EXPLORING LINKS BETWEEN GATEWAY COMMUNITIES AND NATIONAL PARKS: A QUANTITATIVE ASSESSMENT

By

CARY ANDREW LINCOLN

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Thesis Approved:

Dr. Thomas Wikle
Thesis Advisor

Dr. Jonathan Comer
Committee Member

Dr. Rebecca Sheehan
Committee Member

Dr. Sheryl A. Tucker
Dean of the Graduate College

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Chapter 1

Introduction

Gateway communities are critical to national park visitation in the United States by providing goods and services to park visitors at or near park entrances. This function is usually unfulfilled by the National Park Service. Gateway communities are defined generally as communities at or near park unit entrances that provide goods and services to park visitors (Howe, McMahon, and Propst 1997; Steer and Chambers 1998; Stynes and Sun 2003; Wilson 2002; Wondrak 2002; Kurtz 2010). Growth of tourism services in gateway communities can directly impact environmental quality and the tourist experience of national park units. These impacts can affect the execution of National Park Service's (NPS) dual mission, to preserve national park resources and to allow access and use by current and future generations (NPS 1999).

These seemingly paradoxical missions of preservation and use require the NPS to maintain a delicate balance. The challenge of maintaining balance is made more complex because the NPS is not the sole actor in serving the needs of national park units. Dilsaver and Wyckoff (2005) note the challenges faced by the NPS as a result of differences between ecological boundaries of park resources and the defined political boundaries of park jurisdictions. Human development, often in gateway communities, is within the ecological footprint of the park resource, yet outside the politically defined boundaries of park units and thus beyond direct control of the National Park Service. Therefore, these communities are actors independent from the NPS and operate with their own goals that can influence the NPS mission of preservation.

Typically the goals of various actors found in gateway communities are to provide tourism services in the form of goods and services. These goods and services are an instrumental part of tourism supply, affecting the overall visitor experience since tourists need places to sleep and eat. Visitors also seek entertainment and opportunities to purchase souvenirs (Gunn and Var 2002; Stynes and Sun 2003).

Gateway communities impact both the preservation and access missions of the NPS. Since they are typically located within the ecological footprint of national park units, development within gateways can affect the environmental quality of park units (Howe, McMahon, and Propst 1997). Furthermore, businesses within gateway communities provide goods and services to park visitors, an important function in support of the national park tourism experience. The NPS acknowledges that it must cooperate with independent actors to fulfill its missions. NPS Directors Order #17, Operating Premise 3.2 states:

> 3.2 At the core of the Park Service tourism policy is the reality that it is in the best interest of the Service that we understand and pro-actively communicate with tourism businesses and those who visit the parks as tourists. It is to each park's advantage to find common ground with tourism interests. In doing this, the parks must communicate the Service's mission goals and identify the unique limitations and constraints for each park… Conversely, the Service must seek to understand the goals, capabilities, and limitations of the tourism industry, and recognize that tourism businesses have financial obligations to meet and investments to protect (National Park Service 1999).

This policy demonstrates NPS awareness that cooperation and mutual understanding among tourism actors is in its best interest.

This study focuses on the identification of gateway communities by investigating tourism services and other related characteristics in communities near national parks.

Study findings will help the NPS be better informed in working with local businesses and governments in addressing issues tied to the provision of services for tourism.

Communities providing goods and services to park visitors at or near park entrances have been described as gateway communities (Howe, McMahon, and Propst 1997; Steer and Chambers 1998; Stynes and Sun 2003; Wilson 2002; Wondrak 2002; Kurtz 2010). More specifically, Steer and Chambers (1998) define gateway communities as towns and cities that are significantly influenced by park visitors. The most significant influence of park visitors is their economic impact, so the quantity of tourism-related goods and services can reflect the influence of park visitors on communities (Gunn and Var 2002; Stynes and Sun 2003). However, simply providing some goods and services to park visitors likely does not produce a significant influence on a community. Unfortunately, no clear standards delineate a benchmark level for a significant influence of tourism services applicable to define gateway communities. Therefore, the goal of this study is to explore variables associated with tourism services in a sample of communities around selected national park sites as a means of developing a more complete understanding of gateway communities. Two research questions are examined: 1) what spatial and economic variables influence gateway communities? 2) can gateway communities surrounding national park units be successfully identified using spatial and/or economic attributes?

Examples of Gateway Communities

Two prominent communities with tourism-based economies and locations adjacent to national park unit entrances are Gatlinburg, Tennessee, and Nags Head, North Carolina. These two communities are cited as gateway communities because of their tourism-based economies and their locations (Howe, McMahon, and Propst 1997; Stynes

and Sun 2003; Kurtz 2010). Gatlinburg is adjacent to one of the main entrances to Great Smoky Mountains National Park, America's most visited national park, while Nags Head sits at the northern and main entrance to Cape Hatteras National Seashore[1]. Tourism-related businesses dominate the economy of both towns. In 2002, Nags Head had 91 retail establishments with gross sales of $96 million while Gatlinburg had 172 retail establishments with gross sales of $95 million (US Census Bureau 2002). Additionally Nags Head had 50 accommodation or food service businesses with $38 million in sales. In comparison, Gatlinburg had 161 of such businesses and did $164 million in sales (US Census Bureau 2002). Neither community is especially large. Nags Head has 2,882 residents while Gatlinburg has 3,778 (US Census Bureau 2002). In examining service industries relative to population, more goods and services were purchased in these towns than could possibly be used by the residential population. Therefore, visitors purchased these goods and services, hence the tendency for researchers to label these places as gateway communities.

Both Gatlinburg and Nags Head were substantially smaller economies prior to the development of mass tourism (Dunbar 1958; Stick 1958; Tooman 1995). Nags Head is a community on the Outer Banks of North Carolina, a chain of barrier islands. The town struggled to develop a strong commercial economy because of the fluid nature of barrier islands and their remoteness in the face of agriculture and livestock that brought in little income. In the 1930's two bridges were constructed connecting the Outer Banks to the mainland, one in the north and one in the south. To improve access, the North Carolina Department of Transportation built a road along the islands connecting the two bridges,

[1] Great Smoky Mountains 2000 Visitation (10,175,812) Cape Hatteras 2000 visitation (2,647,383)

creating a transportation linkage to the beach that is accessible to anyone with an automobile. At the same time cottages began to be constructed along the beach road, essentially privatizing beach access. To prevent privatization of the beach, Cape Hatteras National Seashore was established (Dunbar 1958; Stick 1958). The national seashore begins along southern border of Nags Head. With the exception of a few small villages along the sound side of islands within the seashore's borders, Nags Head represents the southern terminus of major tourist development along the Outer Banks.

Prior to the development of tourism in Gatlinburg, subsistence agriculture and temporary logging operations were the main forms of economic activity. Two factors caused a decline in the logging industry near Gatlinburg. First, after the initial clear cut harvests, new growth coming from inferior trees, which produced lower priced lumber. Also in the 1920's overall lumber prices dropped, negatively and severely impacting the logging industry in Gatlinburg (Tooman 1995). As a result of this decline, several individuals and groups petitioned the Federal Government to establish a national park in the Southern Appalachia region to spur economic development through tourism. In 1934, Great Smoky Mountains National Park was established as a result of this lobbying effort (Tooman 1995). Gatlinburg soon capitalized on its position adjacent to an entrance for the new national park by developing services for park visitors.

These two parks were founded for very different purposes. Cape Hatteras National Seashore was founded to protect uninhabited beach land (Dunbar 1958; Stick 1958). In contrast, Great Smoky Mountains National Park was established on previously-settled land to encourage tourism-related economic development in the region (Tooman

1995). Despite these different purposes, both park units have communities adjacent to their entrances that are dominated by tourism-based economic activities.

Tourism Supply

The provision of goods and services is only one component of tourism supply. According to Gunn and Var (2002) five interdependent factors influence the supply side of the tourism industry: 1) attractions, 2) transportation, 3) basic goods and services, 4) information, and 5) promotion. The National Park Service participates in all factors of tourism supply except the provision of goods and services. This section briefly describes how the NPS provides attractions, transportation, information, and promotion.

The NPS provides attractions that draw tourism through to its dual mission of preservation and use. Through successful implementation of its dual mission, the NPS excels at providing natural, historical, and cultural attractions. The immense popularity of America's national parks is evidence of the excellence of the NPS at providing tourism attractions. To illustrate this, in 2010 the NPS recorded 281,303,769 recreational visits to US National Park units. If consideration is given to the 2010 US population, 308,745,538 residents, then the number of visits to national parks in 2010 roughly equaled 91% of the United States' population (National Park Service 2010; US Census Bureau 2010).

The next element important to tourism supply is transportation that provides a link between metropolitan areas and visitor destinations (Gunn and Var 2002). The extensive network of interstate and US highways provides much of the access to remote national parks located outside of metropolitan areas (Gartner 2004). In addition transportation within NPS units is important to visitor experience. The NPS also maintains transportation routes within parks to enable visitors to access park attractions (NPS 2010).

Additionally, the NPS provides substantial information and promotion through its website and visitor centers. Tourists need to be aware of opportunities to visit NPS sites including information about operating seasons and hours (Gunn and Var 2002). Examples of information provided by NPS-maintained websites include directions, operating hours and seasons, fees and reservations, things to consider while planning a visit, photos, brief descriptions of park history, and park news. Also, numerous visitor centers provide information about national park units for visitors on-site who may lack access to the Internet.

The provision of basic goods and services plays a supporting role in tourism, and typically the NPS does not provide basic goods and services. Without basic goods and services tourists would not have places to sleep, food to eat, or gas for their cars while they visit the main attraction, the national park unit (Gunn and Var 2002). As mentioned earlier, gateway communities play an important role in providing goods and services to park visitors (Howe, McMahon, and Propst 1997; Steer and Chambers 1998; Stynes and Sun 2003; Wilson 2002; Wondrak 2002; Kurtz 2010). It is in these communities at or near park unit entrances that park visitors can find accommodations, food service, amusement/entertainment, or retail goods.

Development of Rural Tourism

What does it mean for a community to be located near a national park site? First and foremost that community has a strong bureaucratic neighbor with independent goals. As explained, the NPS maintains two principal missions: preservation and public access (NPS 1999). Consequently communities near national park units must deal with NPS actions that help to facilitate these two priorities. Typically, preservation occurs in the form of environmental regulation and restrictions on land use practices (Dilsaver and

Wyckoff 2005; Kurtz 2010). Often traditional, rural, environmentally-degrading, extractive land uses such as ranching, logging, and mining are the most restricted around park units (Dilsaver and Wyckoff 2005; Kurtz 2010). For example, the New World Mine Project near Yellowstone National Park represents how restrictions have influenced land use near a national park site.

The New World Mine Project threatened Yellowstone National Park in the 1990's. Crown Butte Mines, Inc. proposed development of the New World Mine to extract gold, silver, and copper with an estimated value of approximately $800 million over a 10-15 year period (Humphries 1996). The process involved the removal of gold from rock that would turn into sulfuric acid when exposed to air. The operation would contain the sulfuric acid in a tailings pond that was near the headwaters of several creeks that flowed into the Yellowstone River, thus threatening the park. If pond containment failed, the entire river ecosystem would be in danger (Dykstra 1997). Crown Butte Mines, Inc. halted the mine project through a settlement with the Federal Government in 1996 (Associated Press 2010). The New World Mine settlement demonstrated that environmentally degrading land uses near parks have been influenced by the National Park Service even though the land was outside the formal jurisdiction of the NPS (Dilsaver and Wyckoff 2005; Wilson 2002; Kurtz 2010).

As a result of declining profits associated with extractive industries and/or environmental regulation, many rural communities embrace tourism to bolster their economies. This is especially common in areas with attractive natural resources such as national parks because amenity-related tourism development can substantially increase economic activity (Frechtling 1994). Communities use tourism as a means to create new

businesses. Those new businesses revitalize downtown areas, generating additional municipal revenue (Tooman 1995; Howe, McMahon, and Propst 1997; Rothman 1998; Milne and Ateljevic 2001). The result is a shift from extraction to tourism industries, often in the form of lodging, food service, amusement/entertainment, and retail trade (Stynes and Sun 2003).

On the one hand, tourism has been touted as a form of economic development for rural communities with several benefits (Rothman 1998). These businesses are often smaller and require more modest amounts of capital to establish compared to manufacturing operations. Like manufacturing, the jobs tourism brings to an area have low education requirements (Frederick 1993). Tourism is also seen as relatively "free" because it sells the already present natural environment of or around a community (Tooman 1995). Another commonly cited benefit of tourism development is the increase in property values that lead to increased property tax revenue (Frechtling 1994).

Issues Related to the Tourism Industry

On the other hand, unfortunately, the use of tourism as a tool for economic development has proven to have distressing quality of life impacts on rural communities since benefits derived from tourism development have analogous costs (Frederick 1993). For example, development can detrimentally impact the natural amenities affecting growth. In some places tall buildings spoil scenic views (Howe, McMahon, and Propst 1997). In addition, jobs created with tourism development are low-wage seasonal positions that are linked to increased poverty. Another factor can be seen in rapid land value inflation that causes social problems including a shift towards disproportionately older populations and a corresponding displacement of traditional residents. These costs are the result of rapid and uncontrolled injections of wealth into rural communities near

natural amenities (Frederick 1993; Tooman 1995; Tooman 1997; Howe, McMahon, and Propst 1997; Rothman 1998; Bryson and Wyckoff 2010).

Wealth flows into gateway communities in two primary forms: 1) capital invested in tourism businesses designed to capture visitor spending, and 2) consumption from amenity migrants who are often wealthy upper-middle class, professional, retirees or "empty-nesters" seeking a higher quality of life associated with natural amenities and small-town America. This movement of wealth is a crucial part of a larger process known as rural gentrification (Tooman 1995; Robbins 1996; Howe, McMahon, and Propst 1997; Lee and O'Leary 2008; Bryson and Wyckoff 2010).

Visitor spending attracts capital in the form of hotels/motels, restaurants, amusement parks, and retail establishments. These types of businesses often generate significant revenues for owners (Tooman 1997; Lee and O'Leary 2008). However, these businesses also create a significant number of low skill, low wage, seasonal positions (Frederick 1993; Tooman 1997; Howe, McMahon, and Propst 1997; Lee and O'Leary 2008; Kurtz 2010). Residents often lack the means to be business proprietors. Therefore they work during the tourist season as food servers, attendants, or cashiers. Research has suggested that the low wages associated with these positions contribute to an increase in poverty in the areas around tourism dependent communities because employees earning low wages cannot afford the high cost of living within the community (Frederick 1993; Tooman 1997; Rothman 1998).

Moreover, land values within gateway communities are increased by the injections of wealth from tourism businesses and amenity migrants. A high level of profit from tourism businesses also creates high opportunity costs for other types of land-use

located in gateway communities in situations where low-income housing or agriculture land uses cannot match the profitability of tourism services.

Amenity migrants also play a role in land value inflation. These individuals have greater purchasing power for buying residential units in gateway communities, often outbidding longtime residents. Robbins (1996) and Howe, McMahon, and Propst (1997) describe amenity migration as an escape from the pressures of (sub)urban life. Amenity migration is a post-suburban movement made possible partly through improvements in communication technologies (Howe, McMahon, and Propst 1997). Electronic communication through telephone and Internet allows amenity migrants, who typically have higher education and professional skills, to work in their vacation homes. since, many homes purchased by outsiders are seasonal residences used for recreation and remain vacant much of the year (Robbins 1996; Howe, McMahon, and Propst 1997; Tooman 1997; Rothman 1998; Lee and O'Leary 2008; Bryson and Wyckoff 2010; and Silberman and Rees 2010). Additionally, some amenity migrants use their wealth or experience to develop their own businesses in areas with natural amenities and perceived higher quality of life. These residents often choose gateway communities because of their natural amenities (Robbins 1996; Howe, McMahon, and Propst 1997; Bryson and Wyckoff 2010).

A major problem with the increased demand for development in gateway communities is that they often lack land suitable for expansion. Gatlinburg and Nags Head, as mentioned before, are spatially limited by their proximity to national park units as well as their geography. While Gatlinburg's mountainous terrain has a limited amount of land suitable for buildings (Tooman 1995), Nags Head is bounded by water to the east

and west, by the national seashore to the south, and the town of Kill Devil Hills to the north. Space restrictions can cause further inflation of land prices. Increasing the height of buildings can alleviate high land prices but may destroy scenic views making it an unpopular option for many gateway communities (Howe, McMahon, and Propst 1997).

Social tension can occur in gateway communities as a result of land value inflation (Robbins 1996; Rothman 1998). As amenity related development begins in rural communities, speculative developers buy land from traditional residents for slightly more than its market prices (Tooman 1995; Rothman 1998). They then develop tourism related businesses or second homes for amenity migrants on that land, increasing property values in the community. As development continues greater numbers of traditional residents find it difficult to remain with those who are willing to pay higher taxes. As a result, longtime residents may leave and be replaced by amenity migrants (Tooman 1995; Robbins 1996; Howe, McMahon, and Propst 1997; Rothman 1998; Bryson and Wyckoff 2010).

Changes in the social makeup of communities occur with the increased wealth and suburban ideals of amenity migrants (Bryson and Wyckoff 2010). Bryson and Wyckoff (2010) assert that the aesthetic values amenity migrants attach to nature, recreation, and rural land use sometimes conflict with the ideals of traditional rural residents. These opposing notions can cause social disruptions between the groups.

The wealth of amenity migrants may also create a top-heavy population structure. Gateway communities and other amenity communities have been found to have disproportionately older populations. This population structure occurs because: 1) amenity migrants are typically middle aged professionals or retirees, and 2) young adults

at the beginning of their careers do not have the wealth to compete for land in gateway or amenity communities (Howe, McMahon, and Propst 1997; Bryson and Wyckoff 2010).

Another issue often seen in gateway communities is traffic congestion (Frederick 1993; Howe, McMahon, and Propst 1997; Rothman 1998; Kurtz 2010; Silberman and Rees 2010). Many rural communities lack the transportation infrastructure to support large-scale tourism. To accommodate increases in tourism, many communities have found it necessary to expand infrastructure, inviting even more tourism and traffic congestion (Frederick 1993). The development of infrastructure may also contribute to environmental degradation through increasing urbanization.

These issues happen in part because of the rapid and uncontrolled nature of development in gateway communities (Howe, McMahon, and Propst 1997; Rothman 1998; Silberman and Rees 2010). Howe, McMahon, and Propst (1997) describe success stories through a discussion of how some gateway communities embrace tourism development in a manner that prevents many of the detrimental impacts of tourism mentioned above. They discovered that communities can develop tourism-based economies and mitigate many of those issues detrimental to quality of life by being motivated, organized, and properly funded.

Communities can initiate this process by creating inventories of their natural, cultural, or historical amenities. Having an inventory allows communities to generate goals for those amenities. For example, they may wish to increase access by expanding trails or enhance preservation efforts through conservation easements. These types of goals can help establish a sense of place that can shape future development in the community. Additionally, successful communities have master plans, institutionalizing

the aforementioned goals. Generating inventories, establishing goals, and creating plans require significant skilled labor. For example, master plans typically require personnel trained in planning. Small rural communities often lack planning departments or municipal revenues to create them. Therefore, gateway communities are encouraged to seek funding to assist in their efforts to mitigate the detrimental impacts of growth (Howe, McMahon, and Propst 1997; Steer and Chambers 1998). Steer and Chambers (1998) on behalf of the NPS created an index of funding sources for applicable to gateway communities. Results of this research could aid both gateways and the NPS in applications for funding related to mitigating some of the environmental and economic costs of tourism development.

Conclusion

This discussion focuses on themes and issues that describe gateway communities. From these themes, characteristics can be extracted and translated into viable quantitative variables usable in statistical analyses. For example, gateway communities should have numerous tourism businesses, and tourism businesses typically have high proprietor income. Therefore, gateway communities would likely have disproportionately large sales figures for tourism services and high per capita incomes when compared to similarly sized communities. Some other factors that may be prevalent in gateway communities are high land values, a large stock of seasonal housing, low quantity of young adults, short distance to a national park unit entrance, and low poverty values. This study proceeds by specifically identifying and statistically analyzing variables that quantify characteristics discussed in this chapter.

Chapter 2

Methods

This study seeks to improve our understanding of gateway communities as economic engines that provide park visitors with goods and services and to determine how proximity to a national park can change the economic character of a community. The methodology of this study is focused on investigating specific measures that may be used to better identify gateway communities. This study analyzed data at the community level. Only communities identified as economic places by the US Census Bureau for the 2002 Economic Census were included. Additionally, only communities within a 100 mile radius of a sample of fourteen national park units were included. The final sample of communities analyzed included 102 economic places around fourteen national park units. The sampling method section contains more explanation of the sample. Results of this study may be useful to NPS personnel in better understanding their units' economic relationship with surrounding communities.

The first part of this investigation focuses on determining spatial and economic variables that influence gateway communities. Regression analysis is appropriate for this task because it can be used to quantify relationships between a dependent variable, used to represent whether a community is functionally a park gateway, and a set of independent variables. This project uses stepwise regression analysis to investigate three potential measures of "gatewayness" based characteristics from the literature on gateway communities per capita: retail sales, accommodation and food service sales, and a combination. These three measures were chosen because no single viable measure of "gatewayness" is currently known.

"Gatewayness" measures serve as the dependent variables in separate regression models while characteristics typical to gateway communities serve as independent variables. These characteristics include: 1) distance from park entrance, 2) park visitation, 3) per capita income in dollars, 4) median home value in dollars, 5) percentage of seasonal housing, 6) total population, 7) percentage of population ages 18-24, and 8) percent of the population below poverty line. Each measure of "gatewayness" was evaluated in its own regression analysis to explore the relationships each measure has with the independent variables. Separate regression models were necessary because a single regression model cannot have more than one dependent variable.

While the regression analysis investigates the relationships among the variables, it does not identify communities as gateways. This task is better suited to cluster analysis which groups observations into homogeneous groups based on the variables input into the cluster analysis. Subsequently significant variables from regression analyses were used in cluster analysis to bifurcate the sampled places into gateway and non-gateway groups.

Regression Analysis

The first research question explores spatial and economic variables associated with gateway communities. Regression analysis uses the equation: $Y= a+ b_1X_1 + b_2X_2 +\ldots b_iX_i$, where Y is the value of the dependent variable, and X_i is the value of each independent variable 1 to *i*. This equation defines the values of the dependent variable, Y, based on changes in the values of independent variables, X_i. The beta coefficient, b_i, indicates the direct influence an independent variable has on the dependent variable by mathematically representing the relationship between the two. Regression analysis also includes a measure of significance of each independent variable and its beta value, b_i. The significance measure describes the probability that an independent variable has a

relationship with the dependent variable. Regression's ability to quantify both the magnitude and the significance of a relationship between multiple independent variables on a dependent variable make it an applicable tool to the first research question of this investigation (Burt, Barber, and Rigby 2009).

Dependent Variables

To build a data set appropriate for regression analysis an appropriate dependent variable must be selected. Unfortunately, the literature on gateway communities lacks explicit guidance on a measure that can represent the economic link between a community and park unit. Stynes and Sun (2003) assert that economic impacts from park visitors provide a measure of the relationship between park and community. They note that park visitors spend the most money in four economic sectors: 1) lodging (31.6% of total spending); 2) restaurants and bars (31.1%); 3) retail trade (14.9%); 4) admission and fees (12.3%). These sectors account for 90% of all direct economic impact associated with national park tourism. Therefore, sales in these economic sectors may serve as a viable proxy for "gatewayness."

Given that capturing park visitor spending data can be time consuming and expensive, secondary sources were used. Fortunately, the US Census Bureau maintains useful data within its Economic Census. The 2002 Economic Census contains sales data based on North American Industrial Classification System (NAICS) sectors. These correspond to the economic sectors identified as most impacted by tourism (Stynes and Sun 2003). NAICS Sector 72 includes all accommodation and food service activities while NAICS Sectors 44-45 capture all retail trade, and NAICS Sector 71 captures amusement and entertainment (admission and fees). Unfortunately, a large number of sampled places lack published data for Sector 71, amusement and entertainment.

Consequently this variable was excluded from the study. Sectors 72 and 44-45 include Stynes and Sun's (2003) top three tourism related activities, so the exclusion of Sector 71 had little impact. Therefore this investigation focuses on three dependent variables that measure service sales to park visitors: 1) per capita retail sales, 2) per capita accommodation and food service sales, and 3) a combination of the two. Table 1 illustrates the relative importance of activities described by Stynes and Sun (2003) by NAICS Sector.

Table 1: NAICS Sector of Tourism Services and their Percentage of Total Tourism Sales

Activity	NAICS Sector	Tourism Sales
Lodging	72	31.6%
Food Service	72	31.1%
Retail	44-45	14.9%
Amusement	71	12.3%
Total		89.9%

Source: Stynes and Sun 2003; US Census Bureau 2002

Additionally, the dependent variables needed to be standardized by the population of each place because they operate under some assumptions. First, sampled economic places are central places whose primary functions are to provide the surrounding population with goods and services (Lloyd and Dicken 1977). This means that the default assumption is that each place is not a gateway community since gateway communities serve the needs of park visitors who represent an absentee population. Second, sampled places have substantially higher population densities than the surrounding areas and contain most of the population that they would theoretically serve under the previous assumption. Therefore, all sampled places would have similar retail trade and

accommodation and food service per capita sales. Thus, gateway communities' service to park visitors should result in substantially higher per capita sales as represented by the dependent variables.

Dependent variables of this study are per capita sales of: 1) accommodation and food service, 2) retail trade, 3) and a combination of the two. These measures were selected on the basis of their association with tourism as noted in the literature (Stynes and Sun 2003). Additionally, the dependent variables operate under the assumptions that economic places primarily serve the surrounding population and that the majority of each place's population lives within city limits. Using per capita measures allows for relative comparison among the sampled places, since places with larger populations would have higher sales thus making absolute sales figures incomparable.

Independent Variables

The three dependent variables are evaluated in the context of representing a measure of "gatewayness," using independent variables that were also identified in the literature. Table 2 contains a list and descriptions of the variables. The first independent variable included is distance from the park entrance. This variable represents the number of miles from the centroid of each community along roadways to the nearest park unit entrance, and it is based on an assumption of distance decay. Distance decay is relevant because demand for tourism services related to national park visitation should decrease as distance from the park unit increases. Therefore, communities nearer to park entrances should have higher levels of tourism related services.

Table 2: Variables Included in Regression Analysis

Variable	Description
Dependent Variables	
Per Capita 44-45	Per Capita Retail Sales
Per Capita 72	Per Capita Accommodation and Food Service
Combo	Per Capita Retail, Accommodation, and Food Service Sales
Independent Variables	
Distance	Distance to park entrance along roads
Visitation	Percent of park visitation for year 2002 within the sample
Population	Place's population
Home	Median home value
PCI	Per capita income
Poverty	Percent population below the poverty line
Seasonal	Percent vacation housing for seasonal or recreation use
Youth	Percent population ages 18-24

Park visitation for the year 2002 is also an independent variable. It is based on the concept that greater numbers of visitors to a park lead to increased demand for tourism services in surrounding communities. Since only one visitation figure was available for each park unit no attempt to extrapolate the number of visitors for communities around park units was made, meaning that all communities around a park unit were assigned the same value for this variable. 2002 visitation data was used to match data from the 2002 Economic Census.

Additionally, non-metropolitan communities have some of the highest population growth rates in the country. An explanation for this high growth rate is the increased economic activity from tourism businesses in rural gateway communities (Fretchling 1994; Howe, McMahon, and Propst 1997; Smith and Krannich 2000; Gartner 2004). Another potential factor for population increases is that tourism businesses are often more labor intensive than increasingly mechanized extractive industries such as agriculture, logging, and mining (Kurtz 2010). Therefore, population was included as an

independent variable because increased population has been associated with increased tourism development and amenity migration (Robbins 1996, Howe, McMahon, and Propst 1997; Rothman 1998; Smith and Krannich 2000; Gartner 2004; Bryson and Wyckoff 2010).

Another important characteristic of gateway communities is the high cost of land. The allure of revenue associated with tourism development reportedly increases demand for land within gateway communities. Additionally, development of second homes for seasonal recreation and amenity migration have been found to be associated with increases in home prices (Robbins 1996; Howe, McMahon, and Propst 1997; Tooman 1997; Rothman 1998; Lee and O'Leary 2008; Bryson and Wyckoff 2010; and Silberman and Rees 2010). Since land value is unavailable from the US Census Bureau, median home value serves as a proxy for overall property prices.

The next variable is per capita income. Gateway communities reportedly have higher per capita incomes compared to other rural communities. Tooman (1997) details high proprietor income for tourism businesses. Therefore, high levels of per capita income in a community near a national park should indicate high levels of tourism activity. Also, the wealth brought in by amenity migrants may inflate per capita income of gateway communities (Robbins 1996; Howe, McMahon, and Propst 1997; Bryson and Wyckoff 2010).

Furthermore, gateway communities have been linked to both high and low poverty rates through the low-wage seasonal jobs associated with tourism services (Frederick 1993; Tooman 1997; Rothman 1998; Lee and O'Leary 2008). Many residents employed in low wage seasonal labor should have relatively low income leading to

increased poverty rates. However, this directly contrasts with high land values, since people in poverty would likely be unable to pay the high rent in gateway communities (Howe, McMahon, and Propst 1997; Smith and Krannich 2000). This contrast may be the result of different scales of reporting. The increased poverty rates could be reported for the county level, while increased land value is probably associated more on the lower scale of the community. Consequently the findings associated with this variable may be particularly enlightening.

In addition to the above variables, gateway communities typically have large numbers of second homes, due to demand for second homes in areas with natural amenities (Robbins 1996; Howe, McMahon, and Propst 1997; Tooman 1997; Rothman 1998; Lee and O'Leary 2008; Bryson and Wyckoff 2010; and Silberman and Rees 2010). Second homes provide individual families with private accommodations for vacations and serve as weekend get-a-ways. Large quantities of second homes in a community are linked with development of tourism services. Therefore this variable derives from the concept that communities near national parks with large percentages of seasonal homes are more likely to act as gateway communities. The US Census Bureau collects data on the number of seasonal homes.

The final independent variable included is percent of the population age 18-24. Despite assumptions that a large number of 18-24 year olds would work in seasonal service jobs, research shows that gateway communities have an overabundance of middle aged or elderly persons and a dearth of young adults (Howe, McMahon, and Propst 1997; Bryson and Wyckoff 2010). While some young adults temporarily relocate to gateway communities to work during the tourist season, they are typically outnumbered by retirees

or “empty-nesters” who use accumulated wealth to escape the suburbs. Young adults were included as a variable because of the much clearer age segment represented. Retirees’ age range is more difficult to accurately capture. Therefore, expected results for this variable include low numbers of 18-24 year-olds in gateway communities.

Cluster Analysis

The goal of the second research objective was to determine the degree to which variables can be used to identify gateway communities. Cluster analysis is a statistical technique used to create groups of similar observations from a common dataset. It accomplishes this by comparing values of each variable for each observation and then assigning observations to homogenous groups. For this investigation three cluster analyses were carried out, one for each regression model. In each cluster analysis only variables found to be significant in the corresponding stepwise regression analysis were included. Monroe and Comer (2002) found this technique to be helpful in creating more parsimonious datasets for analysis.

There are two main types of cluster analysis, agglomerative and hierarchical. Hierarchical analysis groups observations starting at *n* clusters and proceeds until there is only one group. Once two observations have been grouped together they cannot be ungrouped. Agglomerative cluster analysis uses an *a priori* number of *g* clusters to sort all the observations into *g* groups (Rogerson 2006). For this project cluster analysis was used to group communities based on variables found to be significant influences using regression analysis. The objective to identify gateways from non-gateways creates a clear *a priori* number of two groups. Therefore agglomerative cluster analysis is most appropriate.

Statistical analyses for this research used the PASW software package. Stepwise ordinary least squares regression was chosen for the three regression analyses, with the 0.10 level of significance used as a standard for evaluating each independent variable. Using the 0.10 level of significance there is a 10% chance of Type I error. A Type I error occurs when the results show an independent variable has a significant influence on the dependent variable, but in reality it does not (McGrew and Monroe 2000).

Data

The data for the variables chosen in this study come from a variety of sources and were selected on the basis of their ease of access for this study and for future projects. Much of the data came from the US Census Bureau through the American Factfinder website (www.factfinder.census.gov) that provides direct downloads of user selected data. Although this website allows for relatively quick data collection, data manipulation required substantial time.

The dependent variable data comes from the US Census Bureau's Economic Census which is carried out every five years on the second and seventh years of each decade (US Census Bureau 2002). The data for the distance variable was derived from the National Highway Planning Network (NHPN) shapefile using the Network Analyst extension in ArcGIS. The NHPN contains all interstate, US highways, and state highways in the US. Park visitation data come from the NPS public use statistics website (NPS 2010). Visitation for 2002 was used to match the economic census data. The data for the remaining variables comes from the 2000 Census (US Census Bureau 2000).

Since this study focuses on communities, the data were collected at the community scale. The way communities were defined by the Census Bureau was slightly different for the 2000 Census and the 2002 Economic Census. In the 2000 Census

communities were part of the Incorporated/Census Designated Places dataset. For the 2002 Economic Census communities were part of the Economic Places dataset. The boundaries for places in both datasets are nearly identical, enabling data from both censuses to be used within a single dataset. However, not all communities defined in the 2000 Census are included in the 2002 Economic Census. The definitions of a community in the 2000 Census included all legally incorporated places as well as unincorporated populated areas designated by panels of experts from each state (US Census Bureau 2000). In contrast, the 2002 Economic Census had a more stringent definition that excluded a number of communities included in the 2000 Census' Incorporated/Census Designated Places dataset. To be an economic place in 2002, a community needed to be incorporated and have at least 2,500 residents (US Census Bureau 2002). Therefore, the sample of communities was limited to economic places. It should be noted that Economic Places and Incorporated/Census Designated Places are two of the smallest enumeration units published by the Census Bureau. Typically, these are published at the end of the census publishing cycle. As such, the Incorporated/Census Designated Places data are currently unavailable for the 2010 Census.

Sampling Method

The target population for this study was economic places within a distance of 100 miles from NPS unit boundaries. This was done because research has shown that after 100 miles the economic impact of park visitors sharply decreases (Stynes and Sun 2003). Furthermore, only economic places near national park units located in rural areas were selected for analysis, largely because rural communities have smaller and typically less diverse economies allowing the impacts of tourism to be more easily identified (Lee and O'Leary 2008). It is also more likely that rural economies in gateway communities are

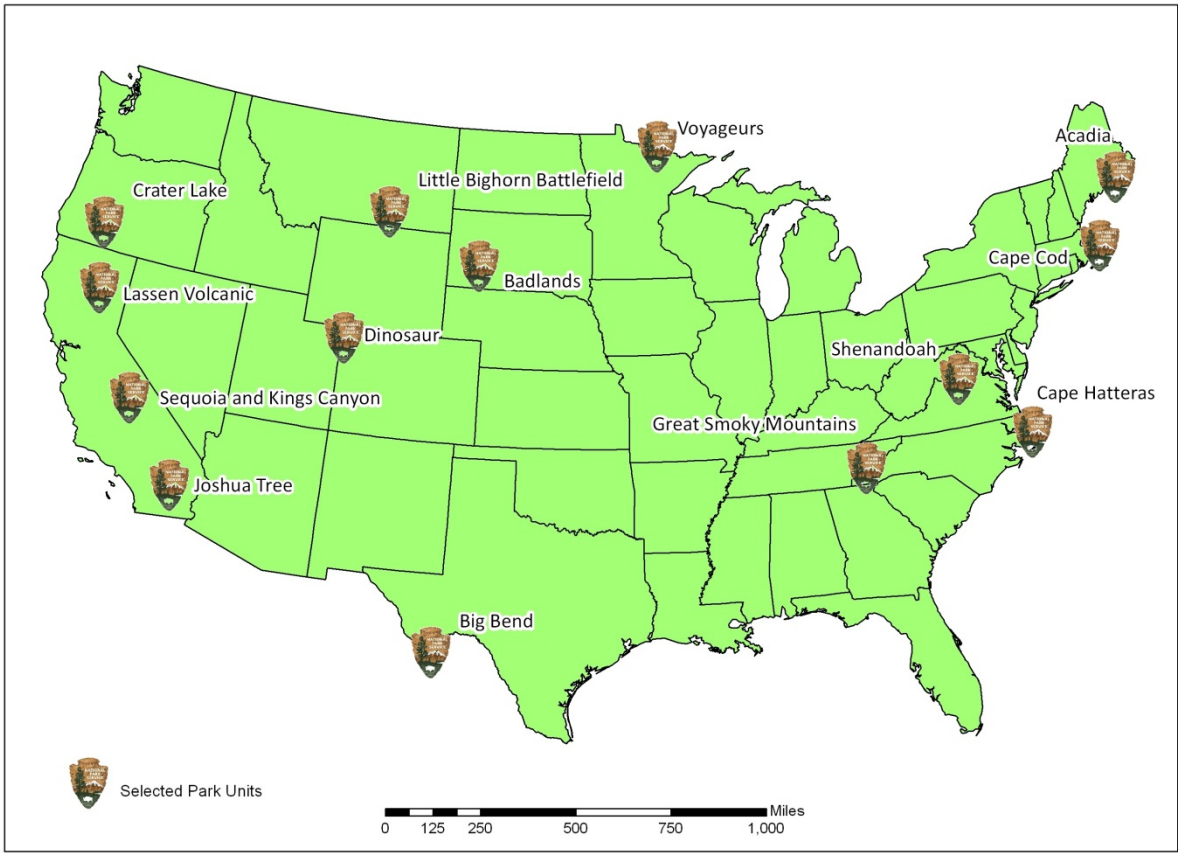
dependent on tourism because of declining profits from extractive economic activities (Howe, McMahon, and Propst. 1997; Wilson 2002; Dilsaver and Wyckoff 2005; Kurtz 2010).

Economic places selected were from the areas directly surrounding 14 national park units. Table 3 provides a list of park units, while Figure 1 shows the locations of selected park units. Park units were chosen based several criteria: 1) specific mention in the literature (i.e. Great Smoky Mountains National Park, which has the often referenced gateway communities of Gatlinburg and Pigeon Forge, Tennessee); 2) equal selection of high, medium, and low visitation park units for the year 2000, and 3) spatial diversity, at least two park units have been included from each of the four census regions.

Table 3: Visitation and Economic Places Corresponding to Selected Park Units

ParkID	National Park Unit	States	Visitors (2000)	Economic Places
1	Great Smoky Mountains National Park	TN, NC	10,175,812	9
2	Cape Cod National Seashore	MA	4,581,169	8
3	Cape Hatteras National Seashore	NC	2,647,383	8
4	Acadia National Park	ME	2,469,238	9
6	Shenandoah National Park	VA	1,419,579	9
7	Joshua Tree National Park	CA	1,233,935	9
8	Badlands National Park	SD	1,105,824	5
9	Sequoia & Kings Canyon National Parks	CA	1,367,934	7
10	Crater Lake National Park	OR	426,883	9
11	Dinosaur National Monument	CO, UT	397,069	5
12	Lassen Volcanic National Park	CA	374,911	9
13	Little Bighorn Battlefield National Monument	MT	330,329	5
14	Big Bend National Park	TX	262,360	3
15	Voyageurs National Park	MN	227,371	7

Figure 1: Selected Park Units

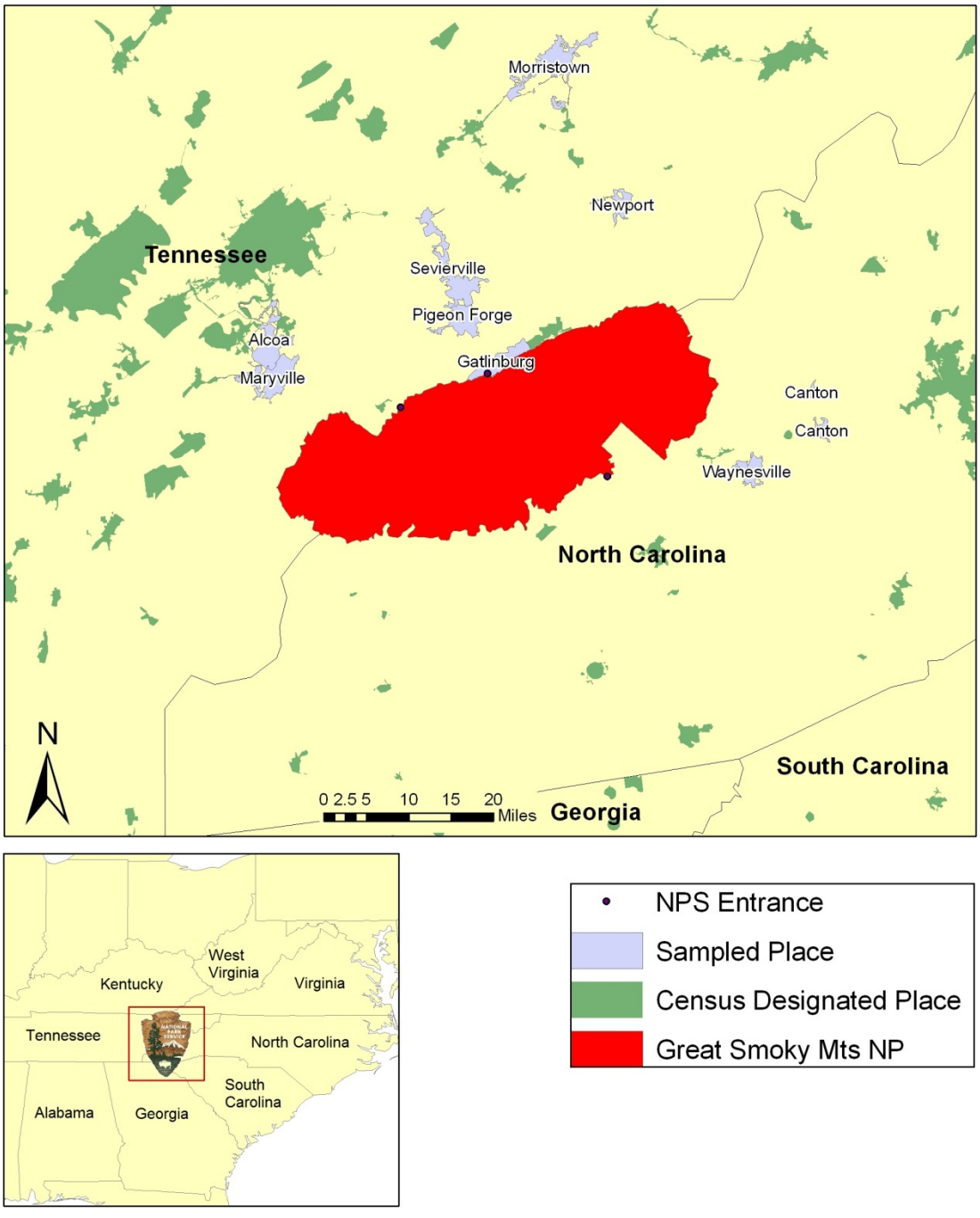


The study used a sampling framework based on a minimum number of places "near" each park unit. The sample of communities was developed by applying a radius that expanded until nine economic places had been selected up to a distance of 100 miles. If the radius reached 100 miles then fewer than nine economic places were selected for a particular park unit. For example, Big Bend National Park in Texas has only three economic places within 100 miles. The final sample included 102 economic places. A complete list of places is shown in Appendix A.

Figure 2 offers an example of the spatial arrangement of communities around a park unit. Communities shown in purple represent the economic places in the sample associated with Great Smoky Mountains National Park, while the communities appearing

in green are Incorporated/Census Designated Places. The Incorporated/ Census Designated Places nearest to the park were not included in the Economic Census because they did not meet Census Bureau criteria. Because economic data was not collected for these municipalities they were not included in this study.

Figure 2: Communities Surrounding Great Smoky Mountains National Park



Chapter 3

Results and Discussion

This chapter discusses the results of the stepwise regression and agglomerative cluster analyses. Again, the focus of the stepwise regression analysis is to investigate the influence of spatial and economic variables on gateway communities. The analysis reveals relationships between independent variables and the three dependent variables: 1) per capita retail sales, 2) per capita accommodation and food service sales, and 3) a combination of the two. These variables were investigated as potential measures of "gatewayness" for communities. After identification of variables associated with gateway communities, cluster analysis was used to create two groups of communities: gateways and non-gateways. Three cluster analyses were performed, one for each measure of "gatewayness." Only the variables identified as having a significant influence on "gatewayness" by the regression analyses were included in each cluster analysis.

Results of the analyses are organized by dependent variable with each presented within its own section describing the results of the regression analysis and the subsequent cluster analysis. Furthermore, for each analysis some observations were removed because they had values that were extreme outliers in the dependent variables. These observations were observed to substantially influence the results of the analysis.

NAICS Sector 44-45, Per Capita Retail Sales Regression Analysis

For per capita retail sales Alcoa, Tennessee, was removed from the sample because it represented a substantial outlier in the value of the dependent variable with over $100,000 of per capita retail sales, compared to the next highest value, Sevierville,

TN, with just over $60,000 in per capita retail sales. The stepwise regression model had an overall adjusted R-squared value of 0.286 and was significant to the 0.01 level. This model thus explains nearly 30% of the variation in per capita retail sales.

Table 4 offers summary statistics about the variables. Standardized beta coefficients provide an indication of the relative influence of a change in the value of an independent variable relative to the dependent variable. Additionally, the sign of the standardize beta coefficient indicates the direction of the relationship between the independent variable and the dependent variable. For example, an increase in one unit of visitation equals an increase in 0.486 units of per capita retail sales, while an increase in one unit of median home value results in a decrease of -0.437 units of per capita retail sales. Level of significance represents the probability of the results showing a relationship when in reality there is no relationship. For example, population has a significance of 0.071 meaning there is a 7.1 % chance that the result showing a relationship between population and per capita retail sales is false. Finally, the added R-squared measure shows how much explanatory power each variable adds individually to the model as a whole. To illustrate, the total R-squared for the model is 0.286, so visitation with an added R-squared value of 0.205 represents a majority of explanatory power of per capita retail sales in this model.

Table 4: Significant Variables in Per Capita Retail Sales

Variable	Standardized Beta Coefficient	Significance	Added R-squared
Visitation	0.486	0.000	0.205
PCI	0.457	0.001	0.026
Home	-0.437	0.002	0.059
Population	0.162	0.071	0.024

Only four of the independent variables are significant at the 0.10 level for explaining per capita retail sales. Those variables are park visitation, per capita income, median home value, and population. Park visitation adds the most explanatory value to the model with an added R-squared of 0.205. The standardized beta coefficient is positive meaning that park visitation increases with per capita retail sales. This matches the expected results since visitors' spending in retail is counted in the total sales but not accounted for in population. Therefore, it is possible to conclude that places with higher visitation also have higher per capita retail sales, supporting the expected result that tourism sales increase with park visitation (Gunn and Var 2002; Stynes and Sun 2003).

Per capita income is the second significant variable. However, it has the third largest added R-squared value of 0.026, falling below the next most significant variable, median home value. The standardized beta coefficient of per capita income is positive, as it was for park visitation, meaning that as the per capita income increases so does per capita retail sales. This matches the expected results of a positive relationship between per capita income and per capita retail sales. Amenity migrants and high proprietor income associated with tourism communities suggests that the per capita income of a place would increase the retail sales (Tooman 1997; Howe, McMahon, and Propst 1997; Bryson and Wyckoff 2010; Silberman and Rees 2010).

Median home value is also significant and adds nearly twice the explanatory power of per capita income with an added R-squared of 0.059. However, the standardized beta coefficient is negative, meaning that per capita retail sales increase as median home value decreases. The inverse relationship of median home value to per capita retails sales is opposite of the expected result. The literature states that one of the

main issues facing gateway communities is the inflation of property values (Robbins 1996; Howe, McMahon, and Propst 1997; Tooman 1997; Rothman 1998; Lee and O'Leary 2008; Silberman and Rees 2010). The assumption that per capita retail sales is a measure of "gatewayness" would then predict a direct, positive relationship between the these two variables. As "gatewayness" increases median home value would also increase.

Additionally, the correlation between median home price and per capita retail sales shows almost no relationship. Therefore, a simple bivariate regression analysis between per capita retail sales and median home value would reveal little. With this weak correlation median home value likely explains variation related to one of the independent variables rather than the dependent variable. This evidence calls to question the validity of median home value as an explanatory variable for "gatewayness." Appendix B provides additional information useful for viewing correlations among variables.

The final significant variable is population. The addition of the population variable in the model adds 0.024 to the R-squared, meaning that it explains about 2% of the total variation in per capita retail sales. Population also has a positive standardized beta coefficient, meaning as population increases so does the dependent variable. This relationship is consistent with the expected result because development related to tourism and amenity migration has been shown to increase a rural community's population (Dunbar 1958; Frechtling 1994; Tooman 1995; Howe, McMahon, and Propst 1997; Smith and Krannich 2000).

NAICS Sector 44-45, Per Capita Retail Sales Cluster Analysis

The second research objective is to attempt to statistically separate gateway from non-gateway communities. The variables found significant from this regression model were included in a k-means cluster analysis. A k-means cluster analysis has a user-defined number of clusters for sorting observations. As mentioned in the methods section, two clusters is a logical number for differentiating gateway communities and non-gateway communities.

The first cluster captured only two of 101 observations in the dataset, Palm Desert, California, and Rancho Mirage, California. Both of these cities are located near Joshua Tree National Park. Table 5 shows z-score standardized values associated with each variable. Z-score values near zero can be interpreted as average, while values below negative two or above positive two can be interpreted as very low or very high respectively. For example, per capita retail has a Cluster 1 value of -0.55141. This value should be interpreted as below average because it is below zero but far from -2 which is a general benchmark for extremely low values. Therefore, places grouped in Cluster 1 have below average values of per capita retail sales. Conversely, places grouped in Cluster 2 have average values of per capita retail sales.

Table 5: Retail Cluster Analysis Z-score Values by Cluster

	Cluster	
Variable	1	2
Per Capita Retail	-0.55141	-0.01114
Visitation	-0.35960	0.00726
PCI	4.58556	-0.09264
Home	2.91019	-0.05879
Pop	0.59046	-0.01193

The characteristics of the first cluster included below average per capita retail sales and below average visitation, indicating that this cluster has lower retail sales and lower park visitation than average in the sample. Additionally observations in the first cluster have exceptionally high per capita income and median home value. Finally Cluster 1 has above average population compared to the sample as a whole. The second cluster's values are approximately average for all variables. This may be tied to the fact that Cluster 2 includes 99 of the 101 observations. It is interesting that per capita income and median home value dominate the cluster analysis when park visitation was found to be the most significant influence on the dependent variable. The extreme values for these two variables in California's Palm Desert and Rancho Mirage communities likely affected the cluster analysis.

The results of the retail sales cluster analysis fall short of successfully identifying gateway communities. A number of the expected values for gateway communities were satisfied, but the below average per capita retail sales, below average values for park visitation, and the failure to include known gateways shows that this method is not useful as a measure of "gatewayness."

NAICS Sector 72, Per Capita Accommodation and Food Service Sales Regression Analysis

For this variable's analysis the two best documented gateway communities (Gatlinburg and Pigeon Forge, Tennessee) were removed because they appeared to be extreme outliers with per capita accommodation and food service sales over $40,000. It should be noted that the place with the next largest value, Nags Head, North Carolina, is under $20,000. The adjusted R-squared for this stepwise regression model is 0.576, and

the ANOVA significance is better than the 0.01 level. This model explains nearly 60% of the variance in per capita accommodation and food service sales of sampled places (Table 6).

Table 6: Significant Variables in Per Capita Accommodation and Food Service Sales

Variable	Standardized Beta Coefficient	Significance	Added R-squared
Seasonal	0.494	0.000	0.369
PCI	0.812	0.000	0.094
Home	-0.531	0.000	0.069
Poverty	0.153	0.096	0.027
Distance	-0.135	0.084	0.021
Youth	0.148	0.055	0.014
Visitation	0.118	0.098	0.012

All variables except population were significant at the 0.10 level. With an R-squared of 0.369, the most significant variable is percent of total housing corresponding to seasonal recreation. Additionally, there is a positive beta coefficient, showing a direct relationship between percent seasonal housing and per capita accommodation and food service sales. Gateway communities attract second home purchases for seasonal and recreation use, so this finding appears to be supported by the literature (Frederick 1993; Howe, McMahon, and Propst 1997; Tooman 1997).

Per capita income is also significant and adds 0.094 to the R-squared. As with the other dependent variables, per capita income has a positive beta coefficient. This relationship is consistent with the expectation that tourism services are found in areas with high per capita incomes (Tooman 1997; Rothman 1998). Median home value is also significant and adds 0.069 to R-squared value. Consistent with the other dependent

variables, it has a negative beta coefficient, meaning there is an inverse relationship between median home value and per capita accommodation and food service sales. This relationship is inconsistent with expected results, which suggest a positive relationship between per capita accommodation and food service sales and median home value. As in the retail model this variable behaves unexpectedly, which undermines its validity as an important variable to "gatewayness."

The next significant variable is percent of the population below the poverty line. This variable has a low added R-squared value of 0.027, meaning it explains slightly less than 3% of the variation in per capita accommodation and food service sales. The beta coefficient is positive, meaning that as poverty increases so does the dependent variable. Poverty's positive correlation is supported through Frederick (1993) and Tooman (1997) who assert that gateway communities' shift toward lower paying seasonal jobs in hotels and restaurants, which leads to an increase in poverty.

The next significant variable is distance to the park. Although this variable adds little to the R-squared, it does have a negative beta coefficient meaning that as distance to the park decreases sales increase. This inverse relationship with the dependent variable also supports the expected results since gateway communities are defined as communities at or near park unit entrances with an economic link through services sold to park visitors (Howe, McMahon, and Propst 1997; Steer and Chambers 1998; Wondrak 2002; Stynes and Sun 2003; Kurtz 2010).

Percent of the population ages 18-24 years old was also found to be significant with a value of 0.055. The beta coefficient is positive, showing a direct relationship between percent of the population ages 18-24 and the dependent variable. The positive

relationship with the dependent variable appears to contradict the literature since; Howe, McMahon, and Propst (1997) argue that increased land value in gateway communities drives out young adults because they are unable to afford higher rents. Likewise, the results for median home value also go against the literature, since neither variable has a positive relationship with the dependent variable. In fact, both variables' beta coefficients show opposite signs than their individual correlations with per capita accommodation and food service sales. Median home value has an *r*-value of 0.232 meaning that there is a positive relationship, but the regression analysis shows a significant negative relationship. Percent youth has a slightly negative relationship (*r*-value -0.113) but has a positive relationship in the regression model (see Appendix B). The influence of the other independent variables changes the relationships that median home value and percent youth have with the dependent variable. The reversal of signs shows that these variables have a minimal impact on the dependent variable when combined with the other independent variables.

The final significant variable is percent visitation. With a value of 0.012 it adds little to the R-squared. However, it does have a positive beta coefficient, meaning increased visitation corresponds to an increase in per capita accommodation and food service sales. It appears that park visitation has little impact. Perhaps the presence of the park and other similar natural amenities in the area are more important than the actual usage of the park. The idea here is that the only difference between national park units and other natural resources is the ownership, public versus private. Amenity communities can be around national parks or around other types of natural resources.

Additionally, a number of the communities near the low visitation national parks had no available data for the dependent variables so they could not be included in the sample.

NAICS Sector 72, Per Capita Accommodation and Food Service Sales Cluster Analysis

The significant variables from the regression analysis for per capita accommodation and food service sales were then analyzed using cluster analysis. The cluster analysis grouped fourteen places in Cluster 2 based on: 1) high per capita accommodation and food service sales, 2) minimal distance to the park, 3) high median home value, 4) high per capita income, 5) low poverty, 6) high percentage of seasonal homes, 7) and low percentage of 18-24 population. Values for Cluster 2 can be seen in Table 7.

Table 7: Per Capita 72 Cluster Z-score Values by Cluster

	Cluster	
	1	2
Per Capita 72	-0.19752	1.21331
Distance	0.15185	-0.93281
Home	-0.3051	1.87417
PCI	-0.27614	1.69629
Poverty	0.18435	-1.13241
Seasonal	-0.35795	2.19885
Visitation	-0.09894	0.60776
Youth	0.14758	-0.90655

The cluster analysis matches all expected characteristics of gateway communities. These communities have: 1) high per capita accommodation and food service sales, 2) low distance from the parks 3) high median home values, 4) high per capita incomes, 5) low poverty, 6) high percentage of seasonal homes, 7) above average visitation, and 8) low percentage of youth. This finding shows that gateway communities and other similar

communities can be identified statistically through cluster analysis based on these variables.

In addition to satisfying expected characteristics, Cluster 2 also contained expected communities in the "gateway" cluster. Communities such as Nags Head, NC and the other towns along the Outer Banks were included in Cluster 2. The other towns were from around Cape Cod National Seashore and Joshua Tree National Park. The retail sales cluster analysis only selected two communities and did not match all expected characteristics. The accommodation and food service cluster analysis satisfied all expected characteristics, selected more communities, and included the expected communities in the "gateway cluster." This cluster analysis performs much better than the retail cluster analysis.

Another important finding is that the fourteen selected communities in the "gateway" cluster were also the communities with the fourteen largest percentages of seasonal housing. This is expected since seasonal housing alone accounts for a most of the variation explained in the regression model. But, it shows that seasonal housing is likely the single most important factor in explaining the "gatewayness" of a community. Since seasonal housing is available from the 2000 Census, it is available for more geographic units and easier to collect.

Combination of NAICS Sectors 44-45 and 72, Retail Sales and Accommodation and Food Service

As noted previously, because Alcoa and Pigeon Forge, Tennessee were substantial outliers, they were removed from the sample. Gatlinburg is only a moderate outlier so it was retained in the dataset. The adjusted R-squared for this model is 0.367. It is more robust than the retail model R-squared of 0.267 but weaker than the

accommodation and food service model R-squared of 0.576. Approximately 40% of the variation in this variable is explained by the independent variables. Table 8 offers summary statistics about variables used in the model.

Table 8: Significant Variables in the Combination

Variable	Standardized Beta Coefficient	Significance	Added R-squared
Visitation	0.436	0.000	0.235
PCI	0.490	0.000	0.054
Home	-0.487	0.000	0.046
Seasonal	0.306	0.007	0.031
Youth	0.204	0.023	0.034

Percent visitation is the most significant variable and has the largest addition to R-squared with a value of 0.235. Additionally, it has a positive beta coefficient which is the same result found in both previous discussed regression models. Per capita income, median home value, percent seasonal housing, and percent population between 18-24 are all significant to the 0.05 level and add between 0.03 and 0.05 to R-squared. Median home value is the only significant variable with a negative beta coefficient. This is the same relationship found in previously discussed models where an inverse relationship predicts increases in tourism sales with declining home values.

These findings demonstrate that combining the two dependent variables adds little to the separate regression findings. The significant variables show the same relationships as both previous analyses. The significant variables for retail appear as the most significant first, and then the seasonal and youth variables emerge as significant, showing that retail sales dominates Sector 72 sales. This result is likely because the magnitudes of

values for retail sales in almost all places are larger than values for accommodation and food service sales.

The cluster analysis of the significant variables reveals one cluster with fifteen places that are substantially influenced by high per capita income, high median home value, above average per capita sales, low percent ages 18-24, high percent seasonal houses, and high visitation. Table 9 shows values for this "gateway cluster." The cluster with the other eighty-five places is influenced by below average per capita income, below average median home value, and below average percent seasonal houses.

The "gateway cluster," Cluster 2, includes the places with the fifteen highest values for percent seasonal housing, which happen to be the same places as in the Sector 72 cluster analysis with the addition of Gatlinburg, Tennessee. Despite the magnitude dominance of retail sales related variables, percent seasonal housing appears to be the most important variable for selecting "gateway" communities in this analysis as well. This provides additional evidence for percent seasonal housing being the most important variable for identifying tourism-based communities.

Table 9: Combination Cluster Analysis Z-score Values by Cluster

	Cluster	
	1	2
Combo		
Sales	-0.12101	0.41822
PCI	-0.2828	1.61382
Home	-0.32184	1.79725
Youth	0.15822	-0.88718
Seasonal	-0.382	2.12016
Visitation	-0.16062	0.71356

Chapter 4

Findings and Conclusions

The aim of this study was to enhance understanding about factors that can be used to distinguish gateway communities. The current definition of gateway communities lacks specificity about factors that make a community near a national park unit a gateway community. A "significant influence" from park visitors is required to determine a community's eligibility for being considered as a gateway (Steer and Chambers 1998). Although economic impacts are thought to be among the most important influences park visitors have on communities near park sites, the specifics of the "significant influence" are unclear (Stynes and Sun 2003). What measures appropriately identify park visitors' economic impact? How much economic impact is required to constitute a "significant influence?" Three measures of "gatewayness" were tested through stepwise regression and agglomerative cluster analyses to address these questions.

The results show that per capita retail sales performs poorly as a measure of the economic link between national parks and gateway communities. This variable has the lowest R-squared with a value of 0.286 meaning that less than 30% of variation in the dependent variable is accounted for. While several of the independent variables were identified as significant influences, the ability of this regression model to identify spatial and economic attributes that influence gateway communities is minimal. In addition, the cluster analysis failed to identify gateway communities. The "gateway cluster" selection of Palm Desert and Rancho Mirage combined with the below average park visitation measure shows that the retail model performs poorly in attempting to identify gateways from non-gateways.

The next measure investigated was per capita accommodation and food service. Of the three measures of "gatewayness" investigated this measure performed at the highest level with an R-squared value of 0.576 (57% of variation explained). All but one independent variable was significant to the 0.10 level. Moreover, the results of the cluster analysis enhance the validity of this measure. The cluster analysis successfully identified expected gateway communities and the expected characteristics of those communities. Of the variables included in the cluster analysis all expected relationships for each variable were shown in the results of the cluster membership. Expected characteristics include high percentage of seasonal homes, high per capita income, high median home value, low poverty, low distance from the park, low percentage of young adults, and high park visitation. Each of these characteristics were present in the "gateway clusters." The second research question, attempting to separate gateways and non-gateways, is successfully addressed using the per capita accommodation and food service model. This measure appears to perform better since people on vacation need food and shelter, but not necessarily souvenirs.

The final tested measure of "gatewayness" is a combination of per capita retail and per capita accommodation and food service sales. The results from this variable perform as an average of the other two measures. The model has an R-squared value between the other two dependent variables of 0.367. Further exploration of the data shows that most places have larger values of per capita retail sales than per capita accommodation and food service sales. Therefore, the larger values of retail sales dominate the regression analysis of the combined variable.

As discussed earlier, Stynes and Sun (2003) provide estimates of each economic sectors' percentage of total tourism sales. They estimate that retail sales capture approximately 15% of total tourism sales while accommodation and food service capture an estimated 63% of tourism sales. Therefore, per capita retail sales is a poor measure for "gatewayness" since it captures a lower amount of park visitor spending than accommodation and food service. The relative impact of tourism is lower on retail sales than on accommodation and food service sales. This also means that the combined dependent variable has lower relative impact from tourism sales, providing additional support for accommodation and food service as the best measure of "gatewayness."

A comparison of communities included in the "gateway clusters" for each potential measure shows additional findings including: 1) percent seasonal housing is the most important measure to the cluster analysis, 2) that the analysis selects both gateways and stand-alone amenity communities independent from significant national park influence, and 3) the relatively close proximity of selected communities to metropolitan areas. Table 10 offers a list of communities selected for the "gateway clusters" for each of the measures investigated.

The retail cluster analysis was the least effective measure of "gatewayness." However, the communities selected for both of the other "gateway clusters" are also the communities with the highest values for percent seasonal housing. The characteristics identified in the cluster centers match the expected characteristics of gateway communities. Since percent seasonal housing was the most influential variable in the regression analysis and the communities selected by the cluster analysis had the highest

values of seasonal housing, it appears that this is the most reliable variable for accommodation and food service sales.

Table 10: Communities Selected in the "Gateway Clusters" for Each Measure

Retail	Accommodation and Food Service	Combination of Retail and Accommodation and Food Service
Palm Desert	Barnstable Town	Barnstable Town
Rancho Mirage	Brewster	Brewster
	Dennis	Dennis
	Falmouth	Falmouth
	Harwich	Gatlinburg
	Kill Devil Hills	Harwich
	Kitty Hawk	Kill Devil Hills
	Mashpee	Kitty Hawk
	Nags Head	Mashpee
	Palm Desert	Nags Head
	Palm Springs	Palm Desert
	Rancho Mirage	Palm Springs
	Sandwich	Rancho Mirage
	Yarmouth	Sandwich
		Yarmouth

Refer to Appendix A to see community-to-park relationships.

Additionally, the cluster analysis only selected communities from four of the fourteen park units (Great Smoky Mountains, Cape Cod, Cape Hatteras, and Joshua Tree). Table 11 offers a list of the selected communities and the parks they are near. However, of the selected communities only Gatlinburg appears to act as a gateway (Tooman 1995; Howe, McMahon, and Propst 1997; Stynes and Sun 2003; Kurtz 2010). The others likely operate as standalone amenity communities because of the relatively low impact of park visitation shown in the analysis (Stick 1958; Gunn and Var 2002; Silberman and Rees 2010).

Table 11: Selected Communities by NPS Unit.

Great Smoky Mts.	**Cape Hatteras**	**Joshua Tree**	**Cape Cod**
Gatlinburg	Kill Devil Hills	Palm Desert	Barnstable Town
	Kitty Hawk	Palm Springs	Brewster
	Nags Head	Rancho Mirage	Dennis
			Falmouth
			Harwich
			Mashpee
			Sandwich
			Yarmouth

Based on a cursory examination of selected communities' websites, only Gatlinburg's website prominently featured the nearby national park unit as an attraction for visitors. The other communities' websites feature the natural amenities of the area while portraying man-made attractions such as golf courses and resorts in supportive roles. For example, Palm Springs' Visitors' Page states, "Nestled at the base of the Mount San Jacinto Mountains, Palm Springs is known for its crystal blue skies, year-round sunshine, stunning landscape, palm tree lined streets and starry night" (City of Palm Springs, 2011). This statement features six nature-based amenities as attractions of Palm Springs including mountains, weather, vegetation, desert landscapes, and the sky (both day and night). Palm Springs clearly places great importance on its natural amenities as a selling point for tourists.

In addition, the communities around both Cape Cod and Cape Hatteras are beach towns. To illustrate, the Visitors' Guide brochure published by the Town of Nags Head, NC states, "Our economy depends on an accessible, clean and safe oceanfront bordered by a natural landscape of sand dunes and salt-tolerant vegetation. Local businesses share in building a sound economy by providing recreational amenities and attractions to support our vibrant tourism market" (Town of Nags Head, 2011). Nags Head describes

itself as dependent on natural amenities with human tourism services providing a supporting role, much like Palm Springs.

Additionally, the brochure about Nags Head offers no mention of the national seashore just to the south. This general dismissal of the importance of the neighboring national park unit brings doubt to Nags Head's role as a gateway community despite the town's proximity to a park unit and its large tourism industry. If visitors to Nags Head do not need information about how to access the national park unit, then how significant is the influence of the NPS on the adjacent community? Nags Head and the other communities along the Outer Banks are likely not gateway communities, but amenity communities because of Nags Head's self-identification that its economy was based on natural amenities, such as its oceanfront property. The towns along the Outer Banks do not depend on the NPS for access to the beach and are likely economically independent from Cape Hatteras National Seashore. The findings of the cluster analysis appear to select communities that are stand-alone amenity communities in addition to gateway communities.

Post analysis investigations of these communities also revealed that they were all within a few hours' drive of major metropolitan areas. Great Smoky Mountains National Park and surrounding communities are near Knoxville, Tennessee. Cape Cod is relatively near Boston, Massachusetts. Cape Hatteras and the Outer Banks communities are approximately an hour and a half drive from the Norfolk-Virginia Beach Metropolitan area. Finally, Palm Springs, Rancho Mirage, Palm Desert, and Joshua Tree National Park are relatively close to the metropolitan areas of Southern California. Although not included in this study it is probable that these communities' proximity to both

metropolitan areas and national park units[2] had an impact on their per capita accommodation and food service sales. This is an interesting finding worthy of investigation in future research.

Limits of the Study

The availability of data from the economic census limited this research to exploring larger communities. An example of one of the smallest national park units that has a gateway community that did not enter this study is Dinosaur National Monument (NM). Dinosaur NM has a community named Dinosaur, which is located at the site's main entrance. Unfortunately, Dinosaur is too small to be captured in the economic census. Therefore, this community and others like it near the less-visited national parks were not included in the study.

Additionally, some gateway communities near high visitation parks do not meet economic census requirements to be economic places. For example, Acadia National park is the fourth most visited park in the sample of park units included in this research. There are several documented gateway communities on Mt. Desert Island, which contains a majority of Acadia NP (Howe, McMahon, and Propst 1997). None of these towns are captured in the economic census, and as such were not included in the sample of places around Acadia NP. However, all communities sampled around Acadia were rightly excluded from the "gateway clusters" lending some support to the use of the methods testing in this investigation.

[2] The communities' proximity to national parks is important because national parks are often located in areas with high natural amenities. However, the communities selected seem to have natural amenities and tourism economies based on those amenities independent of nearby national park units. So amenity communities will likely be near national park units because that is where natural amenities exist.

This study was unable to reveal a benchmark level of tourism services useful for distinguishing a community as a gateway, possibly because most sampled communities are not tourism-dependent communities. A research project using similar techniques and variables that focus on the most visited national park units could enhance this investigation. One of the major limitations of this study was the availability of data. By selecting more visited parks such as Yellowstone, Grand Canyon, and Yosemite, a larger number of economic places acting as gateways would have been included and further explored.

Another limitation of the data used are that they does not distinguish among types of tourism. Per capita accommodation and food service sales of a community serve as a decent proxy for the amount of economic impact visitors have on communities, but this measure does not distinguish between national park related tourism and general amenity related tourism. However, it does introduce the question of what is the difference between a gateway community and an amenity community.

These communities have similar economies based on tourism related to natural amenities. Positive and negative impacts are likely similar in both types of communities. The difference could be as simple as the ownership of the land with natural amenities. The National Park Service controls national park units for the Federal Government, while local governments or private individuals own the land in amenity communities. The methods of quantitative analysis in this research can identify both gateway and amenity communities as separate from other communities, but it cannot distinguish gateway communities from amenity communities.

Conclusions

National Park-related tourism is extremely popular in the United States. In support of park-based tourism, good management practices and substantial planning are needed. An important part of successful tourism management is knowledge of and cooperation among all actors involved in tourism supply (Gunn and Var 2002). For national park-related tourism a key factor is cooperation between the National Park Service and gateway communities since each actor is responsible for a different component of tourism supply. While the NPS maintains attractions, information, promotion, and some transportation, gateway communities provide basic goods and services to park visitors.

This investigation explored the extent to which per capita accommodation and food service sales can be used as measures of the "gatewayness" of communities. It was determined that this measure was significantly influenced by the percentage of seasonal homes, per capita income, median home value, poverty, distance from the park, percentage of the population between 18 and 24 years old, and park visitation. The percentage of seasonal housing had the most influence in the regression and cluster analyses. The fourteen selected communities had the highest values for the percentage of seasonal housing variables.

The cluster analysis selected some communities that were in all likelihood a mixture of gateway communities to national parks and stand-alone amenity communities. This finding expands the value of this type of analysis because it broadens research subjects from simply gateway communities to amenity communities. Since amenity communities can be identified using these variables then attempts to identify amenity communities could be performed beyond the 100 mile buffer around national park units.

Additionally, it raises the question of how gateway communities and amenity communities differ, since the results of the analysis identified both as spatially and economically similar.

In summary, the regression and cluster analysis techniques successfully identified variables influential in the identification of gateway communities. Per capita accommodation and food service and the percentage of season housing are the most influential variables to gateway and amenity communities. Additionally, the cluster analysis successfully created two groups: 1) gateway communities and amenity communities, and 2) other communities. This research can be applied by NPS personnel in the identification of gateway communities as partners in tourism management. It can also aid in identifying amenity communities for developers looking for investment opportunities. The identification of gateway and amenity communities is an important step in research attempting to further enhance understanding of the tourism-driven communities.

Perhaps the most important finding of this study was its inability to distinguish between gateway communities and amenity communities. It shows several possible conclusions: 1) the impact of the NPS is less important than the natural environment; 2) gateway and amenity communities have similar characteristics and issues, so solutions to problems can potentially be applied interchangeably; and 3) research focused on tourism communities needs to pay attention to both gateway and amenity communities.

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Appendix A: Sampled Place, State: Park ID

Park ID is referenced in Table 3

1. Alcoa, TN: 1
2. Canton, NC: 1
3. Gatlinburg, TN: 1
4. Maryville, TN: 1
5. Morristown, TN: 1
6. Newport, TN: 1
7. Pigeon Forge, TN: 1
8. Sevierville, TN: 1
9. Waynesville, NC: 1
10. Barnstable Town, MA: 2
11. Brewster, MA: 2
12. Dennis, MA: 2
13. Falmouth, MA: 2
14. Harwich, MA: 2
15. Mashpee, MA: 2
16. Sandwich, MA: 2
17. Yarmouth, MA: 2
18. Elizabeth City, NC: 3
19. Greenville, NC: 3
20. Kill Devil Hills, NC: 3
21. Kitty Hawk, NC: 3
22. Morehead City, NC: 3
23. Nags Head, NC: 3
24. Plymouth, NC: 3
25. Washington, NC: 3
26. Augusta, ME: 4
27. Bangor, ME: 4
28. Bath, ME: 4
29. Belfast, ME: 4
30. Brewer, ME: 4
31. Ellsworth, ME: 4
32. Old Town, ME: 4
33. Rockland, ME: 4
34. Waterville, ME: 4
35. Bridgewater, VA: 6
36. Charlottesville, VA: 6
37. Culpeper town, VA: 6
38. Front Royal, VA: 6
39. Harrisonburg, VA: 6
40. Luray, VA: 6
41. Staunton, VA: 6
42. Waynesboro, VA: 6
43. Woodstock, VA: 6
44. Cathedral City, CA: 7
45. Coachella, CA: 7
46. Desert Hot Springs, CA: 7
47. Indio, CA: 7
48. Palm Desert, CA: 7
49. Palm Springs, CA: 7
50. Rancho Mirage, CA: 7
51. Twentynine Palms, CA: 7
52. Yucca Valley, CA: 7
53. Belle Fourche, SD: 8
54. Hot Springs, SD: 8
55. Lead, SD: 8
56. Rapid City, SD: 8
57. Sturgis, SD: 8
58. Corcoran, CA: 9
59. Dinuba, CA: 9
60. Exeter, CA: 9
61. Farmersville, CA: 9
62. Lindsay, CA: 9
63. Porterville, CA: 9
64. Woodlake, CA: 9
65. Ashland, OR: 10
66. Central Point, OR: 10
67. Eagle Point, OR: 10
68. Klamath Falls, OR: 10
69. Medford, OR: 10
70. Myrtle Creek, OR: 10
71. Oakridge, OR: 10
72. Phoenix, OR: 10
73. Talent, OR: 10
74. Craig, CO: 11
75. Rifle, CO: 11
76. Rock Springs, WY: 11
77. Roosevelt, UT: 11
78. Vernal, UT: 11
79. Anderson, CA: 12
80. Chico, CA: 12
81. Corning, CA: 12
82. Oroville, CA: 12
83. Paradise, CA: 12
84. Red Bluff, CA: 12
85. Redding, CA: 12
86. Shasta Lake, CA: 12
87. Susanville, CA: 12
88. Billings, MT: 13
89. Buffalo, WY: 13
90. Hardin, MT: 13
91. Laurel, MT: 13
92. Sheridan, WY: 13
93. Alpine, TX: 14
94. Fort Stockton, TX: 14
95. Presidio, TX: 14
96. Chisholm, MN: 15
97. Ely, MN: 15
98. Eveleth, MN: 15
99. Hibbing, MN: 15
100. International Falls, MN: 15
101. Mountain Iron, MN: 15
102. Virginia, MN: 15

Appendix B: Correlation Table

	Per Capita Retail Sales	*Per Capita Sector 72 Sales*	*Distance to Park*	*Pop*	*Median Home Value*	*PCI*	*Poverty*	*% Seasonal*	*Percent Sample Visitation*	*% youth*
Per Capita Retail Sales	1.000									
Per Capita Sector 72 Sales	0.331	1.000								
Distance to Park	-0.129	-0.296	1.000							
Pop	0.036	-0.090	-0.030	1.000						
Median Home Value	0.024	0.232	-0.349	0.271	1.000					
PCI	0.209	0.248	-0.160	0.153	0.751	1.000				
Poverty	-0.150	-0.216	0.107	0.038	-0.491	-0.647	1.000			
% Seasonal	0.129	0.501	-0.429	-0.052	0.617	0.567	-0.446	1.000		
Percent Sample Visitation	0.517	0.469	-0.377	-0.076	0.213	0.177	-0.156	0.314	1.000	
% youth	-0.027	-0.113	0.102	0.321	-0.150	-0.296	0.424	-0.355	-0.163	1.000

This table shows the correlation or relationship between each variable. Correlations are measured on a range from -1 to +1 where -1 indicates a completely negative relationship, 0 indicates no relationship, and +1 indicates a positive relationship.

VITA

Cary Andrew Lincoln

Candidate for the Degree of

Master of Science

Thesis: EXPLORING LINKS BETWEEN GATEWAY COMMUNITIES AND NATIONAL PARKS: A QUANTITATIVE ASSESSMENT

Major Field: Geography

Biographical:

Personal Data: Born in San Diego, California on May 16, 1986.

Education: Graduated from Mills E. Godwin High School in Richmond, Virginia, in June of 2004; received Bachelor of Arts degree in Geography from the University of Mary Washington in Fredericksburg, Virginia in May 2008. Completed the requirements for the Master of Science in Geography at Oklahoma State University, Stillwater, Oklahoma in August 2011.

Experience: Employed by the Department of Geography at Oklahoma State University as a graduate teaching assistant 2009 to 2011. Employed as GIS Intern at Fort AP Hill, Virginia in the summer and winter of 2010. Employed as GIS Analyst at Fort Lee, Virginia from 2008 to 2009

Professional Memberships: Association of American Geographers, South Central Arc Users Group

Name: Cary Lincoln Date of Degree: December 2011

Institution: Oklahoma State University Location: Stillwater, Oklahoma

Title of Study: EXPLORING LINKS BETWEEK GATEWAY COMMUNITIES AND NATIONAL PARKS: A QUANTITATIVE ASSESSMENT

Pages in Study: 58 Candidate for the Degree of Master of Science

Major Field: Geography

Scope and Method of Study: The definition of a gateway community to a national park unit has few quantitative benchmarks or standards. Therefore, the goal of this study was to investigate levels of tourism services in a sample of communities near selected national park units. The sample included 102 communities around 14 national park units. Three potential measures of "gatewayness," per capita retail sales, per capita accommodation and food service sales, and a combination were investigated in three stepwise regression models. Variables found significant in each regression were used in an agglomerative cluster analysis to separate "gateway" and non-gateway communities.

Findings and Conclusions: Per capita accommodation and food service sales was determined to be the best measure of "gatewayness." The most important independent variable within a community was the percentage of housing for seasonal and recreation purposes. Also, selected "gateway" communities were relatively close to major metropolitan areas. Additionally, communities selected in the "gateway" cluster included gateway communities and stand-alone amenity communities defined as communities with large tourism economies that are largely independent of park visitor economic impact. The most noteworthy finding was that quantitative analysis can classify tourism based communities; however, such methods were less effective for distinguishing gateways from amenity communities.

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