Economic Impact of Bicycle Facilities in Hampton Roads

Phase One: Literature Review, Benchmarking, and Analysis of Existing Data

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REPORT DOCUMENTATION

TITLE
Economic Impact of Bicycle Facilities in Hampton Roads
Phase One: Literature Review, Benchmarking, and Analysis of Existing Data

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ABSTRACT
An economic impact analysis inspects the effect of an event on the economy in a specified area, usually measuring changes in revenue, profits, personal wages, and/or jobs. The purpose of the study is to measure the impact of bicycle facilities on local economy.

In order to measure economic impact of bicycle facilities, HRTPO staff conducted a literature review, which served as a guide for this study, and then prepared benchmarking criteria, chose competitor cities (with the help of project steering team), and did an analysis of existing data including: path length, number of bike shops, bicycle event spending.

PROJECT STEERING TEAM
This document was prepared by the Hampton Roads Transportation Planning Organization (HRTPO) with the help of the following steering committee:

Carolyn Murphy	Williamsburg
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Prepared in cooperation with the U.S. Department of Transportation (USDOT), Federal Highway Administration (FHWA), and Virginia Department of Transportation (VDOT). The contents of this report reflect the views of the Hampton Roads Transportation Planning Organization (HRTPO). The HRTPO is 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 FHWA, VDOT or Hampton Roads Planning District Commission. This report does not constitute a standard, specification, or regulation. FHWA or VDOT acceptance of this report as evidence of fulfillment of the objectives of this planning study does not constitute endorsement/approval of the need for any recommended improvements nor does it constitute approval of their location and design or a commitment to fund any such improvements. Additional project level environmental impact assessments and/or studies of alternatives may be necessary.

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EXISTING LITERATURE

Information to Guide HRTPO Study

The HRTPO staff received a request from the city of Williamsburg to develop an economic impact study of bike facilities. For the purpose of better familiarizing themselves with the topic, the HRTPO staff conducted a literature review of approximately 35 studies involving economic impact of bicycle facilities/biking.

After collecting the studies from the internet and reading them, a table was generated for the purpose of summarizing data. Table has 10 columns, and within each column appropriate information regarding studies:

- Title-study name
- Author-person(s) who conducted the study
- Year-when the study was published
- Treatment-whether authors are observing a specific trail or a trail network
- Location-where the trail or trail network is located
- Measures calculated-parameters obtained from the analysis (just the data collected or some variables obtained from model application)
- Methods used-type and name of the model used
- Input data used-information needed to run the model
- Input data sources-ways of collecting data
- Key findings-conclusions

Table is shown in Figure 1 which spans the next 34 pages.

	Burlington Waterfront Path and the Island Line Trail The Island Line Trail is a 12.5 mile trail that runs along Lake Champlain from Burlington to Colchester. Due to scenic views downtown and lakeshore it has a relatively high activity.
Title	Estimating Tourism Expenditures for the Burlington Waterfront Path and the Island Line Trail
Author	UVM (University of Vermont) Transportation Research Center; Chen Zhang, Lance Jennings, Lisa Aultman-Hall
Year	2010
Location	Burlington, Vermont
Measures calculated	See "Input data used"
Methods used	See "Input data used"
Input data used	Continuous 24-hour automatic count data from CCMPO, observational counts, interviews from users were used to determine home of users and expenditures
Input data sources	Surveys in collaboration with local volunteers, data from CCMPO
Key Findings	Highest estimated spending, a total of $2.5 million, was associated with visitors observed at the waterfront location of the trail during weekdays. A substantial number of users, 18% to 49% are visitors to the area

Figure 1 Literature review table (continued)

Source: HRTPO analysis of the literature

	Catskill Mountain Rail Trail intended to connect the city of Kingston with Belleayre Ski Resort in Ulster County with the length of 32-38 miles.
Title	Catskill Mountain Rail Trail: Economic & Fiscal Impact Analysis
Author	Camoin Associates, Economic Development
Year	2013
Location	City of Kingston in Ulster County, NY state
Measures calculated	Estimates of new visitors, Visitors spending amount in $, Earnings (Total, Indirect, Direct)
Methods used	Economic Modelling Specialists, Inc. (EMSI) designed the i/o model used. Camoin Ass. used their own methodology explained in the study
Input data used	Visitors counts: Baseline (typical trail usage), extended stay use (increase in visit duration), event use (trail use and visitation as a result of a specific event)
Input data sources	Regional trail use studies, visitor spending surveys, local and regional visitor estimates
Key Findings	Annual sales in Ulster County are $3.1 million and annual earnings are $1.1 million, while supporting 44 jobs. For New York State, annual sales are $1.8 million, annual earning $684,00 and supporting 18 annual jobs

Figure 1 Literature review table (continued)

Source: HRTPO analysis of the literature

	Central Shenandoah Valley bicycle facilities within Shenandoah Valley
Title	Economic Impact of Bicycling in the Central Shenandoah Valley
Author	Central Shenandoah Planning District Commission
Year	2016
Location	Central Shenandoah Valley, Virginia
Measures calculated	Direct, indirect and induced impacts in forms of labor income, value added, regional sales activity and employment
Methods used	IMPLAN input-output model
Input data used	Bicycle-related spending amount, socio-economic characteristics, biking habits, details of their visit and suggested improvements to the region's bicycling facilities
Input data sources	Online survey using SurveyMonkey
Key Findings	184 jobs, $4.2 million in labor income, $7.2 million in total value added and over $13.5 million in total output

Figure 1 Literature review table (continued)

Source: HRTPO analysis of the literature

	D&L trail Length of 26 miles. Runs parallel to the Lehigh River and an active railroad corridor.
Title	D&L Trail 2012 User Survey and Economic Impact Analysis
Author	Rails-To-Trails Conservancy
Year	2012
Location	Eastern Pennsylvania
Measures calculated	Total est. expenditures from "hard", "soft" goods and accommodations
Methods used	RTC Trail User Survey Workbook template, comparative analysis of the data. Economic Impact i/o model (developed by Rails-To-Trails Conservancy)
Input data used	ZIP code, average use of trail, age group, gender, primary activity on trail, time spent on the trail during each visit, main reasons for use, ways of getting to the trail, amount of money spent, lodging information, state of trail
Input data sources	Survey, passive infrared counters for the summer and fall of 2012 (June-Oct). Extrapolation was used to obtain an annual user estimate.
Key Findings	Total economic impact is estimated to be $19 million; $2.7 million in hard goods, $6.9 million in soft goods only, and $9.3 million in accommodations

Figure 1 Literature review table (continued)
Source: HRTPO analysis of the literature

	Ecusta Rail Trail Runs between the cities of Hendersonville and Brevard, North Carolina. It would be a 19 mile multi-use trail (walk, hike, bike).
Title	Ecusta Rail Trail Planning Study & Economic Impact Analysis- Chp. 5: Economic Impact Analysis
Author	Econsult Corp
Year	2012
Location	Ecusta Rail Trail North Carolina
Measures calculated	Property value impact, tourism impact, direct use impact, health care impact, environmental impact. Composition and scale of total expenditures, employment, and earnings resulting from the aggregate direct expenditures from trail construction were also calculated. Moreover, a rough estimate of the property value impact and tourism impact was done, while taking into account the experience of other similar trails.
Methods used	See "Input data used"
Input data used	Multiplier data provided by the US Department of Commerce
Input data sources	N/A
Key Findings	$20 million in total expenditures supporting 180 jobs, $22 million in property value increases, and up to $160,000 per year in property tax revenues generated, new visitors injecting $1.2 million into the local economy, $5 million per year in health care cost reductions

Figure 1 Literature review table (continued)

Source: HRTPO analysis of the literature

	Farmington Canal Heritage Trail Goes from New Haven to Suffield (CT). It connects 13 towns and allows off-road travel at some sections.
Title	Why Build Multi-Use Trails in Connecticut
Author	Farmington Valley Trails Council
Year	N/A
Location	Tariffville, CT
Measures calculated	Qualitative parameters specific to trails such as: quality of life, spending time with family, making connections with your neighborhood, fostering walkability, mobility, and bike ability.
Methods used	The study lists pros of multi-use trails in Connecticut. It also analyzes effects of trails to public health (obesity, hearth problems) and economic development considerations
Input data used	N/A
Input data sources	N/A
Key Findings	Biking saves health care costs, physically active people tend to have better mental health. Bike facilities and trails have the potential to bring economic benefit to local economy.

Figure 1 Literature review table (continued)

Source: HRTPO analysis of the literature

	Great Allegheny Passage Runs from Pittsburgh, PA to Cumberland, MD
Title	2012 Trail Town Business Survey Report for The Progress Fund
Author	Center for Regional Progress, College of Business, Frostburg State University
Year	2012
Location	Frostburg, Maryland
Measures calculated	See "Data source"
Methods used	See "Input data sources"
Input data used	Location of the business, how long opened, months considered to be peak season, how many workers employed during the peak and off peak, how many hours the employees worked, closure months, etc.
Input data sources	Business surveys
Key Findings	Approximately one-fourth of responding businesses reported gross revenue of more than $250K. On average about 30% of gross revenues were attributed to the trail

Figure 1 Literature review table (continued)

Source: HRTPO analysis of the literature

	Greenville Swamp Rabbit Trail A 19.9 mile multi-use greenway system (bike, hike, etc.)
Title	Greenville Hospital System Swamp Rabbit Trail: Year 1 Findings
Author	Julian A. Reed, Associate Professor Health Sciences, Furman University, Greenville, SC
Year	2010
Location	South Carolina
Measures calculated	Economic impact parameters such as expenditures
Methods used	Descriptive statistics (mean, median, standard deviation)
Input data used	Demographics, purpose of usage, awareness of trails and promoting trail use, evaluation of proximity, describe the trail, reasons for using, current deficiencies of the trail, impact on the community
Input data sources	Surveys with trail users and business owners
Key Findings	Trail spaces increase property values. They can also enhance and promote physical activity which has an effect on health and quality of life

Figure 1 Literature review table (continued)

Source: HRTPO analysis of the literature

	Hardy Pond Trail Located in Newaygo and Mecosta counties.
Title	Hardy Pond Trail: Economic Impact Analysis
Author	MSU Center for Economic Analysis
Year	2014
Location	Newaygo County, Michigan
Measures calculated	Expenditures required to establish the HP trail and expenditures representing ongoing annual impacts due to visitor expenditures. Parameters of economic activity used: employment, labor income, gross state product, the sum of gross state product and industry-to-industry transactions
Methods used	IMPLAN input-output model
Input data used	Estimates of the number of visitors by purpose
Input data sources	Estimates of trail usage were derived from other sources. Primary source: estimates collected from an impact study of the Creeper Trail in VA. Other sources such as: Outdoor Recreation in American Life: A National Assessment of Demand and Supply Trends
Key Findings	Number of jobs: 2; labor income: $102,720; value added: $132,028; output: $326,968. Installation activities of Hardy Pond Trail are expected to generate modest economic impact. Impact will be noticeable to local businesses and residents

Figure 1 Literature review table (continued)

Source: HRTPO analysis of the literature

	Heritage Rail Trail A single rail-trail with total length of 21.20 miles, built next to rails
Title	Heritage Rail Trail County Park 2012 User Survey and Economic Impact Study
Author	York County Community Foundation, Rails-to-Rails Conservancy: Northeast Regional Office, York County Rail Trail Authority
Year	2012
Location	South Central Pennsylvania's County of York
Measures calculated	Money spent on buying "hard" and "soft" goods. Total annual revenue from these activities
Methods used	Methodology developed by Rails-to-Trails Conservancy
Input data used	Users background, gender, usage of trails, usage of parking, day usage, reasons for using the trail, spending data
Input data sources	Infrared counters placed along the trail, surveys, user estimates
Key Findings	Rail trail's economic impact (user spending and business stimulus) has more than repaid the cost of development and on-going maintenance

Figure 1 Literature review table (continued)

Source: HRTPO analysis of the literature

	Illionis bike trails Fox River trail in Chicago's western suburbs, MCT Goshen Trail in the St. Louis metro region, Hennepin Canal State Trail in north central Illinois, Old Plank Road Trail in Chicago's south suburbs, Rock Island State Trail in Central Illinois, Tunnel Hill State Trail in southern Illinois
Title	Making Trails Count in Illinois
Author	Trails for Illinois and Rails-to-Trails Conservancy
Year	2012
Location	Illinois
Measures calculated	Economic impact measures were collected using surveys, including expenditures on consumer and non-consumer goods, and lodgings. Descriptive statistics were calculated (e.g. mean).
Methods used	Authors just showed the data collected, including expenditures
Input data used	Average hourly use and average daily use, demographics, primary reason for trail usage, time spent using the trail by age, maintenance, safety, marking, parking, bathrooms, drinking fountains, sightseeing.
Input data sources	Electronic trail use counters and surveys
Key Findings	Economic findings, environmental findings and health findings. For an extensive list, see the report

Figure 1 Literature review table (continued)

Source: HRTPO analysis of the literature

	Jackson Hole Community Pathway System Offers 27 miles of completely paved trail which connects the towns of Jackson, Teton Village, and Wilson. It can be used by bicyclists, hikers, etc.
Title	Jackson Hole Trails Project Economic Impact Study
Author	Nadia Kaliszewski, University of Wyoming, Laramie, Wyoming
Year	2011
Location	Wyoming
Measures calculated	Economic impact parameters: sales level of businesses, employment figures, payroll, total amount of dollar flow, County Specific & General Purpose tax, state sales tax
Methods used	Descriptive analysis (calculate mean and median), and multivariate analysis to examine how the variables gathered from the survey affect the economic impact of the trail
Input data used	Demographics, trail user preference, trail user satisfaction, survey local expenditures, non-local expenditures. Descriptive statistics were calculated for all expenditure variables from the survey responses. Data was normalized and a Z-test was done
Input data sources	Surveys and questionnaires
Key Findings	The Teton County trail system is estimated to have generated a total of approximately $18 million in economic activity in 2010: an estimated $1.1 million by local trail users and approximately $16 million by non-locals. Employment and wages relating to the trail system in Teton County totaled $3.6 million with approximately 213 workers employed

Figure 1 Literature review table (continued)

Source: HRTPO analysis of the literature

	Junction and Breakwater Trail Length is 6.4 miles according to https://www.traillink.com/trail/junction--breakwater-trail/
Title	Junction and Breakwater Trail; 2011 Trail Use Study & Economic Analysis
Author	Delaware Greenways for Delaware Division of Parks and Recreation; Department of Natural Resources & Environmental Control
Year	2011
Location	Delaware
Measures calculated	Calculation of economic impact of trail on the community, a profile of the average user, calculation of annual trail use. Trail related expenditures are also calculated (hard and soft goods).
Methods used	Economic impact analysis model adapted from the Rails-to-Trails Conservancy.
Input data used	Usage of the trail (how often), age, gender, means of getting to and from the trail, time of usage, purpose, expenditures, cleanliness, maintenance, safety and security of the trail
Input data sources	Survey data and observational data (infrared counters)
Key Findings	Trail-related expenditures for "hard" goods: $114,167, trail-related expenditures for "soft" goods: $390,645

Figure 1 Literature review table (continued)

Source: HRTPO analysis of the literature

	Katy Trail 240 miles long and 12 ft. wide. This trail was built for biking, hiking, walking, and running.
Title	Katy Trail Economic Impact Report; Visitors and MGM2 Economic Impact Analysis
Author	Synergy Group, Pragmatic Research, Inc., James Pona Associates
Year	2012
Location	Missouri
Measures calculated	Direct, indirect and total economic impacts
Methods used	Money Generation Model Version 2 (MGM2) economic impact software
Input data used	Visitors counts, demographics, average time spent in and around the trail, average distance traveled on trail, visitors expenditures, satisfaction. Visitors were divided into the following groups: local day, non-local day; hotel, motel, B&B visitors, and campground visitors
Input data sources	Surveys and questionnaires
Key Findings	The total visitors spending in and around the Katy Trail was $18.4 million; total output sales in and around the Katy Trail was $13.5 million; total output sales supported 367 jobs; the total payroll for supported jobs was $5.1 million; total value added to the local economy from visitors spending in and around the Katy Trail was $8.2 million

Figure 1 Literature review table (continued)

Source: HRTPO analysis of the literature

	Lackawanna River Heritage Trail and the Delaware and Hudson Rail-Trai The longest land trail system in Northeastern Pennsylvania with length of more than 70 miles
Title	Lackawanna River Heritage Trail; 2009 Trail User Survey and Economic Impact Analysis
Author	The Lackawanna Heritage Valley National and State Heritage Area Staff
Year	2009
Location	PA
Measures calculated	Expenditures for consumable "soft" goods, for non-consumable "hard" goods, lodging. Using the previous parameters total economic impact and the impact on area job market were calculated
Methods used	Straightforward calculations. Authors used a U.S. Department of Commerce formula to measure the dollars needed to create one job from heritage preservation/tourism funding in each state.
Input data used	Demographics, origin of respondents, condition of the trail, how often do respondents use the trail, safety and security, time spend on the trail. Using the gathered data the following parameters were calculated: average users per hour, gross utilization per weekdays and weekends at each counting location. Seasonal factors were also included for total trail usage.
Input data sources	Surveys and questionnaires
Key Findings	Based on the purchases of "soft" and "hard" goods and accommodations, the total economic impact of the Lackawanna River Heritage Trail in 2009 was around $28.2 million. The creation and/or retention of full-time jobs is estimated to be 1.259 with an average annual wage of $22,432

Figure 1 Literature review table (continued)

Source: HRTPO analysis of the literature

	Little Miami Scenic Trail Multi-purpose trail in Ohio, which was converted from an old railroad right-of-way. The trail runs more than 70 miles from Springfield, Clark County to the Little Miami Golf Center in Hamilton County.
Title	Impact of the Little Miami Scenic Trail on Single Family Residential Property Values
Author	Duygu Karadeniz, thesis, Izmir Institute of Technology
Year	2008
Location	Ohio
Measures calculated	Property values; home sale price
Methods used	Hedonic pricing technique used to measure property values. It isolates the price of amenities and disamenities by controlling for other variables that affect property values. The author also used regression analysis to estimate prices of homes, and the goodness-of-fit test and statistical significance in order to make sure that there is a relationship between variables.
Input data used	GIS database. Each of these counties maintains a separate GIS database with streets, railroads and parcel feature class for their jurisdiction.
Input data sources	Hamilton County and Clermont County data sources
Key Findings	Little Miami Scenic Trail impacts positively single-family residential property values, with sale prices increasing by $7.05 for every foot closer a property is located to the trail

Figure 1 Literature review table (continued)

Source: HRTPO analysis of the literature

	Massachusetts , numerous locations
Title	Economic Impact of Trails
Author	David Lindahl, John Morton; Presentation to the 1st Annual Massachusetts Trails Conference
Year	2011
Location	Massachusetts
Measures calculated	Authors divide economic benefits to: new residents, tourists and visitors, events, human capital gains and increases in social capital
Methods used	The presentation identifies important economic trends for trails: retiring baby boomers, and increasing desire and willingness-to-pay for all types of trails. The authors state that trails are a highly desired amenity especially by retiring baby boomers and present charts to support this. Authors also list examples of links between trails and house prices
Input data used	N/A
Input data sources	N/A
Key Findings	Net income of $7,707, revenues of approximately $260,000

Figure 1 Literature review table (continued)

Source: HRTPO analysis of the literature

	Miami Valley Trail Network of over 240 miles of connected multi-use trails
Title	Miami Valley Trail User Survey Report
Author	MVRPC Regional Bikeways Committee
Year	2013
Location	Miami Valley, Ohio
Measures calculated	Money spent on buying hard, soft goods and accommodation. Total annual revenue from these activities.
Methods used	Methodology developed by Rails-to-Trails Conservancy
Input data used	Users background, gender, usage of trails, usage of parking, day usage, reasons for using the trail, spending data
Input data sources	Automatic counters and surveys with volunteers
Key Findings	Overall annual economic impact is estimated to be just over $13 million

Figure 1 Literature review table (continued)

Source: HRTPO analysis of the literature

	Michigan network of bike trails 131 established 'rail-trails' covering 1398 miles
Title	Cutting Edge Research in Trails and Greenways
Author	Dr. Vogt, Dr. Nelson, Kristen Steger, Department of Community, Agriculture, Recreation and Resource studies, Michigan State
Year	N/A
Location	Michigan
Measures calculated	See "Input data used"
Methods used	See "Input data sources"
Input data used	Total number of trail uses, uses by day, reasons for using the trail, types of trail use, origin of users, getting to the trail, gender profiles, employment status, respondents perceived economic impact, rating of trails.
Input data sources	Listed examples: observation, off-site methods (mail questionnaires)
Key Findings	Volunteers, students or summer interns are appropriate workforce for on-site surveying; observations or counting plus short user surveys are easy to implement with a random sampling frame; event surveys with a registration list are easy to do and yield high response rates; "in" community trails yielded the highest use levels and greatest proportion of transportation use; longer trails are more heavily used by cyclists; trail neighbors are generally supportive of the nearby trail as shown by their level of use

Figure 1 Literature review table (continued)

Source: HRTPO analysis of the literature

	New York network of bike trails North County National Scenic Trail, the Appalachian National Scenic Trail, The Finger Lakes Trail, The Long Path, and The Long Island Greenbelt Trail. Many trails were built upon existing infrastructure such as abandoned railroad corridors, canal towpaths, and parkway right of ways
Title	Every Mile Counts; An Analysis of the 2008 Trail User Surveys
Author	New York State Office of Parks, Recreation & Historic Preservation
Year	2010
Location	New York (State)
Measures calculated	Economic impact measures
Methods used	Indirect impacts (increase in property value, health benefits), economic impact is directly influenced by the number of trail users, where they come from and how much are they spending on their visits
Input data used	User demographics, estimating yearly trail usage, local vs. non-local spending (equipment, transportation, food, accommodation), time of visiting the trail, activities participated in on day of survey (hiking, biking, birding, dog walking), ways of finding out abbot the trail
Input data sources	Voluntary surveys and face-to-face surveys. 8 trails were surveyed
Key Findings	Non-local users spent on average: $28.90

Figure 1 Literature review table (continued)

Source: HRTPO analysis of the literature

	Omaha Recreational Trails A system of trails that contains approximately 67 miles of paved recreational trails and another 35 miles scheduled for completion by 2008.
Title	Omaha Recreational Trails: Their Effect on Property Values and Public Safety
Author	University of Nebraska at Omaha, Recreation and Leisure Studies Program School of Health, Physical Education and Recreation
Year	2000
Location	Omaha, Nebraska
Measures calculated	See "Input data used"
Methods used	Input data was shown as pie charts
Input data used	Trail's impact on public safety, property values, and quality of life
Input data sources	Telephone and mail surveys
Key Findings	The Omaha Recreational Trails are used often by nearby residents. 58.4% of the responding used the trails daily or weekly. Omaha Trails are generally perceived by nearby residents as an economic benefit (almost two-thirds of those surveyed felt the trails would increase the selling price of their home). Property owners do not appear to have a widespread concern for their safety. Very few residents had increased home security, considered moving or wanted the trail closed. Residents living along the trails appear to perceive there to be a positive relationship between the trails and the quality of life.

Figure 1 Literature review table (continued)

Source: HRTPO analysis of the literature

	Orange County Trails Cady Way Trail (6.5 miles following old railway corridor, alternating between single-width and two paths. A median separates pedestrians from bicyclists and skaters), Little Econ Greenway (7.4 mile paved multi-use trail that goes from Univ. of Central Florida to Forsyth Road), West Orange Trail (22 mile long multi use suburban trail in Western Orange County from Lake/Orange County line to Welch Road in Apopka)
Title	Economic Impact Analysis of Orange County Trails
Author	East Central Florida Regional Planning Council
Year	2011
Location	Florida
Measures calculated	Total employment (number of jobs, full-time plus part-time, by place of work), output of sales (the sum of output for private non-farm industries, state, and local government, federal civilian, federal military, and farm sectors), personal income (income received by persons from all sources)
Methods used	Regional Economic Model (REMI)
Input data used	User surveys were used to obtain trail user characteristics and spending habits. Business surveys were used to collect sales data from local businesses
Input data sources	A trail user survey and a business survey were created and used to obtain statistical information and economic data for analysis. Surveys were derived from a combination of previous business and user surveys: "West Orange Trail-Phase I-A Study of Economic Impact of Trail Users", and "Trail Economic Impact study"
Key Findings	Total employment: 516 jobs; output of sales: $42.6 million; personal income: $10 million

Figure 1 Literature review table (continued)

Source: HRTPO analysis of the literature

	Outer Banks bike network Wright Brothers National Memorial bike path, Nags Head side path, Duck path, Croatan Sound/Virginia Dare bridge path. Network consists of tracks on wide paved shoulders, wide paved shoulders with side path adjacent to road, side path adjacent to road, multi-use path, incidental improvement
Title	Pathway to Prosperity; the Economic Impact of Investments in Bicycle Facilities
Author	NCDOT, Divison of Bicycle and Pedestrian Transportation
Year	2003
Location	Northern Outer Banks of North Carolina
Measures calculated	Percentage of tourists using the trail, annual amount of $ collected vs costs to construct facilities
Methods used	Collected data from surveys (jobs created, retail sales, expenditures)
Input data used	Number of tourists, bicyclists, bicyclists' expenditures
Input data sources	Bicyclists riding on local bicycle facilities were surveyed, self administrated surveys, bike traffic counts
Key Findings	680,000 visitors bicycle in the area annually (17% of all tourists); estimated 102,000 of these visitors report biking to be an important factor in choosing to vacation in the northern Outer Banks; a conservative estimate of the annual economic impact of bicyclists in the area is $60 million; the annual return from bicyclists is nearly nine times the one-time expenditure of $6.7 million of public funds to construct bike facilities in the region

Figure 1 Literature review table (continued)

Source: HRTPO analysis of the literature

	Perkiomen Trail Located in Montgomery County, PA., from Green Lane to Oaks. It was built on a former railroad grade so the trail is generally flat.
Title	Perkionem Trail; 2008 User Survey and Economic Impact Analysis
Author	Rails-To-Trails Conservancy with assistance from Pennsylvania Department of Conservation and Natural Resources, Bureau of Recreation and Conservation, Community and Conservation Partnership Program
Year	2008
Location	PA
Measures calculated	The expenditures on "hard" and "soft" goods
Methods used	From the survey, the percentage of respondents that have purchased "hard" goods was determined and the respondents that have purchased "soft" goods was determined
Input data used	Demographics, activities done, usage of trail, time of usage, info about lodging, expenditures, safety and maintenance
Input data sources	Survey form and infrared counters
Key Findings	Economic impact from purchasing "hard" goods is estimated to be $3.6 million, from "soft" goods $2.6 million

Figure 1 Literature review table (continued)

Source: HRTPO analysis of the literature

	Pikes Peak network of trails Length of the network: N/A
Title	Economic Impact of Cycling in the Pikes Peak Region
Author	Steer Davies Gleave
Year	2015
Location	Colorado
Measures calculated	Economic impact (direct, indirect, induced) which is translated into an estimate of full-time equivalent jobs
Methods used	IMPLAN input-output model
Input data used	Data estimation, residential commuting, utilitarian cycling, recreational cycling, non-residential cycling
Input data sources	Data estimation. Authors read a list of studies, and based on that list projected the data
Key Findings	Bicycling economy supports more than 370 jobs, contributing to $11.5 million in labor income, adding $19 million in value, and creating a total of $33.8 million in direct, indirect, and induced economic output

Figure 1 Literature review table (continued)

Source: HRTPO analysis of the literature

	Schuykill River Trail Runs adjacent to Schuylkill River. The trail passes through 5 counties and 35 municipalities, with length of more than 50 miles
Title	Schuylkill River Trail; 2009 User Survey and Economic Impact Analysis
Author	Rails-To-Trails Conservancy for the Schuylkill River Greenway Association and the Schuylkill River Trail Council
Year	2009
Location	Philadelphia, PA
Measures calculated	The expenditures on "hard" and "soft" goods
Methods used	The percentage of respondents that have purchased "hard" goods and "soft" goods was determined.
Input data used	Demographics, activities done, usage of trail, time of usage, info about lodging, expenditures, safety and maintenance
Input data sources	Survey form and infrared counters
Key Findings	Economic impact from purchasing "hard" goods is estimated to be just over $3.6 million, from "soft" goods just over $3.6 million

Figure 1 Literature review table (continued)

Source: HRTPO analysis of the literature

	Silver Comet Trail
Title	Silver Commet Trail Economic Impact Analysis and Planning Study
Author	Alta Planning + Design Econsult Solutions Rober and Company
Year	2013
Location	Georgia
Measures calculated	Estimated benefit categories:direct and tourism activity, unmet demand, fiscal imapct, property value, new development, direct use and health benefit, employer & employee attraction. For full list consult the report
Methods used	Impact estimates are based on: direct survey data, past research, existing literature and conservative assumptions. RIMS II model was also used.
Input data used	Extensive list (see the report)
Input data sources	Counts and surveys
Key Findings	Direct spending: $47 million, estimated out-of-state spendings of additional $20 million per year. Using RIMS II: direct expenditures: $57 million, indirect & induced expenditures: $61 million, employment: 1,130 jobs, total earnings: $37 million. Tax revenues of approximately $3.5 million per year and 4 to 7 percent increase in home values within a quarter-mile proximity to a recreational amenity. See the report for more information.

Figure 1 Literature review table (continued)

Source: HRTPO analysis of the literature

	Tweetsie Trail A proposal for converting a ten mile railroad between Johnson City and Elizabethon to a multi-purpose recreational trail
Title	Tweetsie Trail: Economic Impact Study
Author	Olya Batsula, Nic Chernikow, Scott French, Chris Hobbs, Bevin Kilbourn, and Kristin Lee
Year	2011
Location	Tennessee
Measures calculated	Sales structure, customer analysis (local visitors vs. tourists), property tax
Methods used	Authors calculated descriptive statistics (mean, median, standard deviation)
Input data used	Age of bike shop, number of employees, yearly revenue, distance from the trail, portion of sales from equipment, equipment rentals, service
Input data sources	Business survey, authors listed limitation being: limited sample size for survey (only 15 responses were recorded), respondent bias (report misleading information that could be favorable to one's business), geographic differences, impact of other shops
Key Findings	80% of the shops which existed before the trail experienced no growth in employment rate after the trail's inception. Authors stated that trails typically do not heavily impact tourism for the local areas because around 60% of the shops derive 95% of their revenue from locals

Figure 1 Literature review table (continued)

Source: HRTPO analysis of the literature

	U.S., various locations Midtown Greenway, Minneapolis, MN; Wonders Why Path/Ravenal Bridge, Charleston, SC; Valencia Street Redesign, San Francisco, CA; Schuylkill River Trail/Wissachickon Park, Philadelphia, PA; Vera Katz Eastbank Esplanade, Portland, OG; McDonald's Cycle Center; Chicago, IL; Grand Teton National Park Pathways, Jackson Hole, WY; Forks Area Trail System, Clarks Hill, SC (Augusta, GA); Williamsburg Bridge, New York, NY; St. Claude Street Bike Lanes, New Orleans, LA
Title	Federal Investment in Bicycling: 10 Success stories
Author	Bikes Belong
Year	N/A
Location	Boulder, Colorado
Measures calculated	See "Input data used"
Methods used	Data was presented
Input data used	Basic stats (length, number of trips, population of cities that are close to trails), key benefits (number of jobs, home value improvement), and funding sources (grants, etc.)
Input data sources	N/A
Key Findings	25 jobs, home values increase $510 for every 400 meters closer they are to off-street facilities, 700 jobs created by construction

Figure 1 Literature review table (continued)

Source: HRTPO analysis of the literature

	Vermont trail network Stowe recreational path, Burlington bike path, Lye Brook Falls trail, Missisquoi Valley rail trail, West River trail: lower section, Delaware&Hudson rail trail, the South Burlington recreation path, East Branch trail, Cross Vermont trail. Study examined impact of bicycling and walking. According to www.visit-vermont.com/state/biking, total length of bike trails in state is more than 150 miles.
Title	Economic Impact of Bicycling and Walking in Vermont
Author	Resource Systems Group, Inc., Economic and Policy Resources, Inc., and Local Motion
Year	2012
Location	Vermont
Measures calculated	Direct, indirect and total economic contribution (sales revenue, jobs and earnings (wages, salaries, proprietor income) in USD
Methods used	Economic input/output model (REMI), also Walk Score was used. Impacts modeled are: The economic returns of capital investments in cycling and walking infrastructure, impacts associated with tourism, avoided transportation consumer costs realized by pedestrians and cyclists, avoided transportation public costs due (GHG, traffic enforcement, noise impact), the effect on real estate values, output and jobs created by bike and walk businesses
Input data used	Extensive list (see the report)
Input data sources	Vtrans capital programs, municipal capital, budget/annual reports, tourism spending, NHTS data, VMT unit cost, business survey
Key Findings	Total economic contribution is shown as the value of: output: $82.744 million; number of jobs: 1,418; and earnings: $40.919 million

Figure 1 Literature review table (continued)

Source: HRTPO analysis of the literature

	Virginia Creeper trail and the New River Trail State Park These trails were converted from abandoned railroad lines into outdoor recreational trails.
Title	Building Connectivity Through Recreation Trails; A Closer Look at the New River Trail State Park and the Virginia Creeper Trail
Author	Economic Development Studio Virginia Tech
Year	2011
Location	Southwest Virginia
Measures calculated	Measures of economic growth, including increased income and job growth in the overall community.
Methods used	Economic impact analysis and Asset-Based Development model used. Primary purpose of Asset-Based Development is to assess and emphasize what the community has (the assets).
Input data used	User trends, demographics, spending information, type of business, income generated by trail users, and impact of the trail on business decisions.
Input data sources	A couple of previous studies served as a pilot for this one: the 2004 Virginia Creeper Trail Study, and the 2004 Waterway at Virginia Creeper Trail and New River Trail State Park study. Surveys were used: the user trail survey to determine user trends, demographics, spending information; and the business survey to determine type of business, income generated by trail users, and impact of the trail on business decisions.
Key Findings	Estimates of expenditures for lodging (average of $133 for privately owned lodging and $13 for publicly owned lodging); food and drinks (average of $44 at restaurants and $32 for other places); gasoline, repair, oil (average of $43 for gas, repair, oil); bike rentals, horse rentals, parking fees (average of $5)

Figure 1 Literature review table (continued)

Source: HRTPO analysis of the literature

	Washington & Old Dominion Trail A 45-mile long transportation and recreational trail running from Arlington, VA to Purcellville, VA. It can be used by equestrians, mountain bikers, joggers.
Title	Washington & Old Dominion Trail: An Assessment of User Demographics, Preferences, and Economics
Author	J.M. Bowker, USDA Forest Service, Southern Forest Research Station, John C. Bergstorm and Joshua Gill University of Georgia, Department of Agricultural and Applied Economics, Ursula Lemanski National Park Service
Year	2004
Location	Virginia
Measures calculated	Estimation of direct and secondary effects of visitor spending. Total economic impact is a combination of direct spending (spending by non locals in the local economy) and secondary spending (indirect+induced effects)
Methods used	Economic impacts (basically measure visitors expenditures) and net economic benefits (consumer surplus- measure that indicates the value of a resource). Estimation of average spending per person per trip for each user type. MGM2 model was used for economic impact
Input data used	Accurate number of users and user type, detailed information on trip expenditures, user demographics, number of trail users, trip profile, preference and satisfaction, trail benefits, trail issues, management issues,
Input data sources	Two survey questionnaires: for locals and for non-locals
Key Findings	An estimated 1.7 million adult users spent in total about $12 million annually related to their recreational use of the trail. Of this, about $7 million was spent directly in the northern Virginia economy by locals and non-locals using the trail. The estimated 1.6 million local visits accounted for about $5.3 million of spending directly related to the use of the trail. Non-local visitor spending was estimated to be about $1.4 million. This spending generated about $1.8 million in local economic impacts and supported 34 full time job equivalents and about $642,000 of personal income

Figure 1 Literature review table (continued)

Source: HRTPO analysis of the literature

	Wisconsin trail network Most of them are designated to support multiple use (most trails are open for a variety of activities). There are more than 1800 miles of trails which are owned by the State and 90% are open to motorized and non-motorized uses.
Title	Trails and their Gateway to Communities; a Case Study of Recreational Use Compatibility and Economic Impacts
Author	Bob Kazmierski, Mike Kornmann, Dave Marcouiller, Jeff Prey
Year	2008
Location	Wisconsin
Measures calculated	Output impact: direct, value added impact, employment impact
Methods used	Input/output model IMPLAN
Input data used	Trail use, trail compatibility (if different activities are compatible among each other on the trail), assessment of current trail-related amenities (trail service amenities, local community services, local tourism business amenities), local fiscal ability (available funds for maintenance and improvement), patterns of trail uses spending
Input data sources	Intercept surveys, mail surveys and group interviews
Key Findings	Total output impact: $4.3 million; total value added impact: $2.4 million; total employment impact: 109 jobs

Figure 1 Literature review table (continued)

Source: HRTPO analysis of the literature

	WOW multi-use Non-motorized recreational pathway, which would connect the town of Belmont, the city of Laconia and the town of Meredith.
Title	Economic Impact Analysis of the WOW Trail
Author	Belknap County Economic Development Council
Year	2012
Location	Laconia, NH
Measures calculated	New jobs which in turn created annual wages for workers
Methods used	Model developed by Economic Modelling Specialists, Inc. It calculates the change in total employment, earnings, and economic output
Input data used	Estimate of the number of annual trail users, local trail users and visitors, amount of spending by visitors
Input data sources	Data estimation. Authors based their assumptions on studies done by Rails-To-Trails Conservancy
Key Findings	Estimated economic impact of new visitor spending- new jobs: 31; annual earnings: $778,400. There is also a positive impact on property values, and a possible potential for new businesses catering to trail users

Figure 1 Literature review table (continued)

Source: HRTPO analysis of the literature

Treatments

Some studies examined specific paths and/or trails, while some examined the entire networks. Figure 2 shows the number of studies examining specific paths/trails and the number of studies examining the entire network.

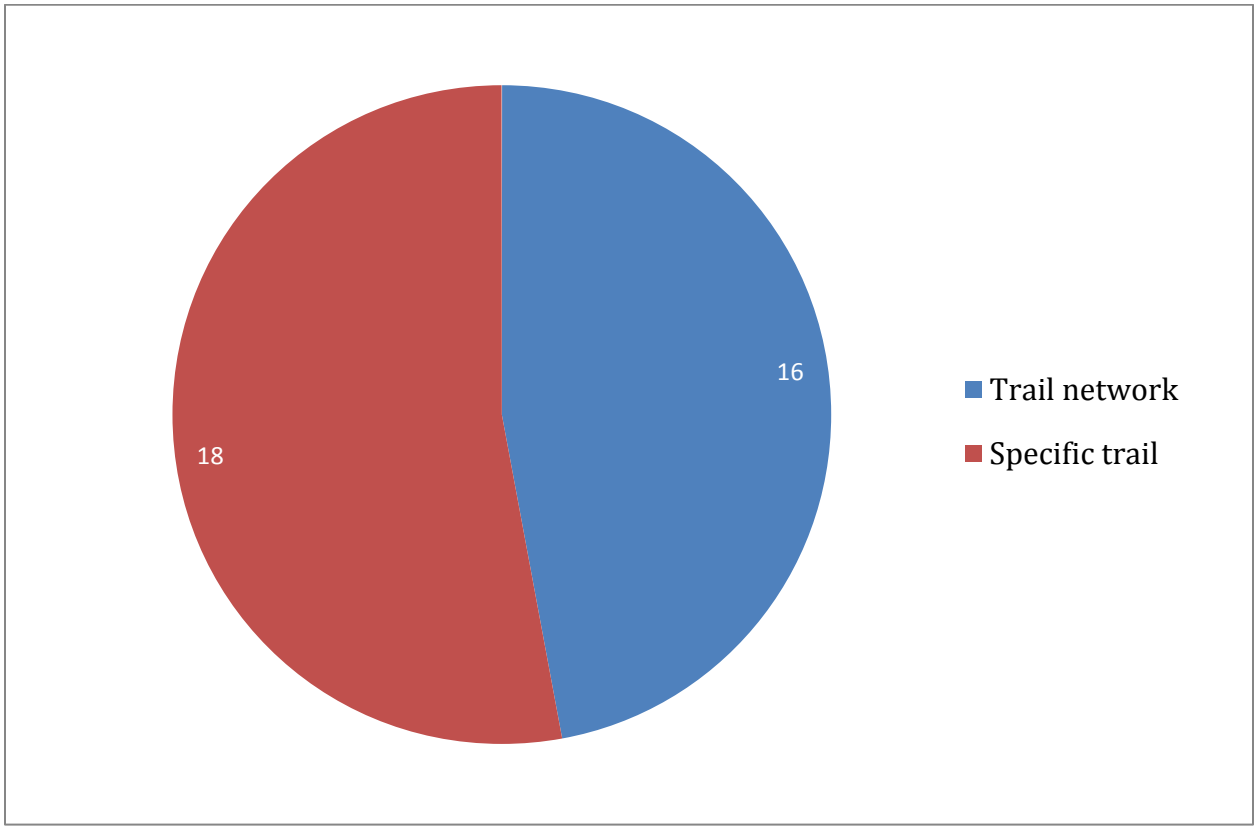


Figure 2 Number of studies examining trail network and specific paths
Source: HRTPO analysis of existing literature

Measures

Weisbrod and Weisbrod (1997) asserted that economic impacts may be viewed as follows:

1. Business outputs (or sales volumes)
2. Value added (or gross regional product)
3. Wealth (including property values)
4. Personal income (wages)
5. Jobs

Any of the previous parameters can serve as an indicator of improvement in economic situation in the area or region. The studies reviewed usually estimated one or more of these economic impact measures.

Models give economic impacts as outputs. There are 3 different economic impacts that models show as outputs:

- Direct economic effects, which come from two main sources: First, additional spending in the region for the construction and on-going maintenance of the trail and its facilities. Second, the increased usage of the newly constructed facilities will expand visitor spending in the area at retailers, restaurants, lodging. Direct economic effects also include: number of jobs and labor income.
- Indirect effects: business-to-business transactions in the region (purchase of construction materials, transport services for hauling of materials, other services such as insurance and accounting).
- Induced effects: the wages and salaries paid to employees and the spending of their income in the regional economy.

Methods and input data used

Concerning methods, studies fall into two groups:

- Model-based studies (using survey inputs)
  These studies use input/output models to estimate economic impact based on interdependencies between different branches of national or regional economy. Input/output models used in the studies:
  a. IMPLAN, privately developed (The IMPLAN Group LLC-formerly MIG, Inc.), used (for example) in: "Hard Pond Trail: Economic Impact Analysis" (MSU Center for Economic Analysis)
  b. REMI, privately developed (Regional Economic Models, Inc.), used (for example) by Resource Systems Group, Inc., Economic and Policy Resources, Inc., and Local Motion for "Economic Impact of Bicycling and Walking in Vermont"
  c. Other models such as the MGM2 (Money Generation Model 2). An example of MGM2 application is the study by Synergy/PRI/JPA, Synergy Group, Pragmatic Research, Inc., and James Pona Associates: "Katy Trail Economic Impact Report".

  Input data for models include: number of bike visitors, average expenditures, information regarding bicyclist and pedestrian businesses, capital investments in bicycle and pedestrian facilities, etc.

- Survey-based studies
  These studies typically use collected data to estimate tourism spending and employment. Methods of collecting data:
  a. User surveys (expenditure data collected from users, i.e. how much money they spent while on trails); an example is a study prepared by UVM Transportation Research Center in Burlington (VT): "Estimating Tourism Expenditures for the Burlington Waterfront Path and the Island Line Trail".
  b. Business surveys (sales data collected from users, i.e. how much revenue did the businesses get, how many jobs did the businesses provide). An example of these studies is one done by Center for Regional Progress, FSU, Frostburg, MD: "2012 Trail Town Business Survey Report for the Progress Fund".
  c. Infrared counters (count users on trails). These counts are used to obtain an estimate of average number of annual users on a specific trail. One example is a study done by York County Community Foundation, Rails-To-Trails Conservancy, and York County Rail Trail Authority: "Heritage Trail Country Park 2012 User Survey and Economic Impact Analysis".

Figure 3 shows the number of survey-based studies vs the number of model-based studies (using survey inputs). As we can see, the number of model-based studies dominates over the survey-based studies.

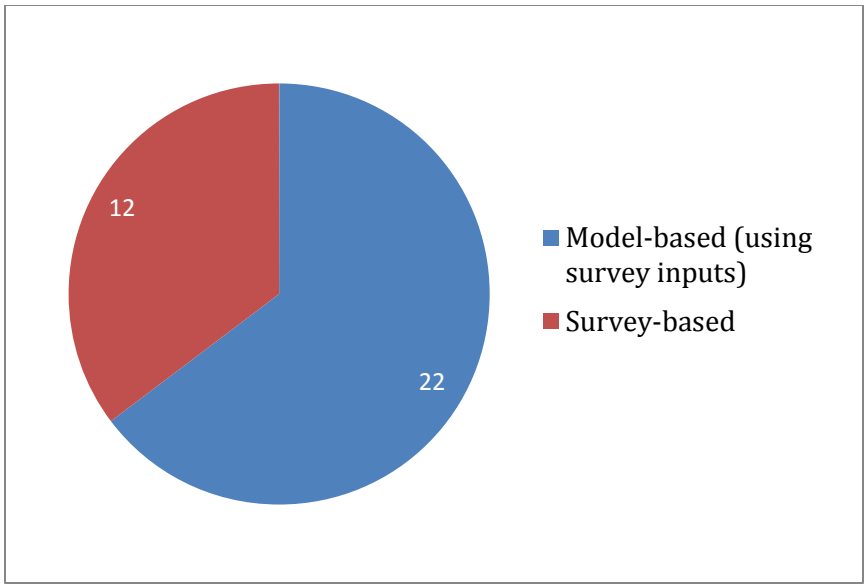


Figure 3 Model-based vs survey-based studies
Source: HRTPO analysis of existing literature

On figure 4 we can see the number of studies that applied specific models such as: IMPLAN, REMI, MGM2 or other methods.

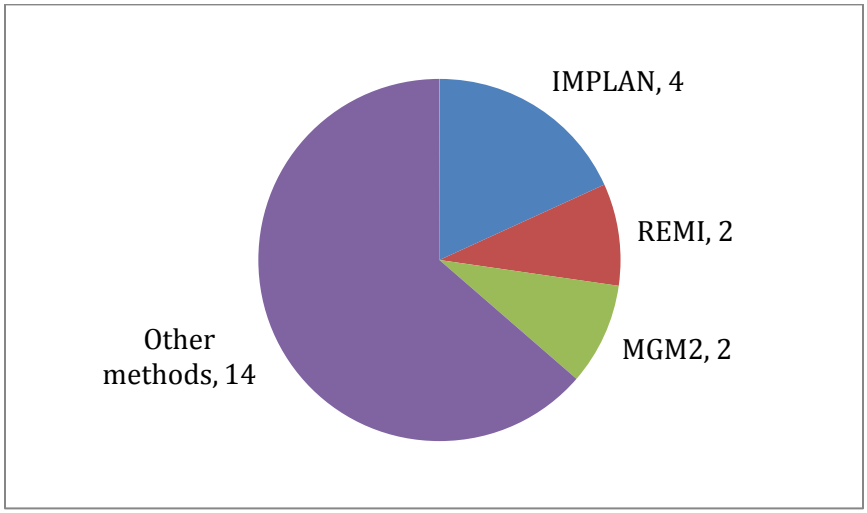


Figure 4 Different models/methods used in studies
Source: HRTPO analysis of existing literature

Expenditure data collected with surveys can be divided into the following categories:

- Expenditures on "soft" goods such as beverages, food, parking, movies, fuel, bike rental
- Expenditures on "hard" goods such as bikes, rollerblades, bike supplies, running/walking/hiking shoes, clothing, auto accessories
- Lodging expenditures (motels, hotels, B&B)

Key Findings

Although economic impact analysis produces quantifiable results and uses complex methods, it is an inexact process, therefore, output numbers should be regarded as a "best guess" (Crompton et al., 2001). Furthermore, according to Crompton, "Sometimes a genuine lack of understanding of economic impact analysis and the procedures used in them leads to inadvertent errors, but in other instances, they are used mischievously or strategically to deliberately mislead and generate large numbers."

Key findings obtained from studies included in literature are concerned with the following impacts of the studied trails:

- Employment
- Total value added
- Labor income
- Output impact
- Property value impact
- Health care impact
- Trail users expenditures and trail revenue

Employment

Employment is used as a measure in economic impact analysis to show increase in the number of total employees in the local region. Out of 30 studies that were summarized in this report, 11 are looking at employment as a measure of economic impact. Figure 5 shows the number of jobs as a measure of economic impact. We see that the study done in Florida ("Economic Impact Analysis of Orange County Trails") reported the highest number of jobs, followed by studies done in Colorado ("Economic Impact of Cycling in the Pikes Peak Region") and Missouri ("Katy Trail Economic Impact Report; Visitors and MGM2 Economic Impact Analysis"). The minimum number of jobs reported was 27 by study: "Ecusta Rail Trail Planning Study & Economic Impact Analysis", while the highest number of jobs reported was 516 by Florida study. The average number of jobs is 174.

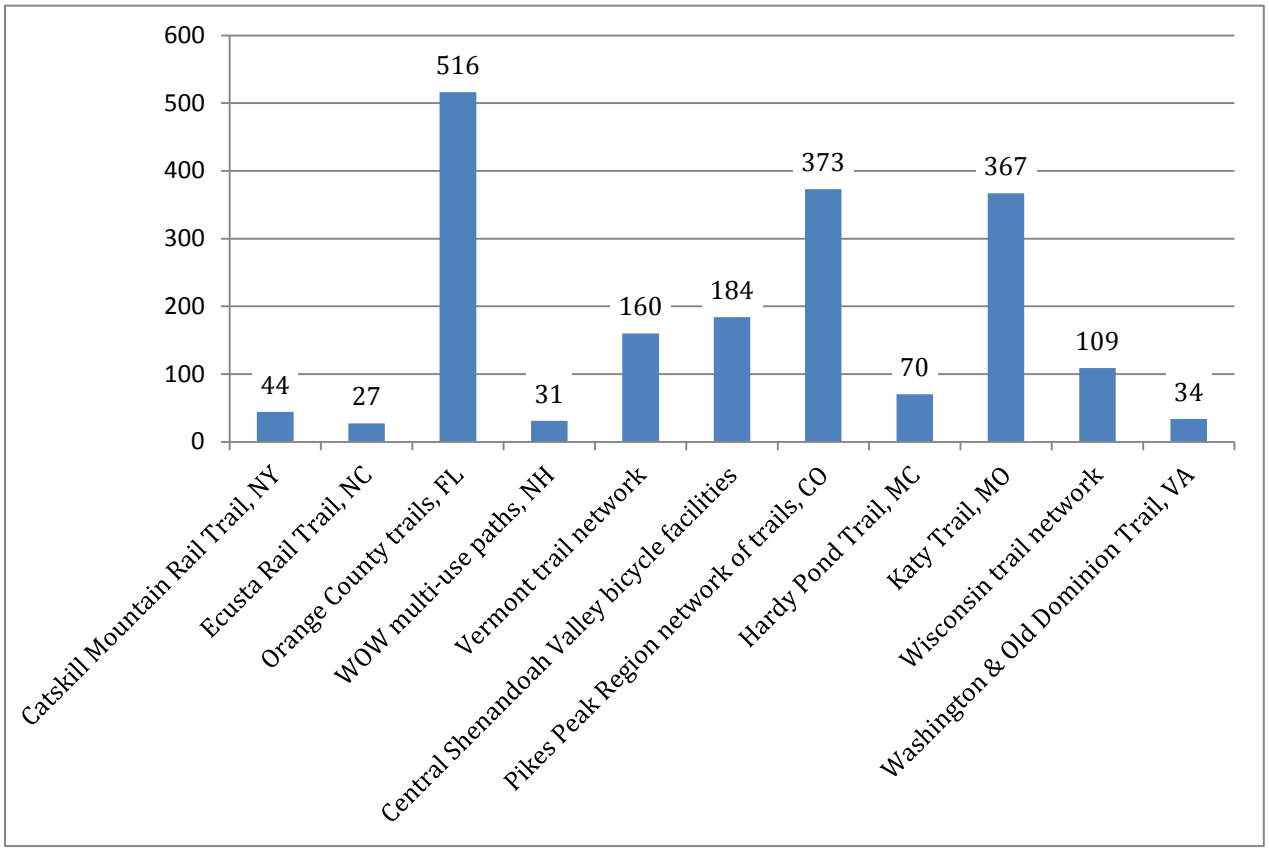


Figure 5 Number of jobs as a measure of economic impact
Source: HRTPO analysis of the literature

Total value added

"Total value added" is a parameter that indicates the sum of wage income and corporate profit generated in the study area. In other words, it estimates the increase in gross regional product (GRP) which represents the total size of the local economy. This measure is one of the most appropriate measures of economic impact in a study area (Weisbrod and Weisbrod, 1997).

Total value added was estimated in six studies from literature review, and values of this measure can be seen on Figure 6. Network of trails in Pikes Peak region in Colorado reports the highest value of total value added, followed by Katy Trail in Missouri and bicycle facilities in the Shenandoah Valley. The average value of this parameter is approximately $6.7 million.

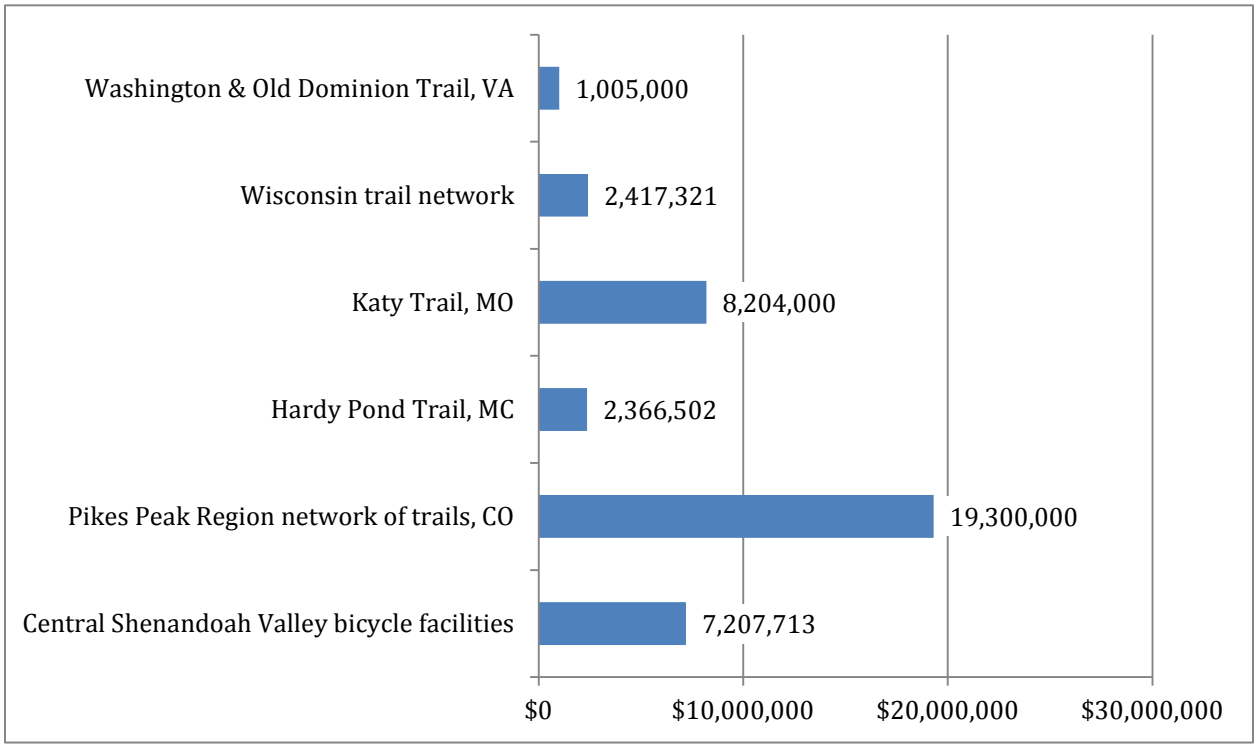


Figure 6 Total value added as a measure of economic impact
Source: HRTPO analysis of literature

Labor Income

In comparison to value added, "labor income" is an even more conservative measure. It represents the increase in total money paid to local employees as salaries and wages. New jobs are one of the reasons the income may increase; other reasons being raises and/or increased working hours for existing employees. Only personal incomes are taken into consideration, not business revenues or profits. As long as a majority of affected workers reside in the study area, this parameter is reasonable to use, although it is still an under-estimate of the true income impact, as there is also some net business income generated (reinvested locally in buildings, equipment, etc.) (Weisbrod and Weisbrod, 1997).

Nine studies observed the labor income as a measure of economic impact. Network of trails in Pikes Peak region in Colorado recorded the highest value of labor income, followed by Cady Way Trail in Florida and Katy Trail in Missouri, while the lowest value of labor income is recorded on Washington & Old Dominion Trail in Virginia (Figure 7). The average value of labor income is approximately $4.4 million.

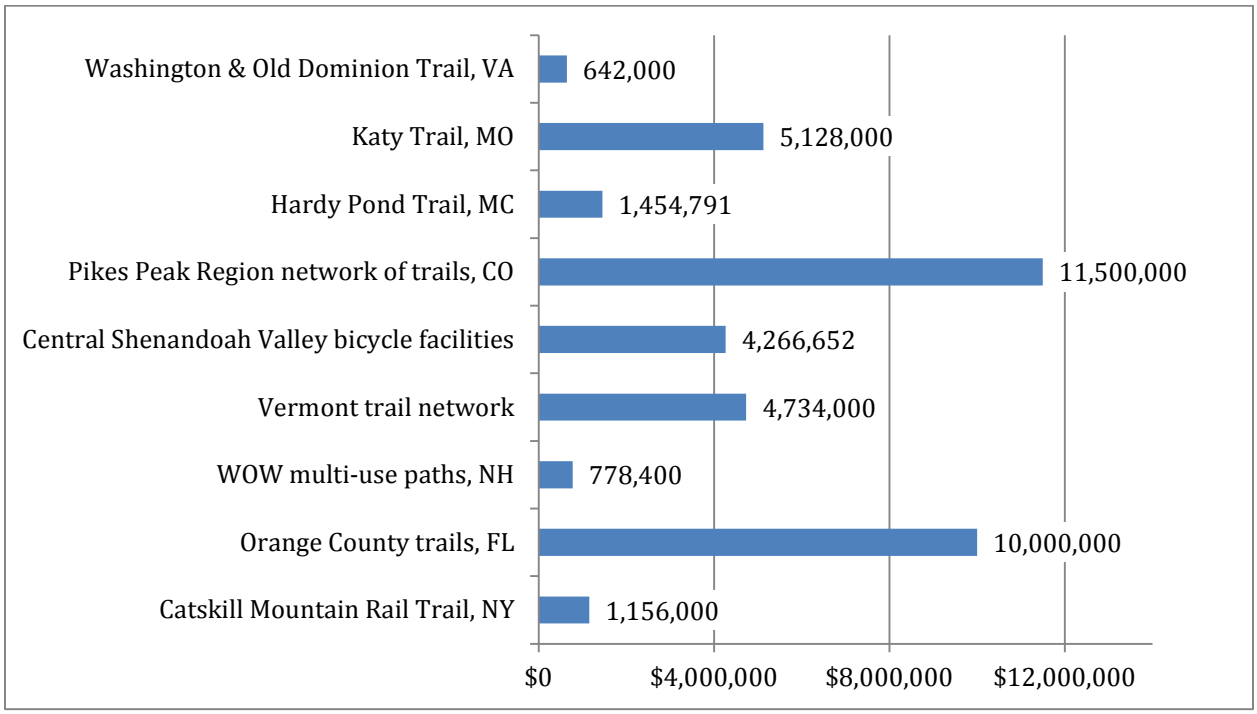


Figure 7 Labor income as a measure of economic impact

Source: HRTPO analysis of literature

Output Impact

Output impact represents the modeled total increase in business sales revenue. Since it does not differentiate between a high value-added activity and a low value-added activity, this parameter can be deceptive. Among the studies summarized in the literature review, Cady Way Trail in Florida recorded an output of more than $42 million, while network of trails in Pikes Peak region in Colorado and bicycle facilities in Shenandoah Valley published an output of around $33.7 million and $13.5 million respectively (Figure 8). Output has an average value of $12.8 million, and the lowest value was reported on Washington & Old Dominion Trail in Virginia.

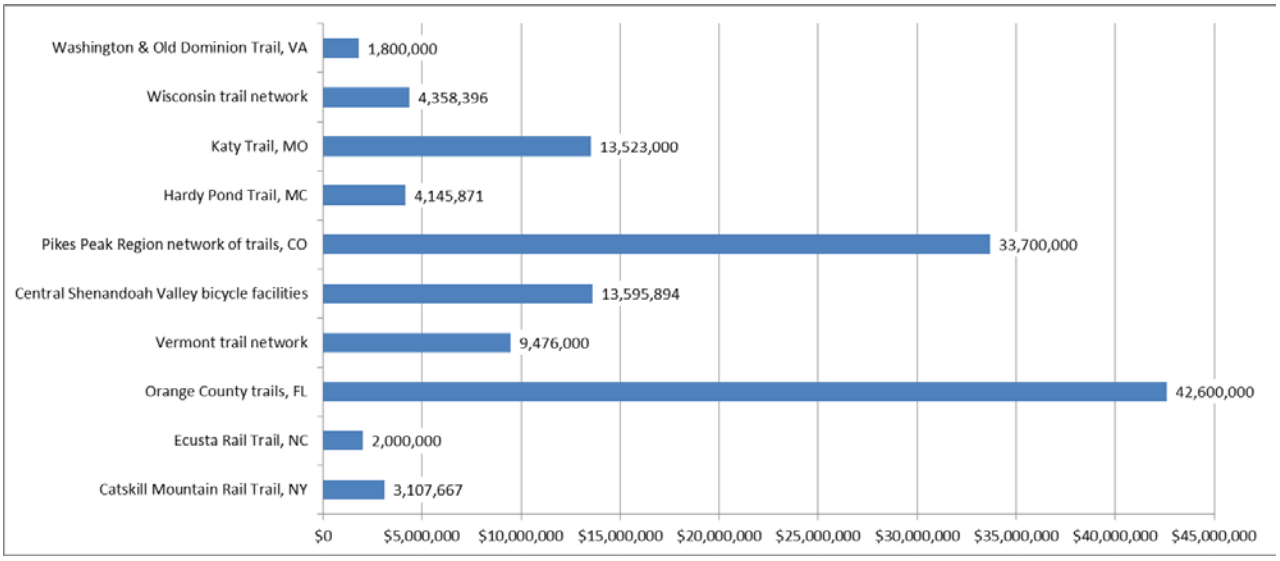


Figure 8 Output as a measure of economic impact

Source: HRTPO analysis of literature

Property Value Impact

Trail development may induce tourism, creating opportunities for economic development (bike shops, restaurants, etc.) along the trail (Lindsay, 2004). This development may also encourage people to relocate to the community and, eventually, property values may rise as demand increases for real estate with access to the trail.

"The Impact of the Little Miami Scenic Trail on Single Family Residential Property Values" study attempts to determine whether the Little Miami Scenic Trail impacts property values. The study found that the trail increased sale prices by $7.05 for every foot closer a property is located to the trail.

Another study that observes property value impact is: "Ecusta Rail Trail Planning Study & Economic Impact Analysis". At the time of composing the study, the trail's characteristics were uncertain, so the authors made a rough estimate of the property value impact. They assumed that this trail will result in a one-time four percent increase in property value or approximately $21.6 million. Additional property tax revenues would be approximately $160,000 per year.

Health Care Impact

Using a trail is enjoyable and it produces health care cost reductions because it makes exercising options more accessible. Unhealthiness of the population due to sedentary lifestyle is a growing problem in the U.S. Outdoor amenities, such as trails, can help in providing physical activity. According to "Ecusta Rail Trail Planning Study & Economic Impact Analysis", health care cost reductions take place on a number of levels:

- Direct health care costs- the amount spent immediately as a result of short-term health care needs
- Indirect health care costs- the amount spent over a lifetime as a result of reduced risk of chronic illness
- Direct worker's compensation costs- the direct amount spend on worker's compensation claims
- Indirect worker's compensation costs- the indirect administrative amount spent on worker's compensation claims
- Worker productivity- the cost of absenteeism (unhealthy and not at work) and "presentism" (unhealthy and present at work but not fully functioning)

Estimated health care cost reduction impact resulting from implementation of the Ecusta Rail Trail is displayed on figure 9 in dollars. Indirect health care costs and lost productivity cost reductions are the highest, while direct worker's compensation cost reductions are the lowest.

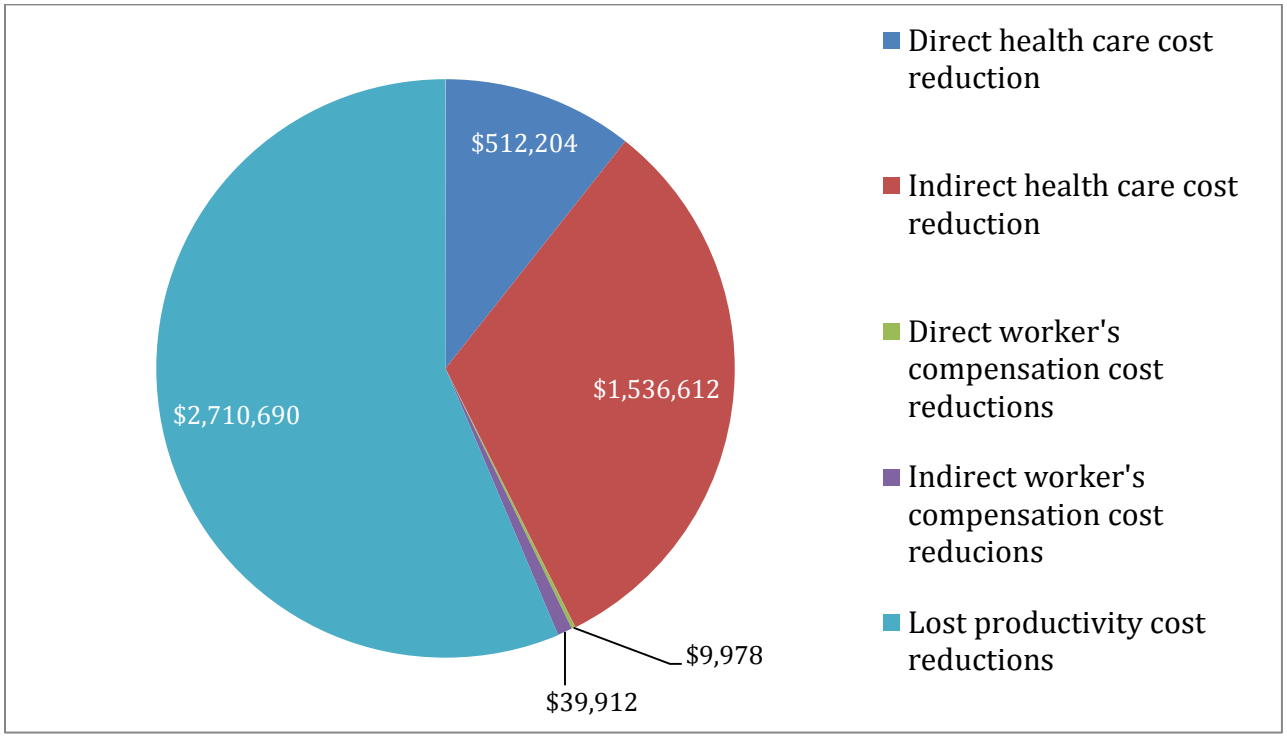


Figure 9 Estimated health care cost reduction impact

Source: "Ecusta Rail Trail Planning Study & Economic Impact Analysis", 2012

Trail Users Expenditures and Trail Revenue

Some percent of the summarized studies report annual expenditures as an economic impact. One type of expenditure is expenditure on hard goods. Hard goods encompass a broad range of non-personal items such as bikes, bike accessories, clothing and electronics. Another type of expenditures used in summarized studies is the expenditures of soft goods. Soft goods are items such as food, beverages, gasoline, bottled water, etc. Lodging expenditures are expenditures on accommodation. A total of seven studies observed these types of expenditures. Figure 10 shows total trail user expenditure for seven different trails (studies). Total user expenditures were obtained by summing hard goods expenditures, soft goods expenditures and lodging expenditures.

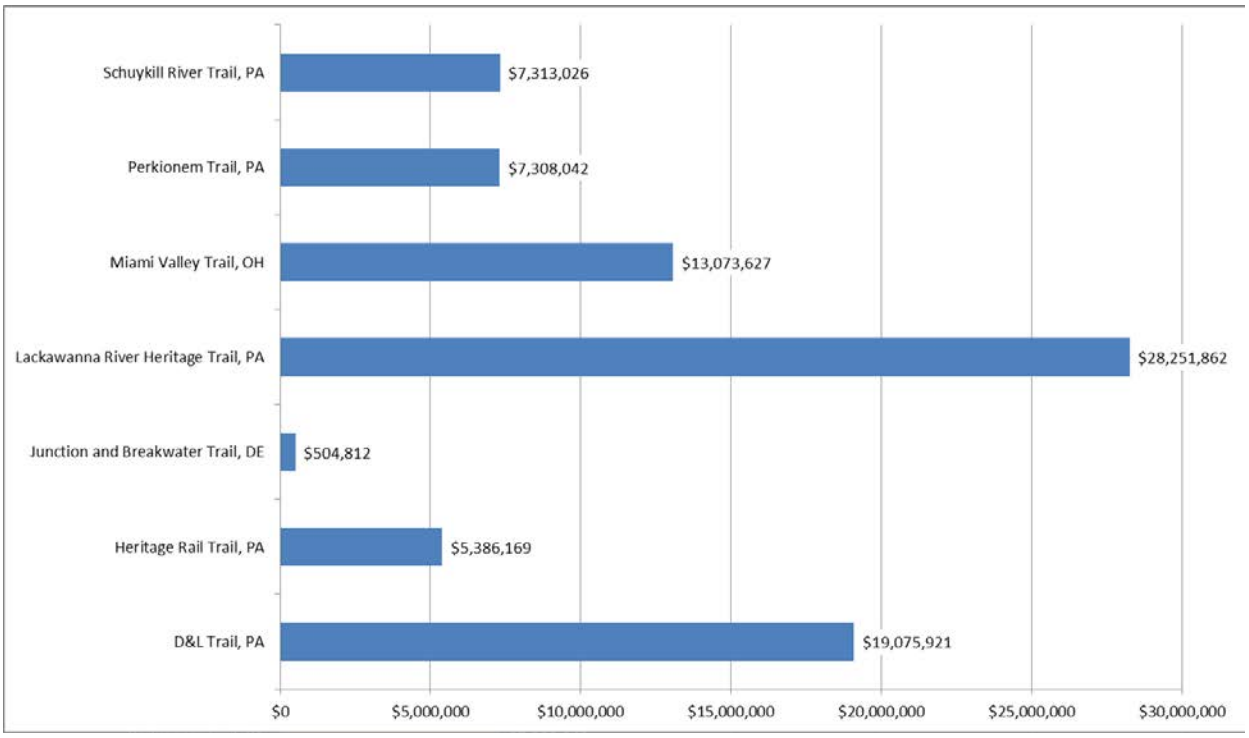


Figure 10 Total trail users expenditures, annual

Source: HRTPO analysis of literature

Lackawanna River Heritage trail in Pennsylvania disclosed the highest user expenditures, followed by D&L Trail also located in Pennsylvania, and Miami Valley Trail located in Ohio, while Junction and Breakwater Trail in Delaware announced the lowest value of total trail users expenditures. Average value of this parameter is approximately $11.5 million.

"Jackson Hole Trails Project Economic Impact Study" observed expenditures coming from local and non-local trail users. Authors of the study estimated the number of users for weekdays and weekends.

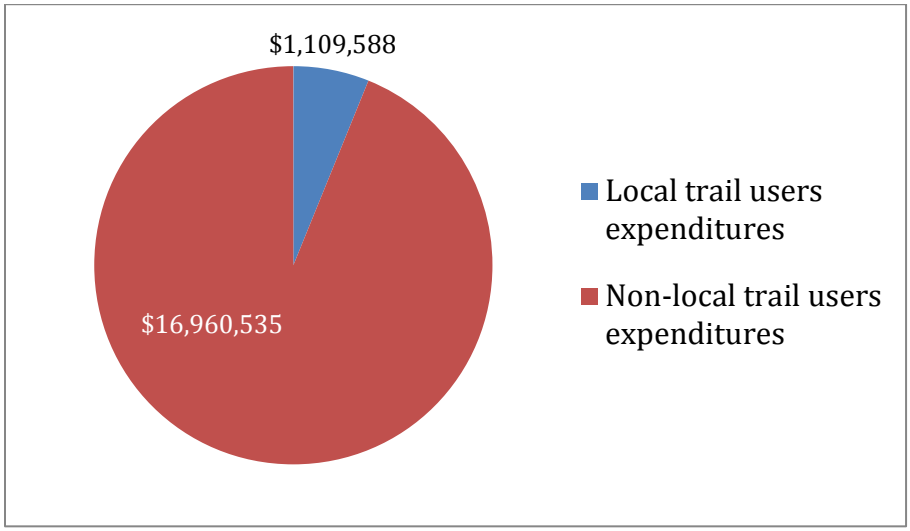


Figure 11 Estimated local and non-local trail users expenditures for Jackson Hole Trails
Source: HRTPO analysis of literature

Average spending per person per trip for in-state, U.S. out-of-state and out-of-country visitors was provided in "Estimating Tourism Expenditures for the Burlington Waterfront Path and the Island Line Trail". These spending rates were multiplied by the estimated visitor volume (in-state, out-of-state and out-of-country) for five months to obtain the estimate of spending associated with tourist path users by location (Figure 12).

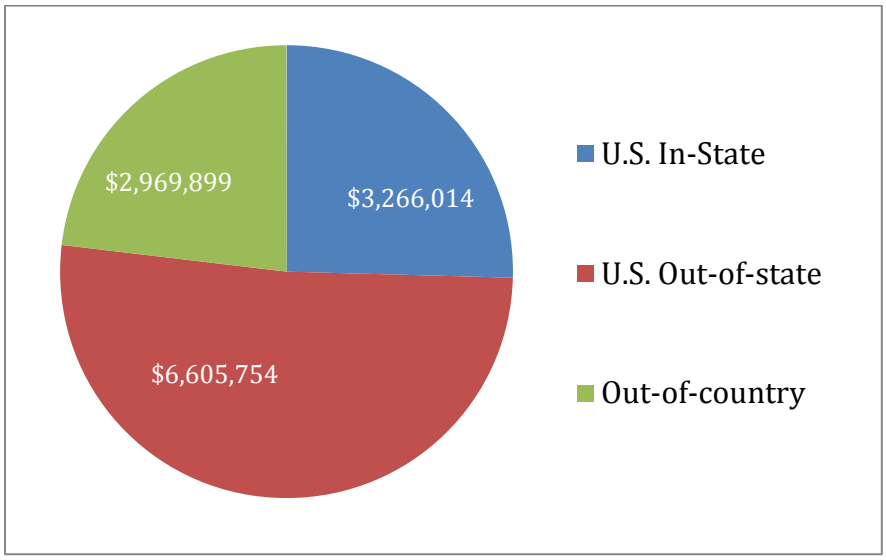


Figure 12 U.S. In-state, U.S. Out-of-state and out-of-country visitor expenditures for the Burlington Waterfront Path
Source: HRTPO analysis of literature

Virginia Capital Trail Foundation Economic Impact Analysis

The purpose of this study is to show the economic impact of Virginia Capital Trail and to reveal user profiles and how the trail is used. Study uses information obtained from an individual user survey, a local business survey, trail counter data, and analysis of local government property assessments.

The Virginia Capital Trail Foundation (VCTF) is a nonprofit organization that enhances, promotes and supports the development of the Capital Trail, which is a 52-mile long multi-use path that connects Richmond and Jamestown along the historic Route 5 corridor completed in 2015.

The report is still in draft phase and it is expected to be published in 2019.

BIKE COMMUTERS- INCOME AND MODE SHARE

Income

Sources of data used for the calculations are:

- Public Use Microdata Sample (PUMS)
- American Community Survey (ACS)

Each record in the PUMS file represents a single person, or (in the household-level dataset) a single household unit. PUMS files for an individual year contain data on approximately one percent of the United States population, while the file covering a five-year period contain data on approximately five percent of the US population.

Persons who use bicycle as a mode of transportation were selected. For this we used variable "JWTR-Means of transportation to work". The variable has values ranging from 01 to 12 for different modes of transportation. We selected the records if the value of JWTR was 9, as it represented a bicycle as a mode of transportation. The next variable needed is "PERNP-Total person's earnings" which shows how much a single person is earning on a yearly basis. The total values of earnings are summed and divided by the number of records (473), thereby obtaining the average earning of people who commute to work by bike in Virginia: $54,285.

Figure 13 and Figure 14 show person earnings range, number of persons who are in that range and the percent of total.

Person Earnings Range	No of Persons	Percent of Total
<$15,000	134	28.33%
$15,000-$24,999	63	13.32%
$25,000-$34,999	55	11.63%
$35,000-$49,999	30	6.34%
$50,000-$74,999	62	13.11%
$75,000-$99,999	39	8.25%
$100,000-$149,999	51	10.78%
$150,000-$199,999	26	5.50%
$200,000+	13	2.75%
Total	473	100%

Figure 13 Person earnings range, number of persons and percent of total, cycling to work

Source: HRTPO analysis of PUMS data, Virginia, 2010-2015

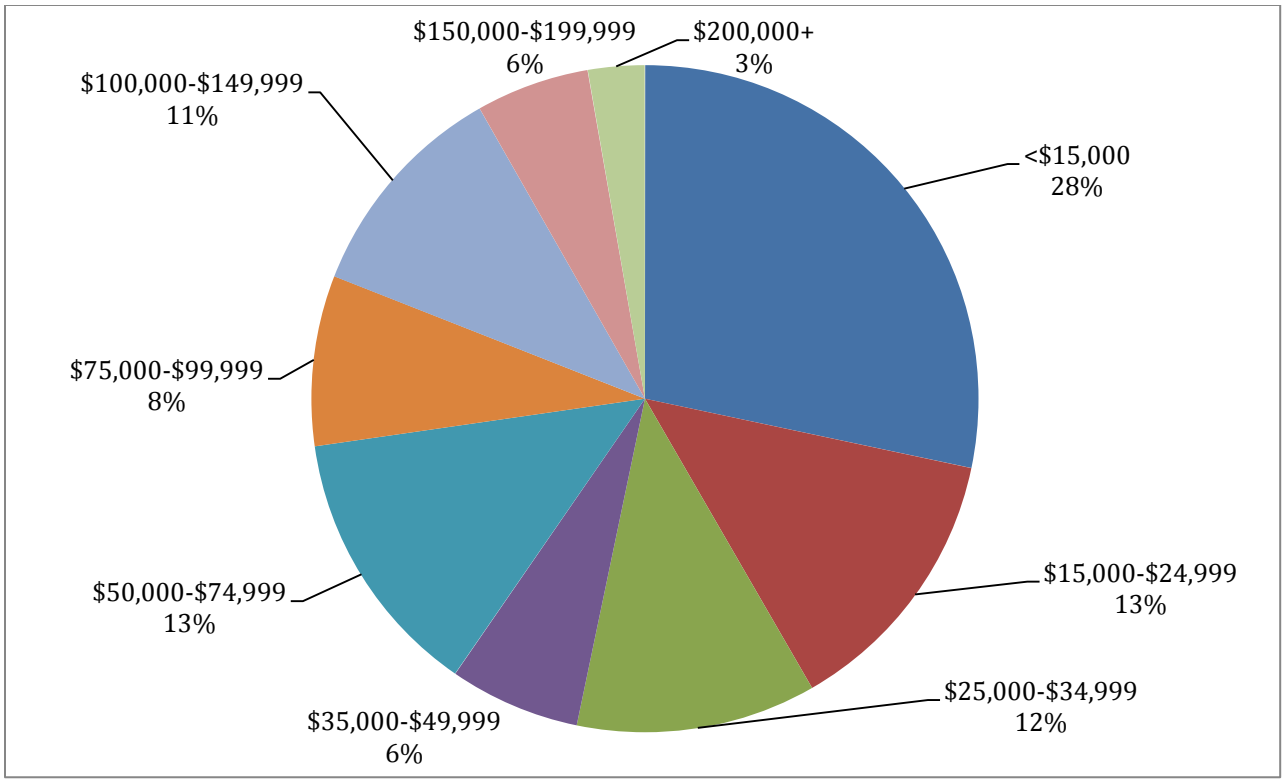


Figure 14 Percentage of persons in a specific earning range, cycling to work
Source: HRTPO analysis of PUMS data, Virginia, 2010-2015

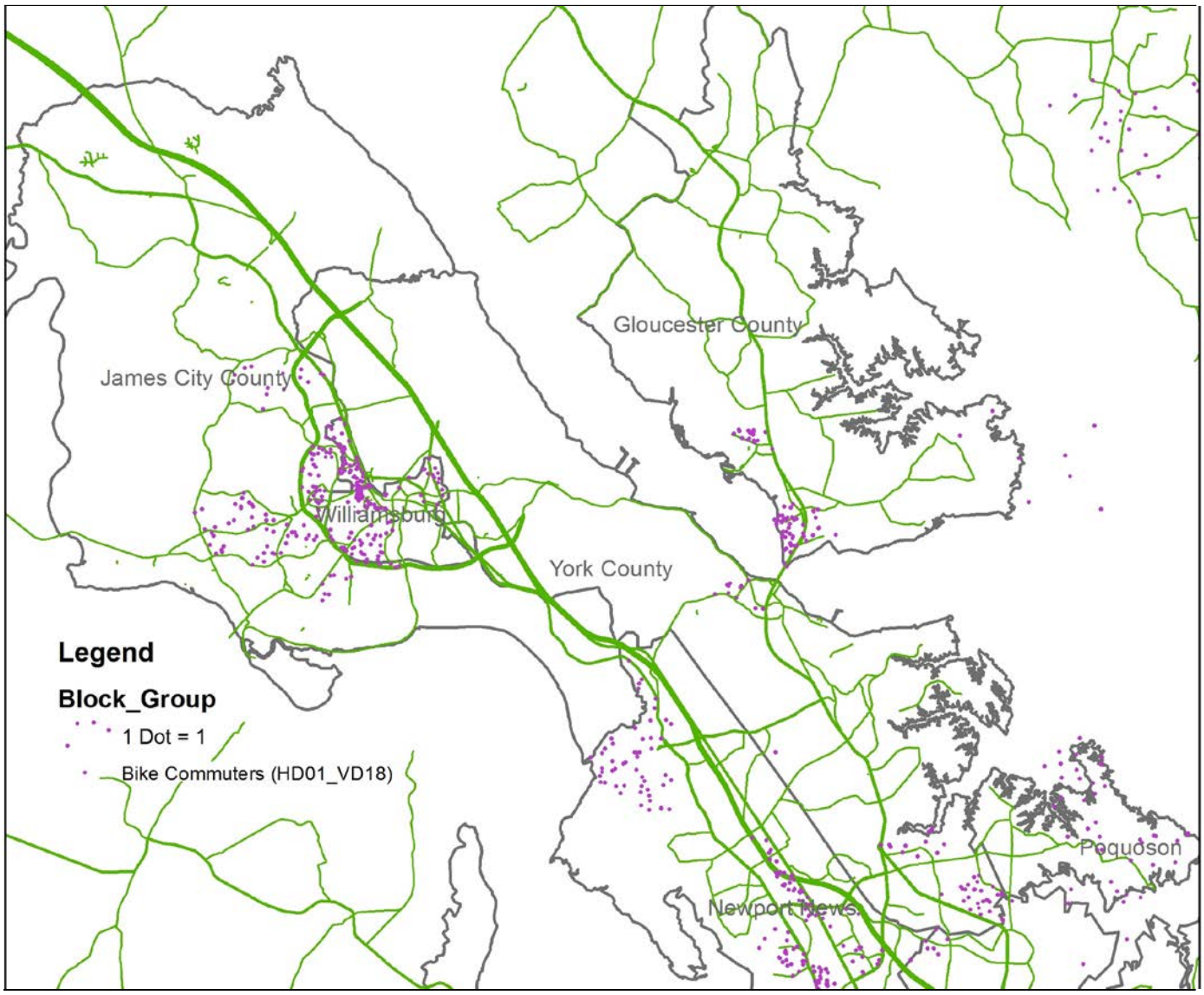
The highest percent of people who commute to work are low income people:

- Below $15,000 per year- approximately 28%
- Between $15,000 and $24,999- approximately 13%
- Between $25,000 and $34,999- approximately 12%

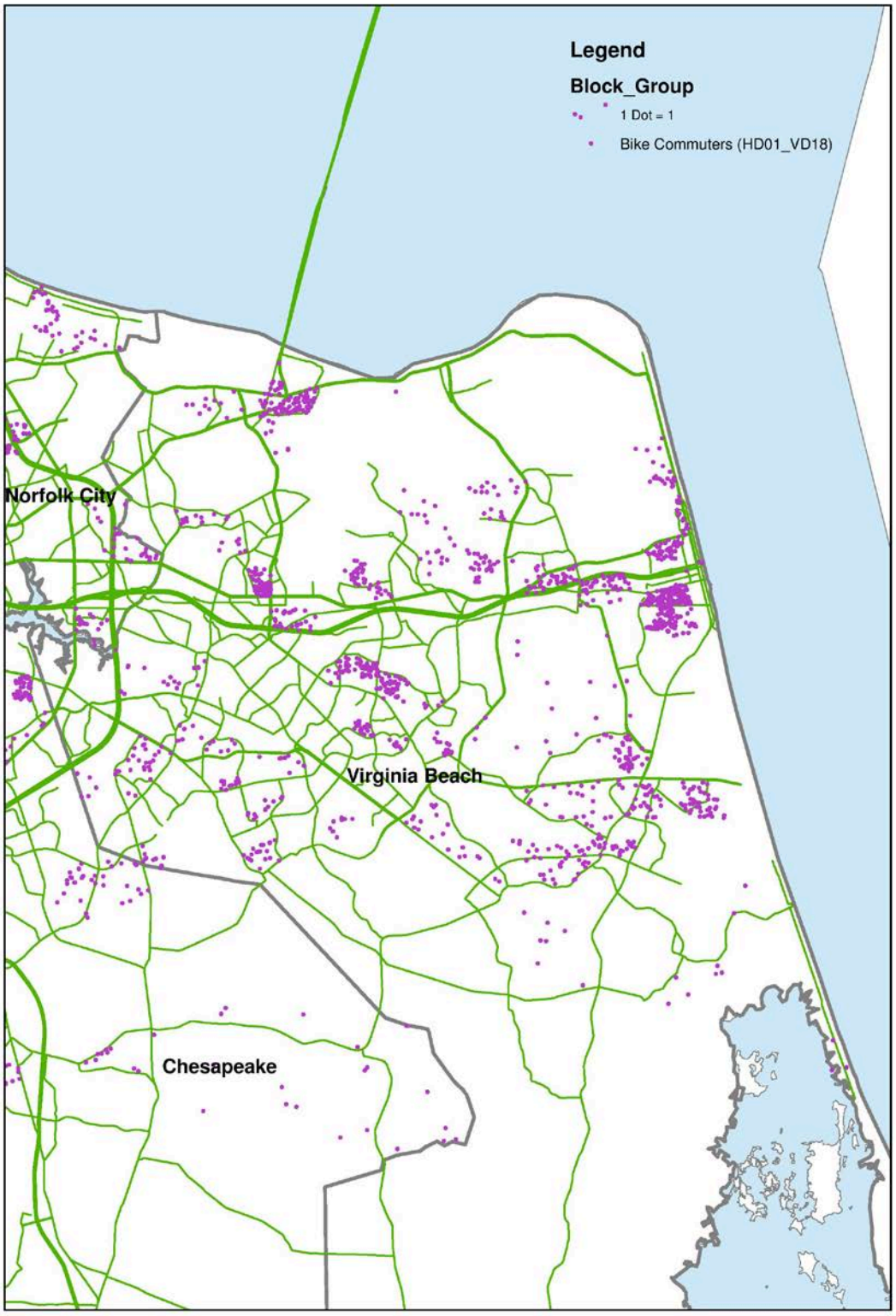
The lowest percent of people who commute to work are high income people:

- Between $150,000 and $199,999- approximately 6%
- Above $200,000- approximately 3%

The American Community Survey (ACS) was used to obtain the number of people who bike to work in Hampton Roads, which is shown on Maps 1 and 2 and in Figure 17. ACS table used is B08301, variable code: HD01_VD18. Maps show borders of the counties, major roads and arterials and bicycle commuters as blue dots (1 dot is 1 bicycle commuter).



Map 1 Bicycle commuters in the Historic Triangle (James City, Williamsburg, and York)
Source: American Community Survey, 2012-2016



Map 2 Bicycle commuters in Virginia Beach

Source: American Community Survey, 2012-2016

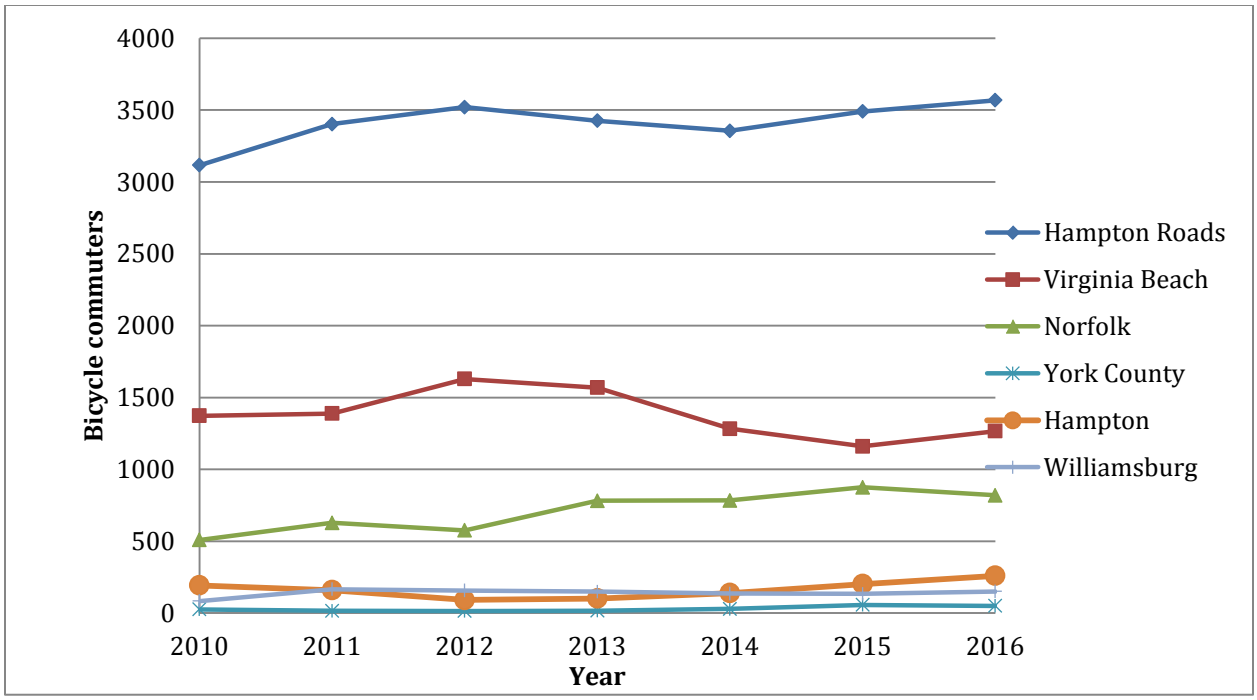


Figure 15 Number of people who bike to work for Hampton Roads, Virginia Beach, Norfolk, York County, Hampton and Williamsburg, 2010-2016

Source: HRTPO analysis of American Community Survey, 2016

Yearly trend of bicycle commuters is shown in Figure 15, and the number of bike commuters grows until 2012 when it starts to decline until 2014 when it starts growing again. For Virginia Beach, the number reached its peak in 2012 and started declining, while for Williamsburg and York County it remained more or less a constant number throughout this period.

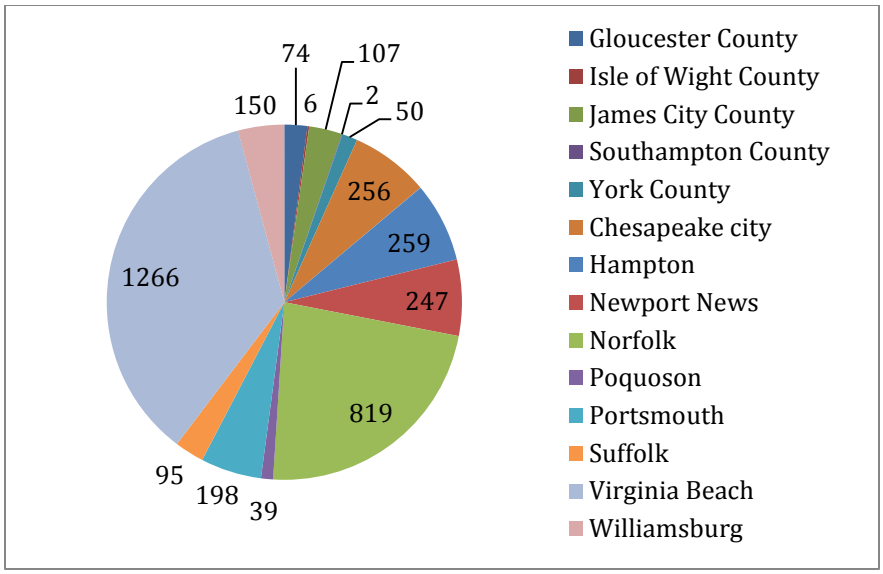


Figure 16 Number of bike commuters
Source: HRTPO analysis of American Community Survey, 2016

Figure 16 shows the number of bike commuters by city and county. We can see that the highest number of bike commuters in Hampton Roads out of all commuters is in Virginia Beach and Norfolk.

Total earnings of bike commuters in Hampton Roads is calculated by multiplying the average income of people who bike to work in Virginia by the number of people who bike to work by city and county in Hampton Roads, which can be seen on figure 17.

County	Number of bike commuters	Average income of people biking to work (VA)	Total income (product)
Gloucester County	74	$54,285	$4,017,090
Isle of Wight County	6	$54,285	$325,710
James City County	107	$54,285	$5,808,495
Southampton County	2	$54,285	$108,570
York County	50	$54,285	$2,714,250
Chesapeake	256	$54,285	$13,896,960
Franklin	0	$54,285	$0
Hampton	259	$54,285	$14,059,815
Newport News	247	$54,285	$13,408,395
Norfolk	819	$54,285	$44,459,415
Poquoson	39	$54,285	$2,117,115
Portsmouth	198	$54,285	$10,748,430
Suffolk	95	$54,285	$5,157,075
Virginia Beach	1266	$54,285	$68,724,810
Williamsburg	150	$54,285	$8,142,750
Total	3568	$54,285	$193,688,880

Figure 17 Number of bike commuters in Hampton Roads with calculations and total income of bike commuters
Source: HRTPO analysis of American Community Survey, Virginia, 2016

The following figure (figure 18) shows total earnings of bike commuters, and, as expected, the highest number is for Virginia Beach followed by Norfolk.

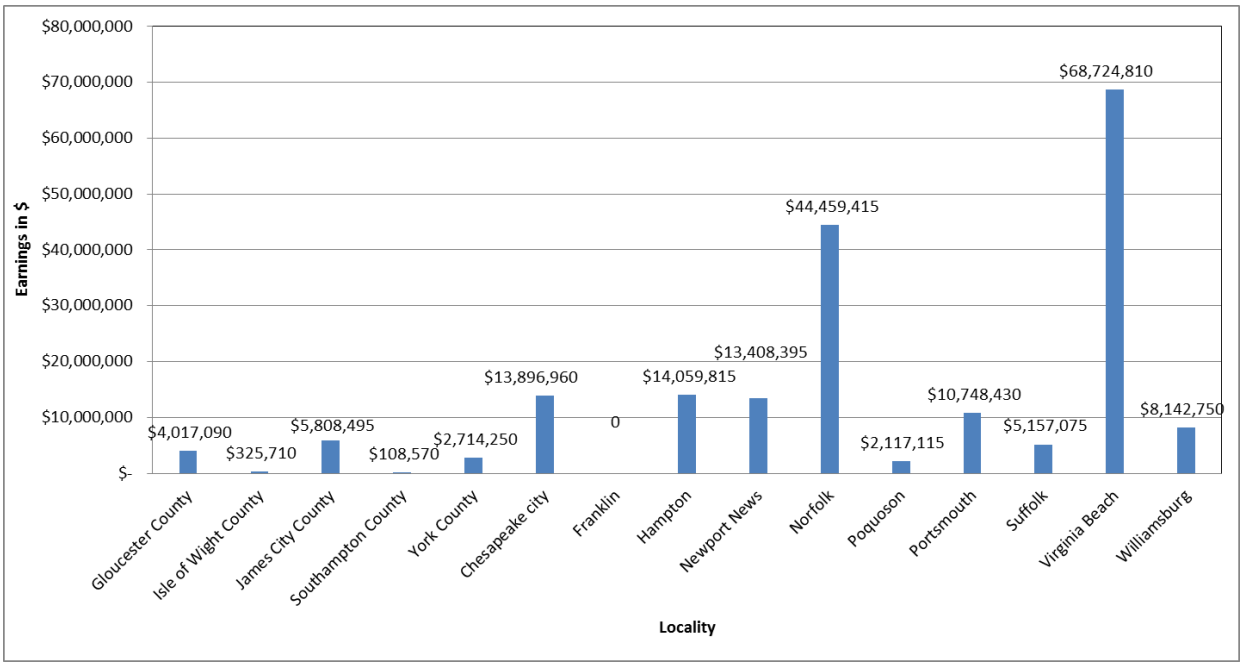


Figure 18 Total annual earnings of bike commuters in Hampton Roads

Source: HRTPO analysis of PUMS and ACS data (see above)

Mode Share

Hampton Roads

Mode share (mode split, modal split) represents the percentage of travelers using a specific type of transportation. Figures 19 and 20 present mode share for Hampton Roads. As expected a huge percentage of commuters use a car, truck or a van alone, while really low percent of commuters use bicycle or walking as means of getting to work.

	Estimate; Total:	Car, truck, or van: - Drove alone	Car, truck, or van: - Carpooled:	Public transportation (excluding taxicab):	Taxicab	Motorcycle	Worked at home	Walked	Other means	Bicycle	Bike %
Gloucester County, Virginia	17,787	14,906	1,711	36	0	22	642	86	310	74	0.42%
Isle of Wight County, Virginia	17,202	15,233	1,260	30	0	27	520	94	32	6	0.03%
James City County, Virginia	32,169	26,575	2,657	217	41	73	1,969	328	202	107	0.33%
Southampton County, Virginia	7,660	6,640	544	4	0	21	278	60	111	2	0.03%
York County, Virginia	32,672	27,817	2,420	74	15	50	1,371	643	232	50	0.15%
Chesapeake, Virginia	112,502	96,821	8,200	802	32	170	4,016	1,328	877	256	0.23%
Franklin, Virginia	3,433	2,917	321	0	0	0	74	108	13	0	0.00%
Hampton, Virginia	64,324	53,062	5,523	1,633	99	115	1,584	1,550	499	259	0.40%
Newport News, Virginia	88,159	69,734	8,411	3,121	212	307	1,892	3,652	583	247	0.28%
Norfolk, Virginia	124,486	92,516	10,952	4,862	270	366	5,302	8,240	1,159	819	0.66%
Poquoson, Virginia	6,204	5,432	374	0	0	47	285	9	18	39	0.63%
Portsmouth, Virginia	43,324	35,180	3,423	1,158	72	72	1,044	1,730	447	198	0.46%
Suffolk, Virginia	40,928	35,074	3,418	128	42	59	1,290	543	279	95	0.23%
Virginia Beach, Virginia	235,755	193,156	20,425	2,040	147	863	9,434	6,170	2,254	1,266	0.54%
Williamsburg, Virginia	5,763	3,505	565	248	0	0	445	850	0	150	2.60%

Figure 19 Mode share data for Hampton Roads
Source: HRTPO analysis of ACS, Virginia, 2016

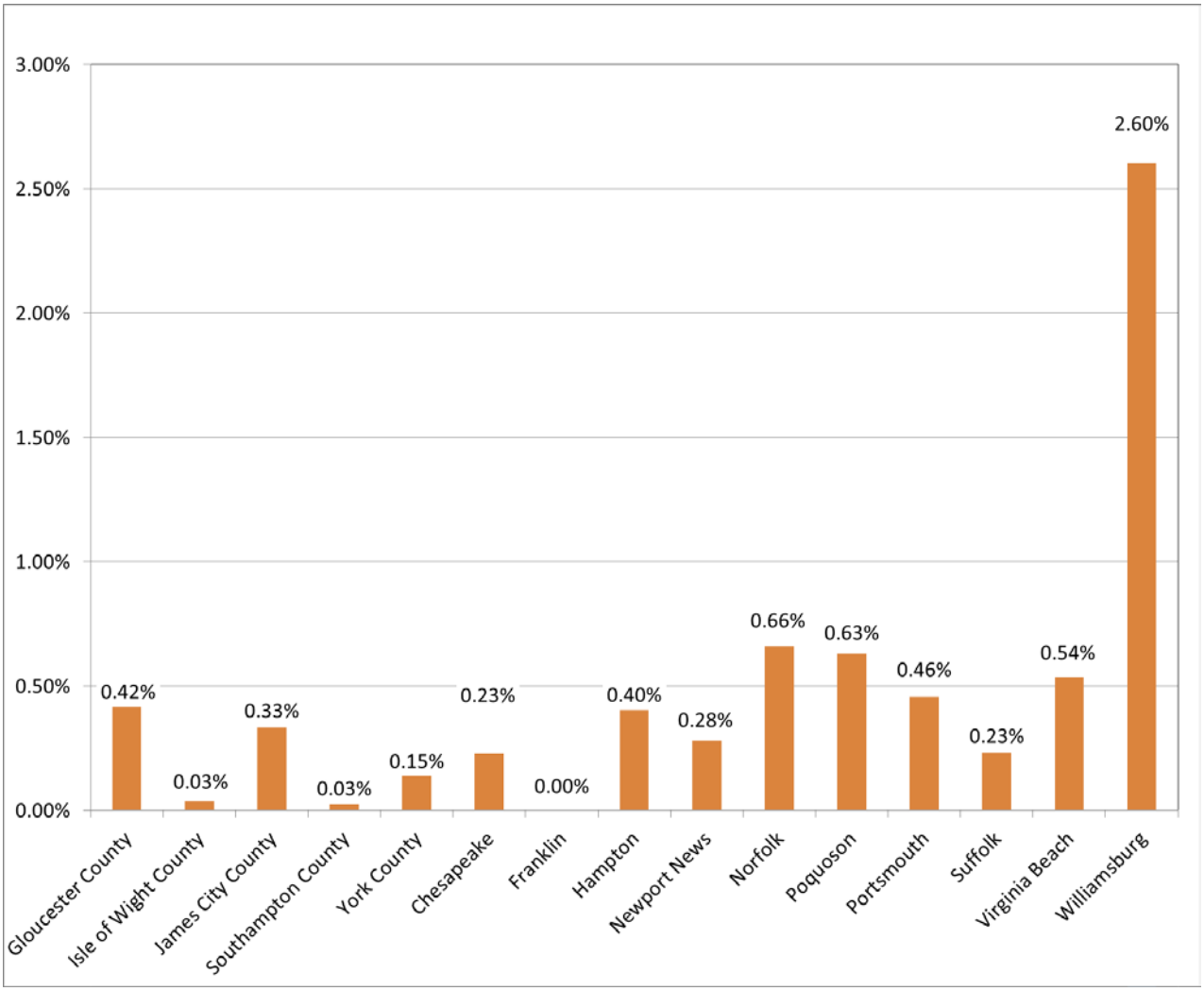


Figure 20 Bicycle mode share in Hampton Roads

Source: HRTPO analysis of the ACS data, Virginia, 2016

Benchmarking- Historic Triangle and Va. Beach vs. Competitors

The next six figures represent mode shares for Historic Triangle, Virginia Beach and 4 competitors, and it can be seen that bicycle as a mode of transportation has a low percentage, while car, truck, or van as a mode holds the first place for all 6 regions.

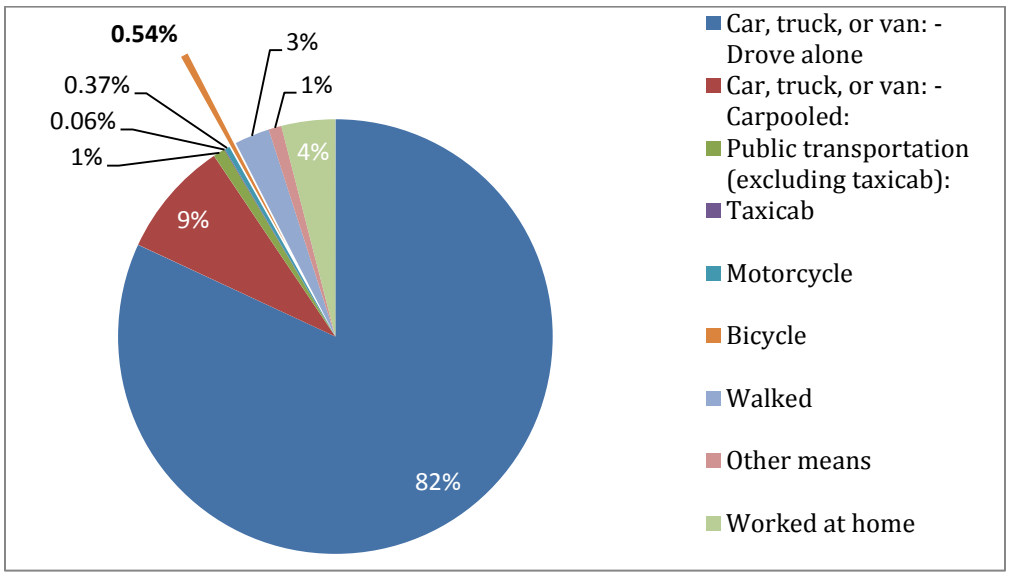


Figure 21 Mode share Virginia Beach

Source: HRTPO analysis of the ACS data, Virginia, 2016

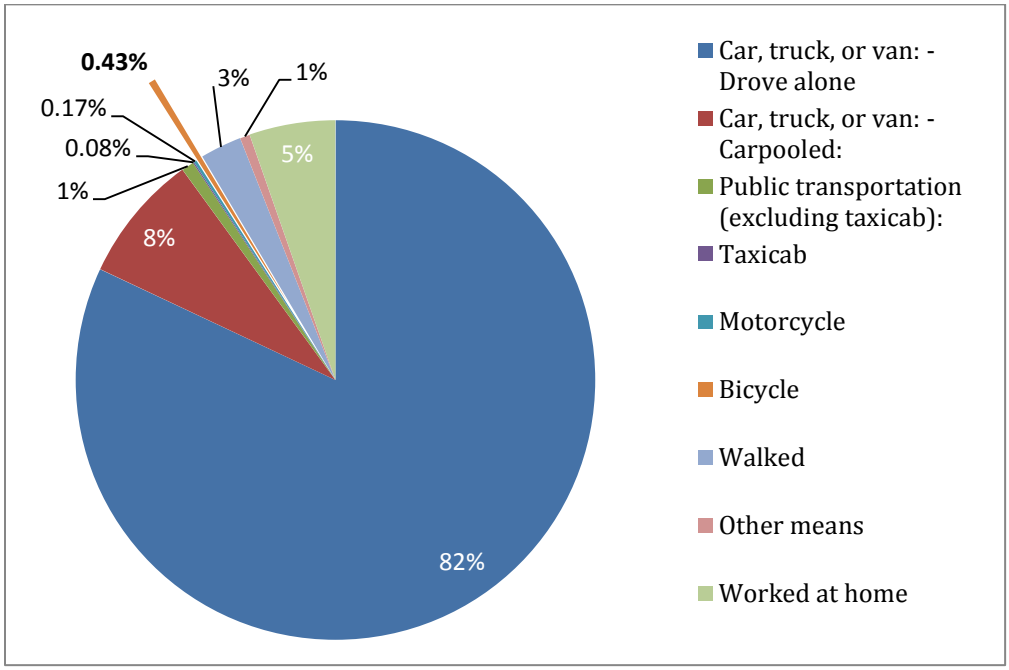


Figure 22 Mode share in Historic Triangle

Source: HRTPO analysis of ACS data, Virginia, 2016

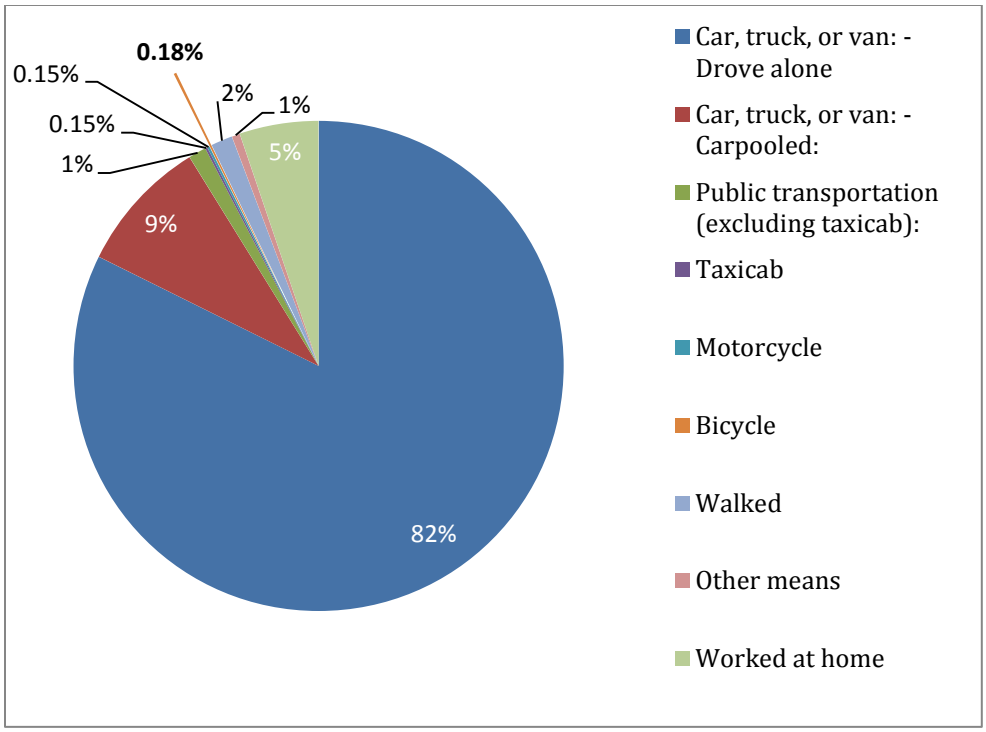


Figure 23 Mode share in Greensboro

Source: HRTPO analysis of ACS data, North Carolina, 2016

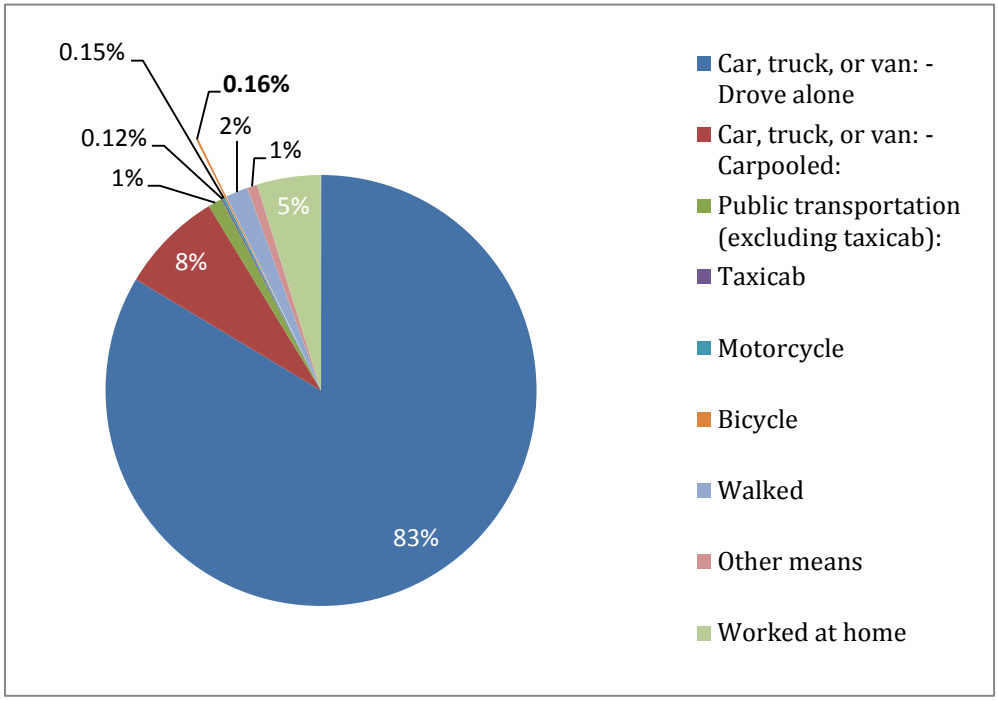


Figure 24 Mode share in Winston-Salem

Source: HRTPO analysis of ACS data, North Carolina, 2016

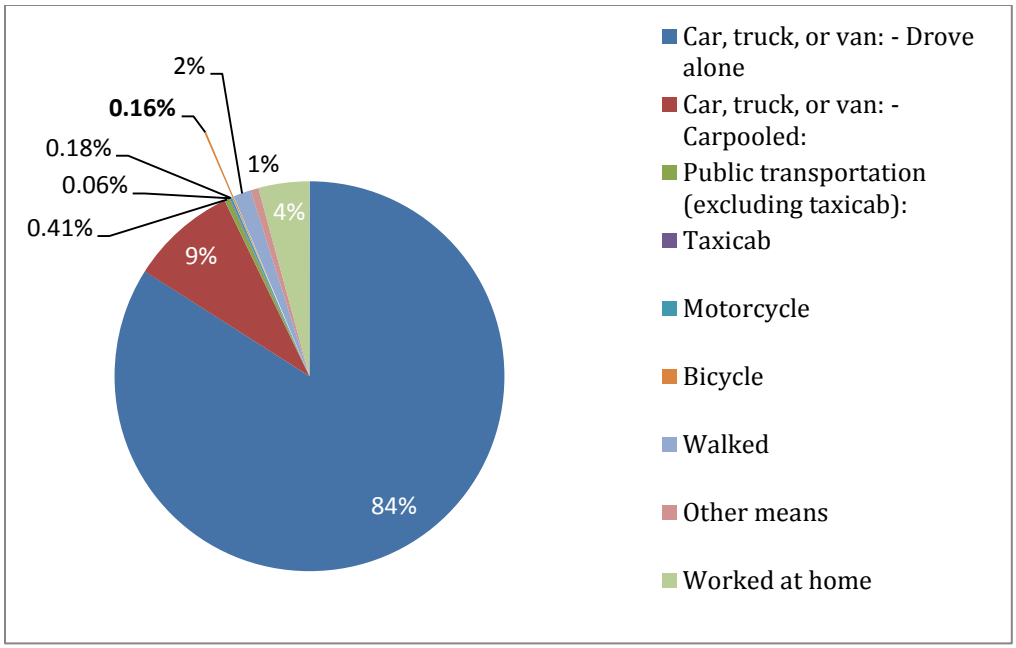


Figure 25 Mode share in Greenville

Source: HRTPO analysis of ACS data, South Carolina, 2016

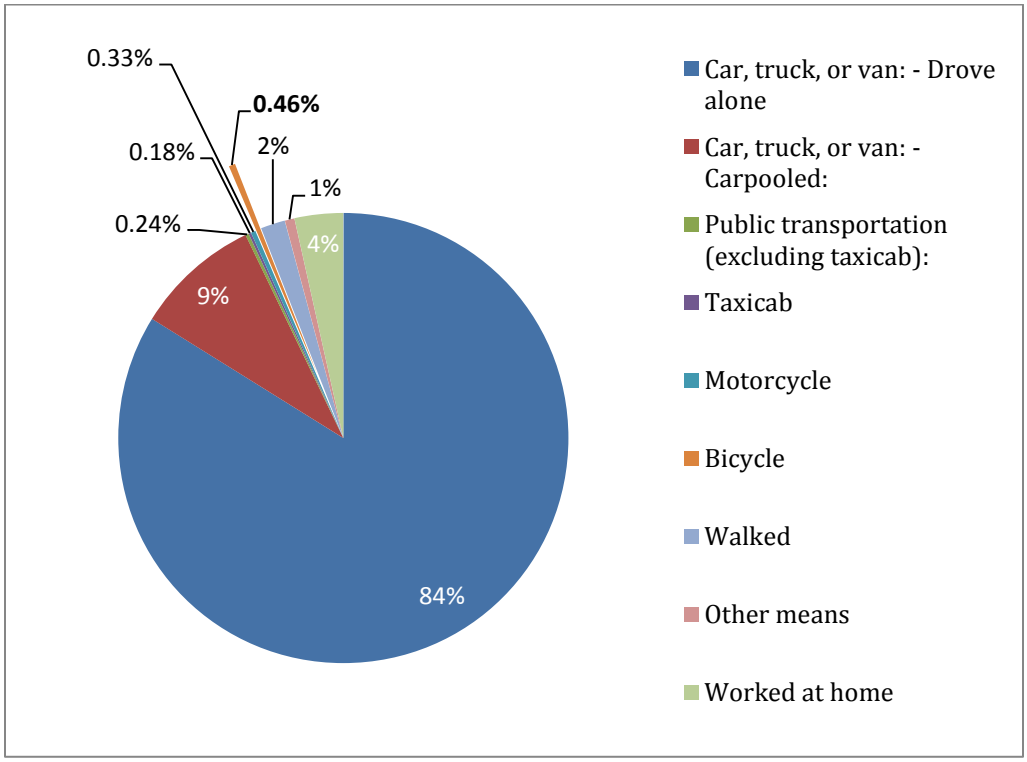


Figure 26 Mode share in Myrtle Beach

Source: HRTPO analysis of ACS data, South Carolina, 2016

Figures 27 and 28 show Virginia Beach and Historic Triangle in comparison to other 4 competitors, and here we can see the differences in mode shares even clearly.

	Total	Car, truck, or van: - Drove alone	Car, truck, or van: - Carpooled	Public transportation (excluding taxicab)	Taxicab	Motorcycle	Worked at home	Walked	Other means	Bicycle	Bike %
James City County, VA	32,169	26,575	2,657	217	41	73	1,969	328	202	107	0.33%
Williamsburg, VA	5,763	3,505	565	248	0	0	445	850	0	150	2.60%
York County, VA	32,672	27,817	2,420	74	15	50	1,371	643	232	50	0.15%
Historic Triangle (JCC+WLMBG+ YC)	70,604	57,897	5,642	539	56	123	3,785	1,821	434	307	0.43%
Greenville, SC	222,920	187,314	19,643	918	134	400	9,406	3,252	1,495	358	0.16%
Greensboro, NC	236,026	194,330	20,905	2,744	350	345	12,317	3,366	1,252	417	0.18%
Myrtle Beach, SC	131,140	109,972	11,790	317	239	434	4,579	2,299	907	603	0.46%
Virginia Beach, VA	235,755	193,156	20,425	2,040	147	863	9,434	6,170	2,254	1,266	0.54%
Winston-Salem, NC	161,825	135,294	12,443	1,722	188	250	7,766	2,672	1,238	252	0.16%

Figure 27 Mode share data for competitors, Virginia Beach and Historic Triangle
Source: HRTPO analysis of ACS data, Virginia, North and South Carolina, 2016

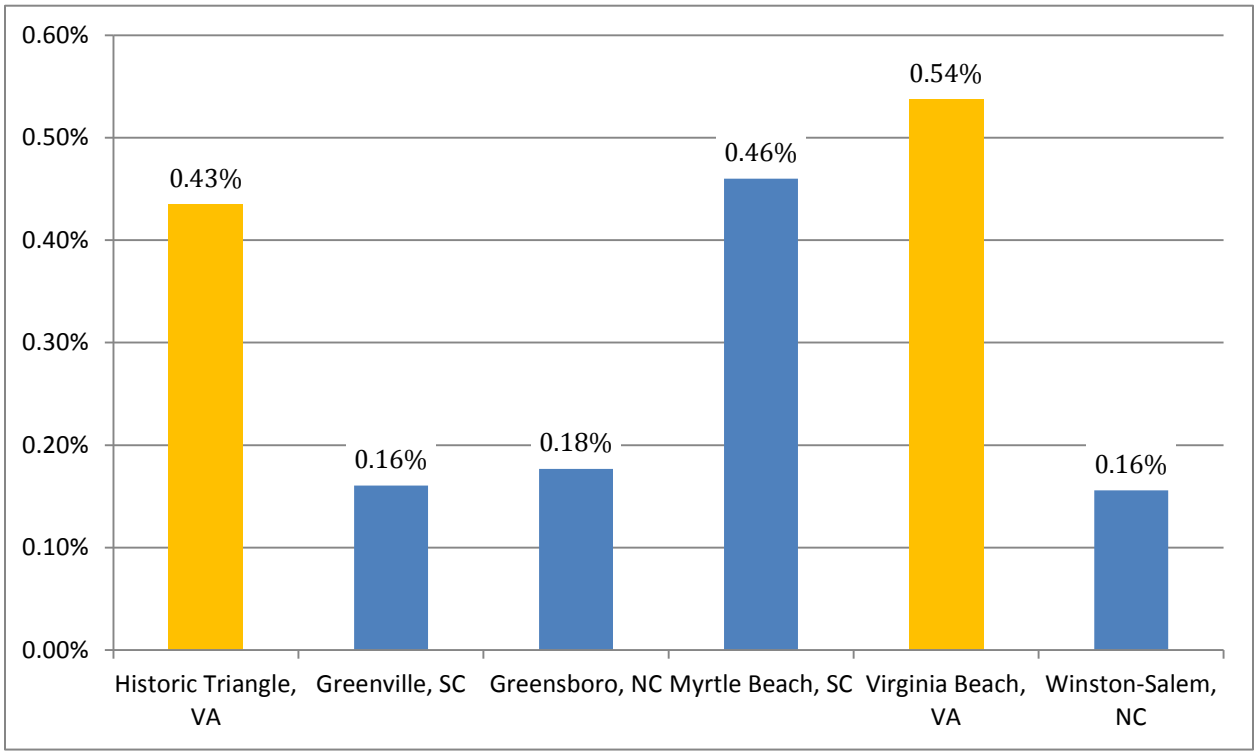


Figure 28 Bicycle mode share for Greenville, Greensboro, Myrtle Beach, Virginia Beach, Historic Triangle and Winston-Salem
Source: HRTPO analysis of ACS data, Virginia, North and South Carolina, 2016

Looking at figures 27 and 28 we can easily discern that Virginia Beach has the highest mode share when compared to the competitors. Historic Triangle is in third place right below Myrtle Beach. The other three competitors have significantly lower mode share.

PATH LENGTH

The purpose of this section is to compare the bicycle infrastructure of Hampton Roads to competitors, specifically path lengths. There are many types of bike infrastructure. Due to the difficulty of gathering data on every type of bike infrastructure (there are no clear definitions for each), HRTPO staff observed only multi-use paths. These types of paths support various recreational and active transportation forms, such as: walking, biking, rollerblading, running, etc. Another name that is typically used is "shared-use path". The criteria adapted by HRTPO staff for multi-use paths for this analysis are as follows:

- Paved
- Minimum width of 8 ft.
- If parks and university campuses have such paths, only paths going through these locations are considered

Multi-use paths can provide users a shortcut through a residential neighborhood, or enjoyable recreation. Paths can be located near rivers, canals, ocean fronts, even abandoned railroads (rails-to-trails), within college campuses, between or within parks.

Hampton Roads

Hampton Roads offers many multi-use paths to users, such as the Elizabeth River Trail (Norfolk), the Boardwalk bike path (Virginia Beach) and others. The total path length in the region is approximately 175 miles. Virginia Beach has the highest length of paths. Figure 29 and 30 shows the path lengths in Hampton Roads and percentages.

	Length (*miles)*
Chesapeake	14.79
Hampton	0.96
James City County	24.88
Newport News	23.94
Norfolk	18.01
Portsmouth	0.37
Suffolk	11.31
Virginia Beach	61.97
Williamsburg	2.86
York County	17.66
Total	176.75

Figure 29 Path lengths in Hampton Roads
Source: HRTPO, 2018

From figures 29 and 30 we can see that Virginia Beach has the highest length of paths in the region, followed by James City County, Newport News and Norfolk respectively.

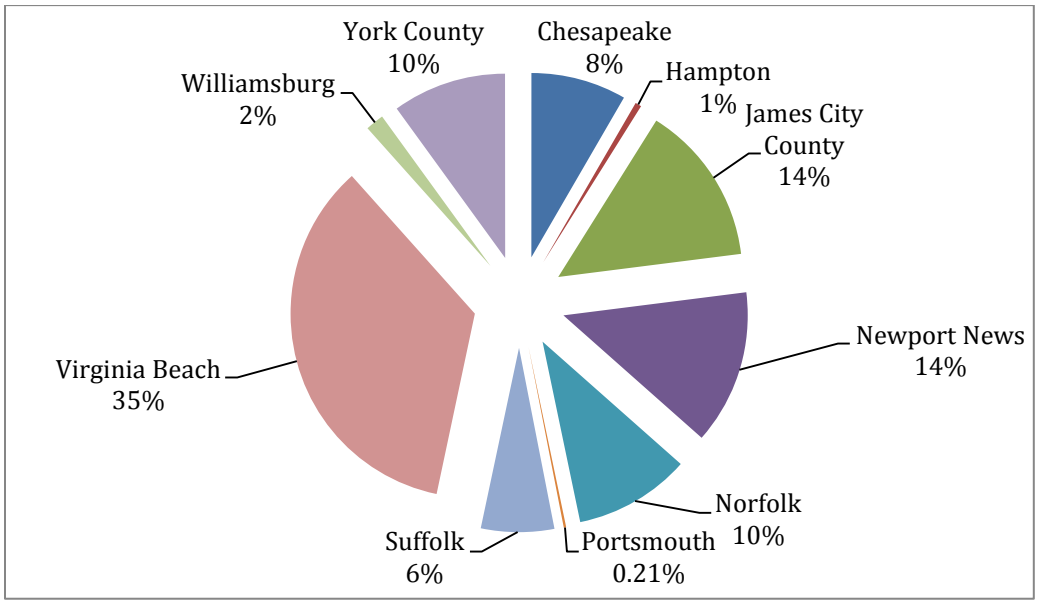
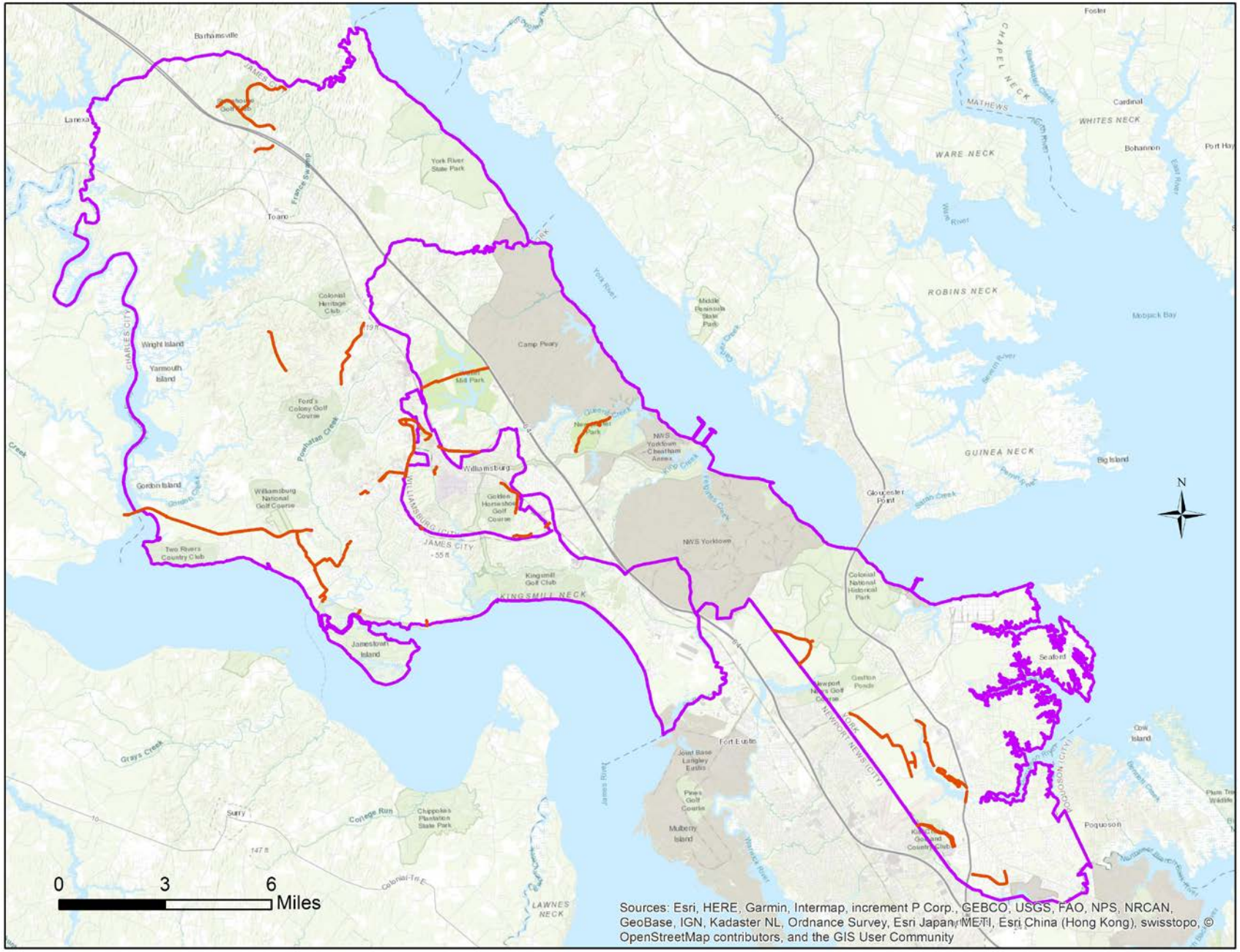


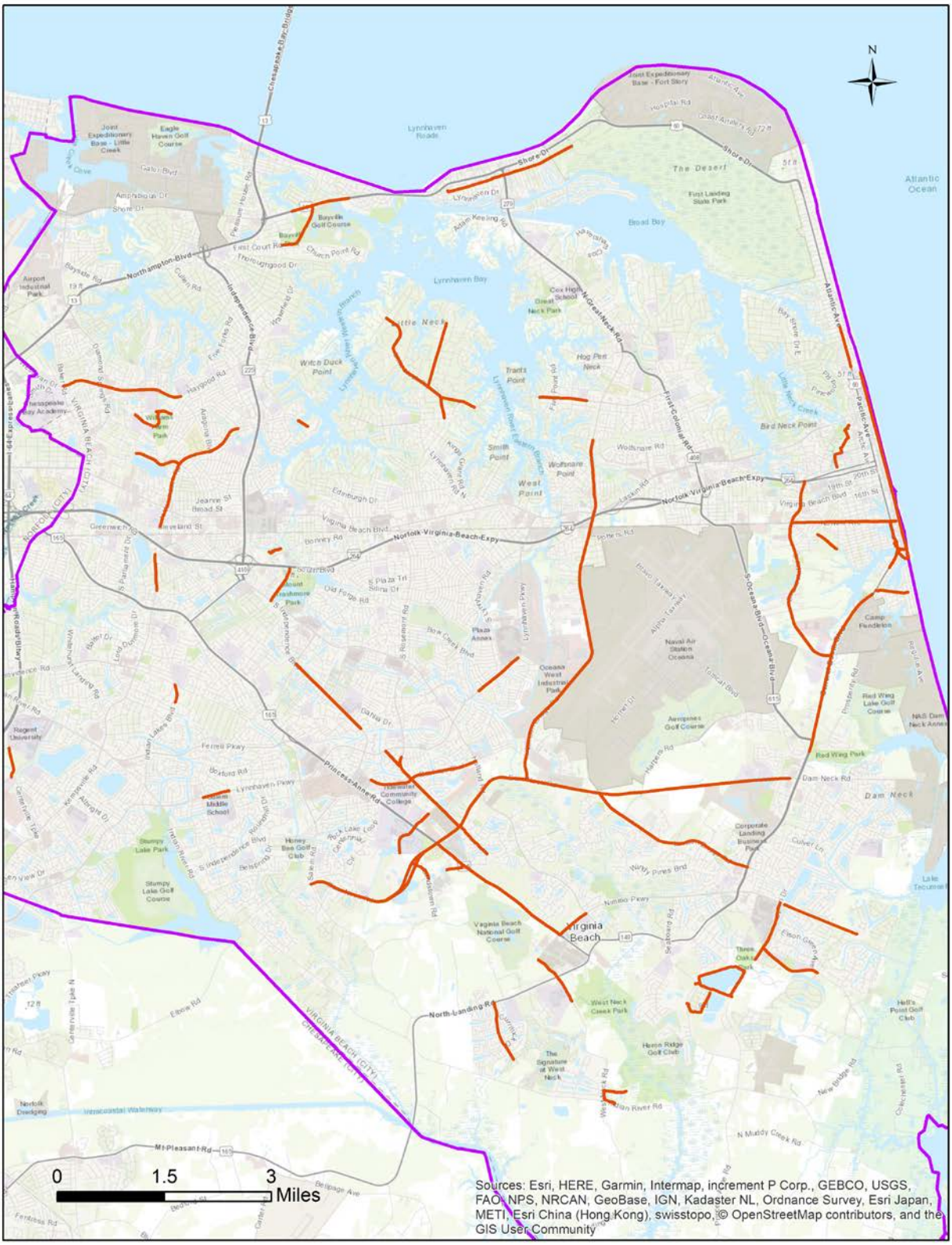
Figure 30 Percentage of path lengths in Hampton Roads
Source: HRTPO, 2018

Maps 3 and 4 convey the location of multi-use paths in Historic Triangle (James City County, Williamsburg and York County) and Virginia Beach.



Map 4 Multi-use paths in Historic Triangle **shown in red**

Source: HRTPO, 2018



Map 4 Multi-use paths in Virginia Beach **shown in red**
Source: HRTPO, 2018

Benchmarking- Historic Triangle and Va. Beach vs. Competitors

If we look at path lengths for competitors and Historic Triangle and Virginia Beach (figure 31) we notice that Virginia Beach and Historic Triangle have more than any competitor. Virginia Beach has the highest path lengths, followed by Historic Triangle (Williamsburg, James City County and York). Greensboro, NC comes in third place while the rest are in the following order: Myrtle Beach, Winston-Salem and lastly Greenville.

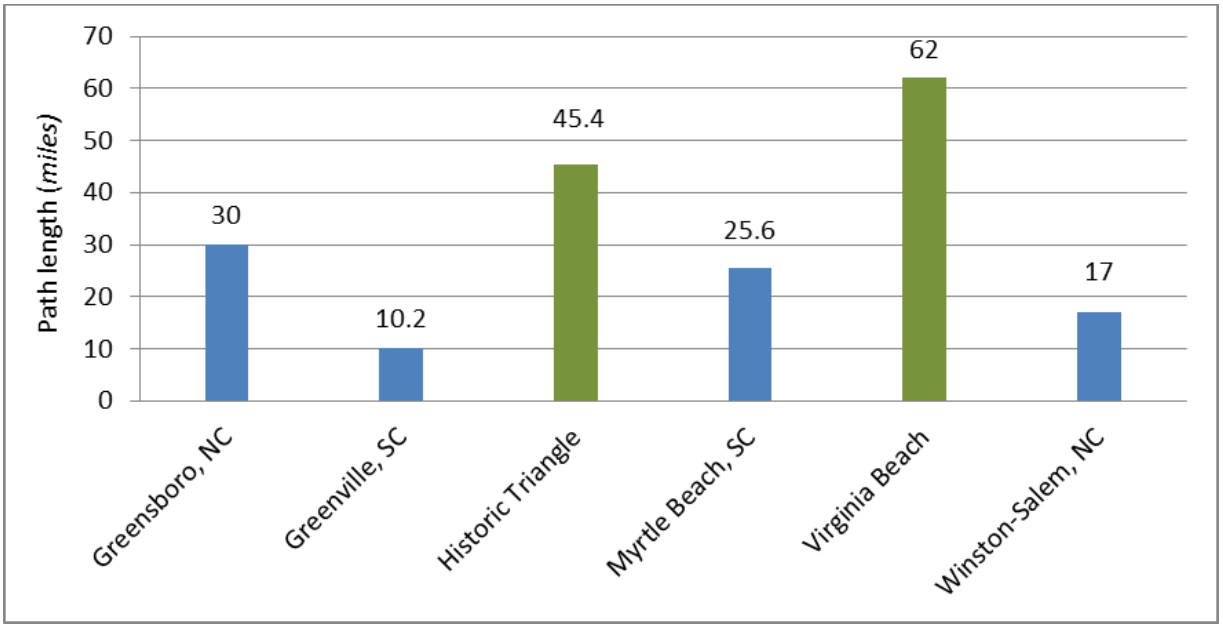
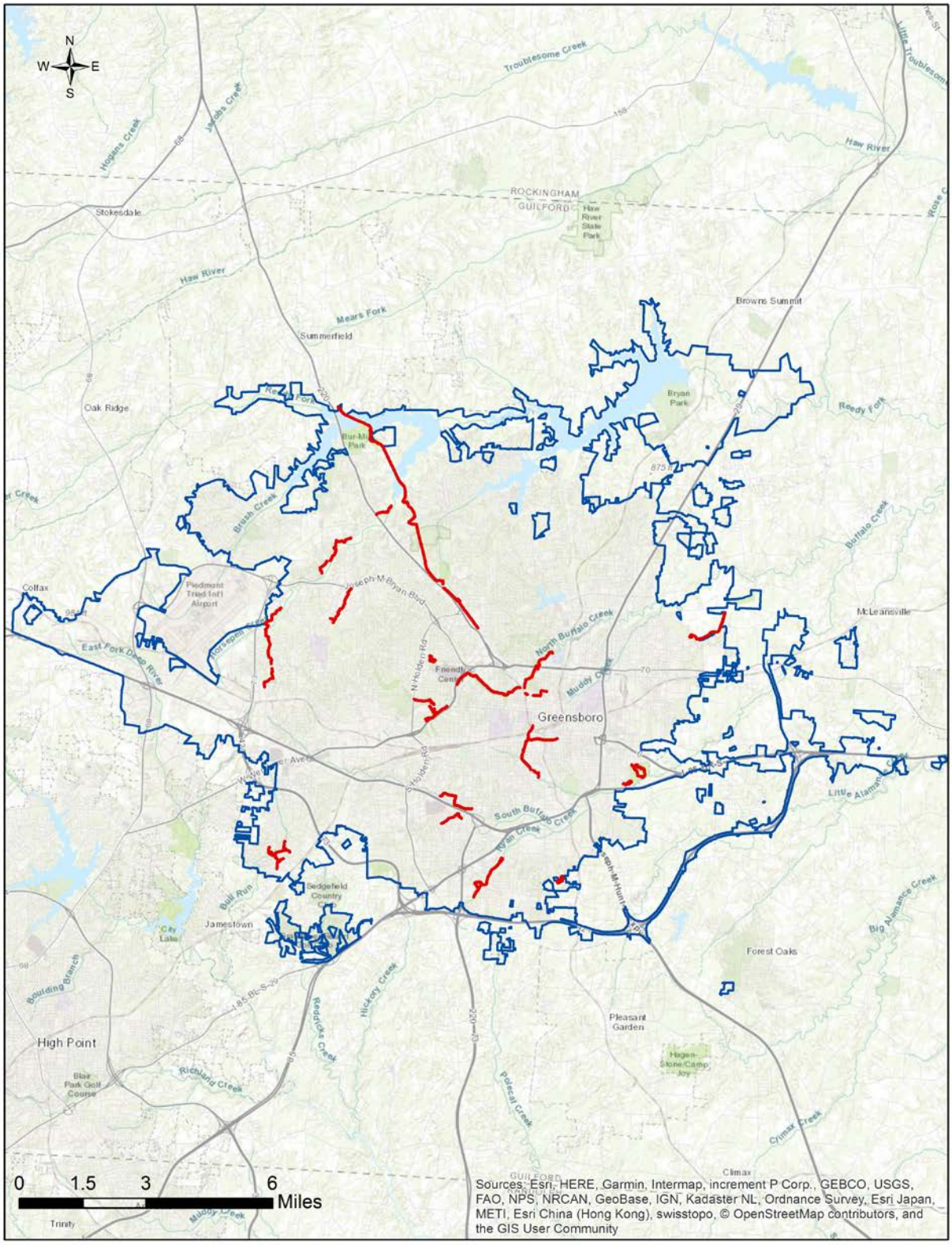
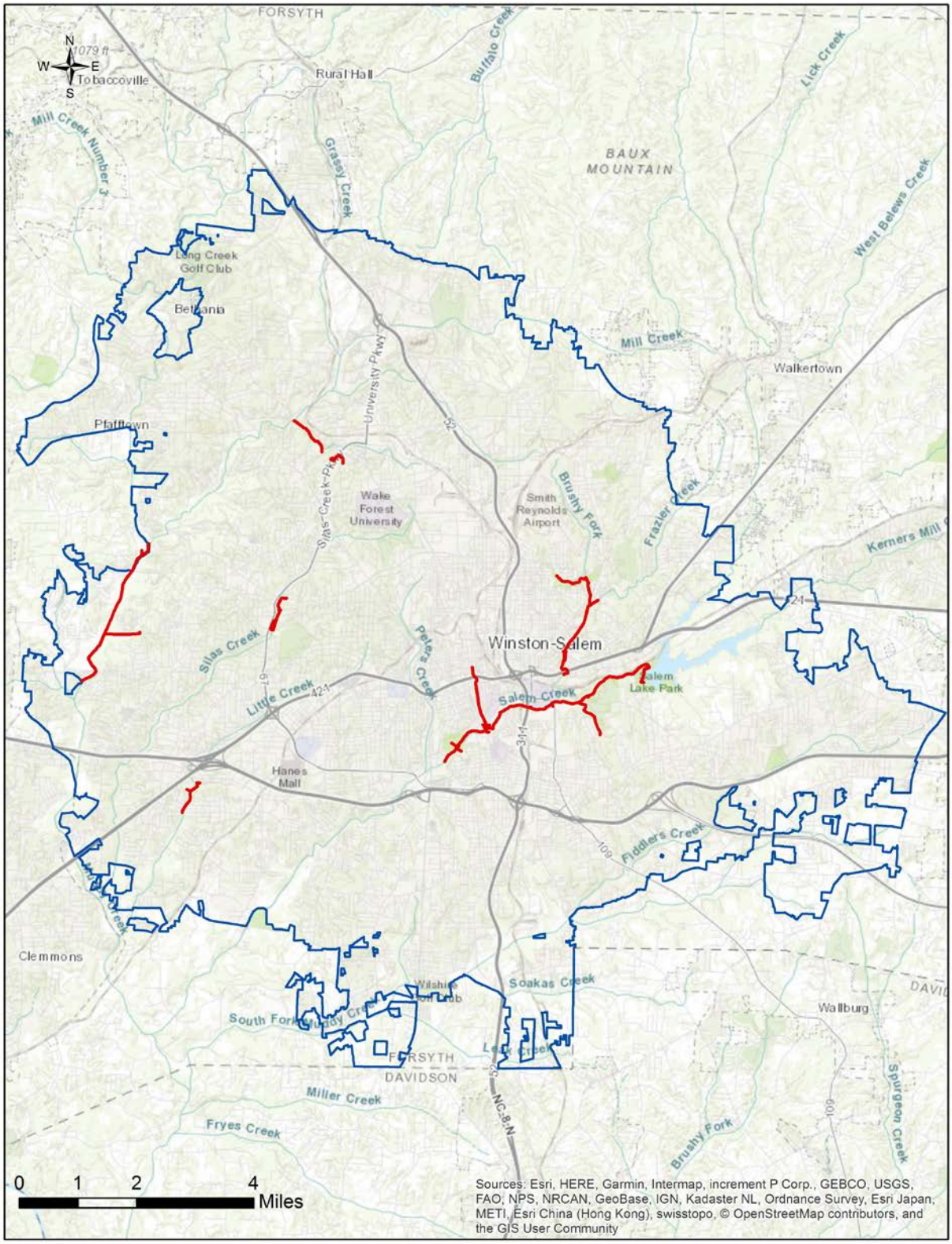


Figure 31 Path lengths for Historic Triangle, Virginia Beach and competitors
Source: HRTPO, 2018

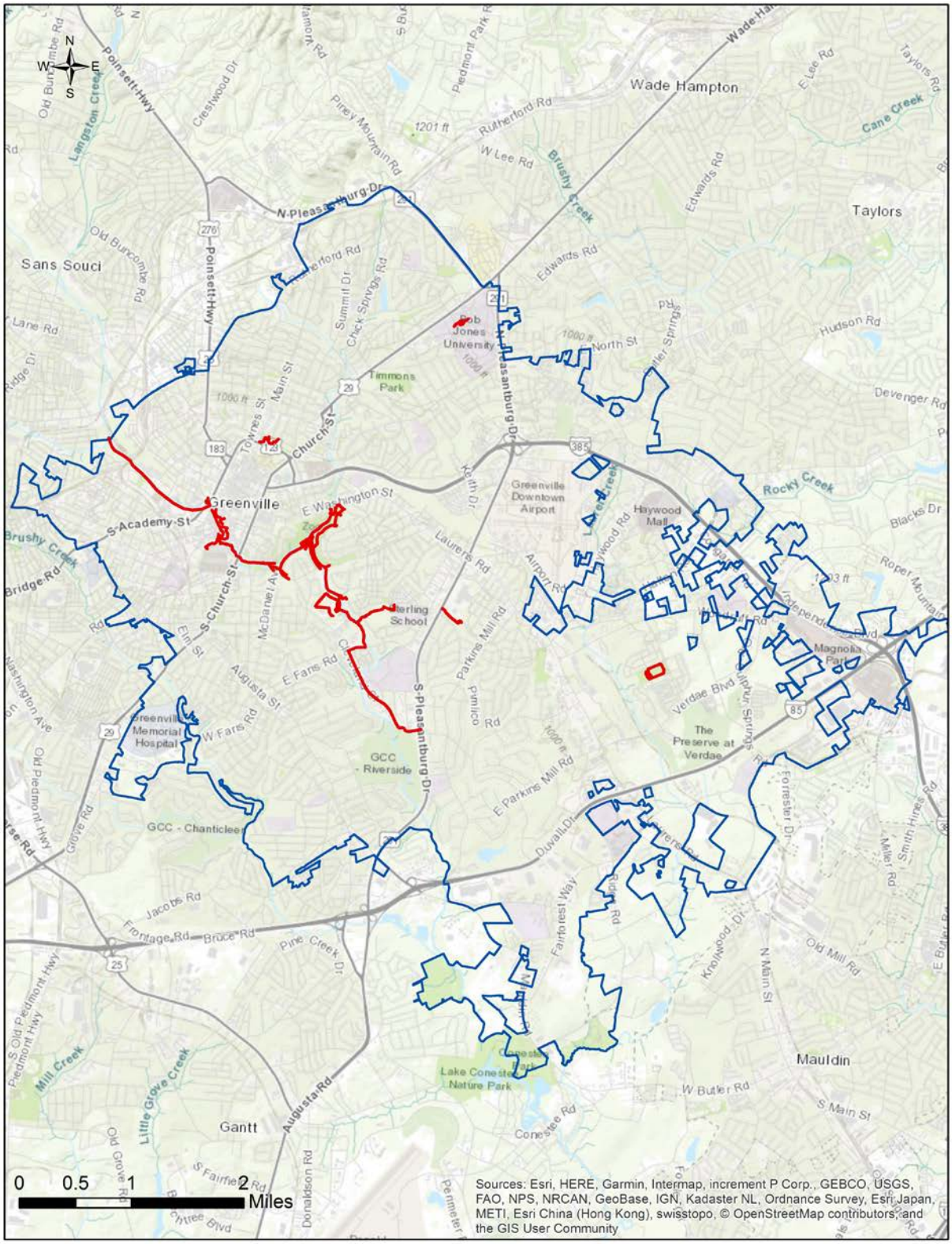
Maps 5 to 8 give us the location of multi-use paths of competitors (Greensboro, Greenville, Myrtle Beach and Winston-Salem).



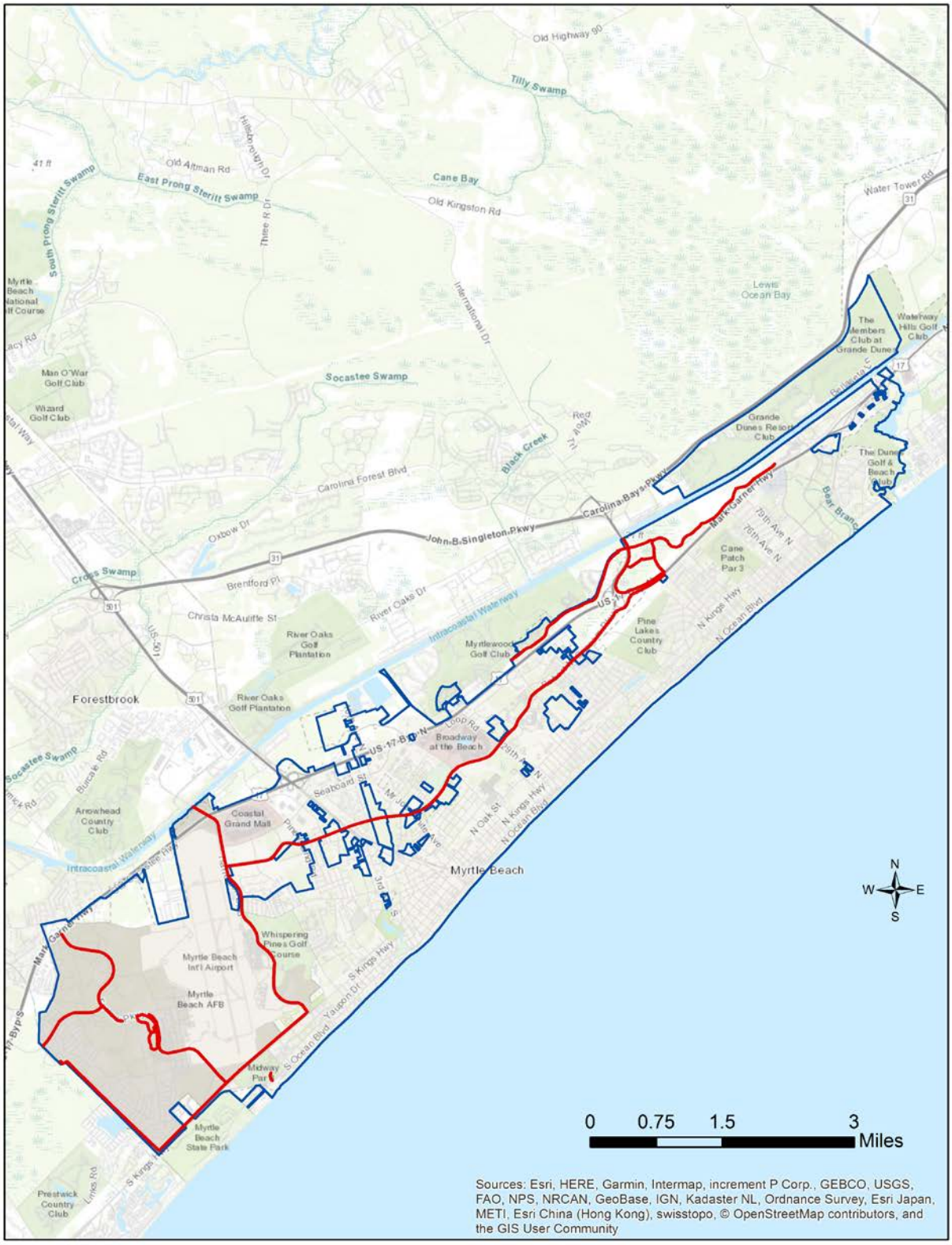
Map 5 Multi-use paths in Greensboro, North Carolina **shown in red**
Source: HRTPO, 2018



Map 6 Multi-use paths in Winston-Salem, North Carolina **shown in red**
Source: HRTPO, 2018



Map 7 Multi-use paths in Greenville, South Carolina **shown in red**
Source: HRTPO, 2018



Map 8 Multi-use paths in Myrtle Beach, South Carolina **shown in red**
Source: HRTPO, 2018

Connectivity of Trails in Historic Triangle

Trails and greenways not only provide a recreational benefit for users, but also provide important environmental, economic, social and health benefit for individuals, communities, and regions. Inter-regional connectivity of trails can bring out-of-region visitors to a particular trail, therefore providing a boost to local economy by visitor spending. Two national trails that pass through the Historic Triangle are:

- East Coast Greenway is a 3,000-mile biking and walking route that goes from Maine to Florida.

  From Washington D.C., the East Coast Greenway enters Virginia along the Mount Vernon Trail which follows the Potomac River and George Washington Parkway south to Mt. Vernon. The Greenway continues on road to Fredericksburg, then south to Richmond where it divides into two routes (Map 9):

  - The spine route continues south to North Carolina's Piedmont region
  - The complementary Historic Coastal Route heads southeast through Jamestown and Williamsburg before going south toward Wilmington, NC. This route follows the Virginia Capital Trail, the Birthplace of America Trail, and the Dismal Swamp Canal Trail to connect to North Carolina.

Map 9 East Coast Greenway in Virginia

Source: https://www.greenway.org/states/virginia

- Transamerica Bicycle Trail

  As the name suggests, this trail is a 5,000-mile cross continent route. The eastern end of the trail follows the Virginia Capital Trail and Colonial Parkway through the Historic Triangle, ending in Yorktown (Map 10).

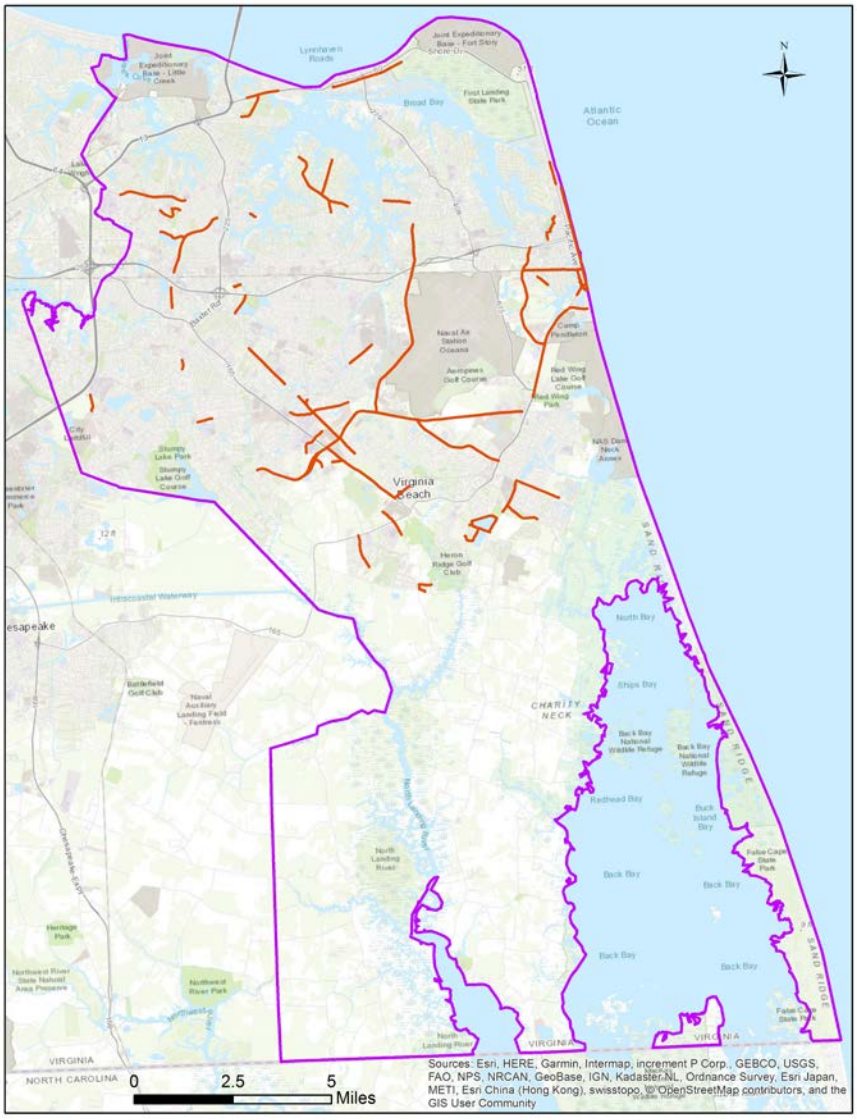
Map 10 Transamerica Bicycle Trail part in Virginia
Source: https://www.adventurecycling.org/routes-and-maps/adventure-cycling-routenetwork/transamerica-trail/

Strava

Strava is a social interface that is primarily used to track cycling and running using GPS data (other alternatives are available). Founded in 2009, it depends on GPS functionality in mobile phones or other GPS-enabled devices to record supported activities which can be shared among user's followers or publicly.

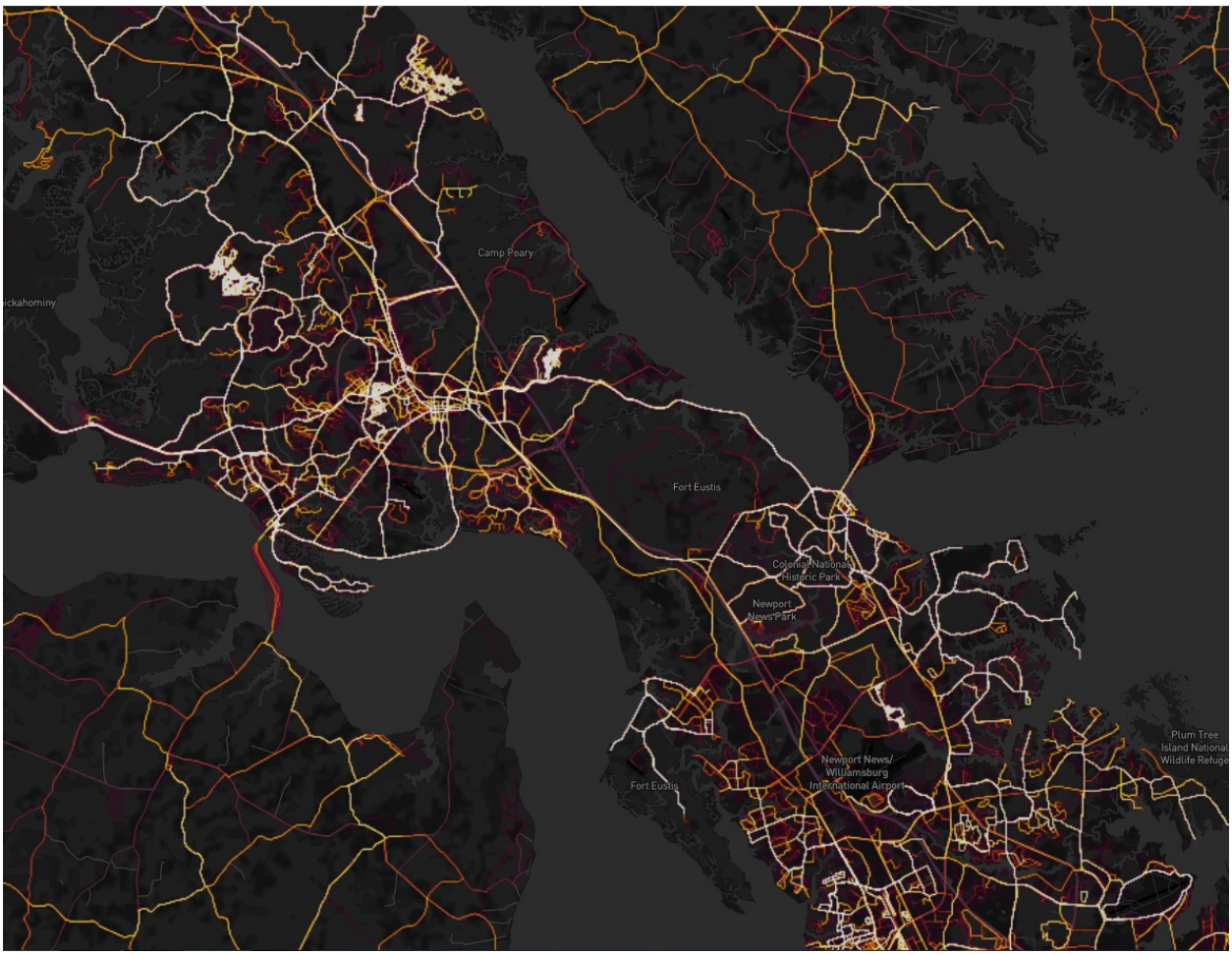
Maps 11 and 13 show Strava heat maps for Virginia Beach and Historic Triangle. Maps 12 and 14 show multi-use path locations in those localities. The brighter the color, the more usage the path has.

Map 11 Strava heat map for Virginia Beach
Source: https://www.strava.com/heatmap#14.00/-76.26597/36.86823/hot/all

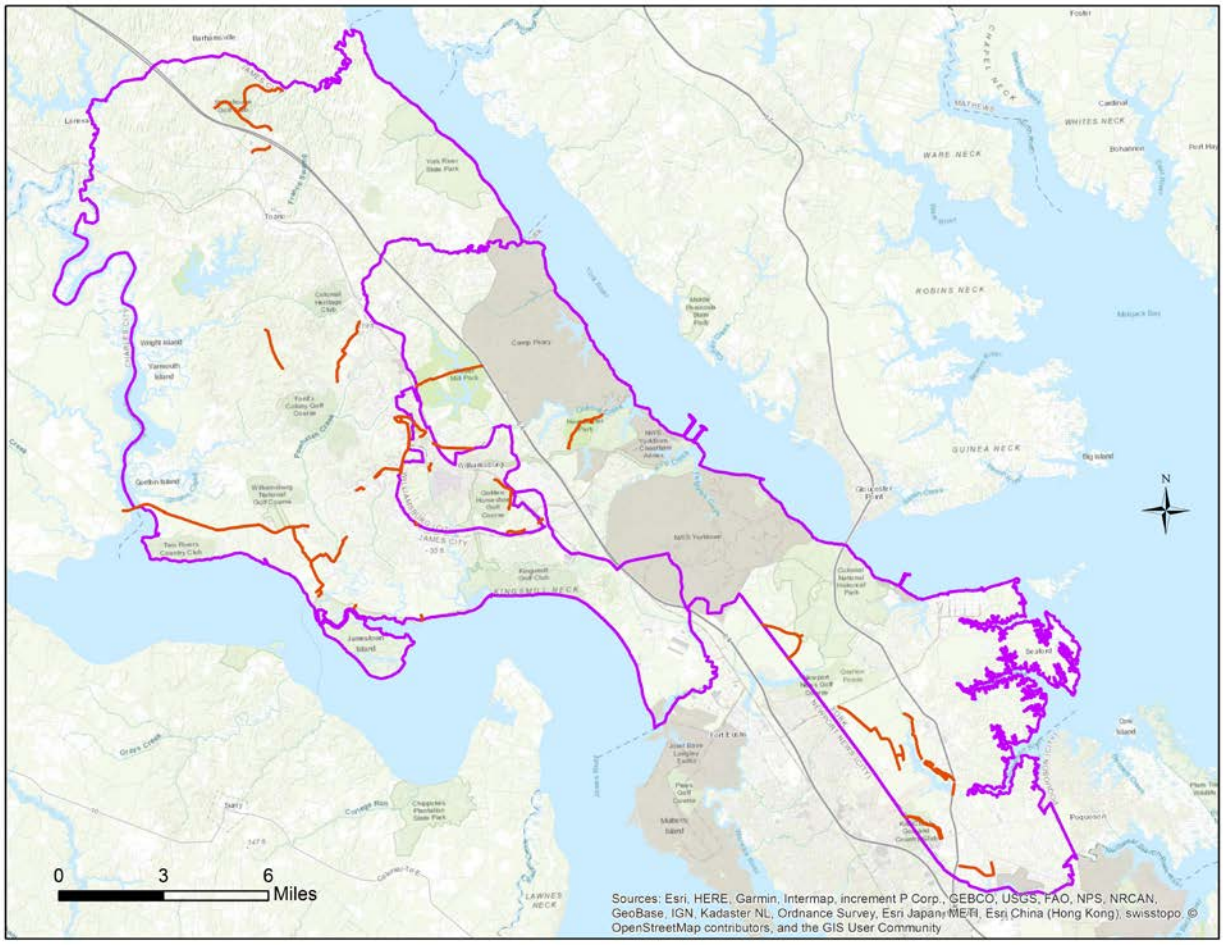


Map 12 Multi-use paths in Virginia Beach
Source: HRTPO, 2018

Looking at the heat maps of Virginia Beach and multi-use path maps we notice that, according to Strava data, the Boardwalk at the Oceanfront and two paths around First Landing Park in Virginia Beach are heavily used by cyclists. Moreover, paths along arterials (e.g. Great Neck Road) are also used, as well as London Bridge Road and paths along General Booth Blvd close to Naval Air Station Oceana. Rural roads are also used by cyclists such as roads in Pungo.



Map 13 Strava heat map for Historic Triangle
Source: https://www.strava.com/heatmap#14.00/-76.26597/36.86823/hot/all



Map 14 Multi-use paths in Historic Triangle
Source: HRTPO, 2018

The situation in Historic Triangle is somewhat similar to Virginia Beach in that paths located in parks are heavily used (e.g. York River State Park, Williamsburg Botanical Garden, New Quarter Park). Cyclists also heavily use the Virginia Capital Trail and Colonial Parkway. Rural roads are also used.

BICYCLE EVENTS SPENDING AND HOME LOCATION OF VISITORS

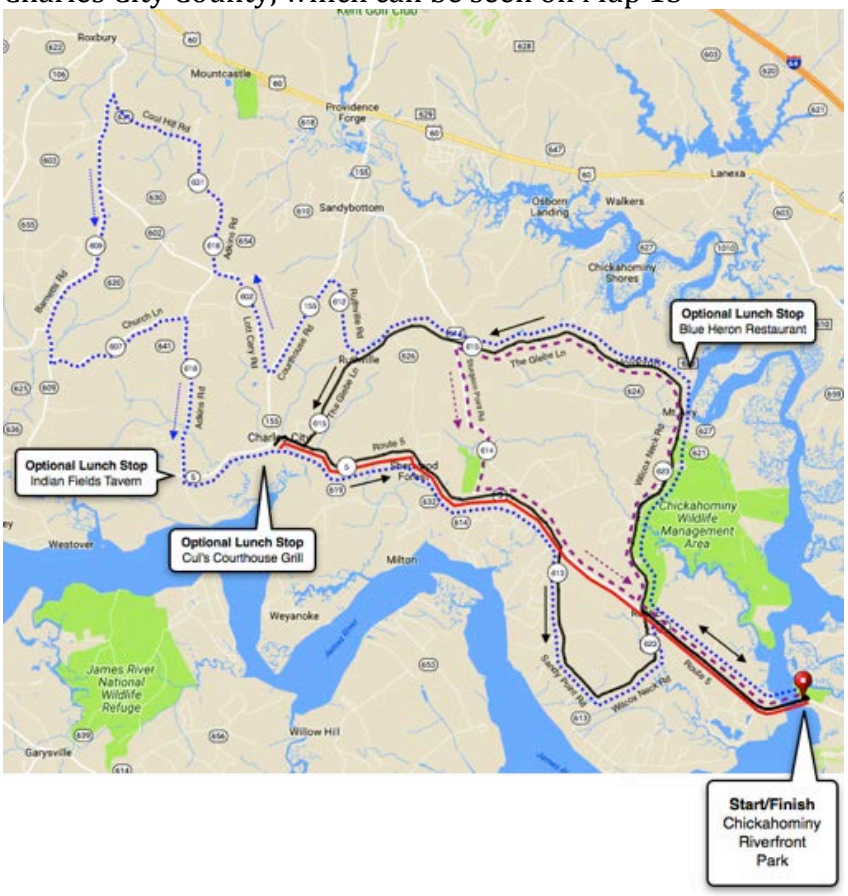
Bicycle events spending

Tandem Event in Williamsburg

The discussion in this chapter is based on text and data provided by Reed Nester who (with wife Karen) organized the 2018 Eastern Tandem Rally in Williamsburg. As one of the many bike events in North America, this rally represents a volunteer group of tandem cyclists who rally together for the purpose of socializing and tandem biking. It is also the oldest tandem organization in North America and has sponsored a rally annually since 1973.

The tandem event attracted approximately 120 teams from 22 states and Ontario, with the farthest traveling couples from California and Oregon. The Eastern Tandem Rally was held in Williamsburg for the first time in 25 years on the weekend of June 15-17, 2018:

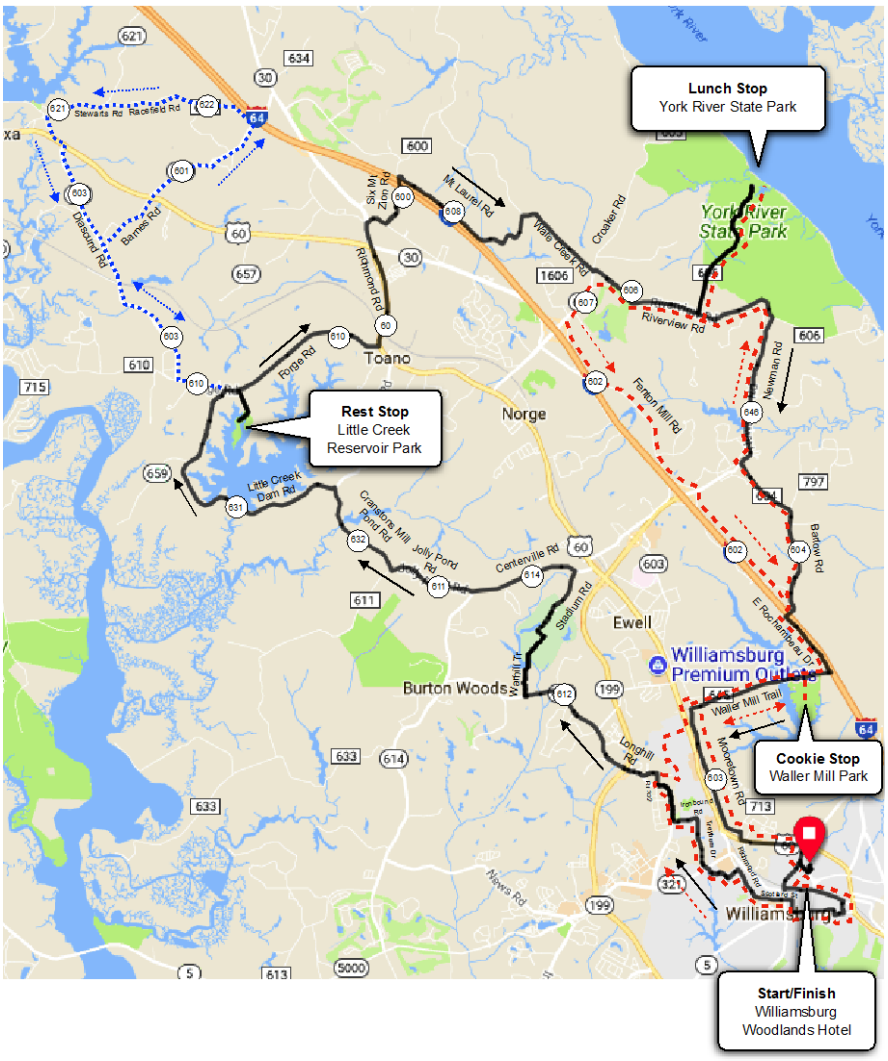
- Friday was Virginia Capital Trail Day. The ride started from Chickahominy Riverfront Park utilizing the Virginia Capital Trail and adjacent rural roads in Charles City County, which can be seen on Map 15



Map 15 Friday rides on Eastern Tandem Rally, Williamsburg

Source: Reed Nester

- Saturday was the day for the main ride. The group started and ended at the Williamsburg Woodlands Hotel, with rest stops at Waller Mill Park and Little Creek Reservoir Park (refreshments provided by Bike Walk Williamsburg) and lunch stop at York River State Park (Map 16)



Map 16 Saturday rides on Eastern Tandem Rally, Williamsburg
Source: Reed Nester

- The rally concluded on Sunday with a ride down the Colonial Parkway and additional loops on local roads (Map 17)

Map 17 Sunday rides on Eastern Tandem Rally, Williamsburg
Source: Reed Nester

The rally showcases the economic benefits of sports tourism to the greater Williamsburg area. Organizers spent 80% of registration fees locally. Registration costs were $145 per person. 240 persons used 272 room nights for the rally. Assumptions were made for the costs of meals outside of the rally and for miscellaneous expenses: $100 per team (team consists of two persons). The following figure conveys the expenses and calculations. Cost per room, tax value and occupancy fee were obtained from Woodlands Hotel in Williamsburg. Total expenses are calculated by summing up the 80% of registration costs, total room cost, cost of meals and total misc. expenses, which adds up to approximately $100,000.

	Expense name	Amount
A	Registration fee	$145
B	No of persons	240
C=A*B	Total registration cost	$34,800
0.8*C	80% of registration costs	$27,840
D	No of room nights	272
E	Cost per room	$140
F=D*E	Room cost	$38,080
G	Tax	12%
H=F*G	Tax	$4,570
I	Occupancy fee (per night)	$2
J=D*I	Total occupancy fees	$544
K=F+H+J	Total room costs	$43,194
L	No of teams	120
M	Cost of meals per team	$100
N	Misc. expenses	$100
O=L*M	Cost of meals	$12,000
P=L*N	Total misc. expenses	$12,000
Sum of grey areas	**TOTAL**	$95,034
Total approximately		**$100,000**

Figure 32 2018 Eastern Tandem Rally spending in area
Source: Reed Nester and HRTPO

The investments made by local governments in improving bicycle infrastructure since the Eastern Tandem Rally last came to Williamsburg in 1993 (over 70 miles of bicycle facilities built in) helped bring the 2018 rally to Williamsburg.

Harrisburg Bicycle Event in Williamsburg

The information exhibited in this sub chapter was provided by Rick Nevins who organized a weekend visit by the Harrisburg Bicycle club from Pennsylvania that took place 26-28 October, 2018. A total of 70 people attended this event.

Online survey was conducted and information about the condition of handouts, routes taken, hotel accommodation and spending were gathered. There were 25 responses out of 70 attendees; however some responses were on behalf of a couple, as there were many couples in the event according to Rick Nevins.

For the 13 responses with food spending higher than $100 we assumed that response was on behalf of a couple, indicating that 38 people were included in the survey. Lodging costs for 25 surveys (38 people) can be calculated as follows:

	Assumption	**Cost**
13 couples	13 rooms (double occupancy)	$319*13=$4,147
12 singles	12 rooms (single occupancy)	$168*12=$2,016
Total	25 rooms (double + single)	$6,163

Other costs (food, attraction/admission, gifts, misc.) for 25 surveys (38 people) were summed as follows:

	Cost
Food cost	$3,695
Attractions/admissions	$170
Gifts	$475
Misc.	$1,320
Total	$5,660

Food cost, attraction/admission, gifts, misc. costs were calculated by summing up the 25 responses to a survey. For all 70 people that attended the event, total costs can be calculated:

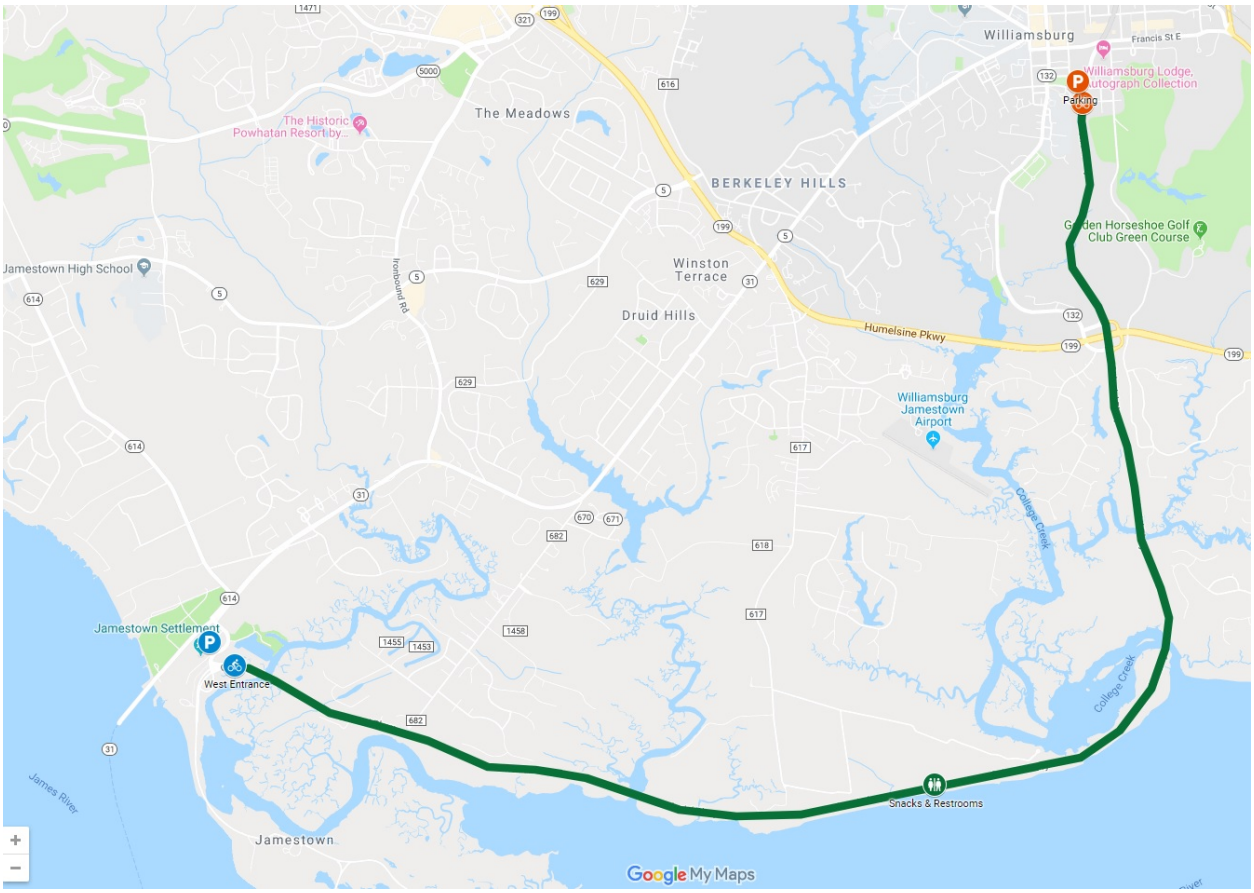
- Lodging: $\$6{,}163 \cdot {}^{70}/_{38} = \$11{,}353$
- Other: $\$5{,}660 \cdot {}^{70}/_{38} = \$10{,}426$
- Total: $\$11{,}353 + \$10{,}426 = \$21{,}779$

The total spending is estimated at approximately $22,000.

Pedal the Parkway Event

Pedal the Parkway typically attracts approximately 1200 participants, estimating one third being children. It is held every year on the first Saturday in May. Participants can ride any time between 8am and 1pm, there is no fixed start time. There is no participant timing, as this is not a competitive event; people are encouraged to go slowly and enjoy the ride along the James River.

Map 18 shows the route, which always stays the same, going along the Colonial Parkway from Jamestown Settlement to Williamsburg at Newport Ave.



Map 18 Pedal the Parkway route
Source: Nancy Carter

Gathering the ZIP codes of participants when they sign the liability waiver at the beginning of their ride helped in determining where participants are coming from. Figure 33 and 34 show the number of riders coming from Virginia (excluding Hampton Roads) and out-of-state riders.

Rest of VA (Locality)	Number of Riders
Alexandria	2
Ashburn	2
Barhamsville	4
Beaverdam	1
Charles City	1
Charlottesville	2
Chester	5
Chesterfield	2
Clifton	3
Dutton	1
Fairfax Station	2
Falls Church	1
Fredericksburg	2
Glen Allen	8
Hayes	7
Henrico	11
Keller	1
Mappsville	1
Marionville	1
Midlothian	15
Moseley	2
Powhatan	1
Quinton	2
Reston	2
Richmond	21
Ruckersville	1
Spotsylvania	1
Springfield	1
Surry	1
Temperanceville	1
Toano	19
Triangle	2
West Point	1
Wicomico Church	1
Woodbridge	1
Total	**129**

Figure 33 Number of riders from the rest of Virginia
Source: Reed Nester

State	Number of Riders
British Columbia	1
California	2
Florida	4
Georgia	1
Illinois	1
Maryland	5
Massachusetts	1
Michigan	1
North Carolina	7
Ohio	1
South Carolina	1
Washington state	1
Total	**26**

Figure 34 Number of out-of-state riders
Source: Reed Nester

Out of 1200 participants, 835 of them filled out a survey. For 835 responses, the number of attendees is divided as follows:

Region	No of responses	Percentage
Hampton Roads	680	81.44%
Rest of VA	129	15.45%
Out-of-state	26	3.11%
Total	835	

Using percentages, we can calculate the number of attendees for each group as follows:

Region	No of responses
Hampton Roads	1200*81.44%=977
Rest of Va	1200*15.45%=185
Out-of-state	1200*3.11%=38
Total	1200

Figure 35 shows the total number of out-of-state riders, riders coming from the rest of Virginia, and riders coming from Hampton Roads.

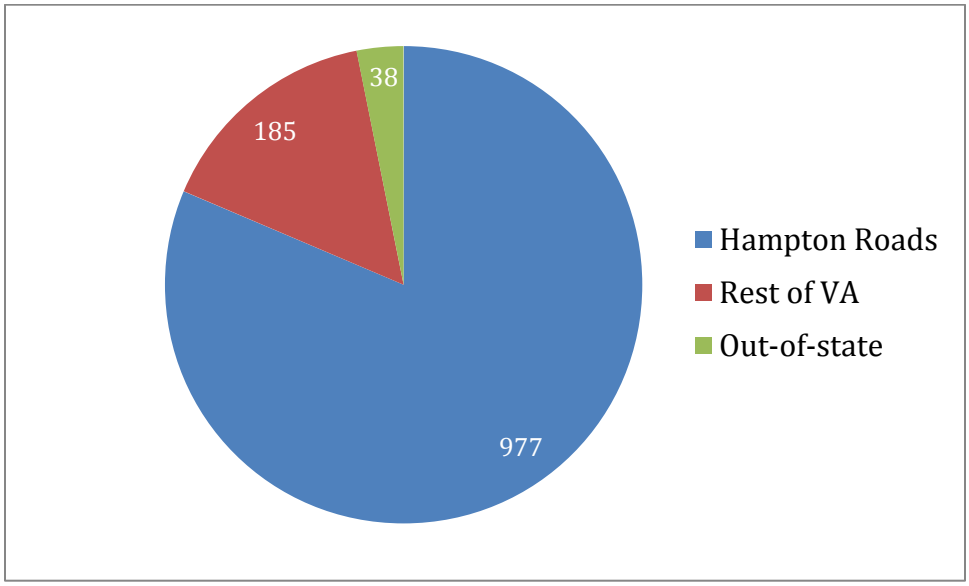


Figure 35 Out-of-state riders and riders from the rest of Virginia
Source: Reed Nester

There were a total of 223 riders that were from outside of Hampton Roads region (185 from the rest of Virginia and 38 are out-of-state attendees) while 977 attendees came from Hampton Roads. Looking at Figure 35 we can see that the number of riders coming from the rest of Virginia is higher than out-of-state riders. Moreover, the highest number of out-of-state riders is from North Carolina, Maryland, and Florida. Riders came from as far away as British Columbia, Washington State and California to attend this event. Looking at the numbers for the rest of Virginia, the highest number of attendees came from Richmond, Toano and Midlothian. Although spending was not surveyed, given that most of these came from within Virginia, i.e. they may not have spent a night in Hampton Roads, spending per person was likely less than spending that came from two events dominated by long-distance travelers: tandem event and Harrisburg bike club visit.

Sports Backers

Sports Backers is a non-profit organization in Richmond that has developed programs and events that inspire people from various communities to live actively, by focusing on a network of collaborative partnerships with other organizations, businesses, local governments and faith based institutions. Sports Backers organize 13 events each year that are among the largest and most successful events in the country:

- Ukrop's Monument Avenue 10k presented by Kroger and Virginia 529 Kids Run
- Dominion Energy Riverrock
- Cougar 7v7 Field Hockey Tournament
- Anthem Corporate Run
- Run Bike Relay presented by Ragnar
- Richmond International Dragon Boat Festival
- Virginia Credit Union Moonlight Ride
- Patrick Henry Half Marathon
- Walmart Biz Bowl
- Trails & Ales
- Whole Foods Market Marathon Jr.
- Anthem Richmond Marathon, Markel Richmond Half Marathon, and VCU Health 8k
- CarMax Tacky Light Run

Bike Walk RVA is a program of Sports Backers that advocates for comfortable and connected places to bike and walk for people of all ages and abilities. Protected bike lanes, paved shared-use paths, safe intersections, and calm neighborhood streets have been proven to get people biking and walking on a regular basis. In 2012, Sports Backers created Bike Walk RVA to advocate for the growth of this infrastructure and to help normalize biking and walking through the region. Bike Walk RVA program has the following initiatives:

1. **Bike Restaurant Week-** Held in September 17-21 in Richmond, it was a 5-day promotion with 21 participating restaurants celebrating the 5 cardinal directions of the city. Each day one direction was highlighted and a guided bicycle ride was held to all the participating restaurants from a central location. Each restaurant offered discounts, deals, special menu item or other promotion just for you for riding your bike there.
2. **Bike Walk RVA Academy-** Program designed to develop Richmond region residents into grassroots leaders in their communities for better walking and biking infrastructure such as paved trails, protected bike lanes, and sidewalks that allows people of all ages and abilities to get where they need to go on foot or by bike. Attendees of the program learn tools, obtain knowledge and confidence to effectively advocate for infrastructure improvements that will make Richmond region a better place to bike, walk and live for everyone.
3. **RVA Bike Month-** A full month of biking-related events that encourages everyone to get out and ride are held in May each year (since 2013). The events come in all shapes and sizes: taco crawls, brewery tours, bike polo, family fun rides, bike lanes cleanups, bike commuting seminars, etc.

4. **Voters Education-** Educational initiative with an objective of working with candidates across political spectrum to make our region's roads safer and our communities healthier. This work includes: questionnaires, outreach with voters, hosting events to elevate our regional dialog around policies, planning, and funding for biking and walking infrastructure.

Cap2Cap Event

The Cap2Cap event is the Virginia Capital Trail Foundation's annual fundraising event that is held in May. In the event, cyclists travel the trail between Richmond and Jamestown. The Virginia Capital Trail Foundation designed and administered a survey. According to the data obtained from the Foundation, of the 1,539 registered participants in 2018, 494 participated in the Foundation's event survey (response rate of 32%). Approximately 68% were from Richmond or Tidewater, leaving approximately 32% as non-regional attendees. For those who traveled out of town, each attendee spent an average of approximately $258. Applying the percentages listed previously to all attendees, the following is calculated:

- 32% of 1,539=491 participants were from other regions
- 491*$258=$126,958 spent in the Richmond to Hampton Roads area by visitors attending Cap2Cap

or approximately $130,000 spent in the Richmond to Hampton Roads area by visitors attending this event.

Bicycle Events

This subchapter reveals bicycle events held in Historic Triangle and Virginia Beach and in competitors: Greensboro, Winston-Salem, Greenville and Myrtle Beach areas.

Historic Triangle

There are 33 bicycle events in Virginia Beach (one bicycle event) and Historic Triangle (32 bicycle events), which is shown on figure 36.

Event
Jamestown Triathlon Festival
Patriots Triathlon Festival
Pedal the Parkway
Pop-up Sunburn Ride
Upper James City County Ride
Friends Ride
Moonlight Ride
Williamsburg Christmas Parade
Jamestown Settlement Ride
Capital Color Ride
Sunset Ride
Pop-up Labor Day Ride
Ware Creek Road Cleanup & Ride
Pub Ride-Alewerks
July 4th Early Ride
Beat the Heat FFR
Park to Park
Big Loop Rides
Jamestown to Smithfield Lunch Ride
Pop-up Sunset Ride
Cap 2 Cap
Yorktown Dandy loop Ride
BWW Proclamation Ride
Pop-up VCT Century
Rides with the W&M Alliance
W&M Tidewater Winter Classic
JCC Rec Expo
VCT Ride/Cull's Lunch
Amber Ox Bike Celebration
Pechakucha & Work Nimbly
Bike Month Proclamation Ride
Bike to School Day

Figure 36 Bicycle events in Historic Triangle

Source: Google

Virginia Beach

Figure 37 shows bicycle event held in Virginia Beach.

Event
Conte's Shop Rides

Figure 37 Bicycle events in Virginia Beach
Source: Google

Competitors

Figure 38 shows bicycle events in Greenville area, SC.

Event
Swamp Rabbit Trail rides - every Sunday afternoon
VELO Valets shop rides - every Tuesday and Thursday
Freehub Bicycle Group Rides - every Saturday
Greenville Spinners Bike Swap
14th Annual Leaf Tour Ride
Greenville Spinners SCTAC Rides - every Tuesday night
Campbell's Covered Bridge Ride & BBQ
Tour de Paws - 17th Annual
Furman Lakeside Concert & Night ride - Thursday
Cindy's Wednesday VOP rides
Benchmark BSC Shop Ride
Spinners 2018 Holiday Party
Greenville Spinners 14th Annual Final Fifty
Carolina Triathlon Group Rides
YES Ucan Ride
Gimme 3 Gran Fondo
Ride to Rock
Miracle Hill in Motion - June 2, 2018
Safe Harbor Cycle Tour
2018 Greenville Spinners Summer Time Trail Series
Tour de Camden 2018
Rescue 1 Century: Atlanta
Bike and Brew - May 12, 2018
Ride of Silence
Hagood Mill Ride - 5/19
Assault on Mt. Mitchell/Marion
Duathlon National Championship
Monthly Hagood Mill Ride
Wheels for Meals charity ride
SFCT - South Florida Cycling Tour
Brevard -BANFF film festival 3 day ride
Cycle Haus Shop Rides
MLK Celebration Ride

Figure 38 Bicycle events in Greenville, SC
Source: Google

From figure 38 we see that there are 33 bicycle events held in Greenville area. Some events are held throughout the year (i.e. Swamp Rabbit Trail rides and VELO Valets Shop Rides). Other events are either held a couple of times a year, or once a year (i.e. Tour de Paws, Cindy's Wednesday VOP Rides).

Figure 39 reveals the names of bike events in Myrtle Beach, SC.

Event
38th Avenue Group ride
Murrells Inlet Goup Ride
Pee Dee Bicycle Shop All Ride Speeds
Sunday House of Pain
Sunday Morning Spin @ Pee Dee
Tour de Murrells Inlet
Murrells Inlet Hump Day Ride
Islanders Pint Ride
Pee Dee Bicycle Light Up The Night Ride
38th Avenue North Group ride
Thursday Night World Championship
Sunday Funday Mountain Bike Group Ride
Slow Mojo
Lowe's Food Beer Den Ride
Java Skidaddle
Mellow Monday
Taco Tuesday Social Ride
Pee Dee Bicycle Beginner Mountain Bike Ride
Wicked Winds-day
Hotter Than Hell Hundred
Memorial Day ride in Conway
Light Up the Night Ride
#ican4Dawn Road Rides
South End trail ride

Figure 39 Bicycle events in Myrtle Beach, SC
Source: Google

There are 24 bicycle events in Myrtle Beach area. Similar to Greenville, some events are annual (Memorial Day ride in Conway), while others are held throughout the year (i.e. Islanders Pint Ride).

Figures 40 and 41 reveal bicycle events in Greensboro and Winston-Salem, NC.

Event
Polar Bear Ride
F3 Red Cross Blood Drive
Rites of Spring
Ride of Silence
Apple Pie Ride
Carolina Century Ride & Roll for MS & More
Wheels on the Greenway
Teacher Cycling Challenge
Bike Rodeo at Pearce Elementary
Changing Gears
Trivium Multisport Season Pass
Northeast Park Duathlon
Nat Greene's Revenge Triathlons and Duathlon
Weekly Group Rides by Trek Bicycle Store Greensboro

Figure 40 Bicycle events in Greensboro, NC
Source: Google

Event
Grand Fondo
Criterium Races & Kids Zone Program
Flow BMW Mountain Madness
Road Race Day
Gears & Guitars
Winston-Salem Cycling Classics
Ramblin Rose Women's Triathlon

Figure 41 Bicycle events in Winston-Salem, NC
Source: Google

Home Location of Trail Users in Hampton Roads

StreetLight gathers data from GPS units and smart phones across the U.S., specifically "smart phone apps that use location-based services" (StreetLightData.com), for example a weather app that knows where you are. StreetLight's "Visitor Home and Work Analysis" allows one to "analyze the home and work locations of visitors to a zone" (StreetLightData.com). Concerning visitors to a zone, "a trip is defined as ending when a vehicle turns off, or when a device is stationary for more than a few minutes." (StreetLightData.com).

Virginia Capital Trail

In order to identify Virginia Capital Trail users, one must find a location where they remain for a few minutes. Some trail users rest or repair bikes at the trailhead gazebo near Jamestown Settlement.

Jamestown Settlement gazebo

Source: Google

The trailhead gazebo, which is located near Jamestown Settlement, is shown at the upper-right corner of the next image.

Jamestown Settlement gazebo location
Source: Google

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Twelve months of data were used and around 8,500 unique devices were included in the project. The parameters for the StreetLight analysis can be seen on the following figure (Figure 42).

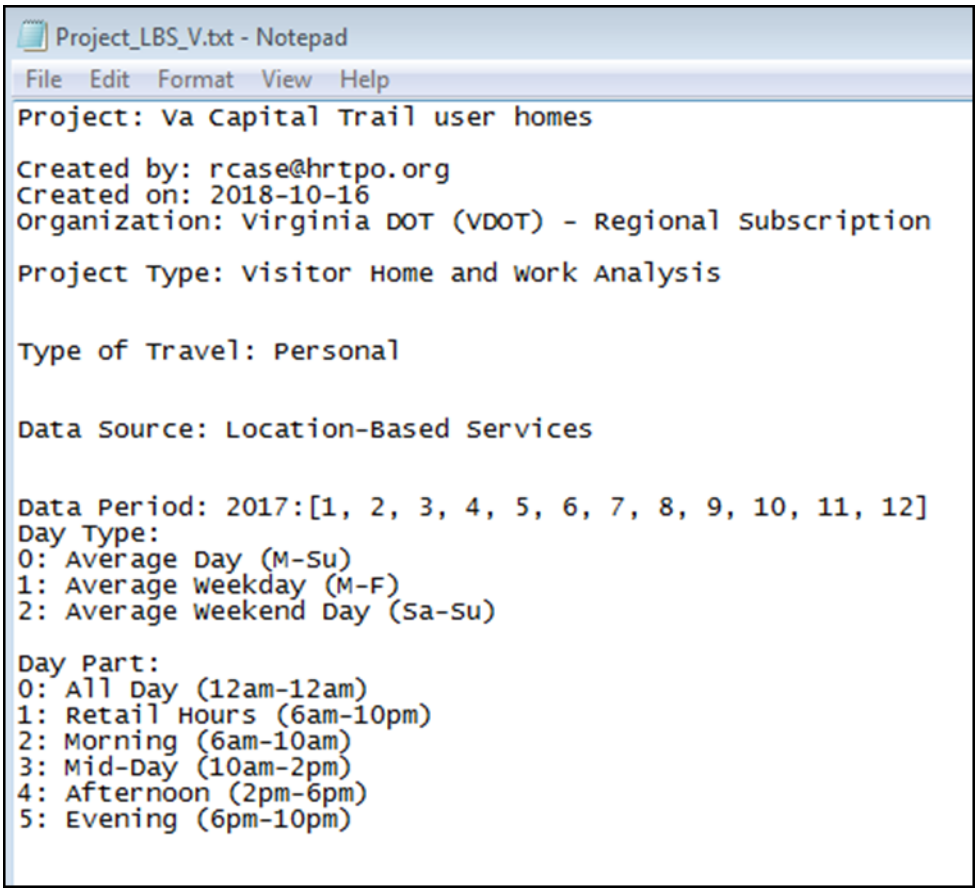


Figure 42 Parameters for StreetLight
Source: HRTPO analysis of StreetLight data, 2017

We can see that all of the months for this analysis are selected for the year 2017, weekends and weekdays; and all parts of the day.

Figure 43 displays the home state of Virginia Capital Trail users obtained from StreetLight analysis.

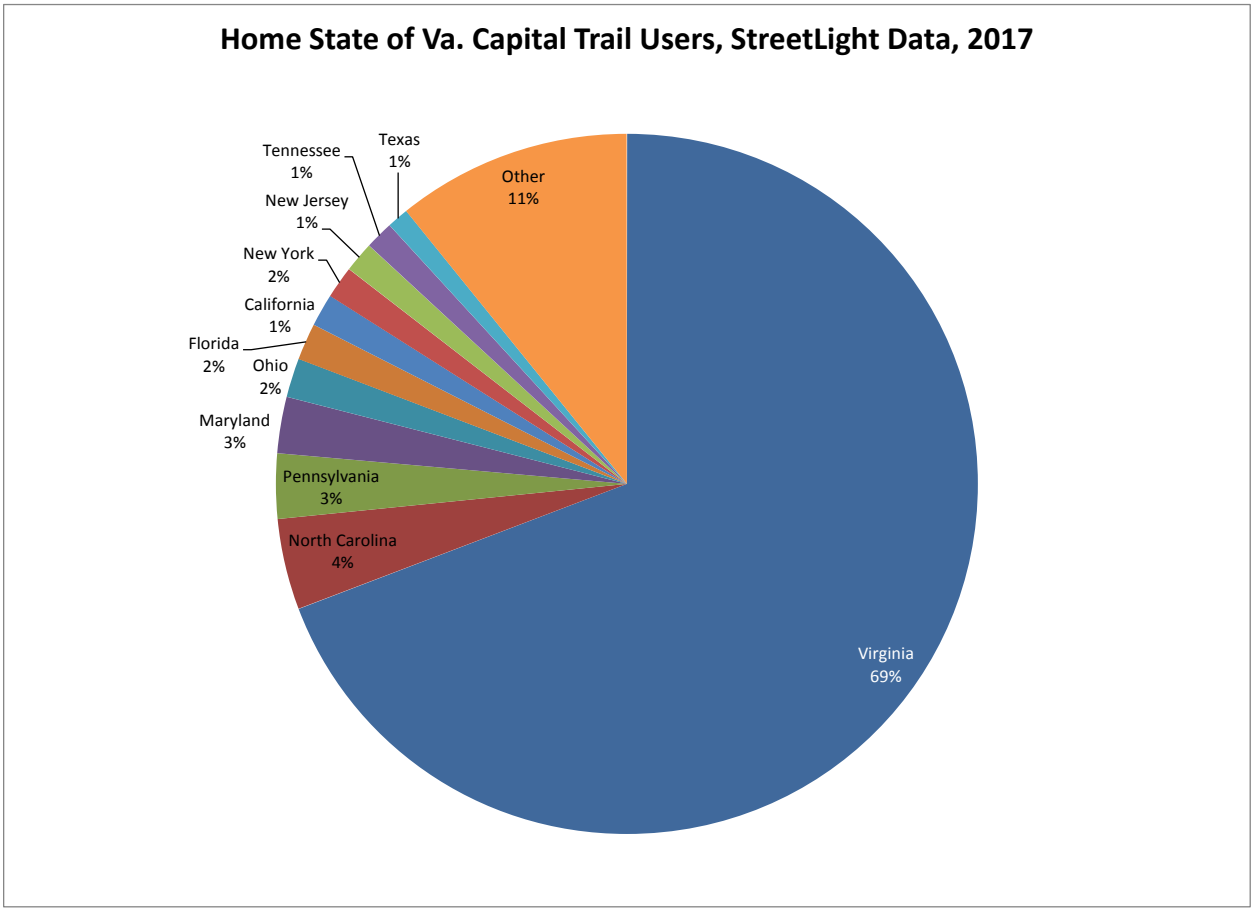


Figure 43 Home states of Virginia Capital Trail users
Source: HTRPO analysis of StreetLight data, 2017

Not surprisingly, the majority of the users come from Virginia. However, around 1/3 of the trail's users come from other states. Three states that have the largest percentage are:

- North Carolina- 4%
- Maryland- 3%
- Pennsylvania- 3%

Home locations of Virginia Capital Trail users are shown on Figure 44 for 2017.

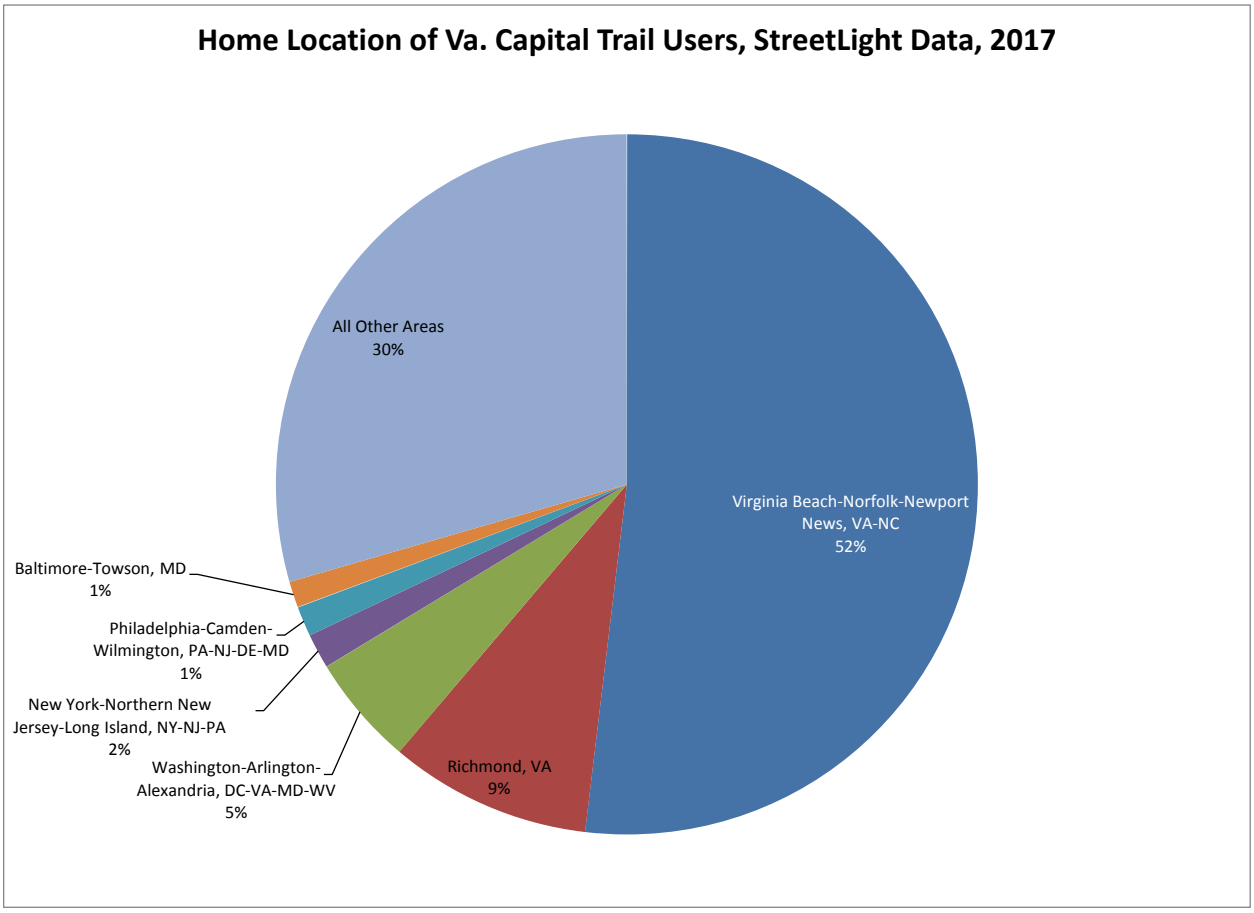


Figure 44 Home location of Virginia Capital Trail users
Source: HRTPO analysis of StreetLight data, 2017

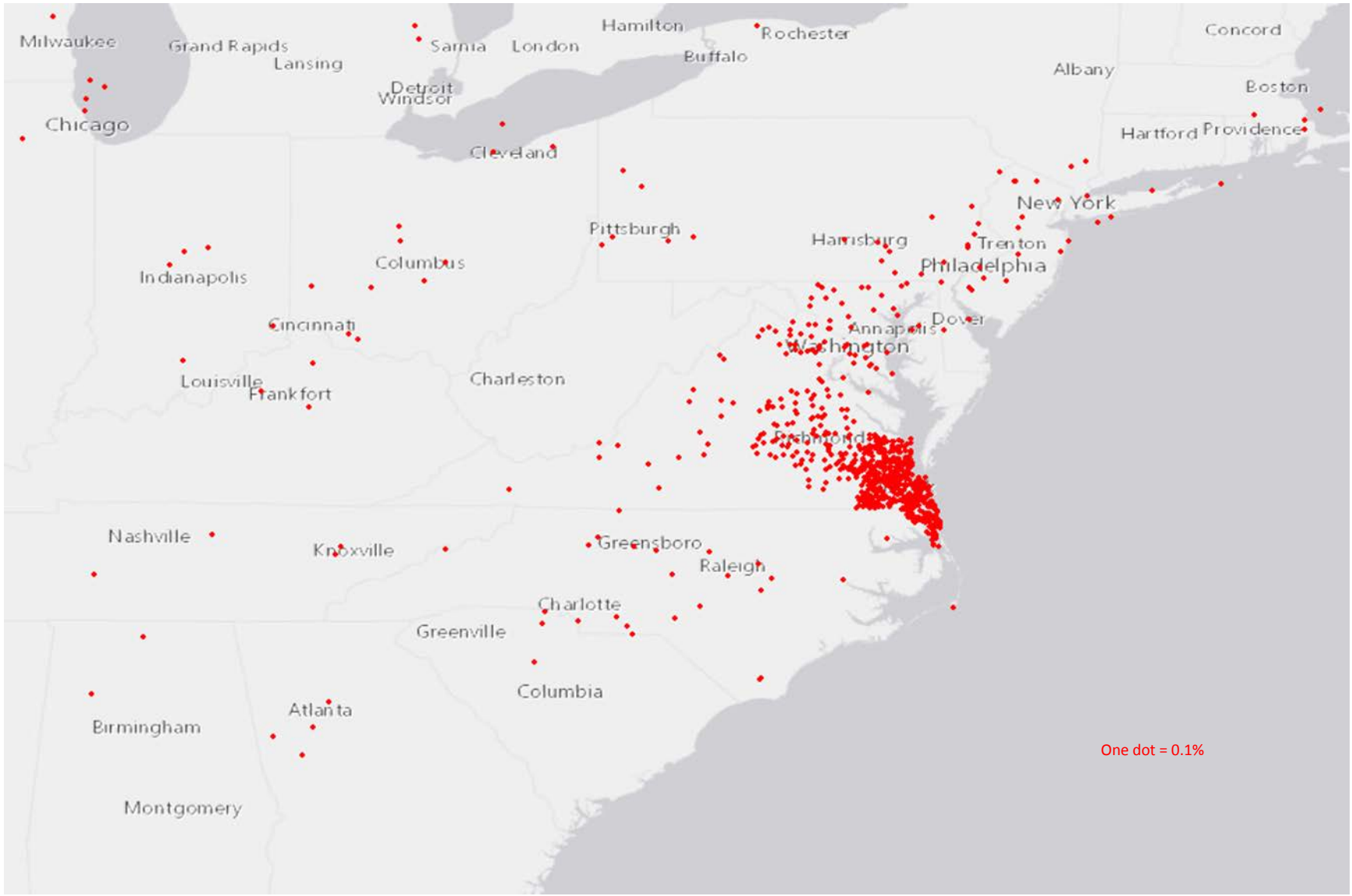
Looking at figure 43, we see that one half of the trail's users live outside of Hampton Roads area, top three locations being:

- Richmond, VA: 9%
- Washington, Arlington, Alexandria, DC-VA-MD-WV: 5%
- New York-Northern New Jersey-Long Island, NY-NJ-PA: 2%

Trail users' home locations are mapped out, with one dot representing 0.1% of users (Maps 18 and 19).

Map 18 Trail users' home location in the United States

Source: HRTPO Analysis of StreetLight data, 2017



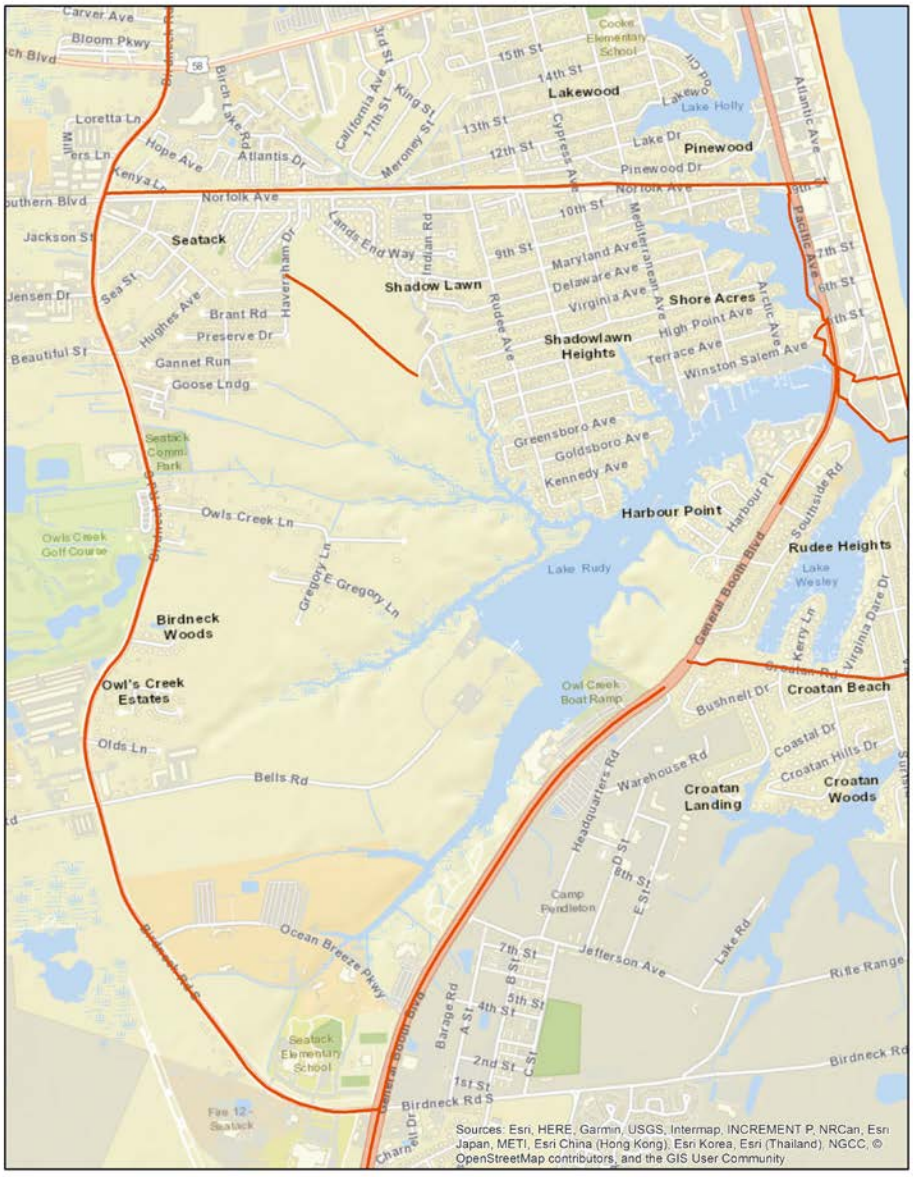
Map 19 Trail users' home location in the Eastern U.S.

Source: HRTPO analysis of StreetLight data, 2017

Maps 18 and 19 shows that the majority of trail users originate from Eastern U.S. We can discern that a large number of dots is concentrated in Hampton Roads, however there are dots scattered in Virginia, Maryland and DC.

South Beach Trail

South Beach Trail is an 8-mile multi-use loop trail running along Norfolk Avenue, Pacific Avenue, General Booth Boulveard, and Birdneck Road (Map 20).



Map 20 South Beach trail in Virginia Beach
Source: HRTPO

A gazebo is located where the South Beach Trail crosses Lake Holly (near 7th Street, map 20). Some users stop at the gazebo long enough for StreetLight to consider them a visitor.

South Beach Trail gazebo
Source: Google

The parameters used for the South Beach Trail analysis are the same as those of the Virginia Capital Trail. Figures 45 and 46 show the home state and the home location of South Beach Trail users.

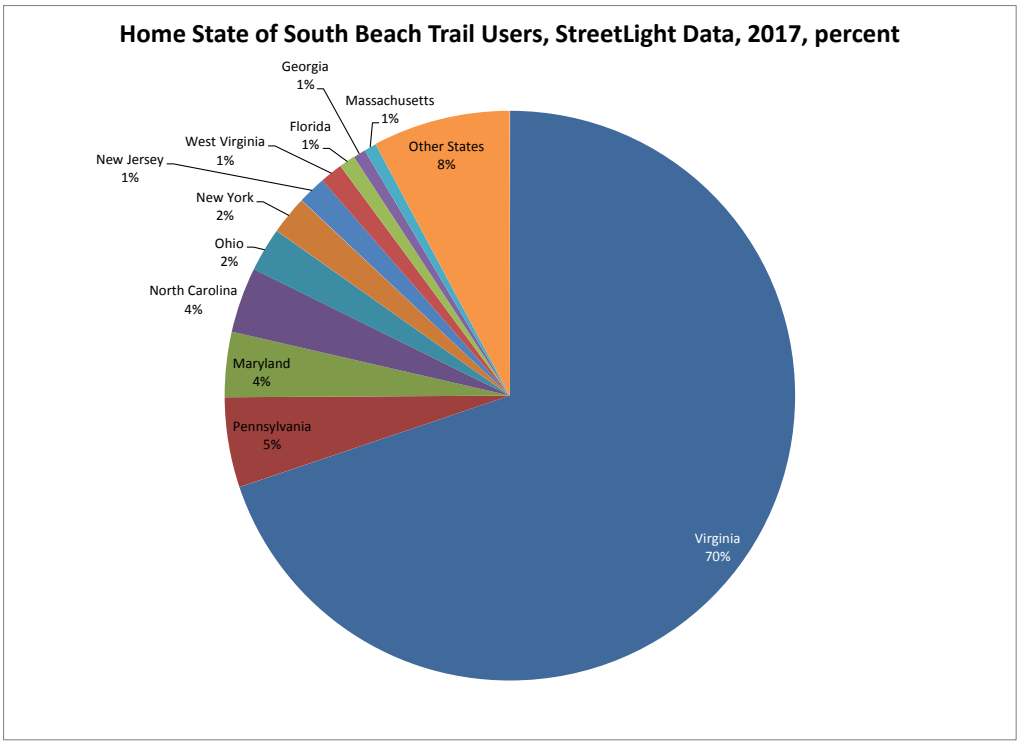


Figure 45 Home states of South Beach Trail users

Source: HRTPO analysis of StreetLight data, 2017

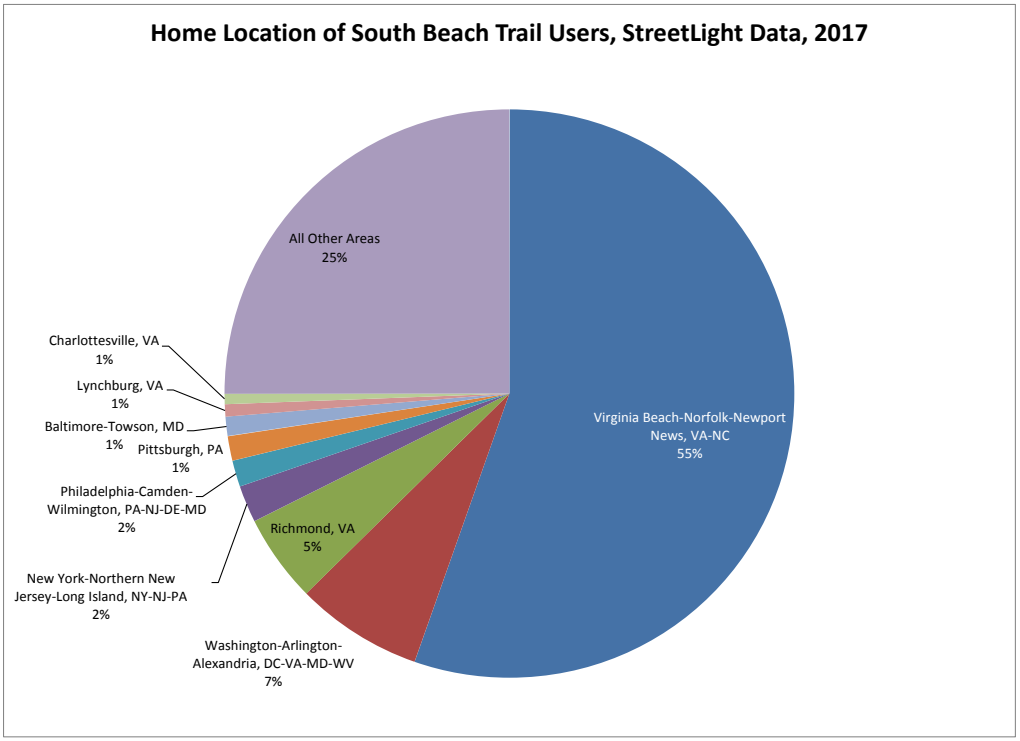


Figure 46 Home location of South Beach Trail users

Source: HRTPO analysis of StreetLight data, 2017

Approximately 30% of trail users are out of state, top three being:

- Pennsylvania: 5%
- Maryland: 4%
- North Carolina 4%

Looking at home location of trail users, 45% of them are from out of Hampton Roads, the highest percentage are in neighbouring areas:

- Washington-Arlington-Alexandria, DC-VA-MD-WV: 7%
- Richmond, VA: 5%
- Philadelphia-Camden-Wilmington, PA-NJ-DE-MD: 2%

Figure 47 compares home locations of users for Virginia Capital Trail and South Beach Trail.

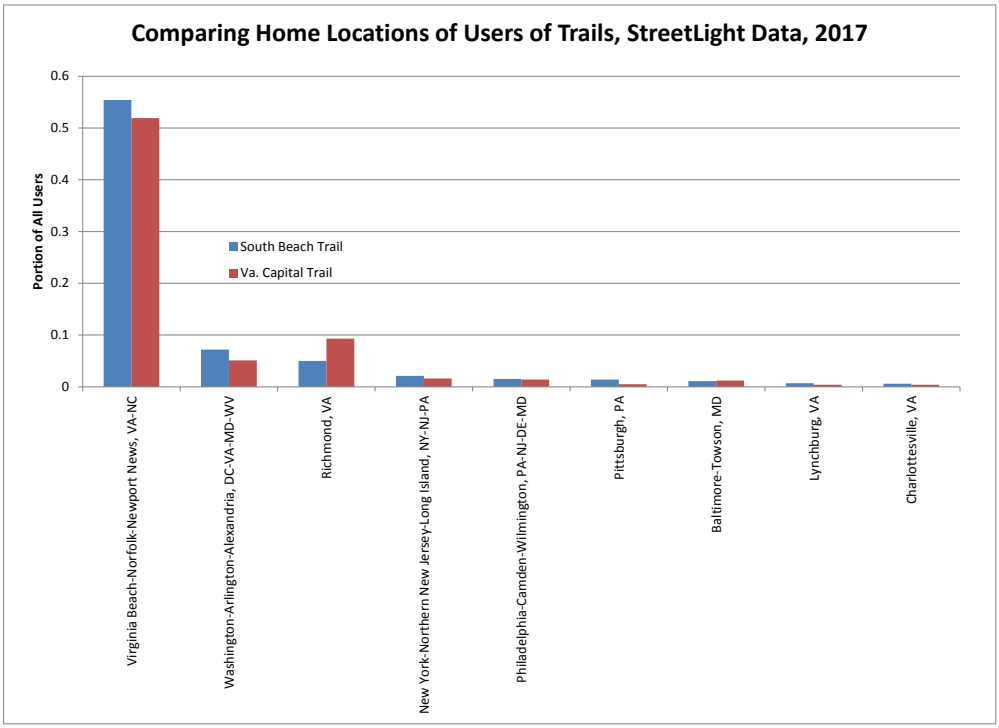
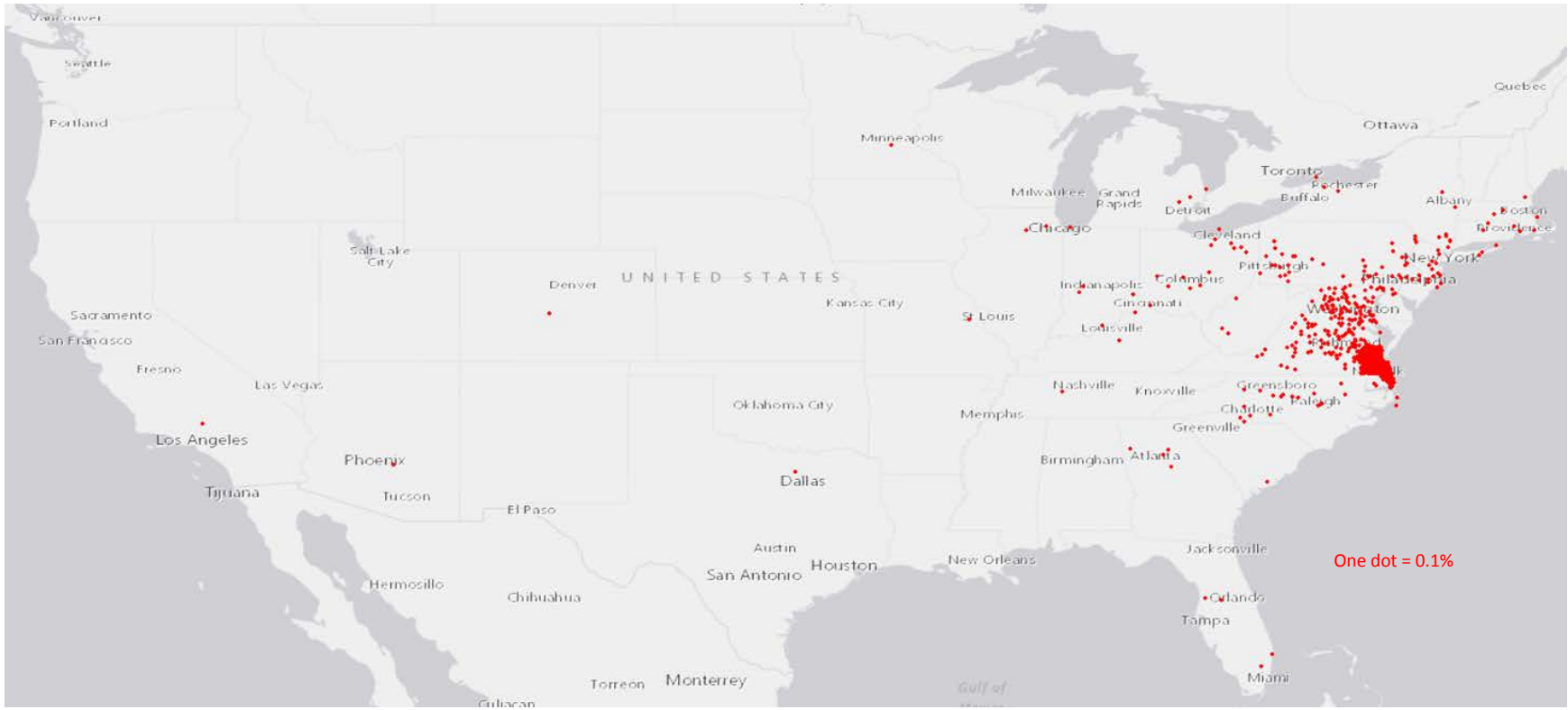


Figure 47 Comparison of home locations of trail users

Source: HRTPO analysis of StreetLight data, 2017

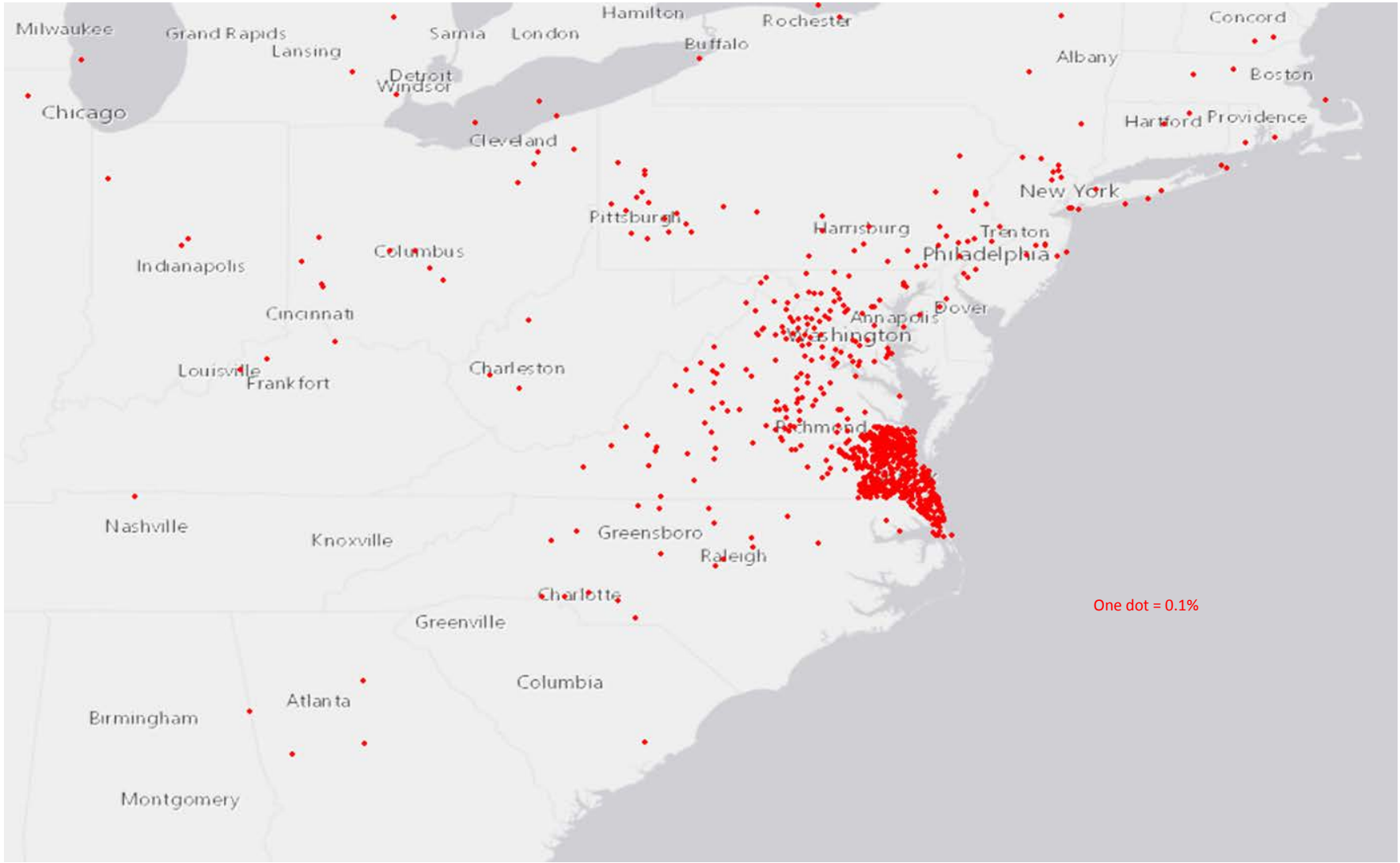
As expected, given the termini of the Virginia Capital Trail, Richmond residents comprise of higher portion of Virginia Capital Trail users than of South Beach Trail users. On the other hand, Virginia Beach-Norfolk-Newport News residents comprise a higher portion of South Beach Trail users than on Virginia Capital Trail.

Maps 21 and 22 gives us further information on Home locations of South Beach Trail users, where one dot represents 0.1% of users.



Map 21 Home locations of South Beach Trail users

Source: HRTPO analysis of StreetLight data, 2017



Map 22 Home locations of South Beach Trail users on Eastern U.S.

Source: HRTPO analysis of StreetLight data, 2017

Maps show the concentration of users, and we can discern that, similarly as with the case of Virginia Capital Trail, the South Beach Trail users are prevalently from Hampton Roads. Scattered dot concentration can be noticed in areas of Richmond, Washington DC, Northern Virginia.

NUMBER OF BIKE SHOPS AND BIKE RENTAL COMPANIES

This chapter presents lists of bicycle shops and bike rental companies in Hampton Roads and in competitors and a comparison of the number of shops and rentals between Hampton Roads and the competitor cities. The purpose of this chapter is to understand how Hampton Roads, specifically Virginia Beach and Historic Triangle compare with competitors. The number of bicycle shops was obtained from Google and Yelp.

Hampton Roads

There are 35 bike shops and/or bike rentals in Hampton Roads. Figure 48 gives us the information on bicycle shops and bike rental companies, specifically, names and locations of these establishments.

Name	County/City
Conte's Bike Shop	**Chesapeake**
Great Bridge Cyclery	
All Out Cycles	
Rolling Hills Bike Shop	**Franklin**
Snow Robert F & Son	**Hampton**
Trek Bicycle Shop	**James City County**
Conte's Bike Shop	
Spoke and Art Provisions Co.	
Freewheel Bicycle Shop	**Newport News**
Conte's Bike Shop	
Village Bicycles	
East Coast Bicycles	**Norfolk**
Hund's Re-cycle Factory	
D & D Import Cycles	
SCATT Bikes	**Portsmouth**
Cycle Classics	

Figure 48 Names and locations of bike shops and bike rentals in Hampton Roads (Continued)

Name	County/City
Perfect Fit Cycling and Triathlon	**Virginia Beach**
Switching Gears Bicycle Shop	
Ocean Waves Gift Shop & Bike Rentals	
Virginia Beach Electric Bike Center	
Cheries Bike & Blade Rental	
Boardwalk Convenience & Bike	
Fat Frogs Bike & Fitness	
Gonzo Gear	
Trek Bicycle Virginia Beach	
Surf & Adventure Co.	
Conte's Bike Shop	
Performance Bicycle	
Freewheelin Bike Shop	
REI	
Electric Bike Works!	
Happy Trails Bike Shop	
Bikes Unlimited	**Williamsburg**
Bike the Burg	
Back Alley Bikes	**York**

Figure 48 Names and locations of bike shops and bike rentals in Hampton Roads (Continued)
Source: Yelp and Google

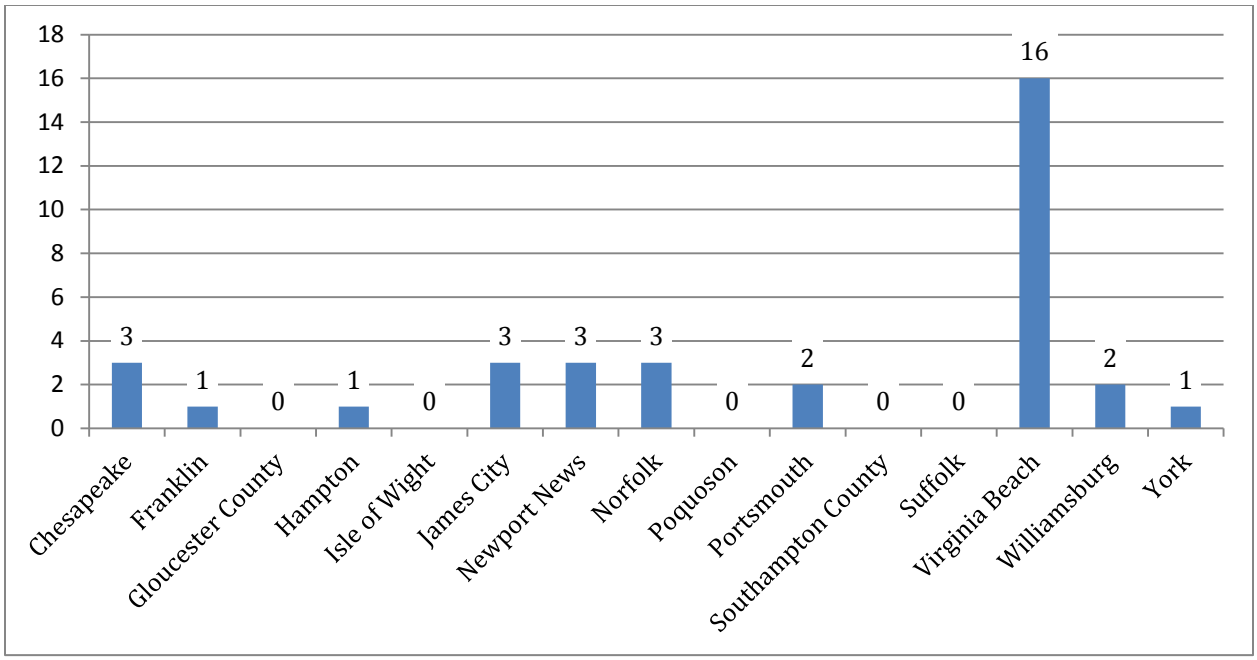


Figure 49 Number of bike shops in Hampton Roads

Source: Yelp, Google

Figure 49 illustrates the number of bike shops and/or bike rentals in Hampton Roads. Virginia Beach has the highest number of these stores, while Williamsburg and Norfolk are tied to second place. Newport News and Chesapeake have three shops, Portsmouth two, while York, Hampton and Franklin have one.

Virginia Beach
Source: Yelp

Williamsburg
Source: Yelp

Benchmarking- Historic Triangle and Va. Beach vs. Competitors

This subchapter discusses the differences in number of bike shops and rentals between Historic Triangle, Virginia Beach and competitors. Names and locations of bike shops and bike rentals for competitors can be seen on Figure 50, which were obtained using Google and Yelp.

Name	City
Revolution Cycles	**Greensboro, NC**
Galactic Bikes	
Cycles de ORO	
Trek Bicycle Store Greensboto	
Performance Bicycle	
Downtown Bicycle Works	
REI	
Higgins Cycle Shop	
Lekker Bikes US	
BoyerCycling	
Play it Again Sports Greensboro	
eBike Central	
Gran Fondo with Friends	
Bicycle	
Recycles Bike Shop	
Downtown BMX	
Myrtle Beach Bicycles	**Myrtle Beach, SC**
Pedego Electric Bikes Murtle Beach	
Pee Dee Bicycles	
Mr C's Bicycles	
Beach Bike Shop	
H&C Bike Shop	
Armadillo Cycles	
Super Cycles & Scooters	
Atlantic Spoke Bicycles	
Wheel Fun Rental	
Surf City Surf Shop	

Figure 50 Names and locations of bike shops and bike rentals for competitors (Continued)
Source: Yelp and Google

Name	City
Piney Mountain Bike Lounge	**Greenville, SC**
Lucky Bike	
Sunshine Cycle Shop	
Velo Valets	
SRT Bike Shop	
Greenville Cycling & Multi Sport	
Trek Bicycle Store Greenville	
Perormance Bicycle	
Pedal Chic	
The Mountain Goat	
Freehub Bicycles	
Village Wrench	
Carolina Triathlon	
Glory Cycles	
Bike the Rabbit	
REI	
Boyd Cycling	
The eBicycle Store	
Greenville B-Cycle Rental Station	
Reedy Rides	
The Bike Shed at the Swamp Rabbit Inn	
Upstate Cycle	
Zike Store	
Academy Sports + Outdoors	
Ken's Bike Shop	**Winston-Salem, NC**
Mock Orange Bikes	
Cycle Your City	
Play it Again Sports Winston- Salem	
NorthStar Customs LLC	
Paul's Cycling and Fitness	
Gerhardt Cycles	

Figure 50 Names and locations of bike shops and bike rentals for competitors (Continued)
Source: Yelp and Google

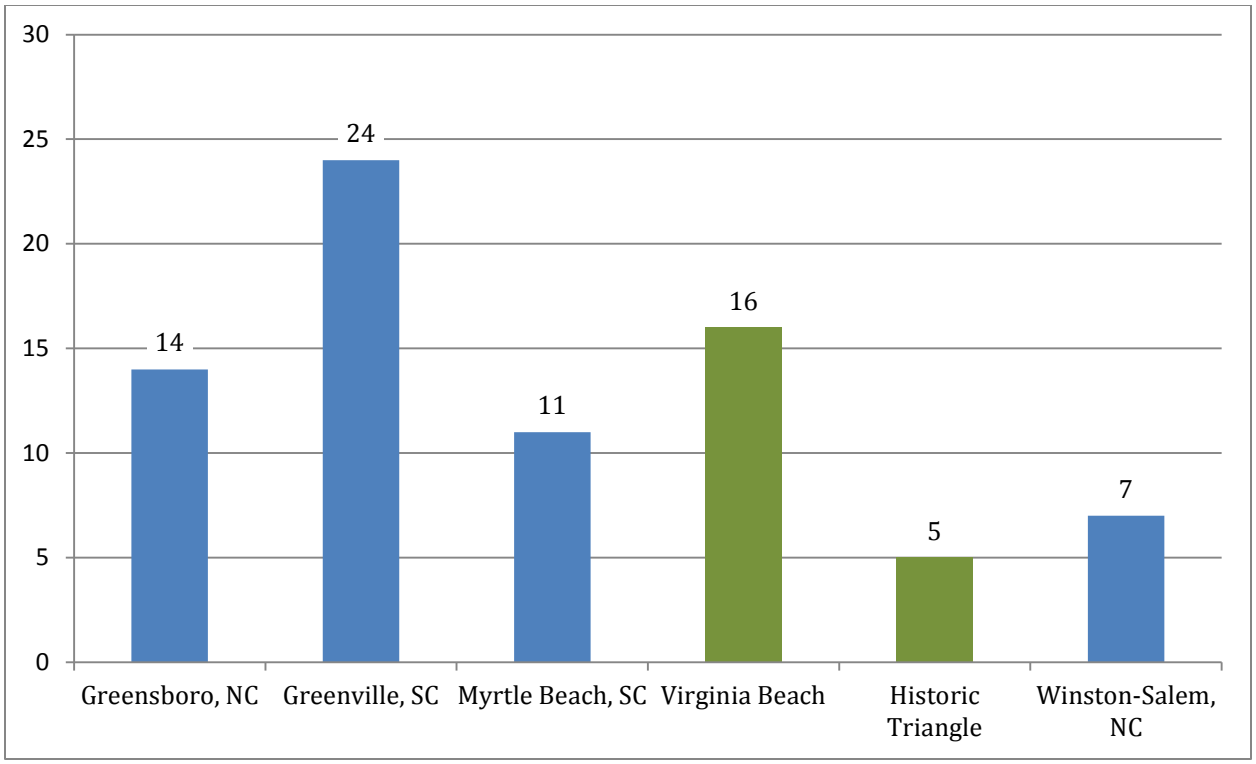


Figure 51 Number of bike shops in Historic Triangle, VA Beach and competitors
Source: Yelp, Google

We examined the number of bike shops and bike rentals for Virginia Beach, Historic Triangle and four competitors (Greenville and Myrtle Beach, SC; and Greensboro and Winston-Salem, NC). Virginia Beach is in second place after Greenville, SC, while Historic Triangle is in last place. This can be seen on Figure 51.

Greensboro, North Carolina

Source: Yelp

Greenville, South Carolina

Source: Yelp

Surreys

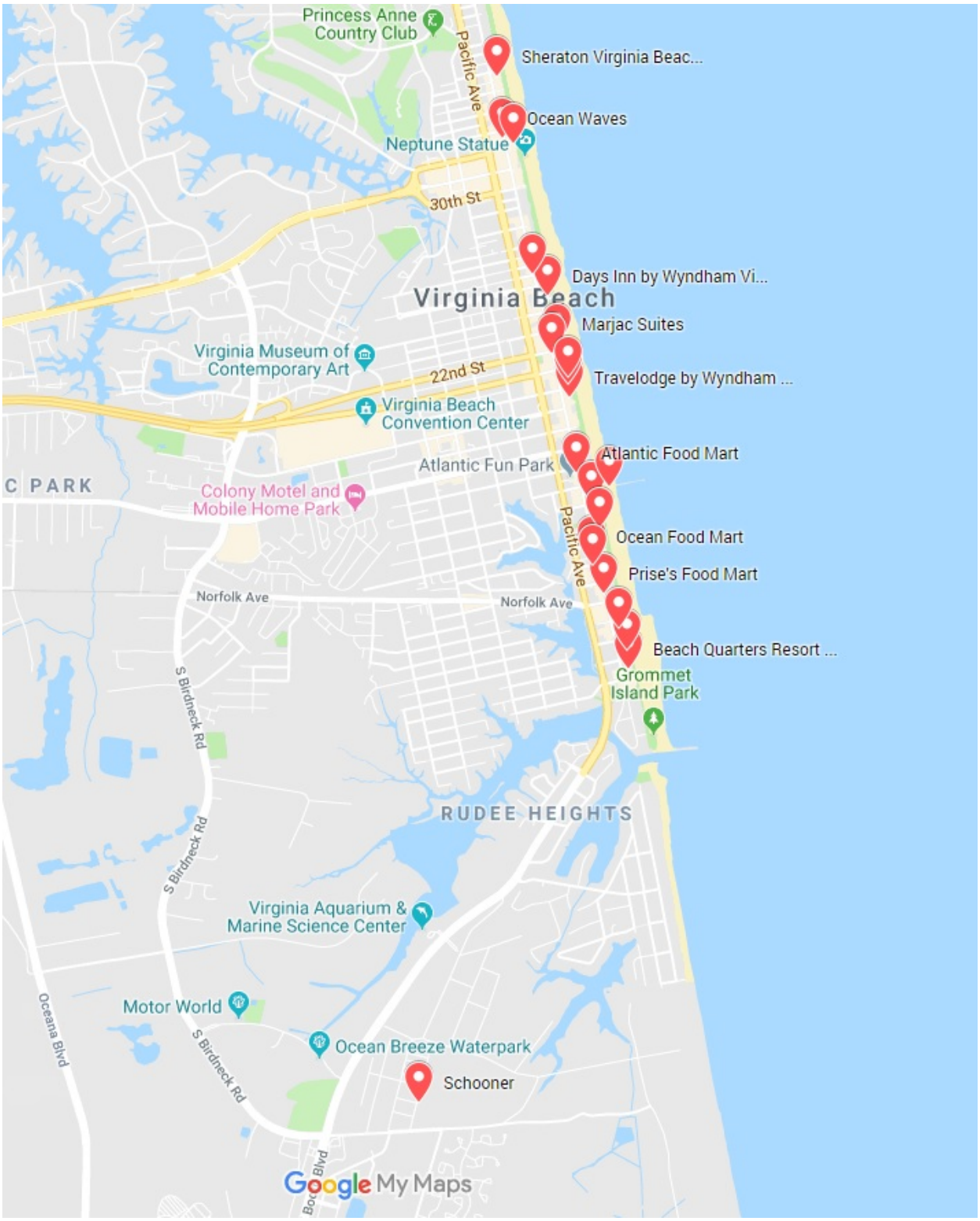
Surreys are four-wheel bikes which can take up to four persons. There are a total of 23 establishments in Virginia Beach which rent surreys (Figure 52).

Surrey, Virginia Beach
Source: Google

Surrey rental shops' locations are exhibited in Map 23. Almost every surrey rental establishment is located on or in very close proximity to the boardwalk in Virginia Beach.

Location	Address
Prise Food Mart	904 Atlantic Avenue
Beach Quarters	5th Street
Ramada	6th Street
Marjac	22nd Street
Quick Food Mart	2126 Atlantic Avenue
Atlantic Food Mart	1520 Atlantic Avenue
Ocean Food Mart	1110 Atlantic Avenue
Ocean Waves	3212 Atlantic Avenue
Sandcastle	1307 Atlantic Avenue #112
Sandcastle	1308 Atlantic Avenue #113
Surfside	1211 Atlantic Avenue
Schooner	2nd Street
Quality Inn	7th Street
Ocean Sands	11th Street
VB Fishing Pier	14th Street
Travel Lodge	19th Street
Capes	20th Street
Comfort Inn	21st Street
Comfort Inn	23rd Street
Days Inn	24th Street
Bluewater Gifts	2510 Atlantic Avenue
Hampton Inn	31st Street
Sheraton	36th Street

Figure 52 Surrey rental locations
Source:HRTPO



Map 23 Surrey rentals in Virginia Beach
Source:Google Maps

Number of surreys for every location is conveyed by Figure 53.

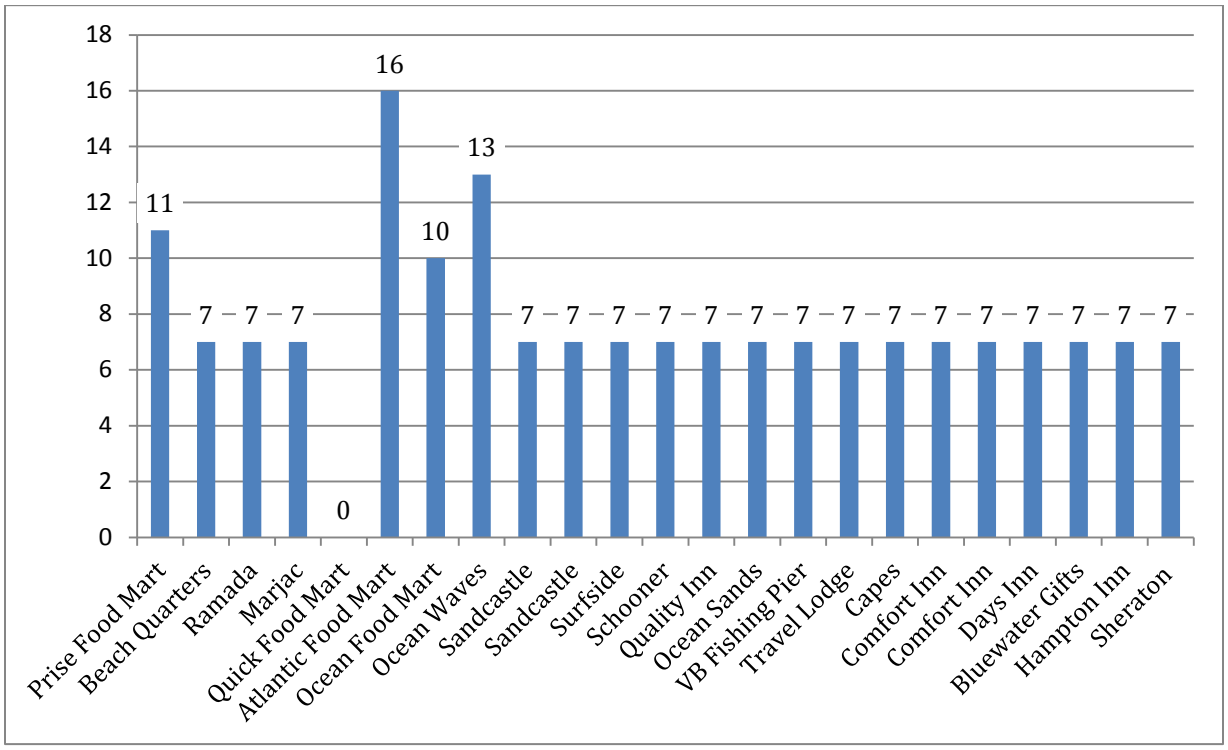


Figure 53 Number of surreys for each location
Source: HRTPO

Total number of surreys is 176 for all of the locations.

PLANNING FOR PHASE TWO: SURVEY OF DOLLARS SPENT BY VISITORS USING THE VA CAPITAL TRAIL

Background

For the Economic Impact of Bike Facilities (EIBF) study, we are documenting the **economic impact of investment in bicycle trails in Hampton Roads** by various methods. To date, as phase one of the study, we have reported key findings from analyses of trails in other regions, calculated the income of local people who bike to work, enumerated the bike shops in the area, etc. Given that most of the impact studies reviewed in phase one estimated economic impacts using surveys, staff is proposing—as phase two of the study—to conduct a survey with which to estimate **the annual amount of money spent locally by visitors drawn to Hampton Roads by bike trails**.

Hampton Roads having many trails (e.g. Virginia Capital Trail, Seaboard Coastline Trail, Elizabeth River Trail, and Boardwalk Bike Trail), staff desired to **survey visitors** to Hampton Roads, screening to find those visiting to use bicycle facilities, asking that group their spending, and applying the result to the number of total visitors to estimate the annual amount of spending attributable to local bicycle facilities. Having discussed this broad-survey option with experts at several organizations (Christopher Newport University's Wason Center for Public Policy, the Virginia Beach Convention and Visitors Bureau, Greater Williamsburg Chamber and Tourism Alliance, and the Virginia Tourism Corporation), due to the cost of **finding the small percentage** of visitors who came primarily to use local bike facilities, it appears that conducting such a broad survey would be cost-prohibitive.

Consequently, staff considered conducting a survey **targeting users of local trails** to estimate **the annual amount of money spent locally by visitors drawn to Hampton Roads by the subject trails**. Given the two tourism focus areas of the EIBF—Historic Triangle and Virginia Beach—staff considered on-site surveys for one key trail in each of those areas:

- The Virginia Capital Trail
- The Boardwalk Bike Trail

Given that one expects only a very small portion of Virginia Beach tourists to have chosen that destination due primarily to the existence of the Boardwalk Bike Trail, conducting such a survey at this location would be cost-prohibitive. Therefore, staff plans to **focus its survey resources on the Virginia Capital Trail (VCT)**.

Two related recent studies should be noted. In 2017, William and Mary student Erica Schneider conducted an online survey of cyclists for her paper "The Economic Benefits of Connecting the Virginia Capital Trail to Williamsburg"), but she did not measure spending. In 2018 an estimate of spending by VCT users was included the "Economic Impact Analysis" completed by the University of Richmond MBA Program for the Virginia Capital Trail Foundation (VCTF).

Although that study estimated annual spending by VCT users, the work is **not useful** for this HRTPO study for the following reasons:

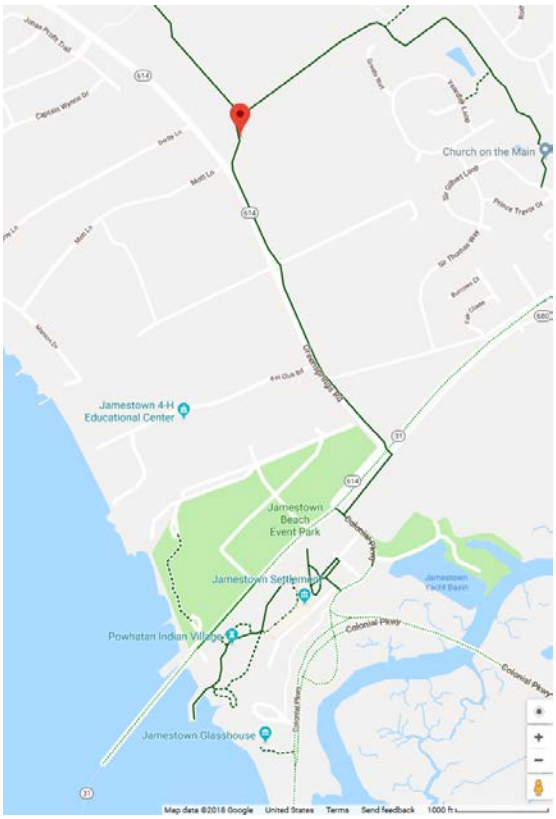
- Being based on an on-line survey advertised via the VCTF website and an email database, the results are "**not representative** of all VCT participants".
- Because the location of the spending was not specified, spending in Hampton Roads cannot be calculated.

Proposal

For phase two of the EIBF, staff intends to conduct a survey of users of the **Virginia Capital Trail** to estimate the **annual amount of money spent locally** by visitors drawn to Hampton Roads by the VCT.

Count and Survey Location

In order to estimate *annual* spending, the survey results will be applied to an **estimate of *annual* trail users**. The Virginia Capital Trail Foundation (VCTF) maintains several permanent counters along the trail. Staff intends to use the 2018 annual count from the only counter located in Hampton Roads: the counter located **one mile from the Jamestown end of the trail**. Given that this count will be applied to the survey results to calculate annual spending, the on-site survey of trail users should be conducted **at the location of the counter** (as shown on map at right).



Survey

- For believability of results, staff proposes a **statistically-valid sample size**.
- To control the cost of collecting surveys, staff proposes that the survey be conducted when the trail has many users, say **summer 2019**.

In order to estimate only money *coming into the region* and *due to the subject trail*, staff proposes that only persons **a) who live outside of Hampton Roads**, and **b) who are visiting primarily to use the trail** be asked to *complete* the surveys.

To gather needed spending data, the following survey is proposed:

(Note: The following is a starting point to be modified by survey professional to be chosen.)

- Screening:
  - "We're doing a survey of visitors coming here to use the trail[1]."
  - "**In which state** do you live?" (If in Virginia, "In which city or county do you live?") If living OUTSIDE of the 15 HRTPO localities:
  - "Did you come to the Historic Triangle **because of this trail**?" If YES:

- Survey questions:
  - "**How many people** are in the group for which you are answering questions?" [This number is necessary in order to apply the survey answers to the total number of persons using the trail annually.]
  - "To better understand the economic impact of this trail, we are interested in finding out the approximate **amount of money** people using the trail spend while in town."
    - "What is the length of your visit (hours, days)?" [The purpose of this question is to get them thinking about their entire visit.]
    - "During the course of your visit, what is the approximate amount [you / your group] will spend **in this region** in each of the following categories?:
      - Food and beverage: _____
      - Retail (souvenirs, gifts, etc.): _____
      - Biking expenses (rental, repair, etc.) _____
      - Lodging expenses (hotel, b&b) _____
      - Auto expenses (gas, parking, tolls, etc.) _____
      - Other _____

Product

To estimate the total **annual local spending by visitors drawn to Hampton Roads by this trail**, staff proposes to multiply these values gathered as described above:

- Estimate of annual number of trail users, based on counts gathered by VCTF.
- % of trail users who passed the screening (i.e. live outside of Hampton Roads, visiting to use the trail), based on survey
- Per person local spending by trail-induced visitors, based on survey

[1] Although it is expected that few travelers visit the Historic Triangle to *walk* on the VCT, because counters count both pedestrians and cyclists, interview both pedestrians and cyclists.

REFERENCE

Crompton, L. J., Lee, S., Shuster, J., T., "A Guide for Undertaking Economic Impact Studies: The Springfest Example", *Journal of Travel Research,* Vol. 40, pp. 79-87, August 2001

Lindsey, G., Man, J., Payton, S., & Dickson, K. "Property Values, Recreation Values, and Urban Greenways", *Journal of Park & Recreation Administration*, *22*(3), 2004

Weisbrod, G., Weisbrod, B., "Assessing the Economic Impact of Transportation Projects: How to Choose the Appropriate Technique for your Project", *Transportation Research Circular* 477, 1997

APPENDINX A: PUBLIC COMMENT

Tidewater

Linwood,
Thank you for your comments.
Concerning the Silver Comet Trail, we added its economic study to our study.
Concerning the "executive summary", we intend to prepare such after completion of phase two (survey).
Rob

From: Linwood Howard [mailto:linwood.howard@yahoo.com]
Sent: Friday, January 11, 2019 5:44 PM
To: Rob Case; Uros Jovanovic
Cc: Alison Eubank; Beverly McLean; Tom Carmine Carmine; John Sprock; Kristi and David; Raleigh Martin; Aaron Bull; Tregg Hartley; Steve Lambert; Cristin Emrick; Katherine Preston; Brian Pierce; Richard M Thompson; Helen Gabriel
Subject: Economic Impact Study Comments

Rob / Uros,

I think the report is great information, full of detail and substance. I think you are on the right track.

The Tidewater Trails Alliance is working closely with the model that the PATH Foundation out of Atlanta, GA (https://pathfoundation.org) used in their construction process Their signature trail is the Silver Comet Trail - over 60 miles and connecting to the Chief Ladiga Trail in Alabama, creating a 100 miles of linear paved trail. The PATH has built over 250 miles of trail in and around metro Atlanta. Our team will be sending a contingent to Greenville and Atlanta to talk with key personnel about lessons learned sometime early summer of this year, as we fell it will benefit our efforts here in Hampton Roads. We may wish to include their trail system in HRTPO's report as it is reflective of our efforts in Hampton Roads (VCT, Birthplace of America Trail & Southampton Roads Trail).

One suggestion I would like to make:

After you complete the final study for Hampton Roads, make a condensed "Executive Summary". A two page document that TTA, HTBAC or and any other user group could use when approaching a city council person or corporate citizen. A two page Executive Summary is easy to digest and could reference back to the core document such as the one you have in the draft.

An example is the attached document from Alta Planning (a familiar name in trails design). This economic impact study is easily digestible for the busy council person or that corporate executive on a time constraint.

Thank you immensely for all the hard work to this point. I am sure that this report will be an example to other localities statewide and nationwide.

Linwood Tom Howard

Tidewater Trails Alliance - Chairman
"Building the Birthplace of America Trail"

Norfolk

Rob Case
Sent: Fri 1/25/2019 3:11 PM
To: amy.inman@norfolk.gov; Earl Sorey
Cc: Uros Jovanovic; Mike Kimbrel
Message | home location appendix.docx (2 MB)

Amy and Earl,

FYI
In response to your comments on the draft Economic Impact of Bicycle Facilities (Amy's made at the meeting, Earl's made after the meeting), I have added analyses of the home location of users of the Elizabeth River Trail and the Dismal Swamp Trail as an appendix (attached) to our EIBF document.

I will follow this email with phone calls to you.
Rob

Williamsburg

Howell, Richard [USA] <Howell_Richard@bah.com>
You replied to this message on 1/24/2019 1:44 PM.
Sent: Tue 1/15/2019 3:00 PM
To: Uros Jovanovic

Mr. Jovanovic,

Thank you for the opportunity to provide my input on this effort. First and foremost, as an avid cyclist here in Williamsburg, I truly appreciate the effort that has been undertaken here and in this region to capture and enhance the value added to our communities through cycling investment, both economic and to the enhancement of our life and recreation.

I have given the draft report a brief review and, in general feel it does provide a limited approach to try and capture some insight. However, I believe limiting the scope of economic impact to only those coming into the area from outside limits the effectiveness this study could provide. I think you will find that the majority of trail users are local or from around the general area. But, they too bring spending that would not otherwise have been brought to bear on the area. As an example, many of the groups I ride with have regular rides out of the Jamestown parking lot on the trail, ending up back at the lot and finishing off the day with beer and food at Billsburg Brewery next door. Money that would not have been spent otherwise. The same can be said for Alewerks and Va Beer Co. All are spots we regularly host "Pub Rides" out of, and a simple inquiry into the spending trends at these businesses will show significant plus ups that would not have otherwise been seen. We have also had rides out of various eating establishments. One that gets significant traffic is Culs on the Cap-2-Cap Trail. They are right around the half way point on the trail and a perfect stop off, or start and finish location. They now do a very brisk business and have even dedicated days to celebrating cyclists.

The advent of the trail over the past few years has dramatically increased the number of local cyclists. I started seriously cycling about 5 years ago and can tell you that the number of riders and organized rides has skyrocketed since the trail's completion. That means more spending on bikes, bike repairs, gear, clothing, nutrition items, food and beverage by LOCALS. We have many regular rides that start and end near local businesses, such as in New Town on Saturday mornings, finishing up with brunch and coffee at Panera Bread. We have other rides that stop at other refreshment locations in the area on a regular basis, coffee shops, pubs, restaurants, etc. Bottom line, where it not for the trails, cycling lanes, cycling friendly roads, etc.., many of these local cyclists would not be cycling or as actively involved. That would mean a lot of money now being pumped into the local businesses would very likely be going elsewhere. Capturing that data is not easy, but I believe it is important to gain a realistic valuation of the impacts. You may well want to include surveys of the local businesses to estimate the value increase from the local cycling communities. I know in the prime riding season many of the breweries/pubs see at least one or two cycling events per week, bringing 40-50 or more patrons per ride into their establishments. Riders come from all over the Hampton Roads area to participate…often from as far away as VA Beach, Richmond, Chesapeake, etc.. Alewerks, VA Beer Co and Billsburg know the value it brings and have even begun selling their own cycling attire (jerseys, clothing, etc). Anytime there is a ride, they know beer and food sales (Food Trucks mostly) will be significantly increased. Even the Williamsburg Winery has gotten in on the cycling traffic, now hosting a weekly ride that uses the Cap-2-Cap trail, and brings in lots of lunch business on ride days with regular attendance of 40-60 riders. They too have their own cycling gear and cycling FB page, etc… Bottom line, not only is it important to understand what "outside" money is being brought into the area from cycling investment, but the impact it is having on local spending and businesses, and the impact it has on money that while already here, might well have been spent elsewhere except for the draw of the cycling opportunities here.

Thanks again for what you are doing and for the chance to provide you my 2 cents worth.

Rich

Richard C. Howell
104 Horseshoe Drive
Williamsburg VA 23185
Cell: 757-207-0235

PS
There are several FB pages and cycling groups I could recommend you link into to gather more information along these lines and to gather input from local cyclists. Three that come to mind off the top are the WAB (Williamsburg Area Bicyclists), PBA (Peninsula Bicycle Association), and the HRC (Hampton Roads Cyclists).

Sent: Thu 1/24/2019 1:44 PM
To: 'Howell, Richard [USA]'
Cc: Rob Case; Steve Lambert

Richard,

Thank you for your comment. I appreciate you taking the time to read through the report and sending your valuable feedback.

I agree with your argument that the spending from local trail users are contributing to the economy. However, much of the money that locals spend on or around the trail would likely be spent somewhere else in Hampton Roads if the trail did not exist.

Therefore, in our study we focused on money coming from the outside. Note that, for phase two, we are planning on doing a survey of out-of-town cyclists on Virginia Capital Trail to get in-depth information on their spending.

Thank you again for reading the report and for your valuable feedback.

Best,

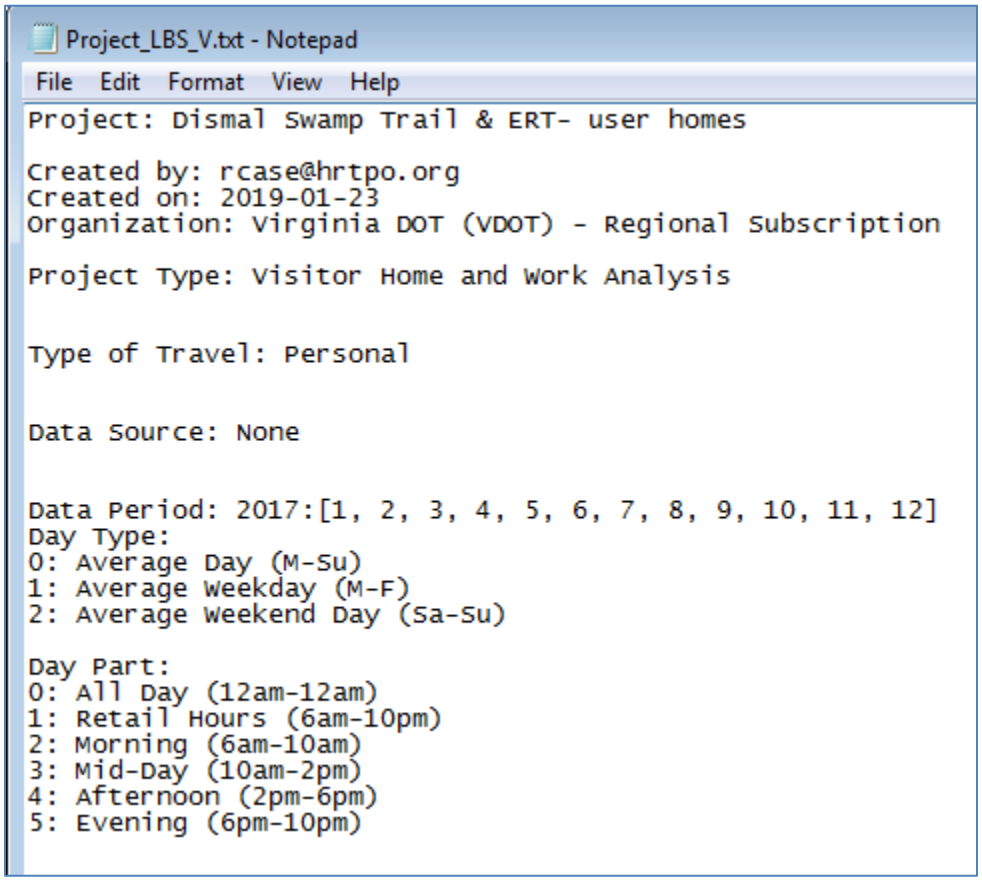
Uros

APPENDIX B: HOME LOCATION OF USERS OF SELECTED TRAILS IN HAMPTON ROADS

StreetLight gathers data from GPS units and smart phones across the U.S., specifically "smart phone apps that use location-based services" (StreetLightData.com), for example a weather app that knows where you are. StreetLight's "Visitor Home and Work Analysis" allows one to "analyze the home and work locations of visitors to a zone" (StreetLightData.com). Concerning visitors to a zone, "a trip is defined as ending when a vehicle turns off, or when a device is stationary for more than a few minutes." (StreetLightData.com).

Given that this study focuses on the two main tourist areas in Hampton Roads—Historic Triangle and Virginia Beach—home locations for users of the **Virginia Capital Trail** Historic Triangle) and the **South Beach Trail** (Virginia Beach) can be found in the body of this report. Due to comments from TTAC members, staff calculated home locations for two other trails in Hampton Roads, as follows.

Twelve months of 2017 data were used. This and other parameters for the StreetLight analysis can be seen on the following figure.



Parameters of StreetLight analysis
Source: HRTPO analysis of StreetLight data

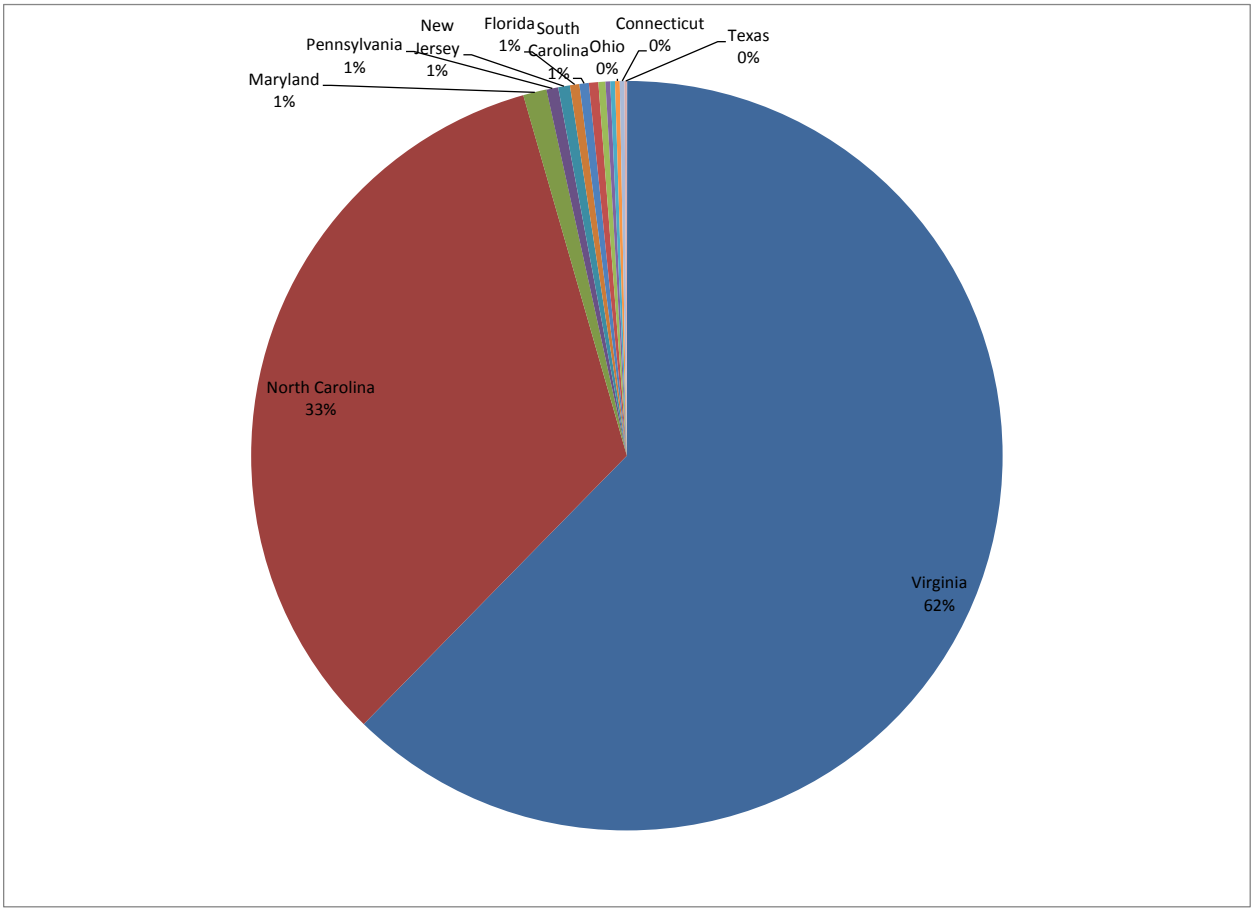
Dismal Swamp Canal Trail

In order to identify Dismal Swamp Canal Trail users, one must find a location where they remain for a few minutes. Trail users are stationary in the parking lot shown below.

Dismal Swamp Canal Trail parking lot

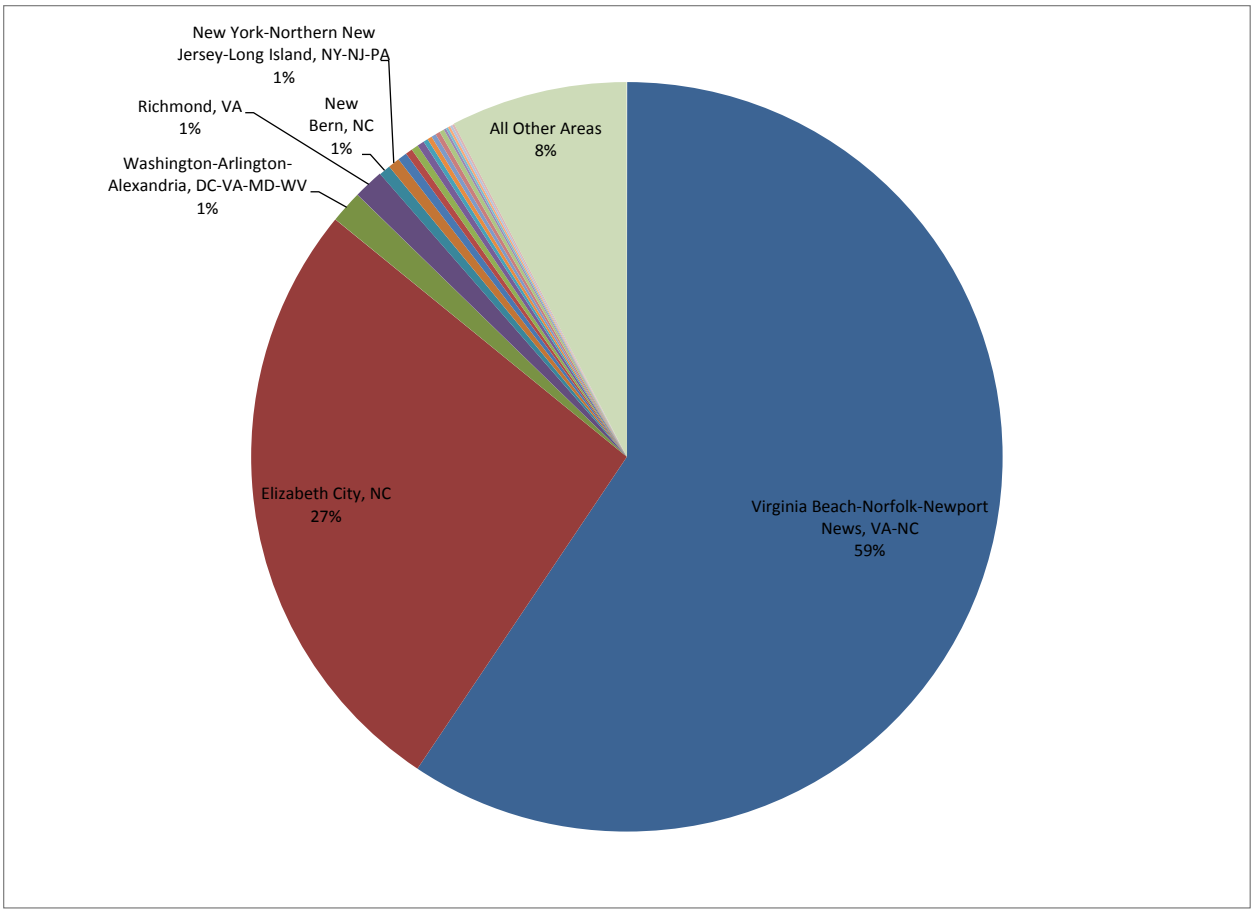
Source: Google, StreetLight, HRTPO

The following figure displays the home state of Dismal Swamp Trail users obtained from StreetLight analysis.



Home states of Dismal Swamp Trail users, 2017
Source: HTRPO analysis of StreetLight data

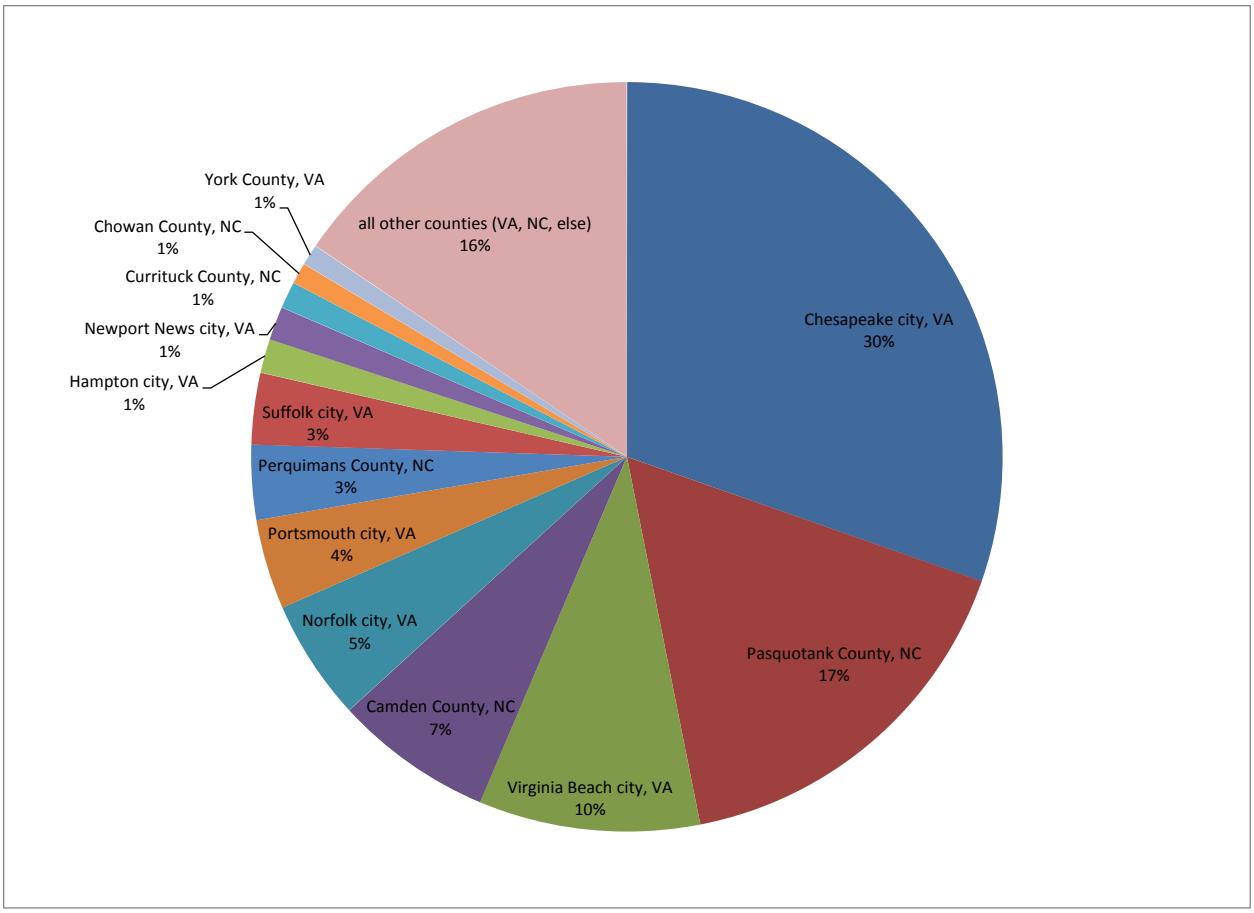
Given the trail's location near the NC/VA border, it is not surprising that 95% of the users come from Virginia and North Carolina.



Home metropolitan statistical area (MSA) of Dismal Swamp Trail users, 2017
Source: HRTPO analysis of StreetLight data

Looking at the above figure, we see that approximately 40% of the trail's users live outside of the Hampton Roads area. Note that the "Elizabeth City, NC" MSA included Camden, Pasquotank, and Perquimans counties.

Because the "Virginia Beach – Norfolk – Newport News, VA-NC" MSA includes two North Carolina counties (Gates and Currituck) which may—due to proximity—supply a significant number of trail visitors, staff calculated visitors by county on the following page.

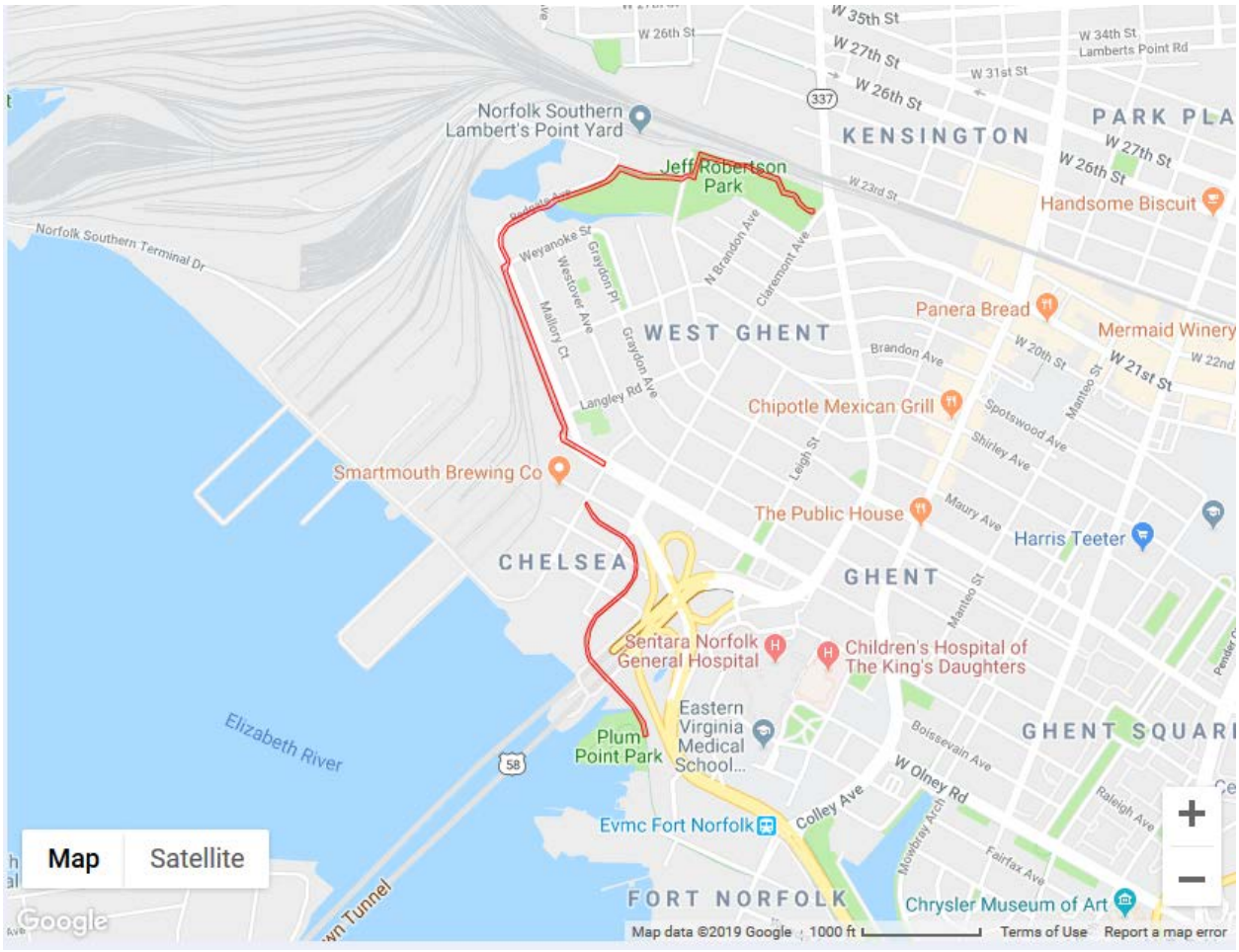


Home county of Dismal Swamp Trail users, 2017
Source: HRTPO analysis of StreetLight data

Looking at the above figure, we see that 70% of the trail's users live outside of Chesapeake.

Elizabeth River Trail

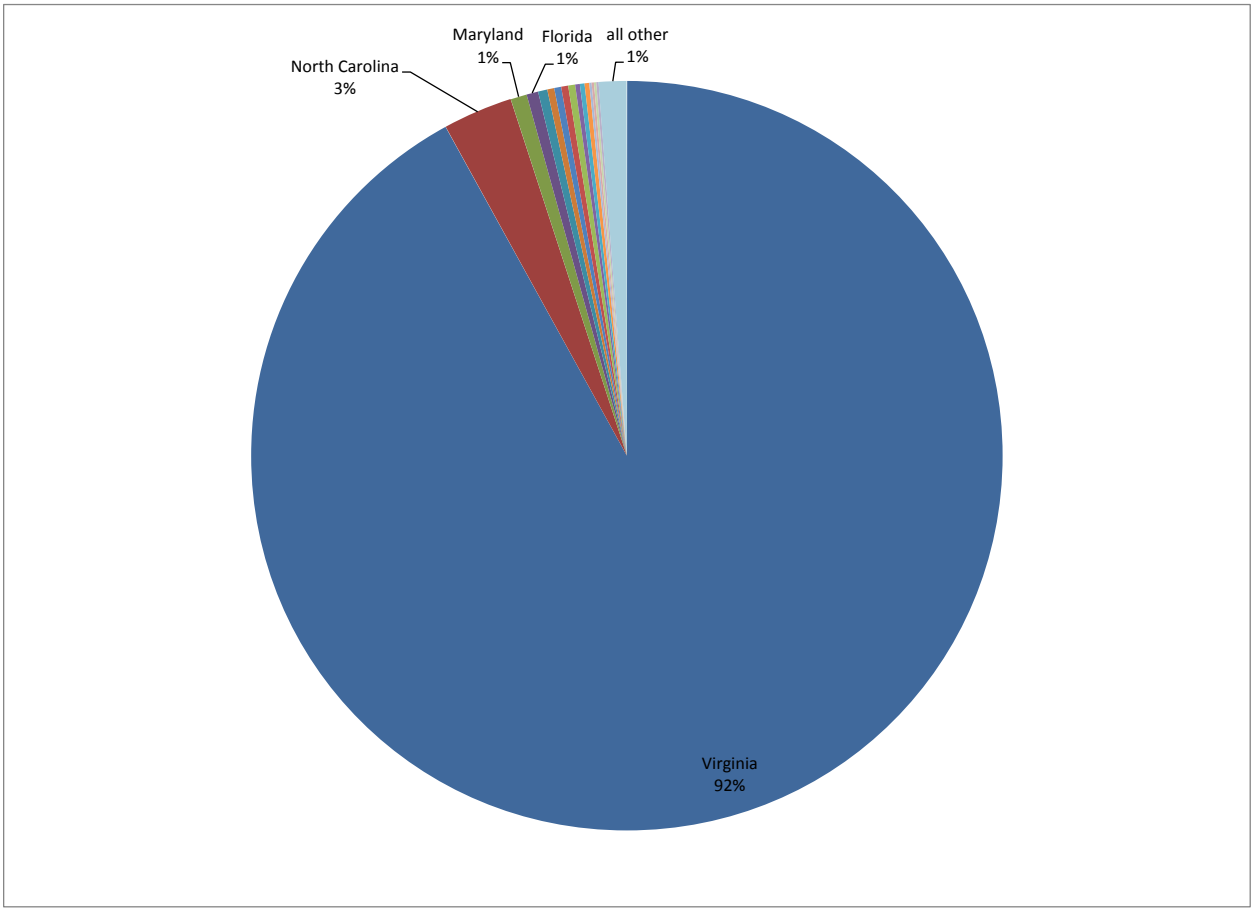
In order to identify Elizabeth River Trail (ERT) users via StreetLight, one must find a location where users remain for a few minutes. Given that there exists no parking lot exclusive to the trail, staff drew StreetLight zones around the trail itself, assuming that users stop at various points along the trail. Although the ERT runs from Norfolk State University to Norfolk International Terminals, in order to identify persons using the trail (as opposed to persons driving on a street which is part of the trail), staff entered into StreetLight the section with exclusive right-of-way from EVMS to Jeff Robertson Park. Given that one short portion of this section has the trail running along a wide sidewalk of Orapax Street (see gap below), staff created two zones, one west of Orapax St (the "West Ghent" segment), and one east of Orapax St (the "Chelsea" segment).



Elizabeth River Trail- West Ghent and Chelsea segments

Source: Google, StreetLight, HRTPO

The following figure displays the home state of ERT- **West Ghent** users obtained from StreetLight analysis.

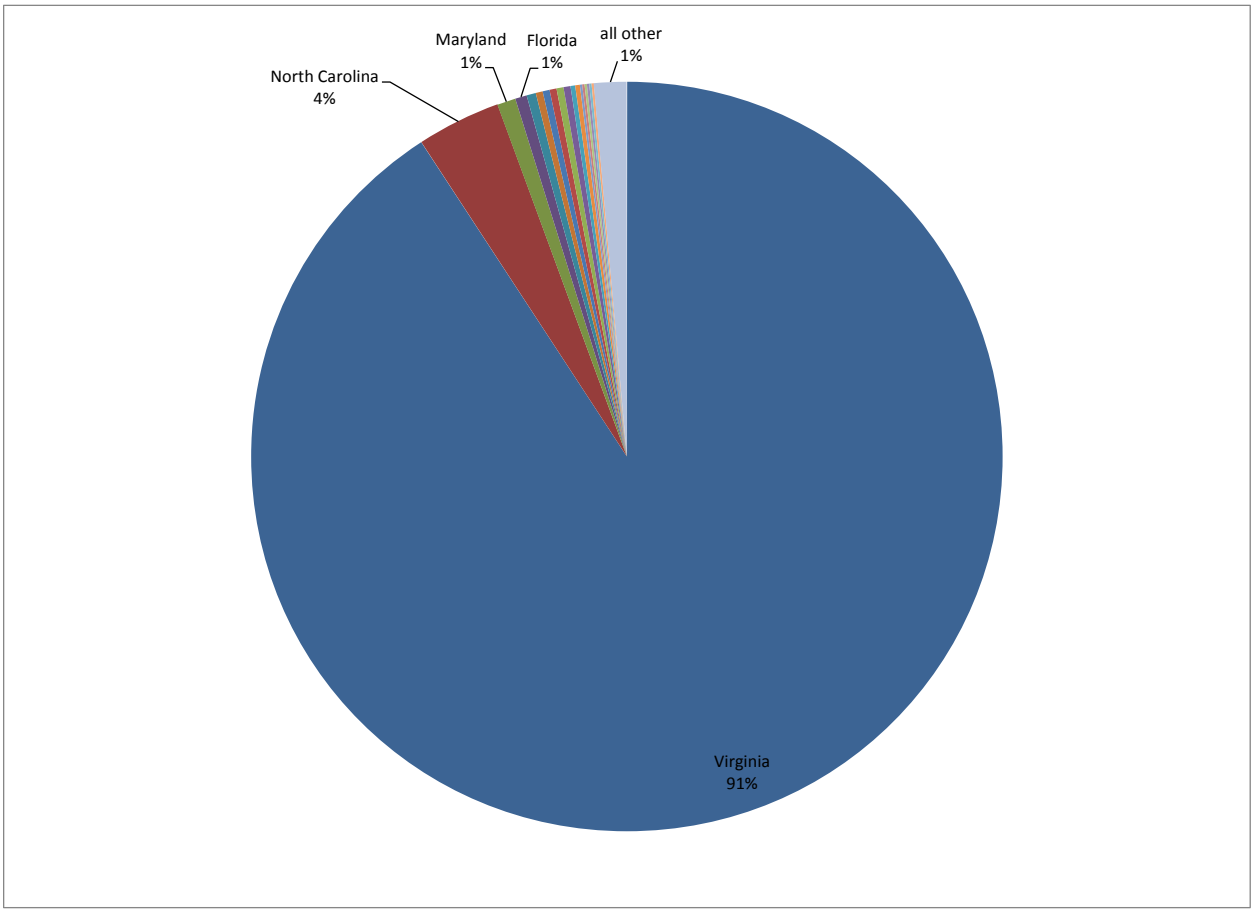


Home states of Elizabeth River Trail users, West Ghent segment, 2017
Source: HTRPO analysis of StreetLight data

8% of the users of this segment come from outside Virginia.

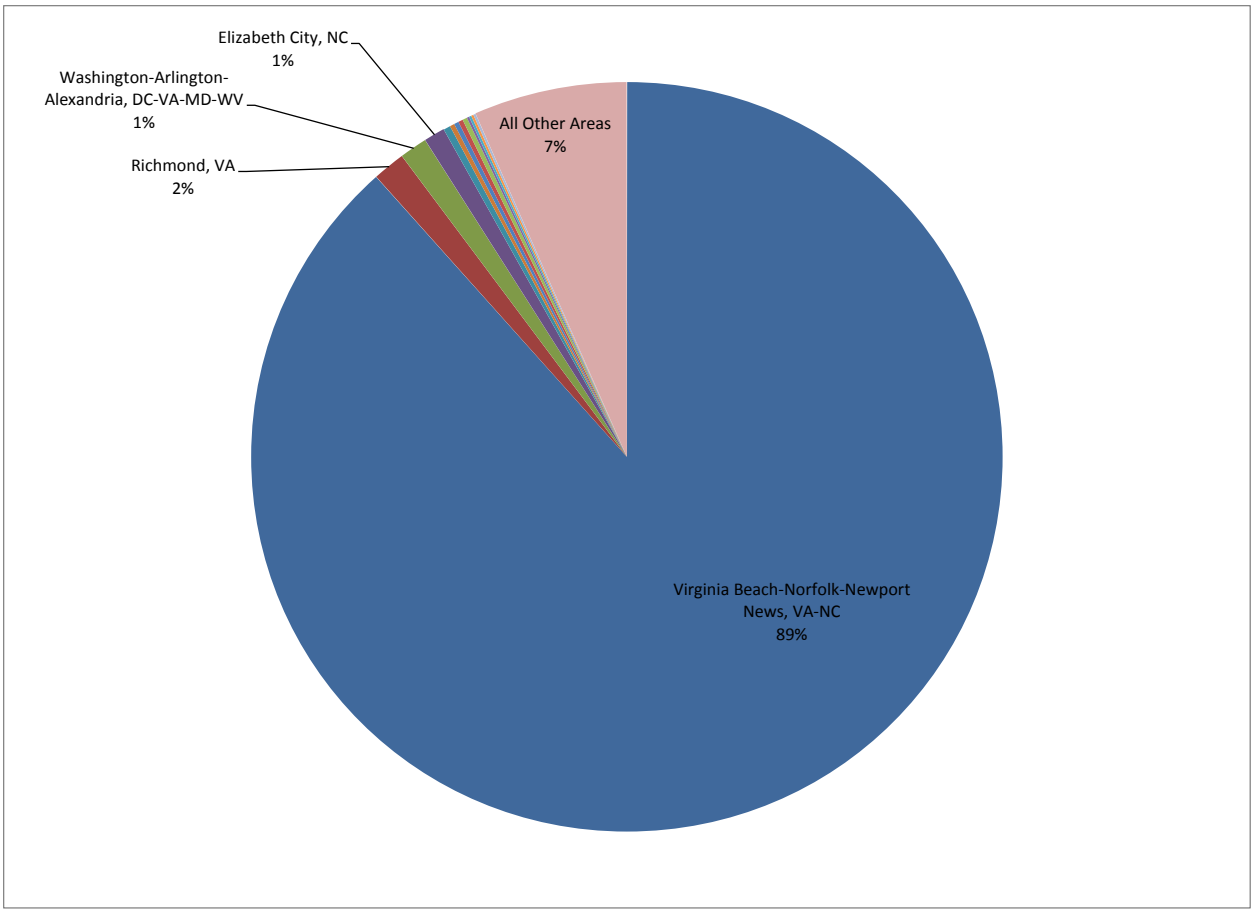
In order to compare the results for the two subject segments, the results for the Chelsea segment are provided on the following page.

The following figure displays the home state of ERT- **Chelsea** users obtained from StreetLight analysis.



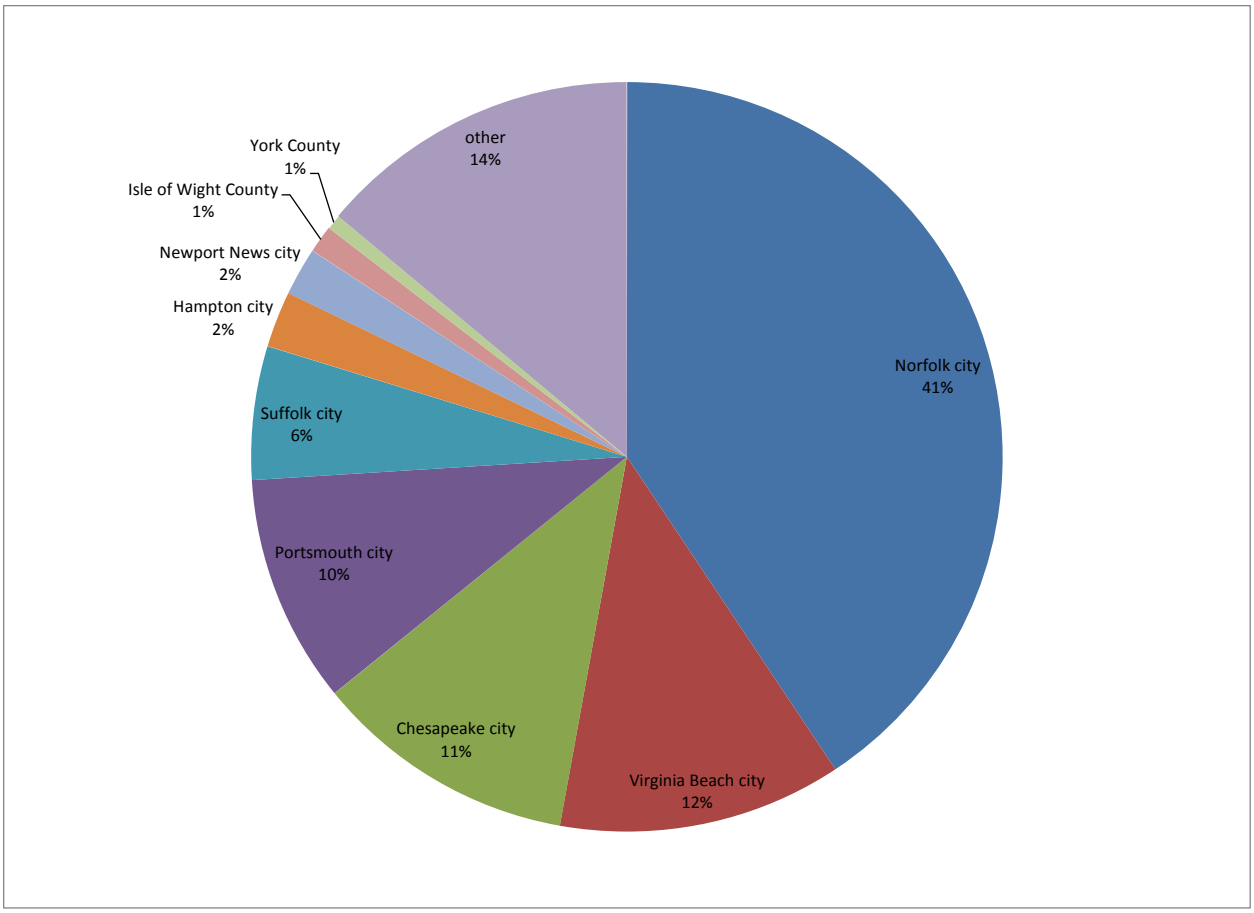
Home states of Elizabeth River Trail users, Chelsea segment, 2017
Source: HTRPO analysis of StreetLight data

The results for this segment of the trail are very similar to that of the West Ghent segment on the previous page.



Home metropolitan statistical area (MSA) of ERT users, West Ghent segment, 2017
Source: HRTPO analysis of StreetLight data

Looking at the above figure, we see that approximately 10% of the trail's users live outside of the Hampton Roads area. (Given that—for home state—the two segments had similar results, it is assumed that the home MSA results for the Chelsea segment would be similar to the West Ghent results above.)



Home Locality of ERT users, West Ghent segment, 2017
Source: HRTPO analysis of StreetLight data

Finally, we see that approximately 60% of the trail's users live outside of Norfolk.