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Accessibility to public high schools and school performance in metropolitan Baton Rouge, Louisiana 1990-2010

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ACCESSIBILITY TO PUBLIC HIGH SCHOOLS AND SCHOOL PERFORMANCE IN
METROPOLITAN BATON ROUGE, LOUISIANA 1990-2010

A Thesis

Submitted to the Graduate Faculty of the
Louisiana State University and
Agricultural and Mechanical College
in partial fulfillment of the
requirements for the degree of
Master of Science

in

The Department of Geography and Anthropology

by

Shaun E. Williams

B.A., Louisiana State University, 2009

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This research is dedicated to my family. Without their support and inspiration, I would not be in such a fortunate position to pursue my dreams not only within academia, but also in life. Mom, I love you. You raised me to be tough, hardworking, and free thinking. In other words, you raised me to develop everything it takes to be successful in life. Stephanie, you inspired me to do well in school. At a young age, I could have easily detoured down another path, but what kept me from that was the inspiration and support I had from you. Peewee, you helped me develop a tireless work ethic which I as an adult I incorporate into every task I take on. More importantly, you showed me that the best skill a hard worker can possess is the ability to think himself through adversities. For Xavier, Tolivar, Jalen, Jaleena, MaJulya, Parker, and Javon, chase your dreams and don't allow any obstacle to stop you.

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ABSTRACT

Education policies developed to initiate improvements to public school systems across Louisiana often result in a continuation or intensification of salient yet overlooked accessibility challenges. The public high school and its students have been particularly susceptible to these actions which have been sustained for decades within the state despite the increasing awareness of individual and community hardships connected to high school level inadequacies. Beyond isolated district studies or aggregate state reports, limited focus has been placed on student accessibility to public high schools or on responses of students and communities to processes which alter their access to area high schools.

This study advances the role GIS in historical geography and education research by implementing the Two-Step Floating Catchment Area (2SFCA) method to link historical phenomena with contemporary accessibility conditions for social groups within the Baton Rouge Metropolitan Statistical Area (BRMSA). This work implements the 2SFCA method and two derivatives to gauge the transitions of high school accessibility from 1990 to 2010 and challenge heuristic approaches which demote the influence of geography in policymaking which effects high school accessibility.

A regression analysis revealed a moderately strong positive association between spatial accessibility determined the 2SFCA and school accountability scores established by the Louisiana Department of Education with 2010 data. Additionally, this examination found urban areas, particularly Baton Rouge, have experienced the lowest levels of spatial accessibility and correspondingly low accountability scores, which in most cases have only continued through time when compared to nonurban high schools. Together these analyses support the potential attraction of suburban high schools within the BRMSA. The conclusion of a series of common

factor analyses implemented to complement accessibility measurements further support the attraction argument and the overall link between access, accountability, race, and geography as a potential offshoot of the White flight phenomenon was captured in the 2010 implementation.

CHAPTER 1: INTRODUCTION

1.1 Background

Three hundred jobs, well-paying jobs, were coming to Pointe Coupee, some 30 miles north of Baton Rouge along the twisting Mississippi River. For a rural Louisiana parish with widespread poverty and high unemployment, the promise of work in the new plastics plants was generating considerable excitement...

Formosa Plastics promised to hire all its nonprofessional employees-some 95 percent of the total-from the parish. All they had to do was pass a 10th grade test...Of the 2,100 parish residents who applied, only a quarter passed the test...Only when he lowered the bar once again-to grade six- did he find enough people to staff the plants. (Lawrence Hardy, "Hope on the Bayou," *American School Board Journal*, 24)

Shortly following this attempt of Formosa Plastics to fill positions in its Pointe Coupee Parish plants, the school district's massive high school consolidation initiative, which established a new central high school, was completed. Ironically, the purpose of this action was to provide students with better educational opportunities and enhance their job preparedness. Similar objectives have formed the basis for education policies which have continuously altered the landscape of public schools in Louisiana.

The journey through some of Louisiana's most impoverished urban and rural communities reveals a common sight with the presence of former public high schools which once called these neighborhoods home. The extent of these schools within the Baton Rouge region is captured in Appendices A and B, which display imagery from visited school sites and the spatiotemporal mapping of public high school locations over recent decades. With the progression of time, several former high schools are now represented by concrete slabs or inconspicuous remnants of the former campus buildings and football stadiums. High schools have followed vastly different paths than primary schools across the Baton Rouge area, and these

divergent paths are best reflected on the landscape with the continued presence of primary schools in the very communities which have lost high schools.

Change to the landscape of public schools has a strong historical connection with official and unofficial ranking, rating, or accountability systems. The relationship between these variables has a well-documented history within many Louisiana school districts and communities, and the interpretations between these variables have routinely dictated policies of school change. This history dates back to the antebellum era arrival of public schools in Louisiana. At that time, public education was met with passionate hostility as residents often opposed the notion of public funds which supported schools. A mixture of academic competitions, education rallies, and standardized testing provided opportunities to rate or rank public schools and went a long way to counter criticisms on the quality of public education. These events also became an agent of change as the label or even perception of schools being poorly rated riled support for initiatives like new facility constructions or school consolidations. Within Louisiana, it has been the public high school that was increasingly found at the heart of much this volatility in public education.

The volatility of Louisiana public high schools in part reflects constant changes in the identification of and resolution to challenges which face have faced schools. Despite having great significance, a common denominator with both processes has been a lack of regard for geography. The downplaying of geography is strongly reflected in common approaches which examine public schools. For example, education studies have been heavily produced at local or statewide scales (Pearce 1931; Frazier 1937; Roddy 1942; Manning 1942; Hall 1966; Derosin 1976; Riffel 1983; Brewster-Turner 2004); however, significantly fewer regional studies have been produced. The limited use of regional approaches is a byproduct of the rigid boundaries

under which schools operate. Boundaries have developed into mechanisms which stifle regional based approaches on matters such as spatial interaction and student mobility.

The landscape of public education within Louisiana is purportedly gradually moving beyond access restrictions based upon geographic boundaries or nonspatial barriers such as race and poverty with the infusion of a series of new public policies. Yet, common methodologies implemented to analyze public education may understate policy impacts as isolated local events or overgeneralized severe local challenges to the district or state level. Both approaches lack regard for core geographic principles such as mobility, space, time, and access. The process of addressing public education challenges, particularly for high schools of Louisiana has long followed such practices. Despite the aforementioned gradual introduction of new public education policies, abiding by this antiquated philosophy may ensure that the same challenges persist.

In current times there has been a growing desire to focus on the public high school. Such efforts recognize the value high schools possess from reducing criminal activities to sparking economic development investments. Yet, the reality within Louisiana is that the public high school landscape has been altered to now account for some of the most inaccessible social institutions within a growing number of state communities. Additionally, the public high school continues to produce a bulk of the state's lowest performing schools. In the year 2000, fifteen senior high schools were rated as unacceptable and by 2010 the total increased to nineteen high schools mostly different schools.

When isolated the aforementioned number of high schools labeled unsatisfactory seem low; however, history shows these results evoke change. The identified failure of these schools

results in their closure or conversion and such reactions which are continually guided by misrepresentation or inefficiencies may only on recycle rather than resolve pertinent public education challenges. The resulting massive displacement of students has been a common occurrence and must raise questions in regards to how challenges get both identified and resolved.

Accessibility is one of the major components behind the effectiveness of social services, yet within public school systems accessibility routinely has been compromised. In many Louisiana parishes, the quest to improve the perceived quality has led to single high schools which serve entire parishes. It is of great importance to identify the nature of the relationship between populations and accessible schools to address challenges faced within communities and break the cycle which may actually be influential in the rise of perceived shortcomings with our public high schools.

1.2 Hypothesis Research Questions

This paper approaches the study of high school accessibility with the two main hypotheses. The first argument is that disparities in spatial access are largest within rural communities or for highly impoverished populations. Secondly, it is hypothesized that spatial accessibility and high school accountability scores have some degree of correlation which may be unrecognized in education policymaking. The following research questions address the hypotheses along with the unique structure and challenges of this research:

1. This paper examines if a Two-Step Floating Catchment Area approach can provide an effective representation access based upon scalar modifications to account for school boundaries and limited competition for students.

2. This paper uncovers trends in spatial accessibility within the Baton Rouge area over the last three decades and examines how unincorporated communities and municipalities of various sizes have been impacted from high school accessibility improvement or decline.
3. This paper determines how historical policies and movements are tied to current spatial interactions between social groups and public high schools.
4. This paper addresses whether nonspatial socioeconomic factors are indicative of different degrees of access to high schools and examines what disparities mean for people of different social groups.
5. This paper analyzes if potential spatial accessibility determined by the Two-Step Floating Catchment Area has any correlation to high school accountability measures.

1.3 Organization of the Study

Chapter Two contains the literature review which examines the history and creation of Baton Rouge area public high schools, the evolution of GIS accessibility methods, and an account of multiple approaches to examine accessibility in public education. Chapter Three introduces the study area, research methodologies, data gathering process, and challenges in the calculation of Two-Step Floating Catchment Area and factor analysis variables. Chapter Four provides results of the Two-Step Floating Catchment Area and factor analysis implementations. Chapter Five analyzes the relationship between high school spatial accessibility and the nonspatial socioeconomic fabric of a community. Chapter Six addresses the relationship between high school accessibility and accountability scores along with the relationship between social conditions and accountability. Finally, Chapter Seven reveals major findings, study limitations, and potential policy implications.

CHAPTER 2: LITERATURE REVIEW

2.1 Accessibility in Education

The research of Howley, Johnson, and Petrie (2011) and Vincent (2006) has shown that the impacts on accessibility from public education policies are often underestimated or disregarded during the decision making process. Such results occur despite the growth of studies on poor access to high schools which have identified potential outcomes that include: low skilled workforces (Hardy 1998), high poverty (Yoshida and Deichmann 2009), fewer student opportunities(Howley, Johnson, and Petrie 2011; Rodgers 1975), disconnections between schools and former communities or current distant communities served (Davis and Donaldson 1975; Rodgers 1975; Brewster-Turner 2004; Lee, Croninger, and Smith 1994), and elevated high school dropouts for premature workforce entry (Baschieri and Falkingham 2009).

These types of challenges heighten the need for not necessarily more schools but schools that are more accessible. In addition to the aforementioned works, an expansive amount of literature which investigates the benefits of accessible public schools has been developed. Material of this category has been instrumental in uncovering connections between school accessibility and conditions which include: stronger community social connections (Lee, Croninger, and Smith 1994), higher standards of living (Guzik 2003; Lee and Burkam 2003) and greater local community business investment (Guzik 2003; Rodgers 1975).

Numerous potential challenges or benefits associated with public school accessibility are indicative of the multiple levels of demands desired by populations and services rendered by the schools. Public high schools have historically been the schools at the center of these exchanges and interactions within communities throughout the nation (Redcay 1936; Rodgers 1975).

Although this role for public high schools has existed for decades, a significant amount of the

accessibility research to date has focused on aggregate or exclusively primary grade levels (Talen 2001).

Due to the unique constructs of public high schools, accessibility tends to be loosely defined to support a diverse set of methodologies and approaches implemented by researchers. The methodologies attempt to account for either spatial or aspatial components and have materialized into works which report on subjects such as student travel time, school-community relations, student demographics, school performance, or parental involvement. In order to account for spatial and aspatial variable components, this paper defines accessibility as the ability of a population to obtain services from a school.

Geographically this definition references distances traveled to schools and the general location of a school in comparison to population centers. Distance based accessibility studies have been a staple within education analyses, and GIS advancements have allowed for diverse approaches to be produced. Examples of the basis of such approaches have included: catchment zones (Talen 2001), travel cost (Guzik 2003), and straight line Euclidean measurements (Vouk and Dulaney 2009; Deerenberg, Zuurmond, and Melser 2010). The aspatial definition of accessibility in this study refers to the overall ability for schools to supply services to young people based upon structural variables such as teacher size, course offerings, and academic curriculums (Hardy 1998; Hallet and Venegas 2011).

To meet the varying demands from young and old social groups within communities, services supplied by public high schools have historically included: concert halls, marketplaces, public libraries, fairgrounds, health centers, and community centers (Rodgers 1975; Middleton 1978; Anderson 1988). The earlier identified shortfalls in contemporary accessibility of Howley, Johnson, and Petrie (2011) and Vincent (2006) found modern challenges to be attributed in part

to declines in the role of the public in the development of public schools. The findings of both works harmoniously exhibit that a movement away from the past ideals of public high schools has taken place. This movement has supplanted historic norms with modern approaches which are now commonly devised to keep the public out.

The modern embraced constructs of public high schools undergo constant restructuring geared to respond or keep up with constantly changing challenges faced within modern day schools. This researcher has found at the center of much of these initiatives have been efforts to improve conditions attributed to aspatial accessibility. Impetus behind aspatial initiatives may be bolstered from an awareness of hardships resultant from high school incompleteness which include: illiteracy (Hardy 1998; Baschieri and Falkingham 2004), unemployment (Rodgers 1975; Lee and Burkam 2003), and incarceration, particularly for young Black males (Ziedenberg and Schiraldi 2002; Lee and Burkam 2003). Howley, Johnson, and Petrie (2011) articulated that aspatial improvement may potentially come at the expense of spatial accessibility. The geographic spread of high schools tend to decrease as schools have shuttered or consolidated in order to welcome new forms of schools such as vocational, charter, or magnet.

A major challenge for the study of spatial and aspatial accessibility analyses in education results from the potential for rampant misrepresentations of the services supplied to the populations served. Accessibility misrepresentations have been researched in relation to impacts on school choice (Lee, Croninger, and Smith 1994; Ben-Porath 2009; Butler and Hamnett 2010) and the expansion of academic curriculums (Hallet and Venegas 2011). In these referenced works the misrepresentations of accessibility routinely were linked to sociopolitical platforms which promoted certain ideological agendas over the prolongation of challenges in public schools (Howley, Johnson, and Petrie 2011; Satz 2012). However, it is of importance to note that

not all misrepresentations of accessibility are blatant as in some situations challenges are overlooked.

Howley, Johnson, and Petrie 2011 (2011) claim general dilemmas caused by accessibility misrepresentations may be of particular damage to high poverty minority populations. The research of Yoshida and Deichmann (2009) uncovered spatial accessibility gaps as a determinant to gauge potential levels of deprivation to services which is of particular importance for disadvantaged populations. Within this study, a highlight of accessibility gaps similar to Yoshida and Deichmann may provide an opportunity to reveal the extent of deprivations which may be misrepresented through common generalized methods utilized by school districts for access analysis.

Race has accounted for significant focal points in accessibility research, particularly in relation to the aforementioned challenges and misrepresentations. Within the works of Redcay (1936), Davis and Donaldson (1976), Bischoff (2008), and Logan et al. (2012) common arguments were made that dilemmas which surround accessibility disproportionately affect Nonwhite populations; therefore, school accessibility problems exist as Nonwhite accessibility problems. Nonwhite populations of the Baton Rouge area are overwhelmingly comprised of Black residents, thus if the aforementioned literatures proves true accessibility disparities of this region are the disparities of Black populations.

Prominent themes in the research of Black education accessibility have been access to quality school (Logan, Mina, and Adar 2012; Satz 2012), race and rational school choice theory (Lee, Croninger, and Smith 1994), and Black mobility (Davis and Donaldson 1976; Freeman 2010). Race has been principle to the legacy of accessibility disparities within Louisiana public education, especially for high school students. The history of these disparities is further

investigated to uncover the contextual background for properly framing contemporary challenges, conditions, and misrepresentations.

2.2 Public Education and High School Development in Louisiana

When placed into proper context the challenges and inequalities of school accessibility can be shown to date back centuries to the era of chattel slavery. At this time, the acceptance of education strongly progressed with the rejection of opportunities extended to Free or Enslaved Blacks (Davis and Donaldson 1975). The eventual establishment of the public education system in 1747 would only mainstream the contradictory nature of the early visions of education and progress in America. It was not until a range of state led policies in the mid-nineteenth century that public schools came into favor for Louisianans (Brewster-Turner 2004).

Despite the emergence of public schools, many families perceived them as unable to match the quality of private schools (Roddy 1942). The transition from majority private to public schools in Louisiana was strongly countered by a small minority who possessed a combination of “self-respect, ignorance, and affinity for the status quo” (Louisiana Department of Education 1865). The strength of this resistance was highlighted by the early identifications and labels of public schools as a form of charity (Roddy 1942). Following the Civil War, abject poverty in Louisiana sealed the demise of private education in many communities. Ironically, this spread of poverty contributed to state budget shortages which initially emboldened resistance as some found it wasteful and damaging to pursue publicly funded schools (Louisiana Department of Education 1864, 1865). However, leadership of the time saw public education as an investment for the future, which was of great importance as growing populations could no longer afford the costs of private schools (Louisiana Department of Education 1865).

With the arrival of Louisiana public schools over 150 years ago, accessibility became the central focus of early school development (Pearce 1931). In fact, between the mid-nineteenth to the early twentieth centuries leaders of the state sought to establish public schools within every population center of their districts (Foote and Lewis 1938, Roddy 1942, Pearce 1931). Accessibility was at this time based on the walking distance and conditions to schools for local populations, and general thresholds varied across locations (Hall 1966, Pearce 1931).

Foote and Lewis (1938) and Hall (1966) identified that within rural communities accessibility was so significant it outweighed a school's physical condition and teacher quality. In addition to accessibility, attendance zone minimums were developed to determine if schools were to remain open (Pearce 1931). In most BRMSA parishes the minimum amount of students was set at 10, and gradually increased until the end of the schoolhouse era in approximately 1910 (Hall 1966, Roddy 1942). When below this threshold, schools were automatically closed and consolidated with nearby locations. In some case consolidations were requested by local residents, conversely in other cases strong resistance was a routine anti-consolidation response.

The primary forms of early public schools in Louisiana were schoolhouses. The early schoolhouses often hailed in comparison to the private school facilities (Roddy 1942). However, schoolhouses were viewed as a sign of progress, particularly when compared to former public sites found in private homes, businesses, churches, or government buildings (Hall 1966, Redcay, 1937, Frazier 137). Early schoolhouses in the BRMSA were typically one, two, or three-teacher facilities and larger developments came with population growth. The schoolhouse architecture and design consisted of "ordinary frames or log houses," and many lacked bathrooms and windows to shelter students, particular in rural settings (Fay and Johnston 1898, Pearce 1931).

In several cases the locations of these schools were so remote that only local residents were familiar with their locations (Frazier 1937, Hall 1966, Foote and Lewis 1938, Pearce 1931). Schoolhouses were also extremely mobile and essentially followed the migration annual pattern of populations (Pearce 1931). Due to the historic school accessibility goals and the sheer volatility surrounding schoolhouses in a given year, dozens of schoolhouses were found around communities. For example, in 1900 the research identified over 200 schoolhouses which were known to exist within the nine parish area that defines the Baton Rouge Metropolitan Statistical Area of today. While primarily intended to serve elementary students, some schoolhouses which served as high schools were found in Iberville and West Baton Rouge Parishes early in Louisiana history (Fay and Johnston 1898).

For a brief period of time a degree of equity and equality were attained between Black and White schools under the guidance of the Freedmen's Bureau during Reconstruction (Redcay 1936, Porter 1938, Smith 1992). However, such conditions were only temporary. Many of the Black or mixed schools established during Reconstruction lost local support and became disregarded with the return to home rule in 1877 (Porter 1938), and at this time resources in many BRMSA communities overwhelmingly shifted to White schools (Hall 1966). These events resulted in expansions and improvements to White schoolhouses concurrent to an expanse of community support for publicly supported schools. Further attempts to pursue an education for Black students in several communities were met with blatant hostility and terror as Black public schools would be set afire and pupils beaten and frightened (Porter 1938).

Realities similar to the aforementioned brought early Black schools physically and socially close within their communities (Rodgers 1975). However, it would be a misnomer to identify this period as a schoolhouse era for Black populations of Louisiana. Similar to White

schools of decades past, Black schools from Reconstruction through the early twentieth century were found in churches, lodges, and private homes (Frazier 1937). For example, in the case of West Feliciana Parish, all its Black schools were once found in churches leading up to 1900 (Hall 1966). The physical conditions of Black schools were routinely cited deplorable, and schools would often get labeled unfit for occupancy.

Attendance at most rural Black schools was comparatively low to that of White schools. Disparities resulted from demands of sharecropping which required children to work farms (Roddy 1942). Another potential factor was the formation Black private schools over the late nineteenth century. These schools were all located in Baton Rouge and were linked by social networks established between churches of East Baton Rouge, West Baton Rouge, East Feliciana, West Feliciana, Iberville, and Pointe Coupee Parishes (Frazier 1937). Although these schools were spatially distant, they provided unique opportunities not found locally for the social mobility of rural Black residents throughout the BRMSA. The rise of Black private schools was a response to fill voids left by the decline in accessible Black public schools following the previously stated return to home rule. Race and geography were salient to the slow rise of Louisiana's public education system. Inequalities materialized into divergent spatial, social, and temporal conditions for the high schools of Black and White populations of Louisiana. For example, high schools for White populations were primarily structured in traditional forms. However, high schools which served Black populations of state communities initially were structured as industrial or vocational based schools.

Heading into the twentieth century, roughly thirty high schools existed in Louisiana with nine located in the BRMSA (Porter 1938). Over time the state initiative of school establishment in every community manifested into at least one high school being established in all sixty-four

parishes. The development of high schools signified a final pivot beyond the White schoolhouse era in which schools were “primitive in their architecture” and often “used by mules and cattle for refuge” (Louisiana Department of Education 1898).

At the turn of the nineteenth century, a total of two schools offered some high school level courses within the BRMSA. These schools included the First Ward School of West Feliciana and the Normal and Industrial School of St. Helena (Frazier 1937). Independent structures for Black public high schools did not begin to appear within the BRMSA until the creation of Baton Rouge Colored High School in 1912 and Iberville High School of Plaquemine in 1916 (Frazier 1937). Both schools were products of local school districts as opposed to commonplace philanthropic developments. Baton Rouge Colored High was eventually relocated and renamed to McKinley High School (Frazier 1937, 84) and together with Iberville High would serve as the only traditionally structured high schools for Black populations in the region for decades. While these schools began to flourish, rural Black populations experienced a different form of high school development in the form of training schools.

Training high schools were introduced into the region by combinations of various philanthropic initiatives spearheaded by the Rosenwald Fund (Smith 1992, Porter 1938). In short time, East Feliciana, St. Helena, Livingston, and Ascension Parishes each housed a training high school for Black communities. The curriculums of training and traditional schools shared strong associations; however, training schools naturally emphasized vocational, industrial, and homemaking education and skill development. The promotion of vocational based studies mirrored the influence of Smith-Hughes agricultural schools on White communities.

These differently composed high school structures were instrumental actions aimed to reflect unequal social status of Black and White communities of the time. Inequalities soon grew

to impact the location and spatial distribution of high schools within communities along the general time periods schools were established. High schools which served White students were heavily developed from the 1890s through the 1930s. Schools of this group included: Baker, Poydras, McKowen, Istrouma, Freyhan, and Denham Springs. High schools which served Black students were heavily established from the late 1940s through the early 1960s. Schools of this group included: Kennedy, Dawson, Levy, Northwestern, and Rosenwald.

The research of Roddy (1942), Rodgers (1975), and Redcay (1937) indicated that Black and White movements for public high schools shared common goals of poverty reduction, job readiness, and college preparedness. The establishment of high schools within Black and White communities came during the midst of national public high school movements and earned recognition as a step towards the sophistication of Louisiana public education (Anderson 1988).

Public transportation gradually became a driving factor behind the integration of public schools much like it had for high school establishment. Busing was viewed as a mechanism which alleviated distance oriented challenges. Integration era busing protests resulted despite the strong presence of busing for decades within suburban and rural Black and White communities (Hall 1966; Davis and Donaldson 1975). A common argument to maintain neighborhood schools was heavily articulated during this period, but in the south this argument translated into de facto racism given that residential communities were heavily segregated (Davis and Donaldson 1975).

The time periods of integration locally varied considerably as waves of court challenges interjected different dynamics into the process. One of the more interesting observations within the scope of this research was the short life span of the previously referenced Black high schools in several communities of the BRMSA. In an overwhelming majority of cases within the Baton Rouge area, White high school facilities were chosen as the integrated high school location site.

Prior to integration the high school held a unique place within the social structure of Black and White communities and experienced unparalleled dynamism over time in the local landscape. Understanding these relationships between high schools and communities is important for current relationships.

Busing protests resulted despite the strong presence of busing for decades within suburban and rural communities (Davis and Donaldson 1975, Hall 1966). A common argument to maintain neighborhood schools was heavily articulated during this period, and in the south this argument meant de facto racism given that residential communities were heavily segregated (Davis and Donaldson 1975). General fears from Whites surrounded the notion of mixed race schools, and the quality of education becoming drastically reduced (Davis and Donaldson 1975, Porter 1938, Smith 1992). These responses reflected the aforementioned concept of “place invaders” detailed in Cresswell (2010) and Kabachnik (2010).

The closure of Black high schools occurred heavily in the BRMSA during the 1960s and 1970s with school desegregation initiatives being implemented. Despite such efforts an abundance of BRMSA public schools remained segregated for prolonged periods of time (Brewster-Turner 2004). Desegregation created new dynamics in high school accessibility, and this integrated landscape form the basis for quantitative analysis with an understanding of what has occurred previously and how the past may influence the quantitative results of recent decades and future trends.

2.3 Accessibility Measures

Geographic based methodologies which examine accessibility have undergone growth and refinement over decades since the development of time geography in the mid-twentieth century. Three salient factors behind these changes have included advances in GIS (Hawthorne

and Kwan 2011), influences from intradisciplinary movements, and desires to better impact public policies (Pearce 1931). Mabogunje (1980) captured the myriad of influences in defining accessibility:

Accessibility to public goods such as employment opportunities, resources and welfare services, can be defined both in physical and social terms. In a physical sense, it relates to the distance to be covered by an individual in an attempt to secure the good; socially, it relates to barriers of class, status or recognition which he [sic] may also have to overcome in the process. (*The Development Process: A Spatial Perspective*, 40)

This general construct of accessibility helped to set a foundation for critical challenges to GIS accessibility research. As a result of ever-emerging critical perspectives, GIS accessibility analyses have grown to account for: individual level phenomena (Kwan 1998; Ben-Porath 2009; Hawthorne and Kwan 2011), nonspatial social factors (Wang and Luo 2005; Dai and Wang 2011), and cognitive/behavioral patterns and perceptions (Ben-Porath 2009; Lindberg 2010; Raubal, Miller, and Bridwell 2011). The ongoing sophistication of GIS-based accessibility methodologies have expanded and introduced geospatial analyses into highly dynamic and contentious social policies of today including healthcare (Wang and Luo 2004; Luo and Qi 2009), and public education (Talen 2001; Guzik 2003; Butler and Hamnett 2010).

Wang (2006, 77) identified the general classification of access based research as “two dichotomous dimensions (potential vs. revealed, and spatial vs. aspatial).” In the potential vs. revealed category, potential access is the likely use of a service based upon area supply, while revealed access is the actual service usage. In the spatial vs. aspatial category, Wang and Luo (2005) stated spatial access “emphasizes the importance of spatial separation between supply and demand as a barrier or facilitator,” and aspatial access “stresses the nongeographic barriers or

facilitators.” There is no mutual exclusivity as studies can be implemented to analyze combinations such as revealed aspatial or potential aspatial. For example, in this research investigation potential spatial and aspatial accessibility is examined. A revealed accessibility approach would have required personal data of students based upon their school of attendance.

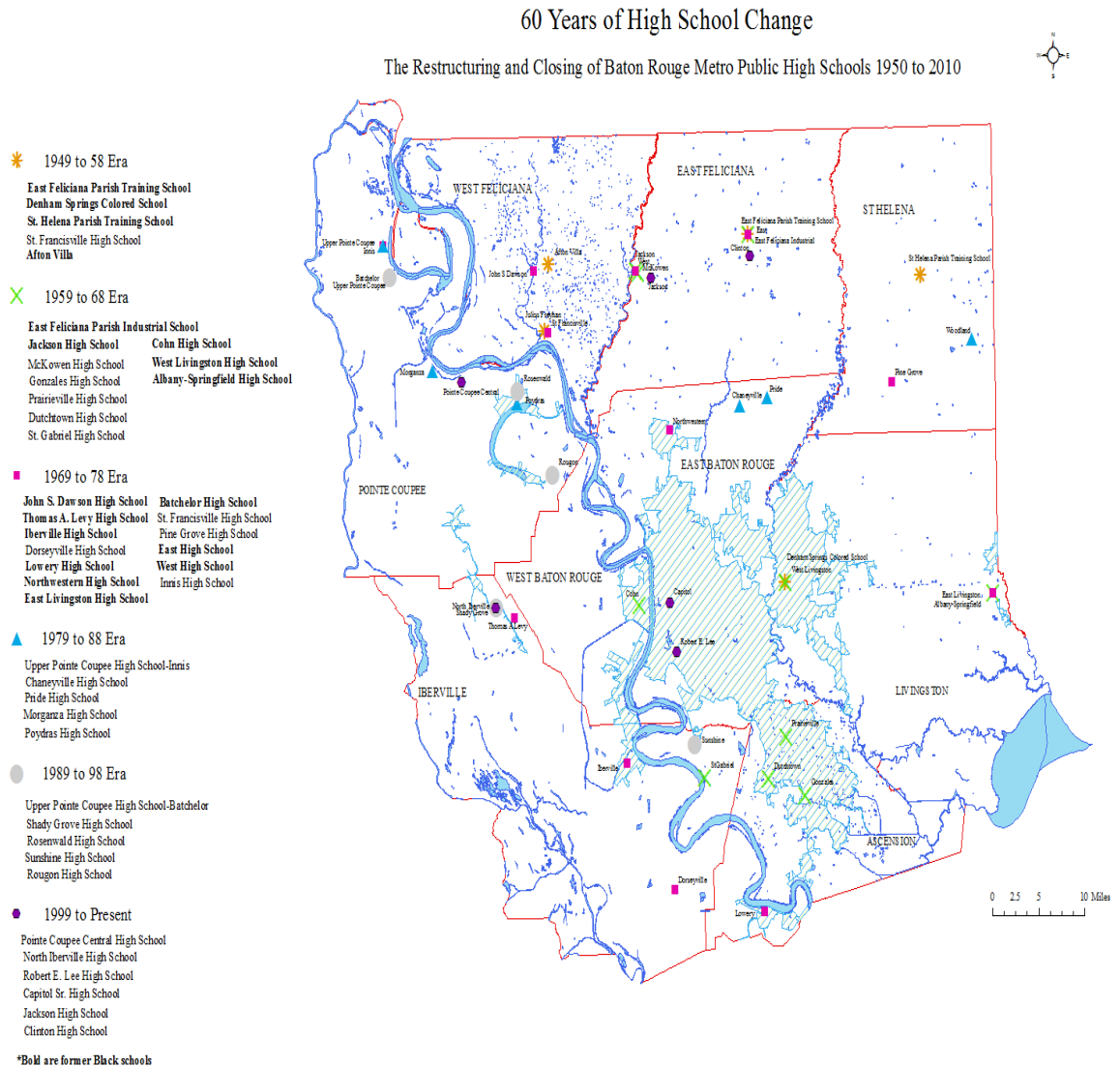


Figure 2.1 High school change approximated from 1950-2000

Wang (2006, 77) identified the general classification of access based research as “two dichotomous dimensions (potential vs. revealed, and spatial vs. aspatial).” In the potential vs. revealed category, potential access is the likely use of a service based upon area supply, while revealed access is the actual service usage. In the spatial vs. aspatial category, Wang and Luo (2005) stated spatial access “emphasizes the importance of spatial separation between supply and demand as a barrier or facilitator,” and aspatial access “stresses the nongeographic barriers or facilitators.” There is no mutual exclusivity as studies can be implemented to analyze combinations such as revealed aspatial or potential aspatial.

Despite the myriad of potential constructs, the supply demand ratio remains principle to of accessibility studies (Thousez, Bodson, Joseph 1988). This ratio formed the regional availability model which held heavy usage in the accessibility studies on healthcare services and jobs (Wang 2006; Luo and Qi 2009). Regional availability compares a ratio of service supplies to demands within a defined area. The simplicity of this method allowed for easy insertion into public policy research; however, representational shortfalls provided impetus for new and improved methodologies. The salient shortfalls which necessitated improvement included an assumption of equal access within a study area (Luo and Qi 2009; Wang and Dai 2011), an inability to differentiate supply capacities (Wang and Dai 2011), and the disregard of spatial interaction from service providers outside of the region (Thousez, Bodson, and Joseph 1988; Wang 2006; Luo and Qi 2009; Wang and Dai 2011).

The regional accessibility approach developed in response to the aforementioned challenges with the regional availability method. Luo and Qi (2009, 1101) identified regional accessibility as an approach which “utilizes a gravity model formulation to factor interaction between supply and demand locations in different regions with distance decay.” Wang (2006)

recognized the completeness of the gravity model as advancements allowed for supply demand interaction to be better represented. Luo and Qi (2009, 1101) documented a shortfall with gravity based regional accessibility in that “while conceptually more complete, a gravity model...is not intuitive to interpret and requires more data input to calculate.”

The response to advance beyond such challenges led to the development of floating catchment area methodologies which encircled a location “to define a filtering window and uses the average value within the window to represent the value of the location (Wang 2006).” The floating catchment area method earned significance in accessibility research; however, fallacies regarding real supply demand distance and supply utilization necessitated growth of this method. This development led to the establishment of the Two-Step Floating Catchment Area method (2SFCA) by Radke and Mu (2000).

The 2SFCA continues the evolution of the supply-demand ratio in GIS accessibility research. This method, modified by Luo and Wang (2003), is a special case of the gravity model which maintains advantages of the gravity model, but the method also is intuitive to interpret (Luo and Qi 2009). The 2SFCA represented below in equation 1.1 identifies the supply demand ratio R_j based upon the supply threshold capacity of S_j over the threshold demand locations (k) within d_0 from location j , where d_{kj} equals the distance of k and j , and D_k is the catchment demand at location k (Wang 2006).

$$R_j = \frac{S_j}{\sum_{k \in \{d_{kj} \leq d_0\}} D_k}$$

Equation1.1

Finally, based on the work of Wang (2006) equation 1.2 displays how the 2SFCA “determines accessibility at demand location i , searches all threshold d_0 supply points j at location i and sum the supply-demand ratio at R_j .”

$$A_i^F = \sum_{j \in \{d_{ij} \leq d_0\}} R_j = \sum_{j \in \{d_{ij} \leq d_0\}} \left(\frac{S_j}{\sum_{k \in \{d_{kj} \leq d_0\}} D_k} \right)$$

Equation 1.2

While the 2SFCA brought significant improvement in GIS accessibility analyses, two important challenges exist. Not all services within a catchment zone are equally reachable and the potential attraction of peripheral service providers to catchment populations may impact access interaction. Spatial weighting techniques utilized by Luo and Qi (2009) and Wang and Dai (2011) have been implemented to overcome the former challenge posed by the 2SFCA method.

More recent challenges facing the accessibility methodologies relate to the representation of aspatial nongeographic factors (Luo and Wang 2003), and this challenge is significant because aspatial factors may inhibit mobility and access in addition to spatial influences. Two strong nongeographic factors which impact school accessibility are race and poverty. Progress continues on these aspatial challenges which only ensure future vitality of GIS accessibility modeling. Despite the evolution of GIS based accessibility methodologies the simplistic regional availability model has provided an ostensibly strong representation of school accessibility.

CHAPTER 3: STUDY AREA AND DATA

3.1 Study Area

The 2010 Baton Rouge Metropolitan Statistical Area provided an ideal research area due to socioeconomic diversity of the population, volatility within the high school landscape, and policy influences due to the concentration of government institutions. Figure 3.1 identifies this region consists of nine parishes which include: Ascension, East Baton Rouge, East Feliciana, Iberville, Livingston, Plaquemines, St. Helena, West Baton Rouge, and West Feliciana. In addition to containing Louisiana's capital city of Baton Rouge, the region is also home to a large range of incorporated and unincorporated communities such as: Bains, Baker, Clinton, Denham Springs, Donaldsonville, Greensburg, Gonzales, New Roads, Plaquemine, St. Francisville, and White Castle.

Accessibility analyses were performed for 1990, 2000, and 2010. These study periods were selected due to the credibility of data obtained from various sources which could be dated back to approximately the 1989-1990 school year. Credible historical data obtained for years prior to 1989 were of value as the data placed events which impact the high school landscape into context. The region's population in 1990 was 528,264, followed by 705,973 in 2000 and the 2010 population was 802,484. A total of 42 public high schools which served the region in 1990 were examined along with 38 high schools in 2000. For 2010, two groups of schools were examined. The first group examined 31 total public high schools which operated within parish level school districts. The second group examined a total of 34 high schools which also accounted for three additional independent schools districts which were established in East Baton Rouge Parish during the 2000s.

BRMSA Parishes



Figure 3.1 BRMSA Parishes

3.2 Variable Definitions

- (1) Two Step Floating Catchment Area- a spatial smoothing technique and special case of the gravity model used to measure accessibility between supply sites and demand locations. It shall be referred to as the 2SFCA from here forward.
- (2) Public high school- includes traditional schools grade 9-12, senior high schools grades 10-12, secondary schools grades 6-12, and community high schools grades 1-12.
- (3) Baton Rouge Metropolitan Statistical Area- census classification of East Baton Rouge and eight neighboring parishes since 2003. It shall be referred to as the BRMSA from here forward.
- (4) School Performance Scores- an evaluation system used to account for the status of public schools based upon scoring of measurable variables. These variables consist of performance test scores and graduation indexes for Louisiana public high schools.

3.3 Data Collection

The unique nature of this study dictated that thorough procedures were to be implemented to validate data accuracies and ensure flexibility for the incorporation of public school data into the quantitative analyses. With education and geography resources as core research components, expansive sets of data were attained and incorporated into contemporary and historic geodatabases and database files in order to meet the aforementioned objective. Significant complexities existed with the formation of historic geodatabases as data was gathered from several unrelated sources. By having awareness of this fact, substantial time was allotted for this phase of the research process; however, this proved valuable in allowing for credible data to be integrated into the numerous methodologies utilized throughout this research.

Louisiana Department of Education (LDOE) school directories, housed at the Louisiana State Library, provided the primary resource for the obtainment of school location information and general attribute data. The LDOE data tables contained salient variables which displayed school enrollment figures, full-time equivalent (FTE) teachers, curriculum structures, and the duration of school existence. In addition to relevant contemporary data, the directories were also found to hold data for various forms of Louisiana public schools which dated back for decades.

Although directories were printed annually, only random assortments for historic school years were readily available. Data tables were found to address the thirty year research period as well as the previous five decades which allowed for any historic context to be examined. Many historic LDOE directories exist exclusively in print form, thus digitization of data tables was required for complete implementation of a GIS based approach. The digitization of data tables was conducted to produce data files and features classes which represented public high schools during years under analysis. Creation of files and databases were primarily developed with Microsoft Excel 2010 and imported into ArcCatalog 10 for further edits and quality control procedures.

The feature classes were expanded and validated utilizing the Geographical Names Information System (GNIS) and National Center for Education Statistics (NCES) public school databases. School address locations were the major field updated by the GNIS and NCES supplementary resources. When location challenges remained a combination of parish and city historical texts along with historical LANDSAT and NAIP imagery were examined to pinpoint former school campus sites. Historic imagery analysis proved invaluable in order to determine demolished and/or redeveloped high school landscapes. This was due particularly to discernible remnants of the former campus football fields identified within the imagery. In a final follow up,

field visits to former school sites were conducted in Livingston, St. Helena, East Feliciana, West Feliciana, and Pointe Coupee Parishes to photograph and record site information as many sites faced uncertainty due to razing and a lack of attention from the community.

In addition to address location data, full-time equivalent (FTE) fields accounted for full-time and part-time teachers employed at each high school was significant for the 2SFCA analysis. Values contained in this data field were collected and validated using LDOE and NCES resources. Wang and Luo (2005) detailed how the US Department of Health and Human Services utilizes the population to FTE primary care physicians' ratio to determine Health Professional Shortage Areas (HPSA). Within the field of education, FTE teachers provides a standardized method of representing teachers and education received in secondary schools based upon courses offered (Benham 2005). The use of FTE teachers within the 2SFCA method is of more value to account for potential interaction between the school and young people of communities it services. This structure allows for a school services to be based upon the variety or number of courses taught at a school.

2000 and 2010 school accountability data were exclusively collected from the LDOE website. In order to avoid privacy concerns, this data was chosen for study implementation because it references aggregate school and district level data rather than individual student data. This step produced an ecological fallacy as interpretations for individuals were based upon group level statistics. The formulation of accountability data has changed throughout time for high school grade levels of Louisiana. However, graduation (30%) and assessment (70%) measurables represented the general categories of accountability inputs for high school ratings in 2000 and 2010.

Summary File 1 (SF1) data based on the 1990 and 2000 census was downloaded from the National Historic Geographic Information System (NHGIS) online database, and 2010 data was downloaded from the U.S. Census website. SF1 data, which is 100-percent data, was the only accessible 2010 release at the start of research, thus to maintain consistency SF1 was used for prior decennial data despite other options being available for those time periods. Four major SF1 sources tables selected for analysis included: population, race, age, and households.

Tiger Files of boundaries for urban areas, parishes, streets, and block groups for the 1990, 2000, and 2010 census were obtained from the United States Census website. The block group level focus is consistent with previous school accessibility studies such as Talen (2001). Census tracts were downloaded for 2010 in addition to the previously stated shapefiles including block groups. These tract shapefiles were added to compare and contrast the 2SFCA at different scales given that variables such as proximity do not necessarily translate to enrollment at a particular school.

The merit of the block group approach is that it provided the lowest scale level of census data which could be contained within school zones. Census tracts were better equipped to identify the general locations of populations. Within this work, the 2SFCA method examines Euclidean (straight-line) distance between two location points. Euclidean distance measurements were viewed as ideal due to the absence of address data which could be inserted into a network analysis. The Euclidean approach required block groups and census tracts to be geoprocesed from polygon to points and create centroids. Creation of block group centroids thus allowed for distance calculations to occur between the centroids and the rooftop geocoded high school sites while census tracts calculated distances from weighted population centers.

3.4 2SFCA

Implementation of the 2SFCA method began with the geoprocessing of census block groups from polygons to points shown in figure 3.2. Distance values were calculated between block group centroids and school locations for each public high school in the region. This step allowed for some areas to fall within the catchment of more than one school, this outcome primarily was found within urban areas.

The 2SFCA method primarily has been used to study accessibility to medical services which unlike public high schools hold no defined boundaries. This means that the use of public schools is assignment based, often with rigid boundaries. The limited freedom of choice presented a challenge for implementation of the 2SFCA method, particularly in parishes which lack potential competition and are served by only one public high school.

In order to fully address the breadth of accessibility challenges presented by school boundaries, datasets were constructed to adhere to the division of schools at local and district scales. Spatial relationships were clearly defined to ensure that when necessary accessibility results did not cross into administrative boundaries of other schools or school districts in the BRMSA. This step ensured accessibility results acknowledge the legal barriers to mobility, which is of particular importance for peripheral or hinterland concentrations of students. This action also allowed schools and school districts with limited or no choices to be analyzed independently from districts with more potential choices in public high schools. The reality is that not all school districts are equal; therefore, it is of value that implementation of the 2SFCA analysis allows for pairing based upon various compositional factors such as funding or total student age population.

Centroids and High Schools

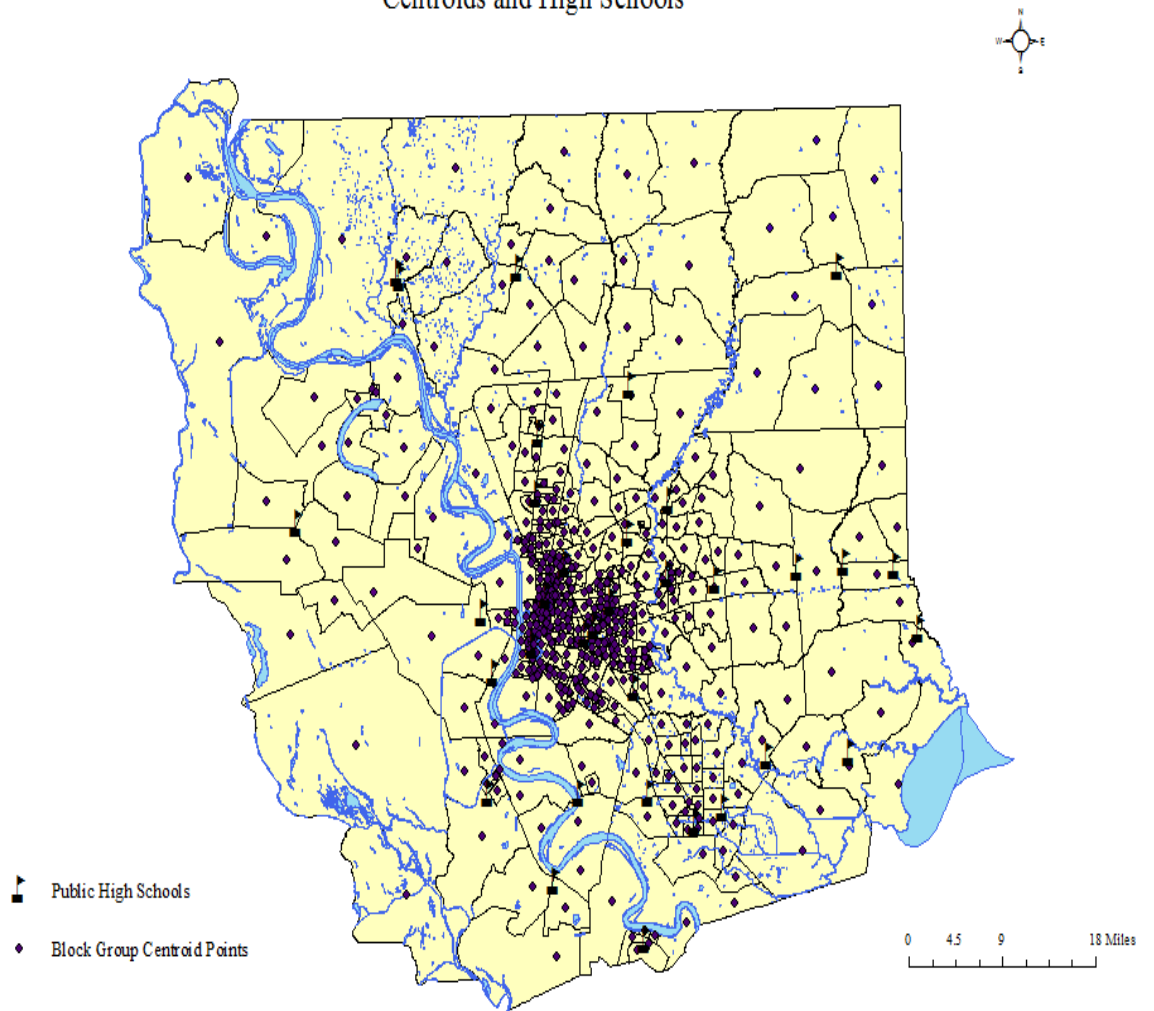


Figure 3.2 Block group centroids which display geographic centers of block groups within the nine parish study area

Population-Weighted Centroids and High Schools

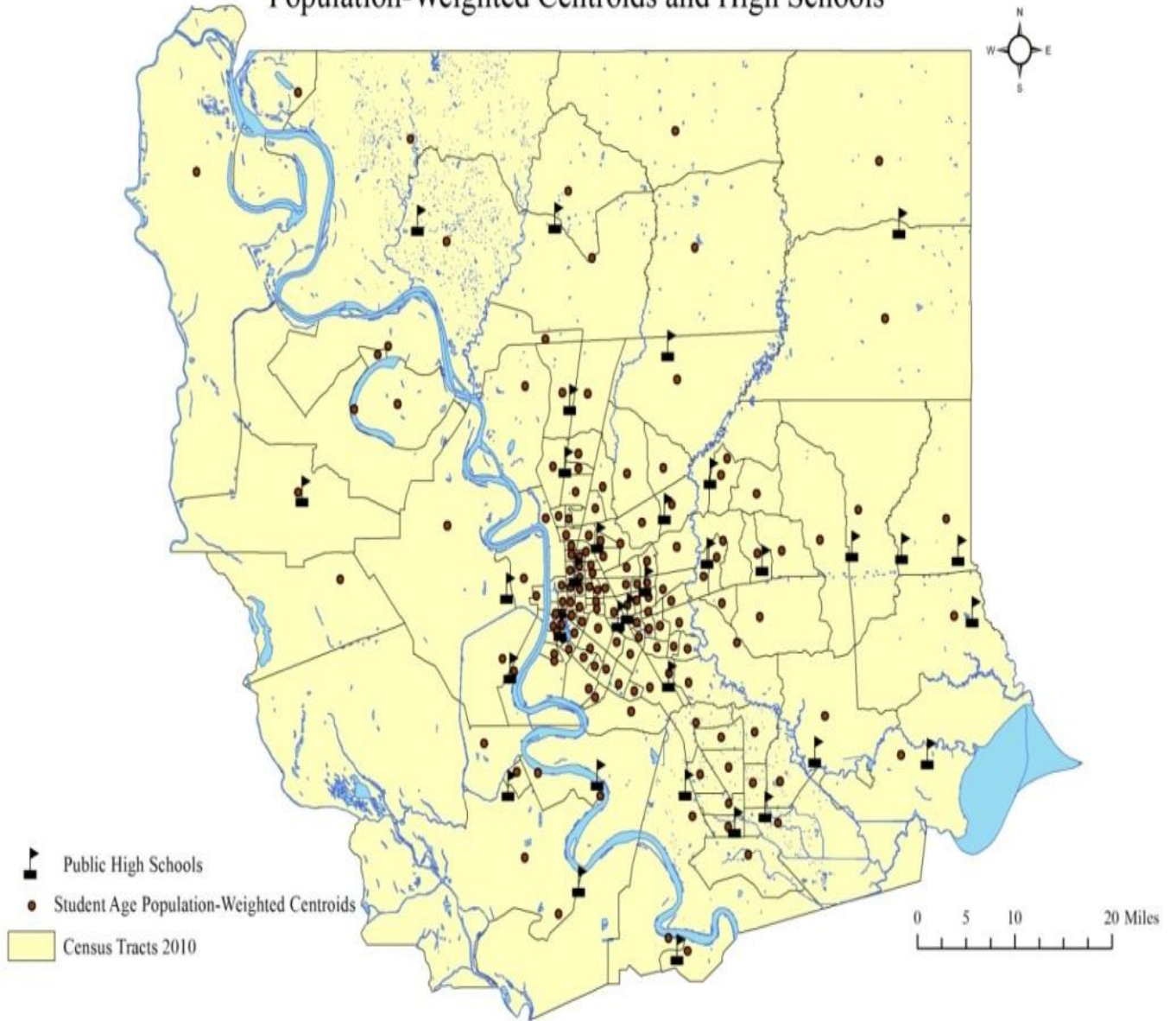


Figure 3.3 Population weighted census tracts based upon high school student age group

A consistent concern within this research was the potential misrepresentation of accessibility. Accessibility methods can be implemented at a variety of scales. To compare and improve upon the block group based approach, a census tract analysis displayed in figure 3.3 was also implemented. The census tract approach utilized the weighted population of high school age students to better represent the demand and location of students as opposed to the geographic center utilized within the block group approach.

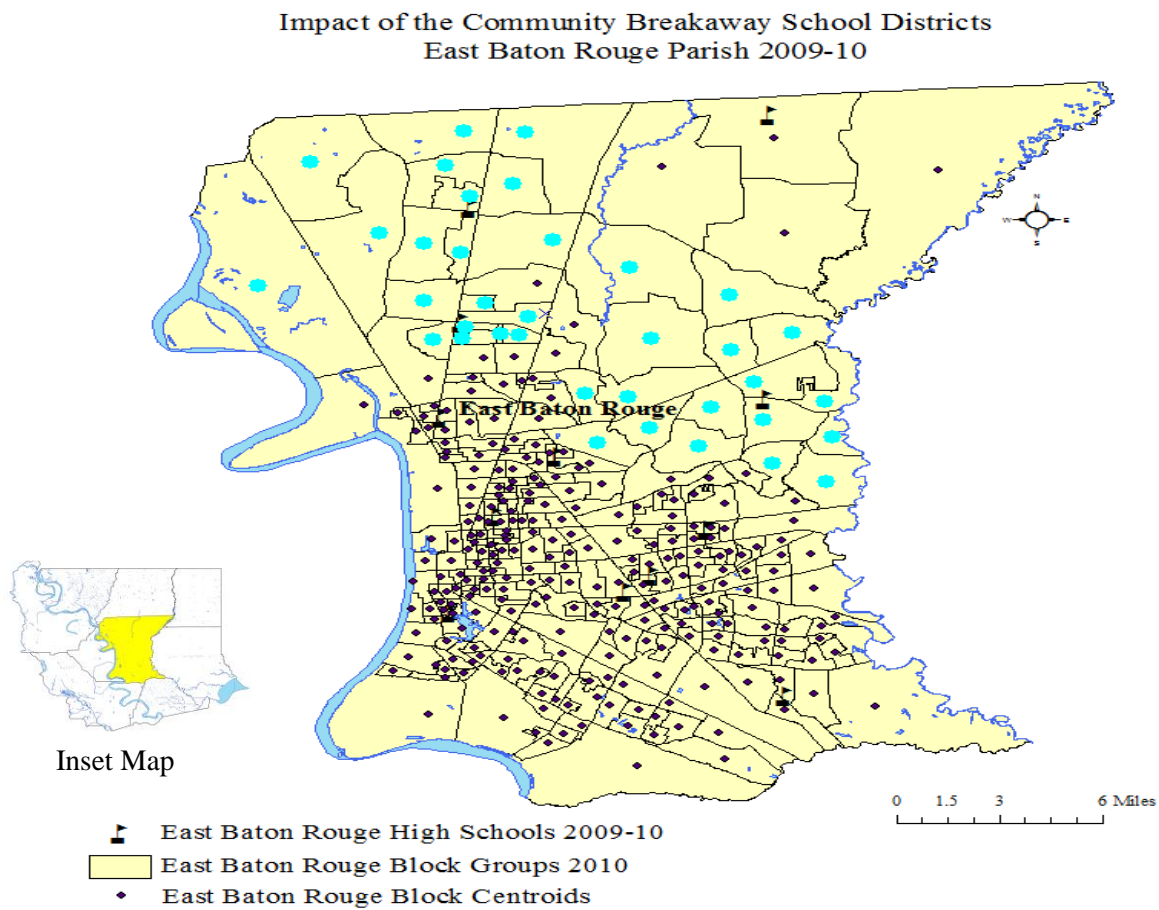


Figure 3.4 District extraction for the independent school districts of Zachary, Baker, and Central within East Baton Rouge Parish

An additional representational challenge presented within to this research resulted from the separation of former unitary school districts. Since the turn of the millennium, the East Baton Rouge Parish school system has experienced a loss several schools including three public high schools by the creation of breakaway community school districts. To account for the loss of the three breakaway districts, the three schools and 2010 block groups predominantly associated with their attendance zones were removed for the 2010 five mile 2SFCA analysis shown in figure 3.4. In addition to improving representation, this action was inspired by the work of O’Sullivan (2005) which contends that addressing temporal change should be an essential objective for the growth of GIS based research.

$$A_i^f = \sum_{j \in \{d_{ij} \leq d_0\}} R_j = \sum_{j \in \{d_{ij} \leq d_0\}} \left(\frac{S_j}{\sum_{k \in \{d_{kj} \leq d_0\}} D_k} \right)$$

Equation 3.1

The primary 2SFCA spatial accessibility analyses in this research were based upon predetermined catchment zones. Distances within a five mile (8046.72m) threshold were extracted and exported for further analysis in developing teacher to population ratios. The distance extraction follows the condition in equation 3.2:

$$i \in \{d_{ij} \leq d_0\} \text{ and } k \in \{d_{kj} \leq d_0\}$$

Equation 3.2

The five mile threshold has been successfully utilized in past studies on focused on school accessibility (Vouk and Dulaney 2009). However, the successful research of Deerenberg,

Zuurmond, and Melser (2010) adopted a five kilometer or three mile approach to examine secondary school accessibility in the Netherlands. To gain certainty in this study, a series of trial calculations were conducted using distances of three, five, and ten miles to determine if a more suitable alternative may have existed unique for the BRMSA. Sensitivity calculations proved the five mile threshold most appropriate for providing applicability with schools found in rural, suburban, and urban regional settings. The ability to account for urban and rural environments was an important condition to be met as Luo and Qi (2009) identified rural and urban applicability as a key challenge to the 2SFCA in healthcare accessibility research.

Following the completion of threshold extractions, attributes of high schools and block groups were linked to the distance table by school and population location. The population was next summarized around each school location. Based upon previous implementations of the 2SFCA method, this step would allow for the total population to be summarized around any given school location. Use of the entire population could substantially inflate the catchment zone analysis; therefore, age group datasets similar to an approach by Talen (2001) were compiled to instead focus on fifteen to eighteen year olds. The summary of populations within the threshold distance from each school location meets the condition in equation 3.3:

$$\sum_{k \in \{d_{kj} \leq d_0\}} D_k$$

Equation 3.3

The high schools attribute table was joined to the aforementioned summary of age based population table to compute the teacher-to-population ratio at each public high school location. Ratios were calculated utilizing the following equations:

$$100 * \frac{FTE_{teachers}}{SUM(popu)}$$

Equation 3.4

$$10 * \frac{FTE_{teachers}}{SUM(popu)}$$

Equation 3.5

The use of dual equations was meant to balance misrepresentations of urban and rural disparities of school access discussed by Luo and Qui (2009). Application the two equations identified two distinct regions within the BRMSA based upon student population identified in table 3.1. Region one was found to contain low catchment zone populations below 1000 students. Region one analyses were performed with equation 3.5. Region two was identified to contain high catchment zone populations above 1000 students. Region two analyses were conducted with equation 3.4. These step implemented the term $\frac{S_j}{\sum_{k \in \{d_{kj} \leq d_0\}} D_k}$ in equation 3.1.

The final phase of the 2SFCA implementation involved the summarizing initial teacher-to-population ratios based upon population location. This summary field was used to identify changes to the availability of high school teachers reachable from residential locations during each period under study. This step determined accessibility A_i^F in equation 3.1.

Table 3.1 2SFCA sub regions

Region 1		Region 2	
Parishes	Cities	Parishes	Cities
East Feliciana	Albany	Ascension	Brusly*
Iberville	Donaldsonville	East Baton Rouge	Plaquemine*
Pointe Coupee	Doyle	Livingston	
St. Helena	French Settlement		
West Baton Rouge	Holden		
West Feliciana	Maurepas		
	Northeast		
	Springfield		

* Met Region 2 population threshold for one period of analysis (2000)

An additional adaptive 2SFCA analysis was applied to 2010 data; however, rather than utilize the five catchment zone this analysis was based upon the defined attendance zones of high schools and the larger scale district boundaries. The effort was inspired by the potential misrepresentation of accessibility based upon the five mile catchment area, in particular between urban and rural located high schools. The attendance zone approach measured Euclidean based accessibility between high schools and weighted population centers previously displayed in figure 3.3. The attendance approach was instituted to follow a similar implementation as the five mile approach except no separation was made between communities based upon their population size. The 2SFCA accessibility scores of school districts were the averages of high school attendance zone accessibility scores.

3.5 Common Factor Analysis

In addition to the 2SFCA method, a common factor analysis was implemented to address multicollinearity (high correlation) of census data and uncover the nonspatial underlying factors salient in the interpretation of unique social groups within the region. Wang (2006) addressed the strong likelihood for census based variables to be highly correlated and explained the merits statistical approaches such as the factor analysis for solving this dilemma. Furthermore, the factor analysis approach was adopted for the results to be paired spatial accessibility findings in order to demonstrate potential relationships between social conditions of populations and their high school spatial accessibility.

Data availability allowed for the factor analysis to be performed on datasets for the 1990, 2000, and 2010. NHGIS Summary File 3 (SF3) data was extracted for the 1990 and 2000 analyses. American Community Survey (ACS) five-year (2006-2010) data was extracted for the

2010 analysis. Collectively, the datasets were ideal selections because they possessed an abundance of potentially valuable variables to input into a statistical analysis of education accessibility.

In reflecting previous studies in food accessibility (Dai and Wang 2011), healthcare accessibility (Wang and Luo 2005), and school accessibility (Baschieri and Falkingham 2011; Logan, Mina, and Adar 2012), a diverse set of variables were chosen for the aspatial factor analysis. Nonspatial variables such as race and poverty have strongly influential access studies to various community resources and services. The variables of this study accounted for a diverse representation of nonspatial challenges at individual, household, and community levels to public high schools:

1. Demographic: Nonwhite population, rural population
2. Socioeconomic status: population under age 18 and impoverished, single parent household, owner occupied household, and population over age 16 employed in primarily outdoor rural-oriented jobs, population between ages 16-19 not enrolled in school, population over age 25 lacking a high school degree
3. Environment: household room occupancy of more than 1.01, household lacking adequate kitchen facilities
4. Linguistic barrier: households with little to no English spoken (2000 and 2010), and household with kids age 5-17 who speak English “not well” or “not at all” (1990)
5. Transportation: household lacking private vehicles

SPSS 19 was utilized to perform the factor analysis. A well accepted approach for the selection of salient factors has been based upon a heuristic method of extraction known as the eigenvalue-1 rule (Wang 2006). This rule simply states that eigenvalues over 1 are important and should be considered for extraction. However, for this study the scree plot was used to determine the adequate amount of factors. Typically, factors plotted before the scree plot curve begins to flatten are ideal for extraction.

CHAPTER 4: ACCESSIBILITY RESULTS 1990-2010

The 1990 2SFCA approach analyzed accessibility based upon five mile catchment zones which surrounded public high schools of the time. An attendance zone accessibility approach could not be implemented due to a lack of credible sources which displayed historic school zone boundaries. The five mile analysis, shown in figure 4.1, revealed significant disparities in spatial access to public high schools within municipalities, suburbs, and unincorporated communities of the BRMSA.

The distinction of these communities was a byproduct of the five mile catchment zones ability to account for local threshold student populations, which were expectedly higher in urbanized areas. As a result of these population distinctions and the limited number of public high schools within the BRMSA, both local and regional phenomena were able to be investigated. Overall the 1990 spatial mapping revealed a strong presence of high schools within population centers of the BRMSA, despite a sizable loss of high schools having occurred over the prior decade with school closures of Innis, Pine Grove, and Morganza.

Results displayed that the strongest accessibility on a regional scale was confined within catchment areas associated with suburban community high schools of 1990. These high accessibility communities specifically consisted of Denham Springs and Walker of Livingston Parish, Gonzales and St. Amant of Ascension Parish, and Zachary of East Baton Rouge Parish. The revealed strength within suburban communities could be indicative of the adequate staffing and funding associated with corresponding area high schools in comparison to rural and urban areas. Spatially the regions formed a near perfect semi-circle which hugged the city boundaries of Baton Rouge to the north, east, and southeast.

2SFCA BRMSA 1989-90

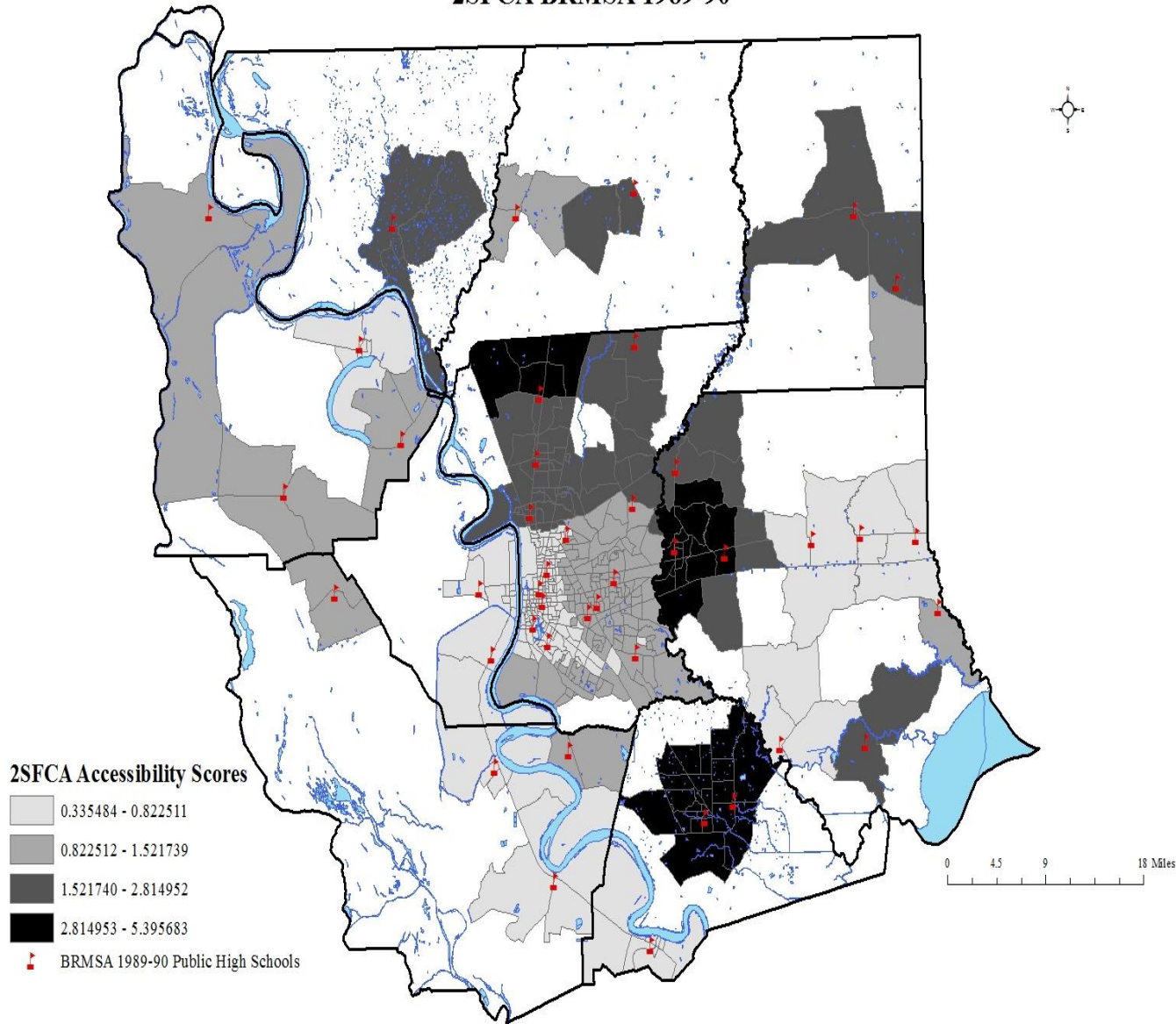


Figure 4.1 1990 2SFCA result based on five mile catchment zones

The lowest levels of spatial accessibility were confined to small and large municipalities of 1990. In particular, Baton Rouge was shown to have contained a conspicuous clustering of poor high school accessibility results within the core centralized neighborhoods of the city. In

addition to Baton Rouge, poor levels of spatial accessibility were present in the school catchment zones associated with the municipalities of Port Allen, Brusly, Donaldsonville, New Roads, White Castle, Albany, and Livingston.

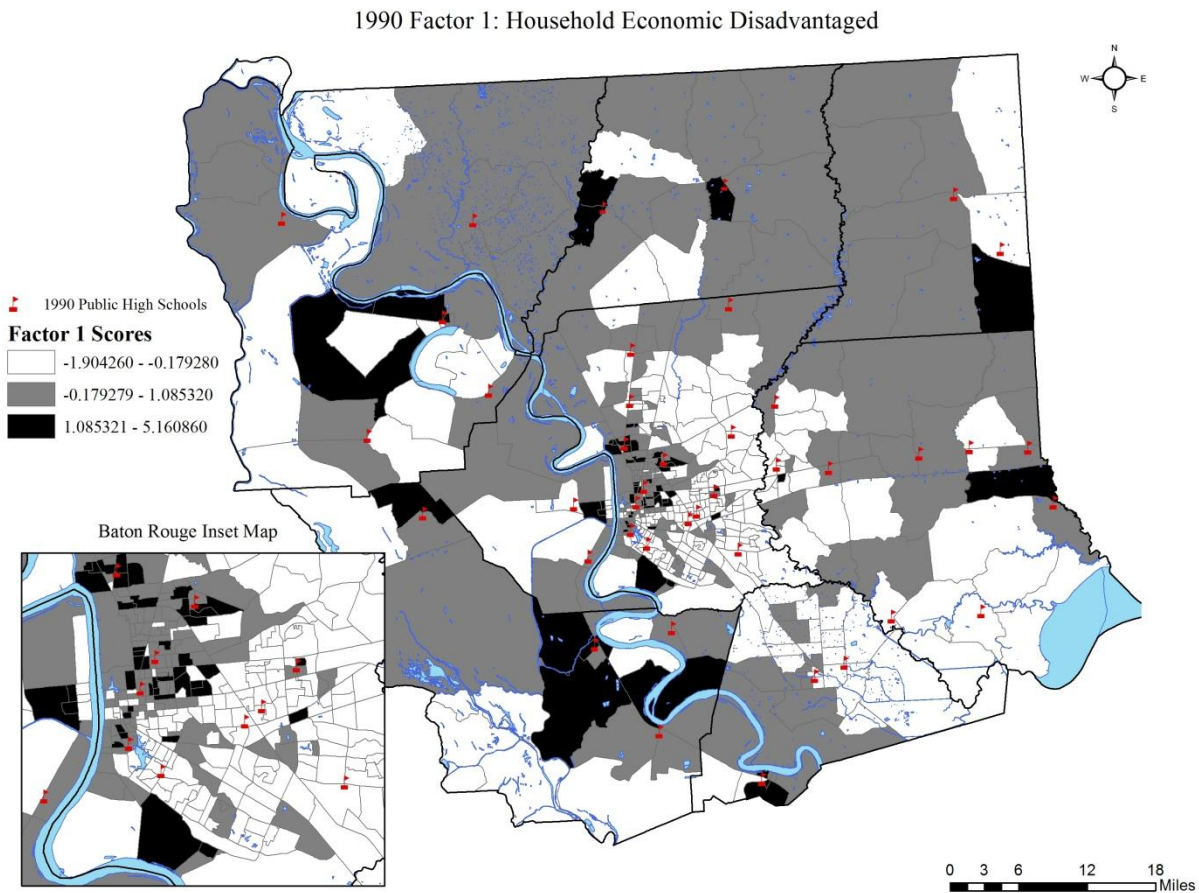


Figure 4.2 Map of 1990 factor 1 scores

Implementation of the 1990 factor analysis revealed three distinct social groupings within the BRMSA. Factor one scores presented in figure 4.2 were identified as household level economic disadvantaged populations. As demonstrated in table 4.1, these populations were found to consist primarily of Nonwhite residents. Factor one households were further revealed to

likely lack personal vehicles, be overcrowded, contain only parent, and have high level of adults without high school degrees. Spatial mapping found factor one populations were salient within municipalities which included Baton Rouge, Donaldsonville, Clinton, and Port Allen.

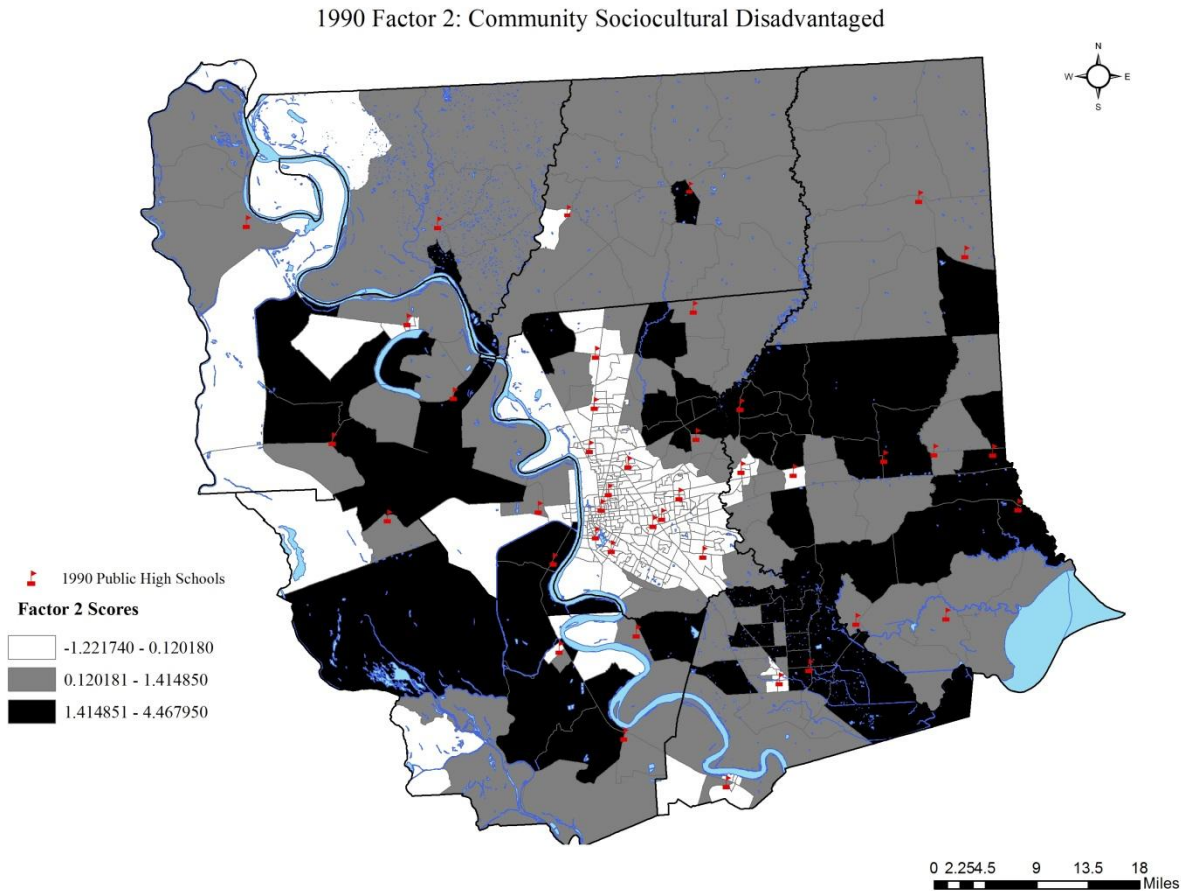


Figure 4.3 Map of 1990 factor 2 scores

The mapping of factor two scores displayed in figure 4.3 reveals a social group described as community sociocultural disadvantaged. In addition to being composed of rural residents, the rotated factor scores found three additional salient variables which included: population over age 25 without high school diplomas, rural oriented industry jobs, and owner occupied housing. The

identification of this social group was a result of the recognized potential pull rural industry jobs may have provided for students. Historically, such occurrences were likely as high schools which served this population tended to stop well before the twelfth grade. A continuance of this scenario, while reduced over the course of time, may have been reflective a sustained culture which compromised student high school participation and graduation. Spatial mapping revealed in most cases these populations to be located far away from BRMSA cities and concentrated heavily within unincorporated sections of southern parishes in 1990.

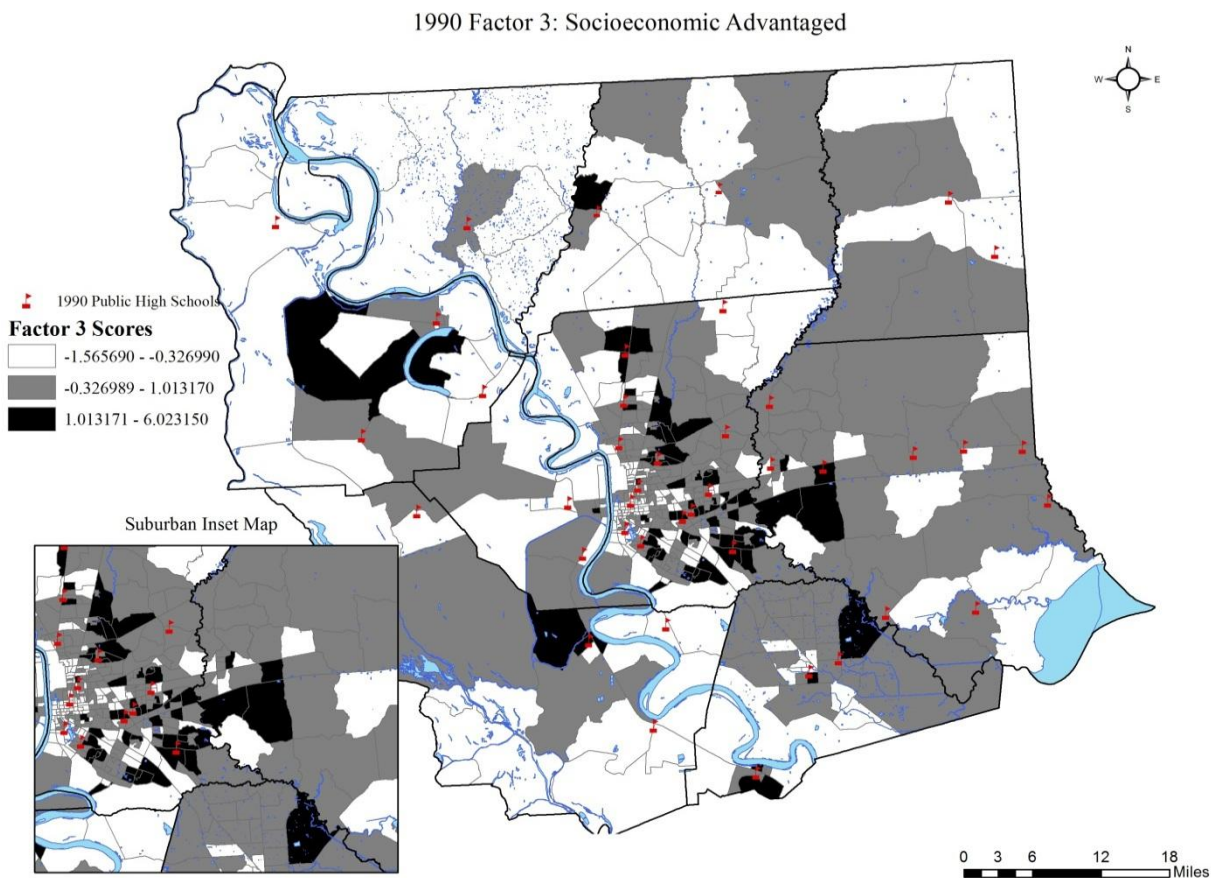


Figure 4.4 Map of 1990 factor 3 scores

Factor three populations mapped in figure 4.4 were identified as socioeconomic advantaged populations. Owner occupied housing by far accounted for the strongest variable representation of this category. Additionally, the advantaged population was associated with low levels of poverty and higher private vehicle ownership than the disadvantaged populations. The strongest concentrations of this population were found in block groups which bordered the boundaries of cities such as Baton Rouge, Denham Springs, Zachary and New Roads. While these populations were spread across regional municipalities, an overwhelming concentration was bunched within East Baton Rouge Parish in 1990.

Table 4.1 1990 Rotated factors scores

	Factor 1: Household economic disadvantaged	Factor 2: Community sociocultural disadvantaged	Factor 3: Socioeconomic advantaged
Nonwhite population	.815	-.122	.129
Lacking personal vehicle	.762	.011	.000
Occupied house >1 occupant per room	.741	.228	.149
Single parent household	.717	-.015	.299
Population (age 25+) without high school diploma	.602	.476	.269
Age 16-19 not enrolled in school	.294	.140	.042
Household lacking complete kitchen facilities	.277	.088	-.020
Household income below poverty level	.122	.031	-.085
Rural population	.067	.949	.063
Agriculture, forestry, fishing and hunting, and mining jobs	.089	.461	.136
Owner occupied	-.061	.541	.838
Age 5-17 little to no English spoke	.104	.038	.162

Extraction Method: Maximum Likelihood.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 7 iterations.

The strong presence of public high schools revealed in 1990 translated into schools being prominent for diverse socioeconomic populations within BRMSA communities. Factor one and two columns on table 4.1 exhibit that factor one or two disadvantaged students faced significant nongeographic barriers which may have inhibited academic attainment, school participation, and may have inhibited their ability to earn high school degrees. Although each disadvantaged endured similar potential hardships, these outcomes would have resulted through different processes based upon the unique composition of both groups.

The salient identified variables of factor one disadvantaged populations were defined by basic physiological needs which represent important life essentials such as food, water, and shelter. Variables reflective of such needs from table 4.1 include: poverty, overcrowded households, and lack of kitchen facilities. The variables of factor two present potential challenges based upon local culture and environment. This is reflected by the presence of jobs and homeownership, despite a lack of high school degrees for many residents.

The 2SFCA implementation for 2000 shown in figure 4.5 revealed substantial accessibility changes occurred within the BRMSA over the 1990s. Similar to the 1990 2SFCA analysis, this approach was based upon five mile catchment zones which surrounded the public high schools of 2000. The spatial mapping of high schools for this period displayed declines of the school were experienced in small municipalities and unincorporated communities. These declines represented the first time that widespread BRMSA population centers lost their sole public high schools since the Civil War era.

The shuttered high schools consisted of three unincorporated high schools and a small municipality high school. The unincorporated community high schools of Upper Pointe Coupee

and Rougon were located in Pointe Coupee Parish and Woodland in St. Helena Parish. The small municipality school, Rosenwald High, was located in the town New Roads in Pointe Coupee Parish.

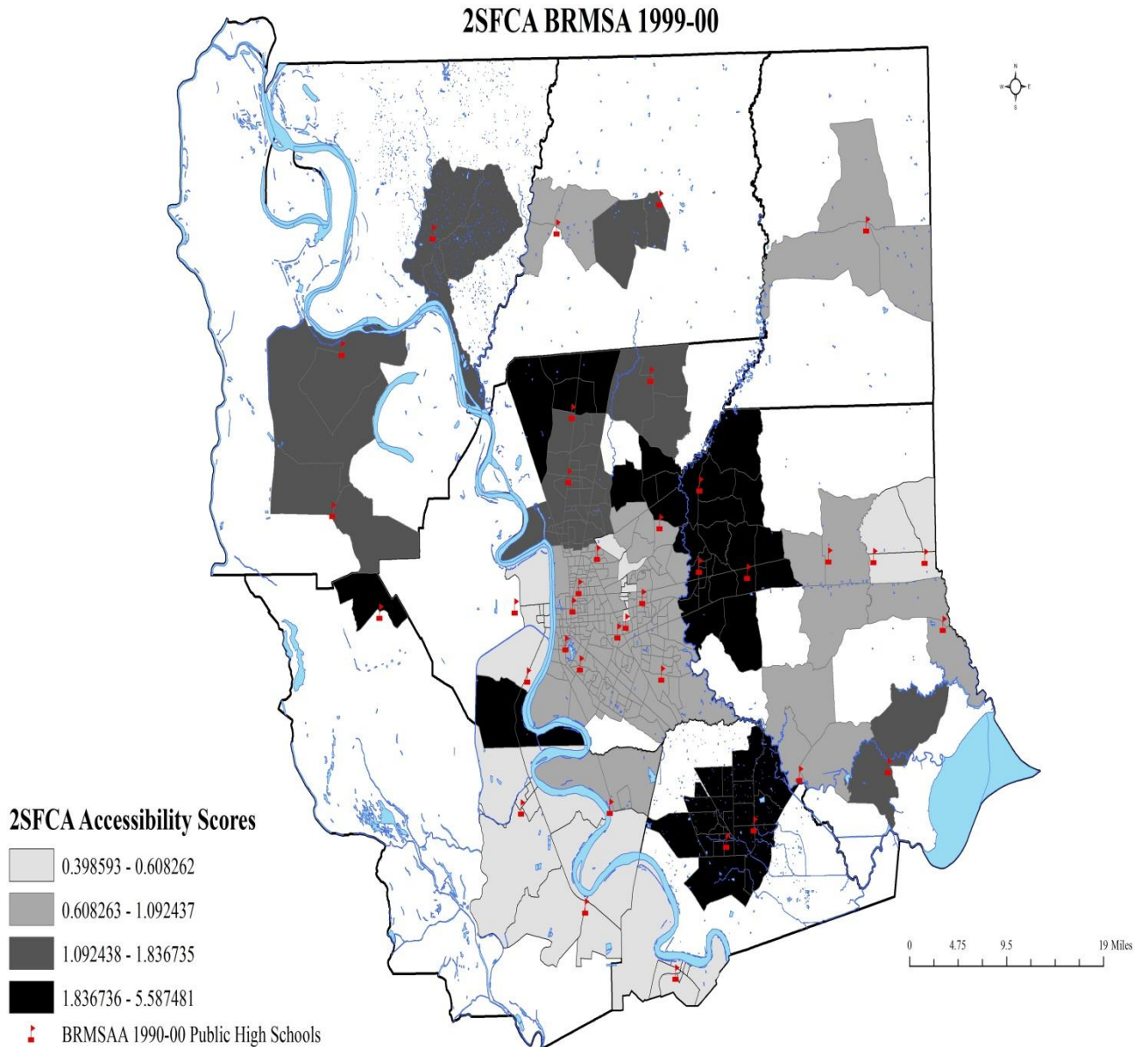


Figure 4.5 2000 2SFCA results based on five mile catchment zones

Over the 1990s general consolidation initiatives and desegregation cases were the primary factors behind the changes to the landscaped of BRMSA public high schools. The 2000 2SFCA implementation revealed a visible level of distinction between communities of various sizes with the highest accessibility scores still located in suburban communities. In fact, figure 4.5 reveals high accessibility spread across the landscape to contain more total block groups by this time. Such observations only reinforced the potential attraction suburban area high schools may have had for families within BRMSA urban or rural areas.

Municipalities were still found to contain much of the poor accessibility block groups; however, relative improvements were found for several schools. Despite, advances in spatial accessibility the loss of high schools left some towns and cities outside of the five mile catchment study. Furthermore, the ostensible improvement of accessibility stood in relation to schools district wide. When prior access results were compared a different result occurred.

The historical account of accessibility in this research allowed for change in accessibility scores to be displayed in addition to the accessibility conditions uncovered by the 2SFCA. Figure 4.6 captured the percentage change in accessibility scores for each school of the study area in 2000. All schools within northern communities were found to have experienced moderate increases in accessibility. Declines in accessibility were dispersed within three distinct areas of the southern BRMSA region. These areas included: (1) Baton Rouge, (2) Mississippi River communities, and (3) eastern Livingston Parish Interstate-12 corridor communities. Regardless of location, every suburban area school experienced at least moderate improvements in accessibility with the strongest growth found within Ascension Parish. In the case of Ascension Parish, results may be reflective of the level of investment for the parish's schools which increasingly grew to serve suburban households.

2SFCA Percentage Change 1990-2000

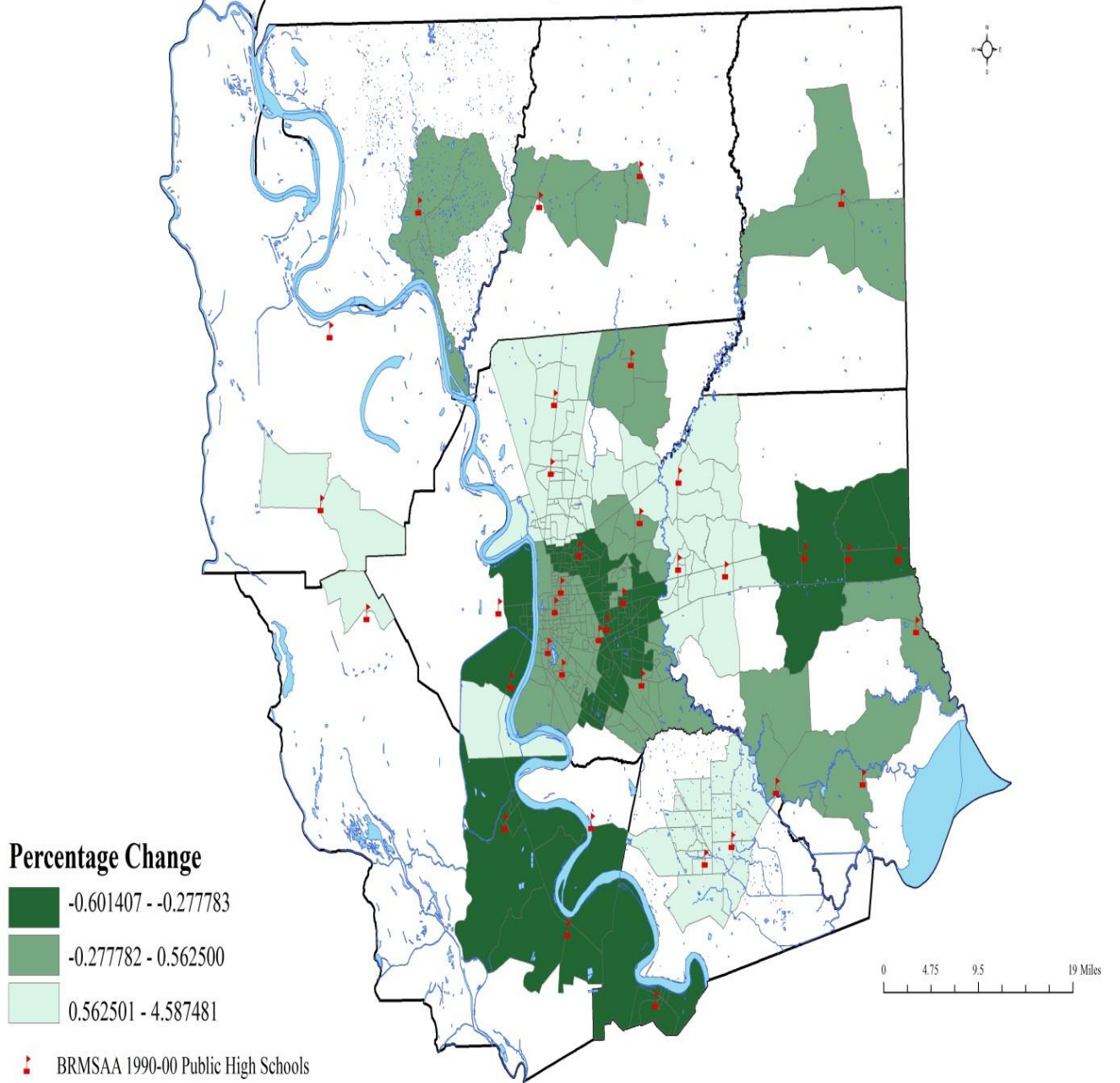


Figure 4.6 Change in 2SFCA scores from 1990 to 2000

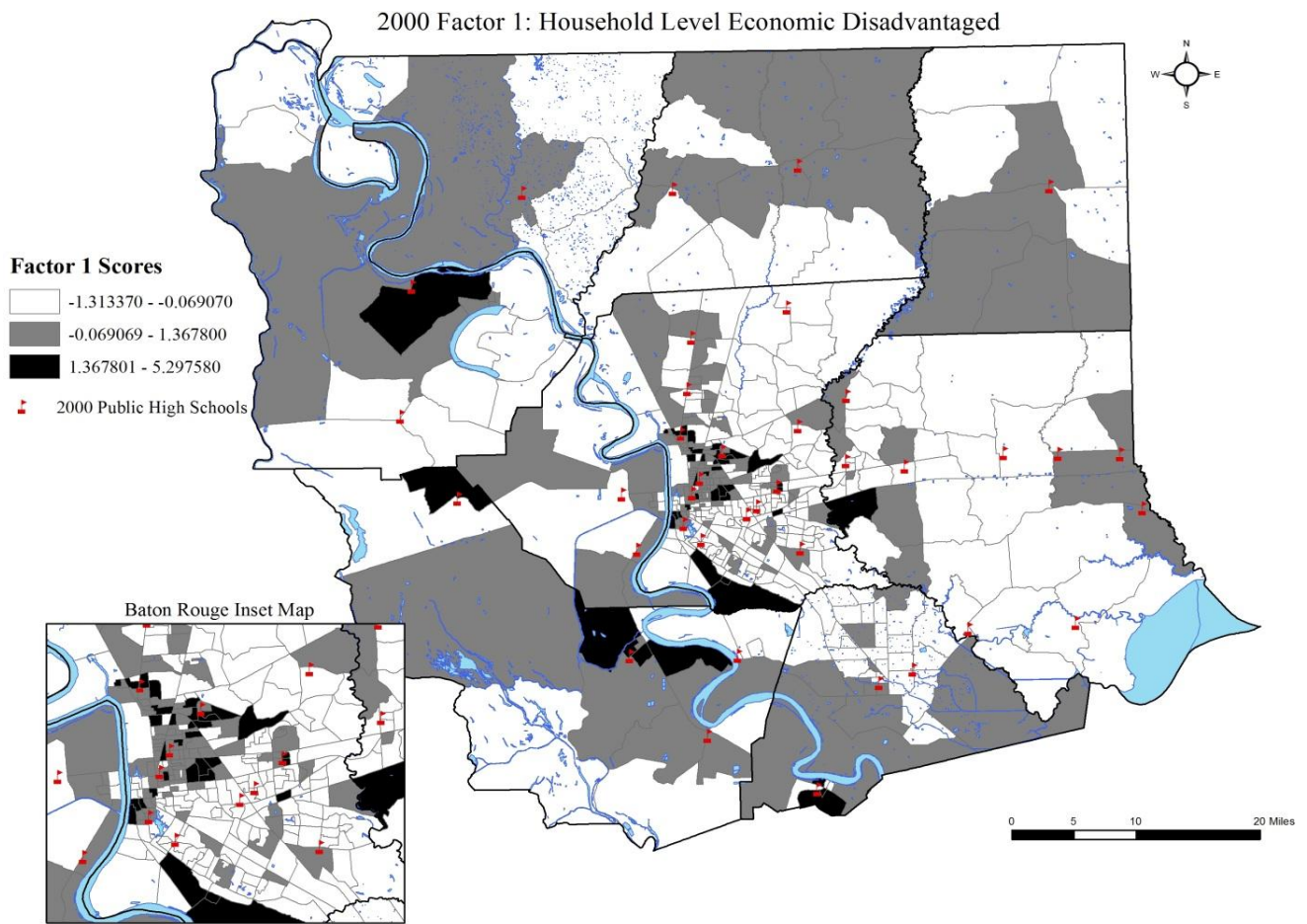


Figure 4.7 Map of 2000 factor 1 scores

Figure 4.7 shows the factor one population for 2000 which has been identified as household level economic disadvantaged. Factor one populations were located within the communities of Baton Rouge, Donaldsonville, New Roads, Plaquemines, Rosedale, and urbanized areas of South Baton Rouge. The rotated factor table, displayed in table 4.2, found this factor grouping primarily consisted of seven variables which included: Nonwhite population, youth poverty, overcrowded households, youth population age 16 to 19 not enrolled in high schools, population age 25+ without diplomas, lack personal vehicle, and single parent households.

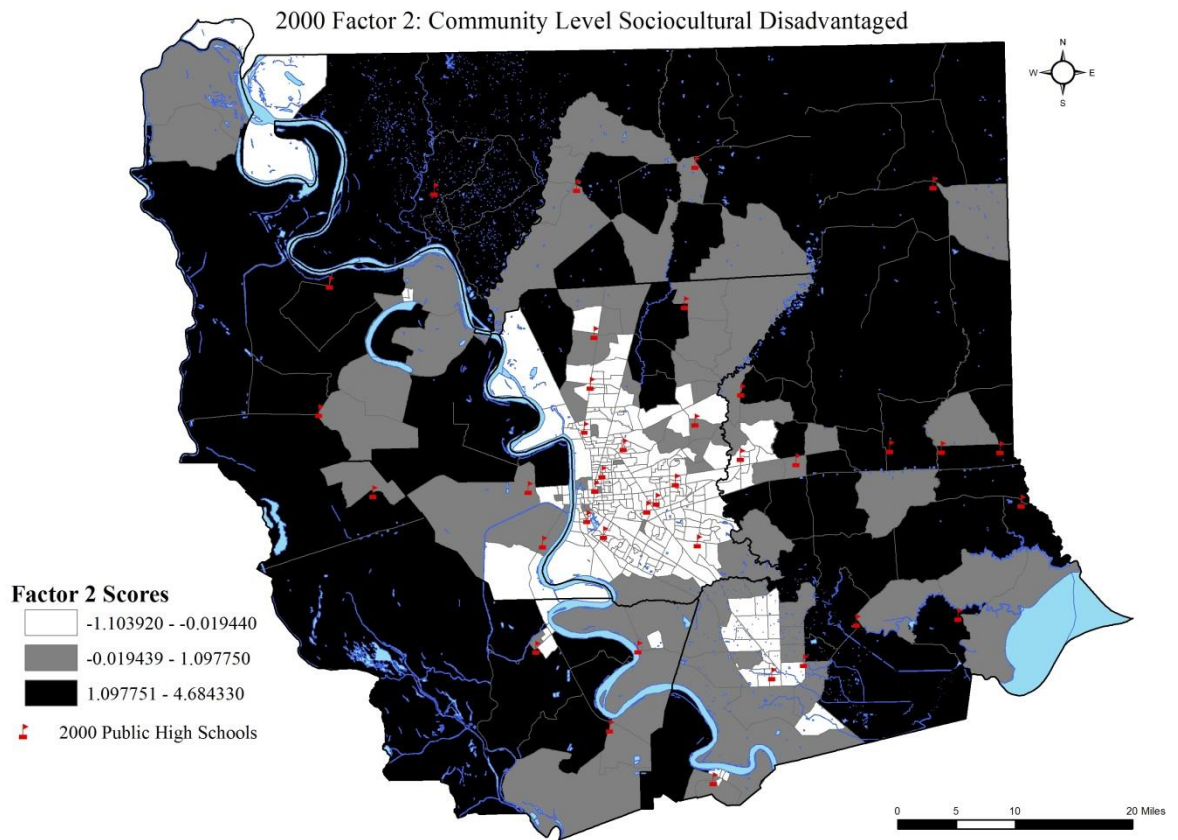


Figure 4.8 Map of 2000 factor 2 scores

Factor two populations displayed in figure 4.8 were identified as community sociocultural disadvantaged. Spatial mapping showed these populations were located primarily in low density unincorporated communities and spanned the entire nine parish region. Similar to the 1990 analysis, the rotated variables shown in table 4.2 associated this social group with variables which included: rural population, households lacking complete kitchen facilities, and strong employment in agriculture, forestry, fishery, or mining industries.

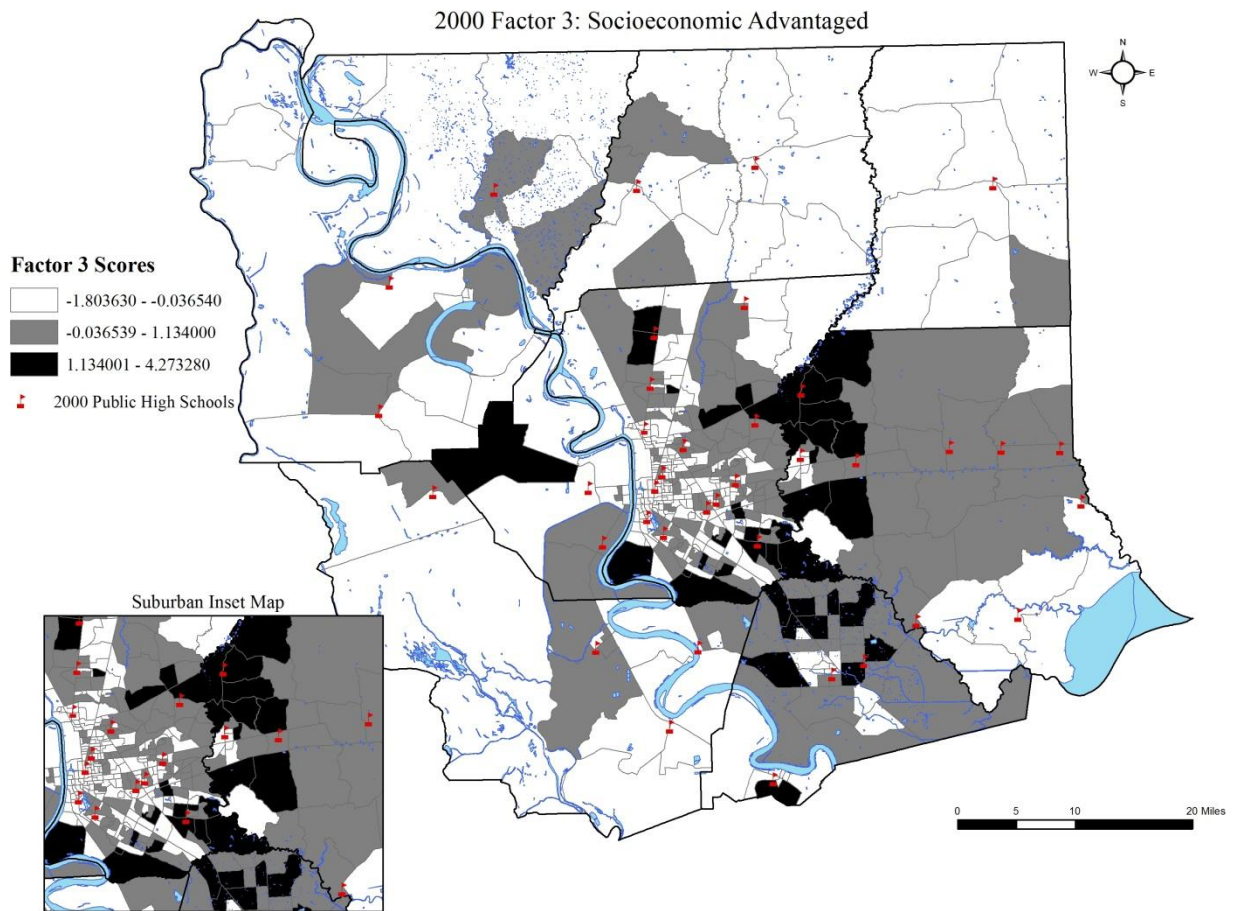


Figure 4.9 Map of 2000 Factor 3 scores

Figure 4.9 displays factor three populations identified as socioeconomic advantaged. Factor three results of 2000 showed a strong growth of this population compared to 1990 results. The spatial mapping displayed that factor three populations were primarily located along boundaries of East Baton Rouge, Ascension, and Livingston Parishes. Consistent with the 1990 factor analysis, the strongly associated factor three variables included: White population, home ownership, low poverty, and private vehicle ownership.

Table 4.2 2000 Rotated factors scores

	Factor 1: Household economic disadvantaged	Factor 2: Community sociocultural disadvantaged	Factor 3: Socioeconomic advantaged
Population (under age 17) below poverty	0.908	0.125	0.014
Single parent household	0.869	0.029	0.314
Nonwhite population	0.814	-0.070	-0.006
Occupied house >1 occupant per room	0.741	0.157	0.186
Lacking personal vehicle	0.727	0.085	-0.163
Population (aged 25+) without high school diploma	0.523	0.500	0.206
Age 16 to 19 not enrolled in school	0.331	0.122	0.137
Rural population	-0.031	0.833	0.184
Agriculture, forestry, fishing and hunting, and mining	0.010	0.520	0.090
Household lacking complete kitchen facilities	0.242	0.429	-0.137
Owner occupied	-0.064	0.364	0.720
Little to no English spoken	0.137	-0.028	0.196

The spatial mapping of public high schools for the 2010 analysis displayed a drastic total loss of the schools occurred over the thirty year analysis. A surprising trend revealed that the decline of high schools from the 1990s to the 2000s shifted from unincorporated or rural communities to larger municipalities. The totality of high school declines since 1990 has been shown to impact all varieties of regional population centers. The 1990 analysis revealed three communities which experienced such losses, and by 2010 five additional communities underwent similar fates.

While public schools operate under rigid attendance zones, competition exists as student mobility is allowed under certain permissions such as the offering of unique curriculums with

2SFCA BRMSA 2009-10

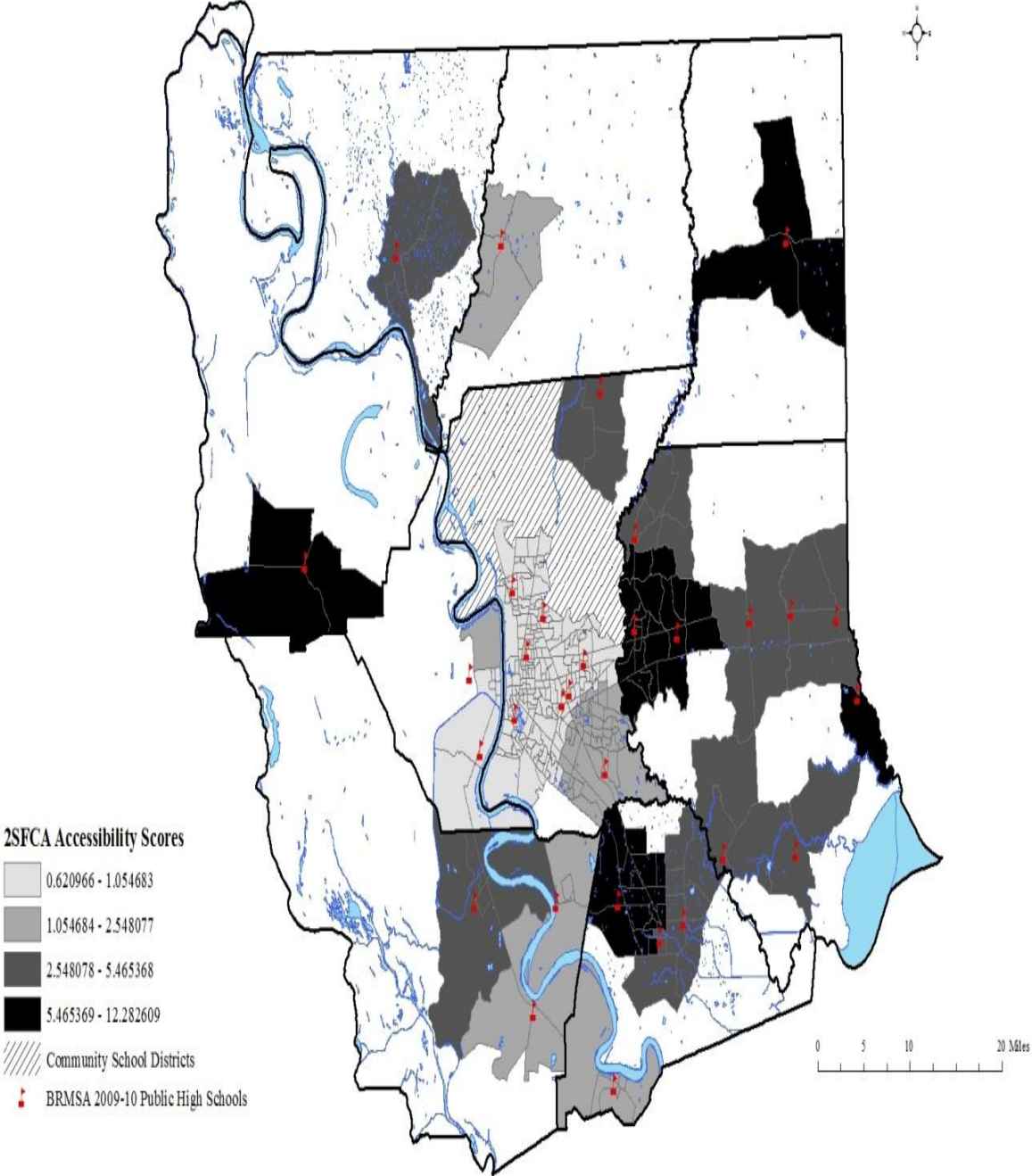


Figure 4.10 2010 2SFCA scores based on five mile catchment zone

magnet schools. Despite this growing reality, 2010 public high school spatial mapping shown in figure 4.10 revealed a lack of any potential competition from public schools was experienced within half of the BRMSA parishes. These parishes had come to be served by one public high school and was each found in the northern parishes of the BRMSA. Any potential spatial mobility for students of these parishes could only result from the presence of private, charter, or other nontraditional schooling alternatives.

A continued trend was exhibited as suburban catchment areas were found to have contained the highest accessibility scores. Two noteworthy differences were displayed as (1) several suburban or exurban schools transitioned into independent community districts (2) high accessibility levels were found outside suburban community catchment zones. While initiated under unique conditions, each of these examples perfectly highlights the ripple effects local policies may hold on a larger district or community. In the case of Pointe Coupee and St. Helena Parishes, resources were centralized to the last remaining public high school; however the case of East Baton Rouge Parish some schools may have encountered a reduction in resources.

Figure 4.11 displays the change of accessibility scores between 2000 and 2010. Improvements were found within all parishes of the BRMSA, with the strongest gains being found within Iberville and Livingston Parishes. In addition to Baton Rouge, these areas were found to have drops in accessibility scores over the 1990s. The argument could be made that information exhibited in figure 4.11 captures the multitude of efforts to improve area high schools. Declines in accessibility were contained exclusively within West Baton Rouge, Ascension, and East Baton Rouge Parishes. East Baton Rouge Parish block groups which experienced accessibility declines were all bordered by independent school districts.

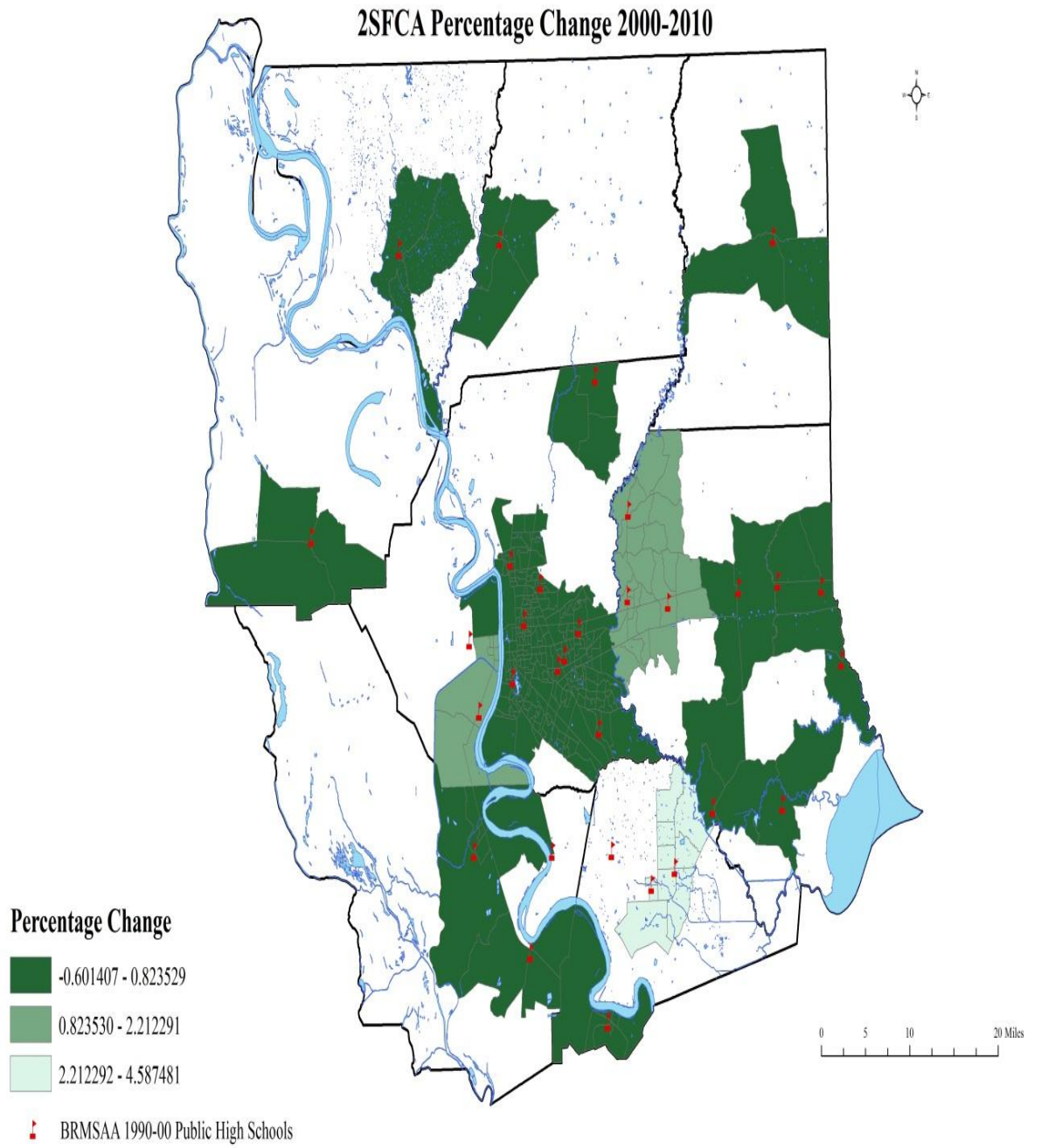


Figure 4.11 Change in 2SFCA score from 2000 to 2010

High School Attendance Zone Accessibility 2010 2SFCA

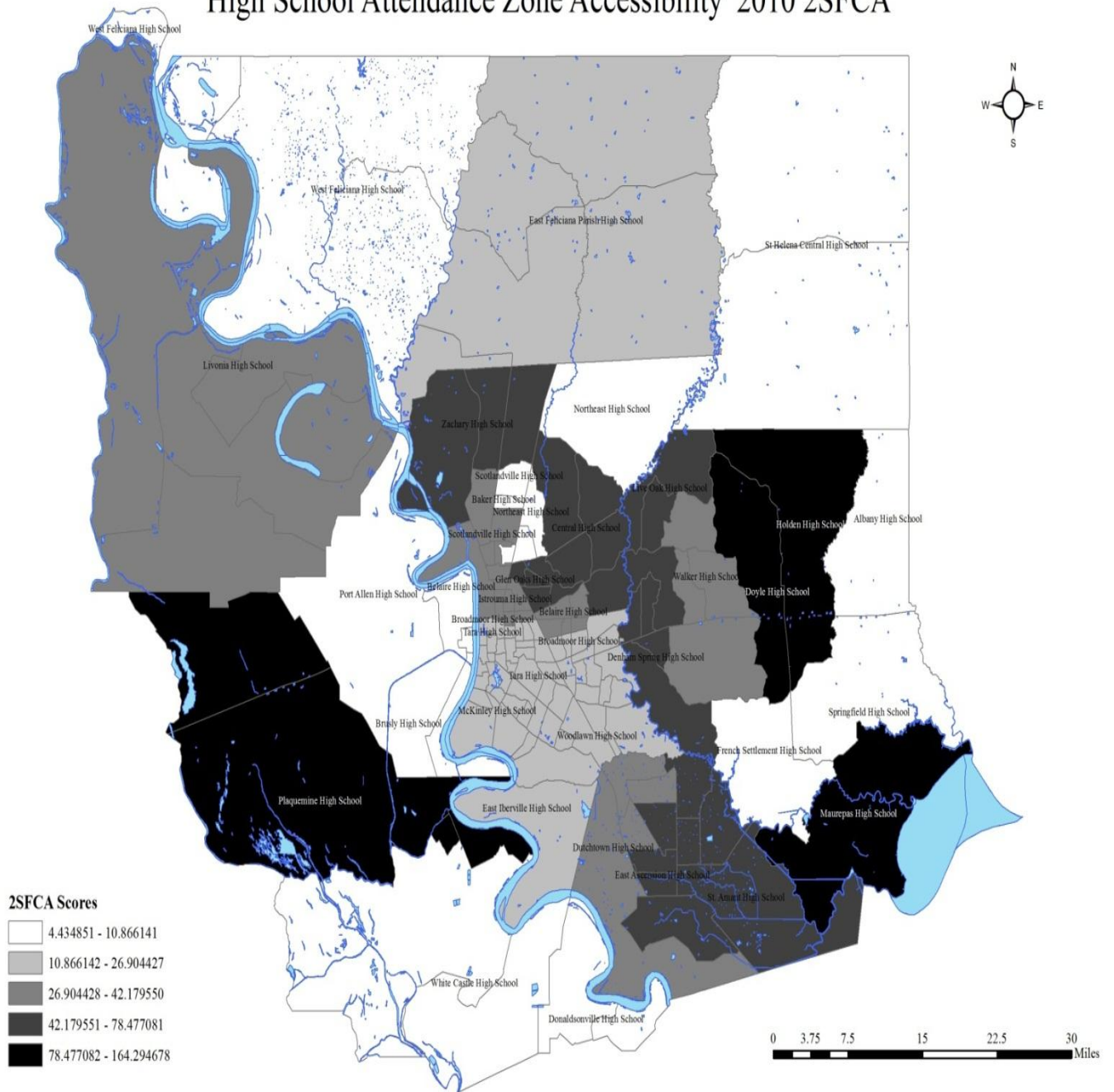


Figure 4.12 2SFCA based on approximated 2010 high school attendance zones

The quantitative analysis of accessibility throughout this research has been based upon a well-researched and effective, yet arbitrary five mile catchment boundary approach. Furthermore, the principle measurement of distance to this point has been calculated between the geographic centroids of block groups contained within this catchment area and rooftop high school locations. The merits and challenges of each implementation were covered in chapter three, and some anticipated shortfalls have been referenced throughout the results analysis in this chapter.

Data availability from 2010 allowed for both the strengths and weaknesses of the five mile approach to be evaluated and compared to a modified approach to the 2SFCA which would be based upon approximated school attendance boundaries. Additionally, distances were calculated based upon the weighted mean centers of high school age populations as opposed to geographic centers. Figure 4.12 reveals the results of this unique and potentially stronger representation of BRMSA high school accessibility.

Although some anomalies were uncovered in comparison with the five mile approach, consistencies were also revealed. In continuing a pattern uncovered in prior implementations, the attendance zone approach displayed suburban catchment areas were consistent in providing the best accessibility to public high schools. Furthermore, this approach continued to highlight the accessibility challenges of high schools with the city of Baton Rouge. One such issue captured resulted as attendance zones were reshuffled following the state takeover of Capitol High School and closure of Lee High School. Results displayed mostly negative accessibility impacts which meant some schools were not adequately capable to handle unexpected boundary expansions.

The attendance zone approach provided mixed results in regards to accessibility to consolidated high school sites. The five mile approach gradually displayed efforts which led to

accessibility improvements for consolidated high schools; however, the attendance zone approach addressed shortcomings of such interpretations. When the entire district has been taken into consideration the attendance zone approach makes school improvements seem trivial in some cases.

The strongest distinction between each approach comes with the attendance zone implementation being able to account for all students within a district. In most cases, the five mile approach will only provide an analysis of students within a threshold as opposed to a complete representation. A key consideration would take place when one considers how many students may live within threshold distances. For example, if 78% of students live within a five mile catchment zone of West Feliciana High, then a general catchment based approach may prove adequate. However, when this decision making becomes commonplace on a regional scale percentage from each school amount to thousands of students from various communities whose accessibility may be disregarded, underreported, or overestimated dependent upon methodologies utilized.

In figure 4.13, the same results are shown from the attendance zone 2SFCA implementation: however, they have been summarized based on the twelve regional school districts. This method was implemented to analyze accessibility through a commonplace approach of examining public education at the school district level. The district accessibility implementation demonstrates a strong level of separation between southern and northern school districts of the BRMSA. Perhaps, not coincidentally the highest access school districts have each underwent major construction projects. These projects have led to either the establishment of new high schools or the expansion of campuses each of which translated into strong accessibility determined with the 2SFCA method.

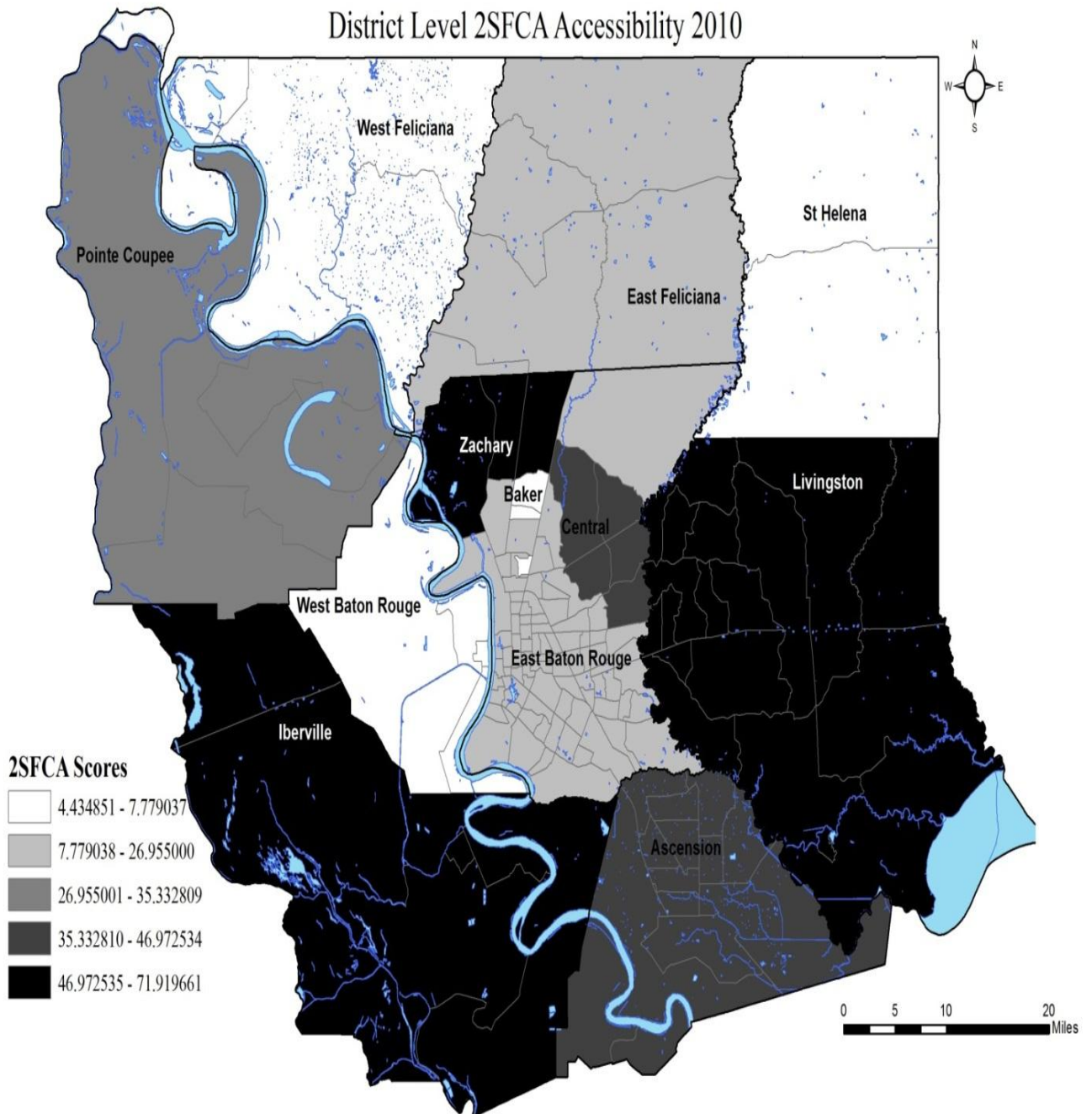


Figure 4.13 2SFCA accessibility scores summed within approximated 2010 public school district boundaries

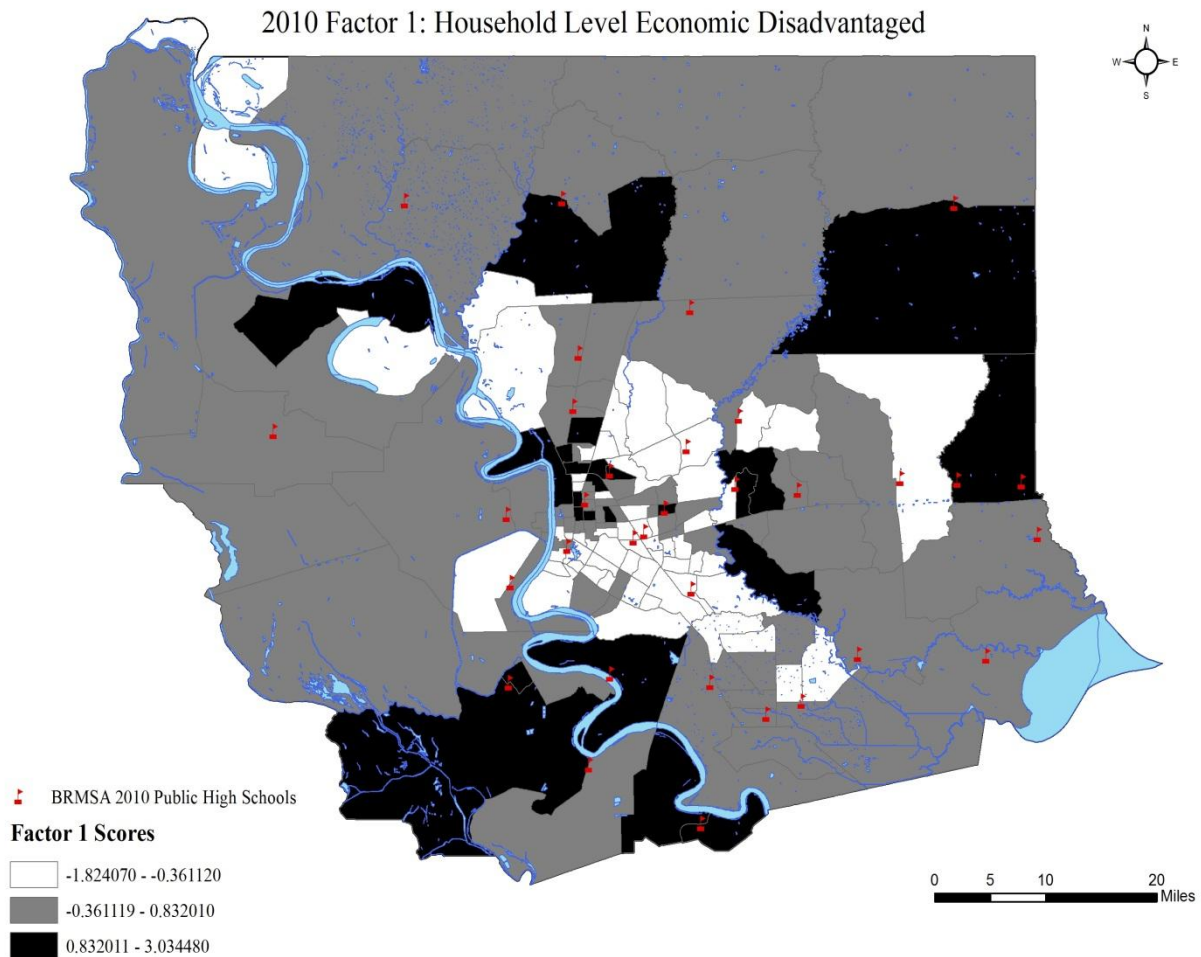


Figure 4.14 Map of 2010 factor 1 scores

Factor one scores for 2010 are shown in figure 4.14. Consistent to the factor analyses of 1990 and 2000, factor one populations were labeled as household level disadvantaged. Although the 2010 factor analysis was based upon census tract data, the spatial distribution of scores was consistent with the aforementioned previous analyses. One key difference with the 2010 resulted from the observed spread of factor one social groups into census tracts which contain the communities of Clinton, Jackson, Greensburg, Denham Springs, Walker, and Albany. Furthermore, within Baton Rouge, the populations shifted northward and were found in exclusively in northern neighborhoods of the city. Variables associated with factor one included:

Nonwhite population, income below poverty level, population over age 25 without a high school diploma, household lacking kitchen adequate facilities, single parent household, overcrowded households, and population age 16 to 19 not enrolled in school.

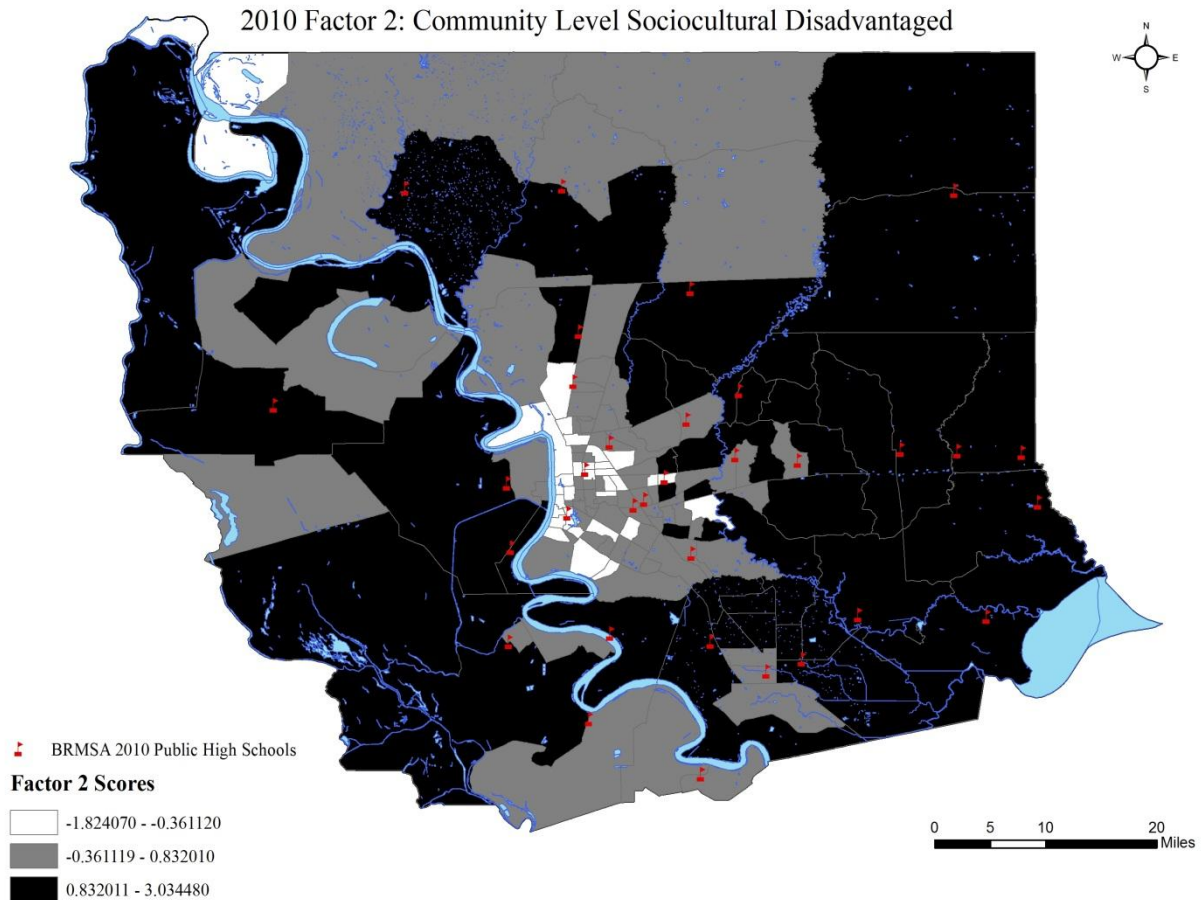


Figure 4.15 Map of factor 2 scores

2010 factor two are displayed in figure 4.15. Again, similar to prior factor analyses this social group was labeled as community sociocultural disadvantaged. The spatial mapping revealed this population to have a strong geographical spread across the BRMSA. Variables associated with this population included: (low) poverty, (low) nonwhite population, homeownership, agricultural/mining jobs, population age 25 without a high school degree.

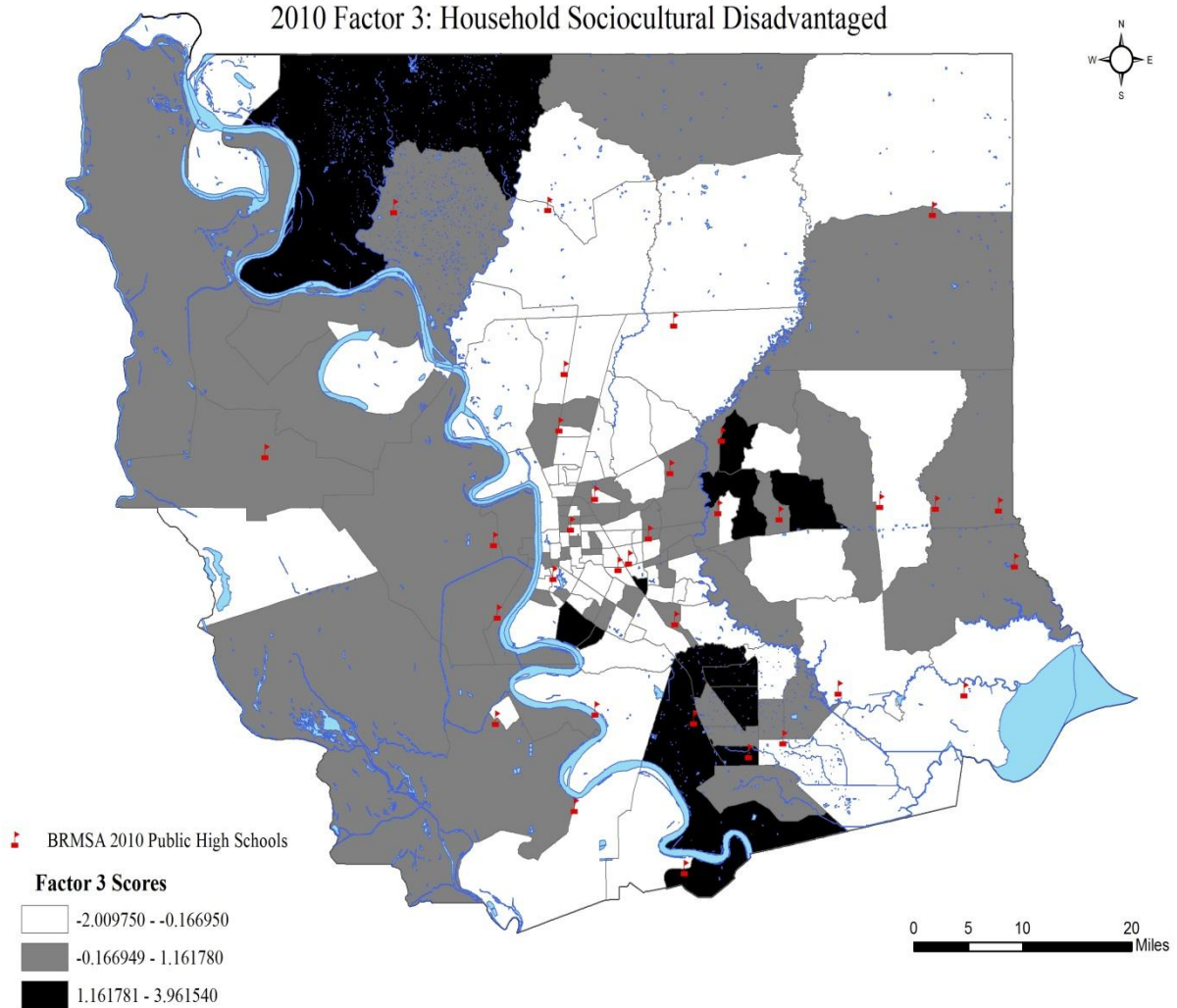


Figure 4.16 Map of 2010 factor 3 scores

The spatial distribution of factor three scores is revealed in figure 4.16. Factor three of the 2010 analysis accounted for the strongest separation away from factor analyses trends of previous study periods. The salient variables of factor three shown in table 4.3 included: overcrowded households, kids 5-17 from households with little to no English spoken, and population age 16 to 19 not enrolled in a school. Factor three populations were identified as

household culturally disadvantaged populations as potential relationships between the three major variables became clear. Geography became the key distinction in the potential identification of two subgroups of this population thoroughly addressed in the next chapter.

Table 4.3 2010 Rotated factor scores

	Factor 1: Household economic disadvantaged	Factor 2: Community sociocultural disadvantaged	Factor 3: Household sociocultural disadvantaged
Income below poverty level	.784	-.282	.215
Over age 25 without high school degree	.781	.341	.102
Nonwhite population	.652	-.255	.003
Household lacking kitchen facilities	.492	.154	.129
Single parent household	-.401	-.129	.069
Age 16 to 19 not enrolled in school	.399	.061	.259
Household lacking person vehicle	.533	-.605	.082
Home ownership	.027	.599	.127
Agriculture, forestry, fishing, hunting, and mining industry	.168	.405	.075
Overcrowded household	.531	.041	.846
Little or no spoken English	-.031	.055	.252

Extraction Method: Maximum Likelihood.

Rotation Method: Varimax with Kaiser Normalization.

CHAPTER 5: DISCUSSION SOCIO.SPATIAL ANALYSIS

5.1 Disadvantaged Population and High School Accessibility

Factor analyses performed in this study for 1990, 2000, and 2010, identified disadvantaged population groups were salient at the household and community levels. With the exception of the factor three group of 2010 analysis, household level disadvantaged populations were shown to routinely be comprised of Black residents, while community level disadvantaged populations were found to overwhelmingly be White residents. Besides a racial division, other variables like economics for factor one and social environments for factor two distinguished conditions endured by populations. However, all variables were ultimately connected as they mostly translated into everyday struggles of the people.

The struggle to meet basic physiological needs was a strong identifier of household level disadvantaged populations for each period analyzed. Rather than emphasize circumstances such as private vehicle ownership, physiological needs regard variables such as crowdedness of households or lack of adequate kitchen facilities. Arguments made in reference to physiological needs were supported by the research of Satz (2012) which found that physiological challenges could impact the educational attainment of students. Spatial analyses revealed that such challenges may have actually been easier to overcome thirty years ago than in current times because more high schools were located in the communities of household level disadvantaged residents. However, such an argument does not take into consideration the comparative quality of high schools which may serve populations of disadvantaged students.

Table 5.1 provides clarity to this dilemma as it displays that the accessibility scores of schools with sizable household economic disadvantaged populations were quite low in

comparison to high students with students from social groups of factors two or three. Low scores reflect the likelihood that public high schools have been less capable to adequately serve students of economic disadvantaged households in comparison to advantaged or community disadvantaged social groups. When combined with the spatial distribution of factor one social groups, the aforementioned observation indicates that for decades, the most disadvantaged populations within BRMSA city high schools likely faced the greatest social and spatial hurdles to attend and complete high school. There are numerous potential reasons for behind this observation such as limited budgets for urban schools.

Table 5.1 further shows that as time progressed, the disparities found with household level economic disadvantaged serving high schools continued and actually increased in most cases. Despite universal 2SFCA score improvements from 1990 to 2010 for schools which served the factor one social group, the gains hailed in comparison to improvements found for other populations. Such an occurrence may have only exacerbated inequalities for the population of factor one social groups.

Table 5.1 also indicates that the improvements found in advantaged communities were far more substantial than what both all disadvantaged groups of factor one and two experienced. Advantaged populations were found not only to have better accessibility levels, but also a clear stability in regards to the presence of their public high schools. In fact, the advantaged populations of 1990 and 2010 were the only social groups to not experience any loss of public high schools over the observed time periods. In terms of new high school developments, advantaged social groups were the only group which gained new constructed schools without the loss in any fashion of former schools.

Table 5.1 30 year trend in 2SFCA scores

Schools		2SFCA Scores		
		1990	2000	2010
FACTOR 1	West Feliciana	1.89	1.36	3.23
	Clinton	1.68	1.51	Δ
	Shady Grove (Rosedale)	1.22	2.81*	●
	Jackson	0.96	1.09	Δ
	Rosenwald (New Roads)	0.61	Δ	n/a
	Plaquemines	0.59	0.44	0.47
	Donaldsonville	0.56	0.53	1.69
	McKinley	0.74	0.77	1.05
	Capitol	0.64	0.72	□
	Glen Oaks	0.80	0.74	0.77
	Istrouma	0.60	0.61	0.72
FACTOR 2	Woodland	1.13	Δ	n/a
	Upper Pointe Coupee (Batchelor)	1.52	Δ	n/a
	Maurepas	1.59	1.38	3.29
	Rougon	1.32	Δ	n/a
	St. Helena	1.95	1	1.28
	Sunshine	1.22	●	n/a
FACTOR 3	Live Oak	2.18	3.21	4.89
	Central	2.81	2.66	†
	East Ascension	4.09	3.57	5.32
	Denham Springs	3.96	3.09	7.93
	Dutchtown	-	-	6.88
	St. Amant	5.4	5.59	5.47
	Woodlawn	1.1	0.91	1.55
	Zachary	3.3	3.55	†

Δ School consolidation

● School closure

□ School taken over by state

† School formed independent district

* School name change

A fascinating observation was made in regards to the high school accessibility of community disadvantaged populations. The strongest accessibility scores for these populations were associated with one category of high schools. This category consisted of suburban high schools whose catchment zones contained strong concentrations of community disadvantaged populations. The four schools in this category were identified as Central, Live Oak (Watson), Walker, and Zachary.

The remainder of schools connected to community disadvantaged population is listed below:

- Albany
- Doyle (Livingston)
- Holden
- Livonia
- Northeast (Pride)
- Rosenwald (New Roads)
- St. Helena Central (Greensburg)
- West Feliciana (Bains)
- Clinton
- French Settlement
- Livingston (Doyle)
- Maurepas
- Port Allen
- Springfield
- Upper Point Coupee (Batchelor)

Unlike the suburban area schools, the schools above have been located in small towns or more remote rural consolidated locations. The divisions in accessibility between the groups are identified within the rows of factor two and three shown in figure 5.1. The row groupings exhibit that community level sociocultural disadvantaged residents within suburban school catchment zones potentially had up to seven times the access to public high school than their counterparts in isolated towns and the countryside by 2010.

Although spatial mapping of factor analysis scores consistently revealed disadvantaged sociocultural populations were found spread throughout the region, sixteen of the nineteen total

high access schools with sizable disadvantaged populations were located in northern communities of the BRMSA. The disparity in accessibility only becomes enhanced when one deconstructs some the variables salient of sociocultural disadvantaged populations. For example, in 2000 half of this group lacked a high school diploma, yet were dwelled in areas with a moderate to strong access to high schools. This observation signals the potential role of high schools to serve as adult education centers due to proximity to adult non-degree holding residents.

A challenge for community disadvantaged populations addressed within the work of Baschieri and Falkingham (2009) has shown the likelihood of rural industry jobs to reduce high school participation. The lure of such jobs increases as they often do not require degrees and appeal to disadvantaged young people who seek employment. This finding was of particular concern because over the 1990s several high schools which served the sociocultural disadvantaged populations were shutdown.

The rotated factor scores of 2000 revealed a near identical match with the scores for these rural industry job count estimates and residents over age 25 without a high school degree for the sociocultural disadvantaged population. The community disadvantaged populations which lost high schools over the ten years leading into 2000 underwent the strong likelihood of having rural industry job opportunities become closer in range than opportunities for a high school education. Such results historically have increased the possibility for less high school participation in rural settings. It is clear that any modern occurrences would hail in comparison to what occurred in history. This outcome is premised on findings which have shown the relative success for community members of this social group in several cases despite not earning a high school degree.

5.2 Geography of Access

Given the dynamism associated with northern BRMSA high schools, the more stable southern schools were found to attain the majority of improvements in 2SFCA spatial access scores. In 1990, two regions which contained some of the poorest overall accessibility scores were located in the southern BRMSA. These regions included the eastern Interstate-12 (I-12) corridor of Livingston Parish and communities along the western edge of the Mississippi River which spanned from Port Allen down to Donaldsonville. The factor analyses displayed that the Livingston communities primarily consisted of community disadvantaged populations, while the Mississippi River communities consisted of household economic disadvantaged populations.

Progression of the 2SFCA from 1990 to 2010 presented the finding that the presence of high schools within these regions was well maintained as no schools were closed or consolidated. This stability correlated with gradual upticks found in accessibility scores for all high schools of these regions. When time is taken into account, it is revealed that the improvements along the I-12 corridor occurred in 2000, while the Mississippi River communities, which had tended to serve majority Black students, saw improvements approximately ten years later.

On a regional scale, this observation indicates that community disadvantaged students at least of southern BRMSA parishes have experienced improvements approximately one decade before household disadvantaged students. Furthermore, spatial mapping displayed geography as a potential determinant of a school district's response to high school accessibility as northern districts supported concepts of closure and consolidation of high schools and in the southern districts expanded internally with teachers or externally with campus construction projects to improve accessibility.

When stability was maintained with two northern BRMSA high schools between 2000 and 2010, improvements in accessibility were shown to have followed. These schools included West Feliciana and St. Helena Central High, and they were both products of parish high school consolidations. The upward trend in accessibility for these consolidated parish high schools was only discovered with the five mile catchment approach; however, when approximated boundaries were taken into account, these schools were uncovered to be poorly accessible. West Feliciana has a larger percentage of high school age students within its catchment area than St. Helena .

5.3 The Misrepresentation of Progress and Failure

As reflected in the previous sentence and at different points of this research, the potential for misinformation and misrepresentation of accessibility as a result of methodological implementation is endless. Over the course of this research the salient challenges of access representation were strongly associated with challenges addressed in the works of Ben-Porath (2009), Lee, Croninger, and Smith (1994), and Hallet and Venegas (2011). Some of the potential misrepresentations encountered within this paper were related to added teachers, expanded curriculums, and increased school accountability measurements.

The dilemma of misrepresenting truths is best highlighted with the current wave of Louisiana public education policies which expressively promote access to quality public and private schools for students of poor performing schools. In agreement with research such as that of Lee, Croninger, and Smith(1994), this research found that the potential exists for such policies to mobilize people and communities that historically lacked any such opportunity. However, these policies may continue a trend in which not only has spatial access been disregarded but also interaction.

A review of the spatial interaction within the BRMSA has shown a strong association with the work of Logan, Mina, and Adar (2012) as the perceived advantaged schools have attracted a growing number of students. However, similar to the findings of Hallet and Venegas (2011) this research suggests that accountability policies have caused schools to serve populations well beyond their designated attendance zones and the studied catchment zones. This argument was clearly presented in the 2010 attendance zone based accessibility approach which display urban area and rural schools facing such conditions.

Literature including Ben-Porath (2009) and Lee, Croninger, and Smith (1994) have acknowledged the lengthy history of school choice initiatives and options which did not alleviate existing accessibility challenges. The 2SFCA reflected their findings with several city high schools of Baton Rouge, which adopted programs that improved accountability but exacerbated accessibility disparities. The most powerful example of this point was displayed with the mapping of high schools in Pointe Coupee Parish which is currently only served by one public high school.

These observations also highlight the importance of history and spatial interaction in the analysis of public schools. Additionally, they shed light on the negative and positive misrepresentations of SPS ratings which may inhibit understanding of spatial access and social mobility challenges in public education. With the interpretation of the 2SFCA and factor analyses this researcher argues that contemporary BRMSA high school policy development should not be restricted to common school boundaries and should account for potential changes in larger scaled access and mobility for students.

This point is stressed because at the core of most current education initiatives are the concepts of choice and competition, and in competition there are always winners and losers. The

price to pay for losing in public education is a matter which must be addressed at length as in jeopardy are the livelihoods of students. Focus on a regional scale would be beneficial to account for mobility and movement which help address common misrepresentations of today and raise awareness of changing conditions and experiences for schools, students, and communities during this dynamic era of public education.

Along with school choice, consolidations have accounted for considerable accessibility misrepresentations. The challenges brought about from high school consolidations were best displayed in the five mile 2SFCA maps which revealed numerous communities of the BRMSA became increasingly distant locations from public high schools. Examples of this dilemma were clear as West Feliciana, East Feliciana, St. Helena, Pointe Coupee, and Iberville Parishes dealt with such conditions. In the case of Pointe Coupee Parish the result of high school consolidation was a complete reversal of 1990 and 2000 catchment zone communities detected by the 2SFCA method.

5.4 Bivariate Analysis of Access and Socioeconomic factors

Bivariate correlations shown in tables 5.2-5.4 below were performed on factor analysis variables and 2SFCA accessibility scores. The results consistently indicated a strong positive relationship existed between higher spatial access scores and owner-occupied households which was to be expected. An unexpected positive correlation came with spatial access and population (25+) without a high school degree in the 2000 analysis. The relationship of race with spatial access is also identified as significant. The negative correlation meant that as spatial access to high schools increased as the amount of Black students declined. This finding raises questions about the quality of high school education found in predominately Black communities and also reflects the aforementioned vulnerability of poor predominately Black populations.

Table 5.2 1990 Correlation coefficients between socioeconomic variables and 2SFCA scores

Variable	Correlation coefficient
Owner occupied	.261 ^{**}
Occupied no vehicle	-.116 ^{**}
Household lacking kitchen facilities	-.058 [*]
Occupied with >1 occupant per room	.011
Household income below poverty level	-.050 [*]
Single parent household	-.024
Household with kids little to no spoken English	.051 [*]
Population 25+ without school diploma	.112 ^{**}
Rural population	.351 ^{**}
Population 16-19 not enrolled in school	.054 [*]
Rural jobs	.148 ^{**}
Nonwhite population	-.145 ^{**}

^{**}. Correlation is significant at the 0.01 level (2-tailed).

^{*}. Correlation is significant at the 0.05 level (2-tailed).

Table 5.3 2000 Correlation coefficients between socioeconomic variables and 2SFCA scores

Variable	Correlation coefficient
Owner occupied	.354 ^{**}
Occupied no vehicle	-.013
Household lacking complete kitchen facilities	.071
Occupied with >1 occupant per room	.078
Nonwhite population	-.107 [*]
Single parent	.072
Limited to no English household	.090
Population 25+ without high school diploma	.301 ^{**}
Population 16-19 not enrolled in school	.097 [*]
Rural jobs	.153 ^{**}
Population under 18 below poverty level	.027
Rural population	.234 ^{**}

^{**}. Correlation is significant at the 0.01 level (2-tailed).

^{*}. Correlation is significant at the 0.05 level (2-tailed).

Table 5.4 2010 Correlation coefficients between socioeconomic variables and 2SFCA scores

Variable	Correlation Coefficient
Nonwhite population	-.132
Population 16-19 not enrolled in school	.039
Household with kids little to no spoken English	.025
Owner occupied	.189*
Household with >1 occupant per room	.074
Occupied no vehicle	-.051
House lacking complete kitchen facilities	.102
Population 25+ without school diploma	-.171*
Single parent household	-.169*
Rural jobs	-.046

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Table 5.5 2010 Correlation coefficients between district scores and socioeconomic variables

Variable	Correlation coefficient
Nonwhite population	-.266**
Population 16-19 not enrolled in school	.105
Household with kids and little to no spoken English	.061
Owner occupied	.395**
Household with >1 occupant per room	.164*
Occupied no vehicle	-.131
Household lacking complete kitchen facilities	.148
Population 25+ without school diploma	-.181*
Single parent	-.171*
Rural jobs	.111

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 5.5 displays district level correlations between factor analysis variables and accessibility. The results continued to show several previously identified relationships which included: (1) the negative correlation between Nonwhite populations and spatial accessibility to high schools and (2) the positive correlation between homeownership and high school accessibility. Two unexpected observations from the 2010 analysis were the sharp decrease in populations with high school diplomas in close proximity to schools and the increase in households with more than one occupant per room and adequate high school accessibility.

5.5 Urban Area and Baton Rouge Accessibility

The 2SFCA revealed strong disparities of spatial access within municipalities and urban areas of the BRMSA. Dating back to 1990, municipalities with the highest spatial accessibility included: Clinton, Greensburg, Maurepas, and St. Francisville/Bains. With the exception of Maurepas, located in southern Livingston Parish, all of these communities are located within the northern parishes of the BRMSA. Lower spatial accessibility levels were concentrated within the southern parishes of the BRMSA specifically within two earlier addressed geographical regions.

The first of these regions contained the communities of Livingston, Holden, and Albany all of which were successively located along the eastern I-12 corridor in Livingston Parish. The second region was comprised of five municipalities which included: Port Allen, Brusly, Plaquemine, White Castle, and Donaldsonville. These communities were successively located along the western edge of Mississippi River and spanned the parishes of West Baton Rouge, Iberville, and Ascension.

Overall, the poorest spatial accessibility scores were primarily confined within the urban area of Baton Rouge. On a regional scale this result was anticipated with the catchment based accessibility approach due to the significant concentration of students in the urban areas. The

2SFCA was structured to represent these high density student areas as correspondingly high potential demand areas. However, an unexpected outcome occurred as the method captured and distinguished potential demand within urban areas and between urban and suburban areas of different populations.

Initial analyses found intraurban spatial disparities within Baton Rouge along a distinct division of urban core neighborhoods and fringe neighborhoods of the city, and the fringe communities found to have stronger spatial accessibility. These fringe high accessibility schools included: Baker, Belaire, Central, Glen Oaks, Lee, Tara, and Woodlawn. The core schools included: Capitol, McKinley, Istrouma, and Lee High Schools contained significant low accessibility urban core block groups within their catchment zones.

As time progressed, the Baton Rouge core-fringe dichotomy was no longer observed. Implementation of the five mile accessibility approach came to display uniform trends within Baton Rouge city high schools by 2010. However, the school zone accessibility approach revealed a new dichotomy of disparities which was split between north and south Baton Rouge high schools.

Northern Baton Rouge high schools, located north of Interstate 10, were discovered to have better spatial access than their southern counterparts. The factor analysis of 2010 showed that the attendance zones of north Baton Rouge high schools contained the highest levels of household economic disadvantaged populations of the entire parish. On the other hand, in communities which were shown to have experienced a growth of household cultural disadvantaged residents, the school zone accessibility approach identified the lowest high school accessibility was associated with their locations in the city.

Further application of the 2SFCA on East Baton Rouge Parish for 2010 revealed an unexpected pattern between accessibility and the high school landscape of the parish. The removal of community school districts of Baker, Central, and Zachary, over the 2000s left Woodlawn High School, located in the southeastern section of the parish, with the highest spatial accessibility five mile catchment area. Prior to separating from the parish school district, the three aforementioned schools contained the highest potential spatial access in the entire district.

As of 2012, efforts have been underway to establish a fourth community school district based around Woodlawn High School. If Woodlawn were to become an independent district, then over the past twenty every East Baton Rouge Parish high school with the best spatial accessibility will have separated from the parish school district. This poses particular challenges to household economic disadvantaged students who may have otherwise sought to attend a high access school.

In addition to the arrival of independent school districts Baton Rouge high schools were nearly decimated by the SPS rating system over the 2000s. Poor SPS scores have led to the charter conversion of Capitol and Istrouma High Schools and the temporary closure of Lee High School to avoid potential charter conversion. As a result of SPS score shortcomings, the city of Baton Rouge lost its first public high school in over sixty years. The constant shifting and restructuring of Baton Rouge public high schools has had a direct impact on accessibility which has also been in a constant state of flux. The catchment based accessibility approached for 2000 and 2010 showed the changes have caused ripple effects which have inhibited the promotion of accessibility to high schools of Baton Rouge.

5.6 Race and Accessibility

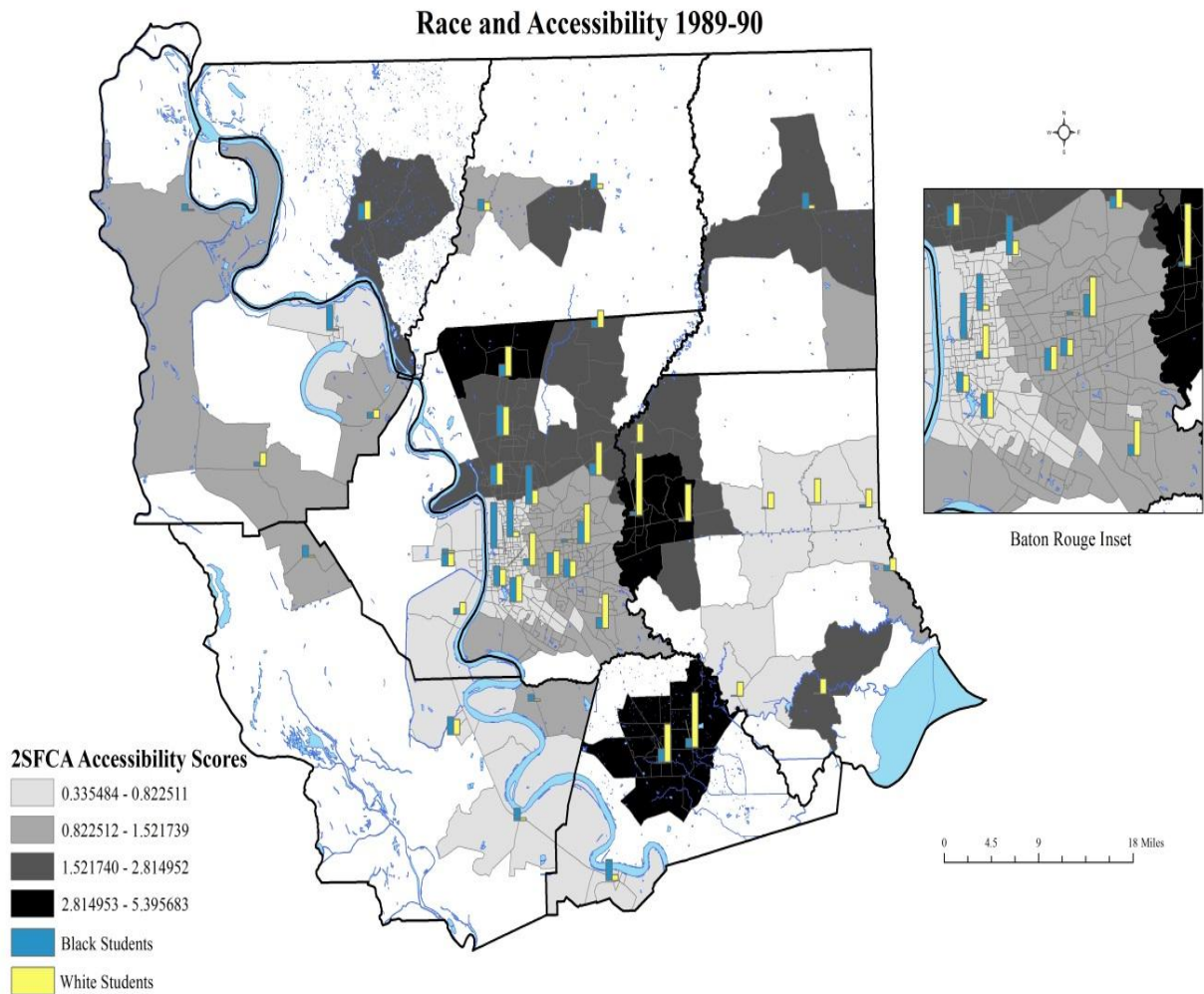


Figure 5.1 Racial composition of 1990 high schools paired with based map of 1990 2SFCA results

In 1990, the inset map of figure 5.1 highlights a strong racial balance between Black and White students within several high schools found within Baton Rouge. The 2SFCA of 1990 was used as a base map to display the racial composition of high schools based upon spatial accessibility scores. One important takeaway from the racial composition overlays is that accessibility displays strongest in areas which had far more White students than Black students.

The greatest abundance of White majority-Black minority schools was found in suburban regions which had the overall highest spatial accessibility in the BRMSA. This overall trend is even observed in city high schools in which sizable levels of middle class White populations attended schools with better spatial access than those associated with disadvantaged urban mostly Black populations. This general division was an extension of the urban core-fringe spatial access disparities discovered with the 1990 implementation of the 2SFCA method.

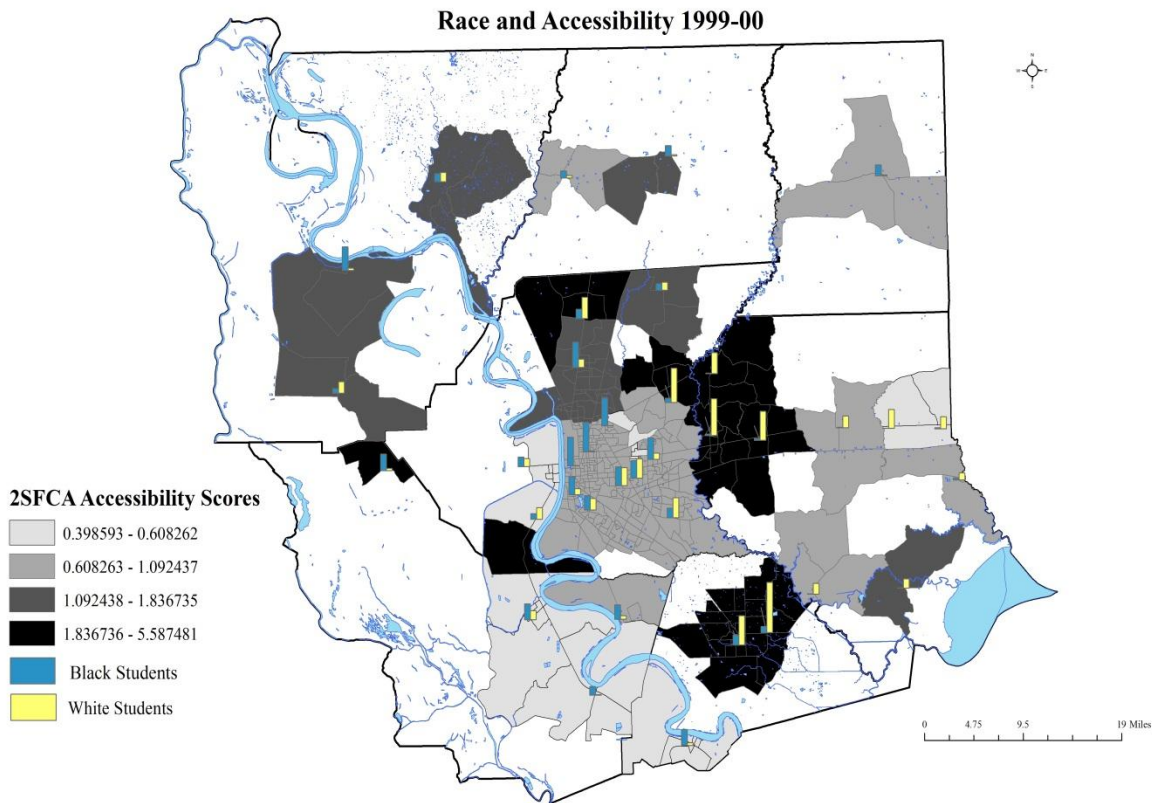


Figure 5.2 Racial composition of 2000 high schools paired with 2SFCA results

By 2000, as shown in figure 5.2, Black students became the majority in all city high schools of Baton Rouge, except for Broadmoor and Woodlawn. Black students were also shown

to have expanded their majorities at Donaldsonville, St. Helena Central, Plaquemine, and Jackson high schools. By the turn of the century the public high schools of the BRMSA had taken major steps towards essentially resegregating.

Such changes portray a fascinating and yet alarming observation for the Black high school student experience in that it has rapidly changed over a short matter of time within the BRMSA. When placed into full context, this instability began decades ago with the arrival training schools which to a degree sought to suppress the upward mobility of Black populations. In due time the training schools manifested into traditional structured segregated schools, followed by traditional structure integrated schools, which again have in some cases resegregated and became Black student majority schools which endure threats ongoing of conversion into charter schools due to poor academic performances. Throughout implementation of factor analyses, Nonwhite populations (Black) populations of the BRMSA were shown to overwhelmingly make up the factor one household economic disadvantaged populations with the region. The socioeconomic challenges faced by much of much this social group could be reflective of the unstable opportunities to receive and complete their education.

By 2010, economic disadvantaged residents of Baton Rouge and New Roads had received opportunities through a myriad of policies to pursue high school alternatives in the form of private and charter schools. Figure 5.3 captures the influence of charter schools within both communities which predominately served Black students. Also shown in this figure are both Capitol and Pointe Coupee Central High Schools which were converted to charter schools and taken over by nonprofit business organizations.

Race and Accessibility 2009-10

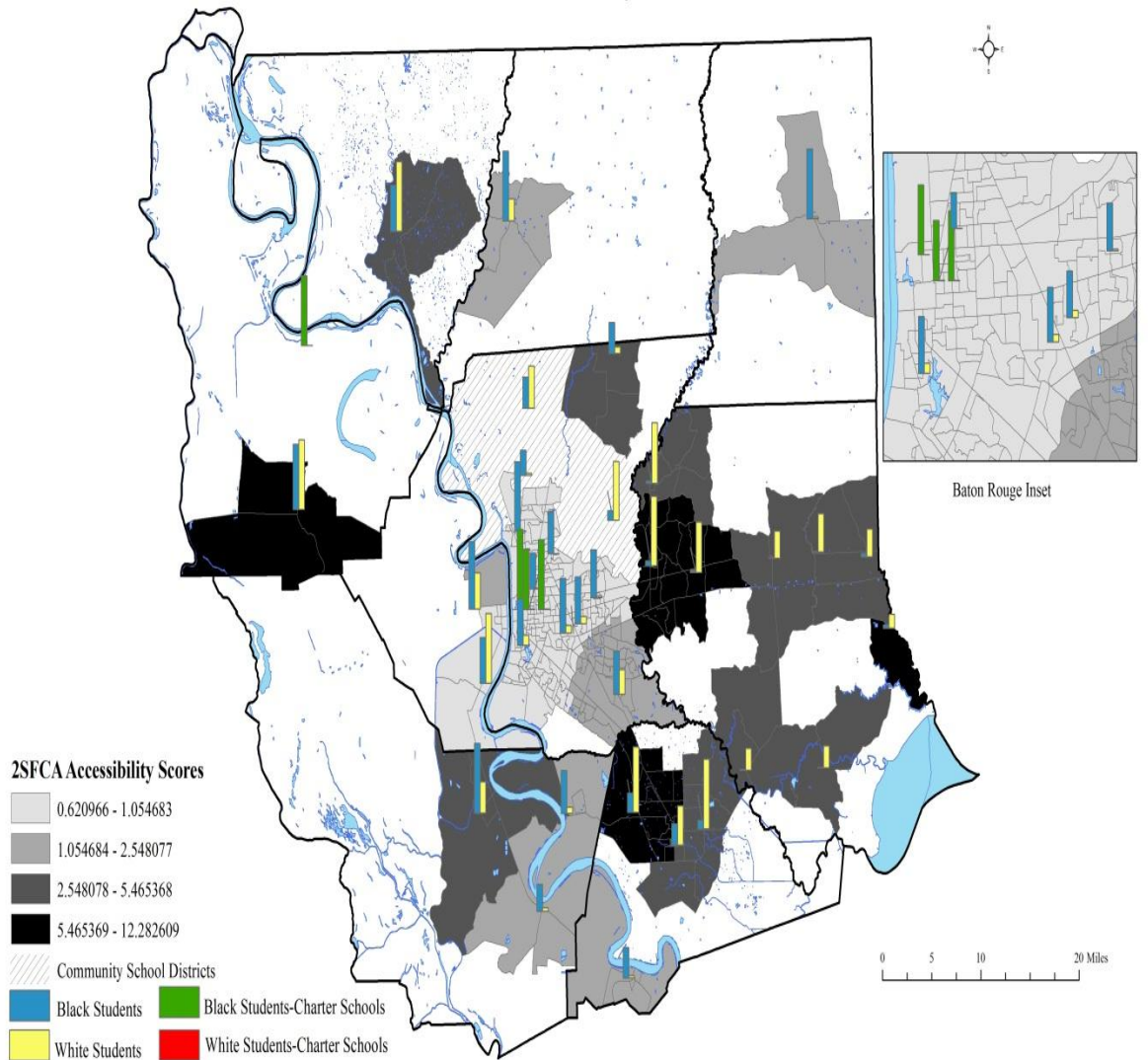


Figure 5.3 Racial composition of 2010 public high schools paired with 2SFCA results

This was the second stint of a charter school aimed to primarily serve the economic disadvantaged residents of New Roads. Hardy (1998) reported that the School of Hope, which was established on the campus of the former Poydras High School, sought to fill a void left as the city no longer contained a public high school. This school was particularly targeted to the

disadvantaged residents of the community who may have struggled at the new more distant consolidated high school, sought job training, or had previously failed to earn their high school diplomas. At the time, this school was structured to complement the consolidated public high school and assist students who may have struggled to move forward at the school as they had no other schooling options within thirty miles.

This research has shown that despite the presence of these alternative options for disadvantaged populations, little sustained mobility occurred for the most disadvantaged of residents. The School of Hope did not last a decade despite support from local business, industry, and political leaders. Pointe Coupee Central eroded both spatial and social connections to the disadvantaged urban and rural populations in and surrounding New Roads that the school intended to serve.

As a result the school was converted to a charter school, and it became taken over by an organization located thirty miles away in Baton Rouge. In this example, while the school structure may have changed, if accessibility proves to be indicative of achievement, this example highlights a flaw concept behind simple charter school conversion policies as accessibility continues to be disregarded for the most vulnerable of populations. Additionally, Figure 5.3 captures a potential lack of popularity with charter schools as exponential growth was experienced at Livonia High School and this growth occurred with Black and White students.

The closures of schools in Clinton and Rosedale over the late 2000s potentially impacted economic disadvantaged household residents of in those communities similar to those of New Roads. The racial composition map for 2000 displayed each school to be overwhelmingly majority Black student schools. Populations in the city of Baton Rouge in most cases still were within the catchment zone of other high schools and had various attendance boundaries

amended. However, despite seemingly smoother transitions, accessibility played a relatively insignificant role in the development of new boundaries following high school closures in Baton Rouge.

In agreement with the research of Anderson (1988), this paper found that of all population or social group breakdowns in BRMSA, rural Black residents historically had the poorest accessibility to public high schools, thus the lowest opportunities for social mobility. Given this reality, it comes as no surprise that the one of the greatest demographic shifts within the BRMSA has been the migration of away from rural BRMSA communities. Despite facing similar initial conditions as rural Black residents, rural disadvantaged White populations overtime achieved levels of accessibility comparable to that found cities and towns in the past. This general finding also stood in agreement the research of Anderson (1988).

In time, the Black population significantly shifted and became established in cities and towns of the BRMSA. As this shift continued to noticeably occur, poor school accessibility in a sense followed. The modern day concentration of poor urban area accessibility found in this research stands in direct opposition to the Los Angeles based study of Logan, Mina, and Adar (2012).

Their work revealed that socioeconomic heterogeneity of populations across metropolitan regions has allowed for disparities in access and achievement to potentially reach every part of a region. The factor analysis identified suburban communities had a negative correlation with Black populations, thus the diversity has remained severely limited in the BRMSA suburbs. This research contained one final prominent difference with the work of Logan, Mina, and Adar (2012) as the suburban areas of the BRMSA have no observable significant disparities in accessibility or accountability scores.

5.7 Trends in the Change of Design and Roles of BRMSA High Schools

Change has brought about detachment between social groups of local or distant communities and public high schools. This research has shown much of this change through the evolution accessibility within communities over history. Declines in accessibility have been attributed to a multitude of actors and variables which range from the action of particular individuals to the implementation of overgeneralized education policies. Field visits were made to northern BRMSA school sites to investigate accessibility at the most intimate neighborhood scale.

Schools visited serve sizable or majority proportions of economic and sociocultural disadvantaged students and communities. The schools shown in figures 5.4 and 5.5 each operate as the only public high school within their entire parish. Due to being the only schools in their districts, these schools potentially serve large amounts of disadvantaged students who live well beyond five or even ten mile catchments. Field visits to these and other BRMSA schools have revealed conditions which exacerbate accessibility challenges presented within this research and show accessibility challenges may occur at the most local of levels.

At the high school campuses chained gates, barbed wiring, crumbled sidewalks, and dilapidated signage are a commonplace sight. These schools indicate a clear movement away from community oriented historic constructs of public high schools addressed in the works of Foote and Lewis (1938), Redcay (1936), Rodgers (1975), and Vincent (2006). Time has brought new challenges in which public services operate under; however, in the case of the public high school, changes have also kept away the local community. Public high schools have transformed from the most accessible community resources to arguably the most inaccessible.



Figure 5.4 East Feliciana Parish High School Main Entrance



Figure 5.5 St. Helena Central High Rear Entrance

A focus on the history of high schools within this region has shown that concerted and overt efforts which targeted disadvantaged populations led to socially mobilizing opportunities for students and the community as highlighted in the work of Niederfrank (1937) and Aaronson and Mazumder (2010). Aaronson and Mazumder (2010) identified major educational gains resulted from educational policies which directly sought to improve the accessibility of Black students to public schools in the early twentieth century. Nearly one hundred years since the studied time period of Aaronson and Mazumder, the spatial and social analysis shows that many Black disadvantaged students now endure education policies that reduce school accessibility.

The growing inaccessibility experienced by disadvantaged students has been combated by policies which aim to provide free private education to students through a voluntary voucher lottery program in Louisiana. By inverting the 2SFCA five mile catchment map, potentially poor high school access communities beyond catchment zones were displayed. The block groups revealed in figure 7.3 show areas where distance and accessibility may potentially be significant barriers for public high school attendance. Highlighting of these communities builds upon the focus on accessibility gaps referenced in the work Yoshida and Deichmann (2009).

These identified areas may also provide the best opportunities for private or charter school growth and development to potentially fill the void left behind by a decline in or absence of public schools. However, neither spatial or social accessibility are current factors in the awarding of vouchers to students, rather the system is structured to appeal to all students enrolled at average to failing public schools. As addressed throughout this research, there have been unfavorable results for such education policies which have disregarded accessibility.

Regional Blockgroups Outside of Five Mile Catchment Zone

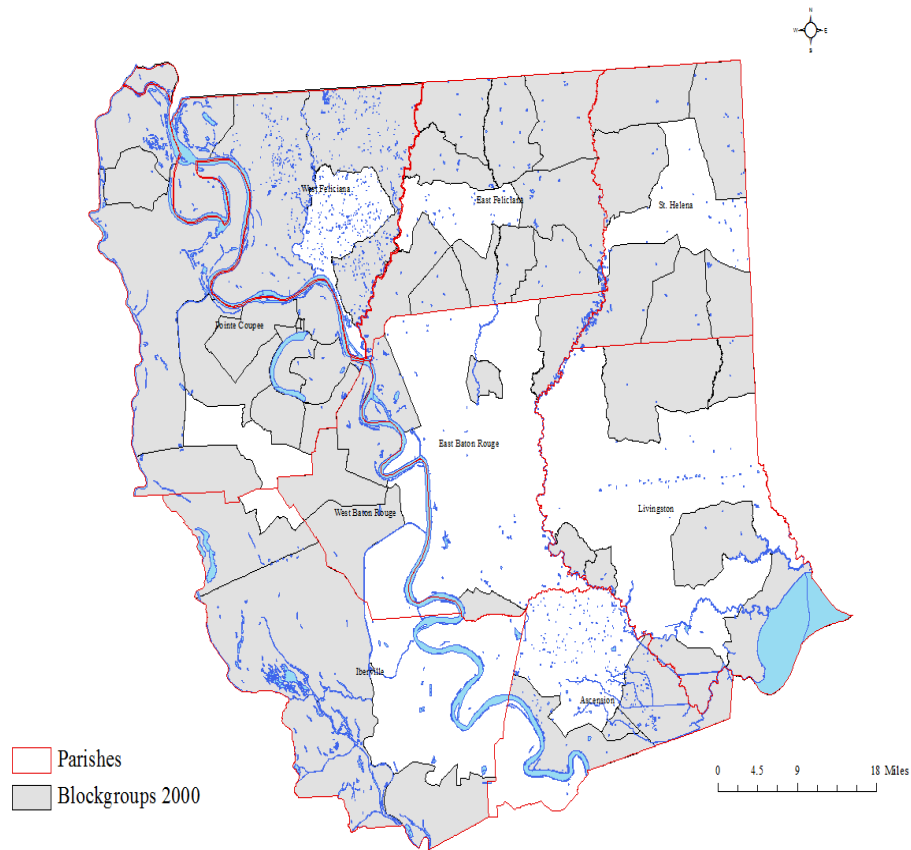


Figure 5.6 Potential high school education deprivation areas based on 2010 high school five mile catchment areas

A historical analysis of the public high school landscape referenced in the literature review along with the contemporary political climate of Louisiana gives support to the likely reemergence of private schools in Louisiana. However, understanding from the historical analyses makes clear that a sizable private school transition would signal the prolonged instability of the education system in Louisiana which would have completely revamped its

structure every one hundred years. In a bit of irony, accessibility challenges, particularly for poor and rural residents played a major role in the downfall of private schools in Louisiana's past. Although public high schools are now at the center of poor accessibility, the social groups impacted the strongest by declines in spatial access to education facilities remained the same as Black, poor, and rural residents have borne the brunt, despite 112 years of time which has passed.

CHAPTER 6: SPATIAL ACCESS AND SCHOOL ACCOUNTABILITY

An initial bivariate correlation analysis was implemented to examine the relationship between spatial accessibility (2SFCA scores) and school accountability (SPS) for 2010. This analysis was conducted based on a randomly selected 50% sample size of 2010 BRMSA public high schools. Due to the limited access of individual student data for privacy concerns, the accountability scores in this analysis are based at the school-level, which also maintained consistency in research as all methodologies analyzed school level data. The analysis revealed a moderately strong positive association between the two variables indicated in table 6.1. Statistically, this result should be interpreted that as accountability scores increased so did 2SFCA scores.

Table 6.1 Correlations

2SFCA	Pearson Correlation	SPS
		.752**

** . Correlation is significant at the 0.01 level (2-tailed).

Based upon the strong correlation of access and performance a simple linear regression was performed to expound upon this discovery. Statistically, the regression statistics indicate that the sampled schools did not over or under emphasize performance scores of BRMSA schools. As shown in Table 6.2, the sampled high schools had an average 2SFCA score of 2.5 and a SPS score of 87.8.

Table 6.2 Regression descriptive statistics

	Mean	Std. Deviation
SPS	87.8421	18.90404
2SFCA	2.5521	2.18697

Figure 6.1 shown below, displays the regression analysis graph and an R square value of .566. The R square means that 56.6% of the variability in SPS ratings can be attributed to 2SFCA spatial access scores. Furthermore, the unstandardized coefficient displayed in table 6.3 reveals that a 1.0 increase in accessibility leads to a school performance increase of 6.5.

Table 6.3 Unstandardized coefficients

Model	Unstandardized coefficients	
	B	Std. Error
	2SFCA	6.504 1.381

The correlation between accessibility and SPS ratings raises a multitude of intriguing historic, contemporary, and future questions in relation to changes to the landscape of public education which impact on school accessibility. Within the scope of this research such questions date back to the 1990 analysis. This study period analyzed school conditions several years before to the introduction of SPS performance measurements in Louisiana.

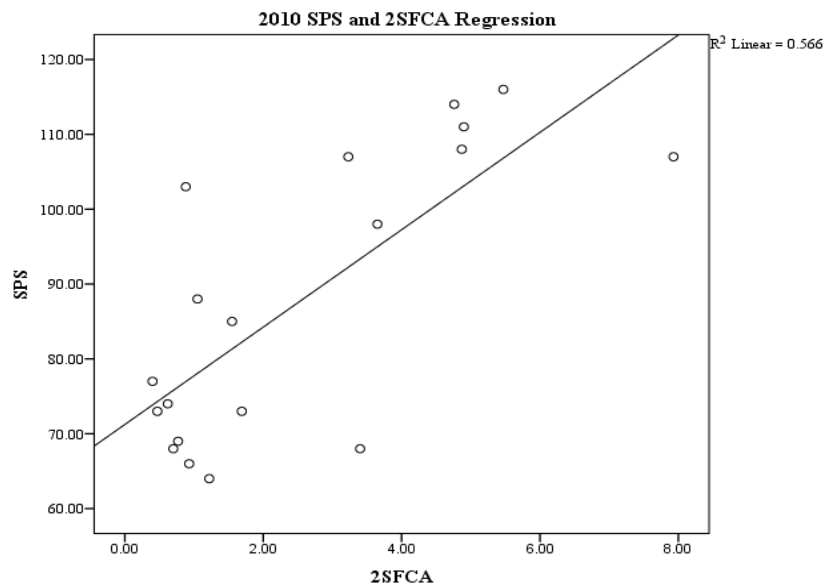


Figure 6.1 Regression of 2SFCA and SPS results

Based upon the potential relationship between access and school performance, the assumption could be made that the strong 1990 accessibility scores of urban fringe high schools in Baton Rouge may have translated into strong performance scores at each school. While a myriad of contentious issues contributed to the 1990s White flight phenomenon in East Baton Rouge Parish, would heavily publicized praiseworthy SPS results have halted the exodus of students into suburban school districts or private academies? As uncovered in an earlier 2SFCA research analyses, in 1990 the gap between Baton Rouge fringe high schools and suburban high schools was relatively narrow; therefore, the potential existed for the city high schools to compete against the suburban schools.

On a regional scale, the potential association of spatial accessibility and accountability measures should raise concerns about the adoption of school consolidation proposals. This research has shown that high school consolidations have been a rather ubiquitous practice within various BRMSA school districts across a sustained period of time. The relationship between access and performance may hold value in the determination of factors which address when or if school consolidations may result in diseconomies of scale, which would prove such undertakings to be counterproductive.

School choice and charter school development policies are a final component called into question with this finding. The association between access and performance indicates that if charter schools continue to disregard spatial accessibility, then they are destined to fail much like their predecessor public schools. This statement specifically references charter schools which simply operate as conversions of former public school campuses. Development of any such schools would potentially provide little improvement for the disadvantaged students who live in locations distant from school sites.

Table 6.4 Correlations

	SPS
Household Cultural Disadvantaged	.514**
Household Economic Disadvantaged	-.068
Community Sociocultural Disadvantaged	-.094

** . Correlation is significant at the 0.01 level (2-tailed).

Table 6.4 provides results of a multivariate correlation analysis between the extracted factors of the 2010 analysis as explanatory variables and school accountability measurements. Household cultural disadvantaged populations were the only factor revealed to have a significant correlation with SPS scores. Figure 6.2 shows an R square of .265 which indicates that 26.5% of the variability in SPS scores is attributed to factor three results.

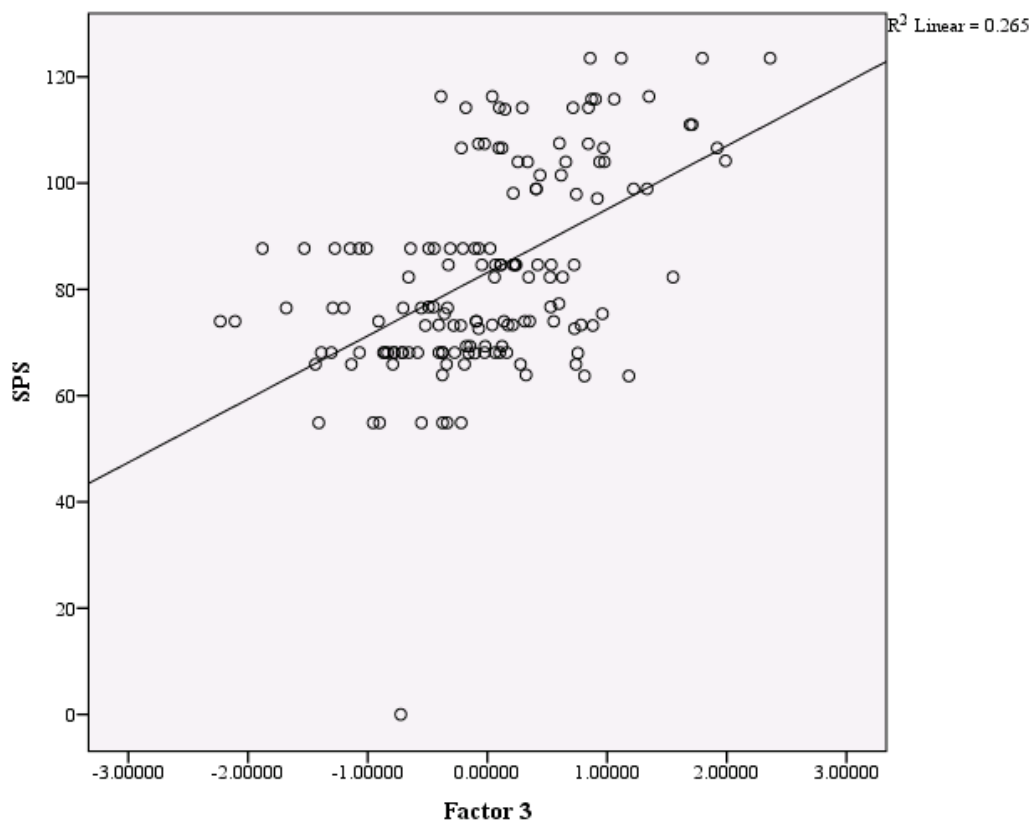


Figure 6.2 Regression of 2010 Factor 3 and SPS Results

This analysis exhibited an unsuspected and interesting observation as household cultural disadvantaged populations displayed a moderately strong correlation to strong performance schools. The previously displayed spatial mapping of the 2010 household cultural disadvantaged population revealed their concentrations within several suburban areas of the BRMSA. If the initial interpretation of the social group labeled household cultural disadvantaged proved true, this observation would stand in direct contrast to several urban economic theories which at the least associate these apparent immigrant populations with urban areas.

A deeper investigation of the 2010 factor three loadings showed that there are actually two intriguing interpretations to be made from the revealed correlation and spatial mapping of this disadvantaged population. The first interpretation is that high performance schools have begun to attract more disadvantaged families into their communities. Spatial mapping of 1990 and 2000 public school accessibility indicated that these school districts drew primarily middle class White families as improvements in both accessibility and performance of these schools took place. Under this interpretation, it can be claimed that poor families are now following the middle class into these suburban regions and the decades of delay could be attributed to the obvious socioeconomic hardship face by families.

While the aforementioned interpretation seems to provide a strong analysis of what has taken place within suburban communities with quality schools, the farther investigation of the 2010 factor analysis variables provided a fascinating deviation from this interpretation. Factor loadings clearly showed that poverty was a nonfactor for this new social suburban social group identified as culturally disadvantaged. This finding meant that the families which had moved into these areas were not highly impoverished but arguably middle class. Yet, the rotated variable of overcrowded households was displayed as the defining feature for these factor three populations.

With the collective analysis of these observations, the researcher concluded that the salience of overcrowded households indicates that rather than families having moved into these suburban areas, it has been children. As previously discussed, all of the non-Baton Rouge tracts associated with the population labeled as culturally disadvantaged were found within top high school attendance zones. These observations could indicate that children are living with extended families or family friends in order to attend quality schools.

One on hand, these results could represent a derivative of the White flight phenomenon, but rather than entire families leaving urban areas only children are sent away. On the other hand, results could also indicate the movement of rural students into nearby school district which may provide more opportunities for students from small rural schools. For some families, this may additionally reflect their response to the loss of their community school. Each of the revealed concentrations of these populations could be initiated by varying local dynamics. For example, the spikes associated within the St. Francisville census tract could be associated with the lack of public high schools in neighboring northern Pointe Coupee Parish, but Ascension and Livingston tracts could be impacted by discontent of neighboring families with East Baton Rouge Parish schools.

Despite this analysis of suburban population concentrations, the urban population concentrations found within Baton Rouge may be heavily associated with the linguistic variable loaded into factor three of 2010. Unlike the discussed suburban populations, the urban population may primarily be comprised of immigrant families or migrant workers of Hispanic descent. The observed urban settlement of these populations would be supported by the zone and sectorial based urban economic theories of Burgess or Hoyt which associate immigrant populations with urban areas.

6.1 Social Hierarchies

The social hierarchy of public schools was a concept implemented by Hamnett and Butler (2010) to interpret how accountability measures and school choice relate. Figure 6.3 presents the 2010 SPS accountability ratings within school attendance zones. Examination of this figure helps to understand from a spatial perspective where initiatives and resources are needed as concentrations struggling poor performance districts are easily identified.

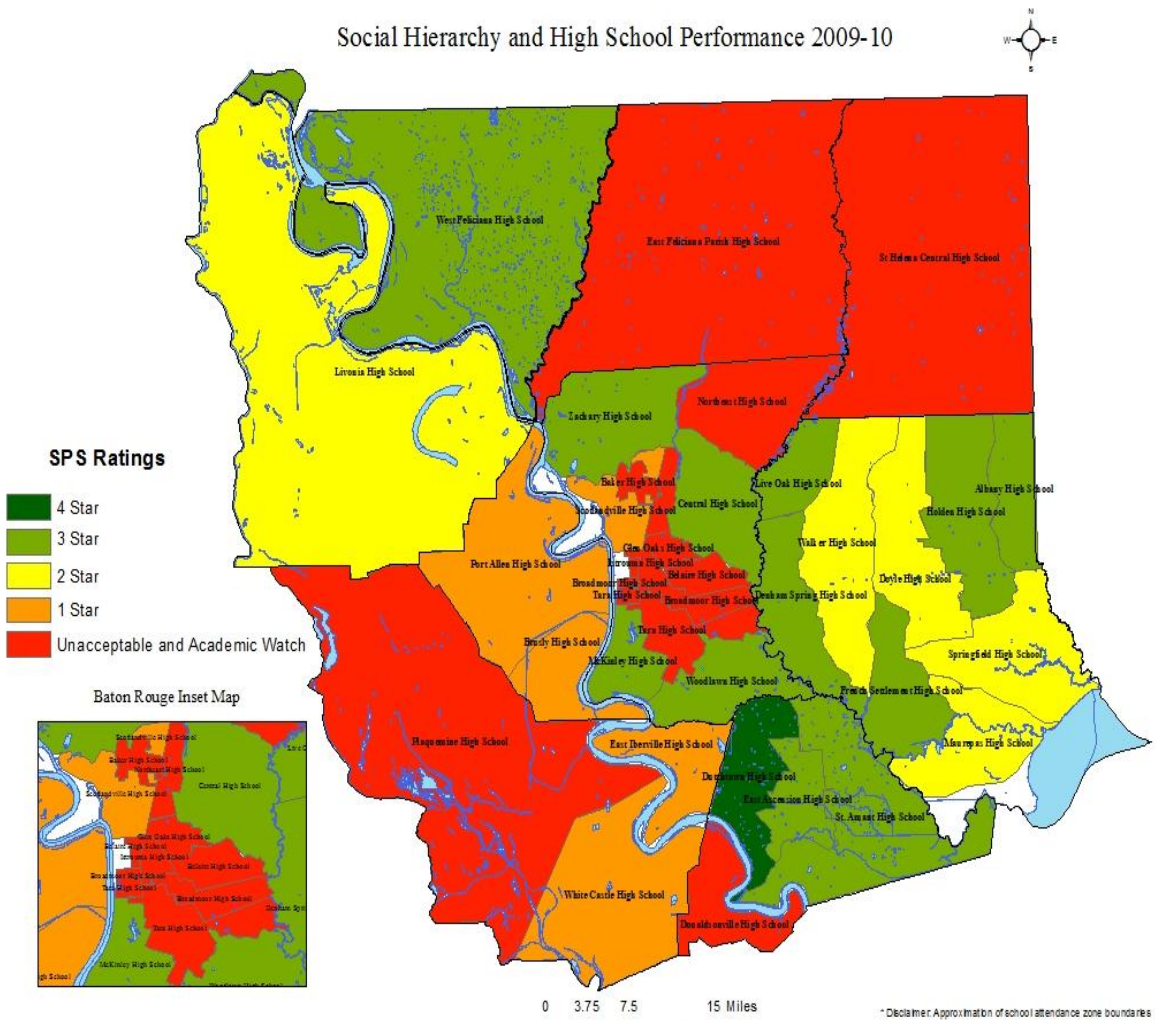


Figure 6.3 Social hierarchy based on SPS scores of 2010

School choice is a new phenomenon within Louisiana, and the potential of social hierarchy influences are in infancy stages across the state. The aggressive pursuit of education reforms have set the foundation for a system of public education never before seen in state's history. In fact, the breadth of policies in many respects has been categorized as a unique endeavor across the national school landscape. The basic premise of the sweeping changes in Louisiana has been to grant students of poorly rated schools access to better performing schools. Although choice based policies were not in place in 2010, the figure 6.3 provides an understanding of the likely mobility of students away from certain regions and into others.

Social hierarchies have the potential to provide an improved understanding of policies which alter public school landscapes such as school closures, expansions, or consolidations. For example, of four BRMSA consolidated parish high schools only West Feliciana rated as at least a 3 (of 5) star school in 2010. Also in Iberville Parish the consolidation of Plaquemine and North Iberville High Schools was followed by the consolidated school being labeled as an unacceptable or academic watch school.

Within the city of Baton Rouge, McKinley High School's 3 star rating could be attributed to success of its magnet program. Social hierarchy mapping similar to the Hamnett and Butler model (2010) can further help to understand the popularity and attraction of policies over space and time. Additionally, the mapping can provide an account for local factors which play a significant role in education policy making.

The McKinley High School observation could be reflective of the popularity behind magnet school development within urban school districts. Similar to the scalar variations of impact on understanding accessibility revealed by the 2010 2SFCA analysis, it is important to note similar impacts could result despite the ostensible progress viewed within urban area

schools. For example, how would magnet school performance and accessibility compare with a traditional public school if student zip code or block group variables were separately assessed?

While spatial access has not been an expressed concern state legislative concern, it could grow into a substantial widespread challenge for all public, private, and charter education systems within Louisiana. The social hierarchy map essentially captures the perceived reputation of schools and their communities by association. The growth of choice would aim to eliminate location or distance as a barrier to a good school. However, the moderately strong relationship between school accessibility and accountability could gradually result in choices being confined to a local area.

This specific phenomenon was referenced in Hamnett and Butler's (2010) study as private schools of London consistently rejected students from distant or unfavorable locations in comparison to those in close proximity to the campus. If such a strong association of accessibility and accountability were to persist in Louisiana, then destination schools would jeopardize their accountability success by attracting students from open and distant locations. Furthermore, what happens to students without alternative options in proximity to their homes? Finally, if issues similar to the London experience do not materialize, then could these policies eventually deconcentrate or reconcentrate school performance challenges onto a larger geographical scale?

If the recently developed policy were in place in 2010, then students within school districts shaded red which include Donaldsonville, Plaquemine, Baker, Northeast, St. Helena Central, East Feliciana, Tara, Broadmoor, and all north Baton Rouge high schools would be prime candidates to change districts or enter private academies. However, figure 6.4 shows the arbitrary nature of the accountability policies as the SPS was restructured one year later in 2011.

The result was a sharp decline in the number of high schools with the lowest level of rankings in the BRMSA. Within this figure two schools received F's and one of the schools, Istrouma High School, has been converted into a charter for the 2012 school year. The trend from both figures is the emerging volatility across the landscape of not only public schools but all schools. On a year to year basis, schools could experience swings in attendance and population based upon arbitrary rankings and a continued disregard of accessibility.

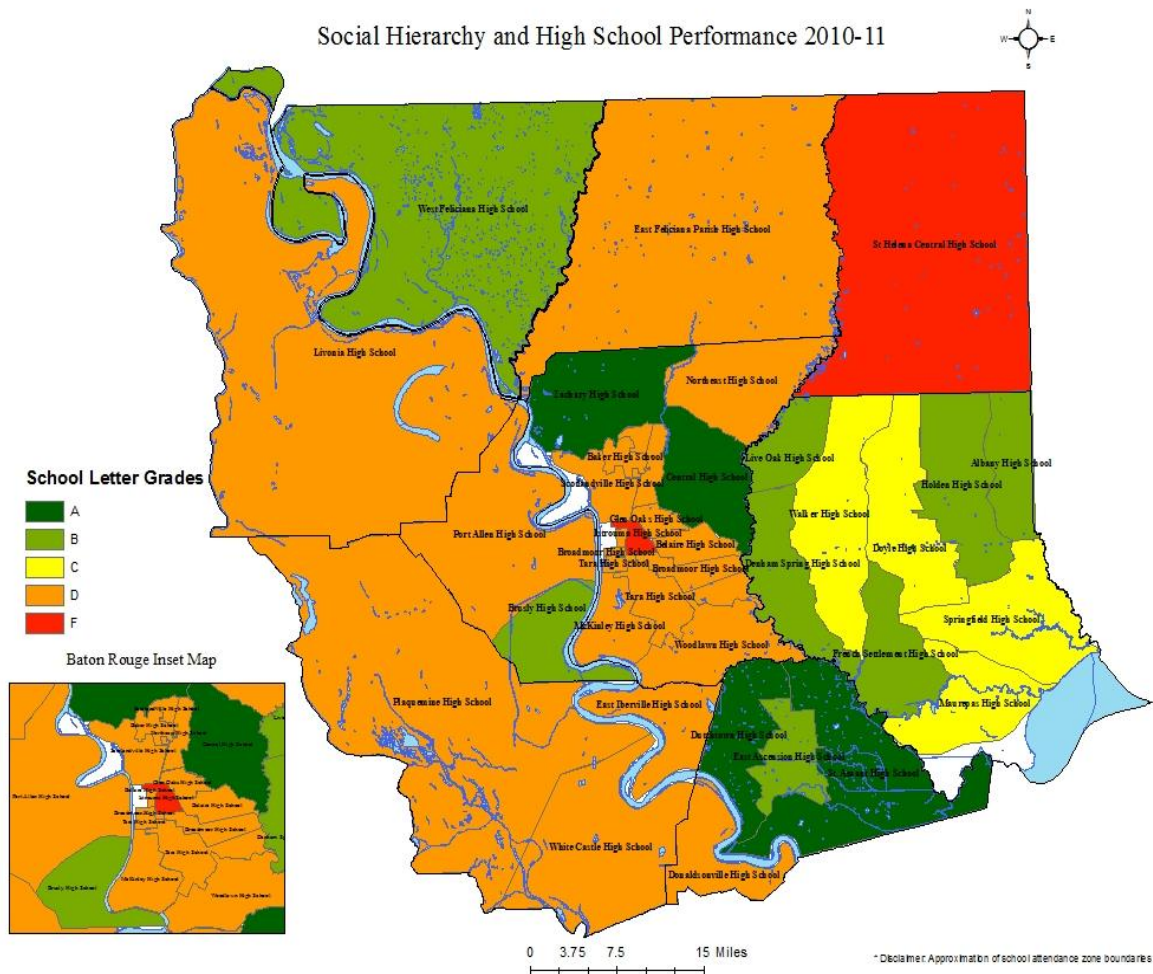


Figure 6.4 Social hierarchy based on 2011 SPS results

CHAPTER 7: CONTRIBUTIONS AND FUTURE RESEARCH

7.1 Major Findings

The 2SFCA was found to have been successfully implemented into the analysis of public school accessibility. In several cases, the results from this implementation were found to strongly differ from 2SFCA implementations into other fields such as healthcare accessibility. Urban areas of the BRMSA were steadily found to offer the poorest levels of accessibility to public high schools, and this finding stands in direct contrast to the typically strong urban spatial accessibility to medical services.

Salient challenges of the 2SFCA method expressed in the works of Luo and Wang (2003), Luo and Qi (2009), and Wang (2006) were also found to have had a unique impact on this study. The threat of peripheral schools which attracted students was minimal to nonexistent due to boundaries of individual schools and the larger school district. This finding answered whether or the 2SFCA could be utilized as a tool which captures real conditions and possibly predict future spatial interactions, and it was successful.

A second recognized challenge of the 2SFCA identified by the aforementioned researchers was also found to have a unique impact within this study. Populations within certain sections Iberville and Ascension Parishes were shown to have equal accessibility to high schools, despite being geographically separated from the nearby schools by the Mississippi River. Euclidean distances do not take land features like bridges into account; therefore, calculations along the river in these areas misrepresented potential spatial accessibility. When the attendance zone derivative of the 2SFCA was implemented the accessibility results much clearer pictures of real accessibility conditions for populations.

One of the most intriguing findings of this research with the strong correlation between access and accountability. An early argument in the work was that access and accountability have an association, and this argument was proven true. The relationship uncovered between the two variables bolster arguments for accessibility inequalities and disparities to have a more prominent role in the development of the policies which impact the public schools. Accessibility within this research was determined by the diversity of course offerings and curriculums which existed at each high school or within their districts. The positive correlation stood in direct contrast to the research conclusions argued by researchers such as Hallet and Venegas (2011) as they determined that general improvements in accessibility by course expansion does not result in achievement improvements for schools.

The structure of this research indirectly took into account curriculum changes as simply the amount of classes taught at the three time period examined. Strong agreement was found on the Hallet and Venegas (2011) argument that the curriculum of urban public high schools were poor in comparison to suburban school curriculums. However, while the work of Hallet and Venegas showed urban high school courses to be of bad quality, this analysis additionally found the urban schools of the BRMSA to also have fewer offerings.

The potential that high performance schools have been attracting students was not a major finding. However, the information revealed in the bivariate correlation shows that the route families may be pursuing to gain entry into these schools could represent a significant finding. This finding indicated social groups are responding to disparities in high school accessibility in a variety of fashions which include charter, private, and suburban schools. The arguments made in this paper are that a new formation of the White flight phenomenon may be underway or suburban schools have strongly attracted students from rural school zones. With either argument

the surprising finding was the movement may just consist of children as they possibly are living with family members to attend the highly attractive schools. The claim was supported by the strong growths in the number of overcrowded households in low poverty advantaged communities of high performance school districts. Also, the argument could be made that improvements in the schools or schooling options from wherever these populations are flowing from could have stronger impacts than anticipated.

A fascinating observed trend was discovered in relation to the volatility of schools which were found to have strong levels of accessibility within East Baton Rouge Parish. This trend showed that the stronger accessibility has been found to be, the more likely a school has been to become part of a separate community school district. The association between accessibility and accountability meant that these schools in most cases did not simply have the best accessibility, but the schools also contained the strongest levels of accountability in the form of SPS scores. This observation was bolstered by recent efforts to establish a community school district based upon Woodlawn High School in the southeastern section of the parish. Following the removal of former three former schools within the East Baton Rouge Parish school district, Woodlawn has now shown to have the highest present accessibility.

A final major finding of this study came from the revealed interconnections of race and geography on the foundation of accessibility disparities which continue to exist today. Social groups of populations which have long histories of accessibility challenges have been shown to be at the center of similar challenges endured, despite decades which have passed. This reality has become clear despite instances throughout history also revealed that direct initiatives which focused on these populations provided the most impactful results on achievement and accessibility.

7.2 Policy Implications

This research poses several important questions about the policies of public education in Louisiana. The overarching theme of the paper has been that policies have to account for the accessibility of students and communities to public high schools. However, given the rise in development of other forms of schooling being introduced into Louisiana, this researcher argues that accessibility should also be of equal importance for all schools. If private or charter schools attempt to grow at the expense of public schools without acting on accessibility challenges, then rather than solve problems these developments may simply reconcentrate the problems. Within public school systems, leaders have to be willing to identify and address when the consolidations of public high schools may reach a level of diseconomies of scale. Although consolidations are often viewed as contemporary phenomena, they have occurred for over a century in Louisiana. Accessibility should be utilized to determine when districts may excessively reduce their public schools.

An additional policy implication involves the need for people of the community and professional planners to partake in the design and development of public schools. One of the significant struggles referenced in planning literature such that of Vincent (2006) is the struggles for planners to gain roles in the development of public schools. The connection between student achievement and accessibility could be beneficial for planners to emphasize the need for smart growth initiatives like walkability beyond just elementary schools. This research study expanded upon the urban based research of Vincent and found that similar accessibility dilemmas were being faced in small towns and rural settlements in addition to urban areas within the BRMSA.

A final focus of policies is a result of the attention disadvantaged populations require. This paper made reference to the improvements achieved when such populations were the direct

focus of education policies. As more policies are being developed that move beyond recognized school boundaries, this researcher argues that analysis of vulnerable populations should follow suite. Perhaps, some forms of positive discrimination would provide means to identify concentrations of disadvantaged populations could prove and prove beneficial in the ensuring that development of alternative schooling options improve shortcomings of public high schools rather than continue or exacerbate them.

7.3 Limitations and Delimitations of the Study

Many of the potential setbacks endured at various points of this experience proved to only be temporary. However, there were a few significant limitations that are shared below, which were encountered over the course of this study or are important to reinforce at the concluding stage of this analysis:

1. Historical data used in this study was primarily found in historic state education directories. In cases where gaps in data were discovered, the data may not have been included within the report or reported by local school districts.
2. Due to privacy concerns and limited information availability, this study used block group or census tract centroids rather than student household or address data to represent and interpret student locations.
3. Major changes to high school such as consolidations or closures which occurred during the peripheral years of this study's time frame were infused into the study to gather a more complete analysis of regional changes.
4. Euclidean distances were utilized rather than network distances. This was a result of the void of personal address data and recognition of endless routes traveled to reach school sites during morning commutes.

5. The five mile catchment area was used to examine accessibility for schools in both urban and rural settings. An adaptation was implemented for the 2010 analysis as approximated attendance zone boundaries were used instead.

APPENDIX A: HIGH SCHOOL SITES



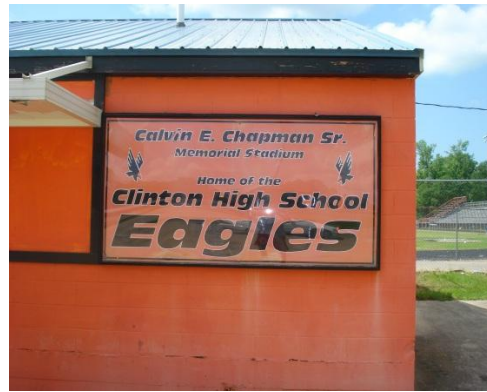
West Livingston High School Denhams Springs, LA



Poydras High School New Roads, LA



Pine Grove High School Pine Grove, LA



Clinton High School Clinton, LA

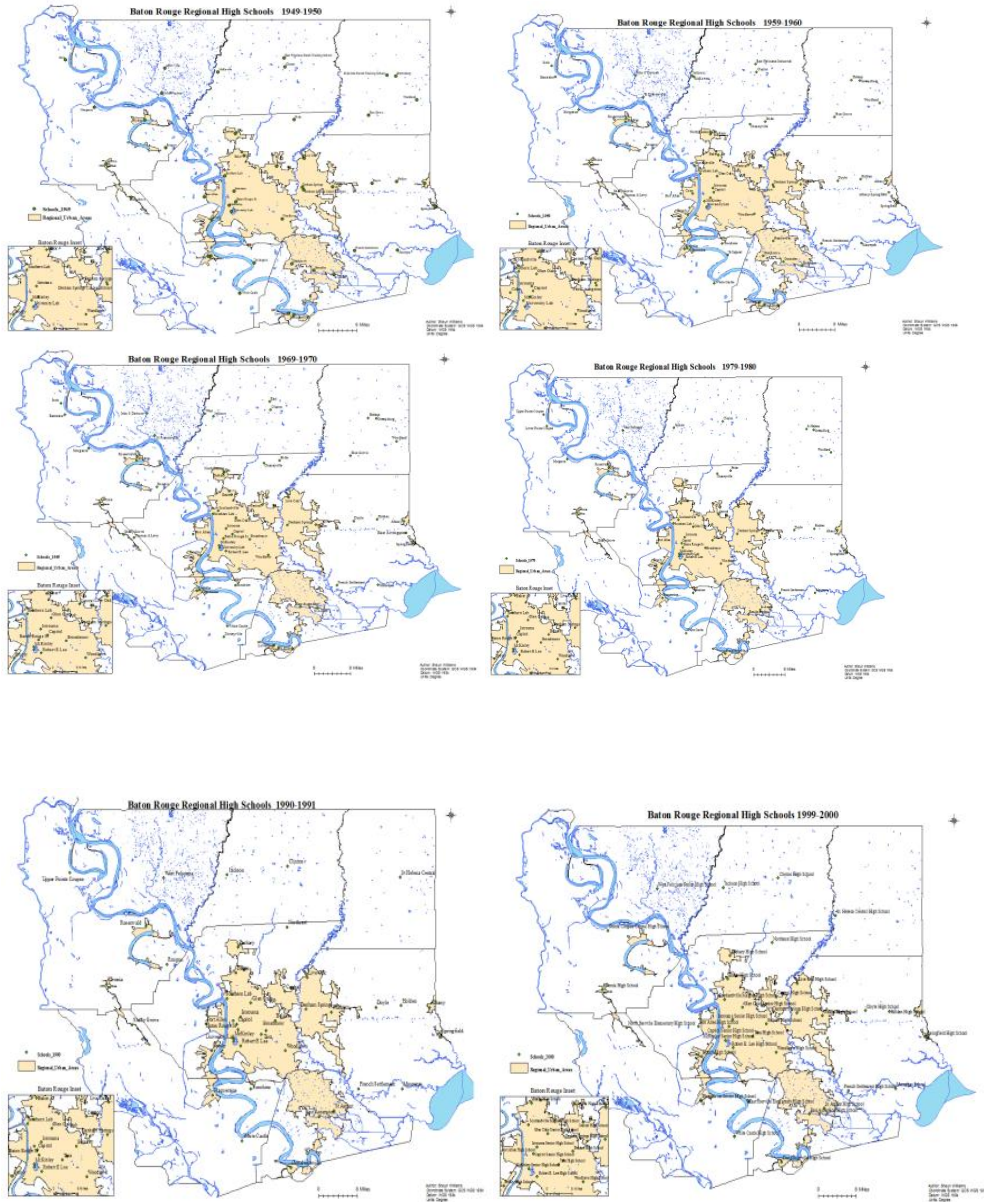


John Dawson High School Bains, LA



West High School Jackson, LA

APPENDIX B: HISTORIC HIGH SCHOOL LOCATIONS



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