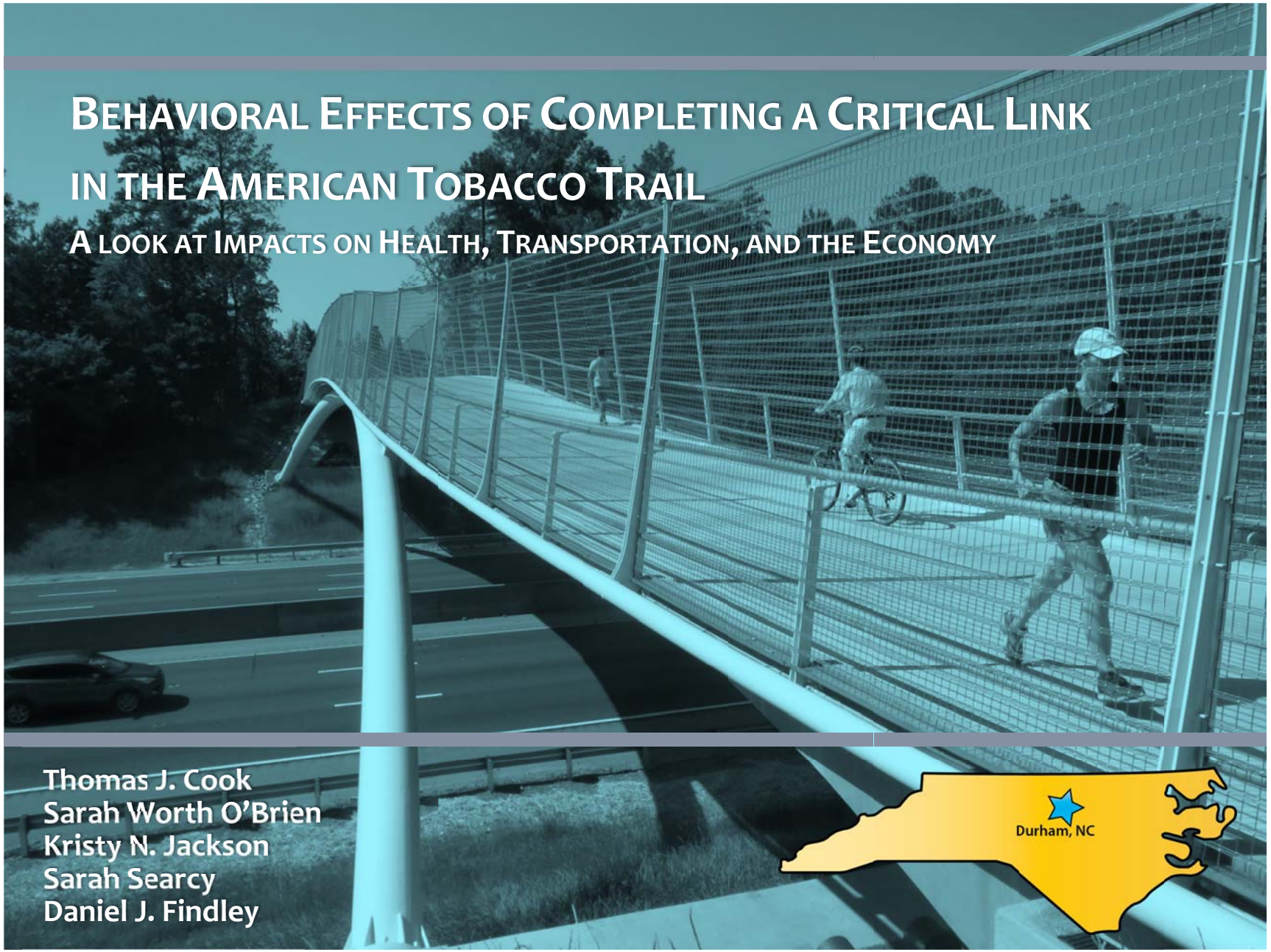
Behavioral Effects of Completing a Critical Link in the American Tobacco Trail

A Look at Impacts on Health, Transportation, and the Economy



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ABSTRACT

This study responded to a unique opportunity to determine behavioral changes that resulted from the construction of a critical link of the American Tobacco Trail (ATT). Observational data were collected both before and after construction of a bicycle and pedestrian bridge that linked two separate segments of the regional greenway. Prior to construction of the bridge and trail connections, the two segments of the ATT were separated by Interstate 40. Heavy traffic on local streets, as well as a lack of bicycle and pedestrian facilities in the area provided additional barriers to active travel between the two ATT segments.

ITRE conducted surveys and counts on the two trail segments before and after construction of the bridge. The before and after data were compared to determine the changes that occurred in use of the ATT and accompanying social, public health, transportation, and economic effects.

Key findings include:

- Use of the ATT increased after construction of the bridge, from 217,900 trips in 2013 to 508,100 trips in 2014, an increase of 233%.
- The average trip distance on the ATT by survey respondents increased from 7.3 miles in 2013 to 9.3 miles in 2014, a 27% increase.
- Direct expenditures on groceries, retail and restaurants related to trips made on the ATT rose from approximately $2.4 million pre-bridge to $6.1 million post-bridge annually for a total increase of $3.7 million or 154%.
- An IMPLAN® model estimated annual impacts of 43 jobs, $1.3 million in employee compensation, and $4.9 million in total business gross revenues.
- The average duration of the active portion of a trip for those using the ATT in 2014 (63 minutes) increased by nearly 7% from that reported in 2013.

DISCLAIMER

The contents of this report reflect the views of the authors and not necessarily the views of the Institute for Transportation Research and Education or North Carolina State University. The authors are responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the North Carolina Department of Transportation, the Helen and William Mazer Foundation, or the BlueCross BlueShield Foundation at the time of publication. This report does not constitute a standard, specification, or regulation.

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EXECUTIVE SUMMARY

INTRODUCTION

The American Tobacco Trail (ATT) runs on a former railroad corridor south from Durham, North Carolina, and is part of the larger East Coast Greenway (ECG) network. This report focuses on the economic, health, and transportation changes resulting from the completion of a critical link in the ATT—the construction of a bicycle and pedestrian bridge over Interstate 40 (I-40) and corresponding paved connections. Those facilities linked two unconnected trail segments to form a continuous 22-mile shared use path.

Data were collected through intercept surveys and user counts on the two separate trail segments in 2013. The process was repeated one year later, adding a data collection point on the newly constructed bridge segment. The before-and-after data were compared to determine changes in trail use affecting transportation, health, and economic behaviors that may have resulted from the construction of the bridge. The objectives of this research were to:

- Compare pre-bridge to post-bridge travel behaviors to determine what effects the connection of the Northern and Southern ATT segments had on transportation factors such as trip purpose, trip distance, and mode of travel to/from the trail.
- Compare the duration and extent of physical activity before and after the construction of the bridge to explore impacts on health.
- Compare trail users' pre-bridge and post-bridge expenditures related to their use of the ATT to determine the economic contributions from the installation of the bridge and paved connections.

Prior to construction of the bridge link, there were two unconnected segments of the ATT. The Northern segment extended approximately seven miles south from downtown Durham to NC Highway 54. The Southern segment ran approximately 13.5 miles south from Renaissance Parkway in Durham to New Hill-Olive Chapel Road in Wake County. Land use and demographic characteristic differ between the Northern and Southern segments of the trail. The Northern segment generally passes through developed areas having commercial and residential uses. The Southern segment runs by several residential communities near its northern terminus, and then passes through rural areas.

METHODOLOGY

The research team used a 'before and after' approach to evaluate the effects of the critical linkage on the ATT. The research team conducted intercept surveys and manual counts on two weekdays and two weekend days in May/June 2013 prior to the bridge installation and again approximately one year later in May 2014 to control for seasonality. Data were collected for 13 consecutive daylight hours (7 AM – 8 PM) for each of the four days in both pre- and post-bridge periods. Data were collected by a combination of ITRE staff, students and volunteers.

In 2013, trail users were intercepted and surveyed at one location on the Northern segment and one location on the Southern segment. May 2014 data were also collected at an additional location on the new trail section near the bridge.

The survey form gathered information on trail users' trip characteristics and demographics.

Manual screenline counts were conducted at the survey locations as well as at one additional site on both the Northern and Southern segments. In 2014, counts were also conducted on the Bridge segment.

A few key data points gathered through both the counts and surveys (age, travel mode, and gender) were compared to assess how well the survey responses represented all those using the ATT during the study period. The demographic proportions were found to be similar for both data collection periods.

Origin, destination, and round trip data from surveys were analyzed in tandem with information from the counts to develop an estimate of the number of visits by people using the ATT annually in the study area. Saturday data collected in 2013 and 2014 were used to calculate an estimate of annual user trips in the study area. Weather data (precipitation and temperature) were used to create relative ratios of use for each day of the year from May 2013 to May 2014.

RESULTS

Study results are organized into the following topic areas:

- Trail Usage
- User Profiles
- Transportation Effects
- Public Health and Social Effects
- Economic Effects

Finally, key findings on effects from induced trail use—travel only on the Bridge segment—are described.

Trail Usage

There was a widespread increase in use of the ATT from 217,900 trips in 2013 to 508,100 trips in 2014, representing a 133% increase in annual ATT trips following installation of the bridge and trail connections.

User Profiles

Bicycling was the primary mode on the ATT. Overall, the proportion of bicyclists on the trail increased by 6% from 2013 to 2014. The largest shift in activity was observed on the Northern trail segment, where the proportion of bicycling increased by 14%.

Demographic information from pre-bridge surveys shows that the typical trail user was male, 26-54 years old, had an advanced degree, and a household income between $60,000 and $119,999. Those surveyed post-bridge exhibited similar demographics.

Nearly 10% of trail users on the ATT were children, and there was an overall 158% increase in children counted on the trail pre- to post-bridge. The number of children counted using the trail independently (propelling themselves) increased 172% pre- to post-bridge. The number of children on the trail travelling dependently (being transported in various types of carriers) increased by 136% between 2013 and 2014.

While the majority of those using the ATT in both 2013 and 2014 were from the local area (zip code areas through which the trail passes), those from outside the local area using the trail in 2014 came from more broadly dispersed origins throughout the state. A higher proportion of people from non-local origins used the Southern trail segment than the Northern segment. The largest change in use by those from outside local zip code areas was an increase in the proportion of female bicyclists on the

Southern trail segment, which increased by 22% from 2013 to 2014.

In 2013, the majority (96%) of survey respondents using the ATT had visited the trail before. In 2014, 94% of survey respondents were repeat users, resulting in a 2% increase in first-time visitors following bridge construction.

On average, survey respondents in 2013 used the trail 11 times in the 30 days prior to the day they were intercepted, and 10 times during a similar period in 2014. Pre-bridge (2013), those on the Northern segment reported a higher frequency of use (13 times) as compared to those on the Southern segment (nine times) over the previous 30 days.

In both 2013 and 2014, the primary trip purpose for the majority of survey respondents on the ATT was exercise/recreation. The proportion of trips for purposes other than exercise/recreation increased from 5% of trips in 2013 to 8% in 2014. A larger percentage of non-recreational trips originated on the Northern segment than the Southern segment both pre- and post-bridge (7% difference in 2013 and 5% difference in 2014.)

Transportation Effects

The average trip distance on the ATT by survey respondent increased from 7.3 miles in 2013 to 9.3 miles in 2014, a 27% increase. In general, males tended to travel slightly farther than females on the trail.

Overall, bicyclists traveled substantially farther than those traveling by other modes. Also, bicyclists reported the greatest change in average trip distance (an increase of 2.7 miles) from 2013 to 2014. Much of the increase in bicycling mileage was due to a change in use by people accessing the ATT on the Northern segment. The bridge provided those who accessed the trail on the shorter Northern segment the option to travel over the bridge to the Southern segment, enabling them to make longer trips in 2014. Whereas, in 2013, bicyclists accessing the trail from the Southern segment made trips almost five miles longer than those accessing the trail on the Northern segment, trip distances for bicyclists in 2014 were similar for those accessing the trail on either segment. Differences in average trip distances narrowed between the two trail segments across all modes (four miles longer on the Southern segment in 2013 versus only one mile longer in 2014).

In both 2013 and 2014, the majority of survey respondents made roundtrips on the ATT. Most people use the trail for exercise or recreational purposes and therefore turn around at some point to go back to their access point. Through, or one-way, trips may be associated more with utilitarian or commuter trip purposes. Through trips increased by 2% in 2014, similar to the post-bridge shift observed toward more non-recreational trip purposes. A higher percentage of through trips occurred on the Northern segment.

In 2013, half of those using the ATT traveled by car to get to/from the trail and half used active transportation (traveling on foot or by bicycle). The proportion of people who walked, biked or jogged to the ATT in 2014 increased by 4%, largely due to more joggers/runners choosing to travel to the ATT on foot in 2014. In general, people tended to drive to access the trail on the Southern segment, while those accessing the trail on the Northern segment tended to walk, run, or bike to/from the ATT. In 2013, a majority of females drove to the trail (55%), while a majority of males walked, ran, or bicycled to/from it (53%).

Public Health Effects

The average duration of the active portion of a trip for those using the ATT post-bridge (63 minutes) increased by nearly

7% from that reported in 2013. The majority of this increase is attributable to people whose trip originated on the Northern segment, particularly bicyclists.

Based on average active travel duration of 138 minutes per week, survey respondents in 2013 were short of meeting recommended weekly levels of moderate-intensity physical activity based only on their use of the trail. In 2014, respondents averaged 162 minutes per week, meeting recommended physical activity guidelines for moderate-intensity physical activity based only on their use of the trail. Overall, males reported spending an average of seven to eight minutes longer on the active portion of their trip than females.

Pre-bridge, the duration of active travel averaged 13 minutes more for the Southern segment than the Northern segment. This difference in average trip duration between Northern and Southern trail segments decreased to five minutes post-bridge.

While the proportion of survey respondents in brackets for household income of less than $50,000 per year remained relatively the same pre- to post-bridge, duration of the active portion of trips increased post-bridge by five minutes for those reporting household incomes of less than $15,000 and by seven minutes for those with incomes of $30,000 - $44,999. Those with household incomes of $15,000 - $29,999 reported only a slight increase in trip duration. Generally, as household income increases, the average duration of the active portion of one's trip also increases – a trend that did not change from pre to post-bridge surveys.

Calculations of caloric expenditures for those using the ATT in the study area estimate that approximately 175 million more calories were burned annually by ATT users post-bridge, an increase of 163% from the pre-bridge period.

Economic Effects

People using the ATT can have an impact on businesses through expenditures on a variety of goods and services. On average, nearly 3 of 10 survey respondents reported purchasing goods or services on the day that they traveled on the ATT, with an average expenditure of $16 on goods or services related to their trip on the ATT. Direct expenditures on groceries, retail and restaurants related to trips made on the ATT rose from approximately $2.4 million pre-bridge to $6.1 million post-bridge annually for a total increase of $3.7 million. The greatest increase in trip-related expenditures occurred at restaurants, followed by retail stores, and grocery stores.

An IMPLAN® model was used to estimate direct, indirect, and induced economic effects of expenditures associated with use of the trail. The model indicated the completion of the bridge linking the Northern and Southern trail segments resulted in an estimated annual impact of 43 jobs, $1.3 million in employee compensation, and $4.9 million in total business gross revenues. As a comparison, the construction of the bridge and connecting trail segments cost approximately $11.2 million.

Trips on the Bridge Segment

Pre-bridge (2013), survey respondents were asked to indicate the likelihood that they would use the bridge over I-40 after it was completed. Overall, respondents indicated an average score of 4.4 out of 5 that they would be Likely/Very Likely to use the ATT bridge. Post-bridge (2014), 53% percent of respondents used the bridge.

Of those who used the bridge during their trip on the ATT, 15% used only the Bridge segment of the trail (i.e. on the ATT between access points at Renaissance Parkway and NC Highway 54). Their trips tended to be shorter in distance and duration, regardless of gender or mode. On average, the active portion of trips only on the Bridge segment was 30 minutes, and respondents traveled an average of 1.2 miles on the trail. Those trail users were primarily female (58%), tended to get to the ATT by car (49%) or on foot (42%), and their primary mode of travel on the trail was walking (75%).

Those using only the Bridge segment reported almost twice the percentage of trips for non-recreational purposes (14%) as the overall population of survey respondents in 2014 (8%).

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PROJECT BACKGROUND

INTRODUCTION

This project is a study of the behavioral effects resulting from the completion of a critical link in the American Tobacco Trail (ATT). The ATT is a rail-to-trail conversion in Durham, North Carolina and part of the larger East Coast Greenway (ECG) network. This critical link included the construction of a bicycle and pedestrian bridge over Interstate 40 (I-40) and corresponding paved connections that joined two unconnected trail segments, forming a continuous 22-mile shared use path. This study focuses on the economic, health, recreation, and transportation changes resulting from the bridge connection.

The construction of the bicycle and pedestrian bridge created a rare opportunity to conduct a before-and-after analysis of the impacts from a regional link in non-motorized transportation infrastructure. Few studies have been conducted to estimate the use, benefits of, or future impact from a greenway before it is built as a means to support the decision to construct the facility (*1, 2, 3*). Some research comparing trails has shown that trails in good condition and offering amenities have higher rates of usage (*4*). Existing research on extending the American Tobacco Trail showed that there was no increase in trail usage among 366 adults surveyed by phone when the first 3.2-mile segment was lengthened by another 2.8 miles, along with a 2.0 mile spur but noted that the results could have been enhanced by intercept surveys of trail users (*5*). Many other studies have been conducted to capture the impact from a greenway in a community after it has been constructed (*6, 7, 8, 9, 10*). Few studies have attempted to quantify the economic benefits of trails, including the impacts to public health through physical activity gains (*11*). Although research has shown that cyclists will go out of their way to use trail systems and that users were not deterred by intersections (*12*), little has been done to study the impacts from the removal of larger barriers to active travel. No studies were found where observed data prior to trail construction were compared to observed data collected following construction, to truly measure a facility's impacts.

The researchers conducted intercept surveys and user counts to collect data on the two separate trail segments of the ATT in 2013, and they repeated the process one year later, adding a data collection point on the newly constructed Bridge segment. The before-and-after data ("pre-bridge" and "post-bridge") were compared to determine changes in trail use affecting transportation, health, and economic behaviors that may have resulted from construction of the bridge.

LINKING TRAIL USE RESEARCH TO TRANSPORTATION, PUBLIC HEALTH, AND ECONOMIC OUTCOMES

The North Carolina Department of Transportation's goals for bicycling and walking include promoting safe access to destinations through connected networks, mobility for better transportation efficiency, physical activity opportunities for

improved health and maximizing return on investment by creating more attractive walkable and bikeable communities (*13*). An increasing emphasis has been placed on evaluation, including how the development of trails contributes to these outcomes.

Increasing physical activity is a national health objective in the United States to improve public health and combat the obesity epidemic (*14*). Previous studies have shown the positive health impact of active transport (*15*). According to the Behavioral Risk Factor Surveillance System (BRFSS) conducted in 2013, approximately 52% of people living in North Carolina do not meet aerobic recommendations for physical activity and over 66% of residents are considered to be overweight or obese. The survey notes that nearly half of North Carolinians are trying to take action to lose weight and about 40% are using trails, greenways, bike paths, or sidewalks for biking or walking activities (*16*). Additionally, a 2007 survey by the State Center for Health Statistics shows that 60% of North Carolinians reported they would increase their level of physical activity if they had more accessible sidewalks and trails (*17*). Health is one of the five pillars of WalkBikeNC, the statewide bicycling and pedestrian plan, which describes the provision of active living environments with safe, connected, accessible facilities as one of the plan's key principles (*13*). Access to trails such as the ATT is one of the factors positively associated with physical activity (*18*).

Over 9% of occupied housing units in Durham, NC do not have a motor vehicle available (*19*). Improving active travel conditions can help achieve social equity objectives by providing a fair share of resources to non-drivers and providing basic mobility for physically, economically, and socially disadvantaged people (*20*).

Prior to the construction of the ATT bridge over I-40, the highway acted as a travel barrier by reducing the potential for active transportation and recreational trips. By connecting the Northern and Southern trail segments, the bridge gives individuals the opportunity to travel longer distances and durations on a shared-use path separated from potential motor vehicle conflicts. Quantifiable benefits of the trail can be measured through increases in the number of people using the trail who conduct regular physical activity, which can translate into calories burned (*21*).

With the time, effort, and money spent developing and maintaining shared-use paths, an increasing emphasis has been placed on their economic benefits. This research includes the direct, indirect, and induced impact of trail users' expenditures.

OBJECTIVES

The primary objectives of this research were to:

- Compare pre-bridge travel behaviors to post-bridge travel behaviors to determine what effects the connection of the Northern and Southern ATT segments had on transportation factors such as trip purpose, trip distance, and mode of travel to/from the trail.
- Compare the duration and extent of physical activity before and after the construction of the bridge to explore impacts on health.
- Compare trail users' before and after expenditures related to their use of the ATT to determine the economic contributions from the installation of the bridge and paved connections.

REPORT OVERVIEW

This report is organized as follows. The remainder of this section provides a brief history of the ATT and describes the characteristics of the trail and the areas through which it passes. The next section describes the research methodology including intercept surveys, manual counts, data collection protocols, and the data analysis process. The Results section describes the research findings and discusses significant changes noted from the pre- and post-bridge periods through a series of subsections on the following topics:

- Profiles of surveyed trail users
- Transportation effects
- Public health and social effects
- Economic effects
- Induced use

Key highlights from the research findings are explored in the Conclusions and Discussion section and future research needs are identified. All resources cited are listed in the References section, and the Appendices provide detailed information on several aspects of the research study.

AMERICAN TOBACCO TRAIL HISTORY

The American Tobacco Trail (ATT) is located on a former railroad corridor in what is known as the Triangle region of North Carolina. The New Hope Valley Railway was constructed in 1906 and transported tobacco to the American Tobacco plants and warehouses in Durham. The rail line extended from Durham through Bonsal to Duncan, where it connected with the Norfolk Southern Railway main line. The Norfolk Southern Railway leased the line starting in 1920, and purchased it in 1957. Construction of Jordan Lake required re-routing a portion of the railroad eastward to the current ATT alignment.

Due to a decrease in railroad traffic, the line was abandoned, and the tracks were removed in 1987. In 1989, the non-profit Triangle Rails to Trails Conservancy promoted development of the corridor into a rail-trail. The corridor was purchased by the North Carolina Department of Transportation in 1995 and subsequently leased to Durham, Chatham, and Wake Counties to be developed and operated as a public recreational trail.

The trail was built in sections over the course of more than a decade. The first 3.2 miles opened in 2000 and extended south from downtown Durham to Cornwallis Road. Later that same year, construction began to complete the section from Cornwallis Road to NC 54. The initial Wake County section opened in 2003 and provided a pathway from New Hill-Olive Chapel Road to Wimberly Road. A second 1.75-mile section in Wake County opened in 2005, with the remaining one-mile section in the county opening in 2006. The 4.7-mile Chatham County section opened in 2010. With the completion of the I-40 pedestrian and bicycle bridge and its connecting sections, the trail now extends more than 22 miles from downtown Durham to the New Hill trailhead.

TRAIL DESCRIPTION

The ATT is paved except for approximately seven miles of compacted screenings extending north from the New Hill-Olive Chapel Road trailhead. Land use and demographic characteristics differ greatly between the Northern and Southern segments of the trail. Figure 1 illustrates the two trail segments that were in place prior to construction of the bridge as well as the location of the bridge and new connecting trail sections.

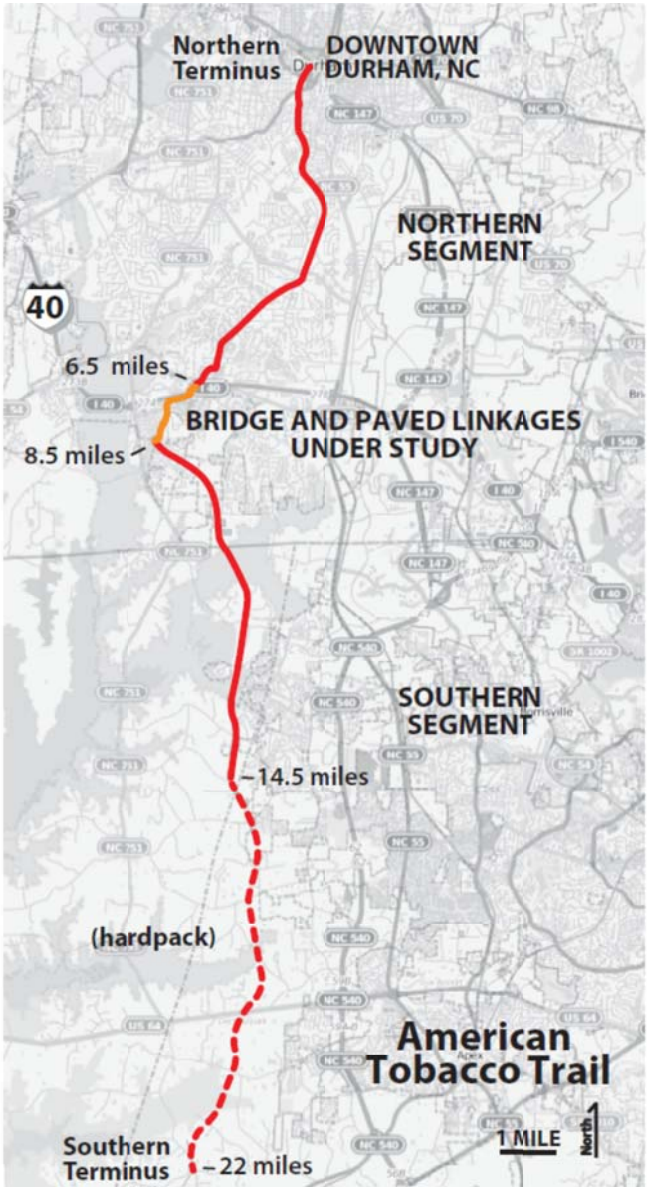

Figure 1 Map showing Northern and Southern segments of the ATT and the critical link joining the two.

Northern Trail Segment

The Northern segment of the ATT extends approximately seven miles south from the heart of downtown Durham, North Carolina to NC Highway 54. Compact urban land uses surround the Northern terminus at the American Tobacco District. The trail begins adjacent to the Durham Bulls Athletic Park and near the Durham Performing Arts Center. Retail, office, and residential uses are all present in a dense development pattern at this urban center.

Going south, the trail runs through several large residential neighborhoods with access to the trail, including Forest Hills, Hillside, Hope Valley Farms North, Woodlake, and Woodcroft, a planned community with approximately 2,000 dwelling units. Several schools and parks are accessible from the trail, including Fayetteville Street Elementary, Hillside High, and Southwest Elementary Schools and Forest Hills, Elmira, and Solite Parks. Prior to construction of the bridge, the Northern segment ended at the Southpoint Crossing area - a suburban area consisting of apartments, townhomes and two strip-developed shopping centers anchored with grocery stores - after running behind Sutton Station, a mixed use development containing retail, office, apartments, and medical services.

At the time of the study, there were 21 known access points to the ATT on the Northern segment. This does not include unofficial dirt paths that may provide access from specific properties or neighborhoods.

Figure 2 Location of Northern trailhead in Durham, showing dense land uses and high road connectivity.

Southern Trail Segment

The Southern segment of the ATT begins at Renaissance Parkway and continues south approximately 13.5 miles through Durham and Chatham Counties, ending in Wake County. The Streets at Southpoint shopping area caps the northern end of the Southern segment. The Streets at Southpoint area includes a regional mall with a movie theater, several adjacent strip shopping centers that include two hotels, and a large apartment complex on Renaissance Parkway.

The trail extends south through several residential neighborhoods including Huntington Ridge, Eagle's Point, Chancellor's Ridge, and The Hills at Southpoint. Many of these neighborhoods are comprised of large, single family homes. As the trail leaves Durham County, the surrounding landscape becomes more rural. The trail passes through largely undeveloped land in Chatham and Wake Counties.

There are no schools with direct access to the Southern segment of the trail. Two parks, CM Herndon Park in Durham and Raferty Park in Cary, are accessible from the trail. The trail passes behind the Old Chatham Golf Club in Chatham County. After crossing into Wake County, the ATT runs adjacent to the Amberly, Georgian Village, Montvale, Weldon Ridge, and Copper Leaf neighborhoods in Cary. The trail ends at the Southern terminus parking lot off of New Hill-Olive Chapel Road near Apex. There are 25 access points on the Southern segment.

Figure 3 Location of Southern trailhead in Apex, showing rural land uses and low road connectivity.

Bridge and Central Connections

The newly built portion of the ATT consists of an expansive 270-foot twin-arch bridge over I-40 and paved linkages which total approximately one mile. This section of trail runs primarily through commercial land uses. There are three access points in this new section of the trail.

Figure 4 Location of bridge over I-40and connecting trail segment near Southpoint Mall area.

METHODOLOGY

A common experimental design is a "pre-post" study in which measurements are obtained in the before period, an intervention is administered, and a follow up measurement is collected and compared afterward to determine the effect of the intervention. Borrowing from the pre-post methods in research design, evaluations of travel behavior, and using a hybrid of behavioral measures to collect the multidisciplinary data linked to the objectives of the study, the research team used a 'before and after' approach to evaluate the impact of the critical linkage on the ATT.

The research team conducted intercept surveys and manual counts on two weekdays and two weekend days in May/June 2013 prior to the bridge installation and again approximately one year later in May 2014 to control for seasonality. The latter data collection period occurred approximately three months after the bridge segment was opened. This evaluation examined the difference between "pre-bridge" and "post-bridge" periods. Data were collected for 13 consecutive daylight hours (7 AM – 8 PM) for each of the four days in both pre- and post-bridge periods. Additional methodological details on the data collection procedures and copies of survey and count forms used to collect the data are provided in Appendix A. For simplification of report tables, pre- and post-bridge results are labeled based on the year in which data were collected.

STUDY AREA

The study area encompasses about four miles of the 22 mile trail, and includes the locations where data were collected, as shown in Figure 5. It is important to note that the methods used to develop results described in this report can only help explain the segment of the ATT that was studied. The findings are not representative of the trail as a whole. To develop a more comprehensive understanding of the full impacts to the trail, additional data collection would be required at other points along the trail.

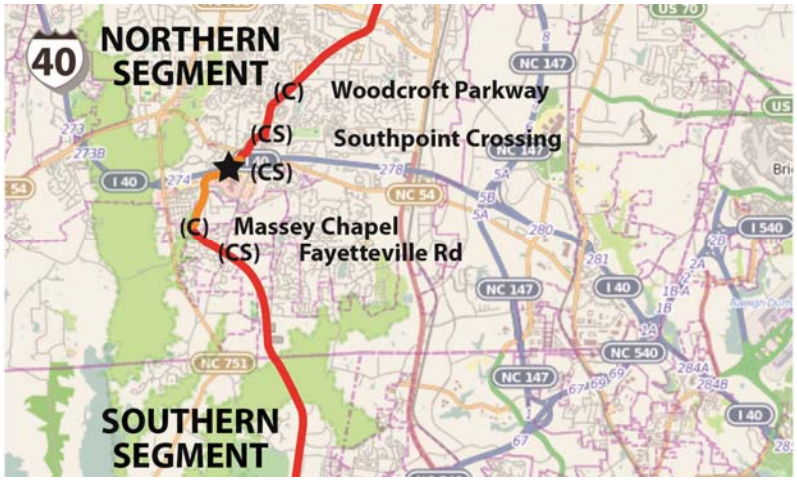

Figure 5 Intercept survey and count data collection sites along the American Tobacco Trail. C = count station; CS = count and survey station. The star indicates the bridge site.

INTERCEPT SURVEYS

Trail users were intercepted at one location on the Northern segment and one location on the Southern segment to solicit survey responses. An additional location was added in 2014 to collect data near the bridge on the new section of the trail. The map in Figure 5 illustrates the location for each data collection station – surveys were collected at three sites within a three-mile section of the trail.

The survey form gathered information regarding the behavior and demographics of the users. Information that was collected included:

- Trail origin, destination, and turn around points (where applicable) – to derive distance, direction of travel on the trail, and proportion of round trips
- Frequency of trail use
- Purpose of trip - recreational, commute, exercise/health, shopping, etc.
- Trip mode - mode of arrival at the trail (e.g. walk, bike, car, bus) and activity on the trail (jogging/running, walking, or bicycling)
- Physical activity indicators- duration of active travel, quantity of typical monthly active travel
- Economic activity indicators- amount spent on goods or services during trail trip; willingness to pay indicator (pre-bridge data only)
- Respondents' demographic information

MANUAL COUNTS

Manual screenline counts were conducted in 2013 at the survey locations on each trail segment as well as at one additional site on both the Northern and Southern segments using the count form shown in Appendix A. In 2014, counts were also conducted on the Bridge segment. Figure 5 shows each of the five count locations. Collecting counts manually allowed the research team to record gender, age, mode, the direction that a user traveled on the trail, and whether users were traveling in a group or alone. The data were used to determine travel patterns along the trail in the study area and to assess whether the survey data collected was representative of the population of trail users in that area.

Figure 6 Example of survey and count station at Southpoint Crossing (left), and count only station at Woodcroft Parkway (right), both looking southbound down the American Tobacco Trail.

DATA COLLECTION PROTOCOLS

A combination of staff, students, and volunteers were used to conduct the data collection efforts. Data collectors were formed into crews for each data collection day- one crew each to conduct the data collection efforts on the Northern, Southern, and Bridge segments of the trail- with one member of the research team serving as the crew leader to ensure data collection protocols were followed.

For pre-bridge data collection, all assistants were given a handout with procedures on how to conduct the surveys and counts. Each crew leader conducted on-site training. Due to the larger number of data collectors required in 2014, and based on lessons learned when processing the pre-bridge data, a formal, one-hour training session was provided to all post-bridge data collectors in advance of meeting on-site to reduce the amount of cleaning needed to process the post-bridge data. This training was required for staff and students and strongly encouraged for volunteers. A copy of the procedures handout and the slides presented at the training are provided in Appendix A.

Table 1: Total Raw Number of Counts and Survey Respondents

Day	2013 Counts	2014 Counts	% Change	2013 Surveys	2014 Surveys	% Change
Tues.	1899	3812	101%	295	481	63%
Wed.	2047	3001	47%	251	358	43%
Sat.	2939	7741	163%	452	777	72%
Sun.	2381	6811	186%	303	629	108%
TOTALS	9266	21365	131%	1301	2245	73%

DATA ANALYSIS PROCESS

Each completed survey form was assigned a unique ID number. Completed survey and count forms were reviewed for accuracy and re-marked as appropriate to clarify or code responses prior to data entry. Additional data processing details are provided in Appendix B.

Entered data were visually scanned for an additional quality check to identify any obvious errors. The final number of survey records and count records entered were also cross checked with the number of survey forms and count forms to ensure all hard-copy information was digitized. Table 1 summarizes the data collection effort by presenting the raw number of screenline counts and the raw number of users surveyed while using the trail.

A few key data points were gathered through both the counts and surveys, i.e., age, mode, and gender. These survey data were compared to the count data to determine if the survey responses could be considered representative of the population of those using the ATT during the study period. Note that while children less than 18 years of age were counted, they were not surveyed. Therefore, the raw count data were adjusted to exclude persons less than 18 years of age for making comparisons to survey data. Table 2 shows a comparison of these adjusted counts to surveyed trail users in 2013 and 2014.

As shown in Table 2, the demographic proportions were similar between the survey and adjusted count populations for both data collection periods, which suggests that those surveyed were generally representative of the ATT users observed over the study period within the study location. Based on statistical testing, it is possible that younger people on the trail were not as likely as older people to complete a survey. Therefore,

Table 2: Comparison of Trail User Demographic Proportions from Survey Population to Count Population

Demographic	2013 Surveyed Users (n)	2013 Counted Users (n)	2014 Surveyed Users (n)	2014 Counted Users (n)
Male	55% (697)	54% (4700)	55% (1218)	56% (11770)
Female	45% (570)	46% (3983)	45% (1004)	44% (9314)
Age 18-25	11% (139)*	16% (1408)	10% (222)*	13% (2547)
Age 26-55	71% (902)	70% (6078)	70% (1571)	71% (13954)
Age >55	18% (232)*	14% (1228)	20% (437)*	17% (3291)

*Survey population proportion is statistically different from counts population

analyses performed on survey results did not investigate subpopulations by age.

Additional comparisons of more detailed user profiles between surveyed and counted trail users were tested for statistically significant differences to determine if any subset was over- or under-represented in the survey responses. Results can be seen in Table 22 in Appendix C. In the pre-bridge dataset, walkers may be underrepresented while female joggers/runners may be over-represented. The post-bridge survey dataset may over-represent pedestrians (walkers and joggers/runners) and under-represent bicyclists. Although there are differences between the proportions of surveys and counts in some cohorts, large sample sizes of surveyed users were collected to reflect the population of trail users as accurately as possible. Ultimately, to simplify data analysis, the data from the surveys were not adjusted.

Estimating Annual Trail Trips

To develop an estimate of, and to compare pre- and post-bridge economic or health impacts, it is necessary to calculate the number of visits by people using the ATT annually in the study area. Using origin, destination, and round trip data from surveys to understand trip patterns in conjunction with count data allowed the team to estimate individual users at a given survey-and-count location. An extrapolation method based on the Saturday data collected in 2013 and 2014 was used to calculate an estimate of annual trips in the study area. Weather data (precipitation and temperature) were used to create relative ratios of trail use for each day of the year from May 2013 to May 2014.

Table 3 gives a summary of the figures used in calculating the estimate of annual trips. Appendix B contains a more detailed description of the extrapolation methods and model used to estimate annual trail trips, which resulted in **217,900 trips in 2013 and 508,100 trips in 2014**. These figures are used in further analysis and discussion in the Results section.

Table 3: Summary of Key Inputs, Adjustment Factors, and Outputs When Estimating Annual Trail Use

	2013	2014
Southpoint (N) Saturday Counts	696	822*
Bridge Saturday Counts	NA	1,787
Fayetteville Rd. (S) Saturday Counts	807	832*
Total Saturday Counts	1,503	3,441
Round Trip Adjustment Factor	92.2%	90.2%
Saturday Unique User Trips	810	1,889
Estimated Annual Trips	217,900	508,100

*Adjusted based on survey data

RESULTS

The following results are organized into key comparative findings by topic area where unique changes were noted between pre-bridge and post-bridge datasets. Topic areas include:

- Trail Usage
- User Profiles
- Transportation Effects
- Public Health and Social Effects
- Economic Effects

Additionally, key findings on effects from those who traveled only on the Bridge segment are described.

The research team looked at differences between user characteristics and usage behaviors on the Northern and Southern trail segments, given their dissimilar land use and user demographic characteristics. Distinctions that were observed consistently between Northern and Southern trail users in pre-bridge and post-bridge periods are highlighted within each topic area. Northern segment trail users are defined as people who got on the ATT via access points between and including NC Highway 54 north to the Jackie Robinson Drive Trailhead in downtown Durham. Southern segment trail users are defined as people who got on the ATT via access points between and including Renaissance Parkway in Durham and the New Hill-Olive Chapel Road trailhead in Wake County.

Two-sided unpaired *t*-tests were utilized to compare datasets for statistically significant differences (such as Northern versus Southern segment data or pre-bridge versus post-bridge data). *P*-values less than 0.05 were considered statistically significant.

TRAIL USAGE

As illustrated in Table 1, there was a widespread increase in use of the ATT in the post-bridge period. The number of trail users counted, individuals surveyed, and the estimate of annual user trips all indicate a substantial increase in use from pre- to post-bridge periods.

In terms of those counted on the trail, 12,099 more counts were tallied in 2014, though this number includes counts at the bridge site which were only conducted in the after period. Excluding the bridge site, there was an 80.1% increase in user counts from sites where data was collected in both pre- and post-bridge periods.

In the United States, men (76%) make approximately three times as many bicycling trips as women (24%) (*22*). In North Carolina, the ratio of male to female bicycle commuters is 2.3 to1 (*23*). The presence of women bicyclists is sometimes seen a as key indicator of the success of bicycling in a community (*24*). Excluding the bridge site counts, there was a 230% increase in female bicyclists on the ATT post-bridge; however the proportion of male to female bicyclists post-bridge remained the same as the pre-bridge ratio (nearly 2:1).

In terms of surveys, 944 more were completed in the after period, an increase of 73%. Since people were

instructed to complete only one survey per trip, figures from the bridge site do not need to be excluded for a comparison of pre- and post-bridge data.

Table 3 shows the estimates of annual trail usage which were developed from an extrapolation of the count data. This resulted in an estimate of 217,900 annual trail visits in the before period rising to 508,100 annual trail visits in the after period, or an overall increase of 133% trips since the installation of the bridge and connections.

USER PROFILES

Information was compiled to investigate the modes used on the trail, general demographics, and where users lived in relation to the trail.

Activity on ATT

Travel mode on the ATT was categorized as: bicycling, walking, jogging/running, or skating. Pedestrian uses were separated to better understand differences between walkers and joggers/runners, as they may use the ATT for different purposes, durations, or frequencies. Based on survey responses and supported by adjusted count data, **bicycling is the primary activity for people on the ATT**.

As shown in Table 4, the proportion of bicyclists on the trail increased significantly (by 6%) from 2013 to 2014. All pedestrians (both those who indicated they were walking or jogging/running) comprised 59% of trail users in 2013 (53% in 2014) while 41% of trail users traveled on the trail by bicycle (47% in 2014). Before the bridge opened, walking was slightly more popular than bicycling or jogging on the Northern segment. The largest shift in activity was observed on the Northern segment, where the proportion of bicycling increased significantly (by14%). Though walking increased by 6% on the Southern segment from 2013 to 2014, bicycling remained the primary activity on that segment.

Demographics

The following series of figures provide demographic information on trail users in both pre- and post-bridge periods. Pre-bridge (2013), **the typical trail user was male, 26-54 years old, had an advanced degree, and a household income between $60,000 and $119,999.** Those demographics remained essentially the same in 2014 following installation of the bridge.

Table 4 Activity Proportions on ATT Pre- and Post-Bridge

	2013 (n)		2014 (n)		% Change
Bike	40%	(519)	46%	(941)	+6%*
Walk	27%	(351)	26%	(542)	-1%
Jog/Run	32%	(415)	26%	(533)	-6%*
All Other Modes	1%	(11)	2%	(30)	+1%

*Difference in proportion is statistically significant ($p<0.05$)

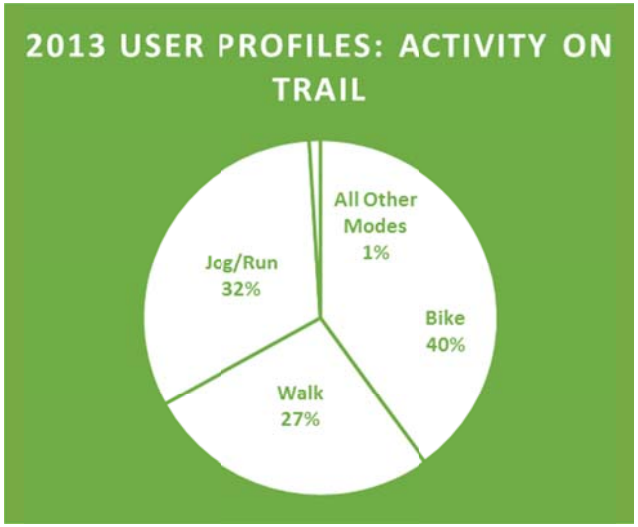

Figure 7 Activity on the trail.

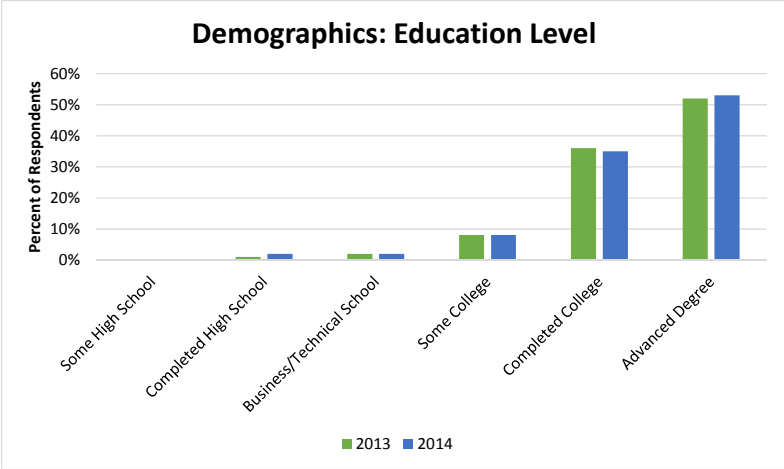

Figure 8 Comparison of education levels of survey respondents in before and after periods.

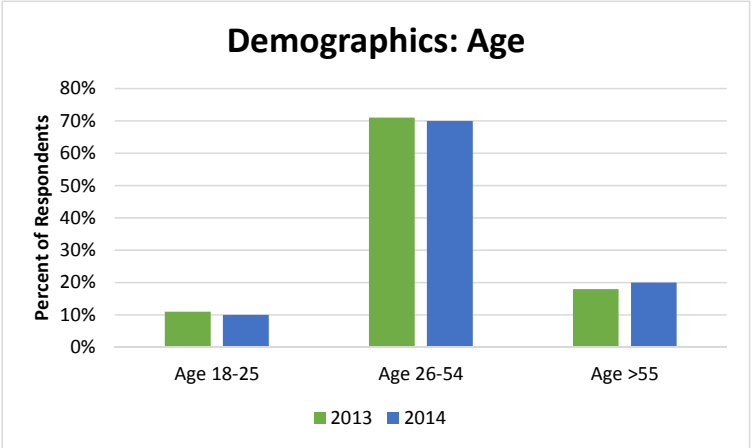

Figure 10 Comparison of age distribution of survey respondents in before and after periods.

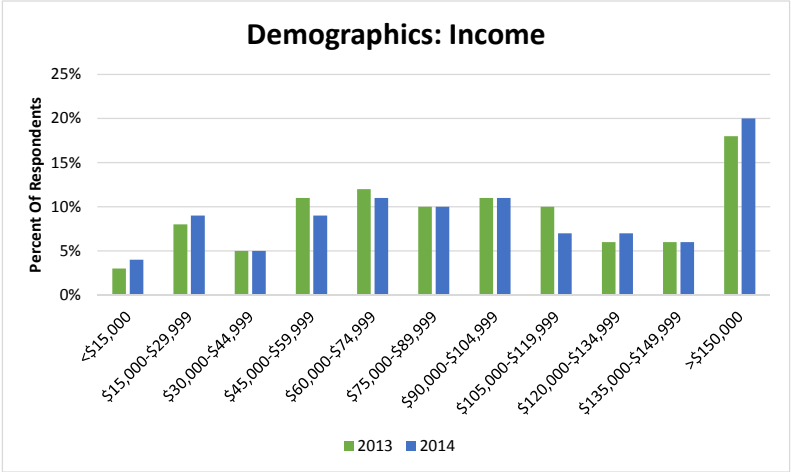

Figure 9 Comparison of household income of survey respondents in before and after periods.

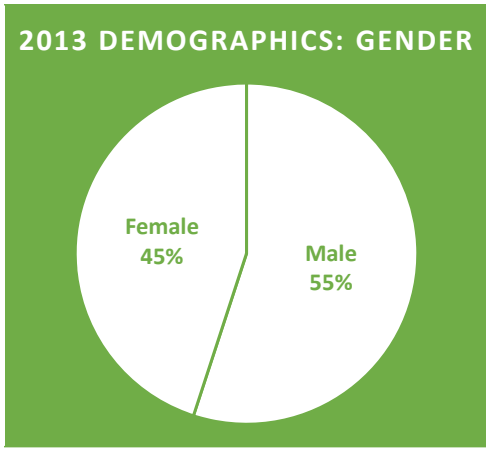

Figure 11 Gender proportion of trail users. Proportion was statisically the same in 2014.

Minors on the Trail

An Active Living Research Brief from the Robert Wood Johnson Foundation compiled in 2011 stated that, at the time,

no data were available on the use of trails by children and adolescents (*25*). As shown in Table 5 and Table 6, this study collected data on minors (those under 18 years of age) who used the ATT. **Nearly 10% of trail users on the ATT were children, and there was an overall increase of 158% in child trail counts from pre- to post-bridge periods.**

Children were counted as either dependent or independent. Dependent children were those who were physically conveyed by an adult and who were not exerting any effort to propel themselves during travel. These children were most often being carried in a stroller, bike trailer, or front/back carrying packs. Independent children were defined as those who exerted effort to propel themselves during travel and included children riding on a tagalong bicycle.

Table 5: Comparison of Raw Counts of Children on the ATT in Before and After Periods

	2013 Count (n)	2014 Count (n)	% Change
Independent Child Trail Count*			
Bike	307	881	+187%
Walk	135	332	+146%
Jog/Run	33	23	-30%
All Modes	490	1,333	+172%
Dependent Child Count**	327	773	+136%
Total Child Count	**817**	**2,106**	**+158%**

* Any independently mobile child; includes tagalong bicycles
**Any child being conveyed by another; includes strollers, bike trailers, front/back carrying packs, etc.

Pre-bridge to post-bridge, the number of children counted using the trail independently increased by 172%. The number of children using the trail dependently increased by 136%, as depicted in Table 5. The largest increase by children traveling independently was in those bicycling.

When viewing the child counts in proportion to the total counts, the percentage of children increased slightly but insignificantly as shown in Table 6. The proportion of dependent children relative to the total counts remained the same; however, the proportion of independent children increased slightly with the largest gain seen in the proportion of independent child bicyclists.

Table 6: Comparison of the Proportion of Children as Percentage of Total Count in Before and After Period

	2013 (n)		2014 (n)	
Independent Children	5.3%	(490)	6.2%	(1,333)
Dependent Children	3.6%	(327)	3.6%	(773)
Total Children	8.9%	(817)	9.9%	(2,106)

ATT as a Regional Destination

Survey respondents were asked to provide their city, state, and zip code of residence. Points of trip origins were analyzed to determine the number of people using the ATT who were from the local area. "Local" is defined as zip codes through which the ATT passes (27701, 27707, 27713, 27519, 27523, and 27502). "Non-local" is defined as all other zip codes.

Pre-bridge, the majority of those surveyed (71%) were local, as shown in Figure 12. Those from non-local points of origin increased overall by 2% post-bridge. Non-local users tended to be bicyclists. There was a significant shift in mode on the trail by non-local people surveyed between 2013 and 2014, with non-local bicyclists increasing by 6% and non-local joggers/runners decreasing by the same percentage.

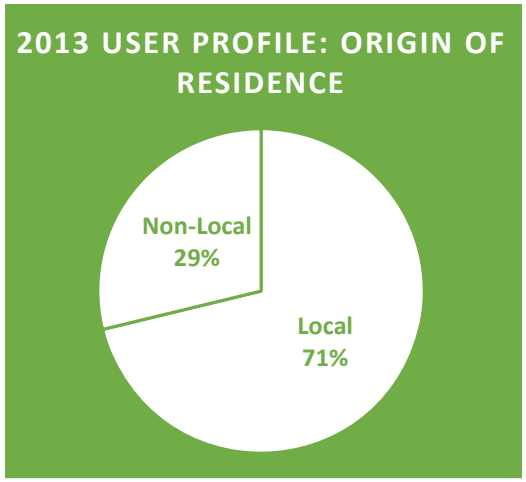

Figure 12 Proportion of ATT users who are local.

In general, the Southern segment had a higher proportion of non-local users than the Northern segment. Also, the pre-bridge to post-bridge increase in non-local use occurred on the Southern trail segment. While the percentage of non-local bicyclists remained the same on the Northern segment pre-to post-bridge, the percentage of non-local bicyclists on the Southern segment increased by 15%. The largest change in non-local use was seen for female bicyclists on the Southern segment, which surged by 22% from 2013. In 2014, it was more likely for a female bicyclist on the Southern segment to be non-local (56%) than local. This may suggest that out-of-town **female bicyclists are drawn to the ATT as a regional destination** more now that it is a contiguous 22-mile long trail.

Figure 13 shows a geographic comparison within North Carolina of the percentage of pre- and post-bridge survey responses by zip code. While the majority of users were from the local area in both 2013 and 2014, responses indicate post-bridge non-local users came from a more broadly dispersed area throughout the state.

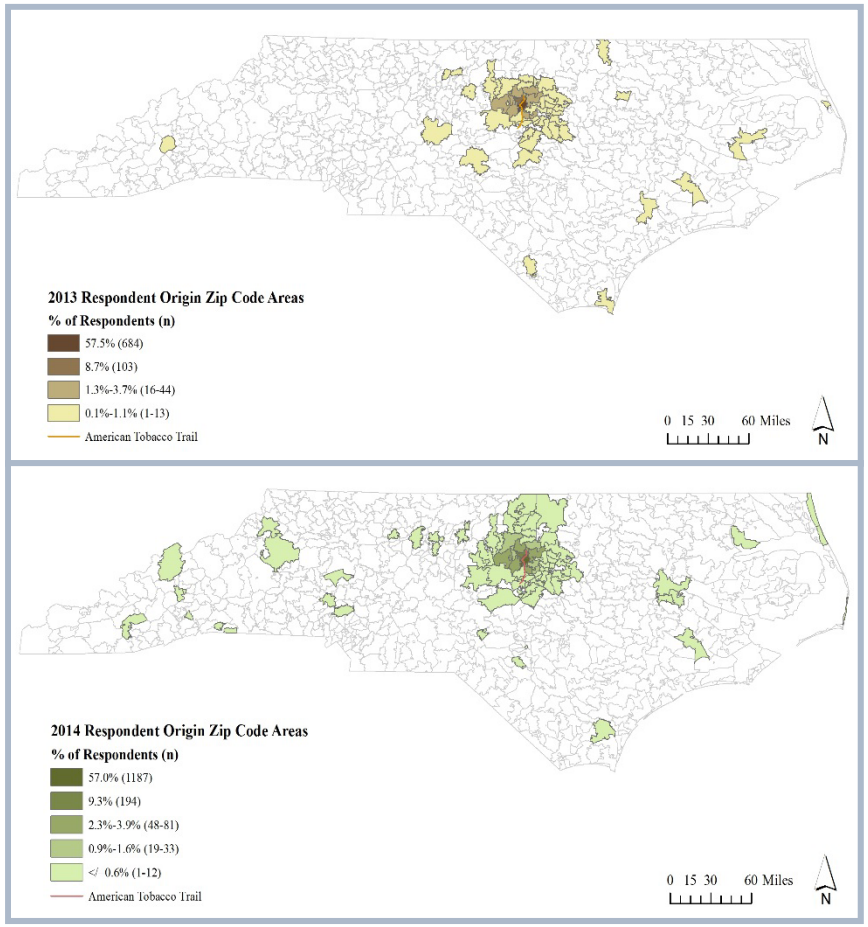

Figure 13 Proportional representation of geographic dispersion of Zip codes from where respondents came to the ATT.

In 2013, the majority (96%) of survey respondents using the ATT had visited the trail before – only 4% were first-time users. In 2014, 6% of survey respondents were

making their first trip on the trail, representing a small but significant 2% increase in first-time visitors. This increase is likely due to an increase in females as first-time visitors (up from 4% in 2013 to 7% in 2014). Equal proportions of first-time users were found on both Northern and Southern segments among those surveyed in 2013, while first-time users in 2014 were more likely to have started their trip on the Southern segment of the trail (8% Southern versus 5% Northern). See Table 25 and Table 26 in Appendix C for full results.

Frequency of Use

Survey respondents were asked how frequently they had used the ATT in the previous 30 days. Respondents indicated the number of trips by trip purpose. An average frequency of trail use was calculated by compiling the total number of trips for each respondent. On average, survey respondents had used the trail 11 times in the 30 days prior to the day they were intercepted.

Pre-bridge (2013), those using the Northern segment reported a higher frequency of use (13 times) as compared to those using the Southern segment (nine times) over the previous 30 days, which held true in 2014. As shown in Figure 14, the overall frequency of trail use by mode did not change significantly post-bridge (2014).

Seasonal usage of the ATT was measured by asking respondents to indicate in which of the last 12 months they had used the ATT, as displayed in Figure 15. From post-bridge survey responses, trail use tapered off in winter months between December 2013 and February 2014 but was relatively steady during the other nine months. Baseline responses collected in 2013 suggest that seasonality had little impact on trail use, as shown by somewhat lower use in November and December of 2012. The increases in March, April, and May seen in both pre- and post-bridge periods may be due to the fact that respondents were surveyed during May/June, and therefore they could more easily recall using the ATT in the months most immediately prior to the survey.

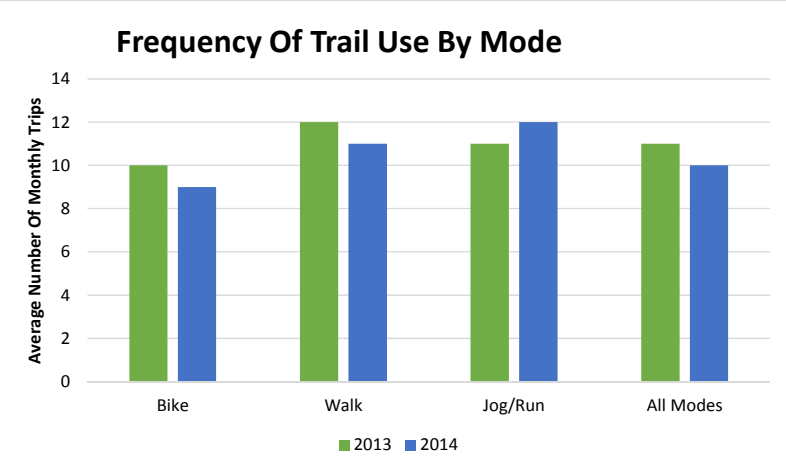

Figure 14 Pre- and post-bridge comparison of the number of trips made by respondents on the ATT over the 30 days prior to being surveyed.

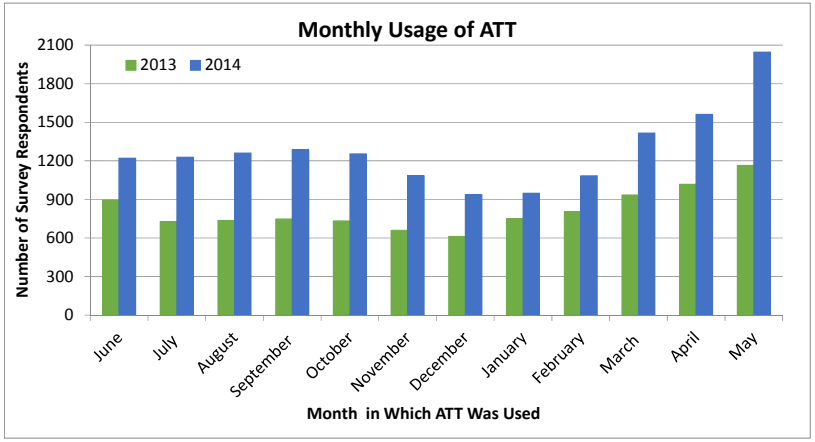

Figure 15 Comparison of number of respondents who indicated the months they used the ATT within the last 12 months from survey interception.

Trip Purpose

In both 2013 and 2014, the primary trip purpose for the majority of survey respondents on the ATT was exercise/recreation. Non-recreational trips included commuting trips (travel to/from work or school), utilitarian trips (run errands, go to entertainment or restaurant, etc.), or sightseeing and entertainment trips.

Figure 16 represents the proportion of respondents who said the primary purpose of their trip was exercise/ recreation in relation to all other purposes combined. There was an increase from 5% of trips pre-bridge to 8% of trips post-bridge that were for non-recreational purposes. A significantly larger percentage of non-recreational trips originated on the Northern segment during both pre- and post-bridge periods than on the Southern segment, (7% difference in 2013 and 5% difference in 2014.)

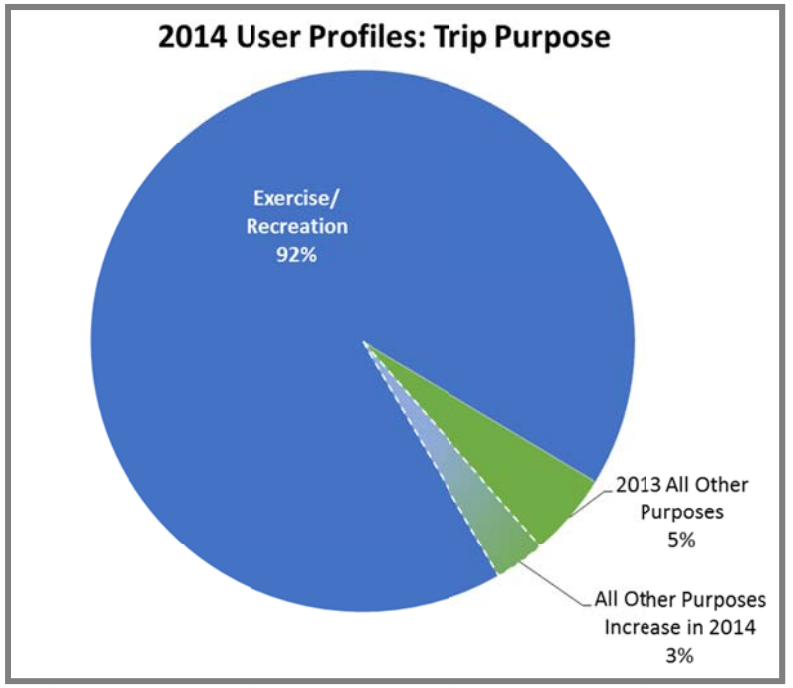

Figure 16 Shift in proportion of respondents who indicated that exercise/recreation was main purpose of that day's trip on the ATT in 2013 to some other non-recreational purpose in 2014.

TRANSPORTATION EFFECTS

Several transportation-related effects were analyzed including:

- Changes in average distance traveled on the ATT
- Changes in the proportions of round trips versus one-way trips
- Mode used to travel to/from the trail

Average Trip Distances

Table 7 illustrates the average distances traveled on the ATT. This figure does not include the distance a trail user may have traveled to get to the trail. Overall, the average intercepted trip distance on the ATT made by a survey respondent pre-bridge was 7.3 miles. **Post-bridge, the average trip distance increased by two miles, representing a 27% increase**.

Table 7 Average Intercepted Trip Distance by Trail Segment of Origin and by Mode

Segment	Mode	2013 Average Miles per Trip (n)	2014 Average Miles per Trip (n)	Difference	% Change
North	Bike	8.8 (178)**	14.4 (534)	+5.6*	+64%
	Walk	3.0 (190)	3.4 (308)**	+0.4	+13%
	Jog/Run	4.1 (176)**	5.1 (326)	+1.0*	+24%
	All Modes	5.2 (549)**	8.9 (1184)**	+3.7*	+71%
South	Bike	13.7 (292)	14.8 (357)	+1.1	+8%
	Walk	3.6 (112)	4.2 (179)	+0.6	+17%
	Jog/Run	5.7 (189)	5.7 (186)	+0.0	+0%
	All Modes	9.2 (597)	9.9 (734)	+0.7	+8%
Total	Bike	11.9 (470)	14.6 (891)	+2.7*	+23%
	Walk	3.2 (302)	3.7 (487)	+0.5*	+16%
	Jog/Run	4.9 (365)	5.3 (512)	+0.4	+8%
	All Modes	7.3 (1146)	9.3 (1920)	+2*	+27%

*Difference in proportion of trip origin from 2013 to 2014 is statistically significant (p <0.05)
**Difference in proportion of trip origin from North to South for each data collection year is statistically significant (p <0.05)

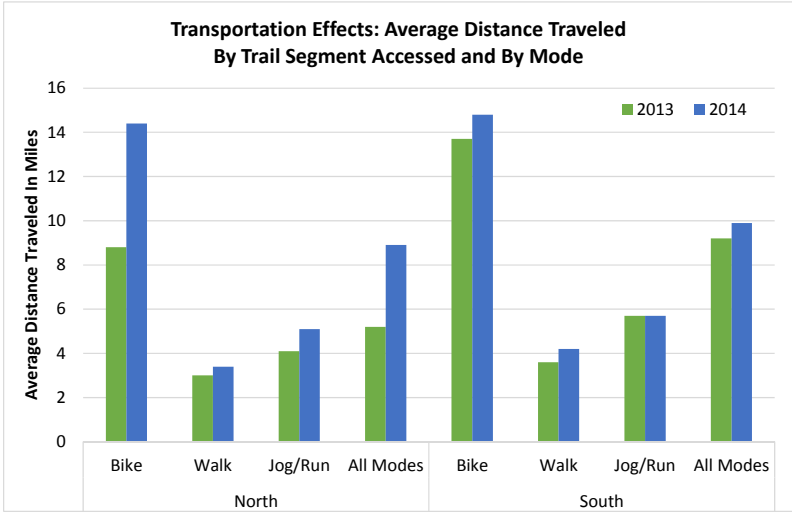

Figure 17 Average distance per intercepted trip by trail segment and by mode.

Not surprisingly, bicyclists traveled substantially farther than those traveling by other modes. Among pedestrians, joggers/runners traveled farther than walkers. **The greatest pre-to post-bridge changes in trip distance were observed among bicyclists (an overall increase of 2.7 miles).**

Much of the increase in bicycling mileage was due to a change in use by people accessing the ATT on the Northern segment, as shown in Figure 17. Bicyclists from the Northern segment, took advantage of the opportunity the bridge afforded in 2014 to access the Southern trail segment.

After construction of the bridge, the average trip distance of bicyclists who accessed the trail on the Northern segment increased by 64%. While in 2013, bicyclists accessing the trail from the Southern segment made trips almost five miles longer than those accessing the trail on the Northern segment, trip distances for bicyclists in 2014 were similar for those accessing the trail on either segment. In fact, differences in average **trip distances narrowed between the two trail segments across all modes** (four miles longer on the Southern segment in 2013 versus only one mile longer in 2014).

Interestingly, average post-bridge walking trip distances increased by 17% by respondents who accessed the ATT on the Southern segment. Also, in general, males tended to travel slightly farther than females on the trail. For a more detailed breakdown of results by gender, see Table 31and Table 32 in Appendix C.

Trip Type

In both 2013 and 2014, the majority of survey respondents made roundtrips on the ATT. This is not surprising, given that most people use the trail for exercise or recreational purposes and therefore simply turn around at some point to go back to the same access point. Through, or one-way, trips may be associated more with utilitarian or commuter trip purposes. **Through trips increased by 2% in 2014** as shown in Figure 18, **which is similar to the post-bridge shift observed toward more non-recreational trip purposes**.

While the majority of trips were roundtrip for both segments, through trips were more likely to be taken by people who accessed the trail on its Northern segment, particularly in 2013 (pre-bridge). At that time, 12% of through trips were made from Northern segment access points versus 5% of through trips from Southern segment access points. The difference in proportions of trip types between Northern and Southern trail segments was less pronounced in 2014 (post-bridge). For more information, see the detailed results in Table 27 and Table 28 in Appendix C.

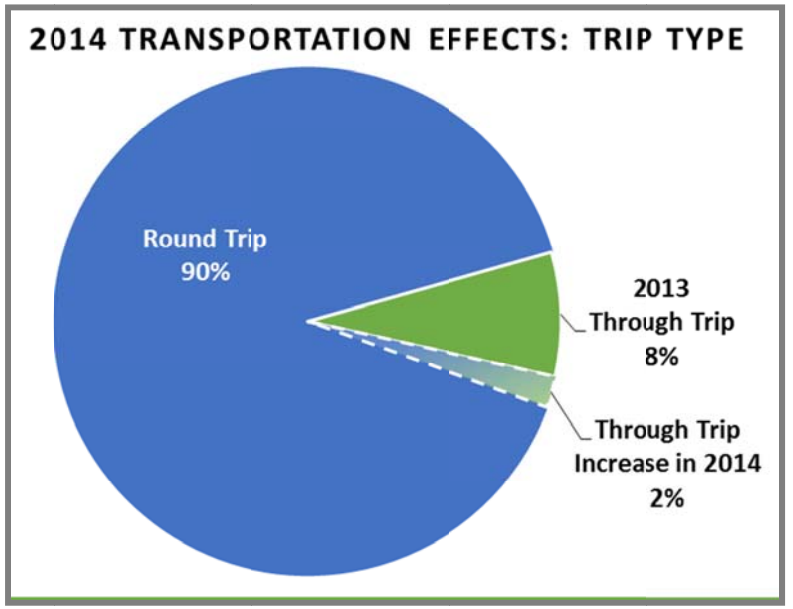

Figure 18 Shift in proportion of respondents making a round trip on the ATT when intercepted in 2013 to making a through trip in 2014.

Mode Used to Get to/from the Trail

Survey respondents were asked to indicate the mode they used to travel to/from the ATT for that day's trip. The survey provided the following choices: car, bicycle, on foot, bus, or other. Table 29 in Appendix C shows a detailed breakdown of how people traveled to/from the ATT by the mode they used while traveling on the trail. In 2013, **half of the ATT users traveled by car to get to/from the trail; the**

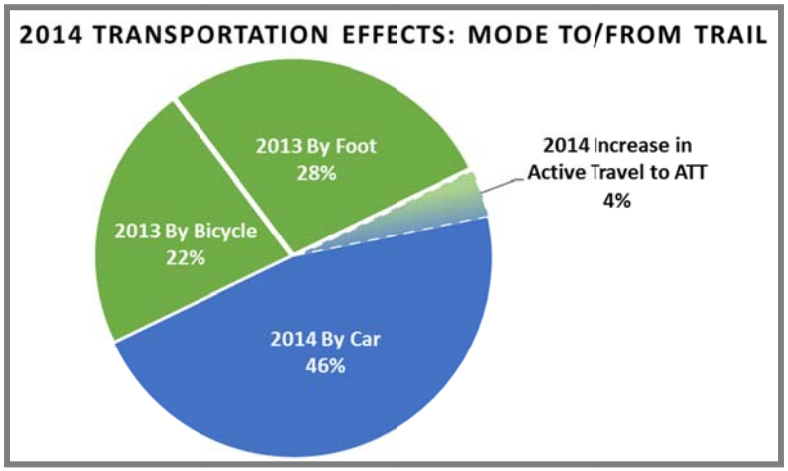

Figure 19 Shift in proportion of respondents who drove to the ATT in 2013 to those actively traveling to the trail in 2014.

other half used active transportation—traveling by foot or bicycle to/from the trail. **The proportion of people who reported that they walked, biked or jogged to the ATT in 2014 increased by 4%**, as shown in Figure 19. From May 2013 to May 2014, no significant changes were made to the bicycle or pedestrian network accessing the trail, which suggests that the proportional shift observed in how people accessed the ATT may be due to the bridge opening.

Joggers/runners were 12% more likely to drive to the trail than bicyclists in 2013 (58% and 46%, respectively.) The 4% overall decrease in people driving to the trail post-bridge was largely due to a jump in joggers/runners choosing to travel to the ATT on foot in 2014. As shown in Figure 20, 13% more joggers/runners reported that they came by foot in 2014 than in 2013.

In general, people tended to drive to access the trail on the Southern segment, while those accessing the trail on the Northern segment tended to walk, run, or bike to/from the ATT. Post-bridge, the difference in travel to/from the trail between the segments was more pronounced, with only 40% of those originating on the Northern segment arriving by car (versus 48% pre-bridge), while 55% of those being located in a more rural area with less originating on the Southern segment arrived by car (versus 53% pre-bridge). This is likely due to the Southern segment connectivity to adjacent land uses and, of the streets that intersect the trail, few have designated bicycling or walking facilities to encourage access to the trail via active modes.

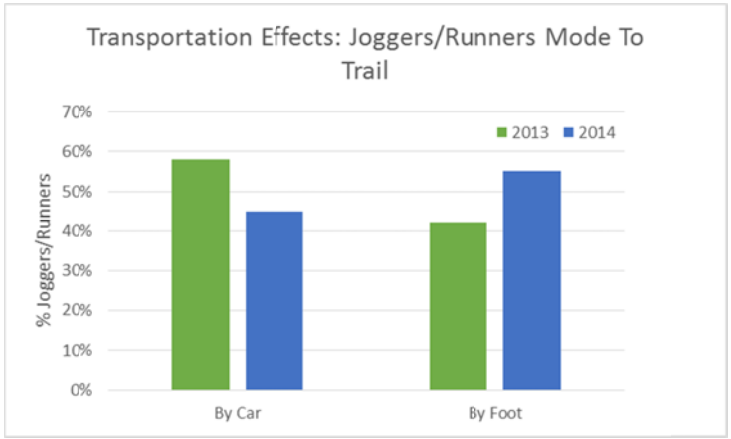

Figure 20 Comparison of the proportion of respondents who were jogging/running on the trail by the mode they used to get to the ATT in 2013 and 2014.

Gender differences were also considered when analyzing the mode by which people chose to get to/from the ATT. In 2013, **a majority of females drove to the trail** (55%), **while a majority of males walked, ran, or bicycled to/from it** (53%). While the proportions of both females and

males who actively traveled to the trail increased in 2014, the shift was larger by females.

On both the Northern and Southern trail segments, female joggers/runners were two times more likely to drive to the ATT than to access the trail on foot in 2013. In 2014, female joggers/runners reported using their car significantly less to travel to the trail (down 21% from 66% 2013), and they were more likely to jog/run to the trail (55%) than to drive (45%). This change in behavior is most evident in female joggers/runners starting on the Northern segment, where they drove to the trail 26% less in 2014, as shown in Table 30 in Appendix C.

PUBLIC HEALTH AND SOCIAL EFFECTS

Information compiled from the survey responses relating to public health and social impacts included:

- The percentage of trail users who indicated exercise as their primary trip purpose
- The type of activity users engaged in while on the trail
- The average duration of the activity by user type and by household income
- A comparison of mode used on the trail by household income
- Estimate of caloric expenditure by users on the trail

Physical Activity

As explained in the User Profiles section on page 23, more than 90% of those surveyed indicated that the primary purpose of that day's trip was for exercise/recreation. It is important to note that ATT users whose purpose was not primarily exercise/recreation were still engaging in physical activity on the trail. Therefore, changes in the modes used on the trail, distances traveled, frequency of trips, or trip durations may show changes in physical activity behaviors regardless of the trip purpose.

According to the *Physical Activity Guidelines for Americans*, adults need the equivalent of at least 30 minutes of moderate-intensity physical activity five times per week, or 75 minutes of vigorous-intensity physical activity once a week, or an equivalent combination of the two (*14*). The guidelines state that most health benefits occur with at least 150 minutes a week of moderate-intensity physical activity, such as brisk walking, and that for most health outcomes, additional benefits occur as the amount of physical activity increases through higher intensity, greater frequency, and/or longer duration.

Trip Duration

The total active portion of a trail user's trip (in minutes) was self-reported on the survey using 20-minute intervals. The figures reported may also include time the respondent spent actively traveling to or from the trail. Table 8 breaks out the active trip duration by mode used on the ATT in the pre-bridge and post-bridge periods. The average duration of the active portion of the trip for ATT users surveyed post-bridge was 63 minutes, or nearly 7% longer than reported in 2013 (59 minutes). The majority of this increase is attributed to people whose trip originated on the Northern segment, particularly to bicyclists whose average durations increased significantly by 15 minutes (for females) and ten minutes (for males).

Table 8 Comparison of Average Duration (in Minutes) of the Active Portion of One's Trip, by Mode, in Before and After Period

Mode	2013 Duration (n)	2014 Duration (n)	Difference	% Change
Bike	70 min (496)	76 min (894)	+6 min*	8.6%
Walk	51 min (329)	52 min (520)	+1 min	2.0%
Jog/Run	51 min (402)	51 min (517)	+0 min	0.0%
All Modes	59 min (1238)	63 min (1959)	+4 min*	6.8%

*Difference in minutes is statistically significant (p <0.05)

As survey respondents indicated that they traveled on the ATT an average of 10-11 times in a 30-day period, an assumption can be made that this would translate into about 2.5 trips per week. Based on average pre-bridge active travel duration of 138 minutes per week, respondents were short of meeting the recommended weekly levels of moderate-intensity physical activity levels in 2013 unless they supplemented their physical activity in addition to their use of the trail. Based on their activity on the ATT alone, **post-**

bridge (2014) adult respondents met the recommended physical activity guidelines by averaging 162 minutes per week of moderate-intensity physical activity.

Pre-bridge, respondents using the Southern segment reported trip durations that averaged 13 minutes longer than those reported on the Northern segment. Bicyclists, in particular, had longer trip durations on the Southern segment. This finding is consistent with the result that bicyclists rode an average of 4.8 miles farther on the Southern segment. **The differences in trip durations between those traveling on the Southern and Northern segments decreased to five minutes post-bridge.**

Overall, males reported spending an average of seven to eight minutes longer on the active portion of their trip than females. When comparing trail segments, this difference in trip duration by gender was more pronounced on the Southern segment for both pre- and post-bridge periods. See Table 33 in Appendix C for full results.

Table 9 Comparison of Trip Duration (in Minutes) by Gender and Mode for Respondents Originating on the Northern Segment Pre- and Post-Bridge

Gender	Mode	2013 Duration (n)	2014 Duration (n)	Difference	% Change
Male	Bike	62 (115)	72 (361)	+10*	16.1%
	Walk	51 (80)	50 (131)	-1	-2.0%
	Jog/Run	48 (94)	52 (155)	+4	8.3%
	All Modes	54 (294)	63 (660)	+9*	16.7%
Female	Bike	57 (52)	72 (180)	+15*	26.3%
	Walk	49 (118)	53 (194)	+4	8.2%
	Jog/Run	48 (97)	49 (172)	+1	2.1%
	All Modes	50 (268)	58 (548)	+8*	16.0%

*Difference in minutes is statistically significant (p <0.05)

Table 9 compares trip durations for respondents using the Northern segment showing differences by gender and mode. For all activity types, the active duration of trips by females using the Northern segment increased from the pre-bridge to the post-bridge periods by an average of eight minutes. The highest gains in trip duration for females were by those who traveled on the Northern segment by bicycle, with an average increase of 15 minutes of activity per trip.

Figure 21 shows the average pre-to post-bridge increase in trip duration by both male and female trail users. **Increased duration for males and females was four minutes and three minutes, respectively, where gender was reported. For all trail users, including those who did not report gender, trip duration increased an average of four minutes (6.8%).**

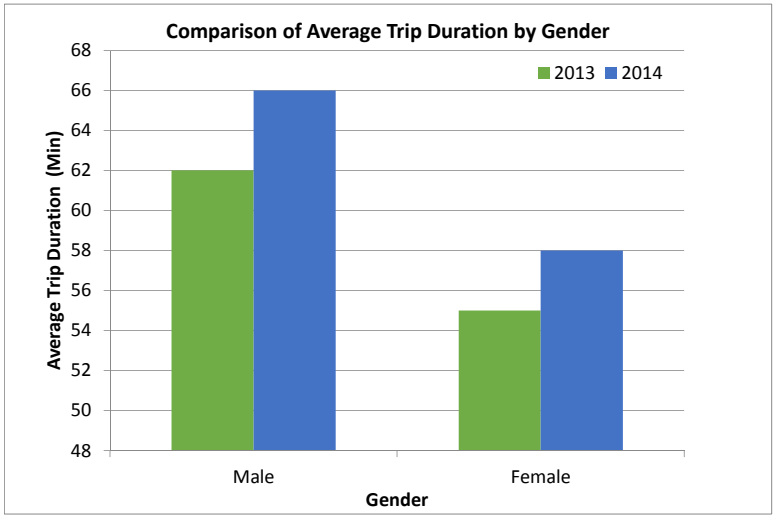

Figure 21 Comparison of average trip duration (in minutes) by gender in before and after periods. The increase in duration for males is statistically significant (p < 0.05).

Low Income Populations

Among low-income North Carolinians, physical inactivity and obesity rates are higher than the state average, posing greater health risks to that population. Among individuals with household incomes of less than $50,000 per year, 30%-40% indicated they participate in no physical activity (0 minutes) per week, with a large portion (35-44%) of individuals in this income group also reporting they do not have access to trails, greenways, sidewalks or bike paths (*16*).

Table 10 Pre- and Post-Bridge Comparison of Trip Duration (in Minutes) by Income

Household Income	2013 Duration (n)	2014 Duration (n)	Difference	% Change
<$15,000	55 (36)	60 (68)	+5	+9%
$15,000-29,999	50 (81)	51 (174)	+1	+2%
$30,000-44,999	49 (48)	56 (97)	+7	+14%
$45,000-59,999	59 (116)	55 (174)	-4	-7%
$60,000-74,999	56 (123)	56 (204)	+0	+0%
$75,000-89,999	61 (110)	61 (171)	+0	+0%
$90,000-104,999	60 (116)	61 (202)	+1	+2%
$105,000-119,999	63 (104)	67 (125)	+4	+6%
$120,000-134,999	64 (61)	66 (124)	+2	+3%
$135,000-149,999	58 (56)	64 (104)	+6	+10%
>$150,000	64 (192)	65 (343)	+1	+2%

Note: average trip duration in 2013 = 59 min; in 2014 = 63 min
No differences in average duration were found to be statistically significant (p <0.05)

While the proportion of survey respondents in household income brackets of less than $50,000 per year remained relatively the same pre- to post-bridge, Table 10 shows a pre- to post-bridge increase of five and seven minutes in duration for individuals reporting household incomes of less than $15,000 and $30,000 - $44,999, respectively. Those making between $15,000 and $29,999 reported only a slight increase in trip duration. Figure 22 shows that **as household income increases, the average duration of the active portion of one's trip also increases – a trend that did not change from pre to post-bridge surveys.** However, when household income is examined by activity type, it appears lower incomes skew towards walking while higher incomes skew towards bicycling except where reported income is less than $15,000.

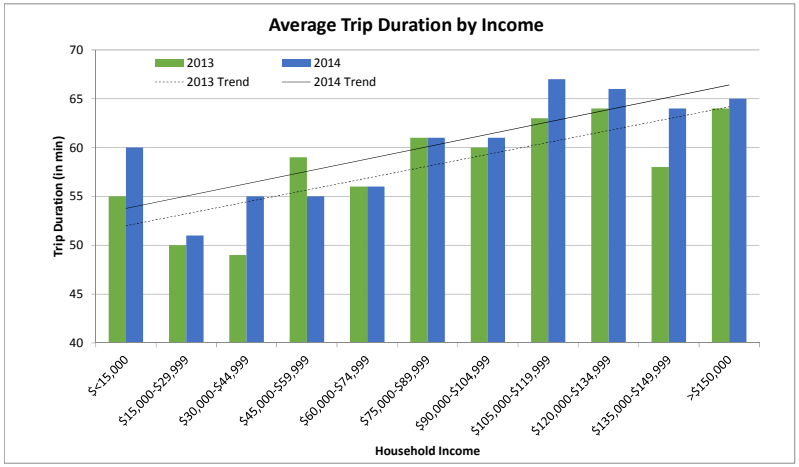

Figure 22 Comparison of trip duration by household income in before and after period.

Longer duration of physical activity by survey respondents is one way to measure the impact of the bridge connection on public health. Another way to measure an increase in physical activity is to consider a shift in the type of activity conducted. Bicycling is considered a vigorous-intensity activity, whereas walking is considered a moderate-

intensity activity, so the observed post-bridge increase in bicycling represents a shift from a lower to a higher intensity activity.

Respondents were asked the number of miles they typically walked/jogged or biked in a month, whether on or off the ATT. No significant changes were found in the average miles traveled in a month when comparing pre-bridge to post-bridge responses, indicating that the overall physical activity level of respondents remained the same – on average, respondents bicycled 76-81 miles and walked or jogged 49-52 miles per month. However, looking at activity shifts only on the ATT, the percentage of bicycling increased by 6% as compared to walking/jogging.

When stratified by income, trips made by the lowest income group, households making less than $15,000 per year, shifted significantly from jogging/running to bicycling in the post-bridge period. This result is somewhat surprising when considering the cost of bicycling equipment. Respondents with household incomes of $15,000-29,999 and $30,000-$44,999 showed a 13% increase in the proportion of walkers on the trail pre- to post-bridge. There was a shift in most income groups from jogging/running to bicycling, although households making $90,000-104,999 and those making $135,000-149,999 reported an increase in jogging/running (8% and 4%, respectively). Figure 23 shows a visual representation of modal percentages in 2013 and 2014 by household income (when the activity on the trail was reported). For additional details, see Table 34 in Appendix C.

When mode to/from the trail was stratified by

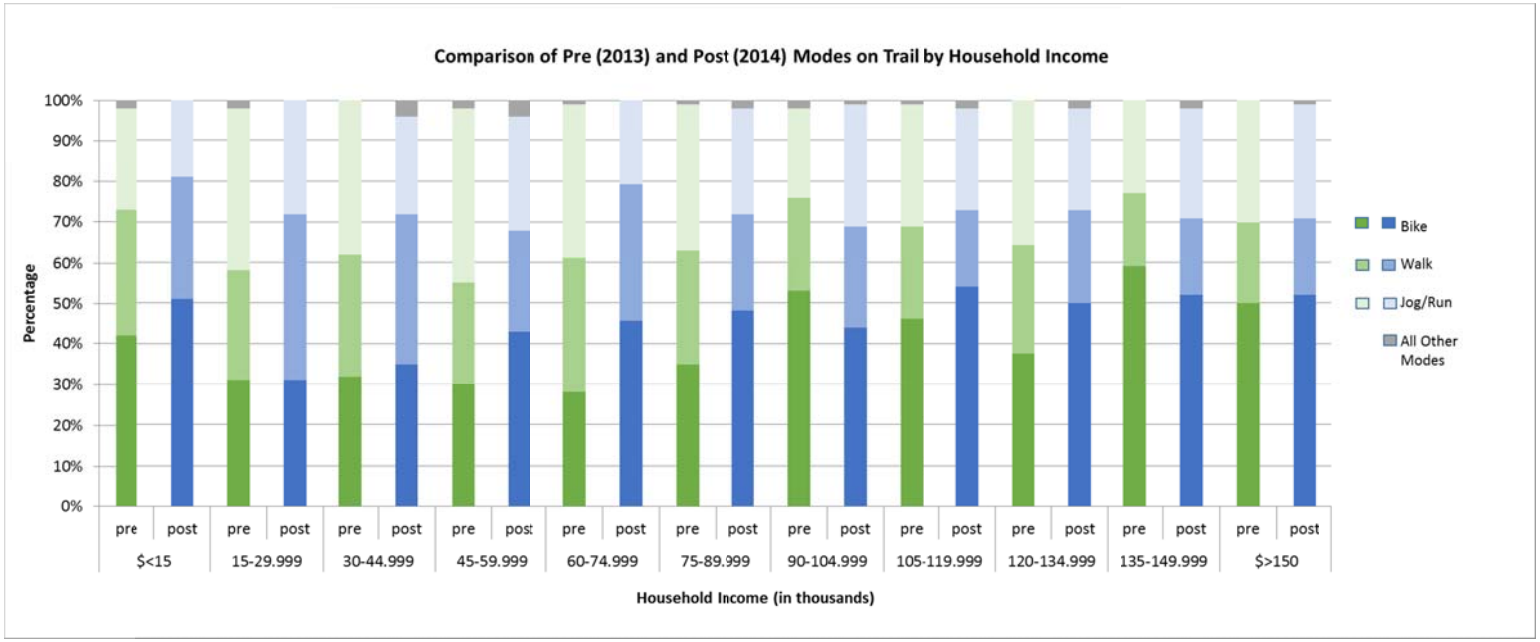

Figure 23 Comparison of modal proportions on the ATT by household income in before and after periods.

household income, trips to/from the trail by car for households making $30,000-$44,999 per year declined in proportion significantly (by 19%) in the post-bridge period. For households making $60,000-$74,999, the proportion of trips made to/from the trail by bicycle increased significantly (by 10%) in the after period. The proportion of trips made to/from the trail by car decreased significantly (by 28%), while the proportion of trips made to the trail by foot increased significantly (by 20%) post-bridge for households making $75,000-$89,999. For additional details, see Table 35 in Appendix C.

It has been noted that there was a 3% shift in the proportion of respondents who indicated that exercise and recreation was the main purpose of their trip on the ATT in 2013 to some other non-recreational purpose in 2014. However, no significant differences were found when trip purpose was stratified by household income. Those results are shown in Table 36 in Appendix C.

Caloric Expenditure

To predict how physical activity on the ATT may impact community health and the effect the bridge connection may have on health outcomes, survey responses can be used to estimate calories burned by those using the trail in the study area during the pre- and post-bridge periods. Two primary factors were used from self-reported survey data: the average duration of the active portion of one's trip and the type of exercise (i.e. walking, jogging/running, or bicycling).

Caloric expenditures were calculated from the annual estimated number of visits for people using the ATT in the study area as derived from the count data (see Estimating Annual Trail Trips on page 16.) The inputs for estimating caloric expenditure were selected to conservatively represent the different types of activity on the trail. These inputs are listed in Table 11 by rate of energy expenditure provided in metabolic equivalents (METs) which were used in relation to the duration of the activity to determine the number calories burned. The following calculations are generalized based on average weights for adults age 20 years and over of 195.5 pounds for men and 166.2 pounds for women (*26*).

Table 11 Selected Activities and Metabolic Equivalents (*27*)

Activity	METS	Description
Bicycling	6.8	Bicycling, 10-11.9 mph, leisure, slow, light effort
Walking	4.3	Walking, level, brisk, firm surface, walking for exercise
Running/Jogging	7.0	Jogging, general

From the 2011 Compendium of Physical Activities.

The average trip duration compiled for each activity type by gender was multiplied by the assumed weights and METs to calculate the caloric expenditure per trail user. Percentages of each of these user types from count data were applied to the annual estimated number of people using the ATT, excluding children, to calculate annual caloric expenditures.

Table 12 presents the results, which estimate that **more than 175 million additional calories were burned annually by ATT users in the post-bridge period, an increase of 163%.** Overall, post-bridge, an average of 5.5 million calories (the equivalent of about 19,000 McDonald's cheeseburgers) were expended weekly by the users who traveled the trail through the study area post-bridge. Due to increases in trip duration and the number of annual user trips, the largest increase in the amount of energy expenditure from the pre-before and post-bridge periods was by female bicyclists, whose cohort demonstrated a 259% increase in calories burned annually.

Table 12 Comparison of Estimated Annual Caloric Expenditure by Trail Users in Before and After Period

	2013				2014				
Type of User	Estimated Annual Trips	Average Duration (Min)	Calorie Expenditure Per User	Annual Calorie Expenditure (Thousands)	Estimated Annual Trips	Average Duration (Min)	Calorie Expenditure Per User	Annual Calorie Expenditure (Thousands)	% Increase
Male Bicyclist	59,262	72	725	43,000	181,826	77	775	141,000	+228%
Female Bicyclist	29,479	68	582	17,200	99,889	72	616	61,600	+259%
Male Walker	29,631	54	344	10,200	52,594	51	325	17,100	+68%
Female Walker	42,449	49	265	11,300	77,344	53	287	22,200	+97%
Male Runner/Jogger	27,886	50	529	14,800	45,293	52	550	24,900	+69%
Female Runner/Jogger	27,886	52	458	12,800	47,086	50	441	20,800	+62%
Annual Total				109,300				287,600	+163%

ECONOMIC EFFECTS

The analysis of economic effects from construction of the ATT bridge and connecting links involved two primary activities:

1. Estimating ATT users' annual direct expenditures on goods and services
2. Estimating the economic impacts from increased use of the ATT following completion of the link between the Northern and Southern trail segments.

In addition to those primary activities, the survey asked respondents to indicate the value of their trip on the ATT on a scale of $0-$10 using $1 intervals. This allowed the researchers to discern whether there was a shift in value up or down the scale after the bridge was opened –the actual dollar amount associated with the value is arbitrary. Table 13 provides the reported pre- and post-bridge values of trips on the trail averaged by mode of travel.

On average, survey respondents valued their trip at $6.60 in 2013. That value increased by a minimal but statistically significant amount of $0.40 in 2014. Bicyclists valued their trip more than those traveling by the other modes. On average, respondents using the Southern segment valued their trip slightly more than those using the Northern segment in 2014; however, the difference was statistically insignificant. No significant differences were found between males and females in their value of their trip on the ATT. See Table 37 and Table 38 in Appendix C for full results.

Table 13 Average Value of ATT Trip

Mode	2103 Average (n)	2014 Average (n)	Difference
Bicyclist	7.0 (461)	7.5 (870)	+0.5*
Walker	6.2 (296)	6.7 (504)	+0.5
Jogger/Runner	6.2 (369)	6.6 (504)	+0.4
All Modes	6.6 (1,137)	7.0 (1,906)	+0.4*

*Difference in average value of trip is statistically significant ($p < 0.05$)

Average Annual Direct Expenditures

People using the ATT can have an impact on businesses through expenditures on a variety of goods and services. The survey targeted respondents' expenditures on goods or services directly related to their trip on the trail on the day of the survey. On the survey form, the question was stated as follows:

> *Related to <u>today's</u> trip on the ATT, approximately how much did (will) you spend on the following goods or services? If traveling with members of your household, estimates should represent the total for your household.*

On average, approximately 3 of 10 respondents reported purchasing goods or services on the day they traveled on the ATT, with an average expenditure of $15 or $16 in both pre- and post-bridge periods. For results on all expenditures made by respondents on the trail the day they were surveyed, see Table 41 and Table 42 in Appendix C.

The results shown in the following tables highlight restaurant, grocery and retail purchases made by respondents during their trip, which were the predominant types of goods or services purchased. Although expenditures were made in other areas, they represent less than 1% of responses and were not included in this analysis. There was an increase in economic activity related to the use of the ATT in the post-bridge period. Applying proportions of respondents making these purchases to the estimated annual user trips, an estimate of total expenditures for each type of expenditure was calculated. **Direct expenditures on groceries, retail, and restaurants related to trips made on the ATT rose from approximately $2.4 million pre-bridge to $6.1 million**

post-bridge annually for a total increase of $3.7 million or 154%. The greatest increase in trip-related expenditures occurred at restaurants, followed by retail stores, and grocery stores. Those figures are summarized in Table 14.

Table 14 Annual Trip-Related Expenditures on the ATT

Expenditures	2013 Direct Expenditures (Thousands)	2014 Direct Expenditures (Thousands)	Difference (Thousands)	% Increase
Grocery	$ 869	$ 1,753	$ 884	102%
Retail	$ 724	$ 1,830	$ 1,105	153%
Restaurant	$ 841	$ 2,512	$ 1,671	199%
Total	$ 2,434	$ 6,094	$ 3,661	150%

Table 15 Average ATT Trip-Related Expenditure at Restaurants

	2013		2014		Difference	
Trail Segment	% Surveyed Who Made Purchase	Total Expenditures (Thousands)	% Surveyed Who Made Purchase	Total Expenditures (Thousands)	% Surveyed Who Made Purchase	Total Expenditures (Thousands)
North	16%	$496	20%	$1,206	5%	$826
South	14%	$345	22%	$1,306	8%	$1,043
All	15%	$841	21%	$2,512	6%	$1,869

Table 15 provides information on expenditures at restaurants. Both the percentage of people spending at a restaurant during their trip on the ATT and the amount of their expenditures increased after completion of the bridge. Average pre-bridge expenditures were approximately $22, and 15% of those surveyed made a restaurant purchase during their trip in 2013. Approximately one-fifth of post-bridge survey respondents (21%) made a purchase at a restaurant with an average purchase of $24. As shown by these data, the percentage of survey respondents making a purchase at a restaurant post-bridge increased by 6%, and the average purchase amount increased by $2. Those increases were present on both the Northern and the Southern segments of the trail and equate to an estimated total increase in trip-related restaurant expenditures of $1.7 million annually.

A greater percentage of those surveyed on the Northern segment spent money at a grocery store during their trip on the ATT, and their average expenditure was higher than that of people on the Southern trail segment in both pre- and post-bridge periods. That makes sense, given the presence of two large supermarkets located at what had been the southern terminus of the Northern trail segment.

Table 16 provides information on expenditures at grocery stores. While there was a decrease in the percentage of people making a purchase at grocery stores, and a decrease

Table 16 Average ATT Trip-Related Expenditure at Grocery Stores

	2013		2014		Difference	
Trail Segment	% Surveyed Who Made Purchase	Total Expenditures (Thousands)	% Surveyed Who Made Purchase	Total Expenditures (Thousands)	% Surveyed Who Made Purchase	Total Expenditures (Thousands)
North	12%	$382	11%	$1,192	-1%	$900
South	8%	$487	7%	$561	-1%	$189
All	10%	$869	9%	$1,753	0%	$1,088

of $4 in the amount of average expenditure, the number of survey respondents who made a purchase and the total value of those purchases increased in the post-bridge period. Pre-bridge, 10% of survey respondents reported making a purchase at a grocery store during their trip, with an average expenditure of $41. Post- bridge, 9% of trail users reported making a grocery store purchase with an average total of $37.

A greater percentage of those surveyed on the Northern segment spent money at a grocery store during their trip on the ATT, and their average expenditure was higher than that of people on the Southern trail segment in both pre- and post-bridge periods. That makes sense, given the presence of two large supermarkets located at what had been the southern terminus of the Northern trail segment.

Table 17 Average ATT Trip-Related Expenditure at Retail Stores

	2013		2014		Difference	
Trail Segment	% Surveyed Who Made Purchase	Total Expenditures (Thousands)	% Surveyed Who Made Purchase	Total Expenditures (Thousands)	% Surveyed Who Made Purchase	Total Expenditures (Thousands)
North	4%	$427	6%	$842	1%	$515
South	3%	$297	6%	$988	3%	$761
All	4%	$724	6%	$1,830	2%	$1,276

Table 17 provides information on expenditures at retail stores. **The percentage of people spending at a retail store during their trip on the ATT increased after completion of the bridge**. Average pre-bridge retail expenditures were $85, and 4% of those surveyed on the ATT made a retail purchase during their trip in 2013. Six percent of post-bridge respondents reported making a purchase at a retail store, with an average expenditure of $60 in 2014. While the percentage of respondents increased, the average retail amounts decreased from 2013 levels after construction of the bridge. Retail expenditures related to trips made on the ATT rose from an estimated $724,000 annually pre-bridge to an estimated $1.8 million annually post-bridge, an increase of $1.1 million or 153%.

Average trip expenditures were sorted by survey respondents' household income as shown in Table 39 and Table 40 in Appendix C.

Economic Impact

To estimate the greater economic impact of expenditures that were associated with use of the trail, an IMPLAN® model was used to estimate direct, indirect, and induced economic effects. The indirect and induced impacts capture multiplier impacts of the direct expenditures related to trail activity.

- Direct impacts result from businesses that are directly impacted by trail users, which included restaurant, retail, and grocery establishments for this study. Trail users also purchased goods or services in other industries (including lodging and entertainment), but those expenditures were not included in this analysis because of the relatively low percentage of trail users who made purchases from other industries.
- Indirect impacts represent the impacts of spending by firms directly engaged in supporting trail user activities. Examples of this type of spending include products and services provided by support businesses (such as office supply companies, property maintenance, etc.).
- Induced impacts result from payroll expenditures of employees of directly- and indirectly-related firms that

produce successive spending (money that is recirculated in an economy resulting in additional economic impact). IMPLAN® (IMpact Analysis for PLANning) is widely used by analysts as a tool to estimate the economic impact of a variety of transportation facilities. IMPLAN® uses data compiled from a wide variety of sources, including unique local data and census information not estimated from national averages (IMPLAN 2014). Measures for which impacts were estimated for this study include: the number of full-time payroll employees (Employment), total payroll costs (Employee Compensation), and gross revenue (Output). Calculations that went into the IMPLAN® model included annual trail usage, and the percentage of users who made a purchase and amount of expenditure by purchase type.

The enhanced connectivity provided by the new bridge and the resulting increases in trail usage positively affected sales at local grocery, retail, and restaurant establishments resulting in the larger economic effects. The impact of the bridge connection was estimated by comparing the trail volume in the study area and average expenditures from pre-bridge and post-bridge survey responses. As shown in Table 18, the installation of the bridge had an estimated annual impact of **43 jobs, $1.3 million in employee compensation, and $4.9 million in total business gross revenues**. This additional employment represents the impact of the trail related expenditures and does not include jobs related to the construction of the bridge and connections. The presence of many commercial establishments in the vicinity of the bridge (which connects two commercial areas with numerous nearby residential developments) provides the community with an additional transportation option, facilitating purchases. In addition to these economic measures, state and local taxes are collected as a result of purchases by trail users. Pre-bridge, state tax collections were estimated to be approximately $107,000 and local tax collections were $86,000. Post-bridge, the revenues were estimated to be approximately $289,000 in state taxes and $233,000 in local taxes annually.

As a point of comparison, the construction of the bridge and connecting trail segments cost approximately $11.2 million. It should be noted that these figures do not quantify the additional economic value in health savings due to additional physical activity or benefits to the environment.

Table 18 Economic Impacts from Construction of the ATT Bridge and Connecting Trail Segments

	2013				2014				Difference			
Type of Impact	**Direct**	**Indirect**	**Induced**	**Total**	**Direct**	**Indirect**	**Induced**	**Total**	**Direct**	**Indirect**	**Induced**	**Total**
Employment (Full-time Jobs)	20.2	2.1	3.0	25.3	54.9	5.7	8.0	68.6	34.7	3.6	5.0	**43.3**
Employee Compensation (thousands)	$544	$107	$137	$788	$1,453	$291	$370	$2,114	$909	$184	$232	**$1,326**
Output (thousands)	$2,434	$332	$423	$3,189	$6,094	$905	$1,139	$8,138	$3,661	$573	$716	**$4,949**

TRIPS ON THE BRIDGE AND BRIDGE SEGMENT

Pre-bridge (2013), survey respondents were asked to indicate the likelihood that they would use the bridge over I-40 after it was completed using a scale of 1-5 where 1 indicated "Not Likely" and 5 indicated "Very Likely." Table 19 shows the reported likelihood of bridge use by mode of travel on the ATT. Overall, respondents indicated an average score of 4.4 out of 5 that they were Likely/Very Likely to use the ATT bridge. Walkers, particularly those using the Southern segment, reported the lowest average score of 3.8 suggesting they would be only slightly more likely than not to use bridge.

Table 19: 2013 Surveyed Users Likelihood of Use of American Tobacco Trail Bridge (1 = Not Likely, 5 = Very Likely)

Mode	Overall (n)	Northern Segment (n)	Southern Segment (n)
Bicyclist	4.5 (367)	4.7 (131)	4.4 (236)*
Walker	4.1 (245)	4.2 (152)	3.8 (93)*
Jogger/Runner	4.5 (288)	4.4 (141)	4.5 (147)
All Modes	4.4 (900)	4.4 (424)	4.3 (476)

*Difference in average likelihood of bridge use is statistically significant ($p < 0.05$)

Post-bridge (2014), the percentage of survey respondents who used the bridge was calculated by determining the number of respondents who indicated a trip pattern that would utilize the bridge, based on their responses of where they got on, got off, and/or turned around on the ATT. In 2014, 53% percent of respondents used the bridge. Of those, 15% were people who used only the Bridge segment of the trail (i.e. on the ATT only between the Renaissance Parkway and NC 54 access points). Those respondents made a trip that was not possible before the Bridge segment opened. Those trips tended to be shorter in distance and duration, regardless of gender or mode, which makes sense given the access point boundaries within which this cohort used the trail. On average, the active portion of trips on the Bridge segment was 30 minutes, and respondents traveled an average of 1.2 miles on the trail. These new trail users were primarily female (58%), tended to get to the ATT by car (49%) or on foot (42%), and were largely walkers (75%), as shown in Figure 24 and Figure 25.

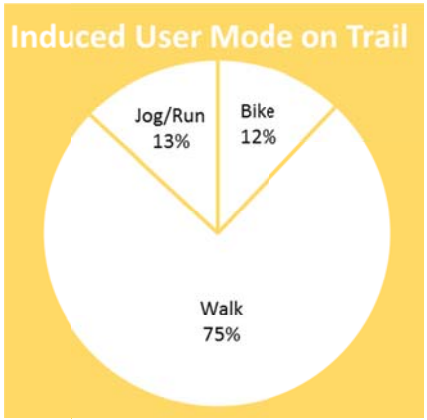

Figure 24 Activity proportions used on the Bridge segment of the ATT.

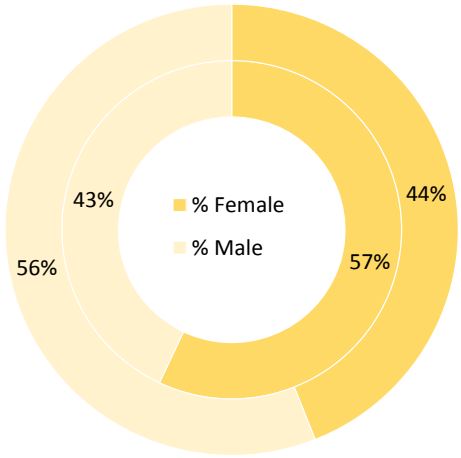

Figure 25 2014 gender proportions of Bridge segment users (inner ring) and all other respondents (outer ring).

Bridge segment users reported almost twice as many non-recreational trips (14%) as the overall population of survey respondents in 2014 (8%). Trips for purposes other than exercise/recreation were highest for Bridge segment bicyclists on the ATT.

Bridge segment users made a higher percentage of through trips (26%) than roundtrips as compared to survey respondents overall (10%) in 2014. This suggests that people using only the Bridge segment are more likely to use the ATT for utilitarian or commuting purposes. Anecdotal evidence supports this, as surveyors noted service workers using the trail to travel to/from their jobs at Southpoint Mall. Also, a trail user commented that she used the Bridge segment to make a connection from her residence to the Triangle Transit express bus stop at the mall for her commute to the Town of Chapel Hill.

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CONCLUSIONS AND DISCUSSION

As transportation decision-making processes increasingly rely on data-driven metrics to prioritize projects that maximize benefits as compared to costs, it is important to demonstrate the impact of **investments in bicycle and pedestrian projects**. Many project prioritization processes incorporate metrics beyond those directly related to transportation, such as a project's impact on public health or economic development. The construction of the American Tobacco Trail bridge over I-40 allowed for a natural experiment often desired in planning and policy discussions in which policy-makers want to know the impact of an infrastructure improvement prior to construction. This study conducted such an experiment, and the **findings provide empirical evidence that constructing bicycle and pedestrian facilities, particularly those that fill a critical link in a non-motorized transportation network, result in measureable positive impacts**.

Analysis of data collected prior to construction of the bridge demonstrates that **the Northern and Southern segments of the ATT functioned as two separate trails**. Although this study cannot show a true causal relationship between pre- and post-bridge changes in behaviors, it is difficult to attribute the majority of activity increases, or **"induced usage**," to any event other than the completion of the bridge and its connections that now provide a continuous 22-mile trail. The induced use on the Bridge segment is considerable, generating nearly 300,000 additional annual trips on the trail, or a 133% increase in trips. The importance of the bridge to the trail in the study area is demonstrated by the finding that 53% of post-bridge survey respondents reported having used the bridge for their trip.

It is not surprising then, that **the research finds exceptional gains in the amount of physical activity and economic impacts occurring just three months after the opening of the bridge**. In addition, the bridge connection provides a dedicated active transportation facility that links a commercial center with nearby residential neighborhoods. By using the bridge, bicyclists and pedestrians can avoid the need to travel on highways with high traffic volumes and limited facilities for non-motorized transportation.

Key impacts from the construction of the bridge and the linking of the Northern and Southern trail segments include:

- An increase in the average trip distance of two miles by those surveyed and using the ATT in the study area.
- An increase in physical activity on the trail, as demonstrated by an increase from 138 to 162 minutes of active travel per week associated with use of the trail.
- An increase in economic activity resulting in an increase in annual expenditures of approximately $3.7 million on goods and services by those using the trail during their trip, and 43 additional jobs, $1.3 million in additional employee compensation, and $4.9 million in additional business gross revenues annually.

This research adds to the growing body of evidence that shows the built environment can positively influence physical activity for recreation and transportation purposes. The bridge has provided an avenue for trail users to exercise an

average of 4 minutes longer, travel 27% farther on the trail, and burn an additional 175 million more calories annually. Adults using the trail are more likely to meet physical activity guidelines now than prior to construction of the bridge. The percentage of those who traveled to/from the trail on foot or by bicycle increased by 4%.

In regard to economic benefits, **direct expenditures on groceries, retail, and restaurants increased by a total $3.7 million in post-bridge period**. These direct expenditures translate into an **annual economic impact of 43 jobs, $1.3 million in employee compensation, and $4.9 million in total business gross revenues related to increased use of the trail**. Government agencies seek a return on the time, effort, and money spent to develop and construct transportation facilities. The annual economic impact calculated can be compared with the cost to construct the bridge and connecting trail links, which was approximately $11.2 million. Furthermore, tax values increased from pre- to post-bridge conditions: it is estimated that approximately $182,000 more state tax and $147,000 more local tax revenues are generated annually due to the increase in purchases of goods and services by trail users.

Finally, it is interesting to note that the demographics of those using the trail showed that the typical person using the trail in the study area is:

- Male
- 26-54 years of age
- Holds an advanced educational degree
- Has a household income of $60,000-$119,999

The research found that the majority of those using the ATT in the study area were from that area, not more distant locations.

Future research that would contribute to a better understanding of the contribution of non-motorized transportation facilities such as the bridge and its connections include additional surveys and counts of those using the trail to determine longer-term trends in use and their effects on transportation patterns, public health, and economic activity. Repeating the study methodology at regular intervals could add to the body of knowledge and track changes that occur over time. For example, to what extent may the increase in the use of the trail after construction of the bridge driven by curiosity to see the new facility, versus real growth in continuing use of the trail? Will use continue to increase, or will use reach a plateau at some future time? These are the types of questions could be answered through additional research.

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APPENDIX A: DATA COLLECTION METHOD DETAILS

DATA COLLECTION OVERVIEW

Pre-bridge data collection was scheduled for mid-May to early June 2013, as the bridge was initially projected to open during July 2013. As a result of several delays, the bridge and connecting trails were completed in February 2014. The May/June period also provided moderate temperatures with the potential for high trail usage.

Dates with special events were eliminated to remove potential variation in typical volumes of traffic during those conditions. Weekday data collection was targeted for Tuesday, Wednesday, and Thursday as those days are more likely to produce volumes typical of weekday travel. Rainy weather events delayed pre-bridge data collection dates targeted in late May 2013, requiring the team to follow up in June to collect the data for missed days. For example, data were collected Saturday, May 18th from 7 AM – 12 PM but rain postponed data collection during the afternoon and early evening until June 1st, the next Saturday. Data were collected from 12 PM through 8 PM that day. Weather was not a factor when collecting post-bridge data during a similar timeframe in May 2014.

Survey stations were outfitted with a water cooler, a "Make the Trail Count" banner, and yard signs on each approach instructing trail users to "slow down," "survey ahead" as trail users approached the site. Each survey station also included a large map of the ATT, with each access point labeled and coded. To maximize accuracy, data collectors encouraged survey respondents to use the map when answering questions about where they entered, exited, or turned around on the trail. A copy of the survey station map is included on page 62.

Only individuals age18 years and older were surveyed with one survey distributed per household to groups. The research team received IRB approval of protocol to conduct intercept surveys. For pre-bridge data collection, individuals were given the option of completing the survey online using a card with a website link and unique identifier to indicate which day they were intercepted, the intercept site, and to provide verification to access the survey. However, due to the low use of this option, it was not offered as a means for post-bridge data collection. Based on findings from data cleaning when processing the 2013 data and the need to replace one question that was relevant to ask only the before trail users, the researchers made minor modifications to the survey form used to collect post-bridge data.

American Tobacco Trail / East Coast Greenway Trail User Survey

(to be completed by persons age 18 or older—one per household)

Where is your permanent residence (i.e., where is home)?

City/Town: _____

State/Province: _____ ZIP: _____

Country: _____

Where did you start this trip? (street address or cross street, name of place or business)

_____

Where did you get on the ATT? (See reference list or map)

_____

Where are (did) you traveling to? (street address or cross street, name of place or business)

_____

Where will you exit the ATT? (See reference list or map)

_____

If you exit the ATT at the same place where you got on, where will (did) you turn around on the trail? (See reference list or map)

_____

Is this your first time on the ATT?

☐ Yes ☐ No

How did you get to the ATT today?

- ☐ By car
- ☐ By bicycle
- ☐ On foot
- ☐ By bus
- ☐ Other (describe): _____

How are you traveling on the ATT?

- ☐ Bicycling
- ☐ Walking
- ☐ Jogging/Running
- ☐ In-line skating
- ☐ Other (describe): _____

Check if you are traveling:

- ☐ With a stroller
- ☐ With a pet

How many minutes is (was) the active portion of your trip?

- ☐ 0 to 20
- ☐ 21 to 40
- ☐ 41 to 60
- ☐ 61 to 80
- ☐ 81 to 100
- ☐ 101 to 120
- ☐ more than 120

For each purpose, indicate the number of trips you've made on the ATT over the past month.

Purpose	Number in Past Month	What is the main purpose of today's trip? (check one)
Travel to/from work	_____	☐
Travel to/from school	_____	☐
Shopping/Run errands	_____	☐
Eat at a restaurant	_____	☐
For exercise/recreation	_____	☐
Sightseeing/cultural attractions	_____	☐
Go to entertainment (movie, show, ball game, etc.)	_____	☐
Other (describe): _____	_____	☐

In the past year, which months have you used the ATT? (Circle all that apply)

Jan. Feb. Mar. Apr. May Jun. Jul. Aug. Sep. Oct. Nov. Dec.

For internal use only
AM CM AF CF B W J S 1 2 3 4
AM CM AF CF B W J S 1 2 3 4
AM CM AF CF B W J S 1 2 3 4
AM CM AF CF B W J S 1 2 3 4
AM CM AF CF B W J S 1 2 3 4
AM CM AF CF B W J S 1 2 3 4

TURN OVER TO CONTINUE SURVEY

How many miles do you typically bike in a month?

_____ Miles

How many miles do you typically walk/jog in a month?

_____ Miles

In the past year, did you purchase any walking, running, or cycling items (footwear, clothing, bicycle, bicycle accessories, car accessories to transport gear, etc.)?

☐ No

☐ Yes **Approximately how much did you spend on these goods?**

$_____

Related to today's trip on the ATT, approximately how much did (will) you spend on the following goods or services? If traveling with members of your household, estimates should represent the total for your household.

Restaurant meals and drinks: $_____

Groceries/Convenience items: $_____

Retail shopping: $_____

Entertainment/Admissions: $_____

Transportation fares/fees: $_____

Hotel/Lodging: $_____

Other (specify): _____ $_____

Did (will) you visit any businesses during this trip on the ATT?

☐ No

☐ Yes **What business(es)?**

_____

_____

How likely will you be to use the ATT bridge over I-40 after it has been completed? (Circle one)

Not likely Very Likely

1 2 3 4 5

On a scale of 0-$10, what would most accurately represent your value of your use of the trail today? (Circle One)

$0 $1 $2 $3 $4 $5 $6 $7 $8 $9 $10

The information below is optional but will help us in our analysis of trail use.

Age: _____

Gender: ☐ Male ☐ Female

Education Level:

☐ Some high school ☐ Some college

☐ Completed high school ☐ Completed college

☐ Business/technical school ☐ Advanced degree

Household Income:

☐ less than $15,000 ☐ $15,000-$29,999 ☐ $30,000-$44,999 ☐ $45,000-$59,999

☐ $60,000-$74,999 ☐ $75,000-$89,999 ☐ $90,000-$104,999 ☐ $105,000-$119,999

☐ $120,000-$134,999 ☐ $135,000-$149,999 ☐ $150,000 or more

Thank you very much for taking the time to fill out this survey!

Conducted by ITRE Institute for Transportation Research and Education NC STATE UNIVERSITY

On behalf of HWMF The Helen & William Maier Foundation; State of North Carolina Department of Transportation; Division of Bicycle & Pedestrian Transportation; East Coast Greenway Alliance

_____

American Tobacco Trail / East Coast Greenway Trail User Survey
(to be completed by persons age 18 or older—one per household)

1. Where is your permanent residence (i.e., where is home)?

City/Town: _____

State/Province: _____ ZIP: _____

Country: _____

2. Where did you get on the ATT? (Use map numbers)

_____

3. Where did you start this trip? (number or cross-street address, name of place or business)

_____

4. Where will you exit the ATT? (Use map numbers)

_____

5. Where are (did) you traveling to? (number or cross-street address, name of place or business)

_____

6. If you exit the ATT at the same place where you got on, where will (did) you turn around on the trail? (Use map numbers)

_____

7. Is this your first time on the ATT?

☐ Yes ☐ No

8. How did you get to the ATT today?

☐ By car
☐ By bicycle
☐ On foot
☐ By bus
☐ Other (describe): _____

9. How are you traveling on the ATT today?

☐ Bicycling
☐ Walking
☐ Jogging/Running
☐ In-line skating
☐ Other (describe): _____

10. Check if you are traveling:

☐ With a stroller
☐ With a pet

11. How many minutes is (was) the active portion of your trip?

☐ 0 to 20 ☐ 81 to 100
☐ 21 to 40 ☐ 101 to 120
☐ 41 to 60 ☐ more than 120
☐ 61 to 80

12. For each purpose, indicate the number of trips you've made on the ATT over the last 30 days.

Purpose	Number in Last 30 days	13. What is the main purpose of today's trip? (check one)
Travel to/from work	_____	☐
Travel to/from school	_____	☐
Shopping/Run errands	_____	☐
Eat at a restaurant	_____	☐
For exercise/recreation	_____	☐
Sightseeing/cultural attractions	_____	☐
Go to entertainment (movie, show, ball game, etc.)	_____	☐
Other (describe): _____	_____	☐

14. In the last 12 months, which months have you used the ATT? (Circle all that apply)

2013							2014				
Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May

SURVEY CONTINUES ON BACK

For internal use only
AM CM AF CF B W J S 1 2 3 4
AM CM AF CF B W J S 1 2 3 4
AM CM AF CF B W J S 1 2 3 4
AM CM AF CF B W J S 1 2 3 4
AM CM AF CF B W J S 1 2 3 4
AM CM AF CF B W J S 1 2 3 4

15. How many miles do you typically bike in a month? _____ Miles

16. How many miles do you typically walk/jog in a month? _____ Miles

17. In the last 12 months, did you purchase any walking, running, or cycling items (footwear, clothing, bicycle, bicycle accessories, car accessories to transport gear, etc.)?

☐ No
☐ Yes Approximately how much did you spend on these goods?

$_____

18. Related to today's trip on the ATT, approximately how much did (will) you spend on the following goods or services? If traveling with members of your household, estimates should represent the total for your household.

Restaurant meals and drinks: $_____
Groceries/Convenience items: $_____
Retail shopping: $_____
Entertainment/Admissions: $_____
Transportation fares/fees: $_____
Hotel/Lodging: $_____
Other (specify): _____ $_____

19. Did (will) you visit any businesses during today's trip on the ATT?

☐ No
☐ Yes What business(es)?

_____
_____

20. How important is the presence of the bridge over I-40 in your decision to use the ATT for today's trip? (Circle one)

Not important Very Important
1 2 3 4 5

21. On a scale of 0-$10, what would most accurately represent your value of your use of the trail today? (Circle One)

$0 $1 $2 $3 $4 $5 $6 $7 $8 $9 $10

The information below is optional but will help us in our analysis of trail use.

Age: _____

Gender: ☐ Male ☐ Female

Education Level:
☐ Some high school ☐ Some college
☐ Completed high school ☐ Completed college
☐ Business/technical school ☐ Advanced degree

Household Income:
☐ less than $15,000 ☐ $15,000-$29,999 ☐ $30,000-$44,999 ☐ $45,000-$59,999
☐ $60,000-$74,999 ☐ $75,000-$89,999 ☐ $90,000-$104,999 ☐ $105,000-$119,999
☐ $120,000-$134,999 ☐ $135,000-$149,999 ☐ $150,000 or more

Thank you very much for taking the time to fill out this survey!

Conducted by ITRE Institute for Transportation Research and Education, NC STATE UNIVERSITY

On behalf of HWMF The Helen & William Maier Foundation; State of North Carolina Department of Transportation; Division of Bicycle & Pedestrian Transportation; East Coast Greenway Alliance

American Tobacco Trail User Count

Name: _____ Date: _____

Location: _____ Time Period: _____

User Type / Mode (circle all that apply)	Circle Dots for Group Members	Direction (check for towards Durham)	Gender		Approximate Age				Notes
			M	F	<18	18-25	26-55	>55	
B W J S / C D	•								
B W J S / C D	•								
B W J S / C D	•								
B W J S / C D	•								
B W J S / C D	•								
B W J S / C D	•								
B W J S / C D	•								
B W J S / C D	•								
B W J S / C D	•								
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B W J S / C D	•								
B W J S / C D	•								

User Type / Mode

B = Bicycle
W = Walker
J = Jogger/Runner
S = Skateboarder, skater
If applicable, select D = Dog
C = Child in Stroller

Count Location _____

Page ____ of _____

DATA COLLECTION PROTOCOL

Screen Line Count Procedures

Count all people who pass your station—if someone passes your counting point and turns around and then comes back in the other direction, that person should be counted on a separate row each time they pass you (in this case, twice).

Using the Form:
Each form sheet represents a 30-minute interval. A new sheet should be started every 30 minutes to log the people who pass the count station within that 30 minute period.

1. Write your **name**, the **date**, and the **count location** on the top of the form. **Write the time when you start to use** the form. Write the end-time as well. The end-time should be 30 minutes after the start-time. For example, if you start using the form at 8:00 am, then enter 8:29 am as the end-time. The next form should cover 8:30 am – 8:59 am, and so on.

   If you are taking over a count station, and your shift starts in the middle of a 30-minute interval, in the first record that you make, write your name in the Notes field and indicate that you are the data collector for the subsequent records.
2. Start a new form every 30 minutes.
3. Complete **one line (record) for each independently mobile person**. If there are three people in a group, use three lines.
   a. Use a separate row for **any child actively contributing to his/her travel.** This includes children who may be walking/biking/skating on their own, as well as any child riding a tandem or '*tag-along'* bicycle.
   b. Persons using wheelchairs, electric scooters, golf carts or 'gators' to traverse the trail are still considered 'independently mobile'. Use the Notes field to indicate the personal assistive device being utilized by the person of record.
   c. People riding a *tandem* bicycle should each be recorded on separate lines, marked as "Bicycle" mode, with an indication in the Notes field that they were on a tandem.
4. **USER TYPE/MODE:** Circle the appropriate "**User Type / Mode**" for each person. For example, in a group of three people, two adults may be "Walkers" and one may be a child on a "Bicycle". If an adult is pushing a "Child in a Stroller", circle both "W" for the adult walking, and "C" for the child in the stroller. Similarly, if a jogger passes with a dog, you would circle "J" for the jogger/runner, and "D" for the dog.
   a. **"Child in Stroller" = Any dependent child who is not traveling on the trail through his/her own physical exertion.** This includes children being conveyed in strollers or bike trailers, or children being carried either in a contraption (like a Baby Bjorn, sling, or other device) or in someone's arms. If an adult has more than one dependent child (like a double stroller), use the Notes field to indicate the number of dependent children.
5. **GROUP MEMBERS:** If there is **more than one person in a group**, circle the appropriate number of dots. For example, if there is a group of three people, you would enclose three dots on successive lines within one circle.
6. **DIRECTION:** Put a **check if a person is travelling toward Durham** (i.e. north). Leave that space **blank** if the person is travelling away from Durham (i.e. south).
7. **GENDER:** Put a **check** in the appropriate space to indicate each person's **gender**. Do not put a mark for a "child in a stroller"—just for the adult conveying the child.

8. **AGE**: Put a **check** in the box that you think best indicates each person's **age**. If unsure of which age category to use, you can discuss with another in your crew. You can make a note in the "Notes" column to that effect.
9. **If you need more than one sheet per 30-minute interval,** start another page and indicate the same date, location, and time period to which the additional page belongs. Number pages sequentially as they are filled in within the interval. For example, if a counter needed 2 sheets to capture all the people counted between 4:30-4:59 pm, then at the bottom of the first page, the counter will record "Page 1 of 2" and at the bottom of the second page, he/she will record "Page 2 of 2".
10. If you can include only a **part of a group at the bottom of a page**, leave the circle around the dots open at the bottom to indicate that the group continues on the next page (i.e. mark it with an "n" shape). At the top of the next page, complete the circle for the remaining group members by leaving it open at the top of the dots (i.e. mark it with a "u" shape).
11. **Store pages in a weatherproof container *or*** put them in a compartment in a plastic file case. Keep them together and chronologically organized.
12. If you need to take a bathroom (or other) **break**, notify the lead person for your crew. That person will make arrangements to cover your station.

Example Form:

Name: *John Doe* Date: *May 17, 2014*

Location: *Massey Chapel Rd·* Time Period: *11:30 am - 11:59 am*

User Type / Mode (circle all that apply)	Circle Dots for Group Members	Direction (check for towards Durham)	Gender		Approximate Age				Notes
			M	F	<18	18-25	26-55	>55	
B (W) J S / C D	·	✓	✓				✓		
B (W) J S / C D	·	✓		✓			✓		
(B) W J S / C D	·		✓				✓		new counter starting here - Jane Smith
B W (J) S / C (D)	·		✓			✓			
B (W) J S / (C) D	·		✓					✓	2 children in stroller
(B) W J S / C D	·	✓		✓			✓		
(B) W J S / C D	·	✓		✓	✓				on tag along
(B) W J S / (C) D	·	✓	✓				✓		1 child in bike trailer
B (W) J S / C D	·	✓	✓					✓	golf cart

Thanks for your help!!!

1

Survey Procedures

Surveys should be provided **only to those 18 and older**!!! If you can't tell if someone is 18 or older, ask them politely if they are 18 or older, explaining that we are surveying only people who meet that qualification.

Distribute **one survey per household**. For example, if two parents are travelling with a child, only one survey should be distributed to that group. However, if three friends are travelling together, three surveys should be distributed—one to each adult age 18 or over.

Soliciting Respondents:

1. One surveyor should approach an individual or group to request that they complete a survey. You may use the following script:

   Hi! Will you fill out a survey about your use of the American Tobacco Trail today? We are conducting a survey to determine changes in use of the trail before and after construction of the bridge over I-40. It will only take a few minutes to complete the survey, and your information will be kept anonymous.

   Tips to get folks to stop:
   - Most people are making round trips on the trail. *Ask if they can fill it out when they pass back through* at the end of their run/walk/bike ride.
   - For bicyclists, stand 15 or so feet in advance of the table. Make clear eye contact, and yell your introduction as they approach. This gives time for them to either slow down, or for you to continue probing whether you can catch them on their way back before they've passed and can no longer hear you.
   - Be "aggressively polite." Even though the table and signage may make it appear self-evident that we want people to stop and fill out a survey, don't rely on the physical cues to entice people to actually do so. People like to be personally invited to engage, so speak up and ask them to!

2. If respondent appears to be part of a group, ask:
   a. *Are you traveling with a group today? Are you all members of the same household?*

      If not in same household, encourage individuals to fill out separate survey forms.

Using the Form:

3. **Enter preliminary information** in the *For Internal Use Only* box to record the individual and any household members also present on the trail. There are 6 spaces, to accommodate up to six people in a household. The first block represents the respondent; the remaining blocks represent the others in the group. If you encounter a larger group, you may ignore the youngest children.

   For each person:
   - Indicate their **age and gender** by circling one of the following: AM = adult male; AF = adult female; CM = male child; CF = female child
   - Indicate each person's **method of travel**: B = bicycling; W = walking; J = jogging: S = skateboarding/in-line skating. Do not record children

traveling in strollers, bike trailers, slings or other means that do not require their own physical exertion.

- Indicate each person's **approximate age by range**: 1 = < 18; 2 = 18-25; 3 = 26-55; 4 = > 55

You may wait until the person hands you back their completed survey to fill in their gender, mode of transportation and age (you can refer to the age they put on the back page), but **don't forget to fill it in**.

4. Give the individual a survey on a clipboard. Briefly *point out that the survey is 2-sided*.

5. Guide them to the map. Point out the list of trail entry/exit points and other landmarks shown on the map. **Explain and encourage them to use the map's reference numbers** when answering the 2nd, 4th and 6th questions. *Ask if they need help finding a location to identify the correct reference number.* If they want to indicate a nearby mile marker, make sure they include MM before the number to clearly distinguish it from the map's reference numbers.

6. Give examples of what is meant by question 3:

   Where did you walk, bike, or drive from to get to the ATT? For example, if you came from a friend's house or your work to the trail, then that's where you started your trip. If you don't know or want to give the street address for that location, just provide the names of the cross streets at the closest intersection to the place where you started your trip, like Main St. at Broad St.

Make sure respondents don't just write "Home", "Starbucks" or "NC 54" – probe for more clarifying details. Note that respondents may need similar examples to answer question 5 as described above for question 3.

7. Point out that you (or other surveyors) are available in case they have any questions.

8. When people give you their completed survey:
   - **Thank** people for having taken the time to complete a survey.
   - **Check the survey for completion**. Commonly overlooked questions are the entire back side and questions in the right columns. If anything is missing, politely point it out and *ask them to complete the unanswered questions*. **Thank them again**.
   - **Check** that the *For internal use only* section is complete.
   - **Write the weekday/date at the top.**
   - Take the completed survey from the clipboard and put it in the container.
   - **Refill** the clipboard with a new questionnaire.

9. If you have **questions**, ask the lead person for your crew (or another surveyor).

10. If you need to take a bathroom (or other) **break**, notify the lead person for your crew. That person will make arrangements to cover your station.

Thanks for your help!!!

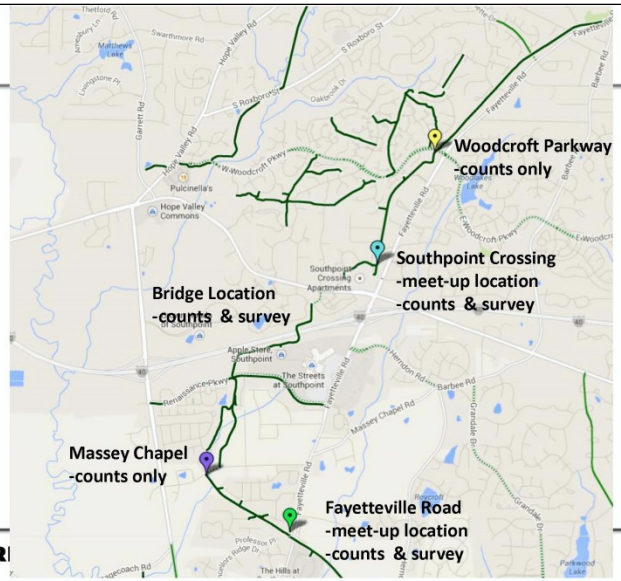
Institute for Transportation Research and Education – N.C. State University

ITRE http://www.itre.ncsu.edu

Outline

- General information/instructions
- Intercept Survey Procedures
- Counts Procedures
- Questions/Wrap-up

ITRE http://www.itre.ncsu.edu



ITRE

General Instructions

- Arrive 15 min before shift starts
  - Help set up
  - Get oriented /transition staff
- Check in with Lead Staff
- Rotate positions as needed

I need your cell phone number!!

ITRE http://www.itre.ncsu.edu

Inclement Weather Plans

- Will monitor forecasts
- Be flexible
- Bring rain gear!
  - May temporarily suspend collection

ITRE http://www.itre.ncsu.edu

Intercept Survey Procedures

1. Approach Respondents
2. Fill in "For Internal Use" section
3. Direct folks to use the map
4. Review survey for completion
5. Thank respondent!
6. Refill clipboard

ITRE http://www.itre.ncsu.edu

Approach Respondents

- Only survey those 18 and older
- Only distribute 1 per household
  - If in group, ask individuals not in same household to fill out survey
- Manage 'clumping'
  - Don't block the trail for those who don't want to stop

ITRE http://www.itre.ncsu.edu

Approach Respondents - Tips

- Highlight:
  - It's anonymous
  - It's not long
- Round-trippers may be willing to stop on their way back
- Be "aggressively polite" – people like to be personally invited to engage

ITRE http://www.itre.ncsu.edu

Approach Bicyclists -Tips

- Don't wait until they're at the table!
  - Stand 15 ft or so in advance
  - Make clear eye contact
  - Loudly voice your intro as they approach
- They need time to slow down

ITRE http://www.itre.ncsu.edu

"For Internal Use" Box

- Collects info on members of household traveling in group
- One block / member (up to 6)
- 1st block = survey respondent
- Codes:

Age/Gender	Mode	Age Range
AM = adult male	B = bike	1 = less than 18
CM = child male	W = walk	2 = 18-25
AF = adult female	J = jog/run	3 = 26-55
CF = child female	S = skate	4 = more than 55

ITRE http://www.itre.ncsu.edu

Instructions to Respondents

- Point out survey is 2-sided
- Encourage them to use the map reference #'s
  - Q. 2: what access point did they use to get on the trail?
  - Q. 4: what access point will they use to exit the trail?
  - Q. 6: at what point did they turn around on the trail?
- Encourage specificity: Q. 3 & Q. 5
  - No: "home", "Starbucks" or "NC 54"
  - Yes: "265 Main St.", "Starbucks in Southpoint Mall" or "NC 54 at Southpoint Crossing Dr."

ITRE http://www.itre.ncsu.edu

Review Survey

- Thank respondent.
- Is it complete? If not, ask for missing info.
  - Back side?
  - Right columns?
  - "For Internal Use"?
- Write weekday and Date at top (eg. Sat 5/17)
- File completed survey in container.
- Refill clipboard.

ITRE http://www.itre.ncsu.edu

Count Procedures

Name: John Doe Date: May 17, 2014

Location: Massey Chapel Rd. Time Period: 11:30 am - 11:59 am

User Type / Mode (circle all that apply)	Circle Dots for Group Members	Direction (check for towards Durham)	Gender		Approximate Age				Notes
			M	F	<18	18-25	26-55	>55	
B (W) J S / C D	•	✓	✓				✓		
B (W) J S / C D	•	✓		✓			✓		
(B) W J S / C D	•		✓				✓		new counter starting here - Jane Smith
B W (J) S / C (D)	•		✓			✓			
B (W) J S / (C) D	•		✓					✓	2 children in stroller
(B) W J S / C D	•	✓		✓			✓		
(B) W J S / C D	•	✓		✓	✓				on tag along
(B) W J S / (C) D	•	✓	✓				✓		1 child in bike trailer
B (W) J S / C D	•	✓	✓					✓	golf cart

ITRE http://www.itre.ncsu.edu

Count Procedures

- Start new form every 30 minutes
- If you need new form within same 30-min. block:
  - Fill out top of form (Name, Location, Date, Time)
  - Number page at bottom (e.g. "1 of 2", "2 of 2")

ITRE http://www.itre.ncsu.edu

Count Procedures

- Count everyone who passes your "line"

ITRE http://www.itre.ncsu.edu

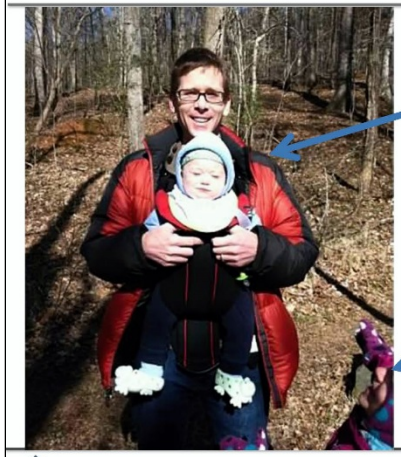
Count Procedures

- 1 line (record) for each independently mobile person

User Type/Mode	Gender	Age Range
B = bike	M = Male	1 = less than 18
W = walk	F = Female	2 = 18-25
J = jog/run		3 = 26-55
S = skate		4 = more than 55
C = Child in stroller or otherwise being conveyed		
D = traveling with dog		

ITRE http://www.itre.ncsu.edu

Dependent or Independent?



Dependent: Circle "C"

Independent: separate record

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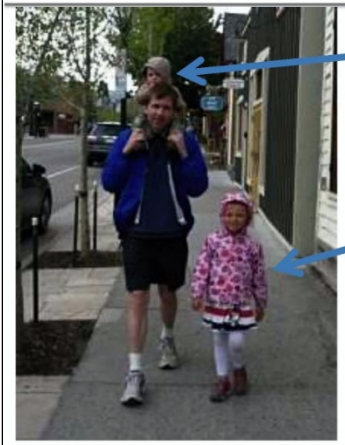
Dependent or Independent?

Dependent: Circle "C"

(Note if more than 1 child in trailer)

ITRE http://www.itre.ncsu.edu

Dependent or Independent?



Dependent: Circle "C"

Independent: separate record

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Dependent or Independent?

ITRE http://www.itre.ncsu.edu

Dependent or Independent?

Dependent: Circle "C"

Independent: separate record

ITRE http://www.itre.ncsu.edu

Dependent or Independent?

It Depends!

ITRE http://www.itre.ncsu.edu

Noting Groups

Name: John Doe Date: May 17, 2014

Location: Massey Chapel Rd. Time Period: 11:30 am - 11:59 am

User Type / Mode (circle all that apply)	Circle Dots for Group Members	Direction (check for towards Durham)	Gender		Approximate Age				Notes
			M	F	<18	18-25	26-55	>55	
B (W) J S / C D	•	✓	✓				✓		
B (W) J S / C D	•	✓		✓			✓		
(B) W J S / C D	•		✓				✓		new counter starting here - Jane Smith
B W (J) S / C (D)	•		✓			✓			
B (W) J S / (C) D	•		✓					✓	2 children in stroller
(B) W J S / C D	•	✓		✓			✓		
(B) W J S / C D	•	✓		✓	✓				on tag along
(B) W J S / (C) D	•	✓	✓				✓		1 child in bike trailer
B (W) J S / C D	•	✓	✓					✓	

ITRE http://www.itre.ncsu.edu

Wrap-up/Questions

Thank you for helping to Make the Trail Count!

Sarah O'Brien
Bicycle and Pedestrian Program Manager
ITRE – NCSU
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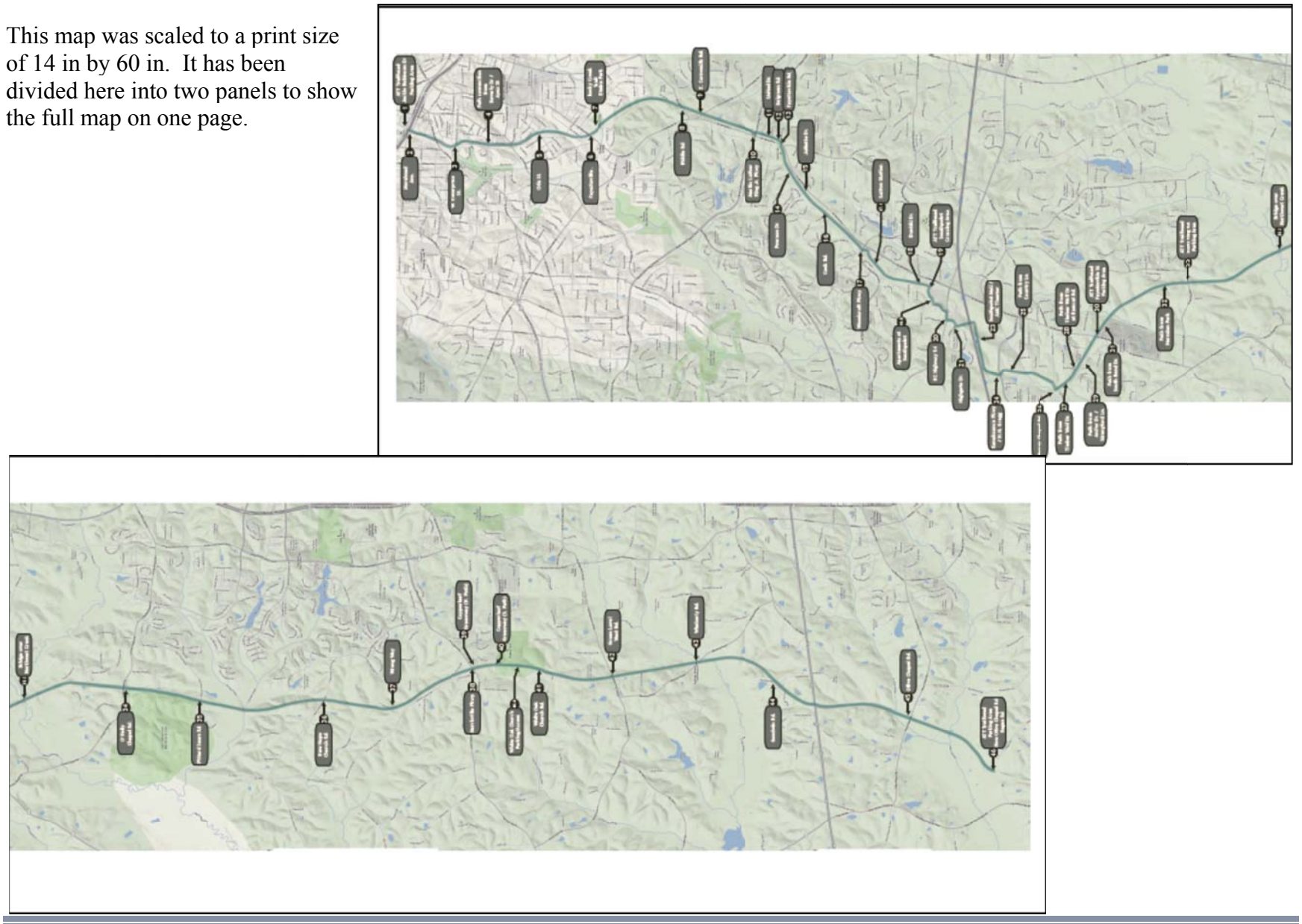
919-515-8703 (work)
919-949-4489 (cell)

ITRE http://www.itre.ncsu.edu

SURVEY STATION MAP

This map was scaled to a print size of 14 in by 60 in. It has been divided here into two panels to show the full map on one page.



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APPENDIX B: DATA ANALYSIS AND EXTRAPOLATION METHODOLOGY

DATA ANALYSIS PROCESS DETAILS

In general, blank, illegible or undefined responses that could not otherwise be clarified were coded as 999; responses that were correctly left blank were coded 888. When a name of a place or business was given as a response to a place visited during a trip or a location where the trip began or ended, the data cleaner tried to determine an address.

For access points where the user got on or off the trail, or where the user turned around on the trail, the data cleaner supplied a numeric code to be entered. A separate Trip Distance Lookup Table with a matrix of distances between each access point on the ATT was created. The access point codes entered for each survey record were linked to the Lookup Table to allow the analyst to quickly determine the total distance a survey respondent traveled on the trail. Some trail trip distances were manually calculated due to the complexity of a respondent's trip. For example, some recreational users turned around multiple times during one trip, rather than traveling a simpler 'there-and-back' pattern.

For questions to which respondents answered with a range rather than a discrete number (e.g. how many miles do you typically bike in a month?), responses were cleaned to the average of the range, rounding to the nearest whole number. Data also were cleaned by converting responses answered in different units from what was asked in the question (e.g. miles per day) to the correct measurement (e.g. miles per month).

Additionally, a few questions that used skip logic required the data cleaner to ensure responses made sense. For example, a respondents may have left all responses blank to questions on how much they spent on goods and services related to today's trip. If the respondent also checked that he/she did not visit a business during today's trip, then those blanks were coded as 0; however, if respondent checked "yes" that he/she visited a business then the blanks were coded as 999.

Children were not included in any analysis that used survey data only, since respondents were required to be 18 years of age or older. Children were also excluded from the count data when comparing percentages of user demographics between the count and survey datasets.

When comparing data by trail segment, 2013 data were split according to where the respondent was surveyed, as very few people reported that they traveled on both Northern and Southern trail segments: Northern segment users were defined as those who were surveyed at Southpoint Crossing. Southern segment users were defined as those who were surveyed at the Fayetteville Road trailhead.

Post-bridge data were split by trail segment as follows: Northern segment users were defined as respondents who accessed the trail between and including NC 54 at Highgate Drive and the Jackie Robinson Drive trailhead. Southern segment users were defined as respondents who accessed the trail between and including Renaissance Parkway and New Hill-Olive Chapel Road. Induced users identified in 2014 (those respondents who only traveled within the trail segment between NC 54 at Highgate Drive and Renaissance Parkway) were excluded from any analyses comparing results by trail segment.

EXTRAPOLATION METHODS

Extrapolation of count data was required to convert raw count data into an estimate of annual user trips in both pre- and post-bridge periods. Only Saturday counts from the survey-and-count stations were used as a base for extrapolation to an annualized number of user trips. Saturday was selected since it had the highest count volume, which is useful when attempting to minimize variability. The following is a description of the methodology used to derive these figures.

Step 1: Determine Unique User Trips

Because it is uncommon for people to travel the entire length of the ATT in one trip, multiple count locations were used to understand overall trail usage. However, a simple summation of counts from each station would result in double-counting people who passed more than one station during their trip. When combining raw counts from each count station to develop a comprehensive estimate of trail usage in the study area, survey data were used to help define trip patterns (where respondents entered, exited, and/or turned around on the trail) to reduce the raw count at each station by people who would have been counted at another station. For pre-bridge counts, determining the total number of unique user trips was straightforward, since very few people traveled on both trail segments during their trip. Therefore, Equation 1 results in a total Saturday Count of 1,503 user trips in 2013.

For post-bridge counts, people were much more likely to pass more than one survey-and-count station in the same trip. Survey results showed that, of those who were intercepted on the Northern segment of the ATT, 56% did not go past the bridge count location. Of respondents who were intercepted on the Southern segment, 55% did not go past the bridge count location. Forty-three percent of respondents were intercepted on the Bridge segment. Each of these percentages was applied to the raw counts collected at each corresponding survey-and-count station to reduce the raw count at each of those stations by the number of people who would have been counted elsewhere so that the adjusted raw counts more accurately reflected the number of people who would have been counted only at that station. Equation 2 shows the calculation used for determining the total Saturday Counts in 2014 on the ATT in the study area, which resulted in 3,441 user trips.

Count data were also adjusted based on survey responses to avoid overestimating or 'double-counting' roundtrips, as a person making a roundtrip would cross the same count location more than once. Equation 3 shows how the total Saturday Count data were adjusted to account for

Equation 1

$$\sum \text{Saturday Count}_{2013} = N_{2013} + S_{2013}$$

Where:

$\sum$Saturday Count_{2013} = Total Pre-Bridge Raw Counts
N_{2013} = Pre-Bridge Raw Count at Southpoint Crossing
S_{2013} = Pre-Bridge Raw Count at Fayetteville Road Trailhead

Equation 2

$$\sum \textbf{Saturday Count}_{2014} = \mathbf{B}_{\mathbf{Bridge}} + \mathbf{N}_{\mathbf{North-Bridge}} + \mathbf{S}_{\mathbf{South-Bridge}}$$

Where:

$\sum$Saturday Count_{2014} = Total Post-Bridge Adjusted Raw Counts
B_{Bridge} = Post-Bridge Raw Count at Bridge Station
$N_{North\text{-}Bridge}$ = Post-Bridge Adjusted Raw Count at Southpoint Crossing Station Who Do Not Cross Bridge Station
$S_{South\text{-}Bridge}$ = Post-Bridge Adjusted Raw Count at Fayetteville Rd. Station Who Do Not Cross Bridge Station

Equation 3

$$\text{Unique Users}_i = \sum \text{Saturday Count}_i - \left(\frac{\rho * \sum \text{Saturday Count}_i}{2}\right)$$

Where:

Unique Users$_i$ = Adjusted Total Number Unique User Trips for a Given Data Collection Period *i*

$\sum$Saturday Count$_i$ = Total Adjusted Raw Counts for a Given Data Collection Period *i*

P = Roundtrip Adjustment Factor (92.2% in Pre-Bridge Period, 90.2% in Post-Bridge Period)

roundtrips based on survey responses indicating the percentage of people using the ATT that made a roundtrip.

The roundtrip adjustment reduced the number of Saturday Unique User Trips to 810 in 2013 and 1,889 in 2014. Note that the adjustments for people making roundtrips or those making longer distance trips where they passed more than one survey-and-count location does not result in a true count of individual persons using the trail during the data collection period -- some individuals may have visited the ATT on more than one data collection day, made more than one trip per day, or traced a unique travel pattern on the trail that was not otherwise captured in survey responses for traditional roundtrips or one-way through trips.

Step 2: Calculate Daily Count Ratios

An extrapolation model was developed to estimate daily trail volume relative to Saturday volume. This allowed for daily counts to be normalized relative to Saturday counts. It is assumed that daily usage is primarily affected by weather (temperature and precipitation) and trail users' availability for recreational activities (represented by the day of the week, as use varies during the week according to occupational, family, and other commitments). Temperature explains seasonal and monthly variations. Precipitation can influence trail usage, particularly for discretionary recreational trips. Therefore, in the application of the model, basic weather and temporal data are required.

The model developed was based on data obtained from North Carolina organizations with data from 14 locations on 11 different greenway trails. The count data from the trails included one or two-week counts during one or more time periods between November 2012 and January 2014. Each daily count was normalized relative to the Saturday count at that location. Several regression equations were tested and examined based on overall model statistics, individual variables, parsimony, and the significance of the variables. The dependent variable in the model was trail volume relative to Saturday volume, and the independent variables were the maximum daily temperature, daily precipitation, and day of the week, as shown in Equation 4:

Equation 4

$$\text{RelVol}_i = B_o + (B_1 * \text{Temp}) + (B_2 * \text{Temp}^2) + (B_3 * \text{Precip}) + (B_4 * \text{Day}_{S/M/F}) + (B_5 * \text{Day}_{T/W/R})$$

Where:

RelVol$_i$ = Ratio of Daily Trail Count Relative to Total Saturday Count (daily volume/Saturday volume)

Temp = Maximum Daily Temperature (Degrees Fahrenheit)

Precip = Total Daily Precipitation (inches)

Day$_{S/M/F}$ = Day of the Week (1 for Sunday, Monday, or Friday; 0 else)

Day$_{T/W/T}$ = Day of the Week (1 for Tuesday, Wednesday, Thursday; 0 else)

Table 20 shows the model variable coefficients and their statistical significance. With regard to temperature, maximum predicted usage occurs at 72 degrees Fahrenheit. For each inch of daily precipitation, the expected volumes decrease by 40.7%. Counts on a Sunday, Monday, or Friday are predicted

to be 18.4% lower than Saturday Counts, and counts on Tuesday, Wednesday, or Thursday are predicted to be 33.6% lower than Saturday Counts.

Table 20 Variables of the Model to Determine Daily Trail Count Ratios

Variable	B	Standard Error	T
Temp	0.080218**	0.029566	2.71
$Temp^2$	-0.00056**	0.000214	-2.61
Precip	-0.40789**	0.096073	-4.25
$Day_{Sun/Mon/Fri}$	-0.18448*	0.111213	-1.66
$Day_{Tue/Wed/Thu}$	-0.33611**	0.110705	-3.04
(Constant)	-1.72457*	1.009897	-1.71

**Significant at <0.05, *Significant at <0.10

Equation 5 shows the recommended model:

Equation 5

$$\text{RelVol}_i = -1.72457 + (0.080218 * \text{Temp}) + (-0.00056 * \text{Temp}^2) + (-0.40789 * \text{Precip}) + (-0.18448 * \text{Day}_{S/M/F}) + (-0.33611 * \text{Day}_{T/W/R})$$

Using the model, the relative daily trail volume ratios were calculated for each day for one year from May 22, 2013 to May 21, 2014. That period included most of the pre- and post-bridge data collection days. Temperature and precipitation data for this period came from the National Oceanic and Atmospheric Administration's daily summaries.

Step 3: Estimate Annual Unique User Trips

As shown in Equation 6, daily Estimated Unique User Trips were calculated for both pre- and post-bridge periods by multiplying the relative daily trail volume ratios by Saturday's Unique Users for each data collection period.

Equation 6

Estimated Daily Unique User Trips_i = Unique Users * RelVol_i

Where:

Estimated Daily Unique User Trips = Total Estimated Unique UserTrips, Given Date *i* within May 22, 2013-May 21, 2014

Unique Users = Adjusted Total Number Unique User Trips (810 in Pre-Bridge Period, 1,889 in Post-Bridge Period)

RelVol_i = Relative Daily Trail Volume Ratio, Given Date *i* within May 22, 2013-May 21-2014

The 365 Estimated Daily Unique User Trips calculated using pre-bridge Unique Users were then summed to derive the estimated annual trail volume, pre-bridge. Likewise, estimated annual trail volume post-bridge was calculated by summing each Estimated Daily Unique Users amount derived from post-bridge Unique Users.

Equation 7

Estimated Annual Trips = Estimated Daily Unique User Trips_1 + Estimated Daily Unique User Trips_2 + … Estimated Daily Unique User Trips_{365}

Where:

Estimated Annual Trips = Sum of 365 days of Estimated Daily Unique User Trips

Estimated Daily Unique User Trips_n = Total Estimated Unique User Trips by Day *n*

In 2013, it is estimated that 217,900 people used the ATT within the study area. After the bridge opened in 2014, the estimate rose to 508,100 people using the ATT annually within the study area.

APPENDIX C: DETAILED RESULTS BY TOPIC

TABLE 21 Data Collection Schedule and Summary Statistics

Day of Week	Date	Time Period	Location[1]	2013 Counts	2013 Surveys	2014 Counts	2014 Surveys
Tuesday	05/21/13 05/20/14	7:00 AM - 8:00 PM 7:00 AM - 8:00 PM	Woodcroft (N)	681	NA	865	NA
			Southpoint (N)	564	166	859	191
			Massey Chapel (S)	266	NA	642	NA
			Fayetteville (S)	388	129	641	136
			Bridge[2]	--	--	805	154
Wednesday	06/05/13 05/21/14	7:00 AM - 8:00 PM 7:00 AM - 8:00 PM	Woodcroft (N)	656	NA	682	NA
			Southpoint (N)	616	124	682	151
			Massey Chapel (S)	350	NA	519	NA
			Fayetteville (S)	425	127	557	95
			Bridge[2]	--	--	561	112
Saturday	05/18/13 06/01/13 05/17/14	7:00 AM – 12:00 PM 11:30 AM – 8:00 PM 7:00 AM – 8:00 PM	Woodcroft (N)	782	NA	1,444	NA
			Southpoint (N)	696	196	1,468	296
			Massey Chapel (S)	654	NA	1,528	NA
			Fayetteville (S)	807	256	1,514	216
			Bridge[2]	--	--	1,787	265
Sunday	05/19/13 06/16/13 05/18/14	7:00 AM - 6:15 PM 6:00 PM – 8:00 PM 7:00 AM – 8:00 PM	Woodcroft (N)	735	NA	1,094	NA
			Southpoint (N)	608	128	1,158	235
			Massey Chapel (S)	412	NA	1,537	NA
			Fayetteville (S)	626	175	1,495	169
			Bridge[2]	--	--	1,527	225
			Totals	9,266	1,301	21,365	2,245

1. N = Northern segment data collection site; S = Southern segment data collection site.
2. Site was added in 2014, upon completion of the Bridge segment.

Proportions of trail user profiles from the counts data, excluding children and excluding counts at the bridge site in 2014, were compared to the survey data from the same time period using two-sided unpaired *t*-tests. *P*-values less than 0.05 were considered statistically significant.

Table 22 Comparative Percentages of Unique Trail Users to Those Surveyed, by Travel Mode and Gender

Mode, Gender	2013 Percentage of Surveyed Users (n)		2013 Percentage of Counted Users (n)		2014 Percentage of Surveyed Users (n)		2014 Percentage of Counted Users (n)	
Bicycle, Male	28%	(353)	27%	(2,344)	29%*	(648)	36%	(7,001)
Bicycle, Female	12%	(148)	14%	(1,166)	15%*	(322)	20%	(3,846)
Walker, Male	11%*	(144)	14%	(1,172)	13%*	(288)	10%	(2,025)
Walker, Female	16%*	(199)	19%	(1,679)	17%*	(386)	15%	(2,978)
Jogger/Runner, Male	15% *	(190)	13%	(1,103)	12%*	(262)	8%	(1,744)
Jogger/Runner, Female	17%*	(219)	13%	(1,103)	13%*	(295)	9%	(1,813)

*Survey population proportion is statistically different from counts population (p <0.05).

USER PROFILE TABLES

Table 23 Surveyed User Profile: Trip Point of Origin by Trail Segment and Mode

Trail Segment	Mode	2013 Local	2014 Local	Difference	2013 Non-Local	2014 Non-Local	Difference
North	Bike	65% (115)	65% (354)**	+0%	35% (63)	35% (192)**	+0%
	Walk	83% (172)	85% (268)**	+2%	17% (35)	15% (48)**	-2%
	Jog/Run	75% (144)	83% (270)**	+8%*	25% (47)	17% (55)**	-8%*
	All Modes	75% (436)**	75% (904)**	+0%	25% (146)**	25% (299)**	+0%
South	Bike	63% (192)	48% (173)	-15%*	37% (112)	52% (187)	+15%*
	Walk	78% (98)	76% (146)	-2%	22% (28)	24% (47)	+2%
	Jog/Run	68% (140)	69% (133)	+1%	32% (65)	31% (60)	-1%
	All Modes	68% (434)	60% (458)	-8%*	32% (206)	40% (300)	+8%*
Total	Bike	64% (307)	58% (527)	-6%*	36% (175)	42% (379)	+6%*
	Walk	81% (270)	81% (415)	+0%	19% (63)	19% (95)	+0%
	Jog/Run	72% (284)	78% (403)	+6%*	28% (112)	22% (115)	-6%*
	All Modes	71% (870)	69% (1362)	-2%	29% (352)	31% (599)	+2%

* Difference in proportion of trip origin from 2013 to 2014 is statistically significant ($p < 0.05$)

** Difference in proportion of trip origin from North to South for each data collection year is statistically significant ($p < 0.05$)

Table 24 Surveyed User Profile: Trip Point of Origin by Type of User

Trail Segment	Gender	Mode	2013 Local	2014 Local	Difference	2013 Non-Local	2014 Non-Local	Difference
North	Male	Bike	65% (74)	66% (242)**	+1%	35% (40)	34% (123)**	-1%
		Walk	87% (71)**	84% (109)**	-3%	13% (11)**	16% (21)**	+3%
		Jog/Run	75% (70)	84% (130)**	+9%	25% (23)	16% (25)**	-9%
		All Modes	74% (219)**	74% (491)**	+0%	26% (75)**	26% (172)**	+0%
	Female	Bike	66% (35)	62% (111)**	-4%	34% (18)	38% (69)**	+4%
		Walk	80% (97)	85% (158)	+5%	20% (24)	15% (27)	-5%
		Jog/Run	74% (70)	82% (140)	+8%	26% (24)	18% (30)	-8%
		All Modes	75% (203)	76% (410)**	+1%	25% (66)	24% (127)**	-1%
South	Male	Bike	61% (129)	50% (119)	-11%*	39% (81)	50% (117)	+11%*
		Walk	71% (40)	73% (67)	+2%	29% (16)	27% (25)	-2%
		Jog/Run	73% (66)	63% (56)	-10%	27% (24)	37% (33)	+10%
		All Modes	66% (237)	58% (246)	-8%*	34% (122)	42% (181)	+8%*
	Female	Bike	66% (57)	44% (54)	-22%*	34% (30)	56% (69)	+22%*
		Walk	82% (54)	79% (79)	-3%	18% (12)	21% (21)	+3%
		Jog/Run	65% (73)	74% (77)	+9%	35% (40)	26% (27)	-9%
		All Modes	69% (186)	64% (212)	-5%	31% (82)	36% (117)	+5%
Total	Male	Bike	63% (203)	60% (361)	-3%	37% (121)	40% (240)	+3%
		Walk	80% (111)	79% (176)	-1%	20% (27)	21% (46)	+1%
		Jog/Run	74% (136)	76% (186)	+2%	26% (47)	24% (58)	-2%
		All Modes	70% (456)	68% (737)	-2%	30% (197)	32% (353)	+2%
	Female	Bike	66% (92)	54% (165)	-12%*	34% (48)	46% (138)	+12%*
		Walk	81% (151)	83% (237)	+2%	19% (36)	17% (48)	-2%
		Jog/Run	69% (143)	79% (217)	+10%*	31% (64)	21% (57)	-10%*
		All Modes	72% (389)	72% (622)	+0%	28% (148)	28% (244)	+0%

* Difference in proportion of trip origin from 2013 to 2014 is statistically significant ($p < 0.05$)
** Difference in proportion of trip origin from North to South for each data collection year is statistically significant ($p < 0.05$)

Table 25 Surveyed User Profile: Proportion of First Time Users by Trail Segment and Mode

Trail Segment	Mode	2013 First Time	2014 First Time	Difference	2013 Not First Time	2014 Not First Time	Difference
North	Bike	6% (11)	7% (39)	+1%	94% (178)	93% (527)	-1%
	Walk	4% (9)	6% (20)**	+2%	96% (207)	94% (321)**	-2%
	Jog/Run	3% (6)	2% (8)	-1%	97% (194)	98% (329)	+1%
	All Modes	4% (26)	5% (69)**	+1%	96% (585)	95% (1191)**	-1%
South	Bike	5% (15)	7% (26)	+2%	95% (313)	93% (349)	-2%
	Walk	5% (7)	12% (25)	+7%*	95% (128)	88% (176)	-7%*
	Jog/Run	3% (6)	6% (11)	+3%	97% (209)	94% (185)	-3%
	All Modes	4% (28)	8% (63)	+4%*	96% (655)	92% (723)	-4%*
Total	Bike	5% (26)	7% (65)	+2%	95% (491)	93% (876)	-2%
	Walk	5% (16)	8% (45)	+3%*	95% (335)	92% (497)	-3%*
	Jog/Run	3% (12)	4% (19)	+1%	97% (403)	96% (514)	-1%
	All Modes	4% (54)	6% (132)	+2%*	96% (1240)	94% (1914)	-2%*

* Difference in proportion of first time users from 2013 to 2014 is statistically significant (p <0.05)
** Difference in proportion of first time users from North to South for each data collection year is statistically significant (p <0.05)

Table 26 Surveyed User Profile: Proportion of First Time Users by Trail Segment, Gender, and Mode

Trail Segment	Gender	Mode	2013 First Time	2014 First Time	Difference	2013 Not First Time	2014 Not First Time	Difference
North	Male	Bike	7% (8)	6% (21)	-1%	93% (115)	94% (360)	+1%
		Walk	2% (2)	7% (9)**	+5%	98% (83)	93% (128)**	-5%
		Jog/Run	1% (1)	2% (4)	+1%	99% (96)	98% (158)	-1%
		All Modes	4% (11)	5% (36)	+1%	96% (299)	95% (658)	-1%
	Female	Bike	2% (1)	10% (18)	+8%	98% (54)	90% (166)	-8%
		Walk	6% (7)	5% (11)	-1%	94% (120)	95% (191)	+1%
		Jog/Run	5% (5)	2% (4)	-3%	95% (94)	98% (171)	+3%
		All Modes	5% (13)	6% (33)	+1%	95% (269)	94% (530)	-1%
South	Male	Bike	6% (13)	6% (16)	+0%	94% (215)	94% (233)	+0%
		Walk	7% (4)	14% (14)	+7%	93% (55)	86% (83)	-7%
		Jog/Run	1% (1)	6% (5)	+5%	99% (92)	94% (85)	-5%
		All Modes	5% (18)	8% (35)	+3%	95% (365)	92% (412)	-3%
	Female	Bike	2% (2)	8% (10)	+6%	98% (91)	92% (115)	-6%
		Walk	4% (3)	11% (11)	+7%	96% (69)	89% (92)	-7%
		Jog/Run	4% (5)	6% (6)	+2%	96% (115)	94% (100)	-2%
		All Modes	3% (10)	8% (28)	+5%*	97% (277)	92% (309)	-5%*
Total	Male	Bike	6% (21)	6% (37)	+0%	94% (330)	94% (593)	+0%
		Walk	4% (6)	10% (23)	+6%*	96% (138)	90% (211)	-6%*
		Jog/Run	1% (2)	4% (9)	+3%	99% (188)	96% (243)	-3%
		All Modes	4% (29)	6% (71)	+2%	96% (664)	94% (1070)	-2%
	Female	Bike	2% (3)	9% (28)	+7%*	98% (145)	91% (281)	-7%*
		Walk	5% (10)	7% (22)	+2%	95% (189)	93% (283)	-2%
		Jog/Run	5% (10)	4% (10)	-1%	95% (209)	96% (271)	+1%
		All Modes	4% (23)	7% (61)	+3%*	96% (546)	93% (839)	-3%*

* Difference in proportion of first time users from 2013 to 2014 is statistically significant (p <0.05)

** Difference in proportion of first time users from North to South for each data collection year is statistically significant (p <0.05)

TRANSPORTATION EFFECTS TABLES

Table 27 Transportation Effects: Trip Type by Trail Segment and Mode

Trail Segment	Mode	2013 Roundtrip		2014 Roundtrip		Difference	2013 Through Trip		2014 Through Trip		Difference
North	Bike	82%	(152)**	85%	(483)	+3%	18%	(33)**	15%	(82)	-3%
	Walk	87%	(180)	88%	(298)**	+1%	13%	(27)	12%	(42)**	-1%
	Jog/Run	96%	(184)**	96%	(325)	+0%	4%	(8)**	4%	(12)	+0%
	All Modes	88%	(519)**	89%	(1120)**	+1%	12%	(71)**	11%	(138)**	-1%
South	Bike	93%	(305)	89%	(332)	-4%*	7%	(23)	11%	(43)	+4%*
	Walk	93%	(126)	93%	(186)	+0%	7%	(9)	7%	(13)	+0%
	Jog/Run	>99%	(212)	97%	(191)	-3%	<1%	(1)	3%	(5)	+3%
	All Modes	95%	(647)	92%	(722)	-3%*	5%	(34)	8%	(62)	+3%*
Total	Bike	89%	(457)	87%	(815)	-2%	11%	(56)	13%	(125)	+2%
	Walk	89%	(306)	90%	(484)	+1%	11%	(36)	10%	(55)	-1%
	Jog/Run	98%	(396)	97%	(516)	-1%	2%	(9)	3%	(17)	+1%
	All Modes	92%	(1166)	90%	(1842)	-2%	8%	(105)	10%	(200)	+2%

* Difference in proportion of trip type from 2013 to 2014 is statistically significant (p <0.05)
** Difference in proportion of trip type from North to South for each data collection year is statistically significant (p <0.05)

Table 28 Transportation Effects: Trip Type by Trail Segment where Trip Began, Gender, and Mode

Trail Segment	Gender	Mode	2013 Roundtrip	2014 Roundtrip	Difference	2013 Through Trip	2014 Through Trip	Difference
North	Male	Bike	83% (101)**	85% (323)	+2%	17% (20)**	15% (57)	-2%
		Walk	86% (71)	85% (117)	-1%	14% (12)	15% (20)	+1%
		Jog/Run	97% (93)	98% (159)	+1%	3% (3)	2% (3)	-1%
		All Modes	88% (267)**	88% (611)	+0%	12% (38)**	12% (82)	+0%
	Female	Bike	83% (44)**	86% (159)	+3%	17% (9)**	14% (25)	-3%
		Walk	89% (107)	89% (179)	+0%	11% (13)	11% (22)	+0%
		Jog/Run	95% (87)**	95% (166)	+0%	5% (5)**	5% (9)	+0%
		All Modes	90% (239)**	90% (506)**	+0%	10% (27)**	10% (56)**	+0%
South	Male	Bike	92% (209)	88% (218)	-4%	8% (18)	12% (31)	+4%
		Walk	93% (55)	93% (90)	+0%	7% (4)	7% (7)	+0%
		Jog/Run	100% (91)	97% (87)	-3%	0% (0)	3% (3)	+3%
		All Modes	94% (357)	91% (405)	-3%	6% (23)	9% (42)	+3%
	Female	Bike	97% (90)	90% (113)	-7%	3% (3)	10% (12)	+7%
		Walk	93% (67)	94% (95)	+1%	7% (5)	6% (6)	-1%
		Jog/Run	99% (119)	98% (104)	-1%	1% (1)	2% (2)	+1%
		All Modes	97% (278)	94% (315)	-3%	3% (9)	6% (20)	+3%
Total	Male	Bike	89% (310)	86% (541)	-3%	11% (38)	14% (88)	+3%
		Walk	89% (126)	88% (207)	-1%	11% (16)	12% (27)	+1%
		Jog/Run	98% (184)	98% (246)	+0%	2% (3)	2% (6)	+0%
		All Modes	91% (624)	89% (1016)	-2%	9% (61)	11% (124)	+2%
	Female	Bike	92% (134)	88% (272)	-4%	8% (12)	12% (37)	+4%
		Walk	91% (174)	91% (274)	+0%	9% (18)	9% (28)	+0%
		Jog/Run	97% (206)	96% (270)	-1%	3% (6)	4% (11)	+1%
		All Modes	93% (517)	92% (821)	-1%	7% (36)	8% (76)	+1%

No differences in proportion of trip type from 2013 to 2014 were found to be statistically significant ($p < 0.05$)

****** Difference in proportion of trip type from North to South for each data collection year is statistically significant ($p < 0.05$)

Table 29 Transportation Effects: Proportion of Mode to Trail by Trail Segment and Mode on Trail

Trail Segment	Mode	2013 By Bicycle		2014 By Bicycle		Difference	2013 By Car		2014 By Car		Difference	2013 By Foot		2014 By Foot		Difference
North	Bike	65%	(118)**	64%	(353)**	-1%	34%	(61)**	35%	(193)**	+1%	1%	(2)	<1%	(2)	-<1%
	Walk	1%	(3)	1%	(3)	+0%	50%	(102)	46%	(151)	-4%	49%	(101)	53%	(177)	+4%
	Jog/Run	<1%	(1)	<1%	(1)	+0%	58%	(114)	42%	(138)	-16%*	42%	(82)	58%	(188)	+16%*
	All Modes	21%	(122)	29%	(357)**	+8%*	48%	(278)**	40%	(492)**	-8%*	32%	(185)**	30%	(367)**	-2%
South	Bike	46%	(147)	40%	(143)	-6%	53%	(169)	60%	(214)	+7%	2%	(5)	<1%	(1)	-1%
	Walk	0%	(0)	0%	(0)	+0%	44%	(58)	51%	(100)	+7%	56%	(73)	49%	(95)	-7%
	Jog/Run	<1%	(1)	0%	(0)	-<1%	58%	(122)	50%	(95)	-8%	41%	(87)	50%	(96)	+9%
	All Modes	22%	(148)	19%	(143)	-3%	53%	(354)	55%	(417)	+2%	25%	(165)	26%	(194)	+1%
Total	Bike	53%	(265)	55%	(496)	+2%	46%	(230)	45%	(407)	-1%	1%	(7)	<1%	(3)	-<1%
	Walk	1%	(3)	<1%	(3)	-<1%	47%	(160)	48%	(251)	+1%	52%	(174)	52%	(272)	+0%
	Jog/Run	<1%	(2)	<1%	(1)	+0%	58%	(236)	45%	(233)	-13%*	42%	(169)	55%	(284)	+13%*
	All Modes	22%	(270)	25%	(500)	+3%*	50%	(632)	46%	(909)	-4%*	28%	(350)	29%	(561)	+1%

* Difference in proportion of mode to trail from 2013 to 2014 is statistically significant (p <0.05)
** Difference in proportion of mode to trail from North to South for each data collection year is statistically significant (p <0.05)

Table 30 Transportation Effects: Proportion of Mode to Trail by Trail Segment, Gender, and Mode on Trail

	Gender	Mode	2013 By Bicycle	2014 By Bicycle	Difference	2013 By Car	2014 By Car	Difference	2013 By Foot	2014 By Foot	Difference
North	Male	Bike	62% (72)**	66% (242)**	+4%	37% (43)**	33% (122)**	-4%	2% 2)	0.3% (1)	-2%
		Walk	0% (0)	2% (2)	+2%	40% (32)	38% (50)	-2%	60% (48)	61% (80)	+1%
		Jog/Run	1% (1)	0.6% (1)	-<1%	50% (48)	44% (67)	-6%	49% (47)	56% (86)**	+7%
		All Modes	25% (73)	37% (245)**	+13%*	42% (123)**	37% (247)**	-5%*	33% (97)**	25% (167)	-8%*
	Female	Bike	74% (39)**	61% (111)**	-13%	26% (14)**	38% 70)**	+12%	0% (0)	0.5% (1)	+<1%
		Walk	2% (3)	0.5% (1)	-1%	57% (70)	51% (101)	-6%	40% (49)**	48% (95)	+8%
		Jog/Run	0% (0)	0% (0)	0%	67% (65)	41% (71)	-26%*	33% (32)	59% (102)	+26%*
		All Modes	15% (42)	20% (112)**	+5%	55% 150)	44% (244)**	-11%*	30% (81)	36% (198)	+6%
South	Male	Bike	45% (99)	41% (97)	-4%	53% (117)	59% (141)	+6%	2% (5)	0.4% (1)	-2%
		Walk	0% (0)	0% (0)	+0%	45% (26)	45% (41)	+0%	55% (32)	55% (50)	+0%
		Jog/Run	0% (0)	0% (0)	+0%	49% (44)	49% (42)	+0%	51% (46)	51% (44)	+0%
		All Modes	27% (99)	23% (97)	-4%	51% (190)	55% (232)	+4%	22% (83)	22% (95)	+0%
	Female	Bike	47% (44)	39% (46)	-8%	53% (49)	61% (72)	+8%	0% (0)	0% (0)	+0%
		Walk	0% (0)	0% (0)	+0%	45% (31)	56% (58)	+11%	55% (38)	44% (45)	-11%
		Jog/Run	0.8% (1)	0% (0)	-1%	64% (76)	50% (53)	-14%*	35% (41)	50% (52)	+15%*
		All Modes	16% (45)	14% (46)	-2%	56% (158)	56% (183)	+0%	28% (79)	30% (99)	+2%
Total	Male	Bike	51% (171)	56% (339)	+5%	47% (160)	44% (263)	-3%	2% (7)	0.3% (2)	-2%
		Walk	0% (0)	0.9% (2)	+1%	42% (58)	41% (91)	-1%	58% (80)	58% (130)	+0%
		Jog/Run	0.5% 1)	0.4% (1)	-<1%	49% (92)	45% (109)	-4%	50% (93)	54% (130)	+4%
		All Modes	26% (172)	32% (342)	+6%*	47% (13)	44% (479)	-3%	27% (180)	24% (262)	-3%
	Female	Bike	57% (83)	52% (157)	-5%	43% (63)	47% (142)	+4%	0% (0)	0.3% (1)	+<1%
		Walk	2% (3)	0.3% (1)	-2%	53% 101)	53% (159)	+0%	46% (87)	47% (140)	+1%
		Jog/Run	0.5% (1)	0% (0)	-<1%	66% 141)	45% (124)	-21%*	34% (73)	55% (154)	+21%*
		All Modes	16% (87)	18% (158)	+2%	55% (308)	48% (427)	-7%*	29% (160)	34% (297)	+5%

* Difference in proportion of mode to trail from 2013 to 2014 is statistically significant (p <0.05)
** Difference in proportion of mode to trail from North to South for each data collection year is statistically significant (p <0.05)

Table 31 Transportation Effects: Distance Traveled by Trail Segment, Gender and Mode

	Gender	Mode	2013 Mi. (n)	2014 Mi. (n)	Difference	% Difference
North	Male	Bike	9.4 (116)**	14.9 (363)	+5.5	+59%*
		Walk	2.9 (75)**	3.6 (121)	+0.7	+24%
		Jog/Run	4.5 (87)**	5.5 (157)	+1	+22%*
		All Modes	6.1 (283)**	10.4 (655)	+4.3	+70%*
	Female	Bike	7.7 (52)**	13.4 (170)	+5.7	+74%*
		Walk	3.1 (111)	3.3 (185)	+0.2	+6%
		Jog/Run	3.8 (85)**	4.6 (169)	+0.8	+21%*
		All Modes	4.3 (248)**	7.1 (526)	+2.8	+65%*
South	Male	Bike	14.2 (208)	15.7 (240)	+1.5	+11%
		Walk	4.0 (51)	4.3 (88)	+0.3	+8%
		Jog/Run	5.9 (80)	6.2 (83)	+0.3	+5%
		All Modes	10.7 (342)	11.4 (421)	+0.7	+7%
	Female	Bike	13.1 (78)	13.0 (116)	-0.1	+1%
		Walk	3.0 (58)	4.0 (91)	+1	+33%*
		Jog/Run	5.6 (107)	5.3 (103)	-0.3	+5%
		All Modes	7.3 (244)	7.8 (312)	+0.6	+8%
Total	Male	Bike	12.5 (324)	15.2 (603)	+2.7	+22%*
		Walk	3.4 (126)	3.9 (209)	+0.5	+15%
		Jog/Run	5.2 (167)	5.7 (240)	+0.5	+10%
		All Modes	8.6 (625)	10.8 (1076)	+2.2	+26%*
	Female	Bike	10.9 (130)	13.2 (286)	+2.3	+21%*
		Walk	3.0 (169)	3.5 (276)	+0.5	+17%*
		Jog/Run	4.8 (192)	4.9 (272)	+0.1	+2%
		All Modes	5.8 (491)	7.3 (838)	+1.5	+26%*

* Difference in distance travelled from 2013 to 2014 is statistically significant (p <0.05)
** Difference in distance travelled from North to South for each data collection year is statistically significant (p <0.05)

Table 32 Transportation Effects: Distance Traveled by Trail Segment and Mode

	Mode	2013 Mi. (n)		2014 Mi. (n)		Difference	% Difference
North	Bike	8.8	(178)**	14.4	(534)	+5.6	+64%*
	Walk	3.0	(190)	3.4	(308)**	+0.4	+13%
	Jog/Run	4.1	(176)**	5.1	(326)	+1.0	+24%*
	All Modes	5.2	(549)**	8.9	(1184)**	+3.7	+71%*
South	Bike	13.7	(292)	14.8	(357)	+1.1	+8%
	Walk	3.6	(112)	4.2	(179)	+0.6	+17%
	Jog/Run	5.7	(189)	5.7	(186)	+0.0	+0%
	All Modes	9.2	(597)	9.9	(734)	+0.7	+8%
Total	Bike	11.9	(470)	14.6	(891)	+2.7	+23%*
	Walk	3.2	(302)	3.7	(487)	+0.5	+16%*
	Jog/Run	4.9	(365)	5.3	(512)	+0.4	+8%
	All Modes	7.3	(1146)	9.3	(1920)	+2	+27%*

* Difference in distance travelled from 2013 to 2014 is statistically significant (p <0.05)
** Difference in distance travelled from North to South for each data collection year is statistically significant (p <0.05)

PUBLIC HEALTH AND SOCIAL EFFECTS TABLES

Table 33 Public Health Effects: Trip Duration by Trail Segment, Gender, and Mode

	Gender	Mode	2013 Minutes (n)		2014 Minutes (n)		Difference
North	Male	Bike	62	(115)**	72	(361)**	+10*
		Walk	51	(80)	50	(131)	-1
		Jog/Run	48	(94)	52	(155)	+4
		All Modes	54	(294)**	63	(660)**	+9*
	Female	Bike	57	(52)**	72	(180)	+15*
		Walk	49	(118)	53	(194)	+4
		Jog/Run	48	(97)**	49	(172)	+1
		All Modes	50	(268)**	58	(548)	+8*
South	Male	Bike	78	(218)	85	(234)	+7*
		Walk	59	(55)	53	(91)	-6
		Jog/Run	52	(89)	52	(86)	+0
		All Modes	68	(365)	71	(421)	+3
	Female	Bike	75	(93)	72	(117)	-3
		Walk	50	(68)	53	(101)	+3
		Jog/Run	56	(116)	52	(104)	-4
		All Modes	61	(279)	59	(325)	-2
Total	Male	Bike	72	(333)	77	(595)	+5*
		Walk	54	(135)	51	(222)	-3
		Jog/Run	50	(183)	52	(241)	+2
		All Modes	62	(659)	66	(1081)	+4*
	Female	Bike	68	(145)	72	(295)	+4
		Walk	49	(186)	53	(305)	+4
		Jog/Run	52	(213)	50	(276)	-2
		All Modes	55	(547)	58	(873)	+3

* Difference in average trip duration from 2013 to 2014 is statistically significant (p <0.05)
** Difference in average trip duration from North to South for each data collection year is statistically significant (p <0.05)

Table 34 Public Health Impacts: Comparison of Mode on Trail by Household Income

	2013			2014			% Change		
Household Income	**Bike**	**Walk**	**Jog/Run**	**Bike**	**Walk**	**Jog/Run**	**Bike**	**Walk**	**Jog/Run**
$<15,000	42% (15)	31% (11)	25% (9)	46% (33)	36% (26)	17% (12)	+4%	+5%	-9%
15,000-29,999	31% (25)	27% (22)	40% (32)	28% (52)	46% (85)	26% (49)	-3%	+19%*	-14%*
30,000-44,999	32% (15)	30% (14)	38% (18)	32% (32)	43% (43)	22% (22)	+0%	+13%	-16%*
45,000-59,999	30% (34)	25% (28)	43% (49)	40% (71)	31% (55)	26% (47)	+10%	+6%	-17%*
60,000-74,999	28% (34)	33% (40)	38% (47)	42% (89)	39% (84)	19% (40)	+14%*	+6%	-19%*
75,000-89,999	35% (39)	36% (40)	28% (31)	47% (85)	25% (46)	26% (48)	+12%	-3%*	-10%
90,000-104,999	53% (62)	23% (27)	22% (26)	42% (88)	30% (62)	28% (58)	-11%*	+7%	+6%
105,000-119,999	46% (48)	23% (24)	30% (31)	50% (66)	22% (29)	25% (33)	+4%	-1%	-5%
120,000-134,999	38% (24)	27% (17)	36% (23)	47% (62)	28% (37)	23% (31)	+9%	+1%	-13%
135,000-149,999	59% (33)	18% (10)	23% (13)	51% (54)	20% (21)	28% (30)	-8%	+2%	+5%
$>150,000	50% (96)	20% (38)	30% (58)	50% (180)	21% (76)	28% (101)	+0%	+1%	-2%

* Difference in proportion is statistically significant (p <0.05)

Table 35 Public Health Impacts: Comparison of Mode to Trail by Household Income

	2013			2014			% Change		
Household Income	**By Bicycle**	**By Car**	**By Foot**	**By Bicycle**	**By Car**	**By Foot**	**By Bicycle**	**By Car**	**By Foot**
$<15,000	25% (9)	42% (15)	31% (11)	31% (21)	40% (27)	25% (17)	+6%	-2%	-6%
15,000-29,999	17% (13)	47% (36)	34% (26)	14% (25)	55% (96)	30% (53)	-3%	+8%	-4%
30,000-44,999	11% (5)	61% (28)	26% (12)	16% (16)	40% (40)	42% (42)	+5%	-21%*	+16%
45,000-59,999	19% (21)	49% (55)	30% (34)	23% (41)	41% (73)	33% (59)	+4%	-8%	+3%
60,000-74,999	14% (17)	49% (59)	37% (44)	24% (51)	42% (89)	31% (66)	+10%*	-7%	-6%
75,000-89,999	23% (24)	52% (55)	25% (26)	28% (49)	24% (41)	45% (77)	+5%	-28%*	+20%*
90,000-104,999	28% (32)	46% (52)	26% (30)	24% (49)	44% (90)	32% (65)	-4%	-2%	+6%
105,000-119,999	23% (23)	59% (60)	18% (18)	27% (35)	47% (60)	26% (33)	+4%	-12%	+8%
120,000-134,999	24% (15)	51% (32)	25% (16)	27% (34)	48% (61)	24% (30)	+3%	-3%	-1%
135,000-149,999	38% (21)	48% (27)	14% (8)	29% (30)	46% (48)	26% (27)	-9%	-2%	+12%
$>150,000	25% (9)	42% (15)	31% (11)	24% (85)	49% (170)	27% (94)	-1%	+7%	-4%

* Difference in proportion is statistically significant (p <0.05)

Table 36 Public Health Impacts: Comparison of Trip Purpose by Household Income

	2013		2014		% Change	
Household Income	**Exercise/Recreation**	**All Other**	**Exercise/Recreation**	**All Other**	**Exercise/Recreation**	**All Other**
$<15,000	94% (34)	6% (2)	85% (61)	15% (11)	-9%	+9%
15,000-29,999	91% (74)	9% (7)	90% (169)	10% (18)	-1%	+1%
30,000-44,999	93% (43)	7% (3)	87% (87)	13% (13)	-6%	+6%
45,000-59,999	94% (106)	6% (7)	89% (160)	11% (19)	-5%	+5%
60,000-74,999	94% (112)	6% (7)	89% (190)	11% (23)	-5%	+5%
75,000-89,999	93% (100)	7% (7)	91% (166)	9% (16)	-2%	+2%
90,000-104,999	95% (106)	5% (5)	93% (195)	7% (15)	-2%	+2%
105,000-119,999	97% (96)	3% (3)	94% (123)	6% (8)	-3%	+3%
120,000-134,999	95% (60)	5% (3)	89% (119)	11% (14)	-6%	+6%
135,000-149,999	91% (52)	9% (5)	89% (94)	11% (12)	-2%	+2%
$>150,000	97% (184)	3% (5)	95% (344)	5% (18)	-2%	+2%

No differences in proportion of trip purpose by household income were found to be statistically significant (p <0.05)

ECONOMIC EFFECTS TABLES

Table 37 Comparison of Value of Trip (on Scale from $0-$10) in Before and After Periods by Trail Segment and Mode

	Mode	2013 Value (n)	2014 Value (n)	Difference
North	Bike	7.6 (165)	7.4 (522)	-0.2
	Walk	6.0 (181)	6.8 (311)	+0.8*
	Jog/Run	6.1 (179)	6.5 (322)	+0.4
	All Modes	6.6 (531)	7.0 (1170)	+0.4*
South	Bike	6.8 (296)	7.7 (348)	+0.9*
	Walk	6.6 (115)	6.5 (193)	-0.1
	Jog/Run	6.4 (190)	6.8 (182)	+0.4
	All Modes	6.6 (606)	7.1 (736)	+0.5*
Total	Bike	7.0 (461)	7.5 (870)	+0.5*
	Walk	6.2 (296)	6.7 (504)	+0.5
	Jog/Run	6.2 (369)	6.6 (504)	+0.4
	All Modes	6.6 (1137)	7.0 (1906)	+0.4*

*Difference in average value of trip is statistically significant ($p < 0.05$)

Table 38 Comparison of Value of Trip (on Scale of $0-$10) in Before and After Periods by Trail Segment, Gender and Mode

	Gender	Mode	2013 Value (n)	2014 Value (n)	Difference
North	Male	Bike	7.6 (109)	7.4 (351)	-0.2
		Walk	6.4 (70)	6.3 (125)	-0.1
		Jog/Run	5.9 (87)	6.5 (155)	+0.6
		All Modes	6.7 (271)	7.0 (644)	+0.3
	Female	Bike	7.8 (49)	7.3 (171)	-0.5
		Walk	5.9 (109)	7.1 (185)	+1.2*
		Jog/Run	6.4 (88)	6.5 (167)	+0.1
		All Modes	6.4 (247)	7.0 (525)	+0.6*
South	Male	Bike	6.6 (203)	7.5 (233)	+0.9*
		Walk	6.8 (50)	6.6 (95)	-0.2
		Jog/Run	6.0 (84)	6.8 (83)	+0.8
		All Modes	6.5 (340)	7.2 (421)	+0.7*
	Female	Bike	7.1 (88)	8.0 (114)	+0.9*
		Walk	6.4 (61)	6.5 (97)	+0.1
		Jog/Run	6.8 (104)	6.8 (99)	+0
		All Modes	6.8 (255)	7.1 (313)	+0.3
Total	Male	Bike	6.9 (312)	7.5 (584)	+0.6*
		Walk	6.5 (120)	6.4 (220)	-0.1
		Jog/Run	6.0 (171)	6.6 (238)	+0.6
		All Modes	6.6 (611)	7.1 (1065)	+0.5*
	Female	Bike	7.3 (137)	7.6 (285)	+0.3
		Walk	6.1 (170)	6.9 (282)	+0.8*
		Jog/Run	6.6 (192)	6.6 (266)	+0
		All Modes	6.6 (502)	7.0 (838)	+0.4*

*Difference in average value of trip is statistically significant ($p < 0.05$)

Table 39 2013 Results: Number and Proportion of Respondents Who Purchased Goods or Services During Trip on ATT and Average Expenditures Made by Household Income

Household Income	Respondents who Made Purchase (n)	% Respondents Made Purchase	Respondents - No Purchase (n)	% Respondents - No Purchase	Average Expenditure Cost
<$15000	36	3.59%	23	3.18%	$20.44
$15000-29999	80	7.98%	58	8.01%	$9.03
$30000-44999	47	4.69%	33	4.56%	$28.98
$45000-59999	110	10.97%	78	10.77%	$9.95
$60000-74999	116	11.57%	82	11.33%	$10.90
$75000-89999	106	10.57%	73	10.08%	$35.71
$90000-104999	111	11.07%	77	10.64%	$7.59
$105000-119999	99	9.87%	76	10.50%	$30.35
$120000-134999	61	6.08%	43	5.94%	$12.10
$135000-149999	56	5.58%	42	5.80%	$16.02
>$150000	181	18.05%	139	19.20%	$10.36
Total	1003	58.08%	724	41.92%	$16.27

Table 40 2014 Results: Number and Proportion of Respondents Who Purchased Goods or Services During Trip on ATT and Average Expenditures Made by Household Income

Household Income	Respondents - Made Purchase (n)	% Respondents Made Purchase	Respondents - No Purchase (n)	% Respondents - No Purchase	Average Expenditure Cost
<$15000	71	3.93%	44	3.64%	$37.77
$15000-29999	183	10.13%	123	10.17%	$12.78
$30000-44999	92	5.09%	68	5.62%	$22.32
$45000-59999	175	9.69%	124	10.25%	$13.08
$60000-74999	205	11.35%	126	10.41%	$20.64
$75000-89999	175	9.69%	116	9.59%	$14.18
$90000-104999	200	11.07%	130	10.74%	$16.93
$105000-119999	126	6.98%	82	6.78%	$13.79
$120000-134999	127	7.03%	91	7.52%	$16.94
$135000-149999	98	5.43%	62	5.12%	$18.28
>$150000	354	19.60%	244	20.17%	$10.55
Total	1806	59.88%	1210	40.12%	$15.99

Table 41 Proportion of Respondents Who Purchased Goods and Services During trip on ATT and Average Expenditures Made by Trail Segment, Gender, and Mode

	Gender	Mode	2013 % Respondents Made Purchase (n)	2013 Average Expenditure (n)	2014 % Respondents Made Purchase (n)	2014 Average Expenditure (n)	Difference %	Difference $
North	Male	Bike	38% (42)	$20.00 (112)	41% (136)	$15.37 (344)	+3%	-$4.63
		Walk	26% (19)	$13.90 (73)	39% (48)	$27.30 (123)	+13%	+$13.40
		Jog/Run	18% (15)	$16.36 (84)	23% (35)	$19.33 (153)	+5%	+$2.97
		All Modes	29% (80)	$17.13 (275)	35% (224)	$19.86 (634)	+6%	+$2.73
	Female	Bike	24% (12)	$8.64 (50)	36% (63)	$13.33 (176)	+12%	+$4.49
		Walk	31% (36)	$12.52 (117)	35% (67)	$17.37 (190)	+4%	+4.85
		Jog/Run	27% (25)	$31.34 (92)	19% (33)	$5.96 (170)	-8%	-$25.38
		All Modes	28% (74)	$18.79 (261)	30% (164)	$12.44 (538)	+2%	-$6.35
South	Male	Bike	27% (58)	$6.67 (216)	37% (83)	$12.14 (226)	+10%	+$5.47
		Walk	22% (12)	$16.70 (54)	25% (23)	$30.20 (91)	+3%	+$13.50
		Jog/Run	28% (23)	$32.40 (83)	24% (20)	$15.95 (84)	-4%	-$16.45
		All Modes	26% (94)	$14.22 (356)	31% (129)	$16.92 (412)	+5%	+$2.70
	Female	Bike	37% (33)	$26.54 (90)	38% (44)	$14.12 (117)	+1%	-$12.42
		Walk	12% (8)	$2.04 (68)	20% (22)	$6.70 (99)	+8%	+$4.66
		Jog/Run	22% (25)	$7.15 (113)	19% (19)	$20.28 (99)	-3%	+$13.13
		All Modes	25% (67)	$12.26 (273)	27% (86)	$13.70 (318)	+2%	+$1.44
Total	Male	Bike	30% (100)	$11.22 (328)	38% (219)	$14.09 (570)	+8%	+$2.87
		Walk	24% (31)	$15.09 (127)	33% (71)	$28.53 (214)	+9%	+$13.44
		Jog/Run	23% (38)	$24.33 (167)	23% (55)	$18.13 (237)	+0%	-$6.20
		All Modes	28% (174)	$15.49 (631)	34% (353)	$18.70 (1046)	+6%	+$3.21
	Female	Bike	32% (45)	$20.15 (140)	37% (107)	$13.65 (293)	+5%	-$6.50
		Walk	24% (44)	$8.67 (185)	31% (89)	$13.72 (289)	+7%	+$5.05
		Jog/Run	24% (50)	$18.00 (205)	19% (52)	$11.23 (269)	-5%	-$6.77
		All Modes	26% (141)	$15.45 (534)	29% (250)	$12.91 (856)	+3%	-$2.54

Table 42 Proportion of Respondents Who Purchased Goods and Services During Trip on ATT and Average Expenditures Made by Trail Segment and Mode

	Mode	2013 % Respondents Made Purchase (n)	2013 Average Expenditure (n)	2014 % Respondents Made Purchase (n)	2014 Average Expenditure (n)	Difference %	Difference $
North	Bike	34% (58)	$18.36 (169)	38% (199)	$14.67 (520)	+4%	-$3.69
	Walk	28% (55)	$12.85 (193)	37% (115)	$21.21 (314)	+9%	+$8.36
	Jog/Run	22% (40)	$23.65 (180)	21% (68)	$12.29 (323)	-1%	-$11.36
	All Modes	29% (158)	$18.24 (551)	33% (388)	$16.44 (1173)	+4%	-$1.80
South	Bike	29% (91)	$12.31 (311)	37% (127)	$12.78 (344)	+8%	+$0.47
	Walk	16% (20)	$8.26 (126)	24% (45)	$17.86 (191)	+8%	+$9.60
	Jog/Run	24% (48)	$17.66 (198)	21% (39)	$18.30 (183)	-3%	+$0.64
	All Modes	25% (161)	$13.12 (641)	29% (215)	$15.48 (732)	+4%	+$2.36
Total	Bike	31% (149)	$14.44 (480)	38% (326)	$13.92 (864)	+7%	-$0.52
	Walk	24% (75)	$11.04 (319)	32% (160)	$19.94 (505)	+8%	+$8.90
	Jog/Run	23% (88)	$20.51 (378)	21% (107)	$14.46 (506)	-2%	-$6.05
	All Modes	27% (319)	$15.47 (1193)	32% (603)	$16.07 (1905)	+5%	+$0.60