"To the extent that bicycling and walking trips replace single-occupancy vehicle trips, they reduce emissions and have tangible economic impacts by reducing traffic congestion, crashes, and maintenance costs. In addition, the reduced need to own and operate a vehicle saves families money."

Chapter Four

Quantitative User Needs Analysis

Introduction

To better understand bicyclist and pedestrian needs, the consulting team conducted a detailed analyisis investigating the current safety, suitability, and demand for bicycling and walking in the ARTS region. This analysis is divided into four parts within this chapter:

- An analysis of current bicyclist and pedestrian suitability in the region.
- A demand and benefit analysis of bicycling and walking in the region.
- Bicyclist and pedestrian count results and their implications.
- A safety analysis which includes an investigation of crashes involving bicyclists and pedestrians in the region.

Suitability Analysis

This section summarizes the inputs and methods of the Augusta Regional Transportation Study (ARTS) Bicycle and Pedestrian Sustainability Analyses (BSA and PSA, respectively). The analysis was completed using Geographic Information Systems (GIS). The Bicycle and Pedestrian Suitability Analysis models use a quantitative overlay approach discussed in detail in this report to identify areas with the greatest potential to produce cyclist and pedestrian trips, as well as the roadways most suitable for such trips. In combination, these results aid in the prioritization of the investments needed to produce an effective cyclist and pedestrian regional network.

Bicycle and Pedestrian Suitability Analysis Overview

The BSA and PSA models were developed to evaluate potential bicycle and pedestrian activity levels in areas covered in the ARTS. These areas include portions of Aiken County in South Carolina and Columbia and Richmond-Augusta Counties in Georgia.

The analyses:

- Quantify factors that impact bicycle and pedestrian activity.
- Locate bicycle and pedestrian network gaps as potential projects.
- Identify potential regional bicycle and pedestrian corridors.
- Guide the development of new pedestrian and bicycle trip generation tools that enhance the user experience and maximize bikability and walkability.

BSA and PSA identify areas where cyclists and pedestrians are most likely to be. The analyses assign weighted values to available mapped data (metrics) based on the data's relative impact on cycling and walking. Impacts take the form of both trip generators and attractors, collectively approximating network **demand**, or infrastructure suitability, representing network **supply**. BSA and PSA demand scores are assigned to areas throughout the region based on the density of generator variables and the proximity to attractors. Demand scores are then overlaid on top of supply to understand roadway quality in areas with high potential demand. Roadway quality incorporates characteristics that make cycling and walking viable, such as traffic speed and volume. The results of this technique can therefore be used to prioritize projects in areas with high demand. Where that demand meets suitable infrastructure, cost-effective investments can help to create a safe and direct network for cyclists and pedestrians. In areas with low suitability, interventions may help to improve conditions, or off-road facilities may provide an alternative for cyclists and pedestrians.

Metrics are divided into five sub categories: **live, work, play, transit, and roadway quality**. The live, work, and play categories represent the destinations that will generate and attract walking and cycling trips, such as homes, workplaces, and recreational amenities. Transit is also considered an attractor category, since transit stops are destinations in themselves providing wider regional access to cyclists and pedestrians. Roadway quality represents trip supply. It includes characteristics of the road network (like shoulder width, traffic, and connected intersections) that allow cyclists and pedestrians to reach each of the other destinations. Table 4-1 presents the metrics by category.

Combining these metrics into one map enables the prioritization of projects that will have the greatest impact on the greatest number of people. Since demand metrics are mapped at different scales, (e.g. points of interest are mapped as nodes and population density is mapped by U.S. Census block group), each metric was converted to a similar scale so that values could be summed. Specifically, a square grid of 100 feet by 100 feet was laid across the entire ARTS region and each metric was converted to this grid. The composite demand values were then compared to the roadway quality scores. Since every community is different, the inputs and scoring methods used in the BSA and PSA are tailored to local needs and values.

This analysis is based on data obtained from ARTS and its municipalities, the Georgia Department of Transportation, the South Carolina Department of Transportation and the University of South Carolina's GIS Data Server. Data was selected based on its availability and regional significance. The following sections present the inputs and analysis for each category examined, as well as the final composite results.

Data Inputs

BICYCLE AND PEDESTRIAN GENERATORS

The datasets described in this section approximate the potential trip generation of homes and workplaces throughout the region. The data extent covers the entire region, and thus provides a composite score for every space within the region for each category. Scores are assigned based on factors affecting the likelihood of trips to and from home and work. Figure G-1, Figure G-2, Figure G-6, and Figure G-7 in Appendix G summarizes these scores.

Live

BSA and PSA utilize a variety of demographic data to indicate where potential volumes of cycling and pedestrian activity will be generated. Base population density, percentage of households without immediate access to a car, and the percentage of people already biking and walking to work are all contributors to this category. Demographic datasets were derived from the 2000 US Census and synthesized into a spatial database in GIS.

Work

Another key indicator of trip volume is the density of places of employment and college student populations. Employment density was obtained via the Longitudinal Employment and Household Dynamics (LEHD), a program conducted by the US Census Bureau. This data was broken down into two sub-categories based on the North American Industry Classification System (NAICS). These categories were separated into service and commercial/manufacturing jobs. The service industry was assigned a higher weight than the commercial/manufacturing industry since these locations tend to draw in customers and generate foot traffic and are therefore both a trip generator and attractor. College student body totals were obtained from a variety of sources

Table 4-1: BSA and PSA Metrics Overview

Category	Metric
Live	Population density, vehicle ownership inventory and journey to work mode
Work	Employment density by job sector and college enrollment density
Play	Proximity to points of interest and schools
Transit	Proximity to bus stops
Roadway Quality	Speed limit, connected/disconnected intersections, slope, etc.

and were included in this category because students typically spend the same number of hours on campus as workers do in a typical day.

BICYCLE AND PEDESTRIAN ATTRACTORS

The datasets described in this section approximate the potential of destinations and transit facilities throughout the region to attract cyclists and pedestrians and thus generate trip demand in areas surrounding them. Unlike the generators described previously, each of these datasets does not cover the entire region but is rather represented as point or polygon nodes distributed throughout the region. Like the colleges described above, these nodes are buffered before overlaying the datasets so that areas closer to the attractor receive higher scores than those farther away. Figure G-3, Figure G-4, Figure G-8, and Figure G-9 in Appendix G illustrate attractor scores in the ARTS region.

Transit

Transit stops act as attractors to cyclists and pedestrians, because they provide potential access to and from many of the other generators (e.g., workplaces, homes) and attractors (e.g., parks, schools) that might otherwise be too far away to bike or walk. In the ARTS region, buses are the only available public transit option, thus bus stops are used as the only data input to the transit map. It is assumed that cyclists will travel up to three miles to access a bus stop, and pedestrians will walk up to one mile. Within these 3-mile and 1-mile areas, scores are assigned, decreasing with increasing distance from the stop, to approximate the decreasing attractiveness of bus stops the farther they lie from a traveler's starting point or destination.

Play

The features in this category represent destinations other than homes and workplaces that are likely to attract cyclists and pedestrians. While cycling and walking are different in nature, the features that attract this activity are quite similar. Varying scores were assigned to each of the features comprising the "play" category, recognizing that some features are more likely to attract cycling and walking than others. Features of regional significance, such as parks, campgrounds, and hotels, are given higher scores, though schools and retail corridors also play a significant role in this category and are scored accordingly.

BICYCLE AND PEDESTRIAN INFRASTRUCTURE SUITABILITY

While all the generator and attractor categories described previously collectively demonstrate potential bicycle and pedestrian trip demand throughout the region, this section describes the potential of road infrastructure to meet that demand. Figure G-5 and Figure G-10 in Appendix G illustrate roadway quality in the ARTS region.

Roadway Quality

Various roadway characteristics collectively comprise the "roadway quality" category. This category is used to understand the quality of available infrastructure supporting cyclist and pedestrian travel between destinations within the generator and attractor categories. Roadway quality is defined by looking at connectivity, safety (collision history from 2008 - 2010), bicycle and pedestrian infrastructure, average daily traffic (ADT), vehicular speed and slope. A majority of the categories are broken into five divisions by their respective units and scored 1 to 5 according to those divisions. The divisions used for average daily traffic and traffic speed are both based on the London Cycling Design Standards.

BSA and PSA Composite Activity Models

Development of the Composite Activity Model followed two steps:

Combine bicycle and pedestrian attractor and generator composite datasets to produce a composite activity score dataset of the region, approximating **demand**. Figure 4-2 and Figure 4-3 illustrate this potential activity for the BSA and PSA respectively.

Overlay the appropriate composite roadway quality score, approximating **supply**, to create a Composite Activity Model.

The Composite Activity Model can be used in several ways to identify areas for improvement and to prioritize projects. These are summarized below.

- Areas with high demand for cycling and walking and high supply of suitable infrastructure can benefit from innovative programs and capital projects that further

support cycling and walking, closure of key gaps, and should be considered showcase areas where best practices can be modeled for the region. These areas provide cost-effective opportunities for improvements and should be high priority for investment.

- Areas with high demand for cycling and walking and low supply of suitable infrastructure can benefit from infrastructure improvements to improve cycling and walking conditions. These areas may require off-road facilities for conditions such as high traffic volume or speed. They should also be high priority for investment.
- Areas with low demand for cycling and walking and high supply of suitable infrastructure can benefit from programs to encourage cycling and walking, and land use changes or development to increase the density of attractors and generators. These areas should be medium priority for investment.
- Areas with low demand for cycling and walking and low supply of suitable infrastructure can benefit from basic infrastructure improvements. These areas should be low-priority for investments.

Composite Activity Models were developed for the entire ARTS region, which includes portions of Aiken County and Edgefield County, in SC, and portions of both Columbia and Richmond-Augusta County, in GA. Independent Composite Activity Models were also developed for Aiken County. Areas of Aiken County that are included in both models have consistent scores but are scaled to the geographic extents of each region (ARTS and Aiken County). This has an effect on only the ranges of values but the streets receive consistent values.

Figure 4-1 describes the recommendation development concept in matrix form. Figure 4-4 and Figure 4-5 on the following pages show the Composite Activity Model results for the ARTS Region.

Figure 4-1: Composite Activity Model Recommendation Summary

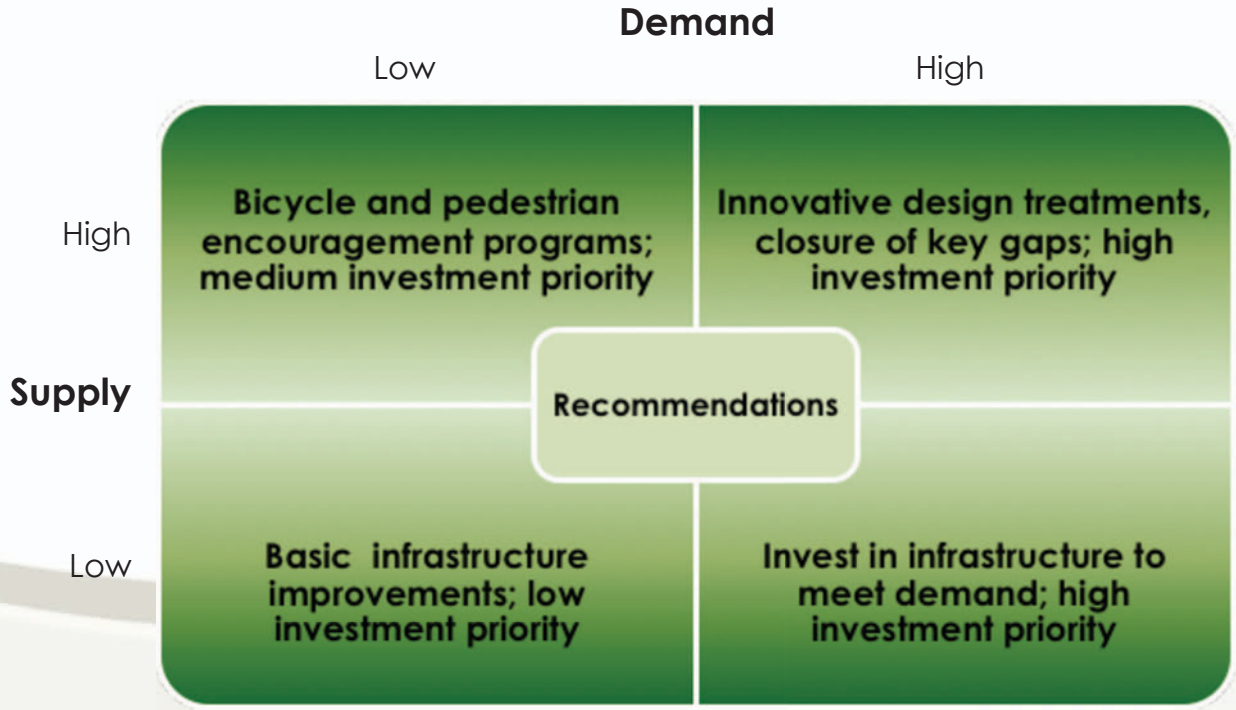

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Figure 4-2: ARTS Demand Composite Map – Bicycle

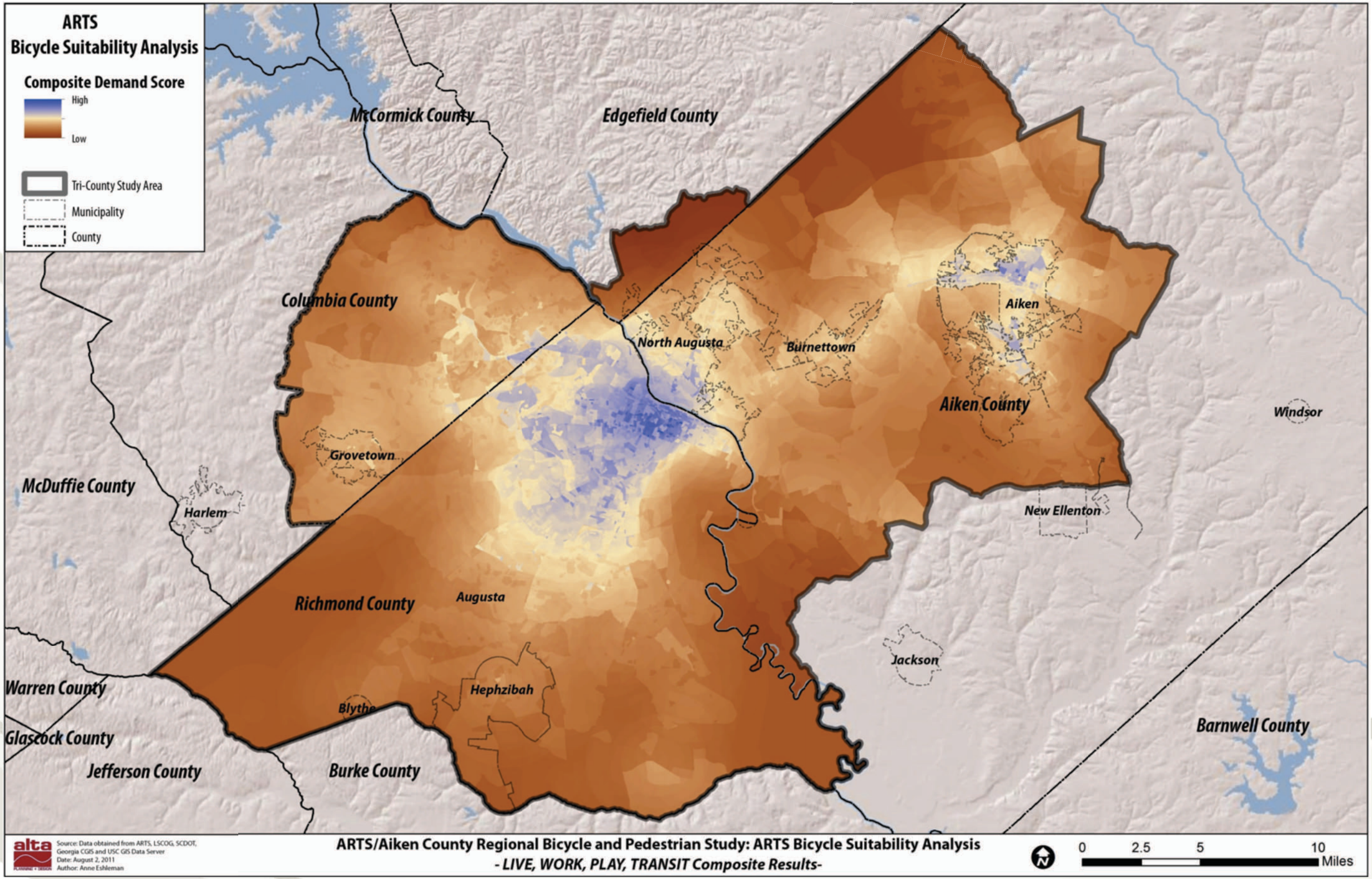


Figure 4-3: ARTS Demand Composite Map – Pedestrian

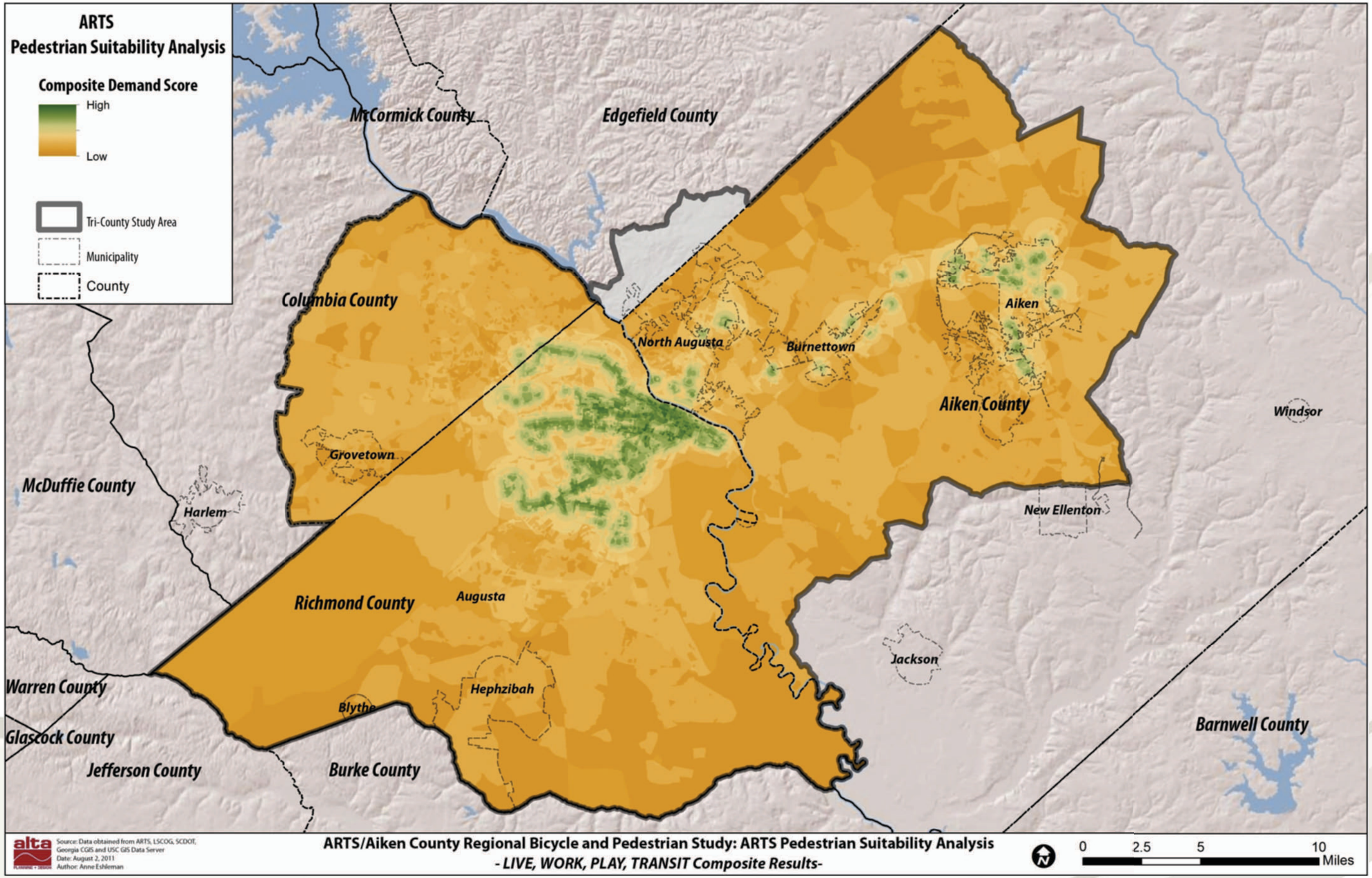


Figure 4-4: ARTS Composite Activity Model Map – Bicycle

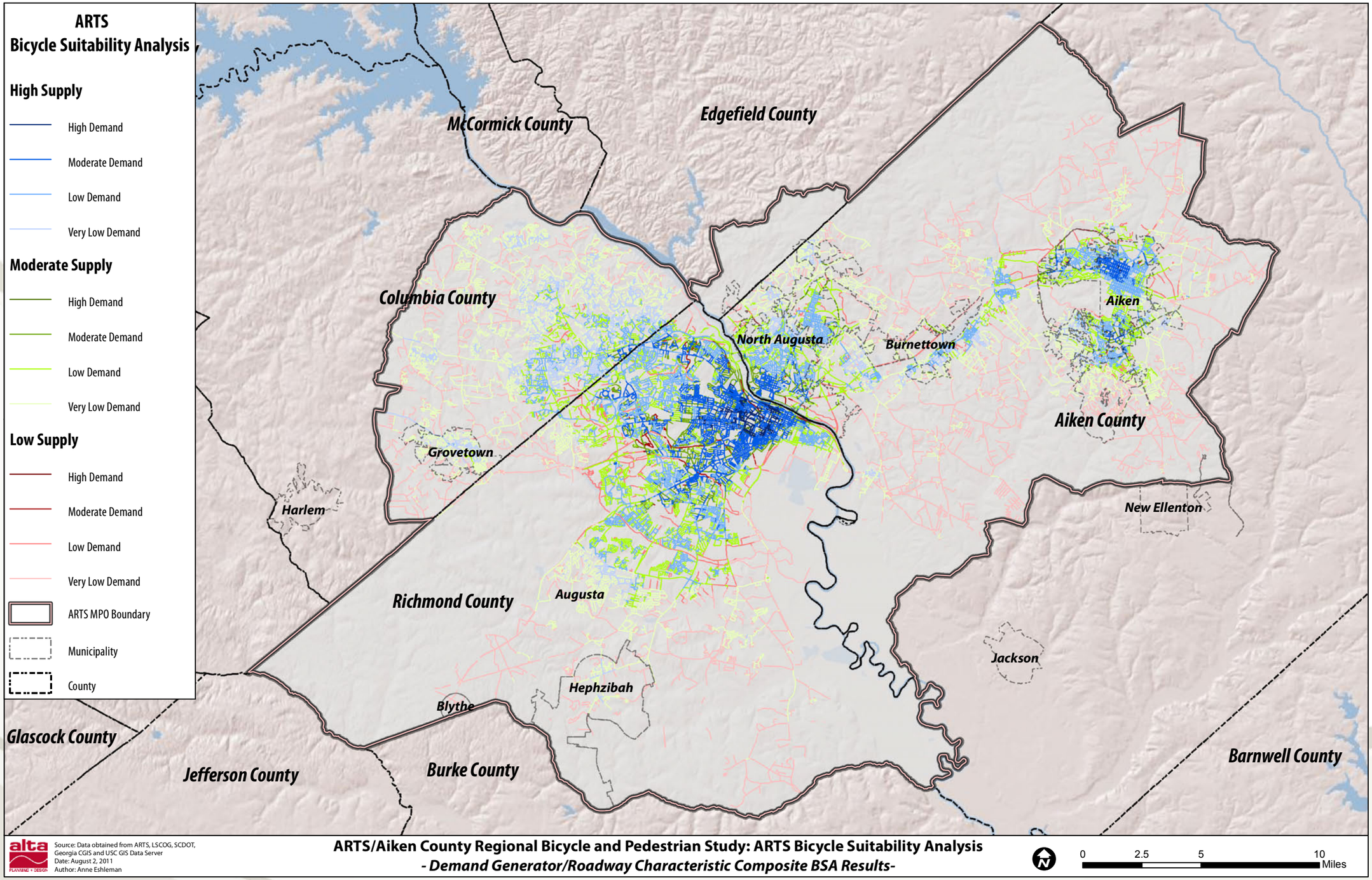
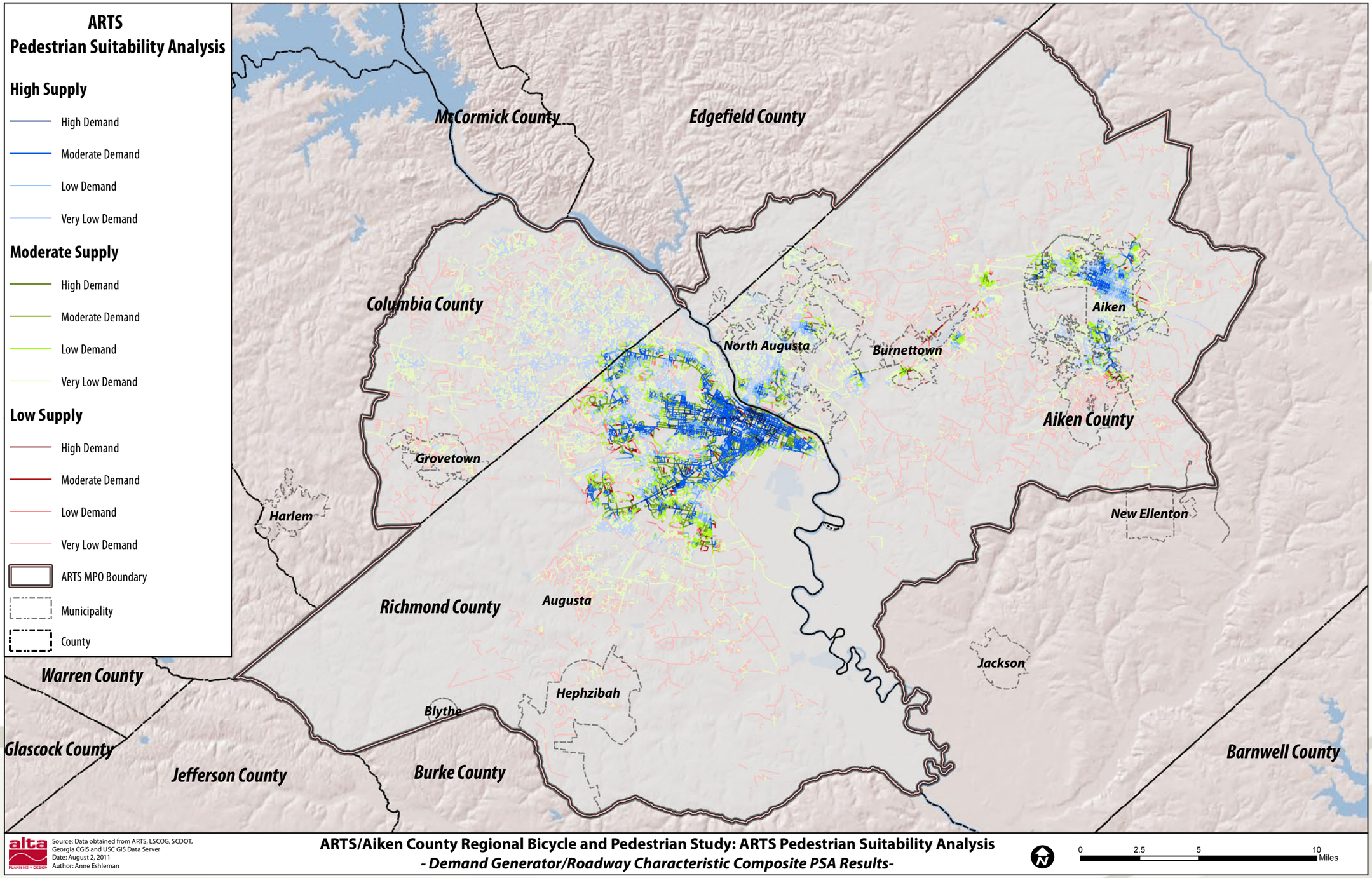


Figure 4-5: ARTS Composite Activity Model Map – Pedestrian



ARTS/Aiken County Regional Bicycle and Pedestrian Study: ARTS Pedestrian Suitability Analysis
- Demand Generator/Roadway Characteristic Composite PSA Results-

Bicycle and Pedestrian Demand and Benefits Analysis

Investments in bicycle and pedestrian facilities result in a myriad of benefits, including economic, environmental, health and fitness, convenience, and quality of life. The Demand and Benefits Model detailed in this section offers specific projections of existing and future bicycle and pedestrian demand. The assumptions used in the demand model to estimate the number of current and future bicycling trips in the Augusta Regional Transportation Study (ARTS) area and the results of the model are included in this section.

The model uses a market segment approach to estimate the number of bicycling or walking trips taken by populations that traditionally have a higher bicycling/walking mode split than work commuters (such as elementary school and college students). National transportation surveys, in particular the *National Household Travel Survey* (NHTS, 2009), have shown that work commute trips are only a fraction of total trips an individual takes on a given day. The model uses the NHTS findings to estimate the number of non-work, non-school trips taken by commuters to determine the number of walking or bicycling trips that occur in a day.

Data Used in the Model

Journey-to-work information collected by the US Census Bureau's *American Communities Survey* (ACS) is the foundation of this analysis. The most recent ACS data available for the ARTS region and Aiken County is the 2005-2009 five-year estimate. Because the ARTS region is not divided along county lines, Census tracts were used. A few of the tracts are partially within the ARTS jurisdiction. The area south of North Augusta, near the Savannah River Site, is relatively rural and the population was assumed to be evenly distributed (e.g., if 30 percent of a tract is within the ARTS boundary, it was assumed that only 30 percent of the total population for that tract is within the ARTS boundary). For the tracts to the northwest near the Augusta Suburbs and to the northeast near North Augusta, it was assumed that the population is concentrated within the ARTS boundary, and a multiplier of 1.5 was added to the proportional area within ARTS.

Model variables for the ARTS region from the ACS include: total population (412,800 people), employed population (179,277 people), school enrollment (70,014 students grade K-12; 28,748 college/university students), and travel-to-work mode split (see Table 4-2).

Richmond County has the highest walking mode split by a large margin, although Aiken has a large number of commute pedestrians compared to other counties. None of the other counties have mode splits higher than the Georgia state average of 1.7 percent or the South Carolina average of 1.9 percent walking. Richmond County also has the highest bicycling mode share at 0.36 percent, which is the only county with a higher rate than the Georgia Average of 0.2 or the South Carolina average of 0.3 percent bicycling.

The 2009 NHTS provides a substantial national dataset of travel characteristics, particularly for trip characteristics of bicycling and walking trips. Data used from this survey include:

- Student mode split, grades K-12
- Trip distance by mode by trip purpose
- Ratio of walking/bicycling work trips to utilitarian trips
- Ratio of walking/bicycling work trips to social/recreational trips

Table 4-2: Commute Mode Share in ARTS Counties

	Aiken	Columbia	Edgefield	Richmond	All Counties	Georgia	South Carolina
Drive Alone	82.8%	85.0%	79.8%	77.3%	80.6%	89.7%	92.2%
Walk	1.4%	0.8%	0.6%	6.0%	3.33%	1.7%	1.9%
Bicycle	0.2%	0.2%	0.0%	0.4%	0.3%	0.2%	0.3%

Source: ACS 2005-2009 Five-Year Estimates
Note: analysis excludes areas of counties outside the ARTS boundary.

Several of these variables are trip type multipliers that provide an indirect method of estimating the number of walking and bicycling trips made for other reasons, such as shopping and running errands. NHTS 2009 data indicates that for every bicycle work trip, there are slightly more than two utilitarian bicycle trips made. Although these trips cannot be directly attached to a certain group of people (not all of the utilitarian bicycling trips are made by people who bicycle to work) these multipliers allow a high percentage of the community's walking and bicycling activity to be captured in an annual estimate.

The *Safe Routes to School Baseline Data Report* (2010) was used to determine the distance of school trips using parents' estimate of distance as well as the frequency of carpooling for trip replacement.

Disclaimer

As with any modeling projection, the accuracy of the result is dependent on the accuracy of the input data and other assumptions. Effort was made to collect the best data possible for input to the model, but in many cases national data was used where local data points were unavailable. Examples of information that could improve the accuracy of this exercise include the detailed results of local Safe Routes to School parent and student surveys, a regional household travel survey, and a student travel survey of college students.

Existing Walking and Bicycling Trips

Table 4-3 shows the results of the walking demand model, which estimates that almost 140,000 walking trips occur in the ARTS region each day. The majority of these occur in Richmond County, with the fewest in Edgefield County (which has only one Census tract within the study area). Table 4-4 shows the bicycling trip model, which estimates that over 9,000 bicycling trips occur in the region each day. Fifty-nine percent of all bicycling trips in the ARTS region occur in Richmond County.

Based on the model assumptions, the majority of trips are social/recreational trips, followed

Table 4-3: Model Estimate of Current Walking Trips

	Aiken	Columbia	Edgefield	Richmond	All Counties
Commute Trips					
Walking commuters[1]	713	356	6	4,899	5,975
Weekday walking trips	1,425	711	11	9,798	11,945
School Trips					
K-12 walking commuters[2]	2,013	1,923	38	3,428	7,402
Weekday K-12 walking trips	4,026	3,847	76	6,856	14,805
College Trips					
College walking commuters[3]	98	50	0	911	1,060
Weekday walking college trips	196	101	1	1,822	2,120
Daily adult walking commute trips[4]	1,621	812	12	11,620	14,065
Utilitarian Trips					
Daily walking utilitarian trips[5]	5,698	2,853	42	40,849	49,442
Social/Recreational Trips					
Daily walking social/ recreational trips[6]	6,834	3,422	50	48,994	59,301
Total Current Daily Walking Trips	18,179	10,935	181	108,319	137,613

1 Employed population multiplied by ACS commute mode split.

2 School children population multiplied by NHTS 2009 mode split for school/daycare/religious trips by individuals age 5-18.

3 Assumes same mode split as employed population.

4 Number of walking commute trips plus number of walking college trips.

5 Utilitarian walking trips multiplied by ratio of utilitarian to work trips from NHTS 2009 (4.92 utilitariwalking trips to walking commute trips). Distributed weekly trips over entire week (vs. commute trips over 5 days).

6 Social/recreational walking trips multiplied by ratio of social/recreational trips to work trips from NHTS 2009 (5.90 social/ recreational walking trips to walking commute trips). Weekly trips distributed over entire week (vs. commute trips over 5 days).

Table 4-4: Model Estimate of Current Bicycling Trips

	Aiken	Columbia	Edgefield	Richmond	All Counties
Commute Trips					
Bicycling commuters[7]	115	82	0	294	491
Weekday bicycling trips	230	164	0	588	982
School Trips					
K-12 bicycling commuters[8]	128	122	2	218	471
Weekday K-12 bicycling trips	256	245	5	436	942
College Trips					
College bicycling commuters[9]	16	12	0	55	82
Weekday bicycling college trips	32	23	0	109	164
Daily adult bicycling commute trips[10]	262	187	0	697	1,146
Utilitarian Trips					
Daily bicycling utilitarian trips[11]	410	293	0	1,092	1,795
Social/Recreational Trips					
Daily bicycling social/ recreational trips[12]	1,204	862	0	3,211	5,278
Total Current Daily Bicycling Trips	2,132	1,587	5	5,437	9,161

7 Employed population multiplied by ACS commute mode split.
8 School children population multiplied by NHTS 2009 mode split for school/daycare/religious trips by individuals age 5-18.
9 Assumes same mode split as employed population.
10 Number of walking commute trips plus number of walking college trips.
11 Utilitarian bicycle trips multiplied by ratio of utilitarian to work trips from NHTS 2009 (2.19 utilitarian bicycle trips to bicycle commute trips). Distributed weekly trips over entire week (vs. commute trips over 5 days).
12 Social/recreational bicycling trips multiplied by ratio of social/recreational trips to work trips from NHTS 2009 (6.45 social/ recreational bicycling trips to bicycling commute trips). Weekly trips distributed over entire week (vs. commute trips over 5 days).

by non-work utilitarian trips, which include trips for medical/dental services, shopping/ errands, family personal business, obligations, transporting someone, meals, and other trips.

The maps on the following pages show the distribution of mode split for walking and bicycling, respectively. They show the data by Census tract, rather than aggregated by county, and therefore display slightly different mode splits than the average mode split for the county, as shown in Table 4-2. The dots on the map indicate the trip generation based on the analysis shown in Table 4-3 and Table 4-4. Several tracts have relatively high rates of walking and/or bicycling, but most of these have low population numbers and therefore do not generate a substantial number of walking or bicycling trips. One particular tract in Richmond County has the highest walking mode split in the region and a high bicycling mode split. Fort Gordon and the Dwight David Eisenhower Army Medical Center are located in this tract, which has a relatively dense, walkable street grid.

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Figure 4-6: ARTS Walking Trips Demand Model

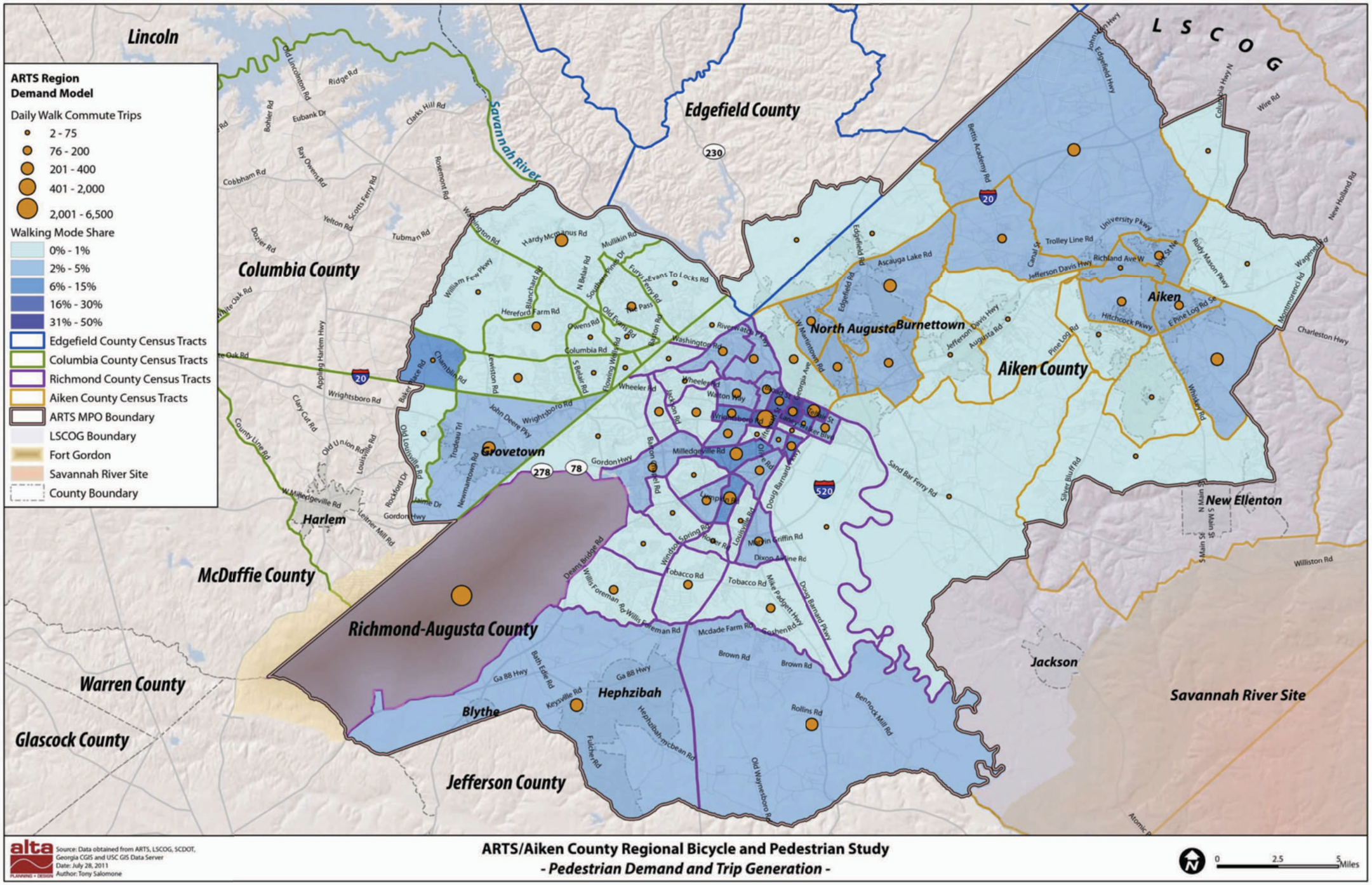


Figure 4-7: ARTS Bicycling Trips Demand Model

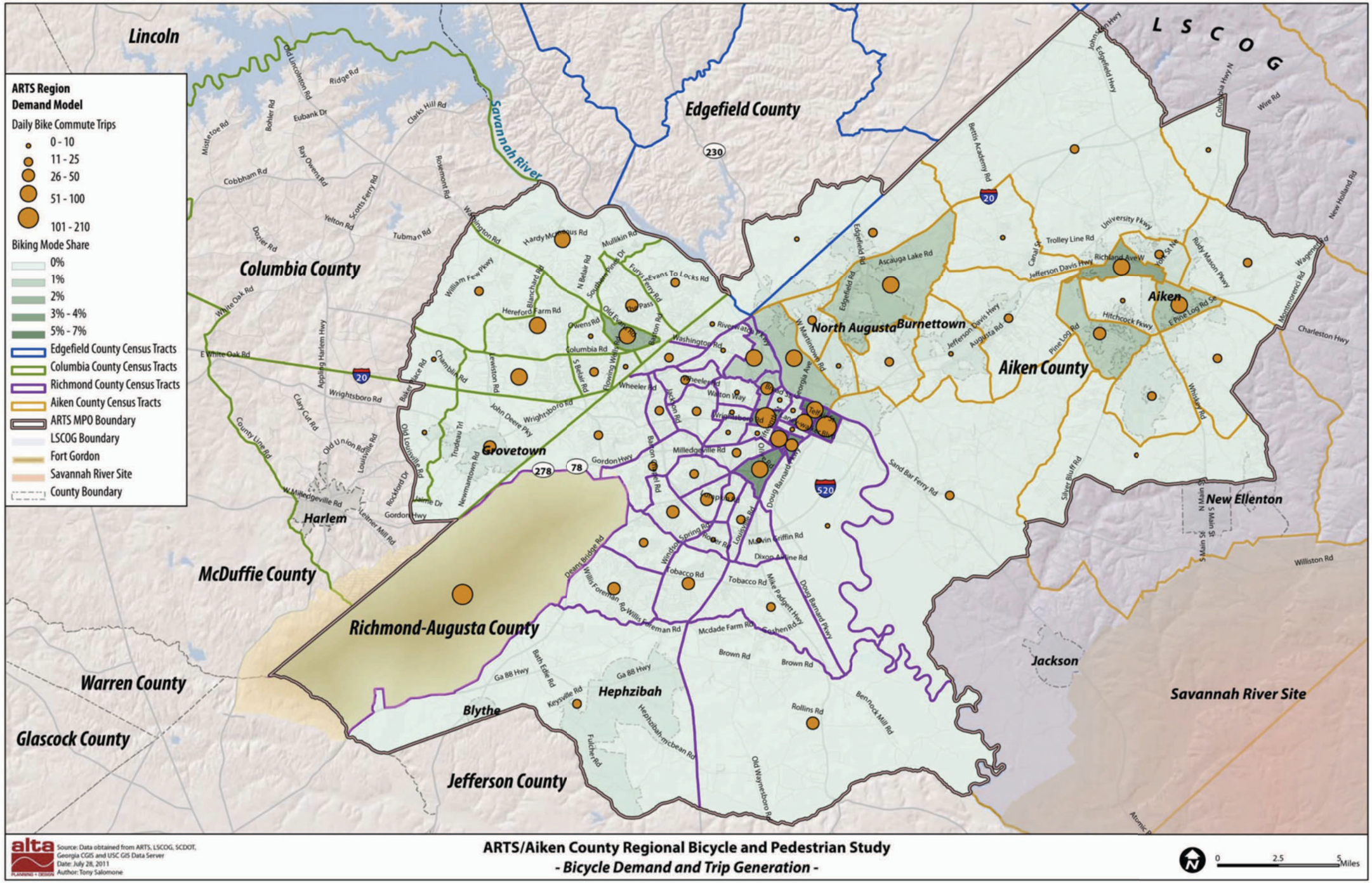


Figure 4-8: Augusta and North Augusta Walking Trips Demand Model

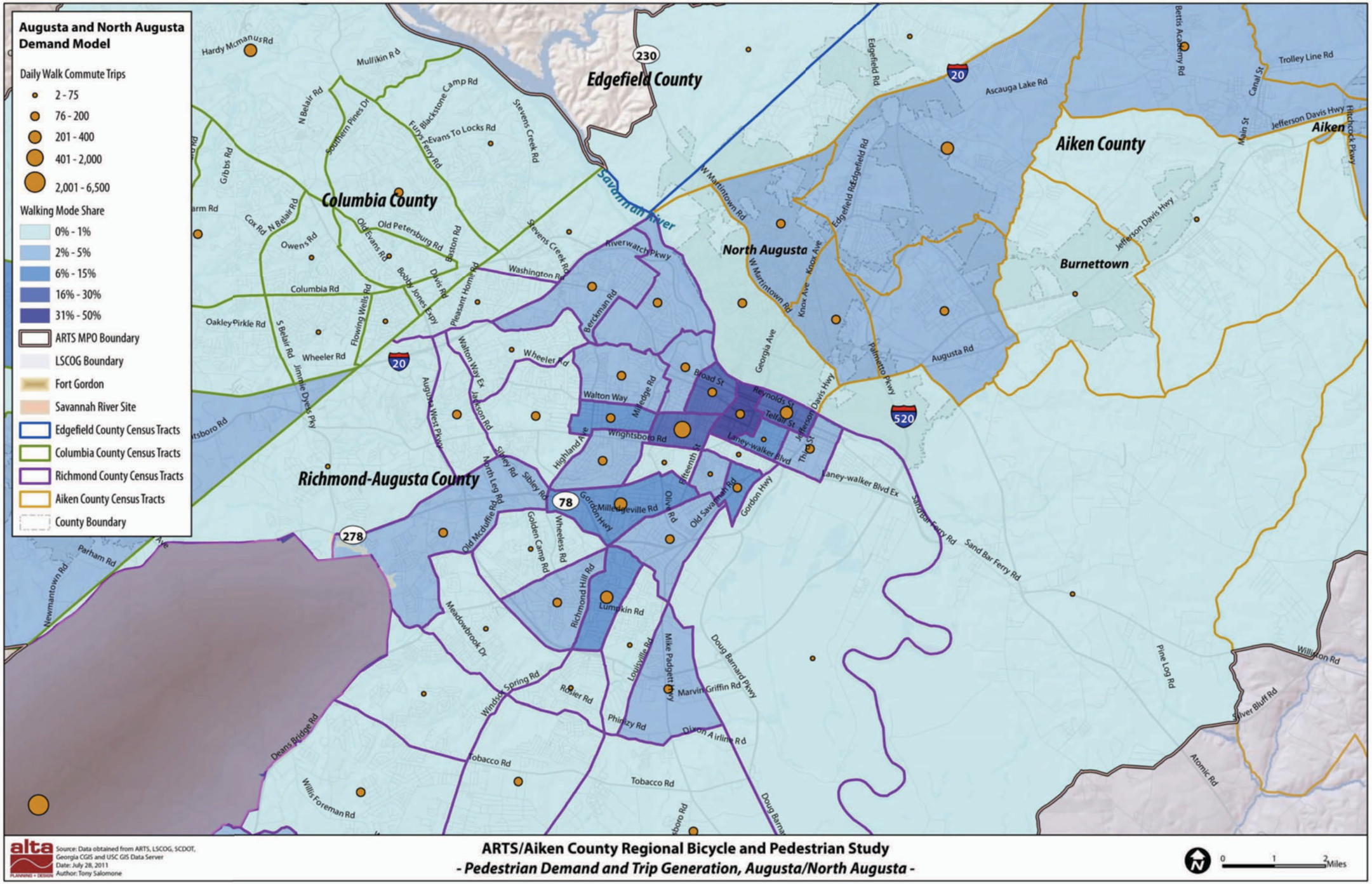


Figure 4-9: Augusta and North Augusta Bicycling Trips Demand Model

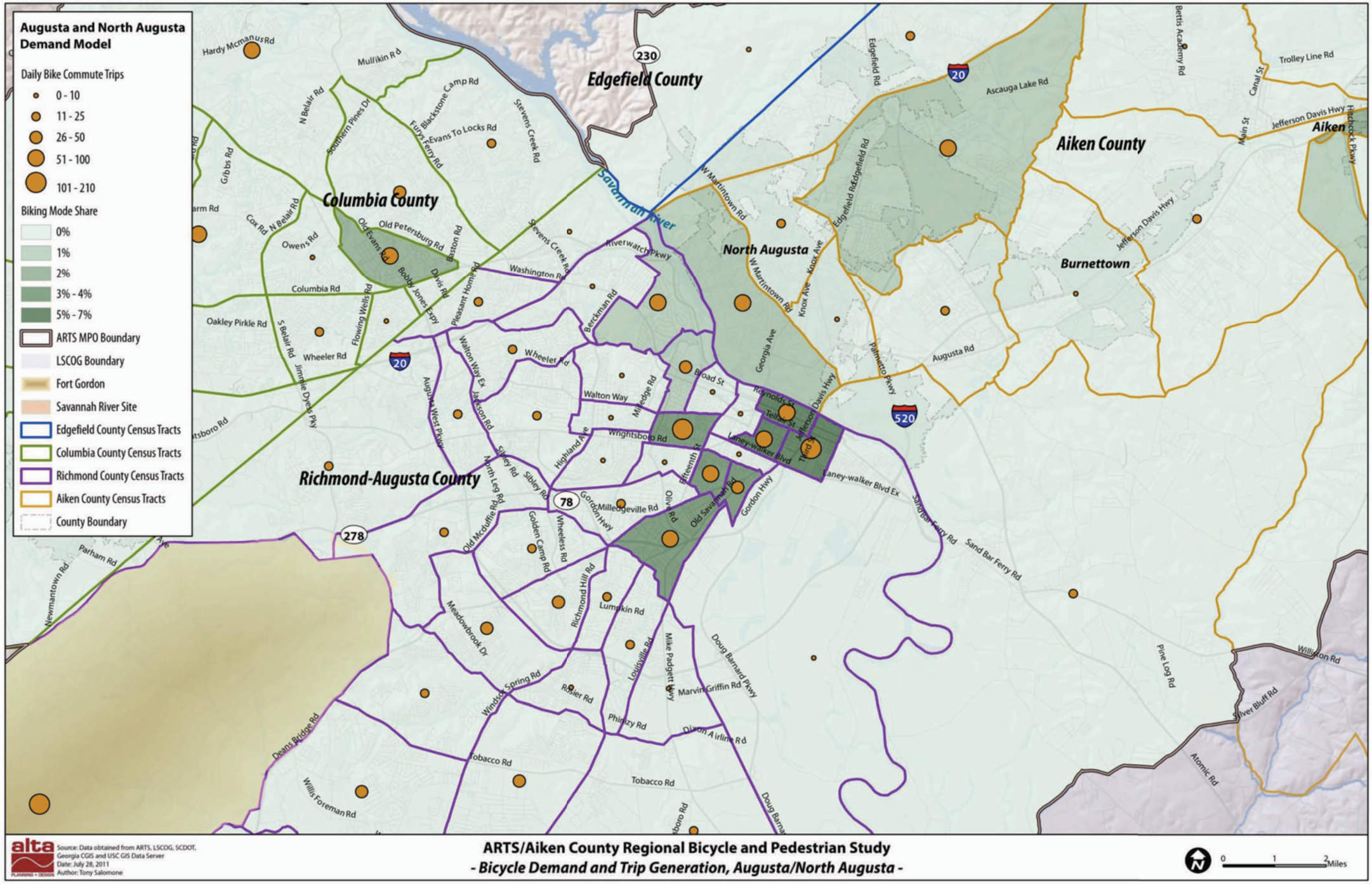


Figure 4-10: Columbia County Walking Trips Demand Model

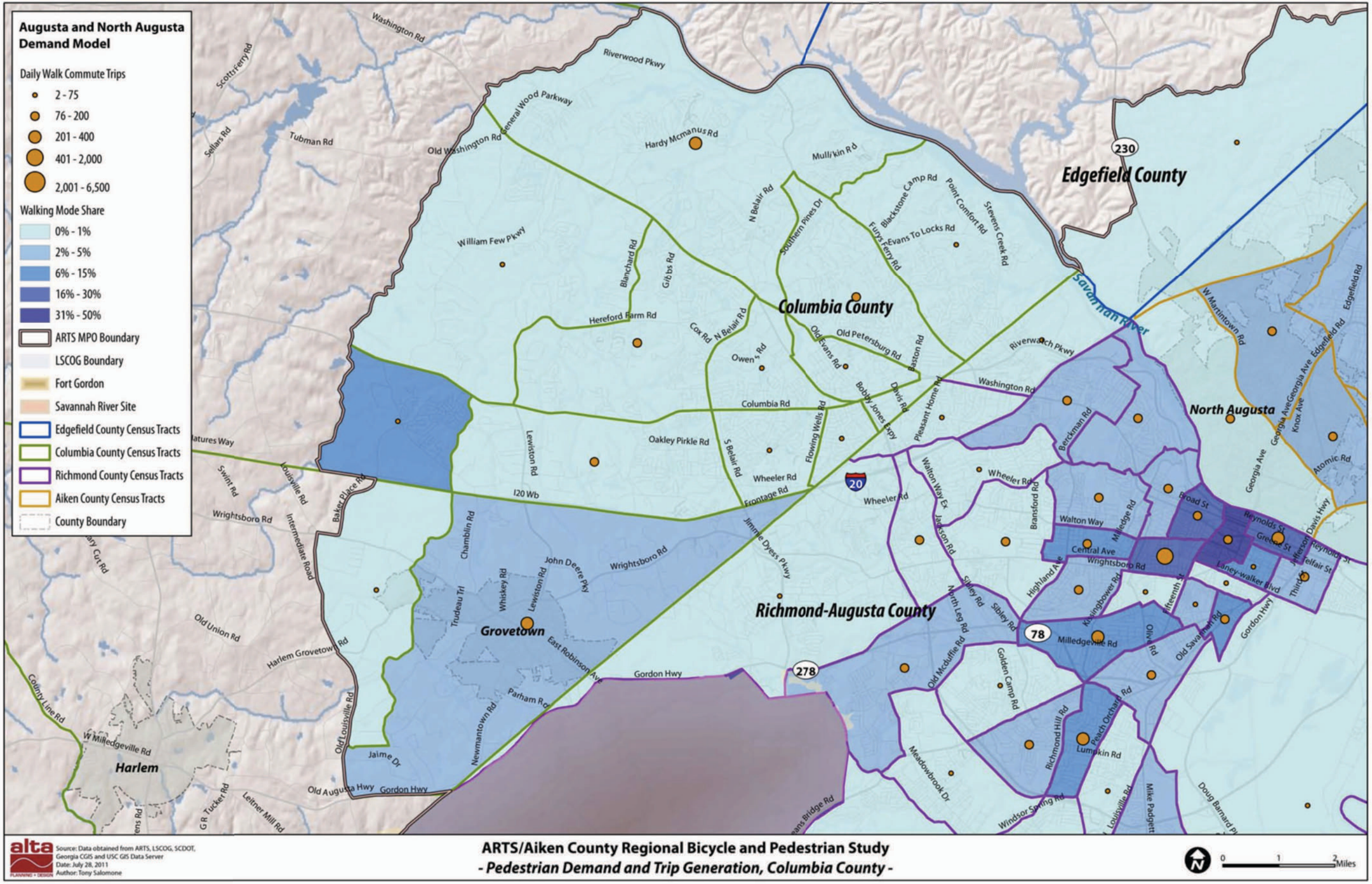
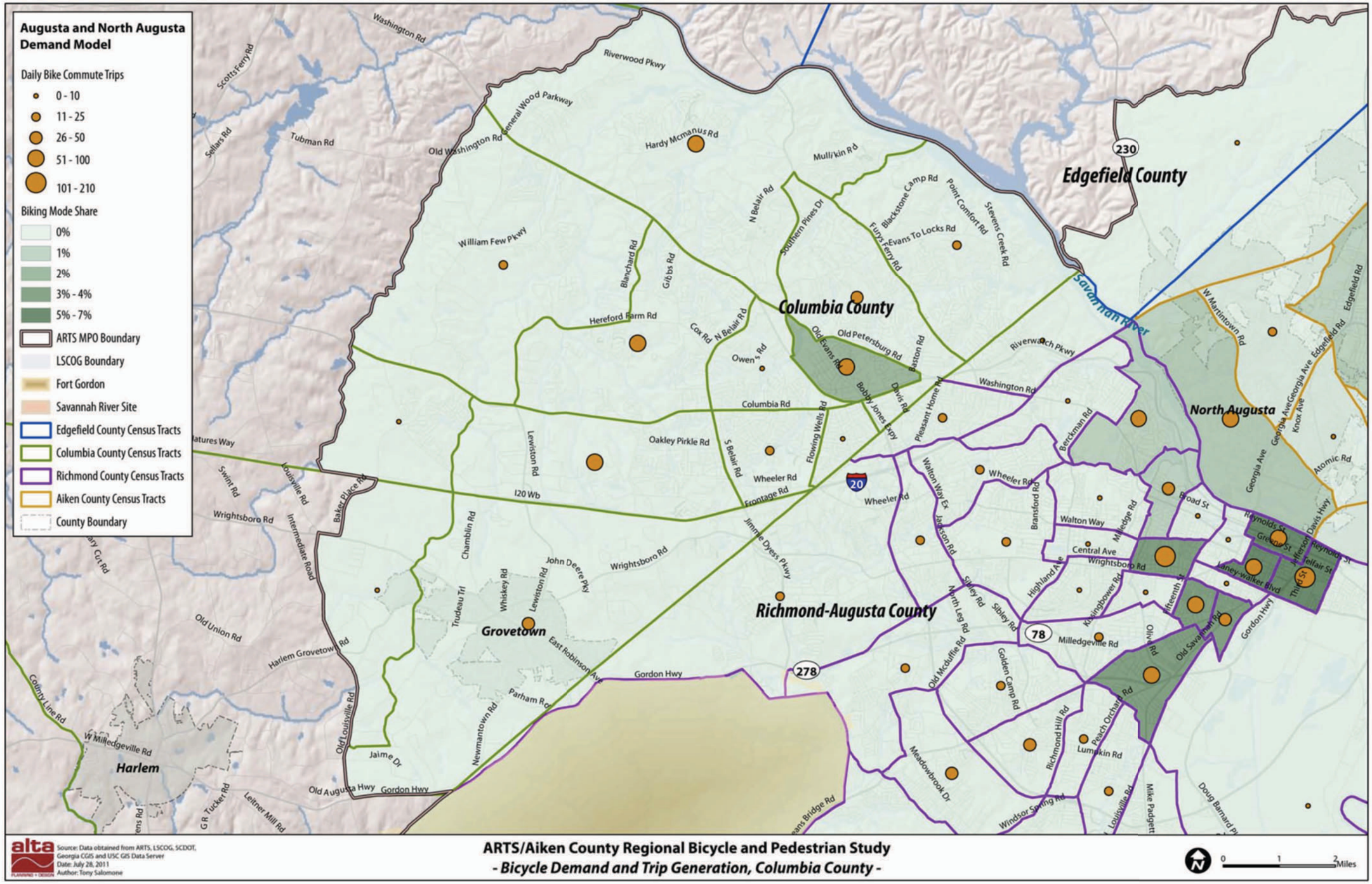


Figure 4-11: Columbia County Bicycling Trips Demand Model



Trip Replacement

Some of these daily walking and bicycling trips are essential trips that individuals would have to take regardless of whether they can walk or bicycle for the trip. If walking or bicycling had not been an option for commute, school/college, and utilitarian trips, some of these trips would have been made by driving. The model estimates that the proportion of these trips that would have been made by driving is equivalent to the drive alone mode split for each county.

To estimate the total distance walking and bicycling trips taken by ARTS residents replace vehicular trips, the model applies trip distance information for walking and bicycling trips by trip purpose from NHTS 2009.

Shown in Table 4-5 and Table 4-6, the model estimates that the estimated 25.5 million commute, school, and other utilitarian walking and bicycling trips each year replace more than eight million vehicle trips, removing more than 6.5 million vehicle miles traveled each year.

Current Benefits

To the extent that bicycling and walking trips replace single-occupancy vehicle trips, they reduce emissions and have tangible economic impacts by reducing traffic congestion, crashes, and maintenance costs. In addition, the reduced need to own and operate a vehicle saves families money.

The Georgia Department of Human Resources estimated that the state's obesity costs are $2.1 billion annually, which is $250 per Georgian each year. The Department also estimates that only 55 percent of middle school students and 44 percent of high school students in Georgia meet the CDC requirements for recommended physical activity. The South Carolina Department of Health and Environmental Control and the South Carolina Coalition for Obesity Prevention Efforts estimated that in 2003, South Carolina's obesity-attributable

Table 4-5: Current Walking Trip Replacement

	Aiken	Columbia	Edgefield	Richmond	All Counties
Commute Trips					
Weekday vehicle trips replaced[1]	1,179	604	6	7,570	9,360
Weekday miles walked[2]	790	405	4	5,072	6,271
School Trips					
Weekday vehicle trips reduced[3]	1,166	1,114	22	1,985	4,286
Weekday miles walked[4]	895	855	17	1,524	3,292
College Trips					
Weekday vehicle trips reduced[5]	162	86	0	1,408	1,656
Weekday miles walked[6]	91	48	0	789	927
Utilitarian Trips					
Daily vehicle trips reduced[7]	1,341	690	6	8,978	11,016
Daily miles walked[8]	894	460	4	5,985	7,344
Yearly Results					
Yearly walking trips	3,279,011	2,000,174	33,313	19,174,417	24,486,916
Yearly vehicle trips reduced	1,057,356	644,410	8,266	5,918,086	7,628,118
Yearly miles walked	725,658	450,423	5,942	3,961,928	5,143,951

1 Trips multiplied by drive alone commute trip ratio to determine automobile trips replaced by walking trips.
2 Number of vehicle trips reduced multiplied by average walking work trip length (NHTS 2009).
3 Trips multiplied by school commute drive alone proportion to determine automobile trips replaced by walking trips (NHTS 2009).
4 Number of vehicle trips reduced multiplied by average trip length to/from school (SRTS 2010).
5 Trips multiplied by drive alone trips to determine automobile trips replaced by walking trips.
6 Number of vehicle trips reduced multiplied by average walking school/daycare/religious trip length (NHTS 2009).
7 Number of daily utilitarian trips multiplied by drive alone trips.
8 Number of vehicle trips reduced multiplied by average utilitarian walking trip length (NHTS 2009; does not include work or home trips).

Table 4-6: Current Bicycling Trip Replacement

	Aiken	Columbia	Edgefield	Richmond	All Counties
Commute Trips					
Weekday vehicle trips replaced[9]	190	139	0	454	784
Weekday miles biked[10]	674	494	0	1,608	2,775
School Trips					
Weekday vehicle trips reduced[11]	74	71	1	126	273
Weekday miles biked [12]	57	54	1	97	209
College Trips					
Weekday vehicle trips reduced[13]	26	20	0	85	130
Weekday miles biked [14]	39	29	0	125	193
Utilitarian Trips					
Daily vehicle trips reduced[15]	216	159	0	539	914
Daily miles biked [16]	410	301	0	1,020	1,731
Yearly Results					
Yearly bicycling trips	265,913	202,307	947	659,063	1,128,230
Yearly vehicle trips reduced	98,672	75,854	274	238,028	412,828
Yearly miles biked	344,164	255,181	211	835,605	1,435,160

Source: ACS 2005-2009 Five-Year Estimates

9 Trips multiplied by drive alone commute trip ratio to determine automobile trips replaced by bicycle trips.
10 Number of vehicle trips reduced multiplied by average bicycling work trip length (NHTS 2009).
11 Trips multiplied by school commute drive alone proportion to determine automobile trips replaced by bicycling trips (NHTS 2009).
12 Number of vehicle trips reduced multiplied by average trip length to/from school (SRTS 2010).
13 Trips multiplied by drive alone trips to determine automobile trips replaced by bicycle trips.
14 Number of vehicle trips reduced multiplied by average bicycle school/daycare/religious trip length (NHTS 2009).
15 Number of daily utilitarian trips multiplied by drive alone trips.
16 Number of vehicle trips reduced multiplied by average bicycling utilitarian trip length (NHTS 2009; does not include work or home trips).

medical expenditures were $1.06 billion.[1] Development of a bicycle and pedestrian network, as well as support facilities and encouragement programs such as Safe Routes to School will encourage people to become active. Health care benefits are not calculated for the current condition, because people who already walk and bicycle are people who would likely have found an alternative avenue for physical activity. Health benefits are therefore calculated in the future estimate only. Other current benefits are shown in Table 4-7.

Potential Future Walking and Bicycling Trips

Estimating future walking and bicycling trips requires additional assumptions regarding ARTS's future population and anticipated commuting patterns in 2035 (the latest year for which estimates are available). Future population predictions were determined by ARTS staff for the 2035 *Long Range Transportation Plan* (LRTP) and incorporated into the regional demand model by the Georgia Department of Transportation.

The LRTP uses Transportation Analysis Zones (TAZ's) to estimate the 2035 population and employment numbers from 2006 numbers. Because more recent Census (ACS) data were used in the current model, the LRTP estimate was used to determine the change in population and employment in the parts of the counties that make up the ARTS region.

The LRTP estimates that 2006 employment in the ARTS region was 168,121 jobs. The LRTP projects that there will be 225,119 jobs in 2035, representing a 33.9 percent increase in regional employment from 2006.

1 http://www.scdhec.gov/health/chcdp/obesity/docs/StatePlanComplete.pdf

Table 4-8 shows the projected future demographics used in the future analysis. The population of school students (K-12) and college/university students was assumed to be the same proportion of the total population for each county as in the 2004-2009 estimate.

The walking and bicycling mode shares are likely to increase in the future because the addition of new facilities and enhancements to the existing system. Areas with higher population and employment densities have significant potential to increase walking and bicycling. The model assumes that all counties can increase the walking share above the

Table 4-7: Benefits of Current Walking and Bicycling Trips

	Aiken	Columbia	Edgefield	Richmond	All Counties
Yearly vehicle miles reduced	1,069,821	705,604	6,152	4,797,533	6,579,110
Air Quality Reduction[1]					
Hydro-carbons (lbs/year)	3,208	2,116	18	14,384	19,726
Particulate Matter (lbs/year)	24	16	0	107	146
Nitrous Oxides (lbs/year)	2,241	1,478	13	10,048	13,779
Carbon Monoxide (lbs/year)	29,246	19,289	168	131,152	179,855
Carbon Dioxide (lbs/year)	870,306	574,013	5,005	3,902,821	5,352,144
Economic Benefits of Air Quality					
Particulate Matter	$2,001	$1,320	$12	$8,973	$12,306
Nitrous Oxides	$4,481	$2,956	$26	$20,096	$27,558
Carbon Dioxide	$14,922	$9,842	$86	$66,915	$91,764
Reduced External Costs of Vehicle Travel (Thousands)					
Traffic Congestion2	$202,196	$133,359	$1,163	$906,734	$1,243,452
Vehicle Crashes	$1,453,887	$958,915	$8,361	$6,519,848	$8,941,011
Roadway Maintenance Costs[3]	$150	$99	$1	$672	$921
Household Transportation Savings[4] (Thousands)					
Reduction in Household Transportation Spending	$535	$353	$3	$2,399	$3,290
Total Current Benefits for Walking and Bicycling (Thousands)					
	$1,656,789	$1,092,740	$9,528	$7,429,748	$10,188,805

Source: ACS 2005-2009 Five-Year Estimates

1 EPA report 420-F-05-022 "*Emission Facts: Average Annual Emissions and Fuel Consumption for Gasoline-Fueled Passenger Cars and Light Trucks*." 2005 and NHTSA Corporate Average Fuel Economy for MY 2011 Passenger Cars and Light Trucks, Table VIII-5 (http://www.nhtsa.dot.gov/ portal/site/nhtsa/ menuitem.d0b5a45b55bfbe582f57529 cdba046a0/).

2 Crashes vs. Congestion – What's the Cost to Society?" http://www.aaanewsroom.net/Assets/Files/20083591910. CrashesVsCongestionFullRe

3 Kitamura, R., Zhao, H., and Gubby, A. R. (1989). *Development of a Pavement Maintenance Cost Allocation Model.* Institute of Transportation Studies – University of California, Davis (http://pubs.its.ucdavis.edu/publication_detail.php?id=19). $0.08/mile (1989), adjusted to 2010 dollars using the Bureau of Labor Statistics Inflation Calculator

4 IRS operational standard mileage rates for 2010 http://www.irs.gov/newsroom/article/0,,id=216048,00.html

Table 4-8: Projected Future Demographics

	Aiken	Columbia	Edgefield	Richmond	All Counties
Population change	48.7%	58.2%	37.1%	13.7%	35.7%
2035 Population	177,498	147,441	2,968	225,275	560,129
Employment change	38.5%	55.6%	21.1%	27.7%	33.9%
2035 Employed Population	71,633	69,229	1,192	104,836	240,052

Source: ARTS 2035 Long Range Transportation Plan

1.7 percent state average in Georgia and the 1.9 percent average in South Carolina to four percent, while Richmond County, which already exceeds that target, can increase to 10 percent walking. For bicycling, the average bicycling mode share for Bronze-level Bicycle Friendly Communities (BFC's) is 1.1 percent. The analysis assumes that every county in ARTS can achieve these levels by 2020.

The results of the model for future walking trips are shown in Table 4-9, while Table 4-10 shows the results of the model for future bicycling trips.

Future Benefits

The trip replacement factors remain the same as in the model of current trips. Since bicycling is among the most popular forms of recreational activity in the U.S.[2], when bicycling is available as a daily mode of transportation, substantial health benefits result. The health benefit of bicycling for exercise can reduce the employer cost of spending on health care by as much as $514 a year, which provides a financial incentive to businesses that provide health coverage to their employees.[3] Table 4-11 shows the air quality benefits of the future projected walking and bicycling trips in the ARTS region.

Additional Benefits of Bicycling and Walking

Bicycling and walking are low-cost and effective means of transportation that are non-polluting, energy-efficient, versatile, healthy, and fun. Everyone is a pedestrian at some point, whether walking to a parked car, taking a lunch break, or accessing transit. In addition, bicycles offer low-cost mobility to the non-driving public. Bicycling and walking as a means of transportation has been growing in popularity as many communities work to create more balanced transportation systems. In addition, more people are willing to cycle more frequently if better bicycle facilities are provided.[4]

In addition to the tangible economic benefits estimated in previous sections of this memorandum, bicycling and walking have many other benefits that are challenging to quantify, but some communities or organizations have studied.

- Walking and bicycling support job creation and create economic benefits for a region:
  - The League of American Bicyclists reports that bicycling makes up $133 billion of the US economy, funding 1.1 million jobs.[5] The League also estimates bicycle-related trips generate another $47 billion in tourism activity.
  - Many communities have enjoyed a high return on their investment in bicycling: the Outer Banks of North Carolina spent $6.7 million to improve local bicycle facilities, and reaped the benefit of $60 million of annual economic activity associated with bicycling.[6]
  - Multiple studies show that walkable, bikeable neighborhoods are more liveable and attractive, increasing home values,[7] resulting in increased wealth for individuals and additional property tax revenue.
  - Walkable, bikeable communities attract the young creative class,[8] which can help cities gain a competitive edge and diversify economic base.
  - Patrons who walk and bicycle to local stores have been found to spend more money to visit local businesses than patrons who drive.[9]

2 Almost 80 million people walking and 36 million people bicycling for recreation or exercise nationally, and 27.3 percent of the population over 16 bicycling at least once over the summer. (National Sporting Goods Association survey, 2003)

3 Feifei, W., McDonald, T., Champagne, L.J., and Edington, D.W. (2004). Relationship of Body Mass Index and Physical Activity to Health Care Costs Among Employees. Journal of Occupational and Environmental Medicine. 46(5):428-436

4 Pucher, J., Dill, J. and Handy, S. (2010). Infrastructure, programs, and policies to increase bicycling: An international review. Preventative Medicine 50:S106-S125.

5 Flusche, Darren for the League of American Bicyclists. (2009). The Economic Benefits of Bicycle Infrastructure Investments.

6 N.C. Department of Transportation, Division of Bicycle and Pedestrian Transportation. (No Date). The Economic Impact of Investments in Bicycle Facilities. atfiles.org/files/pdf/NCbikeinvest.pdf

7 Cortright, Joe for CEOs for Cities. (2009). Walking the Walk: How Walkability Raises Home Values in U.S. Cities.

8 Cortright, Joe for CEOs for Cities. (2007). Portland's Green Dividend.

9 The Clean Air Partnership. (2009). Bike Lanes, On-Street Parking and Business: A Study of Bloor Street in Toronto's Annex Neighborhood.

Table 4-9: Model Estimate of Future 2035 Walking Trips

	Aiken	Columbia	Edgefield	Richmond	All Counties
Commute Trips					
Walking commuters[21]	2,865	2,769	48	10,484	16,166
Weekday walking trips	5,731	5,538	95	20,967	32,332
School Trips					
K-12 walking commuters[22]	2,994	3,043	52	3,898	9,987
Weekday K-12 walking trips	5,988	6,085	104	7,797	19,974
College Trips					
College walking commuters[23]	422	399	5	1,736	2,562
Weekday walking college trips	844	797	9	3,473	5,124
Daily adult walking commute trips[24]	6,575	6,336	104	24,440	37,455
Utilitarian Trips					
Daily walking utilitarian trips[25]	23,112	22,272	367	85,914	131,665
Social/Recreational Trips					
Daily walking social/ recreational trips[26]	27,721	26,713	440	103,044	157,918
Total Future Daily Walking Trips	63,396	61,406	1,016	221,195	347,012
Total Current Daily Walking Trips	18,179	10,935	181	108,319	137,613
Percent Change	248.7%	461.6%	462.5%	104.2%	152.2%

21 Population and employment estimates for 2035 based on ARTS 2035 Long Range Transportation Plan and multiplied by assumed future mode split.
22 School children population multiplied by NHTS 2009 mode split for school/daycare/religious trips.
23 Assumes same mode split as employed population.
24 Number of walking commute trips plus number of walking college trips.
25 Utilitarian walking trips multiplied by ratio of utilitarian to work trips (NHTS). Weekly trips distributed over entire week (vs. commute trips over 5 days).
26 Social/recreational walking trips multiplied by ratio of social/recreational to work trips (NHTS). Weekly trips distributed over entire week (vs. commute trips over 5 days).

- By replacing short car trips, bicycling and walking (especially when combined with transit) can help middle-class families defray rising transportation costs. Families that drive less spend 10 percent of their income on transportation, compared to 19 percent for households with heavy car use,[10] freeing additional income for local goods and services.
- Increased bicycling leads to a reduction in crashes. Concerns about safety have historically been the single greatest reason people do not commute by bicycle; a Safe Routes to School survey in 2004 found that 30 percent of parents consider traffic-related danger to be a barrier to allowing their children to walk or bike to school. In a community where twice as many people walk, an individual walking has a 66 percent reduced risk of being injured by a motorist.[11]

10 Center for Neighborhood Technology. (2005). Driven to Spend: Pumping Dollars out of Our Households and Communities.

11 Jacobsen, P.L. (2003). Safety in numbers: more walkers and bicyclists, safer walking and bicycling. Injury Prevention 9:205-209.

Table 4-10: Model Estimate of Future 2035 Bicycling Trips

	Aiken	Columbia	Edgefield	Richmond	All Counties
Commute Trips					
Bicycling commuters[27]	788	762	13	1,153	2,716
Weekday bicycling trips	1,576	1,523	26	2,306	5,432
School Trips					
K-12 bicycling commuters[28]	311	317	5	406	1,039
Weekday K-12 bicycling trips	623	633	11	811	2,078
College Trips					
College bicycling commuters[29]	116	110	1	191	418
Weekday bicycling college trips	232	219	2	382	836
Daily adult bicycling commute trips[30]	1,808	1,742	29	2,688	6,268
Utilitarian Trips					
Daily bicycling utilitarian trips[31]	2,832	2,729	45	4,211	9,817
Social/Recreational Trips					
Daily bicycling social/ recreational trips[32]	8,326	8,023	132	12,379	28,860
Total Future Daily Bicycling Trips	13,589	13,127	217	20,090	47,022
Total Current Daily Bicycling Trips	2,132	1,587	5	5,437	9,161
Percent Change	537.5%	727.1%	4378.5%	269.5%	413.3%

27 Population and employment estimates for 2035 based on ARTS 2035 Long Range Transportation Plan and multiplied by assumed future mode split.
28 School children population multiplied by NHTS 2009 mode split for school/daycare/religious trips.
29 Assumes same mode split as employed population.
30 Number of walking commute trips plus number of walking college trips.
31 Utilitarian bicycle trips multiplied by ratio of utilitarian to work trips (NHTS). Weekly trips distributed over entire week (vs. commute trips over 5 days).
32 Social/recreational bicycling trips multiplied by ratio of social/recreational to work trips (NHTS). Weekly trips distributed over entire week (vs. commute trips over 5 days).

Table 4-11: Benefits of Future Walking and Bicycling Trips

	Aiken	Columbia	Edgefield	Richmond	All Counties
Yearly vehicle miles reduced	8,730,893	8,498,795	86,779	23,290,546	40,607,013
Air Quality Reduction[33]					
Hydrocarbons (lbs/year)	26,178	25,482	260	69,832	121,751
Particulate Matter (lbs /year)	194	189	2	519	904
Nitrous Oxides (lbs /year)	18,286	17,800	182	48,780	85,047
Carbon Monoxide (lbs /year)	238,679	232,334	2,372	636,701	1,110,087
Carbon Dioxide (lbs /year)	7,102,632	6,913,818	70,595	18,946,993	33,034,038
Economic Benefits of Air Quality (Thousands)					
Particulate Matter	$2.0	$1.3	$0.0	$9.0	$12.3
Nitrous Oxides	$11,865,283	$11,549,862	$117,932	$31,651,853	$55,184,930
Carbon Dioxide	$122	$119	$1	$325	$566
Reduced External Costs of Vehicle Travel (Thousands)					
Traffic Congestion[34]	$1,650,139	$1,606,272	$16,401	$4,401,913	$7,674,725
Vehicle Crashes	$11,865,283	$11,549,862	$117,932	$31,651,853	$55,184,930
Roadway Maintenance Costs[35]	$1,222	$1,190	$12	$3,261	$5,685
Household Transportation Savings (Thousands)[36]					
Reduction in HH trans. spending	$4,365	$4,249	$43	$11,645	$20,304
Reduced Healthcare Costs (Thousands)					
New adult walkers/bikers [37]	3,250	3,540	61	7,405	14,256
New student walkers/bikers	1,164	1,314	17	658	3,153
Healthcare savings of active adults[38]	$467	$601	$9	$1,258	$2,335
Healthcare savings of active children	$80	$131	$1	$66	$278
Total (Thousands)	$25,386,964	$24,712,287	$252,333	$67,722,182	$118,073,766

33 EPA report 420-F-05-022 "Emission Facts: Average Annual Emissions and Fuel Consumption for Gasoline-Fueled Passenger Cars and Light Trucks." 2005 and NHTSA Corporate Average Fuel Economy for MY 2011 Passenger Cars and Light Trucks, Table VIII-5 (http://www.nhtsa.dot.gov/ portal/site/nhtsa/ menuitem.d0b5a45b55bfbe582f57529 cdba046a0/).

34 Crashes vs. Congestion – What's the Cost to Society?" http://www.aaanewsroom.net/Assets/Files/20083591910. CrashesVsCongestionFullRe

35 Kitamura, R., Zhao, H., and Gubby, A. R. (1989). Development of a Pavement Maintenance Cost Allocation Model. Institute of Transportation Studies – University of California, Davis (http://pubs.its.ucdavis.edu/publication_detail.php?id=19). $0.08/mile (1989), adjusted to 2010 dollars using the Bureau of Labor Statistics Inflation Calculator

36 IRS operational standard mileage rates for 2010 http://www.irs.gov/newsroom/article/0,,id=216048,00.html

37 Difference between 2020 and 2010 walking/bicycling commuters and college students.

38 Applies Georgia adult obesity rate of 29.0 percent of the population and 17 percent of overweight children (2008Georgia Data Summary: Obesity in Children and Youth), and South Carolina adult obesity rate of 24.5 percent of the population (from Moving South Carolina Towards a Healthy Weight: Promoting Healthy Lifestyles and Healthy Communities) to the population, and multiplied by health care cost savings per person of $585.97 (from Relationship of Body Mass Index and Physical Activity to Health Care Costs Among Employees. Wang, Feifei; McDonald, Tim; Champagne, Laura J.; Edington, Dee W. Journal of Occupational and Environmental Medicine. Represents a recent, midrange estimate of health benefits of replacing driving with bicycling; estimates range up to $1,175 per person per year according to Krizek et al, "Guidelines for Analysis of investments in Bicycle Facilities," NCHRP Report 552, Transportation Research Board, 2006.

Bicyclist and Pedestrian Counts

Overview

To fully comprehend existing conditions in the ARTS planning area, it is important to understand the number of non-motorized users and the patterns in which they interact with the existing roadway network. To do so, the Bicycle and Pedestrian Plan Project Steering Committee and volunteers performed a comprehensive count of bicyclists and pedestrians at 23[1] regional locations during September 2011. The effort included:

- Careful identification of count locations
- A bicycle and pedestrian count form
- One training session
- One weekday and one weekend count at each location
- Data synthesis and analysis

Bicycle and pedestrian counting is important for several reasons. The U.S. Census reports that in the ARTS region bicycle mode share is less than 1 percent and pedestrian mode share is less than 2 percent, as shown in Table 4-12. While this information can be useful for comparative analysis, the data is very limited. The Census measures commute to work trips only, which account for less than 15 percent of all trips taken in the U.S. By conducting its own bicycle and pedestrian counts, ARTS can account for trips taken by bicycling and walking that are not commute to work trips, as well as better understand where bicycling and walking is occurring. Counts are also helpful to analyze existing bikeway/walkway facility use and where future facilities may be justified.

ARTS's bicycle and pedestrian counts provide a valuable snapshot for the level of bicycling and walking that occurs. This serves as baseline data for future comparison and evaluation of trends. Analysis of the counts and count location characteristics additionally provides useful information regarding the relationship between bicycle ridership levels and the bicycling environment.

Process

Weekday and weekend tallies at the 23 locations were conducted during a two week period between September 10, 2011 and September 24, 2011. The weekday morning count was conducted from 7:00 a.m. to 9:00 a.m. and the weekend count from 10:00 a.m. to noon. The morning rather than the evening peak period was chosen as the focus because of the variety of trips, such as school-commutes and morning exercise, as well as work-related commutes.

The count times and overall guidelines were developed in conjunction with the National Bicycle and Pedestrian Documentation Project (NBPDP), a joint collaboration between Alta Planning + Design and the Institute of Transportation Engineers. The NBPDP guidelines will be used for all subsequent counts within the ARTS planning area. All data from the counts will be forwarded to the NBPDP for further analysis and to add to the growing collection of consistent information about people who are bicycling and walking in different parts of the country. Screenline counting is the methodology that is recommended by NBPDP and was determined to be most appropriate for the ARTS Bicycle and Pedestrian Plan Update. Screenline counts are primarily used to identify general trends in volumes, and to see how demographics, land use, and other factors influence walking

Table 4-12: Commute Mode Share in ARTS Counties

	Aiken	Columbia	Edgefield	Richmond	All Counties	Georgia	South Carolina
Drive Alone	82.8%	85.0%	79.8%	77.3%	80.6%	89.7%	92.2%
Walk	1.4%	0.8%	0.6%	6.0%	3.33%	1.7%	1.9%
Bicycle	0.2%	0.2%	0.0%	0.4%	0.3%	0.2%	0.3%

Source: ACS 2005-2009 Five-Year Estimates

Note: analysis excludes areas of counties outside the ARTS boundary.

1 Counts were taken at 29 locations, but due to errors, six count locations are excluded from this analysis. See results section for details.

and bicycling. During screenline counts, one volunteer identifies the number of bicyclists and pedestrians that pass through a single, imaginary line running across the street, thereby capturing all cyclists and pedestrians traveling in either direction along a single corridor. A person who passes by a point more than once is counted each time they pass by the point.

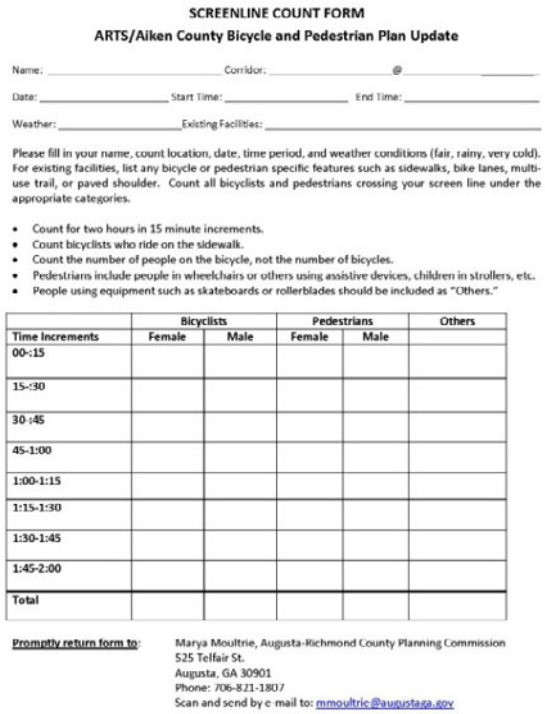
Count Locations

The National Bicycle and Pedestrian Documentation project recommends one count per 15,000 of population. This is considered a reasonable balance between obtaining representative counts and budget limitations. For ARTS, NBPD methodology results in a recommendation of 33 count locations. Based on available budget and staffing, the ARTS count includes a total of 29 locations (or screenlines), 23 of which resulted in complete count data. Table 4-13 displays the number of count locations per county in the ARTS region. Criteria used to select count locations includes:

- Pedestrian and bicycle activity areas or corridors (downtowns, near schools, parks, etc.)
- Representative locations in urban, suburban, and rural locations
- Key corridors that can be used to gauge the impacts of future improvements
- Locations where counts have been conducted historically
- Locations where there are on-going counts being conducted by other agencies through a variety of means, including video taping
- Gaps and pinch points for bicyclists and pedestrians (potential improvement areas)
- Locations where bicycle and pedestrian collision numbers are high
- Select locations that meet as many of the criteria as possible.

For both bicyclists and pedestrians, counters noted if the person was male or female. Additionally, the ARTS/Aiken County Bicycle and Pedestrian Plan Update Count Form recorded the following information:

- Name of Counter
- Corridor
- Date
- Start and end time
- Weather conditions
- Existing facilities



SCREENLINE COUNT FORM

ARTS/Aiken County Bicycle and Pedestrian Plan Update

Name: _____ Corridor: _____ @ _____

Date: _____ Start Time: _____ End Time: _____

Weather: _____ Existing Facilities: _____

Please fill in your name, count location, date, time period, and weather conditions (fair, rainy, very cold). For existing facilities, list any bicycle or pedestrian specific features such as sidewalks, bike lanes, multi-use trail, or paved shoulder. Count all bicyclists and pedestrians crossing your screen line under the appropriate categories.

- Count for two hours in 15 minute increments.
- Count bicyclists who ride on the sidewalk.
- Count the number of people on the bicycle, not the number of bicycles.
- Pedestrians include people in wheelchairs or others using assistive devices, children in strollers, etc.
- People using equipment such as skateboards or rollerblades should be included as "Others."

	Bicyclists		Pedestrians		Others
Time Increments	Female	Male	Female	Male	
00-:15					
15-:30					
30-:45					
45-1:00					
1:00-1:15					
1:15-1:30					
1:30-1:45					
1:45-2:00					
Total					

Promptly return form to: Marya Moultrie, Augusta-Richmond County Planning Commission
525 Telfair St.
Augusta, GA 30901
Phone: 706-821-1807
Scan and send by e-mail to: mmoultric@augustaga.gov

ARTS/Aiken County's Bicycle and Pedestrian Plan Update Count Form captured bicycle and pedestrian gender

Table 4-13: Number of Count Locations per County

	County			Total Count Locations
	Aiken	*Columbia*	*Richmond*	
Number of Count Locations	17	3	9	29
Number of Completed Counts	15	3	5	23

Results

The combined total count of bicyclists for both count days was 351 (Table 4-14) and the combined total count of pedestrians for both count days was 1,089 (Table 4-15). While this number provides an important snapshot of non-motorized transportation in ARTS/Aiken, it does not provide a comprehensive count of all bicyclists and pedestrians. Instead, the data offers clues as to where and when the community is bicycling and walking. See Table 4-17 and Table 4-18 at the end of this section for detailed count results by location.

On both the weekday and the weekend, five locations counted zero bicyclists. No locations on the weekday or weekend counts had zero pedestrians. The highest numbers of bicycle and pedestrian counts and the count averages are described below.

- On the weekday count, the highest number of bicyclists recorded at a location was 18 and the highest number of pedestrians recorded was 99.

Table 4-14: Bicycle Count Results

Characteristic	Total Count
Total Bicyclists Combined	351
Total Bicyclists Weekday	97
Total Bicyclists Weekend Day	254
Total Female Bicyclists (combined)	93
Total Male Bicyclists (combined)	258

Table 4-15: Pedestrian Count Results

Characteristic	Total Count
Total Pedestrians Combined	1,089
Total Pedestrians Weekday	508
Total Pedestrians Weekend Day	581
Total Female Pedestrians (combined)	532
Total Male Pedestrians (combined)	557

- On a weekend, the highest number of bicyclists counted at a location was 116 and the highest number of pedestrians counted was 117.
- The average weekday count was 4 bicyclists and 22 pedestrians, and the median weekday count was 2 bicyclists and 17 pedestrians.
- The average weekend count was 11 bicyclists and 25 pedestrians, and the median weekend count was 5 bicyclists and 2 pedestrians.

Figure 4-12 and Figure 4-13 show each of the bicycle and pedestrian count locations and include icons that vertically represent the total number of bicyclists counted at each location on the weekend (yellow) and the weekday (purple). A geographic analysis of count data is discussed in the following section.

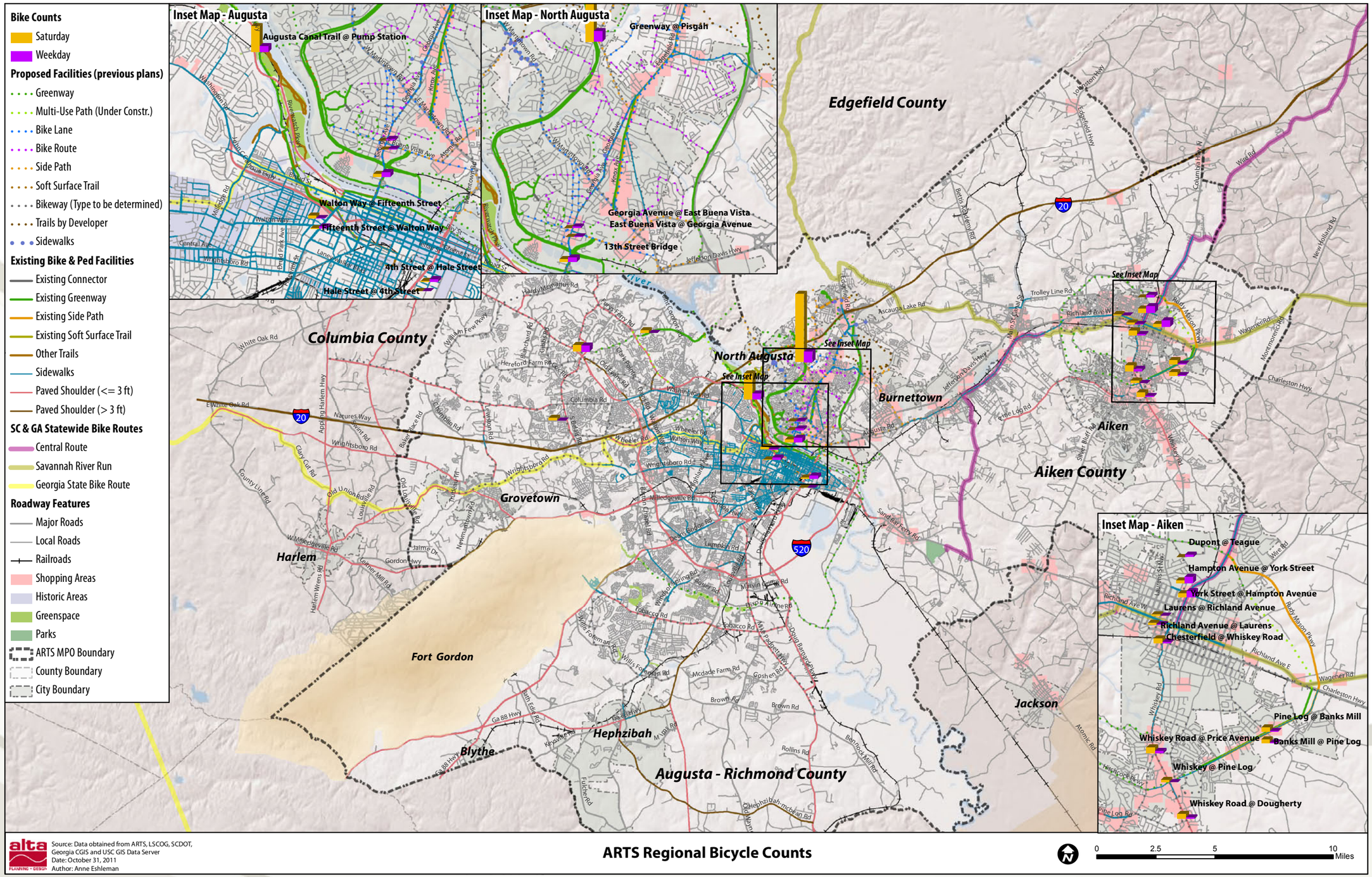
Count Errors

Human error is a common issue in all studies. Five count locations of the ARTS Bicycle and Pedestrian count are excluded from the analysis due to errors. This report excludes both the Two Notch at Marie Drive and the Marie Drive at Two Notch locations because volunteers only attended the weekend count. The Fleming Avenue at Walton Way location is also excluded because volunteers reversed the screenline during the weekday counts meaning volunteers counted on Walton Way rather than on Fleming Avenue. Both the 8th Street at Reynolds Street and Reynolds Street and 8th Street counts received only one count at the location and did not receive a weekend count. Those locations are excluded also. The count totals for the excluded count locations are shown in Table 4-6.

Table 4-16: Excluded Count Location Results

Location	Period	Total Bicyclists	Total Pedestrians
Two Notch at Marie Drive	Weekend	7	11
Marie Drive at Two Notch	Weekend	8	12
Fleming Avenue at Walton Way	Weekend	6	45
Walton Way at Fleming Avenue	Weekday	3	76
8th Street at Reynolds Street	Weekday	1	20
Reynolds Street at 8th Street	Weekday	1	22

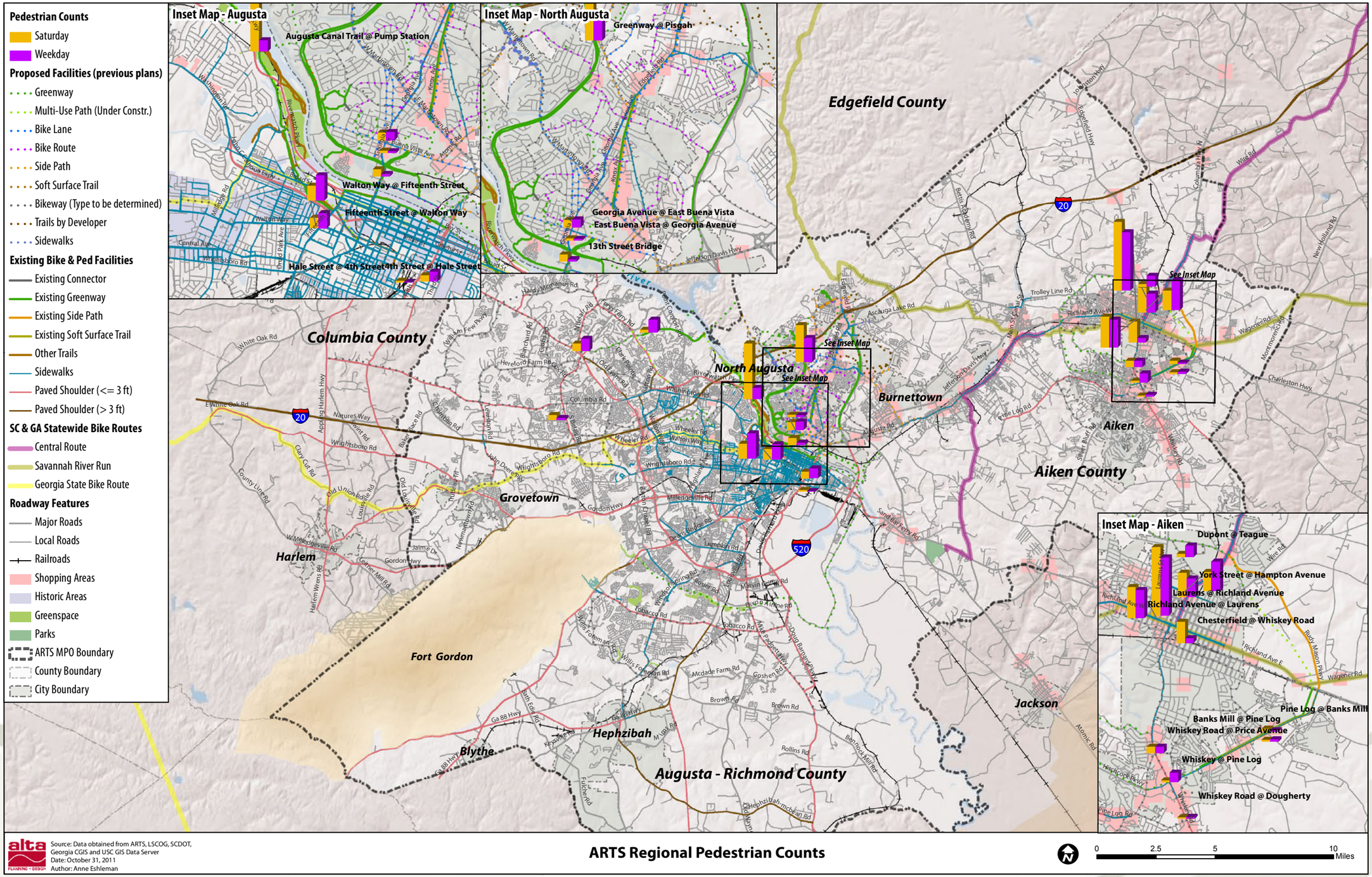
Figure 4-12: ARTS Regional Bicycle Counts



Source: Data obtained from ARTS, LSCOG, SCDOT, Georgia CGIS and USC GIS Data Server
Date: October 31, 2011
Author: Anne Eshleman

ARTS Regional Bicycle Counts

Figure 4-13: ARTS Regional Pedestrian Counts



Count Recommendations

This Plan recommends that bicycle pedestrian counts occur annually throughout the ARTS region. The data collected during the 2011 count serves as baseline data for understanding trends overtime and allows for comparative analysis in future years.

Aiken County should continue to conduct counts at 15 or more locations each year. Augusta-Richmond County should increase the number of count locations to 14 or more. Columbia County should increase the number of count locations to 8 or more. Additionally, the number of counts on downtown Main Streets should be increased. Cities can use count data in downtown commercial districts to quantify "foot traffic" and attract retailers.

Though human error is always possible, the potential for errors during counts can be mitigated by:

- Requiring all volunteers to attend a brief training session prior to the counts
- Providing a map to all volunteers that clearly identifies each count location
- Distributing a list of all count locations, the screenline of each location, and volunteer counter assigned to each location
- Communicating with volunteers prior to the counts to ensure all questions are answered

Key Findings

The results of the ARTS bicycle and pedestrian count show that:

- The majority of the bicyclists counted were male (74%).
- Bicycling is more common on the weekend than weekdays.
- Of the observed locations, the most popular areas for bicycling were the Augusta Trail Canal at the pump station, Greenway at Pisgah (North Augusta), and the intersection of Hampton Avenue and York Street (City of Aiken).
- There was a relatively equal amount of female pedestrians (49%) and male pedestrians (51%)
- There was a relatively equal amount of pedestrians walking during the week and on the weekend.
- The most popular areas for walking are Laurens at Richland Avenue, the Augusta Canal Trail at the pump station, and Hampton Avenue at York Street.

Based on the count, ARTS's ratio of male cyclists to female is just under 3:1. This ratio is consistent with count data and anecdotal evidence from cities throughout the country. While bike-friendly cities in Northern Europe have an even split between men and women (in some cases more women cyclists than men), in North American cities with limited bicycling infrastructure, the number of men is higher in all cases. In cities that strive to create a fully-integrated network of bike facilities such as Portland, Oregon or Montreal, the number of female cyclists has inched closer to male cyclists but continues to be approximately half of the gross number of men. The expectation in ARTS is that the ratio of men to women will, in time, begin to balance out as the number of less traffic-tolerant female cyclists increase as improvements to bicycle infrastructure along important corridors continues.

ARTS's ratio of male pedestrians to female pedestrians is approximately 1:1, which means about the same number of males as females are walking. This suggests that there is less of a barrier to walking for females than with bicycling.

The count data also indicates an association between increased levels of bicycle ridership and walking in close proximity to greenways. Both current and potential bicyclists prefer separated bikeways, and studies have also shown that proximity to a rail-trail spurs bicycling activity. Higher volumes of pedestrians use greenways on weekends than during the week, which suggests that people walking on the greenways are using them for recreation. As counts for the Augusta Canal Trail and other greenways are completed in the near future, more can be learned about the relationship between bicyclists and pedestrians on ARTS's roadways and off-road trail users.

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Detailed Count Results

Table 4-17: Weekday Count Results

	Bicyclists			Pedestrians		
Count Location	**Female**	**Male**	**Total**	**Female**	**Male**	**Total**
Chesterfield @ Whiskey Road (Aiken)	0	2	2	3	5	8
Whiskey Road @ Price Avenue (Aiken)	0	4	4	7	4	11
Pine Log @ Banks Mill (Aiken)	0	1	1	0	2	2
Banks Mill @ Pine Log (Aiken)	0	1	1	2	2	4
Dupont @ Teague (Aiken)	0	4	4	7	12	19
Whiskey Road @ Dougherty (Aiken)	0	2	2	0	3	3
Richland Avenue @ Laurens (Aiken)	0	1	1	24	24	48
Laurens @ Richland Avenue (Aiken)	0	0	0	63	36	99
Whiskey @ Pine Log (Aiken)	0	0	0	9	7	16
Georgia Avenue @ East Buena Vista (North Augusta)	0	3	3	9	5	14
East Buena Vista @ Georgia Avenue (North Augusta)	0	1	1	0	3	3
Greenway @ Pisgah (North Augusta)	7	11	18	25	16	41
Oakley Pirkle Road @ Cavalier Drive (Columbia County)	0	0	0	1	3	4
Stevens Creek @ Stevens Creek Elementary (Columbia County)	0	0	0	12	10	22
Evans to Locks @ Savannah Rapids Pavilion (Columbia County)	2	8	10	15	6	21
13th Street Bridge (North Augusta Side)	3	5	8	4	0	4
4th Street @ Hale Street (Richmond County)	1	4	5	12	5	17
Hale Street @ 4th Street (Richmond County)	0	0	0	0	1	1
Walton Way @ Fifteenth Street (Richmond County)	0	1	1	13	30	43
Fifteenth Street @ Walton Way (Richmond County)	0	4	4	11	15	26
Augusta Canal Trail @ Pump Station	1	9	10	7	12	19
Hampton Avenue @ York Street (Aiken)	0	11	11	12	39	51
York Street @ Hampton Avenue (Aiken)	0	11	11	7	25	32
Totals	**14**	**83**	**97**	**243**	**265**	**508**

Table 4-18: Weekend Count Results

	Bicyclists			Pedestrians		
Count Location	**Female**	**Male**	**Total**	**Female**	**Male**	**Total**
Chesterfield @ Whiskey Road (Aiken)	1	7	8	25	11	36
Whiskey Road @ Price Avenue (Aiken)	0	10	10	3	8	11
Pine Log @ Banks Mill (Aiken)	2	5	7	2	3	5
Banks Mill @ Pine Log (Aiken)	1	5	6	0	3	3
Dupont @ Teague (Aiken)	0	0	0	0	5	5
Whiskey Road @ Dougherty (Aiken)	0	8	8	1	1	2
Richland Avenue @ Laurens (Aiken)	0	3	3	24	29	53
Laurens @ Richland Avenue (Aiken)	0	2	2	64	53	117
Whiskey @ Pine Log (Aiken)	0	4	4	0	3	3
Georgia Avenue @ East Buena Vista (North Augusta)	0	0	0	9	4	13
East Buena Vista @ Georgia Avenue (North Augusta)	0	0	0	0	4	4
Greenway @ Pisgah (North Augusta)	52	64	116	39	24	63
Oakley Pirkle Road @ Cavalier Drive (Columbia County)	0	5	5	2	7	9
Stevens Creek @ Stevens Creek Elementary (Columbia County)	2	3	5	3	2	5
Evans to Locks @ Savannah Rapids Pavilion (Columbia County)	1	10	11	9	4	13
13th Street Bridge (North Augusta Side)	1	4	5	8	4	12
4th Street @ Hale Street (Richmond County)	0	2	2	6	5	11
Hale Street @ 4th Street (Richmond County)	0	0	0	2	1	3
Walton Way @ Fifteenth Street (Richmond County)	0	5	5	7	18	25
Fifteenth Street @ Walton Way (Richmond County)	0	1	1	8	10	18
Augusta Canal Trail @ Pump Station	19	25	44	53	42	95
Hampton Avenue @ York Street (Aiken)	0	5	5	12	21	33
York Street @ Hampton Avenue (Aiken)	0	7	7	12	30	42
Totals	**79**	**175**	**254**	**289**	**292**	**581**

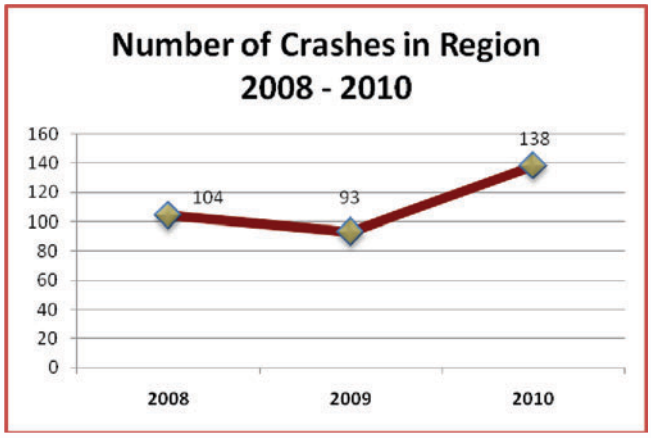
Bicycle and Pedestrian Safety Analysis

Overview

Safety for pedestrians and bicyclists is a major concern for citizens of the ARTS region and a main priority in developing a successful Bicycle and Pedestrian Master Plan. Just over the last year, the region has witnessed a number of alarming fatalities – two doctors were killed while cycling on Belair Road and Tobacco Road, a 68 year old man was killed while bicycling with his wife on Banks Mill Road, and another cyclist was hospitalized in critical condition after being hit from behind by a truck. These recent events indicate a clear safety problem for the region to address, and a Safety Analysis was undertaken to identify trends for the region and within counties so that clear and decisive action can be taken to make the region safer for bicyclists and pedestrians alike.

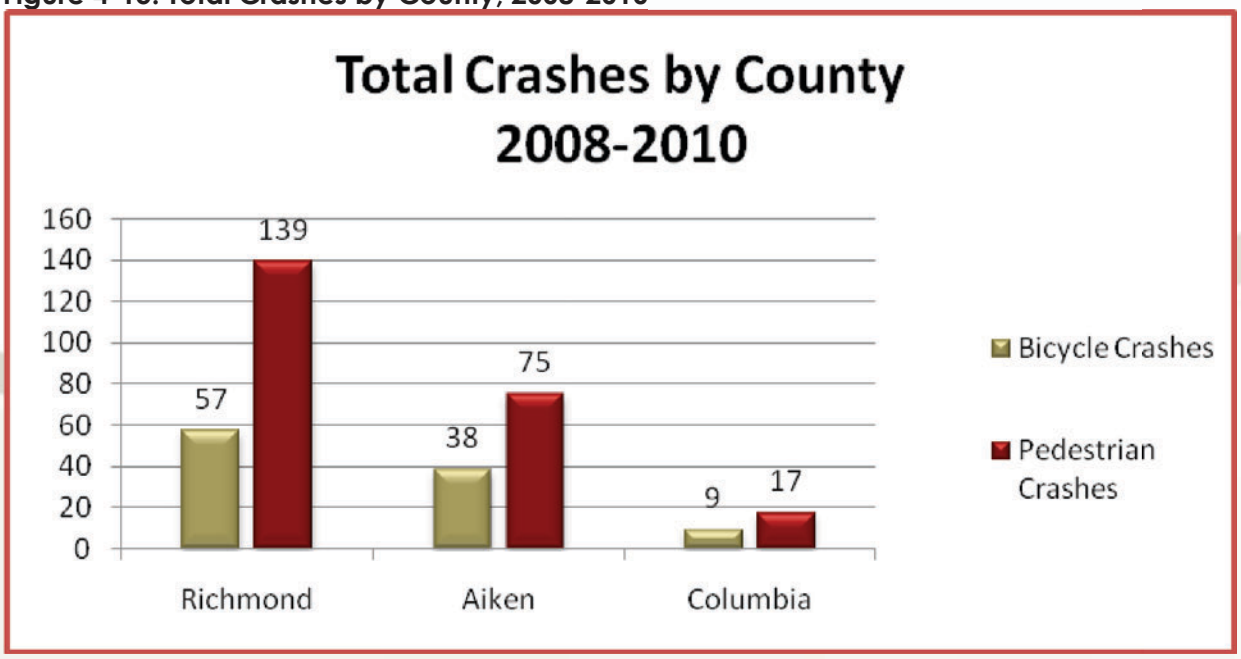
Crash data was collected from the Georgia Department of Transportation (GDOT) and the South Carolina Department of Public Safety for 2008, 2009, and 2010 to provide the needed insight into crashes involving cyclists and pedestrians in the region. As shown in Figure 4-14, crashes involving non-motorists within the region are on the rise after a minor decrease in 2009, with 138 total crashes reported in 2010 alone.

Figure 4-14: Number of Bike/Ped Crashes in the ARTS Region, 2008-2010



Over this three-year period, there have been 104 bicycle crashes and 231 pedestrian crashes. A county by county tabulation of crashes, shown in Figure 4-15, indicates that the Augusta-Richmond County area is experiencing the largest number of identified bicycle and pedestrian crashes, with 57 bicycle crashes and 139 pedestrian crashes over the three-year period. Additional Crashes in Aiken County and Columbia County indicate unsafe conditions are a regional issue in need of attention.

Figure 4-15: Total Crashes by County, 2008-2010



Bicycle and Pedestrian Crash Analysis

A ratio of bicycle and pedestrian crashes within the region, shown in Figure 4-16, indicates that these crashes are resulting in a number of injuries and fatalities. Over 83 percent of the pedestrian crashes reported in the region have resulted in one or more injuries, and approximately 6.5 percent of the total crashes reported have ended in pedestrian fatalities. The outlook for bicyclists is similar, with 74 percent of bicycle crashes resulting in injury and approximately 2 percent of bicycle crashes resulting in fatalities.

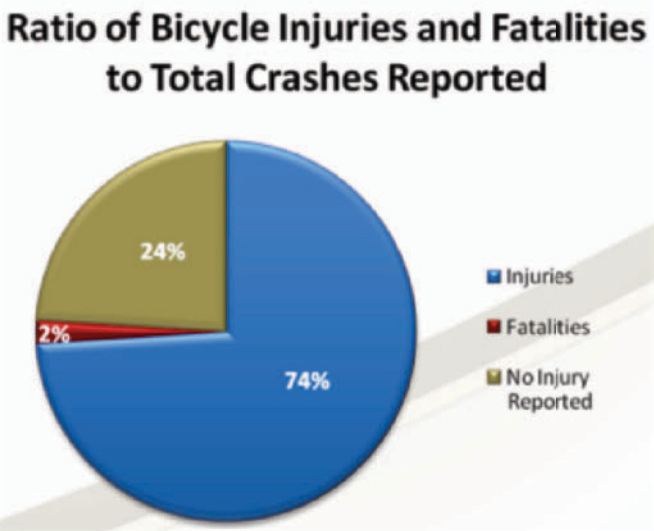
Local crash data for Columbia, Richmond, and Aiken Counties for the years 2008, 2009, and 2010 are included in this analysis. The Aiken County crash data provides greater details on crash types and locations than the collision data available for other areas of the ARTS region. A summary of the crash analysis is broken out by county below. This county by county analysis provides the background needed to determine regional trends.

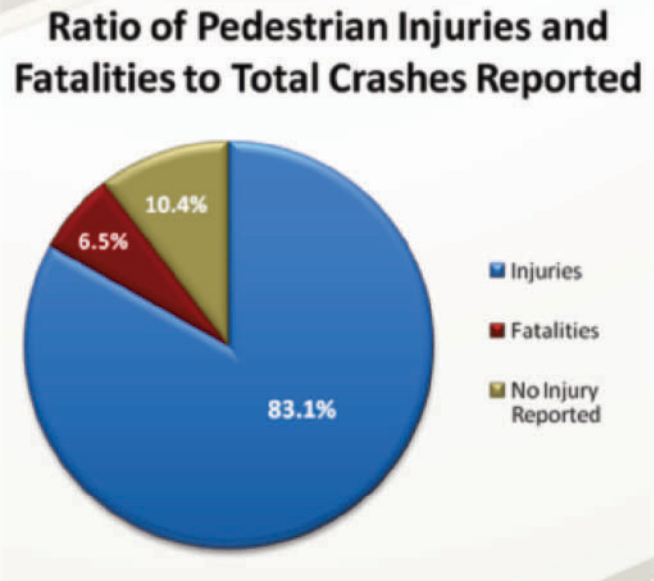
The Aiken County crash data provides details on crash types and locations. A few considerations should be noted when reviewing the provided crash data. First, crash data often under-reports the actual occurrence of crashes, especially those crashes that do not result in a serious injury. As such, specific locations identified in the crash analysis may not present all potentially unsafe areas for bicyclists and pedestrians. Local knowledge from bicycle and pedestrian advocacy groups such as running and cycling clubs should be sought when possible to obtain additional information on unsafe environments.

Secondly, local crash data does not provide details on geographic concentrations of pedestrian or bicycle use and because of this, does not help to comparatively look at safe environments for pedestrians and bicyclists. For instance, although two streets may exhibit the same number of crashes, the level of safety at these two streets may be different depending upon the level of bicycle and pedestrian activity. This can be tested when there is sufficient bicycle and pedestrian count data available. Ironically, areas with greater bike and pedestrian activity are often considered safer than ones without much foot or bike traffic, and crash data does not provide this level of insight. Again, local knowledge should also be sought to supplement crash analyses in order to get a complete picture of the bicycle and pedestrian environment.

Finally, it should be noted that the data provided for this analysis does not contain certain data that can be helpful in identifying recommendations for awareness programs and engineering improvements. Demographic data such as the age of crash victims can be useful in determining how education plays into potential causes of crashes. Younger bicyclists and pedestrians, in particular, are often less observant of safety practices such as looking left, right, left before crossing a roadway, to check for the presence of cars. Detailed information on causes of crashes is also useful determining common types of collisions in

Figure 4-16: Ratio of Pedestrian and Bicycle Injuries and Fatalities





a given area that may indicate a need for engineering improvements. As further reporting and analysis is done on bicycle and pedestrian crash data, data needs should be monitored to ensure that measures important within communities in the region are represented in crash data.

Columbia County

ARTS bicycle and pedestrian crash data from 2008, 2009, and 2010 was obtained to identify crash statistics in the county. In Columbia County, 17 pedestrian crashes and 9 bicycle crashes were reported over the three-year period. Crashes were concentrated in the areas of Grovetown, Evans, and Martinez. These crashes resulted in 3 pedestrian fatalities, 13 pedestrian injuries, and 6 bicycle injuries. No bicycle fatalities were reported. Most crashes for pedestrians and bicyclists occurred during dry conditions (88 and 89 percent, respectively). All bicycle crashes occurred during daylight hours and 76 percent of pedestrian crashes occurred during the day. Of the 3 pedestrian fatalities, two of these occurred at night in lighted areas. A summary of crash statistics for Columbia County is provided in Table 4-19.

As shown in Figure 4-17, the majority of bicycle crashes reported are related to collisions with motor vehicles, most specifically related

Figure 4-17: Columbia County Crash Typology

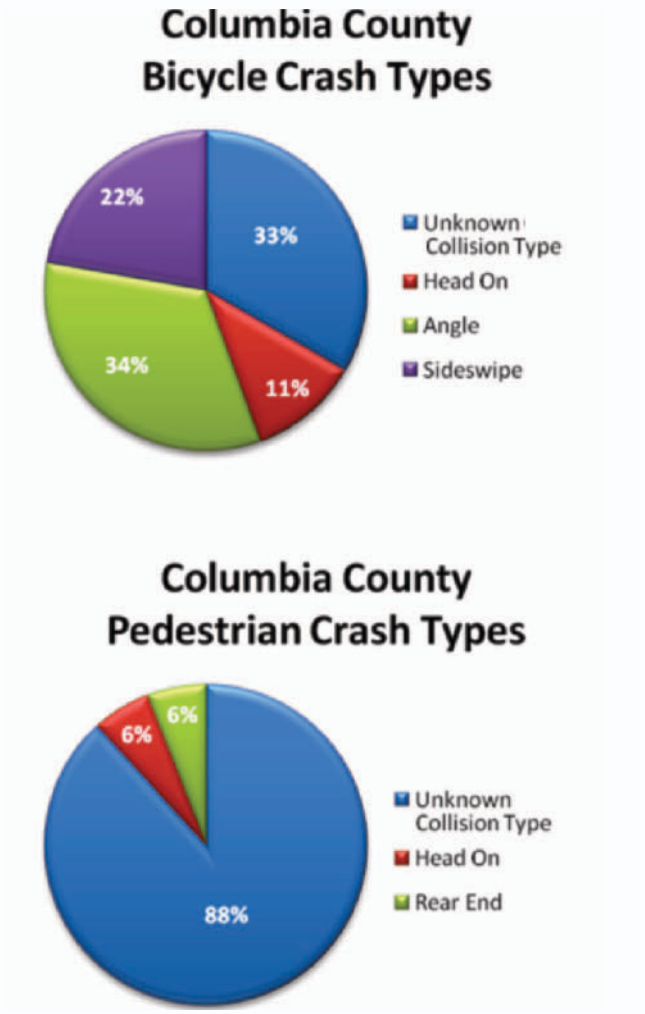


Table 4-19: Columbia County Crash Characteristics

Crash Characteristics	Bicycle Crashes	Pedestrian Crashes	% of Total Crashes*	
			Bike %	Ped %
Total Crashes Reported	9	17	100%	100%
Fatalities	0	3	0%	18%
Injuries	6	13	67%	71%
On Roadway Incidents	8	15	89%	88%
Off Roadway Incidents	1	2	11%	12%
Dry Roadway Conditions	8	15	89%	88%
Wet Roadway Conditions	1	2	11%	12%
Daytime Crashes	9	13	100%	76%
Nighttime Crashes – Lighted	0	2	0%	12%
Nighttime Crashes – Not Lighted	0	2	0%	12%

**Please note that percentages of total injuries and fatalities were calculated based on the total number of crash reports identified. In some cases, one crash report may have identified multiple injuries.*

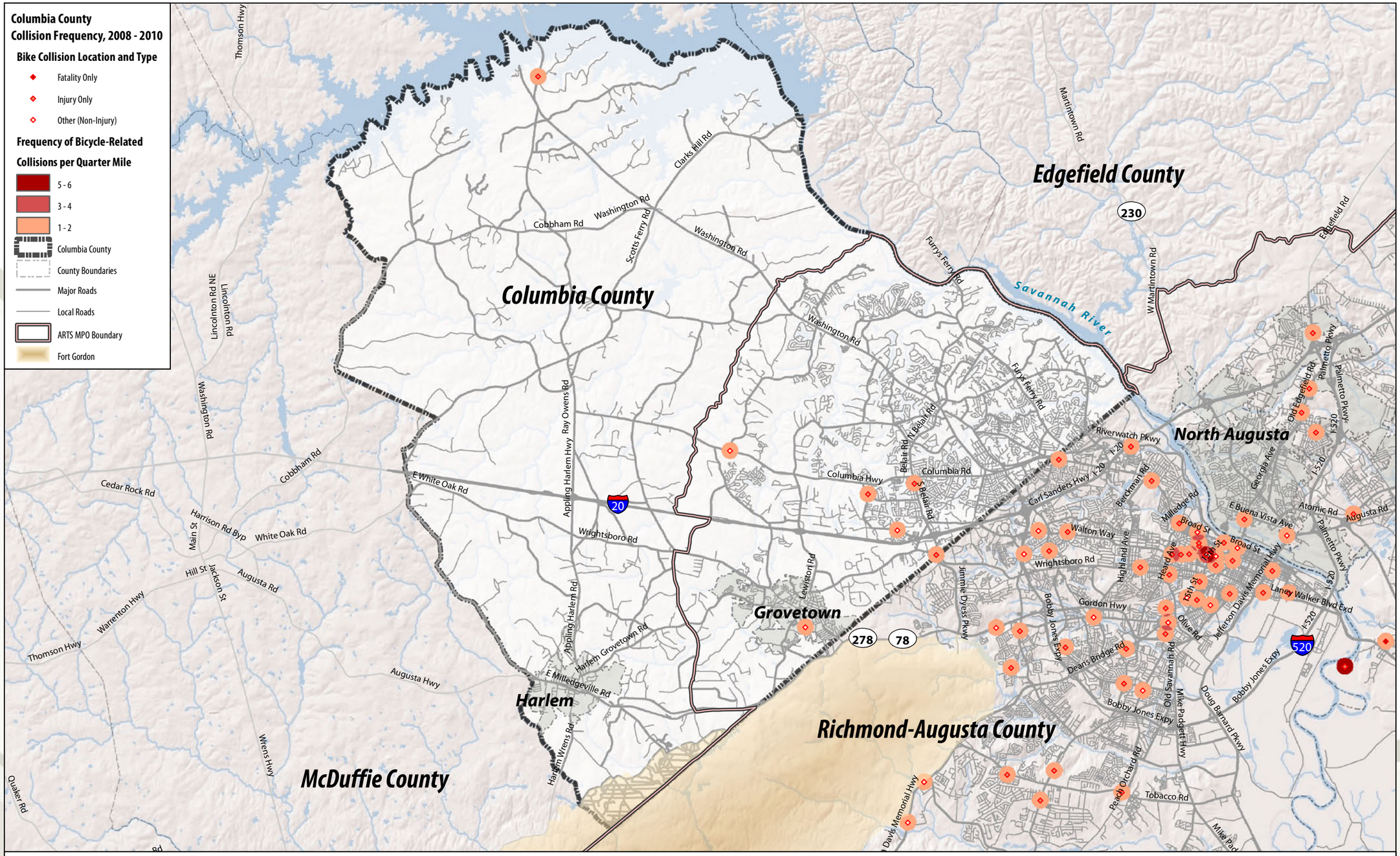
to angle or sideswipe crashes resulting from conflicts with vehicles turning left or right. Pedestrian conflict details for the county do not provide enough information to determine the most common types of collisions. More detailed study of police reports for pedestrian crashes is recommended at the local level to identify more precisely the actions by pedestrians or motorists prior to the crash. This analysis will be useful in developing countermeasures.

Two of the three pedestrian fatalities occurred near the intersection of Belair Road (SR 383) and Owens Road and the other fatality occurred at Old Evans Road and Dent Street. Crashes near Grovetown are concentrated in the residential area northeast of Robinson Avenues (SR 223) and Old Wrightsboro Road. A number of the crashes identified near Evans and Martinez were concentrated near state roads, including Columbia Road (SR 232), Belair Road (SR 383), Washington Road (SR 104), and Carl Sanders Highway (SR 402). The total number of crashes indicates that the following locations contain concentrations of crashes in the county:

1. Washington Road/SR 104 (6 Crashes)
2. Columbia Road/SR 232 (3 Crashes)
3. Belair Road/SR 383 (3 Crashes)
4. 2nd Avenue (2 Crashes)
5. South Old Belair Road (2 Crashes)

Figure 4-18 and Figure 4-19 provide maps of bicycle and pedestrian crashes within Columbia County.

Figure 4-18: Bicyclist Safety Analysis - Columbia County

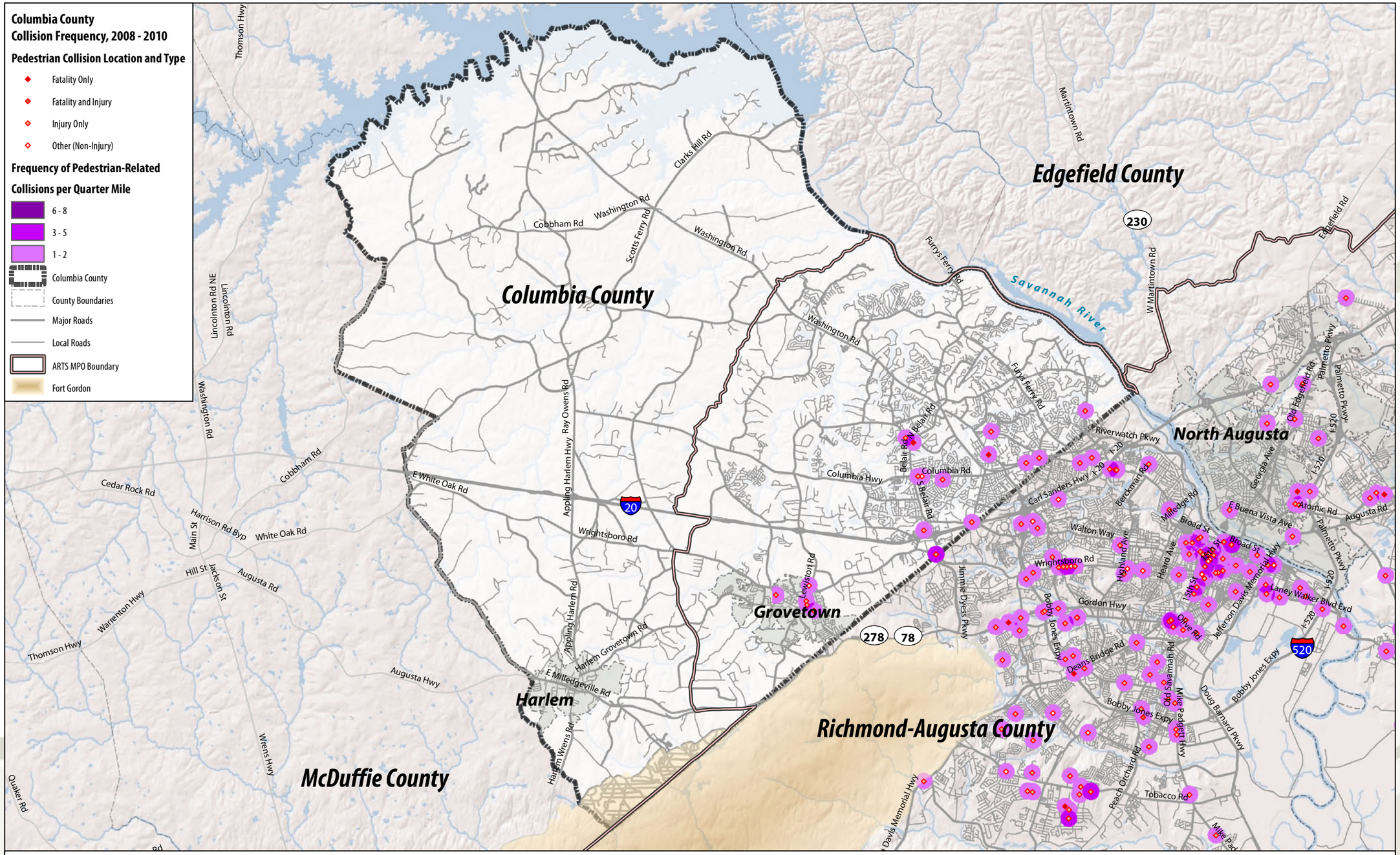


Source: Data obtained from ARTS, LSCOG, SCDOT, Georgia CGIS and USC GIS Data Server
Date: August 18, 2011
Author: Anne Eshleman

ARTS/Aiken County Regional Bicycle and Pedestrian Study
- Bicyclist Safety Analysis - Columbia County -

0 2.5 5 Miles

Figure 4-19: Pedestrian Safety Analysis - Columbia County



Source: Data obtained from ARTS, LSCOG, SCDOT, Georgia CGIS and USC GIS Data Server
Date: August 18, 2011
Author: Anne Eshleman

ARTS/Aiken County Regional Bicycle and Pedestrian Study
- Pedestrian Safety Analysis - Columbia County -

Richmond County

ARTS bicycle and pedestrian crash data for the three years of 2008, 2009, and 2010 provides crash statistics for Richmond County. In Richmond County, there were a reported 57 bicycle crashes and 139 pedestrian crashes over the three-year period. Crashes were concentrated in the northern portions of the county near the urbanized area of Augusta, north and south of the I-520 loop. These crashes resulted in 1 bicycle fatality, 6 pedestrian fatalities, 42 bicycle injuries, and 121 pedestrian injuries. The majority of crashes for both bicyclists and pedestrians were located on roadways (91 and 85 percent, respectively). Most crashes for bicyclists and pedestrians occurred during dry conditions (96 and 88 percent, respectively). 81 percent of all bicycle crashes occurred during daylight hours and 60 percent of pedestrian crashes occurred during the day. The one bicycle fatality occurred during daylight hours at the intersection of Walton Way and Hickman Road. All of the pedestrian fatalities occurred during night or at dusk, and in most cases were in unlighted areas. Locations for these pedestrian fatalities were distributed in various areas of the county, at I-520 (2 fatalities), Gordon Highway (SR 10), Travis Road, Story Mill Road, and Boykin Road. It should be noted that nearly 40 percent of pedestrian crashes occurred in dark conditions. Typically there is far less walking occurring then during the daytime. This signifies an overrepresentation of crashes in dark conditions. With all 6 pedestrian fatalities also occurring in dark conditions, there is a compelling case for addressing this problem in more detail. A summary of crash statistics for Richmond County is provided in Table 4-20.

As shown in Figure 4-20, the majority of bicycle crashes are related to angled collisions where both bicyclists and motorists were traveling along the same path. The most common types of pedestrian crashes could not be provided from the available crash information. More detailed study of police reports for pedestrian crashes is recommended at the local level to identify more precisely the actions by pedestrians and motorists prior to the crash. This analysis will be useful in developing countermeasures.

As might be expected, there is a concentration of reported bicycle and pedestrian crashes in the urbanized downtown Augusta area. In particular, the following roadways were noted and should be reviewed in greater detail to determine needed safety measures: Walton

Table 4-20: Richmond County Crash Characteristics

Crash Characteristics	Bicycle Crashes	Pedestrian Crashes	% of Total Crashes	
			Bike %	Ped %
Total Crashes Reported	57	139	100%	100%
Fatalities	1	6	2%	4%
Injuries	42	121	68%	81%
On Roadway Incidents	52	118	91%	85%
Off Roadway Incidents	4	12	7%	9%
On Shoulder Incidents	1	9	2%	6%
Dry Roadway Conditions	55	122	96%	88%
Wet Roadway Conditions	2	15	4%	11%
Icy/Snowy Roadway Conditions	0	2	0%	1%
Daytime Crashes	46	84	81%	60%
Nighttime Crashes – Lighted	6	29	10%	21%
Nighttime Crashes – Not Lighted	4	22	7%	16%
Dawn/Dusk Crashes	1	4	2%	3%

**Please note that percentages of total injuries and fatalities were calculated based on the total number of crash reports identified. In some cases, one crash report may have identified multiple injuries.*

Way, 15th Street, Wrightsboro Road, Ra Dent Boulevard, and Martin Luther King Boulevard (SR 4). The total number of crashes indicates that the following locations contain concentrations of crashes in the county:

- Wrightsboro Road (16 Crashes)
- Walton Way (14 Crashes)
- Martin Luther King Boulevard/SR 4 (13 Crashes)
- Broad Street (8 Crashes)
- SR 28 (7 crashes)

Figures 4-21 and Figure 4-22 provide maps of bicycle and pedestrian crash locations within Richmond County.

Figure 4-20: Richmond County Crash Typology

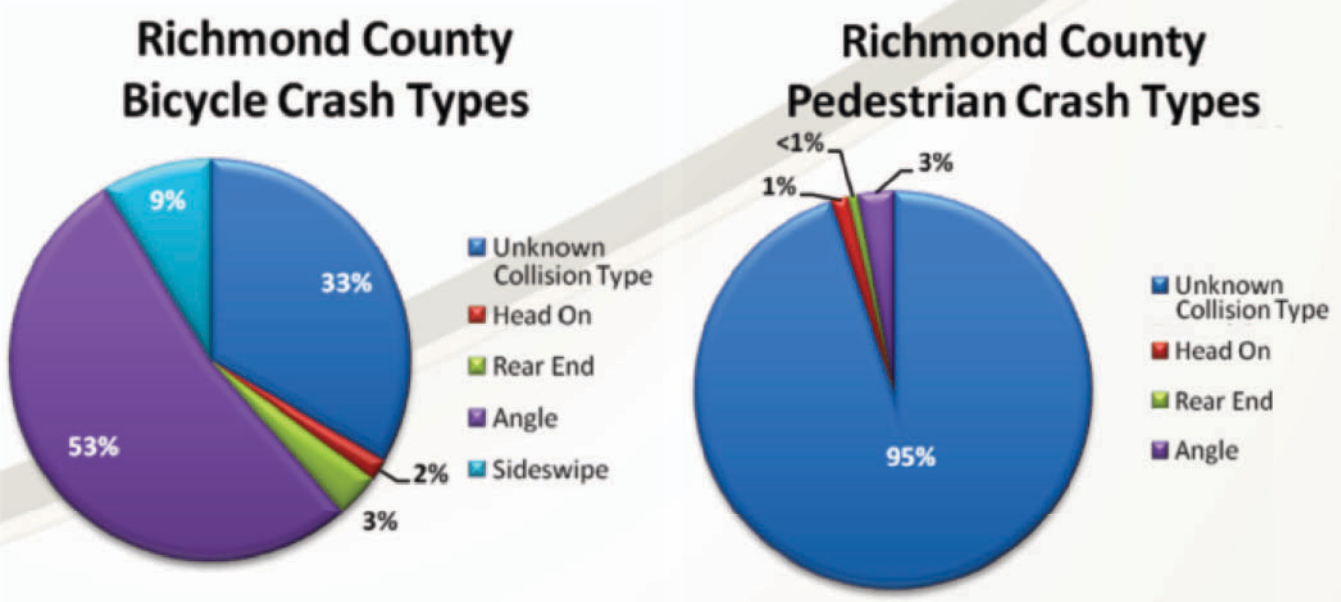


Figure 4-21: Bicyclist Safety Analysis - Richmond-Augusta County

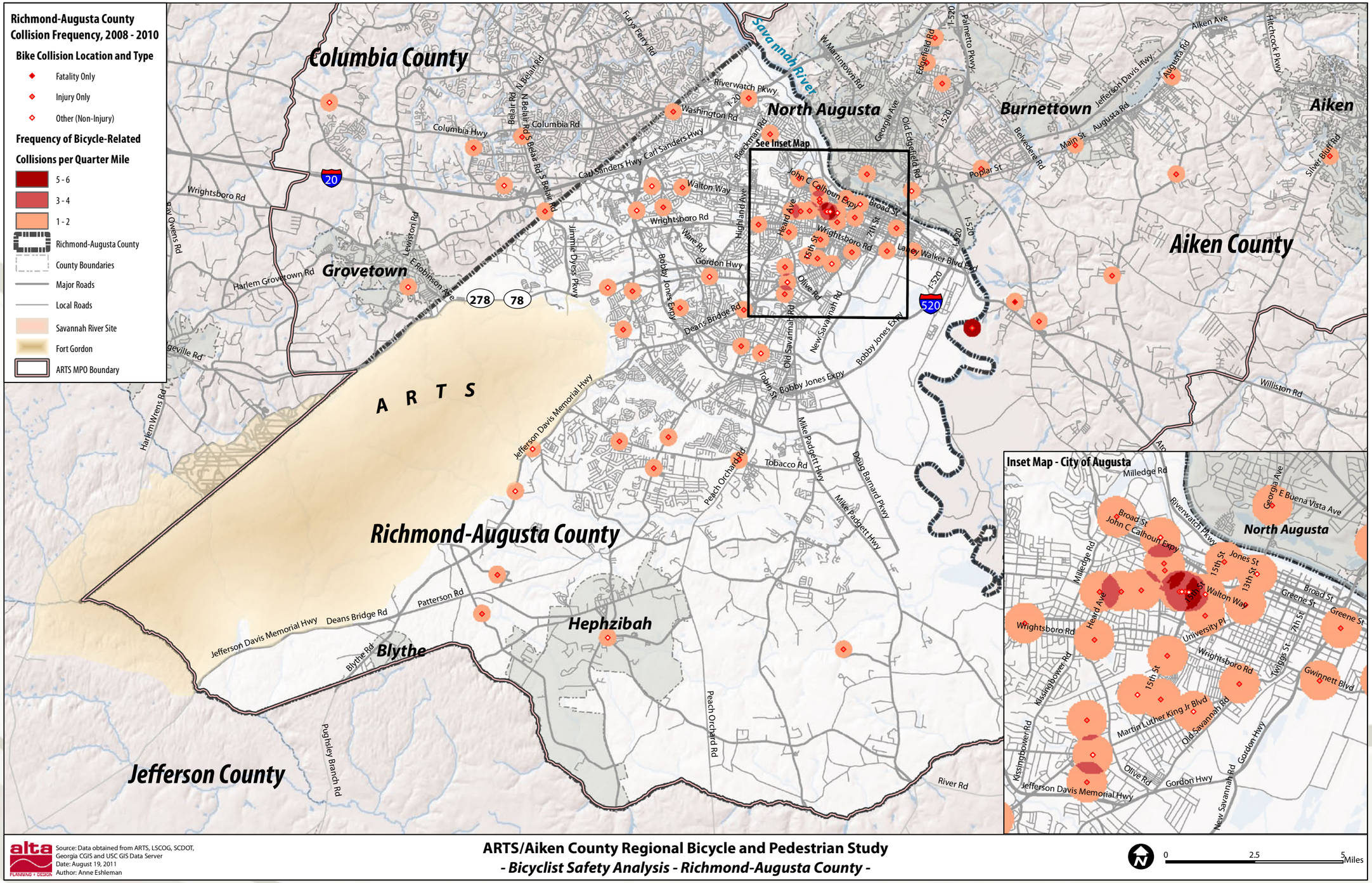
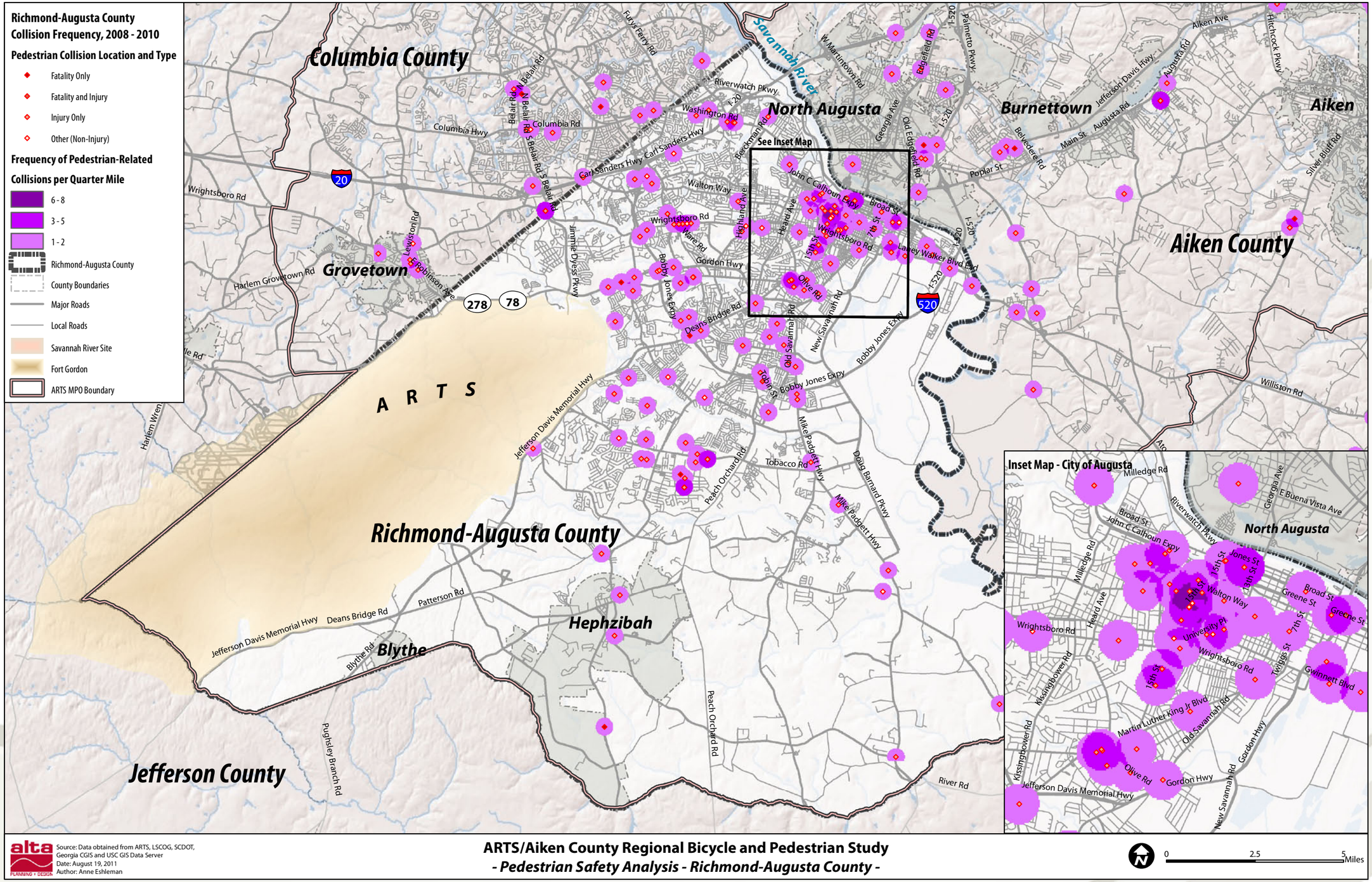


Figure 4-22: Pedestrian Safety Analysis - Richmond-Augusta County



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- Pedestrian Safety Analysis - Richmond-Augusta County -

Aiken County

To provide a comparable analysis between data received on Columbia and Richmond counties, Aiken County bicycle and pedestrian crash data from 2008 to 2010 was used for this regional analysis. A summary of crash statistics for Aiken County is provided in Table 4-21. There were a reported 38 bicycle crashes and 75 pedestrian crashes over the three-year period. Crashes were concentrated in the southern portions of the county near the urbanized area of Augusta. These crashes resulted in 1 bicycle fatality and 6 pedestrian fatalities. Most crashes for bicyclists and pedestrians occurred during dry conditions (92 and 90 percent, respectively). 71 percent of all bicycle crashes occurred during daylight hours and 45 percent of pedestrian crashes occurred during the day. Approximately 40 percent of the pedestrian crashes occurred at night in areas without adequate lighting, resulting in 3 of the total pedestrian fatalities. There is an overrepresentation of crashes in dark conditions. Though there is typically less walking occurring then, over 50 percent of all pedestrian crashes occurred during non-daylight hours, which suggests a compelling case for addressing this problem in more detail. The primary factor reported in these night pedestrian crashes is pedestrians illegally in the roadway. The one bicycle fatality was reported in 2008; it occurred at night along Urquhart Drive due to a motorist under the influence. Out of the 6 pedestrian fatalities, 4 occurred during night or at dusk, mostly in unlighted areas. Locations for these pedestrian fatalities included Fairview Avenue, Pine Log Road, Edgefield Road, Seymour Drive, Laurens Street, and Belvedere Clearwater Road. The total number of crashes indicates that the following locations contain concentrations of crashes in the county:

1. East Pine Log Road (9 Crashes)
2. Atomic Road (5 Crashes)
3. Richland Avenue (4 Crashes)
4. Whiskey Road (4 Crashes)
5. Belvedere-Clearwater Road (3 Crashes)
6. Hampton Avenue (3 Crashes)
7. Rutland Drive (3 Crashes)

Other locations where more than one crash was identified include Columbia Highway, Dougherty Road, Edgefield Road, Jefferson Davis Highway, Marion Street, Seymour Drive, and South Aiken Boulevard. Figures 4-23 and

Table 4-21: Aiken County Crash Characteristics

Crash Characteristics	Bicycle Crashes	Pedestrian Crashes	Bike %	Ped %
Total Crashes Reported	38	75	100%	100%
Fatalities	1	6	3%	8%
Injuries (Possible/Identified)*	35	77	--	--
Not Injured/Unknown Injury	42	90	--	--
Dry Roadway Conditions	35	68	92%	90%
Wet Roadway Conditions	2	7	5%	9%
Unknown Roadway Conditions	1	2	3%	3%
Daytime Crashes	27	34	71%	45%
Nighttime Crashes – Lighted	5	10	13%	13%
Nighttime Crashes – Not Lighted/Unspecified	3	30	8%	40%
Unspecified Lighting Conditions	3	1	8%	1%

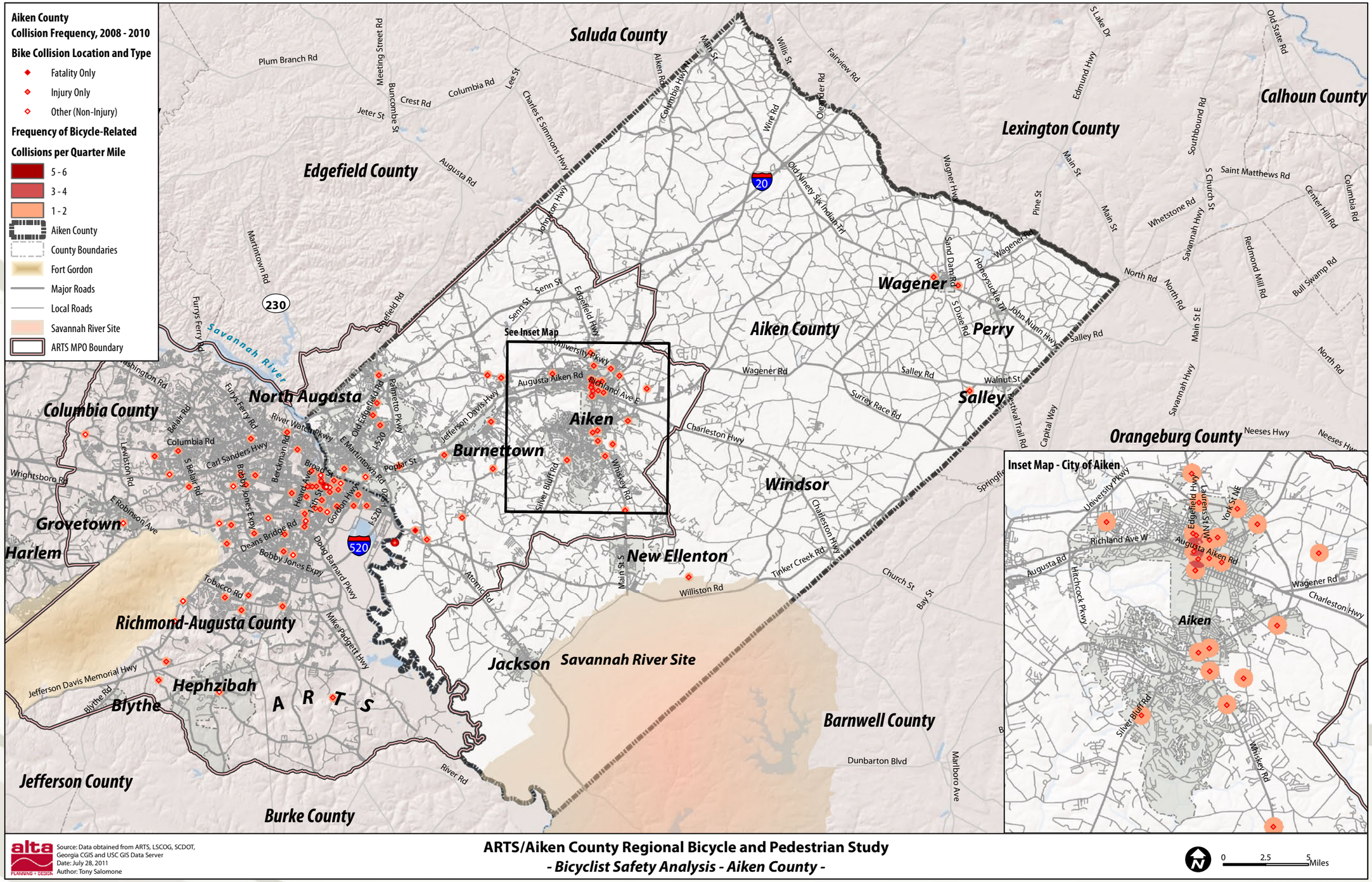
**Please note that Aiken County data provides greater detail for injury types, and have been categorized in this table to provide comparable analysis between counties in the region. Injury types include incapacitated, non-incapacitated or possible injury types. Other categories included not injured or where injury was not reported, and these are included in the category "Not Injured/Unknown Injury for the purposes of this analysis.*

Figure 4-24 provide maps of bicycle and pedestrian crash locations Aiken County.

Figure 4-25 and Figure 4-26 provide details on the primary factors in bicycle and pedestrian crashes. In bicycle crashes, over 80 percent of the automobile contributing factors included improper action or movement by driver (31 percent), driving too fast (13 percent), distracted driving (13 percent), failing to yield to right of way (13 percent), or disregarding a sign or signal (13 percent). Approximately 45 percent of bicyclist contributing factors were from failing to yield right of way and 13 percent resulted from bicyclists disregarding a sign or signal.

For pedestrian collisions, the most prominent automobile contributing factors included improper actions by drivers (30 percent), distracted driving (19 percent), failing to yield right of way to bicyclists (15 percent), and motorists under the influence (11 percent). The most prominent factors in pedestrian collisions where pedestrians contributed to the collision included pedestrians illegally in the roadway (38 percent), improper crossings (12 percent), or distracted/inattentive actions by pedestrians (12 percent). It should be noted that in many cases, the "pedestrians illegally in roadway" code can be misleading. It technically could apply to a pedestrian crossing midblock to get to a bus stop when the "block" is a half mile long. In such cases, it is misleading to code this as a primary collision factor. Reviewing police reports for these pedestrian crashes may provide further insight into countermeasures that may be provided to enhance safety.

Figure 4-23: Bicyclist Safety Analysis - Aiken County



ARTS/Aiken County Regional Bicycle and Pedestrian Study

- Bicyclist Safety Analysis - Aiken County -

Figure 4-24: Pedestrian Safety Analysis - Aiken County

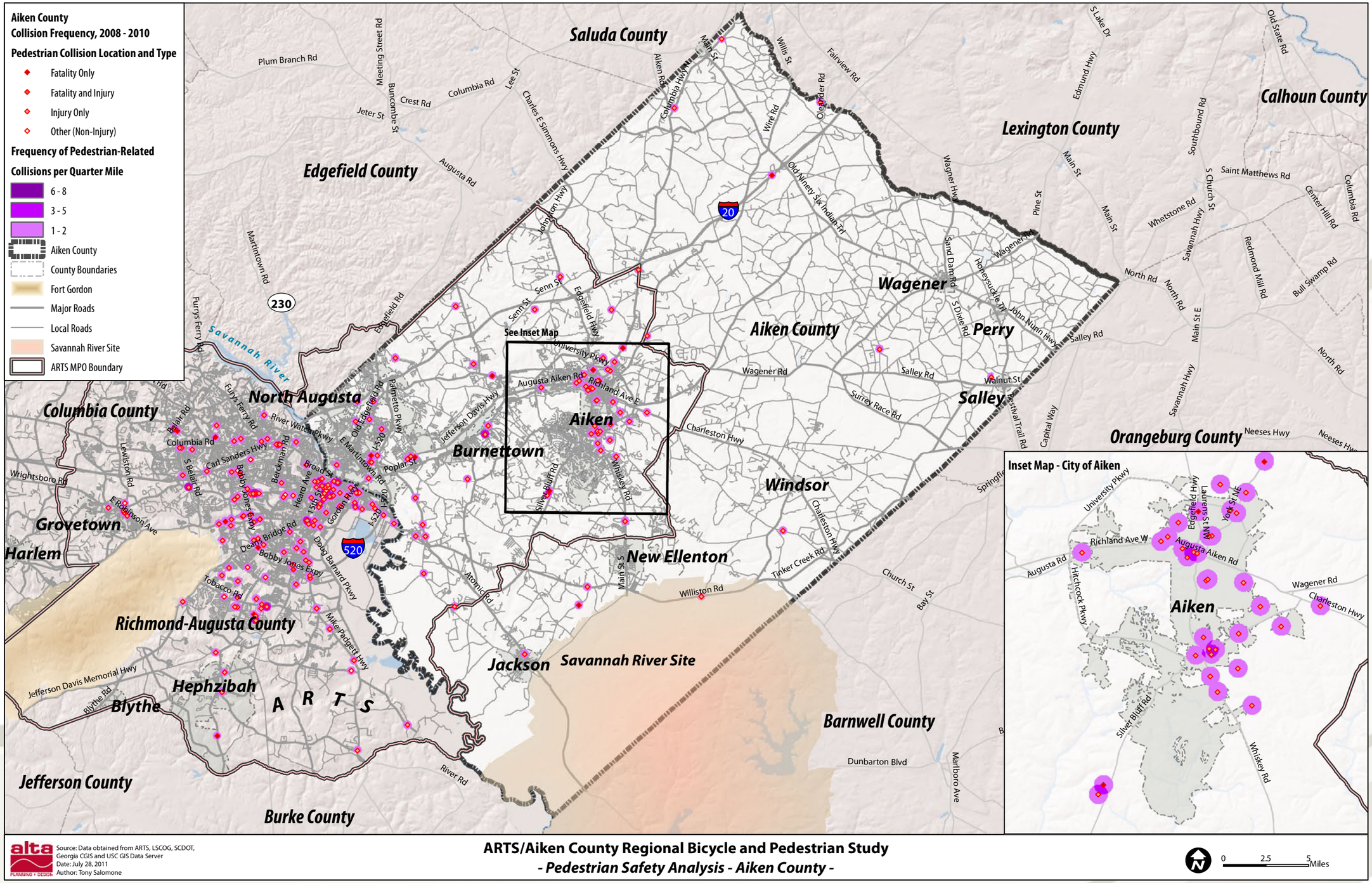
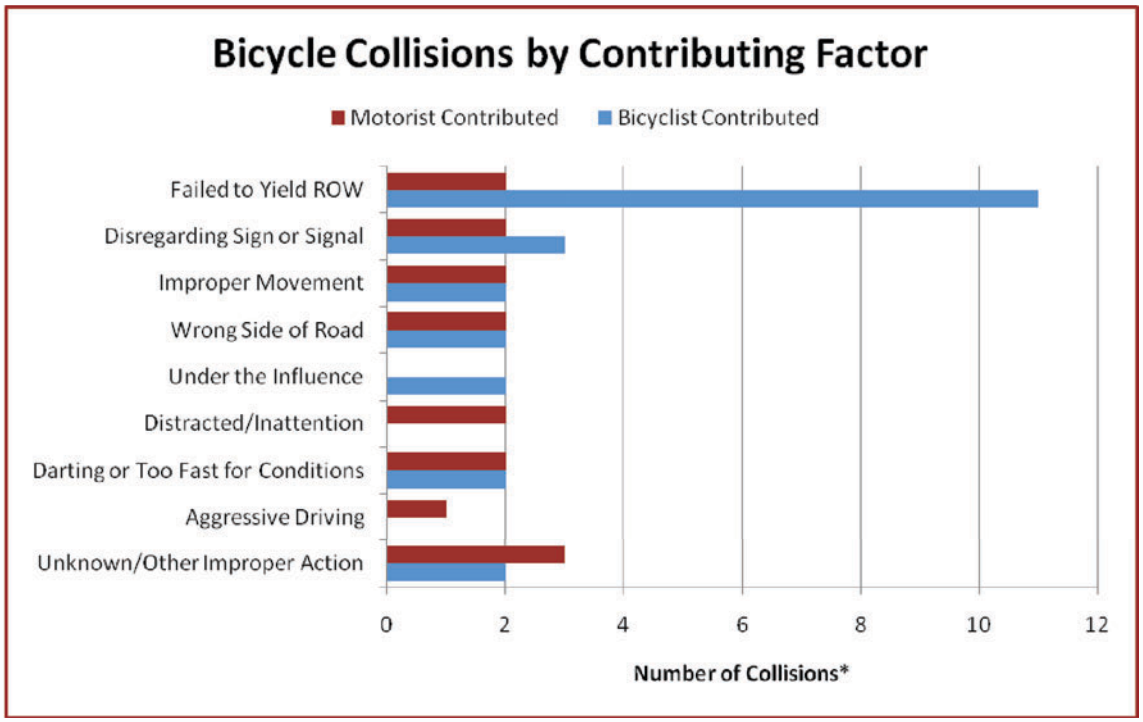
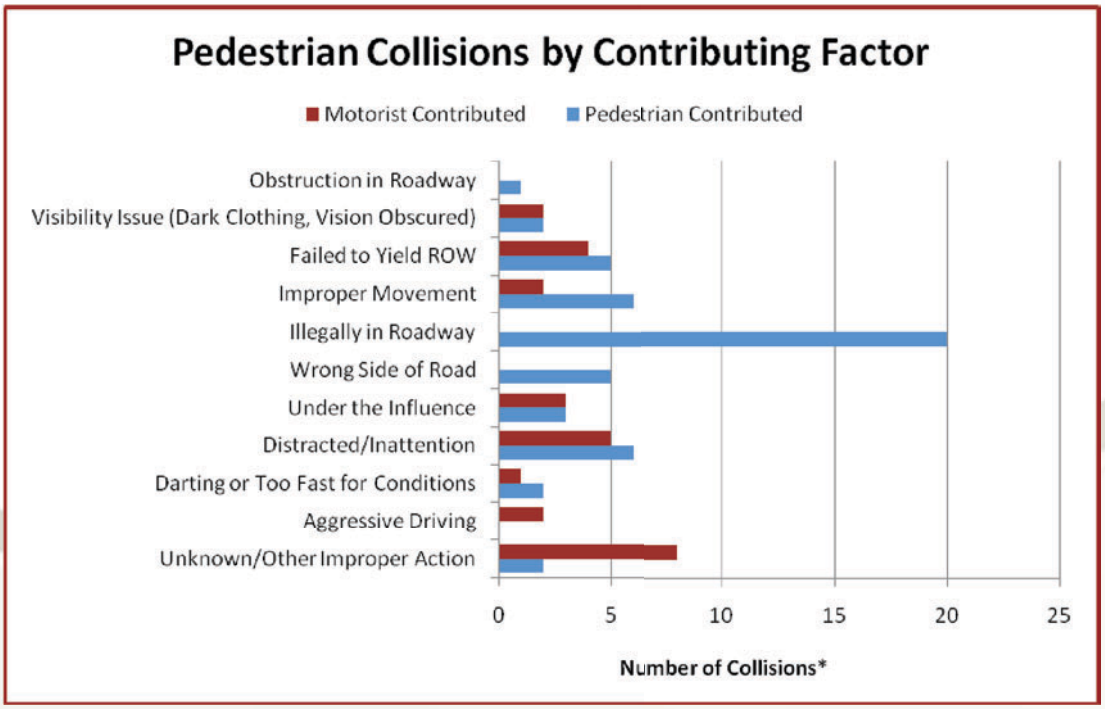


Figure 4-25: Aiken County Bicycle Collisions by Contributing Factor



**Please note that totals are in excess of the total number of bicycle crashes reported. This is due to cases where both motorists and bicyclists were determined to have contributed to the crash.*

Figure 4-26 Aiken County Pedestrian Collisions by Contributing Factor



**Please note that totals are in excess of the total number of crashes reported. This is due to cases where multiple motorists and/or pedestrians were involved in a single crash.*

Crash Analysis Findings

The crash analysis in this technical memorandum focused first on county by county information to provide available details at a localized level on bicycle and pedestrian crashes that could help determine regional trends for the findings in this report.

In identifying key locations where crashes are reported within the region, counts of all crashes for all counties were tabulated. The results of the crash analysis indicate that locations of crashes are concentrated in northern Richmond County near the Aiken County Line. The following streets are locations where at least 5 crashes have been reported during the three-year period in the region:

1. Wrightsboro Road, Richmond County (16 Crashes)
2. Walton Way, Richmond County (14 Crashes)
3. State Road 4, Richmond County (13 Crashes)
4. East Pine Log Road, Aiken County (9 Crashes)
5. Broad Street, Richmond County (8 Crashes)
6. State Road 28, Richmond County (7 Crashes)
7. Milledgeville Road, Richmond County (6 Crashes)
8. SR 104 (Washington Road), Columbia County (6 Crashes)
9. 15th Street, Richmond County (5 Crashes)
10. Atomic Road, Aiken County (5 Crashes)

These locations, in particular, will deserve attention to improve safety for pedestrians and bicyclists in the region.

Pedestrian conflict details for Columbia and Richmond counties do not provide enough information to determine the most common types of collisions. More detailed study of police reports for pedestrian crashes is recommended at the local level to identify more precisely the actions by pedestrians or motorists prior to the crash. This analysis will be useful in developing countermeasures.

There is an overrepresentation of crashes in dark conditions in Aiken and Richmond Counties, with 50 and 40 percent of all pedestrian crashes occurring during non-daylight hours yet there is typically less walking occurring then. With 100 percent and 50 percent respectively of the pedestrian fatalities also occurring in dark conditions, there is a compelling case for addressing this problem in more detail.