



### **Year 3 Findings**

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## **Executive Summary**

Physical inactivity remains a significant public health concern. Recent data from the Centers for Disease Control and Prevention (CDC) found that only 20% of US adults are meeting both the aerobic and muscle strengthening components of the federal government's physical activity recommendations. Successful efforts to promote participation in regular physical activity are essential considering that inactivity has been linked to a variety of health problems including cardiovascular disease, diabetes, cancer, obesity and mental health problems, such as anxiety and depression.

Public health professionals recognize 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 (i.e., built) environments. One such example is the creation of a greenway trail.

The built environment often refers to man-made environmental structures that can be used for recreation or transportation purposes, which can include land-use patterns, small and large scale built and natural features, and transportation systems. Trails are one unique feature of the built environment that can provide inexpensive opportunities for both recreational and transport-related activity. The presence of community trails, like the Greenville Health System Swamp Rabbit Trail (GHS SRT) has often been associated with increased activity participation. In communities where trails are present, trail users are more likely to meet physical activity recommendations compared to trail non-users, which can have substantial health benefits.

The GHS SRT provides accessible open space designed to promote active living and multi-modal transportation options. The findings from this Year 3 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 visitors 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.

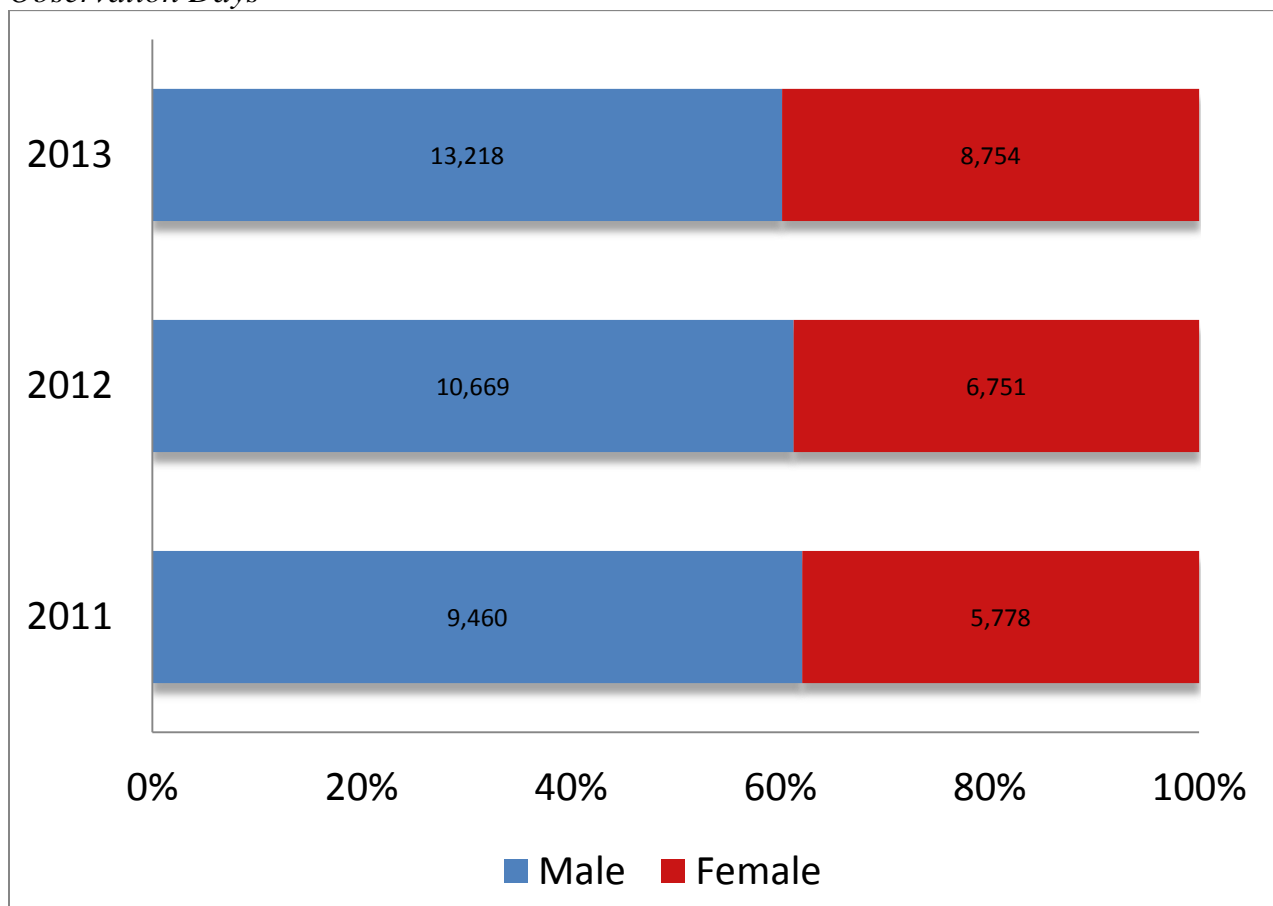
The overall purpose of this Year 3 evaluation is to (a) determine whether key target populations in Greenville, South Carolina are utilizing the GHS SRT to increase their physical activity or for active transportation; and (b) obtain data on which to base future community infrastructure investments on the GHS SRT to promote health, alternative transportation, and economic activity. The evaluation period for the Year 3 report was from July 1<sup>st</sup>, 2012 to June 30<sup>th</sup>, 2013.

### ***Summary of Direct Observation Findings for Year 3***

A ~20% increase in users was observed on the GHS SRT in Year 3. Adjusting for seasonality and temperature 21,972 users were observed during the 16 observation days which translates to an estimated 501,236 potential users in Year 3. The gender trend observed in Years 1 and 2 continued in Year 3 with 60% of all GHS SRT users observed being male and 40% female.

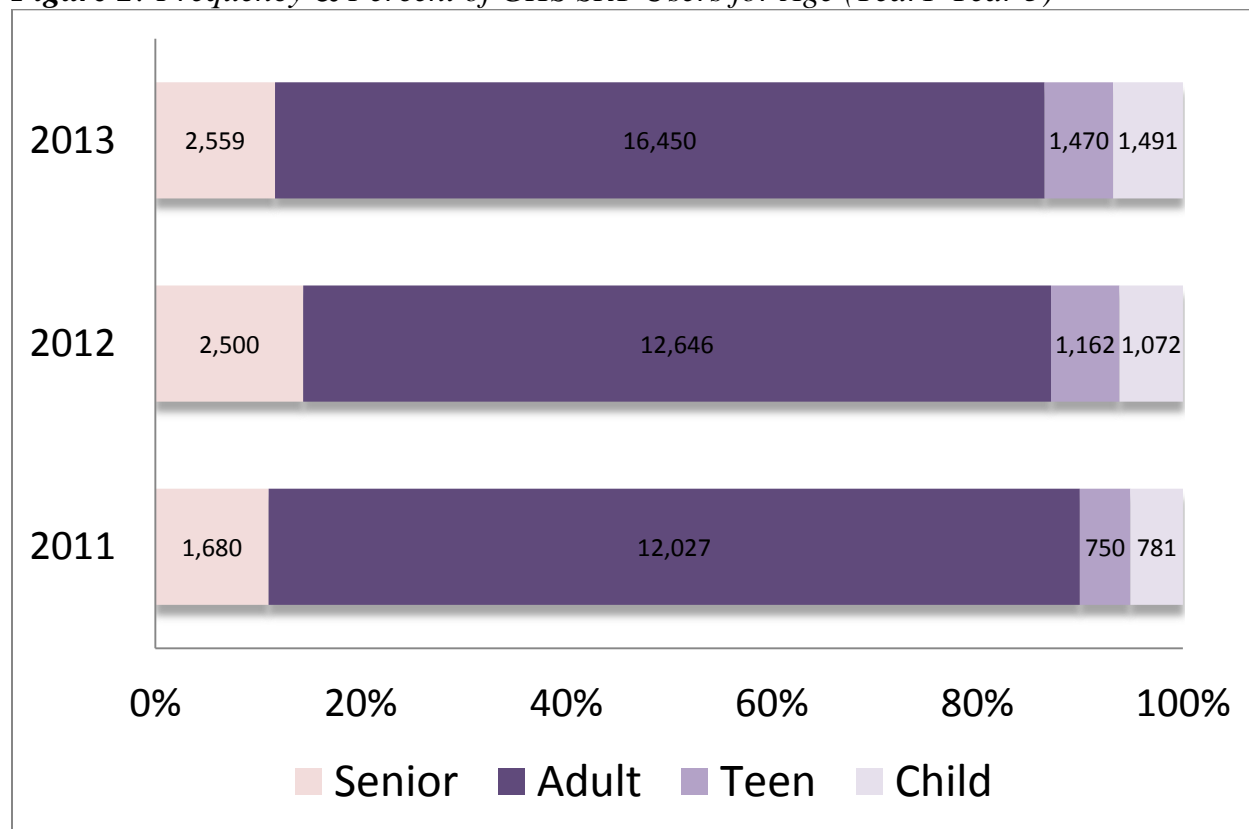
Approximately 93% of trail users observed during the previous two evaluations were white, however in Year 3 minority trail use increased significantly from ~6% to ~10%. A similar percentage of youth trail users was observed in Year 3 (13.4%) compared to previous evaluations. The frequencies and percentages of GHS SRT users from Year 1- Year 3 by Gender, Age, Ethnicity and Activity Intensity are listed below in **Figures 1-4**.

**Figure 1: Frequency & Percent of GHS SRT Users for Gender (Year 1-Year 3) on Observation Days**

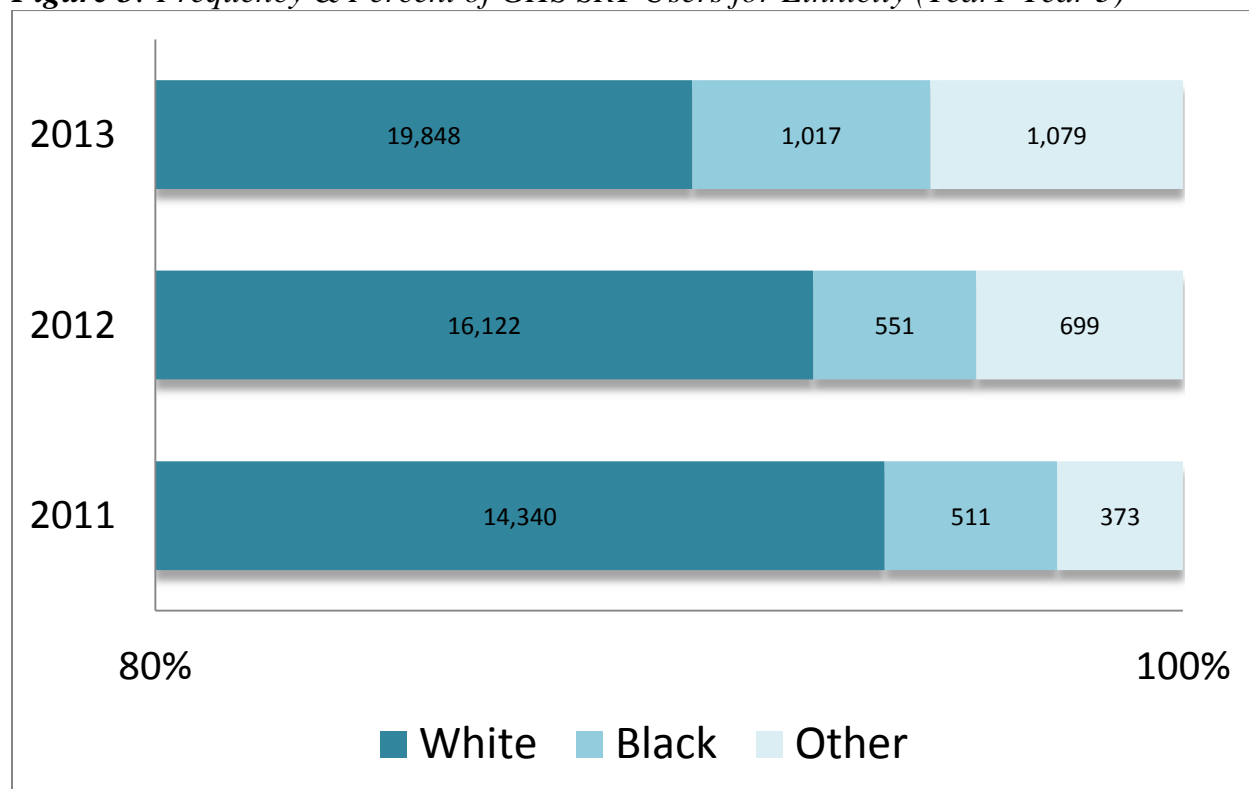


**GREENVILLE  
HEALTH SYSTEM**

**Figure 2: Frequency & Percent of GHS SRT Users for Age (Year1-Year 3)**

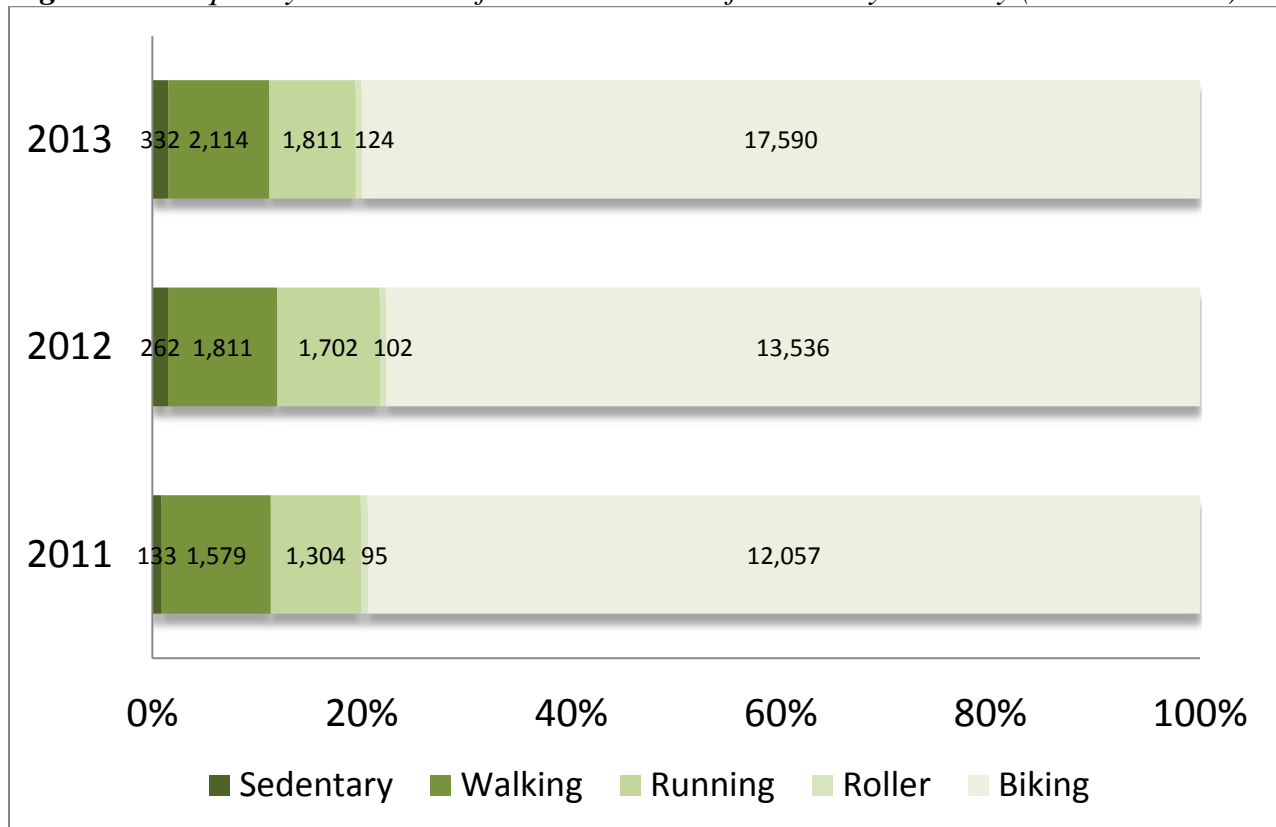


**Figure 3: Frequency & Percent of GHS SRT Users for Ethnicity (Year1-Year 3)**





**Figure 4: Frequency & Percent of GHS SRT Users for Activity Intensity (Year 1-Year 3)**



*Courtesy Greenville County*

### ***Other significant findings from Direct Observation for Year 3***

- 83% of all males observed on the GHS SRT were bicyclists compared to 75% of all females.
- Approximately 13% of females were observed walking on the GHS SRT compared to 7% of males.
- The greatest numbers of GHS SRT users were observed during the winter months.
- The greatest numbers of both male and female trail users were observed when it was sunny and with temperatures between 61-70 degrees.
- GHS SRT male and female users tend to use the trail more frequently in the early afternoon (i.e., between the hours 12-1:30pm [33.6% of all users]).
- An overwhelmingly large number of GHS SRT users continue to visit the trail on the weekends. Over 77% of all users were observed using the GHS SRT on Saturdays (39.4%) and Sundays (36.9%).
- The most frequently used access point based on direct observation of the GHS SRT was E. Bramlett Road located between the Elementary and Middle/High School campuses of Legacy Charter School and less than two miles from Downtown Greenville.
- Approximately 49% of adult male and female trail users were not wearing helmets when bicycling on the GHS SRT.

### ***Summary of Intercept Survey Findings for Year 3***

Intercept surveys were administered to 1,482 trail users at the three designated access points in Year 3. The key findings from these surveys are outlined below:

- Approximately 61% of female and 77% of male intercept survey respondents were bicycling when asked to complete the survey. This finding was consistent with the direct observation data.
- The majority of female (64.3%) respondents reported using the GHS SRT with 'others'; while 59% of male respondents reported using the trail alone.
- The majority of female (55%) and male (55%) respondents resided less than 15 minutes from the trail.
- The majority of female (67%) and male (57%) respondents used a motorized vehicle to access the trail.
- Males reported the safety and security of the trail to be 'excellent' compared to 'good' among female respondents.
- GHS SRT users tend to spend between 1 and 2 hours on the trail per visit when using it for recreation.
- The majority of male and female GHS SRT users reported using the trail for more than 3 years.
- Over 91% of males and females used the GHS SRT for exercise and recreational activity.
- GHS SRT users report the maintenance of the trail as 'excellent'.
- Male and female GHS SRT users tend to be college graduates.
- Approximately 7% of GHS SRT respondents reported using the trail for both recreation and transportation purposes.
- ~25% of all respondents were from outside of the Upstate area.

### ***Summary of RDD Findings for Year 3***

In addition to intercept surveys, a Random Digit Dial (RDD) survey was administered to 956 Greenville County residents to identify barriers and determinants linked to GHS SRT use and non-use. The response rate for the RDD survey was 30% and the refusal rate was only 17.6%.

#### ***GHS SRT non-users frequently cited:***

- Not interested, too busy, 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 one mile closer to the GHS SRT than non-users.

#### ***GHS SRT users frequently cited:***

- Almost all RDD respondents who reported using the trail did so for recreation (94%) rather than for transportation (3.3%) or both recreation and transportation (6%).
- 8% of respondents used the trail for less than 30 minutes, 24.8% used the trail for 30-59 minutes, and 66.7% used the trail for 60 minutes or more.
- 16% of RDD respondents used the trail once per week for recreational purposes, while 38% of respondents used it for at least two or more times per week.

### ***Summary of Focus Groups Findings for Year 3***

Twelve adult GHS SRT users participated in two focus groups (5 males; 7 females). Approximately 50% of focus group participants in Year 3 reported a median household income of \$70,000 or more and 73% of participants were married. One-hundred percent of focus group participants in Year 3 were white and 83% held a college degree.

#### ***Focus group participants perceived the GHS SRT to be:***

- Accessible – with different socioeconomic backgrounds using the trail and a wonderful resource for the community. Most focus group participants reported using the trail for physical and mental health and considered the trail a public health intervention.
- However, many of the focus group participants reported barriers to trail use are related to crowds on the weekends and the high speed of bikers.
- Overall focus group participants reported that the GHS SRT was boon for economic development promoting Greenville tourism.

### ***Summary of Business Interviews for Year 3***

Nineteen managers/owners of retail businesses directly abutting and/or within close proximity to a GHS SRT access point were interviewed in Year 3, including five retail bicycle shops.

- Two bike shops reported an average of 75% of their customers purchased bikes to use the trail in Year 3. These

two bike shops reported a revenue range from \$300,000 to \$400,000 from trail users.

- The majority of the businesses surveyed in Year 3 reported increases in sales/revenue ranging from 10% to as high as 85%.
- Annual revenue from trail users ranged from non-bike shops was as high as \$400,000 according to managers/owners surveyed.



*Courtesy Greenville County*

## **1 Introduction**

Physical inactivity is a significant public health concern. Data from the Centers for Disease Control and Prevention (CDC) released in 2013 found that only 20% of U.S. adults are meeting both the aerobic and muscle strengthening components of the federal government's physical activity recommendations<sup>1-2</sup>.

The Physical Activity Guidelines for Americans recommend that adults get at least 2½ hours a week of moderate-intensity aerobic activity such as walking, or one hour and 15 minutes a week of vigorous-intensity aerobic activity, such as jogging, or a combination of both. The guidelines also recommend that adults do muscle-strengthening activities, such as push-ups, sit-ups, or activities using resistance bands or weights. These activities should involve all major muscle groups and be done on two or more days per week<sup>1-2</sup>.

The rates of adults meeting the overall guidelines ranged from 27% in Colorado to 13% in Tennessee and West Virginia. The West (24%) and the Northeast (21%) had the highest proportion of adults who met the guidelines. Women, Hispanics, older adults and obese adults were all less likely to meet the guidelines<sup>1-2</sup>.

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, obesity and mental health problems, such as anxiety and depression<sup>1-2</sup>. For instance, in 2009-2010, more than one-third of U.S. adults (35.7%) were obese<sup>1-2</sup>.

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<sup>3-5</sup>. One such example is the creation of a greenway trail<sup>5-12</sup>.

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 3 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 the 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-Year 3 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<sup>13-15</sup> from active transport could be significant.

The Theory of Planned Behavior is the common framework used to examine the influences on travel behaviors<sup>15</sup>. 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<sup>16</sup>. 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<sup>15</sup>.

The Transportation Research Board/Institute of Medicine concluded that there is substantial evidence supporting how trail creation can promote active transportation<sup>15-16</sup>. Greenville County's development of trails, such as the GHS SRT, can and does promote daily bouts of "lifestyle" activity to meet current activity recommendations and positively affecting transportation trends in the communities where such trails are located.

### 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*<sup>17</sup>. 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<sup>18</sup>. Non-infrastructure related projects may include student and parent education, public awareness campaigns, and traffic enforcement<sup>19</sup>.

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<sup>20-22</sup>. According to some researchers this is enough activity to "fend" off excess weight gain<sup>22</sup>. 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<sup>23-24</sup>. 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<sup>25</sup>.

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*<sup>26</sup> 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<sup>25</sup>.

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<sup>26</sup>. 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<sup>27</sup>. This conservative number (25% of sales coming from trail users) according to the report by Florida officials revealed that \$3.6 million in annual sales resulted from purchases by trail users<sup>27</sup>.

A national survey of developers revealed consumer interest in higher density, mixed use, pedestrian-oriented alternatives to conventional, low-density, automobile-oriented suburban development<sup>28-29</sup>. 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<sup>29</sup>.

### 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<sup>30-33</sup>. 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<sup>34-38</sup> 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<sup>39-41</sup>.

The CDC's Task Force on Community Preventive Services recommended that efforts aimed at promoting walking and bicycling should include access to trails to encourage physical activity<sup>41</sup>, and identified trails as integral infrastructure for physical activity<sup>41-48</sup>.

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<sup>42-48</sup>.

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<sup>41</sup>. Those promoting the trail might consider highlighting some of the trail features preferred by trail users in this study and previous studies<sup>10,12,15</sup> 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<sup>38-40</sup> 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<sup>49</sup> 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<sup>43-48,50</sup>. Librett and colleagues<sup>51</sup> 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<sup>52</sup>. Few American adults meet current activity recommendations<sup>53</sup>. Therefore, it should not come as a surprise that so many children are overweight and inactive<sup>54</sup>. Physical activity declines precipitously once children enter adolescence<sup>55-56</sup>. 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. 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*<sup>53</sup>, the following updated guidelines are recommended for youth, adults and seniors:

#### *Recommended Guidelines for Youth, Adults and Seniors*

<b>Adults</b>	<ul style="list-style-type: none"> <li>• 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.</li> <li>• 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).</li> </ul>	<ul style="list-style-type: none"> <li>• Moderate intensity activities that raise the heart rate, including brisk walking (3-4 mph) gardening, climbing stairs, housework.</li> <li>• Should be performed in bouts of at least 10 minutes, and preferably, it should be spread throughout the week.</li> <li>• Can be accumulated from leisure, occupational, or transportation.</li> </ul>
<b>Older Adults</b>	<ul style="list-style-type: none"> <li>• Adult guidelines apply, unless health conditions prevent older adults from performing 150 minutes a week.</li> <li>• Should be as physically active as their abilities and health conditions allow.</li> </ul>	
<b>Children and Adolescents</b>	<ul style="list-style-type: none"> <li>• Should participate in 1 hour or more of at least moderate-intensity activity every day.</li> <li>• 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.</li> </ul>	<ul style="list-style-type: none"> <li>• Important to encourage physical activities that are age appropriate, enjoyable, and offer variety.</li> </ul>



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<sup>55-58</sup>.

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<sup>58</sup>.

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<sup>58</sup>.

### *1.3.3 Health in South Carolina: Adults and Youth*

According to the 2010 Behavioral Risk Factor Surveillance System (BRFSS)<sup>57</sup>, obesity prevalence is higher among African Americans (41%) and Hispanics (54.8%) than among their White counterparts (28.3%). Additionally, 76% of African American adults in South Carolina are overweight and/or obese<sup>57</sup> compared to 64% of White adults<sup>57</sup>. Approximately 49% of African American adults are insufficiently active and 24% report no physical activity participation<sup>57</sup>.

Findings from the South Carolina Obesity Burden Report 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%)<sup>60</sup>.

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%)<sup>60-61</sup> 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 among their White counterparts (9.9%)<sup>60-61</sup>.

Findings from *F as in Fat*<sup>62</sup>, a collaborative project of the Trust for America's Health and the Robert Wood Johnson Foundation reveal the percentage of obese youth age 10-17 in South Carolina is the second highest in the nation at 21.5%. Equally alarming, 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<sup>59</sup> 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<sup>59</sup> in an average week. The CDC's State Indicator Report on Physical Activity for 2010<sup>59</sup> 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<sup>59</sup>. The low-income obesity preschool rate for Greenville County is 13.7% compared to 11.4% for South Carolina. 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, 41% of Hispanic youth, and 49% of African American youth are overweight and/or obese<sup>63</sup>.

## **2 Evaluation Methods for Active Transportation Usage, Economic Impacts, and Usage Characteristics of the GHS SRT for Year 1-Year 3**

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-Year 3 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-Year 3**

A brief (5 to 10 minutes) valid and reliable survey<sup>11</sup> 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 3 Findings:** One-thousand four hundred and eighty two (1,482) respondents completed the survey in Year 3. All respondents were at least 18 years old.

Approximately 61% of female (N=334) and 77% of male (N=722) 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 (55%) and male (55%) respondents resided less than 15 minutes from the trail. The majority of female (67%) 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 63% of females and 60% of males believed the maintenance of the GHS SRT was 'excellent'.

An overwhelming majority of female (89%) and male (89%) 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, 91% of males reported using the trail for exercise and recreation. Although Linky Stone Park was the most frequently cited access point in Year 3 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 5). Frequency and percent of most frequently cited intercept survey response(s) for Year 1 –Year 3 are listed in Table 1 below.



Courtesy of Times-News

Table 1: Frequency and Percent of Most Frequently Cited INTERCEPT Survey Response(s) for Year 1-Year 3

Num.	Survey Question	Gender	Most Frequently Cited Response(s) Year 1	Frequency (%) <sup>#</sup> Year 1	Most Frequently Cited Response(s) Year 2	Frequency (%) <sup>#</sup> Year 2	Most Frequently Cited Response(s) Year 3	Frequency (%) <sup>#</sup> Year 3
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%)	Bicycling* Bicycling*	334(61.4%) 722(76.8%)
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%)	With others Alone	350(64.3%) 55.4(58.9%)
2	Identify gender	Female Male	NA NA	475(41%) 686(59%)	NA NA	555(37%) 934(63%)	NA NA	544(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%)	>3 years ago >3 years ago	183(33.6%) 392(41.7%)
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%)	Home Home	441(81.1%) 786(83.6%)
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%)	Less than 15 minutes Less than 15 minutes	298(54.8%) 520(55.3%)
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%)	Less than 15 minutes Less than 15 minutes	36(73.5.0%) 72(71.3%)
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%)	Car or other vehicle Car or other vehicle	365(67.1%) 537(57.1%)
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%)	Exercise or do recreational physical activity Exercise or do recreational physical activity	505(92.8%) 859(91.4%)
6a	During the past 7 days (including today), how many days have you used this trail for exercise or recreational	Female Male	One day One day	225(47.4%) 267(38.9%)	One day One day	261(47.0%) 370(40.8%)	One day One day	253(47.0%) 377(40.1%)

	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%)	Bicycle* Bicycle*	321(59.0%) 683(72.7%)
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%)	Between 1-2 hours Between 1-2 hours	243(44.7%) 452(48.1%)
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	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	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	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%)	Family Nobody/by myself	232(42.6%) 469(49.3%)
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%)	EXCELLENT EXCELLENT	345(63.4%) 559(59.5%)
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%)	GOOD EXCELLENT	238(43.8%) 410(43.4%)
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%)	Word of mouth Word of mouth	302(55.5%) 473(50.3%)
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%)	Scenic Beauty Location/Conven.	134(24.6%) 208(22.1%)
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%)	Age 35 and older Age 35 and older	360(66.2%) 734(78.1%)

13	Are you Hispanic or Latino?	Female Male	No No	461(98.1%) 658(97.2%)	No No	524(94.4%) 873(93.5%)	No No	520(95.6%) 910(96.8%)
14	What is your race?	Female Male	White* White*	446(94.7%) 645(95.0%)	White* White*	505(91.0%) 821(87.9%)	White* White*	485(89.2%) 840(89.4%)
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%)	College graduate College graduate	228(41.9%) 358(38.1%)
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%)	Linky Stone Park Linky Stone Park	135(24.8%) 224(23.8%)

\* 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, 61.4% of all females observed on the trail (question 1) were bicycling, while 76.8% of all males were observed bicycling in Year 3.



Courtesy of Times-News

### 3.1 GHS SRT Active Transportation Findings for Year 3

According to the 2012 American Community Survey<sup>64</sup>, approximately 3.2% of Greenville County residents reported ‘walking’ or using ‘other means’ (i.e., non-motorized vehicles) to commute to and from work. Many US cities are seeing an increase in bicycle commuters, according to a US Census Bureau report. The number of people who traveled to work by bike increased roughly 60% over the last decade, from about 488,000 in 2000 to about 786,000 during the 2008-2012 period<sup>65</sup>. This is the largest percentage increase of all commuting modes tracked by the 2000 Census and the 2008-2012 American Community Survey<sup>65</sup>.

While bicyclists still account for just 0.6% of all commuters, some of the nation's largest cities have more than doubled their rates since 2000. Portland, Ore., had the highest bicycle-commuting rate at 6.1%, up from 1.8% in 2000. In Minneapolis, the rate increased from 1.9% to 4.1%<sup>65</sup>.

The report also looks at the number of people who walk to work. After steadily decreasing since 1980, the percent of people who walk to work has stabilized since 2000. In 1980, 5.6% of workers walked to work, and that rate declined to 2.9% by 2000. However, in the 2008-2012 period, the rate of walkers remained statistically unchanged from 2000. Among larger cities, Boston had the highest rate of walking to work at 15.1%<sup>65</sup>.

The vast majority of GHS SRT users’ preferred bicycle transportation, which was consistent with the direct observation findings for Year 3. Approximately 7% of respondents in Year 3 reported using the GHS SRT for both recreation and transportation purposes. The frequency and percent of GHS SRT Transportation Users

for Year 1-Year 3 are listed below in Table 2.



Courtesy of Times-News

*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-Year 3*

Question Number	Survey Question	Survey Response	Freq. (%) (Year 1)	Freq. (%) <sup>#</sup> (Year 2)	Freq. (%) <sup>#</sup> (Year 3)
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%)	22(1.5%)
		Both for recreation and transportation purposes	85 (7.3%)	155(10.5%)	96(6.5%)
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%)	23(20.0%)
		1 Day	35(34.3%)	45(68.8%)	32(27.8%)
		2 Days	11(10.8%)	22(14.7%)	14(12.2%)
		3 Days	11(10.8%)	20(13.3%)	17(14.8%)
		4 Days	4(3.9%)	8(5.3%)	10(8.7%)
		5 Days	6(5.9%)	9(6.0%)	3(2.6%)
		6 Days	2(2.0%)	6(4.0%)	1(0.9%)
		7 Days	3(2.9%)	8(5.3%)	15(13.0%)
		No response	13(12.7%)	0(0.0%)	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%)	7(6.3%)
		Jog or Run	0(0.0%)	6(3.7%)	2(1.8%)
		Bicycle	74(72.5%)	139(86.3%)	99(88.4%)
		In-Line Skate, roller skate or skate board	0(0%)	3(1.9%)	2(1.8%)
		Other	1(1.0%)	0(0.0%)	0(0.0%)
		NA	2(2.0%)	0(0.0%)	0(0.0%)
		No response	18(17.6%)	0(0.0%)	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%)	7(6.3%)
		Between 15 to 29 minutes	7(6.9%)	27(17.6%)	15(13.4%)
		Between 30 to 44 minutes	23(22.5%)	36(23.5%)	26(23.2%)
		Between 45 to 59 minutes	10(9.8%)	21(13.7%)	11(9.8%)
		Between 1 to 2 hours	26(25.5%)	42(27.5%)	37(33%)
		Between 2+ and 3 hours	7(6.9%)	16(10.5%)	13(11.6%)
		Between 3+ and 5 hours	2(2.0%)	3(2.0%)	2(1.8%)
		More than 5 hours	0(0.0%)	0(0.0%)	1(0.9%)
		No response	17(16.7%)	0(0.0%)	0(0.0%)

**# The percentage listed for frequency in question 6 for Year 3 refers to the percentage of all respondents to this question (that is, of all respondents to the survey, 6.5% used the trail for both recreation and transportation). For questions 6d-6f, the percentage represents the percentage of the 102 individuals in Year 1; 186 individuals in Year 2 and the 118 individuals in Year 3 that indicated that they use the trail for some sort of transportation purpose.**



### 3.2 Proximity to Residence and GHS SRT for Year 3

Proximity to exercise facilities is an environmental support identified as a possible determinant and barrier for physical activity<sup>10-12</sup>. 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<sup>10</sup> examining a trail in Spartanburg, South Carolina and found that

trail users lived, on average, 2.89 miles from the trail they use.

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 5).

Females resided closer to their preferred GHS SRT access point than males in Year 3. The average distance from place of residence and preferred access point on the GHS SRT for Year 1-Year 3 is listed in Table 3.

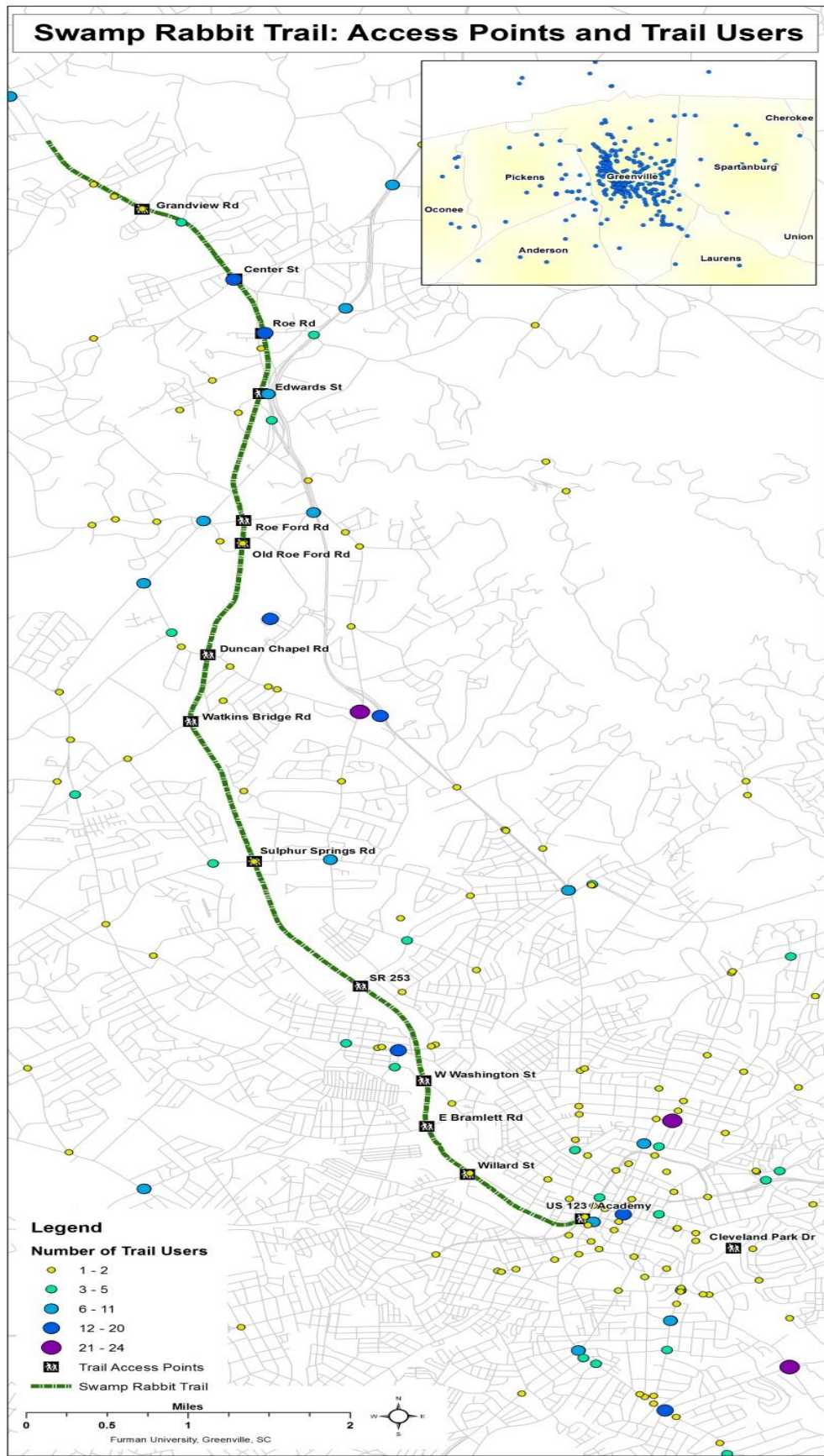
*Table 3: Average Distance from Place of Residence and Preferred GHS SRT Access Point for Year 1-Year 3*

<i>Question</i>	<i>Year</i>	<i>Gender</i>	<i>Distance (Miles)</i>
<i>What are the nearest two cross streets to your residence, city and zip code?</i>	<i>1</i>	Female (N=343)	8.48
		Male (N=461)	10.04
	<i>2</i>	Female (N=555)	12.09
		Male (N=932)	11.01
	<i>3</i>	Female (N=350)	10.98
		Male (N=636)	11.31

The average distance from place of residence and preferred GHS SRT access point for female and male users decreased in Year 3. Based on the intercept survey data illustrated in Figure 5, large

groups of users accessed the GHS SRT on Main Street in Travelers Rest and in Downtown Greenville.

Figure 5: GHS SRT Access Points and Trail User Residences for Year 3



#### **4 Direct Observation of the GHS SRT for Year 3**

The System for Observing Play and Recreation in Communities (SOPARC)<sup>66</sup> was the instrument used to objectively assess GHS SRT user demographics and physical activity behaviors. Several studies have used SOPARC in the US<sup>49-51</sup> 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<sup>66</sup>. SOPARC was selected to measure trails because: 1) it is a valid and reliable tool<sup>66</sup>; 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<sup>67-68</sup>. 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.

##### *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, Inline Skating 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). 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 3*

###### *4.3.1 Overview of Demographic Trail Findings for Year 3*

In Year 3, 21,972 trail users were observed on the GHS SRT. Adjusting for seasonality, approximately 501,236 users would have been observed on the GHS SRT (based on daily observation estimates) in Year 1. The majority of GHS SRT users tended to be White adults. However an increase in minority trail users was observed in Year 3. Demographics of GHS SRT users for gender, age and ethnicity for Year 1-Year 3 are listed in Table 4.

*Table 4: Demographics of GHS SRT Users for Gender, Age and Ethnicity for Year 1-Year 3*

		Year 1		Year 2		Year 3	
		Frequency	Percent	Frequency	Percent	Frequency	Percent
<i>Gender</i>	Male	9,722	62.0%	6,888	61.1%	13,218	60.1%
	Female	6,029	38.0%	10,831	38.9%	8,754	39.9%
<i>Age</i>	Child	925	5.8%	1,216	6.9%	1,491	6.7%
	Teen	879	5.5%	1,278	7.2%	1,470	6.7%
	Adult	12,267	77.8%	12,683	71.5%	16,450	74.9%
	Senior	1,680	10.6%	2,501	14.1%	2,559	11.6%
<i>Ethnicity</i>	White	14,709	93.4%	16,420	92.6%	19,848	90.3%
	Other	1,042	6.6%	1,250	7.4%	2,096	9.7%

#### 4.3.2 GHS SRT Use for Age by Gender for Year 1-Year 3

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 3, similar to Year 1 and Year 2 were adults. Frequency and percent of GHS SRT users for age by gender for Year 1-Year 3 are listed in Table 5.

*Table 5: Frequency and Percent of GHS SRT Users for Age by Gender for Year 1-Year 3*

		Year 1		Year 2		Year 3	
		Freq. (%)	Freq. (%)	Freq. (%)	Freq. (%)	Freq. (%)	Freq. (%)
<i>Age</i>		<i>Female</i>	<i>Male</i>	<i>Female</i>	<i>Male</i>	<i>Female</i>	<i>Male</i>
<i>Child</i>		380(6.3%)	545(5.6%)	505(7.3%)	708(6.5%)	620(7.1%)	870(6.6%)
<i>Teen</i>		375(6.2%)	504(5.2%)	591(8.6%)	686(6.3%)	744(8.6%)	713(5.4%)
<i>Adult</i>		4,773(79.2%)	7,494(77.1%)	4,960(72%)	7,718(71.3%)	6,551(75%)	9,752(74.3%)
<i>Senior</i>		501(8.3%)	1,179(12.1%)	809(11.7%)	1,691(15.6%)	778(8.9%)	1,781(13.6%)

#### 4.3.3 GHS SRT Use by Activity Intensity for Year 1- Year 3

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 3 were bicycling compared to 75% of all females observed. Approximately 13% of females were walking on the GHS SRT compared to only 7.0% of males in Year 3. Although most Americans are not regularly active, walking is the most common form of activity<sup>69</sup>. Eyler and colleagues<sup>69</sup> 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 recreational physical activity in the US<sup>1-2, 25</sup>. This finding supports the large numbers of bicyclists observed on the GHS SRT in Year 3. Frequency and percent of GHS SRT users for activity intensity for Year 1-Year 3 by gender per selected access point are listed in Table 6.

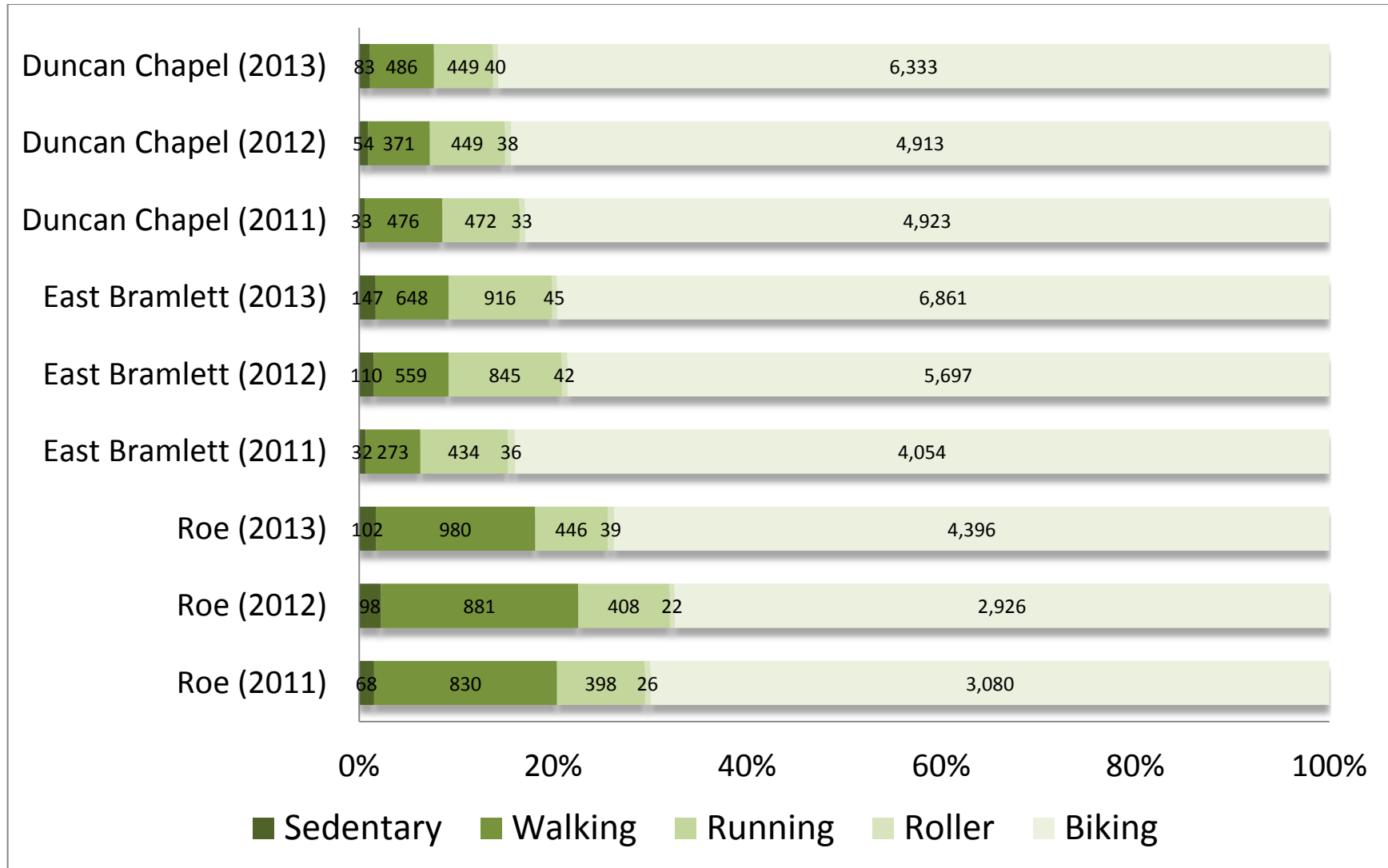
*Table 6: Frequency and Percent of GHS SRT Users for Activity Intensity by Gender for Year 1-Year 3*

	Year 1		Year 2		Year 3	
Gender	Activity Intensity	Frequency (%)	Activity Intensity	Frequency (%)	Activity Intensity	Frequency (%)
<i>Female</i>	Sedentary	75(1.2%)	Sedentary	130(1.9%)	Sedentary	146(1.7%)
	Walking	916(15.2%)	Walking	1,013(14.7%)	Walking	1,165(13.4%)
	Running	604(10.0%)	Running	750(10.9%)	Running	797(9.2%)
	Inline		Inline		Inline	
	Skating	26(0.4%)	Skating	37(0.5%)	Skating	49(0.6%)
	Bicycling	4,390(73.0%)	Bicycling	4,948(71.8%)	Bicycling	6,538(75.2%)
<i>Male</i>	Sedentary	65(0.7%)	Sedentary	138(1.3%)	Sedentary	185(1.4%)
	Walking	744(7.7%)	Walking	831(7.7%)	Walking	922(7.0%)
	Running	744(7.7%)	Running	972(9.0%)	Running	1,000(7.6%)
	Inline		Inline		Inline	
	Skating	71(0.7%)	Skating	67(0.6%)	Skating	75(0.6%)
	Bicycling	8,056(83.2%)	Bicycling	8,808(81.2%)	Bicycling	10,935(83.4%)



Courtesy of Greenville County

**Figure 6: Frequency & Percent of GHS SRT Users for Activity Intensity for Year 1-Year 3**



#### 4.3.4 GHS SRT Use by Ethnicity and the Role of Awareness and Accessibility for Year 1-Year 3

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.

Approximately 93% of trail users observed during the previous two evaluations were White, however in Year 3 minority trail use increased significantly from ~6% to ~10%. Frequency and percent of GHS SRT users for gender by ethnicity for Year 1-Year 3 are listed in Table 7.

*Table 7: Frequency and Percent of GHS SRT Users for Gender by Ethnicity for Year 1-Year 3*

	Year 1		Year 2		Year 3	
Gender	Ethnicity	Frequency (%)	Ethnicity	Frequency(%)	Ethnicity	Frequency(%)
Female	White	5,701(94.6%)	White	6,491(94.2%)	White	8,012(92.1%)
	Other	328(5.4%)	Other	371(5.8%)	Other	673(7.7%)
Male	White	9,008(92.7%)	White	9,916(91.8%)	White	11,833(90.2%)
	Other	714(7.3%)	Other	880(8.1%)	Other	1,265(9.7%)

#### 4.3.5 GHS SRT Use by Socio Economic Status for Year 1-Year 3

Socioeconomic status (SES) is a composite measure of an individual's resources and prestige within a community<sup>70</sup>. 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<sup>71-73</sup>. 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.

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 3, however it should be noted that an increase in minority trail users was observed in Year 3. Although this increase does not reflect the census estimates for the tracts abutting the trail nor for Greenville County, the fact remains that use of the GHS SRT by minorities did increase in Year 3.

#### 4.3.6 GHS SRT Use by Time of Day for Year 1-Year 3

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 Noon observation period had the heaviest traffic in Year 3 for both males and females. The frequency and percent of GHS SRT users for time period by gender for Year 1 –Year 3 are listed in Table 8.

*Table 8: Frequency and Percent of GHS SRT Users For Time Period by Gender for Year 1-Year 3*

Gender	Year 1		Year 2		Year 3	
	Time Period	Frequency (%)	Time Period	Frequency (%)	Time Period	Frequency (%)
<i>Female</i>	Morning	1,353(22.4%)	Morning	723(10.5%)	Morning	1,085(12.5%)
	Noon	1,852(30.7%)	Noon	2,407(34.9%)	Noon	3,036(34.9%)
	Afternoon	1,646(27.3%)	Afternoon	2,287(33.2%)	Afternoon	2,838(32.6%)
	Evening	1,178(19.5%)	Evening	1,471(21.4%)	Evening	1,737(20%)
<i>Male</i>	Morning	2,129(21.9%)	Morning	1,118(10.3%)	Morning	1,821(13.9%)
	Noon	2,870(29.5%)	Noon	3,403(31.4%)	Noon	4,241(32.3%)
	Afternoon	2,643(27.2%)	Afternoon	3,683(34.0%)	Afternoon	4,031(30.7%)
	Evening	2,080(21.4%)	Evening	2,627(24.3%)	Evening	3,024(23.1%)

*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 3

Researchers have called for additional studies examining associations between physical activity behavior and natural elements, such as seasonality<sup>74-78</sup>. 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<sup>47</sup> 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.<sup>47</sup> 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.

In Year 3, fall and spring were the most popular seasons for trail use. The frequency and percent of GHS users for seasonality by gender for Year 1-Year 3 are listed in Table 9.



*Courtesy of Greenville County*



*Table 9: Frequency and Percent of GHS SRT Users for Seasonality by Gender for Year 1-Year 3*

Gender	Season (Months)	Year 1	Year 2	Year 3
		Frequency(%)	Frequency(%)	Frequency(%)
Female	Fall (Sep-Nov)	1,130(18.7%)	1,546(22.4%)	2,139(24.6%)
	Winter (Dec-Feb)	1,450(24.1%)	1,571(22.8%)	2,928(33.7%)
	Spring (Mar-May)	1,211(20.1%)	2,217(32.2%)	1,804(20.7%)
	Summer (June-Aug)	2,238(37.1%)	1,554(22.6%)	1,825(21.0%)
Male	Fall (Sep-Nov)	1,737(17.9%)	2,306(21.3%)	2,998(22.9%)
	Winter (Dec-Feb)	2,016(20.7%)	2,543(23.5%)	3,930(30%)
	Spring (Mar-May)	2,241(23.1%)	3,511(32.4%)	2,942(22.4%)
	Summer (June-Aug)	3,728(38.3%)	2,471(22.8%)	3 247(24.8%)

#### 4.3.8 GHS SRT Use by Temperature for Year 3

Contextual elements, such as ambient temperature, impact physical activity<sup>79</sup>. 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<sup>80-81</sup>. 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<sup>83</sup>.

*Table 10: Frequency and Percent of GHS SRT Users for Changes in Temperature by Gender for Year 3*

Gender		Temperature in Degrees Fahrenheit						
		<40°	40-50°	51-60°	61-70°	71-80°	81-90°	91-100°
Female		19	469	227	3,588	2,388	1,646	359
		.2%	5.4%	2.6%	41.3%	27.5%	18.9%	4.1%
Male		23	824	465	4,808	3,460	2,795	742
		.2%	6.3%	3.5%	36.7%	26.4%	21.3%	5.7%

GHS SRT users clearly preferred to use the trail between 61 – 70 degrees Fahrenheit in Year 3.

Matthews and colleagues<sup>82</sup> 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<sup>82</sup>. In addition, older adults have specifically reported extreme temperatures as barriers to engaging in regular physical activity<sup>82</sup>. 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 3

The vast majority of GHS SRT use was on the weekends in Year 3. 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<sup>97</sup> during the past three years. The frequency and percent of GHS SRT users for day of the week by gender for Year 1-Year 3 are listed in Table 11.

*Table 11: Frequency and Percent of GHS SRT Users for Day of the Week by Gender for Year 1-Year 3*

Gender	Year 1		Year 2		Year 3	
	Day of the Week	Frequency (%)	Day of the Week	Frequency (%)	Day of the Week	Frequency (%)
<i>Female</i>	Tuesday	879(14.6%)	Tuesday	810(11.8%)	Tuesday	971(11.2%)
	Thursday	660(10.9%)	Thursday	1,089(15.8%)	Thursday	865(9.9%)
	Saturday	2,983(49.5%)	Saturday	2,451(35.6%)	Saturday	3,589(41.3%)
	Sunday	1,507(25.0%)	Sunday	2,538(36.8%)	Sunday	3,271(37.6%)
<i>Male</i>	Tuesday	1,732(17.8%)	Tuesday	1,475(13.6%)	Tuesday	1,810(13.8%)
	Thursday	1,265(13.0%)	Thursday	2,133(19.7%)	Thursday	1,521(11.6%)
	Saturday	4,259(43.8%)	Saturday	3,496(32.3%)	Saturday	5,005(38.2%)
	Sunday	2,466(25.4%)	Sunday	3,727(34.4%)	Sunday	4,781(36.4%)

#### 4.3.10 Helmet Use and Cycling Injuries for Year 3

The use of bicycle helmets is effective in preventing head injury<sup>83-85</sup>. 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.

Approximately 56% of adult female and 46% of adult male GHS SRT users were not wearing helmets when bicycling in Year 3. More than 77% of teen females and 72% of teen males did not wear a helmet. Bicycling is the second most popular outdoor activity in the US<sup>84-85</sup>.

Americans from six and older participated in 2.54 billion bicycling outings, averaging 59 outings per bicyclist<sup>86</sup> 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 1-3 are listed in Table 12.



Courtesy of Greenville County

*Table 12: Frequency and Percent of GHS SRT Users by Helmet Use for Gender by Age for Year 1-Year 3*

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



Courtesy of Times-News

Greater than 40% of all deaths from bicycle-related head injury were among persons less than 15 years of age<sup>87</sup>. This finding is a concern since at least two-thirds male and female teens observed on the GHS SRT were not wearing helmets in Year 3. In Year 3, approximately 51% of all male and female children were NOT wearing helmets..

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<sup>87-88</sup>; and every dollar spent on a bike helmet saves approximately \$30 in indirect medical costs<sup>87-88</sup>.



Courtesy of Greenville County

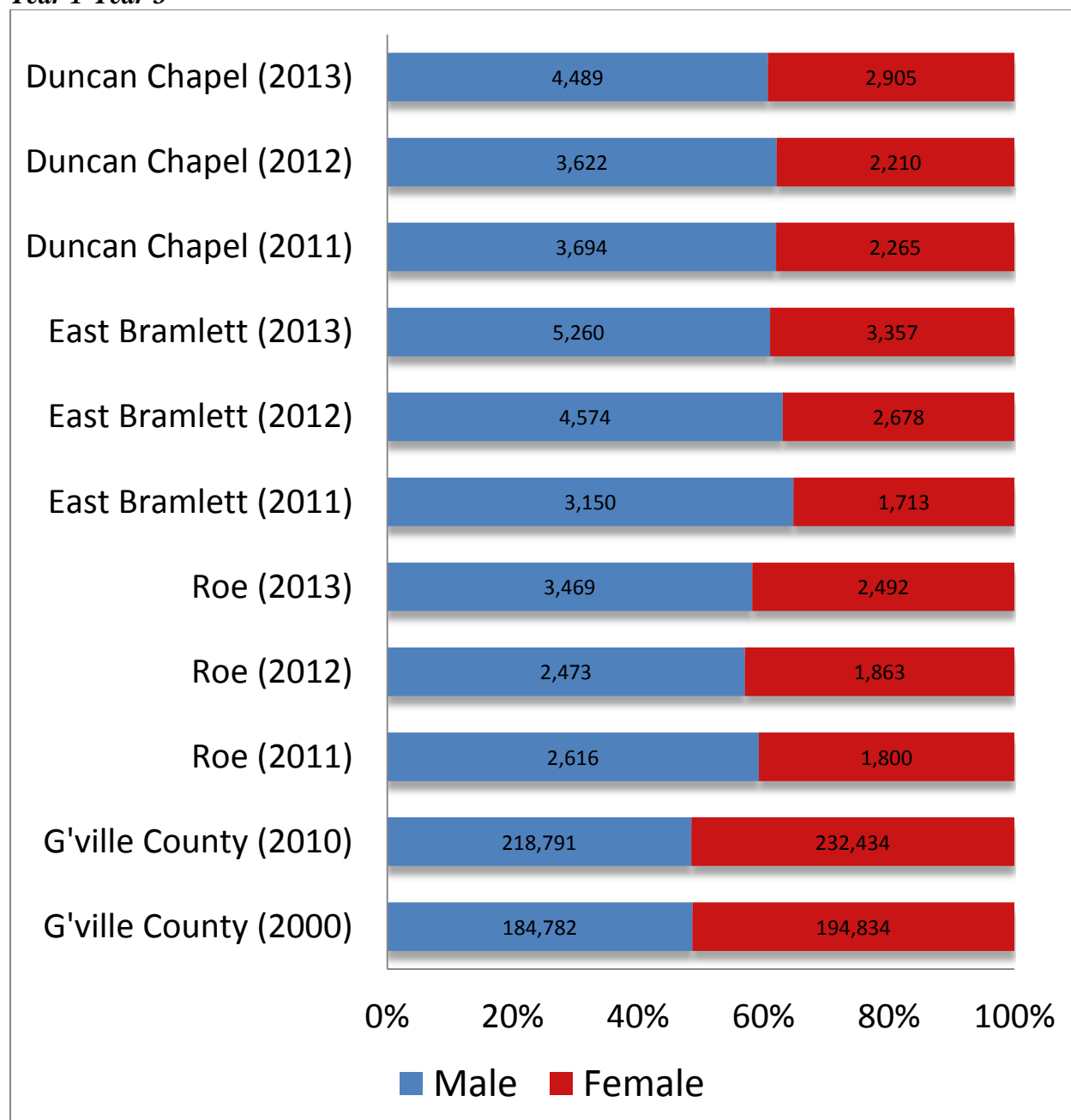
#### *4.4 Demographics and Use per Selected Access Points for Year 1-Year 3*

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 3*

More GHS SRT users overall (both male and female) were observed at E. Bramlett Road. Although line of sight is inferior at this access point, this access point is closest to the City of Greenville. The frequency and percent of GHS SRT users per selected access points by gender for Year 1-Year 3 are listed in Figure 7.

**Figure 7: Frequency & Percent of GHS SRT Users per Selected Access Points by Gender for Year 1-Year 3**

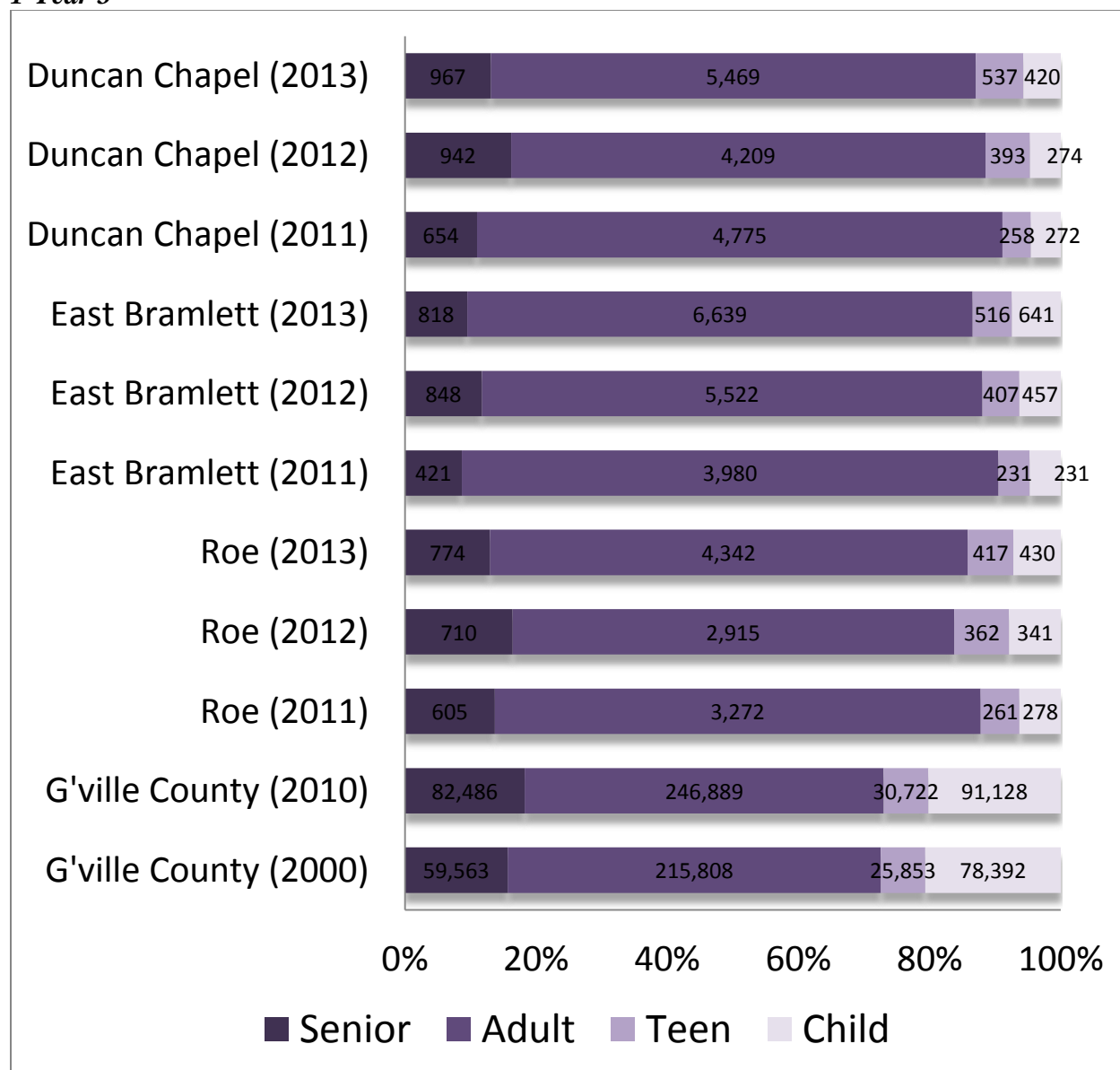


#### 4.4.2 Age per Selected Access Points for Year 1-Year 3

Of the children that were observed during the past three years, they were nearly always accompanied by an adult. More males

continue to be observed on the GHS SRT than females in Year 3. The frequency and percent of GHS SRT users per selected access points by age for Year 1-Year 3 are listed in Figure 8.

**Figure 8: Frequency & Percent of GHS SRT Users per Selected Access Points by Age for Year 1-Year 3**

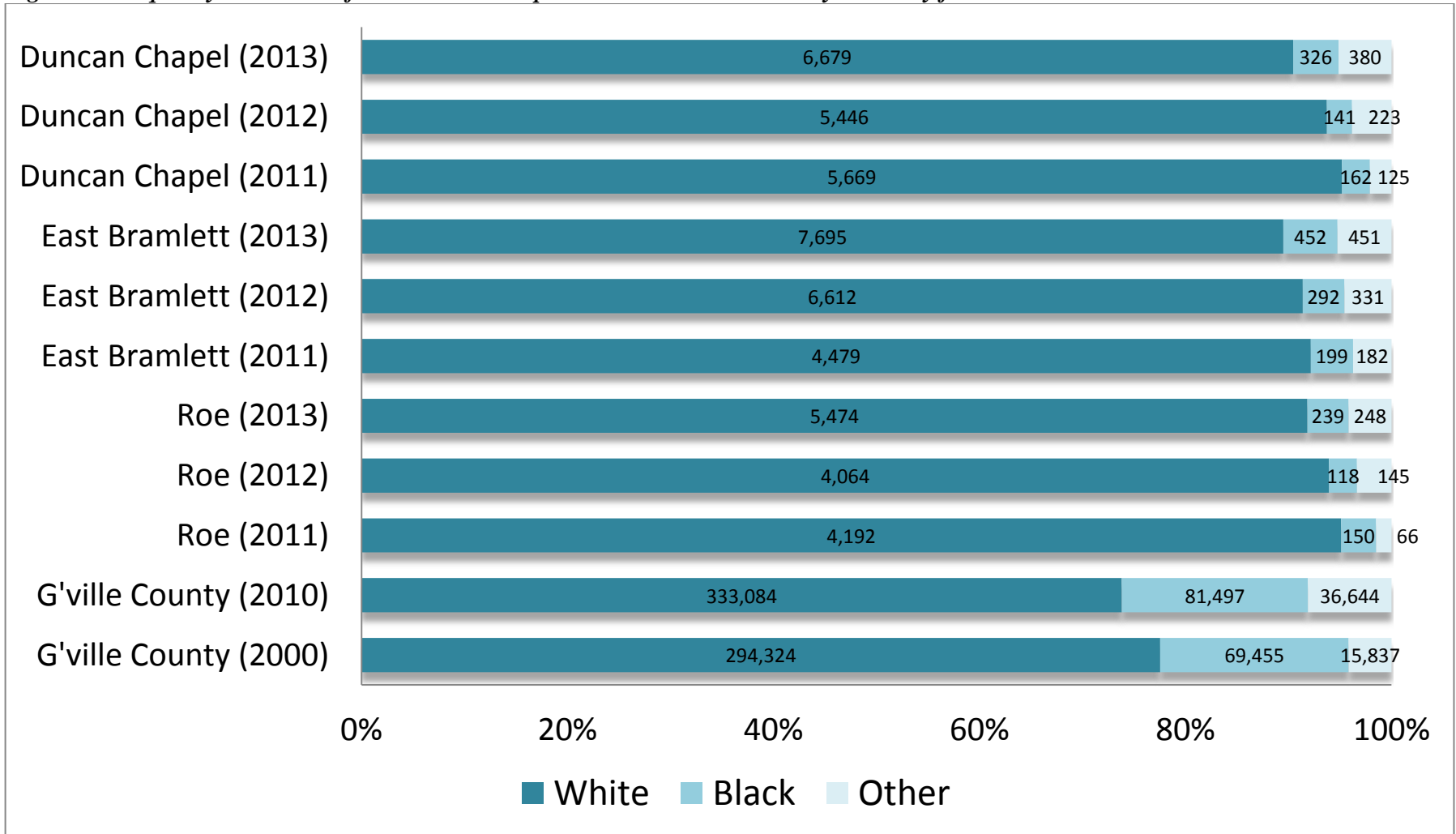


#### 4.4.3 Ethnicity per Selected Access Point for Year 3

Perception of being vulnerable to crime is a frequently cited barrier to trail use<sup>89-93</sup> 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<sup>94</sup>.

These direct observation findings do not align with the current demography for Greenville, South Carolina residents based on current census data estimates<sup>64</sup> of census tracts abutting the GHS SRT. 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.

**Figure 9: Frequency & Percent of GHS SRT Users per Selected Access Points by Ethnicity for Year 1-Year 3**



#### 4.4.4 Comparison to Census Data per Selected Access Point for Year 3

The findings shown in Figure 10 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,

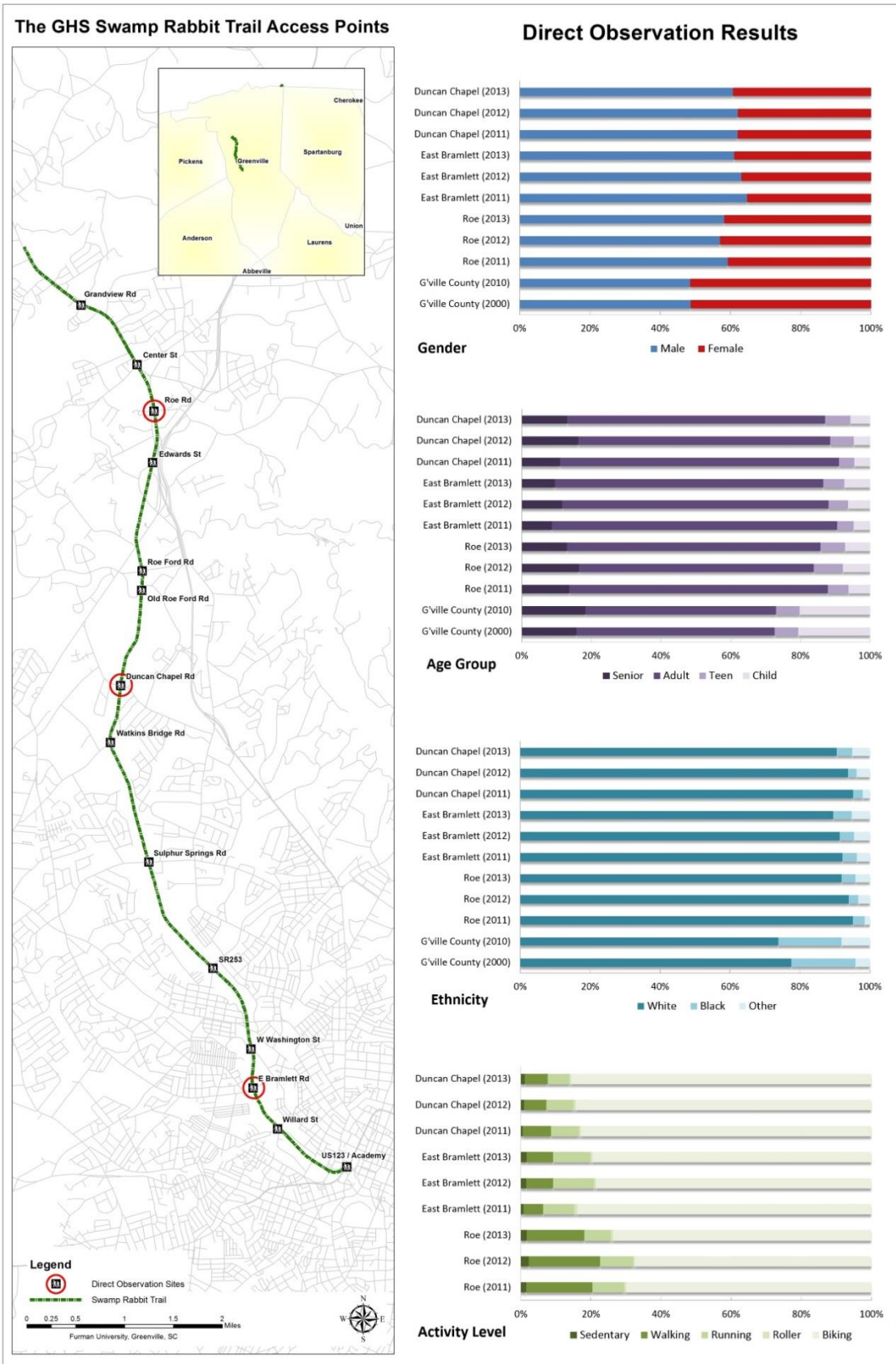
the County as a whole consists of approximately a 50/50 split among males and females during the evaluation period. Therefore demographics of Greenville County are not consistent with the findings of users on the trail for Year 3. Findings also did not agree with County statistics for age and ethnicity on the GHS SRT as discussed previously.



Courtesy of Times-News



Figure 10: GHS SRT Direct Observation Results for Year 1-Year 3



## **Random Digit Dial (RDD) Results for Year 1-Year 3**

### *5.1 Participants for Year 1-Year 3*

A sample of 500 Greenville County residents contacted using Random Digit Dialing (RDD) agreed to participate in this study in Year 1. In Year 2, 726 respondents agreed to participate. In Year 3, 899 respondents were surveyed with RDD.

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*

The primary purpose of the RDD survey was to identify barriers and determinants related to GHS SRT 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-Year 3 are listed in Table 13.



Courtesy of Times-News

*Table 13: RDD Survey Questions and Response(s) for GHS SRT Non-Users for Year 1-Year 3 for Gender*

Num.	Survey Question	Gender	Responses	Year 1 Freq. (%) <sup>#</sup>	Year 2 Freq. (%) <sup>#</sup>	Year 3 Freq. (%) <sup>#</sup>
1	In the last 6 months, did you visit the GHS SRT?	Female	No	241(76%)	333(74%)	454(82%)
		Male	No	130(71%)	212(76%)	262(76%)
2	Why did you NOT visit the GHS SRT?	Female	<ul style="list-style-type: none"> <li>• Too far away/inconveniently located</li> <li>• Not open at convenient times</li> <li>• Does not have features/equipment/programs I desire</li> <li>• Inadequately maintained</li> <li>• Too crowded</li> <li>• Located in unsafe area</li> <li>• Not aware of the trail</li> <li>• No particular reason</li> <li>• Other</li> <li>• Not interested</li> <li>• Too busy</li> <li>• Physical limitations (i.e., too old, back problems, injury, etc.)</li> </ul>	29(9.1%) 8(2.5%) 25(7.9%) 1(0.3%) 0(0.0%) 3(0.9%) 53(16.7%) 98(30.9%) 24(7.6%) NA NA NA	65(19.5%) 0(0%) 11(3.3%) 0(0.0%) 0(0.0%) 1(0.3%) 41(12.3%) 0(0.0%) 215(64.6%)* NA NA NA	44(9.7%) 0(0%) 3(0.7%) 1(0.2%) 1(0.2%) 2(0.4%) 65(14.3%) 0(0.0%) 80(17.6%) 52 (11.5%) (NEW) 101(22.2%) (NEW)
		Male	<ul style="list-style-type: none"> <li>• Too far away/inconveniently located</li> <li>• Not open at convenient times</li> <li>• Does not have features/equipment/programs I desire</li> <li>• Inadequately maintained</li> <li>• Too crowded</li> <li>• Located in unsafe area</li> <li>• Not aware of the trail</li> </ul>	20(10.9%) 4(2.2%) 10(5.5%) 0(0.0%) 0(0.0%) 0(0.0%) 24(13.1%)	40(18.9%) 0(0.0%) 4(1.9%) 0(0.0%) 0(0.0%) 0(0.0%) 36(17.0%)	27(10.3%) 0(0.0%) 1(0.4%) 2(0.8%) 2(0.8%) 1(0.4%) 38(14.5%)

			<ul style="list-style-type: none"> <li>• No particular reason</li> <li>• Other</li> <li>• Not interested</li> <li>• Too busy</li> <li>• Physical limitations (i.e., too old, back problems, injury, etc.)</li> </ul>	60(32.8%) 12(6.6%)	0(0.0%) 132(62.3%)*	0(0.0%) 49(18.7%) 49(18.7%) (NEW) 50(19.1%) (NEW)  43 (16.4%) (NEW)
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# The percentage listed for frequency refers to the percentage of respondents of a specific gender that provided the corresponding answer. For example, 82% of all females in Year 3 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. The responses were added to Year 3's RDD survey.



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### *5.3 Awareness of Trails and Promoting Trail Use for Year 1-Year 3*

Lack of awareness is a frequently cited barrier for not using a trail<sup>44-45</sup> and is one of the most common reasons given in the RDD samples. A study promoting and developing a trail network across suburban, rural and urban communities by Schasberger and colleagues<sup>95</sup> 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<sup>96</sup> 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<sup>97</sup>. The Department found significant increases in trail use following the promotional campaign when compared to a community that did not participate in the campaign<sup>97</sup>.

Similar to Missouri's public health campaign, 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<sup>41</sup>. Those promoting the trail might consider highlighting some of the trail features preferred by trail users in this study and previous studies<sup>41</sup> 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<sup>98</sup> 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<sup>8-9</sup>. 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<sup>38-41</sup>. The presence of litter and noise, dense vegetation areas, and drainage areas and tunnels has also been associated with less trail use<sup>99</sup>. Additional research is needed to examine barriers to trail use as well as strategies for overcoming perceived barriers to trail use.

### *5.4 Evaluation of Proximity for Year 1-Year 3*

Each of the RDD respondents in Year 1-Year 3, 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 14.

*Table 14: Average Distance to GHS SRT from Residence for Users and Non-Users from the RDD for Year 1-Year 3*

Question	User Status/Distance Miles Year 1	User Status/Distance Miles Year 2	User Status/Distance Miles Year 3
What are nearest two cross streets to your residence, city and zip code?	Non-User (N=359)/10.20	Non-User (N=545)/8.39	Non-User (N=715)/8.32
	User (N=45)/8.71	User (N=181)/7.74	User (N=183)/7.65

The RDD findings reveal that non-users on average live farther away from the GHS SRT when compared to users in Year 1-Year 3. 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

#### *5.5 Reasons for Not Using Trail in Year 3*

A total of 899 residents participated in the telephone survey. Of those, 79.6% (n=716) reported not using the GHS SRT in the past 6 months. Reasons for non-use differed significantly by gender, age and income, but not race or education. Specifically, more females cited ‘too far away’ (62.0%), ‘not aware’ (63.1%), ‘too busy’ (66.9%), and ‘physical limitations’ (70.9%) than males. With respect to age, older adults (65+) reported physical limitations more frequently (85.5%), while younger adults (18-64) more often reported ‘too busy’ (69.9%) and ‘not aware’ (64.4%). Finally, individuals with higher household incomes (\$45,000+) reported ‘not interested’ more frequently (61.4%) than those with lower household incomes who more often stated ‘physical limitations’ (81.9%). Trails are often key components of the recreational and transportation infrastructure of

findings, therefore suggest that non-users may not have been aware (see Figure 13) of the GHS SRT. Gordon and colleagues<sup>7</sup> 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.

communities. This study provided unique information about diverse residents’ reasons for not using a prominent community trail. First, the majority of participants that completed the survey reported not using the trail in the past 6 months, suggesting that even though the observed number of trail users has increased each year, additional efforts should be implemented to increase use of the GHS SRT in this context. Furthermore, when designing interventions to address trail use, understanding how different socio-demographic groups perceive barriers can inform how to target messages and reach specific segments of the community. For example, among non-users, a higher proportion of adults (ages 18-64) were not aware of the GHS SRT compared to older adults (ages 65+). Previous research has also demonstrated that a majority of residents who lived in close proximity to a trail were unaware that such resources existed<sup>9-10</sup>. Promotional campaigns or materials that aim to increase trail use could

target community locations and media outlets that are frequented by adults and further research could be conducted to identify effective ways to subdivide and target potential users in this age group with persuasive communications. Further, a higher proportion of women reported ‘too busy’ to use the trail compared to men. Similarly, previous findings suggest that

men are more likely to use trails compared to women<sup>9-10</sup>. Specific efforts could address barriers to trail use for women by developing strategies to incorporate trail use into a weekly recreational or transportation routine. RDD reasons for non-use for age, income, race and education for Year 3 are listed in Table 15.

*Table 15: RDD Reasons for Non-Use for Age, Income, Race and Education Year 3*

	N (%)	Reported Reason for Not Using Trail				
		Not Interested (n=101)	Too Far Away (n=71)	Not Aware (n=103)	Too Busy (n=151)	Physical Limitations (n=148)
<b>Gender</b>						
Male	262 (36.6%)	48.5%	38.0%	36.9%	33.1%	29.1%
Female	454 (63.4%)	51.5%	62.0%	63.1%	66.9%	70.9%
<b>Age</b>						
18-64 years	333 (51.6%)	53.4%	57.8%	64.4%	69.9%	14.5%
65+ years	312 (48.4)	46.6%	42.2%	35.6%	30.1%	85.5%
<b>Income</b>						
< \$45,000	189 (51.6%)	38.6%	54.5%	58.3%	40.4%	81.9%
≥ \$45,000	177 (48.4%)	61.4%	45.5%	41.7%	59.6%	18.1%
<b>Race</b>						
White	500 (82.1%)	83.3%	85.5%	73.7%	82.5%	80.8%
Non-White	109 (17.9%)	16.7%	14.5%	26.3%	17.5%	19.2%
<b>Education</b>						
≤ High School Grad	200 (35.5%)	40.8%	33.9%	38.4%	30.4%	47.8%
≥ Some College	364 (64.5%)	59.2%	66.1%	61.6%	69.6%	52.2%

Figure 11: Users and Non-Users of GHS SRT and Place of Residence for Year 3

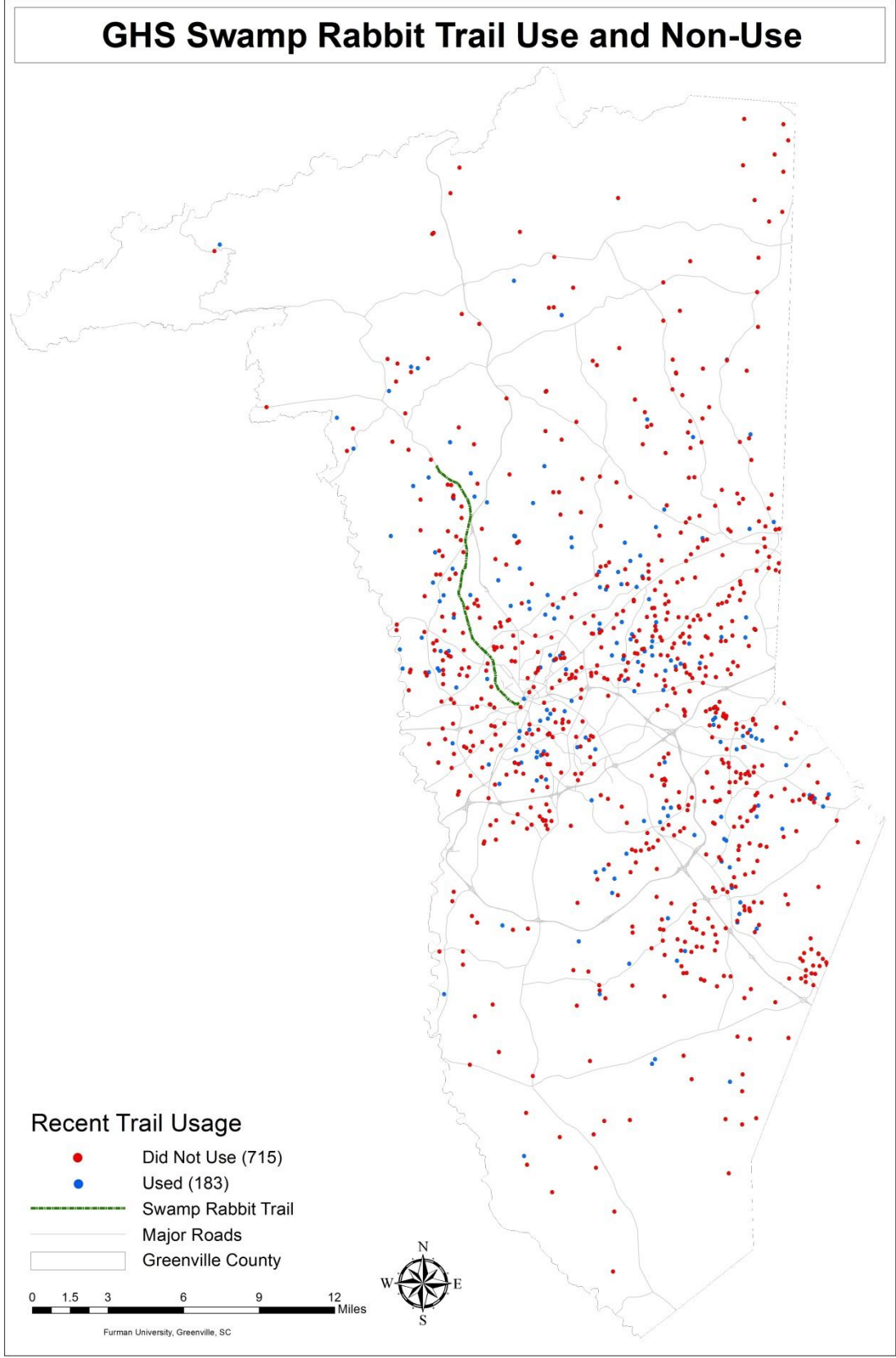
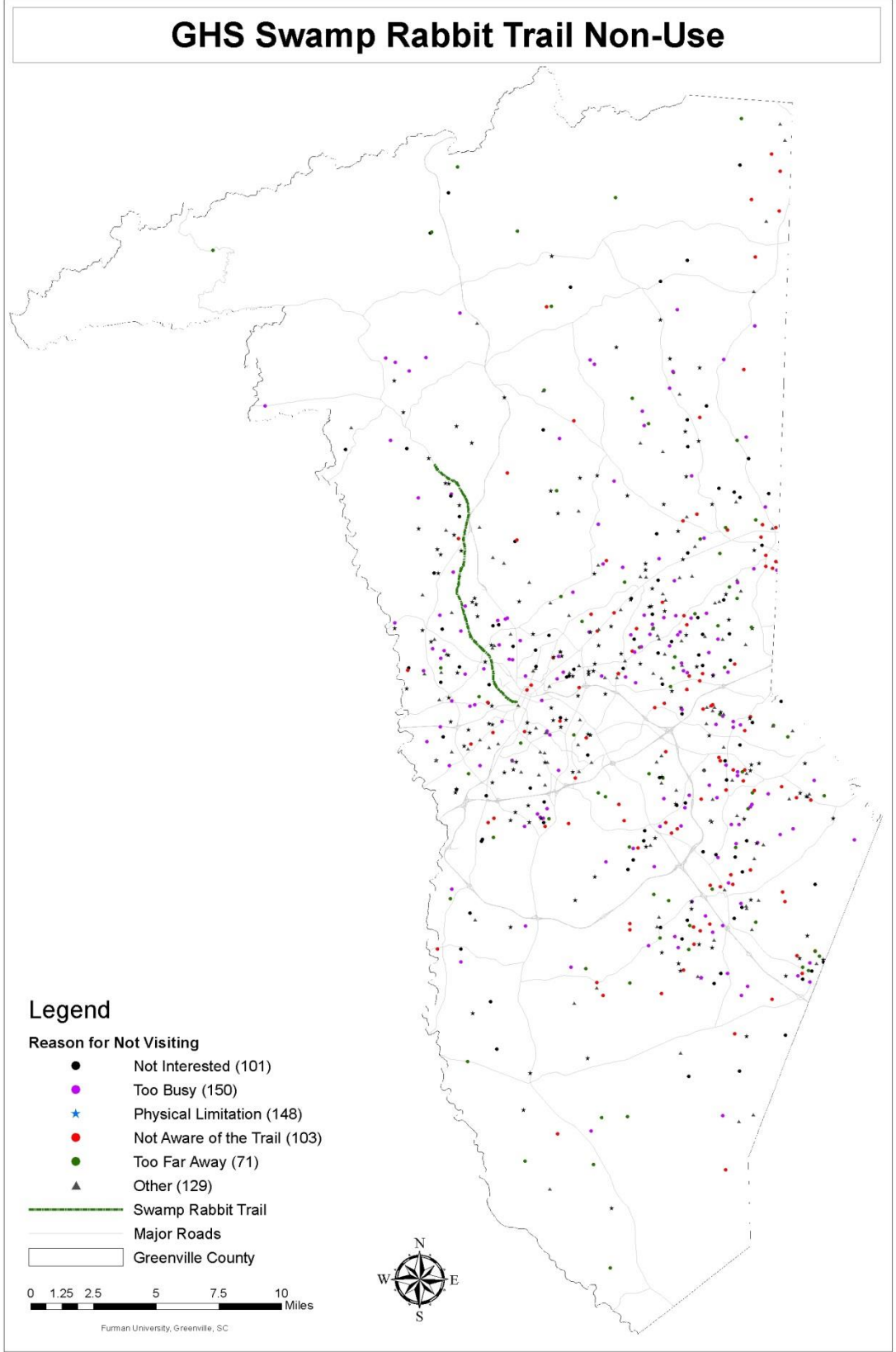




Figure 12: Non-User GHS SRT Reasons and Place of Residence for Year 3



## **6 GHS SRT Focus Group Findings for Year 3**

Focus group participants were recruited by media advertising (i.e., Go Magazine) and through email outreach by the Greenville County Recreation District in Year 3.

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) and the summer of 2013 (Year 3).

Participants were informed that refreshments would be provided and they would receive \$10 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 the

leader of the focus group for 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*<sup>100</sup> was used to develop the themes from the coded notes and findings.

### *6.1 Participant Description for Year 3*

Twelve adult GHS SRT users participated in two focus groups (5 males; 7 females). Approximately 50% of focus group participants in Year 3 reported a median household income of \$70,000 or more and 73% of participants were married. One-hundred percent of focus group participants in Year 3 were white and 83% held a college degree.

### *6.2 Focus Group Questions and Selected Responses Year 1-Year 3*

#### *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

1. *If someone asked you to describe the GHS SRT, what would you say? (Year 3)*

- Good things
- Recreation
- Joy to people
- Hobbies
- Safe place to go exercise- comfortable as a rider
- Accessible – geographical & all different backgrounds
  - Different backgrounds
- Wonderful resource for the community and it is also unique
- “TR” coolest town because of the trail

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

2. *What are some reasons why you use the trail? (Year 3)*

- Mental Health
- Run for exercise and run with friends for socialization
- Health- and enjoyment – relaxation
- Exercise – public health intervention
- Fun
- Transportation
- Economically
- Training for walks/runs long extended time
- Leisure

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

3. *What are the current deficiencies of the trail? What trail improvements would you Recommend? (Year 3)*

- Maintenance of the surface of the trail
- Asphalt caved in near the Washington St.
- Crowded on weekends
- Need for more education
- Speed of bikers
- Mow grass on the other side of Cedar Lane (in and out of darkness because of that bridge)
  - Mirror would also be beneficial
- Trees growing down in Travelers Rest
- Iron rails under pavement near Sun Rift
- Dangerous crossing sections
  - 253
  - CSX hub- those tracks are difficult to cross
- Lack of etiquette
  - People not staying to the right
- Signage

*Improvements*

- Explanation of mile markers
- Air stations
- More kits- fix your bikes
- First aid kits along the trail
- Vending- basics at least for water- some people don't want to pay the big \$\$ to stop in at restaurants
- Park: Linky Stone Parking
  - Specified parking for trail use

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

4. *How does the GHS SRT impact the Greenville Community? (Year 3)*

- Tourism
- Bike rental companies
- Festivals to bring people to Greenville
- Economic: more businesses
- Overall Health
  - Gives people a place to go to exercise
- CrossFit and Tri Place opened
- Diversity
  - Families of all different types of backgrounds
  - Shapes, sizes and ages
- Economically
  - Has completely changed Travelers Rest
- Health
  - Increases the awareness of being a healthy city and lifestyle
- Attracted people to move here
- Socially
- Walking trail with a purpose
- Increasing property value for those who live along the trail
- Diversity: opened up the area of West Greenville – variety of people

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

5. *Based on observation and survey data during the past three years, the vast majority of users are white, adult bicyclists. How would you suggest promoting the trail among, youth, seniors and minorities? (Year 3)*

- Spur trails to communities
- Cycling club in these underserved populations
- Churches involved – knowledge building with those who aren’t using the trails and getting their input
- Talking to those not using the trail

#### Youth

- Within the School System
  - Talking about health and getting active- here’s a place right in your neighborhoods
  - Spurs to schools
- Bike Clinic for Kids
- Group rides
- Organized volunteers to take the kids within camps or neighborhoods
- Opportunities Exposure to the trail
- Partnering with the Boys and Girls club- which is at the Kroc Center

#### Elderly

- Awareness
- Safety main issue
- Talk to Woodlands
- Talk to Senior Centers

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

6. *How can “active transport” be promoted on the GHS SRT? (Year 3)*

- Reach the businesses they work for
  - Incentives for employees and employers
  - Tell employers it will take your employees a specific number of minutes to get from point a to point b
- Budget for billboards- advertising
- More connectivity to work and homes so that transportation makes sense
- Work near the trail
- Accessibility to trail it is key
- Businesses to promote places to shower
- Provide bike racks
- Locker rooms

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

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 3)*

- 10 of 12 participants had frequented to businesses along the trail
- Good quality businesses
- Half of these places on the trail you would not know existed without the trail

- Connected
- Swamp Rabbit Grocery
- Go to these places more out of convenience more than “support”

8. *During the past two three years we noticed a lack of helmet use on the trail among all age groups-how could helmet use be encouraged on the trail? (Year 3 Only)*

- “Scare signs” – even clip art near the trails that are still in the ground
- Incentive for wearing a helmet
- Helmet give away (organizations like the Spinners)
- Food incentives
- Community messages
- Pass a law
- Making it cool
- Education



## **7 Interviews of Business Owners/Managers on GHS SRT for Year 3**

Nineteen managers/owners of retail businesses directly abutting and/or within close proximity to a GHS SRT access point were interviewed in Year 3, including five retail bicycle shops.

Two bike shops reported an average of 75% of their customers purchased bikes to use the trail in Year 3. These two bike shops reported a revenue range from \$300,000 to \$400,000 from trail users. The majority of the businesses surveyed in Year 3 reported increases in sales/revenue ranging from 10% to as high as 85%. Annual revenue from trail users from non-bike shops was as high as \$400,000 according to managers/owners surveyed

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 3 the selection criterion remained the same, however five bicycle stores were also included in the interviews.

Questions for the business interviews in Year 1-3 were taken from Stewart and Barr<sup>101</sup> 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 for Year 3:*

*1. Has the formation of the GHS SRT had any impact on your business? In what ways? How much? (Year 3)*

- Most businesses reported increases in sales/revenue ranging from 10% to as high as 85%.
- Seven new businesses opened because of the trail.
- Annual revenue: \$400,000, annual revenue generated from this group – about 50% according to one business owner on the trail.
- Proximity to trail provides for walk in business.
- More people come to the community because of trail.
- People bike/drive and stop that would not otherwise
- People rent bikes to get to their “destination”.
- Businesses concerned that trail users were using their parking spaces.
- Weekend trail use enhances business.

### ***Bike Store (Responses) (Year 3)***

- Brings people to town and increases tourism for Greenville.
- Source for locals and visitors to use bikes on the trail.
- The trail has become a huge outlet for cycling. There is now a safe place for people to exercise which has in turn increased our business.

2. *Can you estimate the percentage of customers that come from the GHS SRT and the annual revenue generated from this group? (Year 3)*

***Bike Store (Responses) (Year 3)***

- Sales went up in all areas because of the formation of the trail
- 70-80% of their customers use the trail according to one bike store
- \$300-350,00 directly attributed to the trail according to one bike store
- 70% of customers for one bike store are trail users.
- One bike store that focuses on rentals reported that customers are:
  - 50% local
  - 30% Spartanburg, Simpsonville etc.
  - 20% from outside areas like Atlanta
- Up to 30% of new bike users purchasing bikes for the trail.
- Trail feeds the entry level rider and runner.
- 80% of the customers are trail users according one bike store
- \$400,000 of annual revenue generated from people who are also trail users according to one bike store
- One bike owner reported that trail customers account for: 35-40% of revenue with annual revenue from this group to be \$300,000-\$350,000

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

- 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? Vast majority 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. One store owner reported that people come in to store with no intent of purchasing anything.

4. *Have you attempted to specifically market your business to trail users in any way? (Year 3)*

- \$One business owner reported spending \$4,500 to market their business to 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, Go Magazine Word of mouth cited as only marketing.

***Bike Store (Responses) Year 3***

- Using television, internet, mail to market primarily to women age 20 to 60.
- Marketing budgets ranged from word of mouth to \$5,000

- Direct marketing on the trail and traditional print (newspapers, journals) (e.g., Go Magazine).

## 7.2 *Questions Regarding Employee Utilization of Trail for Year 3:*

1. *Do you use the GHS SRT? For what purposes? When? How often? How long?(Year 3)*
  - Trail use among owners/managers was for recreation and transportation purposes.

### ***Bike Store (Responses) Year 3***

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?)*

- Transportation and recreation
- One bike store owner reported that 75% of the employees are biking for around an hr. a day daily
- Bike store owners reporting use ranging from 2 times per month to 3 times per week.
- One bike store owner reported using the trail for recreation and transportation every day.

## **8 Conclusions and Implications for the GHS SRT for Year 3**

The CDC's Task Force on Community Preventive Services recommends that efforts aimed at promoting walking and bicycling should include access to trails to encourage physical activity<sup>41</sup>. The GHS SRT is an example of a built environment public health intervention to promote multimodal activity with the goal of promoting participation in regular physical activity to reduce health disparities among Greenville County residents.

The Year 3 findings demonstrate that the GHS SRT continues to provide an accessible open space promote active living and multi-modal transportation options in Greenville County. Furthermore, the Year 3 findings reveal how the development of a greenway

trail can provide physical activity opportunities that can positively impact the health of a community while improving the local economy.

Meeting the current physical activity recommendations is linked to the strongest health benefits. Regrettably 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.

Access to greenway trails like the GHS SRT can intervene on the sedentary behaviors contributing to South Carolina's obesity epidemic while improving health<sup>102</sup>.

### **Based on the findings from the Year 3 report the following summary statements are appropriate:**

- A ~20% increase in users of the GHS SRT was observed.
- Minority trail use increased significantly from ~6% to ~10%.
- GHS SRT male and female users tend 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 continue to visit the trail on the weekends. Over 77% of all users were observed using the GHS SRT on Saturdays and Sundays.
- The majority of female and male survey respondents resided less than 15 minutes from the trail.
- The majority of female and male survey respondents used a motorized vehicle to access the trail.
- Males reported the safety and security of the trail to be 'excellent' compared to 'good' among female respondents.
- Trail users on average, resided approximately one mile closer to the GHS SRT than non-users.
- Non GHS SRT users reported not being interested in the trail, too busy, lack of awareness of the GHS SRT and perceived inconvenience as the reasons they did not use the trail.

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