Greenville Health System
Swamp Rabbit Trail: Year 2 Findings

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Funding for the following report was provided in part by the United States Environmental Protection Agency under cooperative agreement XA-95454910-0. It does not necessarily reflect the views of the Agency, and no official endorsement should be inferred. Additional support was provided by Bikes Belong through Upstate Forever and Greenville County Recreation District (GCRD) in partnership with the Greenville-Pickens Area Transportation Study (GPATS).

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Executive Summary

While there are myriad health benefits associated with regular physical activity including improved outcomes with regards to cardiovascular disease, diabetes, cancer, weight control, cognitive function, mental health problems, and all-cause mortality, sedentary behavior and inadequate physical activity remains a public health concern. The US Task Force on Community Preventive Services recommends the creation of or enhanced access to open space like recreational trails combined with informational outreach activities as an effective method for increasing physical activity in communities. Community designs offering access to recreational trails promote active living and contribute to local economies.

The Greenville Health System Swamp Rabbit Trail (GHS SRT) provides accessible open space designed to promote active living and multi-modal transportation options. The findings from this second year report were collected on the GHS SRT segment from North Greenville Medical campus of the Greenville Health System in Travelers Rest to Linky Stone Park in Downtown Greenville. The GHS SRT provides Greenville County residents and tourists with an array of opportunities to actively commute to varying destinations, while promoting health and economic activity.

The development of the GHS SRT was a conscious strategy by Greenville County and City officials to intervene on risky behaviors linked to inactivity and obesity and offer additional transportation options, while promoting economic development. To successfully measure the contextual elements impacting trail user patterns on the GHS SRT, five modes of evaluation were utilized: (1) systematic observation utilizing momentary time sampling techniques (e.g., direct observation) during 4 days each season for a total of 16 days; (2) intercept surveys on the GHS SRT; (3) Random Digit Dial (RDD) surveys of Greenville County residents; (4) focus groups; and (5) interviews of businesses in close proximity to the trail.

The overall purpose of the evaluation is to (a) determine whether key target populations in Greenville, South Carolina are utilizing the GHS SRT to increase their physical activity or for active transportation; and (b) obtain data on which to base future community infrastructure investments on the GHS SRT to promote health, alternative transportation, and economic activity. The evaluation period for the Year 2 report was from July 1st, 2011 to June 30th, 2012.

Summary of Direct Observation Findings for Year 2

In Year 1, 15,751 trail users were observed on the GHS SRT. In Year 2, 17,719 users were observed. Adjusting for seasonality, an estimated 359,314 users would have been observed on the GHS SRT (based on daily observation estimates) in Year 1. In Year 2, this number increased to 403,323 estimated users. Sixty-two percent of GHS SRT users were male and 38% were female in Year 1. A similar trend was observed in Year 2 (61% of users observed were male and 39% were female). Approximately 93% of trail users observed during the past two years were white. Only 11% of **all** GHS SRT users were children and teens in Year 1, however, in Year 2 this number increased to 14%.

Figure 1: Percent of GHS SRT Users for Gender (Year 1)

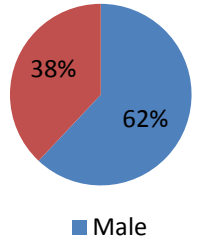


Figure 2: Percent of GHS SRT Users for Age (Year 1)

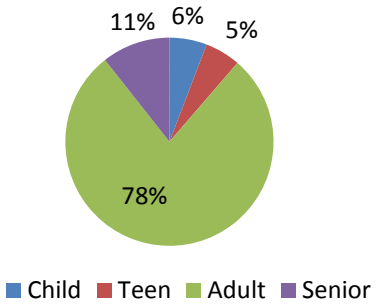


Figure 3: Percent of GHS SRT Users for Ethnicity (Year 1)

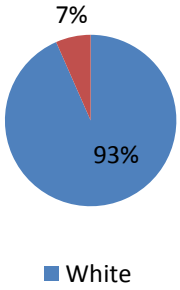


Figure 4: Percent of GHS SRT Users for Gender (Year 2)

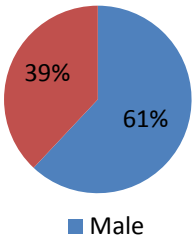


Figure 5: Percent of GHS SRT Users for Age (Year 2)

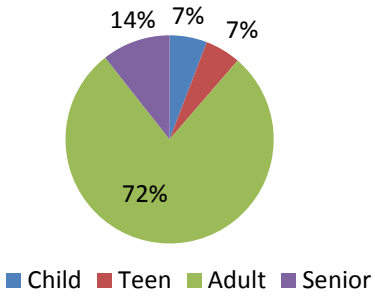
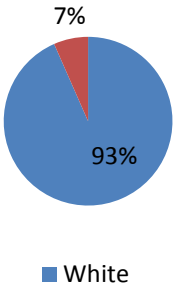


Figure 6: Percent of GHS SRT Users for Ethnicity (Year 2)



Other significant findings from Direct Observation for Year 1 and Year 2:

- 83% of all males observed on the GHS SRT in Year 1 were bicyclists compared to 73% of all females. In Year 2, 82% of males were cyclists compared to 72% of all females.
- Nearly 15% of females were observed walking on the GHS SRT compared to 7.7% of males for Years 1 and 2.
- The greatest numbers of GHS SRT users in Year 1 were observed during the summer, however, in Year 2 most trail users were observed during the spring.
- The greatest numbers of trail users were observed when the temperatures were between 61-70 degrees in Year 1. However, in Year 2 a modest increase in users was observed between 71 to 80 degrees.
- GHS SRT users in Year 1 and Year 2 tended to use the trail more frequently in the early afternoon (i.e., between the hours 12-1:30pm).

- An overwhelmingly large number of GHS SRT users chose to visit the trail on weekends (primarily Saturdays) in Year 1. This trend continued in Year 2 with Saturday (34%) and Sunday (35%) combining for all trail users observed.

- The most frequently used access point on the GHS SRT in Year 1 was Duncan Chapel Road on the campus of Furman University. In Year 2, the most frequently used access point was E. Bramlett Road located between the Elementary and Middle/High School campuses of Legacy Charter School.

- Approximately 50% of adult male and female trail users were not wearing helmets when bicycling on the GHS SRT in Year 1. In Year 2, approximately 46% of adult males were not wearing helmets compared to 56% of adult females failing to wear a helmet when bicycling on the trail.

Summary of Intercept Survey Findings for Year 1 and Year 2

Intercept surveys were administered to 1,161 trail users in Year 1. The number of intercept surveys administered in Year 2 increased to 1,501. The key findings from these surveys are outlined below:

- Approximately 55% of female and 77% of male intercept survey respondents were bicycling when asked to complete the survey in Year 1. This finding was consistent with the direct observation findings. In Year 2, 64% of female and 78% of male intercept survey respondents were bicycling when asked to complete the survey.

- The majority of female (59%) and male (57%) respondents resided less than 15 minutes from the trail in Year 1. Similar trends were found in Year 2; 57% of females and 58% of males surveyed resided less than 15 minutes from the trail.

- The majority of female (64%) and male (56%) respondents used a motorized vehicle to access the trail in Year 1. The percentages of female (63%) and male (56%) respondents using a motorized vehicle to access the trail in Year 2 was similar to Year 1 findings.

- The majority of GHS SRT users tended to spend between 1 and 2 hours on the trail per visit when using it for recreation in Year 1 and Year 2.

- Approximately 71% of females and 68% of males reported the maintenance of the GHS SRT was ‘excellent’ in Year 1. In Year 2, a similar trend was observed with 74% of females and 67% of males reporting the maintenance of the trail as ‘excellent’.

Summary of RDD Findings for Year 1 and Year 2

In addition to intercept surveys, a Random Digit Dialing (RDD) survey in Year 1 was administered to 500 Greenville County residents to identify barriers and determinants linked to GHS SRT use and non-use. The RDD survey was administered to 726 respondents in Year 2. The response rate was 35%. In Year 1, non-users frequently cited lack of awareness of the GHS SRT and perceived inconvenience as the reasons they did not use the trail. Trail users, on

average, resided approximately two miles closer to the GHS SRT than non-users. In Year 2, trail users continued to reside in closer proximity to the trail than non-users.

Only 36% of the non-trail users chose one of the reasons listed as a reason why they do not use the trail. When respondents' chose "other", they were requested to specify their "other" reason. The most common reasons for not using the trail included being too busy (e.g., "just too busy to add it into the weekly schedule"), having physical limitations (e.g., "can't walk well enough," "having back problems," "in a wheel chair").

Age category and education level **did** significantly predict trail use in the previous six months. Specifically, the odds of using the trail in the previous six months were greater among adults compared to older adults and greater among those with a high school degree or college degree than those with less than a high school degree.

Almost all trail users reported using the trail for recreation purposes (89.5%) rather than for transportation (2.2%) or both recreation and transportation (8.3%). Therefore, trail use among the 177 respondents who reported they have used the trail for recreational purposes was further examined. When using the trail for recreation, 2.8% of respondents used the trail for less than 30 minutes, 29.4% used the trail for 30-59 minutes, and 67.8% used the trail for 60 minutes or more. On average, respondents used the trail for recreational purposes for 1.04 days each week with 15.3% using the trail for at least three days per week.

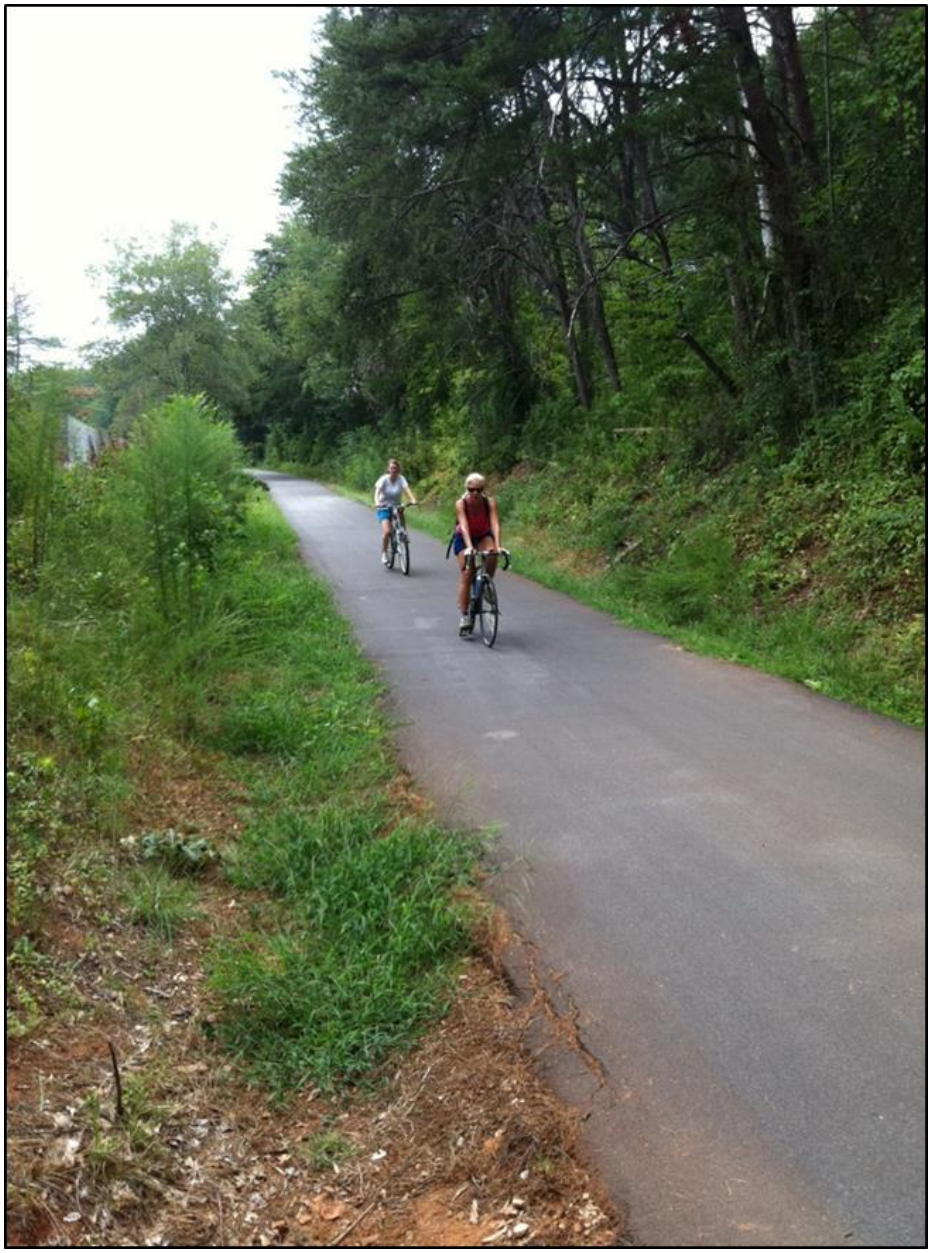
Summary of Focus Groups and Business Interviews for Year 1 and Year 2

Nineteen adult GHS SRT users participated in two focus groups (13 males; 6 females) in Year 1. All participants were white and 79% held a college degree. The median household income of the participants was $80,000 or greater; and 78% of participants reported their relationship status as married. Focus group participants in Year 1 reported the GHS SRT to be one of Greenville's primary assets that should be used for promoting health among youth and adults. Focus group participants in Year 1 suggested using the trail as a marketing tool to recruit new business and to showcase Greenville County. Participants cited its accessibility for recreation, transportation, and physical activity as its best feature. Fifteen adult GHS SRT users participated in two focus groups (7 female; 8 male) in Year 2. Approximately 73% of focus group participants resided within 1 mile of the trail. Approximately 57% of focus group participants in Year 2 reported a median household income of $80,000 or more and 71% of participants were married. Approximately 93% of focus group participants in Year 2 were white and 80% held a college degree.

Trail-based tourism has been found to provide a variety of economic advantages to communities. In Year 1 a total of nine managers/owners of retail businesses directly abutting and/or within close proximity to the GHS SRT were interviewed. Most businesses reported increases in sales/revenue ranging from 30% to as high as 85%. Use of business parking by trail users that did not visit their business was the most frequently cited disadvantage of having a business abutting and/or near the GHS SRT.

Twenty managers/owners of retail businesses directly abutting and/or within close proximity to the GHS SRT were interviewed in Year 2, including five retail bicycle shops. The majority of the businesses surveyed in Year 2 reported increases in sales/revenue ranging from 5% to as high as 100% (avg. = 47%). Five new businesses decided to open as a result of the trail being built

and/or changing location(s) because of their desire to be closer to the trail. Businesses that relocated observed a 30% to 90% increase in sales in Year 2. Annual Revenue from trail users ranged from $50,000 to $400,000 (avg. = $111,250) in Year 2 according to managers/owners surveyed.



1 Introduction

Physical inactivity is a significant public health concern. Currently, the majority (51%) of Americans do not meet national physical activity recommendations. Successful efforts to promote participation in regular physical activity are needed as physical inactivity has been linked to a variety of health problems including cardiovascular disease, diabetes, cancer, excess weight, and mental health problems, such as anxiety and depression[1-2].

Public health professionals have recognized the importance of ecological approaches to promote behavior change. Ecological approaches extend beyond frequently used behavior change strategies targeting individuals to address additional influences such as public policy and physical environments[3-5]. One such example is the creation of a greenway trail[6-10].

The development of the Greenville Health System Swamp Rabbit Trail (GHS SRT) is an excellent example of how creating a trail can modify physical activity, recreation and transportation behaviors while contributing to local economies. The GHS SRT, as defined for this Year 2 report, links the North Greenville Medical campus of the Greenville Health System in Travelers Rest along the Reedy River to Linky Stone Park in Downtown Greenville, SC.

1.1 Active Transportation Using Trails/Greenways

Although a limited number of studies have examined impact of trail creation on active transportation (i.e., walking and bicycling for transportation purposes) and corresponding links to health outcomes, findings from Year 1 and Year 2 demonstrate the importance of continued monitoring of this behavior. The potential to reduce the incidence of obesity and cardiovascular disease risk factors, as well as contribute to overall physical activity levels[11-14] from active transport could be significant.

The Theory of Planned Behavior is the common framework used to examine the influences on travel behaviors[11-15]. Despite the health benefits of regular physical activity, only 6% of trips are completed by foot or bicycle in the US and these trips have recently decreased[14]. National trends demonstrate that 31% of trips 1 mile or less are made by bicycling or walking and only 4% of all trips between 1 and 3 miles are done by walking or biking. According to the National Household Travel Survey, increasing the share of walking or biking trips between 1 and 3 miles from 4% to 10% would avoid 21 billion miles of driving per year[15].

The Transportation Research Board/Institute of Medicine concluded that there is substantial evidence supporting how trail creation can promote active transportation[16]. Greenville County's development of trails, such as the GHS SRT, can and does promote daily bouts of "life style" activity to meet current activity recommendations and positively affecting transportation trends in the communities where such trails are located. For approximately $50 million, the price of a single mile of four-lane urban highway, hundreds of miles of bicycle and pedestrian infrastructure can be built[16].

1.1.1 Safe Routes to School

The Safe Routes to School (SRTS) program is designed to encourage active and safe transportation for children to school. It was launched in 2005 by the Federal *Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users*[16]. To qualify for SRTS funds these programs must have used at least 70% but no more than 90% of the funds on

infrastructure-related projects, which may include sidewalk improvements, traffic-calming measures, bicycle lanes, and bike racks[17]. Non-infrastructure related projects may include student and parent education, public awareness campaigns, and traffic enforcement[18-19].

Walking to school may only contribute to a portion of the recommended levels of daily physical activity needed for optimal health, but those children who walk participate in significantly more activity than those who do not[20-21]. According to some researchers this is enough activity to "fend" off excess weight gain[22]. With many youth in South Carolina sedentary throughout the day, the GHS SRT - and its close proximity to AJ Wittenberg Elementary School, Legacy Charter School, Travelers Rest High School and Furman University for example - can provide opportunities for children, teenagers and college students to actively travel to and from school to increase their levels of daily activity.

1.2 Economic Impact of Open Space, Greenways and Recreational Trails

Consumers are willing to pay a premium to reside in walkable communities with open space[23]. A review of over 60 studies examining the impact open spaces have on residential property values found that most open spaces increase property values. The magnitude of the increased value depends on the size of the area, the proximity to residences, the type of open space, and the method of analysis[24].

A study examining data from departments of transportation and public works departments from 11 cities in the US entitled *Using Pedestrian and Bicycle Infrastructure: A National Study of Employment Impacts*[25] evaluated 58 separate projects. The report found that bicycling infrastructure (e.g., bicycle lanes) creates the most jobs for a given level of spending - for each $1 million spent, the bicycle projects create 11.4 jobs within the state where the project is located. Pedestrian-only projects (e.g., sidewalks) create an average of about 10 jobs per $1 million invested. Multi-use trails (e.g., greenways) create 9.6 jobs per $1 million invested. Infrastructure that combines road construction with pedestrian and bicycle facilities create fewer jobs than pedestrian and bicycle projects. Automobile-only road projects create the least number of jobs per $1 million spent - 7.8 jobs per $1 million[25].

Another recent study examining the economic impact of the Little Econ Greenway, West Orange and Cady Way Trails in Orange County, Florida supported 516 jobs and had an estimated positive economic impact of $42.6 million on the area. A second economic impact analysis was conducted to analyze the economic impact of business activities in Downtown Winter Garden and consumer spending related to trail usage on the West Orange Trail in Orange County, Florida[26]. Based on 31 Downtown Winter Garden businesses surveyed, the average sales revenues were $470,000, bringing total business sales to $14.6 million. A similar study, the Great Allegheny Passage Economic Impact Study, concluded 25.5% of gross revenue was directly attributed to trail users[26]. This conservative number (25% of sales coming from trail users) according to the report by Florida officials revealed that $3.6 million in sales resulted purchases by trail users[26].

A national survey of developers revealed consumer interest in higher density, mixed use, pedestrian-oriented alternatives to conventional, low-density, automobile-oriented suburban development[27-28]. A survey of 2,000 homebuyers, conducted by the National Association of Homebuilders and National Association of Realtors, indicated that walking/jogging and bike

trails rank "important to very important" behind highway access. Trails consistently rank in the top five important amenities in making real estate purchase decisions[29].

1.3 Trails and Health

Efforts to create trails such as the GHS SRT that promote and encourage physical activity have been successful in various settings[29-32]. Understanding all influences related to trail use will assist researchers, practitioners and policy makers in efforts to better understand the impact that public policy, social systems, and infrastructure[33-37] have on physical activity adherence. Accessibility to no-cost facilities that support physical activity (like the GHS SRT) has been linked to physical activity participation[38-40].

The Centers for Disease Control and Prevention (CDC) Task Force on Community Preventive Services recommended that efforts aimed at promoting walking and bicycling should include access to trails to encourage physical activity[40], and identified trails as integral infrastructure for physical activity[41-48]. Community infrastructure is often considered a foundation for health and wellness and affects decisions related to health outcomes. Trails are examples of infrastructure associated with regular physical activity participation[42-48].

The Task Force on Community Preventive Services recommends that the creation of trails be paired with efforts to promote the trail to increase awareness and use of the trail for physical activity[40]. Those promoting the trail might consider highlighting some of the trail features preferred by trail users in this study and previous studies[16] such as the trail's convenient location, beauty, and design. In regards to barriers to trail use, trail users frequently mentioned being too old, too busy, not interested, and having physical limitations. Those managing and promoting trails might consider providing environmental supports[37-39] to enable older adults and those with physical limitations to use trails, such as smooth trail surfaces for wheelchairs, and benches and shaded areas for resting.

In 2008, Reed and colleagues[48] examined the activity behaviors in 25 parks in Greenville County and found that trails were the most frequently used amenity. Sixty-percent of adult males and 81% of adult females observed in all 25 parks were on trails. The development of and increased access to trails, has been frequently advocated by researchers and policy makers alike to promote regular physical activity[42-47, 49]. Librett and colleagues[50] examined the physical activity levels among trail users in the US and found that individuals who reported using trails at least once a week were twice as likely to meet physical activity recommendations as individuals who reported rarely or never using trails.

1.3.1 Sedentary Living: A National Problem

Participation in regular physical activity is a preventive behavior, reducing the risks of chronic disease (including diabetes) and increasing quality, and perhaps length of life[51]. Less than 50% of American adults meet current activity recommendations[52]. Therefore, it should not come as a surprise that so many children are overweight and inactive. Physical activity declines precipitously once children enter adolescence[53-55]. Females of all ages are less active than males of the same age.

First Lady, Michelle Obama launched in early 2010 the Let's Move Initiative to reduce childhood obesity. Let's Move was followed by the White House's Task Force on Childhood Obesity action plan to fight against childhood obesity. With approximately 25 million American

children overweight or obese[40,54-55] and few youth meeting the daily physical activity recommendations, substantial progress is this area is greatly needed. Participating in regular physical activity, a widely accepted preventive behavior, not only contributes to overall health of but can also reduce the prevalence of overweight and obese youth.

1.3.2 Recommendations for Physical Activity by Age Group

According to the *2008 Physical Activity Guidelines for Americans*[52], the following updated guidelines are recommended for youth, adults and seniors:

Recommended Guidelines for Youth, Adults and Seniors

Adults	• Should participate in at least 150 minutes (2 hours and 30 minutes) of moderate-intensity activity per week, or 75 minutes (1 hour and 15 minutes) of vigorous-intensity physical activity per week, or an equivalent combination of moderate- and vigorous- intensity activity. • Additional health benefits possible through greater amounts of physical activity (i.e., 300 minutes (5 hours) of moderate-intensity per week, or 150 minutes of vigorous-intensity aerobic physical activity per week, or an equivalent combination of moderate- and vigorous-intensity activity).	• Moderate intensity activities that raise the heart rate, including brisk walking (3-4 mph) gardening, climbing stairs, housework. • Should be performed in bouts of at least 10 minutes, and preferably, it should be spread throughout the week. • Can be accumulated from leisure, occupational, or transportation.
Older Adults	• Adult guidelines apply, unless health conditions prevent older adults from performing 150 minutes a week. • Should be as physically active as their abilities and health conditions allow.	
Children and Adolescents	• Should participate in 1 hour or more of at least moderate-intensity activity every day. • At least three times a week, some of these activities should be vigorous-intensity, and help to enhance and maintain muscular strength, flexibility, and bone health.	• Important to encourage physical activities that are age appropriate, enjoyable, and offer variety.

Meeting activity recommendations links physical activity to the strongest health benefits. Since the majority of the US population is inactive and susceptible to greater health risks, the greatest potential for reducing the public's risk is by promoting those who are sedentary to become moderately active, rather than promoting more activity among those already active[54-55]. According to recent reports, increasing physical activity to recommended levels would prevent approximately 150,000 deaths from cardiovascular disease, over 20,000 deaths from cancer, and 20,000 deaths from diabetes each year[56].

The most impactful way to ensure that all individuals have daily physical activity opportunities is to implement the US National Activity Plan released in 2010. The Plan's vision is that one day, all Americans will be physically active and will live, work, and play in environments facilitating regular physical activity[57].

The Plan is a comprehensive set of policies, programs, and initiatives designed to increase physical activity in all segments of the population. The Plan seeks to create a national culture that supports physically active lifestyles that will improve health, prevent disease and disability, and enhance quality of life of all Americans in all age groups[57].

1.3.3 Health in South Carolina: Adults and Youth

Approximately 43% of South Carolina middle school youth recently reported three or more hours of sedentary time per school day from television alone. Furthermore, twice as many African American middle school students (62.4%) reported three or more hours of sedentary time per school day from television alone as white middle school students (30.6%)[58]. The GHS SRT can provide opportunities for recreation and transportation activity to limit the negative consequences of daily sedentary behaviors exhibited by South Carolina youth. Approximately, 76% of African American adults in South Carolina are overweight and/or obese[58] compared to 64% of white adults[58]. Approximately 49% of African American adults are insufficiently active and 24% report no physical activity participation[58].

Findings from the South Carolina Obesity Burden Report[58] disseminated in 2011 found that 30% of all South Carolina high school students were either overweight or obese, with males (32.3%) more likely to be overweight or obese than females (26.8%). Although 16.3% of all high school students were considered overweight, the percent of female students who were overweight (18.4%) was greater than the percent of male students who were overweight (14.3%).

There were differences by race/ethnicity for both overweight and obese. Though 16.3% of all SC high school students were considered overweight, the percent of African American high school students who were overweight (23.4%)[58-60] was greater than the percent of overweight among their white counterparts (12.6%). This disparity increases when considering high school students who are obese. While 13.3% of all high school students are considered obese, the percent of African American students who were obese (17.6%) was also greater than the percent of overweight students among their white counterparts (9.9%)[58].

South Carolina is one of the nation's leaders in the percentage of children (50%) who do not participate in afterschool team sports or lessons[59] and 83% of high school students currently do not attend daily physical education when in school. Furthermore, 65% of high school students currently do not attend physical education classes in an average week. The CDC's State Indicator Report on Physical Activity for 2010[59-60] found that only 20% of high school students are physically active.

1.3.4 Health in Greenville: Adults and Youth

Approximately 48% of adults in Greenville County do not participate in moderate-intensity physical activity as defined by current activity guidelines[61]. Data collected by the Greenville County School District (with support from the Piedmont Healthcare Foundation in collaboration with Furman University and LiveWell Greenville) found that 36% of white youth, 44% of Hispanic youth, and 49% of African American youth are overweight and/or obese[62].

2 Evaluation Methods for Active Transportation Usage, Economic Impacts, and Usage Characteristics of the GHS SRT for Year 1 and Year 2

The GHS SRT evaluation process was designed to obtain objective quantifiable information about active transportation use, economic impact, and usage characteristics (including demographics and physical activity intensity levels) of trail users. Within this research field, examining the multitude of user behaviors continues to be difficult due to the lack of objective measures of activity intensity in specific ecological contexts. Therefore, to successfully measure the contextual elements impacting user patterns, objective methodologies in concert with survey methods were utilized.

This information was collected in Year 1 and Year 2 through five modes: (1) systematic observation using momentary time sampling techniques (e.g., direct observation 4 days each season for a total of 16 days; (2) intercept surveys on the GHS SRT; (3) Random Digit Dial (RDD) survey methods of Greenville County residents; (4) focus groups; and (5) interviews of businesses in close proximity to the GHS SRT. The purpose of the overall evaluation was to (a) determine whether key target populations in Greenville are utilizing the GHS SRT to increase their physical activity levels and/or for transportation purposes; and (b) obtain data on which to base future infrastructure improvements on the GHS SRT.

3 GHS SRT Intercept Survey Results for Year 1 and Year 2

A brief (5 to 10 minutes) valid and reliable survey[10] comprised of 15-17 interviewer administered questions was used to assess users' perceptions of the GHS SRT. No identifiable information of the respondent was solicited and Internal Review Board (IRB) procedures protecting human subject confidentiality were strictly followed. The survey was designed to provide practitioners, researchers, along with Greenville County and City officials, the ability to collect objective information on a variety of users. The survey included questions related to patterns of GHS SRT use (both recreation and transportation). Specific items concerning the length of time using the GHS SRT, time spent on the GHS SRT, origin (e.g., home or work) when accessing the GHS SRT, distance and time from home and work to the GHS SRT, mode of transportation to the GHS SRT and the usual reason for using the GHS SRT (e.g., recreational physical activity or transit) were included. Five separate questions were asked for recreational and transportation activity. Four additional questions focused on whether the respondent visited the GHS SRT alone or with someone else (e.g., friend, family and/or pet), perceptions of GHS SRT maintenance and safety, and perceived impacts of GHS SRT use on respondent physical activity. The survey also included demographic items such as: age, gender, ethnicity, and highest educational level attained.

Year 1 Findings: One-thousand one hundred and sixty-one (1,161) respondents completed the survey in Year 1. All respondents were at least 18 years old. Approximately 55% of female (N=258) and 77% of male (N=523) survey respondents were bicycling when asked to complete the survey. This finding is consistent with the direct observation findings (see Section 4). The majority of female (59%) and male (57%) respondents resided less than 15 minutes from the trail. The majority of female (64%) and male (56%) respondents used a motorized vehicle to access the trail. GHS SRT users tend to spend between 1 and 2 hours on the trail per visit when using it for recreation. In addition, approximately 71% of females and 68% of males believed the maintenance of the GHS SRT was 'excellent'. Of those surveyed, less than half (40.9%) were

female, 93.1% were white, and 84.2% were adults. When asked why they were using the trail, the majority (91%) of trail users reported they were using the trail for exercise. Two percent said they were using the trail for transportation and 7% said they were using the trail for both recreation and transportation purposes. On average, trail users traveled 9.2 miles to get to the trail with a range of 0 miles to 87 miles in Year 1. Trail users in Year 1 learned about the trail by word of mouth (54.2%), followed by newspaper (13.8%) and driving by the trail (10.5%).

Specifically, a greater proportion of older adults than adults reported learning about the trail through the convention bureau. In addition a greater proportion of whites than persons of other ethnic groups reported learning about the trail through word of mouth and the newspaper; whereas, a greater proportion of those of other racial/ethnic groups compared to whites reported learning about the trail when they drove by it. Finally, a greater proportion of females than males learned about the trail through word of mouth and signs for the trail; whereas a greater proportion of males than females learned about the trail through the newspaper and other channels.

An overwhelming majority (95%) of respondents were white, also consistent with GHS SRT's direct observation findings. Approximately 93% GHS SRT female respondents used the trail primarily for exercise or recreation. Similarly, 90% of males reported using the trail for exercise and recreation. Approximately 6% of all GHS SRT users reported using the trail for transportation purposes, which is considerably higher than the 2.7% of Greenville County residents who reported 'walking' or using 'other means' to commute to and from work in the 2009 American Community Survey.

Year 2 Findings: One-thousand five hundred and one (1,501) respondents completed the survey in Year 2. All respondents were at least 18 years old. Approximately 65% of female (N=359) and 78% of male (N=726) survey respondents were bicycling when asked to complete the survey. This finding is consistent with the direct observation findings (see Section 4). The majority of female (57%) and male (58%) respondents resided less than 15 minutes from the trail. The majority of female (63%) and male (57%) respondents used a motorized vehicle to access the trail. GHS SRT users tend to spend between 1 and 2 hours on the trail per visit when using it for recreation. In addition, approximately 74% of females and 67% of males believed the maintenance of the GHS SRT was 'excellent'.

An overwhelming majority of female (91%) and male (94%) respondents were white, also consistent with GHS SRT's direct observation findings. Approximately 89% GHS SRT female respondents used the trail primarily for exercise or recreation. Similarly, 86% of males reported using the trail for exercise and recreation. Although Linky Stone Park was the most frequently cited access point in Year 2 based on intercept survey data, it is important to note that the trail was frequently accessed in Travelers Rest in addition to Downtown Greenville (see Figure 7). Frequency and percent of most frequently cited intercept survey response(s) for Year 1 and Year 2 are listed in Table 1 below. Trail users in Year 2, similar to Year 1 most often learned about the trail through word of mouth (53.5%) followed by the newspaper (14.7%), and driving by the trail (13.4%).

Table 1: Frequency and Percent of Most Frequently Cited INTERCEPT Survey Response(s) for Year 1 and Year 2

Num.	Survey Question	Gender	Most Frequently Cited Response(s) Year 1	Frequency (%)[#] Year 1	Most Frequently Cited Response(s) Year 2	Frequency (%)[#] Year 2
1	Identify the physical activity respondent is doing.	Female Male	Bicycling* Bicycling*	258(54.5%) 523(76.2%)	Bicycling* Bicycling*	359(64.7%) 726(77.8%)
1a	Identify who the person is on the trail with.	Female Male	With others With others	308(64.8%) 344(50%)	With others Alone	364(65.7%) 502(53.8%)
2	Identify gender	Female Male	NA NA	475(41%) 686(59%)	NA NA	555(37%) 934(63%)
3	When was the first time you used this trail?	Female Male	12 to 16 months ago 12 to 16 months ago	245(51.6%) 376(54.8%)	12 to 16 months ago 12 to 16 months ago	161(29.1%) 271(29.0%)
4	Where are you usually coming from when you use this trail?	Female Male	Home Home	400(84.2%) 579(84.4%)	Home Home	478(86.1%) 797(85.3%)
4a	How much time does it usually take to get to this trail from your home?	Female Male	Less than 15 minutes Less than 15 minutes	281(59.2%) 390(56.9%)	Less than 15 minutes Less than 15 minutes	315(56.8%) 541(57.9%)
4b	How much time does it usually take to get to this trail from your work?	Female Male	Less than 15 minutes Less than 15 minutes	21(70.0%) 59(70.2%)	Less than 15 minutes Less than 15 minutes	18(49.0%) 75(77.3%)
5	How do you usually get to this trail?	Female Male	Car or other vehicle Car or other vehicle	305(64.2%) 381(55.5%)	Car or other vehicle Car or other vehicle	347(62.5%) 520(55.7%)
6	What is your usual reason for using this trail?	Female Male	Exercise or do recreational physical activity Exercise or do recreational physical activity	440(92.6%) 615(89.7%)	Exercise or do recreational physical activity Exercise or do recreational physical activity	496(89.4%) 801(85.8%)
6a	During the past 7 days (including today), how many days have you used this trail	Female Male	One day One day	225(47.4%) 267(38.9%)	One day One day	261(47.0%) 370(40.8%)

	for exercise or recreational purposes?					
6b	What exactly do you usually do when you are on this trail for exercise or recreational purposes?	Female Male	Bicycle* Bicycle*	226(47.6%) 470(68.5%)	Bicycle* Bicycle*	327(58.9%) 664(71.1%)
6c	How much time do you usually spend on the trail per visit when you use it for exercise or recreational purposes?	Female Male	Between 1-2 hours Between 1-2 hours	236(49.7%) 353(51.5%)	Between 1-2 hours Between 1-2 hours	232(41.8%) 445(47.6%)
6d	During the past 7 days (including today), how many days have you used this trail for transportation purposes (to get somewhere)?	Female Male	See Table 2	See Table 2	See Table 2	See Table 2
6e	What activity do you usually do when you are on this trail for transportation purposes?	Female Male	See Table 2	See Table 2	See Table 2	See Table 2
6f	How much time do you usually spend on the trail per visit when you use it for transportation purposes?	Female Male	See Table 2	See Table 2	See Table 2	See Table 2
7	Who are you usually with when you use this trail?	Female Male	Family Nobody/by myself	161(33.9%) 261(38.1%)	Family Nobody/by myself	236(42.5%) 423(45.3%)
8	In your opinion, the maintenance of the trail is EXCELLENT, GOOD, FAIR or POOR?	Female Male	EXCELLENT EXCELLENT	334(70.5%) 463(67.6%)	EXCELLENT EXCELLENT	412(74.2%) 629(67.3%)
9	In your opinion, the safety and security along the trail is EXCELLENT, GOOD, FAIR or POOR?	Female Male	EXCELLENT EXCELLENT	179(37.8%) 278(40.6%)	GOOD EXCELLENT	229(41.3%) 418(44.8%)

10	How did you find out about this trail?	Female Male	Word of mouth Word of mouth	230(48.4%) 291(42.5%)	Word of mouth Word of mouth	290(52.3%) 473(50.6%)
11	What do you like most about this trail?	Female Male	Free place to exercise Free place to exercise	96(20.3%) 149(21.8%)	Free place to exercise Free place to exercise	138(24.9%) 247(26.4%)
12	What is your age?	Female Male	Between 18 and 34 Age 35 and older	295(25%) 878(75%)	Between 18 and 34 Age 35 and older	339(22.7%) 1,115(74.3%)
13	Are you Hispanic or Latino?	Female Male	No No	461(98.1%) 658(97.2%)	No No	524(94.4%) 873(93.5%)
14	What is your race?	Female Male	White* White*	446(94.7%) 645(95.0%)	White* White*	505(91.0%) 821(87.9%)
15	What is the highest grade in school you have completed?	Female Male	College graduate College graduate	166(34.9%) 249(36.3%)	College graduate College graduate	217(39.9%) 350(37.5%)
16	Where did you access the trail today?	Female Male	Linky Stone Park Linky Stone Park	134(28.2%) 270(39.4%)	Linky Stone Park Linky Stone Park	129(23.2%) 217(23.2%)

* Denotes consistency with direct observation findings, where applicable (see section 4).

The percentage listed for frequency refers to the percentage of respondents of a specific gender that provided the corresponding answer. For example, 64.7% of all females observed on the trail (question 1) were bicycling, while 77.8% of all males were observed bicycling in Year 2.

3.1 GHS SRT Active Transportation Findings for Year 1 and Year 2

According to the 2012 American Community Survey[63], approximately 3.2% of Greenville County residents reported 'walking' or using 'other means' (i.e., non-motorized vehicles) to commute to and from work. Respondents reporting that they "used the GHS SRT 1 to 3 days during the past 7 days for transportation purposes" significantly increased in Year 2. The vast majority of users' preferred bicycle transportation, which was consistent with the direct observation findings for Year 2. Approximately 28% of respondents using the trail for transportation spent between 1 to 2 hours on the GHS SRT in Year 2. The frequency and percent of GHS SRT Transportation Users for Year 1 and Year 2 are listed below.

Table 2: Frequency and Percent of GHS SRT Transportation Users (includes all respondents that indicated they use the trail for some type of transportation) for Year 1 and Year 2

Question Number	Survey Question	Survey Response	Freq. (%)(Year 1)	Freq. (%)# (Year 2)
6	What is your usual reason for using this trail?	To travel somewhere (e.g., to store, commute to work or school)	17(1.5%)	31(2.1%)
		Both for recreation and transportation purposes	85 (7.3%)	155(10.5%)
6d	During the past 7 days (including today), how many days have you used this trail for transportation purposes (to get somewhere)?	0	17(16.7)	32(21.3%)
		1 Day	35(34.3%)	45(68.8%)
		2 Days	11(10.8%)	22(14.7%)
		3 Days	11(10.8%)	20(13.3%)
		4 Days	4(3.9%)	8(5.3%)
		5 Days	6(5.9%)	9(6.0%)
		6 Days	2(2.0%	6(4.0%)
		7 Days	3(2.9%)	8(5.3%)
		No response	13(12.7%)	0(0.0%)
6e	What activity do you usually do when you are on this trail for transportation purposes?	Walk	7(6.9%)	13(8.1%)
		Jog or Run	0(0.0%)	6(3.7%)
		Bicycle	74(72.5%)	139(86.3%)
		In-Line Skate, roller skate or skate board	0(0%)	3(1.9%)
		Other	1(1.0%)	0(0.0%)
		NA	2(2.0%)	0(0 .0%)
		No response	18(17.6%)	0(0.0%)
6f	How much time do you usually spend on the trail per visit when you use it for transportation purposes?	Less than 15 minutes	10(9.8%)	8(5.2%)
		Between 15 to 29 minutes	7(6.9%)	27(17.6%)
		Between 30 to 44 minutes	23(22.5%)	36(23.5%)
		Between 45 to 59 minutes	10(9.8%)	21(13.7%)
		Between 1 to 2 hours	26(25.5%)	42(27.5%)
		Between 2+ and 3 hours	7(6.9%)	16(10.5%)
		Between 3+ and 5 hours	2(2.0%)	3(2.0%)
		More than 5 hours	0(0.0%)	0(0.0%)
		No response	17(16.7%)	0(0.0%)

 # The percentage listed for frequency in question 6 for Year 2 refers to the percentage of all respondents to this question (that is, of all respondents to the survey, 10.5% used the trail for both

recreation and transportation). For questions 6d-6f, the percentage represents the percentage of the 102 individuals in Year 1 or the 186 individuals in Year 2 that indicated that they use the trail for some sort of transportation purpose.

3.2 Proximity to Residence and GHS SRT for Year 1 and Year 2

Proximity to exercise facilities is an environmental support identified as a possible determinant and barrier for physical activity[1,3,8,30-32]. Troped and colleagues[11] examined factors impacting trail use and determined that travel distance to access the trail plays a significant role and should be considered when building a trail. To better understand the relationship between proximity from the GHS SRT to place of residence, GHS SRT users were asked to indicate the proximity of their residence to their preferred GHS SRT access point. Members of the research team identified themselves to each potential respondent and discussed the purpose of the research and how the data would be used. Respondents were asked their age, to ensure all respondents were 18 years or older. Respondents were also asked to identify their gender and ethnicity.

Reed and colleagues[9] examining a trail in Spartanburg, South Carolina and found that trail users lived, on average, 2.89 miles from the trail they use. Maslow and colleagues[64] found the majority of trail users live 15 minutes or less from the trail they use; although, Maslow found no significant association between proximity to the trail and frequency of trail use. A recent paper examining the relationships between proximity of recreational facilities was not associated with walking among men[65].

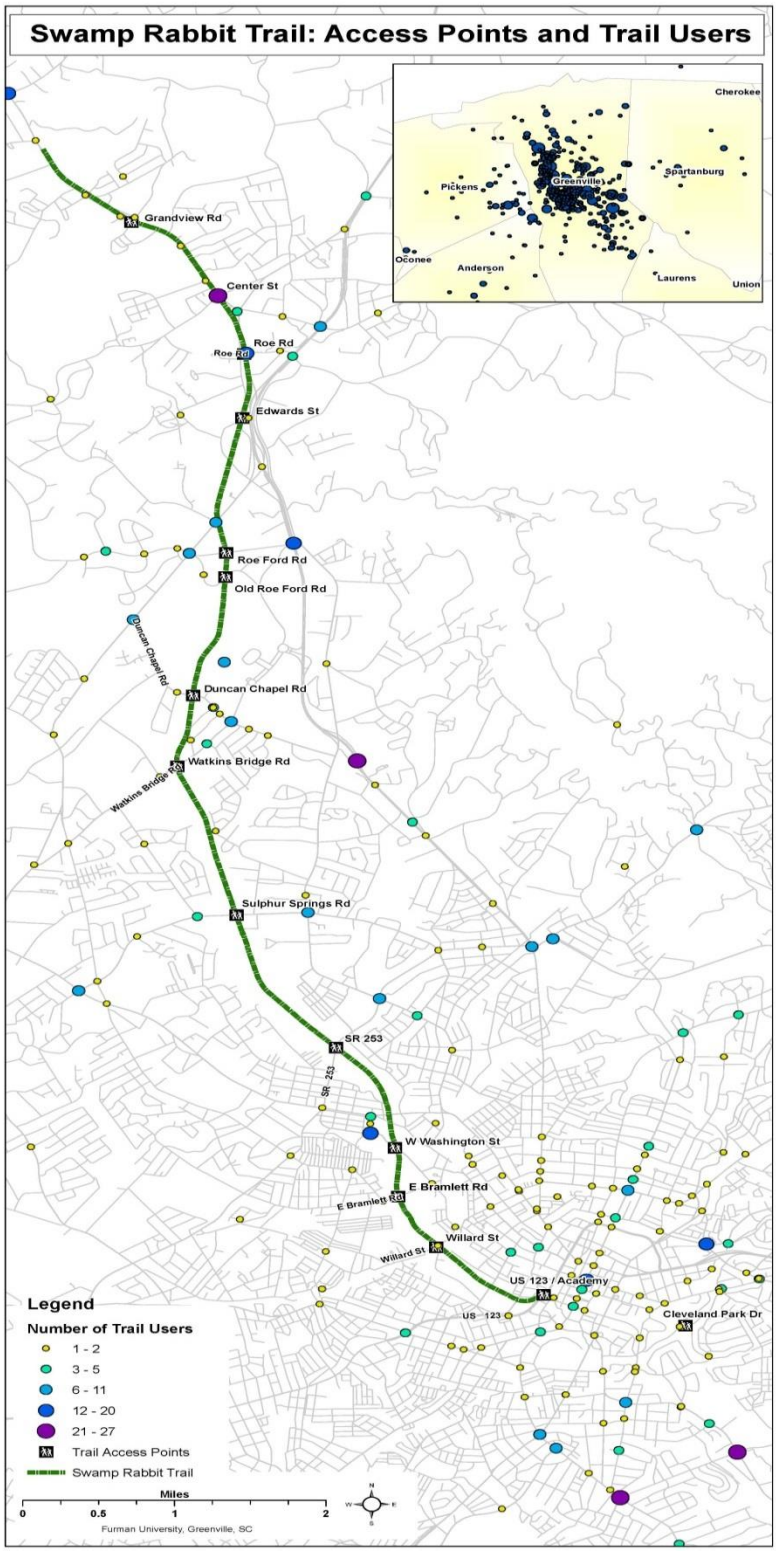
Each respondent was asked for the nearest two cross-streets of their primary residence. GPS coordinates pertaining to the residence of each respondent were registered to a common datum, converted into a spatial map, and imported into ArcView GIS to be used as a base for examining proximal relationships and determining a mileage distance from place of residence to their preferred GHS SRT access point (See Figure 7). Females resided closer to their preferred GHS SRT access point than males in Year 1. However, in Year 2 male GHS SRT users resided closer to their preferred access point. The average distance from place of residence and preferred access point on the GHS SRT for Year 1 and Year 2 is listed in Table 3.

Table 3: Average Distance from Place of Residence and Preferred GHS SRT Access Point for Year 1 and Year 2

Question	*Year*	*Gender*	*Distance (Miles)*
What are the nearest two cross streets to your residence, city and zip code?	*1*	Female (N=343)	8.48
		Male (N=461)	10.04
	2	Female (N=555)	12.09
		Male (N=932)	11.01

The average distance from place of residence and preferred GHS SRT access point for female and male users increased in Year 2. These findings suggest that awareness of GHS SRT has increased. The increased distances among male and female users in Year 2 could also be explained by users perceiving the GHS SRT as a destination along with providing a free, accessible option for exercise, recreation and transportation. Based on the intercept survey data illustrated in Figure 7, large groups of users accessed the GHS SRT on Main Street in Travelers Rest and Downtown Greenville.

Figure 7: GHS SRT Access Points and Trail User Residences for Year 2



4 Direct Observation of the GHS SRT for Year 1 and Year 2

The System for Observing Play and Recreation in Communities (SOPARC)[66] was the instrument used to objectively assess GHS SRT user demographics and physical activity behaviors. Several studies have used SOPARC in the US[42,49,67] to measure physical activity in open environments such as trails. Validity of SOPARC physical activity codes has been established through heart rate monitoring. Provided measures of persistent behaviors (i.e., physical activity) are taken at frequent intervals, momentary time sampling (i.e., specific time episodes throughout the day - e.g., 7:30am, 12:00pm, 3:30pm, 5:00pm) techniques have been shown to be valid and reliable[66]. SOPARC was selected to measure trails because: 1) it is a valid and reliable tool[66,] ; and 2) it will assist in obtaining useful information on GHS SRT users.

Open spaces have been identified in the literature as important to promoting participation in regular physical activity[68-69]. Documenting the varying types of physical activity in open spaces, like the GHS SRT, and preference of differing demographics provides invaluable information to establish priorities for infrastructure[31, 45].

4.1 Observer Preparations for Direct Observation on the GHS SRT

Prior to beginning the direct observation evaluations, undergraduate college students were trained as GHS SRT observers. The GHS SRT observers prepared materials that included: synchronized wristwatch, clipboard, sufficient SOPARC recording forms, and pencils. The observers arrived at the GHS SRT site at least 10 minutes prior to the official start of data collection. They reviewed the sequence for observing all trail access areas, which are places where individuals could enter and exit the GHS SRT.

4.2 Direct Observation Procedures for the GHS SRT

Inter-rater reliability of all trained trail observers was assessed prior to participating in the present evaluation of the GHS SRT. Each observer was assessed using 30 pictures of diverse individuals performing a variety of physical activities. Each observer identified the gender, age, and race/ethnicity of the individual, plus the physical activity behavior and intensity. Observers were required to have an inter-rater reliability score of 90% or greater before field observations began.

Visual scans were made at each target area. During each scan, the physical level of each user was coded as Sedentary (i.e., lying down, sitting, or standing), Walking, Running, Rollerblading or Bicycling. Scans were made for gender, age, and ethnicity groupings. Simultaneous entries were made for time of day and temperature. Quarterly (i.e., seasonal) observations of trail users were made 4x/day (7:30am, 12:00pm, 3:30pm, 5:00pm) for 4 days (Tuesday, Thursday, Saturday and Sunday) beginning in the summer of 2011 ending in the spring of 2012. Summary frequency counts described the number of participants by gender, activity mode and level, estimated age and ethnicity groupings.

4.3 Direct Observation Results for the GHS SRT for Year 1 and Year 2

4.3.1 Overview of Demographic Trail Findings for Year 1 and Year 2

In Year 1, 15,751 trail users were observed on the GHS SRT. In Year 2, 17,719 users were observed on the trail. Adjusting for seasonality, approximately 359,314 users would have been observed on the GHS SRT (based on daily observation estimates) in Year 1. In Year 2 this number increased to 403,323 users. Sixty-two percent of GHS SRT users were male and 38% were female in Year 1. A similar trend was observed in Year 2 (61% of users observed male and

39% female). The majority of GHS SRT users tended to be white adults. Approximately 93% of trail users observed during the past two years were white. Only 11% of **all** GHS SRT users were children and teens in Year 1, however in Year 2 this increased to 14%. Demographics of GHS SRT users for gender, age and ethnicity for Year 1 and Year 2 are listed in Table 4.

Table 4: Demographics of GHS SRT Users for Gender, Age and Ethnicity for Year 1 and Year 2

		Year 1		*Year 2*	
		Frequency	*Percent*	*Frequency*	*Percent*
Gender	Male	9,722	62.0%	6,888	61.1%
	Female	6,029	38.0%	10,831	38.9%
Age	Child	925	5.8%	1,216	6.9%
	Teen	879	5.5%	1,278	7.2%
	Adult	12,267	77.8%	12,683	71.5%
	Senior	1,680	10.6%	2,501	14.1%
Ethnicity	White	14,709	93.4%	16,420	92.6%
	Other	1,042	6.6%	1,250	7.4%

4.3.2 GHS SRT Use for Age by Gender for Year 1 and Year 2

Identifying the physical activity patterns (e.g., walking, running, bicycling) in open environments, such as the GHS SRT by age and gender provides specific objective data to develop user profiles that can lead to creation of effective physical activity infrastructure. The majority of GHS SRT male and female trail users observed in Year 1 and Year 2 were adults. The number of male and female teens and seniors increased in Year 2. Frequency and percent of GHS SRT users for age by gender for Year 1 and Year 2 are listed in Table 5.

Table 5: Frequency and Percent of GHS SRT Users for Age by Gender for Year 1 and Year 2

	Year 1		*Year 2*	
	Frequency (%)	*Frequency (%)*	*Frequency (%)*	
Age	*Female*	*Male*	*Female*	*Male*
Child	380(6.3%)	545(5.6%)	505(7.3%)	708(6.5%)
Teen	375(6.2%)	504(5.2%)	591(8.6%)	686(6.3%)
Adult	4,773(79.2%)	7,494(77.1%)	4,960(72.0%)	7,718(71.3%)
Senior	501(8.3%)	1,179(12.1%)	809(11.7%)	1,691(15.6%)

4.3.3 GHS SRT Use by Activity Intensity for Year 1 and Year 2

Activity intensity has been linked to a variety of health outcomes with more intense activities providing greater health benefits. Eighty-three percent of all males observed on the GHS SRT in Year 1 were bicycling compared to 73% of all females observed. Approximately 15% of females were walking on the GHS SRT compared to only 7.7% of males in Year 1. Similar findings among males and females were observed in Year 2 as well. Bicycling remained the most common activity observed among males and females on the GHS SRT in Year 2. Similarly, walking was more popular among females compared to males. A greater percentage of bicyclists were observed at the E. Bramlett access point in Year 2. Although most Americans are not regularly active, walking is the most common form of activity[70]. Eyler and colleagues[70] examined the epidemiology of walking in the US using the US Physical Activity Study and

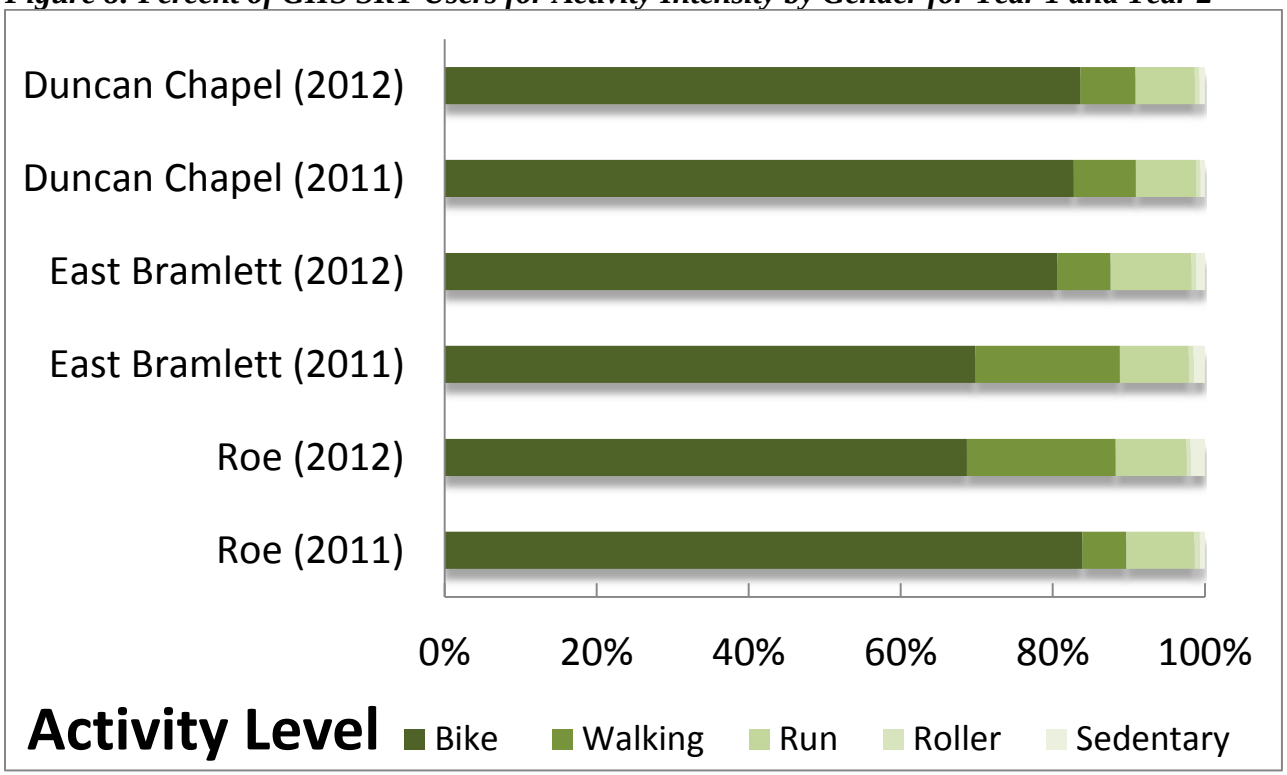
found that approximately 34% of the American population reports that they are regular walkers and 46% are occasional walkers.

Bicycling is the second most popular activity in the US. This finding supports the large numbers of bicyclists observed on the GHS SRT in Year 1 and Year 2. Frequency and percent of GHS SRT users for activity intensity by gender per selected access point are listed in Table 6 and Figure 8.

Table 6: Frequency and Percent of GHS SRT Users for Activity Intensity by Gender for Year 1 and Year 2

	Year 1		*Year 2*	
Gender	*Activity Intensity*	*Frequency (%)*	*Activity Intensity*	*Frequency (%)*
Female	Sedentary	75(1.2%)	Sedentary	130(1.9%)
	Walking	916(15.2%)	Walking	1,013(14.7%)
	Running	604(10.0%)	Running	750(10.9%)
	Rollerblading	26(0.4%)	Rollerblading	37(0.5%)
	Bicycling	4,390(73.0%)	Bicycling	4,948(71.8%)
Male	Sedentary	65(0.7%)	Sedentary	138(1.3%)
	Walking	744(7.7%)	Walking	831(7.7%)
	Running	744(7.7%)	Running	972(9.0%)
	Rollerblading	71(0.7%)	Rollerblading	67(0.6%)
	Bicycling	8,056(83.2%)	Bicycling	8,808(81.2%)

Figure 8: Percent of GHS SRT Users for Activity Intensity by Gender for Year 1 and Year 2



4.3.4 GHS SRT Use by Ethnicity and the Role of Awareness and Accessibility for Year 1 and Year 2

Approximately 7% of all GHS SRT users observed in Year 1 and Year 2 were minorities; however up to 28% of the population residing in census tracts abutting the GHS SRT from Travelers Rest to downtown Greenville are minorities. Based on findings from previous research, the relative prevalence of walking on trails is higher among African Americans and other ethnic groups when compared to regular and occasional white walkers[70]. This was not consistent with the direct observation GHS SRT findings for Year 1 and Year 2, suggesting that barriers exist to minority usage of the GHS SRT. Frequency and percent of GHS SRT users for gender by ethnicity for Year 1 and Year 2 are listed in Table 7.

Table 7: Frequency and Percent of GHS SRT Users for Gender by Ethnicity for Year 1 and Year 2

		Year 1	*Year 2*	
Gender	*Ethnicity*	*Frequency (%)*	*Ethnicity*	*Frequency(%)*
Female	White	5,701(94.6%)	White	6,491(94.2%)
	Other	328(5.4%)	Other	371(5.8%)
Male	White	9,008(92.7%)	White	9,916(91.8%)
	Other	714(7.3%)	Other	880(8.1%)

4.3.5 GHS SRT Use by Socio Economic Status for Year 1 and Year 2

Socioeconomic status (SES) is a composite measure of an individual's resources and prestige within a community[71]. Resources include both material goods (e.g., owning a home) and assets (e.g., savings), whereas prestige refers to an individual's status within a social hierarchy and is typically determined by the classification of education and profession according to the esteem placed on each by society. In nearly every disease category, adults of lower SES experience higher rates of morbidity and mortality than adults of higher SES[72-74]. Similar findings have been documented in samples of children and adolescents when relationships between family SES and health are examined. In addition, there is often a correlation between low SES and minority communities.

Wilson and colleagues[75] examined environmental variables (i.e., perceptions of access for physical activity) impacting the physical activity patterns of individuals residing in low and high socio-economic status (SES) areas and found that the low (vs. high) SES group reported lower perceptions of access to public recreation facilities like trails Thus, the individuals residing in low SES areas near the GHS SRT may perceive a lack of access and/or found it to be more difficult to access the trail and therefore used the GHS SRT less than individuals residing in or near higher SES areas along the trail. Assuming that conclusions from prior studies hold true on the GHS SRT, a perception of a lack of access among minorities in low SES communities may be a barrier contributing to decreased usage by minorities on the GHS SRT in Year 1 and Year 2.

4.3.6 GHS SRT Use by Time of Day for Year 1 and Year 2

Four time periods were examined: Morning (7:30am - 9am), Noon (12pm - 1:30pm), Afternoon (3:00 pm - 4:30pm) and Evening (5:00 pm - 6:30pm). The Evening observation (5pm - 6:30pm) time period had less traffic than the other three observation time periods, for females and males alike. Broomhall[76] concluded from a literature review that numerous observable factors, like perceived safety could influence use of open space as well. Previous studies therefore suggest

that perceptions of safety during evening hours may have influenced one's decision to use the GHS SRT. However, it should be noted, GHS SRT intercept survey respondents reported that the safety and security along the trail to be 'excellent'. The frequency and percent of GHS SRT users for time period by gender are listed in Table 8 and Figure 9.

Table 8: Frequency and Percent of GHS SRT Users For Time Period by Gender for Year 1 and Year 2

	Year 1		*Year 2*	
Gender	*Time Period*	*Frequency (%)*	*Time Period*	*Frequency (%)*
Female	Morning	1,353(22.4%)	Morning	723(10.5%)
	Noon	1,852(30.7%)	Noon	2,407(34.9%)
	Afternoon	1,646(27.3%)	Afternoon	2,287(33.2%)
	Evening	1,178(19.5%)	Evening	1,471(21.4%)
Male	Morning	2,129(21.9%)	Morning	1,118(10.3%)
	Noon	2,870(29.5%)	Noon	3,403(31.4%)
	Afternoon	2,643(27.2%)	Afternoon	3,683(34.0%)
	Evening	2,080(21.4%)	Evening	2,627(24.3%)

Morning = 7:30am-9am; Noon = 12pm-1:30pm;Afternoon = 3:00pm-4:30pm; Evening = 5:00pm-6:30pm

.

4.3.7 GHS SRT Use by Seasonality for Year 1 and Year 2

Researchers have called for additional studies examining associations between physical activity behavior and natural elements, such as seasonality[77-81]. Despite easy access provided by greenway trails like the GHS SRT for outdoor physical activity, individuals have a variety of potential barriers to being physically active in the outdoor environment. One of the barriers to overcome is weather, including both hot and cold temperature extremes, precipitation, wind, and humidity. Researchers recently found that inclement weather is associated with lower rates of physical activity.

A study by Lindsey and colleagues[46] investigated weather and time-related variables to determine their correlation to neighborhood trail use. Results from their analysis indicate that temperature and precipitation impact neighborhood trail use. Specifically, Lindsey et al.[46] found that trail traffic increased 3.2% for every one degree Fahrenheit increase in temperature above the annual average and decreased by 40% for every inch of rain above the annual average. Similarly, GHS SRT users preferred to use the trail during the warmer and dryer summer months in comparison to the fall, winter and spring in Year 1. In Year 2, however spring was the most popular season for trail use. The frequency and percent of GHS users for seasonality by gender for Year 1 and Year 2 are listed in Table 9.

Table 9: Frequency and Percent of GHS SRT Users for Seasonality by Gender for Year 1 and Year 2

		Year 1	*Year 2*
Gender	*Season (Months)*	*Frequency(%)*	*Frequency(%)*
Female	Fall (Sep-Nov)	1,130(18.7%)	1,546(22.4%)
	Winter (Dec-Feb)	1,450(24.1%)	1,571(22.8%)
	Spring (Mar-May)	1,211(20.1%)	2,217(32.2%)
	Summer (June-Aug)	2,238(37.1%)	1,554(22.6%)

Male	Fall (Sep-Nov)	1,737(17.9%)	2,306(21.3%)
	Winter (Dec-Feb)	2,016(20.7%)	2,543(23.5%)
	Spring (Mar-May)	2,241(23.1%)	3,511(32.4%)
	Summer (June-Aug)	3,728(38.3%)	2,471(22.8%)

4.3.8 GHS SRT Use by Temperature for Year 1 and Year 2

Contextual elements, such as ambient temperature, impact physical activity[82]. The limited studies available suggest physical activity levels do vary with seasonality and the impact of poor and extreme weather has been identified as a barrier to activity among various populations[83-84]. Studies that attempt to identify usage barriers for trails and/or physical activity should, therefore, recognize and account for these contextual variables to better gauge usage[83].

Table 10: Frequency and Percent of GHS SRT Users for Changes in Temperature by Gender for Year 1

		Temperature in Degrees Fahrenheit						
		<40°	*40-50°*	*51-60°*	*61-70°*	*71-80°*	*81-90°*	*91-100°*
Gender	Female	36	106	675	1,959	959	1,509	785
		.6%	1.8%	11.2%	32.5%	15.9%	25.0%	13.0%
	Male	73	147	1,063	2,808	1,493	2,557	1,581
		.8%	1.5%	10.9%	28.9%	15.4%	26.7%	16.2%

GHS SRT users clearly preferred to use the trail between 61 – 70 degrees Fahrenheit in Year 1. Frequency and percent of GHS SRT users for changes in temperature for Year 1 and Year 2 by gender are listed in Tables 10 and 11.

Although, the greatest number of trail users were observed when the temperatures were between 61-70 degrees in Year 1, in Year 2 a modest increase in users was observed between 71-80 degrees. Matthews and colleagues[85] found that 6% of the variance in physical activity levels over 12 months was explained by temperature effects. Older adults' physical activity behavior may be especially influenced by temperature because of reductions in thermal tolerance with age, which may be largely due to chronic diseases and a sedentary lifestyle rather than age itself[85]. In addition, older adults have specifically reported extreme temperatures as barriers to engaging in regular physical activity[85].

Table 11: Frequency and Percent of GHS SRT Users for Changes in Temperature by Gender for Year 2

		Temperature in Degrees Fahrenheit						
		<40°	*40-50°*	*51-60°*	*61-70°*	*71-80°*	*81-90°*	*91-100°*
Gender	Female	156	281	1,000	2,343	2,213	854	41
		2.3%	4.1%	14.5%	34.0%	32.0%	12.4%	0.6%
	Male	211	371	1,533	3,438	3,677	1,461	140
		1.9%	3.4%	14.2%	31.7%	33.9%	13.5%	1.3%

Few seniors were observed on the GHS SRT in Year 1. More seniors were observed on the GHS SRT in Year 2. As temperatures increased above 80 degrees Fahrenheit, a significant percentage decrease in seniors using the trail was observed. Thus, the literature and findings from our observations suggest that temperature and weather may have an effect on older adult activity patterns.

4.3.9 GHS SRT Use and Day of Week for Year 1 and Year 2

The vast majority of GHS SRT use was on the weekends in Year 1 and Year 2. Recent reports have found that day of the week, in addition to weather and temperature are related to trail use. Weekend trail use has been identified to be significantly higher than weekday use[97] during the past two years. A significant increase in use on Sundays was observed in Year 2 as well. The frequency and percent of GHS SRT users for day of the week by gender for Year 1 and Year 2 are listed in Table 12.

Table 12: Frequency and Percent of GHS SRT Users for Day of the Week by Gender for Year 1 and Year 2

	Year 1		*Year 2*	
Gender	*Day of the Week*	*Frequency (%)*	*Day of the Week*	*Frequency (%)*
Female	Tuesday	879(14.6%)	Tuesday	810(11.8%)
	Thursday	660(10.9%)	Thursday	1,089(15.8%)
	Saturday	2,983(49.5%)	Saturday	2,451(35.6%)
	Sunday	1,507(25.0%)	Sunday	2,538(36.8%)
Male	Tuesday	1,732(17.8%)	Tuesday	1,475(13.6%)
	Thursday	1,265(13.0%)	Thursday	2,133(19.7%)
	Saturday	4,259(43.8%)	Saturday	3,496(32.3%)
	Sunday	2,466(25.4%)	Sunday	3,727(34.4%)

4.3.10 Helmet Use and Cycling Injuries for Year 1 and Year 2

The use of bicycle helmets is effective in preventing head injury[86-88]. Community programs to increase bicycle helmet use can reduce the incidence of head injury among bicycle riders, thereby reducing the number of riders who are killed or disabled. Increasingly, state and local laws are being developed that will make mandatory the use of bicycle helmets. South Carolina does not currently require use of bicycle helmets.

Approximately 54% of adult female and 49% of adult male GHS SRT users were not wearing helmets when bicycling in Year 1. More than 75% of teen females and males did not wear a helmet either. In Year 2, similar patterns were observed regardless of gender and age. Bicycling is the second most popular outdoor activity in the US[88-89]. Americans from six and older participated in 2.54 billion bicycling outings, averaging 59 outings per bicyclist[89] in 2010. With this many individuals, proper bicycling helmet use is needed to prevent severe head injuries. The frequency and percent of GHS SRT users by helmet use for gender for Year 1 and Year 2 are listed in Table 13.

Table 13: Frequency and Percent of GHS SRT Users by Helmet Use for Gender for *Year 1 and Year 2*

		Year 1		*Year 2*	
Gender		*Yes(%)*	*No(%)*	*Yes(%)*	*No(%)*
Female	Child	225(60.0%)	152(40%)	251(49.0%)	254(50.3%)
	Teen	89(23.7%)	286(76.3%)	133(22.5%)	458(77.5%)
	Adult	2,176(45.6%)	2,597(54.4%)	2,194(44.2%)	2,765(55.7%)
	Senior	225(44.9)	276(55.1%)	476(58.8%)	333(41.2%)
Male	Child	332(60.9%)	213(39.1%)	327(46.2%)	381(53.8%)
	Teen	119(23.6%)	385(76.4%)	194(28.3%)	492(71.7%)
	Adult	3,861(51.5%)	3,632(48.5%)	4,136(53.6%)	3,580(46.4%)
	Senior	625(53.0%)	554(47.0%)	1,039(61.4%)	652(38.6%)

Greater than 40% of all deaths from bicycle-related head injury were among persons less than 15 years of age[90]. This finding is a concern since three-fourths of male and female teens observed on the GHS SRT were not wearing helmets in Year 1 and Year 2. In Year 1, 60% of all male and female children were wearing helmets; however fewer children were observed wearing helmets in Year 2 indicating that helmet education may need to target children, teens and adults.

According to the National Highway Traffic Safety Administration, injuries and deaths related to bicyclists affect children and young people more frequently. Therefore, Greenville County and City officials should consider the implementation of effective bicycle helmet programs to reduce injuries and their associated costs. The healthcare costs and savings are significant. For example, total annual cost of traffic related bicyclist death and injury among children 14 and younger is more than $2.2 billion in the US[90-91]; and every dollar spent on a bike helmet saves approximately $30 in indirect medical costs[90-91].

4.4 Demographics and Use per Selected Access Points for Year 1 and Year 2

Observers were strategically placed at three access points along the GHS SRT: Roe Road, Duncan Chapel, and E. Bramlett. Using SOPARC, each observer recorded gender, age, ethnicity and activity intensity per user.

4.4.1 Gender per Selected Access Points for Year 1 and Year 2

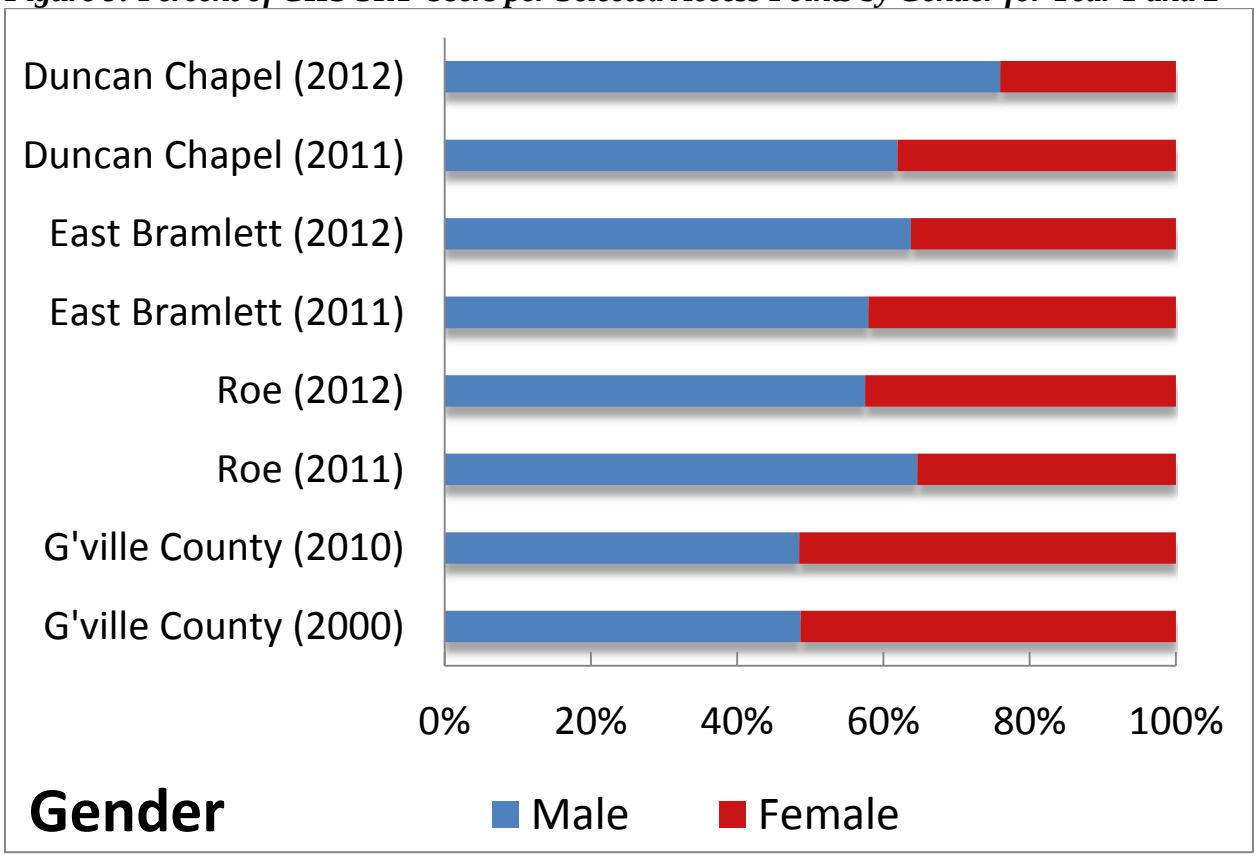
The most GHS SRT users overall (both male and female) were observed near Duncan Chapel Road in Year 1. Following Duncan Chapel, there were more male users at E. Bramlett Road and more female users at Roe Road. Visibility of GHS SRT users at Roe Road in Travelers Rest and Duncan Chapel Road on the campus of Furman University is significantly better than at E. Bramlett. Furthermore, the access points at Roe and Duncan roads support vehicular parking, are

well marked, and users can be seen by oncoming vehicular traffic in comparison to E. Bramlett. However, in Year 2 more trail users were observed on the GHS SRT at E. Bramlett Road. Although visibility is inferior at this access point, the census tracts adjacent to E. Bramlett Road are considerably more diverse than the census tracts abutting Furman University and Roe Ford Road. The frequency and percent of GHS SRT users per selected access points by gender for Year 1 and Year 2 are listed in Table 14 and Figure 9.

Table 14: Frequency and Percent of GHS SRT Users per Selected Access Points by Gender for Year 1 and Year 2

Year 1	Gender	*Roe Road*	*Duncan Chapel*	*E. Bramlett*
	Female	1,938(42%)	2,333(38%)	1,754(35%)
	Male	2,686(58%)	3,798(62%)	3,234(65%)
	Total Users per Access Point	4,624	6,131	4,988
Year 2	*Female*	1,896(43%)	2,211(38%)	2,781(37%)
	Male	2,473(57%)	3,622(62%)	4,736(53%)
	Total Users per Access Point	4,369	5,833	7,517

Figure 9: Percent of GHS SRT Users per Selected Access Points by Gender for Year 1 and 2



4.4.2 Age per Selected Access Points for Year 1 and Year 2

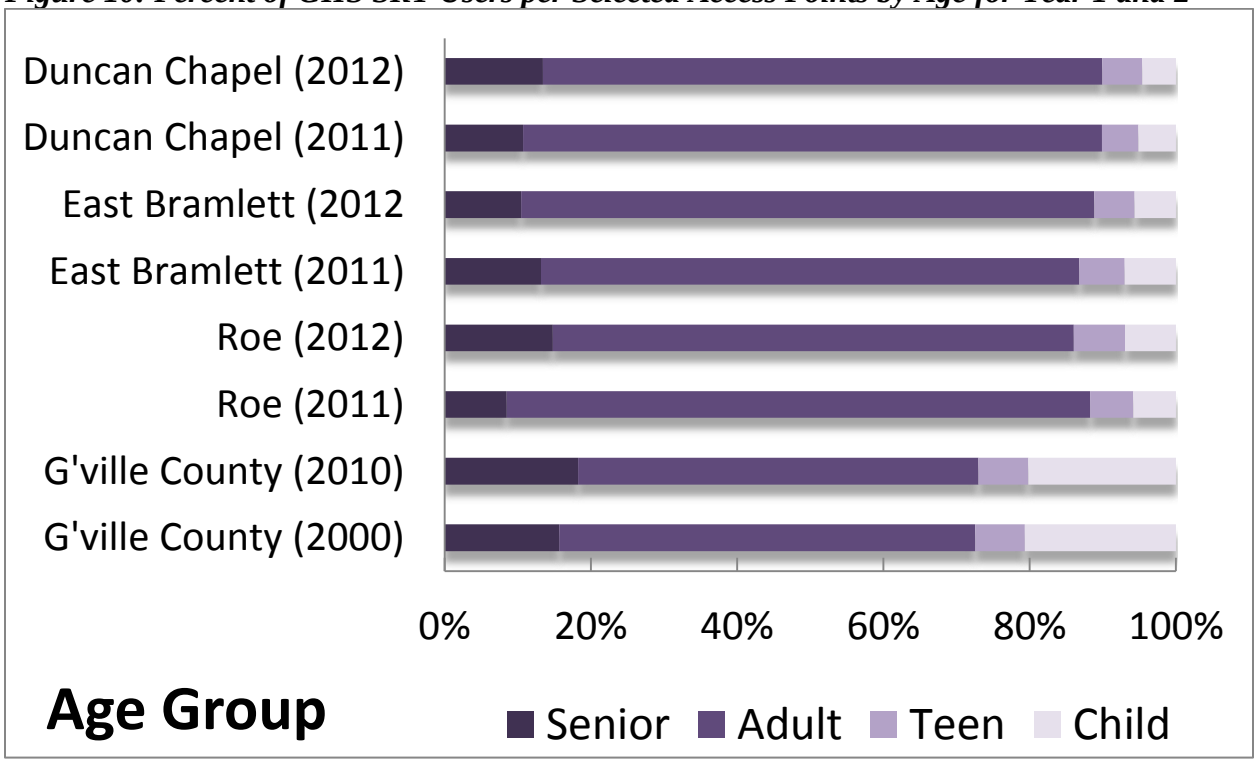
Relatively few children and teens were observed using the GHS SRT in Year 1 and Year 2. Of the children that were observed during the past two years, they were nearly always accompanied

by an adult. Similarly, few seniors were observed on the GHS SRT in Year 1. However, in Year 2, more seniors were observed on the GHS SRT.

Table 15: Frequency and Percent of GHS SRT Users per Selected Access Points by Age for Year 1 and Year 2

Year 1	*Age*	*Roe Road*	*Duncan Chapel*	*E. Bramlett*
	Child	322(7.0%)	313(5.1%)	290(5.5%)
	Teen	285(6.2%)	303(4.9%)	291(7.2%)
	Adult	3,412(73.8%)	4,861(79.3%)	3,986(79.3%)
	Senior	605(13.1%)	654(10.7%)	421(8.4%)
	Total Users per Access Point	4,264	6,131	4,988
Year 2	Child	341(7.8%)	274(4.7%)	601(8.0%)
	Teen	362(8.3%)	393(6.7%)	523(7.0%)
	Adult	2,948(67.7%)	4,210(72.5%)	5,525(73.6%)
	Senior	710(16.2%)	942(16.1%)	849(11.4%)
	Total Users per Access Point	4,361	5,819	7,498

Figure 10: Percent of GHS SRT Users per Selected Access Points by Age for Year 1 and 2



4.4.3 Ethnicity per Selected Access Point for Year 1 and Year 2

Perception of being vulnerable to crime is a frequently cited barrier to trail use[92-96] among minority communities. Current research examining ethnicity and physical activity in urban Missouri revealed that African Americans perceived their neighborhoods as less safe and less pleasing for physical activity in comparison to whites, regardless of neighborhood racial composition[97]. Of whites surveyed on the GHS SRT, 40% perceived the safety and security of the trail to be 'excellent'; compared to only 30% of minority respondents in Year 1. Furthermore few minorities were observed using the trail compared to whites in Year 1 and Year 2. It is therefore possible that perception of safety on the trail may have been a barrier to use among minorities, as suggested by conclusions of previous studies and the differing perceptions of safety between white and minority users[97].

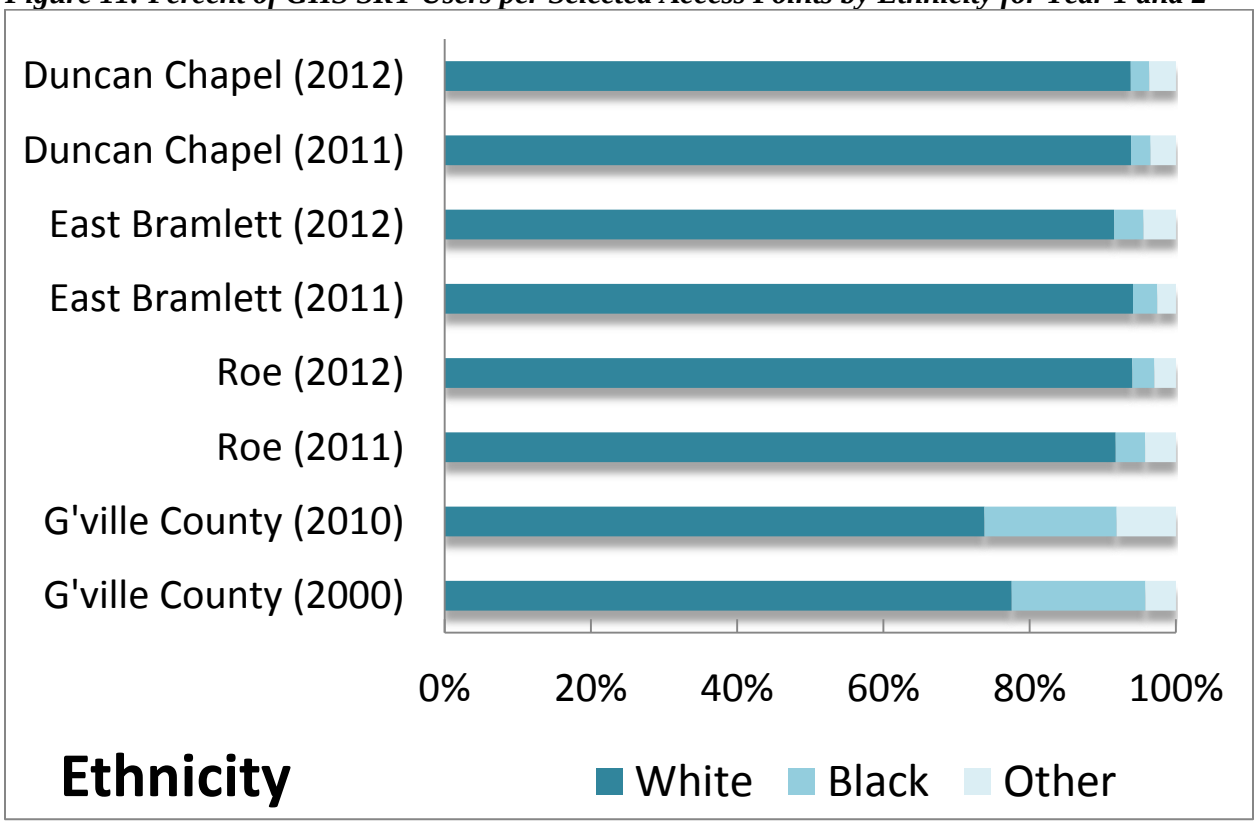
The small percentage of minority trail users observed and surveyed on the GHS SRT in Year 1 and Year 2 warrants future investigation of the racial disparity of users identified. These direct observation findings do not align with the current demography for Greenville, South Carolina residents based on current census data estimates[63] of census tracts abutting the GHS SRT. As mentioned previously up to 28% of residents residing in the census tracts abutting the GHS SRT are minorities, yet minorities only comprised 7% of all users observed on GHS SRT in Year 1 and Year 2. Only 77% and 64% of Greenville County and City of Greenville residents are white respectively. As mentioned previously, a greater percentage of minority users were observed at the E. Bramlett Road access point in Year 2 compared to the other access points.

The census tracts abutting the E. Bramlett Road access point is considerably more diverse than the access points at Duncan Chapel Road at Furman University and Roe Road in Travelers Rest. The frequency and percent of GHS SRT users per selected access points by ethnicity for Year 1 and Year 2 are listed in Table 16 and Figure 11.

Table 16: Frequency and Percent of GHS SRT Users per Selected Access Points by Ethnicity for Year 1 and Year 2

Year 1	*Ethnicity*	*Roe Road*	*Duncan Chapel*	*E. Bramlett*
	White	4,358(94.2%)	5,760(93.9%)	4,585(91.9%)
	Black	150(3.2%)	162(2.6%)	197(3.9%)
	Other	116(2.5%)	209(3.4%)	206(4.1%)
	Total Users per Access Point	4,624	6,131	4,988
Year 2	White	4,097(94.0%)	5,447(93.9%)	6,876(91.7%)
	Black	118(2.7%)	141(2.6%)	292(3.9%)
	Other	145(3.3%)	223(3.5%)	331(4.4%)
	Total Users per Access Point	4,360	5,811	7,499

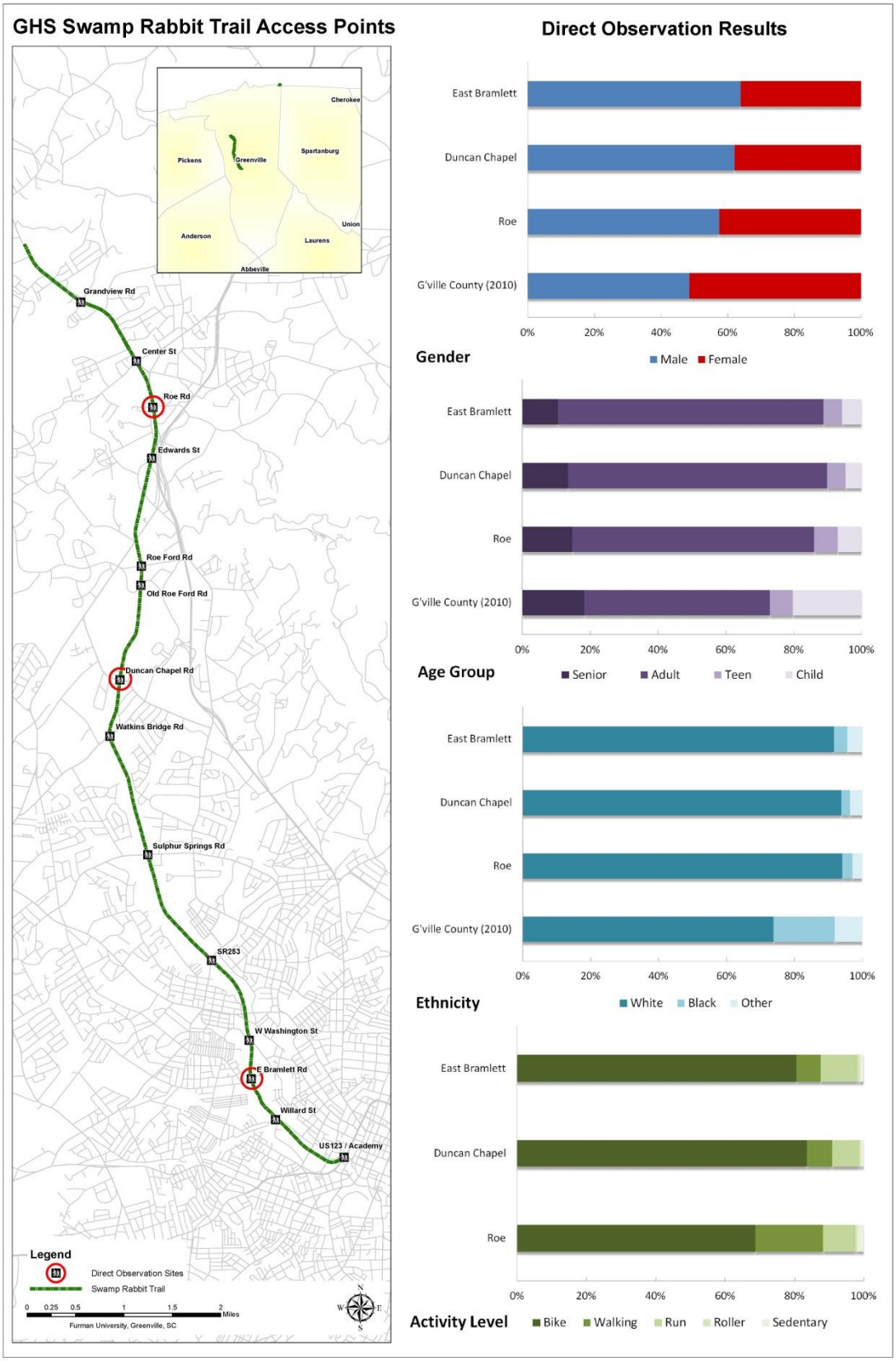
Figure 11: Percent of GHS SRT Users per Selected Access Points by Ethnicity for Year 1 and 2



4.4.5 Comparison to Census Data per Selected Access Point for Year 1 and Year 2

The findings shown in Figure 12 illustrate use at three access points on the GHS SRT (Roe Road, Duncan Chapel Road and E. Bramlett Road) and how the demography of GHS SRT users compares to Greenville County Census data. Significantly more males were observed at all three access points in comparison to females. However, the County as a whole consists of approximately a 50/50 split among males and females during the evaluation period. Therefore demographics of Greenville County are not consistent with the findings of users on the trail for Year 1 and Year 2. Findings also did not agree with County statistics for age and ethnicity on the GHS SRT as discussed previously.

Figure 12: GHS SRT Direct Observation Results for Year 2



5 Random Digit Dial (RDD) Results for Year 1 and Year 2

5.1 Participants for Year 1 and Year 2

A sample of 500 Greenville County residents that was contacted using Random Digit Dialing (RDD) agreed to participate in this study in Year 1. In Year 2,726 respondents agreed to participate. A marketing company was hired to derive a representative sample of the population from a database of all residential telephone numbers and various geographic service parameters such as primary zip codes in Greenville County. In addition, the database provided working bank information at the two-digit level - each of the 100 banks (i.e., first two digits of the four-digit suffix) in each exchange was defined as "working" if it contained one or more listed telephone households. On a national basis, this definition covers an estimated 96.4% of all residential telephone numbers and 99.96% of listed residential numbers. This database is updated on a quarterly basis. Following specification of the geographic area, the system selected all exchanges and associated working banks that meet those criteria.

5.2 Purpose of RDD for Year 1 and Year 2

The primary purpose of the RDD survey was to identify barriers and determinants related to GHS SRT use and non-use. Direct observation analysis, intercept surveys and focus groups focused on GHS SRT users. The RDD survey was able to identify perceptions of non GHS SRT users as well as examining a variety of geographic information system data (i.e., proximity to trail from residence) perhaps affecting use. The RDD survey questions and response(s) for non-users for Year 1 and Year 2 are listed in Table 17.

Table 17: RDD Survey Questions and Response(s) for GHS SRT Non-Users for Year 1 and Year 2

Num.	Survey Question	Gender	Responses	Year 1 Freq. (%)[#]	Year 2 Freq. (%)[#]
1	In the last 6 months, did you visit the GHS SRT?	Female	No	241(76%)	333(74%)
		Male	No	130(71%)	212(76%)
2	Why did you NOT visit the GHS SRT?	Female	a. Too far away/inconveniently located	29(9.1%)	65(19.5%)
			b. Not open at convenient times	8(2.5%)	0(0%)
			c. Does not have features/equipment/programs I desire	25(7.9%)	11(3.3%)
			d. Inadequately maintained	1(0.3%)	0(0.0%)
			e. Too crowded	0(0.0%)	0(0.0%)
			f. Located in unsafe area	3(0.9%)	1(0.3%)
			g. Not aware of the trail	53(16.7%)	41(12.3%)
			h. No particular reason	98(30.9%)	0(0.0%)
			i. Other	24(7.6%)	215(64.6%)*
		Male	a. Too far away/inconveniently located	20(10.9%)	40(18.9%)
			b. Not open at convenient times	4(2.2%)	0(0.0%)
			c. Does not have features/equipment/programs I desire	10(5.5%)	4(1.9%)
			d. Inadequately maintained	0(0.0%)	0(0.0%)
			e. Too crowded	0(0.0%)	0(0.0%)

			f. Located in unsafe area	0(0.0%)	0(0.0%)
			g. Not aware of the trail	24(13.1%)	36(17.0%)
			h. No particular reason	60(32.8%)	0(0.0%)
			i. Other	12(6.6%)	132(62.3%)*

The percentage listed for frequency refers to the percentage of respondents of a specific gender that provided the corresponding answer. For example, 74% of all females in Year 2 responded to the RDD survey have not visited the trail in the last 6 months (question 1).

*** When respondents' chose other, they were requested to specify their "other" reason in Year 2. The most common reasons for not using the trail included being too busy (e.g., "just too busy to add it into the weekly schedule"), having a physical limitations (e.g., "can't walk well enough," "having back problems," "in a wheel chair"), being too old (e.g., "76 years old…and if I was I young person I would enjoy it"), and reporting being "not interested." Many of the persons who reported being too old simply reported their age (e.g., 75, 80, 88, 90, etc.) as the reason for not using the trail without mentioning any physical limitations associated with age.**

5.3 Demographic Predictors of Trail Use in the Previous Six Months for Year 2

Age category and education level **did** significantly predict trail use in the previous six months. Specifically, the odds of using the trail in the previous six months were greater among adults compared to older adults and greater among those with a high school degree or college degree than those with less than a high school degree.

5.4 Trail Use among Trail Users for Year 2

Almost all trail users reported using the trail for recreation purposes (89.5%) rather than for transportation (2.2%) or both recreation and transportation (8.3%). Therefore, trail use among the 177 respondents who reported they have used the trail for recreational purposes was further examined. When using the trail for recreation, 2.8% of respondents used the trail for less than 30 minutes, 29.4% used the trail for 30-59 minutes, and 67.8% used the trail for 60 minutes or more. On average, respondents used the trail for recreational purposes for 1.04 days each week with 15.3% using the trail for at least three days per week.

5.5 Associations between Regular Trail Use and Demographic Characteristics of Trail Users for Year 2

Fifteen percent of trail users reported using the trail regularly for recreation (i.e., at least 30 minutes 3 days each week). There were no significant associations between regular trail use and age category, gender, or ethnicity. There was a significant association between education and regular trail use with a greater proportion of high school graduates (53.8%) and college graduates (38.5%) reporting regular trail use than those without a high school education (7.7%).

5.6 Perceptions of the Trail among Trail Users for Year 2

Those who reported using the GHS SRT were asked to rate both the safety and maintenance of the trail and report what they liked most about the trail. The trail characteristic trail users most often reported liking was that the trail was conveniently located (33.1%) followed by the trails' scenic beauty (19.3%), the trail being free (12.2%), the trail design (7.7%), the trail surface (6.1%), the presence of others exercising (5.5%), the safety of the trail (5.0%), the distances being marked on the trail (2.8%), and the trail lighting (0.5%). Almost eight percent of trail users said they were unsure what they liked most about the trail. The majority (89.8%) of GHS SRT users rated trail safety positively as excellent (34.1%) or good (55.7%) while 10.2% of trail users rated the trail's safety as fair (7.4%) or poor (2.8%). With regards to trail maintenance, (98.3%) of trail users rated trail maintenance positively as excellent or (63.9%) good (34.4%) or fair (1.1%) while 1.7% of trail users rated the trail's maintenance as poor (0.6%).

5.7 Reasons for Not Using the Trail in Year 2

Only 36.3% of the 545 non-trail users chose one of the reasons listed as a reason why they do not use the trail. Among these 545 non-trail users, 53% reported they do not use the GHS SRT because it is too far away or inconveniently located, 38.9% said they were unaware of the trail, 7.6% said the trail does not have the features that they desire, and one person (0.5%) said the trail is located in an unsafe area. Among those who said the GHS SRT was too far away, the median distance from these respondents' homes to the trail was 9.55 miles. This distance was significantly different than respondents who did not report the trail being too far away as a reason for not using the trail (Med=7.38). The remainder of persons (63.7%) who reported not using the trail said there is some "other" reason why they do not use the trail.

When demographic predictors of GHS SRT use were examined, only education and age category were significant predictors. The odds of adults using the trail were greater than the odds of older adults. This is similar to findings from a previous study which found that adults were more likely than older adults to visit recreational facilities[98]. Efforts to promote physical activity among older adults are needed as older adults are less likely to meet the national physical activity recommendations than adults[99]. Promoting physical activity on trails might be an effective avenue to increase physical activity among older adults.

Those with higher education levels compared to lower education levels were also more likely to use the trail, and more likely to regularly use the GHS SRT. Several studies have identified a positive association between education level and trail use[100]. However, findings from one study showed that persons with lower education levels are more likely to use trails for transportation purposes and actively travel to trails than those with higher education levels[101]. Almost all of the respondents used the GHS SRT for recreational purposes. Promoting active transportation on trails might increase trail use and physical activity among those with lower education levels[101].

As mentioned previously, the majority of respondents who used the GHS SRT did so for recreational purposes. This is similar to findings from previous studies[64-65] and highlights an opportunity to promote additional trail use for transportation purposes. While most participants reported using the trail for at least 30 minutes when they used it, on average, respondents reported using the trail only one day per week. It is possible that trail users are engaging in physical activity elsewhere, such as at home or commercial gyms, as previous research suggests trail users are more likely to meet physical activity recommendations than non-trail users[102-104]. Gordon and colleagues[6] found that new exercisers who used a walking trail were more likely to exercise only on trails compared to habitual exercisers who were active on the trail and in many other settings. Thus, it is likely that some trail users are not engaging in sufficient physical activity. Those promoting trail use could use the health communication opportunity to highlight the national physical activity recommendations[52] as well as the myriad benefits for engaging in regular physical activity[105].

As shown in Table 18, the majority of the 726 survey respondents in Year 2 were college-educated, white, adult females. The majority (75.1%) of respondents reported not using the trail in the previous six months. The RDD sample had a significantly greater proportion of females, whites, older adults, and those with a college degree than the proportions of females, whites, older adults, and those with a college degree in Greenville County.

Table 18: Demographic Characteristics of Interview Respondents Overall and by Trail Users and Non-Users with Comparison to Greenville County Residents for Year 2

	Total n=726	Trail Users n=181	Non-Users n=545	Greenville County[a] n=461,299
	n(%)	n(%)	n(%)	(%)
Sex				
Male	278(38.3)	6(5.0)	212(38.9)	224,191(48.6)
Female	448(61.7)	115(95.0)	333(61.1)	237,108(51.4)
Race				
White	572(84.6)	154(86.5)	418(83.9)	356,123(77.2)
Other	104(15.4)	24(13.5)	80(16.1)	105,176(22.8)
Age Category				
Adult	436(63.3)	152(84.9)	284(55.7)	401,330(87.0)
Older adult	253(36.7)	27(15.1)	226(44.3)	59,969(13.0)
Highest Education				
< High school degree	50(7.6)	8(4.5)	42(8.8)	69,195(15.0)
High school degree	286(34.6)	59(33.3)	227(47.4)	252,331(54.7)
College degree	320(48.8)	110(62.2)	210(43.8)	139,773(30.3)

[a] Based on 2011 US Census Bureau data

5.8 Awareness of Trails and Promoting Trail Use for Year 1 and Year 2

Lack of awareness is a frequently cited barrier for not using a trail[43-44, 106-107] and is one of the most common reasons given in the RDD samples. A recent study promoting and developing a trail network across suburban, rural and urban communities by Schasberger and colleagues[107] increased awareness for the trail network; and found messaging promoting social and entertainment benefits of participating in physical activity on a trail most effective. Brownson and colleagues[108] examined trail use in 12 rural counties in Missouri and discovered that of the individuals who had access to walking trails, close to 40% reported having used the trails to engage in activity. In another program that focused on reducing obesity through trail development, the Missouri Department of Health was interested in examining if individuals were participating in more physical activity following an awareness campaign in a community with a one-year-old trail[109]. The Department found significant increases in trail use following the promotional campaign when compared to a community that did not participate in the campaign[109].

Similar to Missouri's public health campaign, Greenville's GHS SRT was developed to facilitate multi-modal transportation and to promote public health recommendations for participating in regular activity. The data from this assessment suggest that Greenville must continue to publicize the trail and its positive impacts on transportation and physical activity.

The Task Force for Preventive Services recommends that the creation of trails be paired with efforts to promote the trail to increase awareness and use of the trail for physical activity[40]. Those promoting the trail might consider highlighting some of the trail features preferred by trail users in this study and previous studies[40] such as the trail's convenient location, beauty, and design. In regards to barriers to trail use, trail users frequently mentioned being too old, too busy,

not interested, and having physical limitations. Those managing and promoting trails might consider providing environmental supports[110] to enable older adults and those with physical limitations to use trails, such as smooth trail surfaces for wheelchairs, and benches and shaded areas for resting.

Lack of facilities and unsafe conditions have been cited as important barriers for new exercisers using trails, while lack of facilities and maintenance issues were important barriers for habitual exercisers using trails[6-7, 38]. Another study found that persons living in neighborhoods not conducive to physical activity (lack of sidewalks, safety, etc.) perceived inconvenient travel to trails as a barrier to trail use[37-40]. The presence of litter and noise, dense vegetation areas, and drainage areas and tunnels has also been associated with less trail use[111]. Additional research is needed to examine barriers to trail use as well as strategies for overcoming perceived barriers to trail use.

5.9 Evaluation of Proximity for Year 1 and Year 2

Each of the 500 RDD respondents in Year 1 and 726 RDD respondents in Year 2, similar to intercept survey respondents, were asked for the nearest two cross-streets of their primary residence. No identifiable information of the respondent was solicited and the IRB procedures protecting human subject confidentiality were strictly followed. GPS coordinates pertaining to the residence of each respondent were registered to a common datum, converted into a spatial map, and imported into ArcView GIS to be used as a base for examining proximal relationships and determining a mileage distance from place of residence to the GHS SRT. The average distance from place of residence for GHS SRT users and non-users is listed in Table 19.

Table 19: Average Distance to GHS SRT from Residence for Users and Non-Users from the RDD for Year 1 and Year 2

Question	User Status/Distance Miles Year 1	User Status/Distance Miles Year 2
What are nearest two cross streets to your residence, city and zip code?	Non-User (N=359)/10.20 User (N=45)/8.71	Non-User (N=545)/8.39 User (N=181)/7.74

The RDD findings reveal that non-users on average live farther away from the GHS SRT when compared to users in Year 1 and Year 2. Research clearly documents that if individuals reside in an area that has access to a trail and are aware of its existence, they will be more likely to engage in trail use in comparison to those individuals who are unaware of the trail. These previous findings, therefore suggest that non-users may not have been aware (see Figure 13) of the GHS SRT.

Survey respondents in Year 2 lived a median distance of 7.59 (Mean=8.05) miles from the trail. There was no significant difference in distance (miles) from the trail and whether respondents reported using the trail (Med=7.15, Mean=7.74) or not using the trail (Med=7.69, Mean=8.39). In Year 2, the majority of survey respondents reported not using the trail. The more common reasons for not using the trail included the trail being too far away from respondents' homes and not being aware of the trail.

Respondents living a median distance of 9.5 miles from the GHS SRT cited proximity as a barrier to trail use; whereas, those living a median distance 7.4 miles to the trail did not. Gordon and colleagues[6] found that new trail users traveled shorter distances to trails than habitual trail users and identified convenient location as an enabler for using the trail. Future research could examine why distance to the trail is an issue for some but not others.

Figure 13: Users and Non-Users of GHS SRT and Place of Residence for Year 2

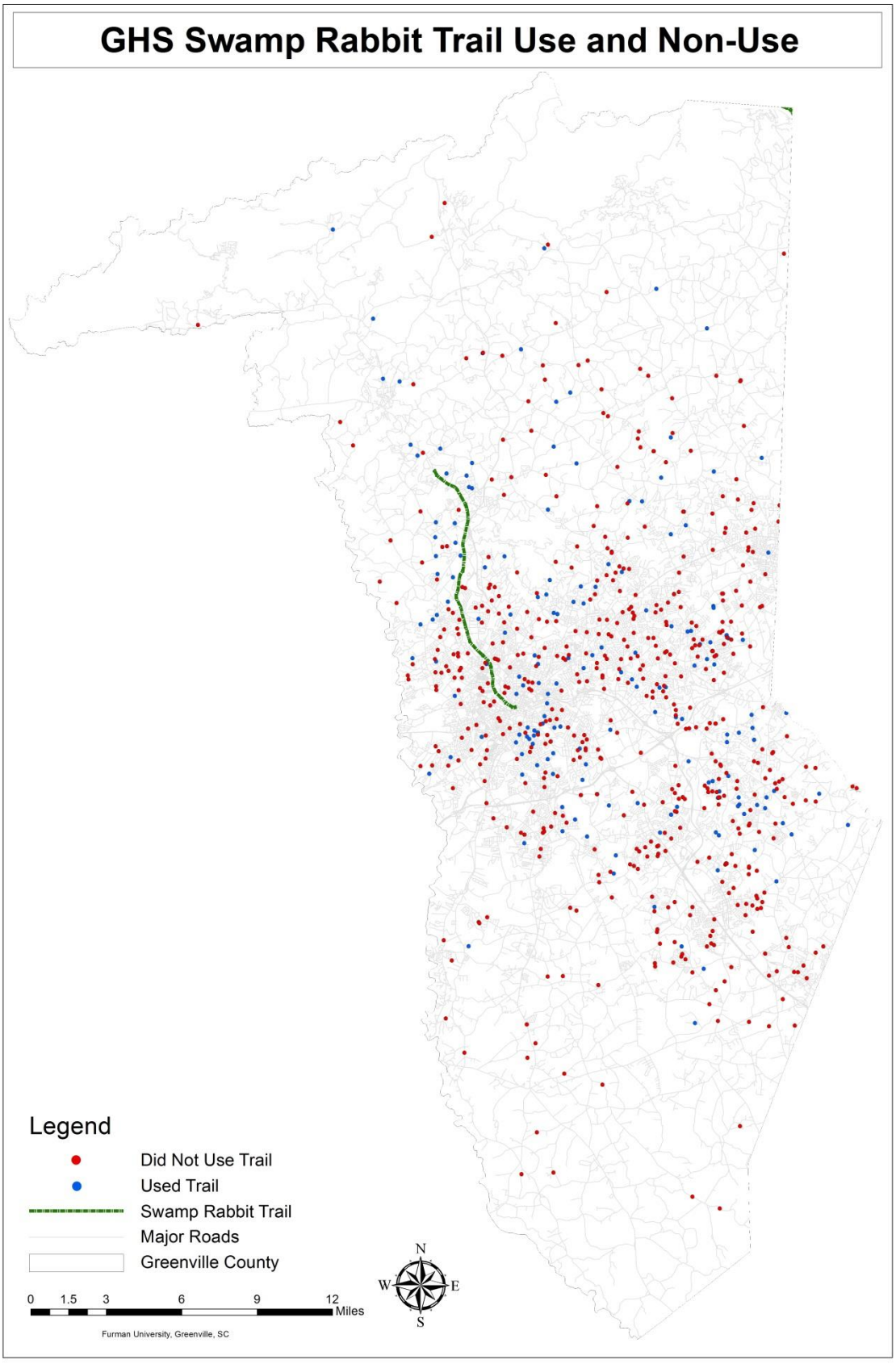
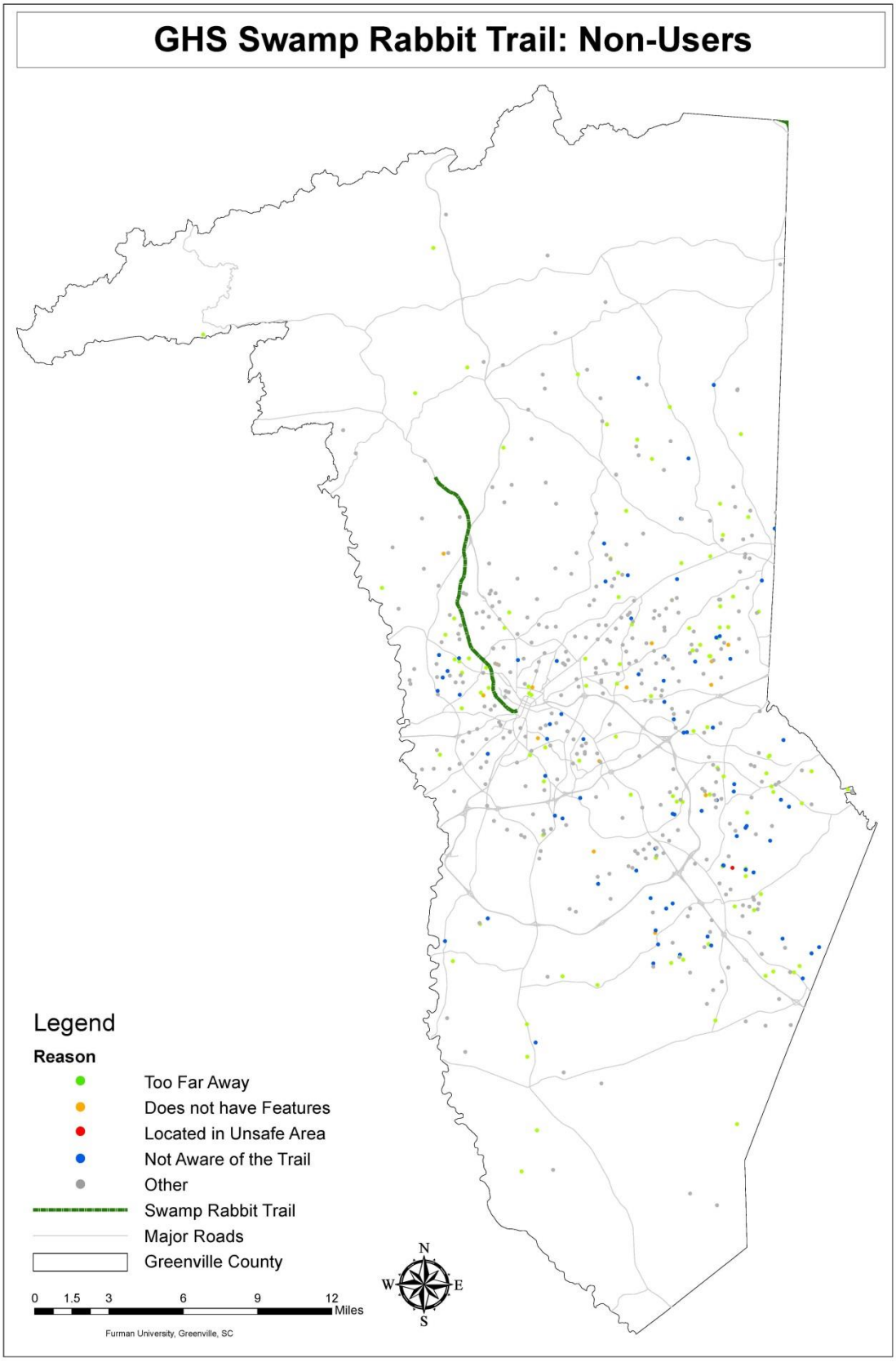


Figure 14: Non-GHS SRT User Reasons and Place of Residence for Year 2



6 GHS SRT Focus Group Findings for Year 1 and Year 2

Focus group participants were recruited by media advertising (i.e., Go Magazine) and through email outreach by the Greenville County Recreation District in Year 2. Requirements for participation were that the individual must be aware of the trail and must have used the trail in the past six months. Participants chose to attend one of two focus groups held in the Lay Physical Activity Center on the campus of Furman University in the spring of 2011 (Year 1) and 2012 (Year 2). Participants were informed that refreshments would be provided and they would receive $20 incentive upon completion of the focus group. Each focus group was approximately 60 minutes in duration.

The focus groups were audio-taped and participant responses were manually recorded by two individuals. Once typed, the incomplete or illegible notes were corrected. The handwritten notes were reviewed by each question, and a coding theme was created for each question within the study guide. The notes were then coded with other codes added if needed. The moderator coded the final notes and wrote the summary of findings. Richard Kruger's Analyzing and Recording Focus Group Results[112] was used to develop the themes from the coded notes and findings.

6.1 Participant Description for Year 1 and Year 2

Prior to beginning the focus group in Year 1, each participant completed a brief survey. Nineteen adults participated in the two focus groups (13 males; 6 females). All participants were white and 15 participants (79%) held a college degree. The remaining 4 focus group participants (21%) attended college for at least 1 year. The median household income of the participants was $80,000 or more and 78% of respondents were married.

In Year 2, fifteen adult GHS SRT users participated in two focus groups (7 female; 8 male). Approximately 73% of focus group participants resided within 1 mile of the trail. Approximately 57% of focus group participants in Year 2 reported a median household income of $80,000 or more and 71% of participants were married. Approximately 93% of focus group participants in Year 2 were white and 80% held a college degree. The GHS SRT was defined for all focus groups as the segment between the City of Travelers Rest and East Bramlett Road.

6.2 Focus Group Questions and Selected Responses Year 1 and Year 2

1. *If someone asked you to describe the GHS SRT, what would you say?* ***(Year 1)***
   - Multi-use trail, one of Greenville's top five assets
   - Great marketing tool for Greenville
   - Great for fitness for all levels and abilities
   - Excellent for the economy
   - Promotes use from people who do not look like exercisers
   - Beautiful place to walk and ride your bike

1. *If someone asked you to describe the GHS SRT, what would you say?* ***(Year 2)***
   - Best thing to happen to Greenville
   - Promotes economic development
   - Paved trail
   - Accessible/Convenient

- Promotes use from people who are not necessarily exercisers
- Beautiful/scenic/safe place to walk and ride your bike

2. *What are some reasons why you use the trail?**(Year 1)***
   - Fitness and recreation
   - Transportation
   - Mostly commute using the trail
   - Healthy living
   - Get the family moving
   - Great way to get downtown from home

2. *What are some reasons why you use the trail? **(Year 2)***
   - Health
   - Transportation to and from work
   - Exercise and recreation
   - Leisure/enjoyment

3. *What are the current deficiencies of the trail? What trail improvements would you recommend?**(Year 1)***
   - Bicyclists go way too fast
   - Not enough signage
   - Too busy
   - Intersections are really dangerous
   - Don't like the rails in the intersections
   - Need trail signs for etiquette

3. *What are the current deficiencies of the trail? What trail improvements would you recommend? **(Year 2)***
   - Lack of trail etiquette
   - Speed of road bikes
   - Dangerous intersections (253)
   - Lack of signage
   - Too busy/crowded
   - Don't like the rails in the intersections
   - Empty the trash cans more regularly
   - Road bikes traveling too fast
   - Need community education on how to use the trail

4. *How does the GHS SRT impact the Greenville Community? **(Year 1)***
   - A true community asset
   - Should be used for recruiting
   - Business benefits
   - Very social trail
   - People are extremely friendly
   - Great incentive to get people outdoors

4. *How does the GHS SRT impact the Greenville Community?* ***(Year 2)***
    - More diversity on the trail (ages, gender, ethnicity)
    - Great social interaction
    - Non-health conscious people using the trail
    - People come to Greenville to use the trail
    - Should be used for recruiting
    - People are extremely friendly

5. *Based on observation and survey data during the past year, the vast majority of users are white, adult bicyclists. How would suggest promoting the trail among youth, seniors and minorities?* ***(Year 1)***
    - More community outreach and promotion
    - Use the schools and promote the access points for the trail
    - Some perceive it to be unsafe
    - No bathroom facilities
    - No connections from many neighborhoods to the trail

5. *Based on observation and survey data during the past* ***two*** *years, the vast majority of users are white, adult bicyclists. How would suggest promoting the trail among youth, seniors and minorities?* ***(Year 2)***
    - More community outreach and promotion/lack of awareness
    - Use the schools to promote the access points for the trail
    - Perceived not to be "cool" to exercise among some groups
    - Bikes may be too costly to purchase for some groups
    - Lack of access/connections from many underserved neighborhoods to the trail

6. *How can "active transport" be promoted on the GHS SRT?* ***(Year 1)***
    - Promote use of the Greenlink, bikes are welcome on bus
    - More parking at access points
    - Need connections to trail, few bike lanes in county to connect to trail
    - No infrastructure around to support getting to trail
    - Need more bike racks
    - Need maps and kiosks to show where you are

6. *How can "active transport" be promoted on the GHS SRT?* ***(Year 2)***
    - Build trail to destinations
    - Encourage businesses to provide bike racks/educate business to promote bike use
    - Partner with business to promote trail use
    - Parking-park and ride
    - Develop PR campaigns
    - Safe access points

7. *Do you think the trail has had an impact on businesses adjacent to the trail? Have you used, purchased, frequented any business near the trail when on the trail? Are you more likely to frequent a business that provides services (i.e., food, drink) for trail users?* ***(Year 1)***

- Definitely helped business in Travelers Rest
- Assume bike sales are up
- Leopard Forest, Williams Hardware and Sunrift have benefited
- Property values should increase
- Plan trips to Travelers Rest to get coffee and eat
- Encouraged to frequent stores in Travelers Rest
- More business will 'pop up' on the trail

7. Do you think the trail has had an impact on businesses adjacent to the trail? Have you used, purchased, frequented any business near the trail when on the trail? Are you more likely to frequent a business that provides services (i.e., food, drink) for trail users? ***(Year 2)***

- Swamp Rabbit Café opened because of the trail
- Trailside creamery, Bistro in Travelers Rest, Dukes Dogs, TTR bikes all benefited because of trail
- Yes, used these businesses on the trail
- Other communities mimicking the trail for business
- Business are destinations for trail users
- Positive impact on real estate

New Question for Year 2 Only

8. During the past two years we noticed a lack of helmet use on the trail among all age groups-how could helmet use be encouraged on the trail?

- Monthly campaigns to promote helmet use
- Promotions to give away helmets on the trail and at schools
- Education and provide statistics on trial related to injuries for not wearing helmet
- Enforcement like seatbelts in cars
- Teach at schools that it is cool to wear a helmet
- Bike share programs make it hard to wear a helmet
- Discount adds on trail for reduced price to purchase a helmet
- Some people just don't care about wearing a helmet
- Awareness week of helmet use

7 Interviews of Business Owners/Managers on GHS SRT for Year 1 and Year 2

A total of nine managers/owners of retail businesses directly abutting and/or within close proximity to the GHS SRT were interviewed in Year 1. Twenty managers/owners of retail businesses directly abutting and/or within close proximity to the GHS SRT were interviewed in Year 2.

Selection criteria for the business interviews were as follows:

- Retail business (i.e., food/entertainment; clothing/equipment; services).
- Must directly abut GHS SRT or be located within 250 yards of a GHS SRT access point. The trail segment for the business interviews was from Travelers Rest to Linky Stone Park in downtown Greenville.
- In Year 2 the selection criterion remained the same, however five bicycle stores were also included in the interviews.

Questions for the business interviews in Year 1 and Year 2 were taken from Stewart and Barr[113] examining promotion methods used by hospitality-related firms in close proximity to rail/trails. The business interviews were designed to determine:

A. If businesses located near the GHS SRT access points have observed any change in business after the trail was built?
B. If employees of businesses located near the GHS SRT segment are utilizing it?

7.1 Questions on Any Impact on Business:

1. Has the formation of the GHS SRT had any impact on your business? In what ways? How much? ***(Year 1)***

- Most businesses reported increases in sales/revenue ranging from 30% to as high as 85%, however one business did not believe trail has affected business.
- One business decided to open as a result of the trail being built.
- One business reported changing location because they desired to be closer to the trail and observed a 30% increase in sales.

1. Has the formation of the GHS SRT had any impact on your business? In what ways? How much? ***(Year 2)***

- Five new business opened because of the trail.
- Proximity to trail provides for walk in business.
- More people come to the community because of trail.
- Increases in revenue as high as 100%.
- 40% increase in sales because of the trail for one business.
- 4 times greater sales, business are destination for trail users.
- People rent bikes to get to their "destination".
- Two business reported no impact on business. People cannot purchase from store and
- then travel on trail.
- Two businesses were concerned that trail users were using their parking spaces.
- Needed to be on same side of street for visibility-opened business because of trail.
- Weekend trail use enhances business.

Bike Store (Responses) (Year 2)

- The trail has increased awareness of cycling, particularly in women. Moved store to be near the trail.
- Brings people to town and increases tourism for Greenville.
- Source for locals and visitors to use bikes on the trail.

2. Can you estimate the percentage of customers that come from the GHS SRT and the annual revenue generated from this group? ***(Year 1)***

- One business over the past two years reported a 20% increase in revenue related to trail use.
- One business reported that 75% of Saturday business is related to trail use and 40% of business during the week is related to trail use.
- One business reports that an average customer purchase is approximately $15 dollars.

2. Can you estimate the percentage of customers that come from the GHS SRT and the annual revenue generated from this group? ***(Year 2)***

- Multiple businesses reported a range from 5% to 90% of customers are trail users.
- Average ticket price of trail user/customer for multiple businesses ranged from $5 to $10.
- Two businesses reported no revenue increases as a result of trail.
- Average lunch tickets for trail users were $10 reported by two businesses.
- Multiple businesses reported a range of annual revenue from $200,000 to $400,000 from trail users.
- One business reported trail users spend $20 at first visit and select items to be put on hold when on the trail and spend over $100 at second visit.
- People only come to use bathroom was reported by one business.

Bike Store (Responses) (Year 2)

- Annual revenue for bike stores resulting from trail users ranged from $50,000 to $700,000.
- One bike store reported 100% of business is because of the trail, an150% increase from the previous year.
- 70% of customers for one bike store are trail users.
- Up to 30% of new bike users purchasing bikes for the trail.
- Trail feeds the entry level rider and runner.

3. Can you comment on any advantages or disadvantages associated with having your business located close to the GHS SRT? ***(Year 1)***

- Advantages? The advantages according to most of the businesses are more recognizable branding; another business reported that business has more than doubled since the trail opened. An additional advantage is easy advertising according to multiple businesses and new people visiting their respective establishments because of the location on the trail.

- Disadvantages? The vast majority of businesses reported parking to be the biggest disadvantage. Parking spots designated specifically for their businesses are frequently used by non-business visitors of the trail, negatively impacting business. Also, some of

the businesses noted that providing the trail users access to restrooms has led to increases in utility bills.

3. Can you comment on any advantages or disadvantages associated with having your business located close to the GHS SRT? ***(Year 2)***

- Advantages? People come to Travelers Rest because of the trail; People using bikes because of the economy; People taking bikes to work; Increased browsing; Selling drinks to people coming off the trail; Location; Increased exposure and word of mouth; Destination for tourism.

- Disadvantages? Half of owners/managers reported "no" disadvantages; Parking used for trail users who do not frequent business establishment; Traffic; Just use restroom and leave trash; Too crowded; Because of location, weather impacts business; Lack of crosswalk near business.

Bike Store (Responses) Year 2

- Advantages? Creates awareness of bike shops; lots of traffic into stores because of trail; economic impact on Greenville; increase is service to repair bikes from trail use.
- Disadvantages? None.

4. Have you attempted to specifically market your business to trail users in any way? ***(Year 1)***

- Providing bike racks was frequently among business owners plan to market to trail users.
- Advertising in the Greenville Journal was also reported to be used to market to trail users.
- One already established business reported modifying their building infrastructure to provide access to trail users.
- One business reported modifying the outside of their business to increase aesthetic appeal.

4. Have you attempted to specifically market your business to trail users in any way? ***(Year 2)***

- Approximately $50,000 per year for trail users and as destination for people outside of Greenville area.
- $3,500 for items that can be used by trail users
- Selling t-shirts with trail logo, using Facebook, promoting restroom available for trail users to get them into store.
- Multiple businesses reported 'no' marketing to trail users.
- Used Greenville Journal, SRT webpage, Swamp Rabbit Race, spend $100 per month in marketing.
- Word of mouth cited as only marketing.

Bike Store (Responses) Year 2

- Using television, internet, mail to market primarily to women age 20 to 60.
- Marketing budgets ranged from $5,000 to $25,000 per year on marketing.
- Direct marketing on the trail and traditional print (newspapers, journals) media including magazines (e.g., Go Magazine) and word of mouth.

7.2 Questions Regarding Employee Utilization of Trail for Year 1 and Year 2:

1. *Do you use the GHS SRT? For what purposes? When? How often? How long?**(Year 1)***

- Most business owners/managers interviewed reported using the trail frequently averaging 3 times per week for approximately 45 minutes per bout.
- Trail use among owners/managers was for recreation and transportation purposes.

1. *Do you use the GHS SRT? For what purposes? When? How often? How long? **(Year 2)***

- Many business owners/managers reported using the trail for recreation, averaging 2 to 4 times per week, but as high as 6 days per week.
- Duration on the trail ranged from 30 minutes to 2 ½ hours per day on trail.
- Multiple owners/managers reported not using the trail.

Bike Store (Responses) Year 2

- Transportation and recreation
- Business owners' use ranged from 2 times per month to 3 times per week.
- Duration ranged from 30 minutes to 5 hours per week

2. *Do you think the trail has had an impact on your employees? Are they utilizing the trail? When? How often? How long? For what reasons are they using the trail? (e.g., leisure or commuting?) **(Year 1)***

- Most business owners/managers reported employees using the trail for recreation and transportation. Many employees according to the owners/managers use the trail get to work daily.

2. *Do you think the trail has had an impact on your employees? Are they utilizing the trail? When? How often? How long? For what reasons are they using the trail? (e.g., leisure or commuting?) **(Year 2)***

- Yes, high school employees use the trail 3 times per week.
- Used by employees for recreation and transportation ranging from 30 minutes to 2 hours.
- One business reported half of the employees use it for recreation.
- Multiple businesses reported employees using trail for transportation most if not all days of the week.
- Most employees using the trail ride a bike.
- Many owners/managers did not think the development of the trail had an impact on their employees using the trail.

Bike Store (Responses) Year 2

- Most if not all employees use the trail for recreation/transportation ranging from 3 to 5 days a week for minimum of 30 minutes.

References

1. Eyler A, Matson-Koffman D, Vest J, et al. Environmental, policy, and cultural factors related to physical activity in a diverse sample of women: The Women's Cardiovascular Health network Project--summary and discussion. *Women's Health.* 2002;36(2):123-134.
2. Mabry P, Olster D, Morgan G, Abrams D. Interdisciplinary and systems science to improve population health: A view from the NIH Office of Behavioral and Social Sciences. *American Journal of Preventive Medicine.* 2008;35(2S):S211-S224.
3. Evenson KR, Herring AH, Huston SL. Evaluating change in physical activity with the building of a multi-use trail. *Am J Prev Med.* Feb 2005;28(2 Suppl 2):177-185.
4. Brownson R, Houseman R, Brown D. Promoting physical activity in rural communities. *American Journal of Preventive Medicine.* 2000;18:235-241.
5. Gordon PM, Zizzi SJ, Pauline J. Use of a community trail among new and habitual exercisers: a preliminary assessment. *Prev Chronic Dis.* Oct 2004;1(4):A11.
6. Librett J, Yore M, Schmid T. Characteristics of physical activity levels among trail users in a US national sample. *American Journal of Preventive Medicine.* 2006;31(5):399-405.
7. Starnes HA, Troped PJ, Klenosky DB, Doehring AM. Trails and physical activity: a review. *J Phys Act Health.* Nov In Press;8(8):1160-1174.
8. Reed J, Hooker S, Muthukrishnan S, Hutto B. User demographics and physical activity behaviors on a newly constructed urban rail/trail conversion. *Journal of Physical Activity and Health.* 2011;8:534-542.
9. Troped P, Whitcomb H, Hutto B, Reed J, Hooker S. Reliability of a brief intercept survey for trail use behaviors. *Journal of Physical Activity and Health.* 2009;6(6):775-780.
10. Troped PJ, Sauders RP, Pate RR, et al. Associations between self-reported and objective physical environmental factors and use of a community rail-trail. *Preventive Medicine*. 2001;23, p. 191-200.
11. Johan de Hartog J, Boogaard H, Nijland H, Hoek G. Do the health benefits of cycling outweigh the risks? *Environmental Health Perspectives*. 2010;118:1109-1116.
12. Gordon-Larsen P, Boone-Heinonen J, Sidney S et al. Active commuting and cardiovascular disease risk. *Archives of Internal Medicine*. 2009;169(13):1216-1223.
13. Pucher J, Dijksta L, Making walking and cycling safer: Lessons from Europe. *Transportation Quarterly*. 2000;54(3):25-50.
14. Federal Highway Administration. *National Household Travel Survey*. 2001.
15. Gotschi T, Mills K. Active transportation for America. 2008; *Rail Trail Conservancy*: 1-44.
16. SAFETEA-LU: Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users. Public Law 109-59, 1404. http://fhwa.dot.gov/safetealu/legis.htm. Accessed on March 11th, 2011.
17. Watson M, Dannenberg AL. Investment in safe routes to school projects: public health benefits for the larger community. *Preventing Chronic Disease*. 2008; 5(3).
18. FHWA program guidance: Safe Routes to School (SRTS). Washington (DC): US Department of Transportation, Federal Highway Administration. http:// safety.fhwa.dot.gov/saferoutes/srtsguicance.htm#_Toc123542199. Accessed on March 1st, 2011.
19. Simeon, R. 2011 South Carolina Obesity Burden Report. SC Department of Health and Environmental Control/Division of Nutrition, Physical Activity & Obesity; August 2012. <http://www.scdhec.gov/health/epidata/index.htm>South Carolina Obesity. Accessed on January 23rd, 2013.

20. Donald NC. Active transportation to school: Trends among US school children, 1969 2001. *American Journal of Preventive Medicine*. 2007;32(6):509-516.
21. Heelan KA, Donnelly JE, Jacobsen DJ et al. Active commuting to and from school and BMI in elementary school children. *Child Care Health Development*. 2005; 31(3), 341-349.
22. Geoghegan J, Lynch L, Bucholtz S. Capitalization of open spaces into housing values and the residential property tax revenue impacts of agricultural easement programs. *Agricultural and Resource Economics Review*. 2003; 32(1): 33-45.
23. McConnell V, Walls M. *The value of open space: Evidence from studies of nonmarket benefits*. Washington: Resources for the Future, 2005.
24. Garrett-Peltier H. Pedestrian and bicycle infrastructure: A national study of employment impacts. Political Economy Research Institute. 2011. www.peri.edu. Accessed on August 16th, 2011.
25. East Central Florida Regional Planning Council. Economic impact of orange county trails. www.ecfrpc.org. Accessed on January 15th, 2013.
26. Visit Florida. www.visitflorida.com/trails. Accessed on January 15th, 2013.
27. Levine J, Inam A. The market for transportation–land use integration: Do developers want smarter growth than regulations allow? *Transportation*. 2004; 31(4): 409–427.
28. National Association of Home Builders. www.nahb.com/news/smartsurvey2002.htm. Accessed on August 22nd, 2011.
29. Baranowski T. Reciprocal determinism at the stages of behavior change: an integration of community, personal and behavioral perspectives. *International Quarterly of Community Health Education*. 1990; 10: 297-327.
30. Brownson RC, Houseman RA, Brown DR et al. Promoting physical activity in rural communities. *American Journal of Preventive Medicine*. 2000; 18: 235-241.
31. Merom D, Bauman A, Vita P et al. An environmental intervention to promote walking and cycling—the impact of a newly constructed Rail Trail in Western Sydney. *Preventive Medicine*. 2003; 36: 235-242.
32. King AC, Jeffery RW, Fridinger F et al. Environmental and policy approaches to cardiovascular disease prevention through physical activity: issues and opportunities. *Health Education Quarterly*. 1995; 22: 499-511.
33. Sallis JF, Owen N. Ecological models. In: Glanz K, Lewis FM, Rimer BK, eds. *Health Behavior and Health Education*. San Francisco, California: Jossey-Bass; 1997, p. 403-424.
34. Spence JC, Lee RE. Toward a comprehensive model of physical activity. *Psychology of Sport and Exercise*. 2003; 4: 7-24.
35. Reed JA, Talbot-Metz M, Hooker S. *Policy and program recommendations following the evaluation of an urban rail-trail conversion project*. Active Living Research: Investigating Policies and Environments to Support Active Communities Conference, 2008, Washington, DC, April 10-12.
36. Saelens BE, Sallis JF, Frank LD. Environmental correlates of walking and cycling: Findings from the transportation, urban design, and planning literatures. *Annals of Behavioral Medicine.* 2003; 25: 80-91.
37. Sallis JF, Owen N. *Physical activity and behavioral medicine*. Thousand Oaks, California: Sage Publications. 1999.
38. Brownson RC, Baker EA, Houseman RA et al. Environmental and policy determinants of physical activity in the United States. *American Journal of Public Health*. 2001; 91: 1995-2003.

39. Humple N, Owen N, Leslie E. Environmental factors associated with adults' participation in physical activity. *American Journal Preventive Medicine*. 2002; 22: 188-199.
40. Centers for Disease Control and Prevention (CDC). The task force on community preventive services. http://www.thecommunityguide.org/pa/default.htm#environmental. Accessed on February 23rd, 2012.
41. Reed JA, Morrison A, Arant C. Profile differences of paved vs. natural surface trails. *Journal of Physical Activity and Health*. 2009; 6: 112-118.
42. Reed JA, Wilson DK. Awareness and use of a university trail. *Journal of American College Health*, 2006; 54(4): 227-230.
43. Reed JA, Ainsworth BE, Wilson DK, Mixon G, Cooke A. Awareness and use of community walking trails. *Preventive Medicine*. 2004; 39: 903-908.
44. Zaza S, Briss PA, Harris KW (Eds). *Physical activity. The guide to community preventive services: What works to promote health*? New York, NY: Oxford University Press, 80-113. 2005.
45. Reed JA, McKenzie TL, Hagen S, Harring H. Using direct observation methodology to measure trail use. *The ICHPER-SD Journal of Research*. 2007; 2(2): 33-39.
46. Lindsey G, Nguyen DBL. Use of greenway trails in Indiana. *Journal of Urban Planning and Development*. 2004; December: 213-217.
47. Renalds A, Smith TH, Hale PJ. A systematic review of built environment and health. *Family Community Health*. 2010; 33(1): 68-78.
48. Reed JA, Arant CA, Wells P, Stevens K, Hagen S, Harring H. A descriptive examination of the most frequently used activity settings in 25 community parks using direct observation. *Journal of Physical Activity and Health.* 2008; 5(s1): *s*183-s195.
49. McKenzie TL, Cohen DA, Sehgal A, Williamson S, Golinelli D. System for observing play and recreation in communities (SOPARC): Reliability and feasibility measures. *Journal of Physical Activity and Health.* 2006; 1: S203-217.
50. Librett JJ, Yore MM, Schmid TL. Characteristics of physical activity levels among trail users in a US national sample. *American Journal of Preventive Medicine*. 2006; 31(5): 399-405.
51. Deaths, percent of total deaths, and death rates for the 15 leading causes of death: United States and each state, 2006. www.cdc.gov/nchs, National Vital Statistics System.
52. 2008 Physical Activity Guidelines for Americans. http://www.cdc.gov/physicalactivity/everyone/guidelines. Accessed on September 30th, 2012.
53. Centers for Disease Control and Prevention (CDC), National Center for Chronic Disease Prevention and Health Promotion, Division of Nutrition, Physical Activity and Obesity, Brown DR, Heath GW, Martin SL (eds). *Promoting physical activity* (2nd Ed.). Champaign, Illinois: Human Kinetics. 2009.
54. Centers for Disease Control and Prevention (CDC) Division of Adolescent and School Health through cooperative agreement 1U87DP001244 . Accessed on October 21st, 2013.
55. Danaei G, Ding EL, Mozaffarian D et al. The preventable causes of death in the United States: Comparative risk assessment of dietary, lifestyle, and metabolic risk factors. *PLoS Med.* Apr 28 2009; 6(4):e1000058.
56. Centers for Disease Control and Prevention. Behavioral Risk Factor Surveillance System. http://www.cdc.gov/brfss. Accessed on September 15th, 2012.

57. Evenson K, Brownson R, Satinsky S, Eyler A, Kohl H. The u.s. National physical activity plan: dissemination and use by public health practitioners. *American Journal Of Preventive Medicine* [serial online]. May 2013;44(5):431-438. Available from: MEDLINE, Ipswich, MA. Accessed April 30, 2013.
58. Simeon, R. 2011 South Carolina Obesity Burden Report. SC Department of Health and Environmental Control/Division of Nutrition, Physical Activity & Obesity; August 2011. http://www.scdhec.gov/health/epidata/index.htm>
59. Centers for Disease Control and Prevention. State Indicator Report on Physical Activity, 2010. Atlanta, GA: U.S. Department of Health and Human Services, 2010.
60. South Carolina Youth Behavior Survey. www.saashsc.org/wordpress/wp-content/uploads//2011YRBSReport.pdf. Accessed on April 20th, 2013.
61. Centers for Disease Control and Prevention. http://www.cdc.gov/obesity/stateprograms/fundedstates/south_carolina.html. Accessed on March 3rd, 2013.
62. Feigenbaum MF. Childhood obesity baseline for Greenville County, South Carolina. 2008
63. American Community Survey 2011. http://factfindercensus.gov. Accessed on September 23rd, 2012.
64. Maslow AL, Reed JA, Price AE, Hooker SP. Associations between sociodemographic characteristics and perceptions of the built environment with the frequency, type, and duration of physical activity among trail users. *Preventing Chronic Disease* 2012;9:110114. DOI: http://dx.doi.org/10.5888/pcd9.110114 .
65. Michael Y, Perdue L, Orwoll E, Stefanick M, Marshall L. Physical activity resources and changes in walking in a cohort of older men. *American Journal of Public Health* [serial online]. April 2010;100(4):654-660. Available from: MEDLINE, Ipswich, MA. Accessed April 30, 2013.
66. McKenzie TL, Cohen DA. *System for observing play and recreation in communities (SOPARC).* San Diego, CA: San Diego State University. 2004.
67. U.S. Department of Health and Human Services [DHHS]. *Physical activity and health: The link between physical activity and morbidity and mortality*. Atlanta, GA: Centers for Disease Control and Prevention. 2001.
68. Hinno AAF, Reis RS, Ribeiro IC et al. Using observational methods to evaluate public open spaces and physical activity in Brazil. *Journal of Physical Activity and Health*. 2010; 7(Suppl 2): s146-154.
69. Frank L, Kavage S. A national plan for physical activity: The enabling role of the built environment. *Journal of Physical Activity and Health*. 2009; 6(Suppl 2): s186-195.
70. Eyler AA, Brownson RC, Bacak SJ, Housemann RA. The epidemiology of walking for physical activity in the United States. *Medicine & Science in Sports & Exercise.* 2003; 35: 1529-36.
71. Krieger N, Williams DR, Moss NF. Measuring social class in US public health research: Concepts, methodologies, and guidelines. *Annual Reviews of Public Health*. 1997; 18: 341-378.
72. Adler NF, Boyce T, Chesney MA et al. Socioeconomic status and health: The challenge of gradient. 1994. *American Psychologist*; 49: 15-24.
73. Anderson NR, Armstead CA. Toward understanding the association of socioeconomic status and health: A new challenge for the biopsychosocial approach. 1995. *Psychomatic Medicine*; 57: 213-225.

74. Marmot MG, Kogevinas M, Elston MA. Social/economic status and disease. *Annual Review of Public Health*. 1987; 8: 111-135.
75. Wilson DK, Kirtland KA, Ainsworth BE, Addy CL. Socioeconomic status and perceptions of access and safety for physical activity. *Annals of Behavioral Medicine*. 2004; 24: 20-28.
76. Broomhall MH. Study of the availability and environmental quality of urban open space used for physical activity. *Master's thesis, Department of Public Health, University of Western Australia, Perth*, 1996.
77. Tucker P, Gillilan J. The effect of season and weather on physical activity: a systematic review. *Public Health*. 2007; 121(12): 909-922.
78. Merrill R, Shields E, White G, Druce D. Climate conditions and physical activity in the United States. *American Journal of Health Behavior*. 2005; 29: 371-381.
79. Matthews C, Hebert J, Freedson P, Stanek E, Merriam P, Ebbeling C et al. Sources of variance in daily physical activity levels in the seasonal variation of blood cholesterol study. *American Journal of Epidemiology*. 2001; 153(10): 987-995.
80. Velasquez KS, Holahan CK, You X. Relationship of perceived environmental characteristics to leisure-time physical activity and meeting recommendations for physical activity in Texas. *Preventing Chronic Disease*. 2009; 6(1): A24.
81. Neff LJ, Ainsworth BE, Wheeler FC et al. Assessment of trail use in a community park. *Family Community Health*. 2000; 23: 76-84.
82. Mathews A, Laditka S, Laditka J, Wilcox S, Corwin S, Liu R et al. Older adults' perceived physical activity enablers and barriers: A multicultural perspective. *Journal of Aging and Physical Activity*. 2010; 18(2): 119-140.
83. American College of Sports Medicine, Chodzko-Zajko W, Proctor D, Fiatarone S, Minson C, Nigg C et al. Exercise and physical activity for older adults. *Medicine & Science in Sports & Exercise*. 2009; 41(7): 1510-1530.
84. Belza B, Walwick J, Shiu-Thornton S, Schwartz S, Taylor M, LoGerfo J. Older adult perspectives on physical activity and exercise: Voices from multiple cultures. *Preventing Chronic Disease*. 2004; 2(4): 1-12.
85. Mathews A, Corwin S, Laditika S, Friedman D, Colabianchi N, Montgomery K. (In Press). Older adults' perceptions of physical activity and cognitive health: Implications for health communication. *Health Education Behavior*. 2010.
86. Thompson RS, Rivara FP Thompson DC. A case-control study of the effectiveness of bicycle safety helmets. New England Journal of Medicine. 1989; 320:1361-1367.
87. Bikes Belong http://www.bikesbelong.org/resources/stats-and-research/statistics/bicycling-is-the-second-most-popular-outdoor-activity-in-america. Accessed on August 23rd, 2011.
88. Sacks JJ, Holmgreen P, Smith SM, Sosin DM. Bicycle-associated health injuries and deaths in the US from 1984 through 1988: how many are preventable. *JAMA*. 1991; 266: 3016-3018.
89. National Highway Safety Transportation Safety Association. www.nhtsa.gov. Accessed on August 22nd, 2011.
90. Safe Kids USA. Bicycling and skating safety fact sheet. http://www.safekids.org/our-work/research/fact-sheets/bicycle-safety-fact-sheet.html. Accessed on November 11th, 2011.
91. Rodgers GB. *Bicycle and bicycle helmet use patterns in the US: a description and analysis of national survey data*. Washington, DC: US Consumer Product Safety Commission, 1993.
92. Kirtland KA, Porter DE, Addy CL, Neet MJ, Williams JE, Sharpe PA, Neff LJ,

Kimsey jr. CD, Ainsworth BE. Environmental measures of physical activity supports: Perception versus reality. 2003. *American Journal of Preventive Medicine*; 24: 323-331.
93. Ainsworth Henderson KA, Ainsworth BE: Enablers and constraints to walking for older African American and American Indian women: The Cross-Cultural Activity Participation Study. *Research Quarterly Exercise and Sports*. 2000; 71: 313–321.
94. American College of Sports Medicine. American college of sports medicine position stand. Exercise and physical activity for older adults. *Medicine & Science in Sports & Exercise*. 1998; 30(6): 992-1008.
95. Cohen DA, Sehgal A, Williamson S et al. New recreational facilities for the young and old in Los Angeles: Policy and programming implications. *Journal of Public Health Policy*. 2008.
96. Heesch KC, Han JL. Associations between demographic, perceptual, and behavioral factors and support for policies encouraging active transport. *Journal of Physical Activity and Health*. 2007; 4(3): 271-277.
97. Bialeschki MD, Henderson KA. Constraints to trail use. *Journal of Park and Recreation*. 1988; 6: 20-28.
98. Reed J, Price A. Demographic characteristics and physical activity behaviors of park-visitors versus non-visitors. *Journal of Community Health.* In Press.
99. Centers for Disease Control and Prevention. US Physical Activity Statistics, 2011.
100. Renalds A, Smith T, Hale P. A systematic review of built environment and health. *Family Community Health.* 2010;33(1):68-78.
101. Price A, Reed J, Grost L, Harvey C, Mantinan L. Travel to, and use of, twenty-one Michigan trails. *Preventive Medicine.* Under Review.
102. Price A, Reed J, Hooker S. The association of natural elements and trail use by adults. *Preventing Chronic Disease.* 2012;9.
103. Reed J, Wilson D. Awareness and use of a university trail. *Journal of American College Health.* 2006;54(4):227-230.
104. Price AE, Reed JA, Mutukrishnan S. Trail user demographics, physical activity behaviors, and perceptions of a newly constructed greenway trail. 2012; *Journal of Community Health*.
105. American College of Sports Medicine, Chodzko-Zajko W, Proctor D, et al. Exercise and physical activity for older adults. *Medicine and Science in Sports and Exercise.* 2009;41(7):1510-1530.
106. Zoellner J, Hill J, Zynda K, Sample A, Yadrick K. Environmental perceptions and objective walking trail audits inform a community-based participatory research walking intervention. *The International Journal of Behavioral Nutrition And Physical Activity* [serial online]. January 30, 2012;9:6. Available from: MEDLINE, Ipswich, MA. Accessed April 30, 2013.
107. Schasberger MG, Hussa CS, Polgar MF et al. Promoting and developing a trail network across suburban, rural, and urban communities. *American Journal of Preventive Medicine*. 2009; 37(6 Suppl 2): s336-344.
108. Brownson RC, Hagood L, Lovegreen S et al. A multilevel ecological approach to promoting walking in rural communities. *Preventive Medicine*. 2005; 41: 837-842.
109. Wiggs I, Brownson R, Baker E. If you build it, they will come: Lessons from developing walking trails in rural Missouri. *Health Promotion Practice*. 2006; 10(10): 1-8.
110. Price A, Reed J, Long S, Maslow A, Hooker S. The association of natural elements with physical activity intensity during trail use by older adults *Journal of Physical Activity and Health.* 2012;9(6).

111. Abildso C, Zizzi S, Abildso L, Steele J, Gordon P. Built environment and psychosocial factors associated with trail proximity and use. *American Journal of Health Behavior*. 2007;31(4):374-383.
112. Kruger RA. Analyzing & reporting focus group results. Thousand Oaks, CA: Sage Publications. 1998.
113. Stewart KL, Barr J. Promotional methods used by hospitality-related firms in close proximity to Pennsylvania Rail-Trails. *Journal of Hospitality and Leisure Marketing*. 2005; 13(2).