From Signs to Minds: Wayfinding in Keene

Keene State College
Department of Geography
Fall 2017

Keene
STATE COLLEGE

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Acknowledgements

The authors of "From Signs to Minds: Wayfinding in Keene", Brittany LaFleur, Zachary Pearo, and Jennamarie Moody, would like to express our sincerest gratitude to all that helped make this final project possible. We would first like to thank Dr. Christopher Cusack for being our faculty mentor throughout our research this semester and in past semesters. He has been there to help guide our research and provide constructive feedback.

Another special thanks goes to Mr. William Schoefmann, GIS Mapping Technician for the City of Keene Planning Department, who provided us with much data and ideas for the development of our project. Additionally, there were many people who helped by providing the authors with information through expert interviews. Thank you to: Dr. Kemal Atkins, Vice President of Student Affairs at Keene State College; Mr. Rhett Lamb, Director of Planning for the City of Keene; Mr. Donald Lussier, City Engineer for the City of Keene; Mr. Andy Bohannon, Director of Parks, Recreation and Facilities for the City of Keene; Ms. Tara Kessler, City Planner for the City of Keene; and Ms. Tiffany Mannion; Bicycle Mayor of Keene, for providing us with insight on your daily work and how it connects to this project.

Thank you to the Keene State College Department of Geography for providing the authors with a foundation for this project. In addition, the authors are grateful for the assistance of the Geography Department faculty, Dr. Christopher Brehme, Dr. Sasha Davis, Dr. Jo Beth Mullens, and Adjunct Professor, Mr. Kevin Heaney, who graciously allowed for surveying of their students during class time. A big thank you goes out to our classmates; Katie Van Veen, Aimee Kraft, Mark Landolina, and Brendan Jones for helping with specific aspects of our project and to all of the senior geography students who worked through their projects as the authors of this paper worked through theirs. We appreciate the atmosphere that was developed between us.

Abstract

From Signs to Minds: Wayfinding in Keene

This study examines wayfinding in Keene, New Hampshire, in relation to signage and safety. The presence or absence of adequate informational signage is key to successful navigation. This project investigates the adequacy of navigational signs on bicycle trails around town, the overuse of signage on a busy street, and the overall feeling of safety in relation to high traffic crosswalks. Three types of data were gathered: mental mapping abilities in relation to navigation; the occurrence of different types of signs and their placements; and, the overall feeling of safety from people crossing a busy street.

Data were generated via online and paper surveys, as well as active research collection by authors. Survey participants included Keene State College students, faculty, and staff, as well as residents of the city. Findings are associated with mental mapping, navigation, perceptions of safety, location of signage, and usage of crosswalks. Methodology includes the use of statistical procedures in Excel and SPSS, as well as ArcGIS mapping technology. This research demonstrates that the City of Keene has a need for a complete wayfinding system throughout the entirety of the town, including main roads, bicycle trails, and pedestrian paths. Despite extensive bicycle trails and signage, the residents of Keene lack requisite mental mapping and navigational abilities. Suggested improvements include the inclusion of more safety measures on specific crosswalks, the addition of more bicycle trail signs at nodal regions, and the overall installation of a completely new wayfinding system for the center of Keene.

Key words: Wayfinding, Bicycle Paths, Crosswalks, Signage, Nodes, Recreation

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INTRODUCTION

CHAPTER 1

Throughout history, wayfinding techniques have been used by travelers on land and sea in order to locate routes that are unmarked or mislabeled. *Wayfinding refers to one's navigational skills and the instruments used to guide travelers*. Instruments may include a map, compass, landmarks, and dead reckoning. European mariners used dead reckoning for centuries; navigators used simple tools to track their ship's compass heading, speed, and the time spent on heading at each speed. The navigator could then calculate the route and distance the ship covered and mark a sea chart. These wayfinding techniques were strategical during the Age of Exploration, a historical European period from the 15th to the 18th century known as an extensive overseas exploration that contributed to the beginning of globalization (Smithsonian 2017).

Another historical use of wayfinding was seen in the indigenous people of Polynesia, who explored and settled on the islands in the Pacific Ocean using devices such as the Marshall Islands stick chart. Stick charts represented major ocean swell patterns and how the Marshall Islands disrupted these patterns. Many were created using coconut fronds that were tied together; these contributed to the history of cartography as the first system for representing ocean swells in map form. Incredibly, ancient Polynesians were able to navigate not only their own land but the entire ocean. Even though the ocean presented many dangers, wayfinding was something they took pride in. Today in Hawai'i, a navigator for the Polynesian Voyaging Society named Chad Kalepa describes wayfinding as "non-instrument navigation," and "a natural orientation process that uses surrounding environmental clues-sun, moon, stars, waves, and animals- to help set direction" (Genz et al. 2009). Wayfinding resembles a holistic approach because it incorporates a variety of instruments, resources, landmarks, and people. Being able to use environmental

clues to find one's way is seen as a unique set of skills that truly embodies intellect and challenges the human mind, and is of course very rewarding over time.

Historical methods of wayfinding are still used today, but have also paved the way for new technologies. The uses of wayfinding techniques have expanded from exploration into navigation of developed urban and rural settings. Wayfinding is practiced by nearly everyone, whether people are conscious of it or not. This study, *From Signs to Minds: Wayfinding in Keene, New Hampshire,* aims to examine wayfinding in Keene, in relation to signage and safety. As wayfinding takes a holistic approach, there are many factors that affect one's ability to navigate in a foreign environment; hence the need for this particular study. The presence or absence of adequate informational signage is key to successful navigation and overall safety. This project investigates the adequacy of navigational signs on bicycle trails around town, the overuse of signage on a busy street, and the overall feeling of safety in relation to high traffic crosswalks (Figure 1.1).

Figure 1.1 *Wayfinding in Keene.* ***Source:*** *Authors*

Located in the southwestern portion of the state, Keene, New Hampshire, is considered the hub of Cheshire County; providing resources to smaller surrounding communities. Keene is approximately 37 square miles, with much of the city located within a valley and former lake bed. As a regional hub, it is convenient for businesses to locate in Keene as the city is connected by many state highways. According to the 2010 Census, there are 23,409 people living in Keene and a total of 77,117 in Cheshire County. Keene comprises about 30 percent of Cheshire County's total population and has a population density of 627.6 people per square mile (U.S. Census Bureau 2010).

Keene was once a railroad town, with trains traveling through the city and connecting it to locations near and far. In the mid-1800s however, there was a shift in transportation due to the Industrial Revolution. The last freight train passed through Keene in the late 1800s and soon thereafter, the rails and ties were removed from the rail bed and the beds themselves stayed intact. Although the trains left the city, the previous rail bed infrastructure has developed into the Cheshire Rail Trail and the Ashuelot Rail Trail. The rail trails may be absent of the freight trains that once connected Keene with other cities, but the trails now allow people to engage in recreational activities that connect communities, farms, restaurants, local businesses, and parks. This network of trails is a huge asset to the city and surrounding communities, and this study investigates if it is properly labeled with signage and convenient to access.

The three interrelated components in this project as stated above, each contains an overarching hypothesis.

Adequacy of bicycle trail signage hypothesis: *Despite the town's commitment to bicycle trails in Keene, lack of signage hinders the ability for residents and visitors to navigate and utilize the trail system.*

Overuse of signage hypothesis: *Despite the large number and variety of signs on Main Street, Keene State College students' ability to navigate to destinations around town remains dependent on their time spent in the community.*

Crosswalk Safety Hypothesis: *Despite recent safety enhancements to the Main Street crosswalks, safety remains a concern.*

With a focus on trail connection and signage, crosswalk safety, and Main Street navigation in relation to wayfinding, the data gathered in this study include mental mapping abilities in relation to navigation; the occurrence of different types of signs and their placements; and, the overall feeling of safety from pedestrians crossing a busy street. All research is original by the authors and will be used to assist Keene State College, the City of Keene Planning Department, and the Keene Department of Parks and Recreation with future development projects.

LITERATURE REVIEW

CHAPTER 2

Keene, New Hampshire, has an extensive bike path network that connects bicyclists and pedestrians to shopping centers, farms, downtown Keene, local colleges, and surrounding communities. Unfortunately, the path is difficult to navigate as there are few signs to mark the route which may include travel along roads and through parking lots in downtown Keene. An investment in wayfinding could dramatically improve the navigability associated with the Keene bike path network. Investing in bike paths is not only good for public health and the environment; the benefits are estimated to bring in four to five times the costs (Saelensminde 2004). Much of the trail infrastructure is already complete thanks to the abandoned railroad beds that have been converted into rail-trails. The rail trails connect the miles of bikable paths to the community, creating a sense of place and community pride. People value rail trails and the communities surrounding them, and are willing to pay more in travel costs to visit them (Siderelis and Moore 1995). Therefore, it is important that people can navigate on and make use of these existing paths and trails with knowledge of their surrounding environment. This concept is called wayfinding.

Wayfinding is the ability to "find your way" or navigate through an unfamiliar or foreign environment (Francescangeli 2017). Being able to identify one's location can happen both cognitively and behaviorally, and is essential in everyday living including several jobs such as airplane pilots and submarine personnel. Internal and external factors can affect one's ability to navigate confidently throughout an environment; these external factors include the density of the surrounding buildings, the ability to find meaningful landmarks, and the patterns of streets and intersections. Internal wayfinding factors are based upon familiarity with the environment and the strategies one uses to navigate through an environment (Prestopnik and Ewoldsen

2000). Measuring wayfinding performance is based on reporting one's sense of direction and behavioral methods including estimating distances, drawing maps of a well-known environment, giving verbal and written directions, and pointing to unseen objects of locations in an environment. One's sense of direction is defined as an awareness of location or orientation (Prestopnik and Ewoldsen 2000).

The end goal of wayfinding is becoming familiar with the environment, and with this heightened awareness of objects and locations in an environment a person can navigate through a space and perform wayfinding and spatial orientation tasks accurately. Living in the same place for many years would put the wayfinder at an advantage because of their long-term experience with the environment. However, a first-year college student on a large campus, for example, may not be able to find their way around for several weeks before acclimating to their new surroundings.

Route Directions and Landmarks

In the subject of geography, movement is a key consideration. Movement can refer to how people travel, how goods are transported, and how ideas are shared. As humans travel, the question of how to get from one place to another is common. Route directions are "sets of procedures and descriptions that allow someone using them to build an advance model of the environment to be traversed" (Raubal and Winter 2002, 2). Route directions have potential to be very effective and have vast practical applications that include navigational information for the disabled, personalized or automated tourist information, and in-vehicle navigation systems. There is no accepted definition of what constitutes 'good' route directions that are informative and helpful. There are many variables that contribute to quality directions including

familiarity of the route (Lovelace et. al 1999). People have various spatial, cognitive, and behavioral abilities that help to orient themselves through a route. These abilities are needed in order to navigate easily and efficiently (Raubal and Winter 2002).

There are three main categories of wayfinding tasks that encourage the movement of people from one place to another: movement with the goal of reaching a destination that is familiar; movement with the goal of exploring and then reaching a familiar point of origin; and, movement with the goal of reaching a new destination. Finding the way from one place to another is often benefitted using symbolic information such as landmarks and wayfinding instructions. A landmark is an object or structure that can be used as a point of reference to determine directionality. Landmarks can be used in mental mapping and in the communication of route directions. They support movement through guidance and create opportunity for fewer wayfinding errors. Route directions that contain landmarks are much easier to understand than ones that are solely direction and distance based (Raubal and Winter 2002).

Landmarks can be used to improve the ease of wayfinding. Landmarks that are eye catching and in prominent locations tend to be of greatest benefit. Rail trails are frequently presented with landmarks due to the rich history surrounding them. Landmarks are best remembered when they fall in decision points; areas where a decision must be made regarding route of travel (Raubal and Winter 2002). A common decision point on campus is where Appian Way meets with the Keene State College campus portion of Blake Street. This section of the street is home to services such as the Math Center and Writing Center. It is not known to Keene State College students as a part of Blake Street, due to the lack of signage with that information. If giving directions to the Math Center for example, one might say to walk down Appian Way

from the arch and then turn right at the giant clock. The lack of signage does make directions at this decision point difficult, however, there is an old Class of 1957 clock that can be easily used as a landmark for successful navigation. These decision points are often called nodes, places where paths cross and decisions are made. Intersections for cars, stores for pedestrians, and connecting paths for bikers are all examples of nodes.

Fewer wayfinding errors occur with landmarks than without. Landmarks can be created at specific intersections which can also contribute to the overall aesthetic value of a city. When they are found along the edges of the path, they still contribute by reinforcing the traveler that they are on the right path. Landmarks can take many different forms. Some may be historical buildings, memorials, natural features from the environment, or a form of public art. Public art would lead to an increase in the number of travelers on the path, as well as attract young adults to the city by showing them community pride (Raubal and Winter 2002; Siderelis and Moore 1995).

Wayfinding Signage and Technology

A key aspect to wayfinding includes the signage that pedestrians will look for when in an unfamiliar environment. Signage is evaluated by its simplicity, consistency, orientation, and navigation. Simple signs are clear and obvious for the visitor so that they can easily be read. The signs should be the same typeface, color, and design as well to prevent confusion. Locations like large malls and hospitals should include a large map that states where the visitor is currently located in the direction that they are facing, with clear arrows in the direction of specific places. There are also different types of wayfinding signage (Francescangeli 2017).

The types of wayfinding signage are informational, directional, identification, and regulatory. Informational signs will provide the visitor with important information necessary to accommodating to the new environment, such as “Please have your identification ready for the teller” at a bank or on-call signage for specific doctors at a hospital. Directional signs point the visitor in the correct direction on varying floors of a building. Identification signs give information about specific people and locations in a place. For example, signs in an academic building that list the room number and professor that teaches in that room for students to navigate themselves. Lastly, regulatory signs display safety procedures like fire escape routes or other common signs like restroom and stairwell signs (Francescangeli 2017). Signs on the front of buildings can be great descriptors to what is inside the corresponding building. If a building is marked as ‘X Public Library’ for example, there is not only information about the building, but also, the service that is inside (Raubal and Winter 2002).

The largest system of wayfinding signs on campus is the collection of Keene State College campus maps. These are distributed around campus in areas that often have the most complicated nodes. For example, there is a map sign next to Rhodes Hall where many paths connect and decisions are made about where to travel next (Figure 2.1). This is also a high traffic area where many new students and visitors could potentially have difficulty in navigating their route.

Figure 2.1 *Rhodes Hall Campus Map*.
Photo Source: *Authors*

There are a lot of aspects that go into the creation of a wayfinding system in a town. Civic branding in a city is important to reinforce brand messages. Streetscaping, parking, pedestrian, and bike friendly environments affects how the system is designed and planned for the city as well. There are many contributors to the wayfinding system. Public art, for example, can be used to orient and bring in environmental reference within the wayfinding system. Public art can also add a variety of dimensions into the system. Wayfinding systems are more than a collection of signs. These systems are most successful when they achieve civic engagement (Hayzlett 2015).

Physical signage is not the only way to relay information to visitors of a place. Wayfinding technology applications are becoming more common today, especially in hospitals. At the University of Alabama at Birmingham's Medical Campus (UAB) many patients and visitors were becoming lost because of the campus spanning over 100 city blocks. This caused anxiety for new visitors, and because of the wide range of patients in terms of their age and socioeconomic status, Senior Associate Vice President, Jordan DeMoss, decided that it was time for a change. Hospitals are not the only complicated physical environments that exist; shopping centers, airports, and universities all benefit from an effective wayfinding system so that their visitors are satisfied (Kim 2017). Of course, examples could include a large map to direct visitors, or obvious landmarks such as a painted mural in a hospital corridor to serve as a reference point. However, in an age of technological advancements; mobile applications, touchscreen kiosks, and digital signage are proving to be more innovative. An example of these mobile applications was developed in 2012 by the Mayo Clinic that patients and visitors could download on their phone; this app included maps and turn-by-turn directions to any destination on campus which was more than useful

throughout its 59-building campus. The UAB also decided to keep their more traditional wayfinding solutions with paper maps and speaking to their patients and visitors (Kim 2017).

Although this is an example at a hospital, these applications can be implemented for many other complex locations including outdoor recreational areas. An app for smartphones called 'myNav Central Park' gives directions for specific locations at Central Park in New York including playgrounds, bridges, fountains, monuments, and gardens. It provides the park's miles of pathways from these destinations to help the visitors develop a sense of their own location to be able to navigate throughout the park. Wayfinding technology has potential to make positive impacts toward successful navigation and the implications for the City of Keene are clear.

Wayfinding Systems for Bicycle and Pedestrian Paths

Investments in wayfinding should be directed towards creating a public map of the bike path and having it displayed in multiple high traffic areas. A specific strategy for organizing wayfinding systems should be considered; such as the concept of districts (Gibson 2009). The area of development is broken up into zones and could be based on landmarks, destinations, or direction. Signs or landmarks should be posted to direct bicycle and pedestrian traffic through difficult to navigate areas. Creating a brand based on the history of the community is important when creating signs and identifying potential landmarks (Dondi et al. 2011). A wayfinding system with these elements serves as a common language for those who visit (Gibson 2009). A trail system that is easy to navigate will lead to an increase in the number of commuters and recreationists on the bike path. The amount of road traffic will decrease, leading to safer traveling, fewer emissions, tourist revenue, and a healthier community (Hebert et al. 2013; Reynolds et al. 2009).

When addressing the need for wayfinding, the Context Sensitive Design (CSD) should be used, as it blends the function of transportation and the surrounding physical setting. The Federal Highway Administration defines CSD as:

> A collaborative, interdisciplinary approach that involves all stakeholders to develop a transportation facility that fits its physical setting and preserves scenic, aesthetic, historic and environmental resources, while maintaining safety and mobility. CSD is an approach that considers the total context within which a transportation improvement project will exist (Dondi et al. 2011).

Using this approach maintains the integrity of the community while also hiring a diverse group of people to complete the task; these jobs range from engineers, ecologists, social scientists, urban planners, biologists, and architects to many more (Dondi et al. 2011). CSD incorporates all aspects of the environment, which promotes a greater public awareness leading to an increase in community feedback. Community feedback allows people to have a stake in the project, effectively creating a greater sense of pride once it is finished. When people have a stake in something, they are more likely to appreciate it and support the cause in the future. A project consisting of all these elements is attractive to old and young populations alike.

Bicycle commuting can be an effective way to get from one place to another. Higher commuting rates are associated with higher levels of bicycle infrastructure such as bicycle lanes and paths. About 50 percent of Americans in a national poll supported requirements that streets include bicycle lanes or paths, even if it meant less space for vehicles. Source of funding, the major issue for many projects, is not the biggest complication for the creation of new bicycle commuting systems. Instead, difficulties lie with the allocation of resources to bicycle facilities, as road and sidewalk space is limited in many areas around the country (Kang and Fricker 2013).

There are two main types of bicycle facilities, on-street and off-street. On-street facilities include bicycle lanes and roadways. A lane is defined as "a portion of a roadway that has been designated by striping, signing, and/or pavement markings for the preferential and exclusive use of bicyclists" (Highway Capacity Manual 1994, 36). Off-street bicycle facilities include bicycle paths and sidewalks. A bicycle path is a smaller road that is physically separated from motorized traffic through the use of open space or a barrier, either shared with pedestrians or limited to exclusive bicycle use. Lastly, a sidewalk is a specifically designed path for pedestrians. Sidewalks are usually paved and along the sides of streets (Highway Capacity Manual 1994).

Even if a city has lanes on roads, bicyclists often still use the sidewalk to ride from one place to another. With limited space, it is nearly impossible to add bicycle lanes along every street. This means that off-street bicycle or sidewalk paths are becoming more popular across the country. Based on an analysis in many large cities, there is a positive association between the quantity of bicycle facilities and the amount of people commuting by bicycle (Dill and Carr 2003). Also, with each additional mile of bikeway per 100,000 residents there is an increase in commuting by bicycle, while all other factors remain constant (Nelson and Allen 1997). Furthermore, it has been found that areas near new bicycle facilities showed a larger increase in bicycle mode sharing than areas farther away (Heinen et al. 2010). There is a conclusion that the presence of infrastructure for bicycles results in more cycling and vice versa. Within a study on the 90 largest United States cities, it is found that cities with a greater supply of bicycle paths actually have a significantly higher bicycle commuter rate. It has been further concluded that both on-street and off-street lanes have similar positive associations with bicycle commute rates in United States cities (Kang and Fricker 2013).

Green Design and Complete Streets

There are many benefits to creating a more sustainable community, creating a healthier environment, both human and natural. Job growth in "green" industries, bringing in new residents, young people, and manufacturing jobs. Population growth is good for local businesses. Purchasing from local suppliers and contracting local builders is not only sustainable, but it is investing money back into the same community. One big investment that should be considered is the addition of solar lights along the more heavily used portions of the bike path. Solar lighting leads to an increase in traffic on the bike paths (Hebert et al. 2015). New England experiences a dramatic shift in the amount of daylight it receives throughout the year. In the winter months, many people are leaving work when it is dark out. Studies have shown that people feel less safe and are less likely to use bike paths in the dark (Willis, Niel and Garrod 2005). Solar lights can transform a recreation path into an everyday commuter path.

Launched in 2004, the National Complete Streets Coalition (NCSC) is the driving force for promotion of development of policies and professional practices. To date, there are over 1,140 agencies at the local, regional, and state levels that have adopted Complete Streets policies, totaling over 1,200 policies nationwide. Within the Monadnock Alliance for Sustainable Transportation, a subcommittee called 'Complete Streets' has been created as the regional section of this initiative (Monadnock Alliance for Sustainable Transportation 2017). NCSC has the view that everyone, regardless of diversity in age, gender, ability, income, race, or ethnicity, has the right to feel safe and comfortable. Streets are often times designed only for vehicles speeding by or halting due to traffic. However, whether walking, bicycling, driving, or taking public transportation, everyone should have access to community destinations and public places. The

National Complete Streets Coalition has made a large impact throughout the United States within the Smart Growth America initiative (Smart Growth America 2017).

Complete streets are known as “pedestrian, transit, and bicycle-friendly streets that provide safe and easy access for users of all ages and abilities, regardless of their mode of transportation” (Monadnock Alliance for Sustainable Transportation 2017, 1). This approach to planning, design, construction, and maintenance of streets considers the context and travel pattern in order to meet the needs of everyone using the area. This helps to ensure that streets are safe for people from all backgrounds, while still balancing the needs of different modes of transportation. User conflict is seen as a top concern for roadways in addition to bicycle paths. Complete streets take everything into consideration, in hopes to balance the different needs of the space. Complete streets look different depending on the context, function of the road, and location within a community (Monadnock Alliance for Sustainable Transportation 2017).

Common elements of complete streets include sidewalks, bike lanes, wide paved shoulders, median islands, curb extensions, and roundabouts. Streets may have narrower travel lanes with safe crosswalk options with pedestrian signals. All of these elements together are a way for a community to enhance safety while boosting local economy and creating a sense of place. These complete streets also help to ease congestion on main roads and lower emissions (Smart Growth America 2017).

Crosswalk and Pedestrian Safety

Pedestrian crosswalks in any city are essential for safe commuting, tourism, and walkability of a city. Careful planning needs to done to ensure that crosswalks are located in efficient safe locations. Efficient in a sense that the natural path people take leads to the

crosswalk and the flow of traffic will not be dramatically disrupted. Safety should be the primary concern, and these concerns extend beyond the United States. In Europe, approximately 25,000 people are killed each year in traffic accidents. Of those 25,000 people, more than 14 percent are pedestrians (Cafiso et al. 2011). Factors in the U.S. that can help reduce the number of pedestrian casualties include bump-outs; where the curbs bump-out at each end of the crosswalk, giving drivers and pedestrians better visuals of each other (City of Keene Planning Department 2010). Another major improvement that can be implemented to further increase safety is the addition of speed humps, either before or at the site of a pedestrian crosswalk. Speed humps naturally slow vehicles down and draw attention to pedestrian crossings. Reductions in speed limits also lead to fewer pedestrian incidences (Cafiso et al. 2011).

Reducing speed limits at crosswalks from 35 miles per hour to 25 miles per hour dramatically increases the number of vehicles that yield to pedestrians at crosswalks. Multiple streets studied show a yield rate of 15 percent to 58 percent on 35 mile per hour streets versus streets with 25 mile per hour speed limits which all had a yield rate greater than 60 percent (Turner et al. 2006). A reduction in speed also leads to fewer collisions with pedestrians. The slower a vehicle is moving translates to a shorter braking distance and a quicker reaction time from the driver. Many pedestrian collisions are eliminated simply by reducing speed limits near crosswalks. If a collision occurs, the likelihood of the pedestrian dying is dramatically lowered if the driver is traveling 10 miles per hour slower (Anderson et al. 1997). Other effective methods aimed at getting vehicles to comply with yielding to pedestrians include crossing flags for pedestrians, and in-street crossing signs. Studies found that pedestrians holding crossing flags lead to a 65 percent compliance rate for motorists yielding and in-street crossing signs lead to 87

percent compliance (Fitzpatrick et al. 2006). Crossing flags can be placed in buckets at each end of the crosswalk allowing pedestrians to grab a flag, increasing the visibility of themselves while they cross the street and then they can place the flag in the bucket at the opposite end of the crosswalk. This is economically an easy way to increase safety for pedestrians crossing the street. In-street crossing signs give drivers a visual cue in the middle of the street to increase awareness of potential pedestrians. Coupled with lowered speed limits and flags, drivers are more likely to identify pedestrians and stop in a safe amount of time (Turner et al. 2006).

Understanding traffic and pedestrian patterns is essential when planning the location and infrastructure involved with crosswalks. Depending on the community and number of lanes a pedestrian needs to cross, different safety measures must be considered. Simple solutions such as flags and in-street pedestrian signs are valuable in any situation. Speed humps also force the driver to abide by traffic laws or risk damaging their vehicle. There is not one solution that ensures complete safety, but a variety of techniques must be studied and utilized to ensure that a crosswalk is as safe as possible.

Samples of Community Wayfinding

Aside from information that is written on signs, design is also a key factor in successful navigation. In Granby, Colorado, signage design clearly reflects the unique character of the town (Bergquist and Allen 2007). Granby is known for being a rustic, railroad environment and mountainous setting. Therefore, it is important that the signs around the town reflect this scenery. The buildings are a mixture between historic and modern made with a rustic timber, and although different, both types of structures are simply designed and call for signage that keep up with this style. The signs are made with few details, providing important information

without distracting drivers. In addition, the picture on the sign includes a mountain setting which blends with the surrounding natural environment.

> The sign is situated between wooden posts that are connected by painted steel hardware, which portrays a simple, rustic durability. The combination of the deep forest green directional panels, which complement the reddish-brown mountain scene, and the rustic materials lend itself to Granby's character while presenting a clean, utilitarian image (Bergquist and Allen 2007, 4).

Figure 2.2 *Granby, CO Signage.* ***Photo Source****: Bergquist and Allen.*

Granby, Colorado is a clear example of the importance of signage in an area and how it can reflect the spirit of the environment simply by its look. With this kind of consistency and simplicity, a visitor can begin to find their way and become familiar with the location.

Internationally, an example of successful wayfinding signage is demonstrated through the Inner Melbourne Action Plan (IMAP) in Melbourne, Australia developed in 2007. The plan was created to implement consistent pedestrian wayfinding signage throughout Melbourne, and to

make all 35 precincts of the city accessible through walking, bicycling, and public transportation. The motto for this plan was to "Make Melbourne More Livable," and strategies established to follow through with this plan include; linking and improving transport routes, minimizing traffic congestion and increasing public transport use, supporting residential growth, and developing distinct activity centers to encourage business and tourism (Herbes and Grant 2007).

Each precinct in Melbourne already has a great system of public transport routes for the train, tram, and bus linked together by Metlink signage. There is also a detailed cycling and shared-path network with comprehensive signage, all clearly illustrated on maps. There is a walking route, however the weakness here lies in the region being fragmented with different types of signage for pedestrians and in some areas of the inner-precinct there are not any signs for pedestrians at all. The IMAP will show the people of Melbourne that transportation routes are essentially a web and all places can be easily accessible by foot, bike, or public transport; whichever the visitor feels is best suited for their needs. The signage is a "map-based family of signs" and illustrates major destinations in the precincts so people know how to travel to specific locations in Melbourne (Herbes and Grant 2007).

Closer to home, still another example of a city implementing wayfinding design is that of Hyattsville, Maryland. The purpose of the Wayfinding Signage Program in Hyattsville is to direct residents and visitors to parking areas, municipal buildings, and other attractions (Sabra, Wang & Associates Inc 2009). After realizing that there is not an existing system for public parking or for the courthouse in Hyattsville, it became apparent that the Wayfinding Signage Program was necessary. Although there are some signs for the Metro Stations in the city, signage for the

historic district and other attractions in Hyattsville are absent. It is important for there to be sufficient signage for successful navigation, especially for visitors unfamiliar with the environment. In comparison to Granby and Melbourne, Hyattsville, Maryland lacks the basic signage included in the other two case studies.

The town of Granby, and the cities of Melbourne and Hyattsville, are all examples of community wayfinding design implementation. It is interesting to note that although they are all connected through a need for signage, each place has a different plan based on its specific city design. In Keene, New Hampshire, there is a demand for signage that is geared towards Main Street so that it is informational and consistent. Downtown Keene is a place visited by many tourists, therefore signage to guide visitors to their destination would be beneficial. Keene could implement aspects of other community design, such as the ones mentioned above, in order to improve its wayfinding signage system.

Summary

Wayfinding is important in order for people to become familiar with a foreign environment. As a person's awareness for the environment increases, they will be able to navigate through a space and perform spatial orientation tasks efficiently. Ways to improve one's wayfinding abilities is through route directions and landmarks. Landmarks in prominent locations are used by travelers to ensure they are in the right place; they also contribute to the overall beauty of a town or city. Signage is another key aspect to wayfinding. Visitors will look to signs that are informational and provide clear directions, as well as signs that are simple and consistent to prevent confusion.

In Keene, New Hampshire a bike path network exists that connects bicyclists and pedestrians to places around Keene, including the downtown area and shopping centers. However, the lack of signage on this bike path makes it difficult for people to navigate; therefore, improvements are needed. If the bike path signage is to improve, blending the signage with the surrounding physical setting is important to the integrity of the community. Bicycle commuting is a great way to get around, and off-street bicycle or sidewalk paths are becoming more popular. It is difficult to add bicycle lanes and other infrastructure to every street; therefore, this is an effective solution to increasing bicycle commuting.

Using examples of community wayfinding in other cities as well as the information provided through scholarly studies can help to begin making these changes. Places like Granby, Colorado, that are rural and rustic make sure that their signage around town is wooden and simple to maintain its character. Keene should take this lead too, while developing strong wayfinding signage based on its specific city design. In order to do this, it is important to understand the background of Keene as a city and how implementation of wayfinding will begin and what messaging it will provide.

BACKGROUND

CHAPTER 3

Physical Geography

Located in the southwestern portion of the state, Keene, New Hampshire, is considered the hub of Cheshire County and provides resources to smaller surrounding communities. Keene is approximately 37 square miles, and much of the city is located within a valley and former lake bed. The geographic location of the city allows for stunning views of the surrounding hillsides and of Mount Monadnock, the most prominent mountain peak in southern New Hampshire and the highest point in Cheshire County. Mount Monadnock is known as one of the most frequently climbed mountains in the world. The surrounding hills also pose a threat, however, as they all funnel water into the Ashuelot River: a 64 mile long tributary of the Connecticut River which cuts through the City of Keene.

Due to the physical geography of Keene, many businesses and residential areas are susceptible to flooding. In 2005, one-third of the city was submerged in four to six feet of water (Johnson and Mishra 2005). It is not uncommon during heavy rainstorms to have streets flooded in Keene. The low elevation also creates air quality issues, especially in the winter. Cooler polluted air from wood stoves and vehicle emissions gets trapped below the warmer air moving over the city, disabling pollutants to effectively disperse. Keene's many physical features such as hills, rivers, ponds, and brooks as seen in Figure 3.1, make the City the unique area that it is. The physical geography may leave the city vulnerable, but it also allows for stunning panoramic views and creates an environment where recreation can thrive. The beauty of the region attracts many outdoor enthusiasts who take full advantage of the hiking, biking, and other outdoor recreational opportunities. As such, recreation also notably contributes to the overall economy of the region.

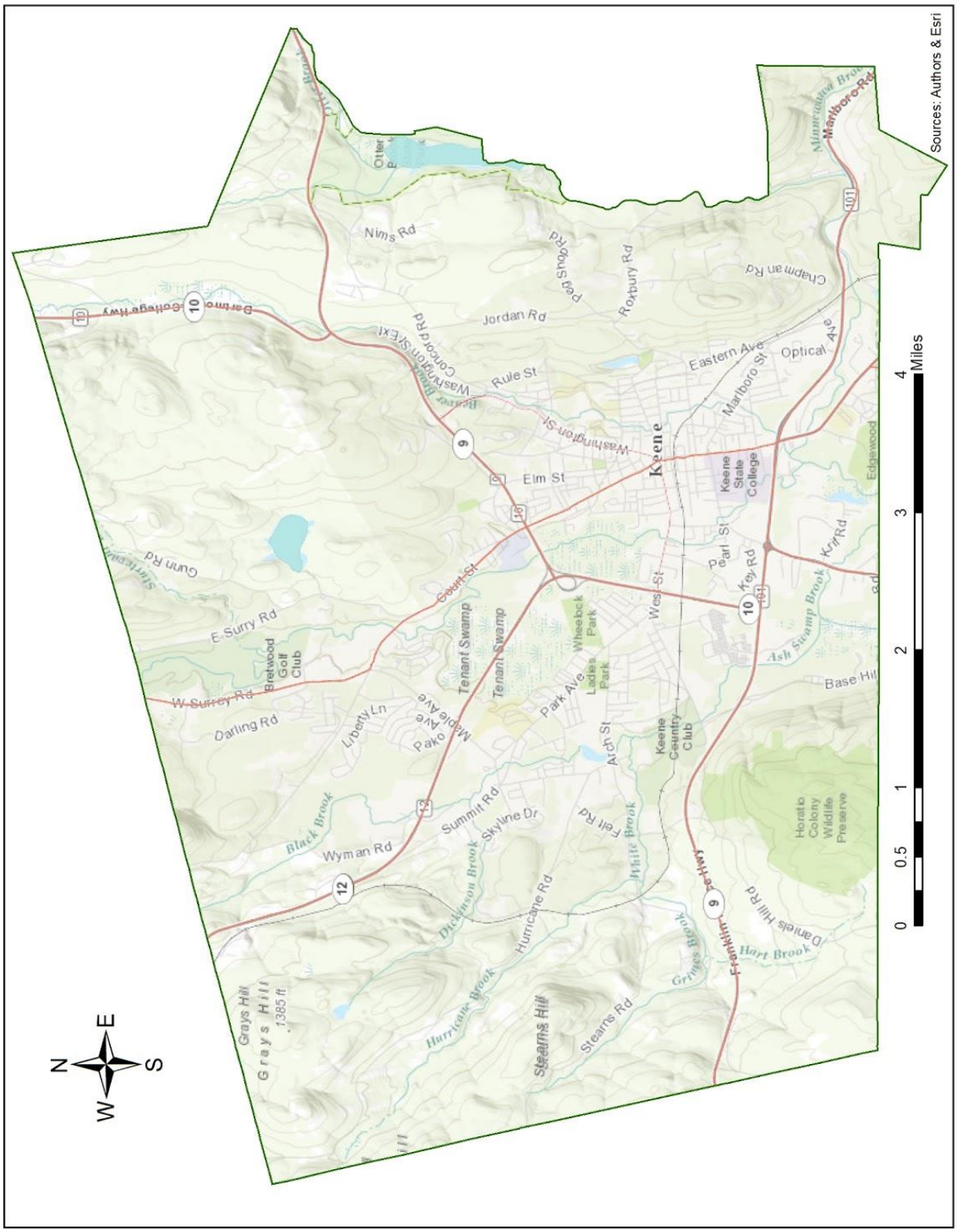

Figure 3.1 *Keene, New Hampshire Physical Geography.* ***Source:*** *Authors.*

Economic Geography

As a regional hub, it is convenient for businesses to locate in Keene as the city is connected by many state highways in addition to the bike trail system. Furthermore, the city is the educational hub of the region and Keene High School is the regional 9-12 education system for surrounding communities. A total of 2,100 individuals are employed in the education field in Keene, making education the biggest provider of jobs out of any sector. The city boasts a total of 16 schools, including Keene State College and Antioch University.

Cheshire Medical Center employs the second most people in the community with a total of 1,500 employees. Cheshire Medical Center services Keene and many of the surrounding communities. Another major employer in Keene is C & S Wholesale Grocers, employing nearly 1,200 individuals (New Hampshire Employment Security 2017). All the major employers in Keene are located near an access point to the bike paths; yet, only one percent of people commute by bicycle, and eight percent by walking. The majority of commuting is performed by driving with 88 percent of individuals using their car to get to work (City of Keene Planning Department 2010).

As a result of Keene's location within Cheshire County and the state as a whole, there are many commuters who work in Cheshire County, while others commute to places outside the county (Figure 3.2). For people working in Cheshire County, 82.8 percent also reside within the county. About 53.4 percent of all workers who commute into Cheshire County live out-of-state, mainly from Vermont and Massachusetts. Many people travel from within New Hampshire as well, but from other countries such as Hillsborough County residents (58.9 percent) and Sullivan County residents (29.4 percent). About two-thirds of Cheshire County's working residents

commute to out-of-state jobs, of which 55.4 percent travel to Vermont and 37.6 percent travel to Massachusetts (New Hampshire Employment Security 2017).

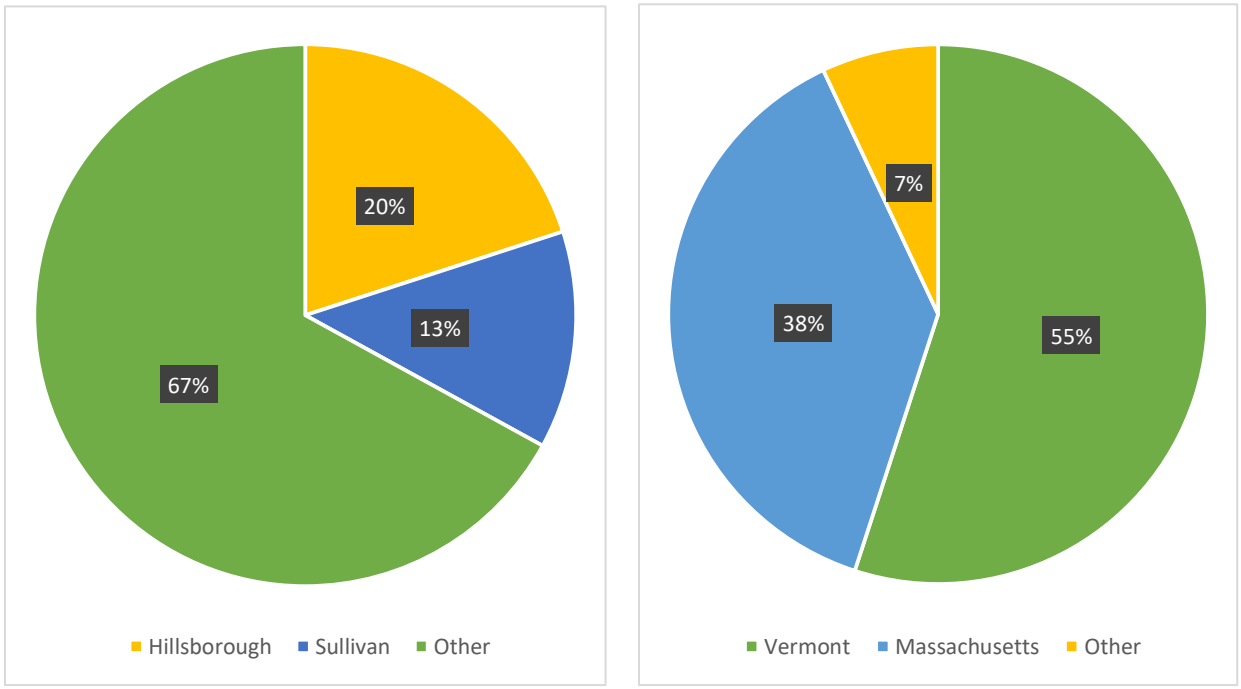

Figure 3.2 *Commuters Traveling into Keene from Surrounding Counties and States.* ***Source:*** *Authors.*

Keene officials state that people love the area due to its environmental quality, economic vitality, and social equity and if the city and surrounding towns want to continue to grow and thrive there cannot be any trade-offs between these areas (City of Keene Planning Department 2010). Working towards becoming more sustainable will help to ensure that these areas all see growth in the future.

Cultural Geography and Demographics

According to the 2010 Census, there were 23,409 people living in Keene and 77,117 in Cheshire County as a whole. Keene comprises about 30 percent of Cheshire County's total population. With Keene's area of 37 square miles, the population density is 627.6 people per

square mile. When compared to Cheshire County's population density of 104 people per square mile and New Hampshire's population density of 147 people per square mile, it is evident that Keene is much more densely populated (U.S. Census Bureau 2010).

The City of Keene may not be growing in population at a rate as quickly as the surrounding communities, but an increase in those communities translates to more jobs in Keene. Examination of population growth in Keene from 1790 until 2010 reveals consistent growth in population (Figure 3.3). In 1800, Keene's population was 1,645, 9,165 in 1900, 22,532 residents in 2000, and 23,403 people in 2015. Although this has been a steady increase in population, there have also been smaller population declines along the way. From 1990 to 2000, for example, there was a population decline of 517 residents within the ten year time frame.

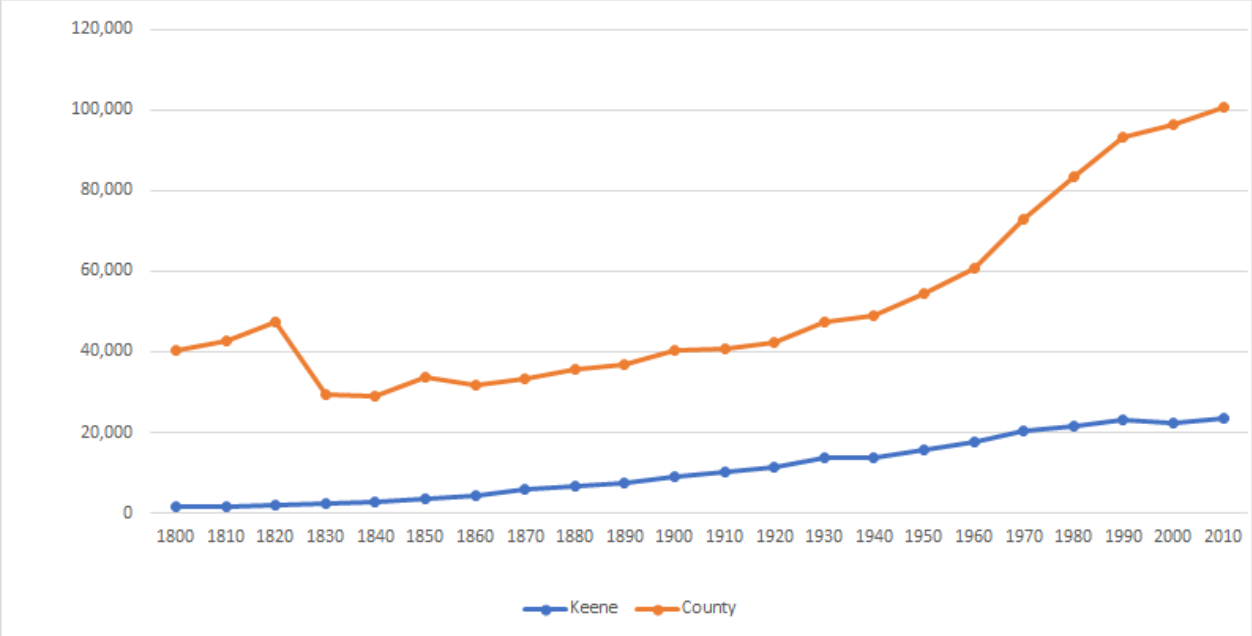

Figure 3.3 *Keene and Cheshire County, New Hampshire Population Growth.*

Keene's population growth rate is less than that of the surrounding communities. When examining the population of the City of Keene in comparison to Cheshire County as a whole, it is easy to see that the population growth of both areas has been historically parallel. Both

populations have been growing; however, the population of Cheshire County has been growing at a much higher rate than the City of Keene since the 1960s. Over the past five decades, Cheshire County has experienced population growth below that of the New Hampshire state average, but above that of the City of Keene. Cheshire County's highest rate of increase was from 1960 to 1970, when the population grew by over 20 percent. Keene's role of being a regional hub does not just provide many job opportunities for surrounding communities but to a largely homogenous, though slowly diversifying populace as well.

In Keene, 98.6 percent of the population identifies as being one race while 1.4 percent of the population identifies as being two or more races. Within the one race population, Keene has a racial makeup that is overwhelmingly White. Figure 3.4 demonstrates that 96.9 percent of Keene is White, with the rest of the population being Asian, African American, or population that identifies as some other race (U.S. Census Bureau 2010).

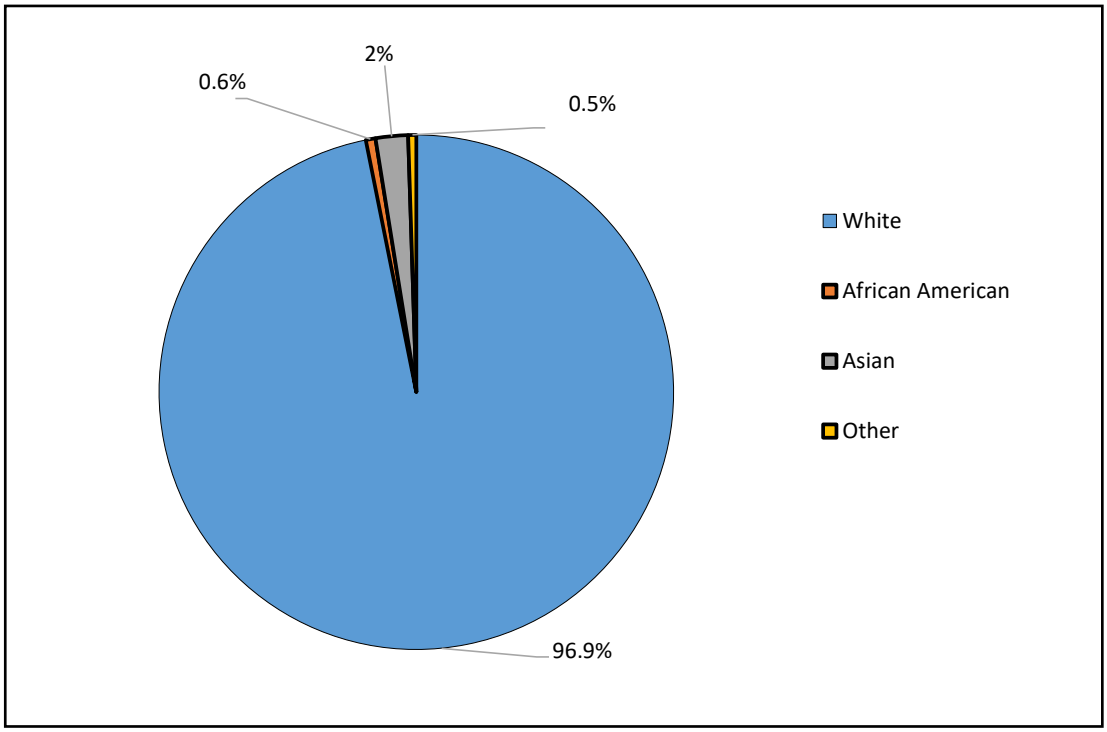

Figure 3.4 *Percentage of Population by Race.* ***Source:*** *Authors.*

Looking closer at the gender and age of the population of Keene, there are many trends that become evident. There is a fairly even number of males and females who in Keene, with a slightly higher number of females in the 70 and older age groups (Figure 3.5). Overall, this is a near stationary population pyramid due to the fact that there are somewhat equal percentages across age cohorts that taper off toward the higher age range. However, an interesting outlier is the 15 to 19 and 20 to 24 age group, as seen in Figure 3.5 (U.S. Census Bureau 2010). This large increase in population for these age cohorts is due to the number of college-aged students that live in Keene. Keene State College, Antioch University, and River Valley Community College are higher education institutions that are located in the city. These institutions educate students of all ages with a majority of their students being between the ages of 17 and 22. This explains the high number of residents in the young adult population range.

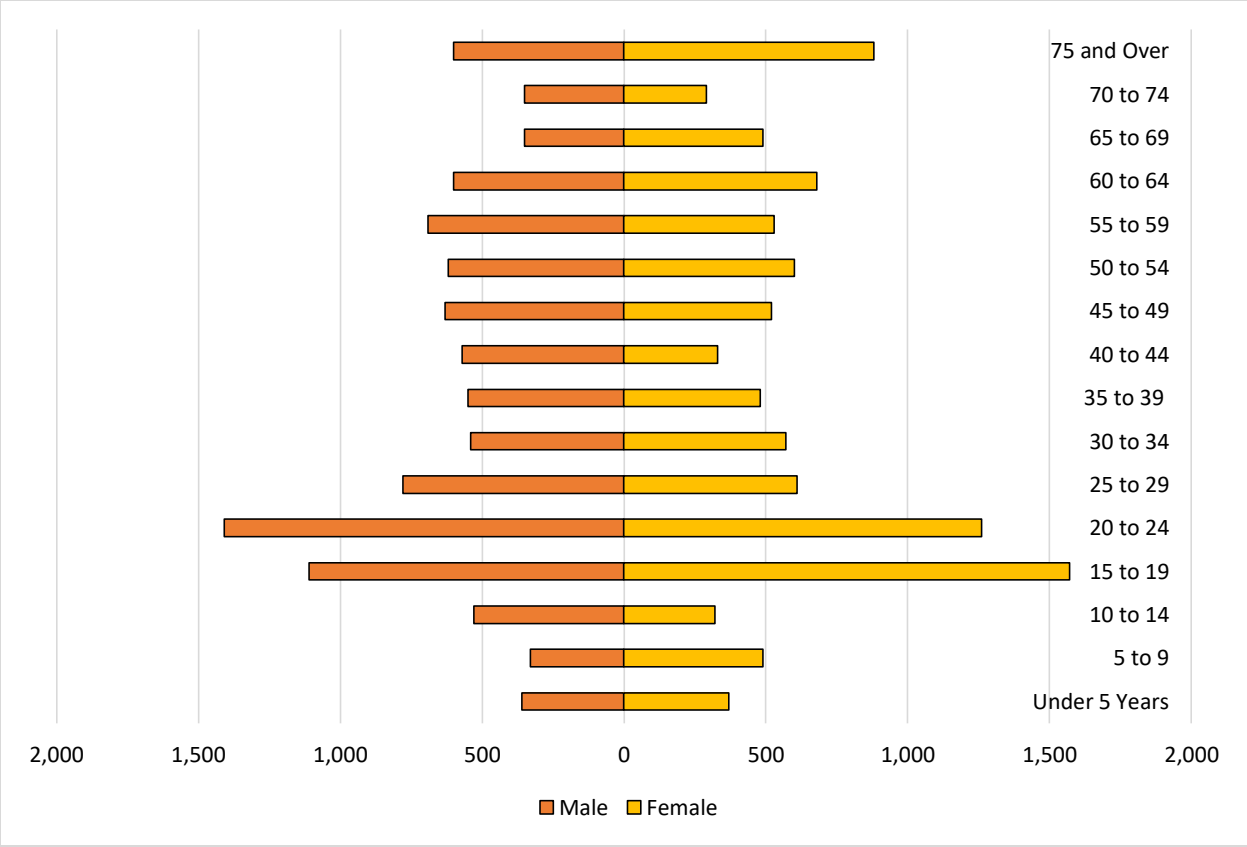

Figure 3.5 *Population Pyramid of Keene, New Hampshire.* ***Source:*** *Authors.*

In addition to the high population of young adults, there is also a slightly higher number of residents in the middle adulthood age range, 40 - 60 years old. The “Baby Boomers” residents represent the aging population of Keene. Due to this demographic, Keene has a large emphasis on community health and wellness for the residents of the city. Vision 2020 is an initiative created to align with community goals and city programs. Within this plan the initiative targets five areas in the city; Health Status, Health Literacy and Communication, Health Care Access, Wellness, and Social Capital. Opportunities for the residents of Keene to maintain a healthy and active lifestyle include utilizing the many trails and hiking locations the city has to offer. The simple act of walking helps to grow healthy bone tissue, keeps metabolism up for weight control, and even improves sleep and mental health. A group called Cheshire Walkers meets once a week in Cheshire County to walk and hike in order to promote this healthy and active lifestyle (City of Keene 2017). This is a great way to also bring the community together to work towards a greater quality of life.

There is also extensive public outreach within the community about the importance of health. It is important that the City of Keene engages all ages within the community. This is possible by providing opportunities for health care and recreation, such as senior volunteer programs that include interaction with day-care facilities. Another opportunity to tie together both the younger and older population in Keene is the development of a multi-generational community/senior center that is easily accessible and walkable within downtown Keene for all ages to utilize (City of Keene Planning Department 2010). The city strives to accommodate the needs of the entirety of its populace, no matter what their age, race, or ethnicity.

Outdoor Recreation and Leisure

Demographics of a city can help predict the occurrence and type of outdoor recreation within the area. Outdoor recreation and leisure pursuit levels are partially dependent on a mix of factors in a certain population. By knowing the racial makeup, residential location, and demographics of Keene, many insights into the city are afforded. Knowing key pieces of information such as these makes a difference in predicting and supporting the quantity of outdoor recreational experiences in this community.

In the United States, individuals who identify as White are far more likely to pursue outdoor recreational activities in large, remote areas, than are minorities. Evidence of this fact comes from the *Outdoor Recreation Resources Review Committee* which reported "a significant difference in the outdoor pursuits between whites and America's minority population" (Cordes and Hutson 2015, 97). With 95.3 percent of Keene's population being White, it is assumed that Keene will have an active pursuit in outdoor recreation and leisure activities. Residential location also has a large impact on the pursuit of leisure activities. Many studies have concluded that residents seek leisure opportunities, especially in developed hub areas such as the City of Keene. In addition, populations that are within close distances to outdoor recreation opportunities are more inclined to participate (Cordes and Hutson 2015). Keene State College students, for example, are very close in proximity to the Cheshire Rail Trail, providing many opportunities for recreation and leisure.

Additionally, as Keene is more urban than surrounding towns in Cheshire County, the city is an ideal place for leisure and recreation opportunities. The city has increased the availability of these opportunities in recent years and continues to expand them around town. Overall, the

residential location of Keene, specifically with Keene State College students, provides ample opportunities for outdoor activities. The strongest demographic factor that correlates with the pursuit of outdoor recreation is the age of a community. An extensive review of studies has previously concluded that "active participation in outdoor pursuits declines with age" (Cordes and Hutson 2015, 97). Younger populations tend to recreate and pursue leisure opportunities at a much higher rate than their elder counterparts. As evidenced by Keene's population distribution, it is clear that there is a very large young adult population. This is an ideal population for outdoor pursuits as such pursuits tend to lessen with age. The three demographic characteristics correlate with the pursuit of outdoor recreation and leisure. The City of Keene does have a largely white, urban, and young population, making it the ideal city to have recreation activities. Keene, New Hampshire, has a Recreation Department that is constantly working on the improvement of these opportunities.

Parks, Trails, and Recreation

The City of Keene Parks and Recreation Department oversees a number of community programs, cemeteries, trails, and parks. There are a total of 16 community parks in Keene, each of them unique and with something special to offer. The Community Garden within town allows residents of Keene to pay a $20 fee in exchange for a plot in the community garden. The community garden allows residents who may not have the proper space for growing a garden to have their own plot to plant and manage throughout the growing season. The parks department will mow around the plots and leave a hose out for the residents to use (City of Keene 2017). The community garden is just one example of how Keene is promoting a healthier community.

Wheelock Park is a 41-acre park located in West Keene surrounded by trees, hosting multiple athletic fields, including hockey, basketball, baseball, swimming, tennis, and horseshoe courts. Throughout the summer, Wheelock Park is also home to a public campground. Wheelock Park and the accompanying campground are connected to the bike path, making it a short ride to downtown Keene. Other notable parks include Ashuelot River Park, Robin Hood Park and Forest, and the Greater Goose Pond Forest. The Parks and Recreation Department maintains each of these grounds and has continually made an effort to increase awareness of its estates as well as improve the network of trails that provide access to parks (City of Keene 2017). The network of trails in Keene incorporates a few parks, including the Ashuelot River Park and Wheelock Park (Figure 3.6). Appel Way is a trail that runs through Wheelock Park, ultimately connecting the park to Johnathan Daniels Trail and Ashuelot Trail West. The existence of a trail network makes for easy links between local parks and other desirable locations.

Figure 3.6 *Wheelock Park, Keene, New Hampshire.* ***Photo Source****: Authors.*

Some of the programs overseen by the Parks and Recreation Department include community soccer, baseball, basketball, jump rope, Zumba, and billiards. One of the goals of the department is to promote a healthier more sustainable community through its programs and land. Many of the programs take place at the Recreation Center on Washington Street or one of the 16 parks overseen by the department. Programs are also categorized by age, some directed towards senior adults and others towards youth programs as well as co-ed adult sport sessions. The parks department also oversees many facilities throughout the community that are available to rent (City of Keene 2017). Throughout the years the Department of Parks and Recreation has not only maintained each of these activities, it has made a special point to increase the safety, usability, and navigability of the trails and parks through lighting, maps, and trail maintenance. Creating areas that are safer for the public and easier to access coincide with the City of Keene's mission to create a healthier more sustainable community.

Rail Trails: History and Present Use

There have been a growing number of decommissioned railway lines across the United States since the mid-1800s, when the first trains made their way through Keene, New Hampshire. The Industrial Revolution was a big factor in this shift in transportation, making the City of Keene a railroad town. The largest advocates for bringing the railways to the region were businessmen of Keene who saw it as an opportunity to stimulate the economy. Over 160 years ago, more than 5,000 people gathered in Keene to watch as the first train came through the Cheshire Railroad, into Keene from Boston. Cheshire Railroad Station was the official station in Keene, as seen in Figure 3.7, but the first train that was seen in the City of Keene made its way right across Main Street. As the train came around the curve from Water Street, “cannons roared

and bells rang amid the cheers of over 5,000 people" (Reynolds 2013, 2). Excitement about the new railway system spread across the area.

Figure 3.7 *Cheshire Railroad Station.* ***Photo Source:*** *New England Today.*

During the early 1900s, there was much less use of the Cheshire rail line and in the 1960s it was closed for passenger use. In the 1980s, the last freight train made its way through Keene. The rails and ties were removed from the rail beds, but the beds themselves stayed intact. The Cheshire Rail Trail, in addition to the Ashuelot Rail Trail, provide many opportunities for the reuse of old rail beds (Figure 3.8). These multi-use and picturesque trails offer recreational experiences that meander through country roads, over bridges, and under many trees. Figure 3.9 clearly shows the extent of the Keene railways, creating an environment that made the City of Keene what it is today.

Figure 3.8 *Bikers on the Rail Trail.*
Photo Source: *Authors.*

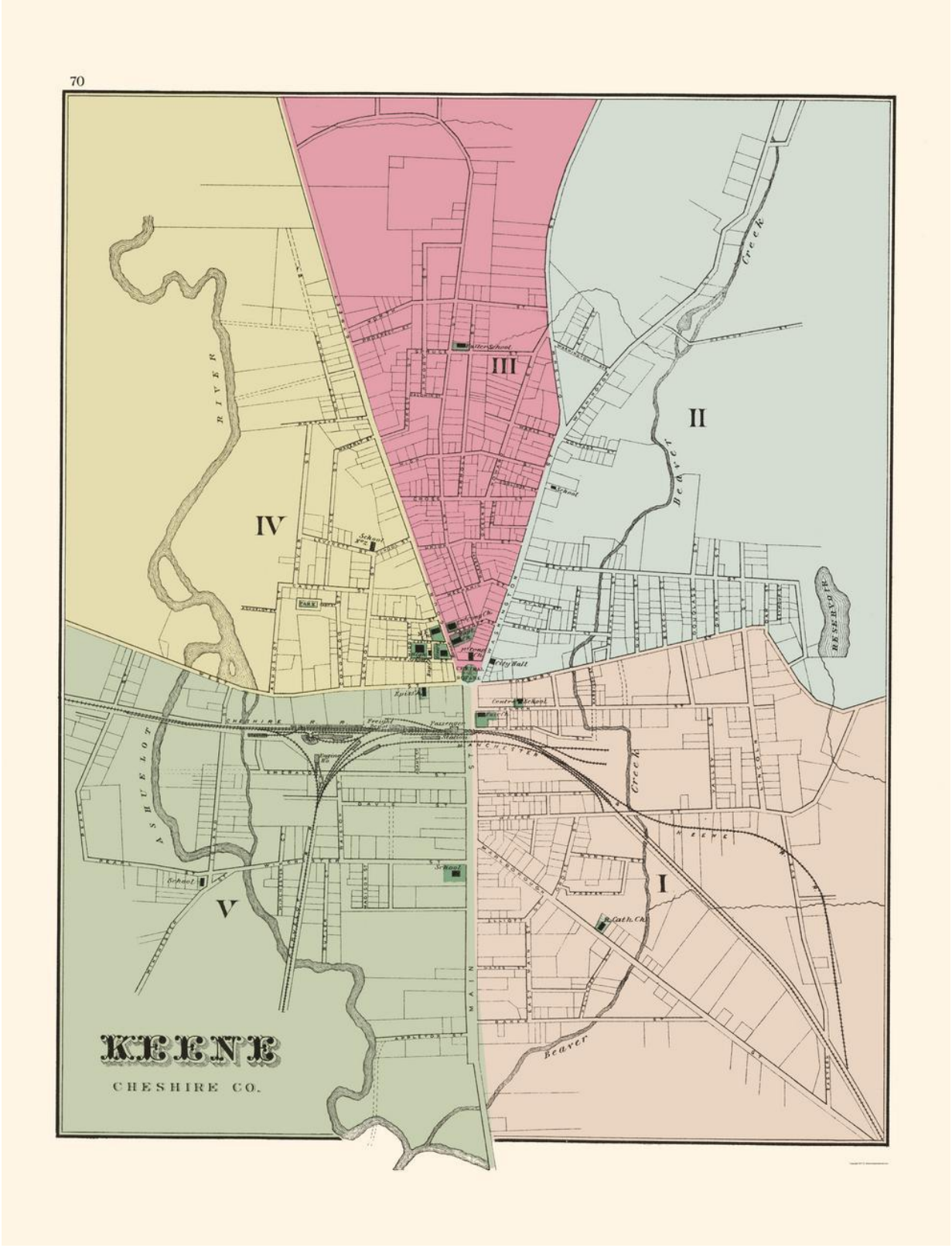

Figure 3.9 *Railroad Map of Keene, New Hampshire.* ***Source:*** *Maps of the Past 2017.*

In addition to the railway system, there was also an electric railway (Figure 3.10). The use of transportation helped to bring people to and from the City of Keene, increasing business within the city as well as creating opportunity far beyond Keene.

Figure 3.10 *Main Street, Keene.* ***Source:*** *New England Today.*

Downtown Keene

Keene is perhaps most notable for its vibrant downtown area on Main Street, still boasted as the widest Main Street in the world. With a mix of old and modern shops and plenty of dining choices, there is a unique feel to the many businesses and owners among this area. The design and architecture of the buildings in the downtown area reflects the history and personality of the community and businesses (City of Keene Planning Department 2010). Each building is unique so that there is not an overwhelming feeling of generalness that would conflict with Keene's existing qualities. The design of all buildings is also meant to be contemporary and elegant, but should also always adhere to the local aesthetic in order to create a balance between the old and

the new. In 2009, Central Square was named in the top *10 Great Public Spaces* by the American Planning Association (American Planning Association 2009). Central Square is located at the north end of Main Street; its benches, trees, gazebo, and water fountain bring the community together with a picturesque view and a cozy, at-home feel (Figure 3.11).

Figure 3.11 *Central Square.* ***Photo Source:*** *Authors.*

This is known as the streetscape design, focused on truly enhancing the character of the community in its lighting, trees, plants, and furniture all along Main Street (City of Keene Planning Department 2010). Keene is dedicated to providing green infrastructure, such as the trees lining the streets, enhancing the aesthetics of the downtown area. Trees also make the sidewalks 5-15 degrees cooler, reduce vehicle pollution, and increase emotional health. With a balance of green space and city buildings, the greenery reduces the heat that is retained by all of the buildings and

pavement; this is referring to the urban heat island effect (City of Keene Planning Department 2010, 95).

These are all key factors to improving the comfort of the downtown area, meaning that more people will choose to go there and travel to experience it themselves (EPA 2017). Residents of Keene agree on the importance of the implementation of these street trees; reminding them of the city's historic nickname known as the "Elm City" for its Elm Trees that used to populate Keene. In Keene, there are plenty of spaces and parks such as Central Square that contribute to the city's sense of identity and character. Places like these provide opportunities for environmental stewardship and education. Keene also prides itself on the city's dedication to sustainability and climate change efforts.

Summary

Keene, New Hampshire, is a beautiful city located in the Monadnock region known for its striking geographic location and physical geography features. Some of these geographic features include Mount Monadnock, the most prominent mountain peak in southern New Hampshire, and the Ashuelot River that connects to the Connecticut River. Keene is also the hub of Cheshire County, connected to many state highways which moves businesses to the city. One of the biggest job providers in Keene is in the education field as a result of 16 schools within the city. Keene State College is a major contributor to this, which focuses on undergraduate studies and liberal arts. The college also affects the large 15 to 24 year old age population in Keene. Cheshire Medical is also a major employer in Keene; however, although these major employers are located near an access point to the bike path, very few people use it to get to

work. This could be as a result of the lack of signage on the bike paths, as well as the Cheshire Rail Trails that eventually connect to trails in Vermont and Massachusetts.

The city is constantly working towards several sustainable practices, including but not limited to the implementation of bike paths, the addition of new bridges, and the use of conservation lands. Lastly, Keene is known for its vibrant Main Street and downtown location. Central Square at the end of Main Street focuses on its streetscape design and green infrastructure, reflecting the importance of Keene's aesthetic that the community strives to preserve. With the city's goals to become a more walkable place and a commitment to the safety of its residents and visitors, the Keene community is strong and reflects the character of this New England city.

EXISTING CONDITIONS

CHAPTER 4

Wayfinding in Keene is composed of many interrelated elements; these include pedestrian-friendly streets and walkability, the overall bikeability of the City of Keene, the existing infrastructure of the bike paths and how they can be improved, and the safety of the crosswalks that can affect how pedestrians are able to travel around the city by foot or bike. Each topic determines how efficiently, safely, and easily pedestrians and bicyclists are able to find their way around Keene. These are all areas open to improvement, intended to facilitate visitors' ability to become familiar with the environment around them and heighten their sense of place. Because Keene State College is located in this city, many of the visitors happen to be college students coming to Keene for the first time with no familiarity with of the local environment. Therefore, easing their ability to get around is important.

Keene State College

Keene State College is a four year residential college with a focus on liberal arts and undergraduate studies. Located on Main Street in Keene, the college is just a short walk from downtown. In addition to the close proximity to many local businesses, Keene State College directly abuts bike trails (Figure 4.1). These trails provide easy access to destinations further away, along with providing recreational opportunities that are nearby. Keene State College students are a large proportion of the city population and have a significant overall effect on the community. Students, as well as their families, strengthen the local economy through shopping and dining. The bicycle paths and sidewalks efficiently connect students to the resources that they desire.

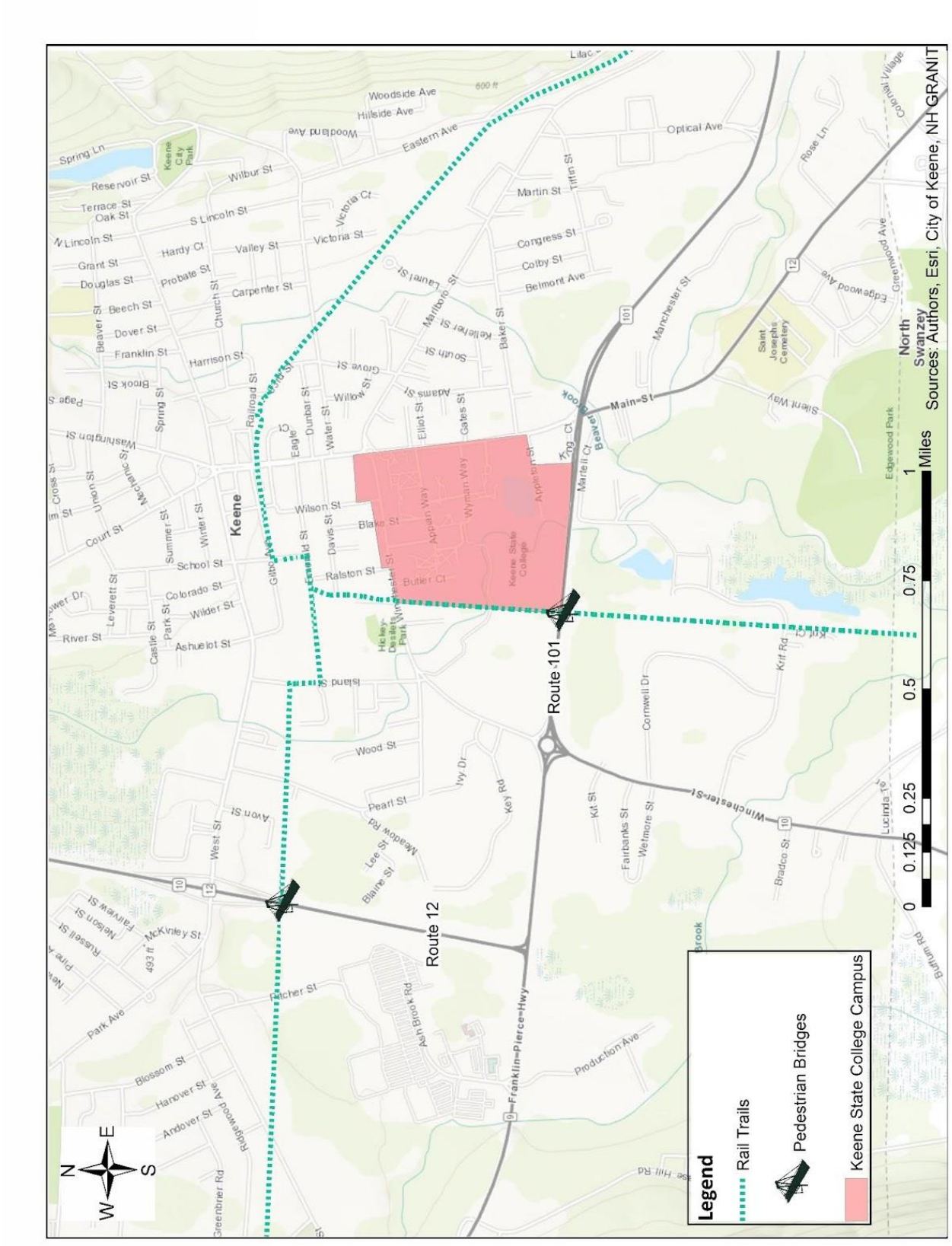

Figure 4.1 *Keene State College and the Cheshire Rail Trail.* ***Source:*** *Authors.*

Keene State College is a member of the University System of New Hampshire and the Council of Public Liberal Arts Colleges. It was founded in 1909 and has a long history of being a college focused on education. There are over 40 areas of study including the top four majors, in terms of numbers of students: Safety & Occupational Health, Applied Sciences, Education, and Psychology. Keene State College is the only institution in the United States with a Holocaust and Genocide Studies major (Keene State College 2017). Keene State College is a relatively affordable institution with competitive undergraduate tuition costs and many amazing educational opportunities for 4,068 undergraduate students. The safety of these students is amongst the most paramount of the college's concerns; as a result of this, the existing crosswalks on Main Street present a pressing concern of danger for the students and all of those who use these crosswalks on a daily basis. In order to understand the use and relative safety of the crosswalks, it is important to understand the overall walkability and safety of Keene.

Walkability and Safety

Along Main Street and beyond, Keene is considered a walkable community. There is a mix of land uses and sidewalks, connections to trails, and a close proximity of goods, services, housing, and employment. However, according to the *Keene Comprehensive Master Plan*, there is still a lot of work to be done in terms of the walkability and connectivity of Main Street (City of Keene Planning Department 2010). The sidewalk and crosswalk infrastructure in Keene needs to be improved in order to ensure the safety of all pedestrians and bicyclists. This means that there needs to be a way for people to walk around the community based off the streetscape amenities available. This begins from implementing sidewalks on both sides of the road according to the width of the road, and the maintenance on these sidewalks. Especially in the winter, if sidewalks

and bicycle trails are not properly cleared and cleaned, bicyclists and pedestrians are discouraged from utilizing these routes.

Connectivity of several destinations is also a goal of the Keene Master Plan so as to facilitate the movement of people from their places of work, play, and living. Encouraging compact development near already existing areas helps create the interaction between various public spaces in Keene in order to enhance the overall community. Connectivity also relates to filling in the gaps between the already existing sidewalk network, trails, crosswalks, and bicycle lanes. Installing bike racks or lockers along Main Street and throughout bicycle trails or other public spaces helps enforce the idea that walking and biking as a form of transportation is not only encouraged, but vital to a complete transportation network.

Safety is considered to be a high concern in terms of all modes of transportation. One way to adhere to safety is through the design and integration of complete streets. The National Complete Streets Coalition is a program of the non-profit organization Smart Growth America. This program is interested in the public and committed to the development and implementation of Complete Streets policies and practices. In 2004 Complete Streets was launched nationwide, and is defined as the integration of people and place in the planning, design, construction, operation, and maintenance of transportation networks (Seskin et. al 2015). In 2014, the City of Keene welcomed an opportunity for modeling what a complete street would look and feel like. Residents believed in the cause and came to help re-create Marlboro Street. The street was transformed, for one day, into a more walkable, bikeable, vibrant, and active public space. It is readily evident that the Keene Complete Streets sampling was a successful program that brought forth awareness about safety as well as aesthetics (Figure 4.2).

Figure 4.2 *Complete Streets, Keene.* ***Photo Source:*** *Keene State College, Department of Geography.*

The Planning Department in Keene researches, advises, and administers comprehensive land use planning functions within the city, and was directly involved in the Complete Streets demonstration. Subsequent to the Complete Streets demonstration, the city's emphasis on accessibility and neighborhood improvement has resulted in the Marlboro Street Re-Zoning Initiative innovative approach to redevelop and enhance the area. The goal is to "promote reuse and redevelopment of underutilized properties, improve storm water management practices, preserve residential neighborhoods, and strengthen the area as a vibrant, walkable, mixed-use district" (City of Keene 2017).

Neighborhoods and streets should be designed in order to accommodate all people including drivers, those who use public transportation such as the bus, pedestrians, bicyclists, as well as seniors, children, and those with disabilities. A street is not considered 'complete' unless all users feel safe utilizing the mode of transportation of their choice.

Traffic calming strategies also affects this because it determines the livability of an area. Traffic calming techniques are used for residential streets and not solely for city streets. The goals of traffic calming are to reduce traffic speed; it also includes protecting neighborhoods from unwanted through traffic and increasing road safety (Cusack 2014). Some examples of the measures used to slow down the flow of traffic include raised and lighted crosswalks. An example of a lighted and raised crosswalk is seen on Winchester Street directly across from Wilson Street near Keene State College. Winchester Street is a straightaway, creating opportunity for cars to speed up. In addition, many college students use the crosswalks along Winchester Street to get to and from their off-campus homes and to campus, making it a high concern area in terms of safety. Therefore, these very apparent lights like the Roxbury Street sign (Figure 4.3) on the crosswalks force drivers to pay attention and slow down to avoid accidents. These strategies improve Keene and contribute to the main goals of a safe, walkable, and vibrant downtown area and livable community.

Figure 4.3 *Lighted Crosswalk on Roxbury Street.*
Photo Source: *Authors.*

Keene Bicycle Infrastructure

The City of Keene may not be universally recognized as a bicycle friendly city, but it boasts an impressive network of trails catering to a variety of outdoor enthusiasts. There are approximately 2,000 acres of recreation land in Keene with 16 miles of trails within the city limits and many more miles that lead into neighboring communities (City of Keene Planning Department 2010). The Keene Parks and Recreation department is responsible for maintaining the vast network of trails. One trail in Keene is called the Jonathan Daniels Trail and runs along the Ashuelot River watershed. It is over 10,500 years old and home to diverse wildlife, making the trail environmentally significant. The trail also includes many bike racks and a family park with a footbridge that highlights the river dam. A portion of the 42-mile long Cheshire Rail Trail also passes through Keene, partly paved, allowing rollerblades, skateboards, bikes, and walkers to utilize the trail. The trail also leads to popular mountain bike trails not owned by the City of Keene. Recently, pedestrian bridges were added to the rail trail to allow people to safely cross over busy state roads; Route 12 and more recently, Route 101 (Figure 4.4).

Figure 4.4 *Bicycle Path Bridge over Route 12.* ***Photo Source:*** *Authors.*

The bridge over Route 12 allows pedestrians to travel to the nearby Monadnock Marketplace which includes stores such as Target, Price Chopper, Michaels, Home Depot and more. The rail trail eventually connects with other trail networks leading into Vermont and Massachusetts (NH Department of Natural and Cultural Resources 2017). The rail trail is easily accessible throughout Keene, but lacks signage to direct newcomers to the path. Even though the infrastructure for bicycle and pedestrian commuting is established, the percentage of commuters in Keene who use the trial is very low. There are also a limited number of signs from employers notifying employees of nearby paths and where they lead. In addition, the City of Keene has only a few signs notifying the public as to which businesses the paths lead. While intersections on the path are entirely lacking in signage. Access from the downtown district is poorly labeled with only small signs.

Mr. Andy Bohannon, Director of the Parks and Recreation department in Keene, believes that increasing signage on the bike trails is a necessity. Specifically, wayfinding signs located at intersections and nodes along the trails. He would like to see signs that are universally designed in a way that represent the Keene community and offer the most useful information possible to those utilizing the trail (Bohannon 2017, Personal Interview). Signs at intersections could include arrows directed down each path and locations of what can be found along the trail as well as the distance to those destinations. Bohannon would also like to see more kiosks along the bike trail system. There are only three kiosks available right now, including one off Pearl Street (Figure 4.5). Mr. Bohannon would like the public to have access to a simple aesthetically pleasing map that includes the vast network of trails.

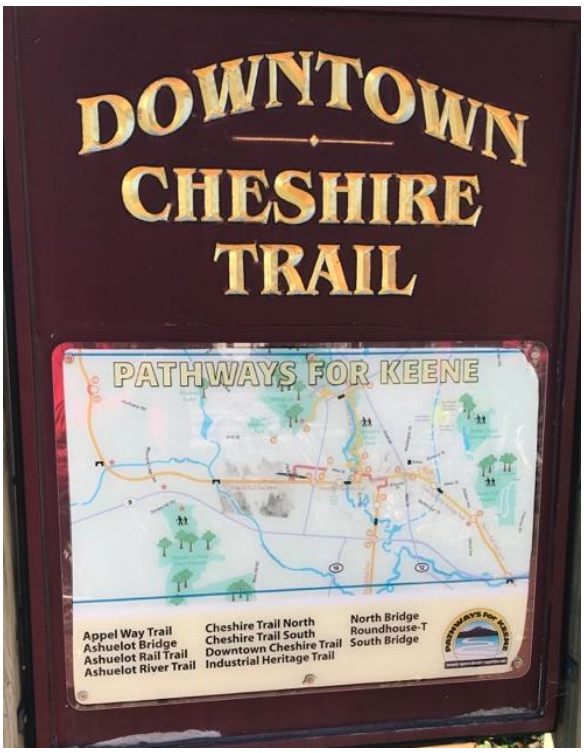

Figure 4.5 *Island Street Trail Kiosk.*
Photo Source: *Authors.*

Mr. Bohannon cited Crosby, Minnesota, as a town that re-identified itself as a recreation town with historic mining roots. By labeling and promoting its 25 miles of mountain bike trails, Crosby, with a population of fewer than 2,500 people, has seen its number of recreation visitors double within the last few years to about 185,000 people (Aamot 2017). Signage is not the only improvement the Parks and Recreation department plans to make. Currently, the City of Keene is working with a local company "Lumens For Less" on installing solar lights along the bike path between Pitcher Street and Island Street. They hope to install lights from Railroad Square in downtown Keene all the way to Eastern Avenue in the future. Lights along the path will increase safety, visibility, and usability throughout the year. Mr. Bohannon also stated that adding bike repair stations along the trail would encourage more people to utilize the trail system. Currently there is only one bike repair station, located near Antioch University.

The City of Keene has built an impressive network of trails, linking Keene State College, Antioch University, and downtown Keene directly to the bike path. Additional signage in each of these areas, as well as at specific intersections throughout the network of trails is one of the Park and Recreation department's goals for increasing the traffic along the bike trails. Other programs like the Green Bike Program at Keene State College, run by Marcus McCarroll, have increased the

usage of bicycles by allowing students to sign out and use bikes for free. There are now over 200 bikes in circulation throughout Keene State College. The success of this program has also lead Mr. McCarroll to work with the City of Keene to start a similar program for residents called Keene City Green Bikes (Keene State College 2017).

Through improvements in wayfinding signage, solar lights, maps, kiosks, repair stations, bike loaning programs, and trail expansion, the City of Keene hopes to increase the number of people who use the bike trails for commuting and for recreation. Increasing the traffic on the trails helps Keene work towards its goal of becoming a sustainable city. As a regional hub, Keene can be accessed by the rail trails as well as major state routes in nine directions (New Hampshire Employment Security 2017). This makes Keene an easily accessible city as well as a wonderful place to develop businesses.

Summary

There are many elements that contribute to the overall navigational abilities of Keene, New Hampshire. Wayfinding access has many components such as adequate signage, walkable sidewalks, and bike friendly areas. There are many ways that wayfinding access in Keene can be improved. Residents and visitors of the town were able to take a deeper look into "Complete Streets" through a demonstration that was performed on Marlborough Street. The street was transformed, for one day, into a more walkable, bike able, vibrant, and active public space. There is much potential for improvement of wayfinding as well as ascetics of the city, especially in the downtown and surrounding area. The ease of navigating around town is a benefit to all, visitor, business owner, and safety personnel alike.

SIGNAGE AND NAVIGATION

CHAPTER 5

Signage on Main Street

A portion of this study is dedicated to the number and types of signs located on Main Street. In order to better grasp wayfinding in downtown Keene, data collection for all of the signage on Main Street were collected on two separate days; one day was dedicated to all of the signage in Central Square because of its diversity and large quantity, and another day for the half mile stretch of Main Street and the roundabout near Keene State College. Images from Google Maps were used to hand plot the points of each sign in order to record an accurate location of each sign.

Data collection began at the roundabout that connects Winchester, Main, and Marlboro Street. The signs in this rotary were recorded first before heading north on Main Street towards Central Square. Three types of signs were recorded: vehicle, pedestrian, and wayfinding. Vehicle signs include stop signs, one way signs, yield signs, and other typical signs used to direct drivers. Pedestrian signs are those that point out the locations of crosswalks for those on foot. Wayfinding signs are those that direct people to specific businesses on Main Street, such as the sign that points in the direction towards Lindy's Diner, which is located on Gilbo Avenue off Main Street and not in a direct line of sight (Figure 5.1).

Figure 5.1 *Wayfinding Signs.*
Photo Source: *Authors.*

Once data collection was completed, the information was transferred to ArcGIS computer mapping software. Each sign was manually entered with the Geoprocessing tool in ArcGIS. Figures 5.2 and 5.3 reveal the 945 meter (0.58 mi) stretch of downtown Main Street and all vehicle, pedestrian, and wayfinding signs. Figure 5.2 provides clear vision of the walkability and number of businesses located downtown, while Figure 5.3 provides a clean basemap showcasing the number and types of signs. As readily evident, the downtown area is literally inundated with signs of all types of sizes, shapes, colors and designs (Figure 5.4). Newcomers and tourists may find it difficult to locate and identify the signs needed for finding popular downtown destinations.

Lack of a community brand also makes it difficult to identify wayfinding signs. Multiple designs are used for pedestrian and wayfinding signs with little consistency along Main Street. Table 5.1 presents the total number of signs located within the area surveyed.

Table 5.1 *Total number and Type of Signs Located on Main Street.* ***Source:*** *Authors*

Vehicle Signs	Pedestrian Signs	Wayfinding Signs	Total
131	32	20	183

Of the 183 signs on Main Street, 131 are directed towards vehicles. Considering the short distance (.58 mi), this may seem like information overload. Rhett Lamb, Director of the Keene Planning Department, stated that decreasing the number of signs directed at vehicles would be difficult due to the guidelines the State of New Hampshire adopted (Lamb, Personal Interview 2017). Guidelines state that at every intersection, specific signs need to be in place. Therefore, limiting the number of vehicle signs would not be possible given the regulations the city must follow.

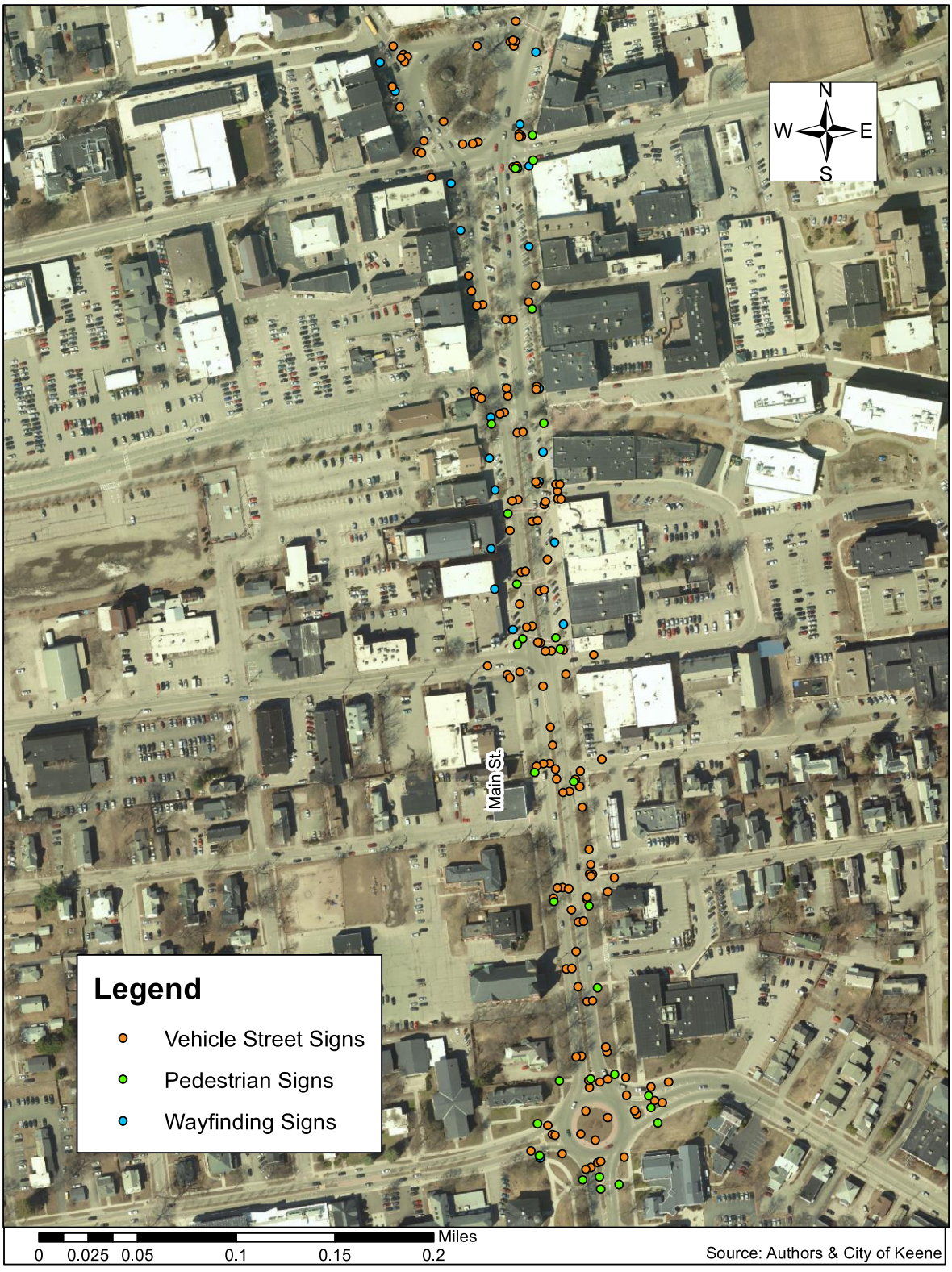

Figure 5.2 *Keene Main Street Signs Raster Map.* ***Source:*** *Authors.*

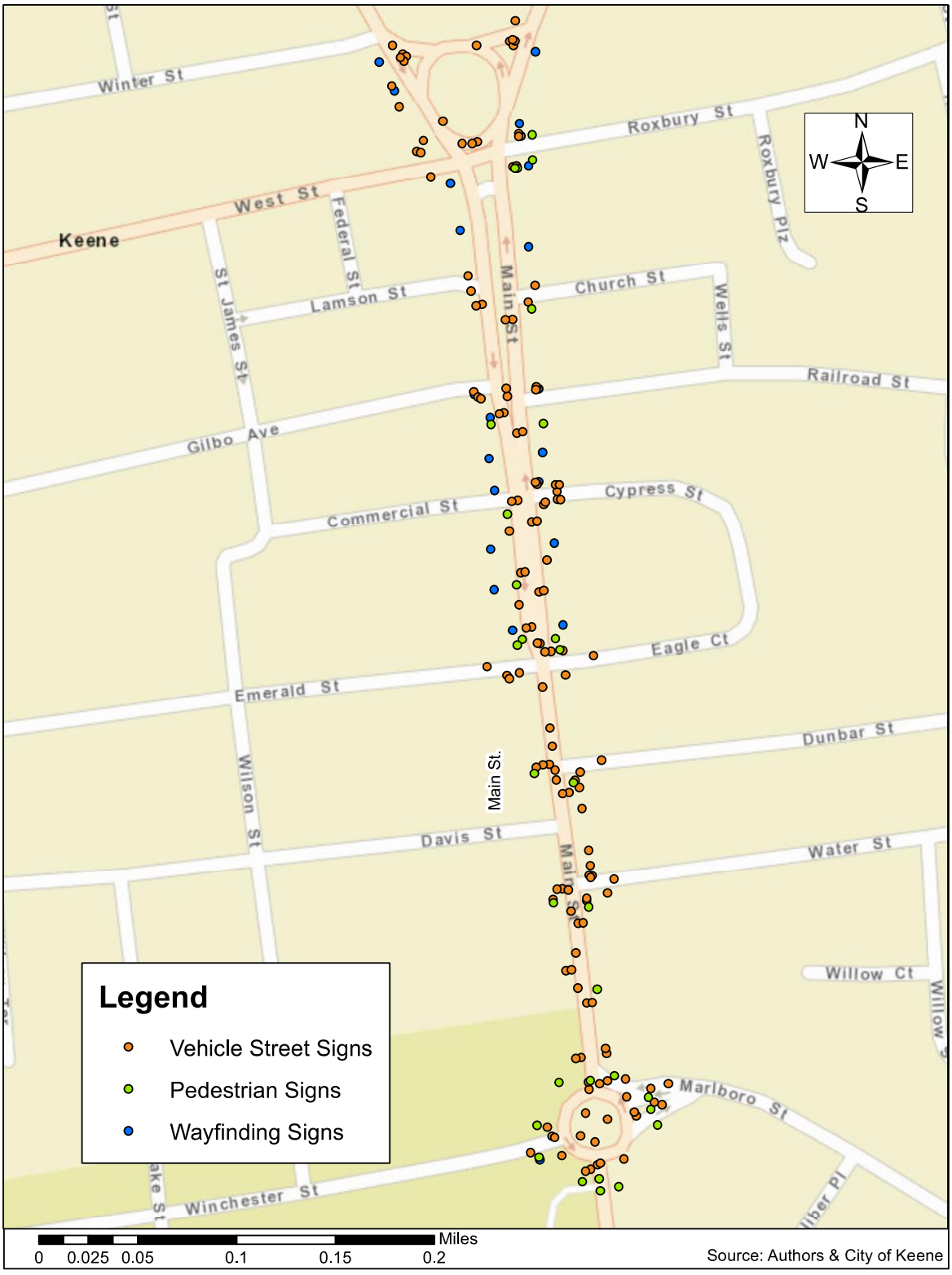

Figure 5.3 Keene *Main Street Signs Esri Basemap.* ***Source:*** *Authors.*

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Figure 5.4 *Keene Main Street Signs.* ***Source:*** *Keene State College, Department of Geography.*

The number of pedestrian signs and wayfinding signs can be altered however, as they do not follow the same set of guidelines. Keene is currently in the planning stages of a downtown revitalization project that may address pedestrian and wayfinding signage. The city hosted a Downtown Vision Forum, as seen in Figure 5.5, where residents were invited to share ideas about what they would like to see change in the downtown area. Many community members mentioned the lack of a downtown brand, specifically attached to signage.

Figure 5.5 *Downtown Vision Forum.* ***Source:*** *Authors.*

If all wayfinding and pedestrian signs had a brand specific to Keene, it would make the downtown area more appealing as well as easier to navigate. One issue that came up with regards to wayfinding signs is the information presented, which businesses should be on the signs and how would this be decided. Signs like the one on the corner of Main Street and Railroad Street, as seen in Figure 5.6, have no common city brand, identify specific businesses, and even present misleading information. Cheshire Medical is the name of the local hospital, but this sign is referring to the dermatology center which is

Figure 5.6 *Wayfinding Signs.* ***Source:*** *Authors.*

a separate institution. Therefore, the information presented may need to be amended so people are not looking for the hospital on the wrong street. Overall, the downtown area can be overwhelming with the number of signs and lack of brand.

Survey of Navigation in Keene

The overall navigational abilities of visitors is a topic of interest for Tara Kessler, a Keene City Planner (Kessler, Personal Interview 2017). Due to the difficulty of surveying and observing tourists and other visitors to the city, Keene State College students, many of whom have been on campus for a short period of time, were selected for analysis of wayfinding capability. The authors investigated navigation of the city in relation to each individual's time that they have lived in Keene. Original data were collected through survey distribution and collection. The combination of basic survey questions and mental mapping exercises helped with understanding more fully the navigational abilities of students on the local undergraduate campus.

The survey includes a demographic section with a question about the participant's gender, their year at Keene State College, and how long they have lived in Keene. The next section focuses more directly on navigational skills, referring to them as "the ability to accurately navigate to destination and include the use of memory, signs, and landmarks, without the use of GPS technology" (Appendix A). This section encouraged the participant to grade themselves on how they view their navigational skills, and to rate those skills on a Likert scale to determine perceived ability of navigating around Keene through driving downtown, walking downtown, and walking/biking on the bike path. The survey concludes by querying how well the participant believes they can navigate downtown with different tasks and with the completion of the statement; "Navigating in Keene is…" (Appendix A).

The final sections of the survey involves practice of mental mapping techniques. Through the tapping or clicking of their mouse, Keene State College students showed where they think given points of interest are located on a series of individual maps. The first six points of interest focused on notable destinations in the area surrounding Main Street and beyond. These destinations include; Keene State College, Central Square, Monadnock Marketplace, Ashuelot River Park, Cheshire Medical Center, and the Keene Police Department/Keene Ice. The second set of mental maps involved five points of interest on a map that was much more focused on Main Street itself. These destinations include the Monadnock Food Co-op, City Hall, the Keene Public Library, the Keene Fire Station, and the Keene Farmers Market (during the summer season). Both series of mental mapping questions helped with better understanding the participant's overall navigational ability for the City of Keene.

The surveys were completely conducted using Qualtrics, an online survey software that can be conducted via computer or any other device that is able to attain Internet. The link to the online survey was distributed in a variety of ways in order to generate the 172 responses received. Once the survey was developed, the authors shared the survey over social media through the closed official Keene State College Class of 2018 Facebook page in effort to receive statistics from students who have lived in Keene for multiple years. One author also shared the link to the survey with their on campus organization, the Social Activities Council, encouraging fellow students to take the survey. Lastly, the survey was specifically distributed to Keene State College students through administration during five class times, with advanced permission from the professors. During four of these times, an author of this study went into the classroom to administer the surveys. After short discussion by the author about wayfinding in Keene, the

professor posted a link to the survey on the class Canvas page, a cloud-based resource that Keene State College uses to connect professors and students. Students from those four classes completed the survey during class. The students from the fifth class had the survey link emailed to them by their professor. These participants completed the survey on their own time.

The 172 students surveyed provided a large mix of years at Keene State College and amount of time that students have lived in Keene. A fairly equal number of first-year, sophomore, and senior students were surveyed. Likewise, a fairly equal distribution of students that have lived in Keene for less than six months, six months to two years, and two years to four years was also generated (Figure 5.7). Due to the fact that there are many variables that go into the year that students are in college, data used for statistics were mostly obtained using the amount of time that students have lived in Keene, rather than their class standing.

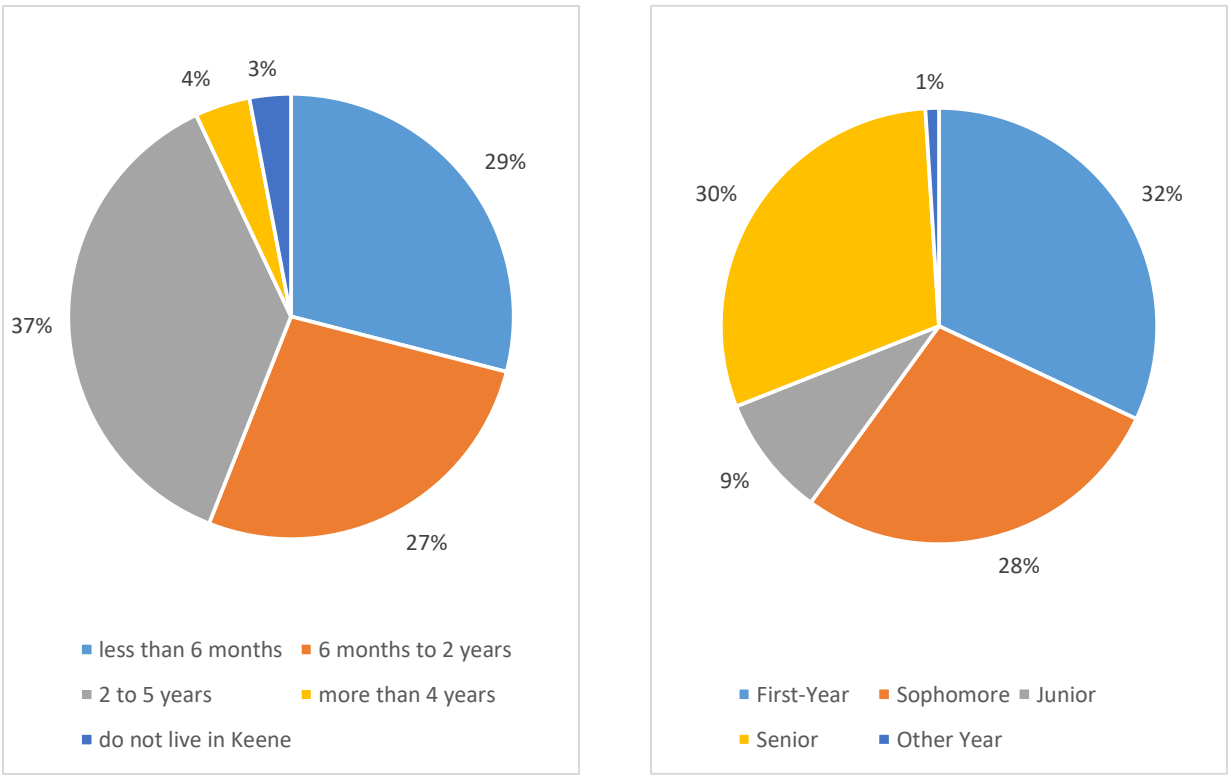

Figure 5.7 *Qualtrics Descriptive Demographic Statistics.* ***Source:*** *Authors.*

When looking further into the survey results, it is evident that overall, many participants believe that their navigational abilities are above average (Figure 5.8). Of the participants that completed the navigational abilities question, 33% believed they are great at navigating overall, followed by 28% choosing good, 18% average, 14% okay, and 7% poor. When specifically looking at the three different categories, it is easy to observe that most students believe that their navigation ability is better while driving downtown and walking downtown in comparison to walking or biking on the bike paths. The navigational ability of Keene State Students is not fully represented in this question however, due to the fact that the question asked them to grade their own ability. The mental mapping of participants carries much more valid data due to the fact that it was a performance exercise rather than a self-evaluation.

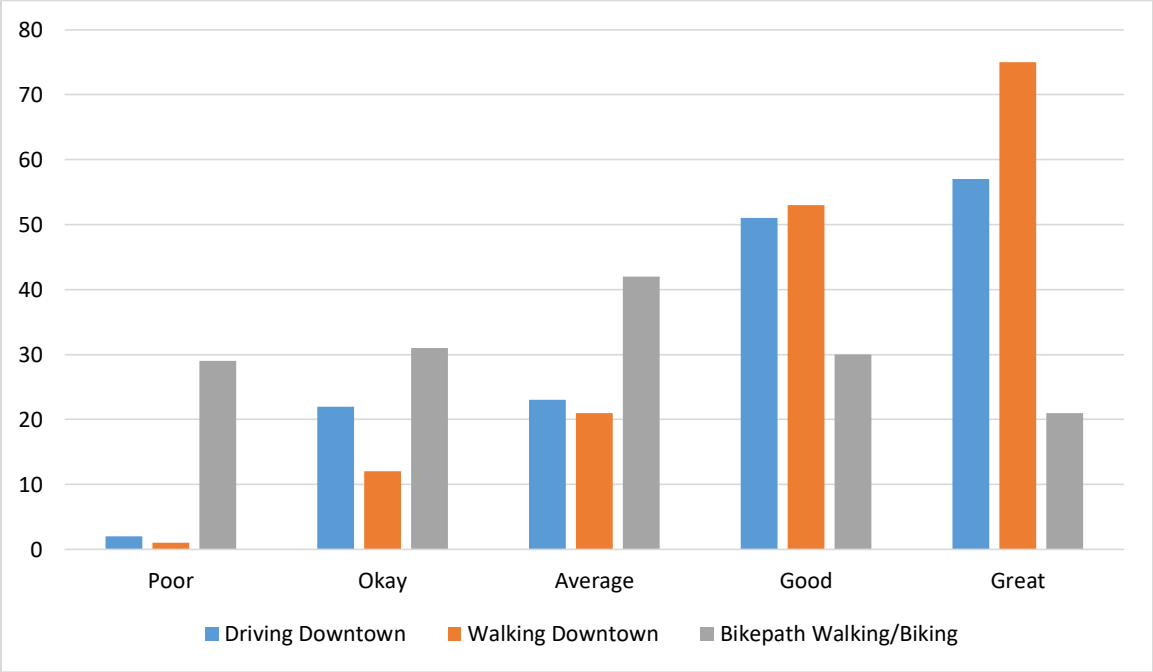

Figure 5.8 *Qualtrics Descriptive Statistics of Perceived Navigation.* ***Source:*** *Authors*.

The extensive mental mapping portion of the survey resulted in the collection of very interesting data. Overall, there is a not unexpected correlation of navigation ability being dependent on the amount of time that students live in Keene. For each of the 11 points of

interest that participants were asked to identify, many varied responses were obtained. This demonstrates that there is no single place around Keene that everyone can find on a map, not even Keene State College where all of the students attend college. The authors are able to tell where survey participants think a location is by the output maps created based on the quantity of participants that clicked or tapped in all areas. Red means an area that has a very high number of locational clicks as compared to blue areas that have very few clicks in relation. Maps with multiple red spots, reveal that each of those areas have the same amount of locational clicks.

Results from Mental Mapping

As stated above, there is a constant descriptive statistic upon which navigation is dependent: time lived in Keene. Through Qualtrics, the authors ran statistical results on how mental mapping responses from participants that have lived in Keene for less than six months differs from participants that have lived in Keene for more than two years. Throughout the figures, 5.9A-5.13B, it is apparent that the time that Keene State Students have lived in Keene makes a large difference in their navigational ability around Main Street and nearby destinations, in particular. There are five sets of maps total, each with a heat map of where students thought the designated destination was on the provided map. All figures "A" are created upon only responses of students that have lived in Keene for less than six months. All figures "B" are created with responses from students who have lived in the Keene for more than two years. It is apparent that there are less red, high clicked areas for all of the B figures. In addition, the A figures tend to have less blue spots as well, meaning that there was less variation in responses on that map of Main Street in Keene. In addition, there is a white circle dot that the authors placed on these maps after data collection, in order to demonstrate the actual location of the destination.

The Monadnock Food Co-op is a grocery store that cooperatively owned and operated by people in the Keene community with support of local farmers and is a healthy and sustainable food system. It is overly apparent that there is a greater number of accurate clicks of students that have lived in Keene longer. Although the map of students who have been in Keene longer shows that the area that received the most clicks is not actually the food co-op (Figure 5.9B), it can be argued that these students are still more aware of where it is located because of the fact that there are less responses that are out of that area. There are several more maps that demonstrate similar responses that can easily be seen as descriptive navigational statistics for students, demonstrating how the time that they have lived in Keene has direct relation to overall navigational ability.

Figure 5.9A *Navigation of Monadnock Food Co-op from Students Who Have Lived in Keene for less than Six Months.* ***Source:*** *Authors.*

Figure 5.9B *Navigation of Monadnock Food Co-op from Students Who Have Lived in Keene for more than Two Years.* ***Source:*** *Authors.*

Keene City Hall is located right on Main Street and houses many offices for city officials. It is an active building for the planning, development and implementation of business in Keene. Looking at Figure 5.10B, there is a large number of older students that know where City Hall is located. Figure 5.10A reveals that a greater percentage of students think that City Hall is located where the United Church of Christ sits. Most students selected areas around Central Square, however they were not able to identify the exact location. Students that have lived in Keene for less time however, have a wider distribution of where they believe that City Hall is located. These maps create the interesting point that Keene State students may not know where City Hall is since they may not have need for its services.

Figure 5.10A *Navigation of Keene City Hall from Students Who Have Lived in Keene for less than Six Months.*
Source: *Authors*.

Figure 5.10B *Navigation of Keene City Hall from Students Who Have Lived in Keene for more than Two Years.*
Source: *Authors*.

The Keene Public Library is a local resource for many in the area. It is utilized by people of all ages, containing vast knowledge, adequate technology, and several programs for the community. It is clear that students that have lived in Keene for less than six months are not yet aware of this resource or where it is located (Figure 5.11A). Students who have lived in Keene for more than two years are better able to identify where the library is located, most likely because they have had more time to use the resource. This is demonstrated through Figure 5.11B since there is only one red dot, showing that a large majority of students selected the correct location for the Keene Public Library. This location is one of the most telling examples of how navigational abilities around the area depend on time spend in the city.

Figure 5.11A *Navigation of Keene Public Library from Students Who Have Lived in Keene for less than Six Months.* ***Source:*** *Authors*.

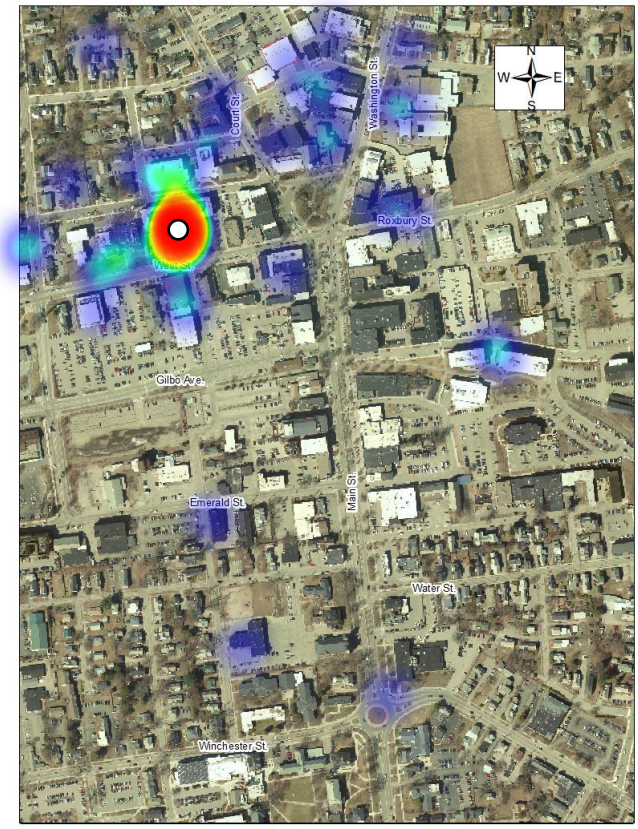

Figure 5.11B *Navigation of Keene Public Library from Students Who Have Lived in Keene for more than Two Years.* ***Source:*** *Authors*.

The Keene Fire Department is a resource which assists with saving lives and protecting property. The department provides services in fire, rescue, emergency medical response, fire prevention, and public education. This resource is not typically a service to which a person in Keene would travel. Instead, people are more likely to have the Fire Rescue or other services travel to them. Astonishingly, there is a very high number of students, both short term and longer, that are able to pinpoint where the department is located. There is a higher accuracy of students who have lived in Keene for more than two years (Figure 5.12B). Students that have lived in Keene for less than six months tend to have a larger variety of responses, with about one-third of responses sharing that they believe that the National Grange Mutual Insurance building is where the Fire Department is located (Figure 5.12A).

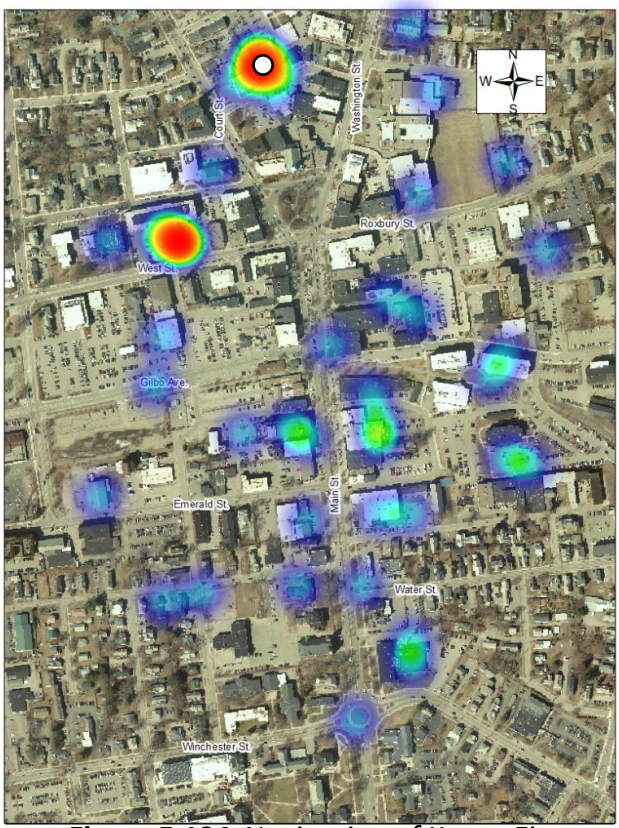

Figure 5.12A *Navigation of Keene Fire Department from Students Who Have Lived in Keene for less than Six Months.* ***Source:*** *Authors*.

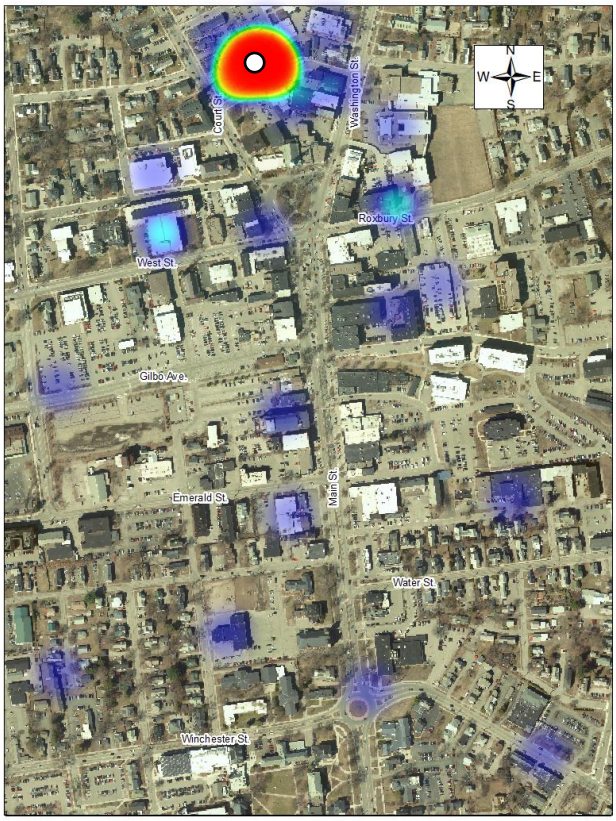

Figure 5.12B *Navigation of Keene Fire Department from Students Who Have Lived in Keene for more than Two Years.* ***Source:*** *Authors*.

In the Summer months, local farmers and other businesses come out to sell their products at the Keene Farmer's Market. This is a wonderful opporunity to buy local items and it is conveniently located near downtown Keene. It is very apparent that students who have lived in Keene for longer than two years have a greater knowledge of where the farmers market is located (Figure 5.13B). This may be due to the fact that these students are older, bringing opportunities to live and work in Keene during the summer, when the farmers market is open for all to enjoy. There are more than 30 areas identified as the farmer's market location, from students who have lived in Keene for less than six months (Figure 5.13A). Each of these locations was equally identified, demonstrating a lack of navigational knowledge for the farmer's market.

Figure 5.13A *Navigation of Keene Farmers Market from Students Who Have Lived in Keene for less than Six Months.* ***Source:*** *Authors*.

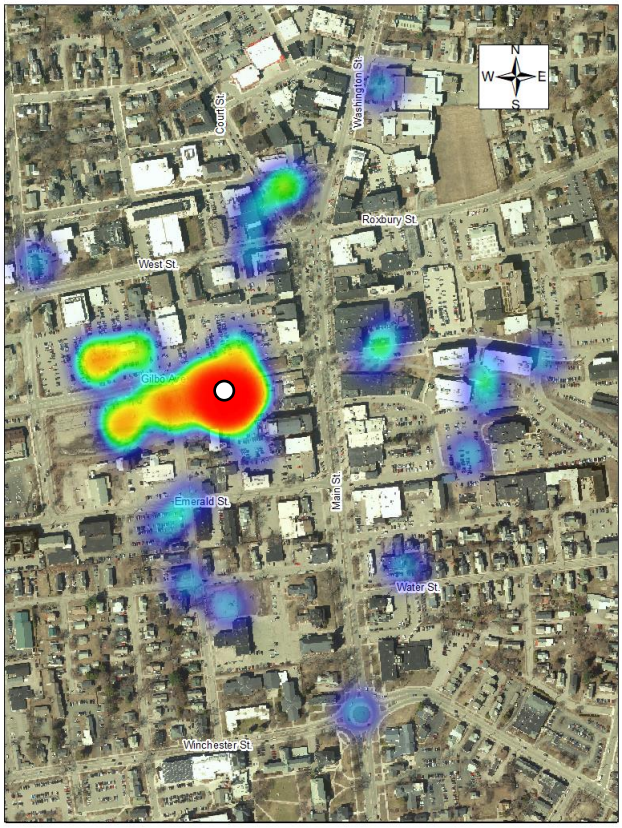

Figure 5.13B *Navigation of Keene Farmers Market from Students Who Have Lived in Keene for more than Two Years.* ***Source:*** *Authors*.

Summary

In conclusion, it is evident that the excessive amount of signage in downtown Keene is overwhelming for newcomers and tourists. Although the number of vehicle signs cannot be reduced as a result of city regulations, the wayfinding signs could certainly be redesigned. Wayfinding signs are intended to direct people to businesses on Main Street. After collecting data on the signage there is no common theme between the signs that do exist and some are even misleading. In discussion currently is a downtown revitalization project for Main Street, including community design and branding. The community would greatly benefit from this, as would visitors who may be easily confused by signs that are different sizes, shapes, colors, and designs.

Throughout the Figures 5.9A-5.13B, it is also apparent that there is a relationship between navigational ability around the city and the amount of time that students have spent living here. The mental mapping portion of the survey demonstrably challenged student ability to navigate to important destinations. Students have shown that they do know where places are located but that knowledge develops over time; time that visitors and tourists do not have. The effort now needs to focus on how signage can help navigation of the city. Even students who have lived in Keene for a few years still feel uneasy about some navigational components around the city. Now is the opportunity to create a more navigable city, so that everyone has access to important destinations.

CROSSWALKS

CHAPTER 6

Safety on Main Street

In addition to the lack of navigational ability demonstrated by some individuals in our community, pedestrian safety is also of paramount concern. This concern is specifically focused on the crosswalks surrounding Keene State College. In order to investigate the perceptions of safety on the portion of Main Street that fronts the campus, original data were collected through the interviews of experts, observations of crossing patterns, as well as survey distribution and collection. The combination of all aspects of this investigation helps provide understanding of the overall usage and perceptions of safety on the crosswalks under analysis.

The existing crosswalks on Main Street present a pressing concern of danger for the students and all of those who regularly use these crosswalks. Although Keene in general is a very walkable place with further planned improvements, the conversation around crosswalk safety remains current. Kemal Atkins, Vice President for Student Affairs and Enrollment Management at Keene State College, voiced concern about crosswalk pedestrian safety on Main Street (Atkins 2017, Personal Interview). There had been complaints for quite some time from faculty, staff, and students as well; however, it was not until April of 2016 that this conversation intensified. A Senior of Keene State College was crossing Main Street when she was struck by a car, causing serious injuries. As many other students stood by and witnessed the scene, the fear of crossing this busy road was amplified. The question remains; how can Main Street be made more safe?

The street itself is very wide, and cars exceed the speed limit with relative frequency. The City of Keene's plan of action to enforce long-term solutions to this problem could reach a cost of $17,000, and would likely not be implemented for another three years. Short-term and low-cost measures can be accomplished in the interim, such as rumble strips and flashing lights to

notify drivers when people are in the crosswalks. Other opportunities in the short term include decreasing the speed limit down to 25 miles per hour, avoiding reflective pedestrian crossing flags, and safety education to ensure that not only the drivers are aware of their surroundings, but that all of those using the crosswalks are aware as well.

Crossing Patterns

When developing long-term solutions for a safer Main Street, it is important to study the crossing patterns of people; this means observing the natural behaviors of pedestrians. There are three crosswalks directly fronting the college on Main Street, including one that receives the most use and leads straight from the arches of the college to Elliot Street across (Figure 6.1). By counting and surveying students, more information can be gathered about prevalent crosswalk patterns. This could also determine if some crosswalks are safer than others and how people may be educated so that they are more likely to use a safer crosswalk. Atkins suggested that fieldwork would be beneficial to directly observe people using the crosswalks, as well as creation of a survey to gauge when the busiest crossing times of the day are and just how safe or unsafe people truly feel on Main Street. A forum for faculty, staff, and students was also recommended in order to relay the research findings back to the college and the community for a safer, more pedestrian-friendly street and city overall.

Figure 6.1 *Elliott Street Crosswalk.* ***Photo Source:*** *Authors.*

To learn more about crossing patterns for the Main Street crosswalks, observations were performed by the authors and their faculty mentor (Figure 6.2). For one week, two hour shifts were taken in the mornings and afternoons of Tuesday, Wednesday, Thursday, and Saturday. During these two hour blocks of time, data were collected on a sheet of paper that showed three crosswalks: one across from the Nursing Home leading to Elliott Hall, one from Elliott Street leading to Rhodes Hall, and one from the Alumni Center leading to the Hale Building (Appendix D). Tallies were then recorded every time a person would cross in these respective crosswalks from either side. Separate boxes were used to mark those who jaywalked across the street, as well as those who rode their bikes across and those who walked their bikes across. In a special comments section, other observations were recorded such as people who rode their skateboards across.

Figure 6.2 *Authors and Mentor while Counting Cross Walkers.* ***Photo Source:*** *Authors.*

Data from the 16 hours of crosswalk observations resulted in a total of 1,161 total crossings, 58 percent of whom used the Elliot Street/Rhodes Hall crosswalk (Figure 6.3 and 6.4). The data suggests that if the City of Keene was to implement measures to 'funnel' pedestrians and other improvements aimed at increasing safety of a single crosswalk, the Elliot Street/Rhodes Hall crosswalk would be the ideal location. In addition, it is evident that there is an unbalanced amount of pedestrian versus any other traffic with 90% of crossings taking place on foot (Figure 6.5). For this reason, additional safety measures that are added in this area should have a focus on pedestrian safety, followed by bicycle safety.

Figure 6.3 *Crosswalk Data by Location.* ***Source:*** *Authors*

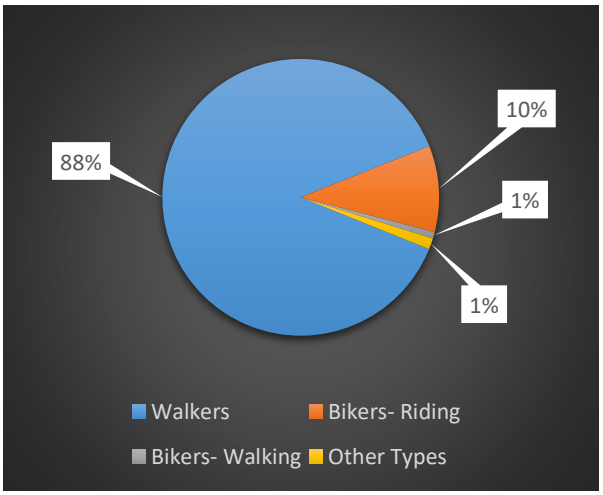

Figure 6.4 *Crosswalk Data by Type.*
Source: *Authors.*

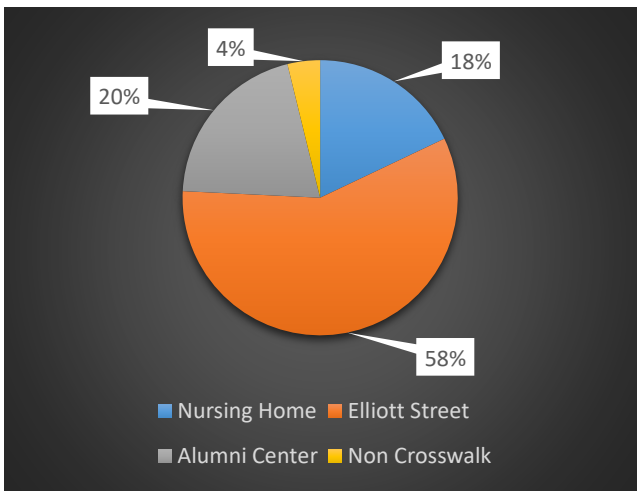

Figure 6.5 *Crosswalk Data by Location.*
Source: *Authors.*

The data presented provide a better understanding of crosswalk patterns and usage (Appendix E). Table 6.1 shows the total number of cross walkers by type and location. These locations include the three main crosswalks but also takes into account the space between the crosswalks as well. Forty-five individuals were counted either walking or biking across the road not on a crosswalk. Overall, there were 1,161 crossings in all different locations and by different means as well. As stated earlier, there is a tremendous majority by type of traffic traveling across this area, for 1,020 of the 1,161 crossings were pedestrians. With all of this information, the implementation of safer infrastructure can be developed. For example, chains could help to funnel pedestrians to the Elliot Street crosswalk, reflective safety flags on each side of the street could help pedestrians increase their visibility while crossing the street, and future long term solutions may include speed humps and flashing pedestrian lights. Increasing safety measures and promoting the use of one principal crosswalk may help to prevent future accidents and increase safety for both drivers and pedestrians. These are just a few examples of preventive measures that can be taken based off this fieldwork.

Table 6.1 *Total Crosswalk Data.* ***Source:*** *Authors*

Type	Jay to Left	Alumni Center/ Hale	Jay Left Mid	Elliott Street/ Rhodes	Jay Right Mid	Nursing Home/ Elliott	Jay to Right	Totals
Walkers	0	225	7	581	9	181	17	1020
Bikers-Riding	1	8	4	80	1	19	4	117
Bikers-Walking	0	3	0	3	0	3	0	9
Other Type	1	2	0	8	1	4	0	15
Totals	2	238	11	672	11	207	21	**1161**

By making observations for multiple hours on the three specific crosswalks, the authors' awareness of pedestrian safety was also heightened. There were many instances where the authors observed that the perception of safety by pedestrians would show through their body language and speed to get across. One common realization is that these crosswalks have very different conditions based on time of day and weather. For example, it is harder to see pedestrians at night, in rainy conditions, and even on cloudy days. These variables make it hard to really tell how safe a crosswalk is because one person's perception might be linked to a specific day with certain conditions. In order to demonstrate how much of a difference these conditions can make in terms of visibility, pictures were taken in different types of weather and at different times of day (Figure 6.6).

Figure 6.6 *Pedestrians Crossing in Various Conditions.*
Photo Source: *Authors and Keene State College, Department of Geography.*

Survey of People Using the Crosswalk

Following the crosswalk observations and field research, a crosswalk survey was developed and distributed (Appendix B). The survey includes a demographic section with a question about the participant's gender and two questions relevant to the study. One asks if they are a Keene State College student, professor, or staff member, resident of the town, or a visitor to the town. The other question is more student specific, asking if they are a first-year, Sophomore, Junior, Senior, other Keene State College student, or not a student at all. The next section was for crosswalk information, including which crosswalk the participant uses most frequently: the nursing home crosswalk that leads to Elliot Hall; the Elliot Street crosswalk that leads to Rhodes Hall; or, the Alumni Center crosswalk that leads to the Hale Building. In addition, other questions asked specifically which days of the week the participant usually crosses and the times of the day they usually crosses. Both allowed for multiple responses. The times of day were subdivided by early morning (before 9am), morning (9am-11am), midday (11am-1pm), afternoon (1pm-3pm), late afternoon (3pm-5pm), and evening (after 5pm). These very specific blocks of time make for descriptive data for the use of statistical tests.

The final section of the survey was specific to the perception of safety of the existing crosswalk infrastructure. This section is most relevant to the conversation surrounding the need for crosswalk improvements. Four statements were provided utilizing the Likert Scale (one through five). The first statement is as follows: "In terms of safety, crossing between Keene State College and the other side of Main Street is:" and then required the response of the participant. On the number scale, one was rated not very safe, three was rated somewhat safe, and five was rated very safe. The next two survey statements were rated on a different one to

five number scale, ranging from disagree to strongly agree: “I believe that there are adequate safety measures for the Keene State/Main Street crosswalks” and “If multiple safety measures were added to a crosswalk that I do not usually use, I would walk further to use that crosswalk instead of my usual route”. Another question simply asked if the person being surveyed has ever been almost hit while crossing on the South Main Street/Keene State crosswalks. Lastly, two open ended questions were added to the end of the survey. One question asked, “What safety feature would you most like to have added to the crosswalks on Main Street in front of KSC?” and the other asked for one word to complete the sentence, “Crossing Main Street is…”. The crosswalk surveys were distributed by crosswalks at different times of the day and during different times of the week to people that had just crossed or were about to cross (Figure 6.7). The authors and faculty mentor collected a total of 55 surveys.

Figure 6.7 *Survey Collection by Author.* ***Photo Source:*** *Authors.*

Results from the crosswalk surveys revealed that the perception of the crosswalks is that they are unsafe. Over 58 percent, 32 of 55 respondents, indicate that they have almost been hit

while crossing the street at one of the three crosswalks in the study. When asked to rate safety while crossing Main Street to and from Keene State College, the average rating on a scale of 1 to 5 was 2.67. This average reveals that people feel less than "somewhat safe". When asked if adequate safety measures were in place, an average of 2.69 was the result from the participants in the survey. Each of these numbers indicate that pedestrians who use the crosswalks do not feel safe, and more than half have had near accidents in the past. Results from question seven, which rated the safety of crossing Main Street, were imported into IBM Statistical Package for the Social Sciences (SPSS) software to determine if there is a significant difference between each individual crosswalk studied and the perception of safety. Results from Table 6.2 indicate that there is not a significant difference between crosswalks and safety, *but it is interesting to note that the perception of safety increases when using crosswalks further away from the traffic circle.*

Table 6.2 *SPSS Descriptive Statistics.* ***Source:*** *Authors*

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
					Lower Bound	Upper Bound
Nursing Home	8	3.00	.756	.267	2.37	3.63
Elliot Street	42	2.67	.954	.147	2.37	2.96
Alumni Center	5	2.20	.447	.200	1.64	2.76
Total	55	2.67	.904	.122	2.43	2.92

The final question of the survey asking participants to finish the statement "Crossing Main Street is…" generated many responses. Only 14 out of the 55 words submitted did not have a negative connotation. In other words, about 75% of the words given to finish that sentence were negative. Some of the most mentioned words were, "risky", "frantic", "scary", "hard", and "okay". These words truly demonstrate the feelings of frequent crossers of Main Street. The 55 words were used in the creation of Figure 6.8, a Tagul.

Figure 6.8 *Tagul Based on Survey Responses. Source: Authors.*

Summary

The safety of South Main Street is not only perceived to be dangerous, but has proven to be so. After more than half of the pedestrians surveyed claim to have almost been hit by a car while crossing the street, the authors' awareness intensified while realizing the unfortunate reality that pedestrians do not feel as safe as they should while simply crossing the street. This

concern of safety truly envelops campus conversation because it affects not only those heading to class or to other college-related affairs, but those trying to get to and from their homes. Original data were collected in various ways to validate and clarify an understanding of the overall usage and perceptions of safety surrounding the crosswalks through careful analysis. After completing the observations of the crossing patterns of pedestrians, it was determined that there should be a primary focus on promoting the Elliot Street and Rhodes Hall crosswalk as the principal crosswalk for pedestrian usage. Fieldwork data also resolved that pedestrian safety should be dealt with first, and then bicycle safety because most people that were crossing the streets did so by foot and not on a bicycle. Preventive measures should increase the visibility of both drivers and pedestrians, and establish an entirely different atmosphere of safety and security, replacing feelings of fear and danger. Therefore, although it is known that something needs to be done to these South Main Street crosswalks, it is more a matter of moving forward to physically implement these safety measures in a thoughtful way concerning both drivers and pedestrians. Until students and others no longer feel that the South Main Street crosswalks are risky or scary, the conversation surrounding the safety of this section of Main Street will remain current.

BICYCLE TRAILS

CHAPTER 7

Case Study

Wayfinding on the Keene bicycle paths can be challenging due to the lack of signage and user friendly maps. In order to study the impact of signage on navigation, the authors led a case study with a group of people not familiar with local bicycle tails. This group consisted of 11 first-year Keene State College students (Figure 7.1). The group was led by two of the authors as well as the faculty mentor. The bicycle ride included wooded dirt trails, paved neighborhood roads, sidewalk, multiple bridges, a tunnel, and gravel rail trail. The route took about an hour and the trails looped the group through both Wheelock Park and the Ashuelot River Park. Throughout the whole route, the group was only aware of two map kiosks and less than a half dozen signs.

Figure 7.1 *Case Study- Navigation of First-Year Keene State College Students.* ***Source:*** *Authors.*

The authors administrated a survey in order to learn more about the navigational abilities of the students in the case study group (Appendix C). The beginning of the case study took place in a classroom, where students identified: demographic information on their survey; how many times they have been on the bike path/trail system in Keene; and, how confident they feel with navigating the system. The second part of the survey was administered while on the bicycle route and required use of a printed map on the back of the survey. When confronted by intersections, the authors and faculty mentor stopped the group of students and asked them to identify on their map, their perceived location. The intersections were labeled as Node A, Node B, Node C, and Node D. Each of the nodes had multiple route options that lead to different destinations. At each intersection, students were asked to write down what they believed to be down each bike path. Only one of the intersections had a map, as seen in Figure 7.2, assisting bikers with navigation. For this reason, the intersection pictured was not used as a node for this case study. If students had no idea what might be down a certain trail, they were encouraged to make an educated guess. With four nodes and 11 students, a total of 44 answers were collected. Of the 44 responses, only two of the answers correctly identified the destination in question.

Figure 7.2 *Case Study Bikers at Intersection with Trail Map.* ***Source:*** *Authors.*

Signage

After the ride on the bicycle route, students were asked to provide examples of how they believe the bike paths could be improved. Ten out of eleven students replied that more signage is needed. Mr. Andy Bohannon, Director of the Keene Parks and Recreation Department, stated in an interview with the authors, that he too believes signage is lacking on the bike paths. When asked about signs, Mr. Andy Bohannon said he would like to see a common brand, the city seal, distance and direction on signs (Bohannon 2017, Personal Interview). A sample of potential signs for the bike path are shown in Figure 7.3.

Figure 7.3 Sample *bike path signs for Keene, NH.* **Source:** *Authors*

Several locations along the bike route would benefit from wayfinding signage. At each nodal intersection, is an opportunity for navigational assistance. During the bicycle ride with the case study group, the trail crossed over Emerald Street where the riders were met by a wooden railing and no sign of a continuing path (Figure 7.4). The rider must turn left (West) and ride along the road for a portion, but there is no indication of this through signage.

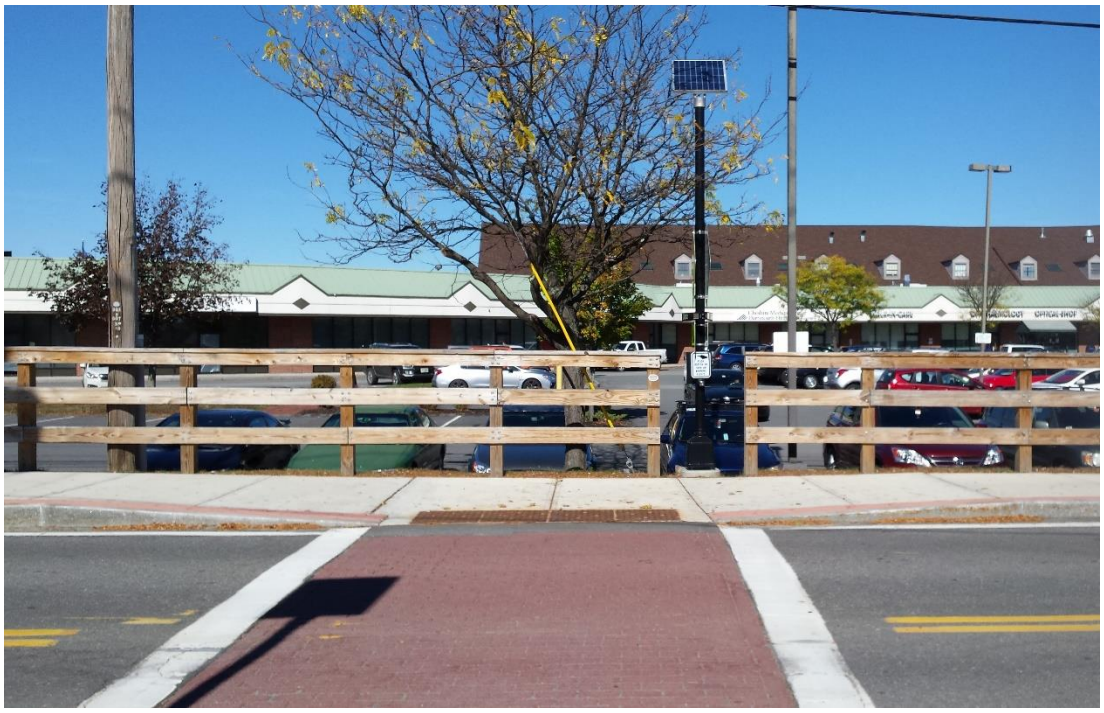

Figure 7.4 *Emerald Street Bicycle Trail Crosswalk.* ***Source:*** *Authors.*

Another location along the bike path in need of signage is the four-way intersection where left (South) to the Monadnock Marketplace, straight (West) to Stonewall Farms, and right (North) takes the rider into West Keene. None of the paths are currently labeled, therefore the rider must have a great sense of direction and knowledge of the area to know what is down each path. Other intersections along the route also suffer from the same lack of signage.

Recently, the City of Keene has elected its first bicycle mayor. This is an honorary title with the purpose of promoting cycling in the city. Tiffany Mannion, Keene's bicycle mayor, is the

first in the United States. Ms. Mannion is also the only certified bicycling instructor in the area. She hopes to work with the City Council and local cycling organizations to promote cycling in the city. Primary focuses include safety, for drivers and bikers, and promoting cycling in the community in the region. Ms. Mannion leads by example, having cycled over 3,000 miles in 2017 alone. She hopes to bring helpful ideas from around the world to increase bicycle commuting, green living, and decrease the dependence on motor vehicles (Mannion 2017, Personal Interview).

Popular Locations in Keene

There are many popular points of interest in Keene that lay just off the bicycle trails. Through a combination of the Wayfinding Student survey as well as an analysis of the case study group, navigation to these locations was analyzed. Through Qualtrics, the authors ran statistical results on how mental mapping responses from participants that have lived in Keene for less than six months differs from participants that have lived in Keene for more than two years. The case study students did not participate in the wayfinding survey but through observation and written answers during the case study, it is shown that their navigational ability is on a similar level as students who have lived in Keene for less than six months. This makes sense because all of the students in the case study group are students who have lived in Keene for a comfortably short period of time.

Throughout the figures, 7.5A-7.10B, it is apparent that the time Keene State students have lived in Keene makes a difference in their navigational ability to points of interest around town. These points of interest all connect to the bicycle trail system and can be easily accessed.

There are six location points and two maps for each of the points. All figures "A" are created using only responses of students that have lived in Keene for less than six months. All figures "B" are created with responses from students who have lived in the Keene for more than two years. It is apparent that there are less red, high clicked areas for all of the B figures. In addition, the A figures tend to have less blue spots as well, meaning that there was less variation in responses on that map of Main Street in Keene. The white circle that the authors placed on these maps after data collection, demonstrates the actual location of the destination.

Three of the six location points are areas that were discussed at the nodes in the case study and survey. The bicycle route actually started at Keene State College (Figure 7.5A and Figure 7.5B), continued over toward Monadnock Marketplace (Figure 7.6A and Figure 7.6B) which was used as node C, and looped through Ashuelot River Park (Figure 7.7A and Figure 7.7B) which was used as node D. At each of these nodes, students riding as part of the case study were not able to successfully identify what was in each direction, demonstrating that signage at these nodal regions would be helpful. It is interesting to see however, that students that have lived in Keene for a short period of time also are not able to identify locations of these three points of interest. This demonstrates that all students, whether they use the bicycle trails or not, benefit from increased navigational skills over time. Additionally, while biking the trails with the case study group, the other three points of interest were pointed out by the authors saying, "if you continue down this path, you will come upon…". These locations included Central Square (Figure 7.8A and 7.8B), the Keene Police Department (Figure 7.9A and Figure 7.9B), and Cheshire Medical Center (Figure 7.10A and Figure 7.10B).

Figure 7.5A *Navigation of Keene State College from Students Who Have Lived in Keene for less than Six Months.* ***Source:*** *Authors*.

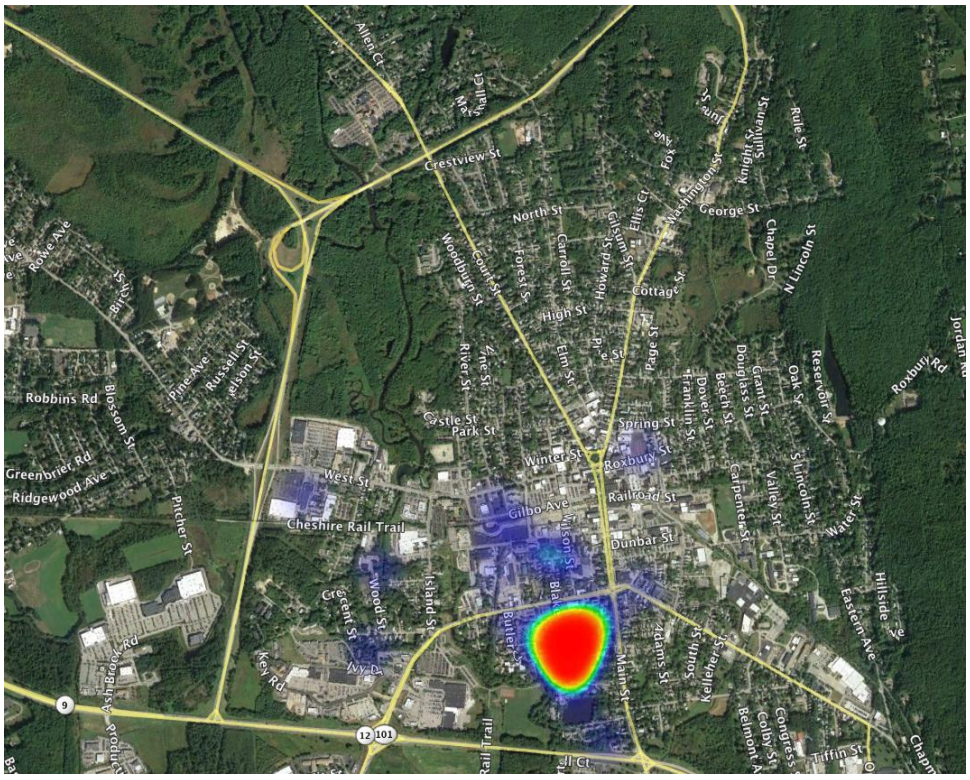

Figure 7.5B *Navigation of Keene State College from Students Who Have Lived in Keene for more than Two Years.* ***Source:*** *Authors*.

Figure 7.6A *Navigation of Monadnock Marketplace from Students Who Have Lived in Keene for less than Six Months.* ***Source:*** *Authors*.

Figure 7.6B *Navigation of Monadnock Marketplace from Students Who Have Lived in Keene for more than Two Years.* ***Source:*** *Authors*.

Figure 7.7A *Navigation of Ashuelot River Park from Students Who Have Lived in Keene for less than Six Months.* ***Source:*** *Authors*.

Figure 7.7B *Navigation of Ashuelot River Park from Students Who Have Lived in Keene for more than Two Years.* ***Source:*** *Authors*.

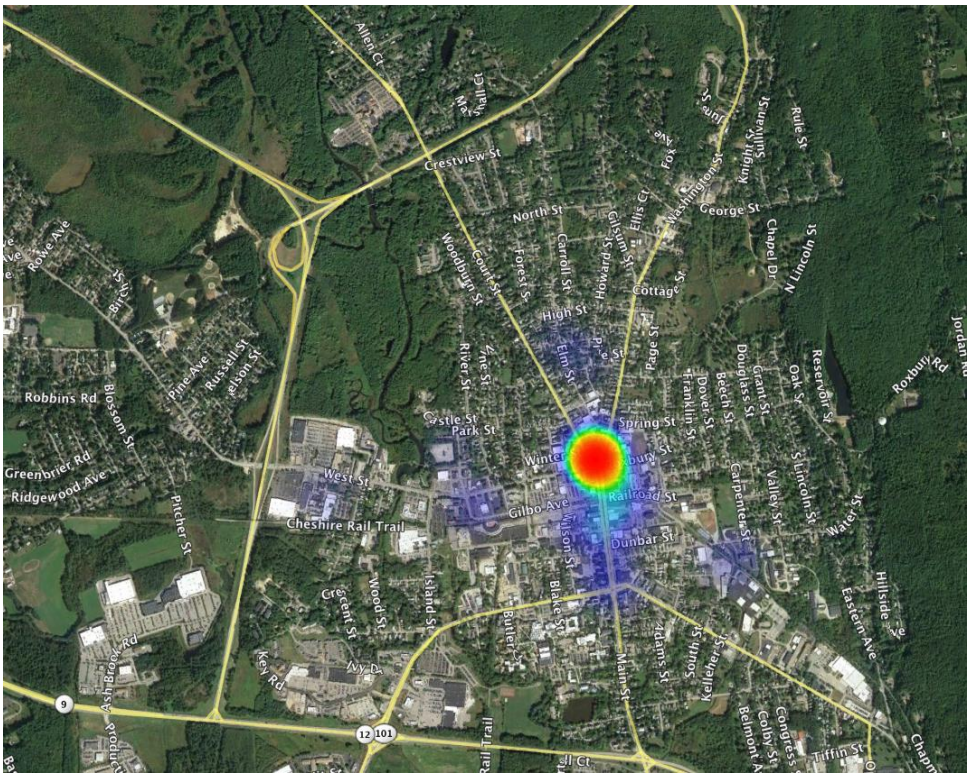

Figure 7.8A *Navigation of Central Square from Students Who Have Lived in Keene for less than Six Months.* ***Source:*** *Authors*.

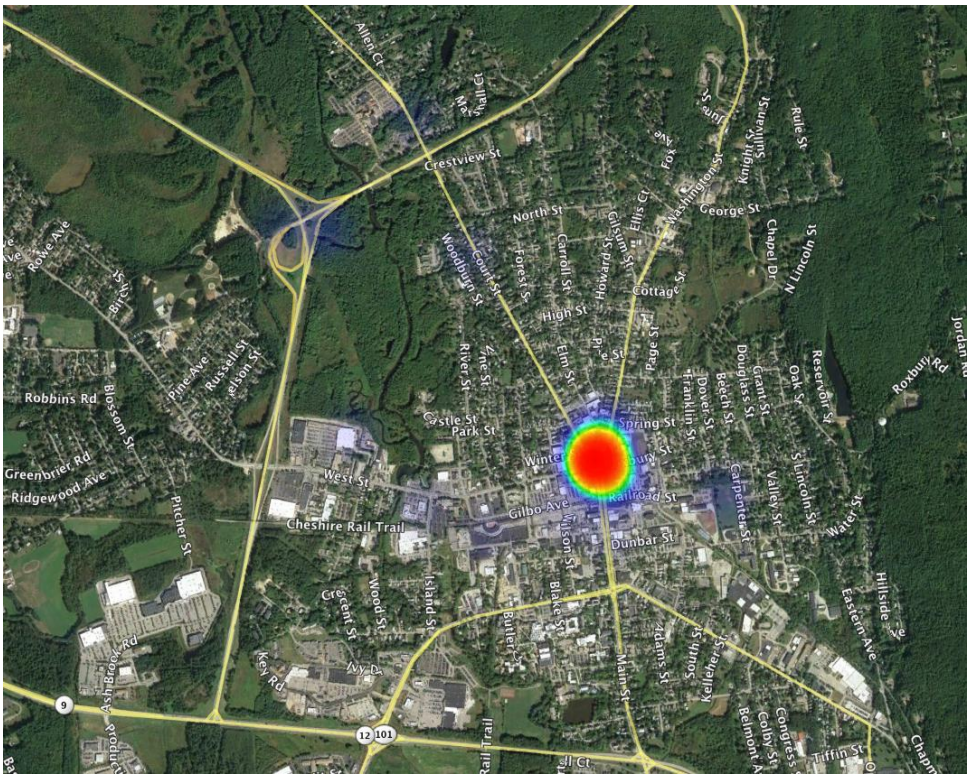

Figure 7.8B *Navigation of Central Square Park from Students Who Have Lived in Keene for more than Two Years.* ***Source:*** *Authors*.

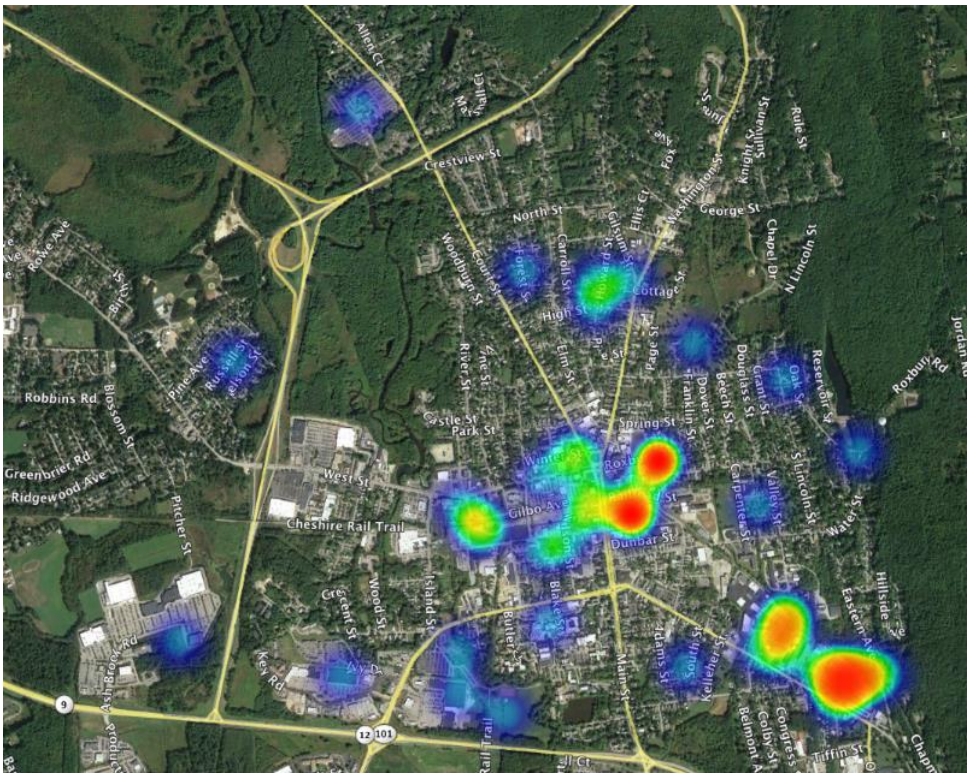

Figure 7.9A *Navigation of Keene Police Department from Students Who Have Lived in Keene for less than Six Months.* ***Source:*** *Authors*.

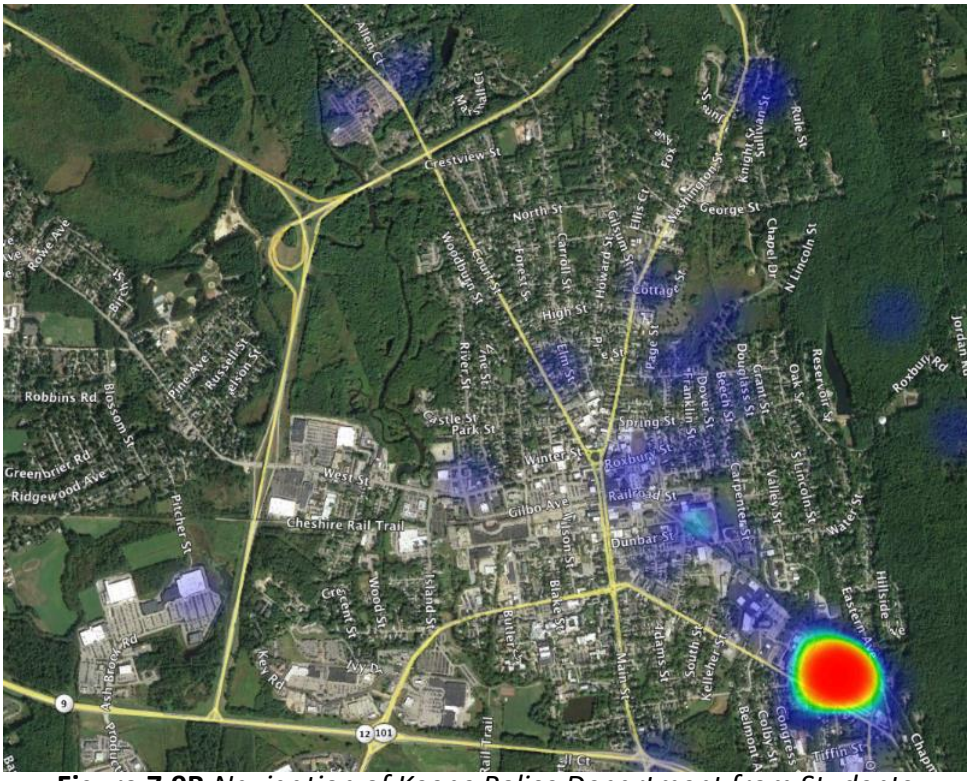

Figure 7.9B *Navigation of Keene Police Department from Students Who Have Lived in Keene for more than Two Years.* ***Source:*** *Authors*.

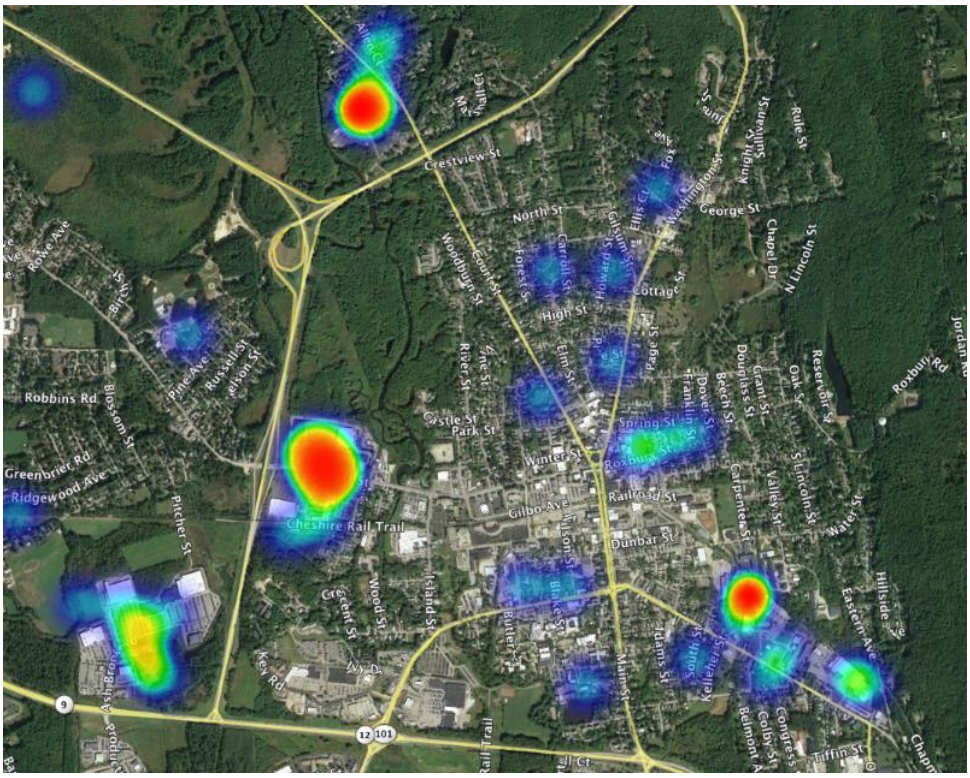

Figure 7.10A *Navigation of Cheshire Medical Center from Students Who Have Lived in Keene for less than Six Months.* ***Source:*** *Authors*.

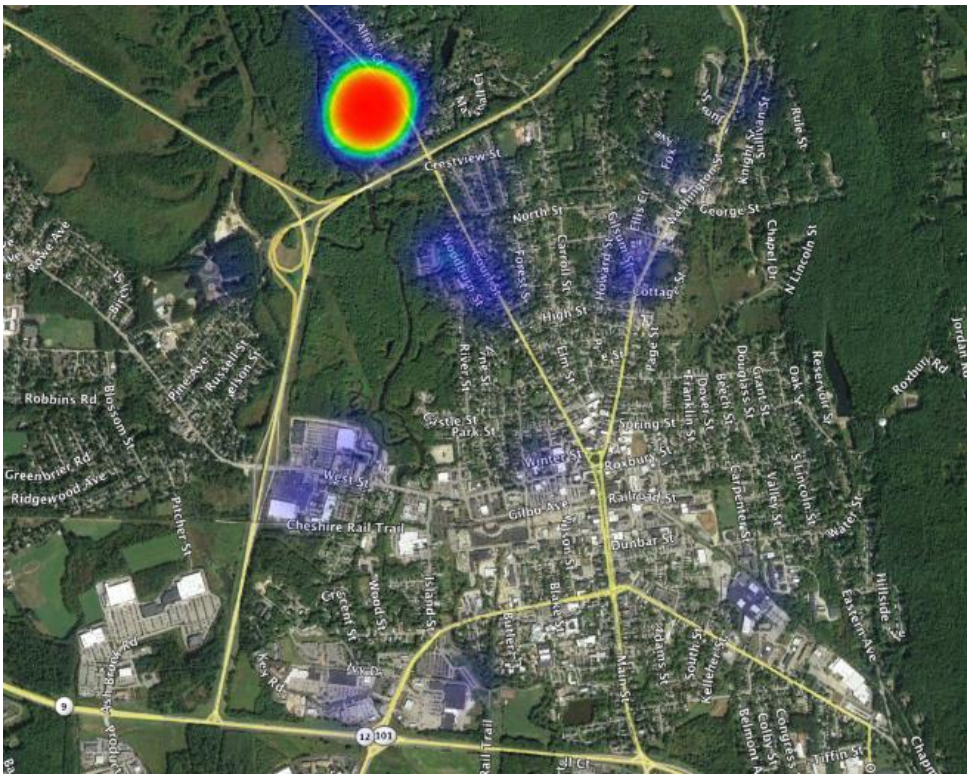

Figure 7.10B *Navigation of Cheshire Medical Center from Students Who Have Lived in Keene for more than Two Years.* ***Source:*** *Authors*.

Summary

Keene's bicycle trail network is vast and convenient for those who know the paths well. The trails are accessible for many, as they are close by to many local points of interest, including close proximity to Main Street (Appendix E). Unfortunately, the current maps and signage are not conducive for those who are new to the trails. The wayfinding survey shows a lack of knowledge for those who are new to area when it comes to navigating Keene by road or trail. The case study group surveyed on the bike path reinforced the clear need for signage as they were confronted by multiple intersections with no signage to point them in the right direction. The Parks and Recreation department, local non-profits, and Keene's new bicycle mayor are all working toward a common goal of promoting the use of Keene's trail network by increasing signage, developing new maps, bicycle safety programs, addition of solar lights, and new bike lanes in the downtown district. Overall, Keene has implemented or plans to implement many new features to help encourage the use of bicycles in the community.

CONCLUSION

CHAPTER 8

This study focuses on three primary elements of concern in Keene, NH (Figure 8.1). The first element addresses the number of signs and lack of consistent branding within the downtown district and how this affects the navigation of those who live and/or visit Keene. The second element delves into the issue of crosswalk safety and approaches the City of Keene can take to improve the perception of safety. The third and final element addresses the need for wayfinding signage on Keene's bike paths.

Figure 8.1 *Wayfinding in Keene.* ***Source:*** *Authors*

With regards to downtown wayfinding, this study has demonstrably revealed a lack of community branding in relation to Main Street signage. Downtown, and especially Central Square, is inundated with signage with no apparent consistency. Out of 183 signs counted, 131 are directed towards vehicles. Although this may not seem of consequence, it does affect visitors and tourists who may find themselves missing important wayfinding or business information due

to the sheer number of signage on the half mile stretch of downtown Main Street. Although downtown revitalization efforts may improve this, the City of Keene must still adhere to vehicle regulations and will not be able to get rid of the excessive density of signage on Main Street. While vehicle signage on Main Street cannot be decreased, the other signage can. Wayfinding signs for pedestrians and drivers that point out businesses should all be branded so that they are uniform in color, text font and size, and of course accurately point out destinations. Keene attracts many visitors and tourists, and it would be a shame if local businesses were left undiscovered due to lack of appropriate signage.

After students of Keene State College completed the wayfinding survey, a majority indicated that their navigational skills are above average. A common theme emerged, students believe their navigational skills are better when driving or walking downtown versus walking or biking on the bike trails. One of the original hypotheses states that the longer students have lived in Keene, the better their navigational skills. After receiving the survey data, the amount of time students lived in Keene did in fact affect the ability of students to correctly identify significant destinations on an aerial map provided to them in the survey. There was no single place on the imagery that 100 percent of the respondents identified correctly. Perhaps most disconcerting is that not all students were able to locate Keene State College. Students would benefit from a map with important destinations and businesses, as well as improved wayfinding signage on the bike trails.

It is clear that the bike trail network, although extensive and useful, lacks signage. New, and newly branded, signage can be implemented on the paths in a variety of ways. Students at Keene State College could not have a more perfect access point to the bike trails, however most

are not going to go out of their way to discover where they lead on their own. Students can even access the Monadnock Marketplace by these trails, but would benefit from signage that includes the name of the destination and the distance that it will take to arrive. Future research could identify ways to promote the use of the bike trails, and how to better connect downtown Main Street to the bike paths.

Pathways for Keene, a non-profit organization that cares for the development and maintenance of the bike trails, has devoted funding from 2016 and 2017 to the Solar Lighting Trail Project. This is a proposal to light the Cheshire Rail Trail from Island Street to Pitcher Street in order to increase the overall safety of the trails. With extra lighting, pedestrians and bicyclists could safely use the trails in the early morning and evening; this also promotes alternative modes of commuting transportation, because those who leave for work early in the morning and those who leave work late at night may be more apt to using the trails if they were well-lit. Increasing the signage and safety of the already well established bike trails is essential for improving the bicycle culture in Keene.

Crosswalk safety is the final element of this study and led to 16 hours of data collection, as well as 55 paper surveys handed out to those utilizing the crosswalks. It was discovered that the Elliot Street and Rhodes Hall crosswalk receives, by far, the greatest use. In 16 hours of observation, there were 1,161 street crossings, with 58 percent of crossings utilizing the Elliot Street Crosswalk. The overall crosswalk perception is that these crosswalks are unsafe, and of 55 survey respondents, 32 report that they have almost been hit. This is far too large of a number to ignore. The fact of the matter is that the perception of danger surrounding these crosswalks is incredibly high, though as the crosswalks move further away from the traffic circle, this

perception decreases. Short term solutions could involve the use of reflective for pedestrians to carry across the street to increase visibility, as well as flashing pedestrian signs to alert drivers. An effective long term solution could incorporate the addition of bump outs in the sidewalk and speed humps. Since the majority of pedestrians use the Elliot Street crosswalk, these measures could be implemented there first. Survey respondents also said they would be willing to walk further to use a safer crosswalk. Overall, there are cost effective short term solutions that can be implemented to increase safety while planning future long term solutions.

The most substantive findings do pertain to the perceived danger of the Main Street crosswalks. This confirms the concerns Kemal Atkins, Vice President of Keene State College for Student Affairs and Enrollment, and demonstrates that improvements to crosswalk infrastructure are perceived as necessary. From the pool of survey respondents regarding crosswalks, more than half have almost been hit by a car. One student has already been struck while in the crosswalk; why continue to let the problem sit as a result of more pressing priorities? Hopefully these survey results, which highlight the perception of the crosswalks as being "risky" and "difficult" will shine light on concerns of pedestrians.

In summation, signage on Main Street needs to be refurbished so that it is consistent, signage on the bike paths need to be more informative, and measures must be implemented in order to enhance crosswalk safety. Wayfinding is practiced by nearly everyone, whether people are conscious of it or not. This study aimed to discover how wayfinding relates to signage and safety, and serves as only the most recent incarnation of a long history of wayfinding techniques, which have paved the way for the navigation that we see today.

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APPENDICES

Appendix A *Wayfinding Navigation Survey. Source: Authors.*

Q1 What is your gender?

- ○ Male
- ○ Female
- ○ Other

Q5 What year are you at Keene State College?

- ○ First-Year
- ○ Sophomore
- ○ Junior
- ○ Senior
- ○ Other Year

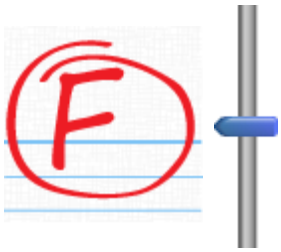
Q17 How long have you lived in Keene? (count time spent going to KSC)

- ○ Less than 6 months
- ○ 6 months to 2 years
- ○ 2 to 4 years
- ○ More than 4 years
- ○ I do not live in Keene

Page Break

Q19 Navigational skills are defined as the ability to accurately navigate to destinations and include the use of memory, signs, and landmarks, **without the use of GPS technology**.

Given this definition, how would you rate your overall navigational skills?



1
2
3
4
5

Q18 Rate your navigational abilities for each aspect of Keene travel, based on the scale below.
(Navigation <u>without</u> GPS)

	Poor	Okay	Average	Good	Great	N/A
Driving Downtown	○	○	○	○	○	○
Walking Downtown	○	○	○	○	○	○
Bikepath Walking/Biking	○	○	○	○	○	○

Q21 Please rate Keene on how easy it is to navigate each of these situations.
(Navigation <u>without</u> GPS)

0 = very difficult, 100 = very easy

Locating Downtown Businesses	
Locating Downtown Parking	
Locating Walking/Biking Paths and Trails from the Downtown Area	

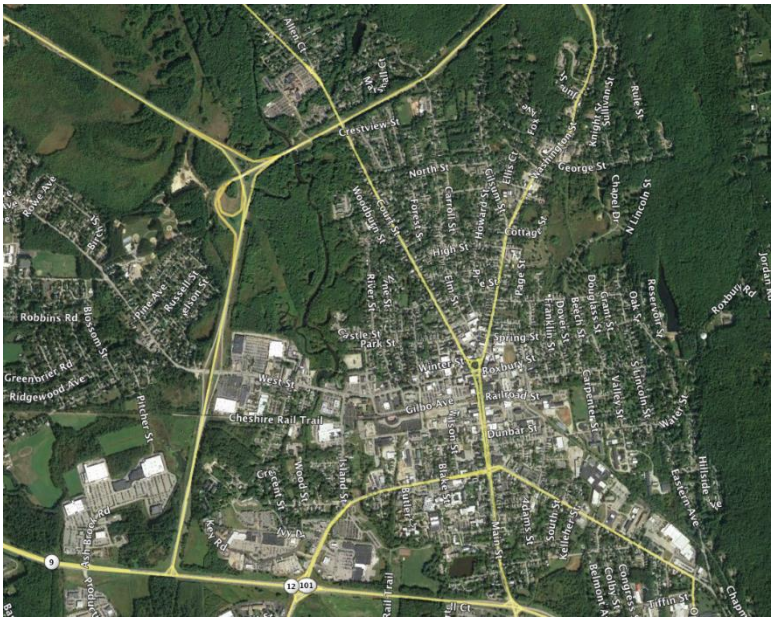
Q20 In **<u>one word</u>**, please complete this statement: *Navigating in Keene is...*

_____

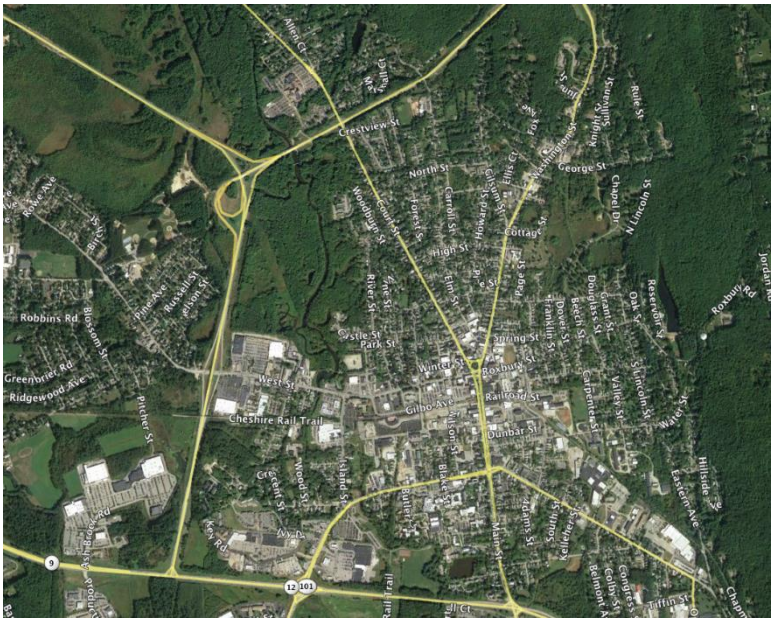
Page Break

Q13 The next few questions will ask you to locate specific destinations around the City of Keene. Without using outside resources, please click where you think the destination is located.

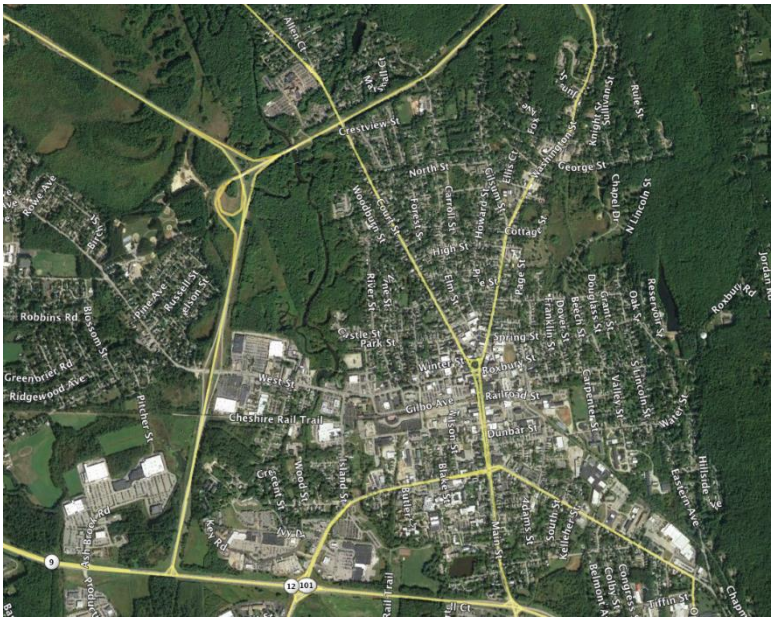
Click where you think Keene State College is located.



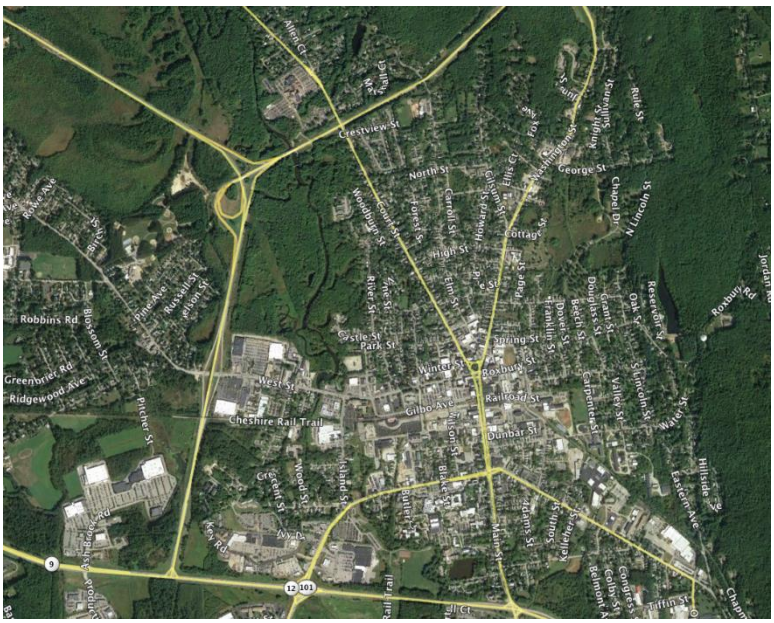
Q14 Click where you think Central Square is located.



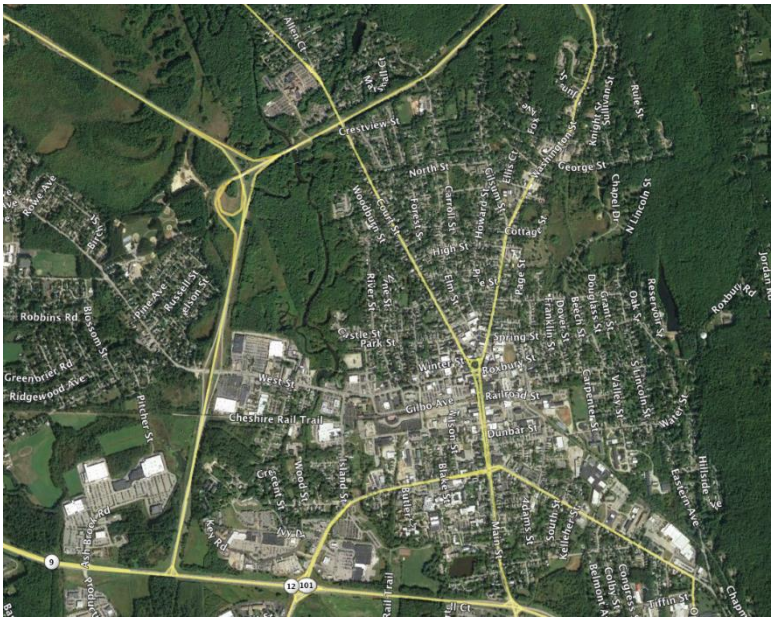
Q11 Click where you think the Monadnock Marketplace (Target Plaza) is located.



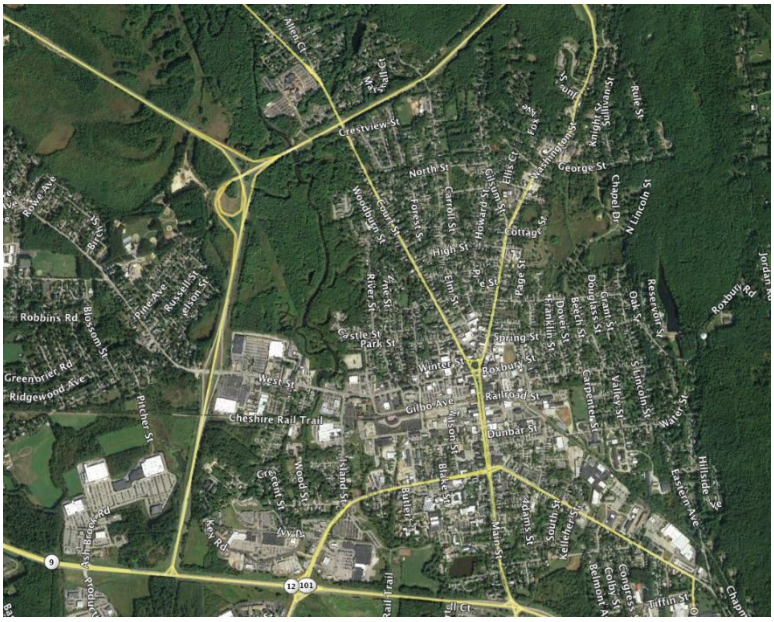
Q12 Click where you think the Ashuelot River Park is located.



Q15 Click where you think Cheshire Medical Center (the Hospital) is located.



Q16 Click where you think the Keene Police Department/Keene Ice is located.



Page Break

Q15 The next few questions will ask you to locate specific destinations surrounding Main Street in the City of Keene. Without using outside resources, please click where you think the destination is located.

Click where you think the Monadnock Food Co-op is located.

Q16 Click where you think City Hall is located.

Q17 Click where you think the Keene Public Library is located.

Q18 Click where you think the Keene Fire Station is located.

Q19 Click where you think the Keene Farmers Market is located. (Summer Season)

Appendix B *Wayfinding Crosswalk Survey. Source: Authors.*

Keene State College Geography Senior Seminar
Wayfinding Crosswalk Survey - October 2017

Demographics

☐ Male ☐ Female ☐ Other

☐ KSC Student ☐ KSC Professor ☐ KSC Staff

☐ Resident of Town (not affiliated with KSC) ☐ Visitor to Town (not affiliated with KSC)

☐ First-Year ☐ Sophomore ☐ Junior ☐ Senior

☐ Other KSC student ☐ Not a KSC Student

Crosswalk Information

Which crosswalk do you use **most** frequently? (Please check one)

☐ **Nursing Home** (to Elliott Hall) ☐ **Elliott Street** (to Rhodes Hall) ☐ **Alumni Center** (to Hale Building)

Which days do you usually cross? (Check all that apply)

☐ **SU** ☐ **M** ☐ **TU** ☐ **W** ☐ **TH** ☐ **F** ☐ **SA**

What times do you usually cross? (Check all that apply)

☐ **Early Morning** (before 9am) ☐ **Morning** (9 - 11am) ☐ **Midday** (11am - 1pm)

☐ **Afternoon** (1 - 3pm) ☐ **Late Afternoon** (3 - 5pm) ☐ **Evening** (after 5pm)

Safety

Please respond to each statement by circling the number based on the 1-5 scale provided

In terms of safety, crossing between Keene State College and the other side of Main Street is:

Not Very Safe		*Somewhat Safe*		*Very Safe*
1	2	3	4	5

I believe that there are adequate safety measures for the Keene State/Main Street crosswalks.

Disagree		*Somewhat Agree*		*Strongly Agree*
1	2	3	4	5

If multiple safety measures were added to a crosswalk that I do not usually use, I would walk further to use that crosswalk instead of my usual route.

Disagree		*Somewhat Agree*		*Strongly Agree*
1	2	3	4	5

I have almost been hit while crossing between Keene State College and the other side of Main Street.

No *Yes*

What safety feature would you most like to have added to the crosswalks on Main Street in front of KSC?

In **one word**, please complete this statement: *Crossing Main Street is* _____

Appendix C *Wayfinding Bike Path Survey. Source: Authors.*

Keene State College Geography Senior Seminar
Wayfinding Bike Path Survey - October 2017

Demographics

Please answer each question by writing a check in one option from each group

☐ Male ☐ Female ☐ Other

☐ KSC Student ☐ KSC Professor ☐ KSC Faculty/Staff
☐ Resident of Town (not affiliated with KSC) ☐ Visitor to Town (not affiliated with KSC)

How long have you been living in Keene? (Use years or months) _____

Bike path Information

Please answer each question by following the directions for each group

How many times have you been on the Keene bicycle path/trail system? (Please check one)

☐ **Never** ☐ **1-5 times** ☐ **6-10 times** ☐ **More than 10 times**

How many miles of bike path do you think are in Keene? (Please check one)

☐ **<5** ☐ **6-10** ☐ **11-20** ☐ **20+**

Rate your confidence with navigating the Keene bicycle path/trail system.
(Please respond by circling an option based on the 1-5 scale provided)

Not confident		Neutral		Very Confident
1	2	3	4	5

Nodal Information

Please answer the question for each node and then demonstrate the location of the node on the back of the survey

Node A:
Where do you think this path leads? _____
(After answering this question, please show where you think you are by placing an "A" on the map provided)

Node B:
Where do you think this path leads? _____
(After answering this question, please show where you think you are by placing a "B" on the map provided)

Node C:
Where do you think this path leads? _____
(After answering this question, please show where you think you are by placing a "C" on the map provided)

Node D:
Where do you think this path leads? _____
(After answering this question, please show where you think you are by placing a "D" on the map provided)

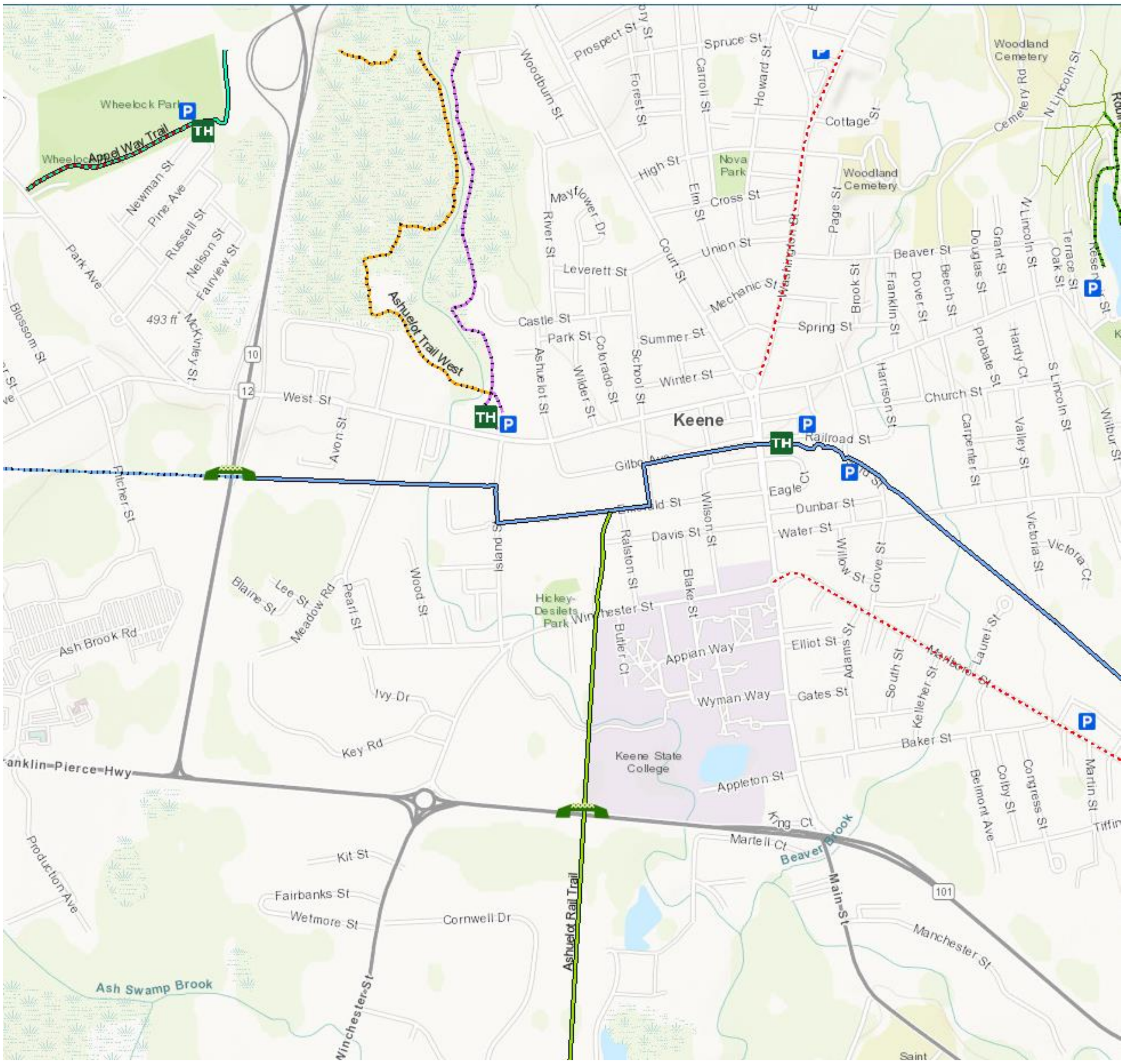
Overall Experience

Rate your overall experience with using the Keene bicycle path/trail system.
(Please respond by circling an option based on the 1-5 scale provided)

Not Great		Neutral		Awesome
1	2	3	4	5

What do you think might improve navigation for the Keene bicycle path/trail system?

In one word, please describe the Keene bicycle path/trail system. _____


Wheelock Park
Appel Way Trail
Ashuelot Trail West
Ashuelot Rail Trail
Keene
Keene State College
Hickey-Desilets Park
Nova Park
Woodland Cemetery
West St
Winchester St
Main St
Franklin-Pierce Hwy
Ash Swamp Brook
Beaver Brook
Railroad St
Appian Way
Wyman Way
Appleton St
Baker St
Court St
Washington St
Marlboro St

Appendix D *Crosswalk Fieldwork Counting Sheet. Source: Authors.*

Appendix E *Crosswalk Counting Data. Source: Authors.*

Date	10/4/17		Type	J- to left	Nursing Home	J- left mid	Elliott Street	J- right mid	Alumni Center	J- right	Totals
Day of Week	Wednesday		Walkers	2	22	2	65	2	31	0	124
Start Time	7:45 AM		Bikers- Riding	1	4	0	9	0	0	0	14
End Time	9:45 AM		Bikers- Walking	0	1	0	0	0	0	0	1
Recorder	Britt		Jogger	0	0	0	0	0	0	0	0
			Skateboard	0	1	0	0	0	0	0	1
			Pulling Handtruck	0	1	0	0	0	0	0	1
			Walk with dog	0	0	0	0	0	1	0	1
			Walk with Stroller	0	0	0	0	0	1	0	1
			Walk with Child Cart	0	0	0	0	0	0	0	0
											0
											0
											0
			Totals	3	29	2	74	2	33	0	**143**

Date	10/5/17		Type	J- to left	Nursing Home	J- left mid	Elliott Street	J- right mid	Alumni Center	J- right	Totals
Day of Week	Thursday		Walkers	5	41	1	72	0	33	0	152
Start Time	8:30 AM		Bikers- Riding	1	6	0	16	0	0	1	24
End Time	9:30 AM		Bikers- Walking	0	0	0	0	0	1	0	1
Recorder	Cusack		Jogger	0	1	0	0	0	0	0	1
			Skateboard	0	0	0	1	0	0	0	1
			Pulling Handtruck	0	0	0	0	0	0	0	0
			Walk with dog	0	0	0	0	0	0	0	0
			Walk with Stroller	0	0	0	0	0	0	0	0
			Walk with Child Cart	0	0	0	2	0	0	0	2
											0
											0
											0
			Totals	6	48	1	91	0	34	1	**181**

Date	10/5/17		Type	J- to left	Nursing Home	J- left mid	Elliott Street	J- right mid	Alumni Center	J- right	Totals
Day of Week	Thursday		Walkers	3	19	4	129	0	36	0	191
Start Time	12:30 PM		Bikers- Riding	0	2	0	12	2	2	0	18
End Time	2:30 PM		Bikers- Walking	0	0	0	0	0	1	0	1
Recorder	Zach		Jogger	0	0	0	0	0	0	0	0
			Skateboard	0	1	0	3	0	0	0	4
			Pulling Handtruck	0	0	0	0	0	0	0	0
			Walk with dog	0	0	0	0	0	0	0	0
			Walk with Stroller	0	0	0	0	0	0	0	0
			Walk with Child Cart	0	0	0	0	0	0	0	0
											0
											0
											0
			Totals	3	22	4	144	2	39	0	**214**

Date	10/7/17		Type	J- to left	Nursing Home	J- left mid	Elliott Street	J- right mid	Alumni Center	J- right	Totals
Day of Week	Saturday		Walkers	4	7	0	11	2	1	0	25
Start Time	9:15 AM		Bikers- Riding	2	2	0	2	0	1	0	7
End Time	11:15 AM		Bikers- Walking	0	1	0	0	0	1	0	2
Recorder	Cusack		Jogger	0	0	0	0	0	0	0	0
			Skateboard	0	0	0	0	0	0	0	0
			Pulling Handtruck	0	0	0	0	0	0	0	0
			Walk with dog	0	0	0	0	0	0	0	0
			Walk with Stroller	0	0	0	0	0	0	0	0
			Walk with Child Cart	0	0	0	0	0	0	0	0
											0
											0
											0
			Totals	6	10	0	13	2	3	0	**34**

Date	10/10/17		Type	J- to left	Nursing Home	J- left mid	Elliott Street	J- right mid	Alumni Center	J- right	Totals
Day of Week	Tuesday		Walkers	3	41	1	92	0	31	0	168
Start Time	9:10 AM		Bikers- Riding	0	2	1	17	1	1	0	22
End Time	11:10 AM		Bikers- Walking	0	0	0	0	0	0	0	0
Recorder	Zach		Jogger	0	0	0	0	0	0	0	0
			Skateboard	0	0	0	0	0	0	0	0
			Pulling Handtruck	0	0	0	0	0	0	0	0
			Walk with dog	0	0	0	0	0	0	0	0
			Walk with Stroller	0	0	0	0	0	0	0	0
			Walk with Child Cart	0	0	0	0	0	0	0	0
											0
											0
											0
			Totals	3	43	2	109	1	32	0	**190**

Date	10/10/17		Type	J- to left	Nursing Home	J- left mid	Elliott Street	J- right mid	Alumni Center	J- right	Totals
Day of Week	Tuesday		Walkers	0	28	1	76	1	64	0	170
Start Time	5:00 PM		Bikers- Riding	0	1	0	6	1	1	0	9
End Time	7:00 PM		Bikers- Walking	0	0	0	1	0	0	0	1
Recorder	Jenna		Jogger	0	0	0	0	0	0	0	0
			Skateboard	0	0	1	0	0	0	0	1
			Pulling Handtruck	0	0	0	0	0	0	0	0
			Walk with dog	0	0	0	0	0	0	0	0
			Walk with Stroller	0	0	0	0	0	0	0	0
			Walk with Child Cart	0	0	0	0	0	0	0	0
											0
											0
											0
			Totals	0	29	2	83	2	65	0	**181**

Date	10/11/17		Type	J- to left	Nursing Home	J- left mid	Elliott Street	J- right mid	Alumni Center	J- right	Totals
Day of Week	Wednesday		Walkers	0	7	0	72	0	13	0	92
Start Time	4:00 PM		Bikers- Riding	0	0	0	5	0	1	0	6
End Time	6:00 PM		Bikers- Walking	0	1	0	0	0	0	0	1
Recorder	Jenna		Jogger	0	0	0	0	0	0	0	0
			Skateboard	0	0	0	2	0	0	0	2
			Pulling Handtruck	0	0	0	0	0	0	0	0
			Walk with dog	0	0	0	0	0	0	0	0
			Walk with Stroller	0	0	0	0	0	0	0	0
			Walk with Child Cart	0	0	0	0	0	0	0	0
											0
											0
											0
			Totals	0	8	0	79	0	14	0	**101**

Date			Type	J- to left	Nursing Home	J- left mid	Elliott Street	J- right mid	Alumni Center	J- right	Totals
Day of Week	Saturday		Walkers	0	16	0	64	2	16	0	98
Start Time	4:30 PM		Bikers- Riding	0	2	0	13	0	2	0	17
End Time	6:30 PM		Bikers- Walking	0	0	0	2	0	0	0	2
Recorder	Britt		Jogger	0	0	0	0	0	0	0	0
			Skateboard	0	0	0	0	0	0	0	0
			Pulling Handtruck	0	0	0	0	0	0	0	0
			Walk with dog	0	0	0	0	0	0	0	0
			Walk with Stroller	0	0	0	0	0	0	0	0
			Walk with Child Cart	0	0	0	0	0	0	0	0
											0
											0
											0
			Totals	0	18	0	79	2	18	0	**117**

Totals

Type	J- to left	Nursing Home	J- left mid	Elliott Street	J- right mid	Alumni Center	J- right	Totals
Walkers	17	181	9	581	7	225	0	1020
Bikers- Riding	4	19	1	80	4	8	1	117
Bikers- Walking	0	3	0	3	0	3	0	9
Jogger	0	1	0	0	0	0	0	1
Skateboard	0	2	1	6	0	0	0	9
Pulling Handtruck	0	1	0	0	0	0	0	1
Walk with dog	0	0	0	0	0	1	0	1
Walk with Stroller	0	0	0	0	0	1	0	1
Walk with Child Cart	0	0	0	2	0	0	0	2
								0
								0
Totals	21	207	11	672	11	238	1	**1161**

Type	Totals
Total Crosswalks	1117
Total Not Crosswalk	44

Appendix F *Bike Path Map of Keene. Source: Krafft, Landolina, Bowen; Keene State College, Department of Geography.*