

Evaluating the **ECONOMIC IMPACT**

of Shared Use Paths
in North Carolina



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TECHNICAL MEMORANDUM: BREVARD GREENWAY YEAR ONE



Acknowledgements

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1. BACKGROUND

Historically, North Carolina has been known as the “Good Roads State,” due to the high quality and connectivity of its state roads system. There is a movement stirring to add a new moniker to North Carolina’s accolades by positioning itself as the “Great Trails State.” This project quantifies the economic contribution that these trails provide through outdoor recreation and transportation options and how these activities may impact local and state economies through tourism, events, urban redevelopment, community improvement, property values, health care savings, jobs, investment, and general consumer spending.

Currently, much of North Carolina’s overall mileage of shared use paths (SUPs) remains in the planning phase. While construction is occurring, the information gleaned through this project’s case studies will assist in the evaluation of these expenditures and may influence decisions for further investment in SUPs for the development of more extensive trails and networked systems across the state. Methodologies developed through this project will assist in easier duplication of research efforts on economic contributions as new trails are opened or expanded, and research products from this project can serve as the basis for studies of these SUPs in the future. Additionally, as similar data are consistently collected and analyzed across the state, this project allows NCDOT to ultimately pull datasets together to compare economic activity from SUPs across regions or understand statewide trends.

The Brevard Greenway in Brevard, North Carolina is one of four SUPs under study in this project. It has been selected as one of two trails to test the consistency of the study’s methodologies over time. The

following provides a summary of Year 1 findings for the Brevard Greenway.

LAND USE OVERVIEW

The Brevard Greenway is a 5-mile shared use path that joins Pisgah National Forest to the town of Brevard, North Carolina. Beginning at the Davidson River Campground, an approximately one mile portion of the trail follows the old Carr Lumber Company railway corridor as it parallels the Davidson River and connects to North Carolina’s Mountains-To-Sea Trail. In total, the Brevard Greenway traverses a national forest, a campground, commercial areas, parkland, sporting fields, a community college, and residential neighborhoods. The path provides a link to forest trails and is popular with mountain bicyclists as well as birdwatchers.

A new connection constructed in Spring 2015 now links a regional brewery and a residential neighborhood to the trail. There is a plan to connect the path to the downtown business district, Brevard Music Center, and Bracken Mountain trail system. The Ecusta Trail is also planned to connect with the Brevard Greenway once complete.

The trail is relatively flat and has signage to indicate non-motorized travelers are present. A large portion of the trail also features high visibility crosswalks. The trail is paved with the exception of one mile of crushed gravel on the northwest section that connects to Pisgah National Forest.

2. MEMORANDUM OBJECTIVES

The findings presented in this document are from research that was conducted in Year 1 of the three-year study. The Brevard Greenway is one of two SUPs that will be examined longitudinally with two days of data collection in three separate years (2015, 2016, and 2017). This memorandum provides summary statistics for behaviors

and trail usage on the entire SUP for the following topic areas:

- Transportation: baseline travel behaviors
- Physical Fitness and Health: duration and extent of active behaviors
- Economy: expenditures related to usage of the shared use path

The data collected on these categories will provide inputs for a series of models that will estimate economic benefits (such as benefits resulting from annual trail user expenditures, retail sales tax, capital and operational expenditures, and property values and property taxes), as well as health benefits, and congestion and pollution reduction benefits related to the existence of the shared use path.

Counts and surveys were conducted on one weekday and one weekend day in October 2015. Bicyclists and pedestrians using the trail were surveyed at three locations distributed across the entire length of the trail.

Information that was gathered included:

- Trail origin and destination points to derive distance and direction of travel on the trail
- Purpose of trip – exercise/recreation/ sightseeing, work/school commute, dining/shopping/errands, cultural attraction/entertainment/leisure activity
- Trip mode – mode of arrival at the trail (e.g. auto, bike, foot, bus, other) and mode

of travel on the trail (e.g. walk, run, bike, other)

- Physical activity indicators – duration of active travel, quantity of typical monthly active travel by trip purpose
- Economic activity indicators – amount spent on goods or services during trail trip
- Respondents’ living status in the area and demographic information

The research team also counted greenway users and noted additional characteristics such as:

- Type of user – bicyclist, runner, walker, other mode
- Direction of travel – north or south
- Age – adult or child
- Gender
- Group size

3. METHODS

The research team conducted counts and intercept surveys in October 2015 during twelve daylight hours from 7AM-7PM on one weekday and one weekend day. Dates were selected to avoid special events and Fridays to remove the potential for variation in typical volumes of non-motorized traffic. Data collection was stopped, delayed, or rescheduled as required due to rain events. Figure 1 provides a map of the three locations where counts and intercept

TABLE 1: DATA COLLECTION SCHEDULE AND SUMMARY STATISTICS

DAY OF WEEK	DATE	TIME PERIOD	STATION	LOCATION	2015 COUNTS	2015 SURVEYS
Wednesday	10/14/2015	7AM to 7PM	1	US 64 Intersection	164	49
			2	Transylvania Activity Center	189	60
			3	McDonald's	152	28
Saturday	10/17/2015	7AM to 7PM	1	US 64 Intersection	282	89
			2	Transylvania Activity Center	182	33
			3	McDonald's	59	11
TOTALS					1,028	270



surveys were collected. Locations with designated parking areas and official trail access points were primarily selected for data collection. The three data collection stations were approximately equidistant from one another.

USER COUNTS

Manual screenline counts at three locations along the entire length of the trail allowed the research team to record information needed to obtain user profiles and determine user flows. The data collection form used by the research team to conduct user counts can be found in Appendix A.

INTERCEPT SURVEYS

The research team intercepted users to solicit survey responses at the same three locations along the trail where manual screenline counts were collected. The survey form gathered information about the behavior and demographics of trail users. Survey sites were outfitted with a water cooler and yard signs on each approach instructing trail users to “slow down” for the “survey ahead” as they approached the site. Only individuals aged 18 years and older were surveyed with one survey distributed per household for household members traveling together on the trail. Appendix B provides an example of the survey form used.

FIGURE 1: MAP OF DATA COLLECTION STATIONS ON THE BREVARD GREENWAY

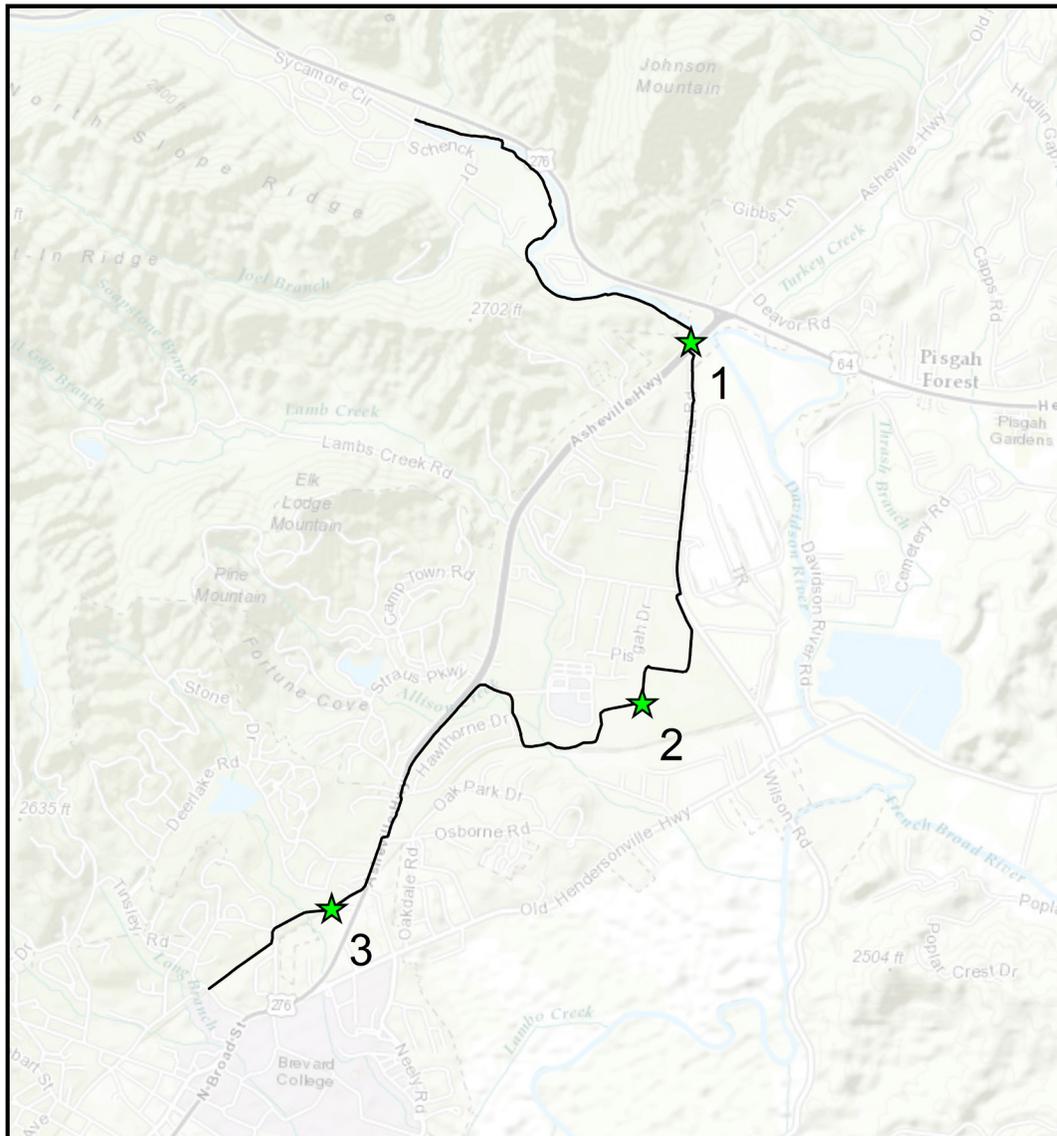


Table 1 summarizes the data collection effort indicating the data collection period, survey/count location on the trail, the raw number of users counted, and the raw number of users intercepted to fill out a survey while using the trail. A total of 1,028 counts were collected during the survey period, and 270 surveys were completed.

4. RESULTS

Results have been compiled for overall use of the trail based on the aggregated data collected at the ten survey/count stations. Findings include users' demographics, their usage of the trail, and transportation, economic, and health aspects of trail use. The preliminary findings provided have not been tested for statistical significance. These results will be further evaluated for significance and for comparative analysis once all years of data collection are complete.

TRAIL USER DEMOGRAPHICS

Table 2 shows the **percentages of surveyed trail users and counts by gender and age group** for Brevard Greenway users and counts overall:

- In general, a greater percentage of males than females used the trail.
- Nearly half of those surveyed were over the age of 55.

Table 3 provides **additional demographic information for the surveyed trail users**, including education level, annual household income, and race.

TABLE 2: SURVEYED TRAIL USER AND COUNT DEMOGRAPHICS - GENDER AND AGE

DEMOGRAPHIC	2015 SURVEYED USERS (N)	2015 COUNTS (N)
Male	53% (139)	51% (525)
Female	47% (123)	49% (497)
Age 18-25	9% (23)	7% (57)
Age 26-55	46% (115)	47% (388)
Age >55	45% (112)	46% (378)



- One-fifth (21%) of surveyed trail users completed some college or business/technical school, while the majority of surveyed trail users completed college or earned an advanced degree (72%).
- Nearly all surveyed trail users were white (98%) and earned annual household incomes less than \$75,000 (59%).

number of survey/count stations passed according to user reported trail origin, turnaround, and destination points to avoid overestimating or ‘double/multi-counting’ unique users of the trail. A summary of the methods used to adjust the counts to unique users can be found in Appendix C.

Survey user type data were compared to manual count user type data to determine if the survey responses could be considered representative of the population of trail users during the data collection period. Count data were adjusted based on the survey responses indicating the percentage of trips that were round trips and the

TABLE 3: SURVEYED TRAIL USER DEMOGRAPHICS - EDUCATION, ANNUAL HOUSEHOLD INCOME, AND RACE

DEMOGRAPHIC	2015 SURVEYED USERS (N)
Some High School	1% (2)
Completed High School	6% (14)
Some College	17% (41)
Completed Business/Technical School	4% (10)
Completed College	35% (86)
Advanced Degree	37% (90)
Less than \$25,000	16% (32)
\$25,000-\$34,999	9% (18)
\$35,000-\$49,999	11% (23)
\$50,000-\$74,999	23% (47)
\$75,000-\$99,999	16% (33)
\$100,000-\$149,999	15% (31)
\$150,000-\$199,999	5% (10)
\$200,000 or more	5% (11)
White	98% (244)
Black	1% (2)
Asian	1% (3)
Native Hawaiian or Pacific Islander	<1% (1)
American Indian	0% (0)

Table 4 provides the **percentages of surveyed users, counts, and unique users by travel mode on the trail during the survey period.** Comparing data across the columns shows the degree to which those surveyed represent a proportionate sample of all those using the trail. Note that while children less than 18 years of age were counted, they were not surveyed.

- In general, surveyed user proportions are similar to unique user proportions by mode.
- The proportion of counted bicyclists is much greater than the proportion of surveyed and estimated unique bicyclists. This is likely due to the longer distances

TABLE 4: ALL TRAIL USERS DURING SURVEY PERIODS - TRAVEL MODE ON TRAIL

MODE	DAY	2015 SURVEYED USERS (N)	2015 COUNTS (N)	2015 UNIQUE USERS (N)
Bike	Wed	23% (31)	25% (126)	22% (52)
	Sat	30% (40)	38% (199)	42% (115)
Walk	Wed	57% (77)	59% (298)	63% (152)
	Sat	45% (60)	40% (211)	41% (111)
Jog/Run	Wed	20% (27)	15% (73)	14% (34)
	Sat	24% (32)	21% (108)	17% (47)
All Other Modes	Wed	1% (1)	1% (6)	1% (2)
	Sat	0% (0)	1% (3)	0% (0)



traveled by bicyclists on average, which allows an individual cyclist to be surveyed once per data collection day but counted multiple times along the trail.

Table 5 provides data separated by travel mode on the trail, gender, and age group for trail users intercepted during the survey period.

TRAIL USER PROFILES

Information was compiled to investigate the travel modes used both to travel to the trail as well as while traveling on the trail, where trail users live in relation to the trail, whether they used the trail for recreational/non-recreational purposes, the frequency of trail use, and the distance users traveled on the trail.

TABLE 5: COMPARATIVE PERCENTAGES/NUMBERS OF COUNTS AND THOSE SURVEYED, BY TRAVEL MODE ON TRAIL, GENDER, AND AGE

MODE, GENDER, AGE	2015 PERCENTAGE OF SURVEYED USERS (N)	2015 PERCENTAGE OF COUNTS (N)
Bicycle, M, 18-25	1% (2)	1% (9)
Bicycle, M, 26-55	13% (32)	13% (106)
Bicycle, M, >55	4% (10)	4% (36)
All Bicycle, Male	17% (44)	20% (202)
Bicycle, F, 18-25	<1% (1)	<1% (2)
Bicycle, F, 26-55	7% (16)	7% (57)
Bicycle, F, >55	3% (7)	5% (37)
All Bicycle, Female	10% (27)	12% (121)
Walker, M, 18-25	3% (7)	1% (10)
Walker, M, 26-55	7% (17)	7% (58)
Walker, M, >55	14% (34)	14% (112)
All Walker, Male	24% (62)	22% (219)
Walker, F, 18-25	<1% (1)	1% (5)
Walker, F, 26-55	7% (16)	8% (61)
Walker, F, >55	19% (45)	20% (161)
All Walker, Female	26% (67)	28% (286)
Jogger/Runner, M, 18-25	2% (6)	2% (17)
Jogger/Runner, M, 26-55	6% (15)	7% (53)
Jogger/Runner, M, >55	3% (7)	2% (15)
Jogger/Runner, Male	12% (31)	9% (93)
Jogger/Runner, F, 18-25	2% (5)	2% (13)
Jogger/Runner, F, 26-55	7% (17)	6% (50)
Jogger/Runner, F, >55	2% (5)	1% (11)
Jogger/Runner, Female	11% (28)	9% (88)

Table 6 shows information on **“Local” versus “Non-Local” point of trip origin** by travel mode on the trail. “Local” is defined as zip code areas through which the Brevard Greenway passes (28768, 28712). “Non-Local” is defined as all other zip code areas.

- In general, more Local people used the trail, with the highest percentage being those who walk on the trail (68%).
- The highest proportion of Non-Local trail users is bicyclists (58%).

Trail users were asked about their **frequency of use** of the trail. The figures shown in Table 7 are averages of the total trips taken in the past 14 days as reported by survey respondents. As shown in the table, most of those surveyed used the trail several times during the previous two week period.

- On average, use of the trail during the previous two weeks was similar across all modes, with an average of six trips in the past 14 days for all modes.
- Surveyed bicyclists were the most frequent trail users, averaging one trip every other day.

Table 8 provides information on the **distance traveled** on the Brevard Greenway by travel mode on the trail and Table 9 provides information on the **distance traveled** on the Brevard Greenway by gender and travel mode on the trail. The figures reported in the table are average trip distances in miles. Cases in which inadequate data was provided to compute trip distance were not included.

- Bicyclists traveled greater distances than those traveling by other modes. Distance traveled varied directly with the relative speed of each mode.
- Female bicyclists traveled the greatest distances on the trail.
- Females tended to travel slightly longer distances than males for each mode.

TABLE 6: TRIP POINT OF ORIGIN BY TRAVEL MODE ON TRAIL

MODE	2015 LOCAL (N)	2015 NON-LOCAL (N)
Bike	42% (30)	58% (41)
Walk	68% (90)	32% (43)
Jog/Run	52% (30)	48% (28)
All Modes	57% (151)	43% (112)

TABLE 7: AVERAGE NUMBER OF TRIPS IN THE PAST 14 DAYS

MODE	AVERAGE NUMBER OF TRIPS	(N)
Bike	7	38
Walk	6	90
Jog/Run	5	48
All Modes	6	177

TABLE 8: AVERAGE TRIP DISTANCE (IN MILES) BY TRAVEL MODE ON TRAIL

MODE	2015 AVERAGE MILES TRAVELED (N)
Bike	3.8 (71)
Walk	2.1 (135)
Jog/Run	3.5 (59)
All Modes	2.9 (266)

TABLE 9: AVERAGE TRIP DISTANCE (IN MILES) BY GENDER AND TRAVEL MODE ON TRAIL

GENDER	MODE	2015 AVERAGE MILES TRAVELED (N)
Male	Bike	3.7 (44)
	Walk	2.0 (61)
	Jog/Run	3.4 (31)
	All Modes	2.9 (137)
Female	Bike	4.1 (27)
	Walk	2.2 (67)
	Jog/Run	3.7 (28)
	All Modes	2.9 (122)



TRANSPORTATION IMPACTS

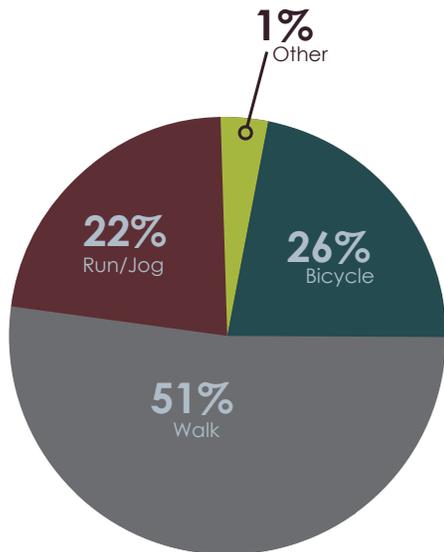
Analysis of transportation-related factors included:

- Mode used to travel on the trail
- Primary trip purpose
- Frequency of round trips versus one-way trips
- Mode used to travel to the trail
- Trail access points

Analysis of survey responses found differences in **proportions of users by travel mode on the trail**, as shown in Figure 2.

- The majority of trail users traveled on the trail by foot (73%).

FIGURE 2: TYPE OF USER BY TRAVEL MODE ON TRAIL



Given the relatively high use of the trail for exercise/recreational purposes (86% of trips – see Table 10), it is not surprising that most travel involved a roundtrip, not a one-way trip on the trail, as illustrated in Table 11.

- Across all modes, the majority of trips were roundtrips.

TABLE 10: PRIMARY TRIP PURPOSE

PRIMARY TRIP PURPOSE	2015 PERCENTAGE OF SURVEYED USERS (N)
For exercise/recreation/sightseeing	86% (232)
Travel to/from work or school	3% (8)
Travel to/from dining/shopping/running errands	8% (21)
Travel to/from cultural attraction/entertainment/leisure activity	3% (9)

TABLE 11: TRIP TYPE

MODE	2015 ROUNDRIP (N)	2015 THROUGHTRIP (N)
Bike	70% (50)	30% (21)
Walk	96% (132)	4% (5)
Jog/Run	100% (59)	0% (0)
All Modes	90% (242)	10% (26)

TABLE 12: MODE TO THE TRAIL BY MODE USED ON TRAIL

MODE ON TRAIL	MODE TO TRAIL		
	2015 by Bicycle (n)	2015 by Car (n)	2015 by Foot (n)
Bike	64% (43)	36% (24)	0% (0)
Walk	0% (0)	82% (110)	18% (24)
Jog/Run	0% (0)	79% (46)	21% (12)
All Modes	17% (43)	69% (180)	14% (36)

TABLE 13: TOP FIVE ACCESS POINTS ON THE BREVARD GREENWAY

ACCESS POINT DESCRIPTION	PERCENT SURVEYED (N)
Lowe’s Parking Lot Driveway Intersection North	23% (63)
Brevard Sports Complex Driveway	14% (37)
Art Loeb Trailhead	12% (31)
Trail Terminus at McLean Road	8% (21)
Davidson River Bridge	5% (14)

The survey also revealed the **mode by which trail users traveled to the trail**. Table 12 provides information on the access modes used to travel to the trail by all survey respondents, sorted by mode of travel on the trail. The percentages shown are calculated by row to reflect the shares of travel to the trail according to the mode used on the trail.

- Over two-thirds of those using the trail traveled to the trail by car while the other third used a mode of active transportation. 81% of respondents traveling by foot on the trail accessed the trail by car compared to 36% of respondents traveling by bicycle.
- 31% of respondents used an active mode of transportation to access the trail.
- Bicyclists were more likely to bicycle to the trail than drive to the trail.

The survey also provided information on **where trail users were accessing the trail**. Table 13 includes the top five access points on the trail according to where survey respondents accessed the trail.

- Nearly a quarter of respondents accessed the trail from the northernmost Lowe’s parking lot driveway intersection.
- Nearly the same number of respondents accessed the trail from the Brevard Sports Complex driveway as from the Art Loeb trailhead.



ECONOMIC IMPACTS

The users of the trail can have an impact on businesses through expenditures on a variety of goods and services. The survey asked trail users to list expenditures on goods or services directly related to their trip on the trail on the day of the survey. If a trail user was traveling with members of their household, estimates represent the total for their household.

The results are shown in the following table. Table 14 shows **trail users' expenditures related to their trip on the Brevard**

respondents made a retail-related purchase with an average cost of \$47, and only one respondent made an entertainment-related purchase with a cost of \$10.

PUBLIC HEALTH IMPACTS

Increasing physical activity among children and adults is a national health objective in the United States. Access to facilities, such as trails, is one of the factors positively associated with physical activity. Information compiled that relates to public

TABLE 14: TYPE OF AND AVERAGE EXPENDITURE BY USER GROUP

BREVARD USER GROUP	Restaurant			Grocery			Retail			Entertainment			Bike Rental		
	Respondents	% of Respondents	Average Expenses	Respondents	% of Respondents	Average Expenses	Respondents	% of Respondents	Average Expenses	Respondents	% of Respondents	Average Expenses	Respondents	% of Respondents	Average Expenses
Bicycle	61	66%	\$27	60	23%	\$30	61	10%	\$43	61	0%	\$ -	61	7%	\$70
Jog/Run	40	20%	\$15	40	28%	\$35	40	3%	\$100	40	0%	\$ -	40	0%	\$ -
Walk	115	21%	\$15	115	14%	\$31	114	8%	\$44	115	1%	\$10	115	0%	\$ -
Total	217	37%	\$20	216	19%	\$32	216	7%	\$47	217	<1%	\$10	217	2%	\$70

Greenway categorized by the type of expenditure and separated by user group.

- Food-related expenditures were the most common among surveyed trail users. The largest percentage of respondents made purchases at a restaurant. 37% of respondents made a restaurant-related purchase with an average cost of \$20, and 19% of respondents made a grocery-related purchase with an average cost of \$32.
- Retail and entertainment purchases were less common. Only 7% of

health impacts from user of the Brevard Greenway included:

- The percentage of trail users who indicated exercise as their primary trip purpose
- The mode of activity users engaged in while on the trail
- The average duration of each activity by user type

Table 15 indicates users' **primary trip purpose**. Non-recreational trip purposes included work, school, shopping, restaurant, and entertainment trips. It is important to

note that users on the trail whose purpose was not primarily exercise/recreation were still engaging in physical activity while on the trail.

- Overall, 86% of all users on the Brevard Greenway indicate their primary trip purpose as exercise/recreation.

Table 16 indicates the **duration of the active portion of a trail user’s trip** (in minutes) by mode traveled on the trail. The total active portion of a trail user’s trip was self-reported on the survey and may include time spent actively traveling to or from the trail. This table includes respondents who did not indicate gender so overall totals vary slightly from those reported in Table 17.

- The average duration of the active portion of the trip for all users surveyed on the trail was 62 minutes.
- Bicyclists reported the highest average duration of the active portion of the trip (89 minutes) compared to walkers (53 minutes) and joggers/runners (53 minutes).

Table 17 breaks out the **duration of the active portion of a user’s trip by gender and travel mode on the trail**. Respondents that did not indicate gender are excluded from the data in the table.

- Male bicyclists reported spending an average of more than 30 minutes more traveling on the Brevard Greenway than female bicyclists.
- Female walkers and joggers/runners reported spending an average of more than 20 minutes more traveling on the trail than male walkers and joggers/runners.

TABLE 15: RECREATIONAL VERSUS NON-RECREATIONAL TRIP PURPOSES

PRIMARY TRIP PURPOSE	2015 PERCENTAGE OF SURVEYED USERS (N)
For exercise/recreation/sightseeing	86% (232)
Non-recreational (all other trip purposes)	14% (38)

TABLE 16: AVERAGE DURATION (IN MINUTES) OF THE ACTIVE PORTION OF USER’S TRIP

MODE	2015 DURATION (N)
Bike	89 min (69)
Walk	53 min (132)
Jog/Run	53 min (58)
All Modes	62 min (260)

TABLE 17: AVERAGE DURATION (IN MINUTES) OF THE ACTIVE PORTION OF USER’S TRIP BY GENDER AND TRAVEL MODE ON TRAIL

GENDER	MODE	2015 DURATION (N)
Male	Bike	102 min (44)
	Walk	42 min (61)
	Jog/Run	46 min (30)
	All Modes	62 min (136)
Female	Bike	66 min (25)
	Walk	63 min (63)
	Jog/Run	60 min (28)
	All Modes	63 min (116)



Table 18 presents information on the **duration of the active portion of a user's trip in relation to annual household income** to assess the activity of users of differing socio-economic status. Duration of the active portion of the trip may include active travel to/from the trail.

- Individuals with household incomes of less than \$25,000 reported using the trail for an average of 46 minutes.
- The longest duration of activity on average (83 minutes) was reported by those in the >\$200,000 household income bracket.

Table 19 presents information on the **percentage of exercise met by using the trail over the past 14 days by travel mode on the trail.**

- Respondents used the trail to meet 47% of their total exercise on average over the past 14 days.
- A slightly larger percentage of exercise was met by using the trail for walkers compared to joggers/runners and bicyclists.

Table 20 presents information on the **percentage of exercise met by using the trail over the past 14 days by gender and travel mode on the trail.**

- Overall, the average percentage of exercise met by using the trail over the past 14 days was slightly larger for female trail users compared to male trail users. The difference was the greatest for female joggers/runners compared to male joggers/runners.

TABLE 18: AVERAGE DURATION (IN MINUTES) OF THE ACTIVE PORTION OF USER'S TRIP BY ANNUAL HOUSEHOLD INCOME

HOUSEHOLD INCOME	2015 DURATION (N)
<\$25,000	46 min (32)
\$25,000-\$34,999	49 min (22)
\$35,000-\$49,999	63 min (17)
\$50,000-\$74,999	64 min (45)
\$75,000-\$99,999	71 min (33)
\$100,000-\$149,999	72 min (28)
\$150,000-\$199,999	63 min (10)
>\$200,000	83 min (11)

TABLE 19: AVERAGE PERCENTAGE OF EXERCISE MET BY USING THE TRAIL OVER THE PAST 14 DAYS BY TRAVEL MODE ON TRAIL

MODE	2015 PERCENT EXERCISE (N)
Bike	46% (52)
Walk	48% (113)
Jog/Run	46% (55)
All Modes	47% (221)

TABLE 20: AVERAGE PERCENTAGE OF EXERCISE MET BY USING THE TRAIL OVER THE PAST 14 DAYS BY TRAVEL MODE ON TRAIL

GENDER	MODE	2015 PERCENT EXERCISE (N)
Male	Bike	41% (33)
	Walk	45% (48)
	Jog/Run	39% (29)
	All Modes	43% (111)
Female	Bike	56% (19)
	Walk	49% (59)
	Jog/Run	53% (26)
	All Modes	51% (104)

TRAVEL ACTIVITY MAPS

The following maps provide a visualization of travel activity on the Brevard Greenway generated using the user reported trail origin, turnaround, and destination points taken from the surveys. Figure 3 shows where roundtrips for all modes (left) and one-way, throughtrips for all modes (right) occurred on the trail during the survey period. Roundtrips and throughtrips occurred on the entire length of the trail. Figure 4 shows where trips occurred on the trail during the survey period by primary trip purpose. The majority of trips

were for exercise/recreation and these trips occurred on the entire length of the trail. Commuting trips were concentrated north of US-267 and south of the Transylvania Activity Center, but happened on most on the trail. Errands trips were reported at consistent levels along almost the entire trail except for a small portion of the trail that runs adjacent to US-267, where no errand-related travel activity was reported. Figures 5-7 show travel activity on the trail by mode on the trail, and include the average trip duration and average miles traveled for each mode.

FIGURE 3: ROUNDTrip (LEFT) AND THROUGHTRIP (RIGHT) TRAVEL ACTIVITY FOR ALL MODES - 90% OF REPORTED TRIPS WERE ROUNDTrips AND 10% OF REPORTED TRIPS WERE THROUGHTRIPS

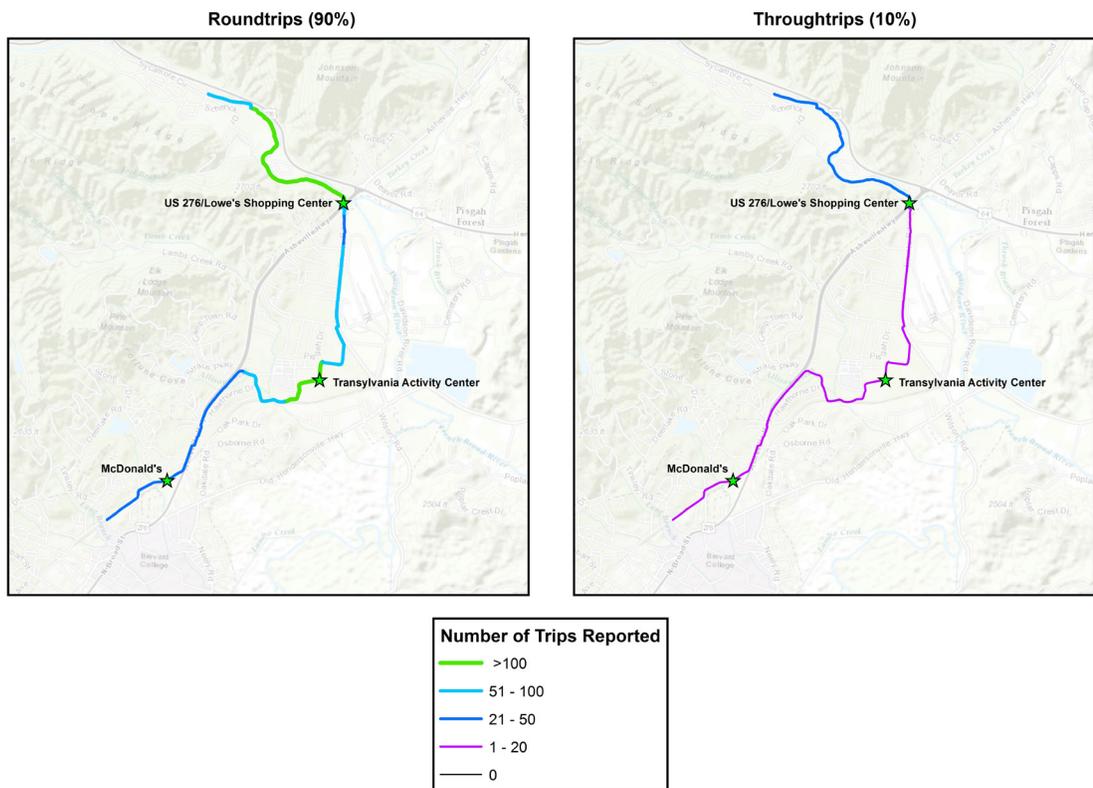


FIGURE 4: COMMUTE (TOP LEFT), ERRANDS (TOP RIGHT), AND EXERCISE/RECREATION (BOTTOM LEFT) TRAVEL ACTIVITY FOR ALL MODES - 3% OF REPORTED TRIPS WERE COMMUTE TRIPS, 8% OF REPORTED TRIPS WERE ERRANDS TRIPS, AND 86% OF REPORTED TRIPS WERE FOR EXERCISE/RECREATION

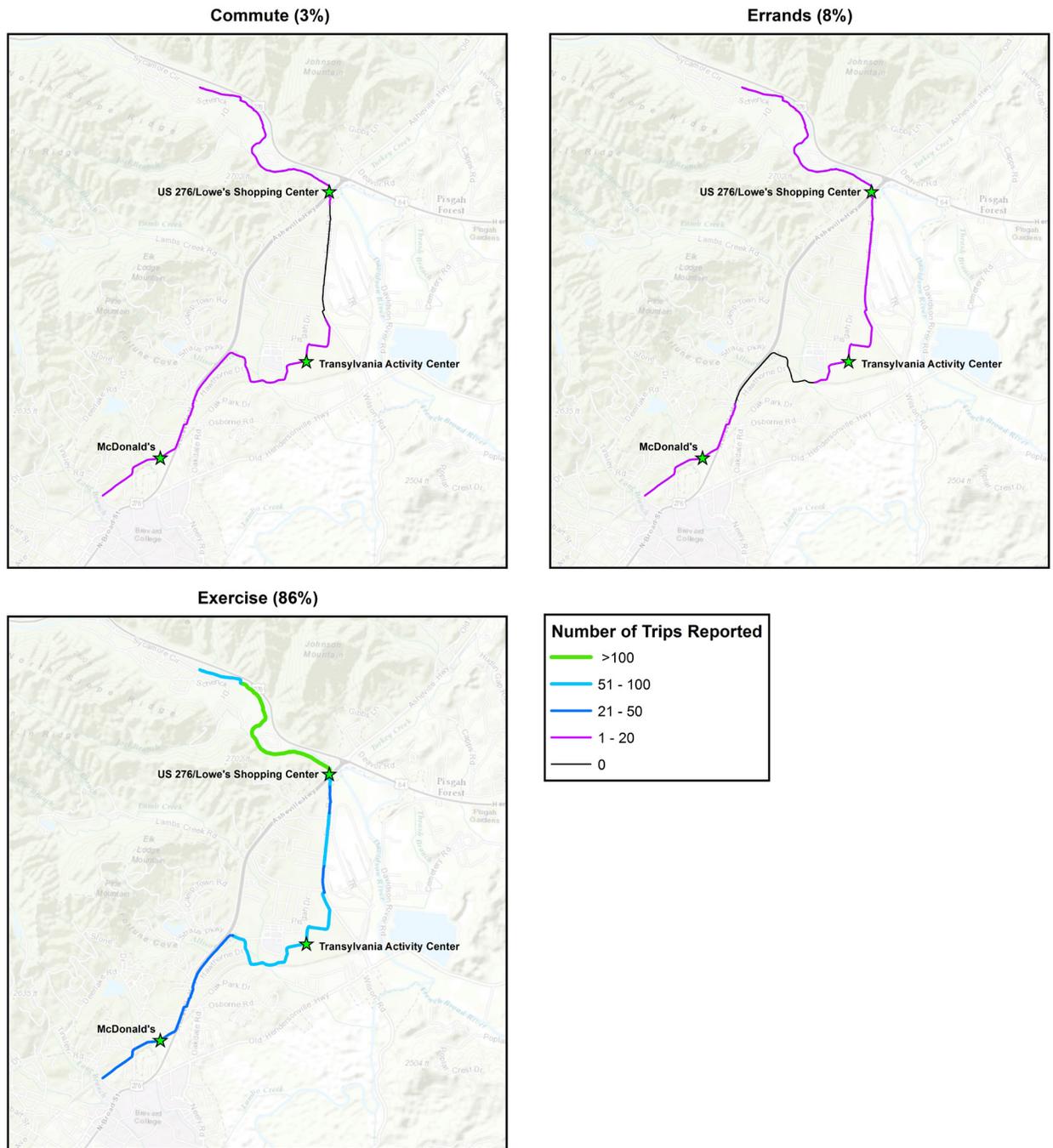


FIGURE 5: ROUNDRIPS (LEFT) AND THROUGHTRIPS (RIGHT) FOR BICYCLISTS - 70% OF REPORTED BICYCLING TRIPS WERE ROUNDRIPS AND 30% OF REPORTED BICYCLING TRIPS WERE THROUGHTRIPS; THE AVERAGE TRIP DURATION FOR BICYCLISTS WAS 89 MIN (102 MIN FOR MALES AND 66 MIN FOR FEMALES); THE AVERAGE DISTANCE TRAVELED BY BICYCLISTS WAS 3.8 MI

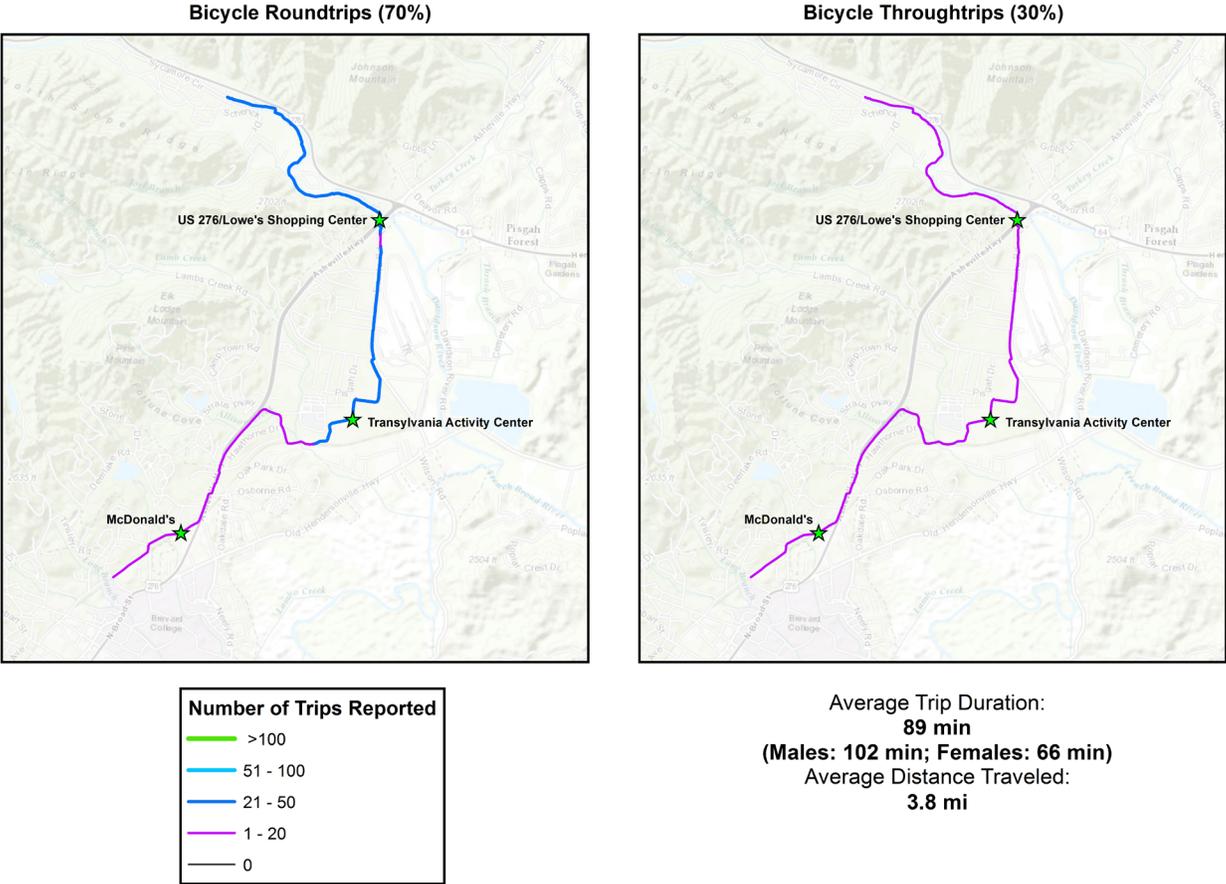


FIGURE 6: ROUNDTrips (LEFT) AND THROUGHTRIPS (RIGHT) FOR RUNNERS - 100% OF REPORTED RUNNING TRIPS WERE ROUNDTrips AND 0% OF REPORTED RUNNING TRIPS WERE THROUGHTRIPS; THE AVERAGE TRIP DURATION FOR RUNNERS WAS 53 MIN (46 MIN FOR MALES AND 60 MIN FOR FEMALES); THE AVERAGE DISTANCE TRAVELED BY RUNNERS WAS 3.5 MI

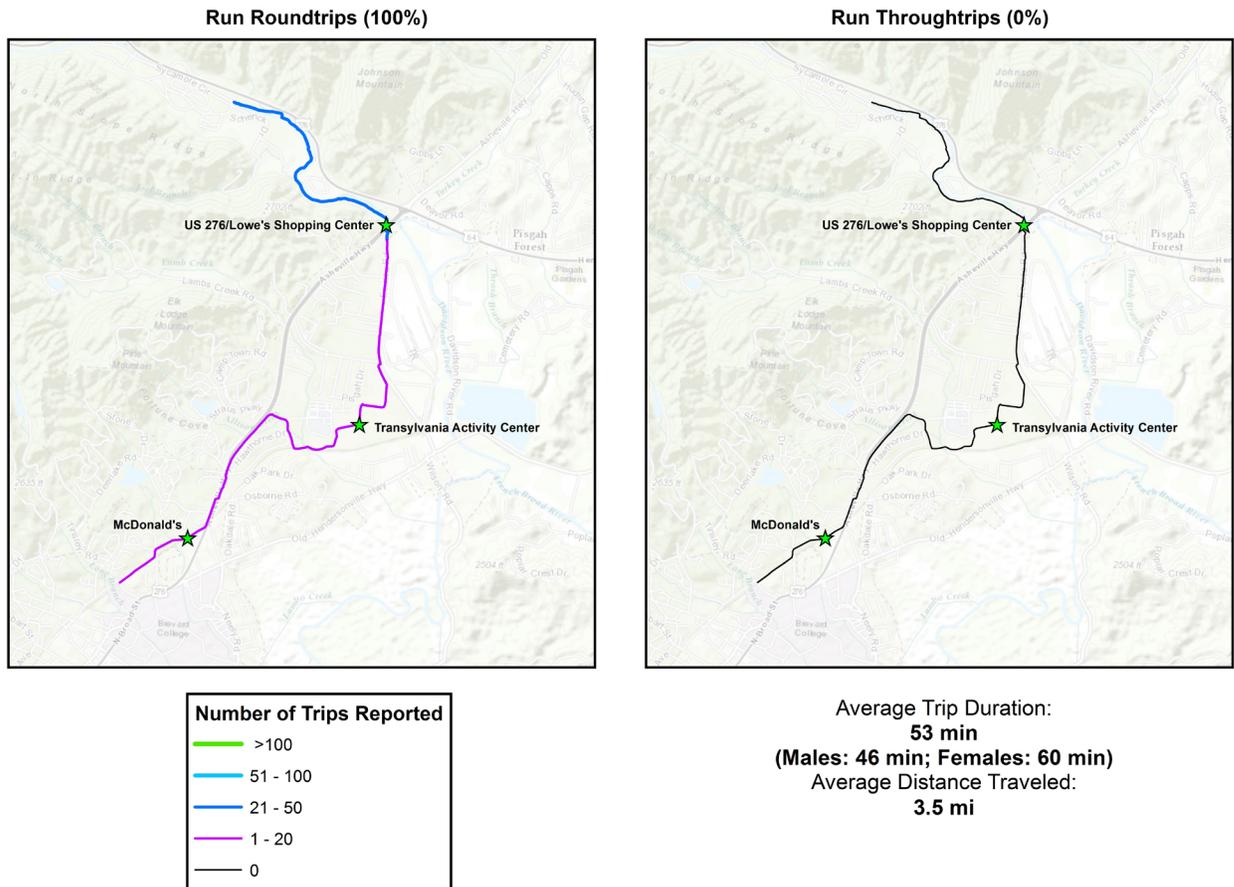
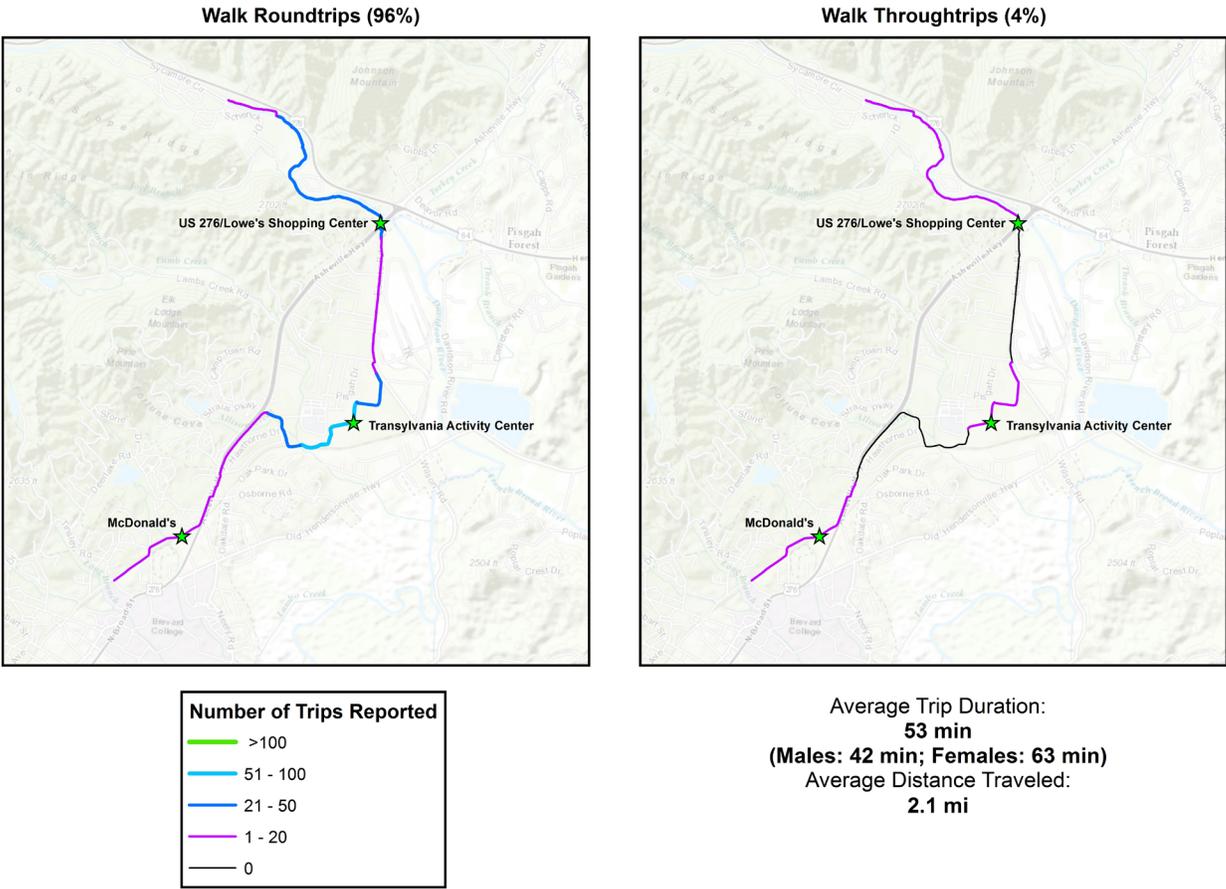


FIGURE 7: ROUNDRIPS (LEFT) AND THROUGHTRIPS (RIGHT) FOR WALKERS - 96% OF REPORTED WALKING TRIPS WERE ROUNDRIPS AND 4% OF REPORTED WALKING TRIPS WERE THROUGHTRIPS; THE AVERAGE TRIP DURATION FOR WALKERS WAS 53 MIN (42 MIN FOR MALES AND 63 MIN FOR FEMALES); THE AVERAGE DISTANCE TRAVELED BY WALKERS WAS 2.1 MI



5. NEXT STEPS

This memorandum presents initial findings from an analysis of the data from the Year 1 surveys and manual counts. Some additional analysis will be required to test for statistical significance of differences among responses in various mode and/or demographic categories.

Preparation is underway to conduct the Year 2 surveys and manual counts in May 2016. Lessons learned from conducting, compiling, and analyzing the data from the 2015 surveys will be applied to the 2016 surveys and data analysis. Once the 2016 data have been collected and compiled, the analysis of differences between the Year 1 and Year 2 data will take place. Additional analyses, including economic valuation analyses such as calculation of retail sales tax benefits, property value and property tax benefits, capital and operational expenditures, as well as congestion, pollution reduction, safety, and health benefits, are in progress.



APPENDIX B: SURVEY QUESTIONNAIRE

Shared Use Path User Survey

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

Site No.

Date

1. Trip Diagram

Start:
(street address, nearby intersection, name of place, business, or neighborhood name)

End:

Destination:
(street address, nearby intersection, name of place, business, or neighborhood name)

3. If this trail were unavailable, which of the following would best describe your course of action for today's trip:

- I wouldn't make the trip
- I would travel to another trail via:
 - Auto Walk/Run/Bicycle Bus
- I would go to my travel destination via:
 - Auto Walk/Run/Bicycle Bus

2. How many minutes on this trip will you be walking/running/bicycling/etc?

Minutes

Trip Purpose	4. What is the main purpose of <u>today's</u> trip? (check one)	5. What is the secondary purpose of <u>today's</u> trip? (check all that apply)
Travel to/from work or school	<input type="checkbox"/>	<input type="checkbox"/>
Travel to/from dining/shopping/running errands	<input type="checkbox"/>	<input type="checkbox"/>
For exercise/recreation/sightseeing	<input type="checkbox"/>	<input type="checkbox"/>
Travel to/from cultural attraction/entertainment/leisure activity	<input type="checkbox"/>	<input type="checkbox"/>

6. Related to today's trip on the trail, 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.

Expenditure Type	Amount	At what business did (will) you make these purchases?
Restaurant meals and drinks	\$	
Groceries/convenience items	\$	
Retail shopping	\$	
Entertainment/admissions	\$	
Bike rental	\$	
Other (specify): _____	\$	

7. When was the first time you used this trail (month and year)?

8. How many trips have you made on this trail in the last 14 days?

9. Allocate those total trips by the following primary purposes (total should sum to answer in #8):

Primary Purpose	No. of Trips by Purpose
Travel to work or school	
Travel to dining/shopping/running errands	
For exercise/recreation/sightseeing	
Travel to cultural attraction/entertainment/leisure activity	

10. Over the past 14 days, what percentage of your exercise was met by using this trail?

_____ %

11. How many people are traveling with you on the trail today?

_____ Check if with you on today's trip: Stroller
 Pet

12. How many people from your household are traveling with you today? (if different from response to # 11)? _____

15. Tell us about who is on the trail with you today from your household or those in your responsible care:

	You	Person 2	Person 3	Person 4	Person 5	Person 6	Person 7
Age							
Gender	<input type="checkbox"/> Male <input type="checkbox"/> Female						
Travel Mode	<input type="checkbox"/> Walk <input type="checkbox"/> Run/Jog <input type="checkbox"/> Bicycle <input type="checkbox"/> Other:	<input type="checkbox"/> Walk <input type="checkbox"/> Run/Jog <input type="checkbox"/> Bicycle <input type="checkbox"/> Other:	<input type="checkbox"/> Walk <input type="checkbox"/> Run/Jog <input type="checkbox"/> Bicycle <input type="checkbox"/> Other:	<input type="checkbox"/> Walk <input type="checkbox"/> Run/Jog <input type="checkbox"/> Bicycle <input type="checkbox"/> Other:	<input type="checkbox"/> Walk <input type="checkbox"/> Run/Jog <input type="checkbox"/> Bicycle <input type="checkbox"/> Other:	<input type="checkbox"/> Walk <input type="checkbox"/> Run/Jog <input type="checkbox"/> Bicycle <input type="checkbox"/> Other:	<input type="checkbox"/> Walk <input type="checkbox"/> Run/Jog <input type="checkbox"/> Bicycle <input type="checkbox"/> Other:

16. Household Income:
- less than \$25,000
 - \$25,000-\$34,999
 - \$35,000-\$49,999
 - \$50,000-\$74,999
 - \$75,000-\$99,999
 - \$100,000-\$149,999
 - \$150,000-\$199,999
 - \$200,000 and more

17. Education Level:
- Some high school
 - Completed high school
 - Some college
 - Completed college
 - Completed business/technical school
 - Advanced degree

18. Race:
- White
 - Black or African-American
 - American Indian or Alaskan Native
 - Asian
 - Native Hawaiian or Other Pacific Islander

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

City/Town: _____

State/Province: _____ ZIP: _____

14. How do you define your living status in the area?

- Permanent Resident
- Seasonal Resident
- Visitor - If checked, my stay is _____ days

Visitors ONLY: How important was this trail in your decision to visit the area?

- Not important
- Somewhat important
- Very important

Visitors ONLY: How much will your household spend on your entire visit, excluding transportation to/from the area? (include all spending on lodging/hotels, foods, retail items, entertainment, etc.)

\$ _____

Conducted by:




NC STATE UNIVERSITY

On behalf of:




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



APPENDIX C: UNIQUE USERS ESTIMATION METHODOLOGY

Because it is uncommon for people to travel the entire length of the Brevard Greenway 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- or multi-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. The number of times a user is likely to be over counted increases as the number of survey-and-count stations increases. For the 2015 data collection period, three survey-and-count stations were used in order to provide coverage for the entire five-mile length of the trail. This means that a single user could be counted up to six times for a roundtrip or three times for a one-way, throughtrip. The amount of times a user is over counted is directly related to trip distance, which is tied to a user's travel mode, i.e. bicyclists tend to travel further distances than joggers/runners and walkers, and joggers/runners tend to travel further distances than walkers.

Because several stations were used for data collection on the Brevard Greenway, determining the number of unique users involves several calculations based on survey responses and manual count data. The following calculation steps are required for each data collection weekday and weekend day by travel mode on the trail to generate the number of unique users by mode for each data collection day:

1. Determine number of stations passed for each intercepted user based on the station where a user was intercepted

2. Determine the number of users by number of stations passed based on the station where a user was intercepted
3. Determine the number of and proportion of roundtrips and throughtrips intercepted at each station
4. Determine the ratio of users by the number of stations passed to the total number of users intercepted at each station for roundtrips and for throughtrips
5. Determine the number of roundtrip and throughtrip counts collected at each station by adjusting by the proportion of roundtrips and throughtrip surveys collected at each station
6. Adjust the number of roundtrip and throughtrip counts collected at each station by the ratio of users by number of stations passed to the total number of users intercepted at each station to generate the number of unique users by number of stations passed

Note that the adjustments for users 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 total data collection period – some individuals may have visited the Brevard Greenway 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, throughtrips. Unique users can be understood only on a per day basis. For the Wednesday data collection date in 2015, 52 unique bicyclists and 186 unique pedestrians (34 joggers/runners; 152 walkers) are estimated to have used the trail. For the Saturday data collection date in 2015, 115 unique bicyclists and 158 unique pedestrians (47 joggers/runners; 111 walkers) are estimated to have used the trail.