept little land out of use. It also required less timber and was very strong. Rocky, shallow soils, however, made digging post holes very labor intensive and sunken posts would rot in a short time unless treated with creosote (Jordan and Kaups 1989; Leechman 1953; Long 1961).

The “board fence” required less timber than the worm, stake-and-rider, or post-and-rail. Construction consisted of posts set into the ground with three or four dimensional boards for rails. The rails were attached to the post by nails or with mortise-and-tenon joints. There were many added costs in labor and material in constructing the board fence. Before wire nails were invented, however, nails were expensive because they were cut by hand, often making them cost prohibitive. Setting posts in the ground added to labor costs. The price of boards in some areas caused this fence to become more of a specialty fence, later to be known as the “gentleman fence” and became common in the Kentucky Bluegrass region (Mather and Hart 1954; Norris 1982). Mortising fence was also a labor intensive process that added to the expense of construction and maintenance (Hart and Mather 1957; Leechman 1953; Mather and Hart 1954).

Finally, the “picket fence” was both functional and aesthetic. It was constructed of vertical pickets, often whitewashed, nailed to the front of horizontal rails. Because of the narrow spacing between the pickets, it served to keep smaller animals out of gardens and yards and was the preferred fence for this task (Brinkley 1999).

Settling a relatively treeless environment such as the Great Plains and Interior Low Plateaus required a new kind of fence. In addition to the demand on timber supplies of traditional fences, the amount of land occupied, the shadows cast, weakness in strong winds, tendency to create large snowdrifts, and labor cost were disadvantages of the worm that were exacerbated on the Plains (Leechman 1953; Via 1962). The barbed wire fence solved these problems. Alphonso Dabb first patented the barbed wire fence in the United States in 1867, but Joseph Glidden received the most credit for a functional and marketable barbed wire patent in 1874 (McCallum and McCallum 1965). This new fence required wood only for posts, later replaced by steel posts. It shaded almost no land, nor did it compete for moisture as did the bois d'arc hedge so highly esteemed in Kansas (Danhof 1944; Report of the Commissioner of Agriculture 1871). Barbed wire provided no real resistance to wind; therefore, it did not sway, weaken, or cause snowdrifts. Smooth wire fencing had been around since 1810, but it was prone to snapping in cold, drooping in heat, and did a poor job of repelling larger animals (Danhof 1944; Leechman 1953). Wire eventually became cheaper and stronger with the introduction of the Bessemer converter in the 1860s, which converted molten pig iron into malleable steel (Temin 1963). In addition, Glidden's patent of twisting two wires together added strength and secured the barbs. These two processes helped eliminate snapping due to temperature fluctuation. After its introduction, barbed wire production skyrocketed from five tons in 1874 to 40,000 tons in 1880 (Leechman 1953).

Fences reflected the physical environment in the Choctaw Nation during the 1890s. Large expanses of timber as well as extensive grassland covered the area. One white resident told of "fine, large, yellow pine timber and…a good many white oaks" that could be found in the Kiamichi Mountains (Perdue 1980, 157). Surveyors working in the mountainous portions of the Choctaw Nation noted the timber quality and quantity writing "The timber along the river is elm, ash and hickory, mostly all of which is to [sic] small for any use; although the mountains are covered with pine of considerable size and value" (Martin and Jones 1895, 48). The railroads running through the Choctaw Nation obtained cross ties from sawmills operating at various timbered locations also attested to plentiful timber even by the early 1870s. In fact, surveyors recorded thirty-six sawmills operating throughout the forested areas, some supplying cross ties, but also dimensional lumber for frame building and board fence construction. Analysis of the GLO plats from the 1890s, reveals the connection between wooden rail (worm) fences in forested areas and barbed wire fences in grasslands hinting that the physical environment was a considerable factor in the settlement patterns of the Choctaw Nation.

Fences and the General Land Office Surveys

The General Land Office (GLO) plats provide data on fence type, length, shape, and orientation. From the type of fence, I was able to ascertain the construction material. Fence lengths, obtained once all fences were mapped, provide a measure of the frequency (and importance) of fence types. Shape and orientation reveal the arrangement of fences in the landscape and provide insight into land use practices in a pre-township and range landscape. While it is impossible to obtain the precise amount of fence in the Choctaw Nation, the surveys provide the best data for understanding their variety and extent.

Surveyors recorded the fences they encountered with a variety of symbols (Figure 6.2) on the plat maps supplemented by written descriptions in their field notes. In order to accurately determine the type of fencing, it was necessary to investigate other sources. For example, on the plats surveyors did not denote the type of rail fence used by residents, but when specific locations are compared with contemporaneous historical photographs, the presence of the worm or stake-and-rider fence on the landscape is revealed (Photograph, 1682, 568). The use of this type of fence during the time of the GLO surveys was noted in other parts of Indian Territory. Photographs indicate that worm and stake-and-rider fences existed in the Muscogee Nation (Photograph, 14789.A, 14789.B). A resident in the Cherokee Nation told of the procedure for constructing a “worm rail” fence with rails made with a hand axe after the Civil War (Perdue 1980, 46). Another indication of the use of worm fences comes from the survey plats. The symbol for “rail fence” closely resembles the panel arrangement (zigzag) for a worm fence (Figure 6.2 top). Another interpretation of the plat symbol and term “rail” could referred to a post-and-rail variation of the straight rail fence with mortised joints, which used two vertical posts. This fence would have been equally labor intensive as the worm fence and much less suited to the shallow soils of the sandstone ridges of the Ouachita Mountains. There is evidence that the board fence was used in the Choctaw Nation (Figure 6.3). When surveyors marked board, picket, paled (a fence similar to picket), and other specialty fences, I cross checked each instance with corresponding field notes. These fences, however, constituted only 2.5 percent of fences in the Choctaw Nation. There was no mistaking the symbology for barbed wire fences as demarcated on the plats.

Other Historical Accounts

The GLO surveys, though the most comprehensive source, are not the only resource for interpreting the enclosed landscape. Various explorers and military expeditions traversed parts of the Choctaw Nation. Lieutenant Amiel Whipple's (1941) journal of the survey for a potential transcontinental railroad route is particularly helpful in understanding the Choctaw Nation landscape in 1853. Though Whipple mentioned fences briefly, he provided a very descriptive account of forest stands and grasslands. Heinrich Mollhausen, the artist and cartographer on the Whipple expedition, wrote vivid descriptions of the landscape and people. For example, while in the vicinity of Sugar Loaf and Cavanal mountains in the northeastern Choctaw Nation, he described "hard hickory" forests suitable for log construction and "slender stems enough for…fences" (Wright and Shirk 1953, 399).

John Edwards (1932) was a missionary who resided in the Choctaw Nation from 1851 to 1861. He wrote that brush fences were used to protect crops as the need arose. As the amount of fencing increased and rail fences were adopted the Choctaw legislature enacted legislation to regulated fence construction in 1888. Edward's noted that Choctaw law required that panels were to be ten rails high with rails in the bottom 2.5 ft. of the panel spaced four inches apart. Many fences had such spacing for only the bottom two feet, though. These fence regulations were the products of two separate laws. The four inch spacing of rails was adopted in 1836 as a means to keep hogs from destroying gardens (Choctaw Nation 1973). The ten-rail-high regulation was adopted in 1888 probably as more people settled in areas with cattle and horses. Edwards noted that although many fences fell short of these regulations, "there is a constant improvement" attesting to the ongoing process of fence building and maintenance (411).

Additional components of the legislation restricted citizens from constructing fences that blocked roads. If they did so, the responsibility fell upon them to construct a "substantial road" around the obstruction (Debo 1934). The Choctaw legislature also limited the amount of land any one person could enclose to 1 mi^2. If fences were rail, then they should be "staked and ridered," board fences should have top rails securely fastened with nails, and no person could have more than one such fence per county (Choctaw Nation 1973, 231). Such fence laws enacted prior to the 1890s demonstrate the changing cultural landscape and land use in the Choctaw Nation from that recorded by Nuttall in 1819.

Results

Rail fences predominated in the Choctaw Nation at the time of the GLO surveys (Table 6.1). Of a total of 7,851.81 kilometers of fence in the Choctaw Nation, 4,191.18 km, or 53.3 percent, were rail fences (Figure 6.4). These fences occurred throughout the study area, including valleys, prairies, bottom lands, and even in mountainous areas. Rail fences typically were shorter and enclosed smaller areas than barbed wire fences, perhaps due to higher amount of labor required for construction. Rail fences more often enclosed cultivated fields than pastures.

Barbed wire fences accounted for the second most prevalent fence type at 3,571.76 km, or 45.49 percent. Barbed wire fencing occurred more often in open grasslands than in forest/woodland cover where it enclosed larger fields and pastures. Barbed wire, relatively easy to erect, was suited for longer lengths and straight fences. In fact, proper installation of this high tension fence demanded straight segments to facilitate stretching.

Picket and paled fences together made up only 0.56 percent of fences recorded by GLO surveyors, with 41.65 km and 2.56 km, respectively. Board and plank fences constituted only 0.54 percent with 36.39 km and 6.6 km, respectively. Stone, brush, and pole fences combined accounted for 0.02 percent of all fences. These fences, at best, were "specialty" fences. They usually occurred around garden plots, yards, or public buildings such as education institutions or courthouses. Several historical photographs show picket fences surrounding schools in the Choctaw Nation. According to the 1871 RCA these fence types, especially board and plank fences, required greater financial investments (Table 6.2). In comparison to the states participating in the RCA questionnaire, the Choctaw Nation remained relatively unfenced due to the rugged and unarable portions of the Ouachita Mountains and relatively late (post-bellum), large-scale emigration. For example, Massachusetts, a state comparable in size to the Choctaw Nation, contained about 106,087.96 km of fence in 1871 compared to the Choctaw Nation's 7,851.81 km in the 1890s (Report of the Commissioner of Agriculture 1871, 510).

Rail fences predominated in other forested southern states to an even greater extent than in the Choctaw Nation. This is particularly true of the adjoining states of Texas and Arkansas, which were source areas for white settlers into the Choctaw Nation in the late nineteenth century. According to the 1871 RCA, Arkansas, with terrain and vegetation similar to the Choctaw Nation, reported that 98 percent of all fencing was worm fence, while board and "other kinds" of fencing constituted the remaining 2 percent. Texas reported that 74 percent of all fencing was worm, whereas the remaining 26 percent was board or other kinds. (Report of the Commissioner of Agriculture 1871, 507). The statistics for these areas strengthen the argument that the "rail" fences surveyors referred to were the worm variety since the known fencing practice would have diffused throughout the Choctaw Nation with the arrival of emigrants from these states.

It is interesting that barbed wire fence did not constitute a larger percentage of fence in the Choctaw Nation. The RCA report, after all, was the statistical backing for the push to develop a new and cheaper type of fence, in terms of labor and adaptability to reducing resources. Large scale barbed wire production began twenty years prior to the GLO surveys. This gave residents of the Choctaw Nation enough time to adopt barbed wire—ample time for barbed wire to become the predominant type of fence, yet it did not. According to Darrell Norris (1982), 300,000 miles of barbed wire ran across the Midwest and surpassed wooden varieties by the end of the nineteenth century. What kept barbed wire from displacing other fence types as it did in other parts of the country? One explanation is simply the cost of barbed wire. Worm fences, despite the labor involved in construction, were cheaper than barbed wire fences. Whereas wire, and in some cases nails, had to be purchased. Close proximity to natural resources also explains the reduced cost for worm fences. Materials for worm fence construction were readily available. The Ouachita Mountains provided the timber needed to construct an entirely wooden fence. Perhaps settlers were not ready to change their fencing practice suggesting that tradition and knowledge largely influenced their choices.

There is a striking relationship between the distribution of the worm and barbed wire fences and land cover. As note earlier in the dissertation, surveyors recorded a grassland land cover type, which can be described as open prairie consisting of tall-grasses. The situation with woody vegetation is problematic. Although the surveyors delimited forested areas, we know from contemporary vegetation that these sites consist not only of closed canopy forest, but include areas with a “park-like” vegetation. In fact, some areas have been regarded by ecologists as open savanna vegetation (Bruner 1931). For example, the shortleaf pine forests of the Ouachitas had widely spaced trees (Smith 1986). Thus, I chose to group forests and woodlands into the same category (Watkins 2002).

The most striking pattern of fences in relation to land cover is the close correspondence of barbed wire fences and grassland areas. Much of the grassland in the Choctaw Nation was located north, west, and southwest of the Ouachita Mountains (Figure 6.5). Although the grassland area is interspersed with forest/woodland, it is reasonable to believe that most of the areas mapped by GLO surveyors as grassland had few trees. Barbed wire fences dominated when compared with grasslands using GIS (Figure 6.6). Out of the 3,554.92 km of fence that had some portion erected in grassland areas, barbed wire made up 2,443.29 km, or 68.7 percent. This compares to 1,072.73 km of rail fence, or 30 percent, located in grassland areas. This is contrary to results for the entire Choctaw Nation, in which barbed wire fences accounted for only 45.49 percent compared to rail fences at 53.3 percent. The pattern is even more pronounced when land cover area is considered. Grasslands accounted for only 3,868.97 km^2, or 13.7 percent of the total land cover, whereas forest/woodland made up 23,590.3 km^2, or 83.8 percent. Simply put, the less frequent barbed wire fence occurred most often on grassland. Such a pattern strongly suggests that a lack of natural resources was a factor in the types of fences in the Choctaw Nation in the 1890s.

Animal husbandry further drove this pattern. Doran (1976) has shown that cattle herding was a dominant industry in the Choctaw Nation prior to the Civil War. Choctaws, mainly Progressives, gained knowledge of animal husbandry while still in Mississippi, and brought some cattle to Indian Territory during removal. Although grazing cattle, at least on some scale, was always known in the Choctaw Nation of Oklahoma, small-scale cultivation retained its place, especially among the Traditionals, who appear to have kept smaller fields close to their dwellings (Debo 1934; Graebner 1945). But the proliferation of cattle meant that fields had to be fenced to protect the crop. This pattern is evident in the GLO surveys, as the great majority of the fences were very small segments generally surrounding cultivated fields. Land in Indian Territory was held in common unless improvements had been made, and as long as a citizen stayed on the land it was considered taken. In some cases, a Choctaw could employ a white or Black laborer to make improvements on a piece of the Choctaw tribal land including constructing a dwelling, cultivating land, and erecting fences. After a specified amount of time, the improved land became the property of the Choctaw citizen (Debo 1934). This pattern emerges from the surveys as a labyrinth of small fence segments with no ordinary shape or orientation and that appear to serve no other purpose than to prove occupation.

Board and plank fences consisted of rails constructed with dimensional lumber. Although board and plank fences accounted for only 0.5 percent of fences, a peculiar pattern arose in their placement. Boards and planks needed to be sawn and/or planed. Hence, I asked whether fence locations coincided with sawmills within the Choctaw Nation. I approached this question in two ways. First, I used a *standard distance* calculation, which uses a set of points, in this case sawmills, to determine the compactness of distributions. I calculated the standard distance for sawmills and for board/plank fences (Figure 6.7). By comparing the two circles, the radii of which represent standard distances, the board and plank fence concentration shows a 91 percent overlap with the sawmill concentration. Secondly, I used proximity to analyze the relationship between individual fences and sawmills and, therefore, is more precise. Using GIS, a buffer of 16 km was created around each sawmill (Figure 6.8). The results indicate that of the 83 board/plank fences, 73 fences, or 88 percent were within

16 km of a sawmill, thus indicating a relationship between sawmills and availability of dimensional lumber. Even if a buffer of 9.6 km was used, as in Chapter 5, 47 board/plank fences, or 57 percent were located within 9.6 km of sawmills.

Conclusion

Surveyors found and recorded nine fence types in the Choctaw Nation during the 1890s, but two fences, rail and barbed wire, dominated. The rail fence remained important into the 1890s because it most likely was the first fence used after removal. However, barbed wire was almost as prevalent attesting to the change sweeping across the territory—a change in economy and in land use. These fences were products of the physical environment in which they stood but also of technology, cultural traits, and land tenure. The story of fences in the Choctaw Nation parallels that of the rest of the United States but on a different time scale. The period between 1820 and 1906, while the Choctaws were in control of their economic development and settlement, was one of relatively small scale agriculture and communally based land tenure. Soon after removal in Indian Territory, the nature of settlement did not require the need for lengthy fences. After the Civil War ended and the railroads began in the Choctaw Nation, large numbers of whites entered. The idea of individualism increased dramatically, and the fence became a principal feature of the new settlement landscape.

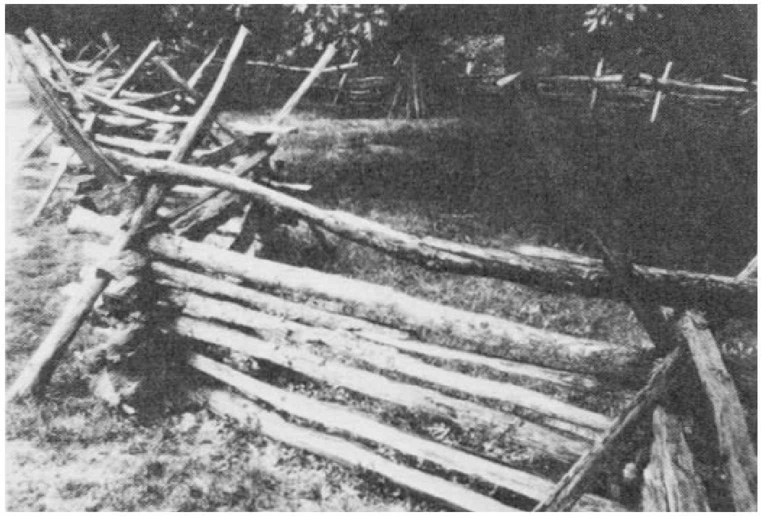

Figure 6.1: Rail (worm) fence shown with stakes and riders. The stakes form "Xs" and the riders rest horizontally above the intersections of stakes.

(Source: Hewes, Leslie and Christian L. Jung. 1981. "Early Fencing on the Middle Western Prairie." p 178)

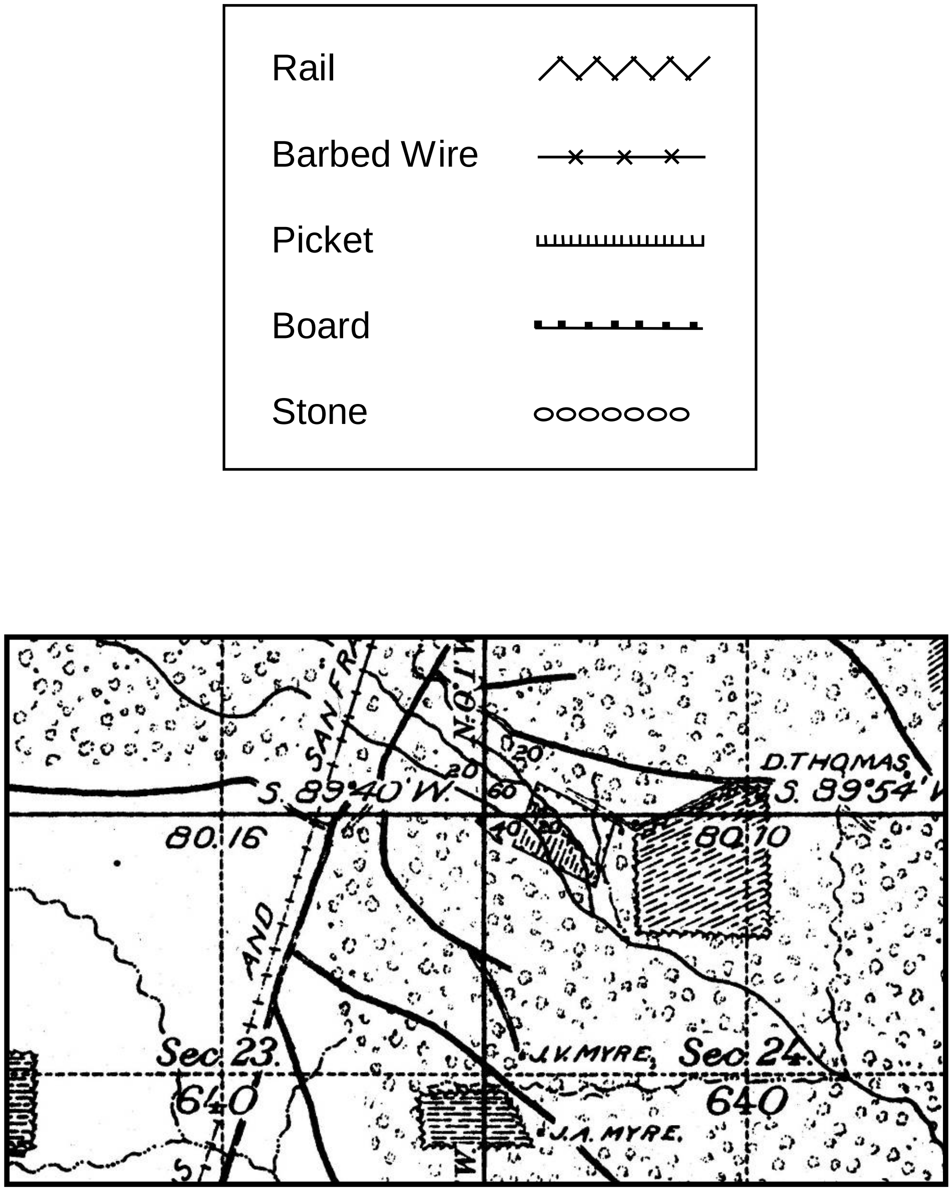

Figure 6.2: Top figure shows symbols used by surveyors to denote fence types. The bottom figure is a portion of a General Land Office survey plat showing rail fences and a board fence.

Figure 6.3: Residence of Gilbert Dukes east of Talihina, Choctaw Nation. Photograph shows stake-and-rider, board, and picket fences. *Courtesy Oklahoma Historical Society*

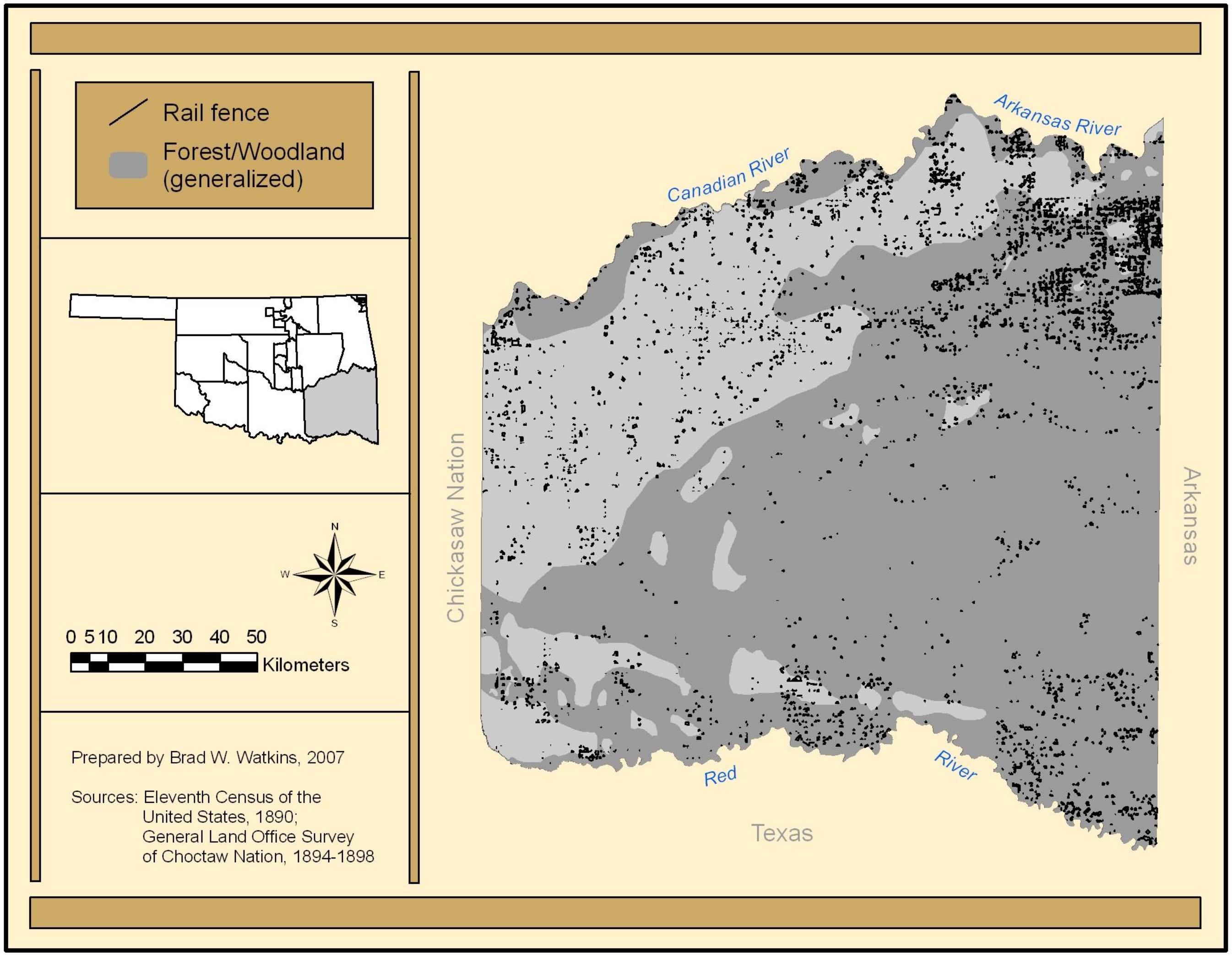

Figure 6.4: Rail (worm) fences and generalized forest/woodland land cover.

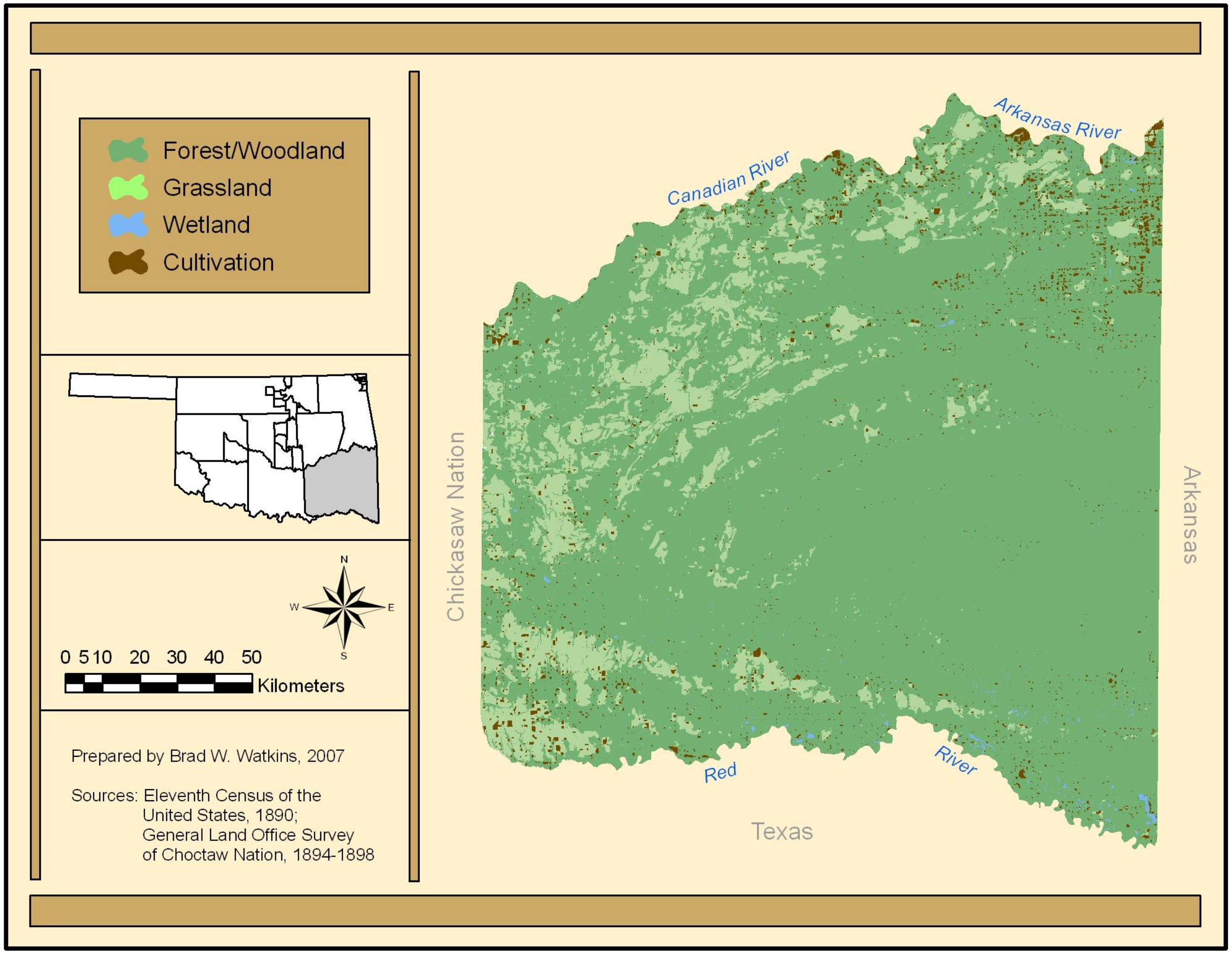

Figure 6.5: Choctaw Nation land cover showing much of the grassland areas to the north and west.

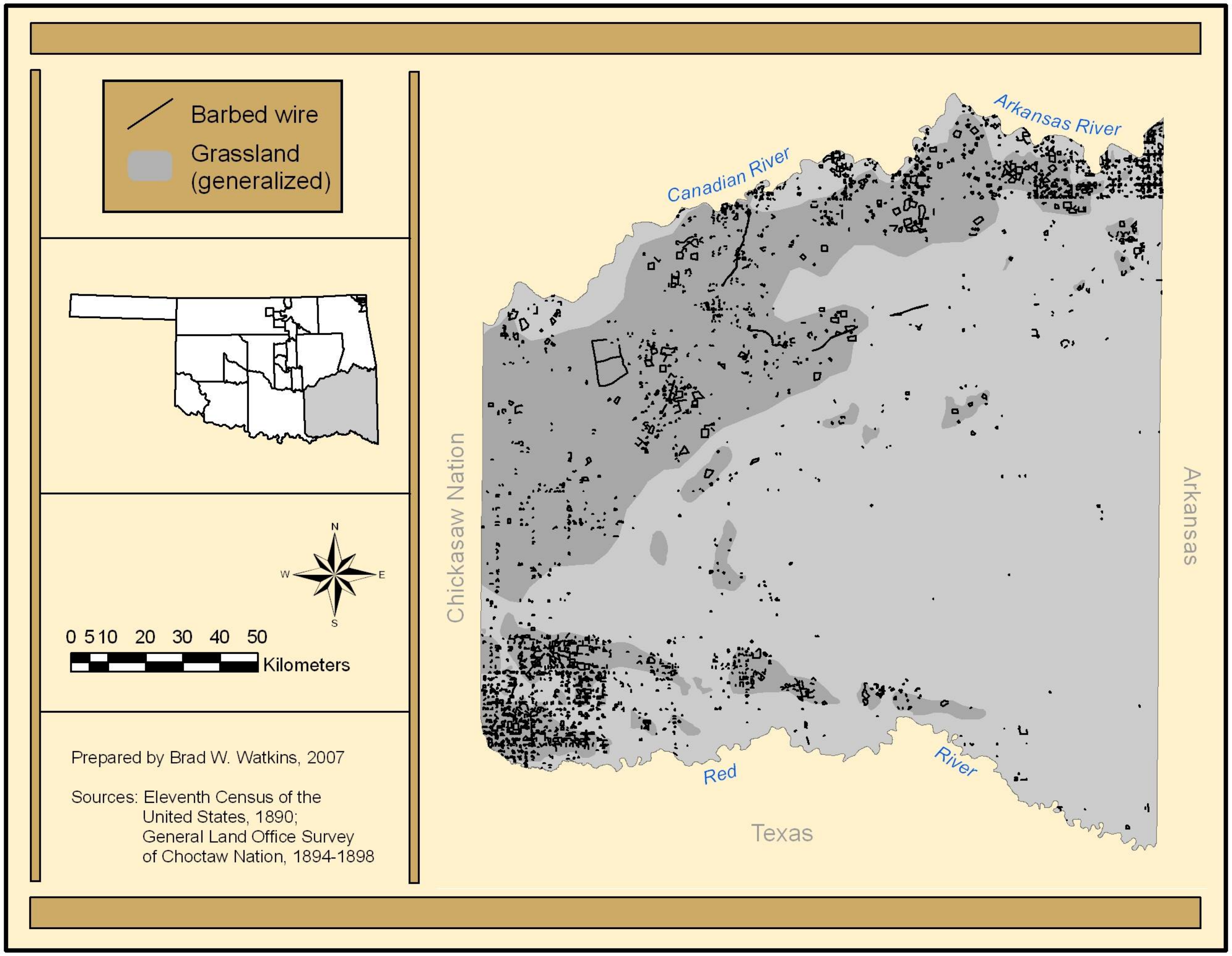

Figure 6.6: Barbed wire fences and generalized grasslands.

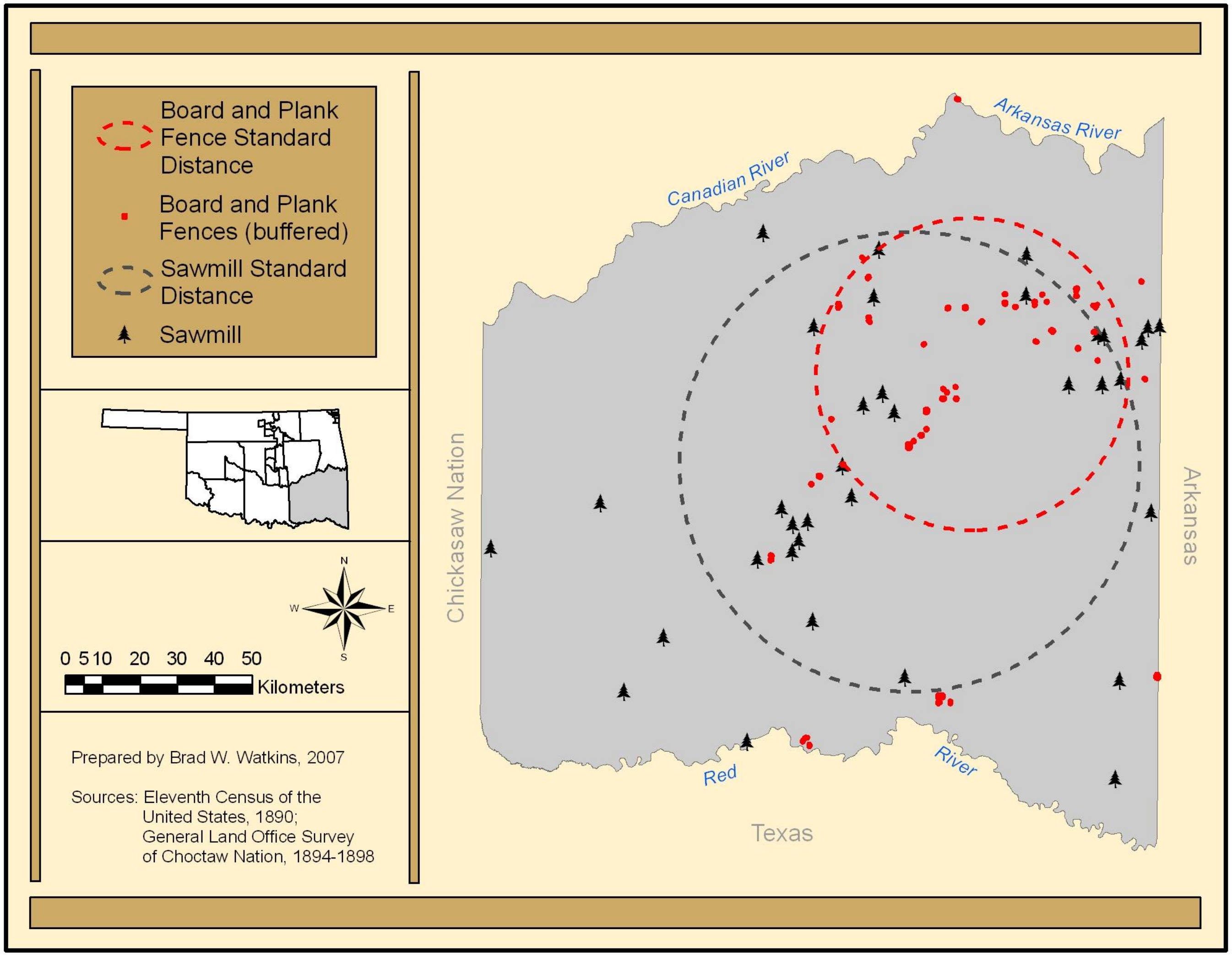

Figure 6.7: Board and plank fences, sawmills, and standard distance circles comparing concentrations of fences to sawmills.

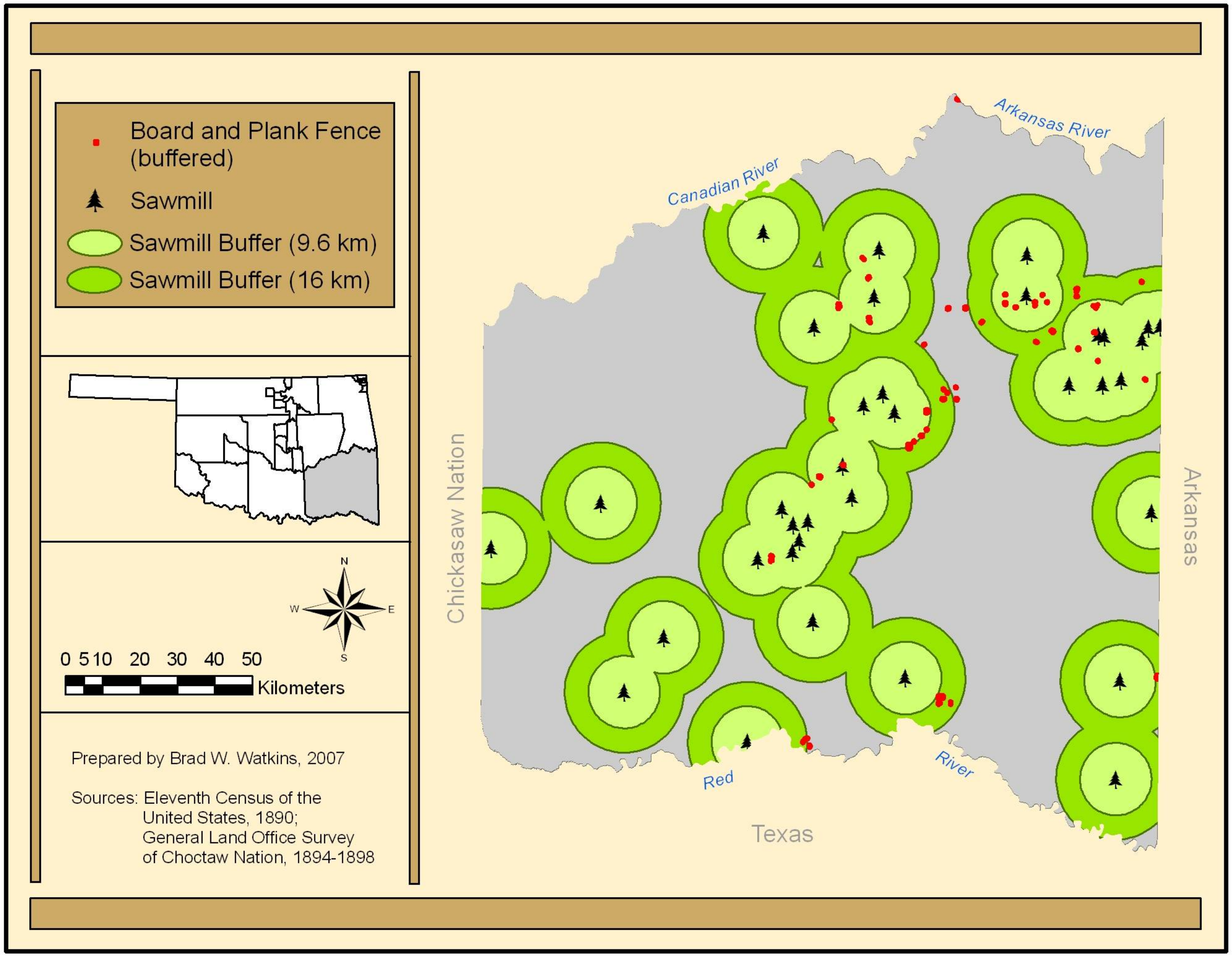

Figure 6.8: Board and plank fences and sawmills with 9.6 km and 16 km buffers.

Type	Length (km)	% All Fence	% Intersecting Grassland
Rail (worm)	4,191.18	53.38	30.18
Barbed wire	3,571.76	45.49	68.73
Picket/paled	44.21	0.56	0.77
Board/plank	42.99	0.54	0.31
Brush	0.6	0.01	0.01
Stone	0.8	0.01	0.00
Pole	.027	0.01	0.00
Totals	**7,851.81**	**100%**	**---**

Table 6.1: Fence quantities in the Choctaw Nation, 1890s. Table shows percent of fence types and percent of those types that intersect grasslands.

(Source: General Land Office Survey of the Choctaw Nation, 1894-1898)

State	Worm	Post and Rail	Board
Louisiana	$.60	$1.25	$3.00
Mississippi	$.43	$.87	$1.57
Texas	$.87	$.80	$1.44
Missouri	$.88	$1.02	$1.43
Kansas	$1.08	$.96	$1.27
Arkansas	$.43	$1.25	$1.21

Table 6.2: Cost of fence material per rod[1] in 1871.

[1] 1 rod is equal to 5 meters (16.5 feet).

(*Source: USDA Statistics of Fences in the United States, 1871*)

CHAPTER 7

CONCLUSIONS

Historical settlement geography offers a way to study how people organized their spaces and the interrelationships between them and their physical settings. Settlement pattern and form are important aspects of cultural landscape reconstruction because they provide evidence of those interrelationships. Landscape reconstruction is related to the subfield of historical geography in which the study of time and geographic space is conceptualized through several approaches.

In this study I combined the *temporal cross section* with the *vertical theme*. The temporal cross section is used to examine a specific time period in great detail. The vertical theme is used to trace the development of spatial phenomena from one period to another. They best accommodate the main data source, the General Land Office (GLO) surveys, and the relatively late entry of the Choctaws into Indian Territory—sixty years prior to the time of the surveys. The GLO surveys provide the earliest, most accurate, and most encompassing view of the cultural and physical landscape of the Choctaw people in Indian Territory. Although these surveys covered only a short period in history, the amount of descriptive detail and geographical data they contain is remarkable. Though the surveys contain many details, at best one can only speculate on the historical landscape of the Choctaw Nation.

This study, in addition, incorporates the latest geospatial technologies such as geographic information systems (GIS) and the global positioning system (GPS) to provide new possibilities for applying the temporal cross section and vertical theme in historical geography. The combination of GLO surveys and GIS enabled a more efficient reconstruction of the late nineteenth century cultural landscape of Choctaw Nation. GIS enabled the creation of the Choctaw Nation Geospatial Database (CNGD) through which historical settlement patterns could be analyzed within their physical environment context. This database can be easily appended and will add to the further development and maintenance of current cultural and historical resource management efforts.

A variety of geographic phenomena spanning many years can be compared efficiently using GIS. This comparison is made possible because data in a GIS is geographically referenced. Put another way, providing the data is available, phenomena and patterns in a landscape for a given time can be compared to any other period in which data survives. The GLO surveys are an excellent data source for inclusion into a GIS also because of the geographic integrity with which they were produced. These highly detailed and spatially referenced data, combined with the analysis capabilities of a GIS, provided a more extensive examination of past settlement landscapes than before was possible. It also provides a benchmark for future historical and geographical research on the Choctaw Nation.

It would have been impossible in the present study to consider every aspect of the cultural landscape for such a large area. Therefore, three main aspects of the settlement landscape were chosen. The questions addressing Choctaw Nation landscape reconstruction were related to 1) settlement patterns and forms, 2) transportation patterns, and 3) fences as material components in the landscape.

Scale is critical when settlement patterns and forms are examined. Without the proper use of scale, it is difficult to ascertain what is concentrated and what is dispersed—what is large and what is small. The extent and completeness of the GLO surveys enable the study of settlement patterns at the Choctaw National scale, while the details in local communities allow a smaller, local scale study of settlement forms. Though the surveys did not provide data that would allow the classification of building form, community form was another matter. Plus, the addition of data on the physical setting such as land use and land cover allows one to reconstruct and examine the interrelationships among settlement patterns, transportation, material culture in their environmental settings.

The Settlement Landscape

Settlement patterns were examined to determine if a relationship existed between the locations of dispersed farmsteads and the lands suitable for agriculture. This was addressed through a large scale analysis of settlement features mapped from the GLO surveys. Dispersed settlement structures were overlaid onto land capability classes (LCC) to determine and counts were made for the number of built structures on each LCC.

I found that 52.8 percent of dispersed structures were located on what were considered suitable lands (LCC I-IV). Lands considered unsuitable for cultivation (LCC V-VIII) contained 43.2 percent of dispersed structures. The remaining structures coincided with areas with no LCC data. These numbers reflect almost a balance between the use of suitable and unsuitable lands. This measure assumes that dispersed structures are tied to agricultural activities, though this was not always the case. LCCs V-VIII, though not good for cultivation, made suitable grazing lands. The western Choctaw Nation, which contains considerably more grassland, coincides with these LCCs. Hence, the dispersed settlement structures that coincide with the grasslands and higher LCC values (not suited to cultivation) could, in fact, have been engaged in stock raising as Doran (1976) reported.

I examined agricultural settlement in another way by analyzing the locations and sizes of cultivated fields in relation to LCCs. These results show that the suitable LCCs contained 60 percent of all of the cultivated land, whereas 32 percent of cultivated land was located on land unsuitable for cultivation. The analysis of field size presents similar findings to that of dispersed structures and cultivated fields. The majority of large cultivated fields occur in bottomland areas near major streams.

The second question addressed “nucleated” settlement form. For this small-scale analysis of settlement, I based the classification on a modified version of Roberts' (1996) framework. I developed a usable scheme, however, that addressed the restrictions of the data source and time period of the study. Nucleations in the Choctaw Nation were classified as 41 percent agglomerated, 33 percent linear, and 26 percent composite. Most of the ninety-five nucleations had a regular as opposed to an irregular arrangement. Most of the large nucleations centered around mining activity possessed composite forms. An additional question arose from the results of this analysis. What was the early (post-Removal) standard for nucleations? Was there a standard? This "framework" approach to settlement provides a benchmark for the late nineteenth century while at the same time invites further discussion on the development of settlement patterns and forms.

The Transportation Landscape

Transportation was examined to answer two questions, the first dealing with differences between rural and urban communities, and the second concerned with how different modes of transportation was related to the extraction of coal and timber. To determine if differences existed between urban and rural settings, I calculated network densities, analyzed grid patterns, and determined accessibility. For the entire Choctaw Nation, the network density, which is a measure of the length of wagon roads divided by land area, was 0.824. Network density at the intermediate scale was based upon geomorphic provinces. For an even smaller-scale analysis, I used Choctaw Nation counties. Density values for the intermediate and small scale analyses present similar results. Network densities were lowest in places with rugged terrain. Where land capabilities were suited to cultivation and places that had a longer history of post-Removal settlement had higher network densities. These places also contained more residential structures (and arguably more people) and was more cultivated than the rugged country.

In addition to network density, I analyzed transportation patterns in nucleated settlements. For this smaller scale analysis, I examined two aspects of local transportation: 1) presence of a grid; 2) accessibility. I found that 38 percent of nucleations contained transportation grids. There were examples of locations with long post-Removal histories that contained grids, and those that did not. It is assumed that transportation grids were not a regular part of the early post-Removal landscape but rather took time to develop. The Choctaw Nation capital moved to several locations from Removal until 1884. Several of these places showed no sign of a grid pattern indicating that place of political importance did not necessarily lead to a planned transportation form. However, most of the towns centered around the coal industry contained highly developed grids.

To determine the accessibility of settlement nucleations, I counted entrances/exits for each. Examining accessibility in this way also showed how connected the nucleation was to the larger transportation network. I found that nucleations classified as large towns were not necessarily more accessible, and, conversely, some smaller nucleations contained many access points for their size.

The second question addressed how the different modes of transportation facilitated the extraction of natural resources (especially coal and timber) in the Choctaw Nation. In answering this question, I used proximity analyses based upon GLO data. When viewed at the Choctaw Nation scale, there seemed to be a relationship between rail transportation and the location of extraction activities. To test this I used buffer and overlay analyses to count the number of sawmills and coal-related features within the “limiting distance” (9.6 km) for overland transport. Over 60 percent of sawmills and over 90 percent if coal-related features were located within proximity to railroads. Of the sawmills that were not located within the limiting distance for railroads, half were located in close proximity to nucleated settlements and probably served local needs.

The Fenced Landscape

The GLO surveys provided detailed information on fences in the landscape. Using GIS, I was able not only to create a digital record of all of the fences recorded in the surveys, but also to quantify the amount of fencing. This data, coupled with the knowledge of how certain fence types were constructed, enabled me to calculate, rather accurately, the amount of timber used in fences. The first logical question to ask, therefore, was what types of fences did surveyors record? Surveyors recorded nine fence types in the surveyors, 53 percent of which were rail (believed to be “worm” or “Virginia rail”) and 45.5 percent were barbed wire. The remaining 7.5 percent of fences were picket, board, plank, paled, stone, brush, and pole.

The fenced landscape presented several conspicuous large-scale patterns. The most striking, perhaps, was the prevalence of barbed wire fences in the western Choctaw Nation. It was so striking because the western and northern Choctaw Nation contain the most grassland. Overlay analysis was used to calculate the amount of barbed wire fencing that intersected grassland. The statistics support the map because while grasslands account for only 13.7 percent of total land cover, they contained 68.7 percent of barbed wire fences. Rail fences in grassland areas accounted for less than half of that amount. Another analysis examined the locations of board and plank fences in relation to sawmills. Fifty-seven percent of board/plank fences were within 9.6 km of sawmills. Eighty-eight percent were within 16 km of sawmills.

Future Research

For all that the GLO surveys contain, this research only scratches the surface of what could be asked about settlement, land use, and land cover in the Choctaw Nation. Perhaps the greatest restraint in reconstructing the landscape was the short period under study. The results actually present more questions than they answer because there was no time for a detailed reconstruction of other periods. With more investigation on local scale settlement forms, the “composite” nucleations that accounted for 26 percent of the nucleations classified could be investigated with the addition of Sanborn Fire Insurance Maps for later years. This might tell if the settlement forms are changing from agglomerated to linear arrangements or vice versa. Although other historical landscape reconstructions may be conducted for the Choctaw Nation, it is unlikely that they will contain the breadth and spatial accuracy because the data simply do not exist. A quasi-comparative analysis could be done on the Chickasaw Nation, which was surveyed in the early 1870s and again in the 1890s, but it would not constitute a true comparison.

An intriguing possibility is the construction of the pre-Removal Choctaw homeland in Mississippi. This could be accomplished using the GLO surveys that were carried out in Mississippi during the early 1830s. Such a comparison could be easily accomplished since a research team at Mississippi State University has been working to digitize the 1830s GLO plats using GIS. The georeferencing capability of GIS would make this comparison relatively seamless.

Reconstruction attempts are not restricted to the distance past. Using the CNGD, one could reconstruct periods after the 1890s using a variety of sources including town site plats, Sanborn Maps, USGS topographic quads, aerial photographs, and satellite imagery. The analysis could take on the successive cross section approach in which settlement and land use are analyzed for multiple progressive time periods.

Comparing the pre-Allotment landscape to the contemporary landscape would give the analysis a greater depth. Transportation networks would be particularly interesting to view using this approach, especially since the pattern in the 1890s shows no relationship to township and range. This approach is similar to that conducted by Milbauer (1997) but greatly expands the scope. Finally, one could diversify the fieldwork component of this research and conduct a more systematic inventory of extant cultural relics within the Choctaw Nation. Advances in GPS technology and developments in GPS-GIS integration will continue to make the inventory and management of cultural and historical resources more efficient.

Notes

1. The five largest tribes of the southeastern United States have often been termed the “Five Civilized Tribes.” Government officials, and many early authors, used the term “civilized” to refer to the Cherokee, Choctaw, Chickasaw, Mvskoke, and Seminole people of the southeastern United States because they seemed to adapt to European and American cultures more readily than did other tribes.

2. I use the phrase “North American Indian” or simply “Indian” to refer to the first peoples of the North American Continent.

3. “Nation” refers to all of the lands within the political boundaries of the Choctaw land in Oklahoma. It is a term that was adopted when the Choctaws drafted their first constitution at Doaksville, Indian Territory.

4. Vogeler and Simmons use the term “morphography” rather than “morphology” in reference to settlement patterns. Their use of the term is no different from the “settlement morphology” used by most other geographers.

5. Land cover is a term used to describe the vegetative or agricultural component found on the surface of the land. A “patch” is the term used by ecologists for describing a parcel of land cover with similar qualities. Therefore, you could have a grassland patch or forest patch.

6. “Mixed blood” is a term used to describe a person of mixed American Indian and European ancestry. It is often seen in relation to “full blood”.

7. “Full-blood” refers to the blood quantum, or percentage of indigenous ancestry, each American Indian possessed. This term is often seen relation to “mixed-blood,” or a person of mixed American Indian and European ancestry.

8. Craig H. Miner is his book The Corporation and the Indian: Tribal Sovereignty and Industrial Civilization in Indian Territory, 1865-1907 writes of how the Choctaws actually adapted to the changing market even exploiting natural resources to compete.

9. A chain equals 66 feet, a link equals 7.92 inches, and 100 links equal one chain.

10. The nature of using historical mapped sources requires that one accept some threshold of error. This is especially true when using GIS. Layers of information that are in error 25 meters or less will still allow the perceptive researcher to locate those features during field work.

11. The surveys contain information on topography that is not included in the Choctaw Nation Geospatial Database or this analysis. Modern digital terrain models are used because they offer a more accurate topographic analysis.

12. The town name “Coal Gate” was recorded in the General Land Office surveys as two words. On contemporary maps, however, it is written as “Coalgate”.

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APPENDICES

APPENDIX A

Geographic Information Systems and Global Positioning System Terminology

absolute location – a position that is measured from a known origin; latitude and longitude

attribute – descriptive information about geographic features that is connected to those features

buffer – an area of specified width around a geographic feature

control point – specific site chosen on a map or image to be digitized that is used to georeference the digitized map

coverage – a file that contains attribute and location information for geographic features

digital elevation model (DEM) – a file that stores elevation data in a complex of consistent squares (cells); used to created hill shades and perspective height views

digitize – to convert analog (paper) data into digital data

georeference – the process of assigning true geographic coordinates to newly digitized data; enables the overlay multiple digital layers

geographic information systems (GIS) – a computer system used to “manage geospatial data” and to “solve spatial problems”

global positioning system (GPS) – a system composed of satellites, land-based control stations, and human controlled receivers that provide absolute location on the Earth’s surface

ground-truth – process of checking digital data against actual site conditions

hill shade – a simulation of topography that shows the interaction between sunlight and surface features; created using a DEM

layer – file containing geospatial data associated with a specific theme

line – “a geographic feature represented on a map by connecting an ordered sequence of points”; an example is a stream

mosaic – in the case of digitized features, a composite of digital layers or coverages that represent one theme

network – “a system of linear features...in a geographic database”; for example, roads

network density – the combined distance of a linear network divided by the land area that contains the network

point – a geographic feature that contains a pair of (x,y) coordinates that indicate the feature’s precise location; an example is an oil well

polygon – a line that closes on itself to enclose a space; also known as an area feature; an example is a forest

positional accuracy – in GIS, the degree to which an object’s position in a geospatial database approaches its true geographic position; in GPS, the degree to which a calculated position differs from the true geographic position

proximity analysis – an analysis that uses the relative location of data; an example is buffering

root mean square (RMS) – “measures the displacement between the actual and estimated locations of the control points”; the value given when performing a geographic transformation

signal degradation – refers to the weakening of a satellite signal due to interference from physical objects such as tree canopy or buildings, or due to atmospheric interference

symbology – refers to the character of symbols used to represent geographic features in a GIS

transformation – the process of changing data from simple x,y coordinates (newly digitized paper maps, for example) into geographically referenced layers

true geographic coordinates – the latitude and longitude of features

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APPENDIX B

Settlement Geography Definitions

agglomerated – the shape of the settlement form approaches the shape of a circle

built structure – an individual settlement feature obtained from the General Land Office survey plats; includes residence, barn, post office, corn crib, etc.

composite – an arrangement that exhibits properties of both nucleated and dispersed settlement plans

dispersed - farmsteads are scattered, i.e., beyond the *hailing distance*

hailing distance – distance of 150 meters used as a traditional method for determining settlement nucleation

hamlet – in this research, a nucleation containing from five to twelve built structures

large town – in this research, the largest nucleation; larger in area than small towns, contained civic features, and was the location of heavy industrial activity

linear – the shape of the settlement form approaches the shape of an ellipse

nucleated – settlement pattern in which elements are clustered, i.e., within the *hailing distance*

settlement form (morphology) – describes the character of settlement elements as "nucleated" or "dispersed" (use here, *settlement form* describes the character of nucleations)

settlement pattern – the distribution of settlement features throughout a region

small town – in this research, a nucleation larger than a village that contained a mapped civic feature such as a post office or courthouse

village – in this research, a nucleation (larger than a hamlet) containing from thirteen to twenty-three built structures

(Source: Roberts, Brian K. 1996. *Landscapes of Settlement: Prehistory to the Present*. New York: Routledge)

APPENDIX C

Settlement Features (Attributes) in
General Land Office Surveys

abandoned coal bed
abandoned sawmill
barn
bench mark
blacksmith
brick kiln
bridge
capital
cemetery
chicken house
church
coal mine
coal pit/strip pit
coal shaft
coal slope
coke oven
corn crib
corral
courthouse
dam
dorm
ferry
ford
gin
grist mill
hay shed
hotel
mill
miners' lodge
natural gas spring
outhouse
post office
quarry
race track
railroad station
residence
sawmill
school
shed
stable
stage stand
stock pen
store
supply camp
tank
triangulation signal
water well

APPENDIX D

Land Capability Classification Definitions

Class I	Soils have few limitations that restrict their use.
Class II	Soils have some limitations that reduce the choice of plaints or require moderate conservation practices.
Class III	Soils have severe limitations that reduce the choice of pliants or require special conservation practices, or both.
Class IV	Soils have very severe limitations that restrict the choice of plants, require very careful management, or both.
Class V	Soils have little or no erosion hazard but have other limitations that limits their use.
Class VI	Soils have severe limitations that make them generally unsuited to cultivation and limit their use largely to pasture, etc.
Class VII	Soils have very severe limitations that make them unsuited to cultivation and that restrict their use to grazing, etc.
Class VIII	Soils have limitation that preclude their use for commercial plant production and restrict their use.

(STATSGO. 1995. *U.S. General Soil Map for Oklahoma*. Natural Resources Conservation Service: United States Department of Agriculture.)

APPENDIX E

Nucleated Settlements in the Choctaw Nation, 1894-1898

Albion

Alderson

Alikchi

Allen

Antlers

Atoka

Bennington

Blue

Bokchito

Bokoshe

Braden

Brazil

Brooken

Caddo

Cale

Calvin

Cameron

Caney

Cartersville

Caston

Cavanal

Choctaw City (Heavener)

Coal Gate

Council Grounds

Cowlington

Doaksville

Durant

Eagletown

Enterprise

Fanshawe

Garland

Garvin

Gilmore

Golconda

Goodland

Grant

Hamden

Hartshorne

Hoyt

Indianola

Iron Bridge

Jackson

Janis
Johnstown
Kennady
Kiowa
Kosoma
Krebs
Kully Chaha
Lehigh
Lona
Mayhew
McAlester
Milton
Mine No. 2
Mountain
Nelson
No. 12
Oak Lodge (Skullyville)
Page
Phillips
Pocola
Polona
Poteau
Red Oak
Rodney
Russellville
Sansbois
Savanna
Shady Point
Shawneetown
South Canadian
South McAlester
Stanley
Stigler
Stringtown
Talihina
Tamaha
Thomasville
Tucker
Tuskahomma
Walls
Wapanucka
Westlake
Whitefield
Wilburton
Wister
Witteville

APPENDIX F

General Land Office Surveyors in the
Choctaw Nation, 1894-1898

Jeremiah Ahern
J. C. Beavers
J. E. Beavers
C. E. Cabell
N. D. Christian
W. B. Douglass
Joe Gillett
J. S. Harrison
W. A. Havener
C. H. Hickman
G. W. Hooper
H. A. Hurt
F. M. Johnson
J. E. Johnson
J. L. Johnson
T. H. R. Johnson
Oscar Jones
F. E. Joy
W. A. Lindsay
Frank Lewis
R. L. McAlpine
M. P. McCoy
C. A. Martin
A. D. Morton
George Nick
J. Phelan
G. A. Purington
Ole Quam
J. W. Riley
F. H. Seeley
J. E. Shelley
Sledge Tatum
J. P. Thayer
W. H. Thorn
W. T. Turner
Fred Watts
J. C. Wilkinson

VITA

Bradley Wayne Watkins

Candidate for the Degree of

Doctor of Philosophy

Thesis: RECONSTRUCTING THE CHOCTAW NATION OF OKLAHOMA: LANDSCAPE AND SETTLEMENT ON THE EVE OF ALLOTMENT

Major Field: Geography

Biographical:

Personal Data: Born in Cushing, Oklahoma, on July 16, 1977, the son of Larry and Judy Watkins.

Education: Graduated from Cushing High School, Cushing, Oklahoma in 1995; received a Bachelor of Arts degree in Geography from the University of Oklahoma in 2000; received a Master of Arts degree in Geography from the University of Oklahoma in 2002; completed requirements for the Doctor of Philosophy degree with a major in Geography at Oklahoma State University in July 2007.

Experience: Employed as student research assistant and graduate research assistant at the Oklahoma Biological Survey in Norman, Oklahoma; employed by the Department of Geography, University of Oklahoma as a graduate teaching assistant, August 2000 to May 2002; employed by Department of Geography, Oklahoma State University as a Graduate Teaching Associate, August 2003 to May 2004; employed by the Rural Alliance for Improving Science Education (RAISE) program, Department of Geography, Oklahoma State University as a Graduate Fellow, July 2004 to present.

Professional Memberships: Association of American Geographers

Name: Bradley Wayne Watkins Date of Degree: July, 2007

Institution: Oklahoma State University Location: Stillwater, Oklahoma

Title of Study: RECONSTRUCTING THE CHOCTAW NATION OF OKLAHOMA, 1894-1898: LANDSCAPE AND SETTLEMENT ON THE EVE OF ALLOTMENT

Pages in Study: 190 Candidate for the Degree of Doctor of Philosophy

Major Field: Geography

Scope and Method of Study: This study is a landscape reconstruction that examines the historical settlement geography of the Choctaw Nation of Oklahoma from 1894 to 1898. The primary data for this reconstruction was the General Land Office Survey plats and field notes for the Choctaw Nation, Indian Territory. Geographic information systems was used to build the Choctaw Nation Geospatial Database that consisted of 351 digitized plats and associated attribute data. It was used to aid in the classification of nucleated settlement morphology and in the analysis of settlement patterns. Transportation networks were examined as factors in the location and development of settlements. Settlement patterns and morphologies were examined within the context of human-environment interactions with particular attention to agricultural settlement related to soil conditions and topography and types of fences used in settlements.

Findings and Conclusions: Settlement patterns ranged from dispersed to nucleated across the Choctaw Nation. Soil capability and topography were strong factors in the size of settlements and proximity to other settlements. Historical settlement patterns, economic activity, and transportation networks also were factors in settlement choices, though, in certain cases, human aspects showed close relationships to physical conditions.

Advisor's Approval: Allen Finchum