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Analyzing Changes In Rural Town Development And Spatial Morphology: A Case Study Of Lakota, North Dakota, 1908-2018

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ANALYZING CHANGES IN RURAL TOWN DEVELOPMENT AND SPATIAL MORPHOLOGY: A CASE STUDY OF LAKOTA, NORTH DAKOTA, 1908-2018

by

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This thesis, submitted by Kelli Fika in partial fulfillment of the requirements for the Degree of Master of Arts from the University of North Dakota, has been read by the Faculty Advisory Committee under whom the work has been done and is hereby approved.

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This thesis is being submitted by the appointed advisory committee as having met all of the requirements of the School of Graduate Studies at the University of North Dakota and is hereby approved.

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Kelli Kay Fika
December 4, 2019

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ABSTRACT

The face of the many rural towns in the U.S. Great Plains region has changed dramatically. Many towns that boomed in the early 1900s struggle to survive or no longer exist, collectively contributing to the depopulation of the Great Plains. One way to study these changes and understand what influences a rural town's ability to survive is through analyzing its spatial morphology. Spatial morphology includes looking at changes in roads, buildings, and building plots and how these elements work together to shape town form and function. Previous works have focused mainly on applying this technique to urban areas, but I demonstrate here that this technique can be applied to rural towns. I selected Lakota, North Dakota, as a case study. I used historical, geographical, and theoretical methods to examine changes in town development and morphology over a period of 100 years. I also conducted a field study for comparison. The results indicate that the spatial morphology of Lakota has changed a great deal, with those changes driven mostly by changes in the predominant mode of transportation (i.e., a shift from rail traffic to road traffic). One important change in Lakota, and many other Great Plains towns, is a shift of the business district from the downtown area to the town's periphery along a primary road. Rural towns that have survived have continually adapted to changing conditions. Studying spatial morphology is one a tool to manage development, preserve history, and plan for towns that can be sustained into the future.

CHAPTER 1

INTRODUCTION

1.1 Background

During the Great Plains Frontier Era (roughly 1850 to 1900), lands were highly sought after by Euro-American settlers (Hudson 1985). Towns boomed as populations soared. There have been many fluctuations in population since, but in the past decade, rural areas in the Great Plains have generally experienced a steady decline (USDA 2018), although a few Plains towns have grown because of the development of the oil and gas extraction industry. As a rule, however, many rural towns are highly affected by even minor shifts in population, and population is not the only factor in a rural town's ability to survive (ICMA 2010; USDA 2018).

Most rural Great Plains towns have suffered from a diminished tax base as well as a decrease in the availability of jobs (Tweeten and Brinkman 1976; Daniels 1989). This makes it difficult to create growth and makes it challenging to continue to exist. The populations of those towns are also aging in place and there has been a net outmigration, especially by younger generations, to larger towns and cities in the Great Plains and beyond (Tweeten and Brinkman 1976; Daniels 1989, USDA 2018).

In the past, researchers have generally turned away from studying rural areas. There seems to be a popular sentiment that rural towns cannot be saved and that they are stagnant, destitute, and easily forgotten (Whiting 1974; Jakle 1982). Some might argue

this makes them unworthy of research, but actually more research and information are needed as their prominent role in the history of the Great Plains is misunderstood.

Until recently, there has been a shortage of research on many issues facing rural towns even though they face many, if not more issues than urban areas (ASPE 2005). The focus on larger cities is generally because this is where change happens at a more rapid pace, but rural towns are not to be overlooked (EPA 2015). The rural town has experienced a great deal of change, maybe not to the same degree or in the same way as an urban center, but change nonetheless (Scheer 2007; ICMA 2010). Rural towns looked much different even 30 years ago than they do today (ICMA 2010). They have a lot of untapped potential. Some are being used as tourist hubs, retirement communities, redeveloping their downtowns and creating new niche markets, or serving as bedroom communities for commuters who wish for a more peaceful way of life still within a reasonable driving distance (ICMA 2010; EPA 2015).

Though these places may sometimes struggle in terms of population, there is often still a form of government and a strong sense of place that keeps these communities together (Whiting 1974; Tweeten and Brinkman 1976). Rural towns are places of hardworking and resilient people who have found ways to make it through the toughest of times. With all the potential opportunities, they only need to be given the proper tools to be successful (Tweeten and Brinkman 1976; ASPE 2005). For these reasons, it is not impossible to think some of these towns could be brought back to life.

1.2 Purpose

Town development is often explained by times of population growth and economic expansion (Scheer 2007). As technology and ideas change and are accepted, the town form shifts to accommodate these changes (Jakle 1982; Scheer 2007). The streets, the buildings, the plots, all tell a story of different periods in town development (Moudon 1996; Scheer 2007). This is the base of the study of spatial morphology. Trying to understand the reasons these elements change or persist can give clues of why some forms of development have worked and why others have not (Scheer 2007). My purpose is to adapt the ideas of spatial morphology to one rural town in North Dakota: Lakota. I will look at the state of Lakota's development every 20 to 30 years from 1908 to 2018, to determine how the town has been affected by shifts in population, modes of transportation, and other socio-economic factors. I will use the books *The American Small Town: Twentieth-Century Place Images* (1982) by John A. Jakle and *Plains Country Towns* (1985) by John C. Hudson as the theoretical framework of the study. I will also use a number of historical sources to gather my data and information. I will conduct a field study, and perform spatial and morphological analyses using aerial photography and GIScience.

1.3 Research Questions

The questions that I will answer are: How has the spatial morphology of Lakota changed over a period of 100 years? To what degree is Lakota representative of the theories on rural development presented in the two books? How have certain changing factors influenced or shaped the town's form? What can be learned from this information to help plan for the future?

1.4 Research Goals

Not all rural towns desire growth in the form of population, some would rather work on improving the quality of life for their current citizens in order to become more sustainable. My goal is to provide a framework to help rural towns recognize their assets. It could also be used to help them identify what has and has not worked to better prepare for what is to come. Preserving the history, reinventing what is already available, and keeping the sense of place that is unique to rural towns is important.

This study may also help researchers in future endeavors at defining a rural town by looking at the how the town form has been affected by social, economic, and cultural changes. By creating a definition that is not solely based on population, there could be better allocation of appropriate funding and the creation of new services that are more applicable to individual towns.

This is not a study that is meant to be representative of all towns in North Dakota or the U.S. Every town is unique in its characteristics, so it should be up to rural towns themselves what would work best for them (EPA 2015). This is merely an exploratory study to try to provide an analysis of the effects of different factors on a rural town's development, and provide access to information that could help inform a town in making future decisions. It is also meant to show rural towns are worthy of research, and that the principles of spatial morphology can be useful to rural towns as well as urban cities.

My thesis will consist of a review of the literature, an explanation of the methodology and theory used in the research, a discussion of the results, and a conclusion. I expect to find significant changes in the town form through time. I expect

that these changes will coincide with changes in population, transportation, and other socio-economic factors. I also expect elements of the town form to remain mostly unchanged. I predict that all of these will line up with the theories presented in the two books and will give an accurate picture of development in a rural town in North Dakota.

CHAPTER 2

LITERATURE REVIEW

In regards to the literature, firstly, I evaluate several terms and definitions that are important to understanding this study. Second, I review theories behind rural town development and discuss how they apply to North Dakota. Then, I examine spatial morphology and common methodologies used in this type of research. Lastly, I analyze factors that might contribute to rural town growth and decline, and discuss why continued research on rural towns is important.

2.1 What is Small? What is Rural?

Throughout the literature, there seems to be no consensus on the definition of a "small" or "rural" town in the U.S. It is important to understand these concepts because different definitions yield different characterizations of towns (ASPE 2005). Currently, the U.S. Census Bureau defines rural as "all housing and territory not included within an urban area" and "a population of less than 2,500 people" (Whiting 1974; U.S. Census Bureau 2018). The U.S. Department of Agriculture classifies rural as "nonmetropolitan areas of 50,000 people or less" (USDA 2016). This is similar to the term "micropolitan" used by Tweeten and Brinkman (1976), which includes cities of at least 50,000 people that serve as trade centers.

Rural areas are often classified according to their population sizes; however, this is not always a good approach. Much of what is missing from a purely statistical definition of a rural town is the unique relationship between land and place (Daniels 1989). The term "small" could be defined by population or size, but the term "rural" is more subjective and generally means the agricultural landscape or a certain way of life (ASPE 2005). A distinction is needed because the literature often uses the terms synonymously. What is considered small or rural in one area of the country may not be in another area of the country. Not all towns are alike in their location, size, connectivity, economic base, or social conditions (Daniels 1989). A more appropriate definition might be small towns are "incorporated units with distinct forms of government, whereas rural areas "are under county jurisdiction" (Daniels 1989). Therefore, a further breakdown of the definition of the terms "small' and "rural" is necessary.

Of the 53 counties in North Dakota, 39 are classified as "completely rural" by the U.S. Census Bureau, and 39.4 percent of the state's total population live in these counties (ND Census Office 2017). By some definitions, the City of Grand Forks is rural, yet if you asked people who live there, most would likely reject that definition. In fact, the majority of towns in North Dakota only have a population of a few hundred people, a size that causes many to wonder how those towns continue to exist, and yet they have persisted for many decades even after their status as viable trade center has been lost. With all the conflicting definitions, it can be challenging for these towns to find appropriate funding, provide business development opportunities, or make services available to their citizens tailored directly to their needs (Whiting 1974). These factors could be, in part, why small towns stagnate or decline.

In this study, a combination of the Daniels (1989) and U.S. Census Bureau (2018) definitions will be used to define a rural town as a sparsely populated town of 2,500 people or less that is incorporated, has a distinct form of government, and a unique way of life. A place that is unincorporated and has no real form of government would then qualify as a "rural area."

2.2 Rural Town Development and Spatial Morphology

Another important consideration in this type of research is understanding the ideas behind town development. This gives the researcher context and allows for connections to be established (Hudson 1985). A discussion is warranted, as there are many questions that still need to be answered; there is no single theory on rural town development that has been proven correct. Rather, a combination of theories is probably more acceptable in explaining rural town development.

2.2a Central Place Theory:

One of the most recognized theories on town development is Walter Christaller's central place theory. Central place theory set out to explain variations in the number, size, and location of human settlements (Briney 2019). Christaller identified five categories of settlements: hamlets, villages, towns, cities, and regional capitals. By this categorization, the rural towns of North Dakota would most likely fall into the "hamlet" or "village" category. The theory says that businesses will locate "centrally" because farmers need a place nearby to sell, process, and ship their goods. (Hudson 1985; Daniels 1989). It also categorizes towns into those that perform either low- or high-order functions. Low-order towns sell goods that are found relatively frequently over a certain area and are tied to a

population's basic needs, while high-order towns sell more luxury goods that are found relatively infrequently over a given area (Lewis 1979; Daniels 1983).

One of the arguments against central place theory is it does not take into account how functions can and do change over time. Lewis (1979) argues there is a need to add a "time or stage component in the analysis" that would more accurately reflect how certain levels of development can take different forms at different times. Many towns in North Dakota were once vibrant trade areas for farmers, businessmen, and travelers, and had both low- and high-order goods. This is not often the case anymore. With advances in transportation and changes in wealth distribution, people are willing to spend more and travel further, and rural towns have lost their higher-order services to bigger trade centers (Lewis 1979). While it is true rural towns are still home to many low-order functions, they have now declined to a state that makes them almost obsolete as high-order retail centers. Businesses are being abandoned and people are no longer reliant on the rural town for all their shopping needs.

Central place theory also assumes there are no outside forces in control of town development, when in fact most of the towns in North Dakota were developed by railroad companies looking to make a quick profit (Hudson 1985). The spacing, timing, and location of towns was often purely political and based on strategies for traffic dominance (Hudson 1985). People who were going to live in these towns had little or no input into their formation.

This is not to say the theory should totally be discounted. Central place theory does a good job in explaining how many rural towns serve as their population's nearest

trade center. However, there has been research over the past few decades that shows the theory is no longer as effective in explaining town development in the U.S. (Tweeten and Brinkman 1976). Christaller was not able to foresee many of the advances in transportation and technology that have changed rural population's behaviors, so it is a good starting point, but not a complete explanation for rural town development on the Plains (Tweeten and Brinkman 1976).

2.2b Socio-economic factors and Transportation

Towns across the U.S. and elsewhere in the world generally were built to take advantage of their surrounding environment's natural resources (ICMA 2010; EPA 2015). The rural towns of the Great Plains were established on lakes, rivers, and prime agricultural land often near trade routes, because these were the places people felt they could achieve the most financial success (ICMA 2010). Rural towns were originally created for specific purposes, but they have seen many periods of development since their formation.

Town development occurs because new social and economic ideas create change (Lewis 1979; Evans et al. 2005). The goal of development is to create higher incomes and a better way of life and it often coincides with periods of economic expansion (Hudson 1985). In his study of Plains towns, Hudson identified three periods of major development that could apply to North Dakota: the frontier era of trading posts and military forts, the inland town era, and the railroad town era (Hudson 1985). Each period of development was accompanied by a shift in economic and social life (Hudson 1985).

The literature also identifies transportation as an important influence on town development (Tweeten and Brinkman 1976; Daniels 1989; Evans et al. 2005; Rodrigue, Comtois, and Slack 2017). The more changes in transportation have occurred, the more changes to town form have resulted (Rodrigue, Comtois, and Slack 2017). In his study on residential cities in the Midwest, Adams identified four stages of transportation development: the walking and horsecar era, the electric streetcar era, the recreational auto era, and the freeway era (Adams 1970). While Adams' categories were more representative of urban transportation, they could also be adapted to fit rural towns.

I use a combination of Hudson's and Adam's stages, as socio-economic and transportation factors are equally important in analyzing town development. These include four stages that apply to North Dakota's history: the frontier and inland town era, the railroad era, the recreational automobile era, and the highway era. The first era will be analyzed briefly as there was no formal structure to towns, so the main focus will instead be rural town development from the railroad era to present day. Some of the eras overlapped, but each period of development was integral to the establishment of the later phases, and one might not have happened had the previous stages not existed (Hudson 1985).

1.) The Frontier and Inland Town Era

During the frontier era, the area of modern-day North Dakota was a part of what was known as Dakota Territory (Hudson 1985). It had not become a state yet, and there were not many formal towns established. Trade occurred, but it was not at a town center, more likely a trading post, and certainly not to the scale it would be in later years

(Hudson 1985). Military forts were also established during this period at strategic sites along the Plains (Hudson 1985). They served a variety of political and economic purposes and were spread sporadically and far between. This made travel difficult as the main form of transportation at the time was either walking, horseback, wagon, or stagecoach (Adams 1970; Robinson 1995). Military forts in particular needed an easier way to receive mail and supplies, so stage routes were eventually established in North Dakota (Robinson 1995). This made travel a little faster, but the roads were rugged and hard to maintain, and trade continued to be limited (Hudson 1985).

There was also an abundance of land available during this time, and settlers rushed to the territory to be the first to claim it (Hudson 1985). The main businesses during this period were post offices, general stores, and blacksmiths shops (Hudson 1985). The buildings were randomly placed and people only heard about them locally or by word of mouth. The businesses were also not what one would think of in today's terms. They were usually operated out of a farmhouse, and sometimes all three were combined into one establishment run by a "jack of all trades" (Hudson 1985).

A little later, "inland" or "speculator" towns developed (Hudson 1985; Scheer 2007). When word got around railroads were being built in North Dakota, people often tried to establish formal settlements in the hopes of enticing railroad companies to build in their direction (Hudson 1985). These towns often had a number of businesses, but they were not necessarily planned in terms of form or layout. Some of the towns were lucky to have the railroad pass through, some became obsolete when plans for a track were abandoned, and the towns that were bypassed by the railroad often failed (Jakle 1982;

Hudson 1985). The inland towns tried to make a go of it on their own, but the more successful towns were those that had the wealth and backing of the railroad.

2.) The Railroad Era

What people of inland towns did not realize, is that railroad companies wanted to be in control of their own design, so they usually did not establish in places where a town site was already built (Hudson 1985). The railroad was the main driver in town development in North Dakota and changed the whole system of settlement to one that was more deliberate and organized. Towns were evenly spaced at seven-to ten-mile intervals with specific designs that were the result of practice, not necessarily planning (Hudson 1982). These were the town plats. They had gridded streets, rows of rectangles with precise dimensions, and empty lots waiting to be bought (Sun 2013). The plat had an initial layout, but subsequent additions were sometimes added as the town grew (Hudson 1985).

Railroad companies created towns for the sole purpose of maximizing profits off agricultural goods and shipping them to terminal markets (Hudson 1985). The placement of towns was mainly because of the grade a train could pass and the area companies felt would give them the highest amount of goods. It was selfish political and economic motivations that led to these towns being built, but they became the fabric of rural life and the base on which future development would take place (Hudson 1982).

This was only the beginning phase. Companies also hired town promotors to encourage businessmen to move to the towns. The promotors tried to sell as many lots as they could, but once people found out about a newer town down the line, lot sales would

cease. The promotor would then be forced to sell lots to a single buyer, or the town ended up with a collection of empty lots (Hudson 1985). This might explain some of the reasons for the placement of businesses at this time.

There was also more diversity in the amount and types of businesses that were created. Doctor and lawyer offices, banks, livery stables, opera houses, confectioneries, and hotels were commonplace in many Plains towns (Hudson 1982). A Main Street was also developed where a majority of businesses chose to locate and there were more defined paths for traffic.

People had more reason to go to town and used it for much of their daily needs. It became the center of rural social life as well as a place to do business. There were many different classes of people: rich and poor, farmer and merchant, who interacted in a way they never had before. The railroad brought increased traffic in the form of new people every day and new businesses and homes were continuously being built (Hudson 1982).

After the railroad building was completed however, the railroad companies left most things to the locals (Hudson 1982). It was then up to the towns themselves whether they were going to become successes or failures. There were many factors involved, but towns that failed during this time period were ones that could not move on from the small business mentality and remained static, with no good leaders to bring them into the next phase of development (Hudson 1982).

3.) The Recreational Automobile Era

After the railroad, technology began advancing more rapidly and soon the automobile was developed. The automobile greatly changed rural town life in North Dakota because it was more personal. An automobile was a sign of social status that everyone wanted to own. It further defined social classes within a rural town. The amount of land allocated to transportation was far greater in the automobile era and roads were no longer simply for pedestrian traffic (Rodrigue, Comtois, and Slack 2017). Streets had to be widened and improved because cars did not do well on the old railroad era roads (Jakle 1982). The appearance of the rural town began to shift again (Jakle 1982).

Though the automobile created advancements in many rural towns, it also sometimes brought further decline (Jakle 1982). The era was a time of transition, not necessarily progress (Jakle 1982). There were no longer troughs or posts for horses. Businesses of the railroad era such as stables and blacksmiths no longer had a purpose, and new businesses catering specifically to automobiles began to appear (Jakle 1982). People could move faster, travel further, and distances between towns shrank (Jakle 1982; Hudson 1985). The pace of life quickened. People no longer had to remain in their town for business or leisure, they could shop in other towns that offered goods not available nearby (Hudson 1985). This was the beginning of the rural town transitioning from the center for rural life to more of an afterthought.

4.) The Highway Era

More changes followed when rural improvements began in the 1920s and 1930s. A new highway system was constructed in North Dakota that connected towns more

extensively (NDDOT 2017). Valuable infrastructure was created and roads were improved and paved (ICMA 2010). The highway promised more business, more people, and more competition with other trade areas, so much like the railroad, the highway became a big asset every town wanted (Jakle 1982).

The highway was usually on the edge of the town and this changed the whole dynamic of movement (Jakle 1982). Towns that were once oriented to the railroad were now oriented to the highway, so people no longer entered in the center of town (Jakle 1982). Businesses moved to be closer to the highway to take advantage of incoming traffic, and new businesses like gas stations and motels sprang up along the road. Main streets were generally away from the highway, so this caused people to remain at the edge, and the main streets became more dismal and forgotten (Jakle 1982; ICMA 2010). Buildings were also larger, took up more space, and were more spread out (Herr et al. 2005; Scheer 2007). They were also hastily constructed and without much architectural style (Jakle 1982). The rural town lost a lot of its unique character in this era.

During the 1960s and 1970s, rural areas actually grew more than urban areas for the first time in 150 years (Daniels 1989). By 1984 however, "more than half the townsites that railroads platted" in North Dakota were "little more than neighborhood gathering points for local farmers" (Hudson 1985). Rail travel declined severely once the highway was built, and stopped almost completely after 1980 (Hudson 1985). The lines of track still exist in most rural towns, but are currently mainly used for freight purposes.

The highway was also generally built through rural towns that already had rail lines, so it further contributed to rural town disappearance. Rural towns that were far

from the highway did not receive the same amount of traffic, so it was very hard to maintain the same level of business that may have existed previously (Jakle 1982). The highway led to new economic development, but it was not the only important factor and did not guarantee a town's success (Tweeten and Brinkman 1976; Haskins III 2002).

2.2c Spatial Morphology

To know how to plan for the future, researchers must understand a current town's form and the origins of that form (Lewis 1979; Evans et al. 2005). One of the principal ways to analyze these changes is through the study of spatial morphology. A majority of the literature focuses on applying this concept to urban areas, so more work needs to be done applying it to rural areas. Rural towns may change at a slower pace than urban areas, but change is inevitable no matter the town, and much could continue to be learned from using this methodology (Evans et al. 2005).

Much of the work on spatial morphology is done through case studies. The literature recognizes the importance of case studies in giving detailed rural specific information, or information that is more localized (ASPE 2005). However, the literature also notes researchers need to work on creating studies that are more generalizable to a greater number of rural towns (Daniels 1989; ASPE 2005). Current morphological studies are also more focused on applying tools and techniques, rather than analyzing the theories behind how towns form and making connections (Daniels 1989).

Every town is different, so it is hard to come up with an all-encompassing formula that will work everywhere (Daniels 1989). Rural towns need to decide for themselves what works best and what does not, and they need to be given the best possible options to

make those decisions. Spatial morphology can help answer these questions and serve as a framework for current and future development (Daniels 1989; Moudon 1996; Evans et al. 2005).

2.3 Common Methodologies

2.3a Urban Morphology

Urban morphology focuses on changes in the settlement form, shape, and pattern over time (Moudon 1996; Topcu and Southworth 2014; Saikia 2015; Mandal, Chatterjee, and Chatterjee 2016). These are almost completely shaped by human forces, except in the instance of natural disaster (Evans et al. 2005; Sun 2013). The literature tends to agree urban morphology is made up of several common elements that comprise the "urban tissue" (Scheer 2007; Saikia 2015). These include plots, buildings, streets, and block patterns (Conzen 1960; Moudon 1996; Topcu and Southworth 2014; Saikia 2015). These elements are the framework for all towns and can only be understood in a historical context because they are continuously transformed (Moudon 1996; Hillier 2010; Topcu and Southworth 2014). There are also elements such as parks and monuments that are equally apart of the urban form, however, remain mostly unchanged through time (Moudon 1996; Scheer 2007).

Analyzing change is important, but sometimes analyzing the forces that create no change is equally as important because it tells a great deal about why certain elements persist (Evans et al. 2005). There also tends to be a hierarchy to these elements in that some experience change faster than others (Hudson 1985; Evans et al. 2005). Buildings are continuously changing ownership, being built or demolished, replaced or redesigned,

so the changes are seen more rapidly than say plots or the street framework (Evans et al. 2005).

The arrangement of morphological elements also reflects the different periods they were created (Gregory and Healey 2007; Hillier 2010; Sun 2013). This can be useful in understanding how towns were influenced by cultural, social, and economic forces, and how these elements worked together to create the current town form (Moudon 1996; Evans et al. 2005; Smith and Crooks 2010; Sun 2013). There are different scales that have been used to study urban morphology (Evans et al. 2005; Topcu and Southworth 2014). Some research has been at a small scale of buildings, streets, or blocks (Herr et al. 2009; Kamalipour and Zaroudi 2014; Vanderhaegen and Canters 2017). These are generally analyzed by shape, spacing, size, materials, or age (Evans et al. 2005; Topcu and Southworth 2014). The elements are interdependent, but are usually analyzed individually (Evans et al. 2005). Other studies have focused more on an entire city or region and how the boundaries and area have been shaped (Smith and Crooks 2010; Sun 2013; Ibrahim and Omer 2014; Topcu and Southworth 2014).

GIScience is currently the preferred method in studying urban morphology, because analysis is much easier and more information can be discovered than with previous methods (Moudon 1996; Gregory and Healey 2007; Hillier 2010; Smith and Crooks 2010). A variety of statistical and spatial approaches have been used. Generally, studies have focused on explaining how the urban form is built and why it was built, exploring how cities should be built in the future, or assessing the impact of past designs

and giving advice on what has and has not worked (Moudon 1996; Evans et al. 2005; Herr et al. 2009).

2.3b Rural Morphology

The literature on urban morphology is extensive, but there is much less research applying the concept to rural towns. There is even less research that looks at the spatial morphology of rural towns over a long period of time, and only a couple studies that have examined rural towns of the Plains. There are two main theoretical bodies of research on rural town morphology that will be the base of this study. Neither study used GIScience, because it was not yet a common tool at the time the research was conducted, so the hope is to use GIScience to further the previous work and test the theories presented.

The principle study on rural town morphology is *Plains Country Towns* by John C. Hudson (1985). Hudson studied rural towns in North Dakota up until the railroad era. He came up with several theories of why rural Plains towns existed and why some may have failed. He defined his research as a division of different variables including: people, activities, and structures that were set in a context of time and place (Hudson 1985). Similar to studies of urban morphology, he noted how the rural town form was both the result of and influence on human activity (Hudson 1985).

In the book, Hudson also argued that while railroad town plats were lacking in design and originality, there were three main morphological types that could be identified (Hudson 1985). These were the symmetric, orthogonal, and t-town (Fig. 1; Hudson 1982; 1985). The negative of this study is it lacked an in-depth morphological analysis of individual elements, and it also did not look extensively at how transportation and other

factors affected rural towns beyond the railroad era. These issues will be addressed in the current study.

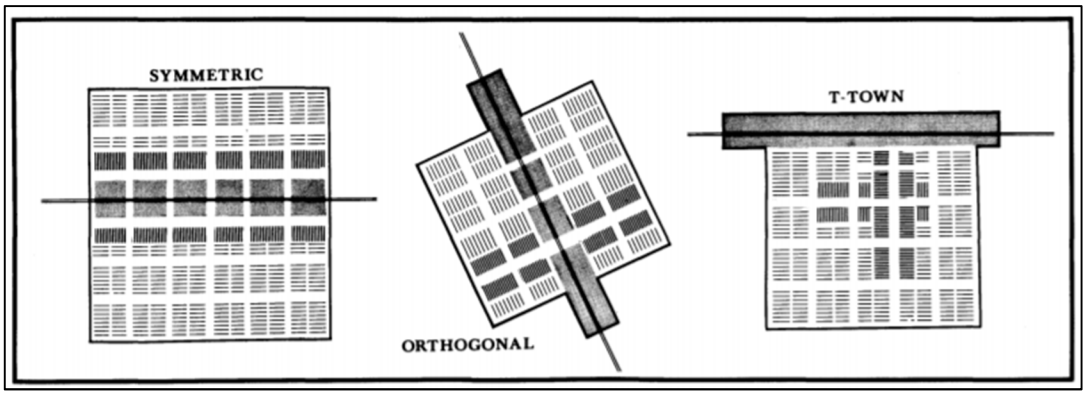


Figure 1: Railroad town morphologies from Hudson's *Plains Country Towns* (1985)

Post railroad era, the main body of work I found on rural town morphology was *The American Small Town: Twentieth-Century Place Images* by John A. Jakle (1982). This book follows a hypothetical layout of a rural town before and after the automobile. The study is more of a generalization of rural towns in America, as Jakle does not use a specific town as a case study. He also does not do an extensive morphological or spatial analysis, but it is a good theoretical framework that shows how a rural town may have been influenced by a variety of factors.

2.4 Theories on Growth and Decline

Studying change is important in answering many questions that will help design the towns of the future. Rural towns that do not adapt to change, are generally the ones that end up failing (Whiting 1974; Daniels 1989). However, there are rural towns in North Dakota that have had numerous setbacks, and even though they are declining in population, they have somehow managed to hold on. Most of the current research focuses

on the success stories, but there is a lot to be learned from the towns that are on the verge of failing too.

There are a number of explanations on what determines rural town success or failure. It is most likely a combination of internal and external forces (Whiting 1974; Tweeten and Brinkman 1976). Internal forces are those such as leadership, community involvement, initial size, availability of resources and assets, and the determination to grow and prosper (Whiting 1974; Tweeten and Brinkman 1976; Jakle 1982; Daniels 1989; EPA 2015). External forces are those such as political entities and politics, county seat status, natural disasters, advances in technology and transportation, and sometimes pure luck (Fuguitt 1965; Tweeten and Brinkman 1976; Jakle 1982; Hudson 1985; Daniels 1989; Haskins III 2002). These forces will be analyzed further in the methodology.

CHAPTER 3

METHODOLOGY

3.1 Study Area

The first step to the research was to select a location for my study. For this type of research, a case study was ideal because a more in-depth analysis could be performed. The focus of my study was Lakota, North Dakota (Fig. 2). Lakota is a rural town in Nelson County. The town is about midway between the larger towns of Devils Lake and Grand Forks, and many people travelling between these cities stopover in Lakota for a break. This is one advantage that Lakota has over other towns in the area.

Nelson County is classified as completely rural, and in 2018 the population in Lakota was estimated to be 625 people (U.S. Census Bureau 2019; USDA 2019). Lakota has experienced many periods of population growth and decline, as well as development. The county itself has experienced an overall trend of decline, with many towns that no longer exist (World Population Review 2019). All these factors make Lakota an ideal candidate for analysis, because one purpose of this study is to find out how Lakota has developed and persisted, while similar towns have disappeared.

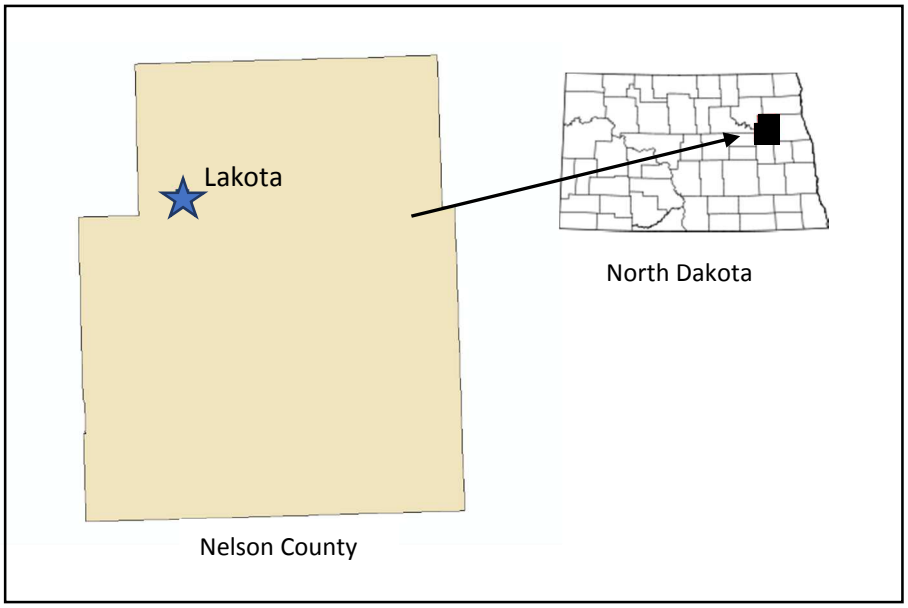


Figure 2: The location of Lakota, North Dakota

3.2 A Brief History of Lakota

Like most towns in North Dakota, Lakota's beginnings can be tied to the railroad. Without the railroad, the town most likely would not have been created. In 1883, the St. Paul, Minneapolis and Manitoba Railroad (later the Great Northern Railway, then the Burlington Northern Railroad, and now the Burlington Northern and Santa Fe Railroad) conducted a survey for an extension of one of their railroad lines from Larimore, North Dakota, to Bartlett, North Dakota (North Dakota State Library 1958). The reasons why Lakota was selected for a townsite are somewhat of a mystery, but the stories say it was mainly political and perhaps a bit of luck (North Dakota State Library 1958).

At the time, many people thought the railroad would go through the towns of Odessa, Wamduska, or Harrisburg further south because these were more "natural

townsites" along the shores of Stump Lake (Lakota Centennial Book Committee 1983). However, it is thought that because of grading issues, it was placed to the north. Lakota also had the good fortune of having two prominent men, James Howard and Francis Kane, who owned the land Lakota was eventually built on (Lakota Centennial Book Committee 1983). Kane was the nephew of George Stephen. George Stephen & Associates bought out the St. Paul & Pacific Railroad in 1879, and he was then president of the new St. Paul, Minneapolis & Manitoba Railroad (Lakota Centennial Book Committee 1983). Stephen had about 40 percent stock in the company, and had international banking ties that were thought to have helped James J. Hill in the building of the railroad (Lakota Centennial Book Committee 1983).

Therefore, it is suggested the town was built mostly in return for financial favors. Howard found the land and Kane asked his uncle to convince Hill to build through it (Lakota Centennial Book Committee 1983). People also thought building a town in Lakota would help convince Governor Ordway to name it as county seat, which he did after the town was established in 1883 (Lakota Centennial Book Committee 1983). In 1885, Lakota was incorporated as a village, and in 1889 it became an officially recognized town (North Dakota State Library 1958; Williams 1966). This is why it is an interesting town to study, because many of the towns along the same line of track had some of the same chances, but are no longer there.

3.3 Data Collection

This type of research required the use of a variety of methods to get the most accurate picture of past and present conditions. I used a combination of theoretical, historical, geographical, and socio-economic sources for my data.

3.3.a Theoretical Considerations

As previously mentioned, some methodology was taken from two books. John C. Hudson's *Plains Country Towns* (1985) was one of the first and only studies that looked at the morphology of rural towns in North Dakota to such an extent. He used many historical sources to compile his research. The main methods I followed from his research were: his analysis of historical sources, the identification of railroad town morphologies, and looking at how different periods of time and different factors have shaped rural town development. The purpose of following Hudson's study was to expand on his research, as he did not go much past the railroad era and did not have GIScience at his disposal. And secondly to show a more concentrated analysis of one town in North Dakota, instead of studying many.

John A. Jakle's *The American Small Town: Twentieth Century Place Images* (1982) also used mainly historical sources to come up with a hypothetical image of a rural town pre- and post-automobile. Like Hudson, Jakle had a hypothesis on how rural towns developed through the influence of transportation and other socio-economic factors, and created several maps to represent these ideas. He never actually tested his ideas on an actual town as it was more of a generalization, so part of the point of this thesis was to test if the hypothetical situations and maps were actually factual. He also

emphasized photography as a way to show how towns change over time, and I adapted this into my methodology.

3.3b Historical Data

Collecting historical data was necessary since this was a study based on changes through time. Historical data are useful in explaining how people once lived, why they made certain decisions, and how towns developed. This type of data can also help in comparing past conditions to present day.

Finding useful historical data was challenging at times, but the records on Lakota were surprisingly well-documented. I found several town histories that were created at the 75th and 100th year anniversary of the town's establishment, as well as a town promotional guide from 1901 (North Dakota State Library 1901, 1953; Lakota Centennial Book Committee 1983). These contained information on particular people, information on businesses, such as when they were created and if they moved at some point, and information on certain events that impacted the town's development. They also contained many photographs. These records were useful in comparing information to the final maps to see if the results matched up.

Another source of historical information was Sanborn fire insurance maps (Fig. 3). Fires were rampant in the early 20th century, so towns needed a way to document their assets in case of loss. Sanborn maps were created to combat this issue (Mueller 2004; Schmidt 2017). The Sanborn fire insurance maps have now become a valuable historical resource as they are full of information on building types, materials, location, number of stories, etc. They have a great amount of detail and are accurately drawn, so

previous studies have used them in studying morphology (Mueller 2004; Lawson 2014; Schmidt 2017). These maps contain no spatial reference because they were hand drawn, however they can be georeferenced to align with aerial imagery. This allows the morphology of early years in town development to be digitized.

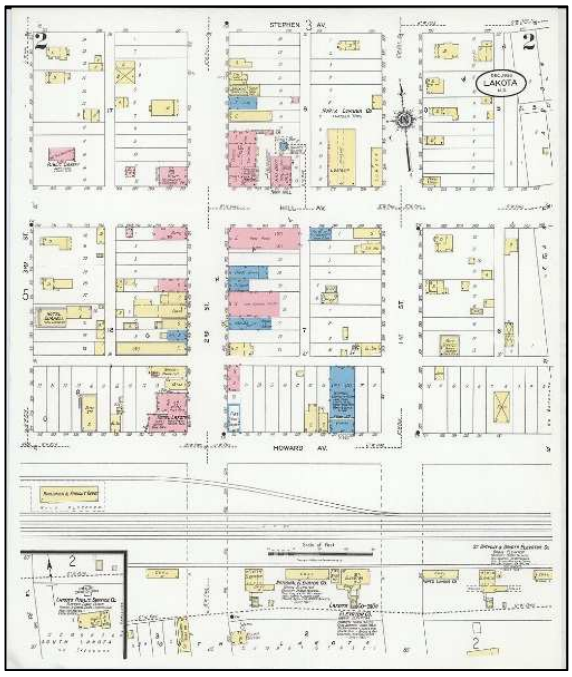


Figure 3: Downtown Lakota on the 1928 Sanborn fire insurance map

Sanborn maps did not exist for many towns in North Dakota because the towns were too small. However, I think because Lakota was a county seat and had an adequate size population at the time, the town was important enough for the railroad and insurance companies to want to document. The Library of Congress had Lakota Sanborn fire insurance maps for 1908 and 1928, so this is the reason those years were chosen (Library of Congress 2019). Many towns do not have these maps after 1930 because updating and keeping the maps became expensive and unrealistic (Schmidt 2017).

3.3c Geographical Data

Since the historic maps extended to 1928, I thought aerial imagery would be a good source in identifying changes in the land after this point. Aerial imagery (Fig. 4) is useful in analyzing land patterns and showing the spatial location of roads, buildings, and plots, all of which are the basis of rural and urban morphology (Holmes 2012). Also, aerial imagery generally has higher resolution than satellite imagery, allowing for more detailed analysis of small areas (Holmes 2012).

After looking through multiple websites, it seemed I would only be able to get images from about every twenty to thirty years. The earliest aerial photograph I could find for Lakota was a black and white image from 1941. Imagery was black and white up until recently, and of course resolution has improved throughout the years, so early photograph details are sometimes hard to see when zoomed in. This is a possible limitation to take into consideration. The other years collected were: 1968, 1997, and 2018. 2018 was the most recent data available at the time of the study.

Figure 4: A comparison of aerial imagery Lakota, North Dakota 1941 and 2018 from ND GIS Hub (2019)

The 1941 and 2018 imagery were taken from the ND GIS Hub (2019) and the other imagery was from Historic Aerials (2019). Both the website's mapping tools allowed the exact town location to be selected, so it was not necessary to clip the images. The aerial imagery has a ground resolution of about 0.5 to 0.6 m (1.5 to 2 feet). The spatial reference was converted to North American Datum of 1983 (NAD83) Universal Transverse Mercator (UTM) Zone14N, which is an appropriate projection for eastern North Dakota.

3.3d Socio-economic Data

Socio-economic data were also collected, because they were suitable for explaining the other factors involved in town development. I first collected population data for Lakota from 1890 to 2018 (US Census Bureau 2019). Then, I collected population data for Nelson County 1890 to 2018 and the whole state of North Dakota from 1870 to 2018 to see if it would match up with the trends seen in Lakota (NDSU 2017; World Population Review 2019). The most recent estimates were from 2018.

3.3e Field Study

After data had been collected, a field study was conducted. This was necessary in order to ascertain whether the maps were accurate, where new structures and roads were located, and to generally get a feel for how the town currently looks and operates. For buildings that were still present, new photographs were taken in the exact location of the old historical photographs to show change or no change. Photographs were also taken looking down Main Street and in the new section of town along the highway. This could be useful documentation for the town and any future studies that may be conducted.

I also completed a walk-through of the business district using the RICEPOTS classification method (Table 1; Parkinson 2014). If this study was focusing on a larger city, using transects to get a sampling of data would probably be a better method, however, because it was a relatively small area, I was able to use this method to classify each individual building. I also used Google Maps and Lakota's town website for further identification purposes (2019).

Table 1: The RICEPOTS classification method adapted from Parkinson's chart (2014)

Code	Building Use	Further Classification
R	RESIDENTIAL	Apartment, Duplex, House, Senior Living, Townhouse, Trailer
I	INDUSTRIAL	Chemical, Heavy Industry, Light Industry
C	COMMERCIAL	Department Store, Food, Garage, Office, Personal, Vacant
E	ENTERTAINMENT	Bar, Hotel, Opera House, Pool Hall, Restaurant, Theater,
P	PUBLIC	Church, City Hall, Courthouse, Library, Public Pool, School
O	OPEN SPACE	Cemetery, Park Pavilion
T	TRANSPORT	Livery, Railroad Depot, Stable
S	SERVICES	Dental, Financial, Insurance, Medical, Service

Next, the categories were further broken down into specific uses such as "food" or "light industry." I mostly followed the given classifications, but added more to match the data. Though there was no field study that could be done for earlier years, the same classification system was used and input into all the attribute tables to ensure consistency. For the earlier years, mostly historical sources were used in identifying businesses, so this

is another limitation as it was not possible to see what was on ground. The Sanborn maps did have their own classification, but this was also adapted for uniformity.

3.4 Data Creation

If data could not be collected, they were created to analyze the morphological and spatial changes. As with urban morphology, there also exists a "rural" morphology of buildings, streets, and plots. I would argue it is almost the same as urban morphology, but on a much smaller scale and not as complex. The morphological data are generally not available for rural areas because they are not widely studied, so I had to create the data myself using ArcMap 10.6 (Environmental Systems Research Institute, Redlands, CA). Every year had a building, road, and plot layer.

3.4a Buildings

To analyze the buildings, the first step was to georeference the 1908 and 1928 Sanborn maps onto the aerial imagery (Fig. 5). Georeferencing requires finding objects and streets that are still present to line the images up, so the 2018 aerial imagery was chosen as the base because this was the most accurate image.

There were some places of the Sanborn maps that were morphed because the maps were hand-drawn, but the majority of it was directly to scale. To combat this issue, some sections were cropped into smaller pieces, so not as much morphing occurred. The images also did not require many control points because this study was on a small scale, so things aligned nicely.

Figure 5: Georeferencing a section of the Sanborn map on top of the 2018 aerial imagery

The transparency of the Sanborn images was also set to 60 percent to make it easier to see the aerial imagery beneath. The buildings were then digitized on top of the georeferenced image (Fig. 6).

Figure 6: 2018 buildings digitized on top of the 2018 aerial imagery

The rest of the years were built off the 1908 and 1928 layers because, presumably, some buildings still existed as time went on. This made digitizing less time-consuming.

The buildings that remained were left the same, new buildings were digitized, and buildings that did not exist in the later imagery were deleted.

After this was completed, information from the Sanborn maps and the field study were added to the attribute tables for each year. This included information such as building type, building use, the year it was built, and if it was new or old. As previously mentioned, there was limited comparison in this data because data for the years in-between were not as readily available.

3.4b Roads and Plots

Roads and plot layers also had to be almost completely digitized. There was some road data found for 2018 from the ND GIS Hub (2019). This layer already contained information, so it was edited minimally, However, the other years had to be created using the aerial imagery and working backward from 2018. Similarly, to the buildings, new roads were added, roads that did not exist anymore were deleted, and attribute data such as road type was updated for analysis. The process for the plot data was exactly the same, except there was no data for any year, so all of it had to be digitized.

3.5 Analysis

Analysis included making numerous maps to depict the changes and development in Lakota throughout the years. These included for example, maps showing the basics of each of the morphological elements, maps showing land use and building data, the street network, or building density. Charts and graphs were also created for population and other relevant statistics. These were compared to each other and changes were noted. The results will be detailed in the next section.

CHAPTER 4
RESULTS

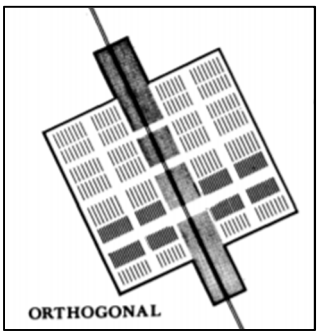
4.1 Testing the Theories

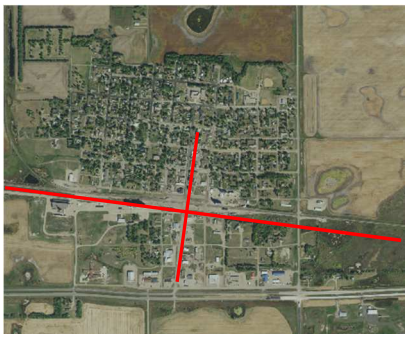
Before getting into the specifics of the study, it was important to test the theories on rural town development and spatial morphology presented in the books.

4.1a Plains Country Towns

In his study of rural towns in North Dakota, Hudson (1985) theorized there were three main railroad town morphologies. These were mentioned in detail in the literature review, but based on the description and images provided, it appears that Lakota is "orthogonal" (Figs. 7-9). In Figures 7-9, it is clear Lakota fits this type of morphology because lots are developed on both sides of the tracks with the main business street running at a 90-degree angle (Hudson 1985). The railroad depot is at the center.

The problem with this design is that one side of the tracks usually developed more than the other, as is the case here, so there became a more natural Main Street and some business people lost out (Hudson 1985). The design also required a railroad crossing, which was more inconvenient and less safe. Townspeople and business owners alike were not in favor of this design, and the "T-Town" later developed as a solution to this issue (Hudson 1985).





Figures 7, 8, and 9: Comparing Hudson's orthogonal morphology to that of Lakota, North Dakota. Railroad morphology from *Plains Country Towns* (1985), Lakota plat map from Historic Map Works (2019), aerial imagery created in ArcMap 10.6

Hudson also described how streets were created with a specific hierarchy. The widest streets were main streets, then cross streets, residential streets, and alleyways being the narrowest (1985). This was meant to emphasize the importance of Main Street and to accommodate for the increased traffic other types of roads did not experience. Lakota's streets also followed this hierarchy.

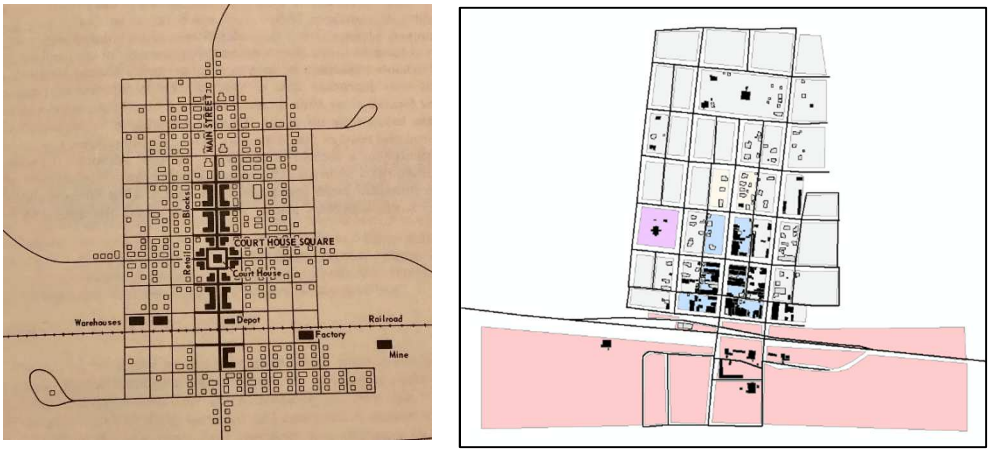
Lakota was platted early and had the advantage of becoming the county seat. Hudson noted these factors as two of the main reasons why some railroad towns were able to sustain themselves. These towns had a longer time to grow, whereas newer towns often struggled to get to the same level (Hudson 1985). They were also likely to be promoted to a greater extent, and town speculators were more willing to create subsequent additions in later years (Hudson 1985). The speculators already knew from the beginning which towns would be successful, or rather, which towns they would make successful. Some towns did not have a chance even from their start.

4.1b The American Small Town

Jakle's 1982 study went more in-depth with a hypothesis on how rural towns changed from pre- to post-automobile. Based on his study of rural town place images, Jakle analyzed the effects of transportation and culture on the changing morphology of rural towns. He then created a series of hypothetical maps to support these ideas.

The first map Jakle presented showed the main business district, industrial district, and courthouse square pre-automobile (Fig. 10). This map most closely resembles Lakota in 1908 (Fig. 11). Jakle started by explaining how the business district, is generally in the middle of the rural town with a courthouse square at its center. The business district, colored in blue in Figure 11, is also in the center of Lakota.

The courthouse was one of a town's most impressive buildings and held a special place of prominence (Jakle 1982). It was given a particular position in the town to represent power and opulence. The courthouse square, colored in purple in Figure 11, functioned as a gathering place and held many town events. Businesses surrounded the square which allowed for increased interaction between townspeople. In Lakota however, the courthouse is off to the side, to give it its own special space separate from the business area. This was apparently a distinction of towns that had county seat status (Jakle 1982).



Figures 10 and 11: A comparison of Jakle's map (1982) of pre-automobile business orientation and Lakota 1908

The industrial sector, colored in red in Figure 11, was mainly situated along the sides of the railroad tracks. This part of town was designed to be practical and utilitarian, not as aesthetically pleasing as the downtown (Jakle 1982). Its businesses dealt with the production and shipment of agricultural products and raw materials. This part of town was devoted almost entirely to the railroad's depot, elevators, and warehouses. The depot was at the center of town because this is where pedestrians entered and exited. The business district was designed to be in close proximity, to make it easy for people to immediately find what they were seeking. Lakota followed this trend closely in the early years. At one point, Lakota had four grain elevators, which was quite impressive for a town of its size (Lakota Centennial Book Committee 1983). A couple of the elevators still remain, but Lakota is not as big of a shipping center as it was in the past.

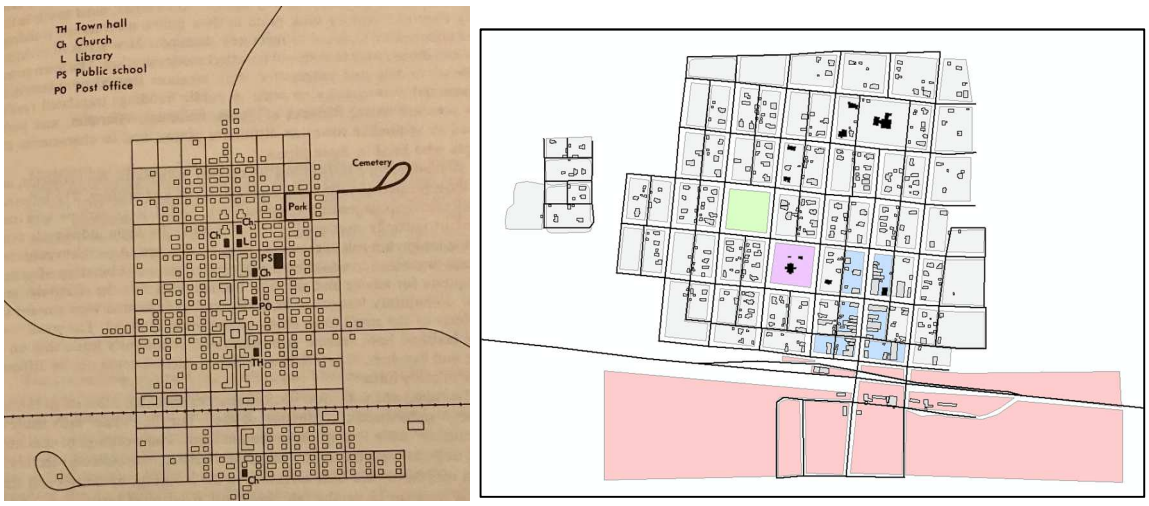
The next map Jakle made was of the rural town's public sector (Fig. 12). The public sector consisted of a town hall, churches, a library, schools, and a post office. These were located a bit north of the business district, but still towards the center for easy access. Rural people used the town for all their daily needs because it was the only trade

center for miles, and in the beginning, travel was done by foot or by horse, so it was important that the public places be near the business district (Jakle 1982).

Jakle's map was meant to represent the public sector pre-automobile, but the map more closely resembles Lakota in 1928 when automobiles were certainly present (Fig. 13). These areas did exist in 1908, but were more clearly defined in 1928, which is why this comparison was chosen.

In Lakota, the school was placed at the end of Main Street, towering in the distance. This created an eye catching visual that drew your gaze all the way to the horizon. The school, like the courthouse square, was given a whole plot to emphasize the importance of education in rural life. It may have also been a bragging point, because many schools in rural towns did not survive or were consolidated. So, if your town was the one with the school, it meant it was successful.

There were also usually several churches. The churches started small and away from the business district, perhaps to keep these two activities separate, but as congregations grew, they too were given more space. The rest of the public buildings were kind of interspersed, but as the imagery shows, all were within close distance to Main Street (Fig. 13).

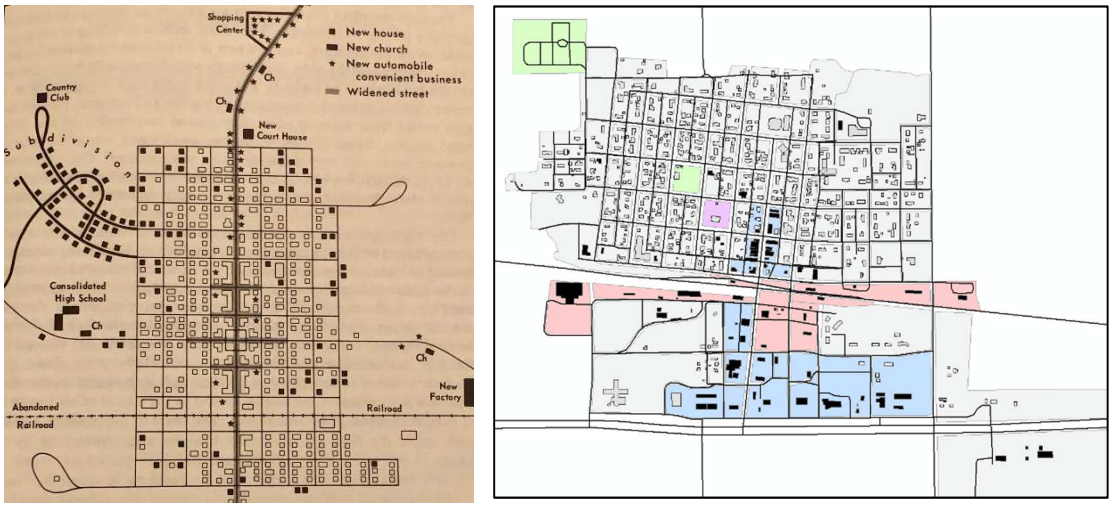


Figures 12 and 13: A comparison of Jakle's pre-automobile public sector map (1982) and Lakota 1928

Jakle's map (Fig. 12) also shows the park and cemetery as a designated area near the periphery of the town. The park and cemetery had specific values, one for relaxation and entertainment, the other for remembrance. The park and the cemetery, colored in green in Figure 13, were often only given a space when lots could not be sold, but in Lakota this was not the case. Though the areas did not have the same look they do today, the park and cemetery were designed into the original plat maps. People enjoyed having these areas of open space that broke up the built area of the town (Jakle 1982). Rural towns may have been small, but it showed the importance of having a few natural spaces.

The final map Jakle (1982) introduced was the orientation of the rural town post-automobile (Fig. 14). This map most closely resembles Lakota in 2018. Jakle argued the automobile had the biggest impact on rural town morphology and changed many aspects of rural life. In Lakota, all the sectors remained mostly unchanged throughout the years, except the introduction of the highway created a new business sector along its edges (Fig, 15). The railroad is still at the center with a less prominent industrial sector, but the highway changed the orientation and movement in town significantly. The newer

businesses that have moved towards the periphery are those catered to newer modes of transport and tourists. These include the gas stations, motels, fast food, and the airport.



Figures 14 and 15: A comparison of Jakle's post-automobile rural town (1982) with Lakota 2018. The businesses are shaded in black.

Looking at Jakle's map, there is similarly a new grade school in Lakota on the north edge of town, and recently, a golf course was created near the airport. Surprisingly though, there are not many new housing developments like one might see in places like the suburbs. There are some newer houses towards the eastern edge, but most of the new housing is intermixed with the old. This may just be because of limited space, or it could also be because population has stabilized enough now, that there is not much need for new residential areas.

Jakle also notes in his analysis that residential areas were generally reserved for the good side of the tracks near the business district (1982). The "other side of the tracks" had less housing and those who lived there were usually of a poorer class or were just passing through (Jakle 1982). To some degree, it appears this is also true for Lakota. The town histories noted a point in the early years where "hobos" set up camp on the south

side of the tracks (Lakota Centennial Book Committee 1983). The hobos eventually had to be physically removed from the area because the townspeople did not want to deal with the problems and stigma associated with their camps (Lakota Centennial Book Committee 1983). There were hardly any houses on the south side of the tracks in the early years, but as time progressed and space became more limited, it appears this area became more desirable.

4.2 Population Trends Explaining Development

There are other factors that can explain how a rural town's morphology changes through time. Another influential factor in development is population.

4.2a Lakota

Lakota's population has never been more than 1,200; however, this does not mean it has not experienced any significant increases (Fig. 16). Increases in population in Lakota have corresponded with times of economic expansion and the invention of new modes of transportation. There was quite a big expansion during the railroad era, 1890 to 1910, because many Midwest towns were developing in this time.

Around 1910, the population was at its height, and this was when Lakota started to become more established. It gradually dropped after the population boom. This was most likely because of the Great Depression that lasted from 1929 to 1939 (North Dakota State Government 2019). Rural areas were some of the hardest hit and North Dakota's rural population was devastated. I think quite a few people in Lakota likely moved to the larger cities to try and find work to support themselves (North Dakota State Government 2019). Once the area recovered a bit through the federal aid programs as a result of the New Deal in the 1930s and 1940s, the population began to increase again (North Dakota

State Government 2019). The New Deal allowed rural areas in North Dakota to acquire much needed aid, and also helped to improve Lakota's infrastructure (Lakota Centennial Book Committee 1983; North Dakota State Government 2019).

The increase in population continued through the 1960s, as people started moving back from the cities in favor of the peace and freedom country living offered (Fig. 16). The 1960s saw an influx of temporary workers in Lakota because of the Cold War (Lakota Centennial Book Committee 1983). Several missile silos were being built in North Dakota and this led to an economic boom for the region (North Dakota State Government 2019). This was particularly evident in Lakota, as the town history notes many of the restaurants stayed open 24 hours to accommodate the temporary workers (Lakota Centennial Book Committee 1983). The workers were building the missile silos and chose to reside in Lakota because the Grand Forks Air Force Base was located a short distance away, near Grand Forks. For the first time, several trailer parks were created, and new businesses and houses began to appear again. The workers were instrumental in keeping the town afloat during this time period (Lakota Centennial Book Committee 1983). After this period ended, most of the workers left for other opportunities, and although there has been continued development, the population has mainly continued to decrease (Fig. 16).

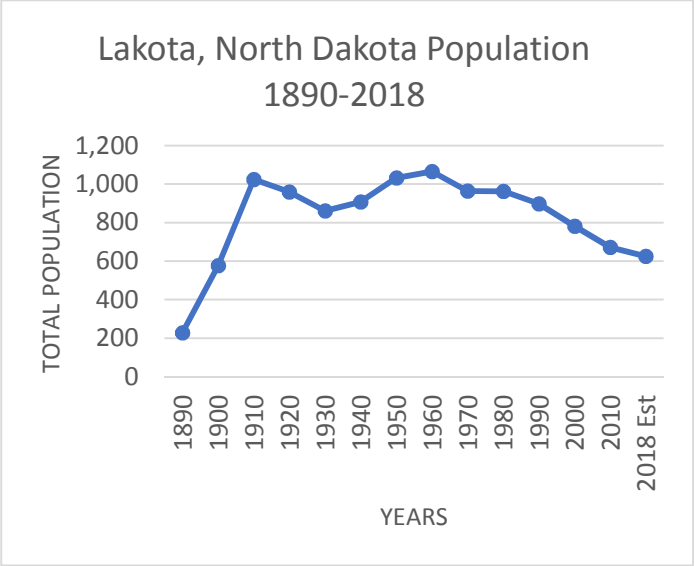


Figure 16: Population of Lakota, North Dakota, from U.S Census Bureau (2019)

4.2b Nelson County

Interestingly, the population of Lakota does not correspond entirely with the overall trend of decline seen in Nelson County (Fig. 17). Like Lakota, Nelson County experienced an increasing population during the railroad era. However, once the railroads left, few towns were able to survive. Many towns had the same advantage as Lakota and some, like Michigan, were along the same set of tracks, yet many quickly declined once the railroad was gone. The construction of U.S. Highway 2 also contributed to this decline, because the towns that were not along the highway had no real chance of surviving. If people could not easily travel to the town, it suffered economically. Another big difference, and this seems to be reiterated in other studies, is the advantage of being a county seat and a political center. Lakota was able to receive more funding and had better ties than many of the other towns. As the political center of the county, it would be hard for it to disappear completely.

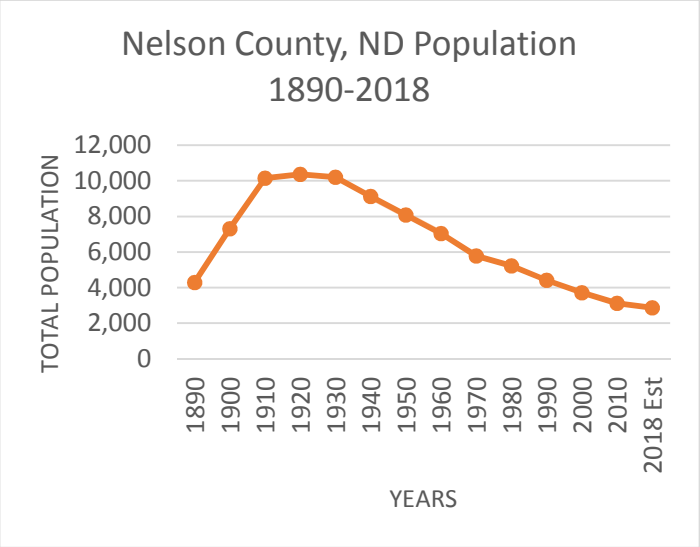


Figure 17: Population of Nelson County, North Dakota from World Population Review (2019)

4.2c The State of North Dakota

When compared to the trends in population with the state on the other hand, both Lakota and Nelson County differ from the 1920s onward (Fig. 18). With North Dakota being almost completely rural, the state depends heavily on agriculture and industry to survive, so it is no surprise the population fluctuates greatly with any changes in these sectors. From around 1940, North Dakota's population appears mostly steady with small increases and decreases throughout the years. Recently however, due to the oil boom and an increase in refugees, North Dakota has started to see increasing population again (SHSND 2019).

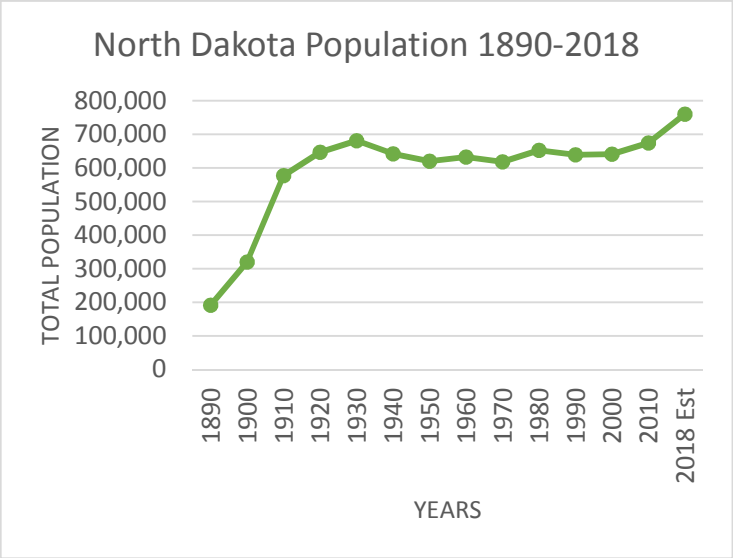


Figure 18: Population of the State of North Dakota from NDSU (2017)

4.3 Buildings

Possibly the most dynamic part of a town's morphology is the buildings. Just like in large cities, the buildings in Lakota changed drastically throughout the years. Buildings appeared and disappeared, businesses moved, owners changed, the architecture became less stylistic and more functional. Studying the buildings of Lakota gives a real sense of the cultural and social influences that led to their development.

4.3a Building Footprints

One of the first steps was to create maps showing building footprints (Fig. 19). The larger footprints are the businesses and prominent buildings such as the school and courthouse. The smaller footprints are housing.

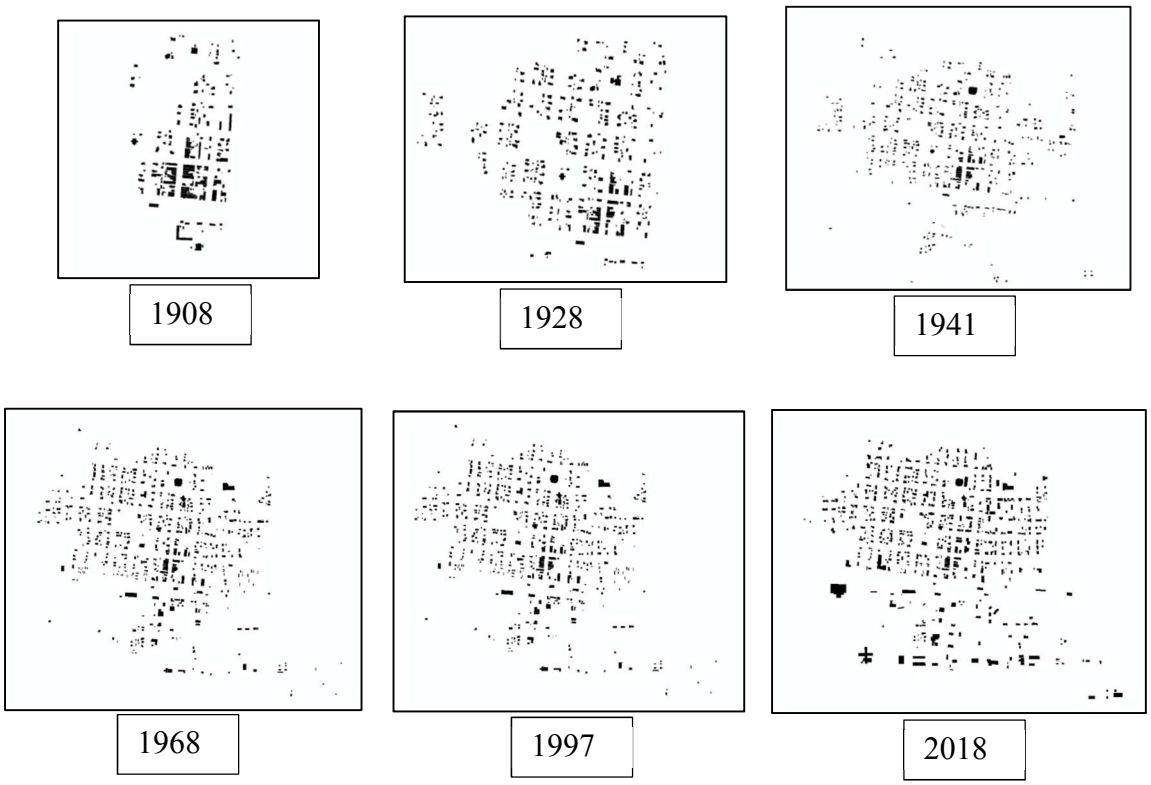


Figure 19: Maps showing changes in building footprints from 1908 to 2018

As evidenced in the maps above, originally there was more of a north-south orientation along Main Street with the railroad at the center. Then, during 1928, the town had to expand to accommodate the increase in population. Buildings were constructed more toward the west side of town and a little bit toward the east, the center remained largely unchanged. The following years saw continued growth toward the periphery in every direction, and toward the middle most of the open spaces were filled in.

In the town's beginning, there were not many buildings on the south side, just mainly those used by the railroad. Clearly U.S. Highway 2 had a large influence on the development of buildings in this area in later years. The center of town is the part that has remained mostly unchanged, and though the downtown is not as prominent as it was in

the early years, there is obviously a reason the townspeople hang on to this area. On the other hand, the north part of town was and continues to be not as developed. This is probably because the land immediately beyond the town is farmland, and therefore, future building in the area hinges on the potential purchase of said land.

4.3b Building Density

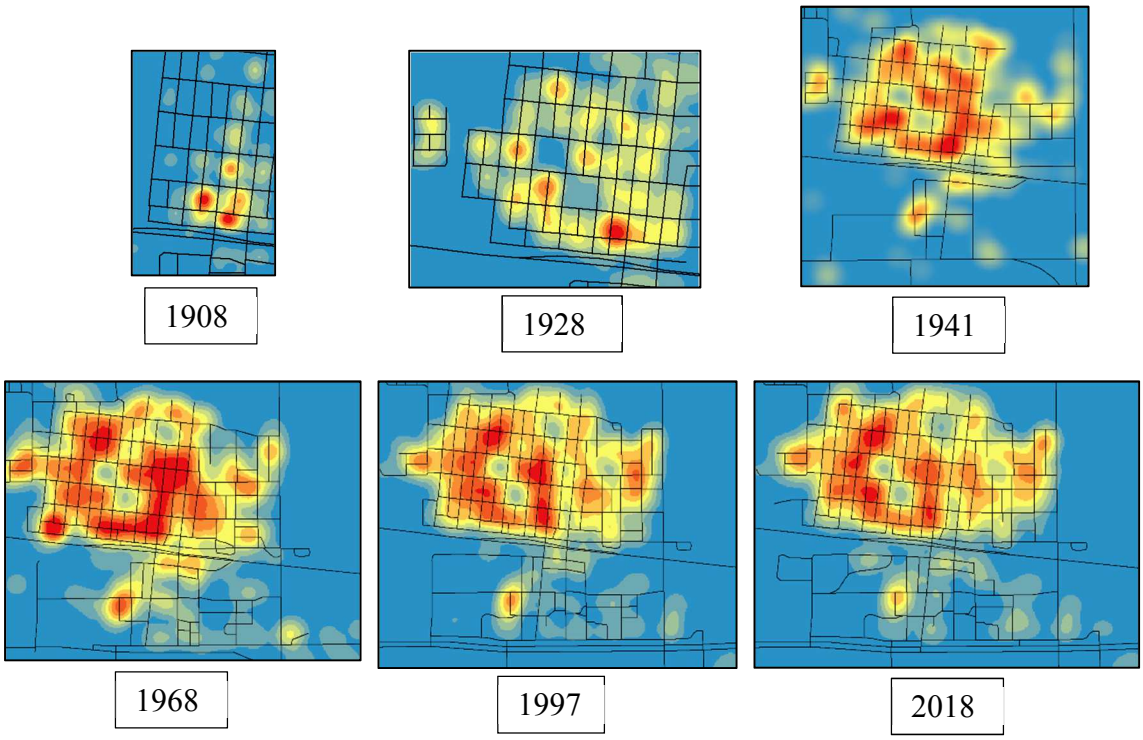


Figure 20: Maps showing changes in building density from 1908 to 2018. Red indicates high density and blue indicates low density. The black lines are roads.

The next part of the morphological analysis was to create building density maps (Fig. 20). This was necessary to show where the highest concentrations of buildings were located. ArcMap 10.6 was used to convert building polygons into points, and then the Kernel Density tool was used to create the heat maps. From a planning standpoint, this gives a better visual representation of where development is occurring. The red indicates the places with the greatest concentration of buildings or an increase in development. The

blue indicates where there are spaces in development, or where buildings were removed. The yellow is in between these measurements.

In 1908, there is a hotspot right where the downtown is located because this is where a majority of businesses chose to set up shop (Fig. 20). There was not much of a residential district during this time, because most of the people were trying to get ahead of the railroad to try and get their businesses started. In 1928, the downtown area continues to show up as a hotspot, but there is more activity where the residential areas were being developed because people were starting to buy lots and settle in the town permanently.

In 1941, there was a large increase in buildings in the residential areas as the town continued to grow. The downtown still remained a hotspot for businesses. This continued into 1968, but the red areas increase to a greater level. As previously stated, during this time period there was a huge boom in population, so housing increased dramatically. The southern part of town also became more developed as businesses moved to be closer to the highway. By 1997, there was another exodus of a portion of the population, and some of the buildings were removed, so this would explain a small decrease in building density. After this time period there is not much difference, although there is a slight increase in building density towards the eastern half of town. The southern part of town will most likely continue to be developed in the future, because this is the area where most of the space and land currently exists.

4.3c Building Development

Next, the total number of buildings was calculated using ArcMap 10.6. Analyzing these changes can help explain some of the results seen in the building density maps, and can be another indicator for development (Fig. 21).

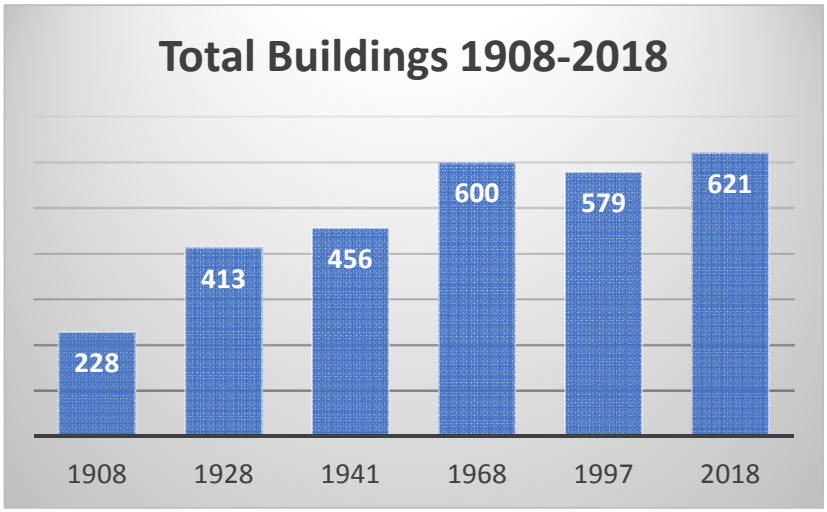


Figure 21: Total Buildings in Lakota, North Dakota, 1908 to 2018

There are two notable increases in buildings in 1928 and 1968. These years correspond to changes in population. In 1997, there was a little bit of a decrease. I was not able to find much information on this because the latest town history book did not provide this information. However, I am assuming maybe it is because of the loss of temporary workers who lived in Lakota in the 1960s. It could also possibly be because the City was actively removing buildings that were no longer viable, because in 2018 you see another increase when new apartments, businesses, and houses appear to replace what was removed.

It was also important to know how many buildings were either removed or were destroyed each year. Some of the reasons behind these results are natural, while others

are the result of deliberate decisions. The town experienced several large fires. One in 1914, one in 1925, and another in 1945. In fact, the town history states that the fire in 1914 wiped out almost the entire southeast portion of the business district (Lakota Centennial Book Committee 1983). In some places, if people could afford it, they rebuilt. Otherwise, people may have moved to a different town or different location. I wanted to see if the data could corroborate these claims.

When looking through the maps, the data seems to line up. The Sanborn map of 1928 shows a large portion of the southeast business section gone, with one building listed as "vacant" and "ruins". Table 2 shows the percentage of buildings that were removed during each time period.

Table 2: The percentage of buildings removed by each time period

Time Period	Total Buildings Removed
1908-1928	49%
1928-1941	33%
1941-1968	45%
1968-1997	49%
1997-2018	11%

I did not expect there to be so many buildings removed or destroyed within every 20 to 30 years. Almost half of all buildings in Lakota were removed or destroyed in three of the time periods. The only exception was 1997 to 2018, when only 11 percent of buildings were removed or destroyed. Perhaps this is partially because of better building

materials that are more fire resistant, or perhaps it is just because there has been less development during this time period, or fewer events that contribute to building loss.

Buildings removed only explained half of the building development seen in the maps, the other half were buildings constructed each year. These data, along with the buildings that were removed or destroyed, represent the total buildings seen in each time period. Figure 23 shows this data, beginning in 1928 because 1908 was the base year.

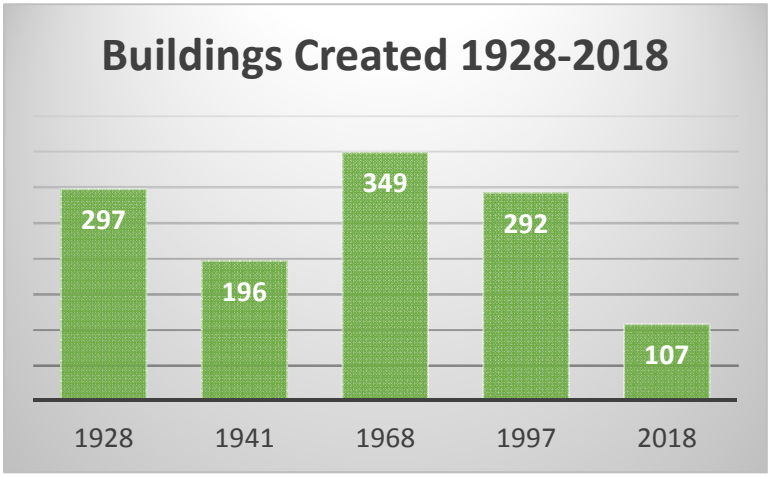


Figure 22: New buildings created in Lakota from 1908 to 2018

This gives a better indication why there is an increase in total buildings in 1928 and 1968. Apparently in 2018 there have not been many buildings either removed, destroyed, or created, indicating a decrease or stagnation in development.

4.3d Business Types

Analyzing business types as a part of morphology, can also help to explain reasons behind development. The types of buildings are more a reflection of rural culture at the time and how it is influenced by transportation.

In the railroad era, businesses were mostly geared toward the horse and railroad travel. So, you see a lot of livery stables, railroad depots and elevators, and hotels. The

hotels were built to serve many of the incoming travelers. Lakota actually experienced a great deal of passenger traffic because it was one of the main destinations between Grand Forks and Devils Lake. This is something that has not changed today, but certainly the amount of people is not the same as it once was, and it has become more of a pit stop, rather than a destination.

The stores in the railroad era were also a lot more diverse and specialized. There was an opera house, a confectionery shop, several hotels, a millinery, and general stores. Many of these businesses were close together to allow for walkability. When the car came into being, this was no longer the case.

When the automobile was introduced, immediately things began to change. The stores changed from being dedicated to horses, to being dedicated to the automobile. The livery barns and stables either converted into businesses such as gas stations and car repair garages, or they were completely removed. It took a little while for the automobile to catch on, but it soon became one of the cultural forces that had the greatest impact on rural morphological design. In fact, Lakota embraced the automobile to such a degree that it was once the central hub for several automobile dealerships in North Dakota (Lakota Centennial Book Committee 1983). In some ways these changes were good because it brought a lot of business to Lakota, but in other ways it only led to further decline.

Today, the new businesses also represent the current culture. The businesses along the highway represent the desire to have everything fast and immediately available. There are now more businesses dedicated to leisure such as the golf club and community center. With the invention of aviation and the help of the Works Progress Administration,

Lakota was lucky enough to secure an airport in 1934 (Lakota Centennial Book Committee 1983).

The housing is also more diversified now than any previous decade. There are trailers, houses, apartments, townhouses, and senior living centers. The senior living centers represent the current state of rural towns as their populations age and seniors are in need of continued care. For a town of its size, Lakota is remarkable in its variety of businesses and they continue to add more to improve the way of life for their citizens.

4.3e RICEPOTS Classification and Use

A field study was also necessary to test out the hypotheses and relate what was seen in the maps to the actual situation in real life. Through my field study, I decided to use the RICEPOTS classification method to identify all the individual businesses in town that were currently present (Fig. 23; Parkinson 2014). I also used Google Maps and the City of Lakota website (2019) to further identify things that I may have missed in my walk through, though I tried to be as thorough as possible.

The RICEPOTS letters stand for: residential, industrial, commercial, entertainment, public, open space, transport, and service. Residential would be houses, commercial is businesses devoted to the sale of goods, industrial is businesses devoted to the creation of goods. The entertainment category includes things such as theatres, hotels, and restaurants. The public category is things such as schools and courthouses. Open space would be anything related to a park or cemetery. Finally, transport is businesses whose sole purpose is based on transportation, and services are those such as medical facilities or financial institutions.

I also used this classification on the earlier years as well to have consistency and allow for comparison of the data. The Sanborn maps were detailed in naming each business, so it was not difficult to extract this data. For the years in between, I used the Lakota histories to identify businesses. They had a lot of photos and historical information, but there was no physical data to back this up. Therefore, it should be considered a limitation, as the data for 1941 and 1968 is only as accurate as possible based off the information that was found in the histories.

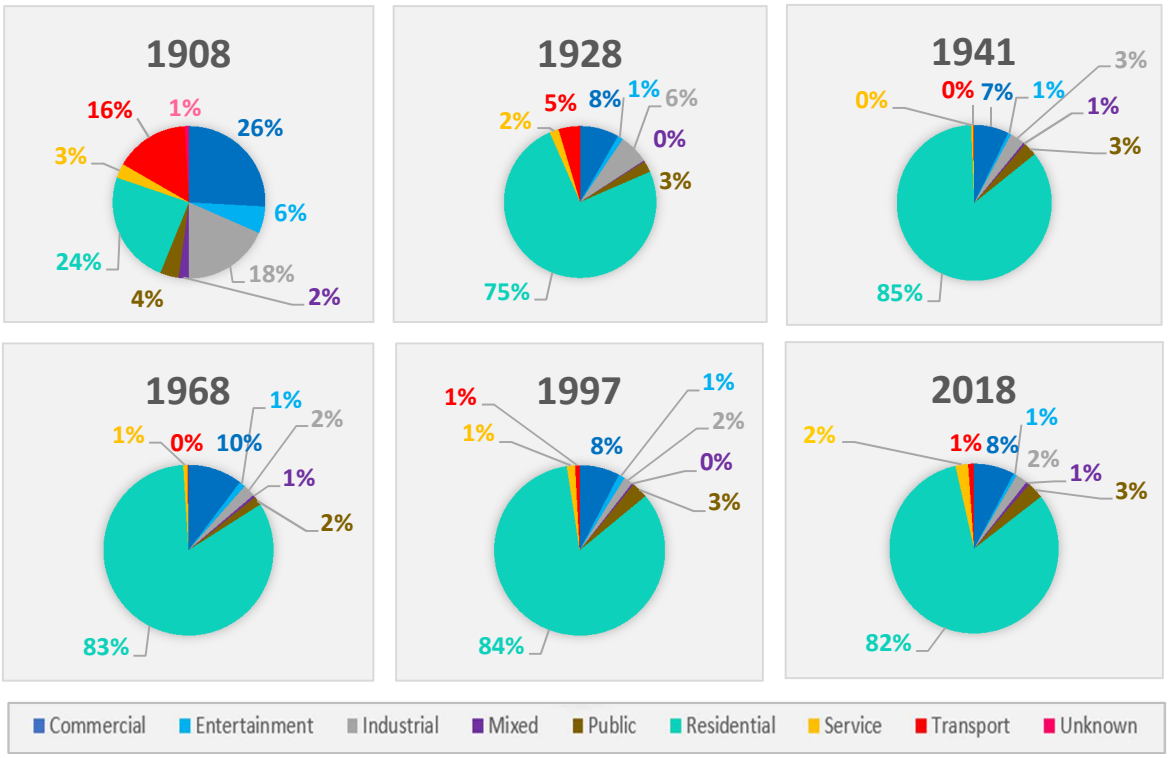


Figure 23: Pie charts showing the percentage of each RICEPOTS category for specified time periods

In 1908, there was a diverse mix of building uses. There was a larger industrial sector that included paint, lumber, coal, grain, and the railroad. There was also a greater percentage of mixed-use buildings than following years, which shows buildings were used for a variety of purposes and allowed the town to save space (Fig. 23). There was

also a greater number of buildings devoted to transport. This included buildings such as stables and livery barns where people kept their horses. The railroad depot was also included. Only 24 percent of buildings were residential because the commercial sector dominated during the towns beginning.

In 1928 there is a large increase in the percentage of buildings devoted to residential uses and this remains around 85 percent in all the following years (Fig. 23). Still, about 5 percent of buildings being used for transport. Some stables are still in use and the railroad depot was used heavily. There is also a greater number of buildings, so comparatively the commercial sector is still about the same, with a few new businesses.

The years following 1928 are relatively similar, though the industrial buildings continued to decrease as a lot of the heavy industry moved elsewhere, and a couple of the elevators were removed. The depot also stopped serving passengers in the 1980s, so it is mostly there only for use by the railroad. The current commercial businesses are probably about the same amount as before, the difference is there is less on Main Street and more along the highway. The only exception was a little bit of an increase in 1968 when many of the businesses were created. The maps for all the years are included in Appendix A for reference.

4.3f Functional Mix

The functional mix of buildings is also an important factor to consider because it shows how buildings are currently being used (Peimani 2016). This can be used for planning purposes. For instance, if one section shows more places where a majority of buildings are used for work, maybe it would be in the best interest of the town to try and

diversify the area with more living spaces or places where people would be interested to visit.

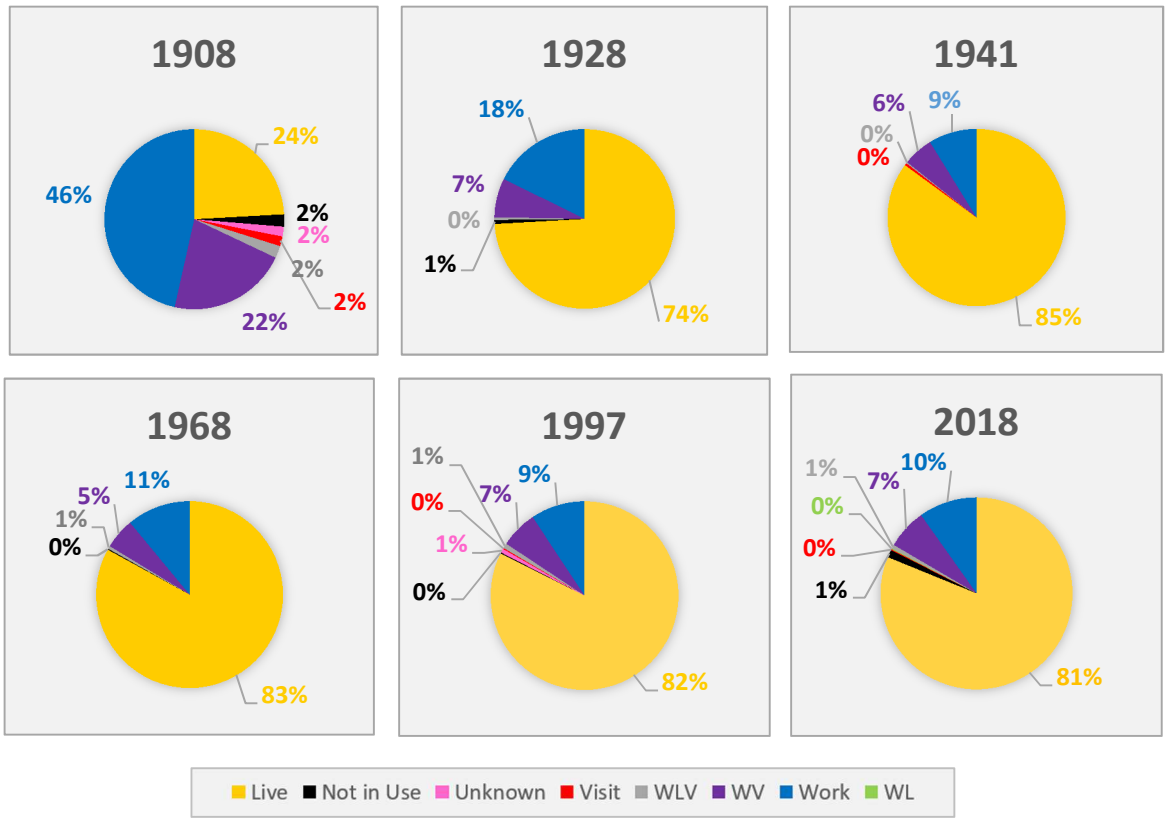


Figure 24: Pie charts showing the percentage of each functional activity for specified time periods

The maps are all included in Appendix B for reference. In 1908, 46 percent of buildings were used for work and 22 percent was used for work and visiting (Fig. 24). Given that the town was in the beginning stages of development, this would make sense, because the town was mainly business people. However, they had a lot more businesses such as hotels and the opera house, and businesses devoted to entertainment that people were interested in visiting. These were all located in the downtown area, so it was a lively place.

The following years are similar to the building uses, in that most are used for living purposes (Fig. 24). The southern part of town is almost completely devoted to work or work and visiting. Eventually it would be nice if there were more residential areas in the southern portion to encourage people to spend more time in that part of town. It would also be nice if more businesses devoted to work or visiting were placed back downtown to try to divert some of the traffic off the highway and show people what a lovely historic district Lakota still has. Currently, there are a quite a few buildings in the downtown that are not being used at all, so there is opportunity for improvement.

There is also a small amount of buildings completely devoted to visiting. If Lakota is to continue to capitalize on tourism or people stopping between Devils Lake and Grand Forks, they should try and create a few more points of interest that would make people want to spend a bit more time in the town. Sections devoted to only one type of activity are good in a planning respect, but they also limit activity to one part of town, rather than encouraging movement between sections.

4.3g Current Buildings and Repeat Photography

Figure 25 shows when the current buildings were developed, and the parts of the town that have been preserved. The year is not the exact year the building was constructed, but rather a timeframe of when it appeared in the imagery. It is apparent that many of the original buildings have been removed or were later torn down and rebuilt. In fact, only 7 percent of the buildings are from the early 1900s. It is quite amazing that almost all of the downtown has not been touched since after the 1940s, almost like a time capsule. While some of the buildings are no longer in use, the forms are still nicely intact.

The most modern building downtown is the State Bank of Lakota, which was remodeled in the 1990s and clearly sticks out against the brick.

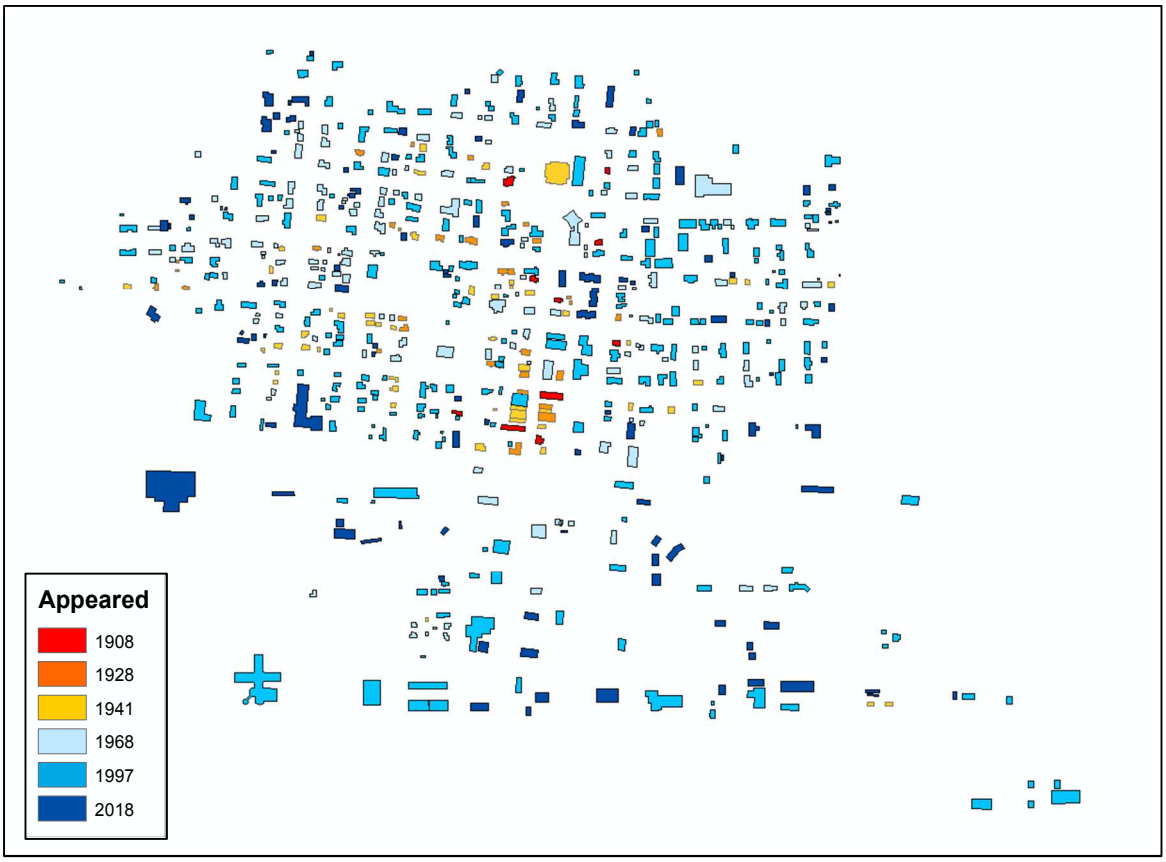


Figure 25: Map showing the current buildings and when they appeared in the imagery

There is also a sprinkling of houses that have stood the test of time and add to the sense of place when driving through the neighborhoods. What is preserved says a lot about the value people place on objects and the places they live. The oldest structures tend to be those that are at the center of everyday life, the places with the most memories, the ones that remind us of what is important and what once was. Places like the churches, the school, and the downtown are among the places that tend to last even when towns cease to exist (Fig. 26). Many other parts of town have not lived on, but these points remain as a remembrance of what it means to be a part of a community.

Figure 26: Repeat photography showing the changes and remnants of development in Lakota, North Dakota. Older photos were taken from the SHSND (2019). Newer photos were taken during the field study.

During the field study portion of this research, it was important to find the locations seen in the map, particularly the historic areas. Part of John Jakle's research came from analyzing photography of rural towns throughout the years, and I felt this was an interesting way to study a town's morphology. I wanted to see if I could recreate some of the photos to show how things have or have not changed. People say photos are windows into the past, and they are often one of the more accurate representations of things on ground. For this research, the photos were used to verify the information that

was seen in the maps. The new photos will be another piece of the puzzle that can be added on to Lakota's story.

There were several old historic houses that are from the very early years, and have only survived based on protective owners who have maintained their beauty. One of the oldest structures in the town is the Episcopal Church. It was lucky enough to have someone purchase it and do renovations to bring it back to life. The school and the courthouse have changed a few times throughout the decades. However, they have not changed location, they were either expanded or rebuilt and remodeled. The current buildings have not changed since their creation. The part that has probably seen the most change is the downtown area. It was once the pinnacle of small-town life and filled with so many unique businesses. Now, it is a shell of the past. It almost makes you feel sad as you walk down the street and see vacant buildings, no cars, no people walking around. The forms are still there, but the life that once occupied the spaces and created such a vibrant sense of community is gone.

4.4 Roads

The second most important part of studying morphology is the roads. Roads are what shapes the development in towns. They act as barriers and influence movement throughout a town. Roads were highly influenced by the social values of people throughout history.

Some roads naturally developed on the boundaries of the plots. In the map, it is clear most of the streets were developed between 1908 and 1928 (Fig. 27). As development expanded to the periphery, the streets were created to follow these developments.

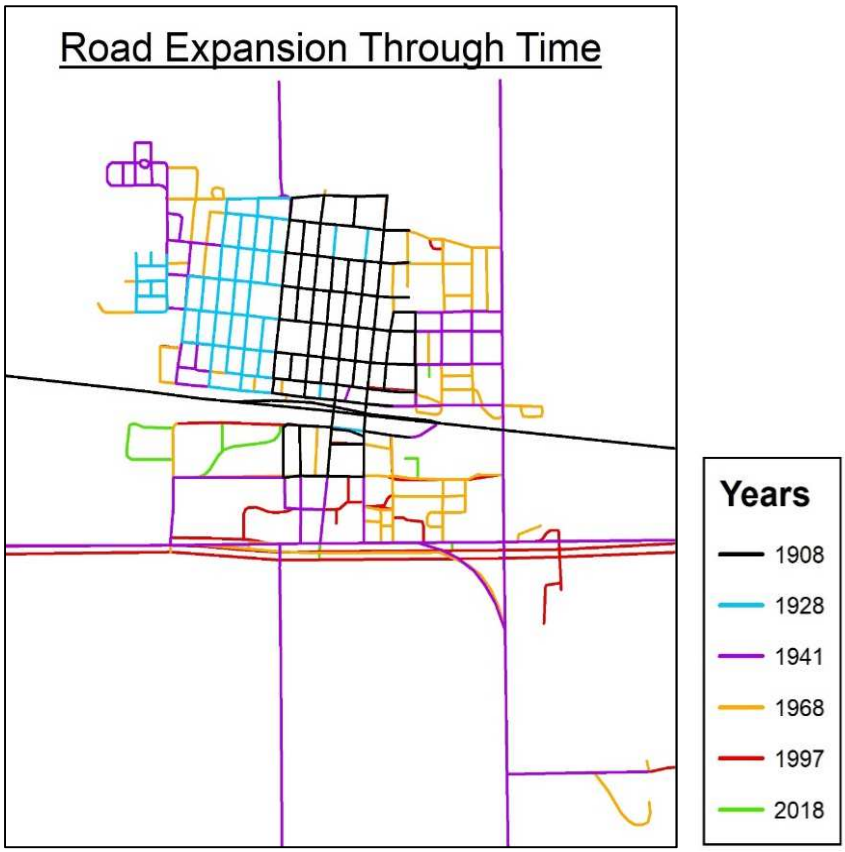


Figure 27: Map showing the expansion of the road network in Lakota through time

4.4a Frontier and Inland Town Era

During the frontier and inland town era, towns were few and far between and the main form of transportation was the stagecoach. There was not much traffic, so there was not much need for roads, and there was not much of anything in Lakota that could be classified as a road (Lakota Centennial Book Committee 1983). The trails that were present were used by the military and most likely doubled as stagecoach trails as well. Lakota did not have a stage line that ran directly through it, but it was near a prominent military trail that traveled to Fort Totten (Fig. 28). So even from the start, the town was set up in an advantageous location.

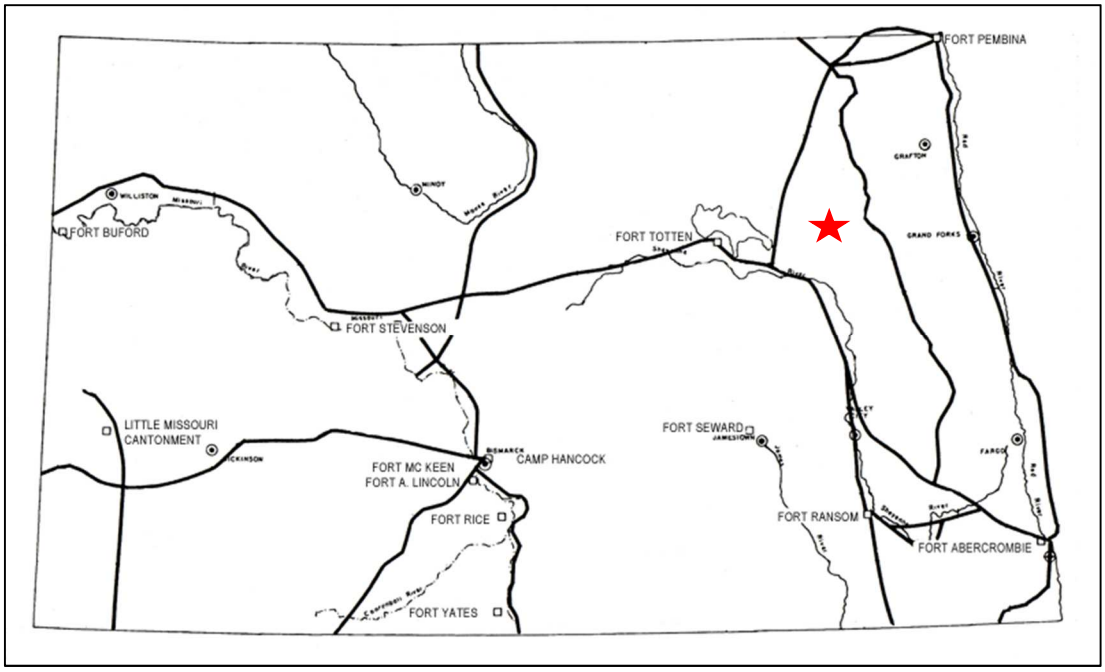


Figure 28: Map showing historic military trails in North Dakota from Noxeo (2019). The red star indicates the approximate location of Lakota.

4.4b Railroad Era

The railroad era was the beginning of real road development, but even in 1908 most of the streets were unimproved (Lakota Centennial Book Committee 1983). In fact, the streets were not graveled until as late as 1924 (Lakota Centennial Book Committee 1983). The streets originally had hitching posts for the horses, and often became worn down from constant foot traffic and changing weather. It was a real challenge to keep up with the maintenance.

Speculators used the same pattern for most towns and the streets basically followed the boundaries of plots. The streets were straight and rectangular to allow for ease of movement, and the design created a strict boundary. In some ways this was ideal, but it also sometimes created a sense of monotony (Jakle 1982).

Similar to other towns, streets were originally either named for people in the town, such as "Myrtle Avenue" for the first child born in Lakota, or for geographic reasons, such as "Front Street" because it was in the front (Lakota Centennial Book Committee 1983). The rest were numbered periodically. At some point, the streets with names were changed to alphabetic letters. I could not find much information as to the reason for the change, but I suspect it may be for postal reasons, for uniformity, or because it is easier for people to navigate.

4.4c Recreational Automobile Era

As the automobile was introduced, the streets were widened. At first, farmers did not see the need to improve the roads because there were not many people who owned vehicles. However, the car became more affordable and then practically everyone had cars.

4.4d Highway Era

The first highway was completed in 1926. This was County Road 1 and it ran north-south. The streets remained gravel until 1933, when the city received pavement through a public works project and was able to complete all of the main roads (Lakota Centennial Book Committee 1983). The second highway, U.S. Highway 2, was two lanes and was built in the early 1930s running east-west (Lakota Centennial Book Committee 1983). As soon as the business people learned of the plans for a highway along the southern part of Lakota, many moved or opened businesses to be close by. They knew this would mean an increase in customers. U.S. Highway 2 was later expanded to four lanes in 1982 and this allowed for increased traffic (Lakota Centennial

Book Committee 1983). This lane expansion did not affect much of Lakota's business district, it more just affected the route a small amount.

It is clear from the map on road development (Fig. 27) that the newer part of town has roads that are more curved. Many of the newer streets do not make sense. There is not a straightforward design, and most have been created after the buildings were in place, not before. This pattern disrupts movement. Some roads in this area were not even formally created, rather forced into existence by motorists traveling the same path multiple times. The roads on this part of town are also mainly gravel except for the road nearest the highway and entering Main Street, which gives it a sort of unfinished appearance.

4.5 Plots

4.5a Development

Plots are also important in understanding morphology because they break up areas into defined boundaries, and help planning departments zone for particular building uses. Planning during the railroad era was fairly simple. The purpose was to divide the space rather evenly and symmetrically. The plots were further broken down into a large amount of small lots. This allowed for the most efficient use of space and allowed for maximized profits. The more houses and businesses you have, the larger the tax base. The original size of Lakota was quite small as it was only in the beginning stages (Fig. 29). There were a lot of empty lots. This was fine for the early years where people were either just passing through or trying to establish themselves.

However, as time went on the town had to add on developments, purchase more land, or further divide lots into smaller sections. You can see in 1941 the plots were

rather large around the periphery because it was mostly farm land with relatively few buildings. Once time went on and more development occurred, the town's boundaries were more clearly defined. The current town, as it sits, is to capacity as far as its boundaries are concerned. Unless the town tries and acquire more farmland from someone, it will probably remain mostly consistent. It is also clear that the southern portion of town has continued to be divided, though the lots have no particular shape. They are also fairly large lots and this is a problem seen in large cities as well. The large lots are given to large development or do not use space efficiently, so there ends up being a huge lot with one building on it.

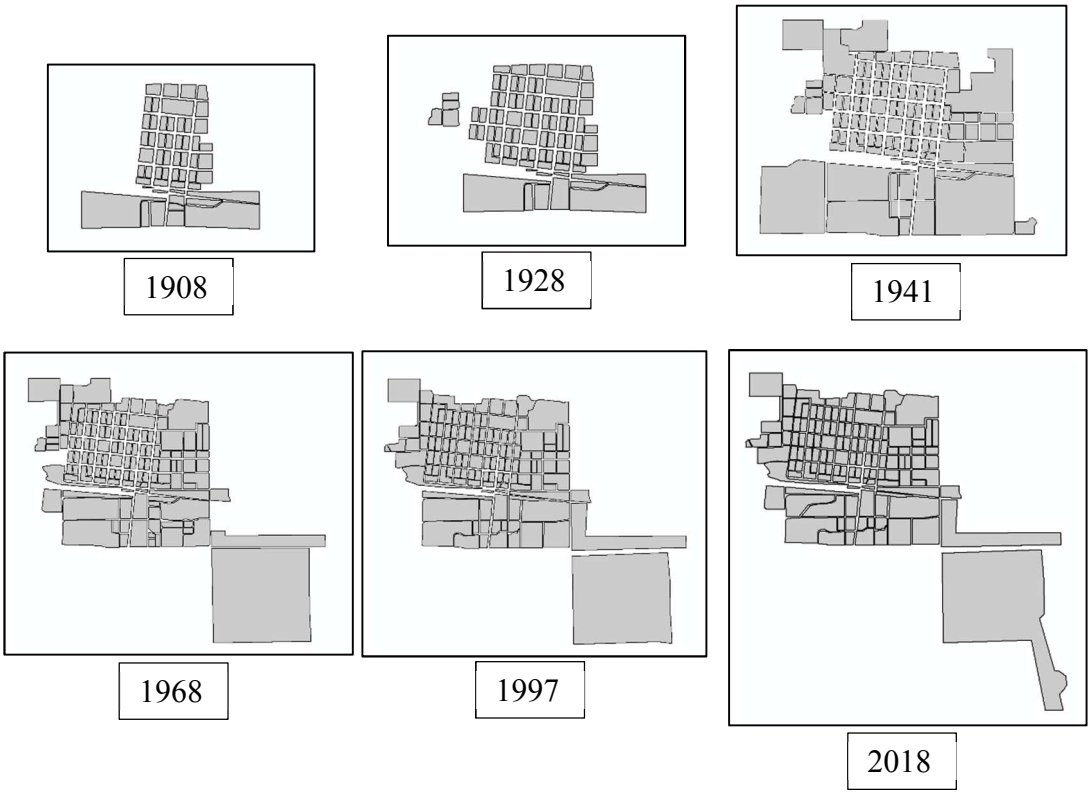


Figure 29: A comparison of Lakota's plots from 1908 to 2018

4.5b Built Space vs. Open Space

Morphology can also be measured in terms of built space and open space. Built space is anything that contains a structure, the gaps in this space in the plot are open space. Open spaces can be made into natural spaces such as parks, or can be further developed.

Lakota is experiencing an interesting phenomenon in that the newer buildings have gotten bigger and more spread out. There are less buildings per plot, but the buildings that are present take up a lot of space. This differs from the plans that were created for the downtown area.

The original city plans were very methodical and well thought out. The speculators designed the plots to be rectangular with narrow lots that ensured buildings would be mostly the same size (Hudson 1985). This gave the downtown a cohesive look. Promotors would sell individual lots on the plots so it had more of a design and purpose.

For example, it is evident that the original business district is along Main Street (Fig. 30). This is what is called fine grain, where buildings are placed very close together and there is not much open space available (Price 2017). Whereas the main business district now along U.S. Highway 2 is spread far between (Fig. 30). This is what is called coarse grain (Price 2017).

Figure 30: Comparing building grain to photographs. The images at the top depict a fine grain morphology (downtown) and the images at the bottom depict a coarse grain morphology (along the highway). Images from the field study and ArcMap 10.6.

Now, similar to what is occurring in larger cities, when there is land it is almost as if it is just given with no rhyme or reason. When buildings are more spread out this decreases walkability, character, and the overall environment of the rural town. It also leads to greater amounts of open space, which may or may not be used. This leads to a less appealing town form and affects the ways in which people interact with their space. All these ideas will be discussed further in the following section.

CHAPTER 5
DISCUSSION

5.1 Were the Theories Accurate?

The theories that Jakle (1982) and Hudson (1985) laid before this study have proven to be the foundation on which to build a morphological analysis. Hudson's idea that there were several forms by which plains towns could be classified was true. Lakota fit into one of these categories. If this is true for Lakota, most other towns in North Dakota that were created as a result of the railroad could also fit these morphologies. Townsite Developers often used the same forms repeatedly, and though the designs were well thought out, they did not always ensure success. It was other factors that played into the design that allowed Lakota to continue through the years. The town's form has changed in almost every direction, but the core of the town, the original design, has stood the test of time.

Jakle's maps of a hypothetical rural town pre- and post-automobile also were mostly accurate when compared to Lakota. Of course, every town is different in the specifics, but nonetheless, the study shows how there are several similar characteristics all rural towns possess, or at least the ones that have experienced some degree of success. Similar to other literature, Hudson and Jakle noted how becoming a county seat was an important precursor to long-term development. These were the towns that had influence, power, and the ability to secure grants and other money.

The other important theory that presented itself throughout both books was the idea that transportation and population are two of the biggest factors influencing rural town development. Transportation was influenced by economic expansion and social values, so it is not surprising it continues to bring about change. Even when population becomes stagnant, or decreases, towns like Lakota have shown they can still survive and develop.

5.2 The Morphology of Lakota

Rural towns have not been studied much throughout the literature in terms of morphology, and yet they have many of the same characteristics as larger cities. It is baffling because if anywhere needs proper planning of limited space, it's rural areas. With small budgets and dwindling populations, rural towns are in need of a revamp. The railroad speculators left a long time ago, and I think it was hard for many towns to come up with another purpose to exist. The railroad was quite frankly the whole reason why these towns were created in the first place, so when it left, towns had to adapt to whatever came next or choose to die along with it.

Partly why Lakota continued, was because it adapted well to changes in population and transportation. Perhaps it has not developed to the same degree as larger cities, but it is important for people to realize that rural towns are not stuck in time. They may change at a slower rate, but they still change, the people still come up with new ideas of what would make their town better. More attention needs to be paid to rural towns because they are full of opportunity and promise if they are given the tools and information they need to succeed.

5.3 Explaining the Results

Studying morphology has proved useful in understanding a rural town's history and social and cultural values. There is no one factor that completely explains why Lakota was more successful than similar towns surrounding it, but a combination of factors set it up for early success. Each time period saw a new form of transportation and each time period built off the other to create the current town form.

The buildings in Lakota, like in previous studies, were probably the morphological characteristic that experienced the greatest change, followed by the roads, and lastly the plots. As time has gone on, the businesses that were once devoted to the horse were replaced by those devoted to the car, the larger industry sector that was around in the early years left for other locations. The highway created a shift of business form the center to the southern part of town.

Studying the buildings showed how easily factors can influence development. Buildings changed shape, changed location, changed owners, changed business type. Studying the buildings also helped back up a lot of what was recorded in the town's histories. Looking at the functional mix of the buildings also helped show the need for more diversity in planning spaces. When you have several sectors limited to one type of activity, this limits movement and people do not interact in different contexts as much.

The roads also showed the importance of planning and were determined by rural values at the time of their creation. Originally there was not much need for roads, but when cars were introduced the town was forced to improve them. The early roads were also very methodical and straight, while the new roads curve and do not always make sense. This also disrupts movement and accessibility within the town by creating barriers.

Studying the plots was also necessary in explaining problems in development. The old part of downtown was once close knit and all the sectors were in close proximity to each other. People could walk throughout the town and do all their business without having to set foot in a car. The new part of town does not make this possible.

5.4 The Future of Rural Towns in North Dakota

Lakota's old Main Street has a historic appearance that is inviting and makes you want to learn more about how it got its form. It makes you want to take a walk down the road and reminisce about how life for this rural town once was. It makes you think about what could be if the buildings and the street were given a bit more TLC.

The new "Main Street" along the highway is a bunch of tall signs for chain stores, hotels, and gas stations. It is as if the town is saying "Stop in, but only for a short visit. Don't spend much time here". There is no sign that points to the actual downtown and though I have never lived in the town myself, it makes it seem like they do not really want people to explore the part of the town that makes it so interesting. This keeps people at the fringe. The new business district is widely spaced, there are no trees, no real sidewalks, and a bunch of gravel. The buildings are all mostly square, one level, and quite frankly, aesthetically unappealing.

If the town continues to develop to the south, which I believe it will, there needs to be more consideration for movement and sense of place that prevailed during the railroad era. I also believe if they improved even small things downtown, it would encourage people to spend more time there.

CHAPTER 6
CONCLUSION

This research has shown the importance of studying the spatial morphology and its connection to the development of rural towns. There has been a plethora of literature focused on cities, when rural areas can offer insights into how development occurs. Studying towns at a smaller scale can also allow for more in depth research that can answer questions about why and how a town was developed. Rural areas are in desperate need of more research as the economies that were once completely dedicated to agriculture and the railroad business, have now had to adapt to new technologies, new forms of transportation, and a faster pace of life. It is also clear that changes in transportation and population have had large effects on the success of these towns as well.

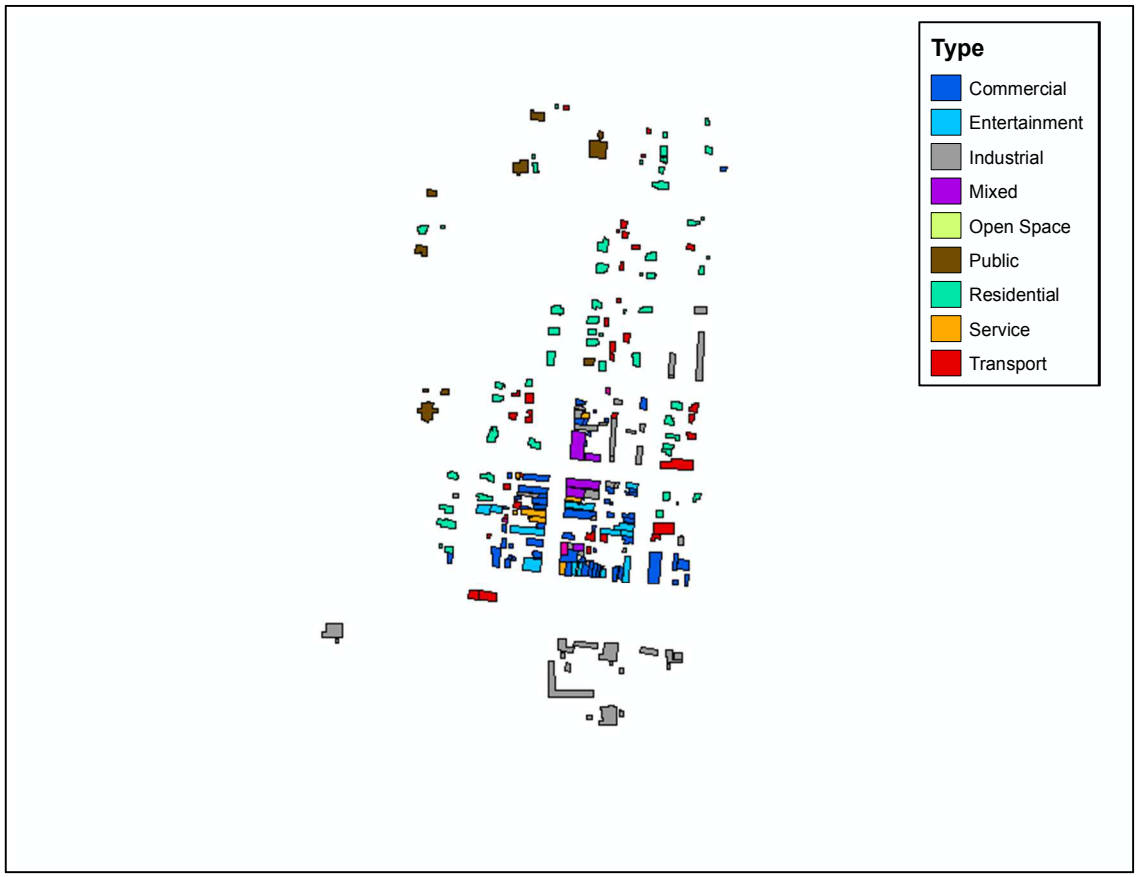
Not all towns necessarily want to increase their populations and not all towns want tourists flooding in. Some rural towns are happy with the way life is and always has been, and may just want a better quality of life. Sometimes improving the roads, the buildings, or adding more activities is all a town needs to keep its residents happy. It is not up to the researcher to decide what is best for a particular town because people living in the towns know their situation best. Rural towns such as Lakota may be small, but their sense of place and their love of community are evident in every part of their morphology. This should continue to be embraced in every aspect of future planning.

This study does not aim to say all rural towns in North Dakota have developed in the same way as Lakota. However, it does aim to provide a framework a rural town could build from to learn more about their history in order to better plan for their futures. By studying morphology, towns can learn what has worked and what has not, they can learn about how transportation and roads affect a town's movement, and they can learn which areas to further develop or which areas need to be preserved. All of these things will help rural towns in North Dakota continue into the future.

APPENDICES

APPENDIX A

Maps of RICEPOTS Classification



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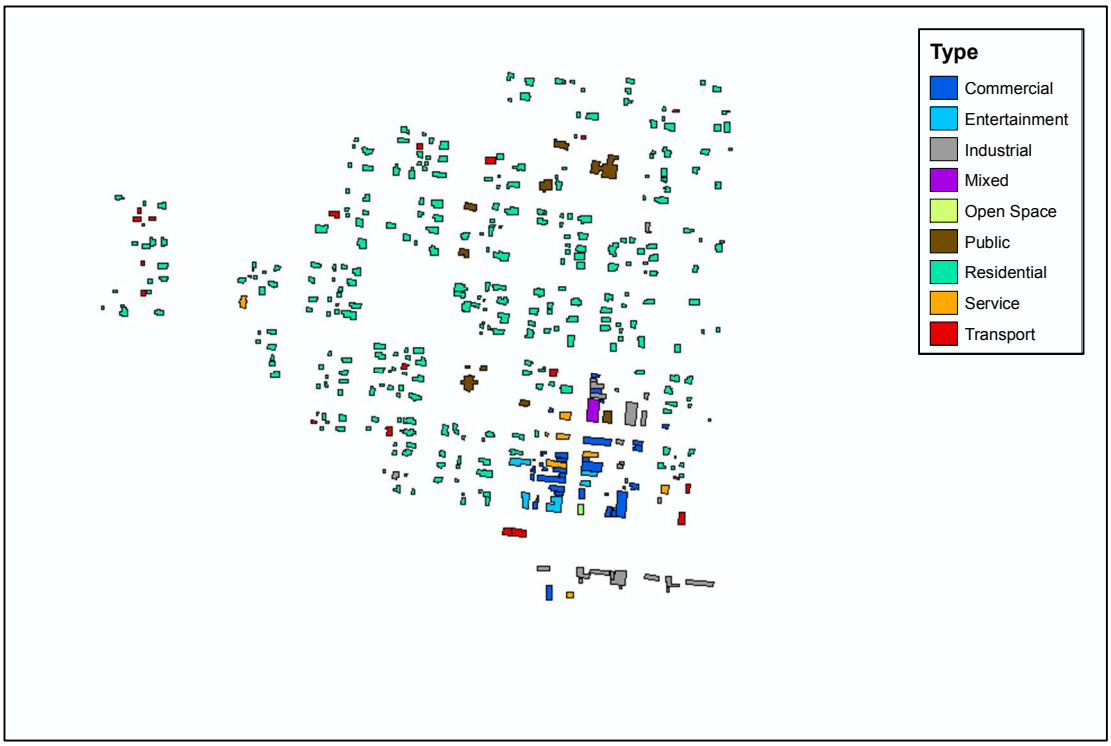
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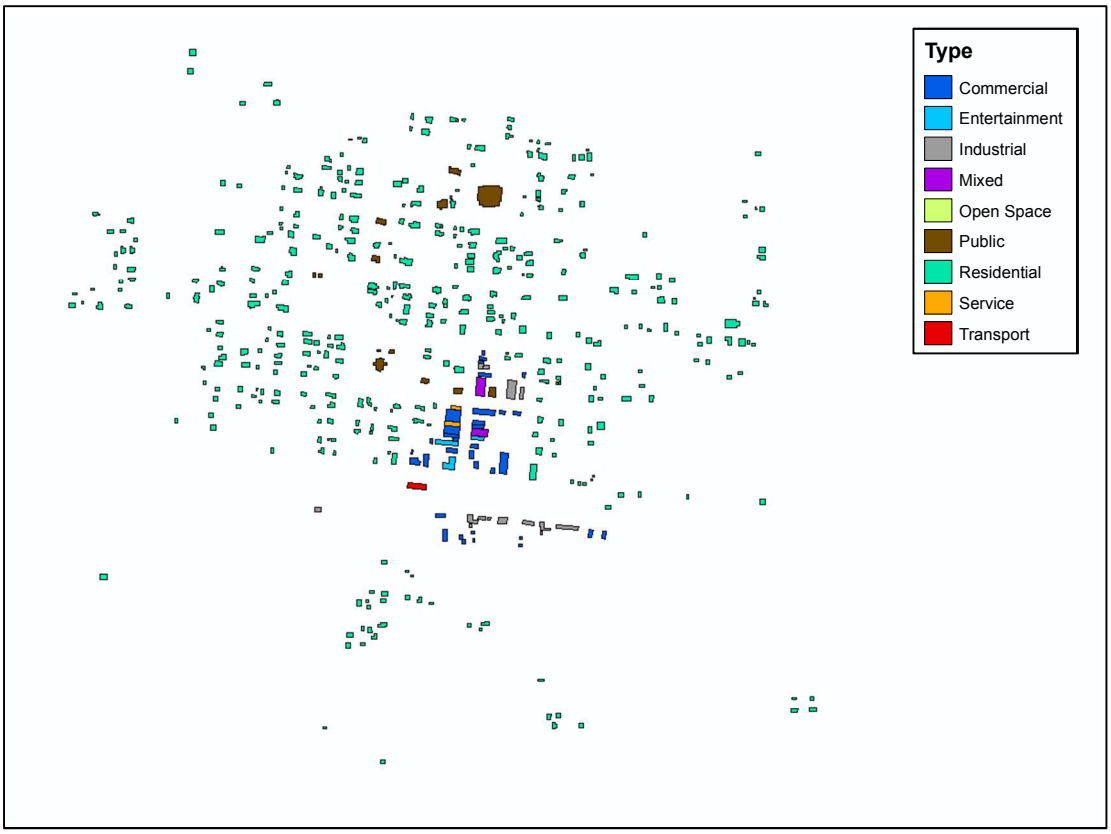
Entertainment
Industrial
Mixed
Open Space
Public
Residential
Service
Transport

1928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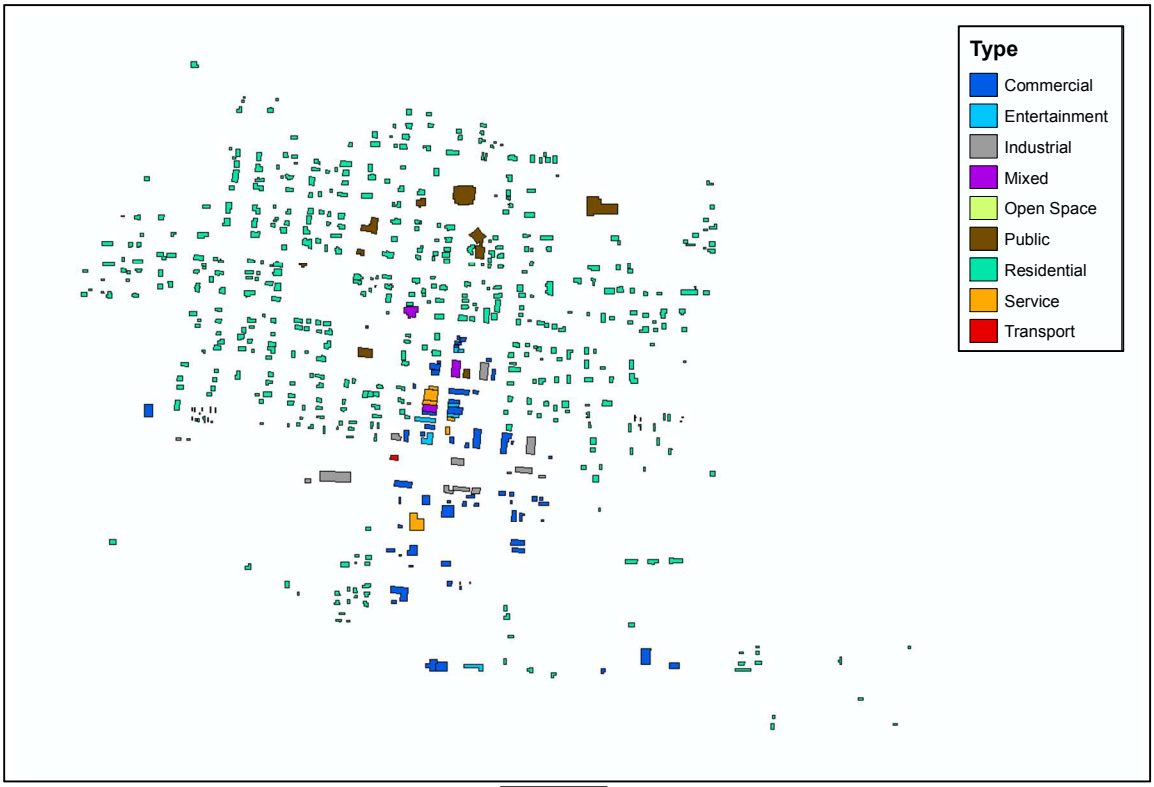
Entertainment
Industrial
Mixed
Open Space
Public
Residential
Service
Transport

1941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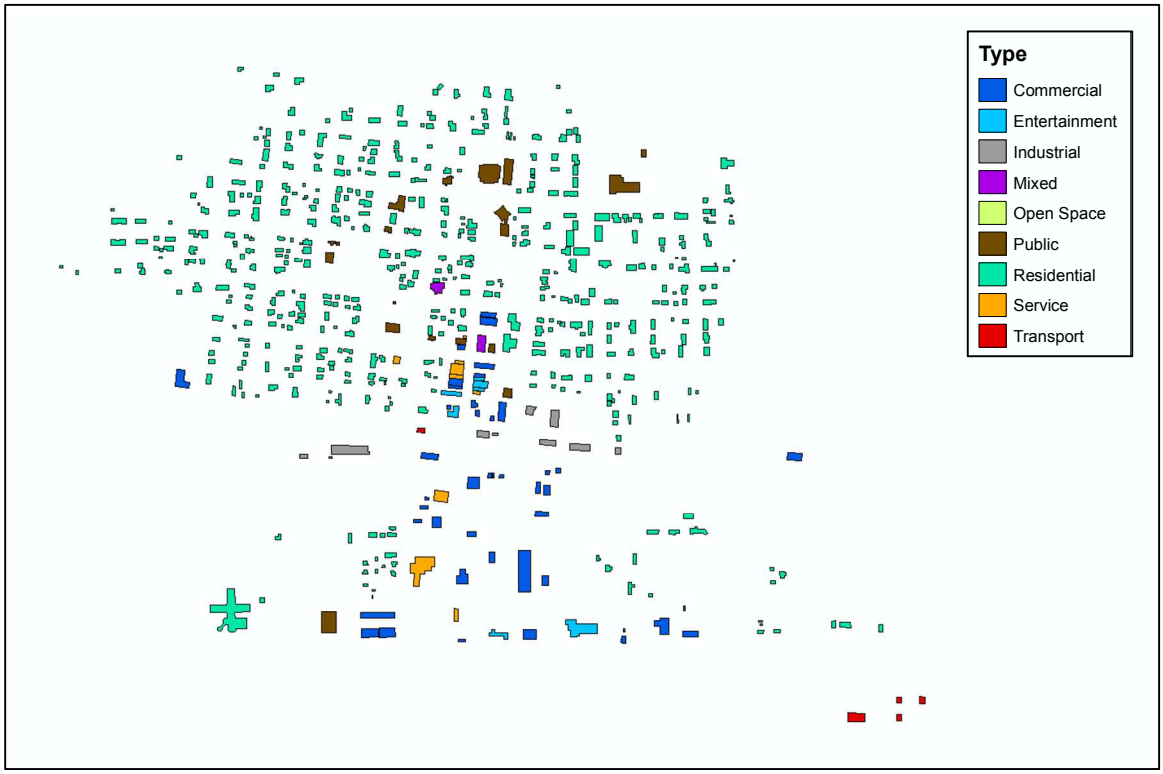
Entertainment
Industrial
Mixed
Open Space
Public
Residential
Service
Transport

1968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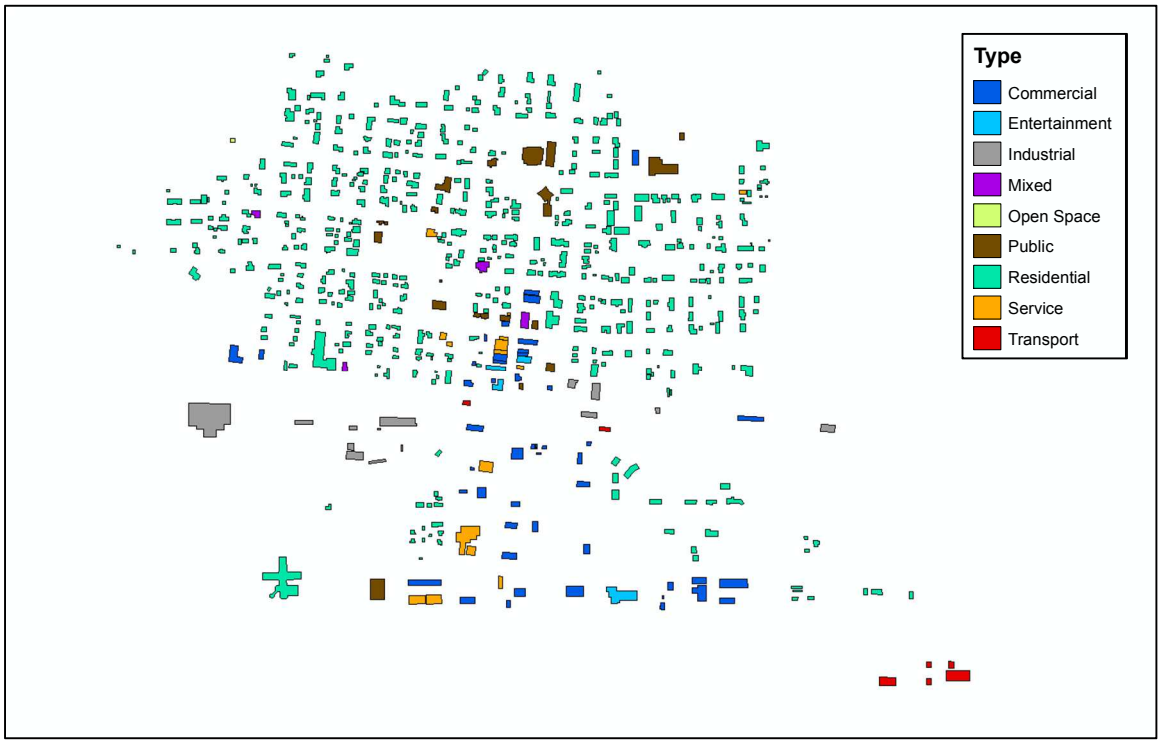
Entertainment
Industrial
Mixed
Open Space
Public
Residential
Service
Transport

1997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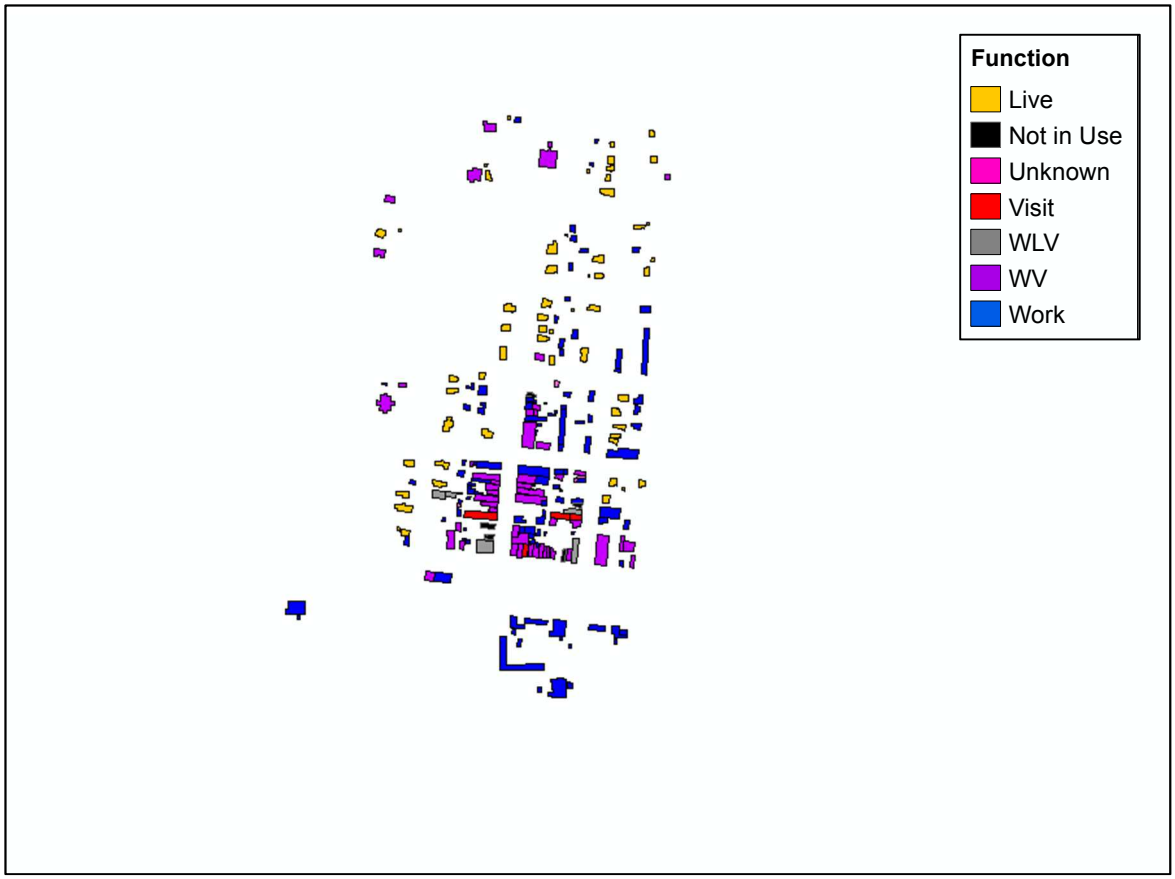
Entertainment
Industrial
Mixed
Open Space
Public
Residential
Service
Transport

2018

APPENDIX B

Maps of Functional Mix



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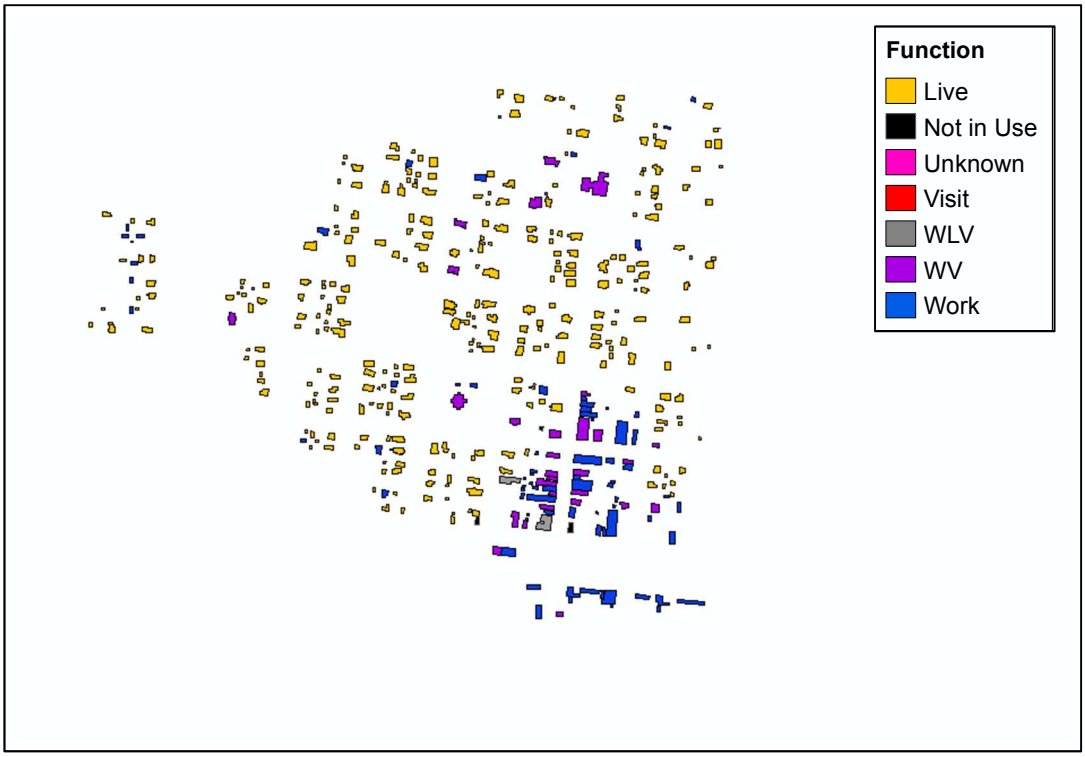
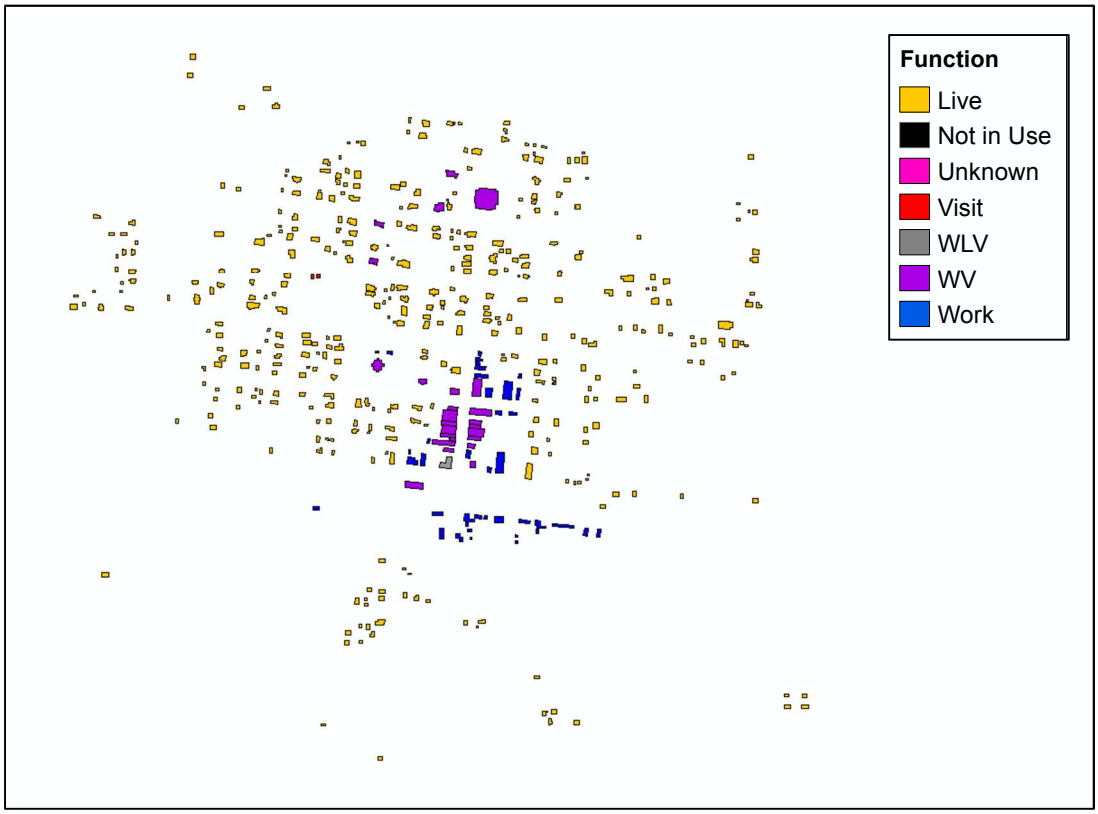

Function
Live
Not in Use
Unknown
Visit
WLV
WV
Work

1928


Function
Live
Not in Use
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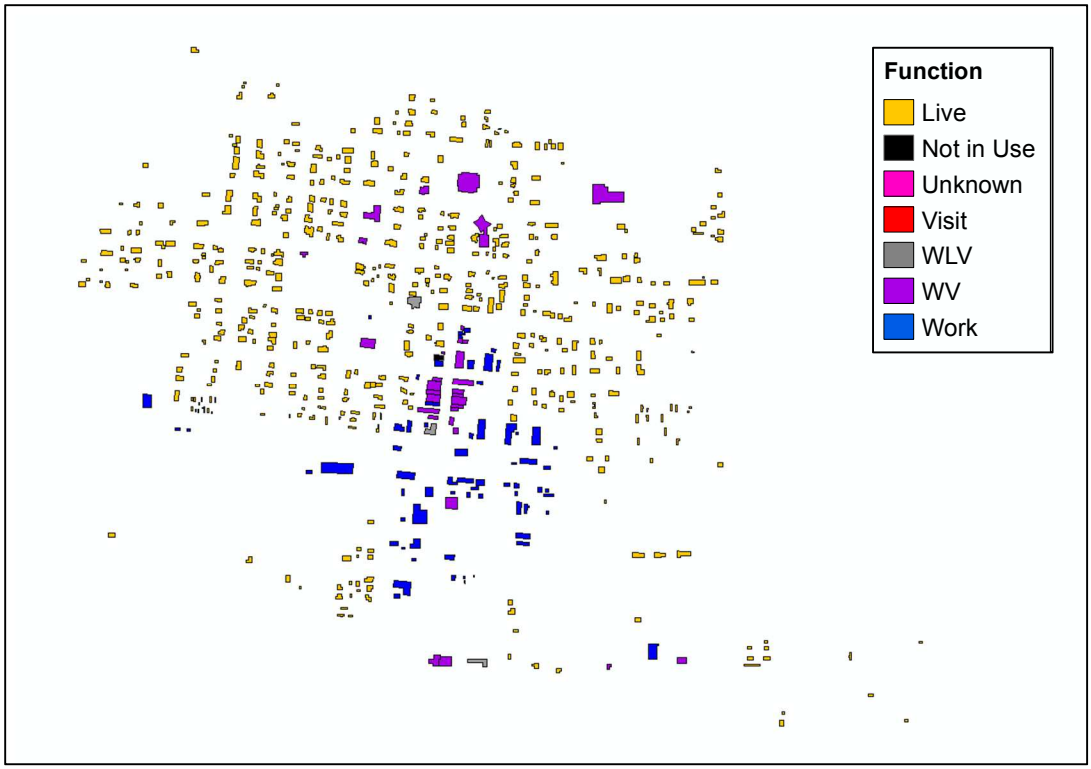
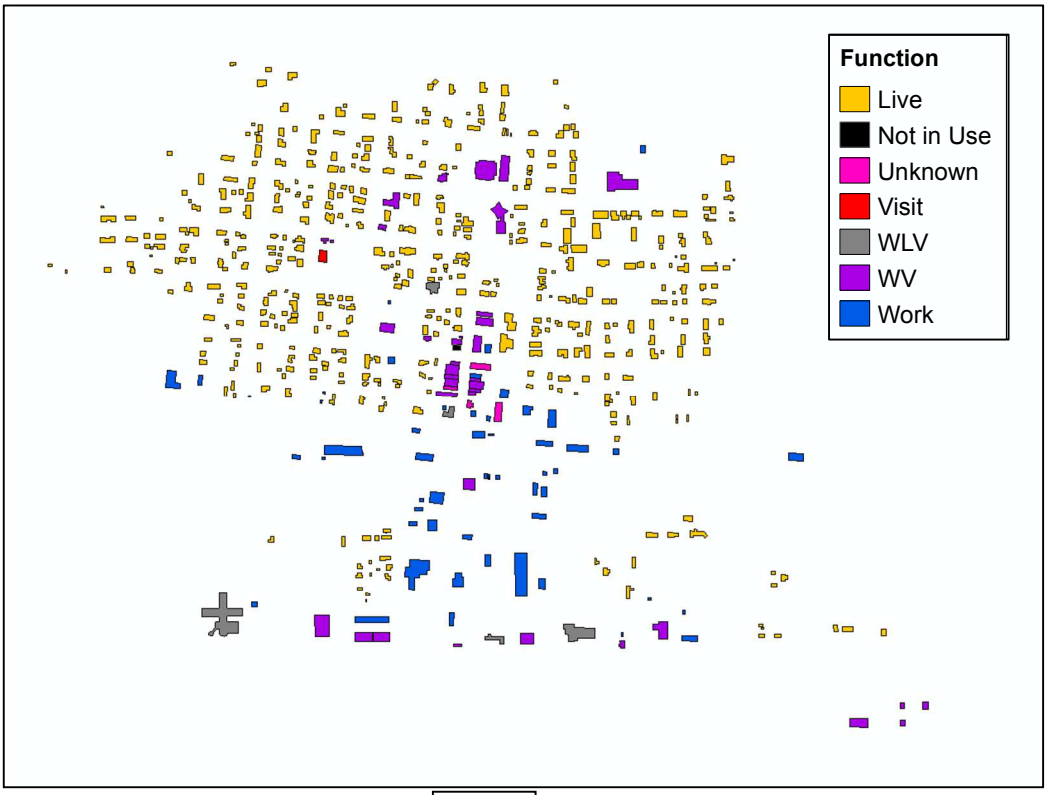
Visit
WLV
WV
Work

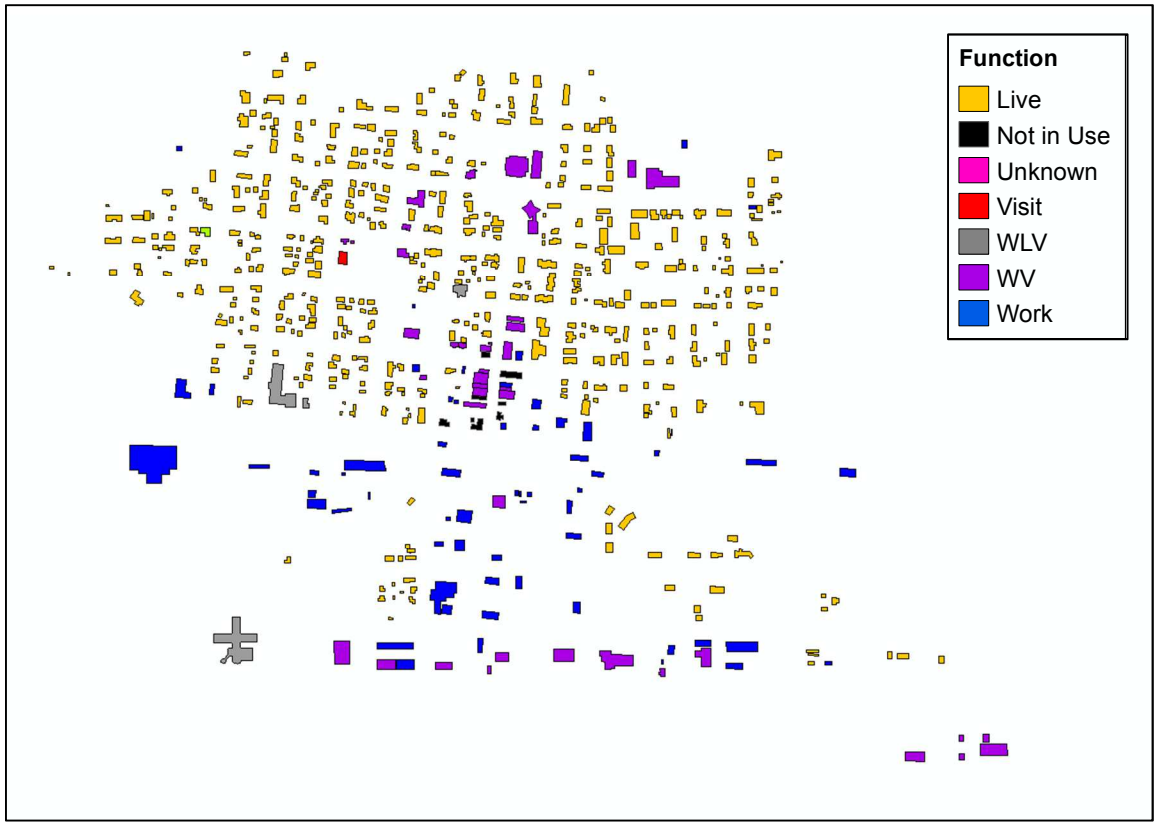
1941


Function
Live
Not in Use
Unknown
Visit
WLV
WV
Work

1968


Function
Live
Not in Use
Unknown
Visit
WLV
WV
Work

1997



2018

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