2014 Annual Countywide Safety Report

Space Coast
Transportation Planning Organization

Brevard County, Florida

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Section 1 Executive Summary

EXECUTIVE SUMMARY

The 2014 Annual Countywide Safety Report describes the initial steps the Space Coast Transportation Planning Organization (SCTPO) has taken to develop a systematic approach to managing transportation safety. This report was undertaken with the goal of developing an objective and repeatable analysis which could be utilized to identify priority crash locations across Brevard County. The analysis developed is more sensitive to the severities and types of crashes occurring as opposed to relying on crash rate alone. This analysis also moves beyond single year crash reporting and reviews five years of crash trends at the county and planning area levels, comparing them to national and statewide trends. The main portion of this analysis is to identify high crash locations based on the following crash characteristics: crash frequency, crash severity, crash type, crash rate, and emphasis areas from the FDOT Strategic Highway Safety Plan (SHSP).

Crash data for this report was obtained from the FDOT Crash Analysis Reporting System (CARS) and the University of Florida's Signal Four Analytics (S4) Database for the years 2009 to 2013. Both CARS and S4 data were used in order to provide a more comprehensive dataset for the County. CARS data was obtained for the state maintained roadways in Brevard County and S4 data was obtained for the county and local roadways. ArcGIS was used for the mapping of all crashes.

Once the crash data was obtained, an analysis was performed on the five safety metrics noted in the first paragraph. A total of 39,005 crashes were reported and mapped on study roadways over the five-year study period from 2009 to 2013. Of those, 11,789 occurred at intersections and 27,216 occurred on corridors. During the study period, a total of 268 fatal crashes, 11,553 injury, and 27,184 property damage only crashes were reported. For the crash type metric, the following highest frequency crash types were analyzed: rear end, angle, lane departure, left turn, sideswipe (intersection only), and head on (corridor only). The SHSP emphasis areas reviewed included the following: intersection crashes, aggressive driving crashes, vulnerable road user crashes (including bicyclists, pedestrians, and motorcyclists), lane departure crashes, impaired driving crashes, at-risk driver crashes, and distracted driving crashes.

Once the data for the various metrics was reviewed and summarized, an analysis was performed to identify high intersection and corridor crash locations. By identifying high crash locations within the County, further study can be targeted on systemic or location specific countermeasures which can be implemented to reduce crash frequency/severity. In order to align with FHWA goals moving forward, the analysis first focused on locations where crash frequency and severity were the greatest. The lists for top crash locations by frequency and severity were compared against one another to identify common crash intersections and corridors. Thirteen intersections and 11 corridors were identified as high crash locations once this analysis was performed.

To further prioritize the 13 intersections identified in the high crash location analysis, intersection crash frequencies for the five highest intersection crash types were reviewed: rear end, angle, lane departure, left turn, and sideswipe. Intersections identified on four or more of the highest crash type frequency lists were deemed to be a higher priority. To further prioritize the 11 corridors beyond the FHWA safety metric review, corridor crash frequencies for the six measurable emphasis areas were reviewed: aggressive, at risk, vulnerable, lane departure, impaired, and distracted. Corridors identified on four or more of the highest emphasis area crash frequency lists were deemed to be a higher priority. **Table 1** and **Table 2** present the prioritized list of 13 intersections and 11

corridors where additional analysis could be conducted to identify specific safety countermeasures to reduce crashes. Once site specific safety countermeasures are identified, a list of priority safety projects could be developed and constructed utilizing State safety funding.

Table 1: High Crash Intersections Identified on Crash Type Lists

Intersection	Crash Type					Identified on 4 or More Crash Type Lists?
	Angle	Left Turn	Sideswipe	Lane Departure	Rear End	
SARNO & WICKHAM	**X**	**X**	**X**	**X**	**X**	**Y**
BABCOCK & PALM BAY	**X**		**X**	**X**	**X**	**Y**
EMERSON & MINTON		**X**	**X**	**X**	**X**	**Y**
HOLLYWOOD & PALM BAY		**X**	**X**	**X**	**X**	**Y**
POST & WICKHAM		**X**	**X**	**X**	**X**	**Y**
BABCOCK & MALABAR			X	X	X	
EAU GALLIE & WICKHAM	X			X	X	
I-95 & WICKHAM		X		X	X	
MINTON & US 192 & WICKHAM	X	X			X	
SR 520 & SYKES CREEK	X		X		X	
AURORA & WICKHAM		X	X			
LAKE WASHINGTON & WICKHAM		X		X		
MURRELL & WICKHAM			X		X	

Table 2: High Crash Corridors Identified in Emphasis Areas

Corridor	From	To	Emphasis Area						Identified in 4 or More Emphasis Areas?
			Aggressive	At Risk	Vulnerable	Lane Departure	Impaired	Distracted	
Eau Gallie	**S. Patrick**	**SR A1A**	**X**	**X**	**X**	**X**	**X**		**Y**
US 1	**Post**	**Pineda Cswy.**	**X**	**X**	**X**	**X**	**X**		**Y**
US 1	**SR 528**	**Canaveral Groves**	**X**	**X**	**X**	**X**	**X**		**Y**
Malabar	**Babcock**	**Corey**		**X**	**X**	**X**		**X**	**Y**
N. Courtenay	**Needle**	**Lucas**	**X**	**X**	**X**			**X**	**Y**
SR 520	**I-95**	**Burnett**	**X**	**X**			**X**	**X**	**Y**
US 192	**John Rodes**	**Wickham**	**X**	**X**	**X**		**X**		**Y**
Babcock	Palm Bay	Eber	X	X		X			
SR A1A	Fisher	St. Lucie		X	X	X			
Wickham	Pineda Cswy.	Jordan Blass					X	X	
Wickham	Murrell	I-95						X	

Section 2 Project Background

PROJECT BACKGROUND

Project Need and Goals

Over the past decade, a higher emphasis has been placed on reducing crash frequency and severity along the nation's Interstates, highways, and local roadways. In the state of Florida, the Florida Department of Transportation (FDOT) is striving to drive down traffic related fatalities and serious injuries. As part of this initiative, the FDOT released the 2012 Strategic Highway Safety Plan (SHSP) which addresses the traffic safety challenge by focusing on engineering, enforcement, education, and emergency response solutions for eight emphasis areas (described in **National, State, and County Crash Trends**).

The 2014 Annual Countywide Safety Report describes the initial steps the Space Coast Transportation Planning Organization (SCTPO) has taken to develop a systematic approach to managing transportation safety. This report was undertaken with the goal of developing an objective and repeatable analysis which could be utilized to identify priority crash locations across Brevard County. The analysis developed is more sensitive to the types and severities of crashes occurring as opposed to relying on crash rate alone. This analysis also moves beyond single year crash reporting and reviews five years of crash trends at the county and planning area levels, comparing them to national and statewide trends. The main portion of this analysis is to identify high crash locations based on the following crash characteristics:

- Crash Frequency;
- Crash Severity;
- Crash Type;
- Crash Rate; and
- Emphasis Areas from the FDOT SHSP.

The findings of this report include several lists of priority crash locations where the SCTPO could conduct additional analysis to identify specific countermeasures and develop a list of priority safety projects which could be constructed utilizing State safety funding.

Highway Safety Improvement Program (HSIP) and Federal Highway Administration (FHWA) Performance Measures

The Highway Safety Improvement Program (HSIP) was established in 2006 as part of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users transportation bill and continued in 2012 in the Moving Ahead for Progress in the 21st Century Act (MAP-21) to significantly reduce fatalities and serious injuries on all public roads.[1] The HSIP is a federally funded program providing money to states to reduce fatalities and serious injuries through infrastructure improvements, education, and enforcement. All public roads are eligible for HSIP funding, including state, county, and local roads.

[1] FHWA. *"Highway Safety Improvement Program (HSIP)."* 2014. http://safety.fhwa.dot.gov/hsip/

To be eligible for funding, the HSIP requires a data-driven, strategic approach to improving highway safety on all public roads. The HSIP provides funding for strategies, activities, or projects consistent with a data-driven SHSP which corrects or improves a hazardous road location/feature or addresses a highway safety problem. These improvements can include roadway improvements, improvements to pedestrian and bicycle facilities, workforce development, training, education, or other activities.[2]

On March 11, 2014, the Federal Highway Administration (FHWA) released a Notice of Proposed Rulemaking (NPRM) as part of MAP-21 regarding performance measures for the HSIP. This NPRM identified the following four performance measures to establish safety targets:

- Fatalities per vehicle miles traveled (VMT);
- Serious injuries per VMT;
- Number of fatalities; and
- Number of serious injuries.

These performance measures will have associated targets, which will be defined either by the State of Florida or the SCTPO in the coming years. In order to begin establishing the data set needed to track these performance measures and targets, this report will include a summary of fatalities, by both the total number and per VMT. Due to limitations in the crash reporting data sets, serious injury crashes will not be summarized.

The analysis performed as part of the 2014 Annual Countywide Safety Report supports the County's efforts to develop projects which can compete for HSIP funding. This analysis will also provide the SCTPO with the information needed to meet the FHWA performance measure targets when they are established.

[2] FHWA. "*Highway Safety Improvement Program (HSIP).*" 2014. http://safety.fhwa.dot.gov/hsip/

Section 3 National, State, and County Crash Trends

National, State, and County Crash Trends

Before reviewing crash data at the countywide level, the key national and state crash patterns were reviewed and compared to trends observed in Brevard County. While additional sources are available, the scope of the national and state study was limited to patterns documented in the following publications:

- Florida Strategic Highway Safety Plan (SHSP) 2012 report;
- National Highway Traffic Safety Administration (NHTSA) traffic safety fact sheets;
- National Highway Traffic Safety Administration (NHTSA) State Traffic Info;
- Fatality Analysis Reporting System (FARS) General Estimates System 2011 Data Summary;
- Florida Highway Safety and Motor Vehicles (FHSMV) traffic crash facts annual report 2012; and
- Brevard County transportation score card.

The national, state, and county trends were summarized in the context of the SHSP in order to better enable comparison of more emphasized safety elements. The SHSP outlines eight emphasis areas as follows:

- Aggressive Driving;
- Vulnerable Road Users;
    - Bicyclists and Pedestrians
    - Motorcycles
- Lane Departure Crashes;
- Impaired Driving;
- At-Risk;
    - Teen Drivers
    - Aging Road Users
- Distracted Driving;
- Intersection Crashes; and
- Traffic Data (not applicable to the safety analysis).

The following sections discuss each emphasis area as well as the associated national trends researched.

Aggressive Driving

The SHSP defines aggressive driving as the inclusion of at least two of the following actions:

- Speeding;
- Unsafe or improper lane change;
- Following too closely;
- Failure to yield right-of-way;
- Improper passing; or
- Failure to obey traffic control devices.

Aggressive driving crash data summaries, based on the SHSP definition, are not provided by national and state agencies. The best-available data summarized at the national, state, and county levels for aggressive driving is

speeding-related fatalities. Over the five-year study period, speeding-related fatalities in Brevard County declined. A decline was also observed across the nation and state, as displayed in **Figure 1**.

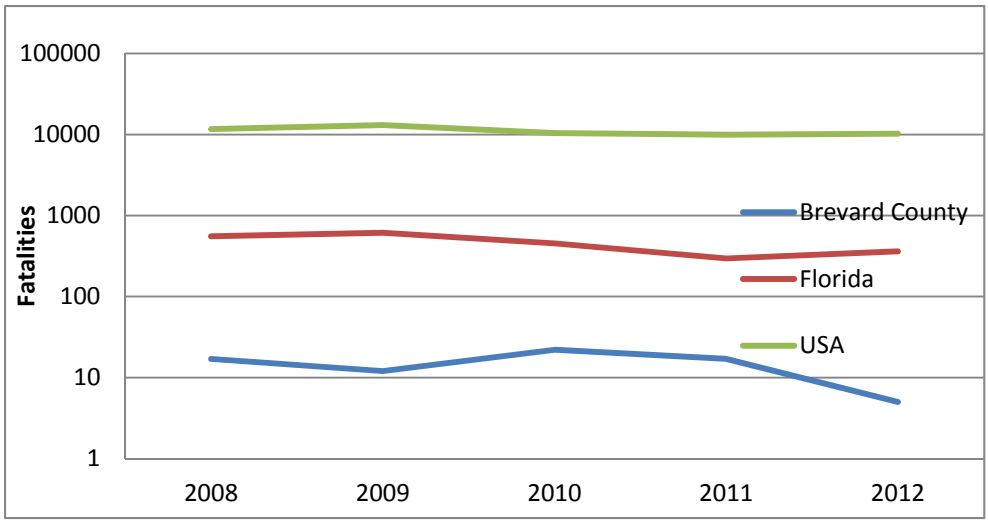


Figure 1: Annual Speeding-Related Fatal Crash Frequency (2008 – 2012)

Florida ranked third in the nation for reported traffic fatalities in 2011, after Texas and California. However, only 12 percent of traffic fatalities in Florida are indicated as speeding-related compared to 32 percent in California and 39 percent in Texas. The Florida statistic is counter to national trends indicating the number of speeding-related fatalities is directly related to fatal crash frequency. This may also reflect some variation in crash reporting among state law enforcement agencies.

Vulnerable Road Users

The SHSP separates vulnerable road users into two sub-categories: 1) bicyclists and pedestrians and 2) motorcyclists. Nationally, annual fatal crash frequency has declined. However, pedestrian fatalities have not declined proportionally. The proportion of fatal pedestrian crashes has increased from 2008 to 2010. Brevard County ranks in the middle third of all United States (US) counties for bicycle and motorcycle fatalities. **Figure 2**, **Figure 3**, and **Figure 4** illustrate annual crash trends by population for each vulnerable road user.

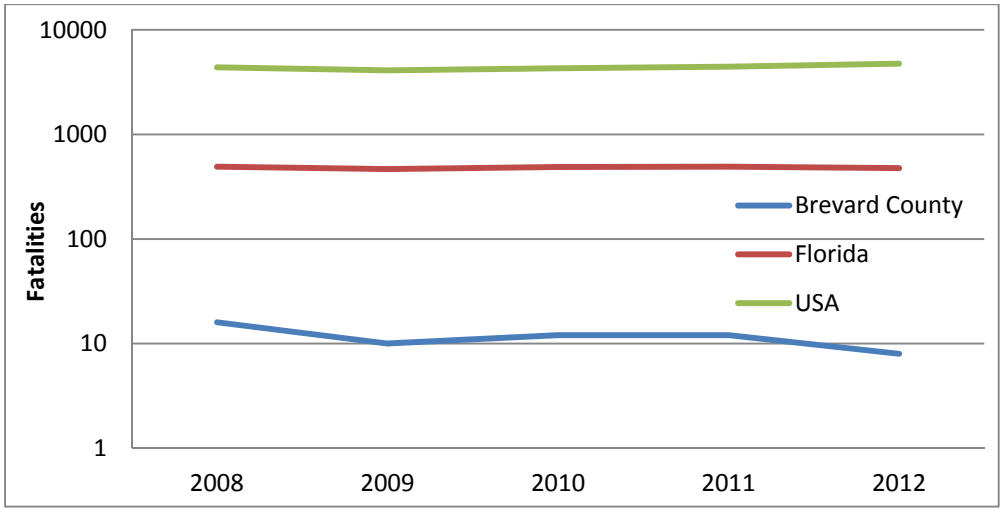


Figure 2: Annual Pedestrian Fatal Crash Frequency (2008-2012)

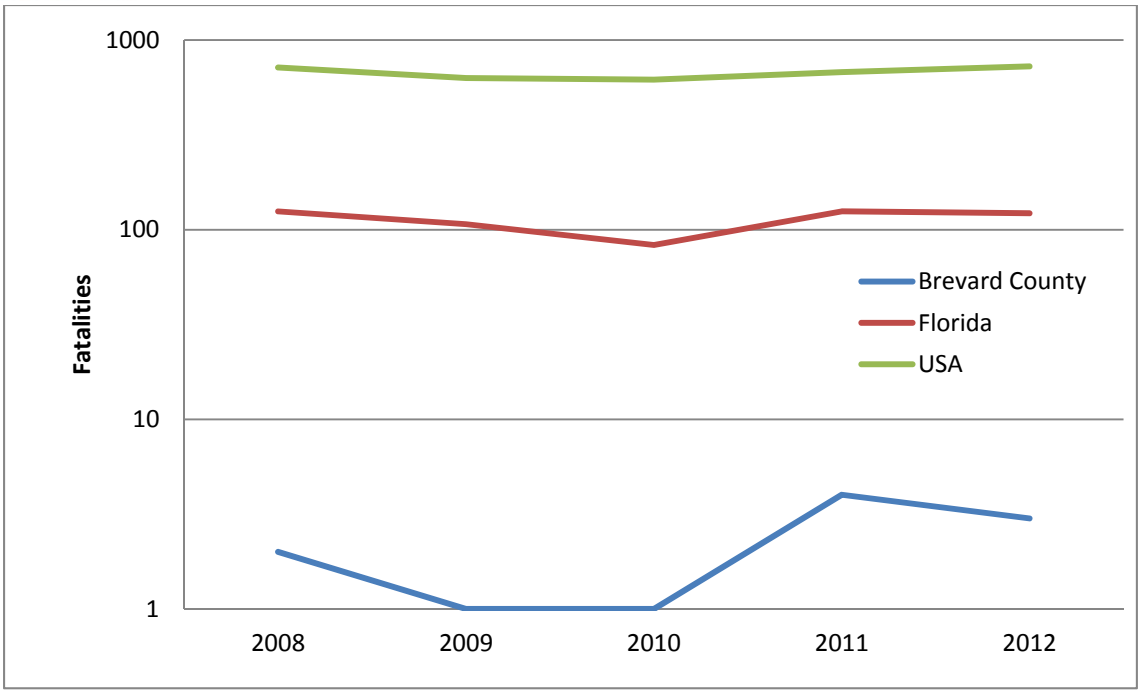


Figure 3: Annual Bicycle Fatal Crash Frequency (2008-2012)

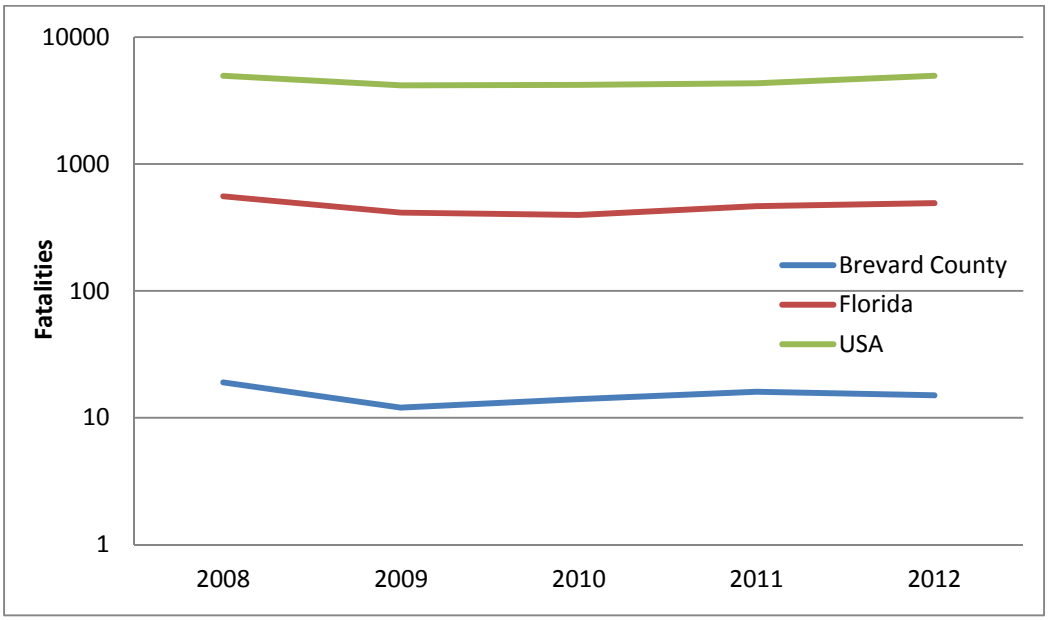


Figure 4: Annual Motorcycle Fatal Crash Frequency (2008-2012)

Pedestrian, bicycle, and motorcycle fatal crash data for 2013 was gathered from the *Traffic Crash Facts Annual Report 2013* published by the Florida's Integrated Report Exchange System (FIRES) Crash Records Team. This data was used to compare Brevard County to other counties in the state by calculating a fatal crash rate. As displayed in **Table 3**, Brevard County ranked number five in fatal bicycle crash rate and ranked in the top third in pedestrian and motorcycle fatal crash rates in 2013.

Table 3: 2013 Vulnerable Road User Fatal Crash Comparison

	All Florida County Crashes	Average County Crash Rate[1]	Total Brevard County Crashes	Brevard County Rate	Brevard County Rank[2]
All Fatal	2,402	12.5	76	13.9	41
Fatal Pedestrian	498	2.6	16	2.9	17
Fatal Bicycle	135	0.7	10	1.8	5
Fatal Motorcycle	462	2.4	20	3.6	19

[1] Crash rate was calculated by dividing the number of crashes by 100,000 population for each county

[2] Brevard County's rank out of 67 counties in Florida

The purpose of this one year comparison is to provide a quick overview of how Brevard County compares to other counties across the state. In future safety reports, this data may be expanded to account for five years of data and may be analyzed utilizing different crash rate methodologies. **Appendix A** provides the supporting data used to calculate the values presented in **Table 3**.

Lane Departure

Lane departure crashes include running off the road, rollover, hitting a fixed object, crossing the center median into an oncoming lane of traffic, sideswipe crashes, and head-on collisions. They generally occur on rural two-lane roadways and limited access roadways with narrow medians.

Annual fatal crash frequencies resulting from lane departure crashes in Florida and Brevard County are shown in **Figure 5**. Similar annual statistics were not available for the US. Nationwide in 2011, 15,307 fatal roadway departure[3] crashes occurred resulting in 16,948 fatalities (51 percent of fatal crashes in US). In Florida, lane-departure crashes account for approximately 39 percent of statewide traffic fatalities.

[3] FHWA defines roadway departure crashes as non-intersection crashes which occur after a vehicle crosses an edge line or a center line, or otherwise leaves the traveled way.

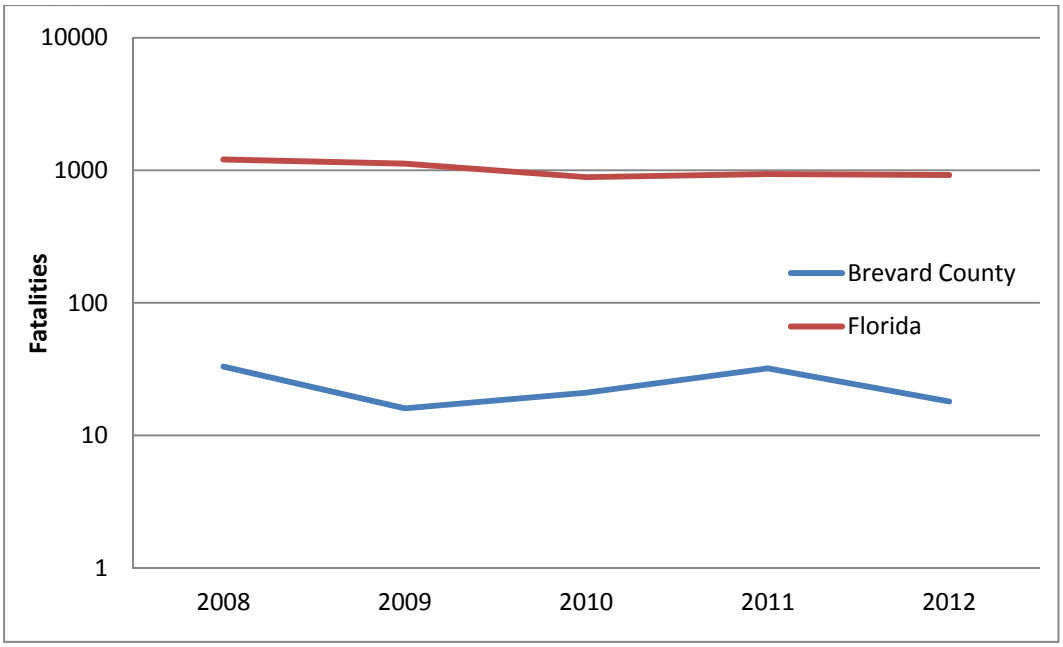


Figure 5: Annual Lane Departure Fatal Crash Frequency (2008-2012)

Impaired Driving

Impaired driving crashes include alcohol and drug-impaired crashes. Alcohol impaired is defined as a blood alcohol concentration of 0.08 percent or above. As shown in **Figure 6**, the frequency of fatal crashes due to impaired driving has decreased nationally, statewide, and in Brevard County from 2008 through 2012. Across the US in 2011, the 9,878 alcohol-impaired-driving fatalities represented 31 percent of total traffic fatalities.

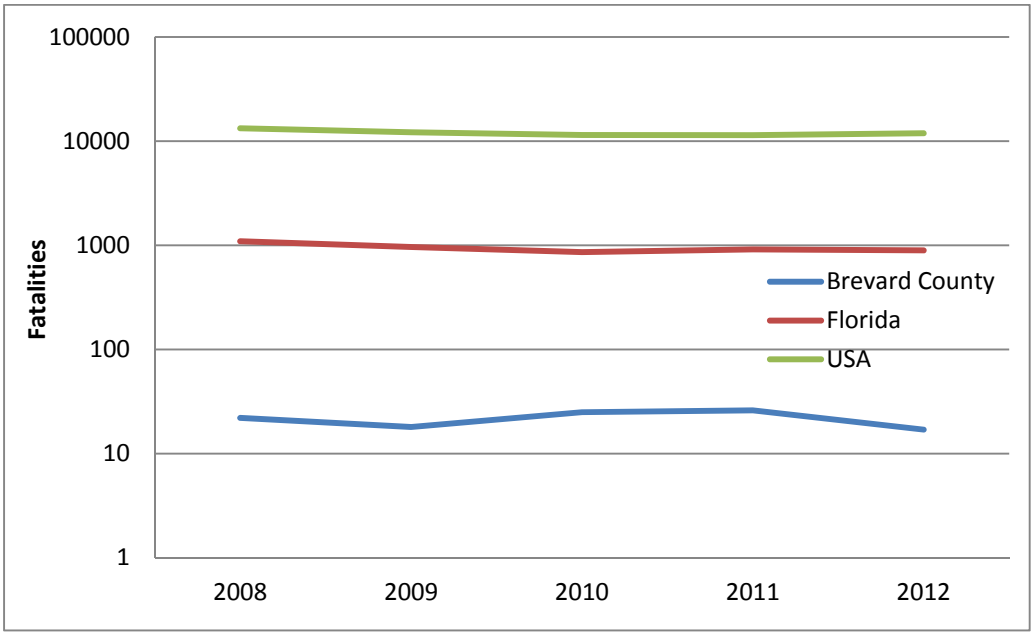


Figure 6: Impaired Driving Crashes

At-Risk

At-risk drivers are defined in the SHSP as adults age 65 and older and teen drivers (15- to 19-year-olds). Nationally, fatality rates per 100,000 population have declined from 2003 through 2012 for both at-risk groups. However, as shown in **Figure 7**, the last 3 years have observed a steady fatal crash frequency amongst the various age groups.

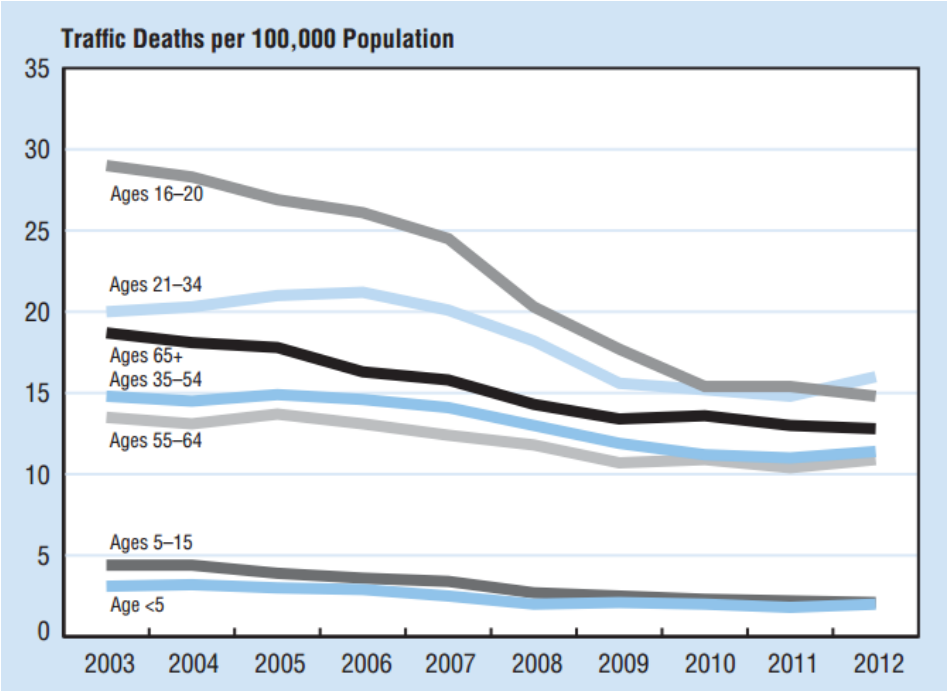


Figure 7: Annual Impaired Driving Fatal Crash Frequency (2008-2012)

Source: Traffic Safety Facts: Older Population (2012 Data), NHTSA's National Center for Statistics and Analysis

Distracted Driving

Limited data on distracted driving has been published for the state and county. National annual reports on distracted driving have summarized the number of fatalities associated with distracted driving crashes. These national studies differentiate between drivers using a cell phone and general distracted driving events. Cell phone use is the primary form of distraction in the reported Distraction-Affected (D-A) fatal crashes.

As shown in **Table 4**, fatal crash frequency associated with distracted driving has increased annually since 2010. The annual number of D-A fatal crashes represents approximately nine to 10 percent of the total reported annual number of fatal crashes.

Table 4: National Distracted Driving Fatal Crash Frequency

Population	Fatal Crashes		
	2010	2011	2012
Distraction-Affected (D-A)	2,843	3,020	3,050
Cell Phone in Use	355	350	378

Section 4 Countywide Analysis Methodology

COUNTYWIDE ANALYSIS METHODOLOGY

The information displayed in the **National, State, and County Crash Trends** section was a macroscopic analysis aimed to provide general information about how the County is trending versus national and statewide statistics. To provide a microscopic level of detail, the following safety metrics were reviewed at the intersection and corridor level for the County:

- Crash Frequency;
- Crash Severity;
- Crash Type;
- Crash Rate (corridor level analysis only); and
- Emphasis Areas from the FDOT SHSP (corridor level analysis only).

Figure 8 displays the flowchart for the overall approach of the countywide analysis. The remainder of this section outlines the data collection, the crash mapping, and the analysis methodology for a few specific safety metrics.

Data Collection

Crash data for this report was obtained from the FDOT Crash Analysis Reporting System (CARS) and the University of Florida's Signal Four Analytics (S4) Database for the years 2009 to 2013. The systems are described as follows:

CRASH ANALYSIS REPORTING SYSTEM (CARS)

CARS is a FDOT maintained crash database utilizing information from the Department of Highway Safety and Motor Vehicles (DHSMV). This database includes reported crashes which occurred on state roadways. Each crash can be geo-located and is assigned a number of descriptive variables explaining the type of crash, how it occurred, and other conditions surrounding the collision. While the data provided by CARS is comprehensive, it does not reliably include non-state roadway crashes and therefore does not provide a complete dataset for a countywide analysis.

SIGNAL FOUR ANALYTICS (S4)

S4 is an interactive, web-based system designed to support crash mapping and analysis needs in the state of Florida. Developed by the GeoPlan Center at the University of Florida, crash reports are collected by Florida Highway Patrol (FHP) officers at crash sites throughout the state and transmitted nightly to the GeoPlan Center to be loaded into the S4 database. The crash data is then geo-located, and includes descriptive variables similar to the CARS data. However, where CARS data lists these variables using the numeric codes found on crash reports, S4 has developed descriptive names for each code to make the crash data more user-friendly.

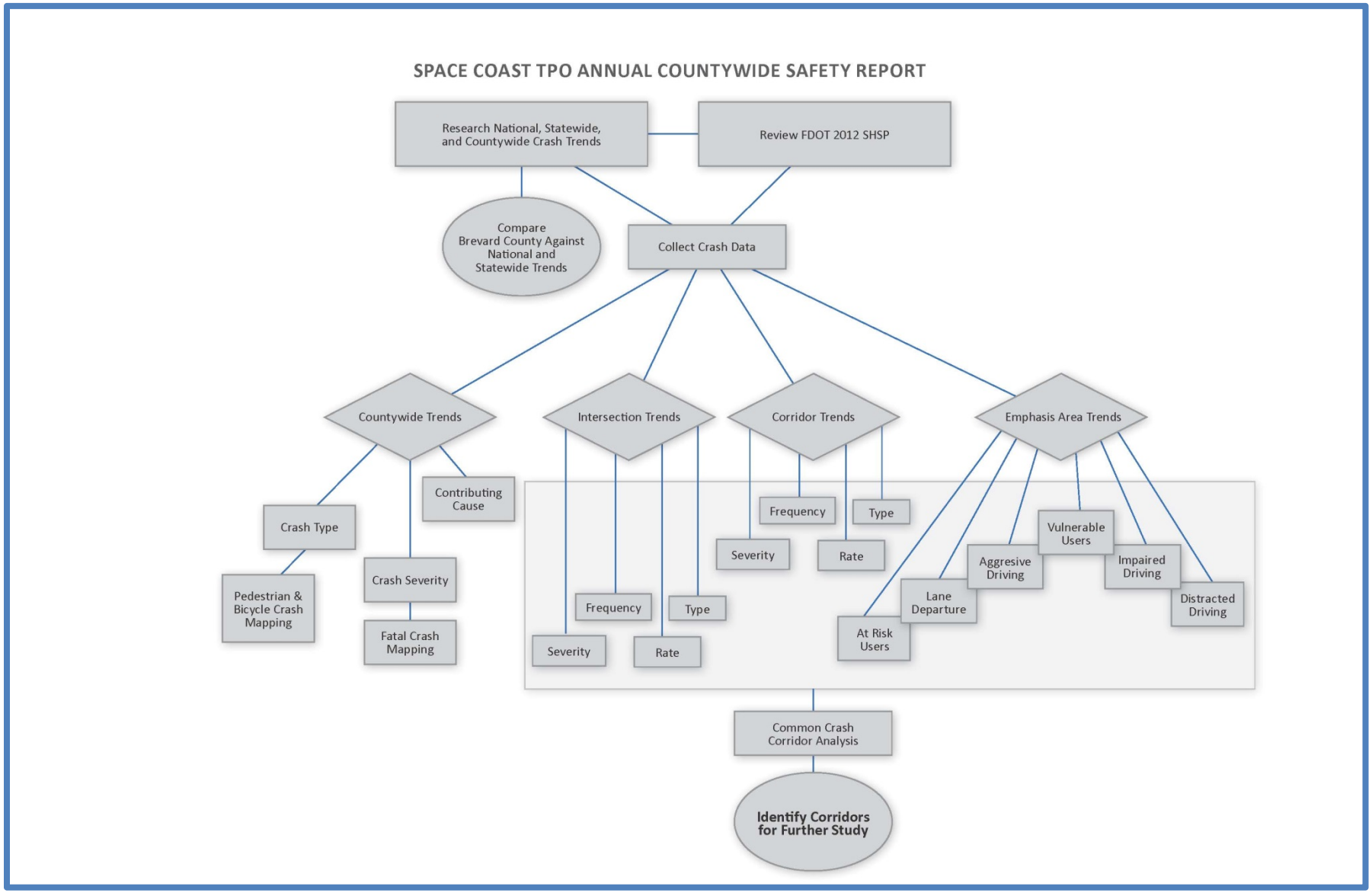


Figure 8: Safety Analysis Flowchart

Consolidation and Mapping

Both CARS and S4 data were used in order to provide a more comprehensive dataset for the County. CARS data was obtained for the state maintained roadways in Brevard County and S4 data was obtained for the county and local roadways. There were a total of 52,560 crashes reported between 2009 and 2013 within the County; however, 4,710 of those were not mapped due to lack of location information. For purposes of consistency and prioritization, only crashes which occurred on the SCTPO State of the System (SOS) roadway network were included in the countywide safety analysis (see **Figure 9** for the SOS roadway network). For the purposes of this report, 39,005 crashes were mapped and analyzed on SOS roadways.

Analysis Methodology

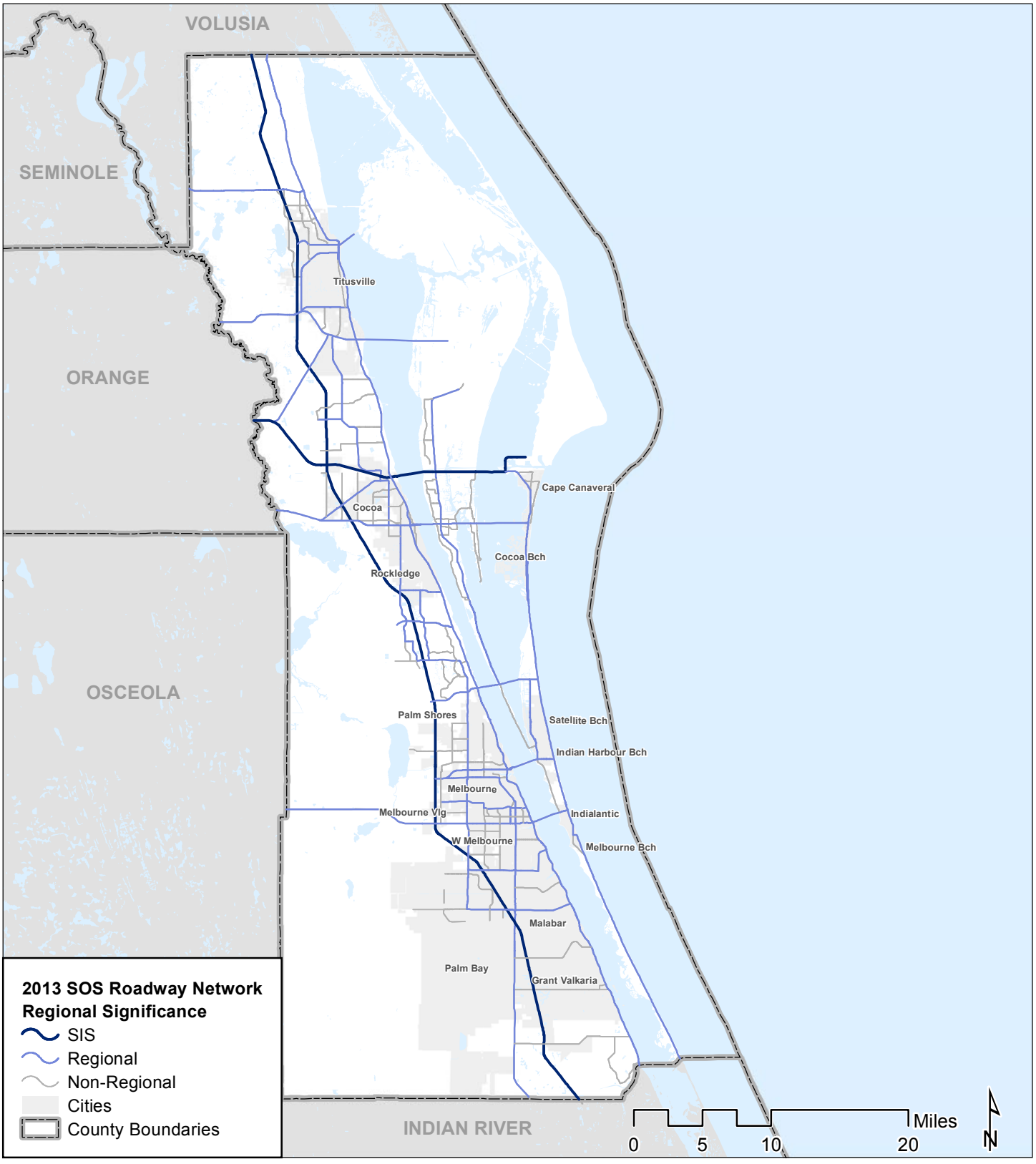
As noted above, the analysis was conducted utilizing the SCTPO's designated SOS roadway network for Strategic Intermodal System (SIS) and Non-SIS facilities, separated by intersections and corridors. After identifying the crash patterns, maps were prepared to identify where frequent and/or severe crashes were occurring within the County. The following sections describe the defining of intersection and corridor crashes, the SIS and Non-SIS crashes, and how the crash severity metric was quantified.

INTERSECTION VERSUS CORRIDOR CRASHES

In previous crash analyses performed as part of the Annual SOS Report, no differentiation was given between intersection crashes and corridor crashes. Because of this, intersection crashes would be applied to corridors, leading to the possible misrepresentation of crashes along a specific SOS roadway. As part of this report, the data allows for intersection and corridor crashes to be analyzed separately. An intersection, in this analysis, is defined as the point where two SOS roadways intersect. An intersection crash is defined as a crash occurring at or within 250' of an intersection. The crashes not coded at an intersection were considered to occur along a SOS roadway corridor.

ROADWAY TYPES

Roadways in the county were divided into two categories: SIS and Non-SIS. SIS roadways are those that are significant at the state and interregional level, contain all forms of transportation for moving both people and goods, and integrate individual facilities into a complete, interconnected transportation network. SIS facilities in Brevard County include I-95 and SR 528. Non-SIS roadways include regional and non-regional roadways, as classified by the SCTPO from the Annual SOS Report. Regional roadways are arterials of regional significance, which include all state maintained roadways, and non-regional roads are local arterials and collectors. Note that only roadways in the SOS roadway network were evaluated as part of the countywide safety analysis.



SOS Roadway Network

Figure 9

CRASH SEVERITY ANALYSIS

In order to gain an understanding of the severity of crashes, a crash severity score was calculated for each intersection and corridor based on the Highway Safety Manual's Equivalent Property Damage Only (EPDO) Average Crash Frequency method. This method takes into account the FDOT crash costs for property damage, injury, and fatal crashes. On average, fatal crashes cost $6.8 million, injury crashes cost $245,000, and property damage only (PDO) crashes cost $6,500. Locations with a higher severity score are experiencing more severe crashes, based on the FDOT crash costs. The score is calculated by multiplying the number of fatal, injury, and PDO crashes at each intersection and corridor by a weighting factor developed based on the FDOT crash costs noted above. The weighting factors used can be found in **Table 5**. A sample of this calculation is also provided below.

Table 5: Weighting Factors for Crash Severity Score

Severity	Crash Cost[4]	Ratio	Weighting Factor
Fatal	$6,820,000	$6,820,000 / $6,500	1,049.23
Injury	$245,623	$245,623 / $6,500	37.79
PDO	$6,500	$6,500 / $6,500	1

Severity Score Calculation for US 1 between SR 528 and Canaveral Groves Boulevard

- 104 PDO crashes x 1 = 104
- 72 injury crashes x 37.79 = 2,721
- 4 fatal crashes x 1,049.23 = 4,197
- Total EPDO severity score = **7,022**

[4] January 2013 FDOT Plans Preparation Manual, Volume 1, Chapter 23, Section 5.y.1

Section 5 Countywide Crash Analysis

COUNTYWIDE CRASH ANALYSIS

The countywide crash analysis reflects an objective approach to identifying locations where opportunities may exist to reduce crashes within Brevard County. The following sections summarize the results of the crash analysis conducted for the County. The analysis is intended to indicate where crashes are most frequent and severe, and where crashes of specific types are frequently reported. For each safety metric analyzed, a summary of the key observations along with a context map are provided. When the various written summaries discuss top crash locations, the intersections/corridors are arranged alphabetically so as not to show bias for one particular location.

Crash Frequency

As stated previously, a total of 39,005 crashes were reported and mapped on SOS roadways over the five-year study period from 2009 to 2013. Of those, 11,789 occurred at intersections and 27,216 occurred on corridors (3,888 on SIS facilities and 23,328 on Non-SIS facilities). **Table 6** provides the top crash frequency intersections while **Figure 10** and **Figure 11** represent the intersection crash frequencies across the County. **Table 7** provides the top crash frequency Non-SIS corridors while **Figure 12** displays the Non-SIS corridor crash frequencies across the County.

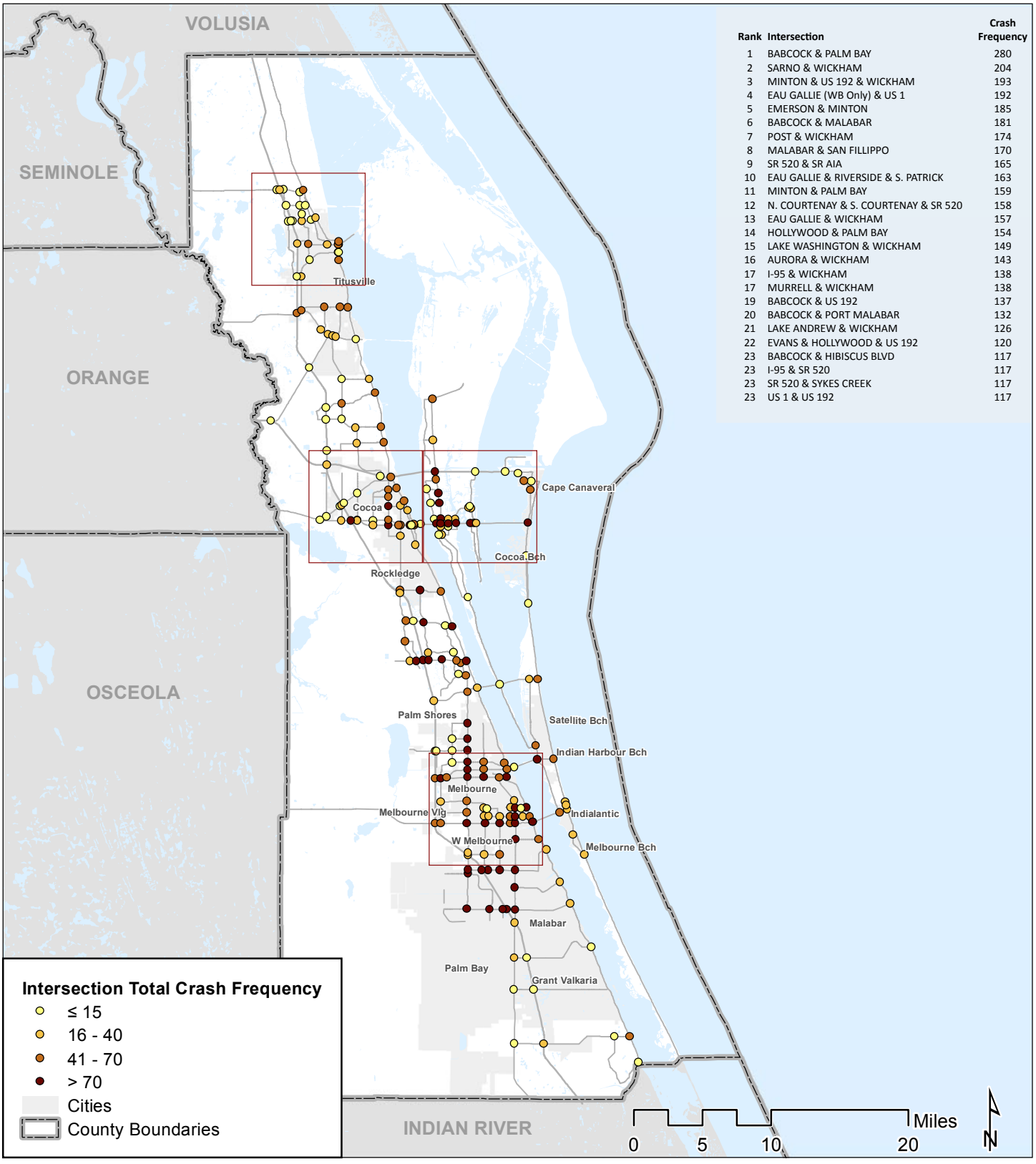
The majority of the high crash intersections based on frequency are in Melbourne and Palm Bay. Additionally, 20 of the high crash intersections by frequency are located along Babcock Street, US 192, and Wickham/Minton Road. Of those 20 intersections, 11 of them are along Wickham/Minton Road.

As displayed in **Figure 12**, a majority of the high crash corridors based on frequency are also located in Melbourne and Palm Bay. 20 of the top 25 high crash corridors occurred along Babcock Street, Malabar Road, Palm Bay Road, SR A1A, US 1, and Wickham Road.

A map displaying the analysis of crash frequencies along SIS corridors can be found in **Appendix B**. Following the trends observed for intersections and corridors, the majority of the crashes on SIS facilities occur on I-95 from the Indian River County Line to SR 520 with the highest concentrations in Melbourne and Palm Bay.

Table 6: Top Crash Frequency Intersections

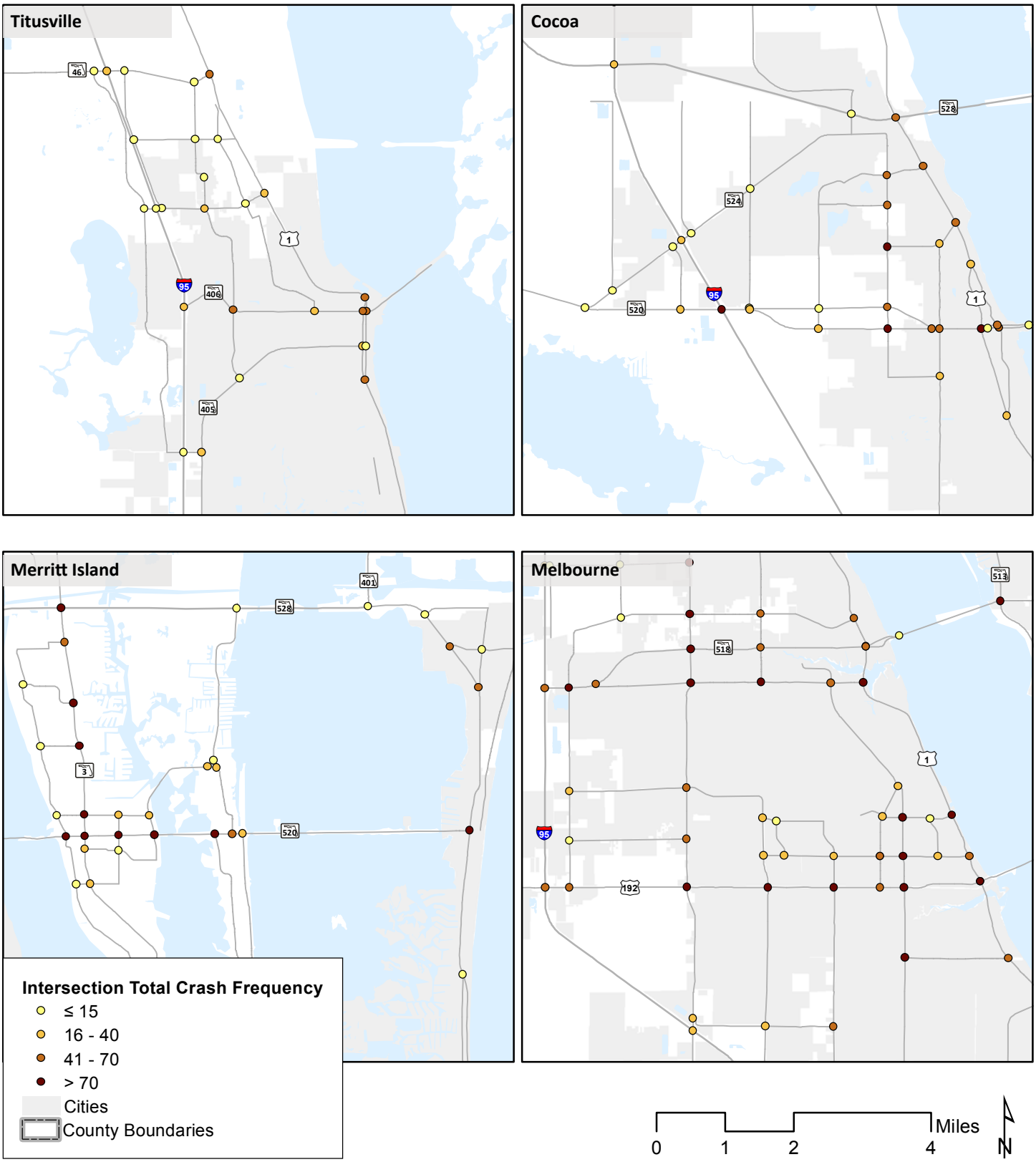
Rank	Intersection	Crash Frequency
1	BABCOCK & PALM BAY	280
2	SARNO & WICKHAM	204
3	MINTON & US 192 & WICKHAM	193
4	EAU GALLIE (WB Only) & US 1	192
5	EMERSON & MINTON	185
6	BABCOCK & MALABAR	181
7	POST & WICKHAM	174
8	MALABAR & SAN FILLIPPO	170
9	SR 520 & SR AIA	165
10	EAU GALLIE & RIVERSIDE & S. PATRICK	163
11	MINTON & PALM BAY	159
12	N. COURTENAY & S. COURTENAY & SR 520	158
13	EAU GALLIE & WICKHAM	157
14	HOLLYWOOD & PALM BAY	154
15	LAKE WASHINGTON & WICKHAM	149
16	AURORA & WICKHAM	143
17	I-95 & WICKHAM	138
17	MURRELL & WICKHAM	138
19	BABCOCK & US 192	137
20	BABCOCK & PORT MALABAR	132
21	LAKE ANDREW & WICKHAM	126
22	EVANS & HOLLYWOOD & US 192	120
23	BABCOCK & HIBISCUS BLVD	117
23	I-95 & SR 520	117
23	SR 520 & SYKES CREEK	117
23	US 1 & US 192	117



Rank	Intersection	Crash Frequency
1	BABCOCK & PALM BAY	280
2	SARNO & WICKHAM	204
3	MINTON & US 192 & WICKHAM	193
4	EAU GALLIE (WB Only) & US 1	192
5	EMERSON & MINTON	185
6	BABCOCK & MALABAR	181
7	POST & WICKHAM	174
8	MALABAR & SAN FILLIPPO	170
9	SR 520 & SR AIA	165
10	EAU GALLIE & RIVERSIDE & S. PATRICK	163
11	MINTON & PALM BAY	159
12	N. COURTENAY & S. COURTENAY & SR 520	158
13	EAU GALLIE & WICKHAM	157
14	HOLLYWOOD & PALM BAY	154
15	LAKE WASHINGTON & WICKHAM	149
16	AURORA & WICKHAM	143
17	I-95 & WICKHAM	138
17	MURRELL & WICKHAM	138
19	BABCOCK & US 192	137
20	BABCOCK & PORT MALABAR	132
21	LAKE ANDREW & WICKHAM	126
22	EVANS & HOLLYWOOD & US 192	120
23	BABCOCK & HIBISCUS BLVD	117
23	I-95 & SR 520	117
23	SR 520 & SYKES CREEK	117
23	US 1 & US 192	117

Intersection Crash Frequency
2009 - 2013

Figure
10

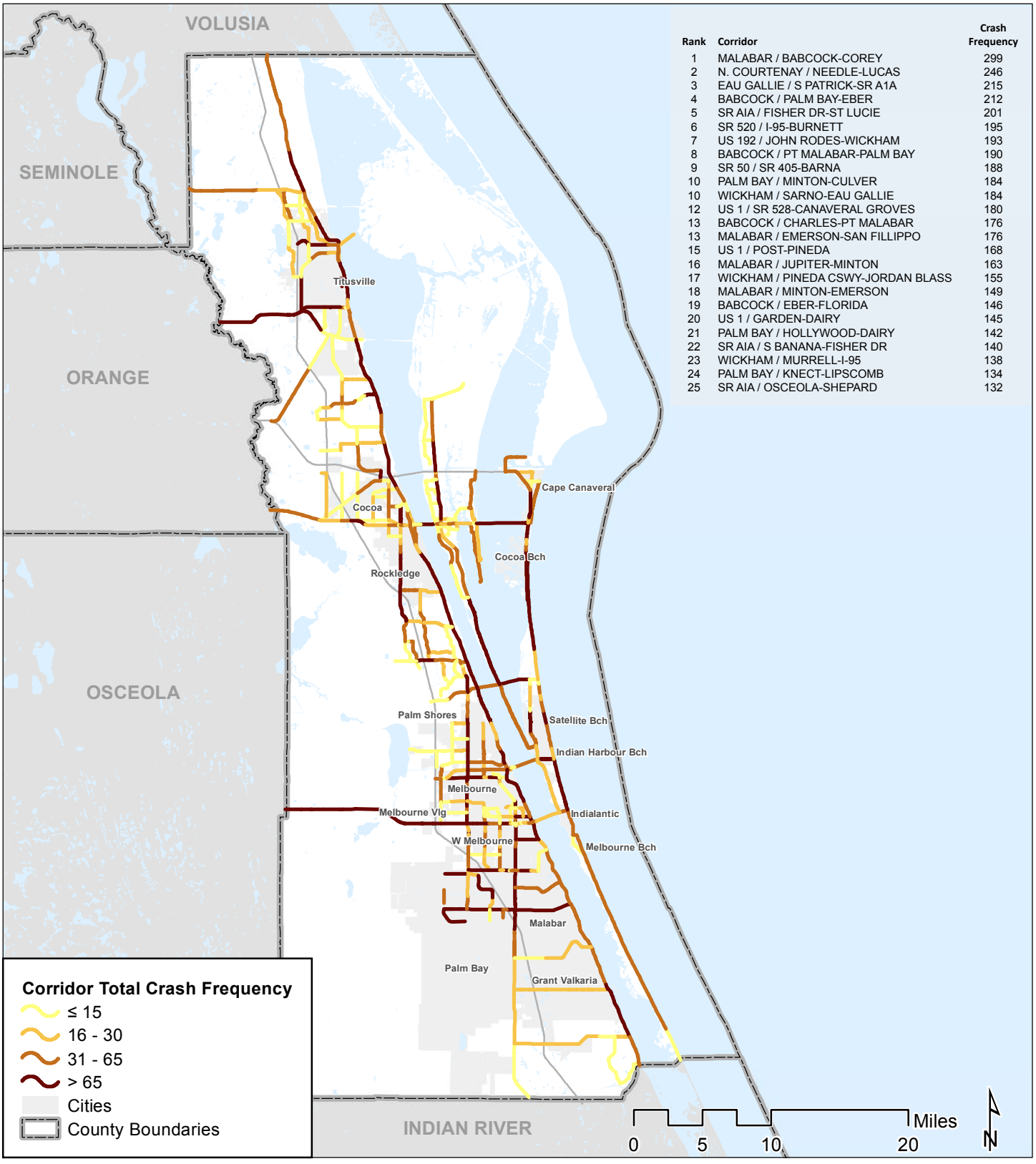


Intersection Crash Frequency
City Level Insets
2009 - 2013

Figure
11

Table 7: Top Crash Frequency Non-SIS Corridors

Rank	Corridor	Crash Frequency
1	MALABAR / BABCOCK-COREY	299
2	N. COURTENAY / NEEDLE-LUCAS	246
3	EAU GALLIE / S PATRICK-SR A1A	215
4	BABCOCK / PALM BAY-EBER	212
5	SR AIA / FISHER DR-ST LUCIE	201
6	SR 520 / I-95-BURNETT	195
7	US 192 / JOHN RODES-WICKHAM	193
8	BABCOCK / PT MALABAR-PALM BAY	190
9	SR 50 / SR 405-BARNA	188
10	PALM BAY / MINTON-CULVER	184
10	WICKHAM / SARNO-EAU GALLIE	184
12	US 1 / SR 528-CANAVERAL GROVES	180
13	BABCOCK / CHARLES-PT MALABAR	176
13	MALABAR / EMERSON-SAN FILLIPPO	176
15	US 1 / POST-PINEDA	168
16	MALABAR / JUPITER-MINTON	163
17	WICKHAM / PINEDA CSWY-JORDAN BLASS	155
18	MALABAR / MINTON-EMERSON	149
19	BABCOCK / EBER-FLORIDA	146
20	US 1 / GARDEN-DAIRY	145
21	PALM BAY / HOLLYWOOD-DAIRY	142
22	SR AIA / S BANANA-FISHER DR	140
23	WICKHAM / MURRELL-I-95	138
24	PALM BAY / KNECT-LIPSCOMB	134
25	SR AIA / OSCEOLA-SHEPARD	132



Rank	Corridor	Crash Frequency
1	MALABAR / BABCOCK-COREY	299
2	N. COURTENAY / NEEDLE-LUCAS	246
3	EAU GALLIE / S PATRICK-SR A1A	215
4	BABCOCK / PALM BAY-EBER	212
5	SR AIA / FISHER DR-ST LUCIE	201
6	SR 520 / I-95-BURNETT	195
7	US 192 / JOHN RODES-WICKHAM	193
8	BABCOCK / PT MALABAR-PALM BAY	190
9	SR 50 / SR 405-BARNA	188
10	PALM BAY / MINTON-CULVER	184
10	WICKHAM / SARNO-EAU GALLIE	184
12	US 1 / SR 528-CANAVERAL GROVES	180
13	BABCOCK / CHARLES-PT MALABAR	176
13	MALABAR / EMERSON-SAN FILLIPPO	176
15	US 1 / POST-PINEDA	168
16	MALABAR / JUPITER-MINTON	163
17	WICKHAM / PINEDA CSWY-JORDAN BLASS	155
18	MALABAR / MINTON-EMERSON	149
19	BABCOCK / EBER-FLORIDA	146
20	US 1 / GARDEN-DAIRY	145
21	PALM BAY / HOLLYWOOD-DAIRY	142
22	SR AIA / S BANANA-FISHER DR	140
23	WICKHAM / MURRELL-I-95	138
24	PALM BAY / KNECT-LIPSCOMB	134
25	SR AIA / OSCEOLA-SHEPARD	132

Non-SIS Corridor Crash Frequency
Non-SIS Facilities
Crash Data 2009 - 2013

Figure 12

Crash Severity

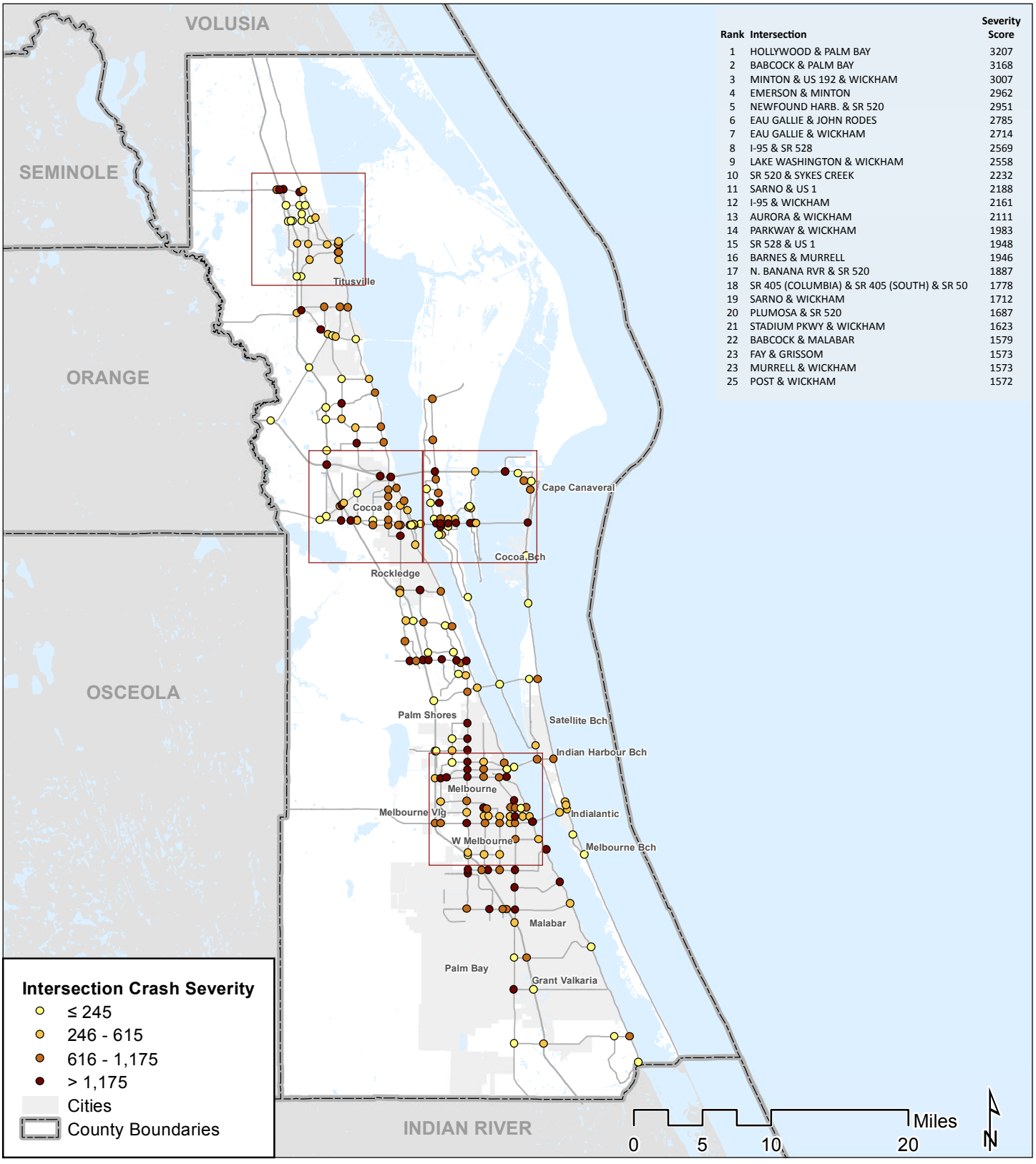
During the study period, a total of 268 fatal crashes, 11,553 injury, and 27,184 PDO crashes were reported. A severity score was calculated for each intersection and corridor, as described in the study methodology. **Table 8** provides the top crash severity intersections while **Figure 13** and **Figure 14** represent the intersection crash severities across the County. **Table 9** provides the top crash severity Non-SIS corridors while **Figure 15** displays the Non-SIS corridor crash frequencies across the County. The fatal crashes within the County were also mapped on **Figure 16** and **Figure 17**.

The top intersections and corridors ranked by crash severity are dispersed throughout the county. Even so, some general trends are apparent. Palm Bay Road, SR 520, and Wickham Road have more of the top intersections by crash severity than the other roadways reviewed. Nine of the top 25 crash severity corridors were located along SR 520 and US 1, with US 1 having two of the top three corridors. A map displaying the analysis of crash severity along SIS corridors can be found in **Appendix B**.

Based on the analysis, there were 18 fatal crashes per VMT on SIS facilities and 21 fatal crashes per VMT on Non-SIS facilities. As seen on **Figure 16** and **Figure 17**, the I-95 corridor, the SR 520 corridor, the SR 528 corridor, US 1 between Malabar Road to US 192 and US 1 north of SR 518, US 192 from I-95 to Wickham Road, and Wickham Road from Sarno Road to Parkway Drive all observed a higher number of fatal crashes during the five-year study period.

Table 8: Top Crash Severity Intersections

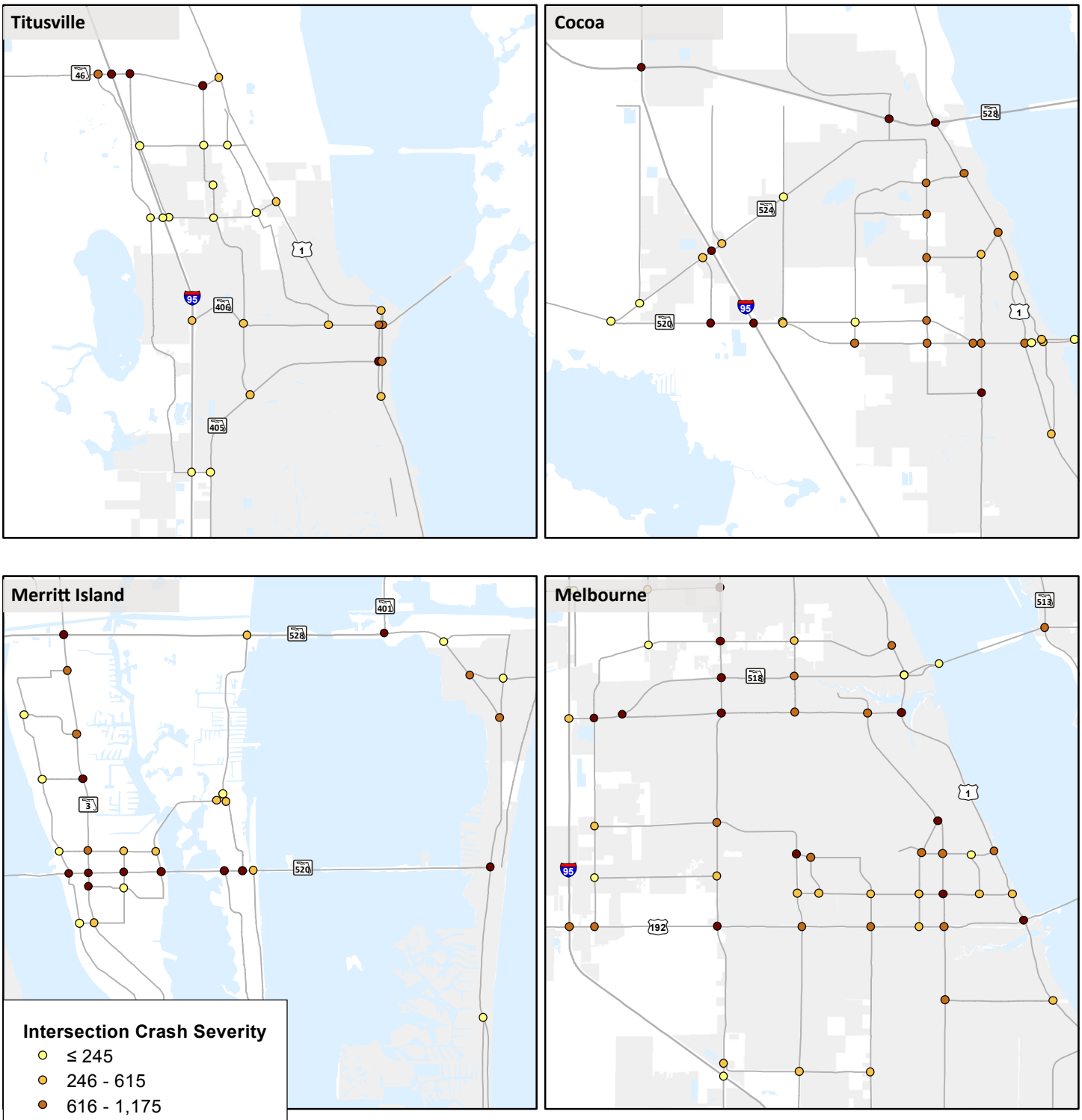
Rank	Corridor	Severity Score
1	HOLLYWOOD & PALM BAY	3207
2	BABCOCK & PALM BAY	3168
3	MINTON & US 192 & WICKHAM	3007
4	EMERSON & MINTON	2962
5	NEWFOUND HARB. & SR 520	2951
6	EAU GALLIE & JOHN RODES	2785
7	EAU GALLIE & WICKHAM	2714
8	I-95 & SR 528	2569
9	LAKE WASHINGTON & WICKHAM	2558
10	SR 520 & SYKES CREEK	2232
10	SARNO & US 1	2188
12	I-95 & WICKHAM	2161
13	AURORA & WICKHAM	2111
13	PARKWAY & WICKHAM	1983
15	SR 528 & US 1	1948
16	BARNES & MURRELL	1946
17	N. BANANA RVR & SR 520	1887
18	SR 405 (COLUMBIA) & SR 405 (SOUTH) & SR 50	1778
19	SARNO & WICKHAM	1712
20	PLUMOSA & SR 520	1687
21	STADIUM PKWY & WICKHAM	1623
22	BABCOCK & MALABAR	1579
23	FAY & GRISSOM	1573
24	MURRELL & WICKHAM	1573
25	POST & WICKHAM	1572



Rank	Intersection	Severity Score
1	HOLLYWOOD & PALM BAY	3207
2	BABCOCK & PALM BAY	3168
3	MINTON & US 192 & WICKHAM	3007
4	EMERSON & MINTON	2962
5	NEWFOUND HARB. & SR 520	2951
6	EAU GALLIE & JOHN RODES	2785
7	EAU GALLIE & WICKHAM	2714
8	I-95 & SR 528	2569
9	LAKE WASHINGTON & WICKHAM	2558
10	SR 520 & SYKES CREEK	2232
11	SARNO & US 1	2188
12	I-95 & WICKHAM	2161
13	AURORA & WICKHAM	2111
14	PARKWAY & WICKHAM	1983
15	SR 528 & US 1	1948
16	BARNES & MURRELL	1946
17	N. BANANA RVR & SR 520	1887
18	SR 405 (COLUMBIA) & SR 405 (SOUTH) & SR 50	1778
19	SARNO & WICKHAM	1712
20	PLUMOSA & SR 520	1687
21	STADIUM PKWY & WICKHAM	1623
22	BABCOCK & MALABAR	1579
23	FAY & GRISSOM	1573
23	MURRELL & WICKHAM	1573
25	POST & WICKHAM	1572

Intersection Crash Severity
2009 - 2013

Figure 13

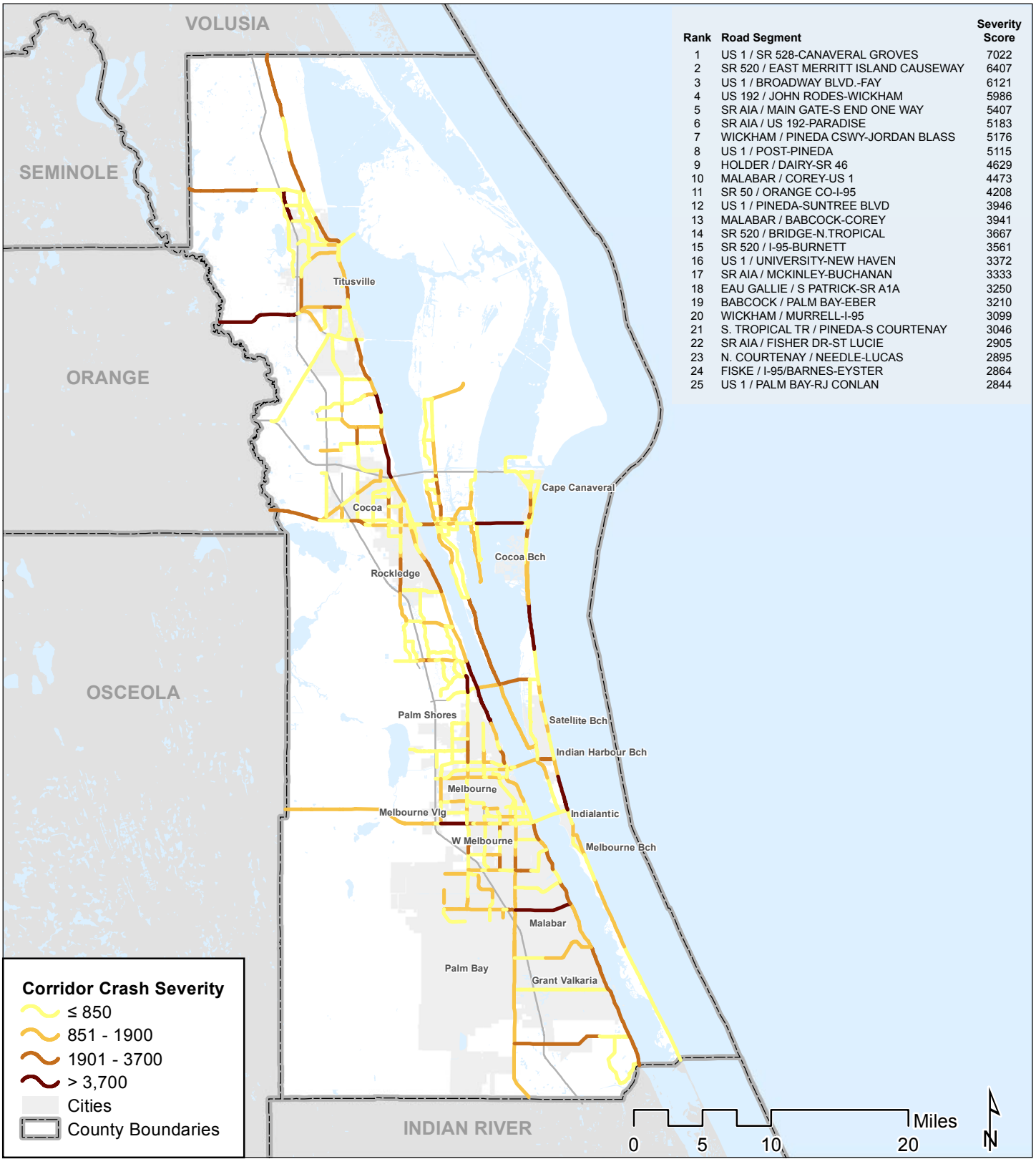


Intersection Crash Severity
City Level Insets
2009 - 2013

Figure
14

Table 9: Top Crash Severity Non-SIS Corridors

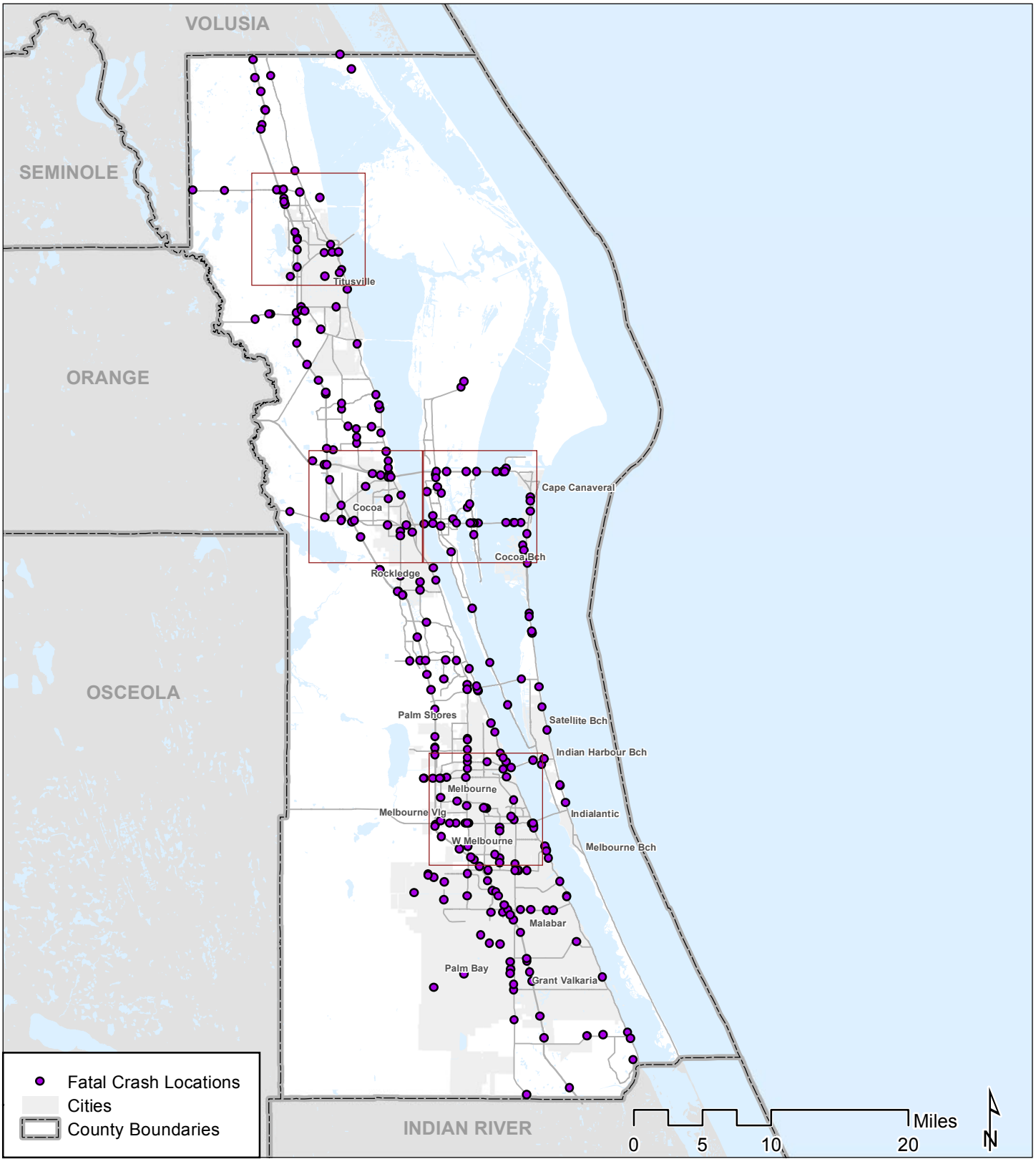
Rank	Corridor	Severity Score
1	US 1 / SR 528-CANAVERAL GROVES	7022
2	SR 520 / EAST MERRITT ISLAND CAUSEWAY	6407
3	US 1 / BROADWAY BLVD.-FAY	6121
4	US 192 / JOHN RODES-WICKHAM	5986
5	SR AIA / MAIN GATE-S END ONE WAY	5407
6	SR AIA / US 192-PARADISE	5183
7	WICKHAM / PINEDA CSWY-JORDAN BLASS	5176
8	US 1 / POST-PINEDA	5115
9	HOLDER / DAIRY-SR 46	4629
10	MALABAR / COREY-US 1	4473
10	SR 50 / ORANGE CO-I-95	4208
12	US 1 / PINEDA-SUNTREE BLVD	3946
13	MALABAR / BABCOCK-COREY	3941
13	SR 520 / BRIDGE-N.TROPICAL	3667
15	SR 520 / I-95-BURNETT	3561
16	US 1 / UNIVERSITY-NEW HAVEN	3372
17	SR AIA / MCKINLEY-BUCHANAN	3333
18	EAU GALLIE / S PATRICK-SR A1A	3250
19	BABCOCK / PALM BAY-EBER	3210
20	WICKHAM / MURRELL-I-95	3099
21	S. TROPICAL TR / PINEDA-S COURTENAY	3046
22	SR AIA / FISHER DR-ST LUCIE	2905
23	N. COURTENAY / NEEDLE-LUCAS	2895
24	FISKE / I-95/BARNES-EYSTER	2864
25	US 1 / PALM BAY-RJ CONLAN	2844



Rank	Road Segment	Severity Score
1	US 1 / SR 528-CANAVERAL GROVES	7022
2	SR 520 / EAST MERRITT ISLAND CAUSEWAY	6407
3	US 1 / BROADWAY BLVD.-FAY	6121
4	US 192 / JOHN RODES-WICKHAM	5986
5	SR AIA / MAIN GATE-S END ONE WAY	5407
6	SR AIA / US 192-PARADISE	5183
7	WICKHAM / PINEDA CSWY-JORDAN BLASS	5176
8	US 1 / POST-PINEDA	5115
9	HOLDER / DAIRY-SR 46	4629
10	MALABAR / COREY-US 1	4473
11	SR 50 / ORANGE CO-I-95	4208
12	US 1 / PINEDA-SUNTREE BLVD	3946
13	MALABAR / BABCOCK-COREY	3941
14	SR 520 / BRIDGE-N.TROPICAL	3667
15	SR 520 / I-95-BURNETT	3561
16	US 1 / UNIVERSITY-NEW HAVEN	3372
17	SR AIA / MCKINLEY-BUCHANAN	3333
18	EAU GALLIE / S PATRICK-SR A1A	3250
19	BABCOCK / PALM BAY-EBER	3210
20	WICKHAM / MURRELL-I-95	3099
21	S. TROPICAL TR / PINEDA-S COURTENAY	3046
22	SR AIA / FISHER DR-ST LUCIE	2905
23	N. COURTENAY / NEEDLE-LUCAS	2895
24	FISKE / I-95/BARNES-EYSTER	2864
25	US 1 / PALM BAY-RJ CONLAN	2844

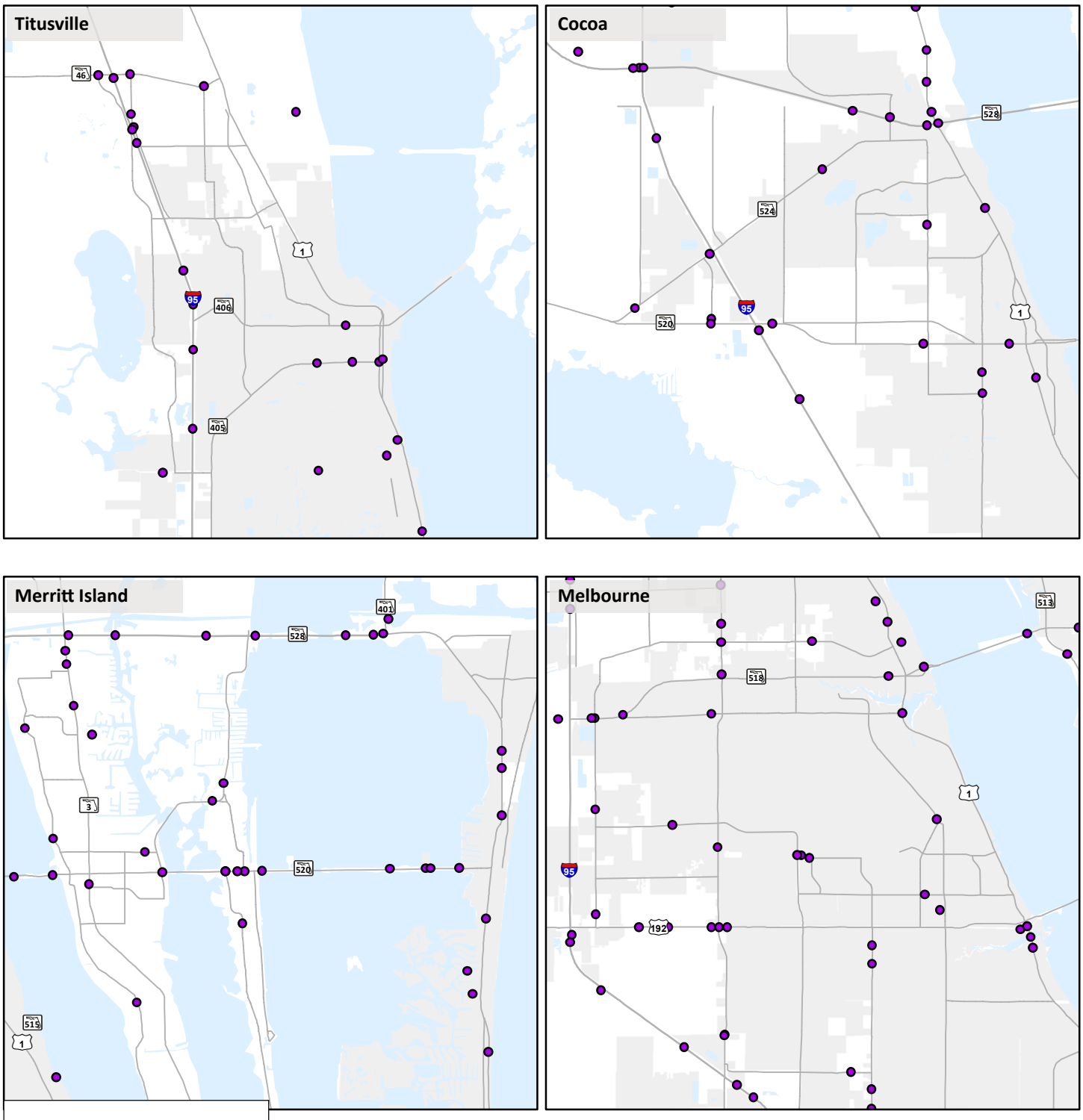
Non-SIS Corridor Crash Severity
Non-SIS Facilities
Crash Data 2009 - 2013

Figure 15



Fatal Crash Locations
All Facilities and Intersections
2009 - 2013

Figure
16



Fatal Crash Locations
City Level Insets
Crash Data 2009 - 2013

Figure
17

Crash Types

An analysis of crash types in the County was completed in order to generate a better understanding of patterns within the county. The five most prevalent crash types for both intersections and corridors (SIS and Non-SIS) were found to be the following:

Intersections

- Rear end;
- Angle;
- Lane Departure;
- Left Turn; and
- Sideswipe.

Corridors

- Rear end;
- Angle;
- Lane Departure (to be discussed as part of the **SHSP Emphasis Areas** section);
- Left Turn (not mapped for SIS); and
- Head On (not mapped for SIS).

These crash types were mapped and are summarized in the following section.

REAR-END

There were a total of 9,617 rear-end crashes during the study period, of which 3,737 were at intersections and 5,880 were on corridors. The top intersections for rear-end crashes are along Babcock Street, Eau Gallie Boulevard, and Wickham/Minton Road. The corridors with the most crashes were mostly concentrated in the southern portion of the county and along SR A1A and US 1. The highest corridors for rear-end crashes are along Babcock Street, US 1, and Wickham/Minton Road. See **Appendix C** for maps of the rear-end crashes at intersections and along corridors (SIS and Non-SIS).

ANGLE

A total of 2,271 angle crashes occurred during the study period. Of those, 789 occurred at intersections and 1,482 occurred along corridors. There was a larger concentration of high frequency angle crash intersections along North Courtenay Parkways and SR 520 in Merritt Island than in other areas of the County. Angle crashes along the corridors were distributed throughout the County. The highest crash intersections were along Clearlake Drive, North Courtenay Parkway, and SR 520. The highest crash corridors were along North Courtenay Parkway, SR A1A, and US 1. See **Appendix C** for maps of the angle crashes at intersections and along corridors (SIS and Non-SIS).

INTERSECTION LANE DEPARTURE

There were a total of 7,046 lane departure crashes during the study period, of which 1,247 were at intersections. The top intersections for lane departure crashes are along Eau Gallie Boulevard (5 intersections), various I-95 interchange ramp junctions (6), US 1 (5), and Wickham/Minton Road (6). See **Appendix C** for maps of the lane departure crashes at intersections and along SIS corridors (Non-SIS to be discussed as part of the **SHSP Emphasis Areas** section).

LEFT-TURN

There were a total of 1,970 left-turn crashes during the study period, with 741 occurring at intersections and 1,229 occurring along corridors. The left-turn crashes were dispersed throughout the County, with the majority occurring in the central and southern areas. Multiple Wickham Road intersections (10) and corridors (5) were on the high frequency left-turn crash lists. See **Appendix C** for maps of the left-turn crashes at intersections and along Non-SIS corridors (SIS corridors not mapped due to low crash frequency).

INTERSECTION SIDESWIPE

There were a total of 1,589 sideswipe crashes during the study period, of which 525 were at intersections. The top intersections for sideswipe crashes are along various I-95 interchange ramp junctions (6), US 1 (4), and Wickham/Minton Road (8). See **Appendix C** for a map displaying the sideswipe crash frequencies at intersections.

CORRIDOR HEAD-ON

By nature of the crash type, a majority of head-on crashes occurred along corridors. There were 1,076 head-on crashes during the study period, of which most occurred in the Cocoa/Rockledge area and along SR A1A and SR 520 in Cocoa Beach. Twelve of the top 28 high crash corridors occurred along the SR A1A and SR 520 corridors. Other high crash corridors include US 1 in Cocoa/Rockledge and US 192 in Melbourne. See **Appendix C** for a map displaying the head-on crash frequencies along corridors.

Crash Rate

To provide another data analysis point, crash rate was calculated for each corridor (SIS and Non-SIS). The crash rate calculation took into account total number of crashes over the five year study period, the average Annual Average Daily Traffic over the five year period, and the length of the roadway segment. The two corridors which appeared most frequently on the high crash rate list were Malabar Road (4) and SR A1A (3). Crash rate can be a misleading safety metric because it relies on the proportion of number of crashes to volume; if there is a lower volume, the crash rate will be higher. Theoretically, a corridor with a high crash frequency but a high volume could have a lower crash rate than a corridor with a low crash frequency and volume. As displayed in **Appendix D**, six of the top 10 Non-SIS corridors are roadways with a low volume (<4,000 Annual Average Daily Traffic). Of these roadways, only S. Tropical Trail and Ocean Beach Boulevard have been identified as high crash corridors for the other safety metrics analyzed.

SHSP Emphasis Areas

The final safety metric reviewed related to the seven measurable emphasis areas from the SHSP:

- Intersection Crashes;
- Aggressive Driving;
- Vulnerable Road Users;
  - Bicyclists and Pedestrians
  - Motorcycles
- Lane Departure Crashes;
- Impaired Driving;
- At-Risk;
  - Teen Drivers
  - Aging Road Users
- Distracted Driving.

The following sections identify countywide crash trends relating to the various emphasis areas.

INTERSECTION CRASHES

The geometry and characteristics of an intersection can influence a crash. Crashes occurring within an intersection influence area of 250' were classified as an intersection related crash in this analysis. There were 11,789 intersection related crashes in Brevard County during the analysis period. For more information on high crash intersection locations and trends, refer to the **Crash Frequency** section.

The intersection related crashes were first reviewed based upon number of crashes over the five year study period to identify any upward or downward trends. There was a declining trend in the number of intersection crashes from 2009 to 2011; however, since 2011, there has been an upward trend. The highest number of intersection related crashes reported during the analysis period occurred in 2013 (3,011 crashes). The results of the year by year analysis are shown in **Figure 18**.

The intersection related crashes were then reviewed based upon the days in which they occurred. The day of the week with the most crashes was Friday with 2,062 crashes (17.4 percent). The number of crashes on Monday through Thursday was averaged approximately 1,750 per day. The results of the day of the week analysis are shown in **Figure 19**.

The intersection related crashes were also summarized by the hour at which they occurred and were grouped in ranges of time pertaining to the morning commute (6am – 10am), the midday lunch period (10am – 2pm), the afternoon commute home (2pm – 6pm), and nighttime (6pm – 10pm, 10pm – 2am, and 2am to 6am). The intersection related crashes occurred the most in the 2pm – 6pm time period as summarized in **Figure 20**. Of the

total 11,789 intersection related crashes, 3,805 crashes (32.3 percent) occurred from 2pm – 6pm. The next most common time periods were 10am – 2pm and 6pm – 10pm which had 2,998 and 2,007 crashes, respectively.

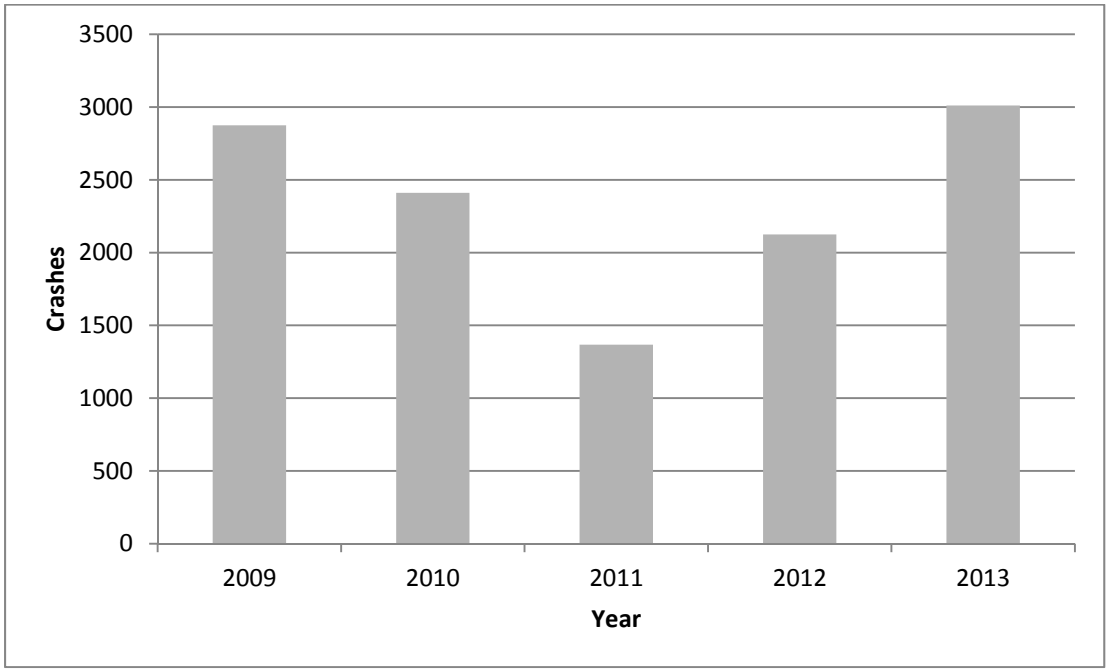


Figure 18: Intersection Crashes by Year (2009-2013)

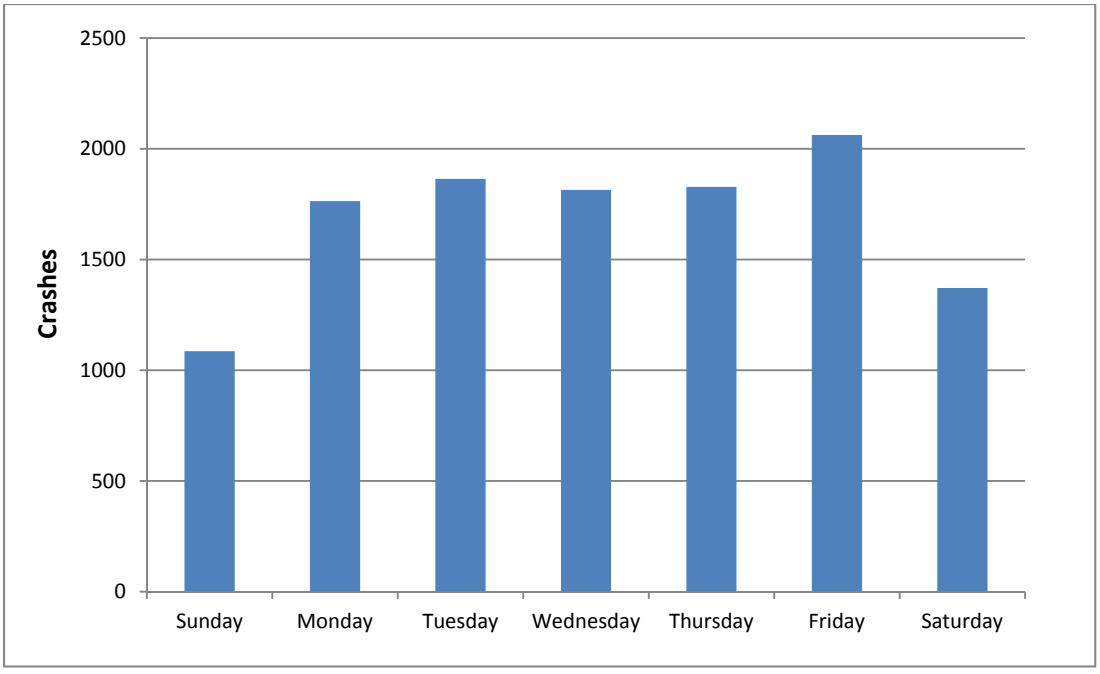


Figure 19: Intersection Crashes by Day of the Week (2009-2013)

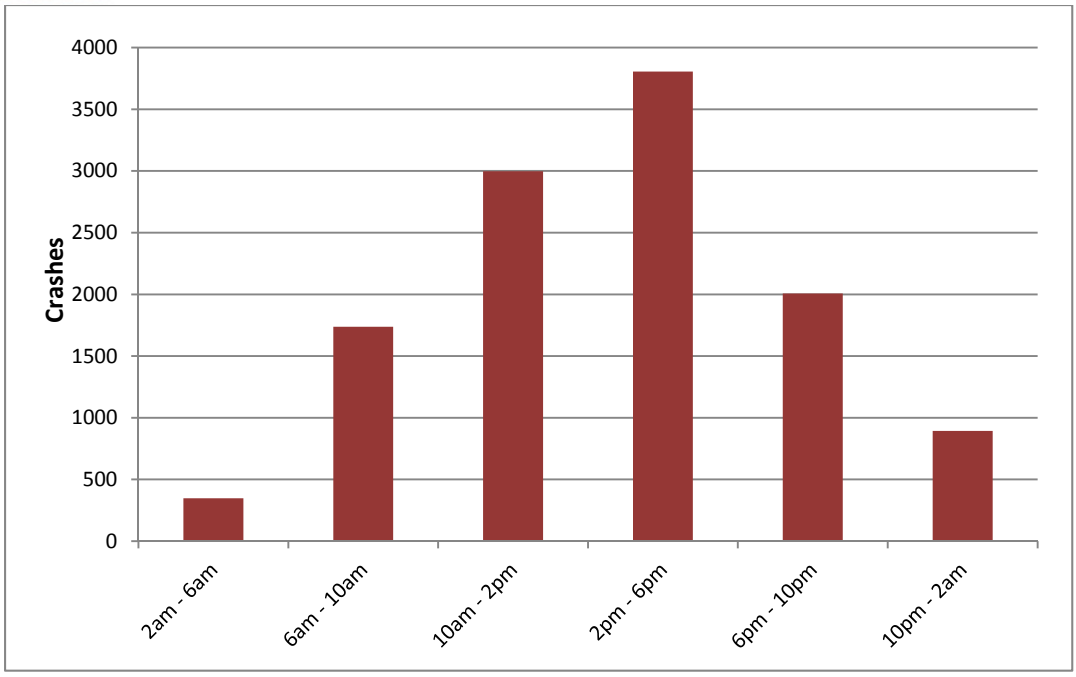


Figure 20: Intersection Crashes by Time of Day (2009-2013)

The intersection crashes were also reviewed for each individual planning area within the County (see **Figure 22** for SOS planning subareas**)**. The South planning area had a significantly higher intersection related crash total compared to the other planning areas (52 percent/6,182 crashes), which can primarily be attributed to the higher roadway volumes in the southern portion of the County. The Central planning area was the next highest with 2,143 reported intersection crashes. The results of this analysis are summarized in **Figure 21**.

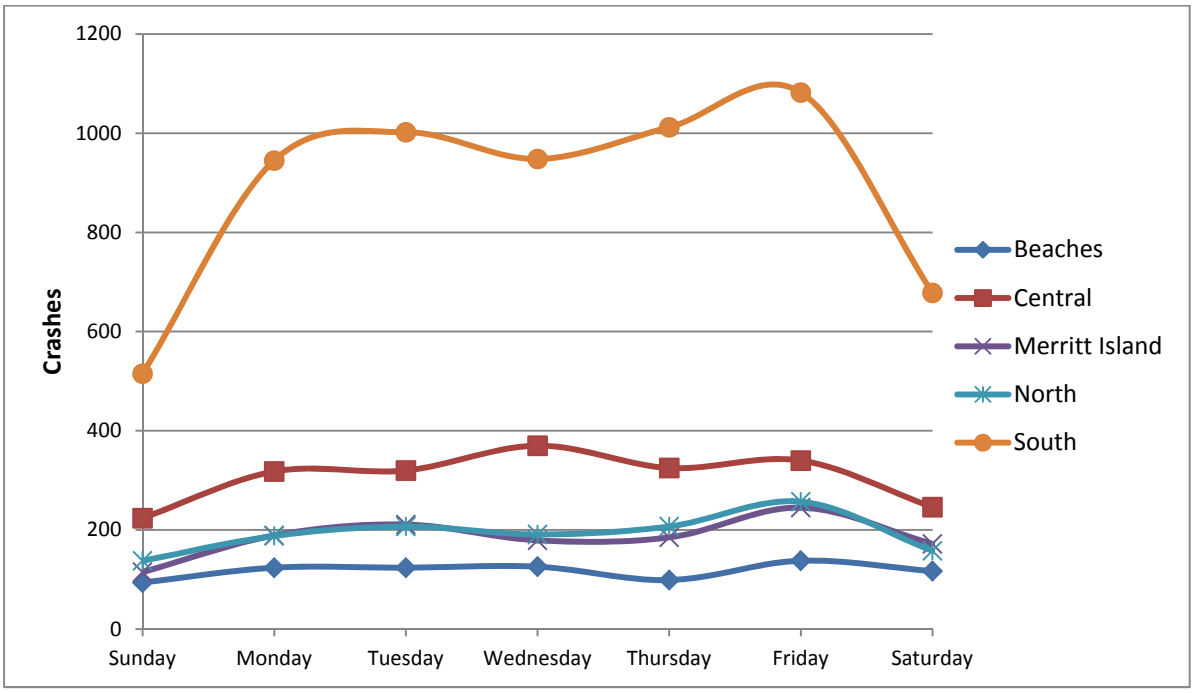
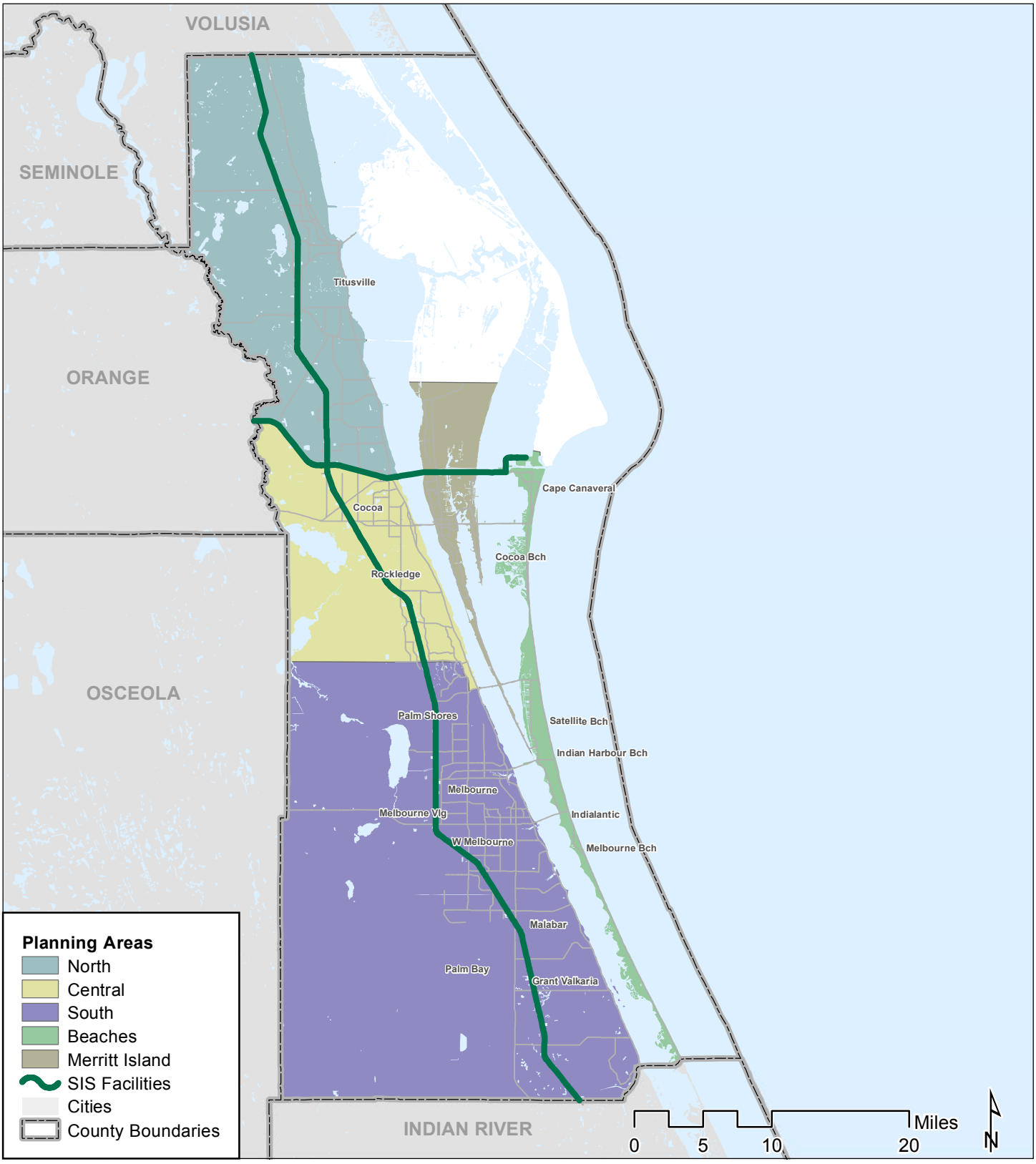


Figure 21: Intersection Crashes by Planning Area (2009-2013)



SOS Planning Subareas

Figure 22

AGGRESSIVE DRIVING

For the aggressive driving metric, the crash data was sorted for crashes including speeding, unsafe or improper lane change, following too closely, failure to yield right-of-way, improper passing, and failure to obey traffic control device. Crashes including any of these causes were considered an aggressive driving related crash.

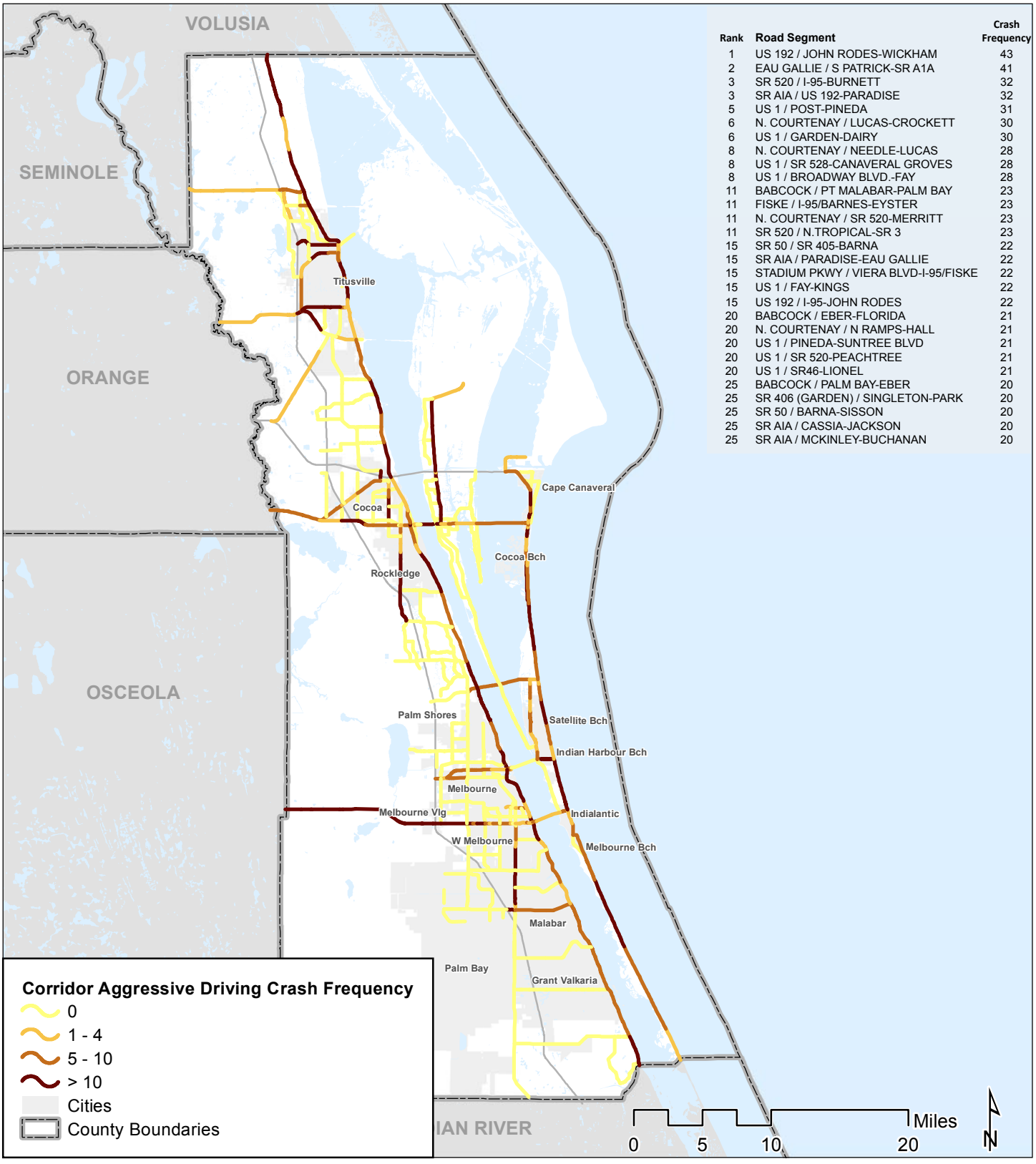
A total of 2,404 aggressive driving crashes were reported in the study period. 284 of these were on SIS facilities and 2,120 crashes occurred on Non-SIS facilities. As can be seen in **Figure 23**, 19 of the top 29 high crash corridors are along Babcock Street, N. Courtenay Parkway, SR A1A, and US 1. Nine of those are along US 1. A map of the aggressive driving crashes on SIS facilities can be found in **Appendix E**.

The aggressive driving related crashes were first reviewed based upon number of crashes over the five year study period to identify any upward or downward trends. From 2009 to 2011, the number of aggressive driving crashes stayed relatively steady. Since 2011, there has been an upward trend, with 2013 having the highest number of reported aggressive driving crashes during the five year analysis period (651 crashes). The results of the year by year analysis are shown in **Figure 24**.

The aggressive driving related crashes were then summarized based upon the number of crashes by day of week. The number of crashes is consistent Sunday through Thursday with approximately 500 crashes per day. However, a significant drop off in crashes was observed Friday and Saturday (approximately half as many crashes). The number of countywide aggressive driving related crashes by day of the week is illustrated in **Figure 25**.

The aggressive driving related crashes were summarized by the hour at which they occurred and were grouped in ranges of time identified in the **Intersection Crashes** metric. The most common aggressive driving related crashes occurred between 2pm and 6pm, during the afternoon commute. Of the total 2,404 aggressive driving related crashes, 967 occurred during the 2pm – 6pm range. The number of crashes in each time range is shown in **Figure 26**.

The aggressive driving related crashes were also reviewed for each individual planning area within the County (see **Figure 22** for SOS planning subareas**)**. **Figure 27** displays the number of aggressive driving related crashes for each planning area on each day of the week. As displayed in the graphic, the South and Beaches planning areas had the most aggressive driving related crashes with 805 and 613 crashes, respectively. I-95 had the least number of aggressive driving related crashes in the County with 282 reported crashes over the five-year study period.



Rank	Road Segment	Crash Frequency
1	US 192 / JOHN RODES-WICKHAM	43
2	EAU GALLIE / S PATRICK-SR A1A	41
3	SR 520 / I-95-BURNETT	32
3	SR AIA / US 192-PARADISE	32
5	US 1 / POST-PINEDA	31
6	N. COURTENAY / LUCAS-CROCKETT	30
6	US 1 / GARDEN-DAIRY	30
8	N. COURTENAY / NEEDLE-LUCAS	28
8	US 1 / SR 528-CANAVERAL GROVES	28
8	US 1 / BROADWAY BLVD.-FAY	28
11	BABCOCK / PT MALABAR-PALM BAY	23
11	FISKE / I-95/BARNES-EYSTER	23
11	N. COURTENAY / SR 520-MERRITT	23
11	SR 520 / N.TROPICAL-SR 3	23
15	SR 50 / SR 405-BARNA	22
15	SR AIA / PARADISE-EAU GALLIE	22
15	STADIUM PKWY / VIERA BLVD-I-95/FISKE	22
15	US 1 / FAY-KINGS	22
15	US 192 / I-95-JOHN RODES	22
20	BABCOCK / EBER-FLORIDA	21
20	N. COURTENAY / N RAMPS-HALL	21
20	US 1 / PINEDA-SUNTREE BLVD	21
20	US 1 / SR 520-PEACHTREE	21
20	US 1 / SR46-LIONEL	21
25	BABCOCK / PALM BAY-EBER	20
25	SR 406 (GARDEN) / SINGLETON-PARK	20
25	SR 50 / BARNA-SISSON	20
25	SR AIA / CASSIA-JACKSON	20
25	SR AIA / MCKINLEY-BUCHANAN	20

Non-SIS Corridor Aggressive Driving Crash Frequency
Non-SIS Facilities
Crash Data 2009 - 2013

Figure 23

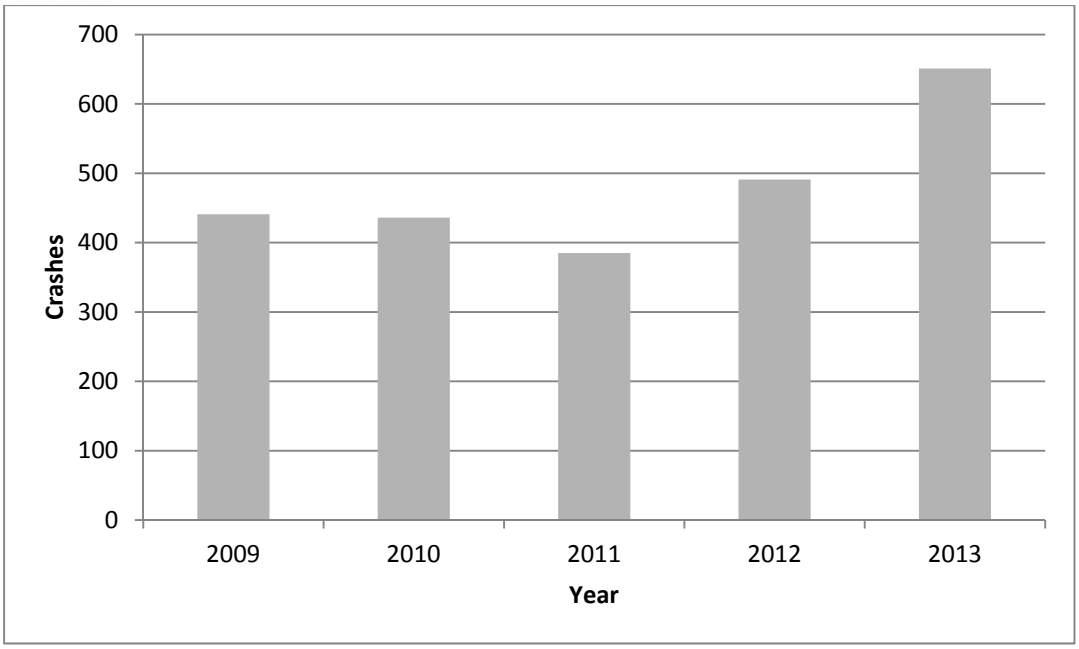


Figure 24: Aggressive Driving Crashes by Year (2009-2013)

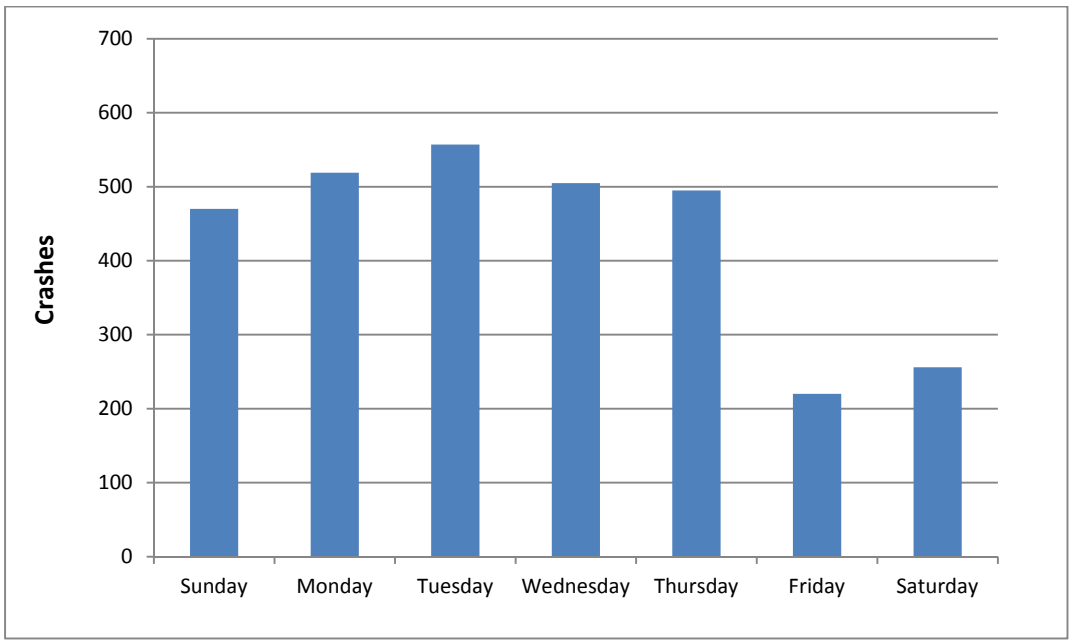


Figure 25: Aggressive Driving Crashes by Day of the Week (2009-2013)

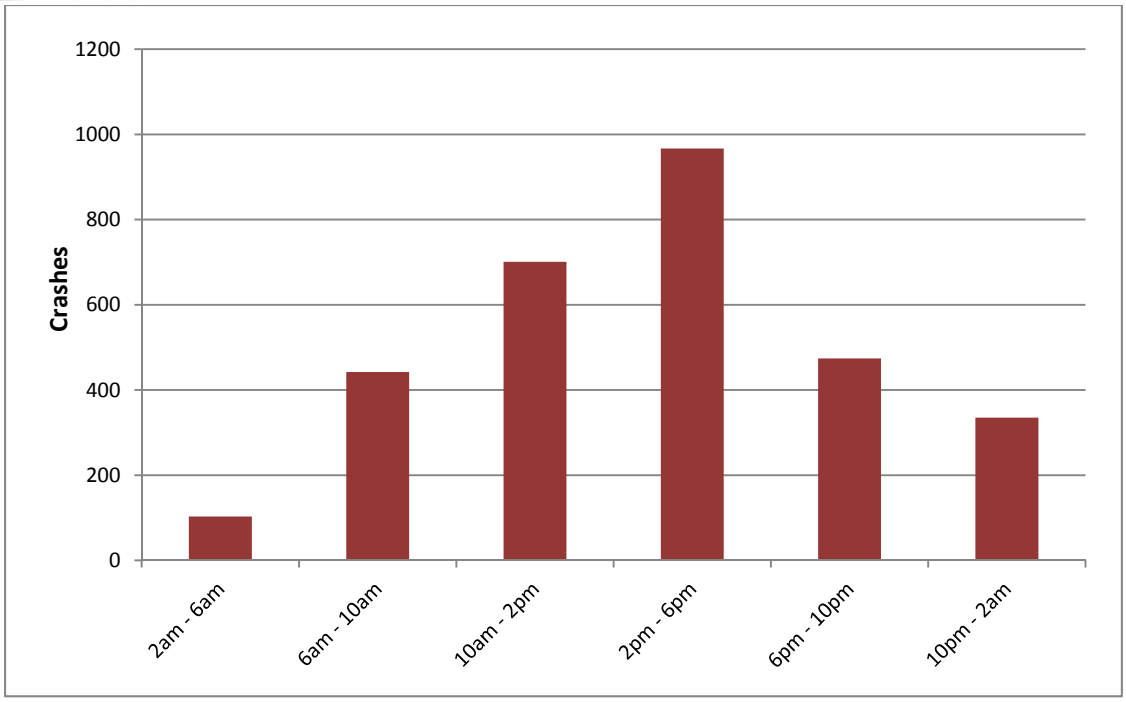


Figure 26: Aggressive Driving Crashes by Time of Day (2009-2013)

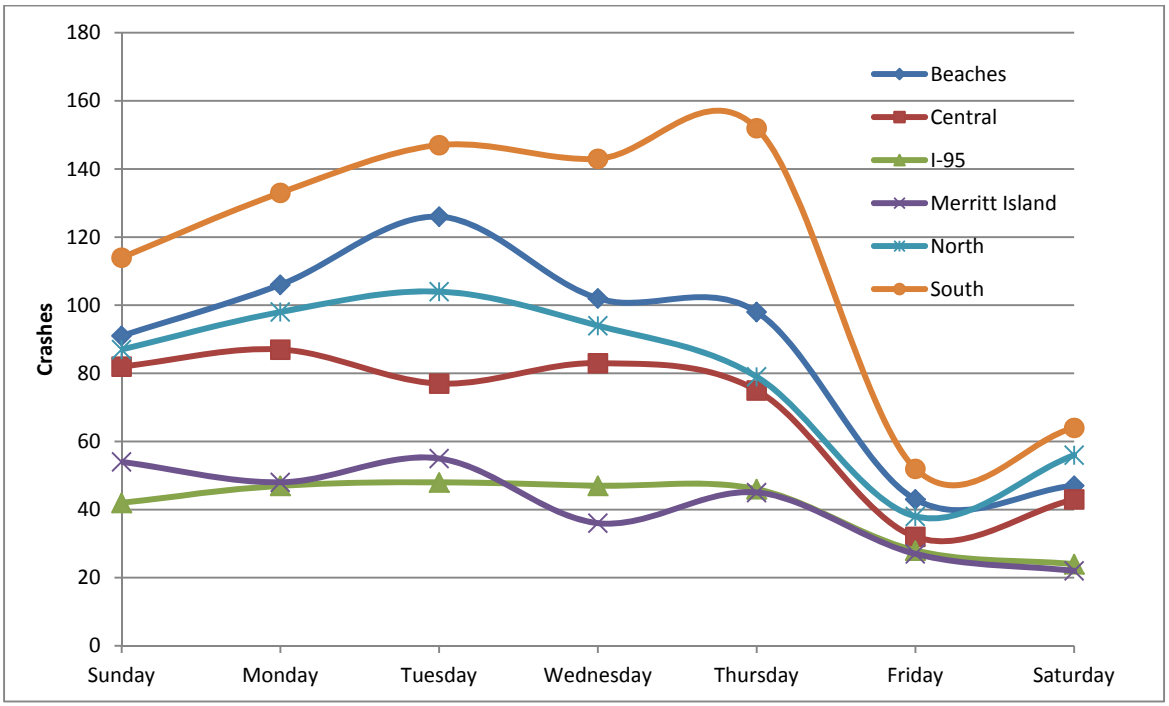


Figure 27: Aggressive Driving Crashes by Planning Area (2009-2013)

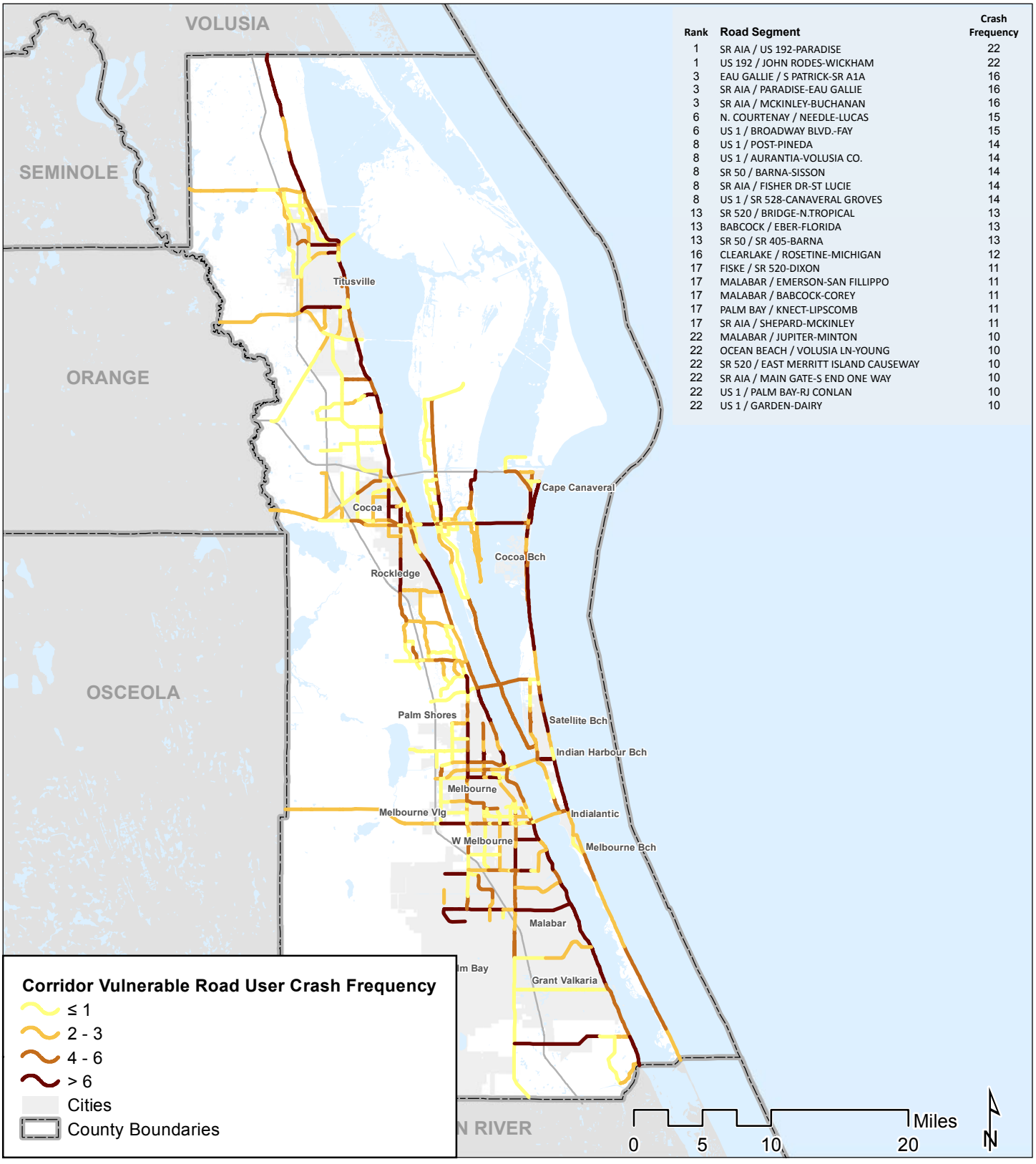
VULNERABLE ROAD USER

Two types of analysis were performed for vulnerable road users: 1. The vulnerable road user (pedestrian, bicycle, and motorcycle) crashes on the SOS roadway network and 2. Pedestrian and bicycle crashes countywide. The former is essential for SHSP analysis, while the latter presents a clear picture of where non-motorized crashes are occurring. A total of 1,722 vulnerable road user crashes occurred on the SOS network. Of those, 94 crashes occurred on SIS facilities and 1,628 crashes occurred on Non-SIS facilities. **Table 10** provides the top vulnerable road user crash frequency corridors, broken down by each vulnerable user type, while **Figure 28** displays the vulnerable user crash frequencies on Non-SIS facilities. A map showing the crashes on SIS facilities can be found in **Appendix E**. As displayed in **Table E-1** in **Appendix E**, a majority of the vulnerable road user crashes observed on SIS facilities involved pedestrians leaving their vehicle or involved a motorcyclist.

Table 10 Top 27 Non-SIS Corridors for Vulnerable Road User Crashes (2009 - 2013)

Rank	Corridor	Total Vulnerable Roadway User Crashes	Pedestrian Crashes	Bicycle Crashes	Motorcycle Crashes
1	SR AIA / US 192-PARADISE	22	4	8	10
1	US 192 / JOHN RODES-WICKHAM	22	3	10	9
3	EAU GALLIE / S PATRICK-SR A1A	16	5	5	6
3	SR AIA / PARADISE-EAU GALLIE*	16	4	6	7
3	SR AIA / MCKINLEY-BUCHANAN	16	5	4	7
6	N. COURTENAY / NEEDLE-LUCAS	15	6	2	7
6	US 1 / BROADWAY BLVD.-FAY	15	5	1	9
8	US 1 / POST-PINEDA	14	1	0	13
8	US 1 / AURANTIA-VOLUSIA CO.	14	2	0	12
8	SR 50 / BARNA-SISSON	14	5	4	5
8	SR AIA / FISHER DR-ST LUCIE	14	5	8	1
8	US 1 / SR 528-CANAVERAL GROVES	14	4	3	7
13	SR 520 / BRIDGE-N.TROPICAL	13	1	2	10
13	BABCOCK / EBER-FLORIDA	13	4	4	5
13	SR 50 / SR 405-BARNA	13	6	3	4
16	CLEARLAKE / ROSETINE-MICHIGAN	12	6	3	3
17	FISKE / SR 520-DIXON	11	5	2	4
17	MALABAR / EMERSON-SAN FILLIPPO	11	6	1	4
17	MALABAR / BABCOCK-COREY	11	3	3	5
17	PALM BAY / KNECT-LIPSCOMB	11	3	2	6
17	SR AIA / SHEPARD-MCKINLEY	11	3	0	8
22	MALABAR / JUPITER-MINTON	10	2	2	6
22	OCEAN BEACH / VOLUSIA LN-YOUNG	10	3	2	5
22	SR 520 / EAST MERRITT ISLAND CAUSEWAY	10	2	0	8
22	SR AIA / MAIN GATE-S END ONE WAY	10	2	0	8
22	US 1 / PALM BAY-RJ CONLAN	10	3	1	6
22	US 1 / GARDEN-DAIRY	10	0	0	10

* One of the vulnerable road user crashes along this segment involved a motorcyclist striking a pedestrian, thus it was counted in both the pedestrian and a motorcycle crash columns. In order to not double count the total vulnerable road user crashes along this segment, one of the two crashes was removed for the “sum”, resulting in 16 total vulnerable road user crashes.



Rank	Road Segment	Crash Frequency
1	SR AIA / US 192-PARADISE	22
1	US 192 / JOHN RODES-WICKHAM	22
3	EAU GALLIE / S PATRICK-SR A1A	16
3	SR AIA / PARADISE-EAU GALLIE	16
3	SR AIA / MCKINLEY-BUCHANAN	16
6	N. COURTENAY / NEEDLE-LUCAS	15
6	US 1 / BROADWAY BLVD.-FAY	15
8	US 1 / POST-PINEDA	14
8	US 1 / AURANTIA-VOLUSIA CO.	14
8	SR 50 / BARNA-SISSON	14
8	SR AIA / FISHER DR-ST LUCIE	14
8	US 1 / SR 528-CANAVERAL GROVES	14
13	SR 520 / BRIDGE-N.TROPICAL	13
13	BABCOCK / EBER-FLORIDA	13
13	SR 50 / SR 405-BARNA	13
16	CLEARLAKE / ROSETINE-MICHIGAN	12
17	FISKE / SR 520-DIXON	11
17	MALABAR / EMERSON-SAN FILLIPPO	11
17	MALABAR / BABCOCK-COREY	11
17	PALM BAY / KNECT-LIPSCOMB	11
17	SR AIA / SHEPARD-MCKINLEY	11
22	MALABAR / JUPITER-MINTON	10
22	OCEAN BEACH / VOLUSIA LN-YOUNG	10
22	SR 520 / EAST MERRITT ISLAND CAUSEWAY	10
22	SR AIA / MAIN GATE-S END ONE WAY	10
22	US 1 / PALM BAY-RJ CONLAN	10
22	US 1 / GARDEN-DAIRY	10

Non-SIS Corridor Vulnerable Road User Crash Frequency
Non-SIS Facilities
Crash Data 2009 - 2013

Figure 28

The vulnerable road user crashes were first reviewed based upon number of crashes over the five year study period to identify any upward or downward trends. From 2009 to 2011, there was downward trend in the number of vulnerable user crashes. Since 2011, there has been an upward trend with 2013 accounting for the most vulnerable road user crashes during the five year analysis period (398 crashes). The results of the year by year analysis are shown in **Figure 29**.

The vulnerable road user crashes were then summarized based upon the number of crashes by day of week. As shown in **Figure 30,** Thursday had the most crashes with a total of 319 (18.5 percent). Saturday and Sunday had the lowest number of vulnerable road user crashes with 179 and 212 crashes, respectively. The weekend comprised approximately 22.6 percent of all vulnerable road user crashes.

The vulnerable road user crashes were also summarized by the hour at which they occurred and were grouped in ranges of time identified in the **Intersection Crashes** metric. Of the total 1,722 vulnerable road user crashes, 537 crashes (31.2 percent) occurred from 2pm – 6pm. The 6pm – 10pm and 10am – 2pm ranges were the next most common ranges for vulnerable road user crashes in the county. The hourly vulnerable road user crash data is summarized in **Figure 31**.

The vulnerable user crashes were also reviewed for each individual planning area within the County (see **Figure** 22 for SOS planning subareas**)**. The South planning area consisted of nearly 40 percent (673 crashes of 1,722 total crashes) of the vulnerable road user crashes in the County. The Beaches observed 342 of the total 1,722 crashes (19.8 percent). The vulnerable road user crashes for each planning area are summarized in **Figure** 32.

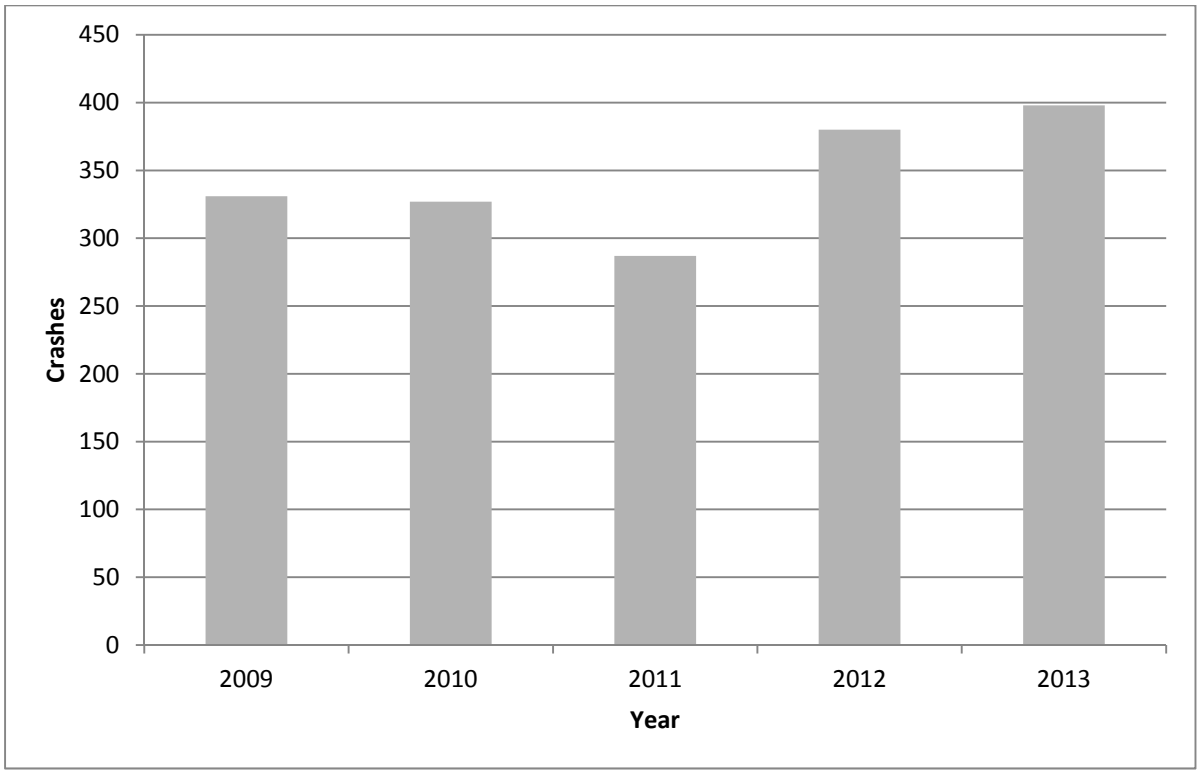


Figure 29: Vulnerable Road User Crashes by Year (2009-2013)

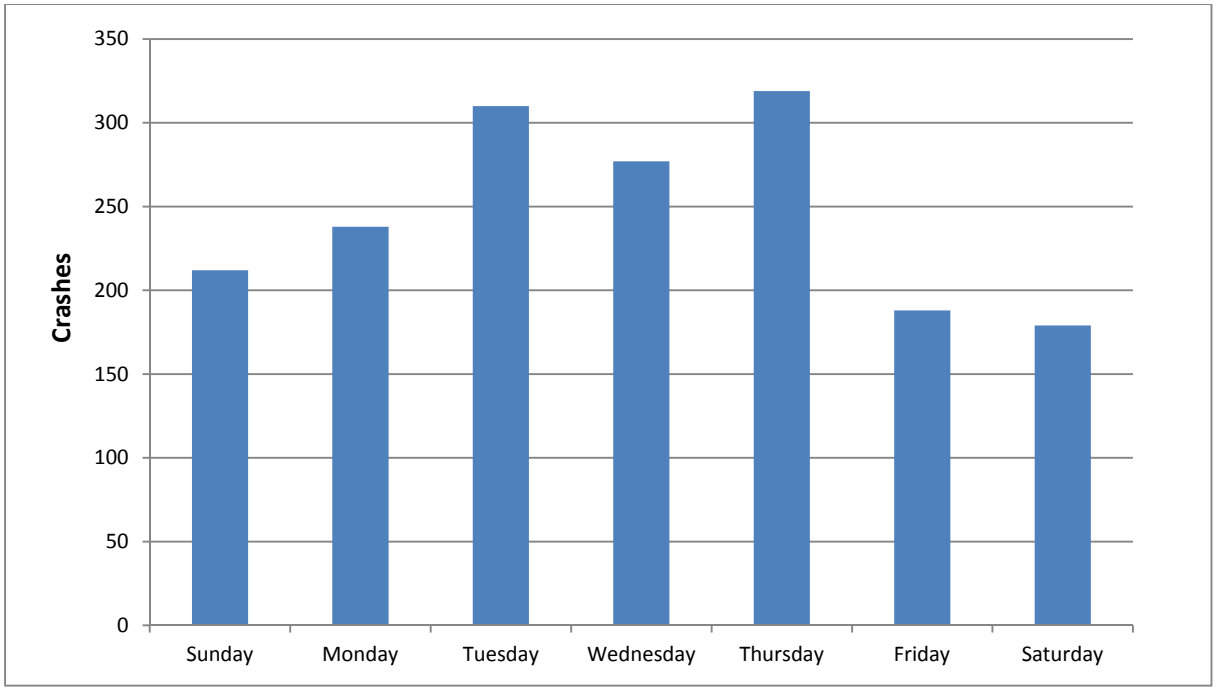


Figure 30: Vulnerable Road User Crashes by Day of the Week (2009-2013)

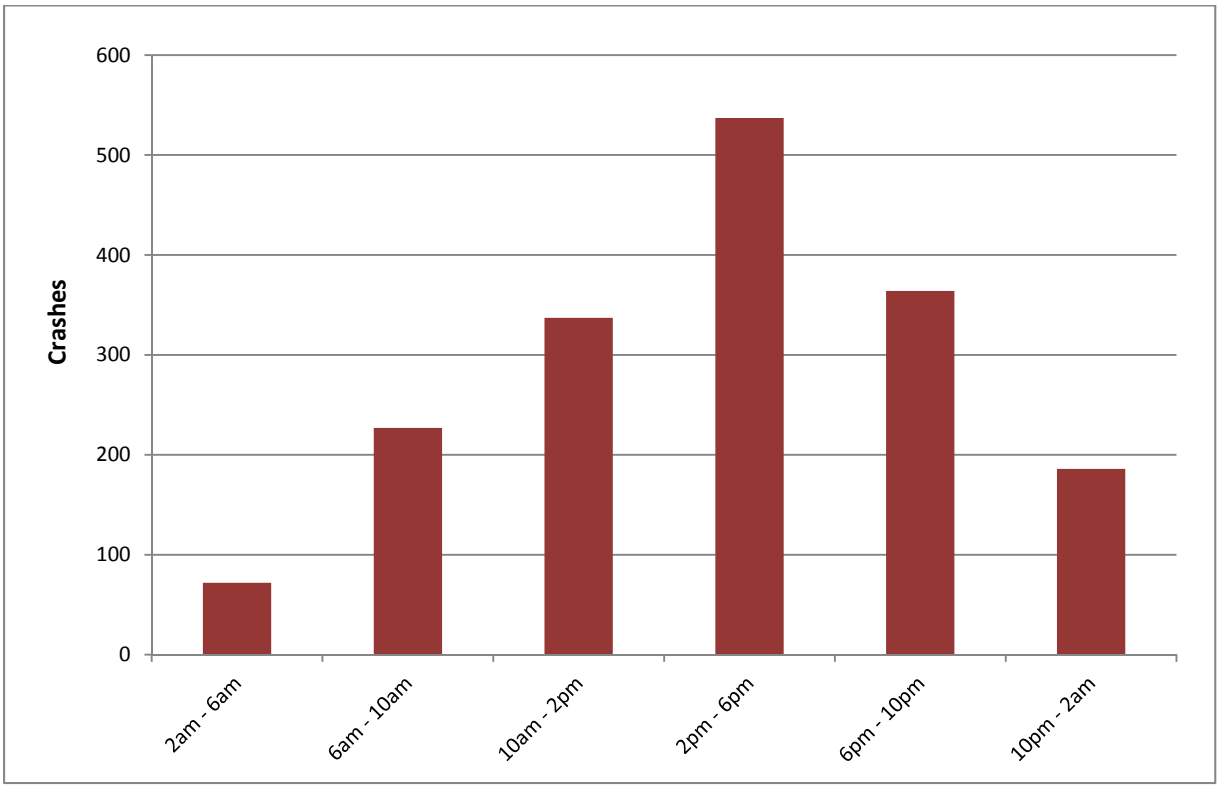


Figure 31: Vulnerable Road User Crashes by Time of Day (2009-2013)

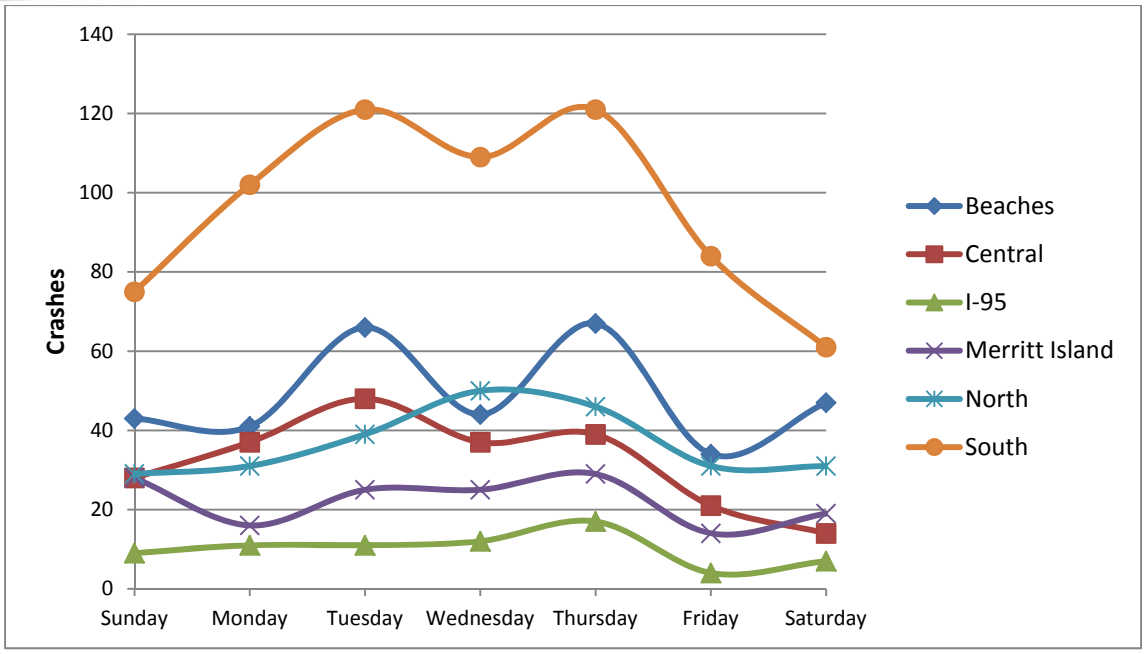


Figure 32: Vulnerable Road User Crashes by Planning Area (2009-2013)

Pedestrian Specific Crash Frequency Trends

During the 2009 to 2013 crash analysis period, there were a total of 431 pedestrian crashes reported throughout Brevard County. This total includes the pedestrian crashes along roadway segments and at defined SOS intersections. As illustrated in **Figure 33**, pedestrian crashes have ranged from 70 to 105 crashes per year with the highest number of pedestrian crashes occurring in 2012. The number of pedestrian crashes per year has remained relatively constant over the five year analysis period.

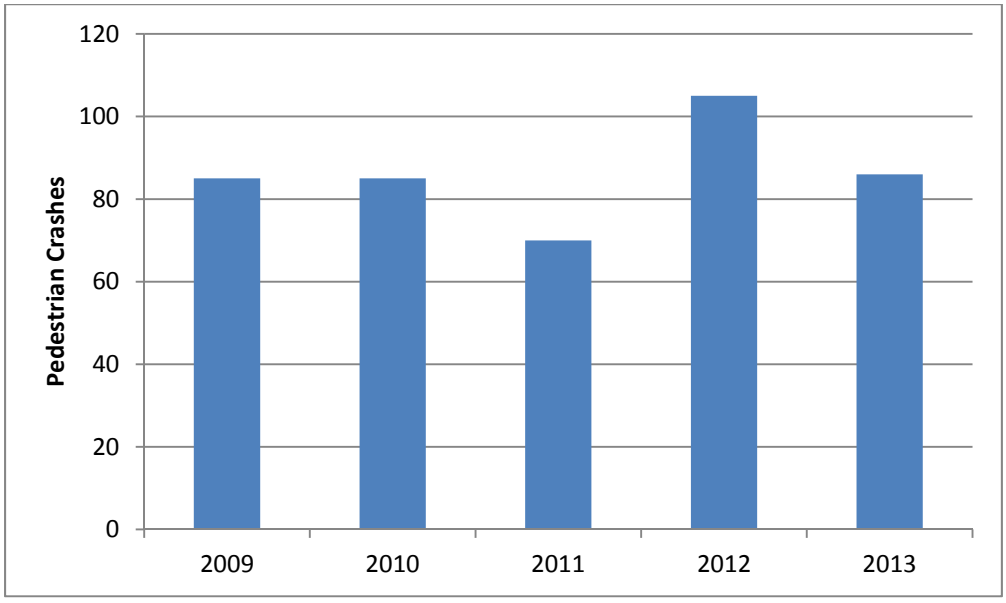


Figure 33 Pedestrian Crash Frequencies 2009 to 2013

Bicycle Specific Crash Frequency Trends

There were a total of 431 reported bicycle crashes on roadway segments and at intersections in Brevard County from 2009 to 2013. The number of bicycle crashes per year in Brevard County has been relatively steady, averaging around 85 bicycle crashes per year. Annual bicycle crash frequencies have seen a low of 78 crashes per year and a high of 95 crashes per year. **Figure 34** illustrates the bicycle crash frequency trends from 2009 to 2013. Brevard County saw the peak in bicycle crashes in 2010, but a drop was observed the following year in 2011. Since 2011, the annual bicycle crash frequency has steadily increased.

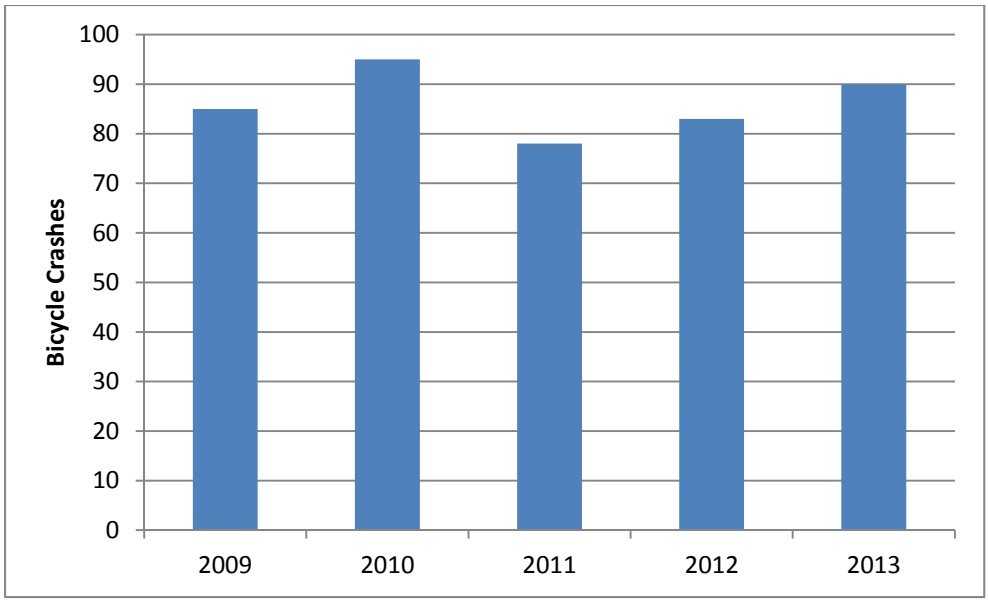
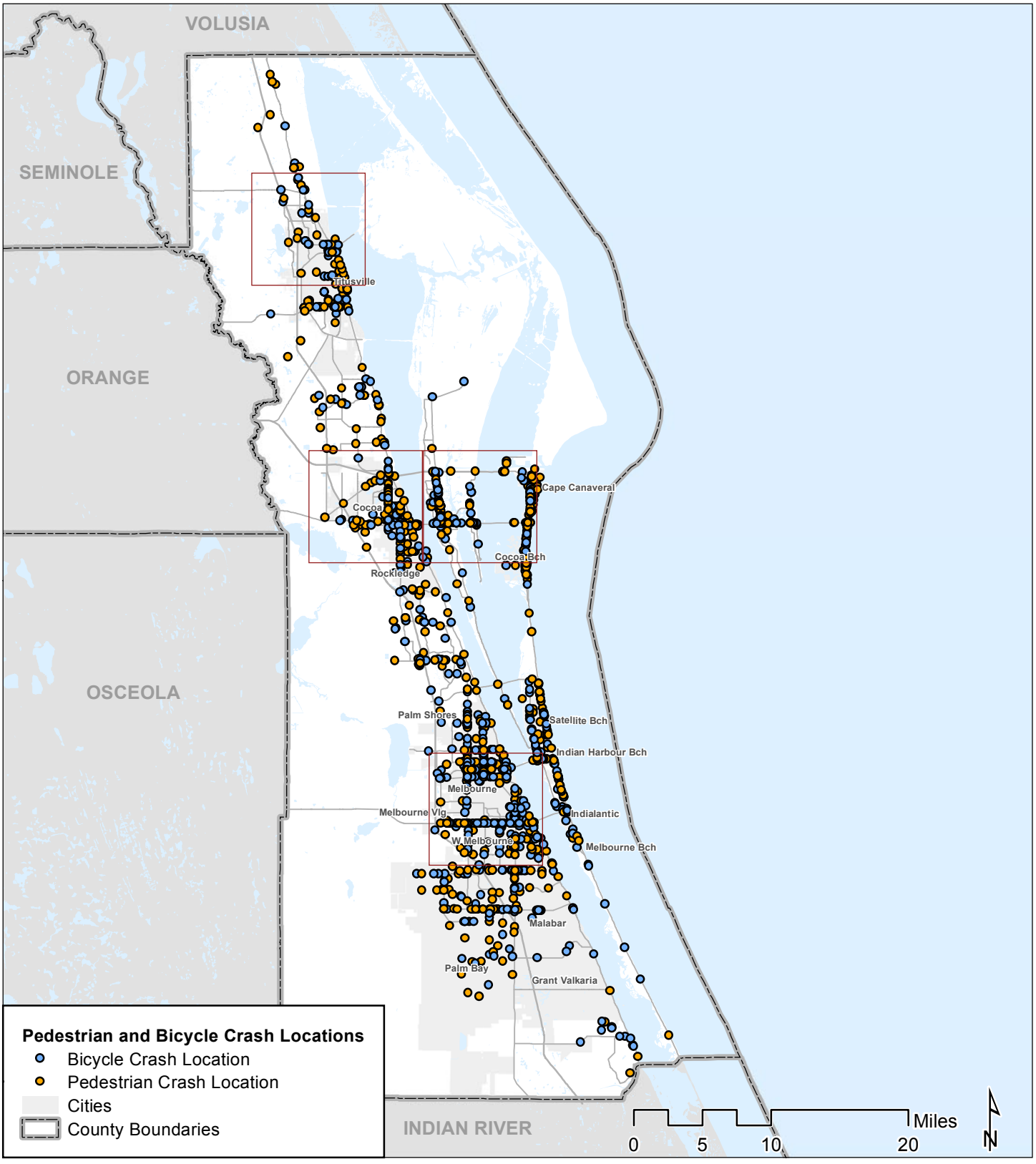


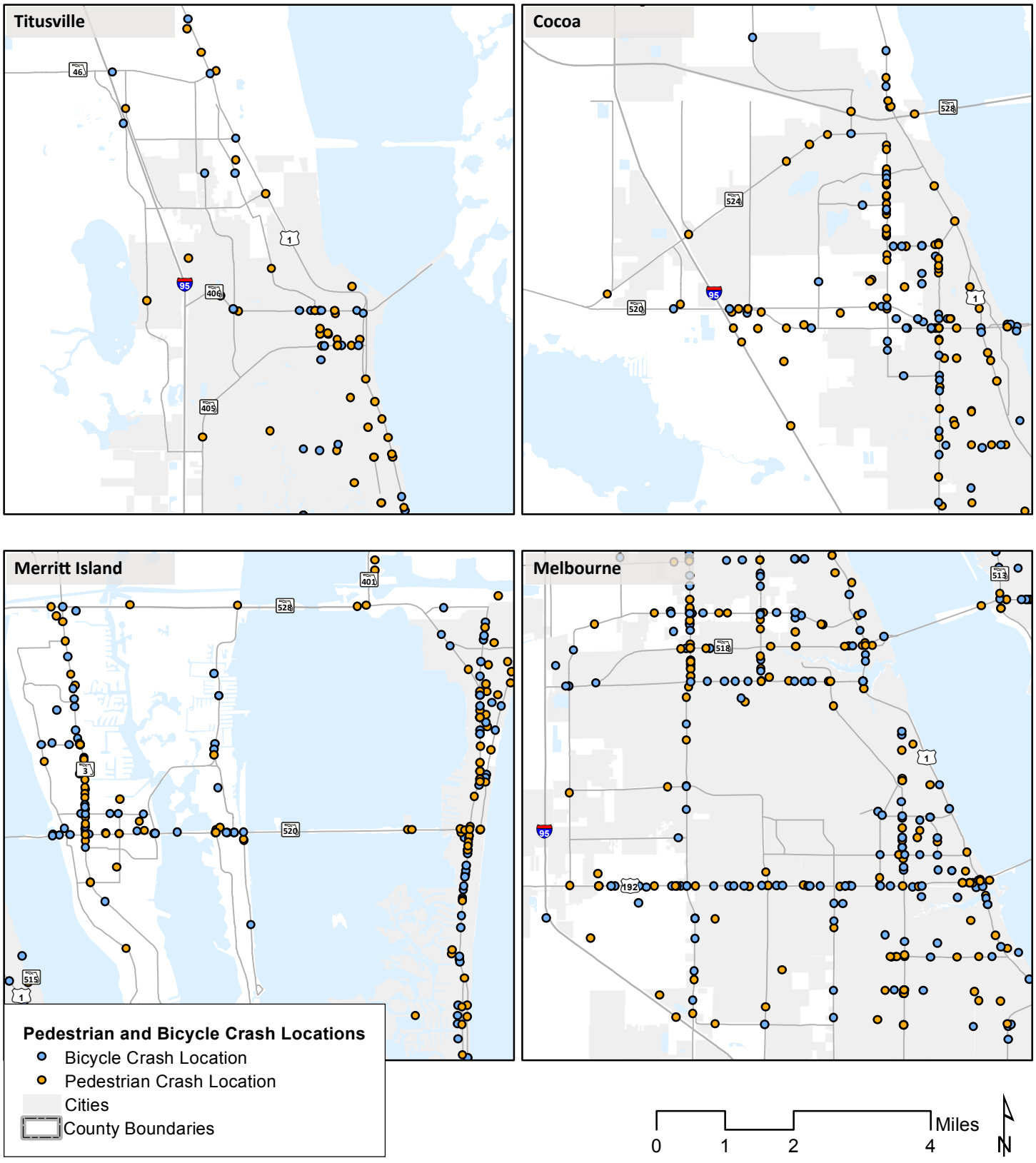
Figure 34 Bicycle Crash Frequencies 2009 to 2013

Figure 35 and **Figure 36** display the pedestrian and bicycle crashes for the County. While the crashes were somewhat dispersed throughout the County, there were higher concentrations of crashes in Cocoa, Merritt Island, Melbourne and the Beaches. Crashes tended to occur on the higher volume roads, such as Palm Bay Road, SR 520, SR A1A, US 1, and US 192.



Pedestrian and Bicycle Crash Locations
Crash Data 2009 - 2013

Figure 35



Pedestrian and Bicycle Crash Locations
City Level Insets
Crash Data 2009 - 2013

Figure 36

LANE DEPARTURE

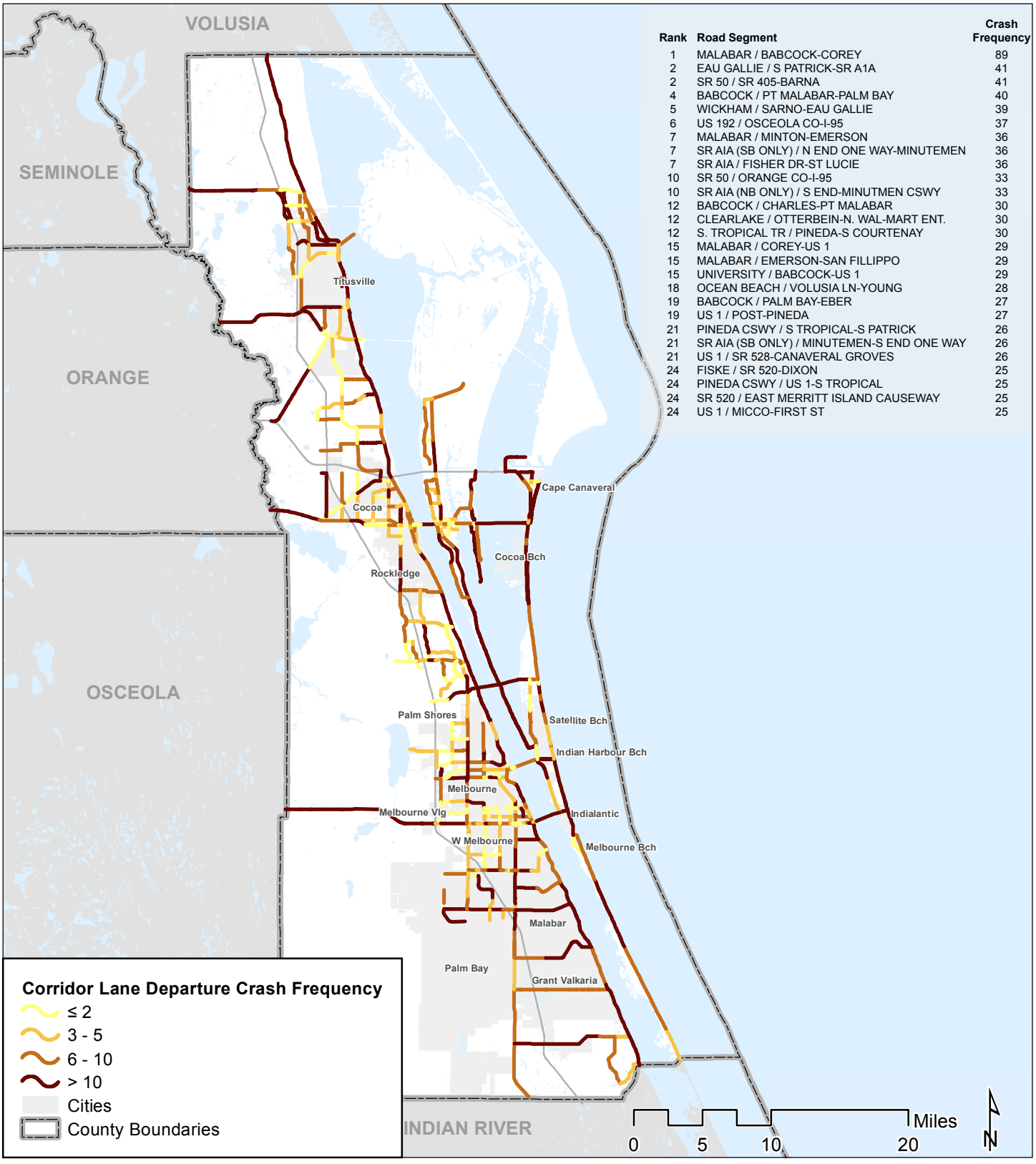
A total of 5,799 lane departure crashes occurred during the study period. 1,580 of those crashes occurred on the SIS facilities while 4,219 of them occurred on the Non-SIS facilities. As displayed in **Figure 37**, the crashes were concentrated in the southern portion of the County, with 14 of the top 27 high crash corridors along Babcock Street, Malabar Road, SR A1A, and US 1. A map of the lane departure crashes on SIS facilities can be found in **Appendix E**.

Lane departure crashes were first reviewed based upon number of crashes over the five year study period to identify any upward or downward trends. The county saw the highest number of lane departure crashes in 2009, with 1,535 crashes. From 2009 to 2011, there was a declining trend in the number of lane departure crashes and since 2011, there has been a steady increase in lane departure crashes. The results of the year by year analysis are shown in **Figure 38**.

As displayed in **Figure 39**, there is little variation of lane departure crashes by day of the week. The most lane departure crashes occurred on Sunday with 867 crashes and the least amount of lane departure crashes occurred on Saturday with 769 crashes.

In addition to the day of the week analysis, the lane departure crashes were analyzed based upon the time of day as identified in the **Intersection Crashes** section. The highest crash frequency time range was from 2pm – 6pm with 1,467 of the total 5,799 crashes (25.3 percent). The 10am – 2pm and 2pm – 6pm time ranges included a comparable amount of lane departure crashes with 1,179 and 1,080 crashes, respectively. The number of lane departure crashes in each time range is illustrated in **Figure 40.**

The lane departure crashes were furthered analyzed based upon each planning area within the County (see **Figure** 22 for SOS planning subareas**)**. As seen in **Figure 41**, the South planning area had the highest frequency of lane departure crashes, followed by I-95 with 1,735 and 1,394 crashes respectively. These two planning areas were significantly higher than the other planning areas within the county, combining for nearly 54 percent of all lane departure crashes in Brevard County.



Rank	Road Segment	Crash Frequency
1	MALABAR / BABCOCK-COREY	89
2	EAU GALLIE / S PATRICK-SR A1A	41
2	SR 50 / SR 405-BARNA	41
4	BABCOCK / PT MALABAR-PALM BAY	40
5	WICKHAM / SARNO-EAU GALLIE	39
6	US 192 / OSCEOLA CO-I-95	37
7	MALABAR / MINTON-EMERSON	36
7	SR AIA (SB ONLY) / N END ONE WAY-MINUTEMEN	36
7	SR AIA / FISHER DR-ST LUCIE	36
10	SR 50 / ORANGE CO-I-95	33
10	SR AIA (NB ONLY) / S END-MINUTMEN CSWY	33
12	BABCOCK / CHARLES-PT MALABAR	30
12	CLEARLAKE / OTTERBEIN-N. WAL-MART ENT.	30
12	S. TROPICAL TR / PINEDA-S COURTENAY	30
15	MALABAR / COREY-US 1	29
15	MALABAR / EMERSON-SAN FILLIPPO	29
15	UNIVERSITY / BABCOCK-US 1	29
18	OCEAN BEACH / VOLUSIA LN-YOUNG	28
19	BABCOCK / PALM BAY-EBER	27
19	US 1 / POST-PINEDA	27
21	PINEDA CSWY / S TROPICAL-S PATRICK	26
21	SR AIA (SB ONLY) / MINUTEMEN-S END ONE WAY	26
21	US 1 / SR 528-CANAVERAL GROVES	26
24	FISKE / SR 520-DIXON	25
24	PINEDA CSWY / US 1-S TROPICAL	25
24	SR 520 / EAST MERRITT ISLAND CAUSEWAY	25
24	US 1 / MICCO-FIRST ST	25

Non-SIS Corridor Lane Departure Crash Frequency
Non-SIS Facilities
Crash Data 2009 - 2013

Figure 37

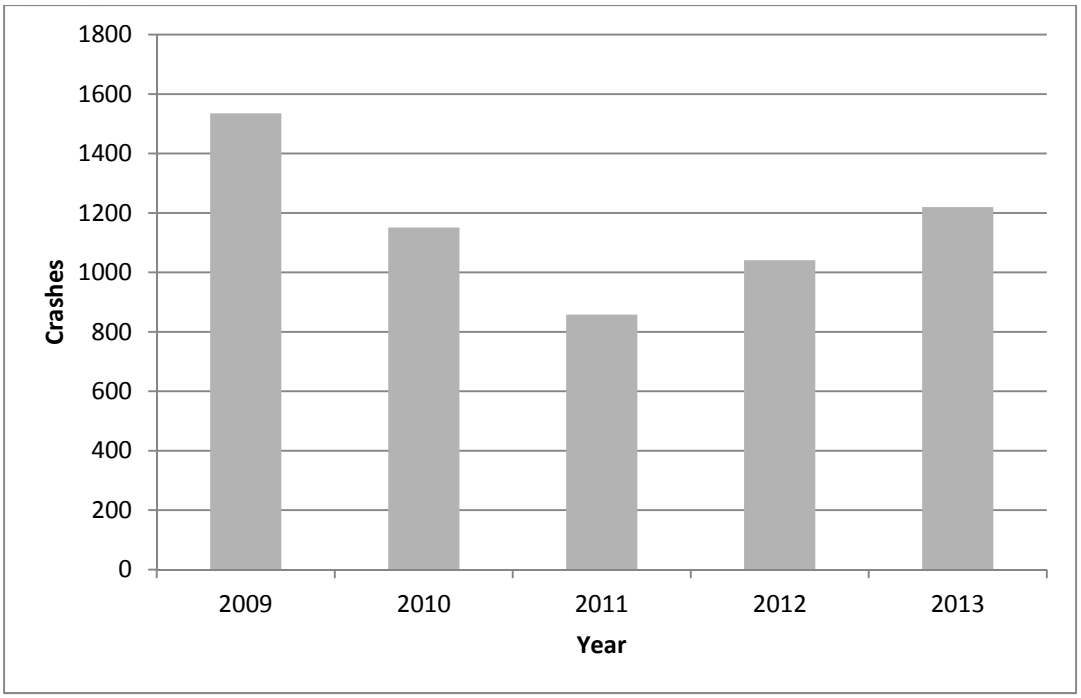


Figure 38: Lane Departure Crashes by Year (2009-2013)

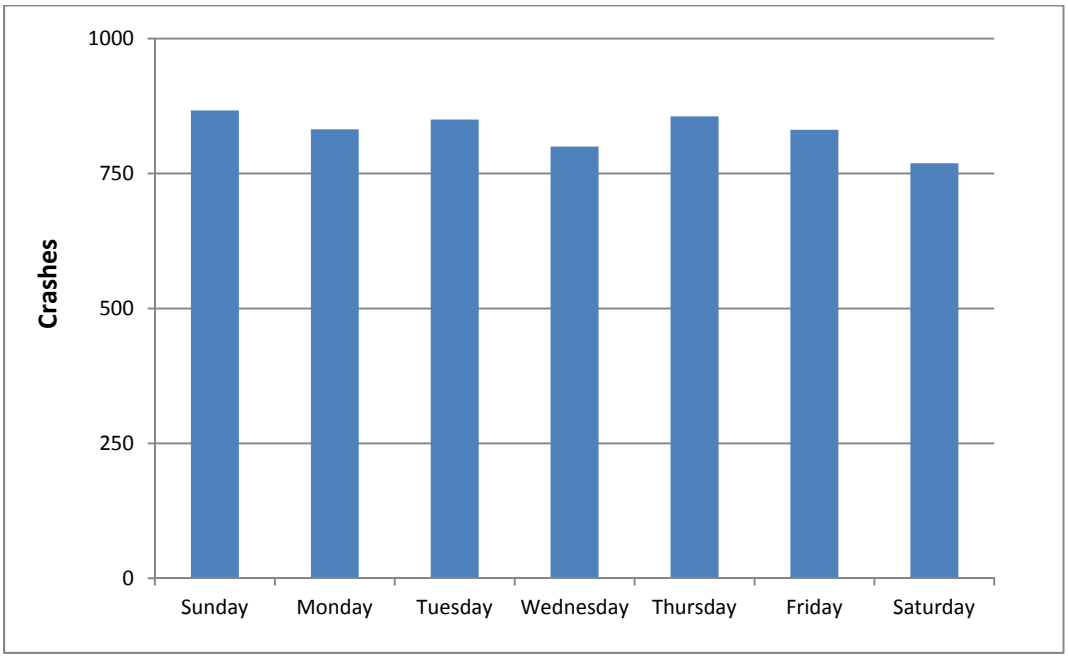


Figure 39: Lane Departure Crashes by Day of the Week (2009-2013)

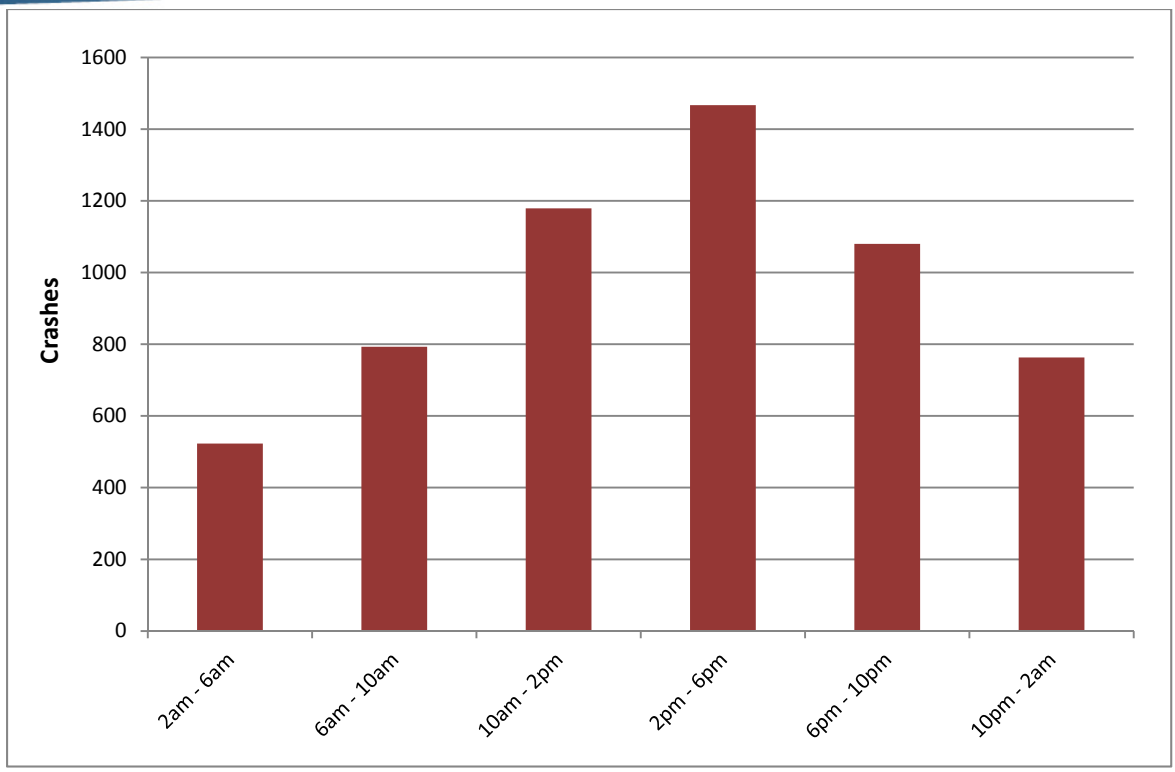


Figure 40: Lane Departure Crashes by Time of Day (2009-2013)

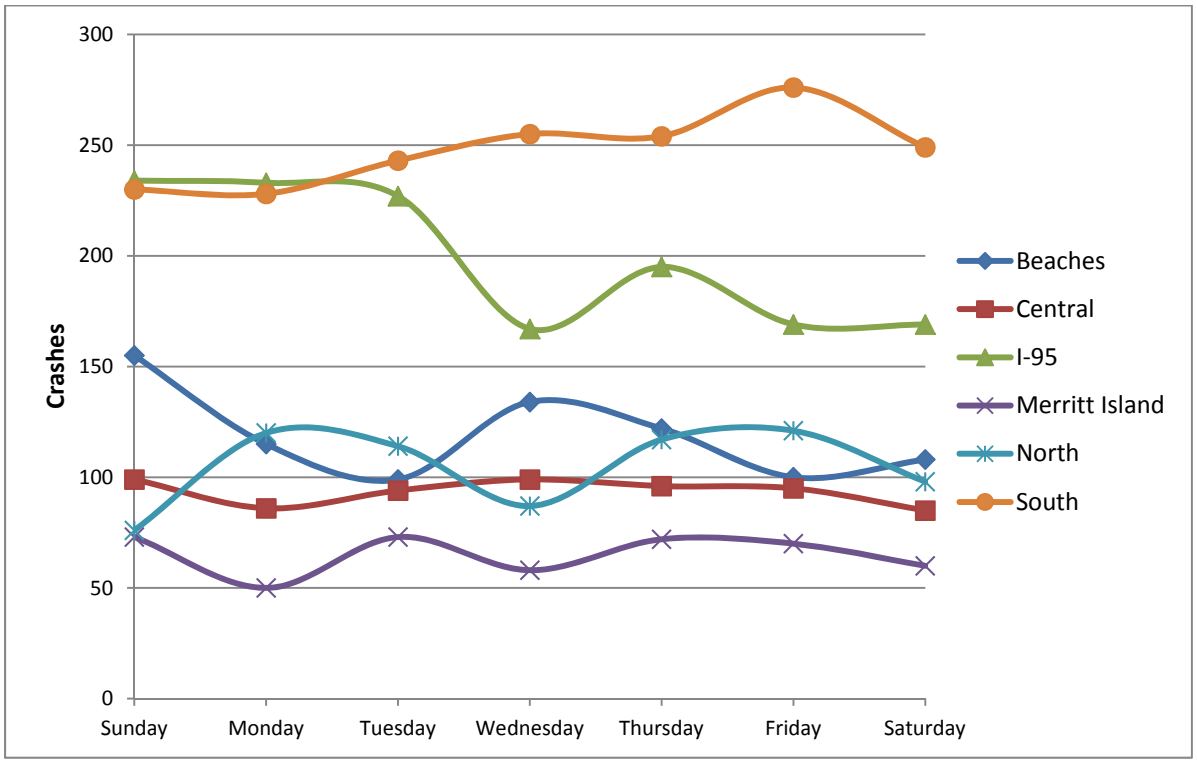


Figure 41: Lane Departure Crashes by Planning Area (2009-2013)

IMPAIRED DRIVING

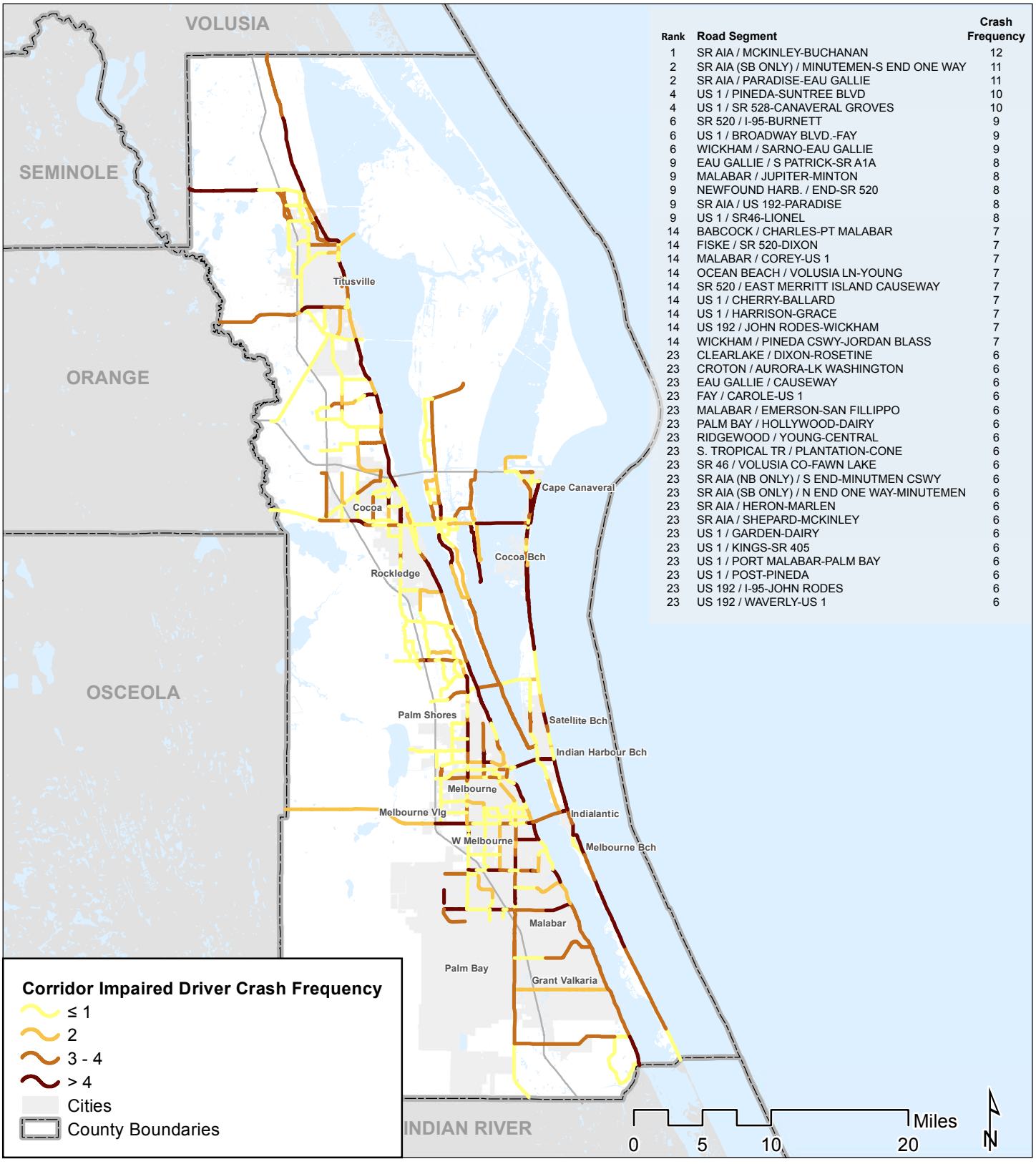
The impaired driving crashes were analyzed by sorting through the CARS and Signal Four Analytics data for alcohol or drug related crashes. If the crash was coded with drugs or alcohol involved, then the crash was considered an impaired driving crash. A total of 1,153 impaired driving crashes occurred during the study period. 126 of those crashes occurred on the SIS facilities while 1,027 occurred on the Non-SIS facilities. As can be seen in **Figure 42**, 21 of the top 42 high crash corridors are along SR A1A, US 1, and the Causeways between US 1 and SR A1A. A map of the impaired driving crashes on SIS facilities can be found in **Appendix E**.

Impaired driving crashes were first reviewed based upon number of crashes over the five year study period to identify any upward or downward trends. Overall since 2009, there has been a decreasing trend in the number of impaired driving crashes in Brevard County. Brevard County saw the highest number of impaired driving crashes in 2009, with 320 crashes. The results of the year by year analysis are shown in **Figure 43**.

The impaired crashes were then analyzed by the day of the week. The weekend (Saturday/Sunday) consisted of approximately 33 percent of the total impaired crashes within the county. In addition to the high number of impaired driving crashes on Saturday and Sunday, Wednesday also had a relatively high number of impaired driving crashes with 185 of the total 1,153. This was higher than the 183 reported crashes on Saturday alone. **Figure 44** illustrates the impaired driving crashes by day of week.

The majority of the total impaired driving crashes occurred from 6pm – 10pm and 10pm – 2am. These two ranges combined for 625 out of the total 1,153 crashes (54 percent). The 2am – 6am and 2pm – 6pm ranges were also significantly higher than the number of crashes occurring from 6am – 2pm. The hourly trends of impaired crashes in Brevard County are illustrated in **Figure 45.**

In addition to a review of impaired driving crashes at the countywide level, the impaired crashes were analyzed for each planning level within the County (see **Figure 22** for SOS planning subareas**)**. The South planning area accounted for 419 impaired driving crashes, which is approximately 36 percent of all the reported impaired driving crashes in the county during the study period. The Beaches planning area experienced the second highest frequency of impaired driving crashes. The impaired driving crashes for each planning area are shown in **Figure** 46.



Rank	Road Segment	Crash Frequency
1	SR AIA / MCKINLEY-BUCHANAN	12
2	SR AIA (SB ONLY) / MINUTEMEN-S END ONE WAY	11
2	SR AIA / PARADISE-EAU GALLIE	11
4	US 1 / PINEDA-SUNTREE BLVD	10
4	US 1 / SR 528-CANAVERAL GROVES	10
6	SR 520 / I-95-BURNETT	9
6	US 1 / BROADWAY BLVD.-FAY	9
6	WICKHAM / SARNO-EAU GALLIE	9
9	EAU GALLIE / S PATRICK-SR A1A	8
9	MALABAR / JUPITER-MINTON	8
9	NEWFOUND HARB. / END-SR 520	8
9	SR AIA / US 192-PARADISE	8
9	US 1 / SR46-LIONEL	8
14	BABCOCK / CHARLES-PT MALABAR	7
14	FISKE / SR 520-DIXON	7
14	MALABAR / COREY-US 1	7
14	OCEAN BEACH / VOLUSIA LN-YOUNG	7
14	SR 520 / EAST MERRITT ISLAND CAUSEWAY	7
14	US 1 / CHERRY-BALLARD	7
14	US 1 / HARRISON-GRACE	7
14	US 192 / JOHN RODES-WICKHAM	7
14	WICKHAM / PINEDA CSWY-JORDAN BLASS	7
23	CLEARLAKE / DIXON-ROSETINE	6
23	CROTON / AURORA-LK WASHINGTON	6
23	EAU GALLIE / CAUSEWAY	6
23	FAY / CAROLE-US 1	6
23	MALABAR / EMERSON-SAN FILLIPPO	6
23	PALM BAY / HOLLYWOOD-DAIRY	6
23	RIDGEWOOD / YOUNG-CENTRAL	6
23	S. TROPICAL TR / PLANTATION-CONE	6
23	SR 46 / VOLUSIA CO-FAWN LAKE	6
23	SR AIA (NB ONLY) / S END-MINUTMEN CSWY	6
23	SR AIA (SB ONLY) / N END ONE WAY-MINUTEMEN	6
23	SR AIA / HERON-MARLEN	6
23	SR AIA / SHEPARD-MCKINLEY	6
23	US 1 / GARDEN-DAIRY	6
23	US 1 / KINGS-SR 405	6
23	US 1 / PORT MALABAR-PALM BAY	6
23	US 1 / POST-PINEDA	6
23	US 192 / I-95-JOHN RODES	6
23	US 192 / WAVERLY-US 1	6

Non-SIS Corridor Impaired Driver Crash Frequency
Non-SIS Facilities
Crash Data 2009 - 2013

Figure 42

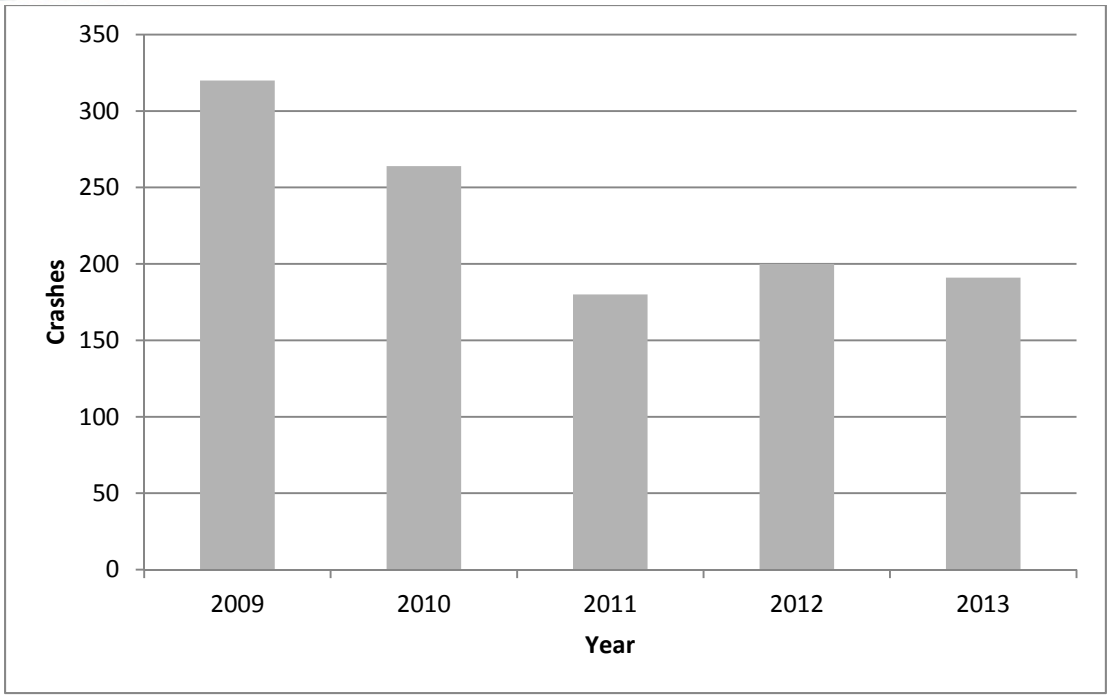


Figure 43: Impaired Driving Crashes by Year (2009-2013)

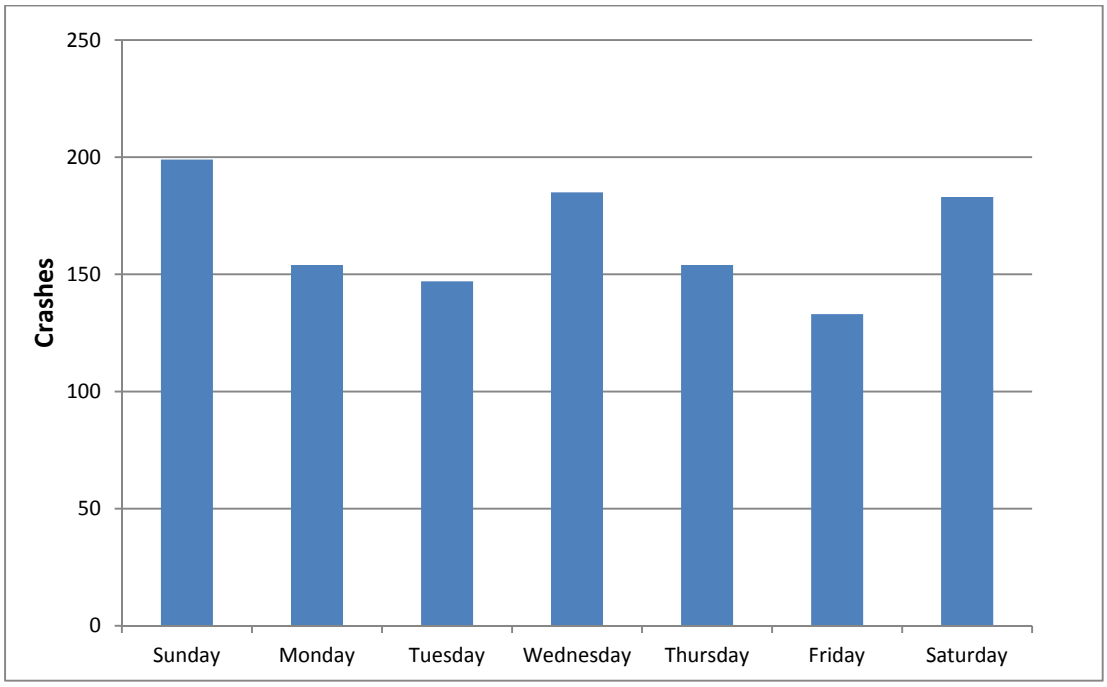


Figure 44: Impaired Driving Crashes by Day of the Week (2009-2013)

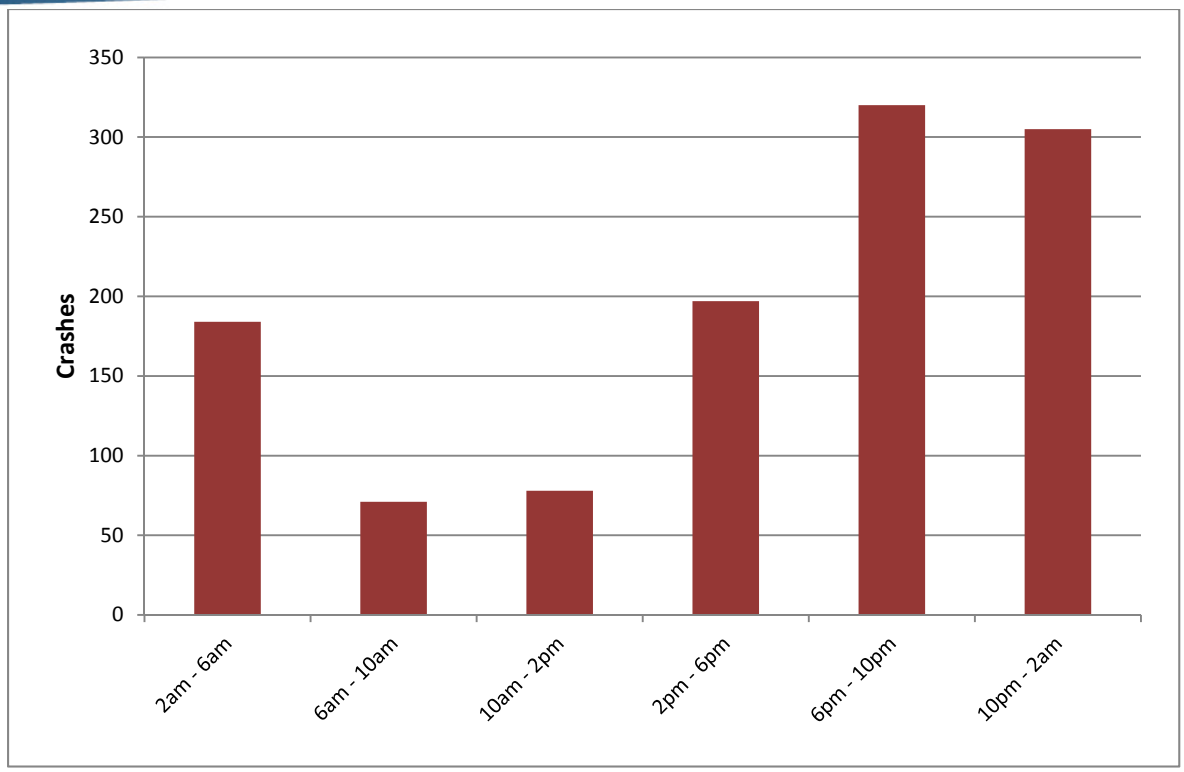


Figure 45: Impaired Driving Crashes by Time of Day (2009-2013)

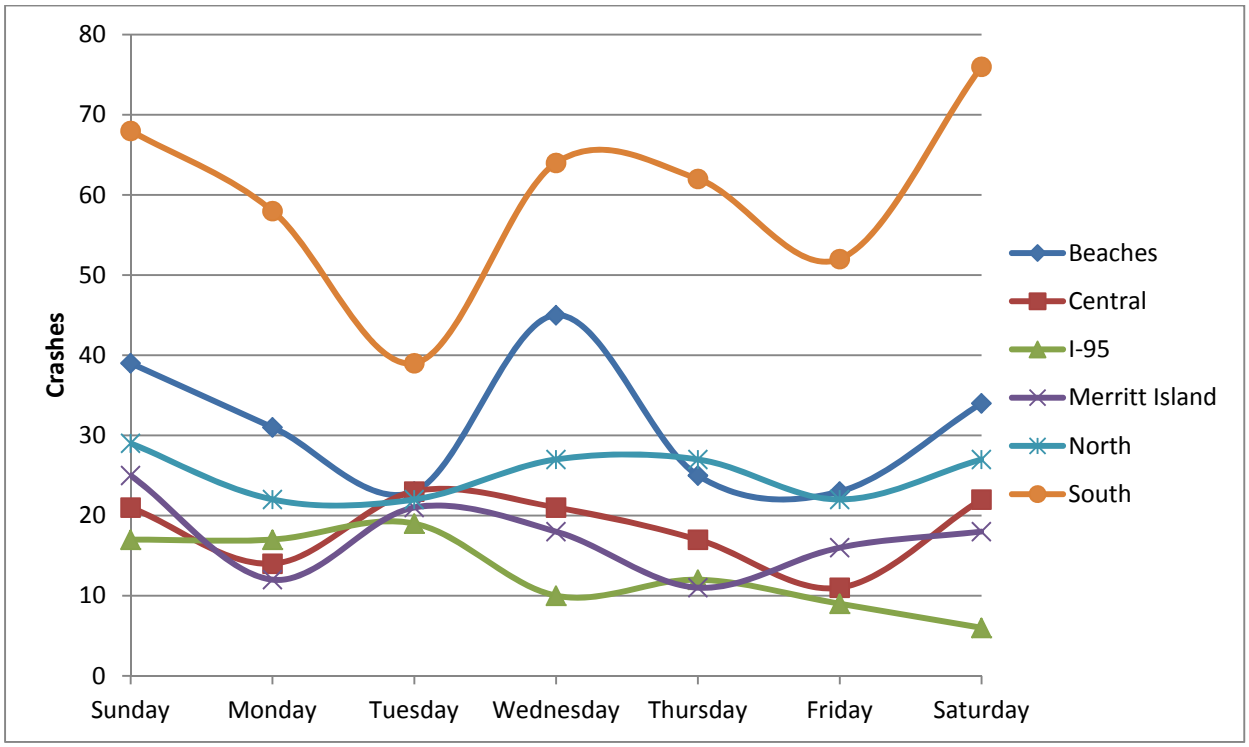


Figure 46: Impaired Driving Crashes by Planning Area (2009-2013)

AT-RISK

In order to determine if a crash would be classified as an at-risk driver crash, the data had to be sorted by the ages of the drivers involved in the crashes. It is important to note the S4 data output does not include drivers' ages as a crash category. Therefore, the at-risk driver crashes in this analysis are based entirely upon the FDOT CARS data set. Crashes were classified as an at-risk driver crash if the crash involved a driver from the age of 15 to 19 years old or 65 years and older.

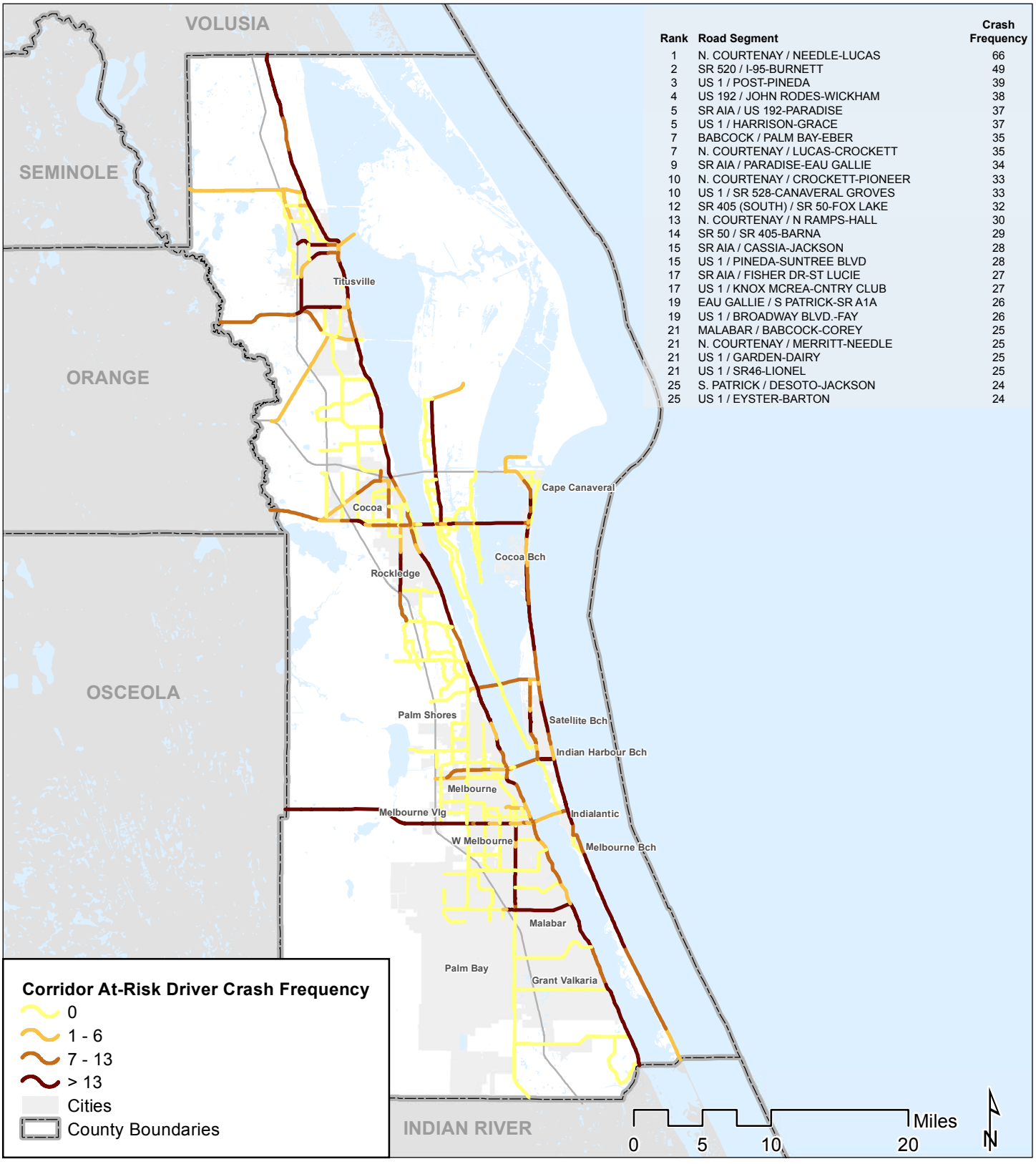
A total of 3,313 at-risk driver crashes occurred during the study period. 585 of those crashes occurred on SIS facilities, while 2,728 of them occurred on the Non-SIS facilities. As shown in **Figure 47**, US 1 had nine of the top 27 high crash corridors. A map of the at-risk driver crashes on SIS facilities can be found in **Appendix E**.

The at-risk driver crashes were first reviewed based upon the number of crashes over the five year study period to identify any upward or downward trends. From 2009 to 2012, the number of at-risk crashes has been relatively steady, with around 600 crashes per year. Since 2011, there has been an upward trend in the number of at-risk driver crashes in Brevard County, with 2013 accounting for the highest number of at-risk crashes in the five year analysis period (870 crashes). The results of the year by year analysis are shown in **Figure 48**.

The at-risk driver crashes were then analyzed based upon day of the week. Of the total 3,313 at-risk driver crashes, Tuesday had the highest number of reported crashes with 657 (approximately 20 percent). Sunday, Monday, Wednesday, and Thursday had a relatively similar number of crashes. Friday and Saturday had the least number of at-risk driver crashes with 258 and 277 crashes, respectively. The county-wide at-risk driver crashes on each day of the week are summarized in **Figure 49**.

The at-risk driver crashes were further analyzed based upon the time of day that the crashes occurred, which is displayed in **Figure 50**. The 2pm – 6pm time range accounted for 1,084 of the total 3,313 at-risk driver crashes (approximately 33 percent). The 10am – 2pm time range accounted for the next highest number of at-risk driver crashes with 894 crashes (approximately 27 percent).

In addition to a review of at-risk driving crashes at the countywide level, the at-risk crashes were analyzed for each planning level within the County (see **Figure 22** for SOS planning subareas**)**. The South and Beach planning areas had the two highest crash numbers in the county with 734 and 649 crashes, respectively. These two planning areas accounted for nearly 42 percent of all at-risk driver crashes in the county from 2009-2013. The at-risk driver crashes for each planning is illustrated in **Figure 51**.



Rank	Road Segment	Crash Frequency
1	N. COURTENAY / NEEDLE-LUCAS	66
2	SR 520 / I-95-BURNETT	49
3	US 1 / POST-PINEDA	39
4	US 192 / JOHN RODES-WICKHAM	38
5	SR AIA / US 192-PARADISE	37
5	US 1 / HARRISON-GRACE	37
7	BABCOCK / PALM BAY-EBER	35
7	N. COURTENAY / LUCAS-CROCKETT	35
9	SR AIA / PARADISE-EAU GALLIE	34
10	N. COURTENAY / CROCKETT-PIONEER	33
10	US 1 / SR 528-CANAVERAL GROVES	33
12	SR 405 (SOUTH) / SR 50-FOX LAKE	32
13	N. COURTENAY / N RAMPS-HALL	30
14	SR 50 / SR 405-BARNA	29
15	SR AIA / CASSIA-JACKSON	28
15	US 1 / PINEDA-SUNTREE BLVD	28
17	SR AIA / FISHER DR-ST LUCIE	27
17	US 1 / KNOX MCREA-CNTRY CLUB	27
19	EAU GALLIE / S PATRICK-SR A1A	26
19	US 1 / BROADWAY BLVD.-FAY	26
21	MALABAR / BABCOCK-COREY	25
21	N. COURTENAY / MERRITT-NEEDLE	25
21	US 1 / GARDEN-DAIRY	25
21	US 1 / SR46-LIONEL	25
25	S. PATRICK / DESOTO-JACKSON	24
25	US 1 / EYSTER-BARTON	24

Non-SIS Corridor At-Risk Driver Crash Frequency
Non-SIS Facilities
Crash Data 2009 - 2013

Figure 47

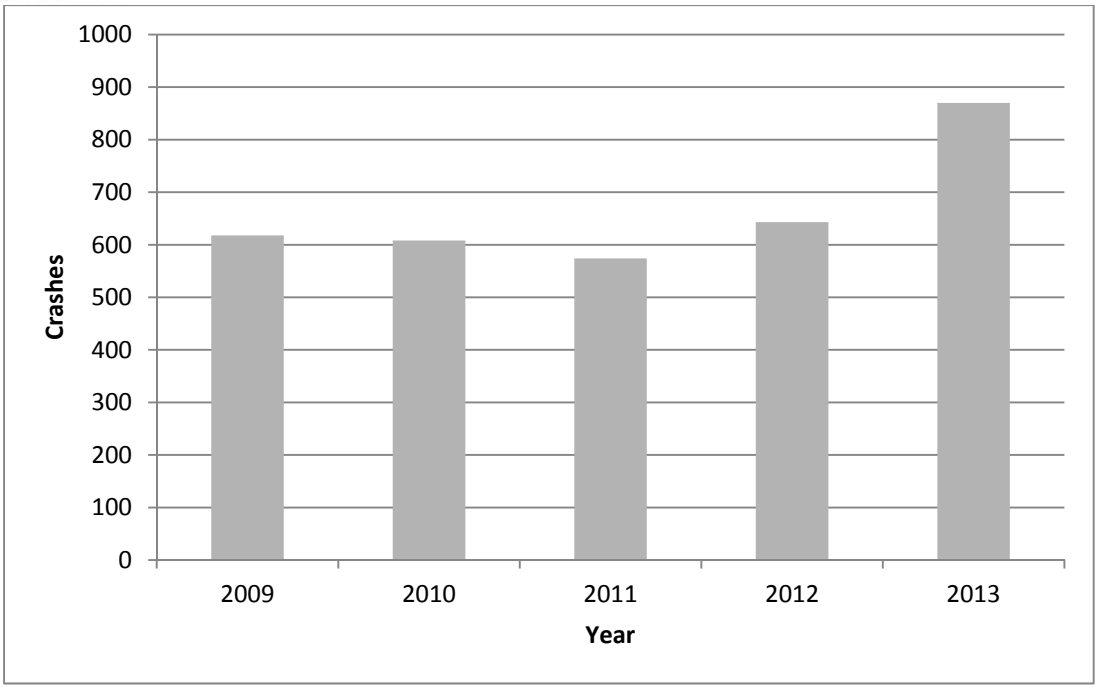


Figure 48: At-Risk Driver Crashes by Year (2009-2013)

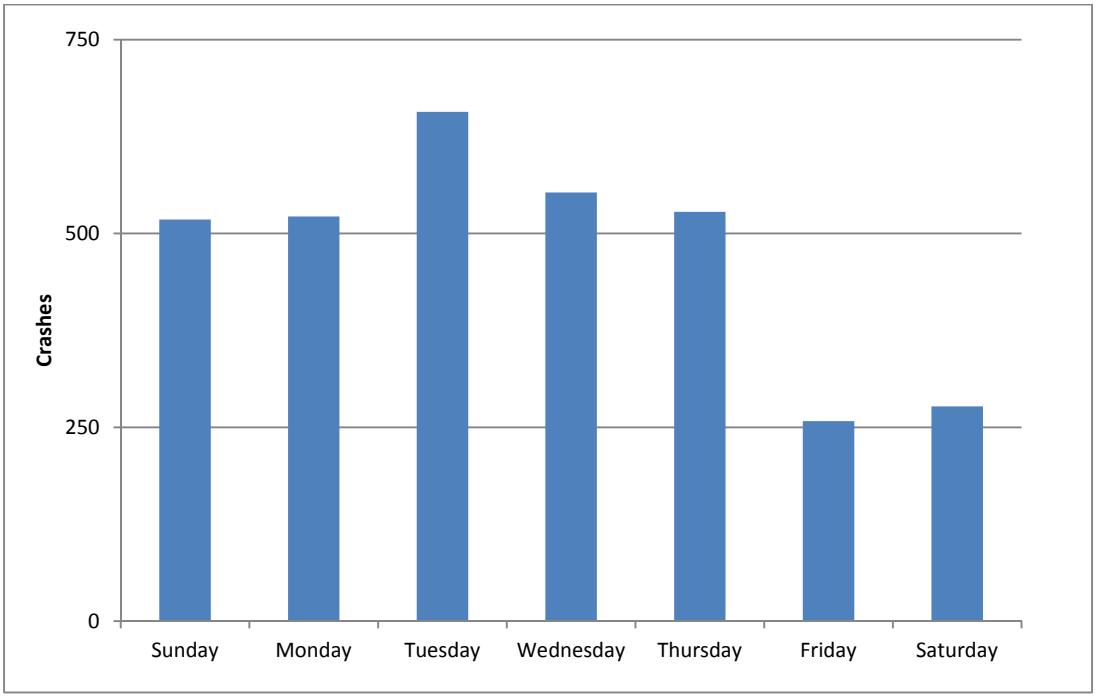


Figure 49: At-Risk Driver Crashes by Day of the Week (2009-2013)

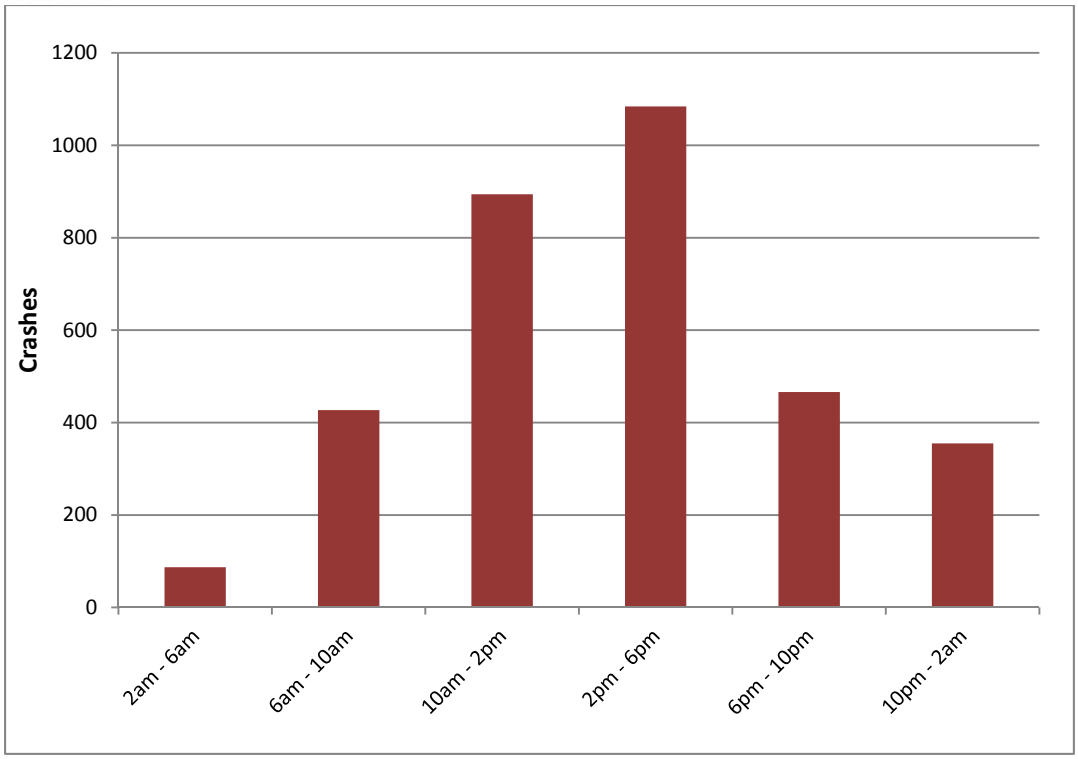


Figure 50: At-Risk Driver Crashes by Time of Day (2009-2013)

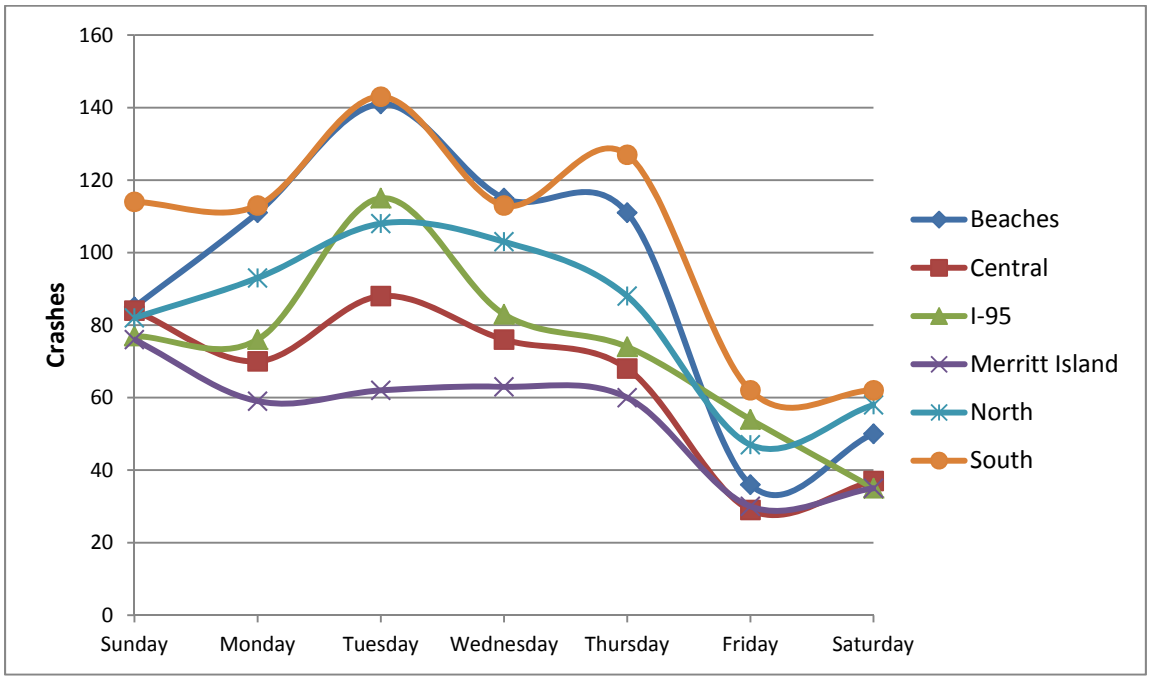


Figure 51: At-Risk Driver Crashes by Planning Area (2009-2013)

DISTRACTED DRIVING

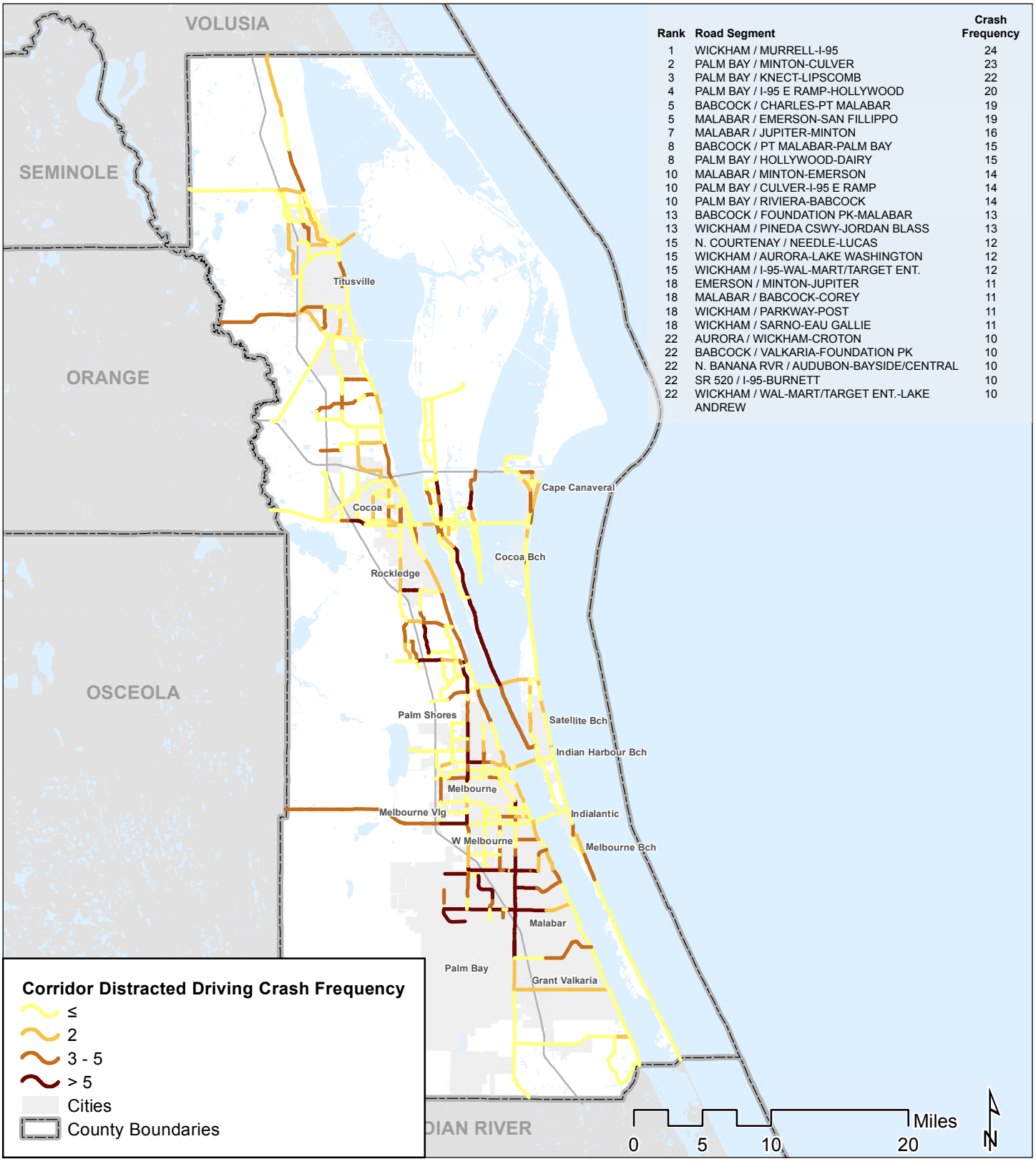
The FDOT CARS and Signal Four Analytics data both contained a metric for whether or not the crash involved a distracted driver. A total of 1,158 distracted driving crashes occurred during the study period. 51 of those crashes occurred on SIS facilities, while 1,107 of them occurred on the Non-SIS facilities. **Figure 52** displays 19 of top 26 high crash corridors occurred in southern portion of County. A map of the distracted driving crashes on SIS facilities can be found in **Appendix E**.

The distracted driving related crashes were first reviewed based upon number of crashes over the five year study period to identify any upward or downward trends. Overall, there has been an increasing trend in the number of distracted driving related crashes. In 2009, no distracted driving related crashes were reported. In the five year analysis period, 2013 accounted for the highest number of distracted driving related crashes in Brevard County with 514. Reporting of distracted driving as a possible contributing crash cause has increased over the past few years, especially with the increased focus on no texting and driving and hands free cell phone usage. The lack of emphasis in reporting during 2009 and 2010 may be the reason for the low distracted driving crash numbers. The results of the year by year analysis are shown in **Figure** 53.

Distracted driving was reviewed by the day of the week these crashes occurred. As shown in **Figure 54**, the days with the most distracted driver related crashes in Brevard County were Wednesday through Friday with 203, 190, and 204 crashes, respectively. These three days accounted for approximately 52 percent of all distracted driving related crashes in Brevard County.

The distracted driving related crashes were analyzed further based upon the time of day. **Figure 55** shows the number of distracted driving related crashes that occurred in each analyzed time range. The time range with the most crashes was from 2pm – 6pm with 393. This time range was followed by the 10am – 2pm time range which included 322 of the 1,158 distracted driving related crashes.

Finally, the distracted driving related crashes were reviewed for each planning area within the County (see **Figure** 22 for SOS planning subareas**)**. The South planning area had a significantly higher number of distracted driving related crashes. There were 693 distracted driving related crashes in the South planning area, which accounts for nearly 60 percent of all distracted driving related crashes in the County. The Central and North planning areas had the next highest number of crashes with 125 and 120 distracted driving related crashes, respectively. I-95 had the least number of crashes with 43. This data is summarized in **Figure 56**.



Rank	Road Segment	Crash Frequency
1	WICKHAM / MURRELL-I-95	24
2	PALM BAY / MINTON-CULVER	23
3	PALM BAY / KNECT-LIPSCOMB	22
4	PALM BAY / I-95 E RAMP-HOLLYWOOD	20
5	BABCOCK / CHARLES-PT MALABAR	19
5	MALABAR / EMERSON-SAN FILLIPPO	19
7	MALABAR / JUPITER-MINTON	16
8	BABCOCK / PT MALABAR-PALM BAY	15
8	PALM BAY / HOLLYWOOD-DAIRY	15
10	MALABAR / MINTON-EMERSON	14
10	PALM BAY / CULVER-I-95 E RAMP	14
10	PALM BAY / RIVIERA-BABCOCK	14
13	BABCOCK / FOUNDATION PK-MALABAR	13
13	WICKHAM / PINEDA CSWY-JORDAN BLASS	13
15	N. COURTENAY / NEEDLE-LUCAS	12
15	WICKHAM / AURORA-LAKE WASHINGTON	12
15	WICKHAM / I-95-WAL-MART/TARGET ENT.	12
18	EMERSON / MINTON-JUPITER	11
18	MALABAR / BABCOCK-COREY	11
18	WICKHAM / PARKWAY-POST	11
18	WICKHAM / SARNO-EAU GALLIE	11
22	AURORA / WICKHAM-CROTON	10
22	BABCOCK / VALKARIA-FOUNDATION PK	10
22	N. BANANA RVR / AUDUBON-BAYSIDE/CENTRAL	10
22	SR 520 / I-95-BURNETT	10
22	WICKHAM / WAL-MART/TARGET ENT.-LAKE ANDREW	10

Non-SIS Corridor Distracted Driving Crash Frequency
Non-SIS Facilities
Crash Data 2009 - 2013

Figure 52

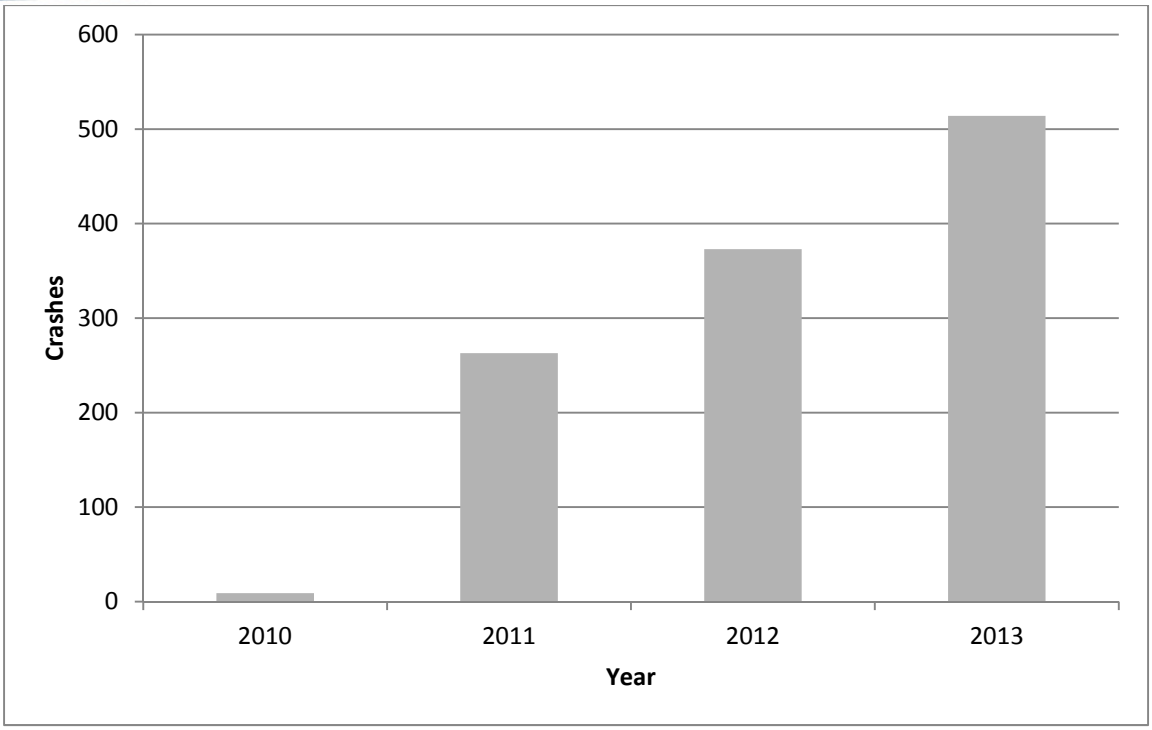


Figure 53: Distracted Driving Crashes by Year (2009-2013)

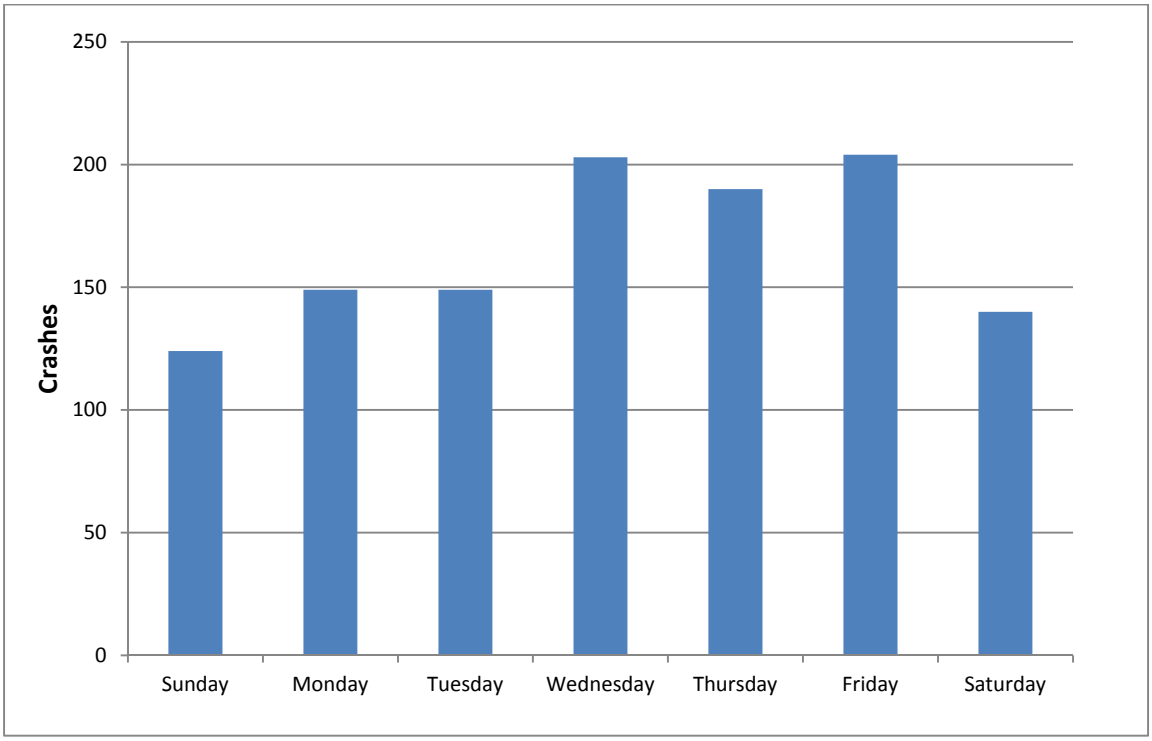


Figure 54: Distracted Driving Crashes by Day of the Week (2009-2013)

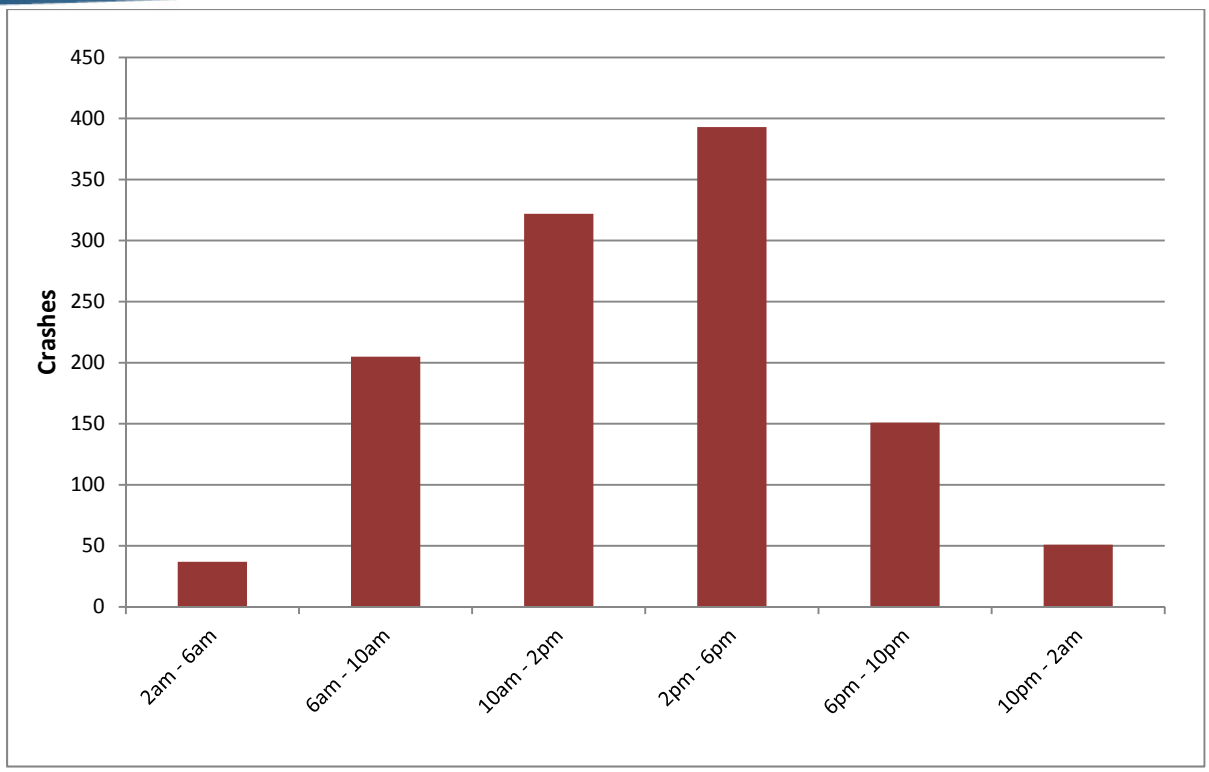


Figure 55: Distracted Driving Crashes by Time of Day

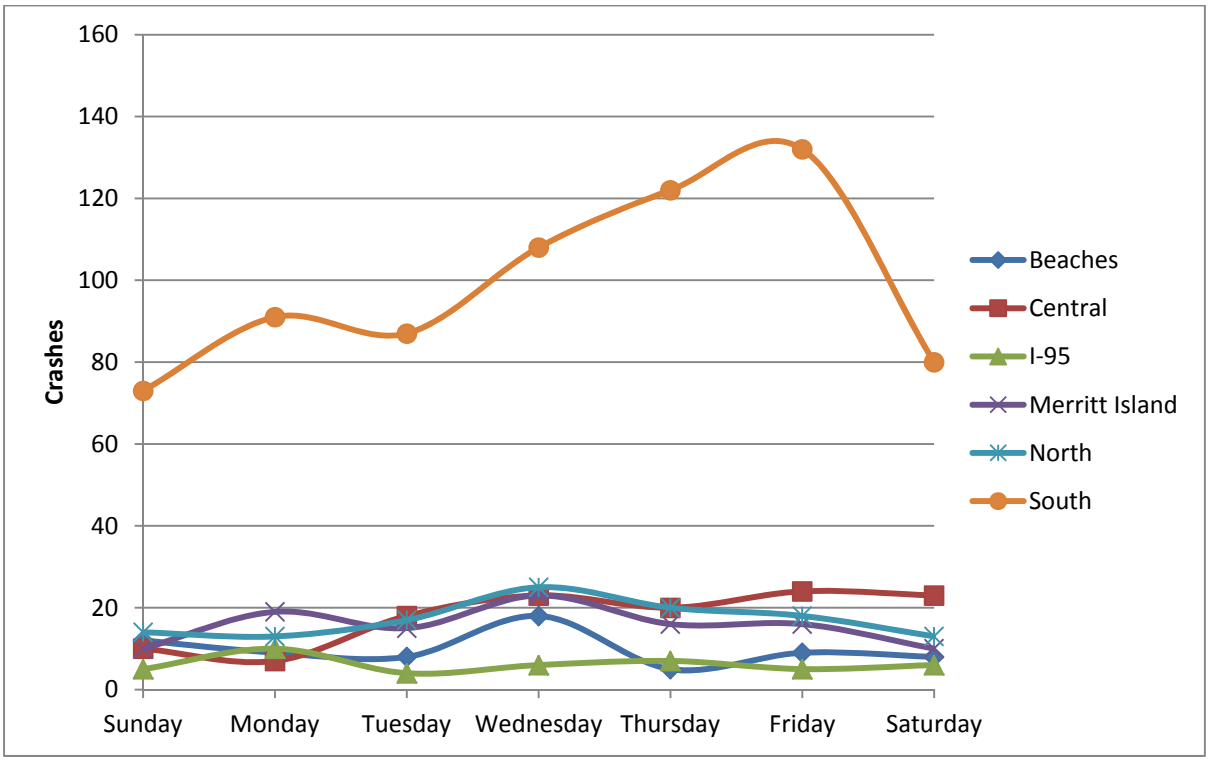


Figure 56: Distracted Driving Crashes by Planning Area

Section 6 High Crash Locations

HIGH CRASH LOCATIONS

Once the data for the various metrics was reviewed and summarized, an analysis was performed to identify high intersection and corridor crash locations. By identifying high crash locations within the County, further study can be targeted on systemic or location specific countermeasures which can be implemented to reduce crash frequency/severity. In order to align with FHWA goals moving forward, the analysis first focused on locations where crash frequency and severity were the greatest. The lists for top crash locations by frequency and severity, as displayed on **Figure 10/Figure 13** (intersections) and **Figure 12/Figure 15 (**corridors), were compared against one another to identify high crash locations. From this review, the following intersections and corridors appeared on both the top crash frequency and crash severity lists (listed in alphabetical order):

High Crash Intersections

- Aurora & Wickham (143 crashes, 2,111 severity score)
- Babcock & Malabar (181 crashes, 1,579 severity score)
- Babcock & Palm Bay (280 crashes, 3,168 severity score)
- Eau Gallie & Wickham (157 crashes, 2,714 severity score)
- Emerson & Minton (185 crashes, 2,962 severity score)
- Hollywood & Palm Bay (154 crashes, 3,207 severity score)
- I-95 & Wickham (138 crashes, 2,161 severity score)
- Lake Washington & Wickham (149 crashes, 2,558 severity score)
- Minton & US 192 (193 crashes, 3,007 severity score)
- Murrell & Wickham (138 crashes, 1,573 severity score)
- Post & Wickham (174 crashes, 1,572 severity score)
- Sarno & Wickham (204 crashes, 1,712 severity score)
- SR 520 & Sykes Creek (117 crashes, 2,232 severity score)

High Crash Corridors

- Babcock / Palm Bay to Eber (212 crashes, 3,210 severity score)
- Eau Gallie / S. Patrick to SR A1A (215 crashes, 3,250 severity score)
- Malabar / Babcock to Corey (299 crashes, 3,941severity score)
- N. Courtenay / Needle to Lucas (246 crashes, 2,895 severity score)
- SR 520 / I-95 to Burnett (195 crashes, 3,561 severity score)
- SR A1A / Fisher to St. Lucie (201 crashes, 2,905 severity score)
- US 1 / Post to Pineda Cswy. (168 crashes, 5,115 severity score)

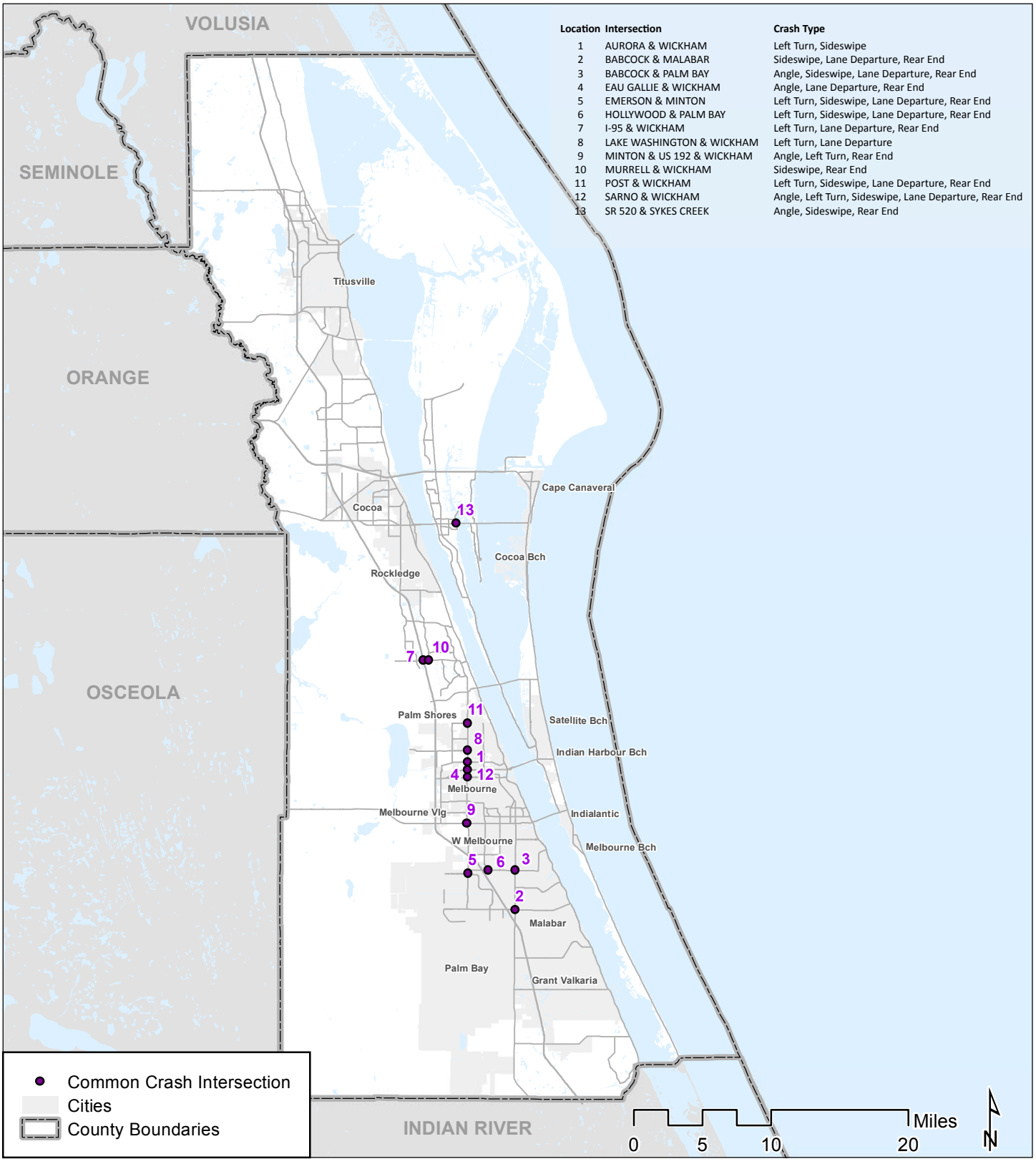
- US 1 / SR 528 to Canaveral Groves (180 crashes, 7,022 severity score)
- US 192 / John Rodes to Wickham (193 crashes, 5,986 severity score)
- Wickham / Murrell to I-95 (138 crashes, 3,099 severity score)
- Wickham / Pineda Cswy. to Jordan Blass (155 crashes, 5,176 severity score)

Thirteen intersections and 11 corridors were identified as high crash locations based on the crash frequency and severity analysis. Of the 13 intersections, only one (SR 520 and Sykes Creek Parkway) occurred in the northern portion of the County. This follows the trends observed throughout the countywide analysis, which relates a higher number of crashes occurring in the southern portion of the County where a majority of the population resides. Five of the 13 intersections are located along Wickham Road between Sarno Road and Post Road. Four intersections are located in Palm Bay: Emerson Road at Minton Road, Hollywood Boulevard and Babcock Street at Palm Bay Road, and Babcock Street at Malabar Road. The 11 high crash corridors were more dispersed throughout the County with five located in the North, Central, Merritt Island, or the Beaches and the remaining six located in the South portion of the County.

To further prioritize the 13 intersections identified in the high crash location analysis, intersection crash frequencies for the five highest intersection crash types were reviewed: rear end, angle, lane departure, left turn, and sideswipe. The 13 high crash intersections were cross checked versus the top crash frequency lists for the five crash types, as seen in **Figure C-1**, **C-5**, **C-9**, **C-11**, and **C-14** located in **Appendix C**. **Table 11** displays the high crash intersections identified as having a high crash frequency for the different crash types. As shown in **Table 11**, the intersections of Sarno Road and Post Road with Wickham Road, Babcock Street and Hollywood Boulevard with Palm Bay Road, and Emerson Road with Minton Road were identified on at least four of the crash type lists while four additional intersections were identified on three or more lists. **Figure 57** displays the high crash intersections.

Table 11: High Crash Intersections Identified on Crash Type Lists

Intersection	Crash Type					Identified on 4 or More Crash Type Lists?
	Angle	Left Turn	Sideswipe	Lane Departure	Rear End	
SARNO & WICKHAM	**X**	**X**	**X**	**X**	**X**	**Y**
BABCOCK & PALM BAY	**X**		**X**	**X**	**X**	**Y**
EMERSON & MINTON		**X**	**X**	**X**	**X**	**Y**
HOLLYWOOD & PALM BAY		**X**	**X**	**X**	**X**	**Y**
POST & WICKHAM		**X**	**X**	**X**	**X**	**Y**
BABCOCK & MALABAR			X	X	X	
EAU GALLIE & WICKHAM	X			X	X	
I-95 & WICKHAM		X		X	X	
MINTON & US 192 & WICKHAM	X	X			X	
SR 520 & SYKES CREEK	X		X		X	
AURORA & WICKHAM		X	X			
LAKE WASHINGTON & WICKHAM		X		X		
MURRELL & WICKHAM			X		X	



Location	Intersection	Crash Type
1	AURORA & WICKHAM	Left Turn, Sideswipe
2	BABCOCK & MALABAR	Sideswipe, Lane Departure, Rear End
3	BABCOCK & PALM BAY	Angle, Sideswipe, Lane Departure, Rear End
4	EAU GALLIE & WICKHAM	Angle, Lane Departure, Rear End
5	EMERSON & MINTON	Left Turn, Sideswipe, Lane Departure, Rear End
6	HOLLYWOOD & PALM BAY	Left Turn, Sideswipe, Lane Departure, Rear End
7	I-95 & WICKHAM	Left Turn, Lane Departure, Rear End
8	LAKE WASHINGTON & WICKHAM	Left Turn, Lane Departure
9	MINTON & US 192 & WICKHAM	Angle, Left Turn, Rear End
10	MURRELL & WICKHAM	Sideswipe, Rear End
11	POST & WICKHAM	Left Turn, Sideswipe, Lane Departure, Rear End
12	SARNO & WICKHAM	Angle, Left Turn, Sideswipe, Lane Departure, Rear End
13	SR 520 & SYKES CREEK	Angle, Sideswipe, Rear End

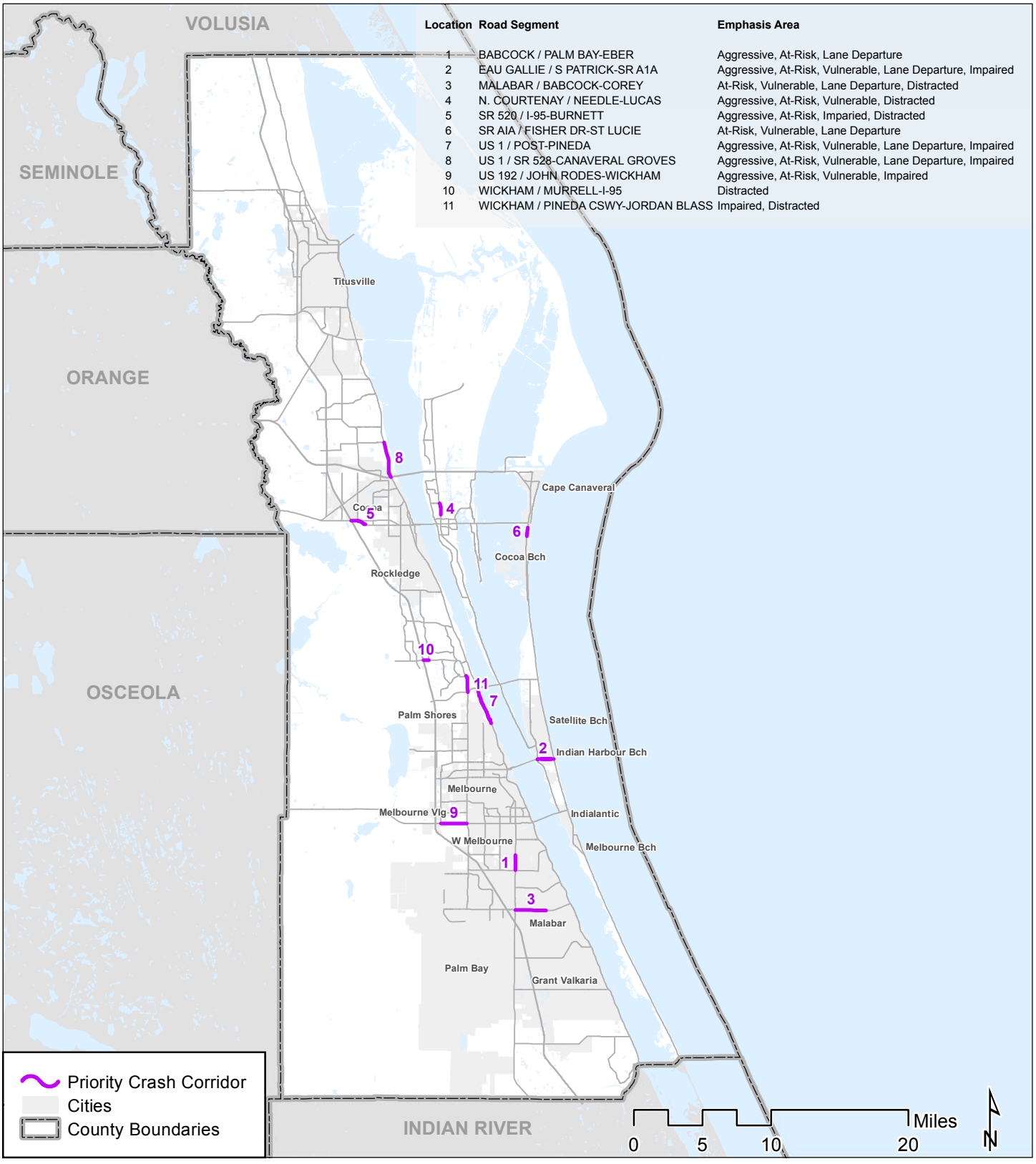
High Crash Intersections
Crash Data 2009 - 2013

Figure
57

To further prioritize the corridors beyond the FHWA safety metric review, corridor crash frequencies for the six measurable emphasis areas were reviewed: aggressive, at risk, vulnerable, lane departure, impaired, and distracted. The 11 high crash corridors were cross checked versus the top crash frequency lists for the six emphasis areas, as seen in **Figure 23**, **Figure 28**, **Figure 37**, **Figure 42**, **Figure 47**, and **Figure 52**. **Table 12** displays the high crash corridors identified as having a high crash frequency for the different emphasis areas. As shown in **Table 12**, three of the 11 corridors were identified on at least five of the emphasis area lists while four additional intersections were identified on four or more lists. **Figure 58** displays the high crash corridors.

Table 12: High Crash Corridors Identified in Emphasis Areas

Corridor	From	To	Emphasis Area						Identified in 4 or More Emphasis Areas?
			Aggressive	At Risk	Vulnerable	Lane Departure	Impaired	Distracted	
Eau Gallie	**S. Patrick**	**SR A1A**	**X**	**X**	**X**	**X**	**X**		**Y**
US 1	**Post**	**Pineda Cswy.**	**X**	**X**	**X**	**X**	**X**		**Y**
US 1	**SR 528**	**Canaveral Groves**	**X**	**X**	**X**	**X**	**X**		**Y**
Malabar	**Babcock**	**Corey**		**X**	**X**	**X**		**X**	**Y**
N. Courtenay	**Needle**	**Lucas**	**X**	**X**	**X**			**X**	**Y**
SR 520	**I-95**	**Burnett**	**X**	**X**			**X**	**X**	**Y**
US 192	**John Rodes**	**Wickham**	**X**	**X**	**X**		**X**		**Y**
Babcock	Palm Bay	Eber	X	X		X			
SR A1A	Fisher	St. Lucie		X	X	X			
Wickham	Pineda Cswy.	Jordan Blass					X	X	
Wickham	Murrell	I-95						X	



Location	Road Segment	Emphasis Area
1	BABCOCK / PALM BAY-EBER	Aggressive, At-Risk, Lane Departure
2	EAU GALLIE / S PATRICK-SR A1A	Aggressive, At-Risk, Vulnerable, Lane Departure, Impaired
3	MALABAR / BABCOCK-COREY	At-Risk, Vulnerable, Lane Departure, Distracted
4	N. COURTENAY / NEEDLE-LUCAS	Aggressive, At-Risk, Vulnerable, Distracted
5	SR 520 / I-95-BURNETT	Aggressive, At-Risk, Imparied, Distracted
6	SR AIA / FISHER DR-ST LUCIE	At-Risk, Vulnerable, Lane Departure
7	US 1 / POST-PINEDA	Aggressive, At-Risk, Vulnerable, Lane Departure, Impaired
8	US 1 / SR 528-CANAVERAL GROVES	Aggressive, At-Risk, Vulnerable, Lane Departure, Impaired
9	US 192 / JOHN RODES-WICKHAM	Aggressive, At-Risk, Vulnerable, Impaired
10	WICKHAM / MURRELL-I-95	Distracted
11	WICKHAM / PINEDA CSWY-JORDAN BLASS	Impaired, Distracted

High Crash Corridors
Crash Data 2009 - 2013

Figure
58

Section 7 Conclusion

CONCLUSION

Based on the information presented in this report and analysis performed as part of the high crash locations, the following corridors/intersections should be reviewed in further detail to identify opportunities for safety improvements:

- Wickham Road corridor from Sarno Road to Post Road
  - Five of the 13 high crash intersections occur along this corridor
  - Sarno Road to Eau Gallie Road experienced the 10th highest crash frequency of Non-SIS corridors
    - Also experienced the 5th highest lane departure and 6th highest impaired driving crash frequency
  - Multiple segments experienced high frequency of distracted driving crashes: Sarno Road to Eau Gallie Boulevard, Aurora Road to Lake Washington Road, and Parkway Drive to Post Road
- Locations along the SR A1A corridor between the Patrick Air Force Base (AFB) Main Gate (Jupiter Street) and North Atlantic Avenue
  - Fisher Park Drive to St. Lucie Lane was identified as a high crash corridor
  - SR A1A at SR 520 experienced the 9th highest crash frequency
  - South Banana River Boulevard to Fisher Drive and Osceola Lane to Shepard Drive experienced the 22nd and 25th highest crash frequencies, respectively
  - Multiple segments Patrick AFB to north of Cocoa Beach experienced greater than 65 crashes over the study period
  - Three of the top 25 crash severity segments occur along this corridor
    - Patrick AFB to the south end of the SR A1A one-way pair
    - McKinley Avenue to Buchanon Avenue
    - Fisher Park Drive to St. Lucie Lane
  - Four of the top 25 vulnerable road user segments were along this corridor
    - Patrick AFB to the south end of the SR A1A one-way pair
    - Shepard Drive to McKinley Avenue
    - McKinley Avenue to Buchanon Avenue
    - Fisher Park Drive to St. Lucie Lane
  - Three of the four one-way pair corridors were in the top 25 highest lane departure crash frequency corridors
  - Six segments observed on the impaired driving high crash frequency list