THE EVOLUTION OF CENTRAL PLACES OVER TIME:

AN ANALYSIS OF THE CHANGES WITHIN THE

TOWNS OF NORTH CENTRAL OKLAHOMA

By

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CHAPTER I

INTRODUCTION

Introduction

Numerous boom-bust economic cycles were responsible for the creation and abandonment of many towns across Oklahoma. The degree to which this cycle affected the urban system of Oklahoma was significantly pronounced because of the rapid succession and high levels of specialization that was the cause for the initial development of these towns. Just as some of the towns started, a new innovation or new discovery encouraged a town's early settlers and establishments to move elsewhere. In towns where little investment had been made, the residents, and many times the buildings themselves were transported to a new, potentially more profitable location.

The location of the towns in the urban system found in north central Oklahoma originated under a multitude of differing economic conditions. The initial period of urban development in this area spanned approximately forty years and within that time three major innovations occurred that shifted the economic system of the area from one basis to another. The relatively isolated agricultural towns that developed after the lands were open for general settlement faced competition from the railroad towns that fought for the

patronage of the same rural population in as little as ten years. Only a short period of time after the railroad towns started, the oil industry made its way into the area. It offered the promise of better paying jobs to the agricultural laborers and the opportunity for higher profits to the businesses that could provide goods or services to the oil field workers. The wealth generated by the oil industry increased the adoption rate of automobile transportation and highway construction in the area. Just as the area had emerged from its developmental period, this area along with the rest of the nation was plunged into the Great Depression, which coincided with the collapse of the agricultural markets.

Amid this chaos, oil towns represented some of the most dramatic shifts between booms and busts. The influx of labor required in drilling for oil was substantial and led to population increases of fifteen to twenty-five thousand residents in a single town over a short period of time (Newsom 1987). While many early businesses operated out of little more than tents, the profits that were quickly generated often encouraged the businessmen to make investments in more permanent structures. However, once the massive labor pool moved on to the next major oil field, there was seemingly little reason for any of these towns to continue to exist.

Problem Statement

Most towns within the study area experienced a crisis similar to the towns that had oil based economies, though to a somewhat lesser extent. As the economic system shifted from one basis to another, some locations became

more attractive to businesses and industries whereas others lost favor. While current urban locational theories can explain the location of towns during an individual set of economic conditions, few urban system theories are designed to handle the succession of innovation that occurred as technology and time advance.

The failure of any given town in this environment reveals little information beyond the fact that the town's original purpose was no longer viable within the larger urban system. However, when a town remains economically important it gives an indication of what characteristics might be beneficial in allowing a town to adapt to a new economic system or corner a niche market. The surviving towns can fit into three generalized categories: those that have succeeded in attracting new industries and retail, those that have been able to maintain a moderate number of commercial interests, and those that contain only a few of the most basic services.

The factors that can lead to the survival of a town within an urban system have been studied on only a limited basis and no research can be found that compares the survival of the most specialized centers, the oil towns, to the other successful towns in the system. This study analyzes the relationships between the presence of several spatial, economic, and demographic variables that may encourage diversification from a town's initial industry. The diversification factors under investigation in this study include: the location of the city in comparison to other cities and the characteristics of its market area, the presence and type(s) of a transportation system both within the city and connecting the city with others,

the presence of city amenities such as schools, parks, and community centers, the percentage of occupied homes and businesses as well as the types of businesses, and demographics such as the average household size, the median income, and the education attainment of the residents.

Objectives

This investigation is structured around the following two research questions. What are the characteristics that aid in the adaptability and survivability of small rural specialized-function settlements after their initial economic foundation declines? Is there any difference in the current demographic characteristics between the towns that once experienced substantial growth as the result of oil exploration and those that did not experience a similar period of growth in their past?

The study is comprised of three major components. The first part of this study employs a historical analysis that identifies the location and time periods during which the towns of the study area are created. This analysis establishes which economic purpose that the town initially served. The second part of the study determines the size based classifications of the towns for five different years within the initial developmental period in addition to the modern urban system. This classification generates six representative hierarchical urban systems that were historically and are presently active within the study area. The third part of this project analyzes the characteristics of the different urban systems. The first portion focuses on the spatial characteristics of the past and

current urban systems. The second portion compares the modern socioeconomic characteristics between oil boom towns and non oil boom towns and also compares the socioeconomic characteristics to the relative success of the surviving towns.

Scope of Study Area

The north central portion of Oklahoma offers an interesting area of study due to its rapid settlement patterns. There have been five major waves of permanent settlement in the area and each wave has created towns that have a distinct initial economic basis. The relocation of Native Americans to the area in the 1860s was responsible for the creation of towns that originated to serve as small trading communities or tribal administration centers. A series of land runs brought the next major wave of settlers whom developed a large number of agricultural towns. The third wave of settlers populated the region after the railroads were constructed; the towns they started initially served as shipping depots. The discovery of oil was responsible for the next influx of immigrants and the towns that developed in this period were designed to serve the needs of the oil field workers rather than the surrounding rural communities. The fifth and current wave of settlement is the result of highway construction. Most new settlements serve as bedroom communities and generally lack the level of economic development commonly found in the older urban developments. Spatial, demographic, and economic factors from all of these settlement periods

have an influence on where the surviving towns are located today. Figure 1.1 shows the study area and the location of the currently active towns.

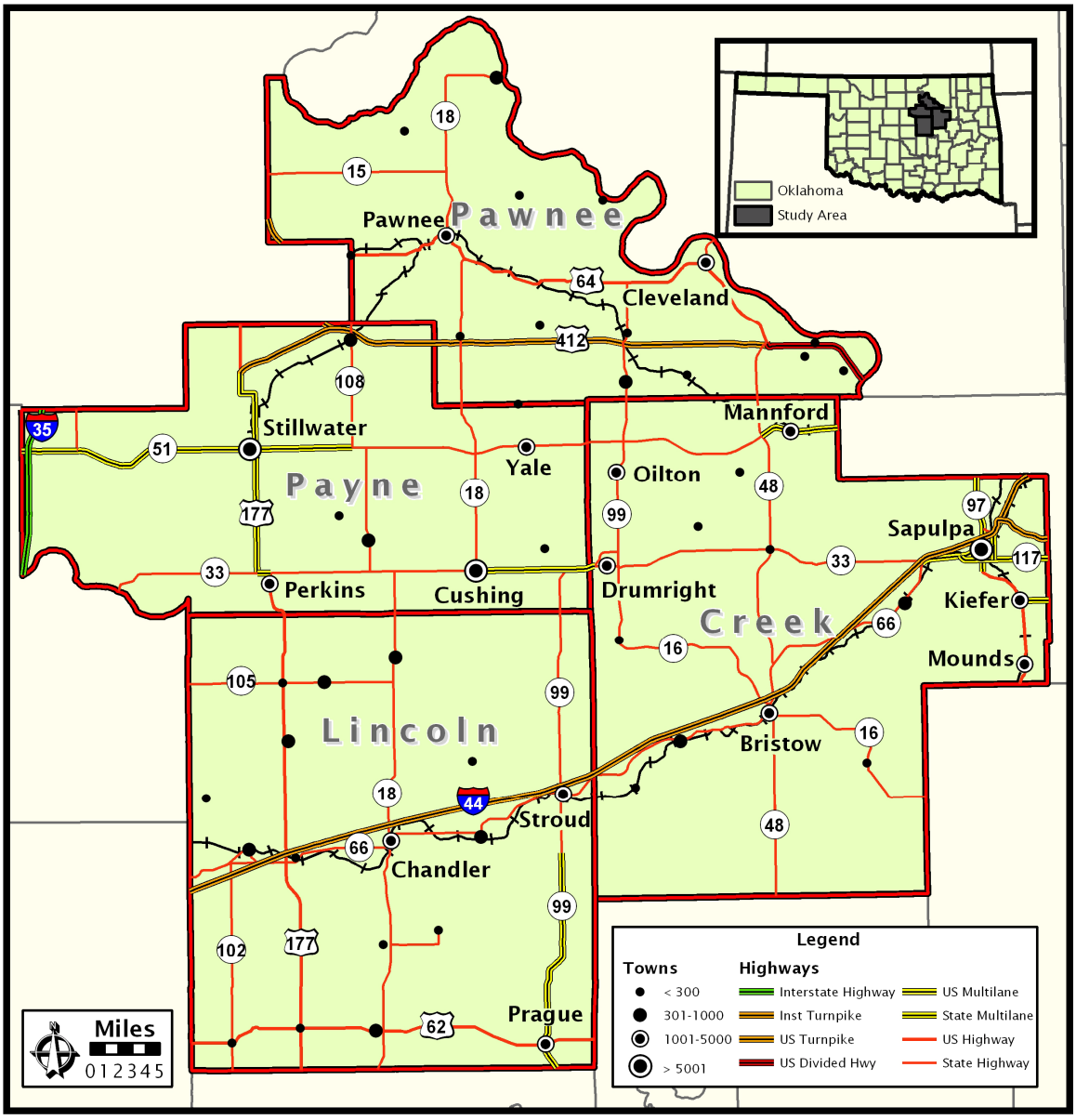

FIGURE 1.1 - Study Area

Creek County, Lincoln County, Payne County, and Pawnee County contain numerous settlements that served as agricultural centers, transportation centers, or oil centers. Many economic centers in this area like Stillwater and Chandler developed in the 1890s around the agricultural lands they served and

had elevators, mills, or gins for storing or processing the harvests. Other communities like Prague and Bristow were founded because of the railroads that built lines across these counties in the days before the automobile. This area also includes a number of oil settlements like Kiefer and Drumright that developed prior to the 1930s. After this time, the advancements in oil extraction technology have led to a reduction in the amount of labor needed to drill for oil and when combined with transportation improvements, the creation of oil related boom towns is no longer necessary on the same scale (Morris 1978).

The history of this area provides an intriguing opportunity to study the adaptability of small urban areas. The once prosperous cities within this four county area have undergone substantial changes in economic structure within the last century. Many cities have been negatively affected by the shift in agricultural practices, the decline of the railroads, and the loss of oil well productivity. This study will show that of the over 200 economic centers that were started within the study area, fewer than a quarter of them have some minimal level of economic importance in 2008.

Significance

It is hoped that the results of this study will improve the understanding of the dynamics of a small urban system over time. The economic conditions that control the need or spatial arrangement of towns can change over time through a sudden or gradual process. Specialization of any urban community can spell disaster if the product their industry provides loses its position in the marketplace

and these specialized centers often experience change in an accelerated manner compared to the more diversified centers (Duranton and Puga 2000). Commercial, industrial, and residential development in both specialized and diversified towns require an investment of capital that could be at risk if the profitability of an activity or activities they depend upon is challenged. It is difficult to predict future technological innovations and the effect they may have on a community. By the study of past alterations within a small urban system, this study hopes to identify some of the characteristics that have contributed to the survival of towns in an economic environment that was responsible for the failure of many others.

CHAPTER II

REVIEW OF LITERATURE

Introduction

This chapter provides a discussion of past works dealing with the spatial and economic analysis of urban systems. It is divided into three major areas: the first explores the different spatial organizational systems that have been developed and the different aspects that can make up a town's economy, the second focuses on the studies that described the changes that occur in boom towns, and the third covers works that are related to the economy and the history of Oklahoma.

Spatial Organization and Success of Urbanized Areas

The spatial structure of cities has long been an area of study within the discipline of geography and several other disciplines. A number of models and theories have been developed in order to gain a better understanding of a city's location and interactions. An early theory was developed by Johann Heinrich von Thünen (1826) in which he constructed an economically based mathematical model that predicted land use surrounding a single city. This model described the agricultural patterns surrounding pre-1850s Germany due to the general lack

of transportation and industrialization. In today's highly networked global economy, such an isolated local development is difficult to find; however, von Thünen's theory has been somewhat successfully applied on a continental scale (Wheeler [1981] 1998).

Alfred Weber (1909) developed another spatial model that included the effects of transportation and industrialization. He constructed a model that predicted the location of industries based on the transport costs of pre-processed and post-processed materials and goods that did not necessarily occur evenly throughout the environment. Hamilton (1967) stated that Weber's model attempted to provide the logic behind the location of industries to certain areas and it identified the minimization of the cost of transport and labor to be the key determining factors. This implied that a rational industry should locate where it had the highest accessibility to a source of raw materials, energy, laborers, supplies and the marketplace. The accessibility issues would have been overcome by the initial industry and if enough improvements were made, other industries could also be attracted to a particular location, especially if they offered a good that was complementary to the first industry's products. Industrialization often led to an increase in urbanization, thus new or larger cities often developed around new industries (Hamilton 1967). This model in part predicted the diversification that took place in cities near oil fields that took advantage of the surplus energy resources, particularly natural gas, created by the oil drilling and refining processes.

Walter Christaller (1933) presented the earliest theory that described the location of cities in general. His Central Place Theory used a regular hexagonal lattice to “explain the size, number, and distributions of towns in the belief that there is some ordering principle governing their distribution” (Garner 1967, 307). This early model was based on several generalizations and as a result the perfect arrangements of nestled hexagons the model used is difficult to see on the landscape. He developed three new systems that helped to explain the spacing of the central places and identified them as the marketing principle, the transportation principle, and the administration principle. Christaller (1933) analyzed the arrangement and hierarchical order of towns in 1930s southern Germany and found that a pattern existed that closely resembled his model. The hierarchical system was later extended by August Lösch (1954) by varying the size of Christaller’s hexagons and was further modified by Walter Isard (1956) to account for population density differences (Garner 1967).

Christaller (1933) also stated that the dynamic processes that took place would alter the centrality of a place, which would mean that a city’s place in the hierarchical system would change. His dynamic processes theory predicted that a central place with a growing population would increase in importance and conversely a central place with a shrinking population would decline in importance. Christaller saw these changes as a result of the change from one spacing principle to another. He also stated that any auxiliary central place that was created was more susceptible to decline compared to the original central place that had existed before the new development occurred (Christaller 1933).

However, he did not test these dynamic processes in his analysis of central places. While a hexagonal pattern may or may not be found in an area, the hierarchical arrangement of the market centers likely played a substantial role in the success or failure of a town over time. The Central Place Theory was best suited to explain the location of urban areas prior to the construction of the railroad system or the discovery of oil, both of which modified the structure of the urban system.

Edward Ullman (1941) introduced Christaller's Central Place Theory to American geographers and also provided a critique of the theory. He suggested a test that was based on the services performed in the central place and stated that a centrality index could be computed based on the known threshold for certain services. He pointed out several factors that distorted the hexagonal arrangement such as the type of agriculture, transportation, topography, and governmental organization. He also stated that Christaller claimed "too great an application of his scheme" because his "criteria do not fit actual frequency counts of settlements" (Ullman 1941, 862). However, he conceded that even with these shortcomings it still had valuable applications.

Harris and Ullman (1945) stated that there were three different types of spatial organization patterns that developed depending on the purpose of the town. They said that the cities that were developed as central places created the grid pattern that Christaller (1933) had suggested, the cities that developed as transportation cities were located in a linear fashion along the transportation routes, and the cities that developed around a specialized function such as

industry created closely spaced clusters (Harris and Ullman 1945). Harris and Ullman's theory was more applicable to describing the locational patterns of the different types of towns found in the study area but did not provide a framework for predicting changes over time.

Several tests of the Central Place Theory took place in the late 1950s and early 1960s and helped usher in geography's quantitative revolution. After this period, the nomothetic approach became widely practiced and more studies were completed in urban, transportation, and economic geography. In addition to Lösch (1954) and Isard (1956), Beckmann (1958) challenged the assumptions of the Central Place Theory and proposed an equation to predict a town's size based on the number of neighboring centers and the rural populations both classes of towns served. This introduced the concept of allometric growth to urban theory by relating the growth or decline of a satellite town to the entire urban network in which it participated.

Other urban development theories were formed that explained the attraction of new retail centers to certain areas. Mulvihill and Mulvihill (1970) discussed the idea that geography and marketing were the two major factors in urban growth. They presented the historical development of the marketplace around the generation of surpluses or specializations of production which also could have played a role in the initial economic development of a town. They also discussed several factors that influenced the market area of retail developments and how a potential store site may be selected. These included the location of a customer base, the frequency of visitation, the ratio of

pedestrian to auto-driving customers, demographic indicators, and the distance decay factors of a customer's behavior (Mulvihill and Mulvihill 1970). The concepts of market area and distance decay were an application of Christaller's work. These factors could have also influenced a town's ability to diversify its commercial economy, which would have had a bearing on a town's success or failure.

Instead of focusing on the attraction of retailers to an area like Mulvihill and Mulvihill (1970), Stabler and Williams (1973) looked at the conditions that could be used to predict consumer behavior. Their equation was an enhancement of the gravity model introduced by Reilly ([1931] 1953). Stabler and Williams approximated the attraction of a town based on the amount of retail floor space and incorporated two time components, travel time and the time needed to prepare for a trip. They also used a weight parameter for different types of goods. The application of a similar equation was completed by Keane (1989), who used it to study the impact of multipurpose shopping on smaller towns.

Another study that looked at market size in relation to the site selection of certain services was completed by Bell, Lieber, and Rushton (1974). Their analysis tested whether a business adhered to Christaller's (1933) theory suggesting that a business would locate near other services, resulting in a clustering of businesses, or if the site selection followed Lösch's (1954) theory predicting that a business would locate in the center of its market area even if this located it in an isolated area. In this context, Bell, Lieber, and Rushton

(1974) studied the clustering of new business activities in southern Minnesota and Iowa. They used a Scalogram analysis which employed Guttman's algorithm to determine the relationship between the rank of a town within a larger hierarchical urban system and the rank of hierarchically arranged activities with the system. This calculation detected the level of error within the central place system when a higher order town lacked a number of lower level activities or a higher level activity was found within a lower level town. They found conflicting results between their two study areas but concluded there are certain groups of businesses that were strongly associated with complementary activities whereas other types of businesses operated independently (Bell, Lieber, and Rushton 1974).

The changes that occurred in cities also became a topic that was studied during this period. In his analysis of the pattern of change found in non-metropolitan America, Lamb (1975) identified three components of change: accessibility, hierarchy, and amenity resources. Lamb provided a comprehensive summary of other research done in these urbanized rural areas. From these other sources he made two substantial conclusions in the area of accessibility: "Growth has been strongly associated with nearness to metropolitan centers," and "in the outlying territory, large centers have grown at the expense of smaller centers" (Lamb 1975, 23). A later study on this issue by Isserman (2001) supported Lamb's idea that urban areas were expanding into the adjacent rural areas. The results of these studies also provided support for Christaller's (1933) dynamic processes theory.

Another study that explored the growth that occurred in smaller communities was undertaken by Wheat (1976). He analyzed the growth of cities with populations between 5,000 and 50,000 in the southern United States. He studied a random sampling of cities from these areas and compared the growth rates of these cities to twenty-three different variables to see which correlated best. Wheat identified air service, unemployment, prior growth, colleges, highways, property taxes, wages, existing manufacturing, metropolitan area proximity, and racial mixing as the most important variables that correlated with urban growth. Wheat gave a detailed conclusion pertaining to each of the variables and provided a method for classifying a city based on its potential for slow, moderate, and rapid growth.

Adamchak et al. (1999) used Central Place Theory in their research on the retail and wholesale employment in the non-metropolitan Great Plains. This region had experienced a decline in population throughout the mid and late twentieth century. They found that while the population decreased, the percentage of people employed in the service sector increased. They stated that this was caused by economic restructuring that had caused a shift to large commercial farming from the original system of small family farms. The service sector employment was closely tied to the central place system because the new jobs that were created were located in the central cities. After the completion of their regression analysis, Adamchak et al. (1999) concluded that the commerce and finance centers had consolidated, which resulted in fewer but larger central cities. They were also able to statistically link population decline with the overall

decline in retail and wholesaling employment that was predicted by Christaller's (1933) dynamic processes theory.

The economic restructuring process in some of the larger cities in the Rust Belt was studied by Wilson and Wouters (2003). Between the 1970s and 1990s cities like St. Louis, Indianapolis, and Cleveland experienced a significant drop in the number of people employed in manufacturing. Like Adamchak et al. (1999) found in the smaller cities, Wilson and Wouters (2003) found that the new jobs in the major urban areas were also created in the service industry as a result of the economic restructuring process.

Robertson (1999) completed a study of downtown areas in small urban centers and presented a number of issues and strategies found in these small cities. He mentioned that there was a lack of scholarly research on the smaller urban centers because most of the downtown studies only included the major cities. His survey of downtown development found that the biggest challenges for the redevelopment of these areas were the inability to attract people in the evenings and the increased competition from new developments outside the downtown area. He found that the most successful tactic used in the redevelopment of the downtown area was the Main Street approach that had been developed by the National Trust for Historic Preservation and implemented by the National Main Street Center during the 1990s. When this approach was successful, it typically enhanced the image of a town and often had a positive impact on a town's ability to attract new industry or commerce to the city from other areas (Robertson 1999).

Duranton and Puga (2000) analyzed the benefits and disadvantages of specialization in large urban areas. They found that there was a positive correlation between city size and relative diversity. Duranton and Puga also observed that individual city specializations and size rankings are usually stable over time. Three notable exceptions to this rule were the once highly specialized cities of Detroit and Pittsburgh, which faced a sharp decline in population, and Phoenix, which saw a dramatic increase in population over the last fifty years. They also found that diversity tended to foster urban employment growth whereas specialization reduced growth except in cities that had a mature industry. They concluded that specialized economies "have less urban crowding and stronger localization economies arising from the proximity of closely related producers," but also suffered from "less innovation and more exposure to risk as the fortunes of specific sectors and technologies rise or fall" (Duranton and Puga 2000, 553). The impacts of such exposure would have been greater for smaller cities because when an industry declined the city's economy would not have been able to absorb the surplus labor that was created.

Several other studies have been undertaken recently that explored the other issues that faced small urban centers in rural areas. Chandra and Thompson (2000) studied the highway system in rural areas throughout the United States and found that the presence of the interstate highway system changed the spatial allocation of the local economic activities. Chandra and Thompson observed an increased amount of economic activity in the counties that contained an interstate highway and a decreased amount of activity in

adjacent counties. Bascom (2001) suggested that tourism had successfully been used as one solution for the reinvigoration a rural town's economy. He also pointed out that the image of small town America was not problematic and had been copied in new developments like Celebration, Florida. Green et al. (2002) found that a local development organization had more success in recruiting and retaining businesses compared to a local government in rural areas. Together these works provided a clearer picture of what small urban areas across the nation have faced in recent years.

James Shortridge (2004) studied the emergence of the urban economic system found in Kansas. He focused on the urban areas which contained at least 2,500 people at some point in their history. Shortridge took a chronological approach and followed the development and subsequent growth or decline of the cities through several models. The major divisions he defined were: a river based model, a railroad expansion based model, a railroad consolidation based model, and a highway based model. Kansas, much like the study area in this thesis, contained a number of specialized cities, urban areas that historically relied upon mining, railroading, and petroleum extraction. Many of these cities faced increasing challenges as their economies began to decline after 1950. Shortridge (2004) identified diversified manufacturing and commuting as the two adaptations that have worked recently and seem to offer the best chance of a small community's survival. This was in line with the conclusions reached by Lamb (1975), Wheat (1976), Duranton and Puga (2000), and Isserman (2001).

Boom Town Studies

A large number of towns within the study area experienced a period of rapid growth at some time in their history. Many towns experienced this growth soon after their establishment, some even on their first day of existence as most of the area had been settled due to a land run. While the occurrence of a land run was unique to Oklahoma, the towns in the study area also experienced booms related to railroad expansion and oil discoveries that were more common across the Great Plains region. The literature review revealed that a large number of works that dealt with economic booms, particularly those that involved the creation of new towns, were tied to the oil or mining industries. Works that looked at booms in existing towns typically involved a new form of transportation or a specialized industry.

An early study on the geographical aspects of an oil boom town was published by William Chambers (1933), which described the rapid development of Kilgore, Texas after the discovery of oil in the area. He also described some of the challenges that the town met such as expanding its education system, improving public health, and dealing with sanitation issues. While this article was written at the peak of the city's boom growth, the author questioned what the future held for the city of Kilgore. Chambers proposed the idea that the town might not be needed in the future because oil could be transported elsewhere for refinement through pipelines and it was in a location where some of the adjacent towns had more substantial rail connections with which Kilgore could not compete. However, he concluded that the town would only suffer relative rather

than complete collapse because of the high amount of investment that had taken place within the town (Chambers 1933). This suggested that what was once a specialized city was poised to shift to a central place function, yet none of the previously mentioned locational models seemed to have been designed to address such a change, much less predict the effect on the rest of the system.

While Chambers' analysis looked at ongoing trends in an active boom town, Reps (1975) was one of the first researchers who analyzed the past trends of towns that experienced rapid growth. The towns in his area of study were primarily Western American mining towns. Reps used city planning as a basis of comparison between the cities he identified as successes and failures but he also considered the differences between the mining centers, supply centers, and centers that served both functions. One important idea that he presented was "that the supply centers were regarded as more permanent than the mining towns" (Reps 1975, 272). This suggested that central and transportation cities may have initially received more investments in infrastructure and more permanent structures which would have allowed them to have been more competitive than mining cities after the boom ended.

The historical analysis of boom towns has also increased in volume, but most dealing with the south central plains are limited to oil cities. Olien and Olien (1982) explored the impact of the oil boom on five Texas communities. When they reviewed other works, Olien and Olien observed that most writers concentrated on the visible decay of the oil towns. Few writers recognized the other improvements that had been made to a community as a result of an oil

boom, such as electric, water, and sanitation systems, which otherwise would not have been constructed. They stated that their "bibliographic search turned up few serious studies of booms in general; let alone oil booms in particular" (Olien and Olien 1982, xiii). However, they also pointed out that while boom towns escaped the attention of scholarly research, these cities were well publicized in popular literature. They identified the body of popular works as heralding "the mud and blood school of thought;" that is, most of these publications were of "colorful tales of oil boom bustle and commotion" (Olien and Olien 1982, 209). They stated that this view grew out of the methods used in describing the mining communities of the west and was widely used in what limited academic works existed. One example of this that they gave was Rister (1949), which Olien and Olien described as too often "falling back on the hackneyed stereotype of oil booms as sources for hellish disorder" (Olien and Olien 1982, 210). Olien and Olien analyzed the boom cities of Texas with a topical approach that focused on explaining the effect of the oil industry's development on community life. The topics they explored included: population demographics, housing, public service and education, the role of women and the family, criminal activity, and recreational activities. They, like Chambers (1933), raised the question of the future economic potential of post-boom cities.

In a work that delved deeper into what happened to a town after a bust, Clements (2003) explored the mining boom and subsequent bust in two towns in Arizona. He mentioned several of the industries in the Western United States that have been plagued by the boom-bust cycle, which have spelled disaster in

the end for the once booming towns that developed around them. These economies included those that were centered on extractive industries such as farming, ranching, mining, drilling, and forestry as well as those that were influenced by transportation innovations, political decisions, or natural disasters. He stated that one thing that most failed towns had in common was that they based their economy on only one specialized product. Thus, when there was a bust, the city had no other industry to support itself. Clements also stated that the body of work done on economics had been focused on the boom period rather than the bust period. He found that leisure oriented businesses, including restaurants, were the most vulnerable after the bust occurred. Clements also identified deflation as a major problem and stated that property values and rent dropped dramatically in the town as soon as the first closings were announced. The towns of Tombstone and Jerome were never able to develop diversified economies and were left to survive on the tourism industry (Clements 2003).

The most recent boom economy in the Great Plains region has been the result of the meat processing industry. Broadway and Stull (2006) recently completed a study of Garden City, Kansas, a rural meat processing town that saw a rapid rise in its economy starting in 1980 that continued until 2000 when a fire destroyed a major employer's factory. Their focus was primarily what had occurred to the town during the boom; they found that out of the 12,000 new jobs only 5,000 were in manufacturing. They also found that this type of boom town drew its new settlers from outside of the United States and paid low wages compared to the past oil boom towns in the area but had developed many of the

same problems. The boom in population resulted in a higher crime rate, a drop in adult education levels, and a rapid increase in the number of students in the city's school system. This investigation took place soon after the bust had begun, but Broadway and Stull (2006) had already observed that the decline in the town's population was more gradual than was initially feared by public officials.

Economic Analysis and the History of Towns in Oklahoma

The current urban system of Oklahoma evolved out of an economic climate that was often subject to extreme boom and bust periods. The developmental patterns of the towns were characterized by brief periods of growth followed by varied periods of relative stagnation. While still subject to the constraints presented by the major urban location theories, a review of historical and modern economic studies on Oklahoma towns revealed several unique traits.

Carl Glasscock (1938) wrote one of the earliest works on Oklahoma history that included the oil boom that occurred during the 1910s-1920s. He discussed some of the developmental patterns that had occurred during the early history of the state. While this work was not geographical in nature it provided an in-depth discussion of the waves of migration that helped to populate the state. The initial wave of settlement was the result of forced Native American relocation from the southeastern United States in the 1830s. He stated that these early settlements developed as small trading centers, often located on rivers. The

second major wave occurred as the land was opened for settlement in the 1890s. Most of the urban developments of this period were tied to the railroads and many served as agricultural centers. Glasscock (1938) identified the third wave of settlement, which began in 1910, as a result of the discovery of oil and other mineral resources in the region. These three initial waves were responsible for most of the settlements that exist in north central Oklahoma today.

Flood and Schreiner (1972) completed one of the first published studies that applied elements of the Central Place Theory to towns in Oklahoma. They analyzed the availability of thirty-five hierarchically ordered goods and services in towns located in South Central Oklahoma based on data from 1972. Flood and Schreiner separated the activities into three classes and established three classes of cities determined by the number of activities within the town. They used the data to test the average minimum distance between the towns within each classification and also compared the distance between the towns and the nearest major population center defined as having a population over 5,000. They found that the proximity to the larger urban centers imposed a constraint on the development of the nearby smaller trade centers. Flood and Schreiner (1972) also found that the smaller centers tended to decline in population over the period studied but were able to maintain a higher number of businesses if the smaller center was located some distance away from the larger centers. The results of this study showed an additional level of complexity than had been described in similar urban studies.

After approximately 150 years of permanent settlement within the state boundaries of Oklahoma, John Morris (1978) began his investigation of failed settlements that occurred during this period and gave a brief history of over 120 historic Oklahoma ghost towns. He defined ghost towns as

> hamlets, villages, towns and cities (1) that are no longer in existence, all buildings and indications of existence having been either destroyed or covered by water; (2) where the remains of business and/or residential structures still stand but are largely unused; and (3) where the population has decreased 80 percent from its maximum (Morris 1978, 3).

Morris highlighted several types of failed boom town developments through Oklahoma, including those that saw initial development as mining centers, agricultural centers, and petroleum centers. He found that the construction of new roads, an agricultural or mining bust, or the construction of new lakes caused many Oklahoma towns to be abandoned (Morris 1978).

Morris (1979) also looked at the larger system of cities in Oklahoma. Morris used the census defined population threshold of 2,500, of which 99 cities existed in Oklahoma in the 1970 census. Morris first discussed the smaller cities and generalized that their success was dependent on their proximity to the larger metropolitan areas or as a result of surviving the shift away from agriculture by diversifying their economy. He also identified the larger regional centers of Ada, Altus, Ardmore, Chickasha, Durant, Enid, McAlester, Miami, Okmulgee, Shawnee, and Stillwater and said the minimal spacing of these areas was 35 miles. The metropolitan system of cities surrounding Lawton, Oklahoma City, and Tulsa was also detailed. Morris (1979) identified Bartlesville, Duncan, and Ponca City as the major oil cities and also identified the cities of Bristow,

Cleveland, Cushing, Drumright, Kiefer, Shamrock, Shidler, and Tonkawa as minor oil centers. Morris did not go into the same amount of depth on the linkages and interaction between the different levels of cities as Shortridge (2004) had done in Kansas, so the Oklahoman urban system was not as well defined.

Several economic impact studies focused on the effects of new highway construction on towns in Oklahoma. Sanders (1973) studied the impact of the interstate system on small towns in North Central Oklahoma. Sanders looked at factors such as the amount of sales tax generated within a town, shifts in property value, and the relative success and failure rates of different business types in the towns. His method was to compare data before the interstate opened to data after the interstate opened, as well as to compare changes in the towns along the highway to a control group of towns not on the highway during the same period. Another more recent analysis by Comer and Finchum (2005) discussed the significance of the impact that a non-interstate highway bypass had on towns in Oklahoma. The study included city level data that were divided into different population based city classes. Comer and Finchum identified bypasses to be relatively detrimental to commerce in small cities through the use of a regression analysis. These works in combination with Chandra and Thompson (2000) showed that the highway transportation system has played a key role in determining the survival of small towns in Oklahoma.

A number of descriptive historical works have also been published that covered the towns in the study area. Shirk (1987) provided the name and a

postal service history of the majority of the towns within the state of Oklahoma. The Lincoln County Historical Society (1988) compiled a history of most towns within Lincoln County. The amount of information varied greatly by town but usually established why a town was started and listed some of the town's early businesses. Franks and Lambert (1994) detailed the origins of the majority of the towns in Pawnee County and also identified many of the towns' early businesses. Newsom (1997) described the history of the towns in Payne County. There was no literature found that provided a similar detailed history of Creek County. Cammaller (2001) compiled a history of the Eastern Oklahoma Railway and other area railroads that documented which towns received service and when. Newsom (1985, 1987) recreated the history of the cities in the Drumright-Cushing Oil Field through the use of local publications, photographs, and interviews. His work was focused primarily on the lawlessness and the dirty nature of the boom towns. Unfortunately, none of these works provided an in-depth analysis or description of the current economic trends in these areas, as was found in Shortridge (2004).

A small number of studies has been completed that focus on the economic evolution of the oil towns in the Cushing-Drumright Oil Field. Butler (1929) described some of the changes that had occurred in Drumright since the town was created. While economic conditions were mentioned, the work was primarily focused on the alteration of the social conditions within the town. Bowles (1949) completed a more detailed analysis on the economic conditions found in Cushing. The study was completed when the refining industry was still

the principal component of the town's economy. Neither Butler nor Bowles considered the spatial interaction that was ongoing between the other towns in the oilfield. Lloyd (1976) provided an in-depth historical account of the development and evolution of the Cushing-Drumright oilfield in the 1910s. She documented the transportation improvements and the competition between the towns for new businesses. While Lloyd suggested several reasons that some towns were able to survive past the oil boom, she did not provide a structured analysis to test her theories.

Conclusions

There were several spatial models established that described the locational patterns among urban areas. However, most theories of urban development were not devised to allow for changes over time such as those found during economic boom periods. The location and level of development of the new towns that were created during boom periods typically did not follow the trends described in the existing spatial models because of the rapid changes experienced by the new towns in a relatively short period of time. The methodology used in the past studies on boom towns, particularly in Oklahoma, has been primarily descriptive and has not been integrated into a larger urban system model.

CHAPTER III

METHODOLOGY

Introduction

In order to address the research questions, the methodology is divided into four major components. The purpose of the first component of this study is to obtain the data needed for the analyses. This involves the collection of historical and modern data that identifies the location and describes the economic characteristics of the towns within the four-county study area. The second component of this study involves the classification of the data. This includes the summarization of the data into more organized groupings and the establishment of a hierarchy among the towns. The purpose of the third component is to explore the spatial relationships found within the urban system. This component involves the construction of Thiessen polygons and the completion of a nearest neighbor analysis. The fourth and final component of the study is to identify the characteristics that may have played a role in a town's survival over time. This involves the use of a regression analysis on the demographic characteristics of a town's population and the presence of certain amenities found within a town.

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Data Collection

The data collection phase of the research project involves the compilation of information on both the historical and current characteristics of the towns that developed within the study area. For the purposes of this study, the word 'town' is defined as any named settlement that at one time served as the location of some economic or administrative activity. The term is equally applied to settlements as small as hamlets and as large as cities throughout the paper.

The historical information is collected through a variety of sources. The historical population data are available through the United States Census Bureau website. The information that states the reason for a town's initial development is primarily found in published histories. The most common secondary sources are identified in Chapter II. Many of these same sources also contain the information that identifies the availability of transportation, the number of commercial establishments, and the types of amenities that the settlement had developed early in its history.

While these secondary sources provide most of the information, some additional research is necessary for some of the smaller towns or where conflicting information is found. Some of the additional information is obtainable through the archival newspaper collection at the Oklahoma History Center and historic maps from the Western History Collection. Much of the historical business data for the larger towns is obtainable from the Digital Sanborn Map Collection that is available on the Oklahoma State University Library website. A

large number of historic transportation maps also help to establish the location of the settlements that are no longer in existence.

In addition to the historic data, several variables that describe the current conditions of the towns within the study area are also collected. The current town level population and demographic information is available from the United States Census Bureau. The data pertaining to the location of the modern commercial and industrial establishments are from the DirectoriesUSA online database. The information for this study was collected from the directory in March of 2008. Duplicate entries have been removed from the data set in order to improve the accuracy of the data.

The current and former townsites are also documented through the use of a digital camera and handwritten notes during a field survey. The former townsites are visited in order to help verify their locations. The site visits give an indication of the size and level of development of the former towns at locations where ruins are found. The field survey of the former and active townsites occurred in early 2008. The types of ruins found include: abandoned buildings, building foundations, cemeteries, abandoned sidewalks and roads, and in one case an old token. In many instances, this is the only indication that a town had ever been located at the site and some examples of these are shown in Figures 3.1-3.4. The information obtained from the visitation of active towns provides a verification of the accuracy of the online business directory and gives an indication of the vacancy rate of other commercial structures within the town. Another important piece of information obtained from the active townsite visits is

what type of amenities are present in a town, such as parks, swimming pools, and community centers. Examples of these are shown in Figure 3.5 and Figure 3.6.

FIGURE 3.1 - Abandoned Building at Heyburn Townsite

FIGURE 3.2 - Foundation of Former Building at West Point Townsite

FIGURE 3.3 - Valley Cemetery near the Valley Townsite

FIGURE 3.4 - Palmolive Soap Token (inset) Found at Watchorn Townsite

FIGURE 3.5 - Community Park in Davenport

FIGURE 3.6 - Senior Center in Agra

Classification

The second component of the study is the organization of the data through the use of three different classification schemes. The first classification divides the towns into groups based on their initial economic purpose. The second classification defines the urban hierarchical scheme for a number of benchmark years that represent the initial developmental period of the urban system and the current urban system. The third classification divides the towns into two different groups, those that experienced an oil based population boom and those that did not.

Town Origins

Using the data collected from the historical research, the towns are classified into five different groups based on their initial economic purpose. The original reason for a town's origin is usually easy to identify using the secondary sources. When this information is not explicitly stated, the town's origin is derived from a combination of the dates associated with the town and its location with respect to the transportation lines and the oil fields that were developed during the same period. The towns are assigned one of the five following origins: Native American settlements, agricultural centers, railroad towns, oil towns, and highway based developments. The agricultural centers are subdivided into five groups depending on which period the land was opened for settlement. The railroad towns are subdivided into eight groups based on which railroad line was present at the location where the town was started. The oil towns are subdivided

into five groups that coincide with the oil field where the town developed. The results and historical information that establishes these classifications are presented in Chapter IV.

Urban Hierarchy

The towns are classified into hierarchical groups using the data obtained from both the historical research and the modern era research. This classification requires two different two-step processes. The first process is used for the historical data and the second process is used for the modern data. These two different methods are required because the historical information is not as complete as the modern information.

The historical hierarchical urban system is more difficult to determine than the modern system. The hierarchical groups used in this classification are based on the hierarchy of goods and services offered within the towns rather than just the number of goods and services contained within the town. The classification of the goods and services is attempted but due to a lack of data several approximations are required. Since a strong similarity exists between the size of a town's population and the hierarchy of the economic activities as is predicted in other theories, the population of the towns that lack historical economic data is compared to the population of the towns that can be accurately classified. It is unlikely that these presumptions have an adverse effect on the overall results but are unavoidable in order for the project to proceed. Three classifications are used; Class A towns are the largest centers and offered activities found

infrequently across the study area, Class B towns have activities that were more frequently found across the study area, and Class C towns are the smallest centers and contain only the most commonly occurring activities found in the study area.

The years used in the historical hierarchy of towns include: 1900, 1907, 1910, 1915, and 1920. These years are used because, with the exception of 1915, a census count is available for each year and because each year represents a change in the economic base of the urban system. A census was taken in the study area in 1907 because it was the year that Oklahoma achieved statehood. The year 1900 represents the pre-railroad agricultural based urban system. The year 1907 represents the railroad-based urban system. The year 1910 is an intermediate system over which the consolidation of railroad towns had started to occur to a limited degree. The year 1915 represents the oil-based urban system. The year 1920 is a second intermediate year which coincided with a shift away from the oil-based urban system in the Cushing-Drumright Oil Field and the designation of the first state highway system. Some of the historical data used to justify the hierarchical class rankings are presented in Chapter IV and the results of the classification are included in Chapter V.

The approach used for the modern economic data is more systematic because the business dataset identifies practically every establishment located within a town in the four-county study area as of March 2008. The appearance of any town within this dataset also signifies that the town had some degree of economic activity and could be considered as being an active participant in the

modern urban economic system. The individual establishments are aggregated into groups based on the name of the business or the establishment's Standard Industrial Classification, or SIC, code. The hierarchy is based on 44 commercial activities which are ranked by their estimated population thresholds. The towns are classified based on what types of activities they contained. The results of this classification are presented in Chapter V.

Population Booms

Using the data obtained from the United States Census Bureau, the surviving towns are divided into two classifications. This binary classification denotes whether or not the town experienced a population boom due to oil exploration. To establish the classification, the population data for every census year between 1900 and the 2006 census estimates is graphed. Visual analysis of the data is used to identify the towns that had a local peak or significant jump during the 1910 to 1940 period. The towns that have a population increase are then checked to make sure they are located in one of the oil fields whose development coincides with the town's population boom to verify that the increase is related to oil. Not every current town that is included in the modern census was enumerated in the period in which it experienced its oil boom so it is necessary to consult other documented sources in these cases. The results of this classification are presented in Chapter VI.

Spatial Analysis

Two different spatial analyses are performed to detect locational patterns found in the dataset. The first analysis compares differences found in the market areas that are generated by the construction of Thiessen polygons. The second analysis considers the average distances found between the towns of different hierarchical classes based on a Euclidian nearest neighbor analysis.

Spatial Relationships Observed Using Thiessen Polygons

The first spatial analysis compares the location of the towns within the urban system to the geometries illustrated by Thiessen polygons. The Thiessen polygons are used to represent the unweighted market area break points of the towns for each of the three different classes of commercial activities. Using the assumption that a consumer will choose which commercial establishment to visit based solely on the basis of shortest distance, the Thiessen polygons serve as the dividing line that would identify the consumer's selection. However, consumer behavior is seldom dictated by distance minimization alone and often a consumer engages in multipurpose shopping (Keane 1989). Another assumption that is made is that the goods or services are of equal price and quality, but this seldom holds true in reality because of the economies of scale that can be produced in larger centers. The use of an unweighted break point also ignores the effects predicted by Reilly's ([1931] 1953) gravity model, which incorporates the size of a town into the consumers choice. A rural consumer often must decide between the convenience of a nearby store and the potential savings of a

larger but more distant center. Therefore, the Thiessen polygons can only be interpreted as a rough estimate of the actual market area of each town. An analysis that can calculate a more realistic probability of the consumer's behavior cannot be attempted because of a lack of consistent historical data.

The historical and current town hierarchical rankings established in the previous analysis are used to generate the Thiessen polygons. The Thiessen polygons are calculated using ArcGIS 9.2's Create Thiessen Polygons tool. The polygons for Class A activities are generated using every Class A town. The polygons for Class B activities are generated using every Class A and Class B town. The polygons for Class C activities are generated using every Class A, Class B, and Class C town. Since towns outside the study area are not included in the classifications, the polygons are clipped at the edge of the four county study area to minimize the possible inaccuracies that occur where the polygon extends into the unresearched areas.

The rural population estimates are established for each town using the following processes. A census township shapefile is first created that includes a population field for the census years: 1900, 1907, 1910, and 1920. The field values are defined by the values given in the historic censuses. The 1915 estimate is calculated by averaging the values from the 1910 and 1920 censuses. The townships' areas are calculated with ArcGIS 9.2's Calculate Geometry tool. The township shapefile is combined with the market area polygons for each year and classification using the Identity tool, resulting in new shapefiles. The areas of these new polygons are calculated using the Calculate

Geometry tool. The population estimate for these polygons is generated by multiplying the population density by the area. The population estimate for each part of the market area is totaled by town. Finally, the rural population density is calculated by dividing the total rural population for each town by the market area. The data from the 2000 census is compiled differently as the location of the centroid for the block group level statistics are available from the Census Bureau. The rural population estimate for each market area is calculated by aggregating the block group populations not included in a town into its respective market area. The estimated rural population density for each town classification is then averaged for each year. The resulting averages for each year are then compared using an Analysis of Variance test to determine if the average density of the rural population is significantly different between the town classifications.

The average market area for each hierarchical town classification and year is calculated using the Calculate Geometry tool on the Thiessen polygon shapefiles. The areas of the Thiessen polygons for the Class B activities are averaged for the Class A towns and the Class B towns. The areas of the Thiessen polygons calculated for the Class C activities are averaged for the Class A, B, and C towns. A Two-Sample Difference of Means t Test is then performed to determine if the average market area size is significantly different for each classification of towns using a 90% confidence level. These processes must be repeated for each of the six year hierarchical groups. The results of this analysis are presented in Chapter V.

Spatial Relationships Observed Using Euclidian Nearest Neighbor

The second analysis provides further insight on the spatial relationships between towns of different classifications using the average minimum Euclidian distance to its nearest neighbor. The concept of this analysis is based on Flood and Schreiner (1972). This analysis is performed on the same six generations of hierarchical classes used in the previous analysis, except that the Class A towns are subdivided between those with populations greater than 5,000 and those with fewer than 5,000. The Class A towns with a population greater than 5,000 are assigned to the Class "5K." This allows for the relationships found among the major population centers to be studied more carefully. Since a large number of towns are used, the distance between the centers is estimated with the equation (Meridian World Data 2009) as follows:

For Latitude: $x = 69.1 * (lat2 - lat1)$ (3.1)

For Longitude: $y = 69.1 * (lon2 - lon1) * \cos (lat1/57.3)$ (3.2)

For Total Distance: $dist = sqrt (x * x + y * y)$ (3.3)

The results of Equation 3.3 are used to find the towns' nearest neighbors. The minimum distance between every Class A town with a population under 5,000 and a population over 5,000 is first calculated and then averaged. The minimum distance between the Class B towns and every Class 5K and Class A town is then calculated. The Class B towns closer to a Class 5K town are given the designation "B1" and the towns closer to a normal Class A town are given the designation "B2." Then, the minimum distances between each group are

averaged. For each Class C town, the minimum distance between it and every Class 5K, Class A, Class B1, and Class B2 town is calculated and compared. The Class C towns closer to a Class 5K town are given the designation “C1,” the towns closer to a normal Class A town are given the designation “C2,” the towns closer to a Class B2 town are given the designation “C3,” and the towns closer to a Class B1 town are given the designation “C4.” These minimum distances are also averaged. A three-dimensional diagram is drawn from the results of these calculations using Google’s Sketch Up program. The results of this analysis are presented in Chapter V.

Town and Population Characteristic Analysis

The fourth and final component of the study identifies the characteristics that may play a role in a town’s survival over time. This is attempted by studying the economic composition of the cities and by studying the social conditions that existed within the towns. The economic composition of the towns is analyzed through a location quotient calculation that compares the ratio of the economic sectors operating in each town. The social conditions are studied through two different processes. The first compares the social characteristics between towns that experienced the oil boom and those that did not. The second process uses a Stepwise Regression analysis to determine what social characteristics of a town besides the total population can predict the number of businesses located within a town.

Location Quotients

The location quotient analysis identifies the level of diversity within each town. Typically, a location quotient analysis uses the employment or income for a particular segment of the economy as its base but these data are not available at the town level. What is established instead is a location quotient analysis which compares the ratio of administrative activities, industrial activities, oil based companies, retail based commercial activities, and service based commercial activities. The businesses in each sector are identified in Table 3.1. Agriculture is still an important sector of the economy in the study area but there is no accurate way to assign the location of farms and ranches to an urban area.

TABLE 3.1 - Businesses by Sector Classification

Administrative	Church	Newspaper	Tribal Government			
	County Government	Post Office	Television			
	Emergency Services	Radio				
	Federal Government	State Government				
	Hospital	Town Government				
Industrial	Consumer Goods	Research and Testing				
	Distributors	Transport				
	Food Packaging	Welding				
	Metalwork and Fabrication	Wholesale				
	Publishing					
Oil Based	Drilling	Transportation				
	Energy Companies	Tools and Supplies				
	Pipeline					
	Pump Repair					
	Tank Welding					
Retail	Antiques and Gifts	Bridal	Drug	General and Department	Liquid Propane	Pets
	Auto Parts	Car or Trailer Lot	Ecommerce	Grocery and Bakery	Liquor	Restaurant
	Auto Salvage	Clothing	Florist	Hardware and Lumber	Musical Instruments	Sports and Recreation
	Boat and Marina	Construction Supplies	Furniture and Electronics	Hobby	Office Supplies	Tobacco
	Book	Convenience	Gasoline Station	Jewelry	Pawn	Video Rental
Service	Appraisal	Bank	Dry Cleaners and Laundry	Graphic Design	Landscaping	Photography
	Attorney	Barber and Beauty Shop	Engineering and Design	Gym, Dance, and Karate	Medical Practitioners	Real Estate
	Auction	Construction	Financial Planning	Hotel and Campground	Music and Party Rental	Rentals
	Auto Repair	CPA and Consulting	Funeral Home	Insurance Agency	Pest Control	Self Storage
	Bail	Daycare and Preschool	General Repair	Janitorial	Pet Care	Travel

The location quotient is calculated using three steps. The first step establishes the numerator by dividing the number of a specific type of activity in a town by the total number of activities in the town. The second step establishes the denominator by dividing the number of a specific type of activity within the

study area by the total number of activities within the study area. The third step of the calculation is performed by dividing the ratio of the activity found within a town by the ratio of the activity found within the study area as shown in Equation 3.4:

$$\text{Location Quotient} = \frac{\text{Activity}^{\text{town}} / \Sigma\ \text{Activity}^{\text{town}}}{\text{Activity}^{\text{area}} / \Sigma\ \text{Activity}^{\text{area}}} \qquad (3.4)$$

A location quotient equal to 1.0 indicates that the town's ratio of activities matches the ratio of activities found in the study area. The location quotients can only be calculated for the towns that have at least four of the five economic sectors because the ratio is not meaningful if a town has three or fewer. Many of the smaller towns only contain a limited number of businesses. If a town lacks two or more economic sectors found in the entire study area, the location quotient for the sectors that the town contains would automatically be much higher because of the ratios involved in the calculation. The results of this analysis are discussed in Chapter VI.

Demographic Composition

The analysis of the demographic composition of the towns within the study area is broken into two parts. The first part compares numerous demographic variables between the towns that experienced an oil boom and those that did not. The second part uses a Stepwise Multiple Regression analysis to identify some of the more important demographic and amenity based variables that are good predictors of a town's relative success.

Demographic Comparisons - This analysis attempts to determine what differences exist between the towns that experienced an oil boom and those that did not based on the historic population trend analysis. The towns are divided into groups as determined by their 2008 economic classification which is established through a previous analysis. This is done to minimize differences that are the result of varying town size between the boom and non-boom towns. The towns also need to be included in the 2000 census so demographic statistics will be available for the analysis. This will exclude some of the smallest towns that are not recognized by the census bureau from the analysis. A breakdown of the towns is presented in Table 3.2.

TABLE 3.2 - Classification of Oil Boom and Non-oil Boom Towns

	Class A Town	Class B Town	Class C Town
Oil Boom Town	Bristow	Davenport	Hallett
	Cleveland	Depew	Quay
	Cushing	Jennings	Shamrock
	Drumright	Kiefer	Slick
	Sapulpa	Oilton	Terlton
		Yale	
Non Oil Boom Town	Chandler	Agra	Blackburn
	Mannford	Carney	Fallis
	Pawnee	Glencoe	Kendrick
	Perkins	Kellyville	Lawrence Creek
	Prague	Meeker	Maramec
	Stillwater	Mounds	Oak Grove
	Stroud	Ralston	Shady Grove
		Ripley	Skedee
		Tryon	Sparks
		Wellston	Warwick
			Westport

Several representative variables are used in this analysis. The demographic variables are obtained from the census and included racial composition, home ownership statistics, and income data. Some manipulation is

required in order to create aggregate records for the drive time and income characteristics of the town's residents. The values from the census need to be totaled and divided by the appropriate population statistic, such as the total population count or total number of homes, to calculate the average values for each grouping. The results of this analysis are presented in Chapter VI.

Stepwise Multiple Regression - This analysis determines which demographic and amenity characteristics are good predictors of a town's relative success. It is not possible to establish the growth or decline of every town as was specified in the proposal because of the lack of data availability. In order to attempt this analysis, the number of total activities within the towns is used to represent the success of the towns as the dependent variable. Independent variables are derived from the census statistics and additional variables are calculated from the data collected during the field survey. The census statistics are converted into ratio data by dividing the aggregate values by the appropriate population statistics, such as the total population count or total number of homes, in order to normalize the data.

Several tools in SPSS 16.0 are used for the data analysis. Some of the statistics that were initially included in the analysis have been dropped because the initial data descriptives reveal multicollinearity or excessive skew. The intended dependent variable, the total number of activities within a town, is heavily skewed and highly leptokurtic. In order to improve the distribution of the data, the natural logarithm of the business totals serves as the replacement dependant variable. The independent variables include: the percentage of the

population that was white, the percentage of the population that lived in the town where they worked, the percentage of homes that were occupied, the percentage of the population that had a household income of under $20,000, the per capita income, the percentage of the homes that were renter occupied, the median rent, the median age, the average household size, the percentage of the population under 65, the percentage of the population that was male, the percentage of the population that did not have any formal education, the percentage of the population that had a bachelors' degree or higher, the number of parks, the number of museums, and the number of recreation centers. The last four variables listed have a skew greater than two but are kept in the analysis because no other equivalent replacement data exist. The results of this analysis are presented in Chapter VI.

CHAPTER IV

TOWN ORIGINS

Introduction

The 205 past and present townsites within the study area are organized into five different groups based on the initial economic conditions under which they developed. The first group of towns that was organized from the 1860s to 1889 was started by Native American tribal members. The economic base of these towns was initially local trade. The second group of towns was started as the lands were open for general settlement from 1889 to 1898. Agriculture served as the initial economic base of these towns. The third group of towns was started as a result of the railroad construction during a period from 1898 to 1904. The economy of these towns was centered on the sale of imported goods and exportation of agricultural produce. The fourth group of towns was started to serve the influx of new workers that came during the period of oil exploration from 1906 to 1925. The economy of these towns was closely tied to the oil industry. The fifth group of towns was started as a result of the construction of the highway system that occurred from the 1920s onward. The economy of this current generation of towns is centered on providing convenience goods to the local market and automobile travelers.

Native American Settlements

The first period of settlement that was important in the establishment of the towns within the study area involved the relocation of Native American tribes to the area between 1830 and 1883. The area had originally been controlled by nomadic tribes including the Osage and Wichita (Foreman 1942). While it is likely that these tribes returned to the same areas on a seasonal basis, the location of any permanent or semi-permanent settlement is not well established. These tribes were forced into other areas and other Native American tribes were relocated into the study area by the Indian Removal Act passed in May of 1830. A series of treaties deeded portions of the study area to the Cherokee, Creek, and Seminole Tribes. Later acts and revisions eventually led to the relocation of many other Native American tribes to the study area as depicted in Figure 4.1 (Foreman 1942).

The land that is now Lincoln County and Payne County was initially held by the Creek and Seminole Tribes but the Seminole Tribe primarily settled in the southern portion of their joint lands. The land holdings and administration of the two tribes were separated in 1856. In 1866, the Creek Tribe ceded the western portion of their lands to the United States which intended to use it for the relocation of the Plains Tribes who had initially been granted reservations in other states. The Sac and Fox Tribe was the first to relocate to a new reservation in this area. The reservation was established on February 18, 1867 and included the eastern half of Lincoln County and a small portion of southeastern Payne County (Foreman 1942). The Sac and Fox Agency was

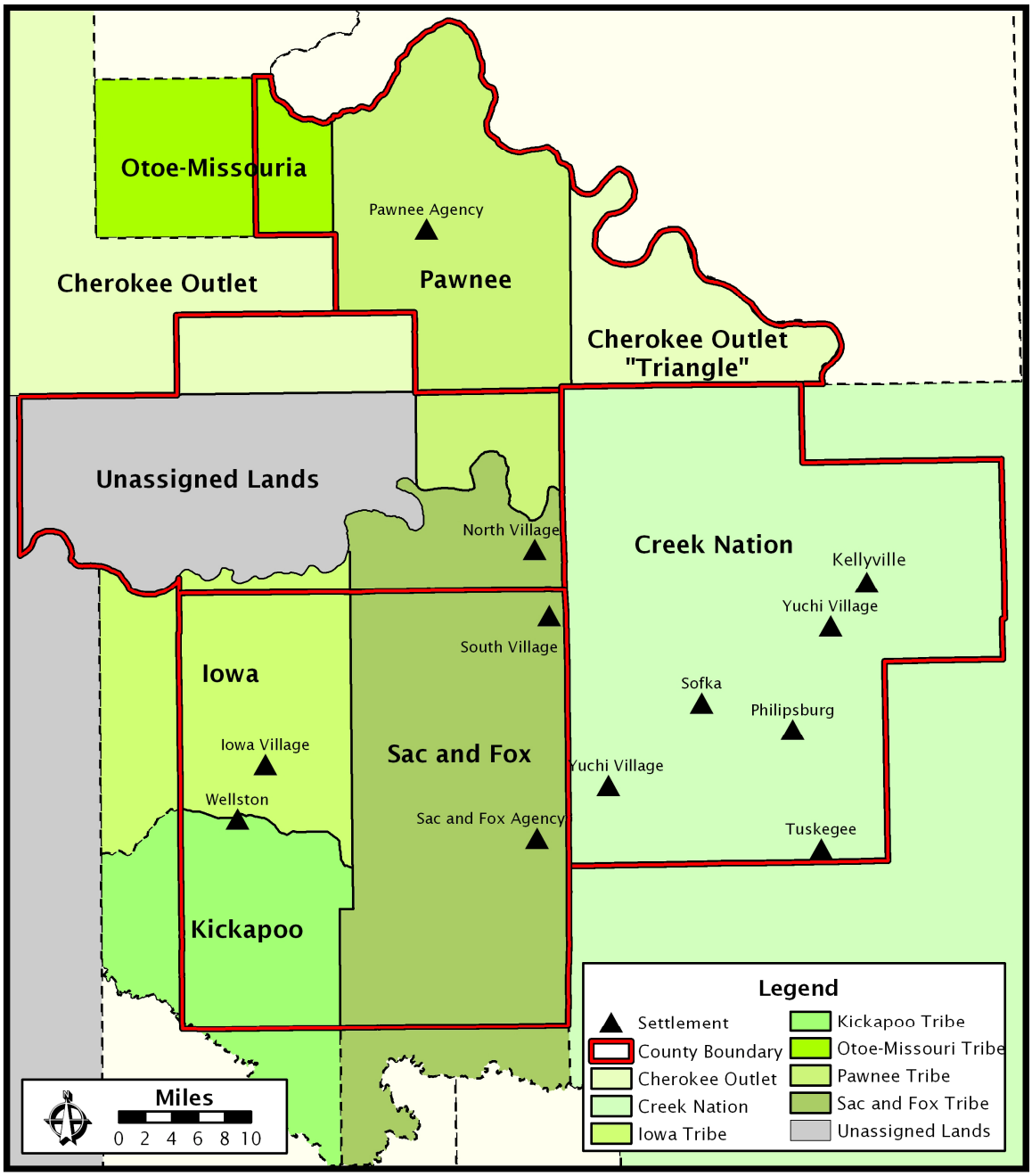

FIGURE 4.1 - Native American Lands and Settlements

established in 1872 at a site in east-central Lincoln County. Postal service existed at the agency from October 25, 1875 until December 31, 1910 (Shirk 1987). It still serves as a tribal administration center. Several villages were established on the reservation; two were located west of present day Drumright

and Shamrock and were commonly identified as North Village and South Village. There are no remains of these two tribal villages.

An Executive Order dated August 15, 1883 established the Kickapoo and Iowa Reservations in western Lincoln County. The Kickapoo Reservation was located in the southwestern quarter of the county and the Iowa Reservation was located in the northwestern portion of the county (Foreman 1942). An agency was established near the border of the two tribes and received postal service on September 19, 1884. However, the post office was given the name of Wellston after Postmaster Christian T. Wells (Shirk 1987). Wellston grew slowly until it received railroad service and it is still an active townsite. There was a short lived Iowa village northeast of Wellston but the exact locations of any temporary Kickapoo settlements are unknown. Separate tribal administration centers were later established in Lincoln County for each of the tribes, the Iowa Tribe's administration center is located three miles south of Perkins and the Kickapoo Tribe's administration center is located five miles east of Harrah.

After the post Civil War treaties of 1866, the Creeks retained control of the area that is now Creek County. It was only a part of the much larger Creek Country, which had its capital at Okmulgee (Foreman 1942). Only three Creek settlements within the study area received a post office. The post office at Tuskegee opened April 6, 1872. Tuskegee was located eleven miles southeast of the present day location of Bristow. It was the first postal location within the entire study area and lasted until September 30, 1957. Philipsburg was located five miles southeast of Bristow and it received mail service from July 16, 1894 to

August 20, 1898. Sofka was located three miles southwest of Bristow and received mail service from August 27, 1894 to December 14, 1897 (Shirk 1987). Other than mail delivery, it is unknown what other services were offered in these three early settlements but they were probably the site of trading posts or general stores. Several other unnamed Yuchi villages were also located across the central portion of Creek County within a few miles of the present day towns of Sapulpa, Milfay, Bristow, and Kellyville. There was no remaining evidence of any of the Creek towns found during the field survey in 2008.

Unlike the rest of the study area, several non-Native American settlements were established while Creek County was still officially under tribal control. These settlements include Sapulpa, Kellyville, and Olive. However, Kellyville is the only one of these settlements that existed to primarily serve the Creeks. Kellyville was granted a post office on November 27, 1893 and had several small stores aimed at capturing the trade with the undeveloped area to its west (Sapulpa Historical Society 1981). It is still a small but active town.

The Cherokee Tribe was initially given the land that would become Pawnee County by the Treaty of New Echota as part of an outlet of surplus land that stretched south of the Kansas border to the Oklahoma Panhandle. The Cherokee Reconstruction Treaty of 1866 opened the Cherokee Outlet to other tribes. The central portion of what became the county was purchased for the Pawnee Tribe on April 10, 1876, although they had occupied the land beginning in June of 1875. A portion of this reservation also extended south into future Payne County. The bands within the tribe settled in several small camps

dispersed throughout the new reservation. The Pawnee Agency was established at one of these encampments near the center of the reservation to distribute provisions to the tribe. It received postal service on May 4, 1876 but its administration was combined with the Ponca and Otoe-Missouria Agencies in 1883. The agency's site remains a tribal administration center. The western edge of the future county was purchased from the Cherokee by the Otoe-Missouria Tribe in March of 1881. Most tribal members relocated to the area by the end of October of that year. The Otoe-Missouria Agency was located near Red Rock in present day Noble County and no known villages were established in the Pawnee County portion of their lands (Franks and Lambert 1994).

This period of settlement of Native Americans within the study area spanned a little over a half century, but primarily took place after the Reconstruction Treaties of 1866. Although some settlement occurred within the area prior to 1866, the area remained of limited importance to the Cherokee, Creek, and Seminole Tribes. With the resettlement of the area by the Sac and Fox, Pawnee, Otoe-Missouria, Iowa, and Kickapoo Tribes, the population of the study area increased and caused the need for the earliest generation of villages and new Native American administration centers to be established. A majority of these settlements had extremely limited economic development but a small number of trade oriented businesses were undertaken. Most Native American villages lasted only a short time but some of the more important settlements associated with tribal administration offices and trade developments were able to evolve into permanent towns.

Agricultural Trade Settlements

The second group of towns in the study area was created when the area was opened to non-Native American settlement through a series of Congressional Acts in the late 1880s. The economy of these new towns was centered on agriculture because a large number of the settlers came to the area in order to establish small farms. The towns varied in size; some of the smaller towns had little more than a general store and a post office like West Point and Baker but other larger agricultural trade centers developed which contained small business districts and residential neighborhoods like Perkins and Ralston.

The Dawes Act of February 8, 1887 forced the Native American tribal members to take individual allotments out of the communally held tribal reservations in the territory (Foreman 1942). The allotment process took over twenty years in some portions of the study area but most, with the exception of Creek County, was completed within ten years. Payne County, Lincoln County, and Pawnee County were settled through four different land runs as un-allotted lands were declared public domain by the government. Some townsites were predetermined by the government before the land runs began but the majority of towns in the area were organized at locations selected by the settlers.

The Land Run of 1889

On March 2, 1889 Congress passed the Indian Appropriations Bill of 1889 with a rider attached that declared the unassigned lands acquired from the Creek and Seminole Tribes in 1866 as part of the public domain. Most of central and

western Payne County was part of the Unassigned Lands. Several years before the lands were officially open, the area around Stillwater Creek was the site chosen for the Boomer Movement's colony (Newsom 1997). Several attempts were made to occupy the land but each time this group was forcibly removed and thus no lasting settlements were established. The Unassigned Lands were declared open for settlement at noon on April 22, 1889 by a presidential proclamation issued by President Grover Cleveland on March 23, 1889 (Foreman 1942). At least eight towns had been started within the first year and that number increased to fourteen within six years. The towns created after the Land Run of 1889 are depicted in Figure 4.2.

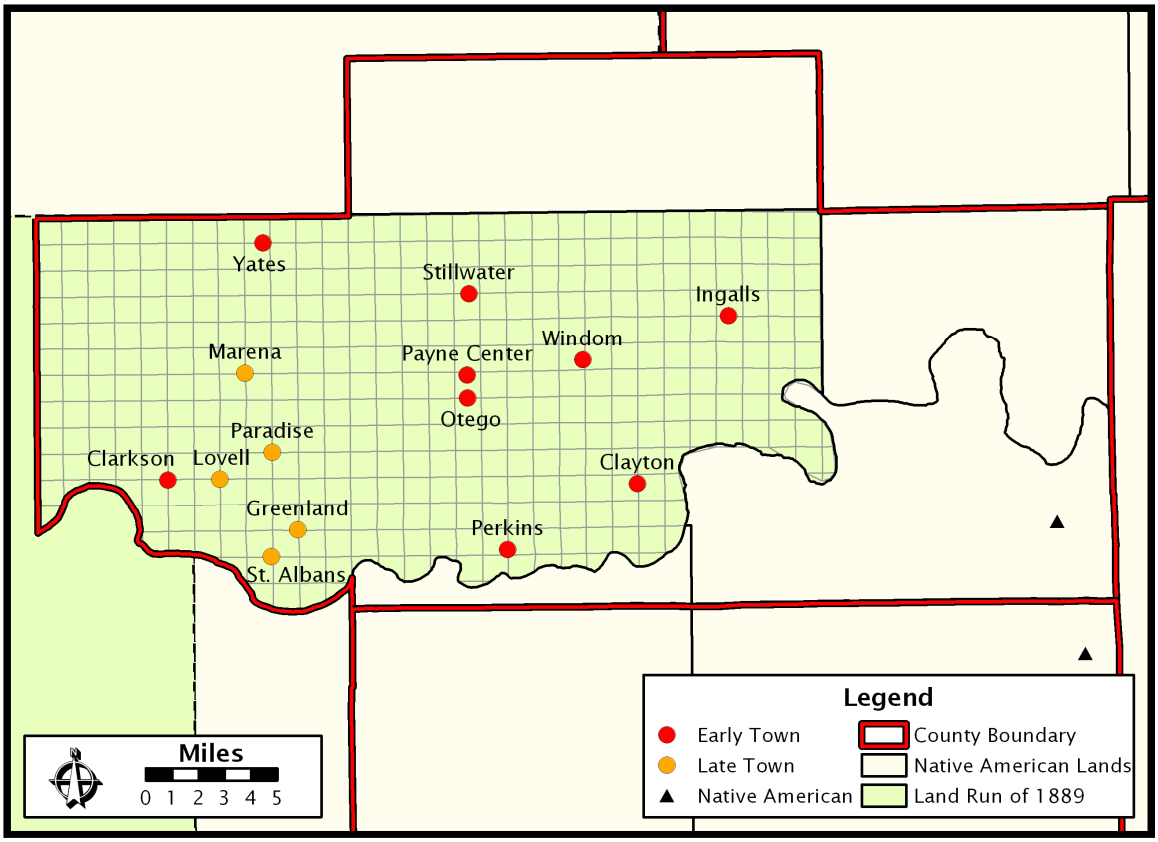

FIGURE 4.2 - Agricultural Towns Created After the Land Run of 1889

Stillwater was among the towns started immediately after the land run occurred. It became the first town to officially file a townsite application in the study area and organized a city government on June 11, 1889. It was granted a post office on August 28, 1889 and made an early effort to become an administrative center in addition to an economic center for the entire region. Stillwater was named as a temporary county seat after the first Territorial Convention in 1889 and was officially designated as the county seat by the Organic Act of May 2, 1890. Payne County was chosen as the site of a college in 1890 and Stillwater was selected as its location in June of 1891. The county seat and the college secured the town's future and many businesses from the smaller surrounding communities relocated to Stillwater over the next decade (Newsom 1997). Stillwater serves as the major economic center for the western portion of the study area.

Ingalls, located 10 miles east of Stillwater, was another land run town that grew quickly. The town's post office was established on January 22, 1890 and lasted until October 31, 1907. During its peak it had five doctors, three churches, two blacksmiths, two saloons, a mercantile store, a hotel and several other businesses. After being bypassed by the railroad in 1900, several businesses including the hotel relocated to Stillwater (Morris 1978). It experienced a brief revival in the 1920s. Ingalls is not the site of any economic activity.

A townsite application for Perkins was first filed on May 17, 1889 under the name Cimarron and a second was filed on December 13, 1889 with the name Italy. When the townsite received postal service on January 31, 1890, it was

given the name Perkins. Several businesses were located in the town soon after the land run, including two general stores, two grocery stores, and a drug store. Within five years it included seven grocery stores, four general stores, four blacksmiths, three barbers, three feed stores, three saloons, two hotels, two mills, two grocery stores, two newspapers, and continued to grow at a steady pace until the 1920s (Newsom 1997). The town experienced a period of growth in the later part of the 20th century. Currently Perkins serves as a minor economic center for southern Payne County.

Clayton was organized as a town in 1890 near a low water crossing on the Cimarron River ten miles southeast of Stillwater. The town had its own marshal, clerk, and justice of the peace and its post office opened on February 21, 1890. Several businesses operated throughout the decade including a saw mill, a grocery and dry goods store, a general store, a millinery store, two saloons, and a newspaper. The town lost its post office on April 14, 1900 when it was bypassed by the railroad and the town's businesses gradually disappeared (Newsom 1997). There are no modern economic activities located near the former townsite.

Several other smaller towns also developed in the area soon after the land run but were generally short lived. Clarkson contained a general store and had a post office from January 31, 1890 until February 28, 1903. It was located fourteen miles southwest of Stillwater. The cemetery is all that remains of the former town. Windom had a general store and a post office that was open from January 18, 1890 until October 15, 1892. The town was located five miles

southeast of Stillwater. Only a small community of homes is still in existence at the townsite. Yates had a general store and a post office that was in operation from May 21, 1890 until December 15, 1908. The former townsite is located along the north shore of Lake Carl Blackwell.

Payne Center was started as a small town that was in direct competition with Stillwater and even fought for the county seat. It was located three miles south of Stillwater near the geographic center of the original area that was designated as Payne County. It had a blacksmith shop, a city hall, and a newspaper; in addition to its general store and post office which opened June 19, 1890. After it lost the bid for the county seat, its businesses soon relocated to nearby Stillwater or Otego and its post office closed February 12, 1894. Otego was just a mile south of Payne Center and had a blacksmith, general store, and several other small businesses (Newsom 1997). A post office opened soon after the one in Payne Center had closed and operated from April 19, 1894 until September 30, 1903 (Shirk 1987). There are no original remains of either town but new development from Stillwater has expanded into this area.

In addition to the towns that started immediately after the land run, several communities were established in the following years. Marena was one of the larger of these towns. It was located nine miles west of Stillwater and its post office operated from January 5, 1892 until February 15, 1907. At its peak the town included as many as seven stores, two doctors, two cotton gins, a church, an ice plant, and a telephone service. Corn and cotton were the principle crops in the area but the cotton gins had been relocated by 1915. Within a few years

the rest of the remaining businesses had chosen to relocate to Stillwater (Sneed 1998). Only the town's cemetery is still in existence near the former townsite.

Several smaller communities were started to the south of Marena near the Cimarron River in southwest Payne County. Paradise had a general store and a post office from June 23, 1892 until June 14, 1905. Lovell had a post office from December 8, 1893 until March 31, 1902. St. Albans had a post office from March 21, 1894 until March 4, 1895. Greenland had a general store and a post office in operation from June 17, 1895 until June 24, 1897 (Newsom 1997, Shirk 1987). There is no economic activity remaining in any of these former townsites.

The Land Run of 1891

The Iowa and Sac and Fox Tribes were forced to allot their land to private citizens of their nations under the Dawes Act of February 8, 1887. The Jerome Commission was charged with overseeing the allotment process. On May 25, 1890 the Iowa Tribe agreed to grant an 80-acre allotment for each tribal member and sold their remaining lands to the commission for about 27 cents per acre. The Commission's agreement with the Sac and Fox Tribe was finalized on June 12, 1890. The Sac and Fox Tribe members received 180 acres and the tribe sold the remaining lands for $1.23 per acre. The Jerome Commission reached agreements with the Citizen Band Potawatomi and Absentee Shawnee Tribes on June 26, 1890. The former Iowa, Sac and Fox, Citizen Band Potawatomi and Absentee Shawnee lands were proclaimed open for settlement at noon on September 22, 1891 by a presidential proclamation signed on September 18,

1891 (Foreman 1942). The towns created in this area after the Land Run of 1891 are depicted in Figure 4.3.

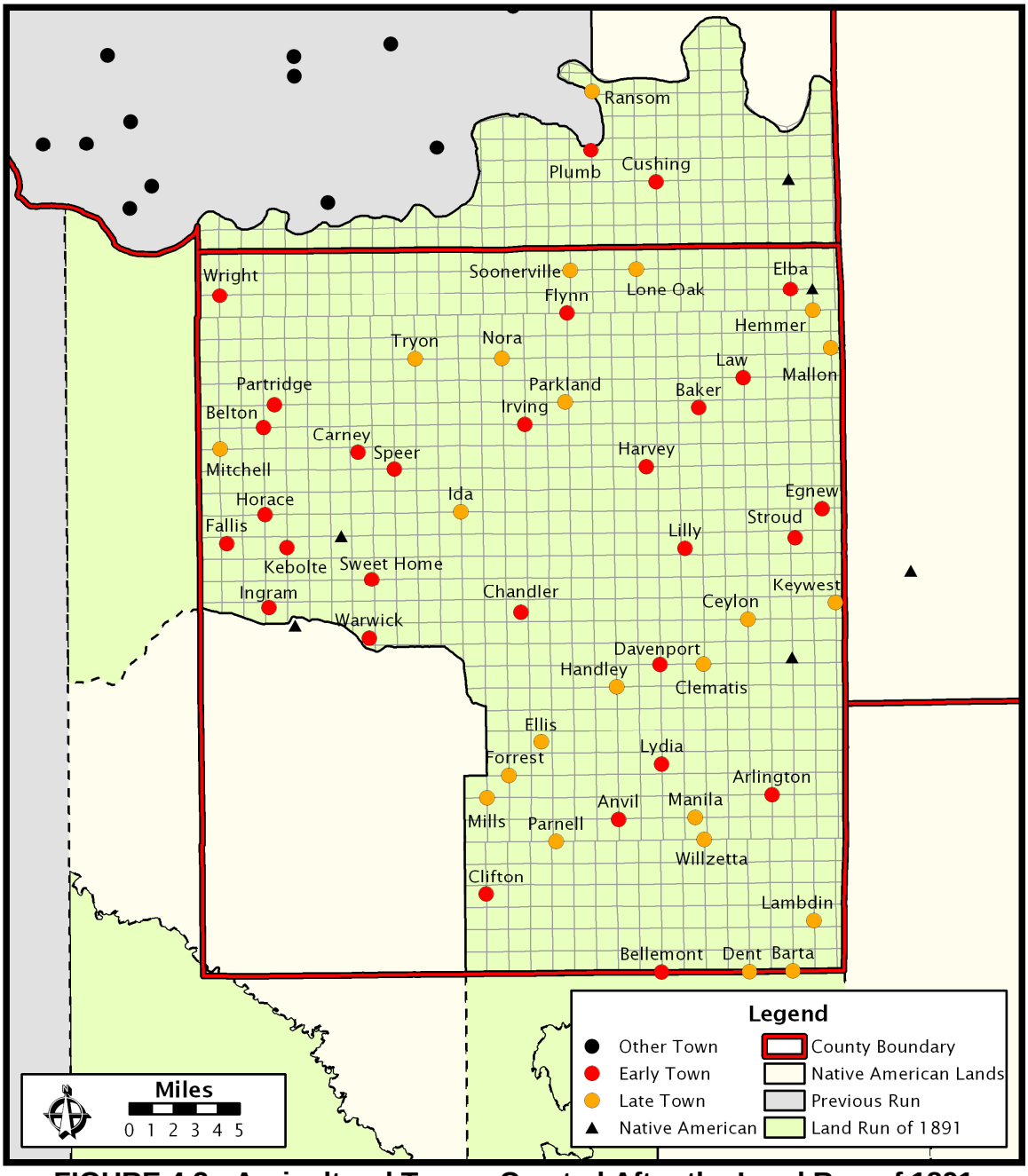

FIGURE 4.3 - Agricultural Towns Created After the Land Run of 1891

There were several large towns that developed on the former Sac and Fox Reservation in eastern Lincoln County. Only one town, Chandler, was formally organized as a townsite in the area before the land run occurred because it was

chosen as the site of the county courthouse. The Chandler Post Office was established on September 21, 1891, the day before the land run occurred. Since the townsite was designated as the administrative center for the county, it developed rapidly. Aside from the businesses, two early industries that developed in Chandler were the brick and cigar making industries but both stopped operation by 1915 (Lincoln County Historical Society 1988). Chandler is currently the major economic center of Lincoln County.

The Stroud Post Office was opened on September 16, 1892 inside a grocery store. The town had several general stores, several blacksmiths, a drugstore, a hotel, and a school by July of 1895. The town was to receive a rail depot but when the railroad developers could not secure enough land at the townsite, a new location one mile to the east was chosen. All of the businesses at the old townsite were relocated and the town continued to grow. Canning and bottling plants were two of the town's early industries (Lincoln County Historical Society 1988).

Two other larger towns, Arlington and Bellemont, developed in the southeastern corner of the county soon after the land run. The Arlington Post Office opened on June 23, 1892 and at its peak the city had three general stores, three saloons, two churches, a blacksmith, a drug store, a school, a hotel, and a telephone exchange. Bellemont was located on the border between Lincoln County and Pottawatomie County. Its post office opened on September 7, 1892 and at its peak Bellemont had five general stores, two cotton gins, two blacksmiths, a drug store, a church, a hotel, and a bank. Many businesses from

both towns relocated to Prague when it received rail service. The Arlington Post Office closed on July 31, 1906 and the Bellemont Post Office closed on July 14, 1906. A limited number of businesses had remained in these towns but all were closed by the 1950s (Lincoln County Historical Society 1988). A small community of homes and a volunteer fire department remain in Arlington but only a few isolated homes exist near the former Bellemont townsite.

There were several small towns started on the former Sac and Fox Reservation in eastern Lincoln County after the land run. Harvey was located nine miles northeast of Chandler and had a post office from December 8, 1891 until May 31, 1900. Lilly was located two miles north of the current location of Davenport and had a post office from June 23, 1892 until December 16, 1898 when service was transferred to Davenport. Davenport first received postal service on March 29, 1892. There were several general stores, a blacksmith, a cotton gin, and a school in Davenport by 1895. The Davenport Post Office was moved three miles to the north in 1898 to be closer to the railroad and two new post offices were established near the original Davenport townsite. The Handley Post Office opened two miles west of the original location of Davenport on December 15, 1898. There were at least two stores in Handley at that time but the post office was closed on March 14, 1906. A second post office, Clematis, opened two miles east of the original Davenport townsite on June 18, 1898 but closed on January 14, 1905 (Lincoln County Historical Society 1988). All of the businesses in Handley and Clematis eventually closed or were relocated to

Davenport. A cemetery is all that remains of the Clematis townsite but nothing remains at the former Handley townsite or the original Davenport townsite.

Anvil, located ten miles southeast of Chandler, had a mill, cotton gin, blacksmith shop, school and trading post in addition to a post office that was in operation from April 9, 1892 until March 15, 1904. Only a few isolated homes still exist in the area. Clifton started as a general store and post office which opened March 3, 1892. The town soon had several general stores, a saw mill, a drug store, a hotel, and a school. The townsite was abandoned when Meeker was developed and the Clifton Post Office closed on May 29, 1903. Baker, located twelve miles northeast of Chandler, had a general store and a school in addition to its post office which operated from May 10, 1892 until April 30, 1904. All evidence of the former townsite has completely disappeared. The Lydia Post Office was in operation from May 28, 1892 until August 13, 1904. It was located nine miles southeast of Chandler but no economic activities remain near the former townsite. Egnew had a post office from June 11, 1892 until May 16, 1895. The former townsite was located one mile north of Stroud. Irving was located eight miles north of Chandler and had a post office for only a short time from June 11, 1892 until April 25, 1894 (Lincoln County Historical Society 1988). No remains of the Irving townsite exist today.

Flynn, located seven miles southwest of Cushing, had a general store and received a post office on August 27, 1892. In 1895, the post office was moved two miles north to a townsite known as Soonerville. A few businesses existed in the area but the post office closed on March 31, 1903 after the railroad bypassed

the town. Law had a post office from September 7, 1892 until May 31, 1900. Law was located ten miles southeast of Cushing. Elba, located four miles northeast of Law along the modern State Highway 99, had a school and a post office that was open from December 28, 1892 until August 30, 1902 (Lincoln County Historical Society 1988). A church is located in the former Elba townsite but no economic activities remain near the former Flynn, Soonerville, or Law townsites.

After the initial wave of settlement, only two additional towns were organized that showed significant levels of development on the former Sac and Fox lands. Parkland was originally named Troy when it was being surveyed. It was sold to a different townsite company and was developed in 1894. Parkland was located ten miles north of Chandler. The post office was opened on December 19, 1894 and the town was home to several general stores, a drug store, a barber, a saloon, a bank, a blacksmith, and a school. Most of the businesses moved to other towns after Parkland was bypassed by the railroads and its post office closed June 15, 1918. A small community of homes, a church, and a park are all that remain of the town. The Parnell Post Office opened on July 13, 1895 in a general store. It was located ten miles south of Chandler. A saw mill, a hotel, a grocery store, a cotton gin, a lumber yard, a bank, a newspaper, a school, and a second general store were all in operation by the time the town received rail service in 1903 (Lincoln County Historical Society 1988). Only a small community of homes is located at the site of the former town.

Several other additional small communities were started during this period. Hemmer, located nine miles southeast of Cushing, had a post office for a brief period from January 24, 1894 until April 16, 1894. Dent was located a mile south of the current town of Prague and had a general store and a post office from May 23, 1894 until August 30, 1903. Any businesses located in the town were probably relocated to Prague after it received rail service. Forrest had a church and school in addition to postal service for a brief period from May 23, 1894 to September 21, 1894. The community was located seven miles south of Chandler. Guild was a small townsite development that had a post office that opened on December 14, 1896. It was located five miles northwest of Prague. Other than a cotton gin, it is unknown what other commercial developments the town had. The town's name changed to Willzetta on July 2, 1904 but the post office was permanently closed on June 30, 1909 (Lincoln County Historical Society 1988). A church remains active in the Forrest community but no other economic activities remain at any of the other former townsites.

Lambdin was located two miles east of the location where the Prague townsite was developed and had several businesses and a school soon after its post office opened on December 21, 1896. The townsite was not chosen as the site for a rail depot and its post office was closed on July 15, 1904. An abandoned cemetery is the only thing that remains of the former town. The Manila Post Office was open from December 24, 1898 until December 31, 1902. It was located twelve miles southeast of Chandler. Nothing remains of the former town. Mills was located eight miles south of Chandler and had a post office from

May 5, 1899 until October 31, 1904. The Mills area was known locally as Wheelersburg before the post office opened. All evidence of the former Mills townsite has disappeared. Mallon had a post office from November 29, 1899 until May 31, 1905. The former townsite of Mallon was located nine miles north of Stroud. Ceylon was located five miles southwest of Stroud and had a post office for only a short time from January 6, 1900 until May 31, 1900. Ellis, located six miles south of Chandler, received a post office on September 10, 1900 but it closed on September 23, 1904. The remaining businesses relocated to Midlothian, a railroad town, after 1903 and nothing remains of the Ellis townsite. Barta had a post office from November 7, 1901 to August 30, 1903 (Lincoln County Historical Society 1988). Barta was located two miles south of the current town of Prague. Nothing remains at the former Barta townsite.

Two other small communities, Lone Oak and Nora, were started during this period but neither had a post office. Lone Oak was located four miles south of Cushing. Nora was located two miles south of the current townsite of Agra. No evidence of the former townsites could be found.

Keywest was the last significant agricultural based center to develop on the Sac and Fox lands in Lincoln County and had a post office from April 20, 1908 until July 31, 1909. It was located four miles southeast of Stroud. The Keywest community existed as late as 1924 when it failed to have its post office reopened (Lincoln County Historical Society 1988). A cemetery is all that remains of the former town.

There were only a few towns that developed on the Sac and Fox lands in Payne County after the land run. The Cushing townsite was organized shortly after the land run and its post office was established on November 10, 1891. The town was incorporated on November 1, 1894. By 1895, the town had six grocery stores, four blacksmiths, two hotels, a drug store, a mill, a saloon, a doctor, a school, and a newspaper. It would continue its growth after it received rail service. A small settlement existed four miles northwest of Cushing named Plumb and it had a post office from March 21, 1892 until August 31, 1900 (Newsom 1997). There was another settlement that existed for a brief period three miles north of Plumb named Ransom but it likely never served as a site of significant economic development. The former Plumb and Ransom townsites are located along the Cimarron River but nothing remains of the towns today.

One of the larger towns that developed on the former Iowa Reservation in northwestern Lincoln County was Carney. Carney was started as a camp along the Ridge Road that ran from Chandler to Guthrie. The camp was originally named Cold Springs but the name was changed to Carney when the post office opened on April 9, 1892. The town was platted in 1893 and developed a two-block long business district within a few years comprised of about fifteen to twenty businesses. The town rapidly declined when the agricultural market collapsed in the 1930s and only a few businesses remained by the 1950s (Lincoln County Historical Society 1988). The town still has several businesses and has seen some limited redevelopment along US Highway 177 since the 1980s.

There are two other towns that started in the period following the land run which still exist as residential communities. Warwick received postal service on October 26, 1892. It was located four miles east of Wellston. Fallis was first known as Mission when its post office opened on December 28, 1892 until July 13, 1894 when it became Fallis. Fallis was located four miles northwest of Wellston. Warwick and Fallis experienced their major period of growth after they received rail service (Lincoln County Historical Society 1988).

There were several smaller towns and communities started on the former Iowa Reservation in northwestern Lincoln County after the land run. Kebolte was located four miles north of Wellston and had a post office from December 17, 1891 until November 15, 1892. The Horace Post Office, located six miles north of Wellston, was in operation from March 23, 1892 until January 7, 1895 when service was transferred to Fallis. Speer had a general store and was near a site that served as a camp for travelers between Chandler and Guthrie. It was located two miles southeast of Carney. The Speer Post Office opened on March 29, 1892 but it was relocated to Lowe, a railroad townsite, on December 15, 1903. The Ingram Post Office was located a mile northwest of Wellston and opened on April 2, 1892. Ingram had a number of businesses but they relocated to Wellston when it received rail service and Ingram's post office closed soon after on December 16, 1898. Partridge was located four miles northwest of Carney and had a post office from April 9, 1892 until July 31, 1908 when its service was transferred to Wellston. Wright had a post office from June 30, 1892 until October 15, 1904 and was located in far northwest Lincoln County. Belton,

located a mile south of Partridge, was first known as Pollock when it received mail service on September 16, 1892. Its name was changed to Belton on November 20, 1893 but the post office closed on February 26, 1895 (Lincoln County Historical Society 1988). The Sweet Home community was located three miles to the north of Warwick but never received a post office. Nothing remains of any of these former towns with the exception of Sweet Home, which was the site of a church, a cemetery, and several residences.

Only one large town developed several years after the initial wave of land run settlers populated the Iowa lands. Tryon, located eight miles southeast of Perkins, was first known as Fouts. The Fouts Post Office opened in a grocery and feed store on April 19, 1894. Shortly after, a townsite was developed one mile to the east of the Fouts Post Office and the post office was relocated to the new town in 1895. The post office was renamed Tryon on March 15, 1899. Several businesses including a bank and school were located in the town which experienced some additional growth when it received rail service. Only a few businesses and the post office are still active within the town. Two other small towns developed during this period. Ida, located five miles northwest of Chandler, had a post office from March 25, 1895 until March 15, 1904. Mitchell had a general store and a post office from April 5, 1895 until February 15, 1905 (Lincoln County Historical Society 1988). It was located six miles west of Carney. There are no remains of the Ida or Mitchell townsites.

The Land Run of 1893

The lands of the former Pawnee Reservation were opened for settlement at the same time as the Cherokee Outlet. The majority of the Pawnee land was located in Pawnee County but a small portion of it extended into northeastern Payne County. The tribe agreed to receive individual allotments on October 31, 1891 and sold the remainder of the land back to the federal government. Payne County and Pawnee County both contain small portions of the Cherokee Outlet. The portion of the Cherokee Outlet in Pawnee County was discontinuous from the rest of the outlet to the west and is known as the Triangle. The Cherokee were required to sell the Outlet to the federal government in 1891 and the funds were approved on March 3, 1893 (Franks and Lambert 1994).

The allotment of the Otoe-Missouria reservation in western Pawnee County was started in 1890 but was not completed by the time of the land run (Franks and Lambert 1994). The allotment was finished in 1907 and the small remainder of the reservation that was not given to individual tribal members was allowed to remain under tribal control. The Pawnee Reservation and Cherokee Outlet were declared open for settlement at noon on September 16, 1893 by a presidential proclamation (Foreman 1942). The towns created after the Land Run of 1893 are depicted in Figure 4.4.

Before the land run occurred, a site near the Pawnee Agency was selected as the location of the administration center of Pawnee County. The town of Pawnee had already been established as a minor trade center before the run but a large amount of additional development occurred in the townsite

(Franks and Lambert 1994). Pawnee remains an important economic and administrative center for the county.

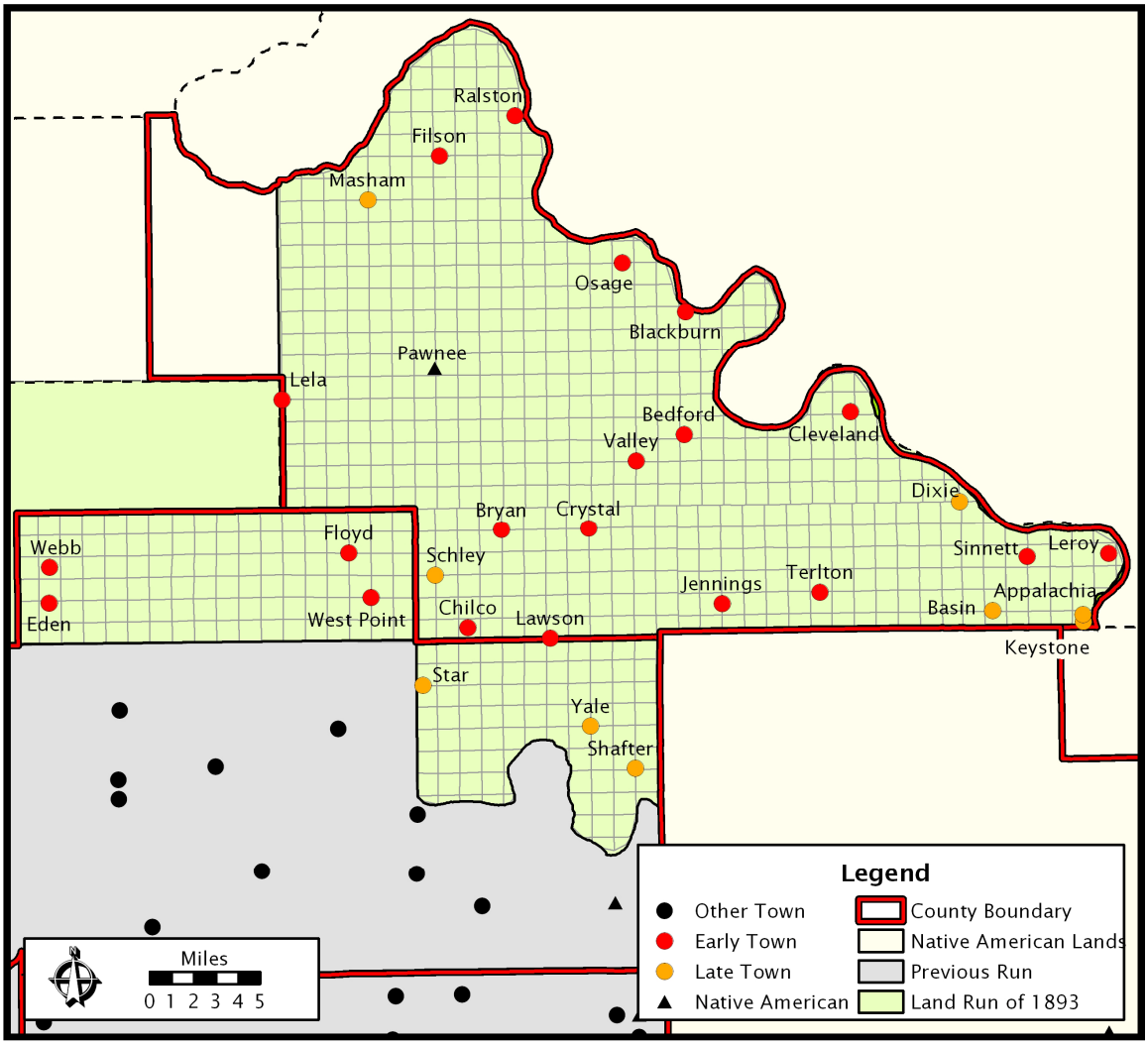

FIGURE 4.4 - Agricultural Towns Created After the Land Run of 1893

One of the first new post offices to open in the Pawnee County portion of the former Pawnee Reservation was Crystal. The Crystal Post Office opened on January 22, 1894. It was located nine miles southeast of Pawnee. There were a few businesses operating in the town but the townsite was abandoned by April of 1903 after the railroad had chosen to develop a new town, Maramec, a mile to the north (Franks and Lambert 1994).

Lela is located on the border of Pawnee and Noble County seven miles west of Pawnee. A hotel and several other businesses opened in the winter after the land run and the town's post office opened on February 17, 1894. The town received rail service and for a short time the post office operated under the name of Valeria from October 3, 1904 to March 18, 1905. After years of decline, the town's post office closed on October 31, 1954 (Shirk 1987). Only a few businesses and a small community of homes are still located in the area.

Osage was started as a trade center near a ford in the Arkansas River eight miles northeast of Pawnee. Its post office opened on May 23, 1894. Osage had three saloons, three restaurants, two general stores, two blacksmiths, two hotels, and a school. When it was bypassed by the railroad the businesses began to move to Skedee and its post office was closed on September 15, 1902 (Franks and Lambert 1994). No evidence of the former townsite exists.

The Riverside Post Office opened on June 15, 1894 near a restaurant and a general store that had been established a few months before. It was located twelve miles northeast of Pawnee along the Arkansas River. A townsite plat was filed in July of 1894 and the community changed its name to Ralston. The town grew quickly and several new businesses were opened including numerous general and specialty stores, several hotels and saloons, two banks, and three newspapers. The town later received rail service but only limited oil exploration took place in the area in the 1910s (Franks and Lambert 1994). Ralston still serves as a minor economic center for northern Pawnee County.

Several other small towns were developed within the former Pawnee Reservation soon after the land run. Bryan was located eight miles south of Pawnee and had a school and a general store in addition to a post office that was open from March 13, 1894 until May 31, 1905. Chilco was located twelve miles south of Pawnee and had a post office from March 30, 1894 until June 30, 1905. Valley had several businesses, a school, and a post office that was open from July 26, 1894 until October 15, 1934. It was located eight miles east of Pawnee. The Filson Post Office was located ten miles north of Pawnee and operated from August 3, 1894 until July 14, 1906 (Shirk 1987). A cemetery exists near the former Valley townsite but nothing remains of the other towns.

After the initial period of settlement, two additional small towns were organized in the Pawnee County portion of the Pawnee Reservation. Schley and Masham were started in relatively isolated areas over eight miles away from Pawnee, though in opposite directions. Schley, to the south of Pawnee, had a post office from December 24, 1898 until April 30, 1903 and Masham, to the north of Pawnee, had a post office from February 3, 1899 until August 14, 1909 (Shirk 1987). Masham had several stores, a school, and a church soon after it was developed (Franks and Lambert 1994). A church and a volunteer fire department are still located in Masham but there is nothing remaining at the former Schley townsite.

The main street of Lawson was split between Pawnee County and Payne County since its main street developed along the county boundary. The town started soon after the Land Run of 1893 three miles north of the current Yale

townsite. The Lawson Post Office opened January 17, 1894 but the name was changed to Quay on February 24, 1903. Several merchants were located in the town (Franks and Lambert 1994). The town experienced some growth when it received rail service but its largest period of growth came when oil was discovered (Morris 1978). Only a few homes still exist in the area.

With the exception of the border town, Lawson, the rest of the Payne County portion of the Pawnee Reservation was developed several years after the initial period of settlement. Yale had a general store, a blacksmith shop, and a post office which opened on October 4, 1895. The original townsite was abandoned in 1902 when the town relocated to a new site one mile to the northeast which received rail service. Shafter, located three miles southeast of Yale, was initially a private development that was started in order to provide a market for its developer's orchard. It originally had a store, a saw mill, and a cotton gin but grew to include several general stores, a blacksmith, a drug store, and a post office. Most of the stores moved to the new Yale townsite after it received rail service (Newsom 1997). The Shafter Post Office operated from November 1, 1898 until August 31, 1905. The other town that started in the area was Star which had a post office from June 2, 1902 until March 15, 1906 (Newsom 1997). It was located nine miles west of Yale. There are no remains of the former Shafter and Star townsites.

One of the first major towns to develop in the Pawnee County portion of the Cherokee Outlet, also known as the Triangle, was the town of Cleveland. The Jordan Valley Townsite Company purchased the land that would become

Cleveland from a homesteader. Other settlers began to establish businesses in the townsite which included a grocery store, hotel, and livery. The first post office opened on October 28, 1893 as Herbert but the name was changed to Cleveland on April 14, 1894. Within a year the town had several general stores, hotels, grocery stores, saloons, lumber stores, restaurants, a book store, a newspaper, and a bank. The town developed a large trade area that extended into the Osage Reservation to its north (Franks and Lambert 1994). Cleveland continued to grow and saw two additional boom periods, one because of rail and another due to the discovery of oil. It remains the regional economic center for eastern Pawnee County and for portions of southern Osage County.

Another townsite company was organized shortly before the Land Run of 1893 with the purpose of developing a town named McElroy; however, the town's name was changed to Jennings shortly after the run occurred. Jennings is located eleven miles southwest of Cleveland along the current State Highway 99. The first business opened in October of 1893 and the post office opened on November 14, 1893. The town quickly grew and had over six general stores, two newspapers, and a bank by the turn of the century. Like Cleveland, Jennings experienced further growth when rail service was expanded to the town and when a large oil field was discovered in the area (Franks and Lambert 1994). The only a small number of businesses remain active within the town.

Blackburn was started as a trade center near a ford that allowed wagons to easily cross the Arkansas River twelve miles east of Pawnee. Its post office opened on December 15, 1893. Since it was adjacent to the Osage Reservation,

trade with the Native Americans was important to its early economy. Three saloons were in operation in addition to other general stores as early as 1894. By 1895, the town had three newspapers, three general stores, two liveries, a hardware store, a meat market, a saw mill, a dry goods store, a restaurant, and a hotel (Franks and Lambert 1994). There were several orchards and other highly productive agricultural lands in the area and Blackburn was able to establish a bank. The town began a slow decline in the 1930s and its post office was closed on March 31, 1960 (Morris 1978). Two churches and a small community of homes are currently located in Blackburn. Six miles to the south of Blackburn was a small town named Bedford that had a post office from June 28, 1894 until October 15, 1904 (Shirk 1987). No evidence of this former townsite exists.

Terlton had only limited economic development throughout its early years. The town is located nine miles south of Cleveland. The town's post office was established on November 30, 1894 and a school also opened in the area. There were relatively few businesses in operation until rail service came to the community and it did not incorporate as a town until 1910. The town also experienced additional growth when oil was discovered in the area (Franks and Lambert 1994). The post office and a small number of businesses are still active within the town.

There are also a couple of other small communities that started in the southeast corner of the Cherokee Outlet lands soon after the land run. Leroy and Sinnett were located within four miles from each other on a narrow strip of land between the Arkansas River and Cimarron River. The area is now

surrounded on three sides by Keystone Lake. Both towns had a post office and a school. Leroy's post office operated from May 31, 1894 until January 15, 1906 and Sinnett's post office was open from September 27, 1894 until January 15, 1906 (Franks and Lambert 1994, Shirk 1987). The Sinnett Cemetery is the only thing remaining of either former town.

After the initial period of settlement, four additional towns were organized around Leroy and Sinnett. The largest and most successful of these towns was Keystone. Keystone's economy initially centered on trade with the Native Americans since it was located near the border of Oklahoma Territory and Indian Territory. Keystone's post office opened on May 26, 1900 and the town continued to grow until the 1930s. The townsite was abandoned in 1962 upon the completion of the Keystone Lake dam and was submerged (Morris 1978). The town of Appalachia tried to develop on the opposite side of the Cimarron River from Keystone in 1903. It had a post office from January 18, 1905 until January 1, 1906 but the town could not successfully compete with Keystone and was abandoned by 1907 (Franks and Lambert 1994). The two other small towns that developed in this area were Dixie and Basin. The Dixie Post Office opened on May 10, 1898. The post office changed its name to Dix on March 20, 1905 but closed on December 14, 1905. Basin had a post office from May 5, 1899 until June 30, 1906 (Shirk 1987). Both Dixie and Basin had a rural school nearby (Franks and Lambert 1994). The area has been substantially redeveloped after the construction of the lake and no indications of the former townsites can be found.

Several smaller towns also developed on the portion of the Cherokee Outlet in Payne County soon after the land run. West Point had a general store, a church, and a school in addition to its post office which was in operation from March 13, 1894 until March 15, 1904 (Newsom 1997). West Point was located twelve miles northeast of Stillwater. Webb was located eight miles northwest of Stillwater and had a post office from April 12, 1895 until March 14, 1896. The nearby community of Eden outlasted Webb and had a post office from April 13, 1895 until June 30, 1902. Floyd also received a post office on March 22, 1895 but it closed on June 15, 1900 (Shirk 1987). Floyd was located eleven miles northeast of Stillwater. No commercial or residential developments remain near the former West Point, Webb, Eden, and Floyd townsites.

Rock and Walnut, the two townships west of Eden and Webb, were initially included in Payne County after the Land Run of 1893 but were removed during the Oklahoma Constitutional Convention of 1906 (Newsom 1997). The townsites that are located in the Rock and Walnut townships, now a part of Noble County, are not included in this study.

The Land Run of 1895

The Kickapoo Allotment Act was passed by Congress on March 30, 1893 which granted the allotment of 80 acres of land to each Kickapoo tribe member. A presidential proclamation issued on May 18, 1895 declared the un-allotted lands open for settlement on May 23, 1895. This was the fifth and final land run in Oklahoma but consisted of only a relatively small amount of land compared to

the previous runs (Forman 1942). Few towns were started within the portion added to Lincoln County and those that did develop remained small since several larger towns were already present along the perimeter of the Kickapoo Lands. The towns created after the Land Run of 1895 are depicted in Figure 4.5.

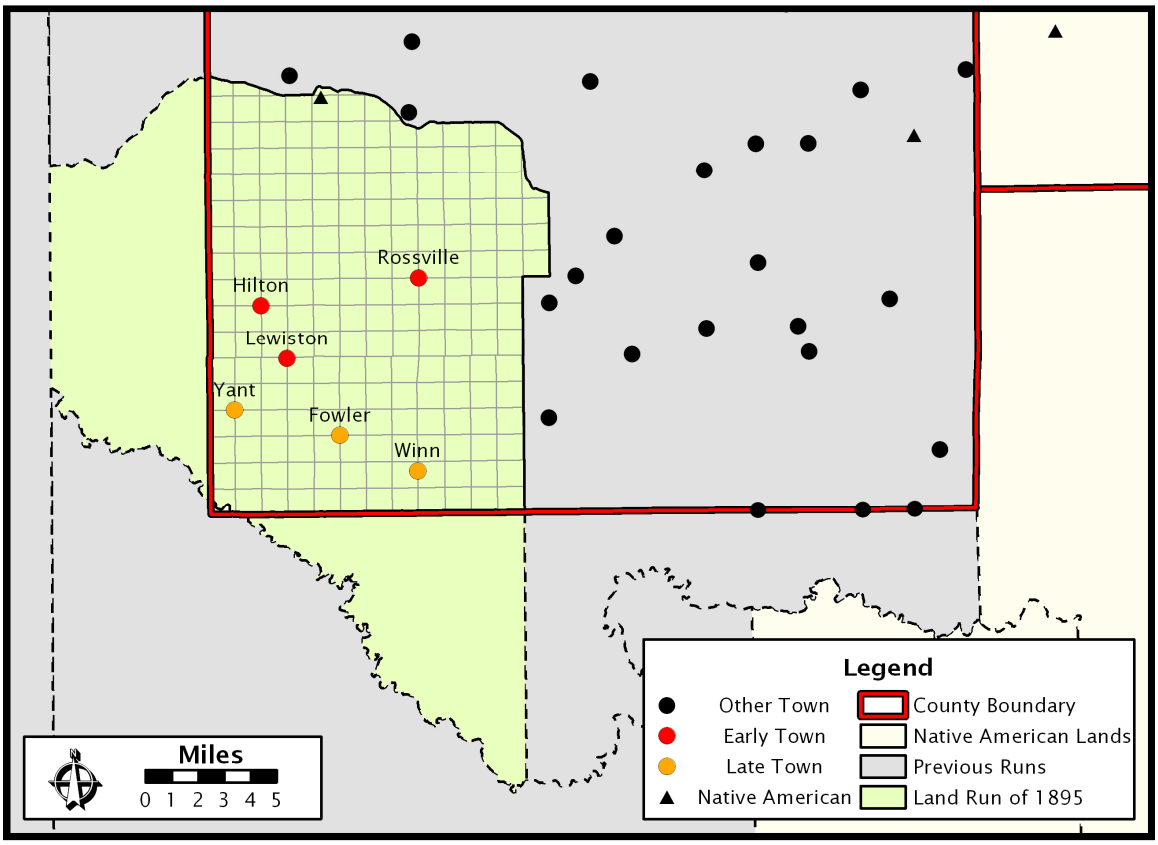

FIGURE 4.5 - Agricultural Towns Created After the Land Run of 1895

Several of the communities in the area were started soon after the land run. Rossville had a post office that opened on October 7, 1895 and remained open until February 15, 1907. Rossville had a cotton gin, telephone office and at least one general store in operation until the 1950s. Rossville is located on the current US Highway 177 and a small community of homes and a volunteer fire department are still found within the town. Lewiston had a post office from October 27, 1895 until December 31, 1904 and Hilton had a post office from

February 15, 1896 until December 31, 1904. A number of modern suburban residential developments exist near the former Lewiston and Hilton townsites.

Additional townsites were started several years after the area had initially been settled by the land run. Winn developed to serve the New Salem community which dated to the land run. Winn had a blacksmith shop and general store in addition to a post office that operated from February 5, 1902 until February 13, 1904. Nothing remains of the townsite. Yant was a small town that had two general stores, three mills, and a blacksmith shop. The Yant Post Office operated from March 12, 1901 until February 29, 1904 and the final store closed in 1918 (Lincoln County Historical Society 1988). No economic activities remain in the former townsite. Fowler was another small community but never had postal service. It is located along the current US Highway 62 and still serves as the location of a church.

Settlement of the Creek Nation

The Curtis Act of 1898 was passed by Congress on June 28, 1898. The Act allowed for the incorporation of towns in Indian Territory and established fee simple title to the platted town lots. This gave municipal governments the power to collect taxes and establish services such as schools and roadways and allowed towns to be settled by non-Creeks (Foreman 1942). A limited number of communities developed before the Curtis Act was passed but remained small because investors could not obtain the title to the site of their buildings prior to 1898. Outside of the incorporated towns, the allotment process was still on-

going and it was not until after statehood that land ownership requirements were removed for the unincorporated areas of Creek County. Unlike what was common in the rest of the study area, several of the agricultural settlements developed concurrently or after the period of railroad construction. The agricultural towns created in Creek County are depicted in Figure 4.6.

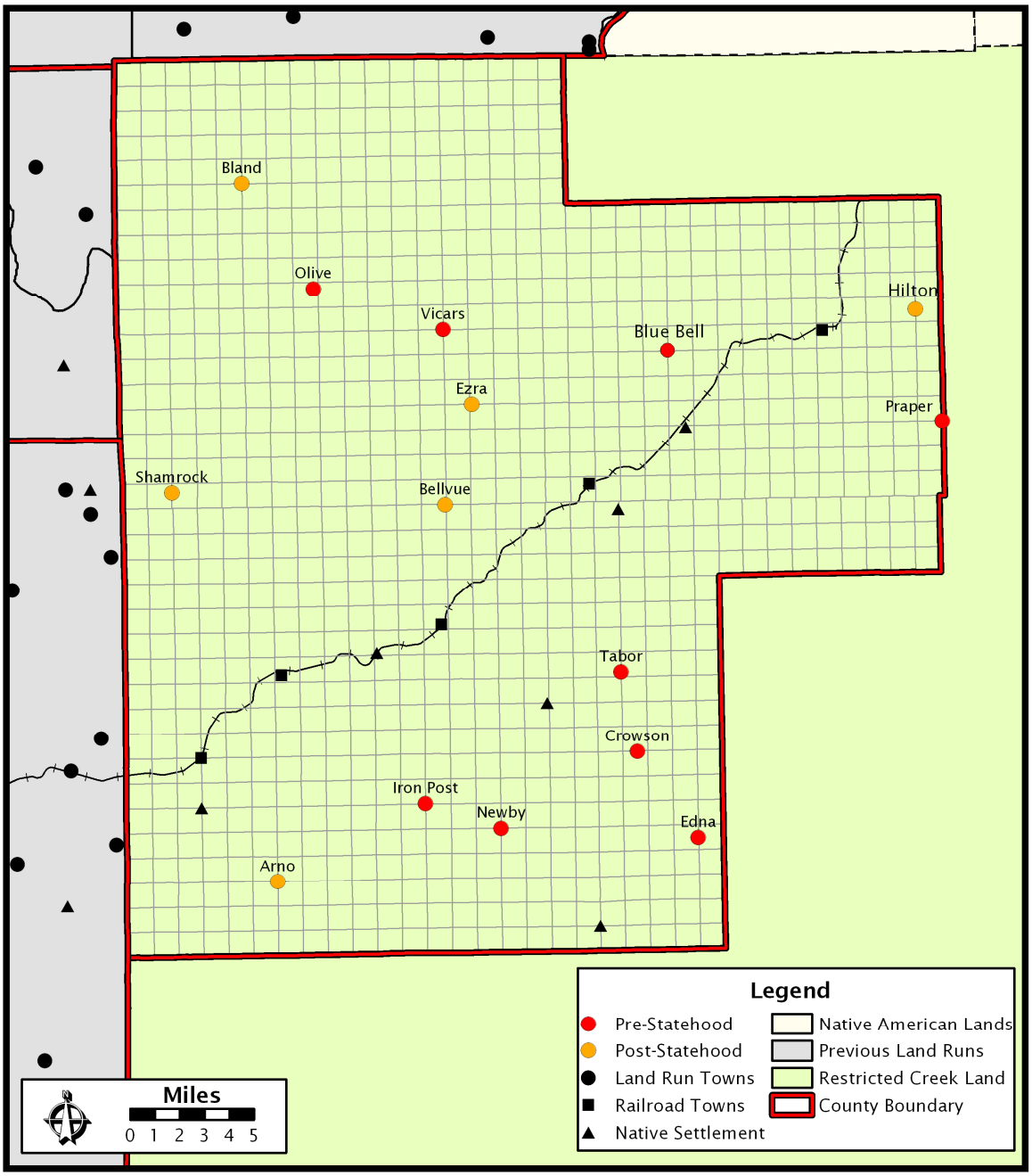

FIGURE 4.6 - Agricultural Towns Created in Creek County

Even though white land ownership was allowed in segregated townships after 1898, new settlements remained slow to develop. Vicars had a school and a post office in operation from April 8, 1900 to September 15, 1903. Vicars was located eleven miles east of the site where Drumright was developed. Olive also formed around a school that opened in 1901. It had a small commercial district which eventually included a cotton gin, blacksmith, a hotel, hardware store, drug store, a doctor's office, two mills, a dentist's office, a pool hall, a barber shop, four grocery stores and a general merchandise store (Newsom 1987). Olive is located eight miles northeast of Drumright. Only a school and a small community of homes remain in the townsite. Praper, located five miles southeast of Sapulpa, had a post office from June 26, 1901 to December 12, 1906. The town was relocated to the Kiefer townsite after oil was discovered in the area.

A number of townsites also developed in the rural area to the southeast of Bristow. Newby was another town that developed around a school and it had a post office from October 17, 1902 until November 30, 1955. The former townsite is located ten miles south of Bristow. Edna had a small business district and a school in addition to a post office that was open from February 25, 1903 until September 20, 1957. Edna is fourteen miles southeast of Bristow. Tabor, located seven miles east of Bristow, was a small community that had a post office from April 2, 1903 until March 31, 1928. It was initially named Robbins but that name was changed on December 12, 1903. Crowson developed between Edna and Tabor and had a post office from February 4, 1905 until March 15, 1919 (Shirk 1987). The few remaining commercial structures found within the

former townsites in this area, including several old school buildings, serve only as private residences.

Since some of the land restrictions were removed after statehood in 1907, land was easier to acquire and a second generation of small agricultural towns developed. Ezra was a short lived community eight miles north of Bristow and had a post office from September 17, 1909 until September 30, 1910. Bland had a post office from April 25, 1910 until May 15, 1912 (Shirk 1987). It developed in order to serve the agricultural area located around the Cimarron River near present day Oilton. Shamrock was a small community when its post office opened on July 9, 1910. It had a general store in operation but did not see additional growth until the Cushing-Drumright Oil Field was discovered (Newsom 1987). It is located five miles south of the Drumright area. Bellvue, located five miles north of Bristow, was a small settlement that developed around the site of a school and had a post office from February 25, 1913 until August 31, 1916. A small community of homes and a gas station exist at the site of the former town. Arno, sometimes identified on maps as “Aron,” had a post office that was in operation from October 11, 1913 until April, 1916 (Shirk 1987). It was located eight miles south of Depew but nothing remains of the town.

There were also a number of other small agricultural based communities which never had a post office and were started during this period. The Blue Bell community once had a church and school. It is located seven miles west of Sapulpa and still has an active church. Iron Post was a small collection of homes located at the intersection of section line roads. It is seven miles south of Bristow

but never developed as an economic center. The Thompsonville townsite was organized as an agricultural settlement in 1921 six miles south of Kellyville but the town was never developed (Shirk 1987).

Railroad Towns

The third set of towns in the study area was created as the result of the expansion of railroad service. Parts of the study area contained rich farm lands so most of the railroads were constructed in part to profit from the shipment of agricultural produce grown throughout the area. Passenger service was also offered for at least a short time on most of the railroad lines. While the first railroad line was extended into the study area in 1886, regular service was not provided across the area until 1898. Most railroad construction took place between 1900 and 1903 and by 1904, seven different railroad companies were in operation across the four-county study area.

One railroad company, the Atkinson, Topeka, and Santa Fe Railroad, took an active role in the development of towns along their railway. Others took a more passive role but most were still ultimately responsible for where their depots were placed and if existing towns would receive regular freight and passenger service. New townsite lots were typically sold at an auction and were developed quickly. Existing towns that received rail service also had a period of rapid additional commercial development. Thirty-four new townsites were started as the result of the railroads. However, at least eleven of these new townsites were created because the railroad was not extended into a preexisting nearby

agricultural town. The railroad companies also located sidings along their railroad and even though they were not extensively developed, several still served as local freight and passenger depots.

Atlantic and Pacific Railroad

The Atlantic and Pacific Railroad reached the Tulsa area from Pacific, Missouri in 1882 and it was later extended to Sapulpa in 1886. As the railroad name suggests, it was originally intended to reach California but the railroad company could not secure financing for further construction (Allhands 1925).

Sapulpa was first organized as a community when it received rail service in 1886. A hotel and general store were opened at the site and its post office opened on July 1, 1889. Sapulpa served as a cattle shipping center for several years as it was the southernmost station on the railway. Sapulpa grew slowly and was not incorporated until after the Curtis Act of 1898 was passed. Sapulpa continued to see modest growth until the Glenn Pool Oil Field was discovered. The Atlantic and Pacific Railroad was sold to the St. Louis and San Francisco Railway on December 18, 1897 (Allhands 1925). The rail line is still in service and is operated by the Burlington Northern Santa Fe Railway.

St. Louis and Oklahoma City Railway

The St. Louis and Oklahoma City Railway Company was incorporated in November 1895. The company built a railroad that connected the terminus of the Atlantic and Pacific Railroad in Sapulpa to the Atkinson, Topeka, and Santa Fe

Railway in Oklahoma City. As seen in Figure 4.7, four new towns were developed along the railroad in Creek County and two new townsites were organized in Lincoln County. Most preexisting cities that received rail service also experienced some growth. The railroad construction was started in early 1898 from Sapulpa and the line was completed in December 1898. The line was sold to the St. Louis and San Francisco Railroad on March 28, 1899 soon after it was completed (Allhands 1925).

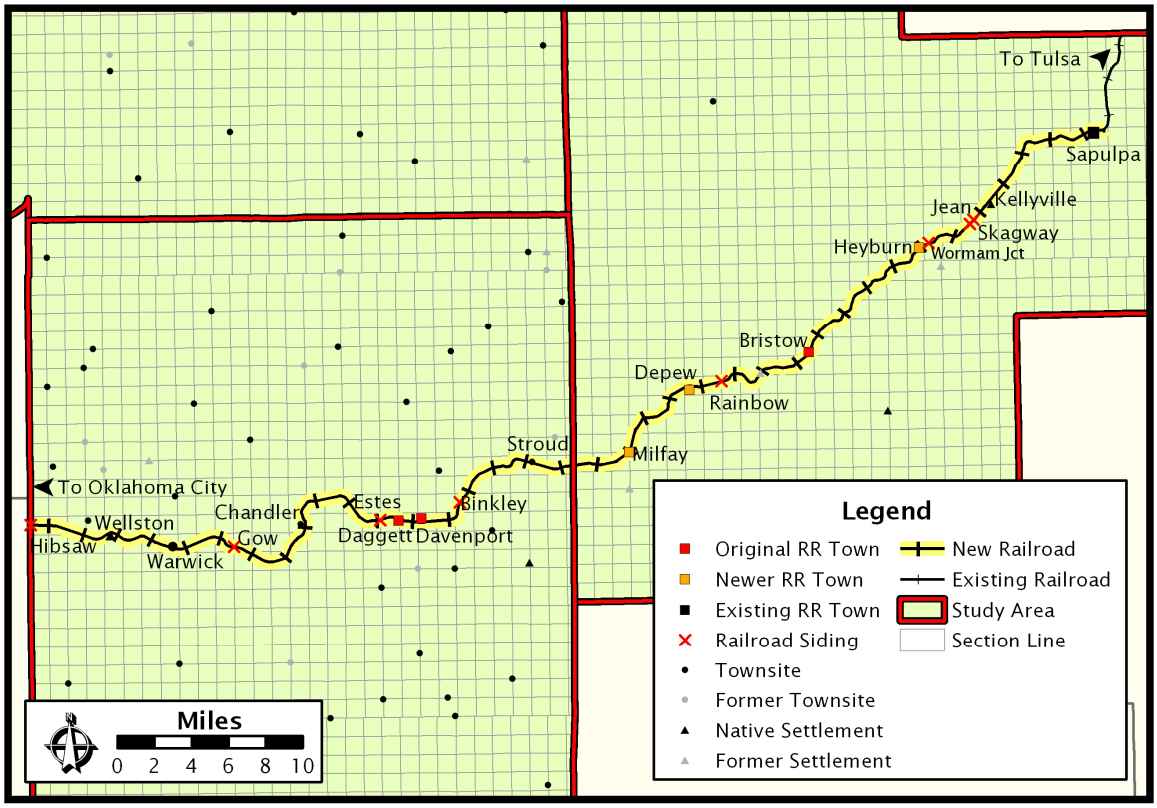

FIGURE 4.7 - Towns Created on the St. Louis and Oklahoma City Railway

After Kellyville received rail service, it experienced a moderate boom in its economy. Two sidings, Skagway and Jean, were later constructed south of Kellyville. These served an industrial area south of the town. A new town named Heyburn was developed near the Worman Junction. Heyburn had a post office from December 14, 1911 until October 14, 1922 (Shirk 1987). There were at

least four businesses that served the community at its peak (Sapulpa Historical Society 1981). Only the ruins of a former commercial building remain of the town.

Bristow developed along the railroad near an isolated trading post. The Bristow Post Office opened on April 25, 1898 and the community grew quickly. The townsite was surveyed and platted in 1901. It was designated as the Creek County seat in 1907 but the courthouse was moved to Sapulpa after a vote in 1908 (Sapulpa Historical Society 1981). Bristow served as a shipping depot for agricultural produce in the 1910s until oil was discovered in the area.

Depew was founded in 1901 and received a post office on April 12, 1901. The railroad initially called the town Hall. The townsite was platted by the Depew Investment Company and lots were sold on June 5, 1905 (Shirk 1987). The town developed a business district that was several blocks long and included three general stores, two blacksmith shops, a bank, a hotel, and a hardware store. The junction to the Sapulpa and Oil Field Railway branch line was built near Depew in 1916 (Newsom 1987). The town's main street has a high vacancy rate but the town is still the site of a large number of homes and a school. Milfay developed to the southwest of Depew and received a post office on December 14, 1911 (Shirk 1987). A few businesses and a school remain in operation in the town.

The St. Louis and Oklahoma City Railway had trouble securing an easement near the towns already in existence in eastern Lincoln County. The businesses in Stroud were forced to relocate one mile to the east because of a

reluctant land owner. Stroud expanded at its new location and was the site of a large outlet mall built in the 1990s along the Turner Turnpike which was constructed in the 1950s. A tornado destroyed the outlet mall and a number of the town's businesses on May 3, 1999 and the town is still trying to recover from those losses.

The railroad was constructed three miles north of the original location of Davenport. Several of the businesses decided to relocate to be closer to the railroad. In 1898, Davenport contained at least six businesses but it was not chosen as a depot site so the business district moved to the southwest in 1899. Davenport was not chosen as the location of a railroad section house which instead was located in Daggett near the Estes siding. Daggett, one mile west of Davenport, was platted in October 1900 and attracted at least four businesses at its peak. Nothing remains of the town today. There was also a railroad siding between Stroud and Davenport named Brinkley but a townsite was not developed at that location (Lincoln County Historical Society 1988).

Unlike eastern Lincoln County, the railroad was not prevented from securing land in the existing towns of central and western Lincoln County. The railroad passed through Chandler and allowed the town to gain additional importance as an agricultural shipping center. The Gow siding was located west of Chandler but was not developed. Warwick, seven miles west of Chandler, grew from its original general store and post office into a small town with two hotels, a bank, a drug store, a saloon, a blacksmith, a newspaper, a cotton gin, and a second general store. Wellston also experienced additional economic

development and remains a minor economic center for its surrounding area. The St. Louis and Oklahoma City Railway exited Lincoln County west of the Hibsaw siding (Lincoln County Historical Society 1988). The railway is still in service and is operated by the Stillwater Central Railroad.

St. Louis, Oklahoma, and Southern Railway

The St. Louis, Oklahoma, and Southern Railway was organized in August 1895 in order to provide another rail connection between northeastern Oklahoma and Texas. Surveying and construction began in January 1900 and construction between Sapulpa and Denison, TX was completed in March 1901 (Allhands 1925). Only one new townsite was developed along this railroad in Creek County and is depicted in Figure 4.8.

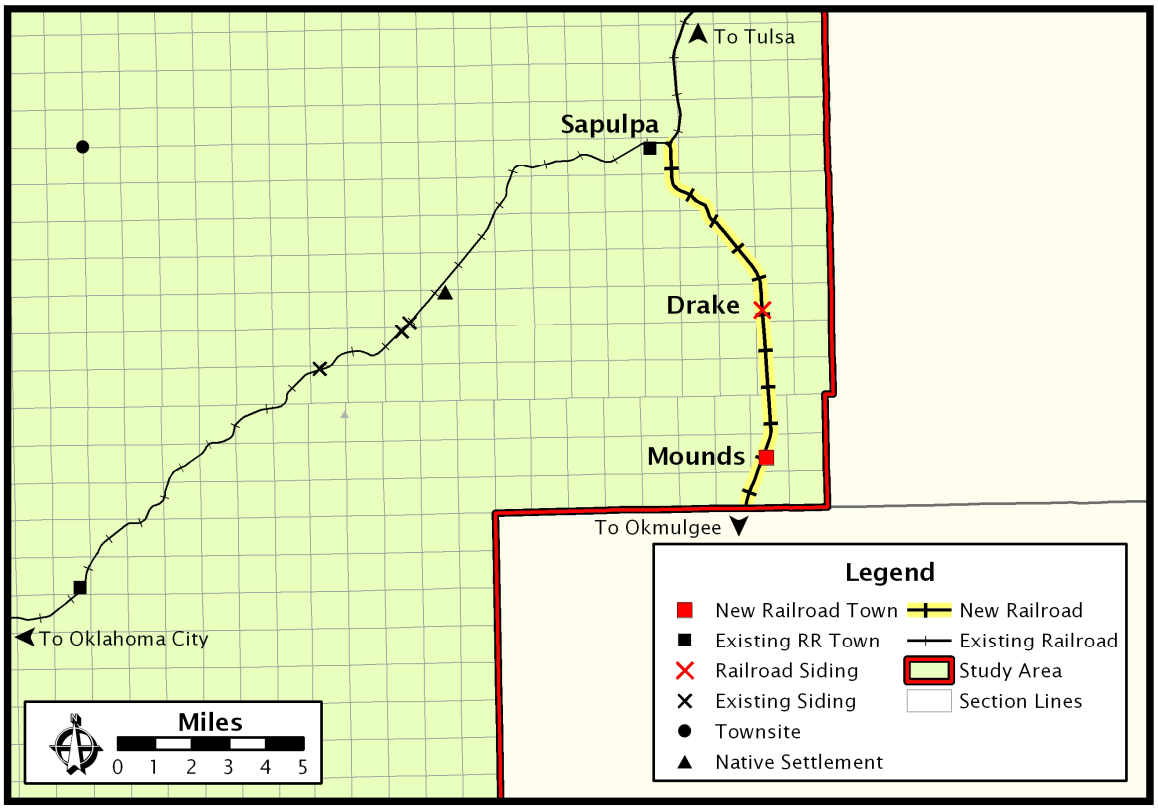

FIGURE 4.8 - Towns Created on the St. Louis, Oklahoma, and Southern Railway

The Mounds townsite was developed when the town of Posey relocated in order to be adjacent to the railroad. Posey was located five miles to the northeast of Mounds in Tulsa County and its post office opened on March 18, 1895. The name of the post office was changed to Mounds when it was moved to the new townsite on April 15, 1898 (Shirk 1987). Mounds has a number of active businesses and homes but its central business district has several vacancies. A second rail stop named Drake was located between Sapulpa and Mounds but it was not developed as a townsite until oil was discovered in the area (Franks 1980). The railroad is still in service and is operated by the Burlington Northern Santa Fe Railway.

Eastern Oklahoma Railway

The Eastern Oklahoma Railway Company was formed in 1899 in an effort to attract freight shipments from fertile agricultural lands in the western portion of the study area. The line was constructed in several segments from 1899 until 1903. A spur line from Guthrie to Pawnee was the first portion completed and was later connected to the second portion, a branch line of the Atkinson, Topeka, and Santa Fe Railroad from Newkirk to Pauls Valley. The Eastern Oklahoma Railway Company was setup as a subsidiary of the Atkinson, Topeka, and Santa Fe Railroad and was fully transferred into its system in 1907 (Cammaller 2001). The Eastern Oklahoma Townsite Company was owned by the railroad and was responsible for the development of nine towns along the railroad in the study area. Five other towns were also organized along the Eastern Oklahoma

Railway by independent developers and six additional siding stops were created.

The location of the towns and the railway is depicted in Figure 4.9.

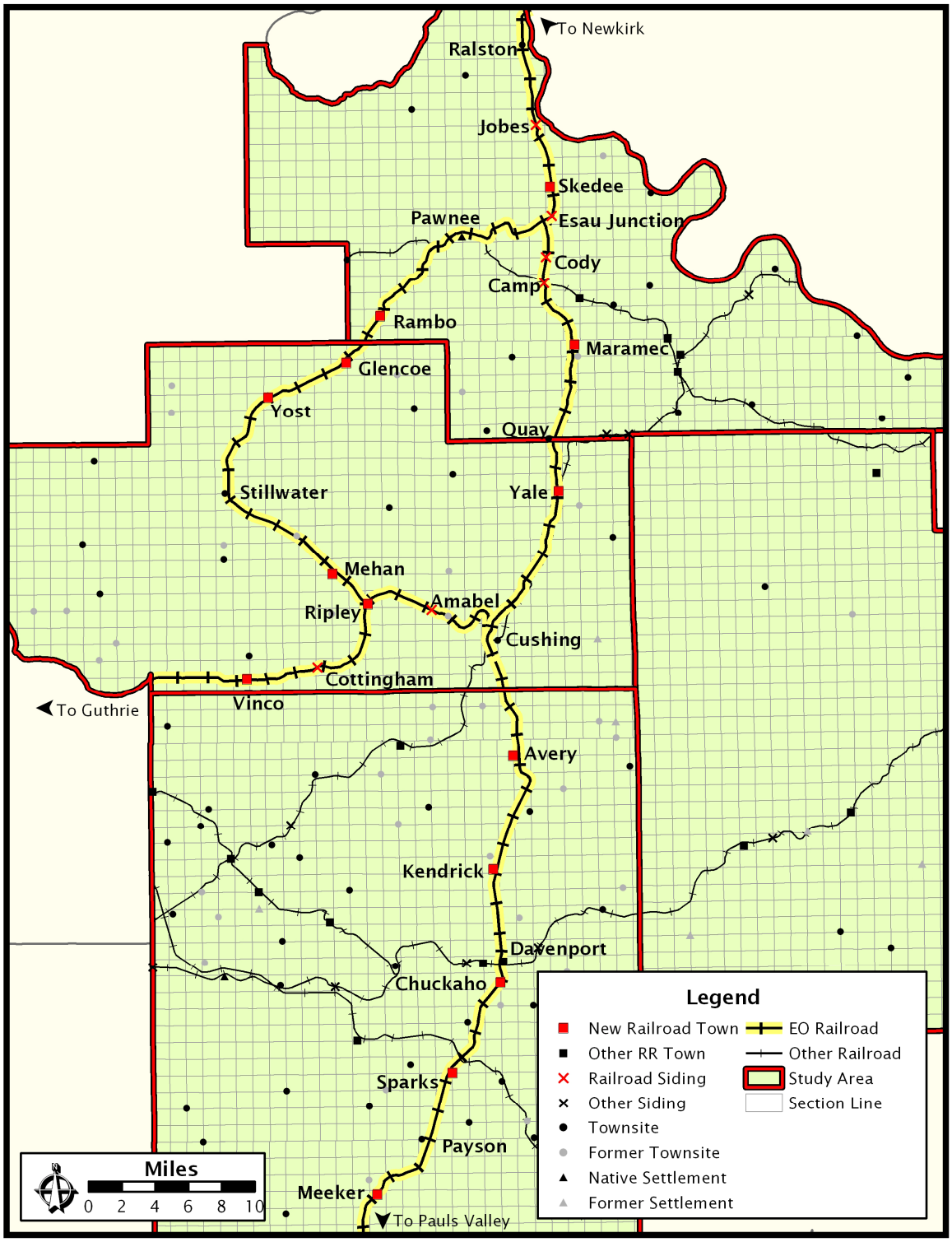

FIGURE 4.9 - Towns Created on the Eastern Oklahoma Railway

The western line of the Eastern Oklahoma Railway reached the Perkins area on January 1, 1900 from Guthrie. The railroad was constructed on the south side of the Cimarron River so the stop for Perkins was not in the town itself (Cammaller 2001). A new townsite named Main was established at the station in January 1902 after an earlier attempt by the name of Stanton had failed. However, the postal service gave the post office the name of Vinco when it opened on March 5, 1903. The town had a general store, a hardware store, a grocery store, a blacksmith shop, and a hotel. Its post office closed on October 15, 1940 and only a few residences remain in the area (Newsom 1997). The rail stop to the east of Vinco was named Cottingham but a town was never developed near its location (Cammaller 2001).

The Ripley townsite was developed by the Eastern Oklahoma Townsite Company who sold the town's lots at an auction in Guthrie on January 13, 1900. A newspaper and bank were in operation a short time later and the Ripley post office opened on February 23, 1900. By the end of March, the town had ten dry goods stores, ten restaurants, four blacksmiths, four saloons, four lumber yards, and two furniture stores. The town was officially incorporated on April 20, 1900. The town remained an important agricultural and shipping center until the 1930s (Newsom 1997). The town contains only a few businesses but has numerous homes and a school.

Mehan, three miles northwest of Ripley, was another townsite developed by the Eastern Oklahoma Townsite Company. The post office opened February 8, 1900 and the town developed a small business district. The business district

included a general store, an implement store, a blacksmith, a rooming house, a lumber store, and a feed store. Some of these businesses had relocated to Mehan from the Clayton townsite. The town received a temporary population boom when oil was discovered south of the town in 1925 but the post office was closed on June 30, 1943 (Newsom 1997). Only a church and a small community of homes still exist in the town.

After passing through Stillwater, the railroad reached Yost. The Eastern Oklahoma Railway constructed a lake at the site and a post office was in operation from January 29, 1901 until January 14, 1905 under the name Youst. The site was not developed as a town but rather as a recreation area and it was the first home of the Stillwater Country Club (Newsom 1997). A private community of homes still exists around the lake.

Glencoe was developed by the Eastern Oklahoma Townsite Company who sold the town's lots at an auction in Guthrie on April 15, 1900. The town's post office opened before the sale on December 6, 1899 but was given the name of Glenco until June 14, 1901. Glencoe was incorporated on December 24, 1900. The town experienced moderate growth over the next decade and had six grocery stores, two banks, two hotels, two livery stables, and several general stores by 1913. The town is still an active economic center.

Rambo, the stop to the north of Glencoe, was not developed as an organized townsite but had a school and a post office that operated from December 3, 1900 until October 14, 1903 (Newsom 1997). The railroad reached

Pawnee on May 31, 1900 and was the temporary terminus until construction resumed in March 1902 (Cammaller 2001).

The Easu Junction, located six miles east of Pawnee, was reached on March 21, 1902 (Cammaller 2001). A townsite named Lemert was planned at this junction by the Eastern Oklahoma Townsite Company but it was never developed. The railroad construction continued north and reached Skedee on March 25, 1902. Skedee was located one mile north of the junction. Several businesses began to locate at Skedee in anticipation of the railroad in 1901, many relocated from the town of Osage. Skedee's post office opened on February 10, 1902 and its business district expanded rapidly. The town started its decline in the 1930s and its post office closed on August 2, 1963. A small community of homes and several abandoned structures are all that remain of the town. A siding named Jobes was located to the north of the town and had a school nearby. The railroad reached Ralston on April 14, 1902 and caused additional development in the town (Franks and Lambert 1994). The line extended to the north and reconnected with the Atkinson, Topeka, and Santa Fe main line at Newkirk (Cammaller 2001).

The next portion of the railroad to be completed was from Ripley to Cushing. Construction was started on April 22, 1902 and reached Amabel on April 28, 1902. Amabel was located four miles west of Cushing. Nothing remains at the site of the former town. The railroad reached Cushing on May 7, 1902 (Cammaller 2001). The depot was not located in Cushing's business district but rather on the south side of the town. A new business district

developed to the east of the rail depot. The town grew to include eight general stores, six blacksmiths, five hotels, five saloons, three drug stores, and three lumber yards (Newsom 1997).

The line was extended southward starting on June 17, 1902 and reached Avery, located seven miles south of Cushing, on July 1, 1902 (Cammaller 2001). A townsite plat was filed on August 5, 1902 and the Avery Post Office opened on September 16, 1902. The town soon had two grocery stores, two cafes, a millinery, a drug store, a bank, a barber shop, a meat market, a hotel, a blacksmith, a saloon, and a lumber yard. Avery's importance declined after the 1920s and the post office closed on July 26, 1957 (Lincoln County Historical Society 1988, Morris 1978). Only a few homes remain in Avery.

Kendrick was developed by the Eastern Oklahoma Townsite Company and its post office opened on January 21, 1903. Kendrick was located five miles north of Davenport. The Kendrick Post Office was moved from Harvey and also operated under the name of Avondale for a short period before it was moved. The townsite lots were sold on November 14, 1902 and in an effort to increase development within the town; free lots were offered to the business owners in Parkland if they relocated to Kendrick. The central business district was comprised of a least twelve buildings by 1908 (Lincoln County Historical Society 1988). The town has a number of homes but only one general store remains in operation.

After Kendrick, the railroad reached Davenport on November 15, 1902 but the Eastern Oklahoma Townsite Company tried to develop a new townsite

named Chuckaho. Chuckaho had the railroad depot, a few stores, and its post office opened on December 5, 1903. The townsite did not develop as the railroad company had hoped and the rail depot was moved to Davenport in 1906. The Chuckaho Post Office closed on April 30, 1908 and the townsite was abandoned (Lincoln County Historical Society 1988). Davenport, which has survived several relocations in addition to two competing railroad towns located less than two miles away from its central business district, is still a small but active town.

Sparks, located eight miles south of Davenport, was developed by the Eastern Oklahoma Townsite Company and the town's lots were sold on August 26, 1902. Many businesses were operating out of tents within weeks and the post office opened on August 30, 1902. By 1905, the town had seven churches, seven doctors, four general stores, three hotels, two grocery stores, two banks, two clothing stores, a lumber store, and an ice house along with many other small businesses. The town started to decline in importance in the 1930s and there were only eighteen businesses still in operation in 1935 (Lincoln County Historical Society 1988). Only a few businesses and a post office remain active in the town.

The railroad reached Parnell on March 14, 1903 but named the station Payson to avoid duplicating the name of a Kansas town on the same rail line (Cammaller 2001). The town was located four miles south of Sparks and the post office operated as Payson from August 22, 1903 until it was closed on October 15, 1954. Several new businesses opened in the town after it received

rail service but it slowly declined as Meeker grew (Lincoln County Historical Society 1988). Only a few homes remain in the area.

Meeker was developed by the Eastern Oklahoma Townsite Company and the lots were sold on March 16, 1903. Most of the businesses relocated from Clifton as the railroad reached the new townsite on March 29, 1903. The post office opened on May 29, 1903. Meeker is located at the intersection of two highways and remains a vibrant community. The railroad extended southward to Shawnee and reconnected with the main Atkinson, Topeka, and Santa Fe line in Pauls Valley (Lincoln County Historical Society 1988).

The portion of the Eastern Oklahoma Railway between Cushing and the Easu Junction was the final part of the line to be completed in the study area. The railroad built north from Cushing starting on July 13, 1902 and reached the Norfolk area on September 25, 1902 (Cammaller 2001). The Norfolk community remained undeveloped until oil was discovered in the area. The railroad reached the new Yale townsite on October 10, 1902. It was developed by local entrepreneurs and the town lots were auctioned on August 1 and 2, 1902. Many new businesses opened in Yale but there were also several that relocated from the old Yale townsite which was located one mile southeast of the new townsite and the other nearby town of Shafter. The railroad reached Lawson on October 28, 1902 but its name was changed to Quay on February 24, 1903. Quay was located four miles north of Yale. Quay had only limited additional development until oil was discovered in the area a decade later (Newsom 1997).

The railroad started south from the Easu Junction in late 1902 and Cody was reached on January 2, 1903. Cody was a rail stop located five miles southeast of Pawnee. The line was extended south to Camp on January 5, 1903 (Cammaller 2001). The Cody and Camp stops were not developed into townsites. Maramec, located eight miles southeast of Pawnee, was developed by the Eastern Oklahoma Townsite Company near the small town of Crystal. The Crystal Post Office relocated a mile north and changed its name to Maramec on April 8, 1903. The new townsite developed quickly and had three general stores, two grocery stores, two restaurants, a hotel, a meat market, a bank, and a newspaper by 1905 (Franks and Lambert 1994). The Cimarron Turnpike was constructed one mile south of Maramec in the 1970s but the nearest exit was located seven miles away from the town. The town has a post office and a fire department in addition to a number of homes but has no other commercial activities. The railroad from Easu Junction was connected with the line from Cushing at Quay on August 31, 1903 (Cammaller 2001).

The Atkinson, Topeka, and Santa Fe Railroad expanded their railroad system once in 1915 from Cushing to Jennings to serve the cities of the Cushing-Drumright Oil Field but this addition was abandoned in March of 1942. Rail service was discontinued between Stillwater, Cushing, and Guthrie when a flood damaged the railroad bridge at Ripley in May 1957. The connection between Pawnee and the Easu Junction was abandoned in 1973 when the railroad received permission to use the Burlington Northern Railroad's line between Tulsa and Perry. The portion of the railroad between Shawnee and Cushing was

abandoned in 1978. The railway between Cushing and Camp was operated briefly by the Cimarron Valley Railroad in the 1980s but it was abandoned in 1984. The railroad line from Camp to Ralston was abandoned in 1986 (Cammaller 2001). Only the Stillwater to Pawnee spur remains open and is operated by Stillwater Central Railroad.

Choctaw, Oklahoma, and Western Railroad

The Choctaw, Oklahoma, and Western Railroad branch line from Guthrie to Chandler was constructed in 1903. It began operation on October 25, 1903 and brought rail service to four new communities in Lincoln County. The railway, shown in Figure 4.10, was sold to the Chicago, Rock Island, and Pacific Railway on March 24, 1904 whom had provided much of the financing for the line and also constructed it (Allhands 1925).

The railroad entered Lincoln County near Merrick. Merrick was located ten miles southwest of Perkins. The town was developed by a local landowner and its post office opened on August 28, 1903. At its peak, the town had two grocery stores, a hotel, a blacksmith shop, a creamery, a school, and a church. The post office was closed on October 31, 1935. Dudley, located three miles west of Carney, and Emsey, located three miles south of Carney, were the next two communities to the east but they did not receive postal service. The post office in Speer was relocated to Lowe on December 15, 1903 but closed on June 30, 1904 (Shirk 1987). Lowe was located six miles northwest of Chandler. Nothing remains of any of the four towns.

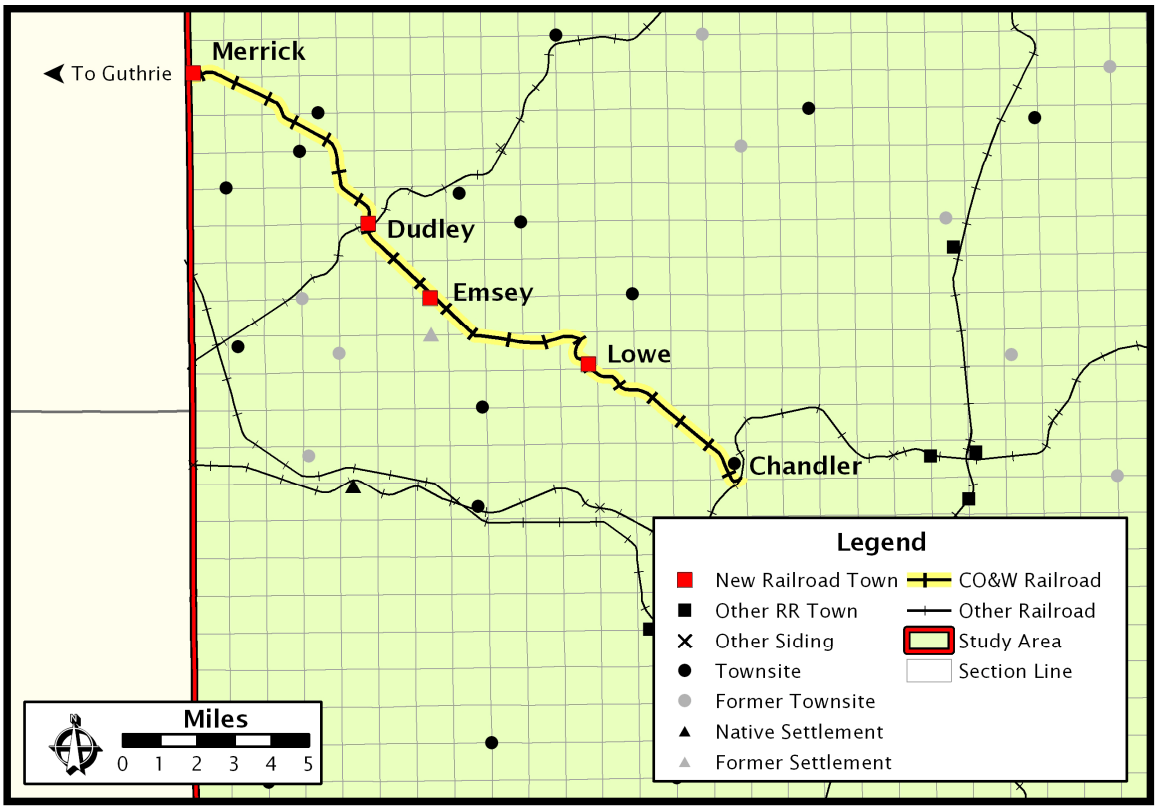

FIGURE 4.10 - Towns Created on the Choctaw, Oklahoma, and Western Railroad

The railway terminated at a junction with the St. Louis and San Francisco Railroad on the south side of Chandler. The line was originally intended to extend to Shawnee from Chandler but this portion was never completed. The railroad between Chandler and Guthrie was abandoned and removed in 1924 (Lincoln County Historical Society 1988).

Fort Smith and Western Railroad

The Fort Smith and Western Railroad, which ran from Fort Smith, Arkansas to Guthrie, was constructed in 1902 and 1903. It began operation on November 1, 1903 and brought rail service to two new townsites and five existing towns in Lincoln County depicted in Figure 4.11. Fort Smith and Guthrie were

the two largest towns on the line, which was initially developed in an attempt to profit from the transportation of coal from southeastern Oklahoma to other major railroads that had connections near the terminus of the Fort Smith and Western Railroad (Allhands 1925). Even though it was one of the few railroads to run east to west across Oklahoma, it struggled to remain profitable throughout its existence.

FIGURE 4.11 - Towns Created on the Fort Smith and Western Railroad

The Prague townsite was organized by a group of bankers from the Sac and Fox Tribe and the railroad company. It was located in the far southeastern corner of Lincoln County. Town lots were sold on May 20, 1902 and it received postal service on August 12, 1902. The town became an agricultural shipping center for the surrounding area. Prague grew at the expense of the neighboring towns of Lambdin, Dent, Bellemont, and Arlington. Prague remains a major economic center for the southeast portion of the county. There was also a stop at the Guild townsite seven miles northwest of Prague. Guild changed its name to Willzetta on July 2, 1904 but its post office closed on June 30, 1909. A depot was constructed for Sparks in 1924 but the railroad was located a mile northeast of the town (Lincoln County Historical Society 1988).

The next townsite on the railroad was Midlothian which was five miles south of Chandler. The town was platted on September 5, 1904 and was developed by the railroad. The Ellis post office relocated to the Midlothian Townsite on September 23, 1904. The town had two general stores, two churches, a restaurant, a grocery store, and a school. The post office closed on November 15, 1919 and the last store closed in the 1930s (Lincoln County Historical Society 1988). Only a few homes are all that remain of the former town.

The railroad also had stops in Warwick, Wellston, and Fallis. From Fallis, the railroad went to Guthrie but after the state capital moved to Oklahoma City in 1910 the Fort Smith and Western Railroad entered an agreement with the Missouri, Kansas, and Texas Railroad in 1915 to provide passenger and freight

service into Oklahoma City (Allhands 1925). The entire line across the study area was abandoned in 1939 when the Fort Smith and Western Railroad went into bankruptcy (Cammaller 2001).

Arkansas Valley and Western Railway

The Arkansas Valley and Western Railway Company was incorporated in January 1902. The company built a railroad that connected the St. Louis and San Francisco Railway in Tulsa to the Atkinson, Topeka, and Santa Fe Railway in Avard, Oklahoma. Construction started in the fall of 1902, the line extended to Enid in December 1903, and it was completed in February 1904. Three new communities were started as the result of the construction of the railroad across the study area and were depicted in Figure 4.12. The Arkansas Valley and Western Railroad company was later purchased by the St. Louis and San Francisco Railway on July 19, 1907 (Allhands 1925).

Mannford developed where the Arkansas Valley and Western Railway crossed the northeastern corner of Creek County in 1902. Mannford received a post office on April 11, 1903. The town developed a large central business district but it was forced to move to the south when Keystone Lake was constructed in the 1960s. The construction of the lake forced the portion of the railroad in Creek County to be reconstructed to the south of its original location. The town has an active business district but the modern basis of its economy is to serve the lake visitors.

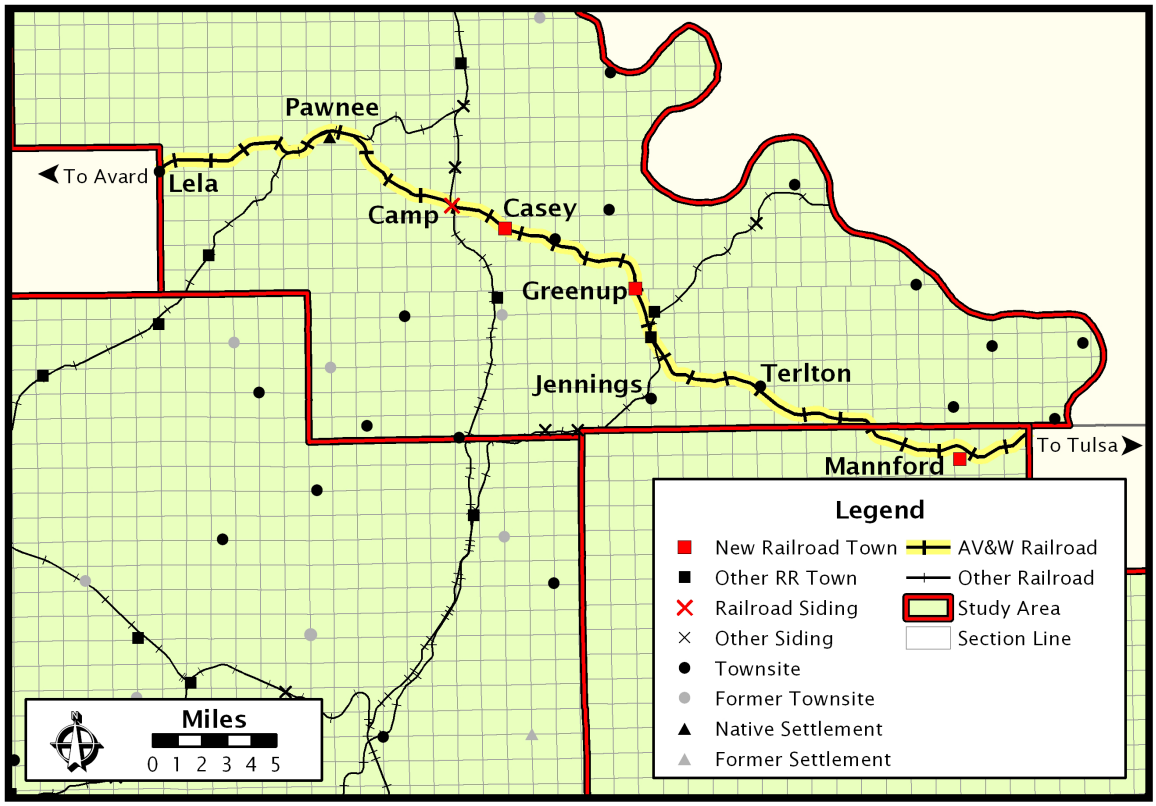

FIGURE 4.12 - Towns Created on the Arkansas Valley and Western Railway

In Pawnee County, the railroad provided service to Terlton and had a spur that extended into Jennings. Unlike Mannford, the two other new communities that developed along the railroad in the study area had only a few businesses. Greenup was located five miles north of Jennings and had a post office from December 21, 1903 until February 14, 1906. Casey was located seven miles southeast of Pawnee and had a post office from November 23, 1903 until November 21, 1930 (Shirk 1987). Nothing remains of either town.

West of Casey, the Arkansas Valley and Western railroad crossed the Eastern Oklahoma Railroad at Camp but no townsite was developed at that location. Another crossing with the Eastern Oklahoma Railroad was in Pawnee. With freight and passenger depots for both railroads, Pawnee became an important transportation center. The railroad exited Pawnee County at Lela.

Lela became a local freight depot but did not receive many additional businesses (Franks and Lambert 1994). The rail line is still in service and is operated by the Burlington Northern Santa Fe Railway.

Missouri, Kansas, and Texas Railroad

The portion of the Missouri, Kansas, and Texas Railroad located within the study area was built during the period from July 1903 to June 1904. The railroad was constructed to connect Oklahoma City to the main Missouri, Kansas, and Texas Railroad line in eastern Oklahoma while capturing some of the agricultural freight produced in north central Oklahoma. The route was completed on June 30, 1904 and brought rail service to three new towns and eight existing towns in Lincoln County, Payne County, and Pawnee County (Masterson 1952). The location of the towns and the railroad are depicted in Figure 4.13.

Construction of the Missouri, Kansas, and Texas Railroad began from Oklahoma City. The railway turned north near Hibsaw after it paralleled the St. Louis and San Francisco Railroad from Luther in Oklahoma County. South of Fallis, the line crossed the Fort Smith and Western Railroad. In Fallis, there was a junction with a branch line of the Missouri, Kansas, and Texas Railroad that connected to Guthrie. The track between Fallis and Oklahoma City was completed on July 23, 1903 (Masterson 1952). Additional economic development occurred in Fallis and by 1907 the community had four general stores, four saloons, three hotels, two blacksmith shops, two banks, two lumber yards, and a bakery. The Fallis area slowly declined and its post office was

closed on April 30, 1970 (Morris 1978). Only a few residences remain in the town.

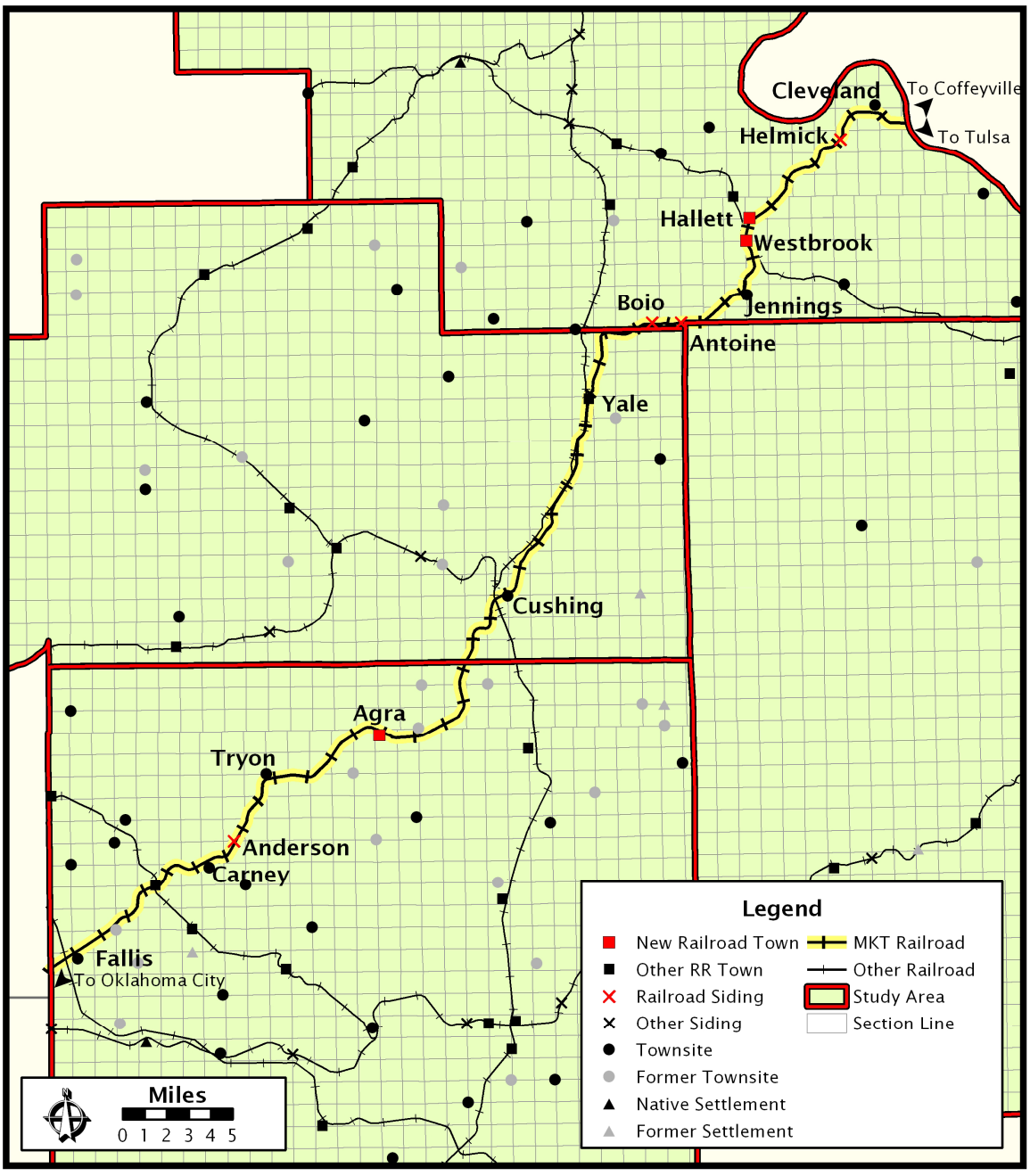

FIGURE 4.13 - Towns Created on the Missouri, Kansas, and Texas Railroad

The railroad continued northeast through Carney and several new businesses were started. A rail stop named Anderson was located north of Carney but it did not develop into a new townsite. The railroad also brought

additional development in Tryon including the town's first bank. Both Carney and Tryon remain small but active towns.

The railroad was extended to Agra on August 23, 1903. The town lots were sold by the American Land Loan and Trust Company in 1902 and the Agra Post Office opened on December 20, 1902. Many businesses relocated to Agra from the smaller towns in the area which included Nora, Parkland, and Soonerville (Lincoln County Historical Society 1988). Agra is still a small economic center.

The Missouri, Kansas, and Texas Railroad paralleled the Eastern Oklahoma Railroad across much of Payne County. The railroad reached Cushing in November of 1903 and Yale on December 25, 1903. This second railroad continued the growth that had started only a year earlier in both of the towns and caused them to evolve into important shipping centers (Masterson 1952). The Missouri, Kansas, and Texas Railroad curved to the east away from the Eastern Oklahoma Railroad near Quay.

As the railroad entered Pawnee County, it passed two stops named Boio and Antoine but both remained undeveloped. The first town in the county that the railroad provided service to was Jennings. Two competing townsites were developed near the point where the Missouri, Kansas, and Texas Railroad crossed the Arkansas Valley and Western Railway (Masterson 1952). Hallett is located four miles north of Jennings and was founded on December 8, 1904 by the Hallett Townsite Company. The Westbrook townsite was platted only a mile south of Hallett. While more lots were sold by the Westbrook developer, Hallett

was able to secure the railroad depots from both lines. The Hallett Post Office opened on May 19, 1905 (Franks and Lambert 1994). A few businesses and homes remain in Hallett but Westbrook has completely disappeared.

The Missouri, Kansas, and Texas Railroad exited the county at Cleveland. A junction east of Cleveland in Osage County allowed passengers and freight to continue north to Coffeyville, Kansas or southeast to Tulsa. The portion of the railroad across the study area was abandoned on December 10, 1977 and was later removed (Cammaller 2001).

Oil Field Towns

The fourth major group of settlements in north central Oklahoma occurred as the result of the discovery of oil in the area. Several major oil fields are located in the study area and their locations are depicted in Figure 4.14. Even though a high degree of mechanization was present in the process of extracting oil, a large amount of manpower was required to transport the equipment, erect and run the rigs, and construct the oil storage equipment. The basic necessities of this new labor pool needed to be met. This required the expansion of nearby existing towns, and where oil discoveries were made some distance away from existing settlements, there was a need for new towns to be created.

Several factors combined which necessitated that this labor pool be developed rapidly. The process of finding oil was expensive so it was vital that an oil company appeased its financiers by bringing in a producing well as soon as possible. The right to develop an oil field was obtained by lease rather than

ownership of the land so it was important to extract as much oil as quickly as possible. Competition between oil companies was also fierce so the ability to put as much oil on the market as possible was important to sell it at the highest price.

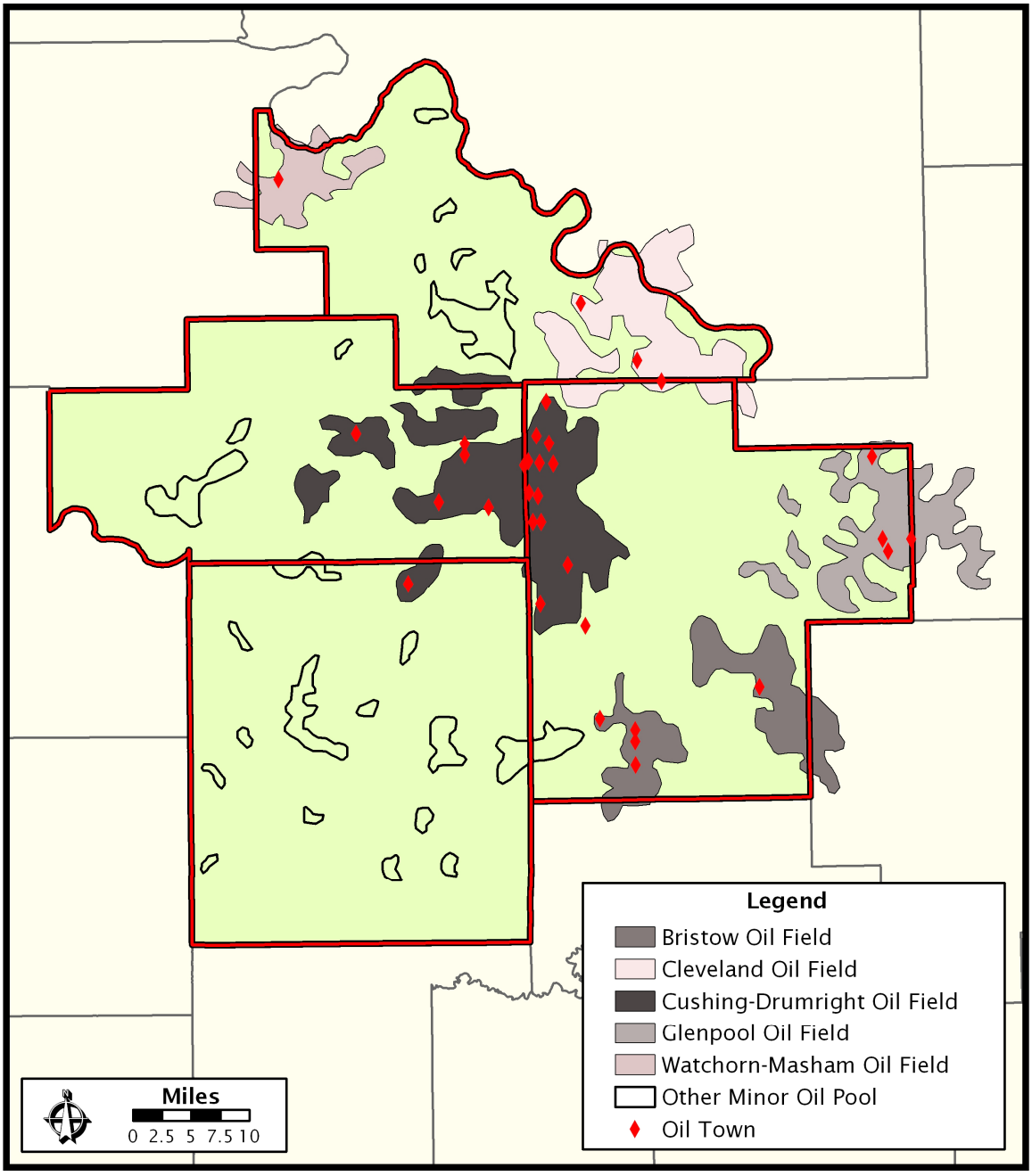

FIGURE 4.14 - Major Oil Fields in North Central Oklahoma

With a sudden influx of labor, the towns both old and new experienced a period of rapid development. The towns initially saw increases in housing and

restaurants, both in those that stood alone or combined in the form of boarding homes. Additional businesses followed soon after such as grocery stores, clothing stores, and laundry services. The oil companies also paid reasonably well so there was a surplus of disposable income as the boom progressed. This created a demand for entertainment among temporary laborers and higher order goods and services among the lease managers and land owners. After the labor demand peaked, some towns were able to maintain much of their gains whereas others vanished entirely.

Early Oil Discoveries

The presence of small quantities of oil in Oklahoma had been known by Native American tribes. Surface oil was used for medicinal purposes and these oil seeps were frequently used as campsites and later trading posts. Discovery operations started in the territory as early as the 1880s but were hampered by a lack of efficient transportation for drilling equipment and only minor discoveries were made. During the 1890s, the market for oil grew because of the increasing industrialization and mechanization in the United States and Europe (Franks 1980).

An oil boom had been underway in southeastern Kansas throughout the 1890s. It was expected that this oil field extended into Indian Territory but the acquisition of oil leases with the Native American tribes was complicated by the Department of the Interior and the Native Americans unwillingness to allow pipeline construction across their lands. Some of the earliest leases approved

were with the Osage and Cherokee tribes. The first major producing well, the Nellie Johnstone Number 1, was brought in April 1897 near Bartlesville. However, there was no profitable way to move the oil to a marketplace. It was not until May of 1900 that the first tanks of oil from Oklahoma made it to a refinery in Kansas after a railroad and several pipelines had been constructed in Bartlesville. The search for oil continued to move to the south and the Red Fork area became the site of a second major oil discovery in Indian Territory in 1901. Since a number of railways had previously been constructed in the Red Fork area, the nearby town of Tulsa became the base of operations for many oil companies in both fields. This helped Tulsa become the dominant administrative and trade center for the eastern portion of the study area (Franks 1980).

Cleveland Oil Field

Many oilmen desired a way around having to deal with the Native American tribes and the Department of the Interior so they started looking for oil in Oklahoma Territory. The first area of exploration was in the eastern most part of the territory just west of the Arkansas River in Pawnee County near Cleveland. The discovery well of the field, named the Uncle Bill No. 1, was completed on June 28, 1904 and was deepened over the next month. While it was not a great producer of oil, it drew the attention of many oilmen and an oil field was developed. Cleveland's population quickly grew from 211 to 1,441 between the 1900 census and 1907 census. Numerous businesses were established and several oil refineries were also opened in Cleveland. In addition to this growth,

several manufacturing plants were also drawn to the town because of the availability of cheap natural gas (Franks 1984). The towns created in the Cleveland Oil Field are depicted in Figure 4.15. The population of the area around the Cleveland Oil Field was estimated to have grown by over 6,000 people between 1904 and 1912 when oil production began to decline because of other nearby discoveries (Franks and Lambert 1994).

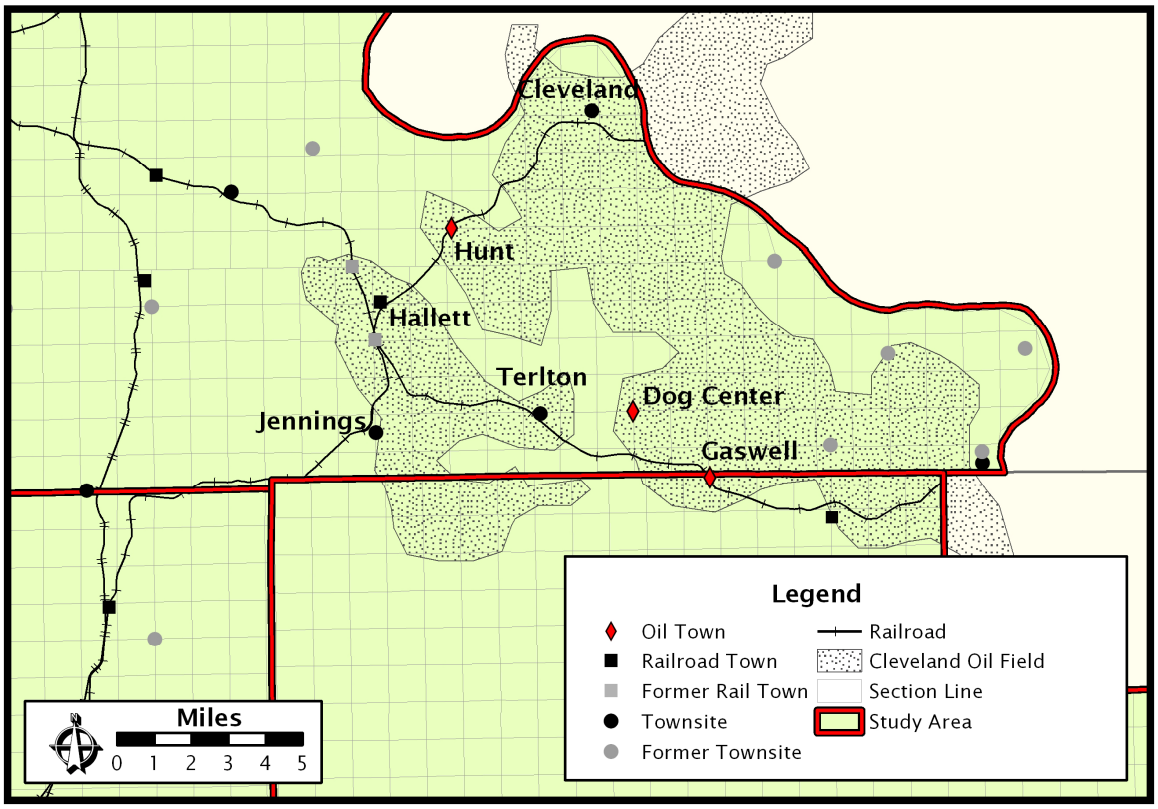

FIGURE 4.15 - Towns of the Cleveland Oil Field

The oil field continued to develop to the south and west of Cleveland and several additional small communities were organized. Hunt was located along the Missouri, Kansas, and Texas Railroad and served as a small trade center and rail stop. Another nearby community located eight miles south of Cleveland was named Dog Center (Franks 1984). It had a number of businesses, but like Hunt it never had a post office. Gaswell, sometimes identified as Goswell, was

located on the Arkansas Valley and Western Railway. It had a post office from December 26, 1906 until December 31, 1915 (Shirk 1987). There are no longer any remains of these townsites.

Several of the surrounding oil pools in the greater Cleveland area were located near established towns. Oil was discovered near Jennings in late 1904 but the economy of the town experienced much of its additional growth in 1907 after several more successful wells were opened. Jennings remained important because it was also near the northern extent of the Cushing-Drumright Oil Field. Oil was discovered near Hallett in 1908 and by 1910 the town grew to include fifteen stores, three hotels, two restaurants, a bank, and a lumber yard in addition to several manufacturing businesses (Franks and Lambert 1994). Oil was discovered near Terlton in 1912 and a major oil storage facility opened in the town shortly after to serve both the Cleveland and Cushing-Drumright oil fields (Franks and Lambert 1994). The towns of Jennings, Hallett, and Terlton remain small economic centers each with a few businesses.

Glenn Pool Oil Field

The Glenn Pool Oil Field was found on November 22, 1905 when the discovery well, the Ida Glenn No. 1, struck oil at a depth of 1,458 feet south of Tulsa. The well was located to the southeast of Sapulpa between Praper and a small community named Glenn in Tulsa County. The development of the oil field brought significant growth to all three of these communities and several

additional communities were organized in the area (Franks 1984). These towns are depicted in Figure 4.16.

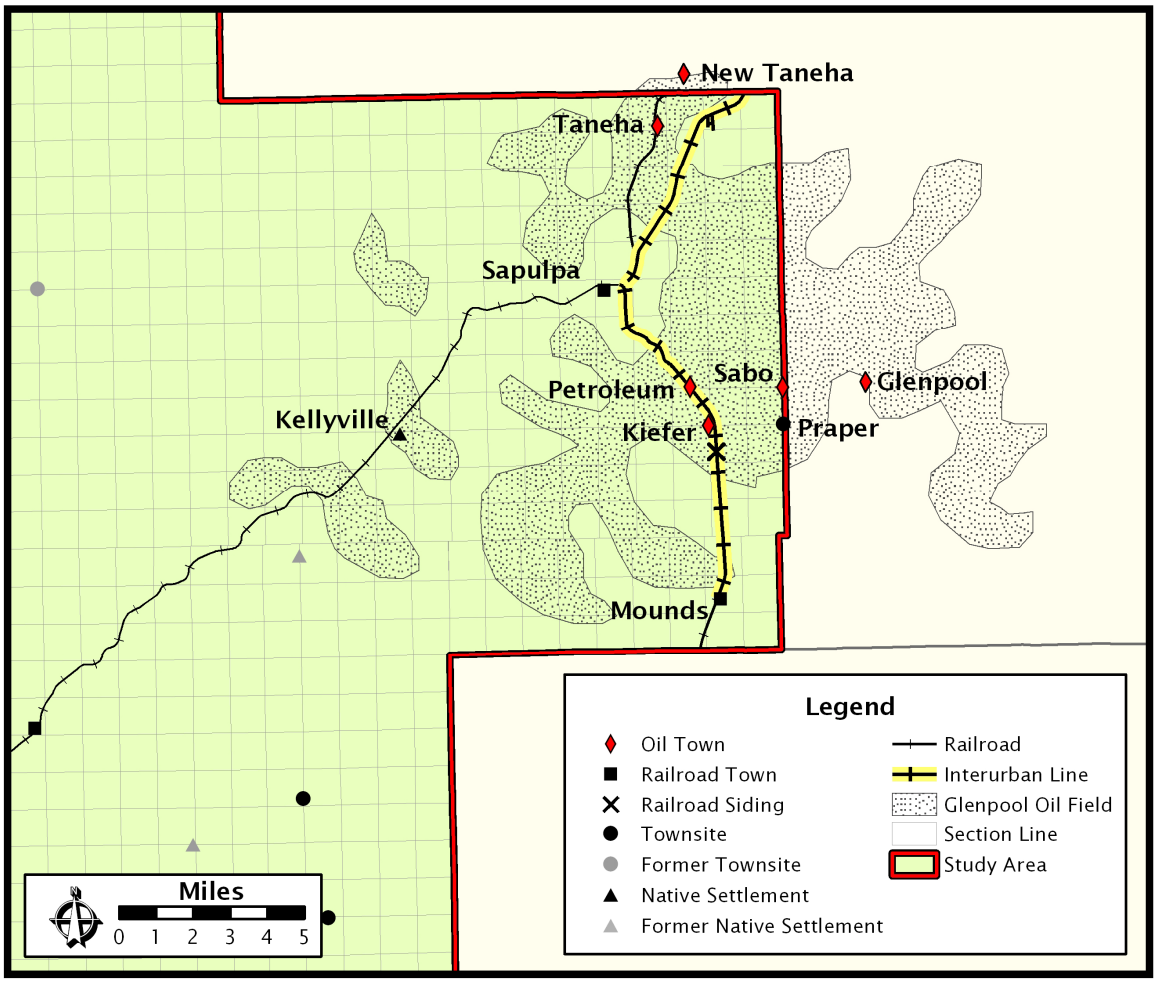

FIGURE 4.16 - Towns of the Glenn Pool Oil Field

Sapulpa was the largest existing community near the oil field and had a population of 891 in the 1900 census. The town's population more than doubled to 2,176 in the 1907 census which was completed only a few years after oil was discovered. Sapulpa became the area's dominate finance and supply center and also served as the location of most of the oil companies' offices. By 1911, there were five different banks in the town and several manufacturing plants opened in the city because of the natural gas supply from the oil field. Sapulpa was the

terminus of four passenger and freight lines of the St. Louis and San Francisco Railroad and the railroad operated a major rail yard that contained over forty miles of track. In order to facilitate the movement of oil field workers, an interurban line was constructed southward and followed the St. Louis, Oklahoma, and Southern Railway tracks to Mounds. The line was later constructed to the northeast to connect with Tulsa (Sapulpa Historical Society 1981).

Unlike Sapulpa, the other nearby communities of Praper and Glenn did not originally have rail service. The Midland Valley Railroad extended a spur line from Jenks that terminated near the Glenn community and the town of Glenpool was platted at the terminus in October 1907. Rather than locate in Praper, most new settlers chose to start a new town at the Drake railroad siding four miles southwest of Sapulpa. The townsite was platted in January 1907 as Kiefer. Most of the businesses and the post office in Praper relocated to Kiefer in 1907. Kiefer was not included in the 1907 census but its population was 1,197 by the 1910 census (Franks 1984). Kiefer declined in the 1930s but now serves as a bedroom community as a result of its proximity to the Tulsa metropolitan area.

Several other new towns were started in the oil field. Sabo had a post office from October 25, 1907 until April 30, 1913. The town was located five miles southeast of Sapulpa on the Creek County border. Only a small group of homes is located at the former townsite. Another small community existed at Petroleum, a stop on the interurban line between Kiefer and Sapulpa (Franks 1984). It was located one mile north of Kiefer. Nothing remains of the former townsite.

On the north end of the oil field, two new towns were organized. Bowden, originally named Taneha, had a small business district and a post office from June 9, 1909 until November 1, 1957. It was located five miles north of Sapulpa. A number of homes are located within the town but none of the town's businesses are still in operation. The second community known as New Taneha was located on the Creek and Tulsa county line but its name was changed to Oakhurst when its post office opened in 1918 (Shirk 1987). Oakhurst has evolved into a suburb of Tulsa and most of its growth is located in Tulsa County.

Although it was to the south of the major area of development in the oil field, Mounds experienced some growth also. It was chosen as the supply point of the Texas Company and had a railroad oil tanker loading facility. Several prominent oil businessmen settled in Mounds to avoid the lawlessness of the oil towns to the north. Production in the Glenn Pool Oil Field peaked in 1907 and began to decline at an accelerated rate in 1911 (Franks 1984).

Cushing-Drumright Oil Field

The Cushing-Drumright Oil Field was discovered on March 17, 1912. The discovery well, the Wheeler No. 1, was brought in by Thomas Slick and was located in a rural area near a community known as Tiger that was nine miles east of Cushing (Franks 1980). The ensuing boom was responsible for the development of 19 new townsites over a period of less than five years. A map of the towns is presented in Figure 4.17.

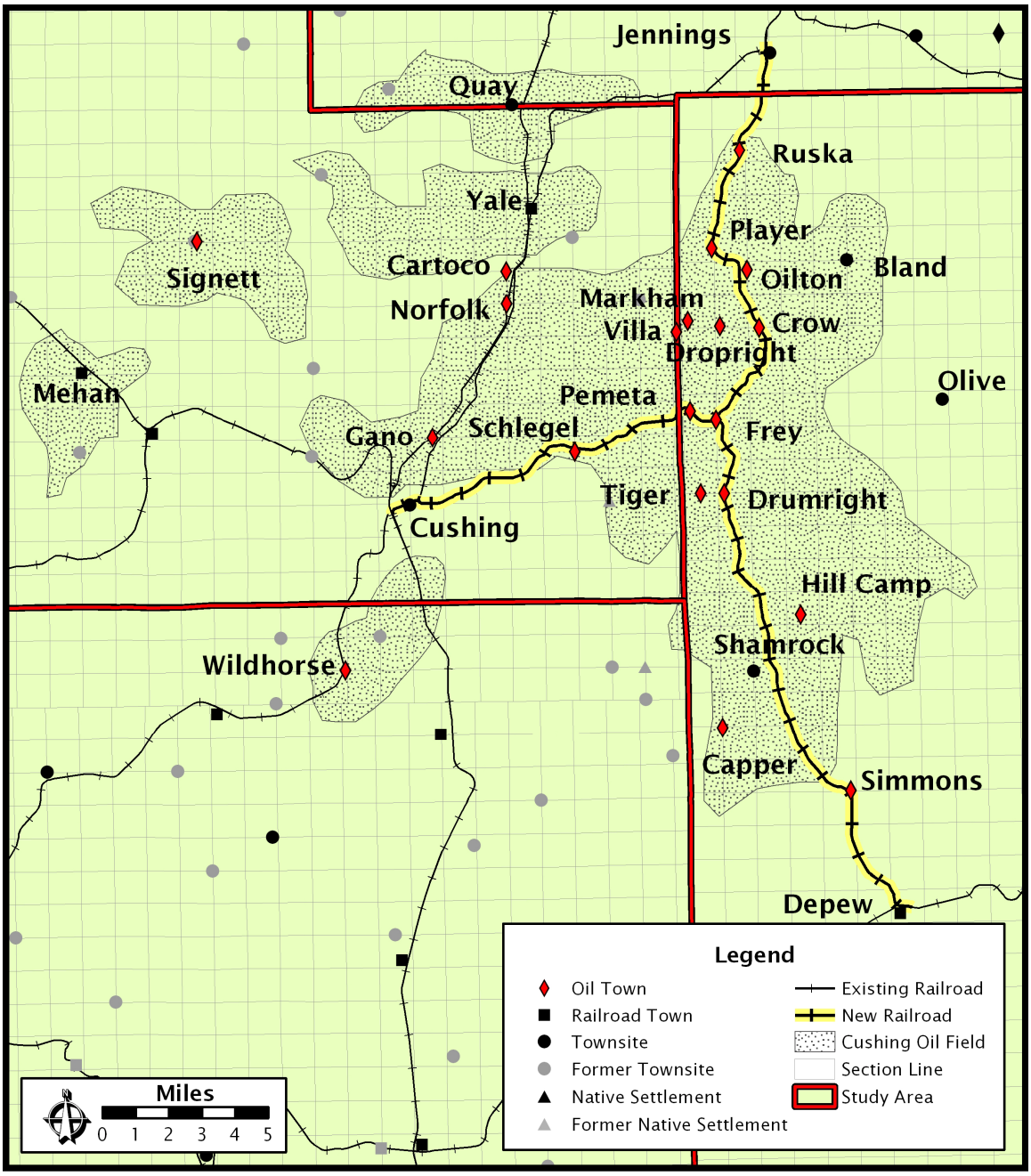

FIGURE 4.17 - Towns of the Cushing-Drumright Oil Field

The two largest established towns near the Wheeler No. 1 well were Cushing and Yale. Cushing emerged as the major supply center for the new oil field because it was closer to the initial discovery well, it was on the same side of the Cimarron River, and it had a railroad depot. Both Yale and Cushing became the site of several refineries and oil storage facilities as the oil field expanded.

Several other smaller existing towns were closer to the oil field than Cushing and Yale. Olive was located seven miles to the northeast of the discovery well, Bland was located seven miles to the north of the discovery well, and Shamrock was located six miles to the south of the discovery well; but all were too isolated to experience a large amount of new development during the initial period of oil exploration.

The town of Tiger was only slightly southwest of the Wheeler No. 1 and was developed in 1910 because of speculation that the area could have oil. The Tiger Post Office was established on June 30, 1910 and a school was established for the small community. However, after the oil was discovered a new townsite named Drumright was developed in very close proximity to Tiger. For a time, both the name Tiger and Drumright were in use for what was essentially the same community and there was also a proposal to officially rename the area Fulkerson (Newsom 1987). Drumright's post office opened on December 28, 1912 and the post office in Tiger was closed on March 31, 1913 (Shirk 1987). Drumright developed rapidly; a list of businesses was published in the March 21, 1913 edition of the *Drumright Derrick* newspaper and is reproduced in Table 4.1. Even though the oil exploration expanded into the surrounding areas, it remained as the major economic center in the oil field. The town has slowly declined since the 1930s but still has a relatively large economic base.

TABLE 4.1 - Businesses in Drumright, March 1913

68	Carpenters	5	Meat Markets	2	Real Estate Offices
14	Groceries	5	Pool Halls	2	Shooting Galleries
12	Casting Crews	3	Bakeries	2	Ten Pin Alleys
12	General Merchandise Stores	3	Drug Stores	1	Airdome Theater
12	Rooming Houses	2	Confectionaries	1	Boiler Repair
8	Boarding Houses	2	Feed Store	1	Box Ball Parlor
8	Restaurants	2	Hardware Store	1	Clothes Cleaning Parlor
7	Barber Shops	2	Ice Cream Shops	1	Dentist
7	Cafes	2	Livery Stables	1	Furniture Store
6	Physicians	2	Newsstands	1	Weekly Paper
5	Blacksmiths	2	Picture Shows	36	Additional Under Construction
Source: Drumright Derrick March 21, 1913 p.1					

Initially, the exploration for oil expanded northward and since the area did not have reliable roadways, a new railroad line was constructed from Cushing and Jennings (Cammaller 2001). Several new townsites including Schlegel, Pemeta, Frey, Crow, Oilton, Player, and Ruska were located on the railroad. Other new townsites, Dropright, Markham, and Villa, developed several miles west of the railroad. Three of these ten new towns were granted a post office in 1915, the Markham Post Office opened on February 26, the Oilton Post Office opened on May 5, and the Pemeta Post Office opened on August 9 (Shirk 1987).

One of the first new townsites developed was Dropright in 1913. Photographs of the town show that it had at least five businesses. The businesses were relocated to Markham after the developers of that town successfully had Dropright condemned using the claim that it was located in a hazardous area because of a potential natural gas explosion. Markham was platted on May 15, 1914 and had a small central business district with about twelve stores (Newsom 1987). Villa was located near the same area but no business information could be located. Of these three towns, only the former Markham school building remains but it is in use as a private residence.

Pemeta was developed in 1914 between Markham and Drumright. Pemeta had two general stores, a refinery, a grocery store, a bank, a hotel, a bakery, a barber shop, and a school. A public park was also created and it had a dance pavilion. Only a few ruins of the town can be found at the former townsite. Frey was located to the east of Pemeta near a railroad junction and had a general store. The former Frey townsite is now an open field. Schlegel was located to the west of Pemeta five miles east of Cushing and it had a school and a small number of businesses (Newsom 1987). A small community of homes and a church is all that remains of Schlegel.

Oilton was platted on February 15, 1915 after the railroad was extended southward from Jennings but several businesses had been operating in the area since at least 1914. By late 1915, Oilton had five general stores, four grocery stores, four drugstores, three clothing stores, two department stores, two furniture stores, two bakeries, two theaters, a bank, a jeweler, and many other businesses. It operated as the main center on the north end of the oil field (Lloyd 1976). Oilton began a slow decline in the 1930s. It still survives as a small economic center. Ruska and Player were located to the north of Oilton and Crow was located to the south but no information describing the economy of these three towns could be located.

After several years of northward expansion, the exploration moved southward toward Shamrock in 1916. Shamrock was one of the few preexisting communities in the Creek County portion of the Cushing-Drumright Oil Field to see a significant economic boom. The Shamrock area was the last portion of the

principal oil pool to be developed so several businesses already in operation in other nearby towns opened a branch location in Shamrock or relocated there. The town's central business district contained at least 55 establishments at its peak and the town also had a large red light district (Newsom 1987). The town declined quickly after the oil boom and only a few of Shamrock's commercial activities remain active.

A second railroad line named the Sapulpa and Oil Field Railroad was constructed into the southern portion of the oil pool in 1916 and had a depot in Shamrock. The railroad was a branch line of the St. Louis and San Francisco Railroad and connected to the main line near Depew (Allhands 1925). Simmons was the only new townsite in the area that developed along this railroad. Two additional townsites, named Capper and Hill Camp, were also established in the area surrounding Shamrock. Capper had a boarding house and at least six other storefronts. The businesses known to exist in Hill Camp were: two general stores, a confectionary, a grocery store, a livery, and a barber (Soward 1917). Nothing remains of the former Simmons, Capper, and Hill Camp townsites.

A small portion of the Cushing-Drumright Oil Field extends south into Lincoln County. Wildhorse developed a small business district that served the oil field workers. While other small oil discoveries have been made in Lincoln County, Wildhorse was the only town in the county that owed its existence primarily to the oil industry (Lincoln County Historical Society 1988). There are no remains of the community.

The oil field development was gradually expanded to the west. Several new townsites, including Gano, Norfolk, and Cartoco, were developed along the Atkinson, Topeka, and Santa Fe Railroad and the Missouri, Kansas, and Texas Railroad between Cushing and Yale. These townsites served as the location of oil storage facilities and refineries but it is unknown what other businesses were located within the towns. None of these towns are still in existence.

Discoveries of other pools of oil were also made near the existing towns of Yale, Quay, and Maramec to the north of the main oil pool and caused additional development in those towns. Following the initial period of development in the 1910s, the search for oil continued westward across Payne County temporarily reviving several former townsites in the 1920s. A pool of oil was found near Ingalls and the area saw such an increase in population that the post office was reopened under the name of Signet from June 6, 1921 to April 30, 1935 (Shirk 1987). An oil pool was also developed around Mehan which brought a brief revival to its business district in the early 1920s (Newsom 1997). No active commercial developments are located in Ingalls or Mehan but both still serve as residential communities.

Bristow Oil Field

The Bristow Oil Field was discovered in 1915 and included several small pools of oil. Besides Bristow, there were two areas where urban development took place. One of these areas is located to the southeast of Bristow and the second is to the southwest and is depicted in Figure 4.18. With the location of

the Bristow Oil Field to its south and the Cushing-Drumright field to its north, Bristow became a major supplier and trade center for those working in the oil fields (Forbes 1939). Bristow's population doubled from 1,667 in the 1910 Census to 3,460 in the 1920 Census. The business district expanded significantly in the early 1920s and the city had three refineries and four pipeline companies in operation in 1930. Bristow remains a major economic center for central Creek County.

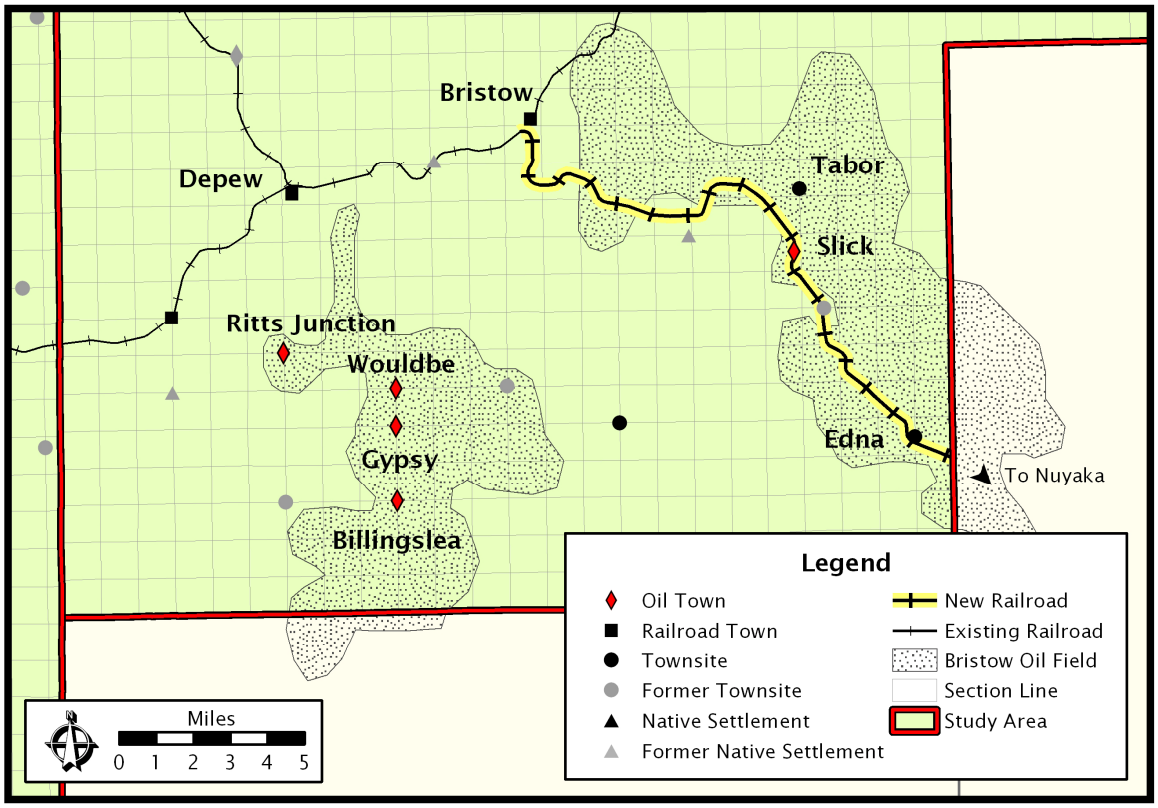

FIGURE 4.18 - Towns of the Bristow Oil Field

Oil man Tom Slick discovered oil eight miles southwest of Bristow in 1919. A new town named Slick was established near the former Crowson community and the Slick Post Office was opened on April 28, 1920. The Oklahoma Southwestern Railway constructed a railroad line between Bristow and Slick in 1920 and later extended the line to Nuyaka in 1921. By 1923, Slick had over

twenty-one general and specialty stores, ten hotels or rooming houses, two banks, two theaters, a lumber yard, and a telephone exchange in its main business district (Morris 1978). Slick began to decline around 1925 and the railroad was abandoned in 1930. By the 1930 Census, Slick had a population of 422. Only a few businesses are still operating in the town.

Several townsites were developed in the portion of the oil field to the southwest of Bristow. The first town to develop was Wouldbe and it had a post office from August 27, 1919 until October 15, 1921. A new post office for the area was established in a town named Billingslea on December 6, 1922. On May 1, 1925 the post office was relocated to a third townsite named Gypsy and a school was established in the town. The Gypsy Post Office was closed on November 30, 1955 (Shirk 1987). It is likely that many of the businesses and probably several of the homes were moved from townsite to townsite as the focus of the oil field shifted when new wells were opened. The entire area declined quickly, the Gypsy Elementary School is the only remaining development that is still open. A fourth town in the area named Ritts Junction did not have a post office but is the site of a refinery.

Watchorn Field

Geologists hypothesized that there was oil in the area of the former Otoe-Missouria reservation northwest of Pawnee as early as 1915. Some oil leases were sold but federal officials suspended the leases in 1916. In 1919, the officials reversed their decision and drilling operations moved into the area

(Forbes 1939). The first major discovery was made in 1922 and the area saw an increase of activity. The oil was not close enough to any previously established large towns so the town of Watchorn was organized; although, nearby Masham also gained a percentage of the oil field workers as the oil exploration was expanded. The location of these towns is depicted in Figure 4.19.

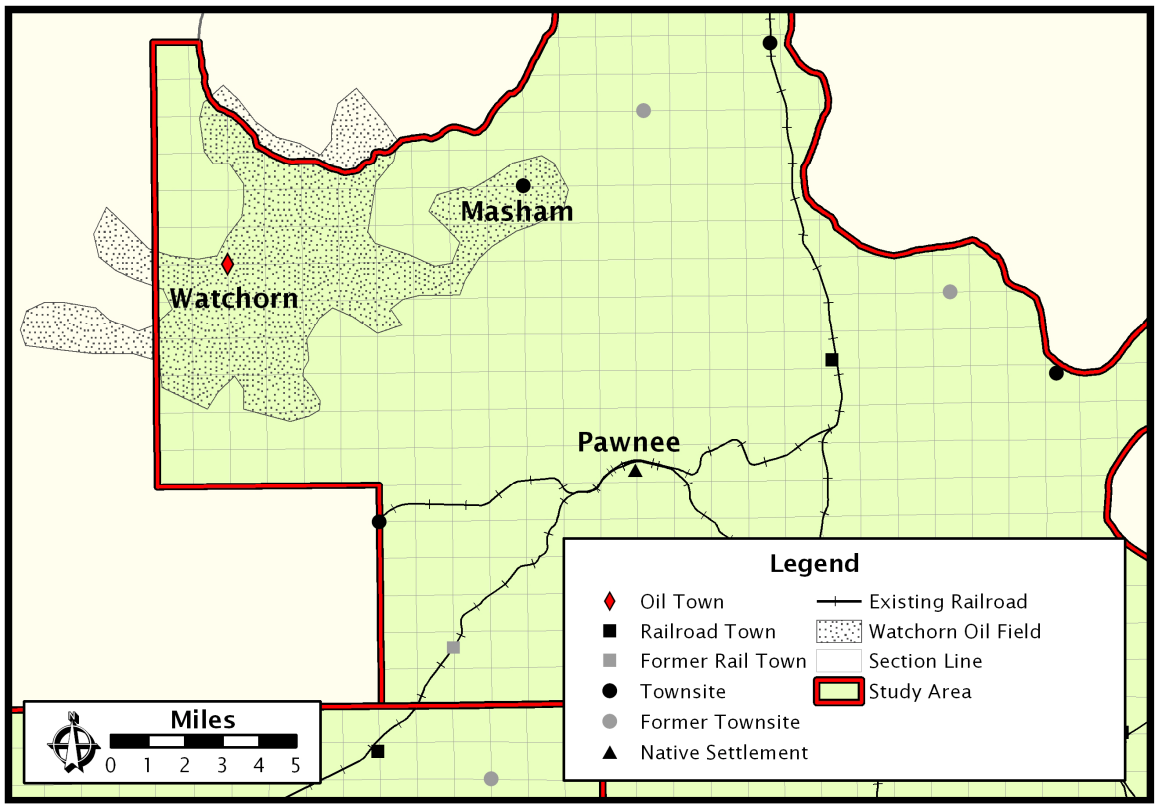

FIGURE 4.19 - Towns of the Watchorn Oil Field

Watchorn's business district had about twenty storefronts including two theaters and also had a large number of hotels and boarding homes. Several Pawnee based businesses opened a second location in Watchorn. The Watchorn Post Office was in operation from April 4, 1925 until July 15, 1926. The population of the area was estimated to be between 1,500 and 1,800 at the peak of the boom. Since automobile transportation had become more reliable, the population of the town was not expected to remain in the area so most of the

area's businesses and homes were constructed from wood rather than brick and concrete. Soon after the initial boom had ended a fire destroyed the remaining buildings in 1927. New oil discoveries were made in 1942 and 1943 but the townsite was not reestablished (Franks and Lambert 1994).

Highway Based Developments

A fifth and most recent group of towns has developed as a result of state and federal highway construction. Highway construction has increased the mobility of the population beginning in the 1920s which hastened the demise of many isolated towns not connected to the highway system. However, a small number of new towns have developed along these new transportation routes and are shown in Figure 4.20. These towns can be generalized into three different types; isolated mid-route towns, intersection towns, and commuter towns. Few of these towns were incorporated and most remain communities comprised of a few small businesses such as a gas station, convenience store, or a restaurant.

There were two towns that formed along highways in between other existing towns. Both of these towns appeared on highway maps as early as the late 1920s. The economies of the towns were based on serving the isolated area between other towns. Old Town Trading Post is located on US Highway 64 three miles west of Pawnee. Only a few residences remain in the town. The Silver City community is located on the old alignment of State Highway 51 five miles east of Oilton. A volunteer fire department station and a few homes are still located in Silver City.

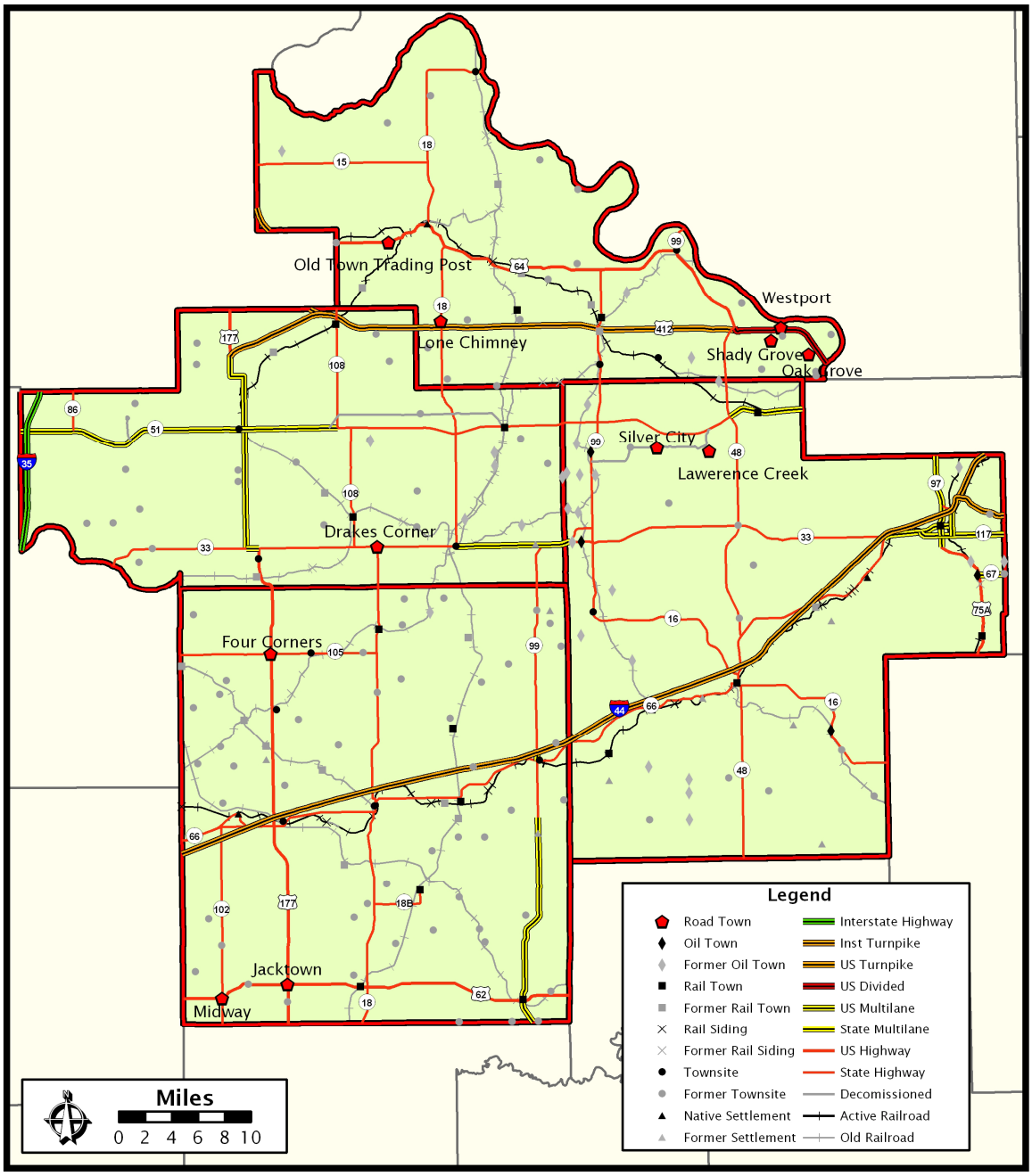

FIGURE 4.20 - Highway Based Developments

Five new towns within the study area are located at an intersection of two different highways. The economies of these towns are primarily based on providing conveniences to travelers rather than on providing services to the surrounding residents. Jacktown developed at the intersection of US Highway 62 and US Highway 177. Midway began at the intersection of US Highway 62 and

State Highway 102. Four Corners developed at the intersection of US Highway 177 and State Highway 105. Drakes Corner began at the intersection of State Highway 18 and State Highway 33. Lone Chimney was established in 1994 at the intersection of US Highway 412 and State Highway 18. All of these towns have at least one gas station and a few homes.

Near Tulsa, several commuter towns developed around the Keystone Lake recreational area after it was completed in the 1960s. Unlike most other towns in the study area, these towns are primarily residential developments rather than commercial or industrial centers. The largest of these towns is Westport, which was organized in 1966 (Franks and Lambert 1994). Several other communities such as Shady Grove, Oak Grove, and Lawrence Creek, serve the same purpose. This area also saw an explosion of incorporated places in the late 1970s as the result of a revision in the Oklahoma Municipal Code but most of these were started by small groups of property owners in an attempt to avoid annexation by a neighboring town and never contained any commercial development.

Conclusions

Of the 205 past and present towns that are located within the study area, there are 12 that developed as Native American Centers, 116 that developed as agricultural towns, 34 that were started as railroad towns, 32 that were started because of oil, and 11 that were started as a response to the construction of the highway network. There were at least two other planned towns identified by this

research that never developed. The land ownership rights of the Native Americans were heavily restricted so the first period of settlement was far from the largest. The most significant period of town development followed the land runs and other land openings which substantially increased the population of the area. The large number of agricultural towns was also a function of the lack of transportation across the area. As the transportation network expanded, the railroad towns virtually replaced the entire system of towns that had developed in the prior period. The towns that had the shortest life span on average were the oil towns which developed to serve a singular specialized purpose. The size and success of these towns varies to a great extent and is further explored in the following chapters.

CHAPTER V

THE PAST AND CURRENT URBAN ECONOMIC SYSTEMS

Introduction

Three different analyses are required to establish the economic conditions of the historic and current urban economic systems within the study area. The first analysis establishes the hierarchical classification of the towns within the study area based on the number and types of goods and services offered within the town. The second analysis compares differences found between market areas as delineated by an unweighted distance break point between the three hierarchical classes established in the first analysis. The third analysis evaluates the spatial relationships found between the towns of different hierarchical classes based on a Euclidian nearest neighbor analysis.

Hierarchical Town Classification

This analysis is used to generate the hierarchical town classifications that served as the basis of comparison for the other analyses undertaken in this study. The classifications divide the towns within the study area into three groups of towns that offered similar types of commercial activities. The Class A towns were the largest centers and offered activities found infrequently across

the study area. The Class B towns had activities that were more frequently found across the study area. The Class C towns were the smallest centers and contained only the most commonly occurring activities found in the study area. The classification of towns is performed for six benchmark years that correspond to the major changes within the urban system observed in Chapter IV. This analysis is divided into two different parts; the first establishes the historical classifications for the years 1900, 1907, 1910, 1915, and 1920 and the second establishes the modern classifications.

Historic Classifications

The historic town classifications are established from a combination of sources that include local histories, archival newspapers, historic photos, and Sanborn maps. Data are not available for every year used in the analysis for every town so several approximations have to be made based on the data from the available years. Where the economic development data are scarce or missing, the population count returned by the census is used to estimate the towns' economies based on the assumption that towns of similar size would have the similar types of services offered.

There are 87 towns that had at least one economic activity in 1900; 62 towns are classified as Class C towns, 19 are classified as Class B towns, and 6 are classified as Class A towns. The town classifications for 1900 are identified in Table 5.1. The Class C towns in this era typically contained only a post office, a general store, a school, a mill, and a blacksmith. An example of a class C town

during this time period is Yale, which had a post office, a general store, and a blacksmith shop. The Class B towns are those that had additional developments such as a bank, hotel, church, drug store, doctor, barber, or newspaper. An example of a Class B town is Osage, which had three saloons, three restaurants, two general stores, two blacksmiths, two hotels and a school. The Class A towns had multiple specialty stores or had an urban population over 700. An example of a Class A town is Chandler, which had seven clothing stores, four meat markets, three drug stores, three hardware stores, three furniture stores, three banks, three printing shops, two jewelers, a soda bottler, a photographer, and an ice house in addition to numerous other businesses found in the smaller towns.

TABLE 5.1 - Town Classifications, 1900

Class A Towns	Class B Towns	Class C Towns		
Chandler	Arlington	Baker	Hilton	Parnell
Pawnee	Bellemont	Basin	Ida	Partridge
Perkins	Blackburn	Bedford	Ingalls	Plumb
Sapulpa	Bristow	Bryan	Iron Post	Rossville
Stillwater	Carney	Chilco	Jennings	Sac and Fox Agency
Stroud	Cleveland	Clarkson	Lambdin	Schley
	Clifton	Clayton	Law	Shafter
	Cushing	Clematis	Lawson	Sinnett
	Davenport	Crystal	Leroy	Soonerville
	Fallis	Daggett	Lewiston	Speer
	Kellyville	Dent	Lilly	Terlton
	Lela	Dixie	Lovell	Tuskegee
	Marena	Eden	Lydia	Valley
	Olive	Elba	Mallon	Vicars
	Osage	Ellis	Manila	Warwick
	Parkland	Filson	Masham	West Point
	Ralston	Floyd	Mills	Willzetta
	Tryon	Fowler	Mitchell	Wright
	Wellston	Glencoe	Mounds	Yale
		Handley	Otego	Yates
		Harvey	Paradise	

There are 81 towns that had at least one economic activity in 1907; 39 towns are classified as Class C towns, 32 are classified as Class B towns, and 10 are classified as Class A towns. The town classifications for 1907 are identified in Table 5.2. The activities used to classify the towns are similar to

those used for 1900 with the exception that locations with railroad service occurring at unmanned sidings, such as Jobes and Rambo, are designated as Class C towns whereas those with railroad depots, such as Sparks and Agra, are designated as Class B towns. The railroad also brought changes to the classification of existing towns during this period. Yale, a Class C town in 1900, moved to a site one mile northwest of its original location to be located near two new railroads and grew rapidly so that by 1907 it was classified as a Class B town. Osage, which was classified as a Class B center in 1900, was by-passed by the railroad and was completely abandoned by 1907. One additional activity that emerged during this period was the supply store that catered to the oil field workers around Cleveland and Kiefer. Both Cleveland and Kiefer were classified as Class A towns in 1907 because of the rapid population growth associated with oil exploration.

TABLE 5.2 - Town Classifications, 1907

Class A Towns	Class B Towns		Class C Towns	
Bristow	Agra	Maramec	Amabel	Mehan
Chandler	Avery	Meeker	Anderson	Merrick
Cleveland	Blackburn	Mounds	Casey	Midlothian
Cushing	Carney	Olive	Chuckaho	Newby
Kiefer	Davenport	Parkland	Cody	Partridge
Pawnee	Depew	Payson	Cottingham	Petroleum
Prague	Dog Center	Perkins	Crowson	Quay
Sapulpa	Fallis	Ralston	Dudley	Rambo
Stillwater	Gaswell	Ripley	Edna	Rossville
Stroud	Glencoe	Sabo	Emsey	Sac and Fox Agency
	Jennings	Skedee	Greenup	Tabor
	Kellyville	Sparks	Hallett	Tuskegee
	Kendrick	Terlton	Hibsaw	Valley
	Keystone	Tryon	Hunt	Vinco
	Lela	Wellston	Ingalls	Warwick
	Mannford	Yale	Iron Post	Westbrook
			Jobes	Willzetta
			Lowe	Yates
			Marena	Yost
			Masham	

There are 62 towns that had at least one economic activity in 1910; 25 towns are classified as Class C towns, 27 are classified as Class B towns, and 10 are classified as Class A towns. These towns are identified in Table 5.3. The activities used to classify the lower order towns are similar to those used for 1907 but a couple of parameters are adjusted for the Class A towns. The population parameter is raised to 800 as a large break in the population data occurs just after a town that had an urban population of 701. The presence of multiple chain department stores is also included as an activity found in a Class A town, though these are most commonly found among the larger Class A towns. An example of a typical Class C town in this period is Shamrock, which had a general store and a post office. An example of a Class B town is Mounds, which included five general stores, five grocery stores, four restaurants, three feed stores, three hotels, two banks, two hardware stores, a furniture store, and a jeweler. One of the smaller Class A towns found in 1910, Bristow, had four confectionaries, three pool halls, three meat markets, two printers, two tailors, two photographers, an ice house, a dedicated fire station, and a theater in addition to many of the activities found in Class B towns.

TABLE 5.3 - Town Classifications, 1910

Class A Towns	Class B Towns		Class C Towns	
Bristow	Agra	Maramec	Bland	Parkland
Chandler	Avery	Meeker	Bowden	Quay
Cleveland	Blackburn	Mounds	Casey	Sac and Fox Agency
Cushing	Carney	Olive	Crowson	Shamrock
Kiefer	Davenport	Payson	Edna	Tabor
Pawnee	Depew	Perkins	Ezra	Terlton
Prague	Fallis	Ralston	Gaswell	Tiger
Sapulpa	Glencoe	Ripley	Hallett	Tryon
Stillwater	Jennings	Sabo	Hilton	Tuskegee
Stroud	Kellyville	Skedee	Mehan	Valley
	Kendrick	Sparks	Merrick	Vinco
	Keystone	Wellston	Midlothian	Warwick
	Lela	Yale	Newby	
	Mannford			

There are 79 towns that had at least one economic activity in 1915; 34 towns are classified as Class C towns, 31 are classified as Class B towns, and 14 are classified as Class A towns. The town classifications are identified in Table 5.4. The activities used to classify the towns are similar to those used for 1910. There were several changes in the town classification due to the discovery of the Cushing-Drumright Oil Field. Shamrock, a Class C town in 1910, became a Class A town by 1915 since its three businesses increased to over fifty as the oil field expanded. Drumright, Oilton, Pemeta, and Markham, which had anywhere from twenty up to seventy businesses at their peak, did not even exist in the years prior to the oil discovery. Other boom towns such as Yale, which was classified as a Class C town in 1900, grew more gradually. By 1907, Yale was a Class B town after it received railroad service. It is classified as a Class A town in 1915 because of the growth that new oil refineries brought to the town's economy. Several of the larger oil towns started in this period were able to maintain a high level of economic development compared to the smaller oil towns which declined much faster. In other areas, only a few towns saw their economy begin to shrink in the 1910s because agriculture was generally still profitable.

There are 60 towns that the research identifies as containing at least one economic activity in 1920; 17 towns are classified as Class C towns, 26 are classified as Class B towns, and 17 are classified as Class A towns. These towns are identified in Table 5.5. The activities used to classify the towns are similar to those used for prior years but one notable change is the inclusion of automobile specific service and retail functions as a Class A activity. Edna was a

TABLE 5.4 - Town Classifications, 1915

Class A Towns	Class B Towns		Class C Towns	
Bristow	Agra	Meeker	Arno	Midlothian
Chandler	Avery	Mehan	Bellvue	Milfay
Cleveland	Blackburn	Mounds	Bowden	Newby
Cushing	Carney	Olive	Capper	Norfolk
Drumright	Davenport	Payson	Cartoco	Parkland
Kiefer	Depew	Pemeta	Casey	Player
Oilton	Glencoe	Perkins	Crow	Ruska
Pawnee	Hallett	Quay	Crowson	Sac and Fox Agency
Prague	Hill Camp	Ralston	Edna	Schlegel
Sapulpa	Jennings	Ripley	Fallis	Simmons
Shamrock	Kellyville	Skedee	Frey	Tabor
Stillwater	Kendrick	Sparks	Gano	Tuskegee
Stroud	Keystone	Terlton	Gaswell	Valley
Yale	Mannford	Tryon	Heyburn	Villa
	Maramec	Wellston	Lela	Vinco
	Markham		Lone Oak	Warwick
			Merrick	Wildhorse

typical Class C town in this period with a school, a general store, and a post office. Agra was an average Class B town and it had three general stores, three grocery stores, two feed stores, two cotton gins, a hardware store, a drug store, a bank, a lumber yard, a printer, a cobbler, a barber, and a grain elevator. In addition to the activities found in a Class B town, Depew, a smaller Class A town, had four filling stations, at least three dedicated automobile repair garages, a car dealership, and a movie theater in this period.

TABLE 5.5 – Town Classifications, 1920

Class A Towns		Class B Towns		Class C Towns
Bristow	Oilton	Agra	Meeker	Bowden
Chandler	Pawnee	Avery	Mehan	Casey
Cleveland	Prague	Blackburn	Pemeta	Edna
Cushing	Sapulpa	Carney	Perkins	Fallis
Depew	Shamrock	Davenport	Quay	Heyburn
Drumright	Stillwater	Glencoe	Ralston	Lela
Jennings	Stroud	Hallett	Ripley	Merrick
Kiefer	Yale	Kellyville	Skedee	Milfay
Mounds		Kendrick	Slick	Newby
		Keystone	Sparks	Olive
		Mannford	Terlton	Payson
		Maramec	Tryon	Tabor
		Markham	Wellston	Tuskegee
				Valley
				Vinco
				Warwick
				Wouldbe

A modern highway system plan was established by the state in 1919 but large scale construction did not occur until the mid 1920s. In the study area, the first portion of the highway system outside of the towns that was improved was between Oilton and the Tulsa County line near Mannford (State Highway Commission of Oklahoma 1925). Many more highways had been improved by 1930 but the system was not largely completed until the late 1950s. Several factors prevent an urban system from being established that accurately represents the origin of this highway-based system. These factors include the uneven pattern of highway construction, the depopulation of the area during the Great Depression, and a gap in the economic history of the towns during this era.

Modern Classifications

The second part of the analysis establishes the modern classification of towns based on 2008 economic data and the 2006 census population estimates. Using the selection criteria identified in the methodology, 44 activities are used to determine the current development of a town's modern economy. This analysis includes 50 towns within the study area that have at least one of the 44 selected activities.

There is a total of 3,457 unique commercial activities within the study area that fit into this classification system. The 44 unique activities are divided into three hierarchical classes based on both actual occurrence and population threshold estimates as specified in the methodology. The classification of the

economic activities used in the analysis and the frequency of their occurrence within the towns are listed in Table 5.6.

TABLE 5.6 - Activity Classifications, 2008

	ACTIVITIES	5K TOWNS	A TOWNS	B TOWNS	C TOWNS	ALL TOWNS
CLASS A	Clothing (Retail)	60	11	2	0	73
	Real Estate (Service)	44	22	0	0	66
	Electronics/Furniture (Retail)	44	18	1	0	63
	Engineering/Design (Service)	43	12	1	0	56
	Gym/Dance/Karate (Service)	29	13	0	0	42
	Drug (Retail)	23	11	2	0	36
	Hobby (Retail)	21	6	3	0	30
	Office (Retail)	23	2	0	0	25
	Laundry (Service)	14	7	1	0	22
	Tag Agency (Retail)	3	9	4	0	16
	Jewelry (Retail)	9	5	2	0	16
	Pawn (Retail)	10	6	0	0	16
	Music (Retail)	9	4	1	0	14
	Spa (Service)	10	2	0	0	12
	Radio/TV	7	1	0	0	8
	CLASS A ACTIVITY TOTALS	**349**	**129**	**17**	**0**	**495**
CLASS B	Financial/Loan (Service)	136	49	8	0	193
	Car/Boat Sales (Retail)	85	44	21	1	151
	Hardware/Feed/Lumber (Retail)	82	44	16	1	143
	Insurance Sales (Service)	68	53	13	0	134
	Attorney (Service)	78	39	6	0	123
	Pet Care (Service)	43	27	5	2	77
	Daycare (Service)	37	24	10	0	71
	Bank (Service)	31	25	14	0	70
	General Sales (Retail)	38	23	4	0	65
	Storage (Service)	29	20	10	0	59
	Recreation (Retail)	34	14	8	0	56
	Repair (Service)	33	8	10	0	51
	Grocery/Bakery (Retail)	22	19	7	1	49
	Landscape (Service)	33	4	10	0	47
	Auto Parts (Retail)	19	17	9	0	45
	Florist (Retail)	9	18	5	1	33
	Pest (Service)	18	9	5	0	32
	Photography (Service)	18	8	5	1	32
	Liquor (Retail)	13	15	3	0	31
	Funeral Home (Service)	10	14	5	0	29
	Video Rental (Retail)	8	16	3	0	27
	Newspaper	8	8	6	0	22
	Propane (Retail)	5	11	4	0	20
	CLASS B ACTIVITY TOTALS	**857**	**509**	**187**	**7**	**1560**
CLASS C	Church	150	141	78	17	386
	Restaurant (Retail)	204	110	31	2	347
	Auto (Service)	143	85	27	2	257
	Hair/Beauty (Service)	133	71	22	2	228
	Gas/Convenience (Retail)	54	55	29	11	149
	Post Office	3	9	16	7	35
	CLASS C ACTIVITY TOTALS	**687**	**471**	**203**	**41**	**1402**
	TOTAL OF ALL ACTIVITIES	**1893**	**1109**	**407**	**48**	**3457**

There are 15 high-order activities identified. Class A activities include nine retail activities, five service activities, and one unclassified activity, radio and television broadcasting. There are 495 Class A activities within the study area. There are 23 intermediate order activities identified. Class B activities include ten retail activities, twelve service activities, and one unclassified activity, newspaper publishing. There are 1,560 Class B activities within the study area. There are six low-order activities identified. Class C activities include two retail activities, two service activities, and two unclassified activities, churches and post offices. There were 1,402 Class C activities within the study area.

There are 50 towns that contained at least one basic economic activity included within the analysis. Five additional towns returned a population in either the 2000 census or the 2006 census estimations but no economic activities are identified as occurring within these towns. The 50 towns included in the analysis are classified into three hierarchical classes based on the frequency of the types of activities occurring within the town. An additional sub-class of the highest order classification is also created to give distinction to the major urban centers, the towns with populations over 5,000 returned in the 2006 census estimations. The town classifications, along with the total number of activities and the 2006 Census Population Estimates, are presented in Table 5.7.

TABLE 5.7 - Town Classifications, 2008

Class A Towns			Class B Towns			Class C Towns		
Name	Population	Activities	Name	Population	Activities	Name	Population	Activities
Bristow	4391	205	Agra	361	11	Blackburn	103	2
Chandler	2872	177	Carney	651	15	Forrest	-	1
Cleveland	3238	137	Davenport	892	26	Four Corners	-	4
Cushing (+5K)	8456	262	Depew	570	19	Hallett	171	5
Drumright	2894	82	Glencoe	578	18	Jacktown	-	1
Mannford	2742	106	Jennings	381	17	Kendrick	144	1
Pawnee	2224	103	Kellyville	921	27	Lela	-	1
Perkins	2250	92	Kiefer	1403	33	Lone Chimney	-	2
Prague	2151	96	Meeker	997	44	Maramec	106	1
Sapulpa (+5K)	20871	575	Mounds	1274	53	Masham	-	1
Stillwater (+5K)	44818	1056	Oilton	1124	26	Mehan	-	1
Stroud	2775	111	Ralston	358	15	Milfay	-	3
			Ripley	438	10	Oak Grove	18	1
			Tryon	455	14	Olive	-	1
			Wellston	851	39	Schlegel	-	1
			Yale	1289	40	Shady Grove	45	4
						Shamrock	124	3
						Slick	150	5
						Sparks	139	4
						Terlton	86	4
						Vicars	-	1
						Westport	268	1

There are 22 towns classified as Class C towns but 11 of those towns are not included within the 2006 census estimates. Of the towns that are enumerated by the census, the range of population spans from 18 to 268. The towns have a range of 1 to 5 activities and average 2.2 activities per town. The Class C towns have 41 Class C activities, 7 Class B activities, and no Class A activities. There are 16 towns classified as Class B towns. The range of population based on the 2006 census estimates spans from 361 to 1,403. The towns have a range of 10 to 53 activities and average 25.4 activities per town. The Class B towns have 203 Class C activities, 187 Class B activities, and 17 Class A activities. There are nine towns classified as Class A towns with a population under 5,000. The range of population based on the 2006 census estimates spans from 2,151 to 4,391. The towns have a range of 82 to 205 activities and average 123.2 activities per town. These smaller Class A towns have 471 Class C activities, 509 Class B activities, and 129 Class A activities.

There are three towns classified as Class A towns with a population over 5,000. The population ranges from 8,456 to 44,818. The towns have a range of 262 to 1,056 activities and average 631 activities per town. These larger Class A towns have 687 Class C activities, 857 Class B activities, and 349 Class A activities.

There is a strong correlation between the number of activities offered within a town and its 2006 census population estimate. The Pearson Correlation Coefficient for the towns is equal to .968 and is significant using a 95% confidence level. The Pearson Correlation Coefficient for the Class C towns is equal to .329 but is not significant using a 95% confidence level. This is partially due to the lack of population estimates for several of the towns. The Pearson Correlation Coefficient for the Class B towns is equal to .782 and is significant using a 95% confidence level. The Pearson Correlation Coefficient for the Class A towns is equal to .912 and is significant using a 95% confidence level. Scattergrams that illustrate these relationships can be seen in Figures 5.1-5.4. This correlation provides some justification of the use of the population as a replacement for actual business counts when no such economic data existed for the historical classification of some of the towns' economies.

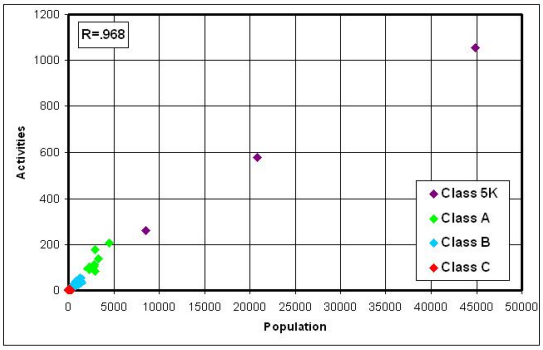

Figure 5.1 - Scattergram for All 2008 Towns

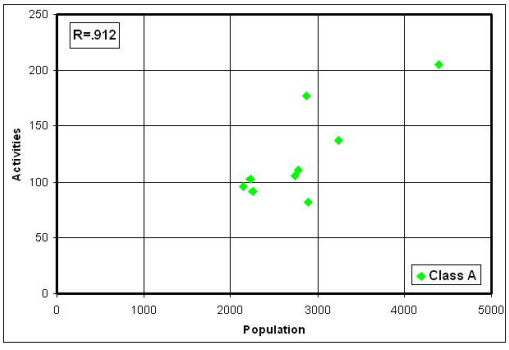

Figure 5.2 - Scattergram for 2008 Class A Towns

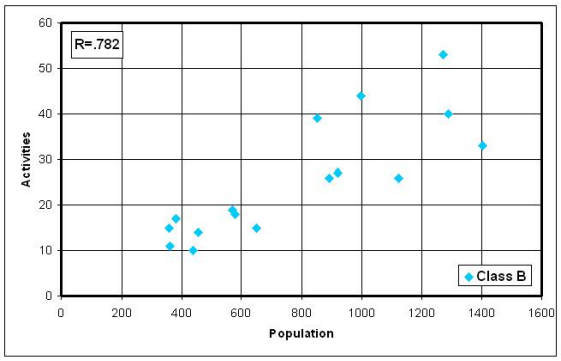

Figure 5.3 - Scattergram for 2008 Class B Towns

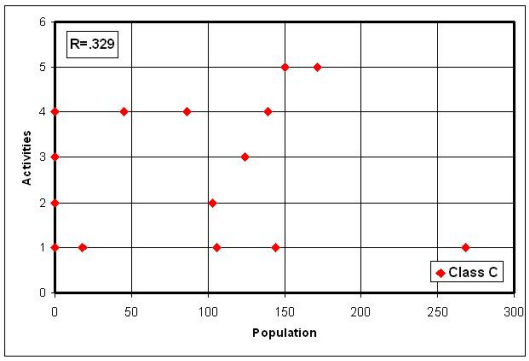

Figure 5.4 - Scattergram for 2008 Class C Towns

There are numerous changes observed in the towns' classification between 1920 and 2008. The 1930s and 1940s was a period of depopulation partially caused by the collapse of the agricultural economy. This not only hurt the local economy of agricultural towns like Blackburn but also hurt the economy of the towns that shipped the produce. Several railroads were removed because they were no longer economical to operate with the decline in agricultural shipments and numerous railroad towns like Kendrick, Maramec, and Sparks experienced decline as a result. After a brief period of revival in the 1970s, the oil market collapsed in the 1980s and resulted in the undermining of the economy of many of the oil based towns like Oilton and Slick. In contrast, several new Class C towns emerged after 1920 as the result of the highway system, such as Four Corners, Jacktown, and Lone Chimney.

Market Area Evolution

The next analysis compares the location of towns to the unweighted market area break points. Six iterations of the urban economic system, one for each period, are generated based on the town classification established in the

previous analysis. The unweighted minimum distance break points between Class A activities are depicted in the following figures by the dark gray lines, the break points for Class B activities are depicted by the medium gray lines, and the break points for Class C activities are depicted by the light gray lines. The resulting Thiessen polygons are most accurate near the center of the study area since towns from the surrounding counties are not included in the analysis.

This analysis uses unweighted distances to delineate a town's market area, following the "rational man" distance minimization assumption of location theory. Under this assumption, a consumer located in the study area would patronize the nearest location for a certain commercial activity and would ignore the influences of price, preference, or multi-purpose shopping. This assumption has been disproven by many previous studies but was necessary because the lack of historical economic data does not allow for a more elaborate model that might better reflect reality.

One of the other assumptions often used in location theory is that the population has to be evenly distributed across the area. The average rural population for each class of towns was calculated and compared to detect if the population was evenly spread across the study area. An unequal population would indicate that the early urban locational theories, such as the Central Place Theory, would not necessarily hold for that generation of towns. The Analysis of Variance, or ANOVA, analysis detected statistically significant differences among the averages between the classes in 1915 and 1920 for Class C activities. This indicates that the population was not spread evenly across the study area for the

period that coincided with the largest creation of towns with an oil based economy.

The diagram for 1900 represents the urban economic system that developed in order to serve the agricultural based society that emerged in the period after the land runs. The towns in Creek County are not included in the analysis because the area was part of Indian Territory at the time and did not experience a similar period of development in the years prior to 1900. There are 79 towns that had at least one economic activity in this reduced three county area; 58 towns are classified as Class C towns, 16 are classified as Class B towns, and 5 are classified as Class A towns. The transportation system was relatively underdeveloped with the exception of the San Francisco and Oklahoma City Railroad that crossed near the center of Lincoln County. The Thiessen polygons that represent the unweighted minimum distance break point between the different classes of towns found in 1900 can be seen in Figure 5.5. The lowest levels of towns within the hierarchy, the Class C towns, tended to cluster around each other in many portions of the study area and were often located near the break points of the higher order centers. Many Class B towns were also located near the break points of the Class A towns.

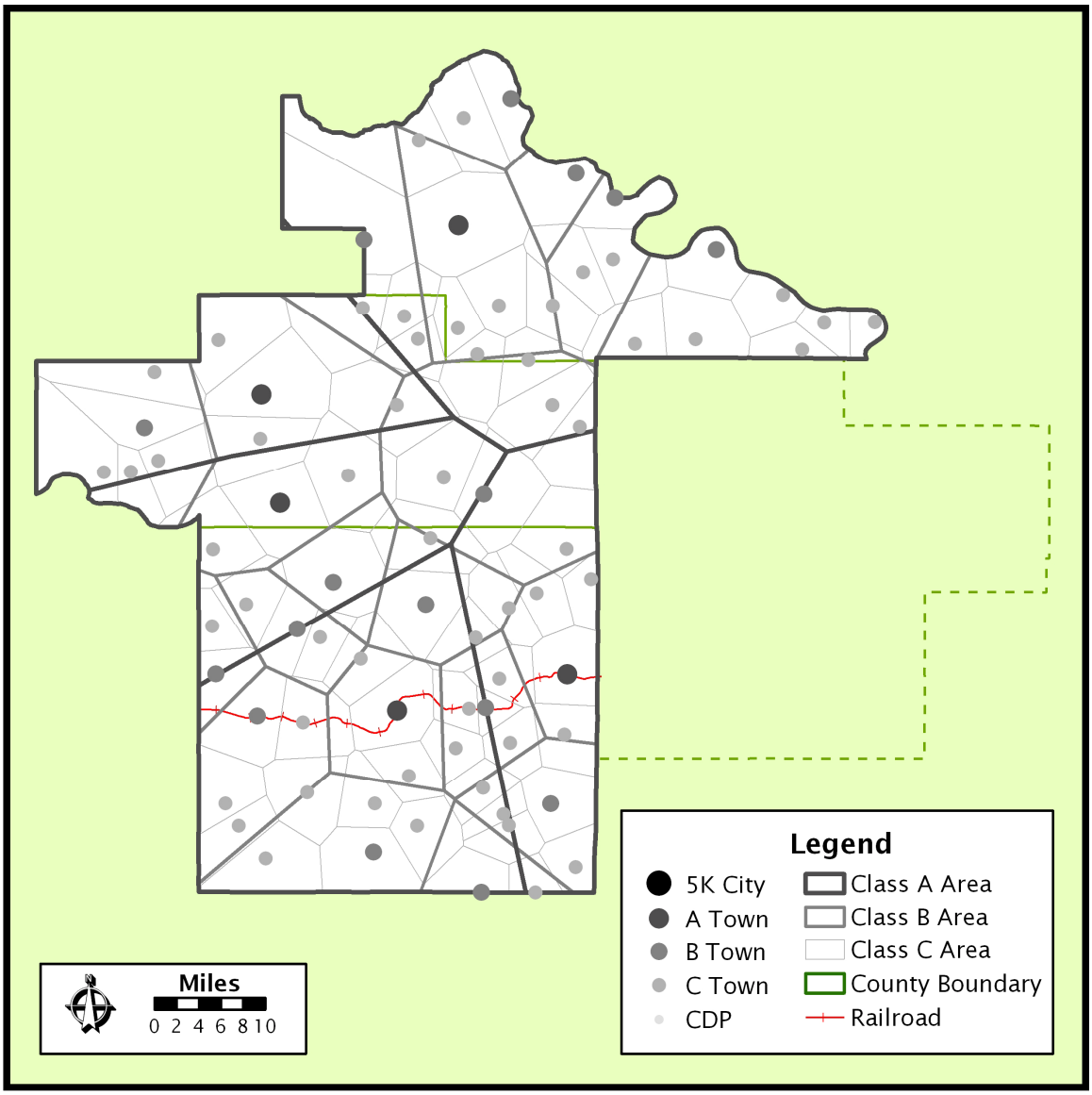

FIGURE 5.5 - Distance Break Points, 1900

There are some differences found between the average size of the market area for each classification of town for the Class B and Class C activities. For Class B activities in 1900, the average market area size of an A town is 125.9 mi² and the average market area size of a B town is 101.7 mi². The average size difference is not statistically significant using a 90% confidence level. The significance is hurt by a single Class B town, Cushing, which has a market area 100 mi² greater than the Class A town with the largest market area for Class B

activities. For Class C activities, the average market area size of an A town is 43.9 mi^2, the average market area size of a B town is 31.2 mi^2, and the average market area size of a C town is 26.5 mi^2. The average size differences between Class A towns and Class B towns and Class A towns and Class C towns are significant using a 90% confidence level. The average size distance between Class B towns and Class C towns is not statistically significant but is within 1.5% of the rejection point.

The diagram for 1907 represents the urban economic system that developed after the construction of the majority of the railroads built across the study area. The transportation system of the area had been significantly improved with railroad construction but access to the system was typically only provided at designated depots or sidings. The Thiessen polygons that represent the unweighted minimum distance break point between the different classes of towns found in 1907 can be seen in Figure 5.6. There was a substantial change in the location of the towns with the construction of the railroads. The majority of the towns are located along the railroads in 1907 including all of the Class A towns and all but four of the Class B towns. Many of the Class C towns found in 1900, which were not located along the new railroad network, disappeared from the urban system. Typically, only one town was located within an area where the different railroad lines created loops and in most cases the town was located near a break point of the next highest order town. A large number of towns along the railroad were also located near the break point of the next highest order towns. Six Class C towns are located in southeastern Creek County in 1907 and

do not follow the trend found in the rest of the study area among the Class C towns. This difference exists because the county experienced its first substantial wave of agricultural-based towns during this period.

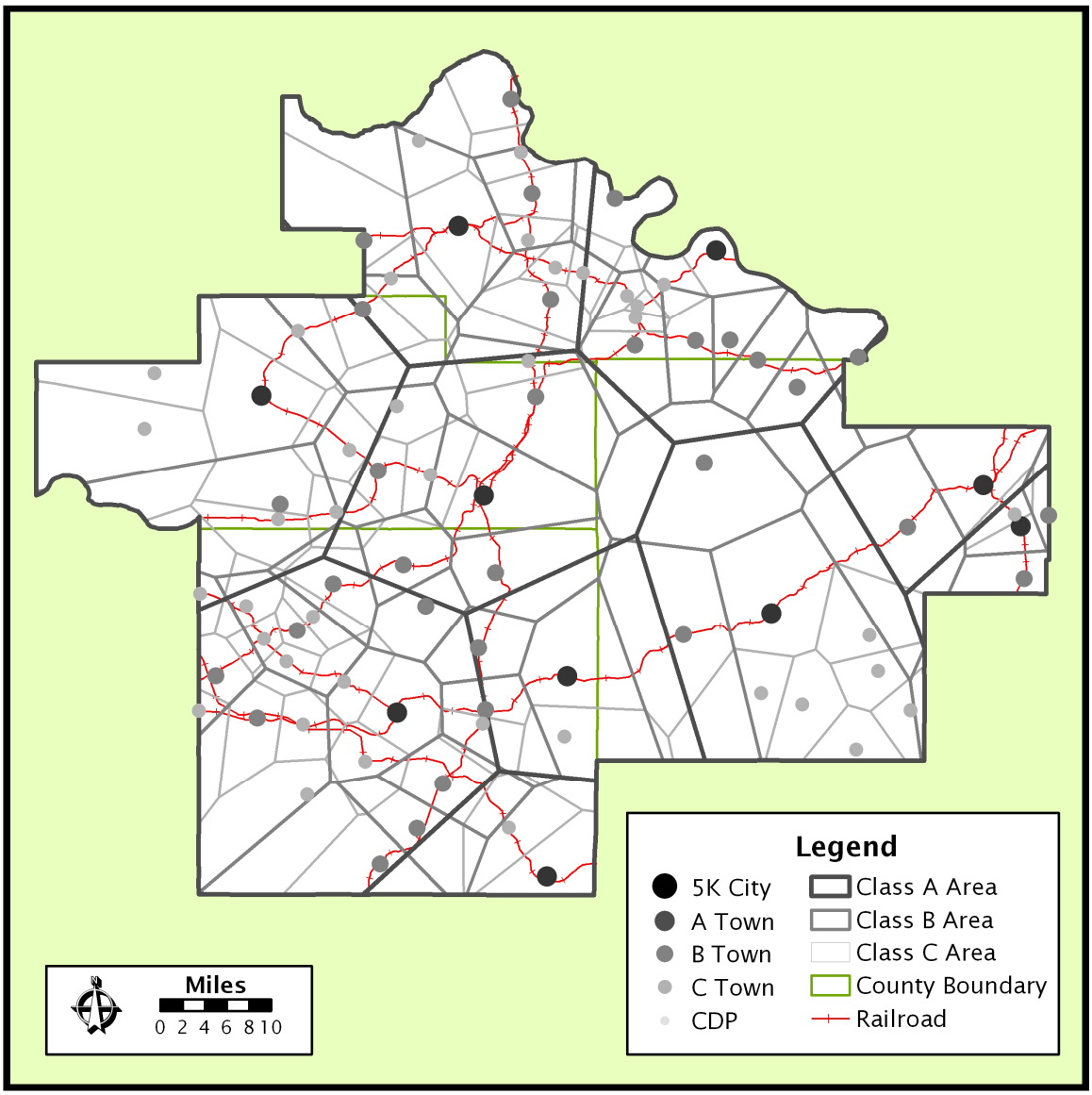

FIGURE 5.6 - Distance Break Points, 1907

Again, there are some differences found between the average size of the market areas for each classification of town for the Class B and Class C activities. For Class B activities in 1907, the average market area size of an A town is 101.6 mi² and the average market area size of a B town is 69.1 mi². The

average size difference is not significant with a 90% confidence level. For Class C activities, the average market area size of an A town is 50.4 mi^2, the average market area size of a B town is 43.0 mi^2, and the average market area size of a C town is 34.6 mi^2. Only the average size difference between Class A towns and Class C towns is significant using a 90% confidence level. While 1907 was established as the representative year for the railroad-based urban economic system, several oil towns had already developed around the Cleveland Oil Field and the Glenn Pool Oil Field and the clustering found among these towns skewed the market area averages. When the oil towns of Kiefer, Cleveland, Sabo, Dog Center, Gaswell, and Petroleum are removed, the average distance between all four pairs of the towns becomes significant.

The diagram for 1910 represents the urban economic system that emerged approximately five years after the railroad construction was completed and two years before the Cushing-Drumright Oil Field was discovered. The Thiessen polygons that represent the unweighted minimum distance break point between the different classes of towns found in 1910 can be seen in Figure 5.7. The most substantial change to the urban system that occurred between 1907 and 1910 was the decrease in the total number of towns, rather than the location of the towns as had been seen between 1900 and 1907. All but a few townsites without railroad service were abandoned. There was also a decline in the number of towns located along the railroad. Their failure was likely due to the over duplication of railroad service in the area. The loss of towns in southeastern Pawnee County was due to the decline of the Cleveland Oilfield. The only area

to see an increase in towns was northwestern Creek County, an area that had lacked development prior to 1910. Four towns, Bland, Ezra, Shamrock, and Tiger, developed along the break point between Olive and the surrounding towns with Class B activities.

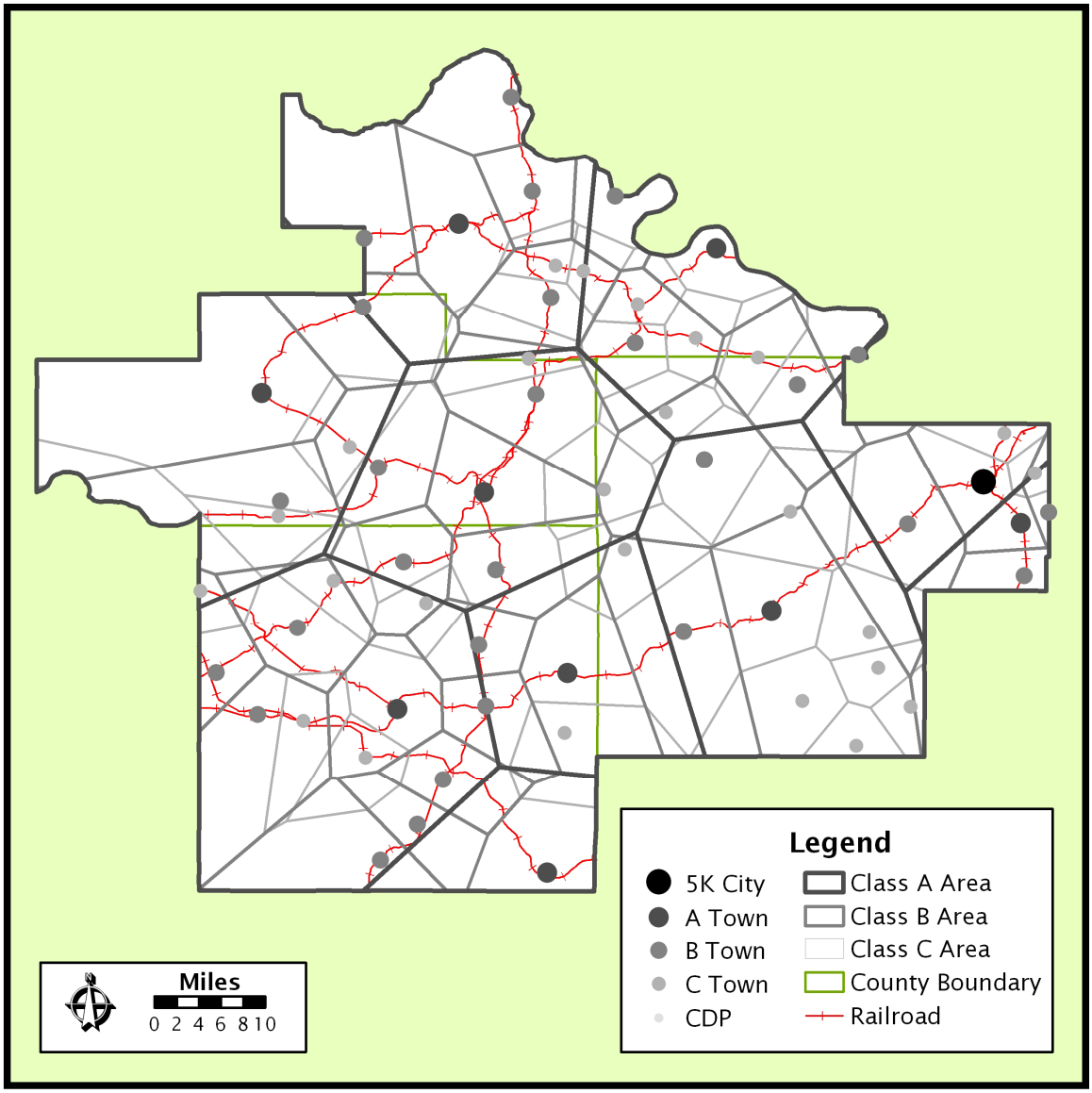

FIGURE 5.7 - Distance Break Points, 1910

Several differences are again found between the average sizes of the market areas. For Class B activities in 1910, the average market area size of an A town is 104.1 mi² and the average market area size of a B town is 81.0 mi².

The averages are not significant with a confidence level of 90%. An oil town, Kiefer, again broke with the size trend found within the other areas for Class A towns and its removal brought the level of significance within 1% of the selected confidence level. For Class C activities, the average market area size of an A town is 69.7 mi^2, the average market area size of a B town is 52.6 mi^2, and the average market area size of a C town is 44.4 mi^2. The average size differences between B towns and C towns and A towns and C towns are both significant using a 90% confidence level. The difference between A towns and B towns for C activities is not significant.

The diagram for 1915 represents the urban economic system just prior to the peak of the Cushing-Drumright Oil Field. Two railroad lines also went into service during this period which improved transportation in the oil field. The Thiessen polygons that represent the unweighted minimum distance break point between the different classes of towns found in 1915 can be seen in Figure 5.8. The most substantial change to the urban system between 1910 and 1915 was an increase in the number of towns. The vast majority of the new towns were created within the Cushing-Drumright Oil Field and very few changes were noted in other areas. Twelve of the seventeen new towns in the oil field were located on the railroads.

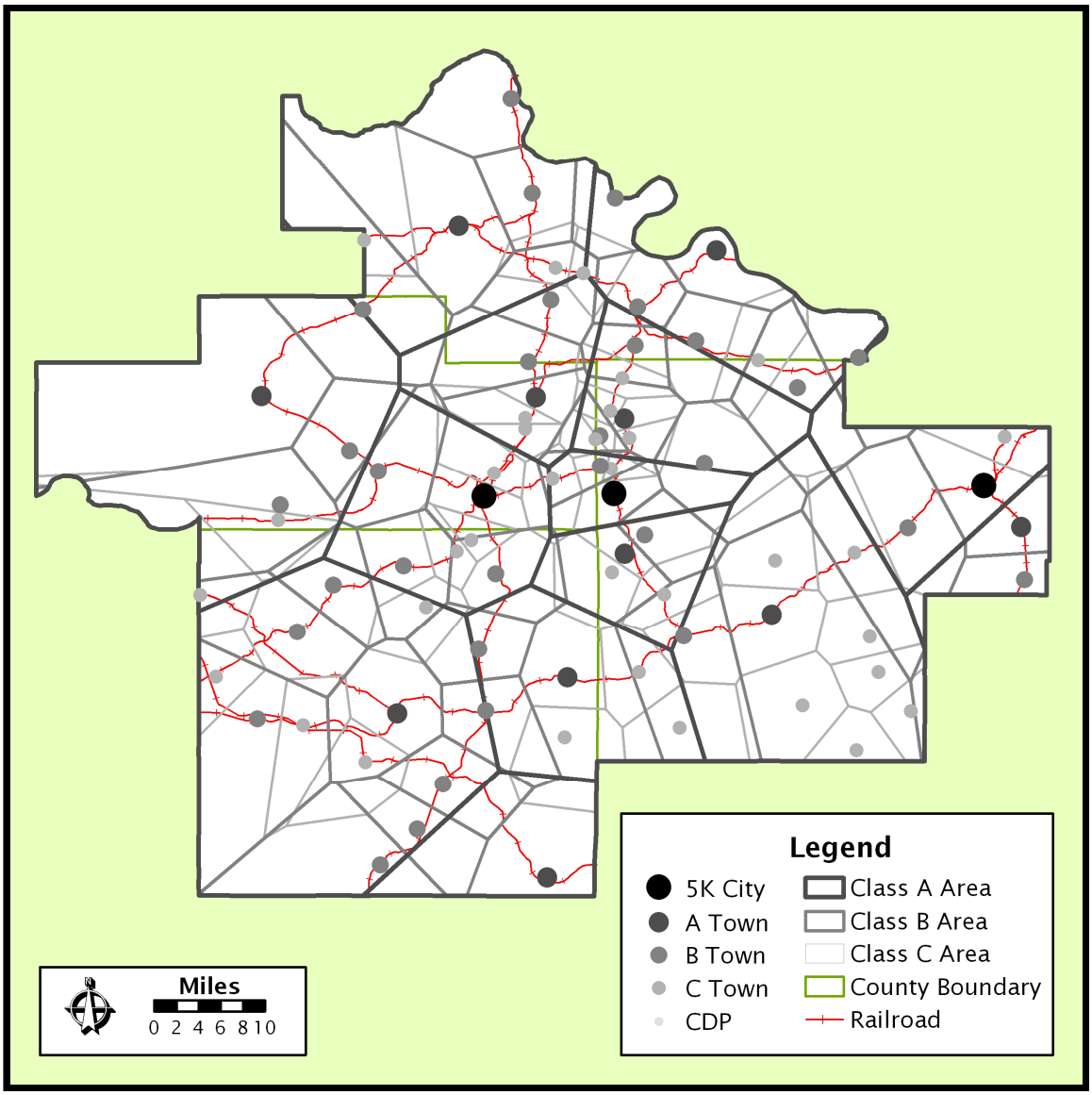

FIGURE 5.8 - Distance Break Points, 1915

With the close spacing of the new towns, only marginal differences can be found between some of the average sizes of the market areas. For Class B activities in 1915, the average market area size of an A town is 86.5 mi² and the average market area size of a B town is 65.1 mi². This is not significantly different using a 90% confidence level. For Class C activities, the average market area size of an A town is 49.7 mi², the average market area size of a B town is 44.9 mi², and the average market area size of a C town is 33.5 mi². The

average size difference between B towns and C towns is significant using a 90% confidence level but the other relationships are not significant.

The diagram for 1920 represents the urban economic system after the Cushing-Drumright Oil Field began to decline and the Bristow Oil Field began to develop. This also marks the time when the first automobile transportation system was undergoing development. The Thiessen polygons that represent the unweighted minimum distance break point between the different classes of towns found in 1920 can be seen in Figure 5.9. The most substantial change to the urban system between 1915 and 1920 was the decrease in the number of towns, particularly among the Class C towns. All of the Class C towns found in 1915 within the Cushing-Drumright Oil Field were abandoned. Other minor changes occurred throughout the study area as a small number of towns grew or declined over the five year period.

Few differences can be found between the average sizes of the market areas because there were so many Class A and Class B towns. For Class B activities in 1920, the average market area size of an A town is 80.6 mi^2 and the average market area size of a B town is 71.4 mi^2. The averages are not significantly different. For Class C activities, the average market area size of an A town is 62.0 mi^2, the average market area size of a B town is 53.6 mi^2, and the average market area size of a C town is 45.9 mi^2. These differences are not significant.

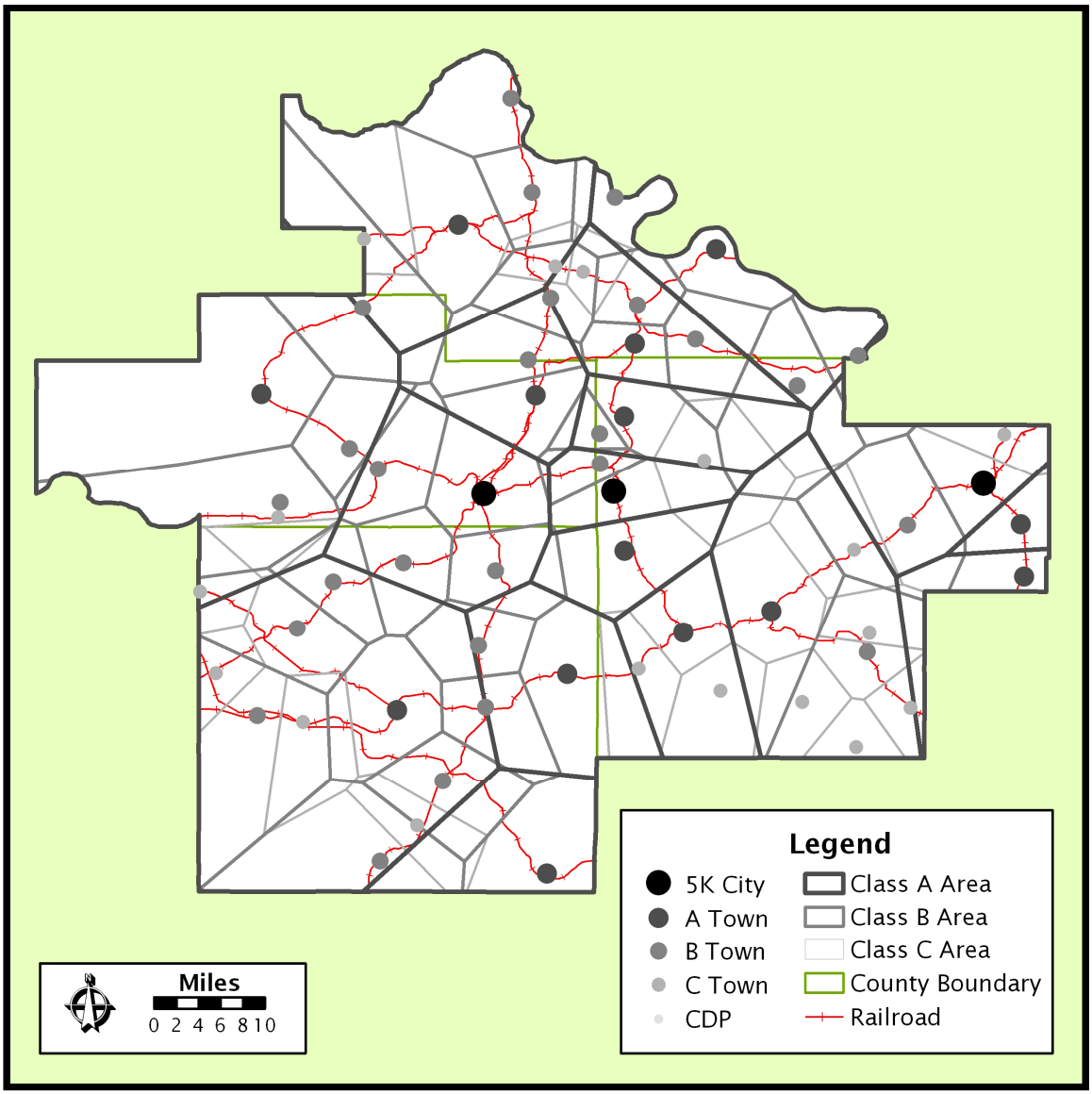

FIGURE 5.9 - Distance Break Points, 1920

The diagram for 2008 is a representation of the modern urban economic system that emerged partially as a result of roadway improvements. These improvements have occurred over a span of twenty five years which is a much longer period of development than any of the past urban systems had experienced. This fact, coupled with the occurrence of the Great Depression and the downturn of the agricultural economy, prevents a representative benchmark year for the development of the roadway system from being established. The

Thiessen polygons that represent the unweighted minimum distance break point between the different classes of towns found in 2008 is shown in Figure 5.10.

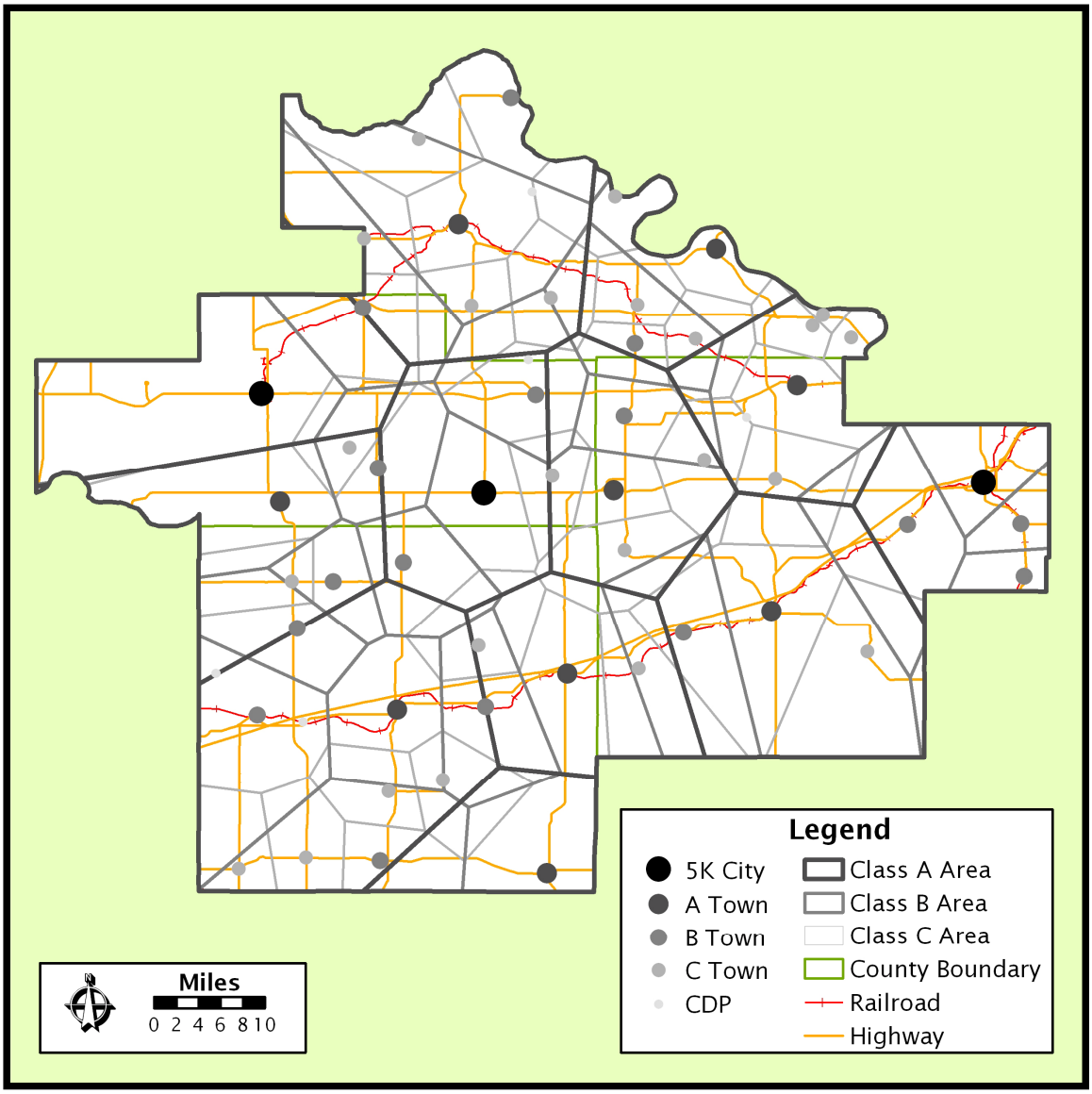

FIGURE 5.10 - Distance Break Points, 2008

Visually, the urban system appears to have returned to a higher degree of organization like what was found in the 1900 diagram, albeit with a smaller proportion of Class C towns. A high number of Class B towns occur near the break point of the Class A town market areas and a high number of Class C towns also occur near the break point of the Class B towns. The instances

where this does not hold true for B towns involve an oil town, Oilton, and oil towns near Tulsa that are now bedroom communities to the nearby metropolis. The Class C towns are not as clustered as is found in the 1900 model but are still commonly found at a distance away from the Class A centers. In addition, the highway system has imposed an additional constraint on the system as towns are generally found where the break point lines intersected with a highway.

The differences found between the average size of the market area for each classification of town for the Class B and Class C activities returned to a higher level of significance. For Class B activities, the average market area size of an A town was 139.2 mi^2 and the average market area size of a B town was 97.3 mi^2. The average size difference was significant using a 90% confidence level. For Class C activities, the average market area size of an A town was 83.6 mi^2, the average market area size of a B town was 56.9 mi^2, and the average market area size of a C town was 57.2 mi^2. The average size difference between the Class A and Class B towns and between the Class A and Class C towns for Class C activities was significant using a 90% confidence level. However, the size difference between the Class B and C centers was not significant.

The fact that the market area sizes are frequently significantly different between the three classes of towns excluding 1915 and 1920 using unweighted distances suggests that the town spacing is not the product of pure distance minimization. Rather, the results indicate that the gravity model (Reilly [1931] 1953), which predicted market area was proportionally related to town size, is present within the spacing of the towns within the urban system. The population

densities of the market areas in 1915 and 1920 were found to be unequal. This provides reasoning for why the differences between the unweighted market areas lacked significance for those same years, as some classes of towns were able to draw patrons from areas with higher population density so the town's potential market area size was not as important. The success of the oil towns appears to be closely tied to the number of people in the area that immediately surrounded the town. As the population density decreased after the oil boom ended, only a few oil towns were able to survive.

Town Classification and Minimum Town Spacing

The next portion of the analysis provides further insight on the spatial relationship between towns of different classifications using the average minimum Euclidian distance to its nearest neighbor. The changes in town spacing are studied using six benchmark years which corresponded to the major changes within the urban system. The hierarchical town classification scheme established in the previous analysis is reused with a few modifications. The Class B towns and the Class C towns are further subdivided based on the classification of the higher order center they were nearest. The B1 sub-classification is used for the Class B towns located nearer to a major population center and the B2 subclass is used for the Class B towns that are nearer to a Class A town. There are four sub-classifications of the Class C towns: C1 towns are nearest to a major population center, C2 towns are nearest to a Class A town, C3 towns are nearest to the a Class B2 town, and the C4 towns are

nearest to a Class B1 town. The calculation results are shown in Figure 5.11 and Table 5.8. Figure 5.11 is constructed using a three-dimensional perspective; the major urban centers are placed at the origin of the three-dimensional space and the C1, C3, and C4 towns are placed on the X, Y, and Z axis.

The first relationship studied was between the major population centers and the lower classifications of towns in the hierarchy. There are no towns classified as major population centers in 1900 or 1907. The year 1910 was the first year in the study that a town had reached the population threshold to be classified as a major population center. Since there is only a single town classified as a major population center and it is near the edge of the study area, the average minimum distances between it and the other cities is not a meaningful point of comparison for the future years. By 1915, three towns, Cushing, Drumright, and Sapulpa, are classified as major population centers based on their estimated population. There was a change within the major population centers by 2008, as Drumright no longer met the 5,000 population threshold and Stillwater's population was well above the threshold based on the 2006 census estimates. With the exception of the lack of a Class C town near the urban population centers in 2008, the other relationships remain present even though the average distances vary over the other three years in which there were three major population centers. The Class C towns, the C4 towns, are located closer to the major population centers than are the nearest Class B towns, B1, and both are closer to the major population centers than are the Class A towns.

TABLE 5.8 - Average Nearest Neighbor Distance Between Towns

Town Class		5K	A	B1	B2	C1	C2	C3	C4
1900	5K		-	-	-	-	-	-	-
	A	-			11.5		7.4	12.9	
	B1	-							-
	B2	-	11.5					6.2	
1907	5K		-	-	-	-	-	-	-
	A	-			9.3		7.4	9.4	
	B1	-							-
	B2	-	9.3					3.9	
1910	5K		35.3	6.7	38.3	4.7	27.8	34.1	-
	A	35.3			9.3		9	10.1	
	B1	6.7							-
	B2	38.3	9.3					4.6	
1915	5K		16.4	6.6	17.8	3.4	15.4	17.9	6.4
	A	16.4			8.3		6	8.5	
	B1	6.6							3.3
	B2	17.8	8.3					4.2	
1920	5K		15.5	6.8	19.2	4.7	14.4	22.5	11.2
	A	15.5			8.4		5.9	10.5	
	B1	6.8							4.5
	B2	19.2	8.4					4.7	
2008	5K		15.5	7.7	19.3	-	17.6	19.9	-
	A	15.5			9.2		6.8	8.1	
	B1	7.7							-
	B2	19.3	9.2					5.4	

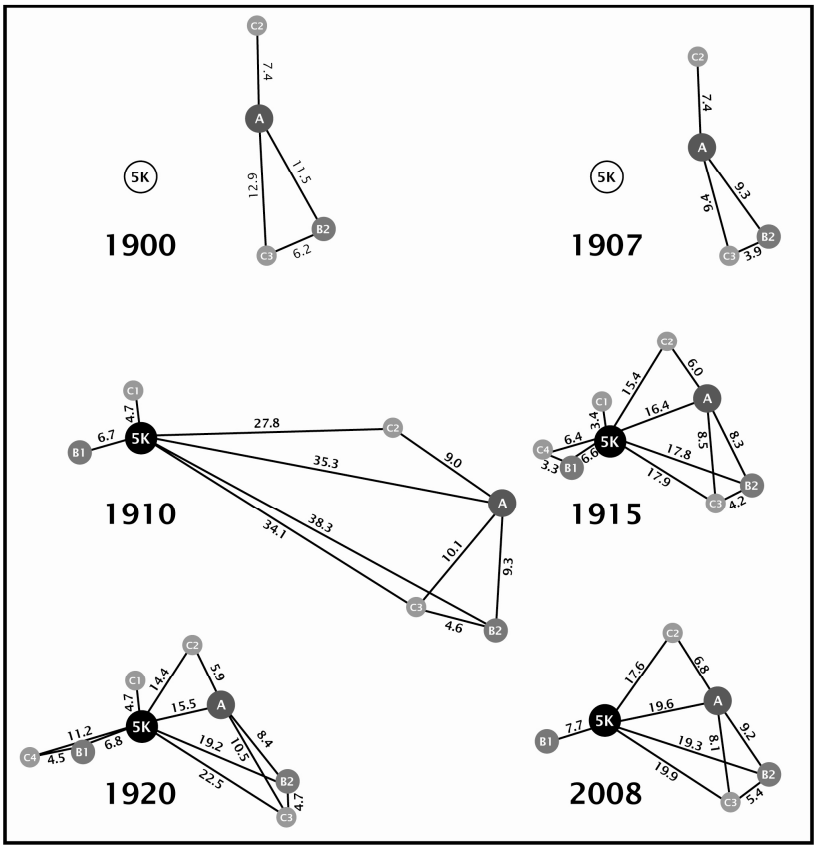

FIGURE 5.11 - Average Nearest Neighbor Distance Between Towns

The spatial relationships between the Class A towns and the classes of towns below it in the hierarchy were studied next. The average distance from the Class A towns to the nearest Class C towns, the C2 towns, is lower than the average distance between the Class A towns and the nearest Class B towns, the B2 towns. The relationship exists in all six years studied but is not substantial in 1910.

The most variable spatial relationships are those that involved the Class C towns. This is not surprising given the fact that they contained the lowest number of commercial enterprises and had a high failure rate. The proximity of the Class C towns to the major population centers has changed considerably over the last century. In 1915, the Class C towns were able to locate much closer to the major population centers than compared to what was found in 1920 or in 2008. One factor that likely attributed to this was that the major population centers were all in areas of oil production in 1915 and the Class C centers would have been able to gain clients from the dense local population in these areas. The other factor that may have caused the increase in spacing between the towns was improved transportation. Since no Class C town's nearest neighbors are the major population centers or the Class B1 towns that are nearest to the major population centers in 2008, there is evidence to suggest that the nonurban populations around major population centers have chosen to bypass the smaller towns in favor of the larger towns.

Conclusions

The results of the economic analyses provide support for the idea that there were at least four separate urban organizational systems that influenced the location where the towns developed within the study area. After each principle period of town development, there were some signs that the system was evolving and possibly attempting to return to some state of equilibrium before the next distinct organizational system took hold. With the close spacing of these developmental boom periods, any common factors that acted to normalize the system had only a limited period to influence the system and could not be determined. However; the modern system maintained the spatial relationships between the hierarchical classes found throughout the last century.

The modern system of cities has evolved over a much longer period as the last major structural change to the system was in place by the mid-1950s with the completion of the majority of the highway system. Few new large towns have developed since the 1920s so the physical location of the cities in the modern system has been strongly constrained by where towns were originally started due to the historical milieu in which they originated. The types of activities found within the towns in the modern urban system appear to be strongly tied to their location in respect to the highway transportation system and their distance from other towns.

CHAPTER VI

TOWN AND POPULATION CHARACTERISTICS

Introduction

Three different analyses are used to establish the town and population characteristics found within the study area. The first analysis identifies the boom towns as determined by the historical population trends found among the towns over the past century. The second analysis focuses on the different economic composition of the towns as determined by a location quotient analysis. The third analysis determines the social characteristics of the towns and consists of two parts; the first compares several demographic variables between boom towns and non-boom towns and the second identifies which variables were good predictors of town development through a Stepwise Multiple Regression Analysis.

Population Trends and Boom Town Identification

The analysis of the population trends is broken down into two parts. The first portion of the analysis looks at the county level population trends. This indicates the general increases and decreases of total population, rural population, and urban population since 1900. The second portion focuses on

individual towns within the study area. This allows for the identification of the oil boom towns and gives an indication of the variation of population growth and decline that the towns experienced.

The analysis of the county level population reveals that the development trends are not even across the study area. The county population trends are depicted in Figure 6.1. The two most similar counties are Pawnee County and Lincoln County. The population in Pawnee and Lincoln counties is more rural than urban except during the 1960s. Both counties grew or maintained their population until the 1930s when both show a large decline in rural population. This drop is likely tied to the decline in agriculture following the Great Depression. This decrease also corresponds to the shift from the railroad dominated transportation system to the modern highway based system but this has little effect on the total urban populations of these counties. The rural population in Lincoln and Pawnee counties begins to recover somewhat in the 1970s but no further analysis on the direct causes of this recovery is considered by this study.

Creek County somewhat reflects the trends found in Pawnee and Lincoln counties, particularly with its rural depopulation and repopulation pattern. One notable difference is its rapid growth from 1907 to 1920. This population boom was the result of the three oil booms that occurred within the county. In Creek County, a large percentage of the rural population was engaged in the oil industry rather than in agriculture as is found in the other counties during this era. This is evidenced by the period when the population growth occurred. After the

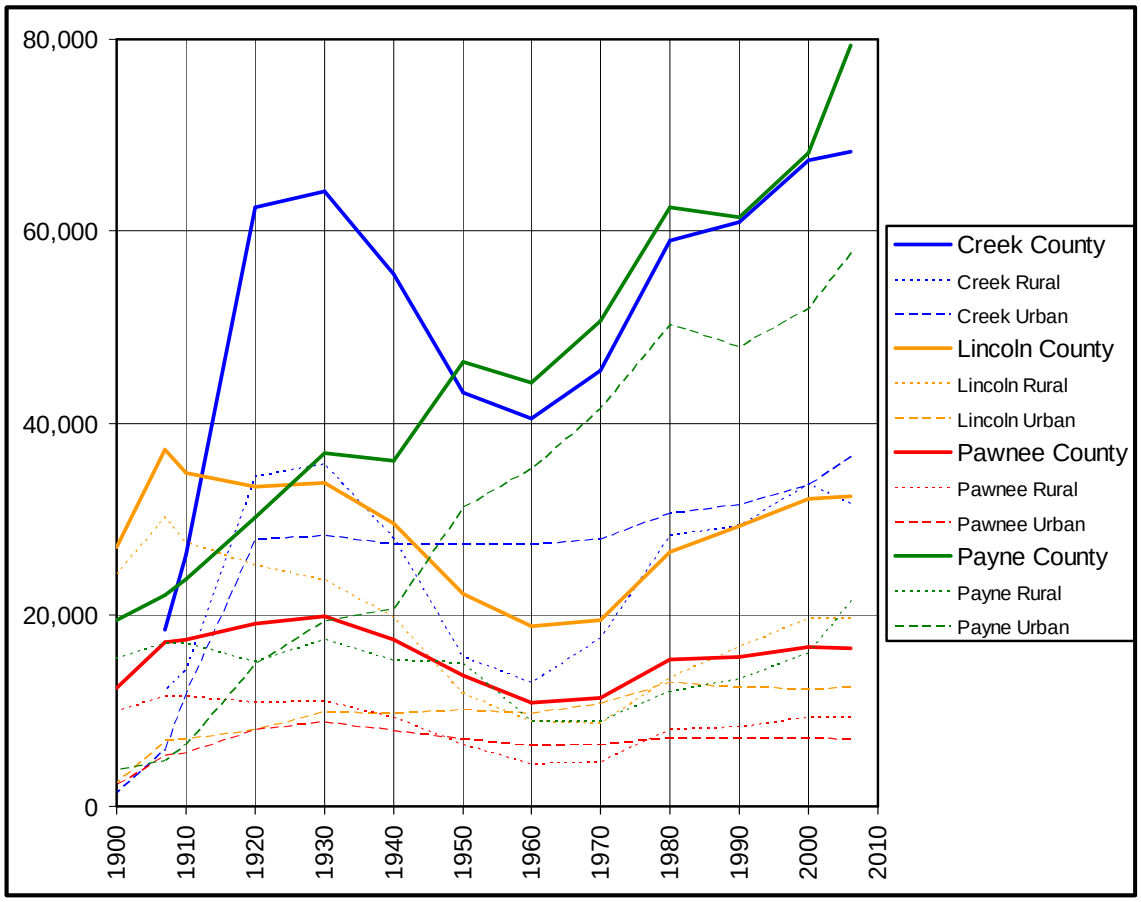

FIGURE 6.1 - County Population Trends, 1900-2006

peak of the oil industry in the 1930s, Creek County lost over 23,000 residents in thirty years and this can be associated with the drop in oil related jobs. Creek County had over 20,000 more residents in 1960 compared to Lincoln County, which had an agricultural based economy but is roughly a similar size. Therefore the total population impact of the oil boom can be estimated between 30,000 and 40,000 people, of which approximately half became permanent residents of the county. After 1960, the growth found in the rural population is the result of an increased number of recreation based settlements around Lake Keystone and an increased number of Tulsa metropolitan area residents who have settled in the unincorporated areas surrounding Sapulpa.

Payne County differs substantially from the other three counties in the study area with the exception of the trend found in its rural population. Payne County has grown consistently throughout the study period. This growth is primarily the result of the increase in urban population, which in part parallels the expansion of Oklahoma State University. Only a portion of the growth found between 1910 and 1930 can be accredited to the development of the oil industry and it was primarily urban rather than rural as was seen in Creek County.

As documented in Chapter IV, the discoveries of the major oil fields within the study area do not correspond with the decennial census and an accurate count of the oil field workers is made difficult because of the workers migratory status. This means that the peak population is not officially documented but to a limited degree, the population increases can still be seen in the following census enumerations. The Census Bureau does not report every town in the study area separately for every census year so the early population of several towns can not be precisely determined.

The first oil boom in the area occurred in two separate oil fields. The town population trends for this boom period are depicted in Figure 6.2. Cleveland is the only town in the Cleveland Oil Field to be returned in any census. Its initial peak boom population occurred shortly before the 1907 census but the oil industry remained active in the surrounding areas in the 1930s. Kiefer is located in the Glenn Pool Oil Field. It was started around 1905 but it was not included in the 1907 statehood census. Other than Sapulpa, which is discussed in another portion of the analysis, none of the other towns in the oil field are included in the

census so the population trends of these smaller additional towns can not be established.

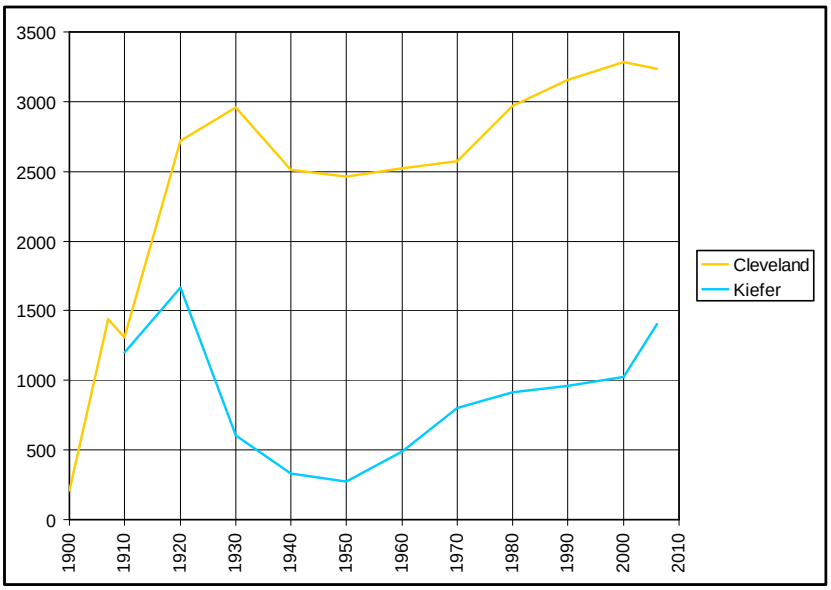

FIGURE 6.2 - Glenn Pool and Cleveland Oil Field Boom Towns, 1900-2006

The second oil boom period is centered on the Cushing-Drumright Oil Field but it also extends northward into a few of the smaller oil pools in southern Pawnee County. The town population trends for this boom period are depicted in Figure 6.3. The actual peak population of the towns in this area occurred between 1915 and 1916 but many towns still showed substantial population growth in the 1920 census. Cushing and Drumright were the two largest towns within this region in this era but Cushing continued to grow between 1920 and 1930 due to the number of oil refineries in the town. Yale, Oilton, Shamrock, and Jennings all show a substantial population boom from 1910 to 1920 while Hallett only shows a moderate increase. Depew, Terlton, Quay, and Markham are not returned separately until the 1930 census but are located within townships that showed similar booms in the 1920s and are all documented oil boom towns.

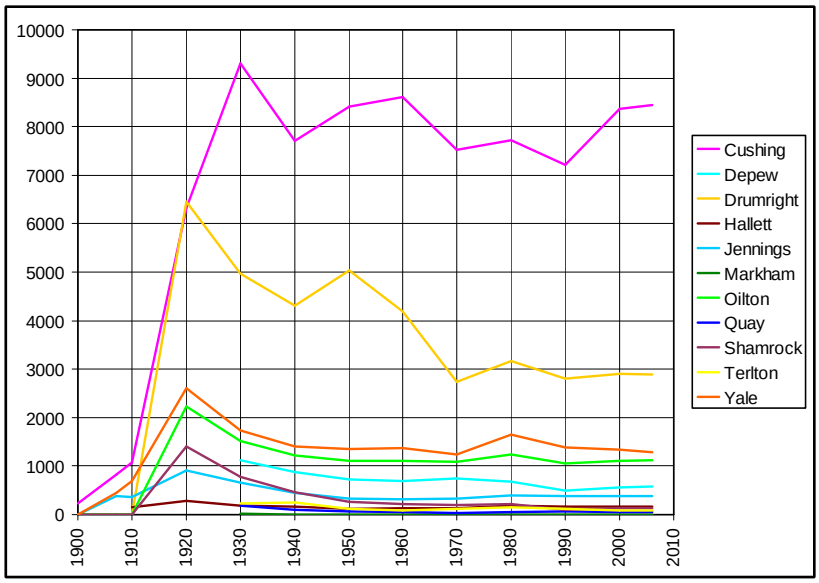

FIGURE 6.3 - Cushing-Drumright Oil Field Boom Towns, 1900-2006

The third oil boom period is centered on the Bristow Oil Field but it also includes the northward and westward expansion of the Cushing-Drumright Oil Field. The town population trends for this boom period are depicted in Figure 6.4. The peak of the Bristow Oil Field is difficult to pinpoint but occurred around the mid-1920s. The oil field was initially developed before 1920 and contributed to the increased population of Bristow in the 1920 census. Bristow continued to grow throughout the 1920s. The only new town to be enumerated by the census after the peak is Slick but it was already in decline by the 1930 census as the focus moved westward toward Davenport. Davenport had a minor oil pool and since it doubled in population it is also considered a boom town. Maramec and Ripley are both located in areas that saw a modest boom in the mid 1920s as the Cushing-Drumright Oil Field expanded. However, since the boom in Maramec and Ripley was short and the growth was much smaller than most other boom towns in the study area, they are not classified as boom towns for this study.

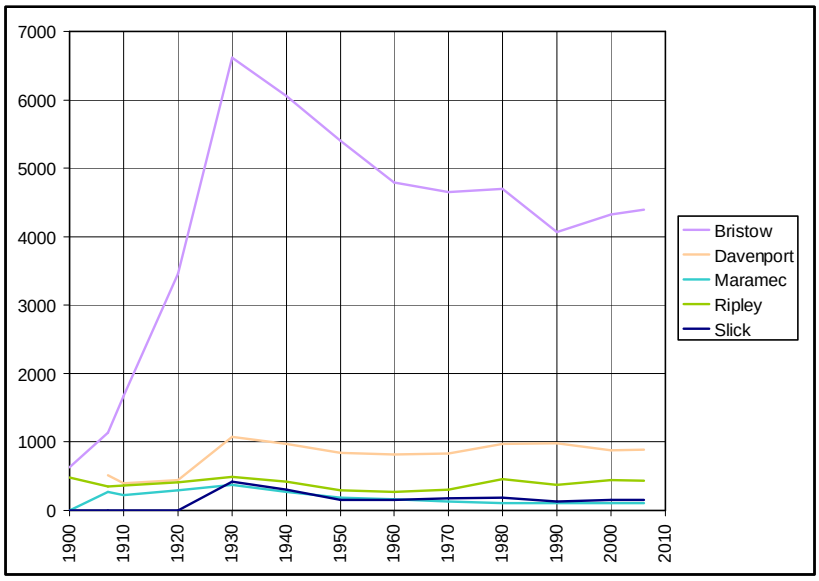

FIGURE 6.4 - Bristow and Cushing Drumright Oil Field Boom Towns, 1900-2006

While a majority of the other towns in the study area saw at least minor increases in their economies due to the discovery of oil near their area or as a result of the general increase of wealth in the region, this increase is not enough to justify their classification as an oil boom town. The town population trends for these other towns are depicted in Figure 6.5 for the towns with a population under 1,000 and in Figure 6.6 for those that surpassed 1,000 sometime during the town's history. Only a few patterns can be drawn between these towns. The smaller towns seem to be more susceptible to the changes in agriculture compared to the larger towns. This is likely caused by the increased diversification found in the larger towns that allowed them to sustain fewer losses during such a recession period. A number of smaller towns have been in decline since the 1930s whereas those that show some of the sharper drops between 1930 and 1960 have generally been able to recover.

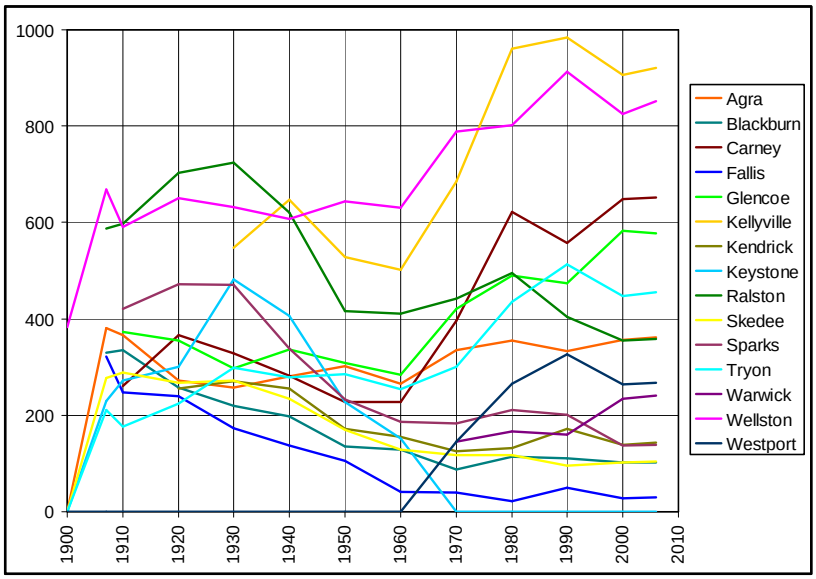

FIGURE 6.5 - Population in Small Non-oil Boom Towns, 1900-2006

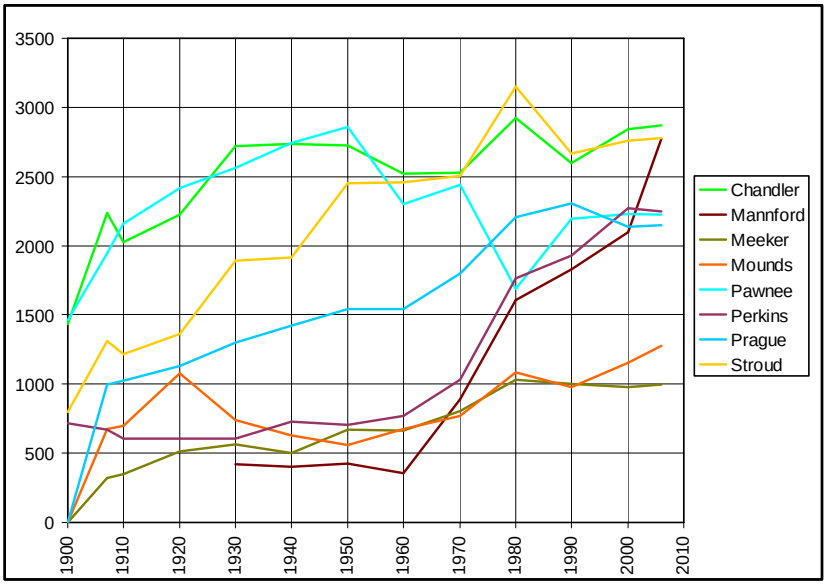

FIGURE 6.6 - Population in Large Non-oil Boom Towns, 1900-2006

The two largest towns within the study area, Stillwater and Sapulpa, also show interesting population trends. The town population trends for these two towns are depicted in Figure 6.7. Sapulpa is located in the Glenn Pool Oil Field and experienced a population boom as a result. Its continued growth is partly a result of its proximity to Tulsa. The biggest contributor to Stillwater's population growth appears to be Oklahoma State University. The town experienced what

could be called a “College Boom” between 1940 and 1950, doubling in population as a result of the GI Bill which provided money for veterans to attend college after World War II.

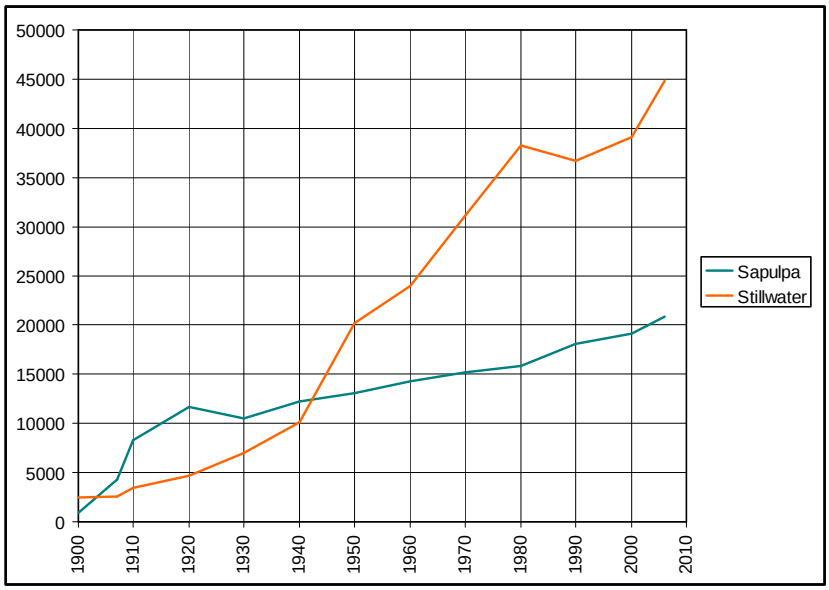

FIGURE 6.7 - Sapulpa and Stillwater Populations, 1900-2006

Location Quotient Analysis

The location quotient analysis is used to evaluate the structure of a town’s economy as it existed in 2008. The calculation is based on the ratio of administrative activities, industrial activities, oil based companies, retail based commercial activities, and service based commercial activities. Of particular interest is the ratio of oil based companies within an oil boom town because if this number is found to be lower than the study area average, it could indicate that the town has diversified its economy to a point where it is no longer economically susceptible to the volatile boom and bust cycles found in the oil

industry. The ratios are illustrated in Figure 6.8. The results of the location quotient calculation are presented in Table 6.1.

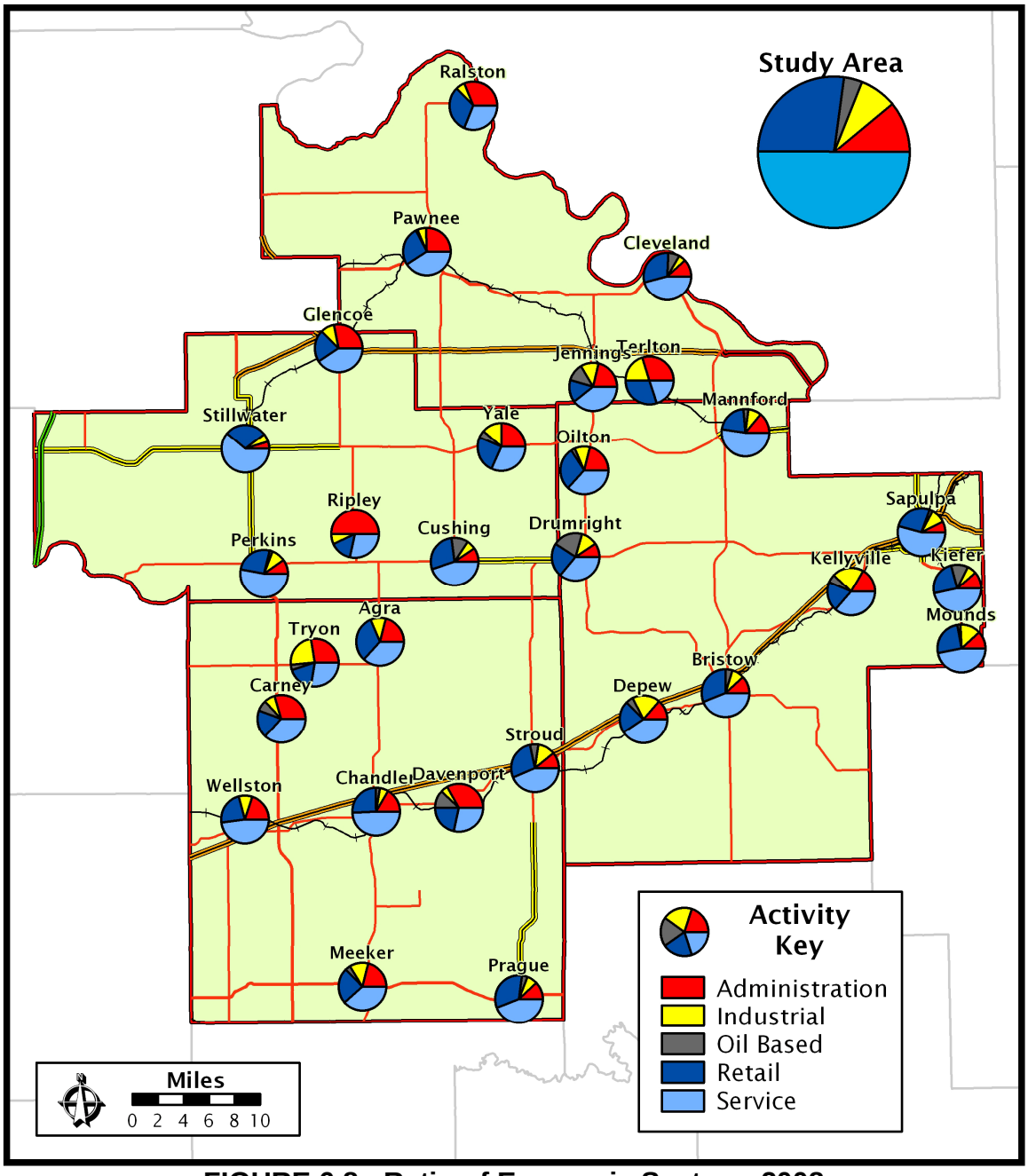

FIGURE 6.8 - Ratio of Economic Sectors, 2008

TABLE 6.1 - Location Quotients

CITY	Administrative	Industrial	Oil Based	Retail	Service
Agra	1.91	1.33	0.00	1.17	0.74
Bristow	1.06	1.08	1.21	1.15	0.88
Carney	2.69	0.94	1.88	0.68	0.74
Chandler	1.50	0.73	0.77	0.94	0.98
Cleveland	1.06	0.62	1.94	1.11	0.91
Cushing	0.85	0.80	2.87	1.04	0.89
Davenport	3.03	0.60	3.03	0.79	0.57
Depew	1.23	2.39	1.37	0.80	0.81
Drumright	0.85	1.40	5.20	0.86	0.72
Glencoe	2.56	1.19	0.00	0.81	0.81
Jennings	1.93	1.53	3.08	0.56	0.79
Kellyville	1.49	2.76	1.39	0.74	0.73
Kiefer	1.03	0.82	2.87	0.89	0.93
Mannford	1.26	1.12	0.85	0.80	1.04
Meeker	1.90	1.62	0.89	0.90	0.77
Mounds	1.06	1.75	0.54	0.94	0.93
Oilton	1.91	1.33	0.67	1.07	0.74
Pawnee	2.34	0.74	0.30	0.97	0.82
Perkins	0.87	1.21	0.49	0.96	1.06
Prague	1.10	0.89	0.97	1.22	0.88
Ralston	2.84	0.79	0.00	1.15	0.62
Ripley	4.54	0.90	0.00	0.53	0.57
Sapulpa	0.65	1.25	0.56	0.98	1.08
Stillwater	0.42	0.69	0.24	1.05	1.21
Stroud	0.99	1.51	1.45	1.03	0.87
Terlton	2.73	2.53	0.00	1.11	0.40
Tryon	2.51	3.05	0.88	0.64	0.55
Wellston	1.82	1.18	0.00	0.84	0.96
Yale	2.27	1.69	1.27	0.92	0.63

There are a number of variations between the towns' economic sector ratios. The largest differences appear to be size based. The smaller towns have higher concentrations of administrative functions compared to the larger centers. Conversely, the smaller centers have lower concentrations of commercial activities, both in retail and in service, compared to the larger centers. This suggests the threshold needed to establish certain non-profit administrative activities like a town government, a church, or emergency services is lower than what is needed to establish for-profit commercial activities.

There are several instances where a town's economic sector ratio breaks from this trend. Among the larger centers, Pawnee and Chandler have a higher

than average ratio for administrative activities. This is not surprising because both are a county seat and thus have a larger government presence. Pawnee is also likely higher because of the Pawnee Nation Tribal government. Among the smaller centers, Terlton, Agra, Ralston, and Oilton have a higher than average ratio for retail activities.

The industrial activity ratios do not seem to closely follow a population based pattern. The towns with higher than average ratios for industrial activities include Terlton, Tryon, Depew, Kellyville, Yale, Meeker, Mounds, Drumright, and Stroud and the towns with lower than average ratios include Ralston, Davenport, Pawnee, Cleveland, Chandler, Cushing, and Stillwater. It should be noted that the industrial activities are not weighted so the larger industrial facilities such as those found in Stillwater are considered equal to a small welding or metal fabrication shop in this analysis. Weighting the facilities based on employment is not possible because the employment statistics are not available on a city level aggregation scale.

As expected, the ratio of the oil-based activities generally follows a spatial pattern based on the location of the oil fields. The towns that have much higher than average ratios for the oil based activities include Cushing, Cleveland, Drumright, Kiefer, Davenport, and Jennings, but also include Carney, a town not historically identified with oil production. Drumright's location quotient is equal to 5.2, which is substantially higher than the average for the rest of the region, which means that the oil industry is still a vital part of the town's economy. Three oil boom towns, Sapulpa, Terlton, and Oilton, have a notably lower than average

ratio for the oil based services. This suggests that these towns are more diversified than the other oil boom towns.

Demographic Characteristics

The demographic analysis is used to identify some of the social factors that have a bearing on the success of a town in north central Oklahoma. This portion of the study is composed of two parts. The first part of this analysis compares the differences between the racial, income, housing, and workplace locations of the residents in a town that experienced an oil boom and those that did not. The second part of this analysis uses a Stepwise Regression to determine which social variables and amenities are important characteristics of a town's ability to survive in the modern urban system.

Demographic Comparisons

There are only a few substantial differences found in the modern demographic characteristics between towns that experienced an oil boom than those that did not. With the small number of towns located within the study area, the significance of these differences is low. There are twelve Class A towns used in this analysis and five of these are boom towns. The size of the Class A towns varies considerably so some of the demographic differences may be caused by size-based patterns. There are sixteen Class B towns and six are boom towns. There are also sixteen Class C towns and five of these are boom

towns. Proportionately, there are more surviving boom towns found in the Class A division than are found in the Class B and Class C divisions.

The first group of social variables used in the analysis includes the basic demographic variables of total population, race, and sex. These statistics are presented in Table 6.2. The population comparisons reveals that the population between the boom towns and non-boom towns is relatively even across individual economic town classifications. However, the average for Class B boom towns is slightly higher than the non-boom towns. There are only slight differences found between the racial composition of the towns and they are not consistent across the economic town classifications. Also, there is no pattern to the differences found in the male to female ratio between the boom towns and non-boom towns.

TABLE 6.2 - Population and Racial Comparison

Towns			Population			Racial Composition						Sex	
Town Class	Oil Boom	n	Total	Average	Ave HH Size	White	Black	Indian	Asian	HI/Pacific	Other	Male	Female
A	Y	5	37553	7511	2.56	79.9%	4.7%	8.7%	0.2%	0.0%	1.0%	49.0%	51.0%
A	N	7	53202	7600	2.49	82.2%	4.3%	5.6%	3.6%	0.0%	0.9%	49.8%	50.2%
B	Y	6	5293	882	2.58	84.5%	2.5%	7.2%	0.2%	0.0%	1.0%	47.5%	52.5%
B	N	10	6594	659	2.53	84.6%	0.6%	10.0%	0.1%	0.0%	0.7%	48.5%	51.5%
C	Y	5	607	121	2.84	90.0%	1.5%	5.8%	0.0%	0.0%	0.0%	47.6%	52.4%
C	N	11	1289	117	2.58	86.3%	0.7%	5.7%	0.5%	0.0%	0.4%	48.1%	51.9%

The second group of social variables used in the analysis consists of the income based statistics. The average income shows only some variation between the Class C towns, with non-boom town residents averaging just over $2,500 more than the residents in the boom towns. This is likely related to the differences shown in the income breakdown since 2.5% more residents in non-boom towns are in the group that made more than $100,000. It appears that this is a result of several developments around Lake Keystone that are classified as Class C towns because they have only limited commercial activities. The

residents that fell into this income class likely work in the Tulsa area. One income based statistic that is relatively dissimilar across the different sized towns is the percentage of residents on some form of public assistance. The number of people who received assistance is at least 2.2% higher for residents of boom towns than compared to residents of non-boom towns.

TABLE 6.3 - Income Comparison

Towns			Average	Income Breakdown				Other Income	
Town Class	Oil Boom	n	Income	<25K	25K-50K	50K-100K	>100K	Public Assistance	Retirement
A	Y	5	$29,061	42.1%	33.9%	19.7%	4.3%	5.9%	15.8%
A	N	7	$29,309	47.8%	27.4%	19.0%	5.8%	3.3%	12.1%
B	Y	6	$24,593	47.2%	34.4%	16.6%	1.8%	8.0%	12.6%
B	N	10	$24,201	46.4%	35.8%	16.2%	1.5%	5.8%	15.7%
C	Y	5	$26,221	46.3%	30.4%	21.5%	1.9%	7.5%	10.3%
C	N	11	$28,766	44.8%	30.2%	20.6%	4.4%	4.8%	17.6%

The third group of social variables used in this analysis consists of statistics that represented the housing characteristics of the towns. Owner occupied homes are more numerous in Class A boom towns than what is found in non-boom towns. This seems like a large difference but it is partly the result of the high number of rental homes located in Stillwater because of Oklahoma State University. This may also be responsible for the difference found in the average rental price among Class A towns but the average rent is consistently lower for homes in the former boom towns compared to the non-boom towns for all size classifications. Home value, the percentage of full kitchens, and full plumbing are also all lower in boom towns than non-boom towns for all town size classifications. The differences between the Class B boom towns and non-boom towns are much smaller than those found between the Class A towns and Class C towns and this was somewhat surprising given that they have the largest difference in average population.

TABLE 6.4 - Housing Comparison

Towns			Ownership			Rent	Qualtiy of Life			
Town Class	Oil Boom	n	Owner Ocupied	Renter Ocupied	Vacant	Average	Rooms	Value	Kitchen	Plumbing
A	Y	5	61%	28%	11%	$270	5.3	$66,233	97.3%	97.9%
A	N	7	44%	47%	9%	$388	4.9	$85,166	98.8%	99.1%
B	Y	6	61%	27%	12%	$207	5.0	$43,154	95.7%	97.7%
B	N	10	62%	24%	14%	$216	5.2	$46,391	98.2%	98.9%
C	Y	5	65%	14%	21%	$131	4.9	$29,341	88.7%	91.8%
C	N	11	71%	12%	17%	$186	5.3	$61,762	95.0%	96.0%

The fourth group of social variables used in this analysis is related to the workplace locations of the residents and the amenities offered within the towns. A large difference is found in the travel time required to reach the workplace of the residents in the larger sized boom towns compared to those in larger sized non-boom towns. This is related to the percentage of residents that worked in the town where they resided, which is much lower for the larger sized former boom towns. Both of these characteristics are reversed for the medium and smaller sized towns. The total number of current economic activities within a town is slightly higher on average for the boom towns than the non-boom towns. This seems in contrast to the assumption that an explosive economic boom is damaging to the long-term economic outlook of a town. The number of amenities offered within a town is also slightly higher for the boom towns than compared to the non-boom towns, especially for the larger centers. The higher number of parks and recreation centers suggests that there is an active effort to improve the sense of community within the towns. The fact that all former large boom towns have an active Chamber of Commerce likely helps them maintain their current economic importance.

TABLE 6.5 - Workplace and Town Amenities Comparison

Towns			Drive Time in Minutes				Workplace	Activities		Average Town Amenities				
Town Class	Oil Boom	n	0-15	15-30	30-45	45+	In Town	Total	Average	Cbr of Com	Library	Park	Museum	Rec Center
A	Y	5	44%	27%	16%	12%	41%	2129	426	1.0	1.0	5.0	0.6	8.2
A	N	7	66%	20%	6%	8%	75%	2869	410	0.7	1.0	4.4	1.0	6.3
B	Y	6	30%	30%	22%	18%	19%	272	45	0.3	0.2	1.0	0.2	0.8
B	N	10	24%	27%	32%	17%	16%	447	45	0.1	0.3	0.7	0.1	0.7
C	Y	5	13%	40%	14%	33%	9%	28	6	0.0	0.0	0.2	0.0	0.6
C	N	11	11%	29%	30%	30%	3%	30	3	0.0	0.0	0.6	0.0	0.7

It is not possible to determine which type of town had a higher survivability rate because the oil booms occurred at different times so a standardized time on which to base the comparison can not be selected. Of the 16 surviving boom towns, only four were started because of oil exploration. Considering that there are 32 settlements identified in the study area that originated because of oil, the overall survival rate of these towns is quite low.

Stepwise Multiple Regression

A Stepwise Multiple Regression Analysis is used in the second part of the demographic analysis. The SPSS 16.0 Regression Model selected three variables that significantly improved the F score by a value of .05. The first variable selected is the percentage of the population that worked in the same town in which they lived. The second variable selected is the percentage of the homes that were renter occupied. The third variable selected is the average household size. The fourth variable selected is the number of parks within a town. These variables led to the removal of the percentage of the population that worked in the same town in which they lived. Another variable, the percentage of the population under 65 in a town is selected as the new fourth variable. This caused the average household size statistic to be removed from the model. The

Regression Model Summary is provided in Table 6.6. The model produces an R^2 of .814 and an adjusted R^2 of .798.

TABLE 6.6 - Regression Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.801[a]	.642	.632	...	.642	62.771	1	35	.000
2	.844[b]	.712	.695	...	.070	8.257	1	34	.007
3	.874[c]	.764	.743	...	.052	7.341	1	33	.011
4	.893[d]	.797	.772	...	.033	5.150	1	32	.030
5	.889[e]	.790	.771	...	-.007	1.081	1	32	.306
6	.908[f]	.825	.803	...	.034	6.297	1	32	.017
7	.902[g]	.814	.798	...	-.010	1.871	1	32	.181

a. Predictors: (Constant), worklive

b. Predictors: (Constant), worklive, rentocch

c. Predictors: (Constant), worklive, rentocch, avehhsz

d. Predictors: (Constant), worklive, rentocch, avehhsz, park

e. Predictors: (Constant), rentocch, avehhsz, park

f. Predictors: (Constant), rentocch, avehhsz, park, popudr65

g. Predictors: (Constant), rentocch, park, popudr65

h. Dependent Variable: logbuist

The final Stepwise Multiple Regression Analysis produces the following standardized equation to predict the size of a town:

$$\text{Log (\# of Activities)} = .512\ (\%\text{Rental}) + .392\ (\text{\# of Parks}) - .311\ (\%\ \text{under 65}) \quad (6.1)$$

The stepwise multiple regression analysis coefficients are provided in Table 6.7.

TABLE 6.7 - Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	.839	.126		6.659	.000	.583	1.094					
	worklive	3.227	.407	.801	7.923	.000	2.400	4.054	.801	.801	.801	1.000	1.000
2	(Constant)	.393	.193		2.037	.049	.001	.785					
	worklive	2.047	.553	.508	3.701	.001	.923	3.171	.801	.536	.341	.449	2.227
	rentocch	3.174	1.104	.395	2.873	.007	.929	5.418	.772	.442	.264	.449	2.227
3	(Constant)	3.759	1.255		2.995	.005	1.206	6.312					
	worklive	1.249	.587	.310	2.128	.041	.055	2.443	.801	.347	.180	.336	2.976
	rentocch	3.254	1.014	.405	3.208	.003	1.190	5.318	.772	.488	.271	.449	2.229
	avehhsz	-1.255	.463	-.298	-2.709	.011	-2.198	-.313	-.683	-.427	-.229	.590	1.695
4	(Constant)	3.566	1.186		3.008	.005	1.151	5.981					
	worklive	.639	.615	.159	1.040	.306	-.613	1.892	.801	.181	.083	.272	3.678
	rentocch	2.911	.968	.362	3.007	.005	.939	4.882	.772	.469	.240	.438	2.284
	avehhsz	-1.152	.439	-.274	-2.624	.013	-2.046	-.258	-.683	-.421	-.209	.584	1.713
	park	.080	.035	.271	2.269	.030	.008	.152	.752	.372	.181	.446	2.244
5	(Constant)	4.039	1.096		3.684	.001	1.808	6.269					
	rentocch	3.429	.831	.426	4.128	.000	1.739	5.119	.772	.584	.329	.596	1.678
	avehhsz	-1.336	.402	-.317	-3.322	.002	-2.154	-.518	-.683	-.501	-.265	.697	1.434
	park	.096	.032	.325	3.024	.005	.031	.161	.752	.466	.241	.551	1.816
6	(Constant)	6.338	1.370		4.628	.000	3.549	9.128					
	rentocch	3.814	.786	.474	4.851	.000	2.213	5.415	.772	.651	.359	.573	1.745
	avehhsz	-.637	.466	-.151	-1.368	.181	-1.586	.312	-.683	-.235	-.101	.448	2.233
	park	.103	.030	.348	3.472	.002	.042	.163	.752	.523	.257	.546	1.831
	popudr65	-4.894	1.950	-.234	-2.509	.017	-8.867	-.921	-.400	-.405	-.186	.628	1.593
7	(Constant)	5.986	1.363		4.392	.000	3.213	8.758					
	rentocch	4.115	.765	.512	5.382	.000	2.560	5.671	.772	.684	.404	.622	1.608
	park	.116	.028	.392	4.090	.000	.058	.174	.752	.580	.307	.611	1.637
	popudr65	-6.490	1.584	-.311	-4.098	.000	-9.712	-3.268	-.400	-.581	-.307	.977	1.023

a. Dependent Variable: logbuist

Equation 6.1 is not accurate in predicting the number of activities for towns that had little or no economic activity. The most problematic town is Shady Grove, a commuter town located in far southeastern Pawnee County surrounded on three sides by Lake Keystone. The town had a population of 44 in 2000 but has four economic activities: a gas station, an auto repair shop, a marina, and a church, which are all located along US Highway 64. The town has a much higher than normal percentage of renter occupied homes and is located adjacent to Keystone State Park. These factors contribute to its poor predictability with the variables selected in the regression analysis. The distributions of the standardized residuals are shown in Figure 6.9 and 6.10. These graphs show that the residuals follow an approximately normal distribution.

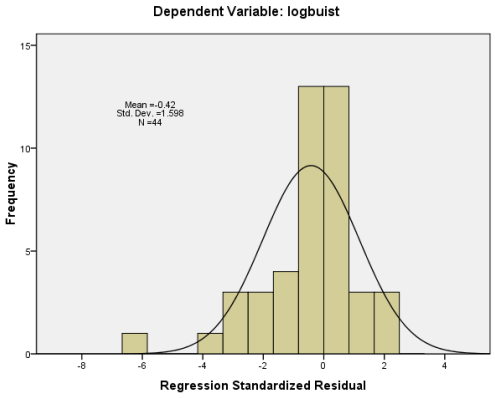

FIGURE 6.9 - Histogram of the Residuals

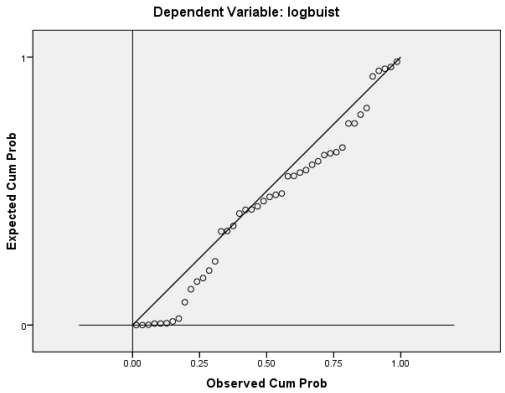

FIGURE 6.10 - Normality Plot of the Residuals

Conclusions

The analysis of the town and population characteristics reveals several traits that are common among the surviving towns within the study area. The boom towns are easy to identify even though the census data were collected

several years after the peak boom had ended and signifies that the declines are not always sharp. It is difficult to tell with certainty how much the eventual declines in population are due to the deterioration of the oil-based economy because the majority of the study area experienced a decline in population during the same period but for a different reason. Most of the towns in areas where oil discoveries were made still have an active oil industry but a few have been able to move away from that sector and diversify. There are demographic differences found between boom towns and non-boom towns but many of the relationships varied between the sizes of the towns. The only major difference seems to be related to home value and the quality of the housing. The Regression Analysis suggests that the number of businesses in a town in the study area could be a factor of the number of rental homes, the number of parks, and an older population.

CHAPTER VII

CONCLUSIONS

Findings

The purpose of this study was to gain a better understanding of the dynamics of change in the small towns of north central Oklahoma. The study has made numerous observations as to the characteristics that were important to the origination, location, and survival of these small urban areas. It was found that there has been a general lack of research on smaller towns and on urban location systems in Oklahoma. Still fewer studies have been made in areas where clusters of new towns were developed around a single industry such as was found in the center of the study area. This study has been completed in an attempt to fill some of the gaps that were present in the current literature on the subject of urban systems.

The initial economic purpose of the towns within the study area can be generalized into one of five distinct possibilities. The first purpose behind the creation of towns was to serve the Native American tribes that were relocated into the study area from their native homelands. These settlements were typically centered on trading posts or the federal Indian Agencies. The second and most common reason for the creation of towns was to serve the local farm

populations. These settlements came in many different sizes and offered an array of different services. The third reason for the creation of a town was to serve as a transportation depot. Many of these towns were developed at a platted townsite, often in conjunction with a railroad company. The fourth reason for the creation of a new town was due to an influx of oil field workers. These workers were often concentrated in a small remote area so new towns were started in order to provide for their housing and commercial needs. The fifth reason that towns were started was a result of highway construction. Highways changed the accessibility and travel patterns of the area's inhabitants, which allowed for the creation of small towns that survived on their added convenience to local residents and travelers.

Four unique spatial systems have been identified in the analysis. The first system involves the towns that originated as central places. The smaller towns within this system tended to cluster around each other and were located away from the larger centers. The second system was generated as the railroads were constructed across the area. The majority of the active towns in this system were located on the railroad. There were only a few towns that could co-exist with the railroad towns provided that they were in the isolated areas far away from the railways. As this system evolved, the smaller towns generally disappeared. The third system of cities was created as the result of major oil discoveries within the study area. These towns were located within the oil fields and tended to cluster around each other. This was made possible in part because of the higher population densities created during this period. As this

system evolved, the smaller centers again had a much higher rate of failure. The fourth system of cities was governed by the location of the highways. The unique system that represented the conditions at the origin of this system could not be accurately determined due to a lack of data. This system of urban organization controls the success and spatial arrangement of the present economic development found in the towns and has had the longest period of any system to evolve. This system is typified by towns that were located on the highway system. No small towns are located in close proximity to the larger cities and many of the smaller towns are located near the simple minimum distance break point along a highway between two larger towns.

The social and economic characteristics important to a town's survival are difficult to determine conclusively but several valid observations have been made. Most oil boom towns are still dependent on oil production as the oil businesses comprise a large percentage of the total number of the towns businesses. The non-profit administrative sector comprises a large percentage of the economy of the smaller and moderately sized towns than in the larger towns. The industrial sector does not seem to have a clear affinity for the large or moderate sized towns. The most significant difference between former boom towns and the non-boom towns is in the housing characteristics. The value and quality of homes found in the former boom towns is typically lower on average than is found in the non-boom towns with the exception of the moderately sized towns. The regression analysis has revealed that the size of a town within the study area can be predicted based on the number of parks, the number of

occupied rental homes, and the percentage of the population under 65. There is a time scale variance in these social characteristic analyses because they use business data from 2008 but population statistics from 2000.

Future Directions

The conclusion of this project has offered the possibility of numerous opportunities for expansion and application of additional analyses. This study only covers a small geographic area and is limited in the number of surviving towns of any type. An immediate opportunity for expansion would be the inclusion of additional counties in the surrounding area. Data from the Oklahoma Territory portion of the state, especially from the census, are easier to find so that would be the most logical direction of expansion. Additional research as to how the settlement rules in place in Indian Territory impacted the location or generation of towns could also be a promising area of investigation.

This study is also limited by the amount of historical data that was available. The data required to do a more in depth study as to the changes found in the economy of small towns might exist but it will require a significant amount of additional effort to establish exactly what businesses are located where and when. This study is focused on the urban system that developed in the thirty year period after the land runs and the modern urban system. The population trend analysis reveals that there is a thirty year period of depopulation and then a thirty year period of recovery that occurred between the historical and modern systems analyzed in this study. While only a few new towns developed,

further research into this intermediate period could provide a more complete picture of the economic evolution of the towns in north-central Oklahoma. With this additional data, the socio-economic characteristics may be able to better predict the survivability of the towns within this area.

The market area analysis that is performed in this study also reveals some interesting trends that may be worthy of more advanced study. The number of instances of a town being located at a simple distance break point is much higher than what was expected because it runs contrary to several more complex theories, such as those presented by Reilly ([1931] 1953), Mulvihill and Mulvihill (1970), and Keane (1989). The lack of smaller centers in the areas that surrounded the larger centers is unexpected because this runs contrary to several other theories, particularly the Central Place Theory. If these trends are significant and hold true in other areas, a new urban locational model could be developed. An unknown amount of error is introduced in the market area analysis since the location of the towns that surrounded the study area is not established in the research. More accurate results could be obtained if the boundary of the towns' minimum distance based market areas did not have to be cut at the study area border. If the next closest Class A, B, and C towns in the area immediately surrounding the study area are identified, the market areas of the towns along the inside perimeter of the study area will better reflect reality.

Several additional analyses could also be completed on the present data. One analysis that is not included in this project is a network based analysis. Transportation has proven to be one of the more important elements in the

survival of town so the inclusion of this analysis may lead to more noteworthy findings. Only a basic regression analysis is performed in this project so the inclusion of additional variables or the elimination of some of the outliers could improve the significance of the findings. The degree of clustering found among the different types of settlements is also not empirically tested. This project evolves a nearest neighbor analysis but the proximity of a new town to an existing town might also yield interesting results.

Concluding Remarks

The creation and survival of small urban places has proved to be a fascinating area of study. These towns were all started for a particular purpose and have followed their own unique pattern of evolution over the last 150 years. Each town represents at least a modest investment of time and money as even the smallest center has at least a few buildings. Some of the surviving towns are able to increase or maintain their economic importance as the result of promotional efforts devised by its residents or businesses. Other towns are started in a favorable location and were placed on a successive series of new transportation routes which connected them to the outside world. A few are even fortunate enough to have been started near an unknown oil field or were started within one on purpose and profited at least for a short time from the extraction of the energy source. However, a great number of the other towns were not so lucky and quickly vanished from the landscape. The failure rate of townsites within the study area is quite surprising at over 75%. Long term economic

survival seems the exception to the rule, which has made the investigation into some of the factors that benefited the communities even more interesting.

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Scope and Method of Study: This study explored the evolution of the historical and current urban economic systems of north central Oklahoma. Of particular interest in this study were the towns that were created or benefited from the development of the five major oil fields found within the study area. The study was comprised of three major components. A historical analysis was used to establish the initial economic basis of every settlement occurring within the study area. Two different spatial analyzes were then employed to evaluate the patterns found within the towns' market areas and the average Euclidian nearest neighbor distances between the towns. Finally, several social and demographic analyzes were completed that compared the characteristics of the surviving oil boom towns with those that had not experienced a similar oil based economic boom.

Findings and Conclusions: This study identified the location and the origin of 205 towns in Creek, Lincoln, Payne, and Pawnee counties. Four unique urban spatial systems were identified. It was found that the smallest centers were the most volatile in the system and that the survivability of a town over the evolution of the spatial system was closely tied to the location of the transportation system. The high population density of the oil fields was found to be the main catalyst in the development of the oil towns but the long term survivability of these towns was also tied to the transportation network. A demographic analysis revealed that the only substantial difference between the surviving oil boom towns and non-oil boom towns was in the housing characteristics. It was also determined that the oil industry was still a vital part of many of the oil boom towns' economies and that only a few oil towns had considerably diversified their economies over the past eighty years.

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