River to Sea Transportation Planning Organization
2570 W International Speedway Boulevard #100
Daytona Beach, FL 32114
(386) 226-0422

2022 CONGESTION MANAGEMENT PROCESS

2022 Congestion Management Process

Prepared for:
River to Sea Transportation Planning Organization
2570 W International Speedway Boulevard #100
Daytona Beach, FL 32114
386.226.0422

Prepared by:
Kittelson & Associates, Inc.
225 East Robinson Street, Suite 355
Orlando, FL 32801
407.540.0555

June 2022

DOCUMENT CONTROL SHEET

Document Title: 2022 River to Sea Transportation Planning Organization (R2CTPO) Congestion Management Process (CMP)			
Document Creator/Originator: Andrew Garrison, E.I.			
Draft (v1.0) Completed: 04/11/2022			
Stage	**Reviewer**	**Date Reviewed:**	**File Format:**
v1.0	Travis Hills, P.E., RSP$_1$	04/18/2022	Word
v1.1	Travis Hills, P.E., RSP$_1$	04/20/2022	Word
v1.1	Jessica Josselyn	04/21/2022	Word
v1.1	Adam Burghdoff, P.E.	04/22/2022	Word
v1.2	Travis Hills, P.E., RSP$_1$	04/28/2022	Word
v1.3 Complete On: 04/29/2022			
v1.3	Stephan Harris – River to Sea TPO	06/01/2022	PDF
v1.3	Carmen Rosamonda – City of DeBary City Manager	06/02/2022	PDF
v1.3	Volusia County (Multiple Reviewers	06/08/2022	PDF
Final v2.0 Complete On: 06/27/2022			

CONTENTS

1. Executive Summary 1
1.1. Overview of the CMP 1
1.2. Congestion Sources 4
1.3. Key Performance Measures 5
1.4. Key Strategies 6
1.5. Next Steps 7
2. Introduction 8
2.1. Overview 8
2.2. Congestion Dimensions 9
2.3. Congestion Sources 10
2.4. Federal and State Requirements 11
2.5. Performance-Based Approach 12
3. Goals, Objectives, and Performance Measures 13
4. CMP Network 16
4.1. Roadway Network 16
4.2. Transit Network 16
4.3. Bicycle and Pedestrian Network 16
4.4. Transportation System Management & Operations (TSM&O) Networks 16
4.5. Evacuation Route Network 16
5. Data Collection 23
5.1. Types of Data 23
6. Congestion Analysis 25
6.1. Goal 1: Efficient Multimodal Transportation System 25
6.2. Goal 2: Economic Development 40
6.3. Goal 3: Enhance Connectivity and Mode Choice 43
6.4. Goal 4: Improve Safety 44
6.5. Goal 5: Promote Livability 64
6.6. Goal 6: Promote Equity 66
6.7. Federal and State Performance Measures 69
7. Congestion Management Strategies 75
7.1. Identification of Strategies 75
7.2. Application of Strategies 81
8. CMP Next Steps 82
8.1. Monitoring Plan 82
8.2. Programming and Implementation of Strategies 82
8.3. Strategy Effectiveness Evaluation 82
9. Outreach 84

LIST OF FIGURES

Figure 1: Goals, Objectives, and Performance Measures 2
Figure 2: FHWA 8-Action Process for CMPs 4
Figure 3: Congestion Management Strategy Categories 7
Figure 4: FHWA 8-Action Process for CMPs 9
Figure 5: FHWA Performance-Based CMP Approach 12
Figure 6: Goals, Objectives, and Performance Measures 14
Figure 7: CMP Roadway Network 17
Figure 8: CMP Transit Network 18
Figure 9: CMP Bicycle and Pedestrian Network 19
Figure 10: CMP ITS Network 20
Figure 11: Signals and CCTV Locations 21
Figure 12: Evacuation Routes 22
Figure 13: 2019 CMP Roadway Network AADTs 26
Figure 14: VMT and VMT per Capita on CMP Roadways (2015 to 2019) 27
Figure 15: Annual Cost of Delay in R2CTPO Area 27
Figure 16: 2019 Daily Level of Congestion on CMP Roadways 30
Figure 17: Interstate NHS Roadway Daily Travel Time Reliability 32
Figure 18: Non-Interstate NHS Roadway Daily Travel Time Reliability 33
Figure 19: NHS Roadway AM Peak Hour Travel Time Reliability 34
Figure 20: NHS Roadway PM Peak Hour Travel Time Reliability 35
Figure 21: NHS Roadway Weekend Travel Time Reliability 36
Figure 22: NHS Roadway Peak Season (March) Travel Time Reliability 37
Figure 23: Votran and Flagler County Ridership 38
Figure 24: SunRail Ridership at DeBary Station 39
Figure 25: Interstate NHS Roadway Daily Truck Travel Time Reliability 41
Figure 26: Non-Interstate NHS Roadway Truck Travel Time Reliability 42
Figure 27: Bicycle and Pedestrian Facility Coverage 44
Figure 28: Miles of Trail by Type 44
Figure 29: Vehicle and Motorcycle Crashes in R2CTPO Planning Area 45
Figure 30: Serious Injury/Fatal Vehicle and Motorcycle Crashes in R2CTPO Planning Area 46
Figure 31: Bicycle and Pedestrian Crashes in R2CTPO Planning Area 46
Figure 32: Serious Injury/Fatal Bicycle and Pedestrian Crashes in R2CTPO Planning Area 47

Figure 33: Total Vehicle and Motorcycle Crashes by CMP Segment....49
Figure 34: Serious Injury and Fatal Vehicle and Motorcycle Crashes by CMP Segment....50
Figure 35: Total Bicycle and Pedestrian Crashes by CMP Segment....51
Figure 36: Serious Injury and Fatal Bicycle and Pedestrian Crashes by CMP Segment....52
Figure 37: Top 25 Vehicle Crash Frequency Segments....54
Figure 38: Top 25 Vehicle Crash Severity Segments....55
Figure 39: Top 25 Motorcycle Crash Frequency Segments....56
Figure 40: Top 25 Motorcycle Crash Severity Segments....57
Figure 41: Top 25 Bicycle Crash Frequency Segments....58
Figure 42: Top 25 Bicycle Crash Severity Segments....59
Figure 43: Top 25 Pedestrian Crash Frequency Segments....60
Figure 44: Top 25 Pedestrian Crash Severity Segments....61
Figure 45: Level of Congestion on Evacuation Routes....63
Figure 46: Electric Vehicle Charging Stations and Units....64
Figure 47: Location of Electric Vehicle Charging Stations....65
Figure 48:Transportation Disadvantaged Areas and Transit Service....67
Figure 49: Transit Coverage in R2CTPO Planning Area....68
Figure 50: Job Accessibility by Mode....68
Figure 51: Congestion Management Strategy Categories....76

LIST OF TABLES

Table 1: Typical Recurring and Non-Recurring Congestion Causes 5
Table 2: Daily Level of Congestion on CMP Roadways 6
Table 3: 2016-2020 R2CTPO Safety Statistics 6
Table 4: Dimensions of Congestion 10
Table 5: Typical Recurring and Non-Recurring Congestion Causes 11
Table 6: Data Sources and Applicability 24
Table 7: Congestion Factors 28
Table 8: Over Capacity Centerline Miles by Jurisdiction 29
Table 9: Reliability Factors 31
Table 10: Truck Reliability Factors 40
Table 11: 2016-2020 R2CTPOSafety Statistics 45
Table 12: Weighting Factors for Crash Severity Score 48
Table 13: Air Quality Attainment Status Ozone Readings in ppb (2016 to 2020) 66
Table 14: Safety Performance Measures 70
Table 15: 2020 Safety Results 71
Table 16: Infrastructure Performance Measures 71
Table 17: 2020 Infrastructure Status 72
Table 18: System Performance Targets 72
Table 19: 2020 System Performance Results 73
Table 20: Congestion Management Strategies: Multimodal Systems 77
Table 21: Congestion Management Strategies: Roadway Management 79
Table 22: Congestion Management Strategies: Emerging Technologies and Capacity 81

APPENDICES

Appendix A: CMP Performance Measures
Appendix B: Safety Analysis
Appendix C: Congestion Management Strategies
Appendix D: Congestion Management Strategy Matrix
Appendix E: Outreach Summary

LIST OF ACRONYMS

Acronyms	Definitions
AADT	Annual Average Daily Traffic
BtU	Beyond the Ultimate
CAV	Connected and Automated Vehicle
CAC	Citizen's Advisory Committee
CCTV	Closed-Circuit TV
CIP	Capital Improvement Plan
CMP	Congestion Management Process
DMS	Dynamic Messaging Sign
DVMT	Daily Vehicle Miles Traveled
EOC	Emergency Operations Center
EPDO	Equivalent Property Damage Only
EV	Electric Vehicle
FAST Act	Fixing America's Surface Transportation Act
FDEP	Florida Department of Environmental Protection
FDM	FDOT Design Manual
FDOT	Florida Department of Transportation
FHSMV	Florida Highway Safety and Motor Vehicles
FHWA	Federal Highway Administration
FRATIS	Freight Advanced Traveler Information Systems
FTA	Federal Transit Administration
ITS	Intelligent Transportation Systems
LOS	Level of Service
LOTTR	Level of Travel Time Reliability

Acronyms	Definitions
LRTP	Long Range Transportation Plan
MAP-21	Moving Ahead for Progress
MPO	Metropolitan Planning Organization
NHS	National Highway System
NPMRDS	National Performance Management Research Data Set
NPRM	Notice of Proposed Rule Making
NTD	National Transit Database
OSONOC	Other Safety Occurrences Not Otherwise Classified
PDO	Property Damage Only
PTASP	Public Transportation Agency Safety Plan
R2CTPO	River to Sea Transportation Planning Organization
ROW	Right of Way
S4	Signal Four Analytics
TAM	Transit Asset Management Plan
TCC	Technical Coordinating Committee
TDP	Transit Development Plan
TERM	Transit Economic Requirement Model
TIP	Transportation Improvement Program
TMA	Transportation Management Area
TMC	Traffic Management Center
TNC	Transportation Network Company
TOD	Transit-Oriented Development
TSM&O	Transportation Systems Management and Operations
TSP	Transit Signal Priority

Acronyms	Definitions
TTTR	Truck Travel Time Reliability
ULB	Useful Life Benchmark
V/C	Volume-to-Capacity
VMT	Vehicle Miles Traveled

1. EXECUTIVE SUMMARY

This document provides an overview of the River to Sea Transportation Planning Organization's (R2CTPO) Congestion Management Process (CMP). The CMP provides data analysis regarding current issues to help make informed decisions regarding congestion management strategies that can be applied throughout the R2CTPO planning area. The R2CTPO CMP strives to analyze data and provide congestion management strategies that support the primary purpose of the Connect 2045 Long Range Transportation Plan (LRTP):

"…the intent and purpose of an LRTP is to encourage and promote the safe and efficient management, operation, and development of a cost-feasible intermodal transportation system that enhances mobility and freight movement. The LRTP considers how projects could affect the resiliency and reliability of the transportation system, as well as enhance travel and tourism in the area."

Specific goals from the Connect 2045 LRTP that relate to congestion management were identified and applied as the guiding principles for the CMP. These goals encompass six focus areas, as shown in **Figure 1**. Multiple objectives are associated with each goal and provide more specific guidance on what each goal represents. The performance measures used to evaluate the R2CTPO planning area were derived from these goals and objectives. Tracking CMP performance measures as they relate back to the LRTP goals and objectives creates consistency in the overall planning process.

1.1. OVERVIEW OF THE CMP

The CMP is intended to serve as a resource that provides information for local decision makers to plan for a safe and effective transportation system for all road users. Through tying the Connect 2045 LRTP goals and objectives to data-driven performance measures, the R2CTPO can monitor system performance and use performance measurement data for project prioritization criteria in the LRTP, Transportation Improvement Program (TIP), and/or List of Priority Projects. Specific ways the CMP could be incorporated into regional prioritization may be addressed as part of the LRTP, TIP, and/or List of Priority Projects during their next update cycle. Rather than identify specific congestion management projects, the CMP's purpose is to provide a toolbox of actions and strategies the R2CTPO and partner agencies can refer to when addressing congestion management issues.

This CMP incorporates the 8-Action Process model (shown in **Figure 2**) as discussed in the FHWA Congestion Management Process: A Guidebook[1]. These actions start with the identification of goals and objectives and proceed to the evaluation and implementation of strategies that can reduce congestion in the planning area. The 8-Actions do not begin and end with the CMP. The CMP is a starting point for further implementation via additional studies and plans to identify specific projects. The remainder of this CMP is organized around the 8-Action Process model.

[1] FHWA Congestion Management Process: A Guidebook (April 2011): https://www.fhwa.dot.gov/planning/congestion_management_process/cmp_guidebook/cmpguidebk.pdf

GOALS	OBJECTIVES	PERFORMANCE MEASURES
Goal 1 Develop and maintain a balanced and efficient multimodal transportation system	**Objective 1.1** Develop a multimodal transportation system that improves accessibility and mobility to economic centers for all users (including motor vehicle, bicycle, pedestrian, transit) as well as the movement of goods.	**1.1.1** Level of Congestion on Roadways Connecting/Adjacent to Economic Centers **1.1.2** Percent of Roadway Miles Connecting/Adjacent to Economic Centers with Pedestrian/Bicycle Facilities **1.1.3** Percent of Roadway Miles Connecting/Adjacent to Economic Centers with Transit Routes
	Objective 1.2 Minimize congestion/delay and maintain travel time reliability on roadways and intersections through projects that improve capacity, provide for the more eficient use and operation of existing transportation facilities, and reduce transportation demand.	**1.2.1** Daily Vehicle Miles Traveled per Capita **1.2.2** Annual Vehicle Hours of Delay and Associated Cost per Capita **1.2.3** Level of Congestion (Volume to Capacity Ratio) on Roadways **1.2.4** Level of Travel Time Reliability on Interstate **1.2.5** Level of Travel Time Reliability on Non-Interstate National Highway System **1.2.6** Percent of Roadways with Existing ITS Fiber
	Objective 1.3 Provide public transit systems that serve diverse populations and deliver efficient and convenient transit service.	**1.3.1** Total Transit Ridership (Votran, Flagler County, SunRail broken down individually) **1.3.2** Percent of Fixed-Route Transit Ridership on Varying Headway Routes **1.3.3** Number of Transit Signal Priority Service Roadways
	Objective 1.4 Develop a plan that maximizes the use of all available existing and alternative revenue sources and is financially feasible.	**1.4.1** Adequately fund preservation of transportation assets (National Highway System Pavement Condition, Bridge Condition, and Transit Assets).
	Objective 1.5 Incorporate measures that give priority to projects that provide high benefit-to-cost value.	**1.5.1** Average Emergency Response Time (Key Roadways Only) **1.5.2** Average Crash/Incidence Clearance Time (Key Roadways Only)
Goal 2 Support the economic development and growth of the TPO area and region	**Objective 2.1** Develop a transportation system that supports diverse economic growth, advances tourism, and improves the economic competitiveness of the region.	**2.1.1** Truck Travel Time Reliability (TTTR) on National Highway System
	Objective 2.2 Identify and support safe and efficient truck routes and other facilities that improve the movement of freight and goods.	**2.2.1** Level of Congestion (Volume to Capacity Ratio) on Roadways Adjacent to Key Facilities
	Objective 2.3 Improve connectivity and access to rail, port, bus, and airport facilities.	**2.3.1** Percent of Roadway Miles Connecting/Adjacent to Employment Activity Centers with Transit Routes

Goal 3
Enhance and expand transportation connectivity and choice for all users

Objective 3.1
Provide a range of transportation alternatives to improve mobility for all residents and visitors which includes addressing the unique needs of the elderly, people with disabilities, and those unable to drive.

Objective 3.2
Maximize the interconnectivity of roadways, sidewalks, bicycle facilities, trails, transit, and other transportation system components to provide safe and convenient pedestrian, bicycle, transit, and motor vehicle mobility.

3.1.1 Annual Trips Using Transportation Network Companies (TNCs)

3.1.2 Annual Trips Using Shared Micromobility

3.2.1 Percent of Roadway Network Serviced by Transit Routes

3.2.2 Percent of Roadway Miles with Pedestrian/Bicycle Facilities

3.2.3 Total Miles of Constructed Trail Facilities

Goal 4
Eliminate or reduce crash-related fatalities and serious injuries (safety) and improve security throughout the transportation network

Objective 4.1
Develop a transportation system that supports diverse economic growth, advances tourism, and improves the economic competitiveness of the region.

Objective 4.2
Identify and support safe and efficient truck routes and other facilities that improve the movement of freight and goods.

Objective 4.3
Enhance the safety and security of transit systems and other modes such as airports through appropriate design, monitoring, and enforcement programs.

4.1.1 Total Number of Vehicle Crashes

4.1.2 Number of Fatalities in Vehicle Crashes

4.1.3 Fatality Rate in Vehicle Crashes

4.1.4 Number of Serious Injuries in Vehicle Crashes

4.1.5 Serious Injury Rate in Vehicle Crashes

4.2.1 Total Number of Pedestrian/Bicycle Crashes

4.2.2 Number of Fatalities in Pedestrian/Bicycle Crashes

4.2.3 Number of Serious Injuries in Pedestrian/Bicycle Crashes

4.3.1 Level of Congestion (V/C) on Evacuation Routes

4.3.2 Percent of Evacuation Route Roadway Lane Miles with Existing ITS Fiber

Goal 5
Promote livability by providing, protecting and enhancing social, cultural, physical and natural environmental places

Objective 5.1
Promote compact, walkable, mixed-use development and redevelopment opportunities that encourage a range of transportation options and maximize the efectiveness of the transportation system.

5.1.1 Total Number of Electric Vehicle Charging Stations

5.1.2 Average Annual Air Quality Index (AQI)

Goal 6
Promote equity, transparency, and opportunities for the public to be involved with their transportation system

Objective 6.1
Provide opportunities for public participation that are open, inclusive, and accessible for all citizens; and develop outreach programs to engage citizens in all jurisdictions as well as the traditionally underserved and underrepresented.

6.1.1 Percent of Transit Routes within Half-Mile of Transportation Disadvantaged Areas

6.1.2 Percent of Population/Jobs within a Half-Mile of Transit Routes

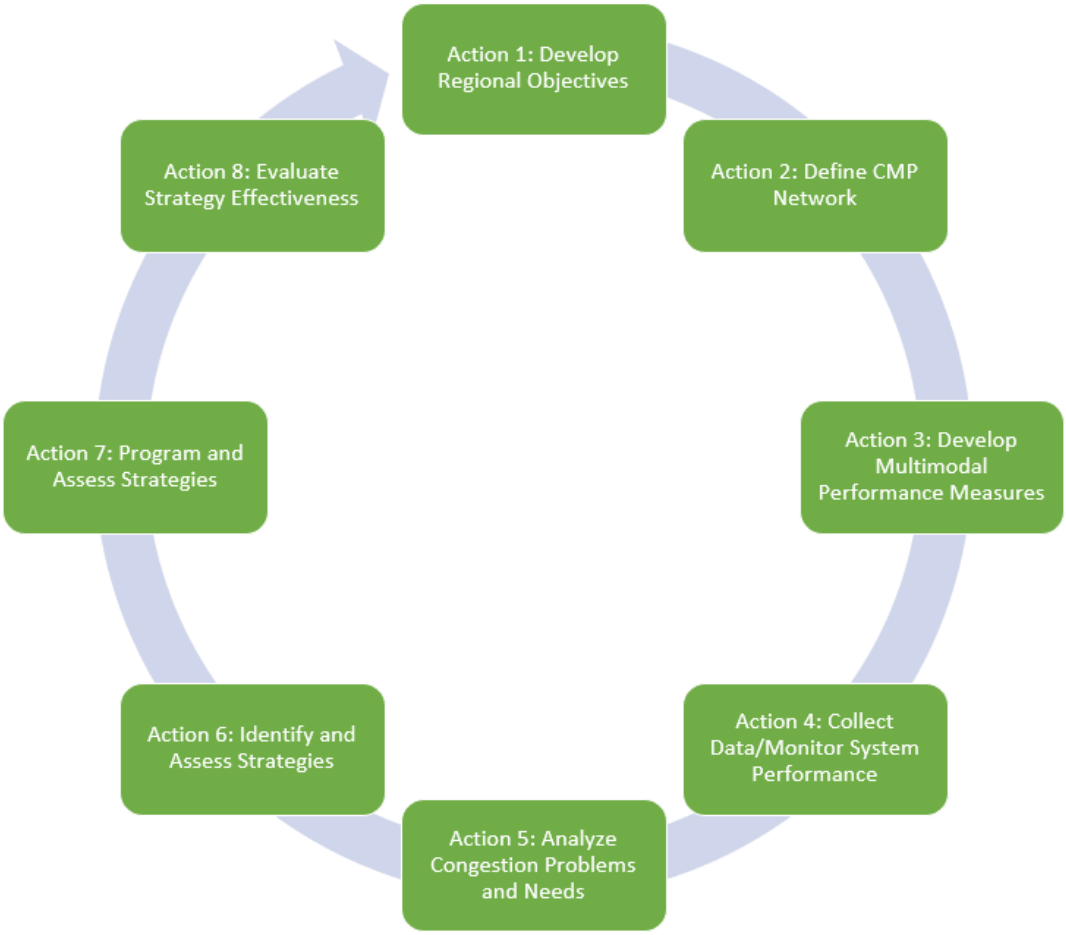


Figure 2: FHWA 8-Action Process for CMPs

1.2. CONGESTION SOURCES

Congestion can either be a regular/recurring event, or an isolated/non-recurring event. Recurring congestion occurs when a demand for a roadway segment is greater than the capacity of a roadway segment. Recurring congestion occurs predictably and most commonly in the morning and evening peak hours. Non-recurring congestion occurs when an incident impacts the roadway capacity, and a segment can no longer process the demand. Typical causes of recurring and non-recurring types of congestion are described in **Table 1**.

Specific to the R2CTPO planning area, planned major special events (such as the Daytona 500, Bike Week, Rolex 24, etc.) occur frequently enough to be considered recurring congestion. Unplanned special events, such as impromptu truck meets, also create non-recurring congestion within the planning area. Both recurring and non-recurring congestion impacts the degree of certainty and predictability in travel times, also referred to as reliability.

Table 1: Typical Recurring and Non-Recurring Congestion Causes

Recurring Congestion	Non-Recurring Congestion
Planned special events	Impromptu special events
Bottlenecks (overcapacity)	Weather
	Work zones
Traffic control devices (signal timing, stop control)	Traffic incidents[1]
	Fluctuations in normal traffic[2]

[1] Examples include vehicular crashes, breakdowns, and debris in travel lanes.

[2] Day-to-day variability in demand leads to some days with higher traffic volumes than others.

1.3. KEY PERFORMANCE MEASURES

The CMP analysis identified and analyzed numerous performance measures within the R2CTPO planning area, with two key performance measures being congestion and safety. The congestion analysis, as displayed in **Table 2**, shows that the R2CTPO CMP network is primarily uncongested. As shown in **Table 3**, the R2CTPO planning area has experienced an increase in fatalities from 2019 to 2020. One contributing cause may be higher vehicle speeds due to less congestion which can lead to a higher number of serious injury severity crashes. The full performance measure analysis is presented in **Section 6: Congestion Analysis**.

Table 2: Over Capacity Centerline Miles by Jurisdiction

City[1]	Key Roadways	Centerline Miles Over Capacity	% of Total Centerline Miles
Palm Coast	I-95	5.8	0.5%
Daytona Beach	Williamson Blvd.	4.0	0.4%
Deltona	Normandy Blvd.	3.3	0.3%
Ormond Beach	Williamson Blvd., SR 40	1.9	0.2%
Orange City	Veteran's Memorial Parkway	1.7	0.2%
DeLand	US 17/92	1.5	0.1%
Port Orange	Williamson Blvd.	0.9	0.1%
Total Centerline Miles Approaching Congestion – 34.6 (3.2% of Total Centerline Miles)			
Total Uncongested Centerline Miles – 1024.8 (95.0% of Total Centerline Miles)			

[1] Jurisdictions with zero miles of overcapacity roadways were not shown in this table.

Table 3: 2016-2020 R2CTPO Safety Statistics

Safety Metric	2016	2017	2018	2019	2020
Number of Fatalities	142	156	122	135	155
Rate of Fatalities (per 100M VMT)	2.01	2.14	1.63	1.78	2.11
Number of Serious Injuries	773	825	841	758	612
Rate of Serious Injuries (per 100M VMT)	10.77	11.30	11.26	9.97	8.33
Number of Non-Motorized (Pedestrian/ Bicycle) Fatalities and Serious Injuries	112	111	100	110	106

1.4. KEY STRATEGIES

The identification and application of various congestion management strategies is central to the CMP. Rather than identify specific congestion management projects, the CMP's purpose is to provide a toolbox of actions and strategies the R2CTPO and partner agencies can refer to when

addressing congestion management issues. The identification of congestion management strategies for the CMP was completed by referring to a variety of sources including:

- 2015 R2CTPO Congestion Management Process
- 2018 R2CTPO TSM&O Master Plan
- 2020 R2CTPO Connected and Automated Vehicle Readiness Study
- Industry best practices

During this process, more than 70 congestion management strategies were identified and categorized as shown in **Figure 3**. A few key example strategies are listed under each category. **Section 7.1: Identification of Strategies** presents the full list of specific strategies for each category.

Figure 3: Congestion Management Strategy Categories

1.5. NEXT STEPS

This CMP provides an analysis of current congestion and safety conditions, as well as a toolbox of potential strategies to address identified congestion management issues. Establishing a consistent monitoring plan will help track trends for recurring issues or identify new hot spots for congestion or safety issues. Once the issues are studied, strategies should be programmed and their effectiveness evaluated, which addresses the final two Actions of the FHWA 8 Action Process.

2. INTRODUCTION

2.1. OVERVIEW

The Federal Highway Administration (FHWA) requires a congestion management process (CMP) from metropolitan areas with a population exceeding 200,000, also known as Transportation Management Areas (TMAs). CMPs are required in every TMA; however, the federal regulations do not dictate the approach and implementation of the CMP. This flexibility allows metropolitan planning organizations (MPOs) the ability to develop an approach and application specific to their planning area.

The CMP is intended to serve as a resource that provides information for decision makers to plan for a safe and effective transportation system for all road users. The FHWA CMP Guidebook notes "Although the CMP does not have an update cycle established by federal regulations, both the four-year certification review cycle and the four- or five-year MTP update cycle for each TMA provide a baseline for a re-evaluation/update cycle in the absence of an identified requirement. The CMP must, at minimum, be updated often enough to provide relevant, recent information as an input to each MTP update." Thus, the R2CTPO is proposing bi-annual updates of the CMP so there are up to two updates prior to each LRTP update cycle. Updating bi-annually will also allow the R2CTPO to, as applicable, analyze newly available data sources, identify changes in congestion patterns and sources, and document the most recent industry best practices. The R2CTPO may elect to update the CMP on a more frequent cycle, if desired. The R2CTPO adopted the most recent CMP in 2018.

The CMP goals and objectives are consistent with the 2045 LRTP. Through tying the Connect 2045 LRTP goals and objectives to data-driven performance measures, the R2CTPO can monitor system performance and use performance measurement data for project prioritization criteria in the LRTP, TIP, and/or List of Priority Projects. Specific ways the CMP could be incorporated into regional prioritization should be addressed as part of the LRTP, TIP, and/or List of Priority Projects during their next update cycle. Rather than identify specific congestion management projects, the CMP's purpose is to provide a toolbox of actions and strategies the R2CTPO and partner agencies can refer to when addressing congestion management issues.

This CMP incorporates the 8-Action Process model (shown in **Figure 4**) as discussed in the FHWA Congestion Management Process: A Guidebook (April 2011). These actions start with the identification of goals and objectives and proceed to the evaluation and implementation of strategies that can reduce congestion in the planning area. The remainder of this CMP is organized around the 8-Action Process model.

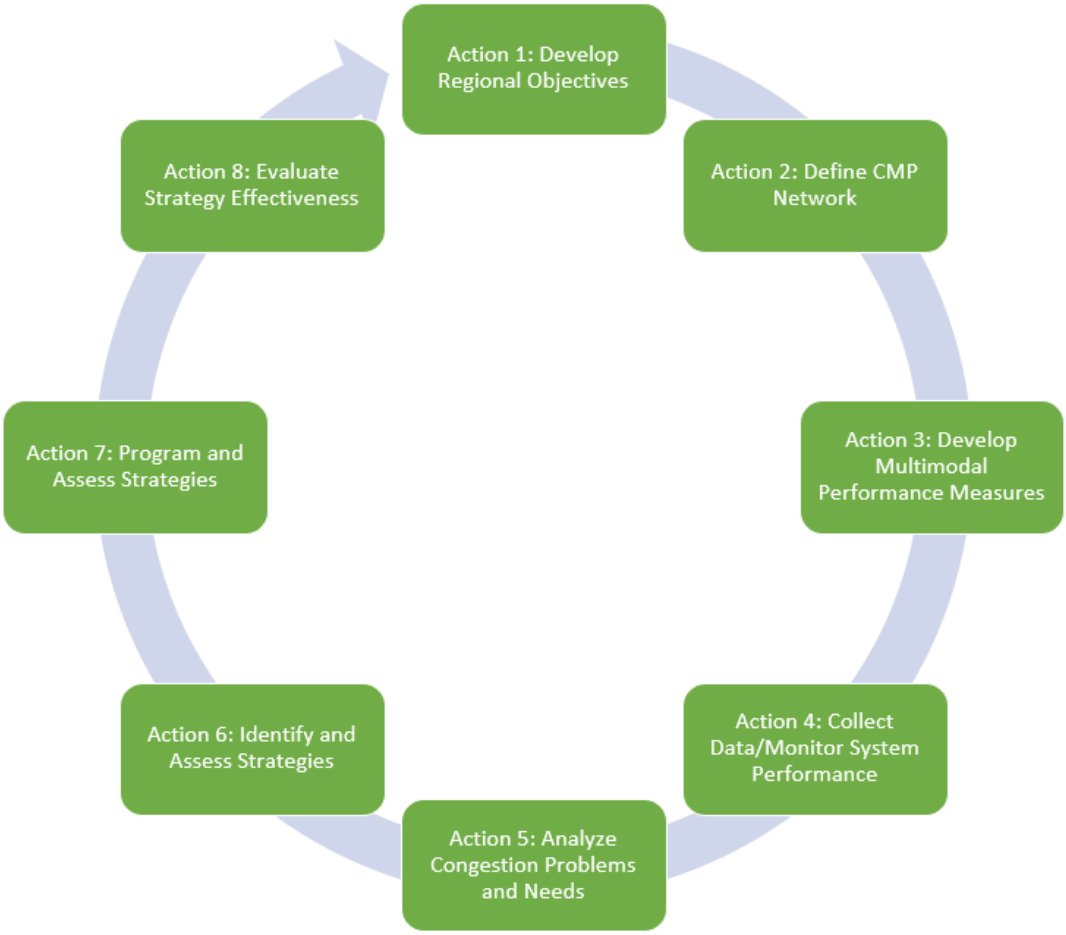


Figure 4: FHWA 8-Action Process for CMPs

2.2. CONGESTION DIMENSIONS

Table 4 depicts the primary dimensions of congestion as defined by the FHWA CMP Guidebook. The R2CTPO considers all dimensions of congestion within its planning processes.

Table 4: Dimensions of Congestion

Dimension	Definition
Intensity	The relative severity of congestion that affects travel. Intensity has traditionally been measured through indicators such as volume-to-capacity (V/C) ratios or Level of Service (LOS) measures that consistently relate the different levels of congestion experienced on roadways.
Duration	The amount of time the congested conditions persist before returning to an uncongested state.
Extent	The number of system users or components (e.g., vehicles, pedestrians, transit routes, lane miles) affected by congestion. For example, the proportion of system network components (roads, bus lines, etc.) that exceed a defined performance measure target.
Variability	The changes in congestion that occur on different days or at different times of day. When congestion is highly variable due to non-recurring conditions, such as a roadway with a high number of traffic accidents causing delays, this has an impact on the reliability of the system.

2.3. CONGESTION SOURCES

Congestion can either be a regular/recurring event, or an isolated/non-recurring event. Recurring congestion occurs when a demand for a roadway segment is greater than the capacity of a roadway segment. Recurring congestion occurs predictably and most commonly in the morning and evening peak hours. Non-recurring congestion occurs when an incident impacts the roadway capacity, and a segment can no longer process the demand. Typical causes of recurring and non-recurring types of congestion are described in **Table 5**.

Specific to the R2CTPO planning area, planned major special events (such as the Daytona 500, Bike Week, Rolex 24, etc.) occur frequently enough to be considered recurring congestion. Unplanned special events, such as impromptu truck meets, also create non-recurring congestion within the planning area. Both recurring and non-recurring congestion impacts the degree of certainty and predictability in travel times, also referred to as reliability.

Table 5: Typical Recurring and Non-Recurring Congestion Causes

Recurring Congestion	Non-Recurring Congestion
Planned special events	Impromptu special events
Bottlenecks (overcapacity)	Weather
	Work zones
Traffic control devices (signal timing, stop control)	Traffic incidents[1]
	Fluctuations in normal traffic[2]

[1] Examples include vehicular crashes, breakdowns, and debris in travel lanes.

[2] Day-to-day variability in demand leads to some days with higher traffic volumes than others.

2.4. FEDERAL AND STATE REQUIREMENTS

This section discusses the Federal and State legislative requirements of a CMP that the R2CTPO followed when preparing this document.

2.4.1. FEDERAL REQUIREMENTS

The federal CMP requirements found in 23 C.F.R. 450.322 details the Federal CMP requirements for TMA MPOs. While the Federal CMP requirements are not prescriptive, FHWA's Congestion Management Process Guidebook helps guide MPOs through CMP development that can be tailored to a specific planning area. Requirements from 23 C.F.R. 450.322 are summarized below:

- Address congestion management through a process that provides for safe and effective integrated management and operation of a multimodal transportation system.
- Should result in multimodal system performance measures and strategies.
- Consider strategies that manage demand, reduce single occupant vehicle (SOV) travel, improve transportation system management and operations, and improve efficient service integration within and across modes.
- CMPs shall include:
    - Methods to monitor and evaluate performance.
    - Definition of objectives and appropriate performance measures.
    - Establish a data collection and system performance monitoring.
    - Identification of congestion management strategies.

2.4.2. STATE REQUIREMENTS

The state CMP requirements found in Florida Statute Section 339.175, F.S. requires all MPOs in Florida to "prepare a congestion management system for the metropolitan area and cooperate with the department in the development of all other transportation management systems required

by state or federal law." The R2CTPO CMP meets these requirements and was developed in close coordination with FDOT District 5.

2.5. PERFORMANCE-BASED APPROACH

FHWA and the Federal Transit Administration (FTA) promote the use of an objectives-driven, performance-based approach to planning for operations, as summarized in **Figure 5**. The central tenet of this approach is developing operations objectives that indicate how a region plans to manage and improve congestion on its transportation system. For the R2CTPO, these objectives were identified in the LRTP and are now being applied in the CMP. The CMP focuses on the tasks shown as the right side of **Figure 5**, and aims to provide specific, measurable, agreed-upon performance measures that can be tracked on the regional level. Monitoring performance can help lead to informed decisions about what congestion management strategies should be applied within the R2CTPO planning area.

Figure 5: FHWA Performance-Based CMP Approach[2]

[2] https://ops.fhwa.dot.gov/publications/fhwahop10027/fhwahop10027.pdf

3. GOALS, OBJECTIVES, AND PERFORMANCE MEASURES

Goals and objectives from the Connect 2045 LRTP that relate to congestion management were identified and applied as the guiding principles for the CMP. These goals encompass six focus areas, as shown in **Figure 6**. Multiple objectives are associated with each goal and provide more specific guidance on what each goal represents. Establishing these goals and objectives addresses Action 1 of the FHWA 8 Action Process shown in **Figure 4**.

In developing the CMP, performance measures were directly related to the LRTP goals and objectives. By associating performance measures with LRTP goals and objectives, the CMP allows the R2CTPO to implement strategies to achieve a goal and track progress over time. As part of the CMP, these performance measures were analyzed to provide a baseline indication of how the R2CTPO planning area is progressing towards reaching their goals and objectives. The performance measures for each goal and objective are also shown in **Figure 6**. Establishing these performance measures addresses Action 3 of the FHWA 8 Action Process shown in **Figure 4**.

Some of the performance measures were not assessed due to lack of data or generally undefined analysis parameters. **Appendix A** indicates the status of each performance measure and what needs to be done to analyze the performance measures that were not analyzed as part of this CMP. For performance measures not analyzed, changes in data availability and/or better defined analysis parameters could result in these performance measures being analyzed in future CMPs.

GOALS	OBJECTIVES	PERFORMANCE MEASURES
Goal 1 Develop and maintain a balanced and efficient multimodal transportation system	**Objective 1.1** Develop a multimodal transportation system that improves accessibility and mobility to economic centers for all users (including motor vehicle, bicycle, pedestrian, transit) as well as the movement of goods.	**1.1.1** Level of Congestion on Roadways Connecting/Adjacent to Economic Centers **1.1.2** Percent of Roadway Miles Connecting/Adjacent to Economic Centers with Pedestrian/Bicycle Facilities **1.1.3** Percent of Roadway Miles Connecting/Adjacent to Economic Centers with Transit Routes
	Objective 1.2 Minimize congestion/delay and maintain travel time reliability on roadways and intersections through projects that improve capacity, provide for the more eficient use and operation of existing transportation facilities, and reduce transportation demand.	**1.2.1** Daily Vehicle Miles Traveled per Capita **1.2.2** Annual Vehicle Hours of Delay and Associated Cost per Capita **1.2.3** Level of Congestion (Volume to Capacity Ratio) on Roadways **1.2.4** Level of Travel Time Reliability on Interstate **1.2.5** Level of Travel Time Reliability on Non-Interstate National Highway System **1.2.6** Percent of Roadways with Existing ITS Fiber
	Objective 1.3 Provide public transit systems that serve diverse populations and deliver efficient and convenient transit service.	**1.3.1** Total Transit Ridership (Votran, Flagler County, SunRail broken down individually) **1.3.2** Percent of Fixed-Route Transit Ridership on Varying Headway Routes **1.3.3** Number of Transit Signal Priority Service Roadways
	Objective 1.4 Develop a plan that maximizes the use of all available existing and alternative revenue sources and is financially feasible.	**1.4.1** Adequately fund preservation of transportation assets (National Highway System Pavement Condition, Bridge Condition, and Transit Assets).
	Objective 1.5 Incorporate measures that give priority to projects that provide high benefit-to-cost value.	**1.5.1** Average Emergency Response Time (Key Roadways Only) **1.5.2** Average Crash/Incidence Clearance Time (Key Roadways Only)
Goal 2 Support the economic development and growth of the TPO area and region	**Objective 2.1** Develop a transportation system that supports diverse economic growth, advances tourism, and improves the economic competitiveness of the region.	**2.1.1** Truck Travel Time Reliability (TTTR) on National Highway System
	Objective 2.2 Identify and support safe and efficient truck routes and other facilities that improve the movement of freight and goods.	**2.2.1** Level of Congestion (Volume to Capacity Ratio) on Roadways Adjacent to Key Facilities
	Objective 2.3 Improve connectivity and access to rail, port, bus, and airport facilities.	**2.3.1** Percent of Roadway Miles Connecting/Adjacent to Employment Activity Centers with Transit Routes

Goal 3
Enhance and expand transportation connectivity and choice for all users

Objective 3.1
Provide a range of transportation alternatives to improve mobility for all residents and visitors which includes addressing the unique needs of the elderly, people with disabilities, and those unable to drive.

- **3.1.1** Annual Trips Using Transportation Network Companies (TNCs)
- **3.1.2** Annual Trips Using Shared Micromobility

Objective 3.2
Maximize the interconnectivity of roadways, sidewalks, bicycle facilities, trails, transit, and other transportation system components to provide safe and convenient pedestrian, bicycle, transit, and motor vehicle mobility.

- **3.2.1** Percent of Roadway Network Serviced by Transit Routes
- **3.2.2** Percent of Roadway Miles with Pedestrian/Bicycle Facilities
- **3.2.3** Total Miles of Constructed Trail Facilities

Goal 4
Eliminate or reduce crash-related fatalities and serious injuries (safety) and improve security throughout the transportation network

Objective 4.1
Develop a transportation system that supports diverse economic growth, advances tourism, and improves the economic competitiveness of the region.

- **4.1.1** Total Number of Vehicle Crashes
- **4.1.2** Number of Fatalities in Vehicle Crashes
- **4.1.3** Fatality Rate in Vehicle Crashes
- **4.1.4** Number of Serious Injuries in Vehicle Crashes
- **4.1.5** Serious Injury Rate in Vehicle Crashes

Objective 4.2
Identify and support safe and efficient truck routes and other facilities that improve the movement of freight and goods.

- **4.2.1** Total Number of Pedestrian/Bicycle Crashes
- **4.2.2** Number of Fatalities in Pedestrian/Bicycle Crashes
- **4.2.3** Number of Serious Injuries in Pedestrian/Bicycle Crashes

Objective 4.3
Enhance the safety and security of transit systems and other modes such as airports through appropriate design, monitoring, and enforcement programs.

- **4.3.1** Level of Congestion (V/C) on Evacuation Routes
- **4.3.2** Percent of Evacuation Route Roadway Lane Miles with Existing ITS Fiber

Goal 5
Promote livability by providing, protecting and enhancing social, cultural, physical and natural environmental places

Objective 5.1
Promote compact, walkable, mixed-use development and redevelopment opportunities that encourage a range of transportation options and maximize the efectiveness of the transportation system.

- **5.1.1** Total Number of Electric Vehicle Charging Stations
- **5.1.2** Average Annual Air Quality Index (AQI)

Goal 6
Promote equity, transparency, and opportunities for the public to be involved with their transportation system

Objective 6.1
Provide opportunities for public participation that are open, inclusive, and accessible for all citizens; and develop outreach programs to engage citizens in all jurisdictions as well as the traditionally underserved and underrepresented.

- **6.1.1** Percent of Transit Routes within Half-Mile of Transportation Disadvantaged Areas
- **6.1.2** Percent of Population/Jobs within a Half-Mile of Transit Routes

4. CMP NETWORK

The R2CTPO CMP provides a systemic approach for addressing congestion in the TPO's planning area, which includes all of Volusia County and the developed areas of eastern Flagler County (including Beverly Beach and Flagler Beach, as well as portions of the cities of Palm Coast and Bunnell). Various features of the transportation network within the R2CTPO planning area were defined in order to perform the performance measure analysis. This section reviews each of the transportation networks defined for this CMP, which addresses Action 2 of the FHWA 8 Action Process shown in **Figure 4**.

4.1. ROADWAY NETWORK

The CMP roadway network was defined as roadways where traffic counts are being collected by either FDOT, Volusia County, or agencies in Flagler County, as shown in **Figure 7**. These roadways were analyzed in the CMP for auto and freight travel.

4.2. TRANSIT NETWORK

The CMP transit network was defined based on the following: 1. Roadways with existing Votran fixed route transit in Volusia County; 2. Areas of service for Flagler County on demand transit; 3. SunRail station locations; 4. Park and ride stations; and 5. Amtrak station locations. The CMP transit network is shown in **Figure 8**. It should be noted that Votran is currently considering route modifications and Flagler County Public Transportation is considering adding fixed-route service.

4.3. BICYCLE AND PEDESTRIAN NETWORK

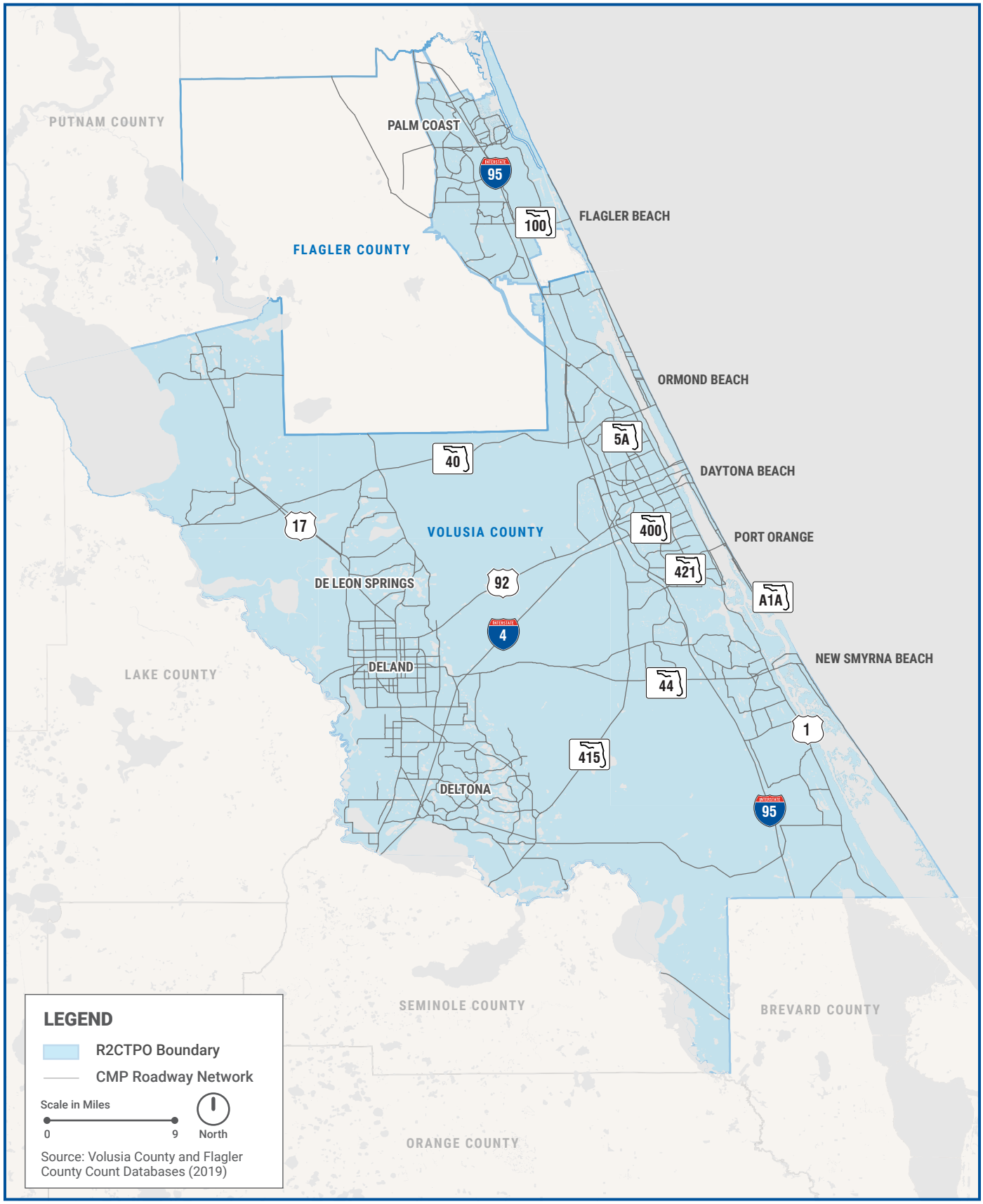
The CMP bicycle and pedestrian network was determined by identifying the bicycle and pedestrian facilities in the R2CTPO planning area. These facilities include sidewalks, bicycle lanes, and existing/funded trails, as shown in **Figure 9**.

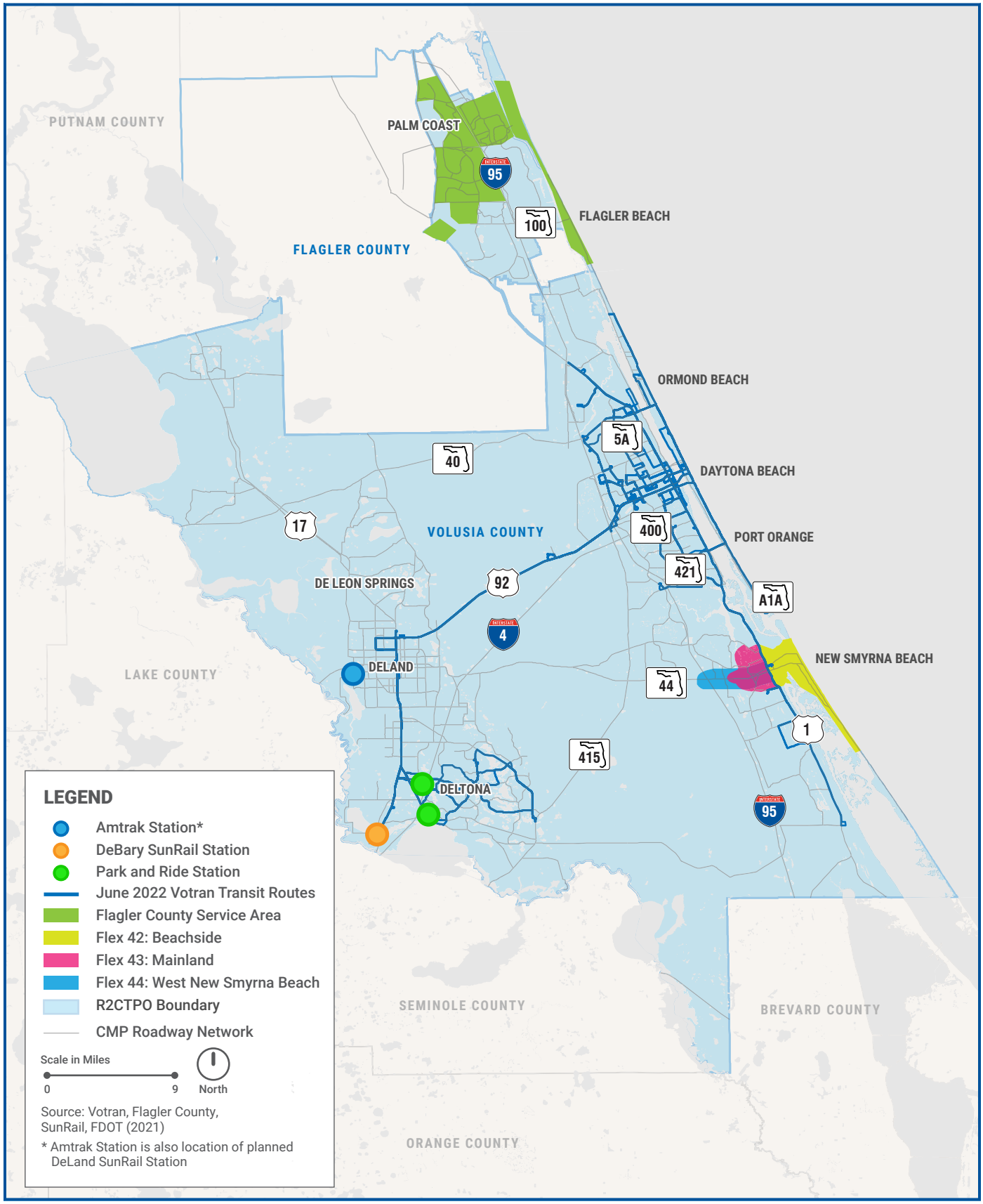
4.4. TRANSPORTATION SYSTEM MANAGEMENT & OPERATIONS (TSM&O) NETWORKS

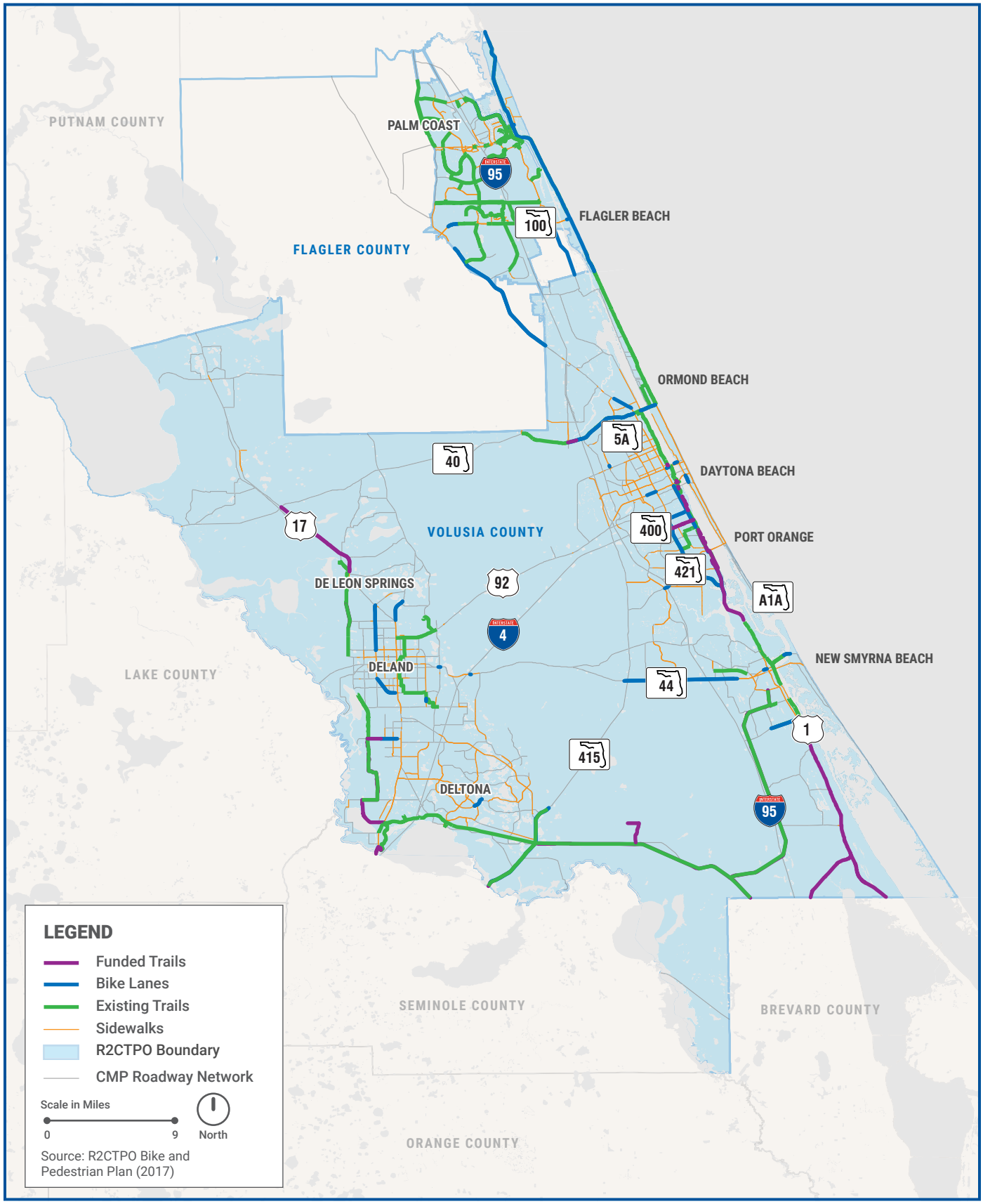
Two Transportation System Management & Operations (TSM&O) networks were identified for the CMP. The CMP Intelligent Transportation Systems (ITS) network was determined by identifying the roadways with fiber, as shown in **Figure 10**. The second network included signals and Closed-Circuit TV (CCTV) locations, as identified in **Figure 11**.

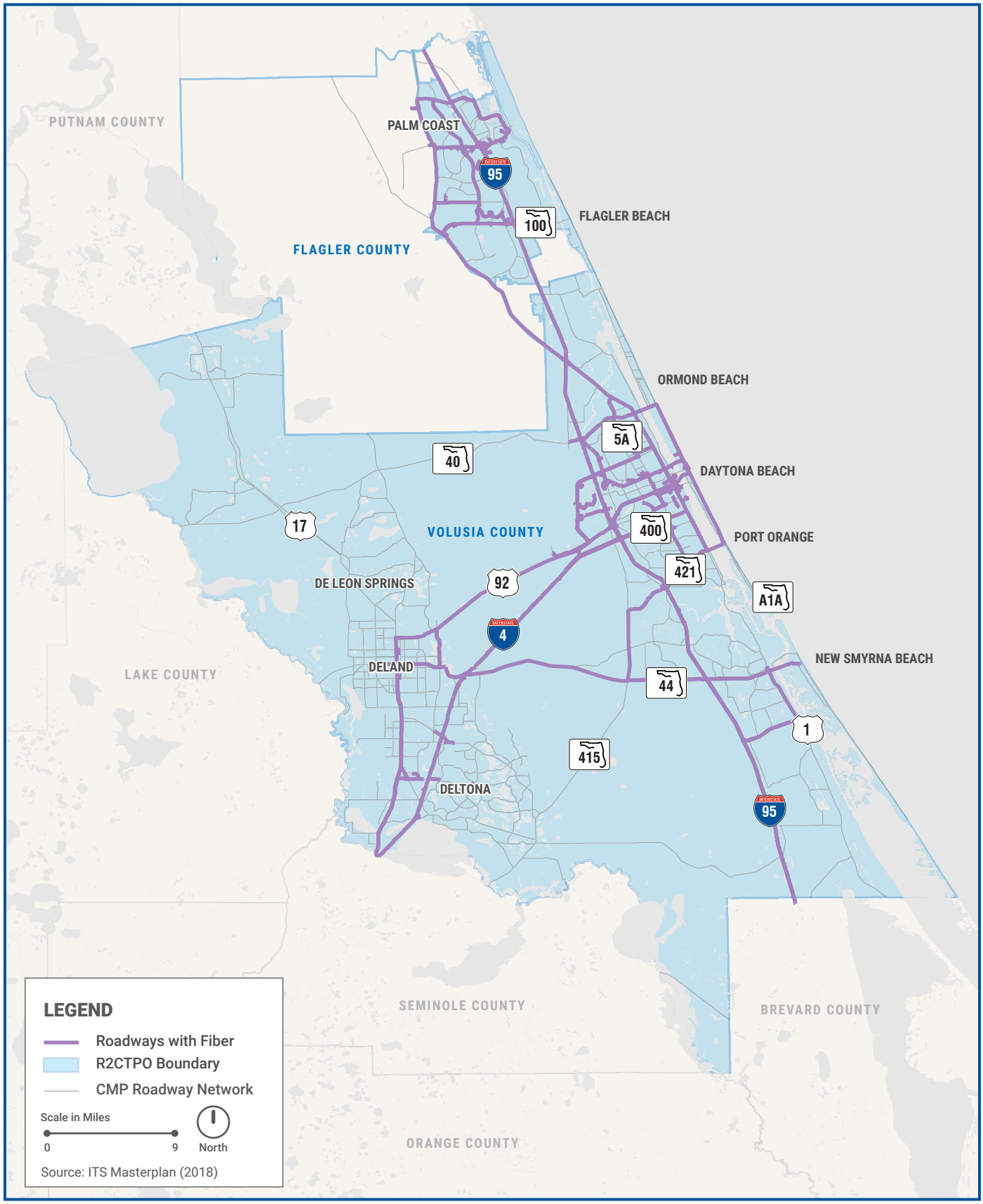
4.5. EVACUATION ROUTE NETWORK

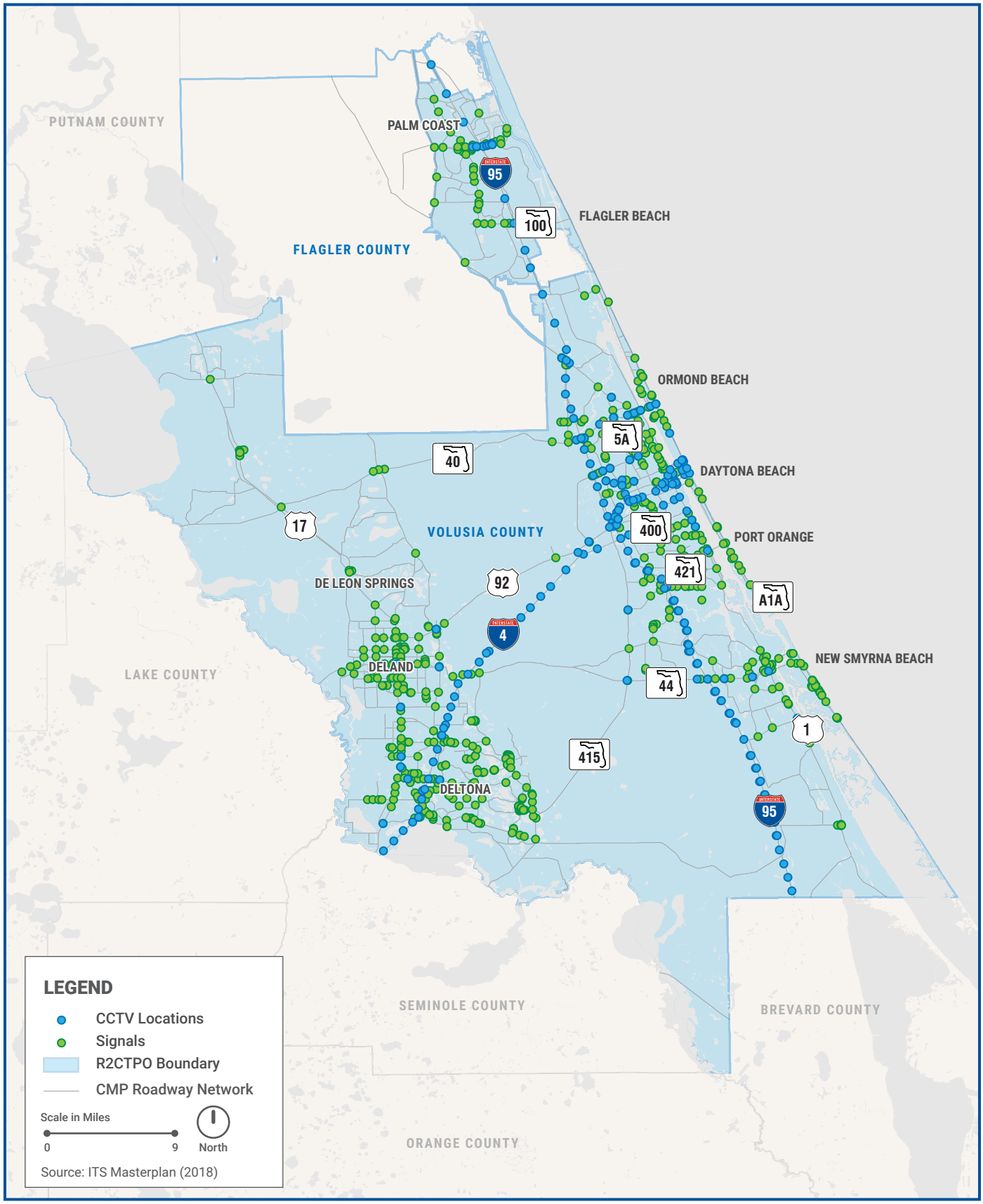
Based upon the East Central Florida Regional Planning Council database, the evacuation routes in the R2CTPO planning area are shown in **Figure 12**. Not only is the evacuation route network vital for the region's safety and mobility, but the evacuation route network also defines congestion thresholds in the R2CTPO area, as discussed in **Section 6.1.3: Congestion Metrics**. Refer to the appropriate County Comprehensive Plan, Chapter 2 – Transportation Element, Evacuation Routes for the "officially" designated routes.

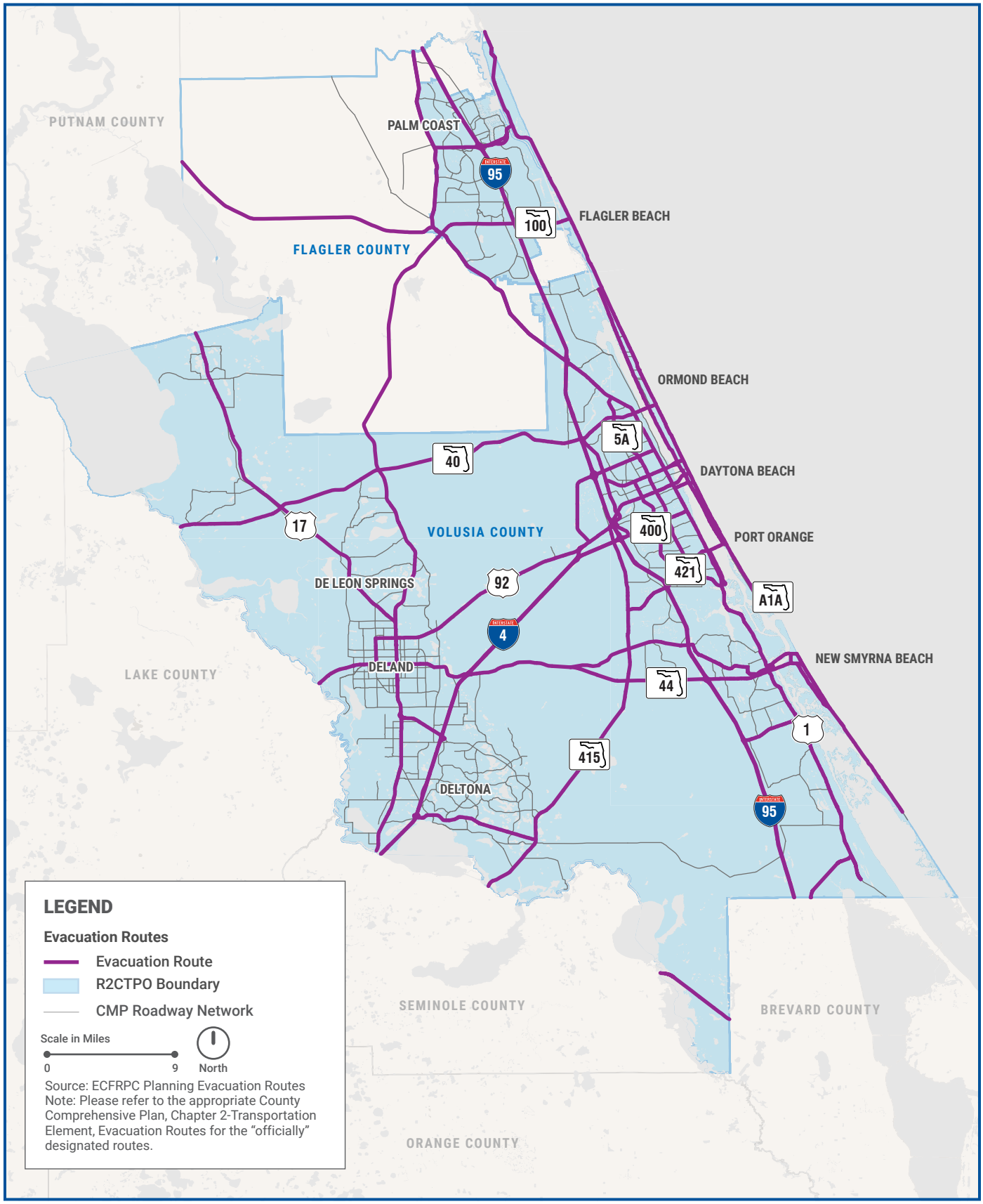

PUTNAM COUNTY
PALM COAST
95
100
FLAGLER BEACH
FLAGLER COUNTY
ORMOND BEACH
5A
40
DAYTONA BEACH
17
VOLUSIA COUNTY
400
PORT ORANGE
421
DE LEON SPRINGS
92
A1A
4
NEW SMYRNA BEACH
LAKE COUNTY
DELAND
44
1
415
DELTONA
95
SEMINOLE COUNTY
BREVARD COUNTY
ORANGE COUNTY
LEGEND
R2CTPO Boundary
CMP Roadway Network
Scale in Miles
0
9
North
Source: Volusia County and Flagler County Count Databases (2019)


PUTNAM COUNTY
PALM COAST
95
FLAGLER BEACH
100
FLAGLER COUNTY
ORMOND BEACH
5A
40
DAYTONA BEACH
17
VOLUSIA COUNTY
400
PORT ORANGE
421
DE LEON SPRINGS
92
A1A
4
NEW SMYRNA BEACH
LAKE COUNTY
DELAND
44
1
415
DELTONA
95
SEMINOLE COUNTY
BREVARD COUNTY
ORANGE COUNTY
LEGEND
Amtrak Station*
DeBary SunRail Station
Park and Ride Station
June 2022 Votran Transit Routes
Flagler County Service Area
Flex 42: Beachside
Flex 43: Mainland
Flex 44: West New Smyrna Beach
R2CTPO Boundary
CMP Roadway Network
Scale in Miles
0
9
North
Source: Votran, Flagler County, SunRail, FDOT (2021)
* Amtrak Station is also location of planned DeLand SunRail Station


PUTNAM COUNTY
PALM COAST
95
FLAGLER BEACH
100
FLAGLER COUNTY
ORMOND BEACH
5A
40
DAYTONA BEACH
17
VOLUSIA COUNTY
400
PORT ORANGE
421
DE LEON SPRINGS
92
A1A
4
NEW SMYRNA BEACH
LAKE COUNTY
DELAND
44
1
415
DELTONA
95
SEMINOLE COUNTY
BREVARD COUNTY
ORANGE COUNTY
LEGEND
Funded Trails
Bike Lanes
Existing Trails
Sidewalks
R2CTPO Boundary
CMP Roadway Network
Scale in Miles
0
9
North
Source: R2CTPO Bike and Pedestrian Plan (2017)


PUTNAM COUNTY
PALM COAST
95
100
FLAGLER BEACH
FLAGLER COUNTY
ORMOND BEACH
5A
40
DAYTONA BEACH
17
VOLUSIA COUNTY
400
PORT ORANGE
421
DE LEON SPRINGS
92
A1A
4
NEW SMYRNA BEACH
LAKE COUNTY
DELAND
44
1
415
DELTONA
95
SEMINOLE COUNTY
BREVARD COUNTY
ORANGE COUNTY
LEGEND
Roadways with Fiber
R2CTPO Boundary
CMP Roadway Network
Scale in Miles
0
9
North
Source: ITS Masterplan (2018)


PUTNAM COUNTY
PALM COAST
95
100
FLAGLER BEACH
FLAGLER COUNTY
ORMOND BEACH
5A
40
DAYTONA BEACH
17
VOLUSIA COUNTY
400
PORT ORANGE
421
DE LEON SPRINGS
92
A1A
4
NEW SMYRNA BEACH
LAKE COUNTY
DELAND
44
1
415
DELTONA
95
SEMINOLE COUNTY
BREVARD COUNTY
ORANGE COUNTY
LEGEND
CCTV Locations
Signals
R2CTPO Boundary
CMP Roadway Network
Scale in Miles
0
9
North
Source: ITS Masterplan (2018)


PUTNAM COUNTY
PALM COAST
95
100
FLAGLER BEACH
FLAGLER COUNTY
ORMOND BEACH
5A
40
DAYTONA BEACH
17
VOLUSIA COUNTY
400
PORT ORANGE
421
DE LEON SPRINGS
92
A1A
4
NEW SMYRNA BEACH
LAKE COUNTY
DELAND
44
1
415
DELTONA
95
SEMINOLE COUNTY
BREVARD COUNTY
ORANGE COUNTY
LEGEND
Evacuation Routes
Evacuation Route
R2CTPO Boundary
CMP Roadway Network
Scale in Miles
0
9
North
Source: ECFRPC Planning Evacuation Routes
Note: Please refer to the appropriate County Comprehensive Plan, Chapter 2-Transportation Element, Evacuation Routes for the "officially" designated routes.

5. DATA COLLECTION

When evaluating the R2CTPO network, the CMP leverages existing plans, documents, and data sources. Since the CMP is a living document, these data sources should be monitored and updated on an ongoing basis. FHWA specifically requires a "coordinated program for data collection and system performance monitoring to define the extent and duration of congestion, to contribute to determining the causes of congestion and evaluate the efficiency and effectiveness of implemented actions. To the extent possible, this data collection program should be coordinated with existing data sources" (23 CFR 450.322(d)(3)). The data collection efforts for the CMP addresses Action 4 of the FHWA 8 Action Process shown in **Figure 4**.

5.1. TYPES OF DATA

For the network evaluation, the CMP uses local, state, and federal data sources. The data types include point data (ex. crash data), segment data (ex. count data), and polygon data (ex. census data).

Differing data sources are also available for different areas of the R2CTPO. For example, travel time data available from the National Performance Management Research Data Set (NPMRDS) only is available for National Highway System (NHS) segments and not the entire CMP network. **Table 6** depicts the data sources used and the applicable performance measures.

Table 6: Data Sources and Applicability

Data	Sources	Performance Measures
Traffic Volumes	FDOT, Volusia County, City of Palm Coast	Vehicle Miles Traveled (VMT); Level of Service (LOS); Volume-to-Capacity Ratios (v/c).
Travel Time Data	NPMRDS (NHS only)	Level of Travel Time Reliability (LOTTR); Truck Travel Time Reliability (TTTR)
Crash Data	Signal Four Analytics (S4)	Safety
Bicycle and Pedestrian Facilities	R2CTPO Bicycle and Pedestrian Masterplan	Bicycle and Pedestrian Coverage
Transit	Votran, Flagler County Public Transit, SunRail, Amtrak	Transit Coverage; Transit Ridership
Transportation Disadvantaged Areas	FDOT D5 Bicycle and Pedestrian Masterplan	Transit Coverage in Disadvantaged Areas
Electric Vehicle Charging Stations	FDOT	Electric Vehicle Charging Stations
Air Quality	Florida Department of Environmental Protection (FDEP)	Air Quality Attainment Status

6. CONGESTION ANALYSIS

The data collected as part of the CMP was used to conduct various congestion and safety analyses to identify potential congestion management issues in the R2CTPO planning area. The data was analyzed based on the performance measures for each goal as outlined in **Section 2.5: Performance-Based Approach**, addressing Action 5 of the FHWA 8 Action Process shown in **Figure 4**.

6.1. GOAL 1: EFFICIENT MULTIMODAL TRANSPORTATION SYSTEM

The first goal of the CMP focuses on creating a balanced and efficient multimodal transportation system. To track progress towards this goal, multiple performance measures were identified and analyzed to determine the current performance of the R2CTPO transportation network, as reviewed in this section.

6.1.1. ECONOMIC CENTER TRAVEL TRENDS

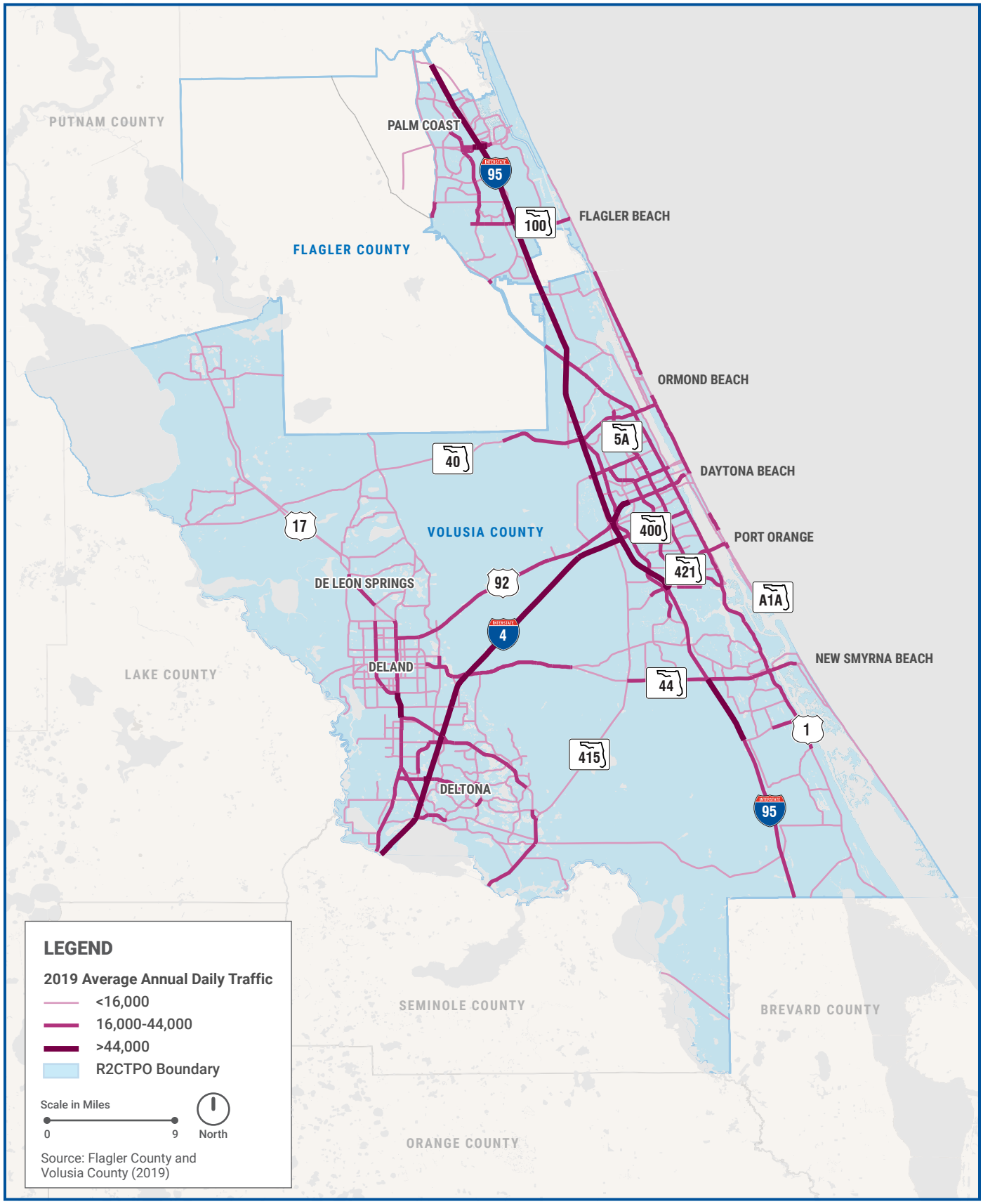
Performance Measures 1.1.1 to 1.1.3 address travel trends associated with economic centers. At the time of this CMP update, the definition of economic centers had not been determined thus these performance measures were not analyzed. Economic centers should be defined as part of a future CMP update and once they are, these performance measures can be analyzed.

6.1.2. DAILY VEHICLE TRAVEL TRENDS

Daily vehicle travel trends were analyzed for the R2CTPO planning area. 2019 Annual Average Daily Traffic (AADT) for CMP roadways were identified from FDOT, Volusia County, and local Flagler County agency traffic counts. These traffic volumes are shown in **Figure 13**. 2020 traffic volume counts were not analyzed to avoid reporting potential COVID-19 impacts on traffic volumes in the R2CTPO planning area.

The traffic volumes along each roadway segment in the R2CTPO planning area combined with the length of each segment yields an understanding of the “amount” of driving R2CTPO residents have performed. This statistic, known as VMT, helps monitor travel demand. A second important factor, VMT per capita, is calculated by dividing the total VMT for all CMP roadways by the total population in the R2CTPO planning area, as defined by FDOT’s MPO Mobility Profiles. The VMT per capita estimates the distance traveled by each resident per day. These VMT statistics are shown in **Figure 14**.

VMT has increased by six percent between 2015 to 2019, while VMT per capita increased by less than one percent in the same time period. The increase in VMT correlates to an increase in population growth, thus an increase in traffic volumes on R2CTPO planning area roadways. While overall VMT is increasing, the lack of growth in VMT per capita shows that the average person is traveling approximately the same number of miles. This analysis addresses Performance Measure 1.2.1 shown in **Figure 6**.


PUTNAM COUNTY
PALM COAST
95
100
FLAGLER BEACH
FLAGLER COUNTY
ORMOND BEACH
5A
40
DAYTONA BEACH
17
VOLUSIA COUNTY
400
PORT ORANGE
421
92
DE LEON SPRINGS
A1A
4
NEW SMYRNA BEACH
LAKE COUNTY
DELAND
44
1
415
DELTONA
95
SEMINOLE COUNTY
BREVARD COUNTY
ORANGE COUNTY
LEGEND
2019 Average Annual Daily Traffic
<16,000
16,000-44,000
>44,000
R2CTPO Boundary
Scale in Miles
0
9
North
Source: Flagler County and Volusia County (2019)

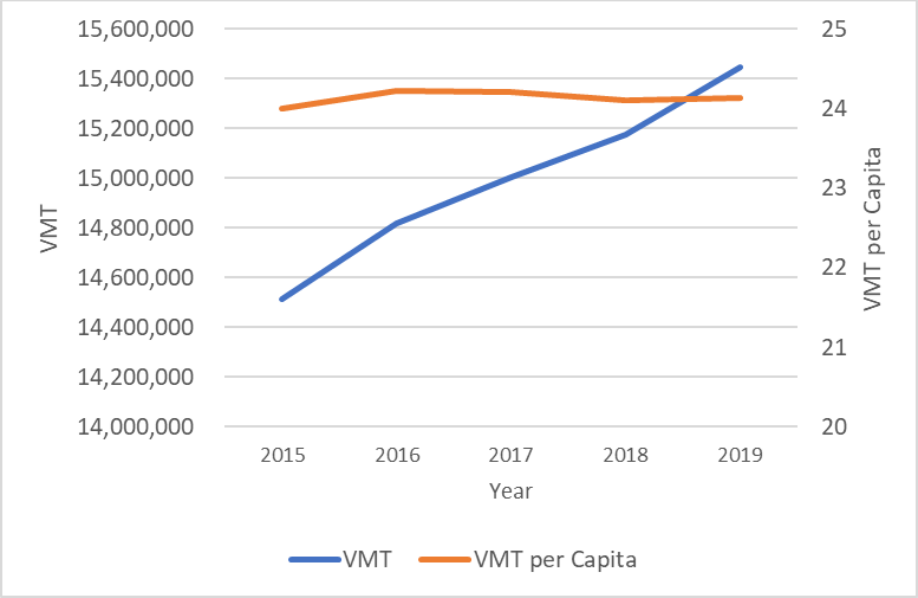


Figure 14: VMT and VMT per Capita on CMP Roadways (2015 to 2019)

6.1.3. CONGESTION METRICS

The entire CMP roadway network is key to the R2CTPO's economic prosperity, providing mobility for people and goods for access to employment centers, intermodal centers, and tourist destinations.

The annual cost of delay can be calculated by determining the daily delay experience per capita on the State Highway System and multiplying by an hourly cost factor determined from the American Census Survey. This cost is shown in **Figure 15** and addresses Performance Measure 1.2.2 shown in **Figure 6**.The 6-lane widenings of I-4 and I-95 were completed between 2017 and 2018, contributing to the annual hourly delay and cost of delay decrease during that time period.

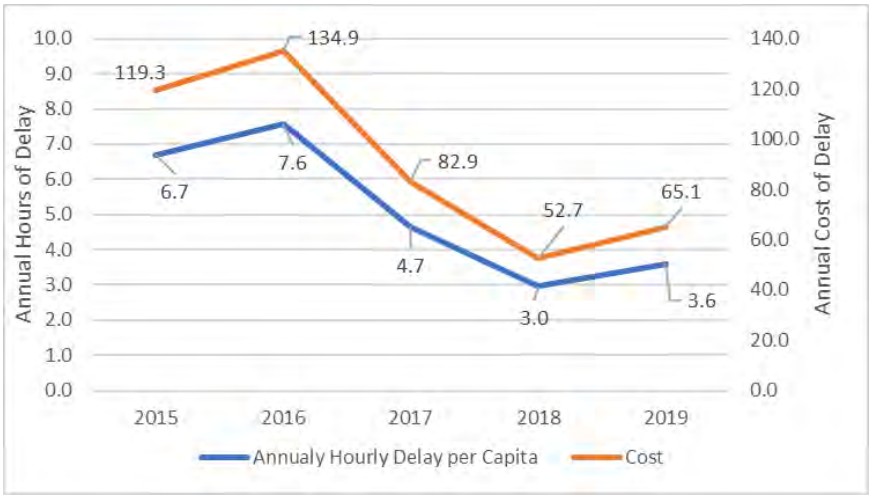


Figure 15: Annual Cost of Delay in R2CTPO Area

Roadway congestion can be reported by utilizing v/c ratios, which compares existing volume on a roadway to that roadway's capacity. In doing so, the R2CTPO can recognize when a corridor is reaching its maximum capacity or if latent demand is present in the system. The factors affecting this congestion metric are presented in **Table 7**.

Table 7: Congestion Factors

Factor	Characteristic
Data Availability	Available for the entire CMP roadway network
Equation	V/C = Segment AADT/Segment Capacity
Metric for Non-Evacuation Route Roadways	V/C < 0.90 – Not Congested V/C between 0.90 and 1.10 – Approaching Congestion V/C > 1.10 – Congested
Metric for Evacuation Route Roadways	V/C < 0.90 – Not Congested V/C between 0.90 and 1.00 – Approaching Congestion V/C > 1.00 – Congested

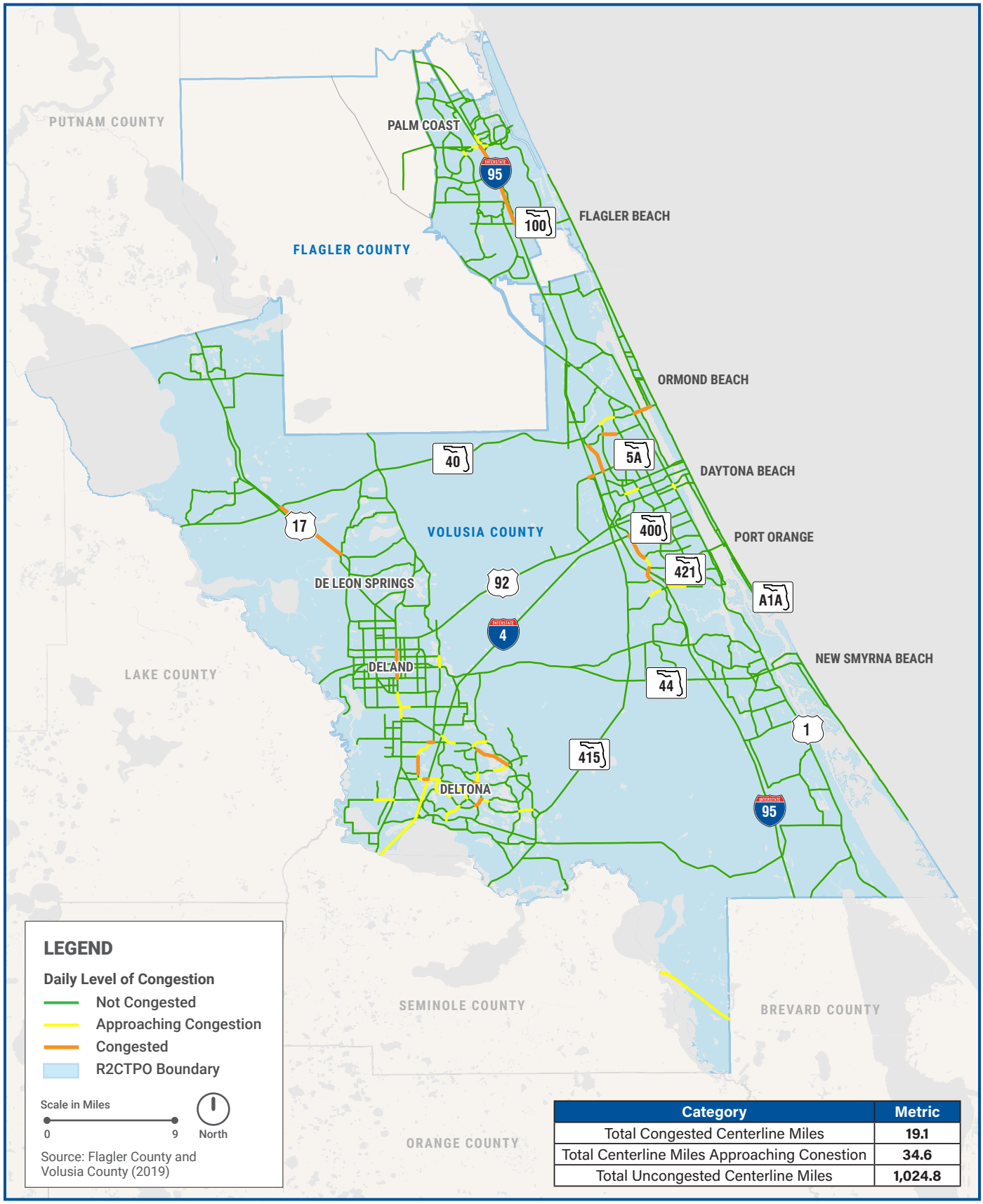
2019 volumes and capacities from readily available sources were reviewed at the segment level across the CMP roadway network to identify spot locations where congestion is present. The number of overcapacity centerline miles were calculated for each jurisdiction in the R2CTPO planning area. The number of overcapacity centerline miles are presented in **Table 8**. If a jurisdiction is not shown in **Table 8**, that specific jurisdiction had zero overcapacity centerline miles.

Table 8: Over Capacity Centerline Miles by Jurisdiction

City[1]	Key Roadways	Centerline Miles Over Capacity	% of Total Centerline Miles
Palm Coast	I-95	5.8	0.5%
Daytona Beach	Williamson Blvd.	4.0	0.4%
Deltona	Normandy Blvd.	3.3	0.3%
Ormond Beach	Williamson Blvd., SR 40	1.9	0.2%
Orange City	Veteran's Memorial Parkway	1.7	0.2%
DeLand	US 17/92	1.5	0.1%
Port Orange	Williamson Blvd.	0.9	0.1%
Total Centerline Miles Approaching Congestion – 34.6 (3.2% of Total Centerline Miles)			
Total Uncongested Centerline Miles – 1024.8 (95.0% of Total Centerline Miles)			

[1] Jurisdictions with zero miles of overcapacity roadways were not shown in this table.

The daily level of congestion throughout the CMP roadway network is presented in **Figure 16**. Deltona has multiple roadways that are either congested or are approaching congestion. US 17/92 in downtown Deland is congested, along with most of Williamson Boulevard between Taylor Road in Port Orange to Beville Road/SR 400 in Daytona Beach. I-95 between SR 100 and Palm Coast Parkway in Flagler County was also identified as being congested. This analysis addresses Performance Measure 1.2.3 shown in **Figure 6**.



Category	Metric
Total Congested Centerline Miles	19.1
Total Centerline Miles Approaching Conestion	34.6
Total Uncongested Centerline Miles	1,024.8

6.1.4. RELIABILITY METRICS

Reliability is critical for economic concerns like freight travel, and for mobility concerns like commuting times. Roadway reliability is analyzed by comparing the likelihood of different travel times, such as with LOTTR. These factors are shown in **Table 9**.

Table 9: Reliability Factors

Factor	Characteristic
Data Availability	Available for the National Highway System Only
Equation	LOTTR – 80th Percentile Travel Time/50th Percentile Travel Time
Metric	LOTTR < 1.5 – Reliable LOTTR >= 1.5 – Unreliable

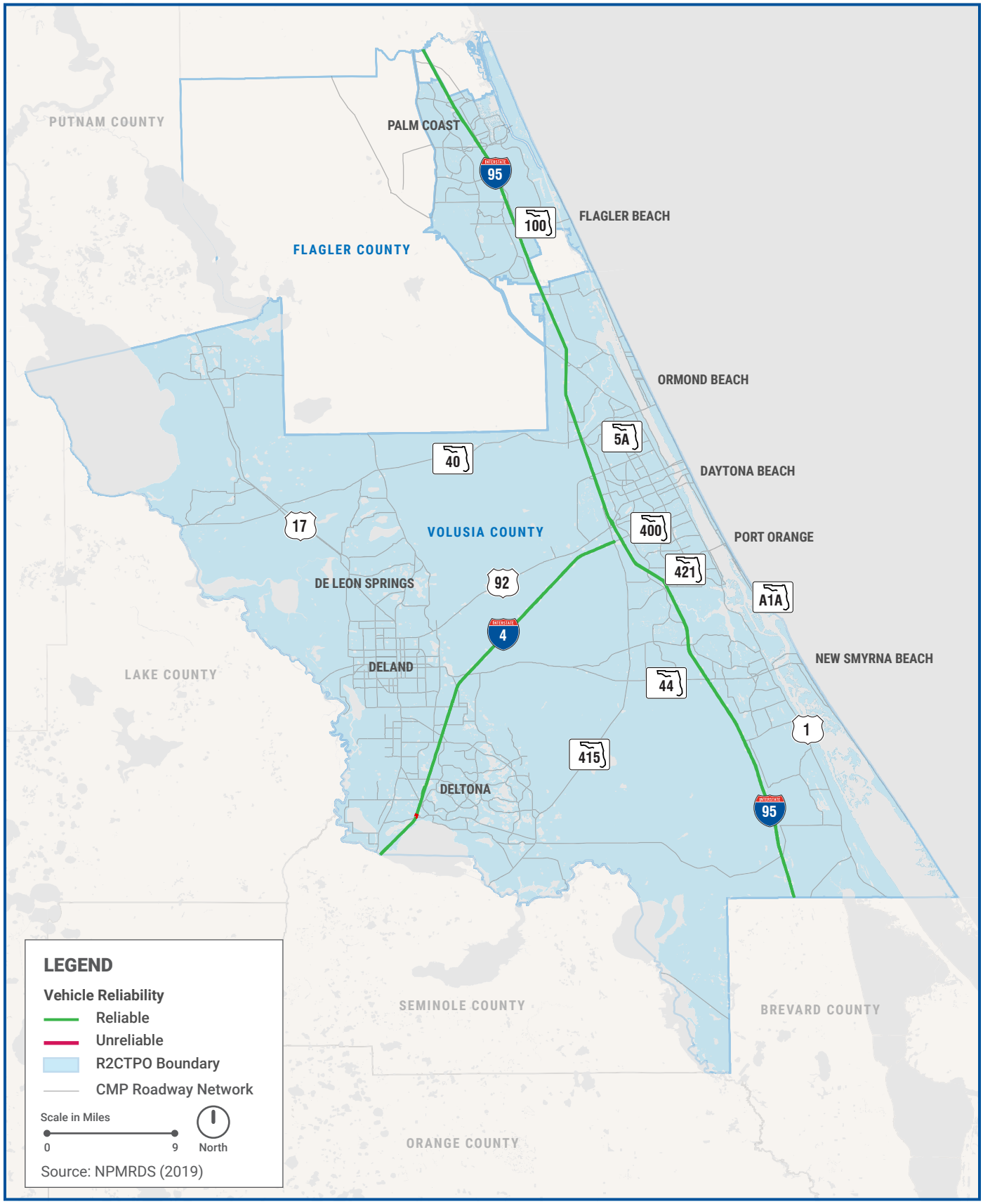
An example calculation of LOTTR is shown below:

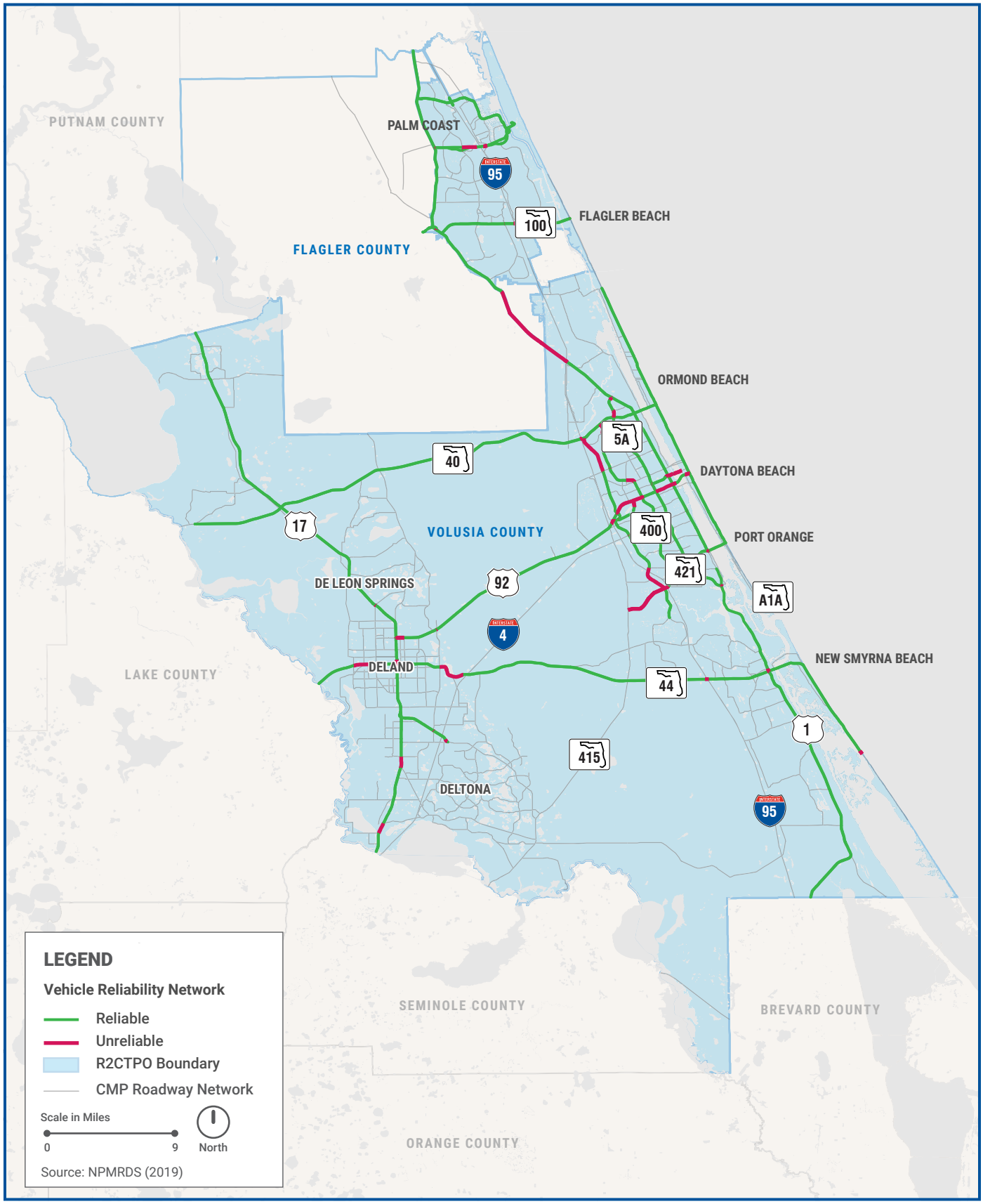
- 50 percent of the time, it takes 30 minutes or less to travel to a destination
- 20 percent of the time, it takes 50 minutes or more to a travel to the same destination
- LOTTR = 50 minutes/30 minutes = 1.67 = *Unreliable*

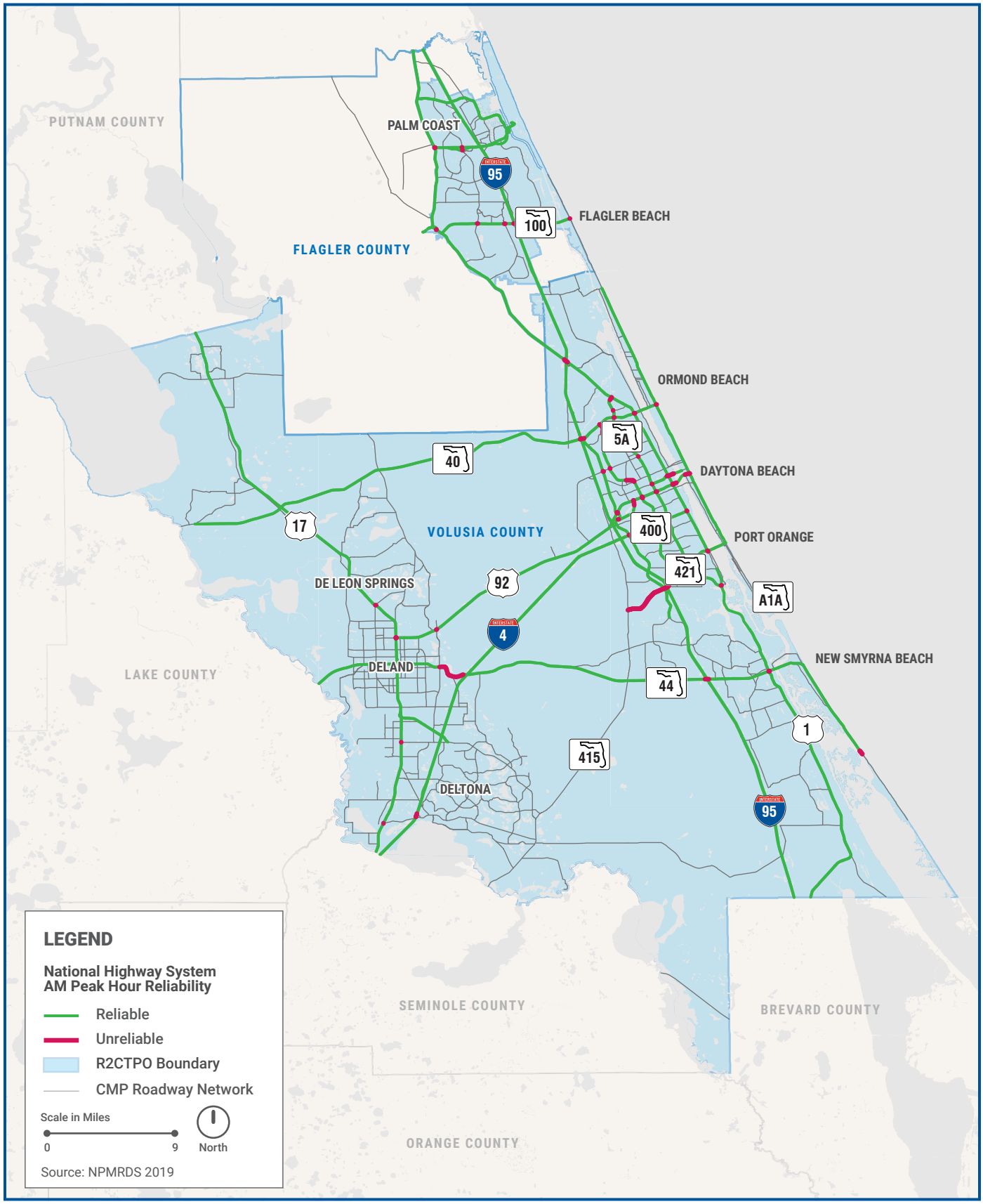
Using this metric, the reliability of different roadways can be determined for daily and peak hour times. **Figure 17** and **Figure 18** show the reliability of Interstate and non-Interstate NHS roadways in the R2CTPO planning area. **Figure 19** and **Figure 20** show the reliability for all NHS roadways in the AM and PM peak hours. Finally, **Figure 21** and **Figure 22** show the NHS roadways that are less reliable on the weekend and in the peak season (which is defined as March). Several trends can be determined from these figures:

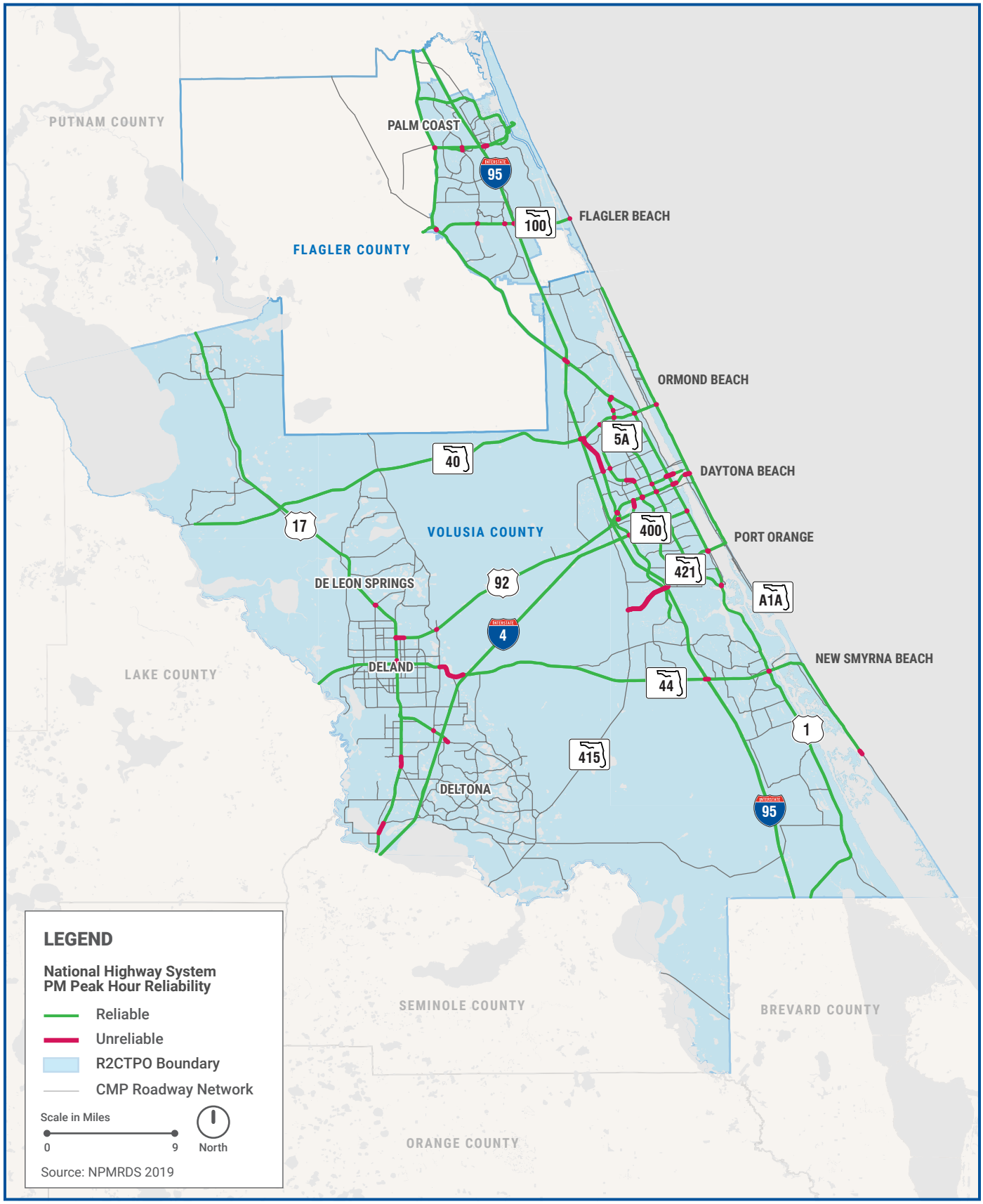
- The only unreliable daily segment on Interstate NHS roadways is on I-4 near the Dirksen Drive/Debary Avenue interchange.
- The largest concentration of unreliable daily segments, AM peak hour segments, and PM peak hour segments on non-Interstate NHS roadways are in the Port Orange/Daytona Beach/Ormond Beach area.
- Long sections of US 1, SR 44, and SR 40 are less reliable on the weekend.
    - It is important to note that some roadways (like SR 44) may continue to be congested into the future based on local amenities/business (like the beach or Daytona International Speedway). While widening roadways to reduce congestion may not be the priority for certain corridors, other congestion management strategies should be employed to improve travel time reliability.
- US 92, US 1, SR 44, and SR A1A are less reliable during the peak travel season (March).

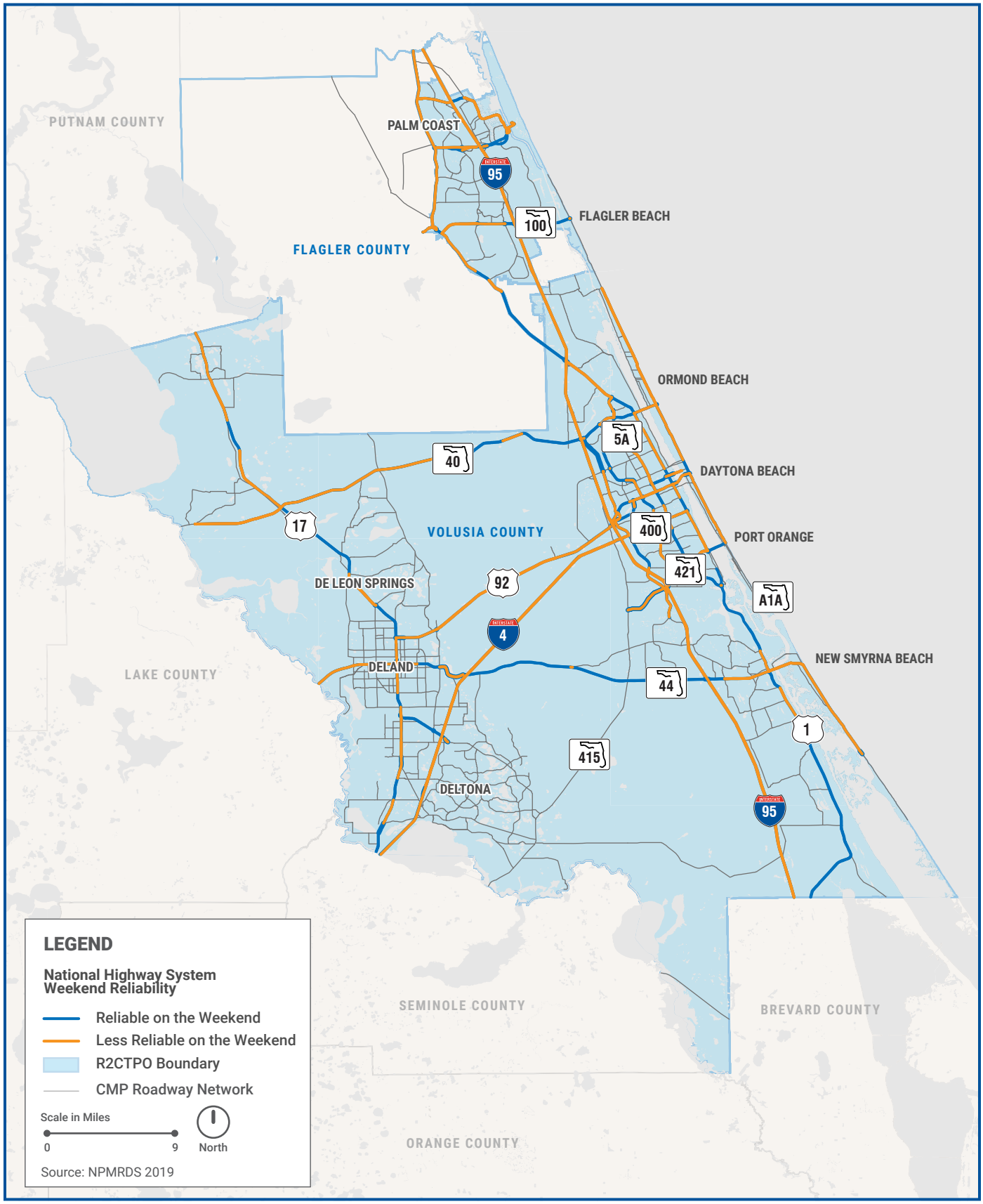
This analysis addresses Performance Measures 1.2.4 and 1.2.5 shown in **Figure 6**.

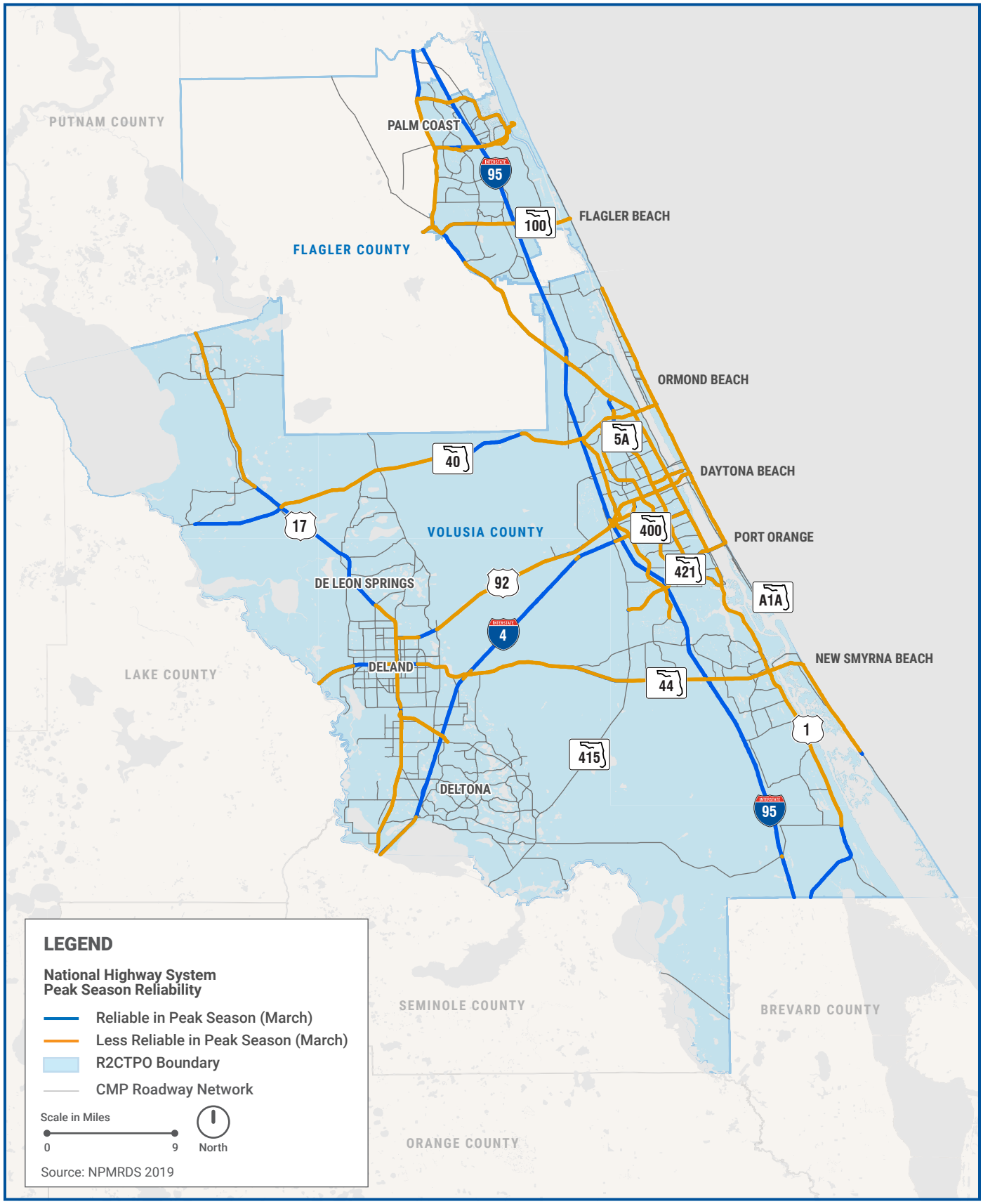

PUTNAM COUNTY
PALM COAST
95
100
FLAGLER BEACH
FLAGLER COUNTY
ORMOND BEACH
5A
40
DAYTONA BEACH
17
VOLUSIA COUNTY
400
PORT ORANGE
421
DE LEON SPRINGS
92
A1A
4
NEW SMYRNA BEACH
LAKE COUNTY
DELAND
44
1
415
DELTONA
95
SEMINOLE COUNTY
BREVARD COUNTY
ORANGE COUNTY
LEGEND
Vehicle Reliability
Reliable
Unreliable
R2CTPO Boundary
CMP Roadway Network
Scale in Miles
0
9
North
Source: NPMRDS (2019)


PUTNAM COUNTY
PALM COAST
95
100
FLAGLER BEACH
FLAGLER COUNTY
ORMOND BEACH
5A
40
DAYTONA BEACH
17
VOLUSIA COUNTY
400
PORT ORANGE
421
DE LEON SPRINGS
92
A1A
4
NEW SMYRNA BEACH
LAKE COUNTY
DELAND
44
1
415
DELTONA
95
SEMINOLE COUNTY
BREVARD COUNTY
ORANGE COUNTY
LEGEND
Vehicle Reliability Network
Reliable
Unreliable
R2CTPO Boundary
CMP Roadway Network
Scale in Miles
0
9
North
Source: NPMRDS (2019)


PUTNAM COUNTY
PALM COAST
95
100
FLAGLER BEACH
FLAGLER COUNTY
ORMOND BEACH
5A
40
DAYTONA BEACH
17
VOLUSIA COUNTY
400
PORT ORANGE
421
DE LEON SPRINGS
92
A1A
4
NEW SMYRNA BEACH
LAKE COUNTY
DELAND
44
1
415
DELTONA
95
SEMINOLE COUNTY
BREVARD COUNTY
ORANGE COUNTY
LEGEND
National Highway System
AM Peak Hour Reliability
Reliable
Unreliable
R2CTPO Boundary
CMP Roadway Network
Scale in Miles
0
9
North
Source: NPMRDS 2019


PUTNAM COUNTY
PALM COAST
95
100
FLAGLER BEACH
FLAGLER COUNTY
ORMOND BEACH
5A
40
DAYTONA BEACH
17
VOLUSIA COUNTY
400
PORT ORANGE
421
92
DE LEON SPRINGS
A1A
4
NEW SMYRNA BEACH
LAKE COUNTY
DELAND
44
1
415
DELTONA
95
SEMINOLE COUNTY
BREVARD COUNTY
ORANGE COUNTY
LEGEND
National Highway System
PM Peak Hour Reliability
Reliable
Unreliable
R2CTPO Boundary
CMP Roadway Network
Scale in Miles
0
9
North
Source: NPMRDS 2019


PUTNAM COUNTY
PALM COAST
95
100
FLAGLER BEACH
FLAGLER COUNTY
ORMOND BEACH
5A
40
DAYTONA BEACH
17
VOLUSIA COUNTY
400
PORT ORANGE
421
DE LEON SPRINGS
92
A1A
4
NEW SMYRNA BEACH
LAKE COUNTY
DELAND
44
1
415
DELTONA
95
SEMINOLE COUNTY
BREVARD COUNTY
ORANGE COUNTY
LEGEND
National Highway System
Weekend Reliability
Reliable on the Weekend
Less Reliable on the Weekend
R2CTPO Boundary
CMP Roadway Network
Scale in Miles
0
9
North
Source: NPMRDS 2019


PUTNAM COUNTY
PALM COAST
95
100
FLAGLER BEACH
FLAGLER COUNTY
ORMOND BEACH
5A
40
DAYTONA BEACH
17
VOLUSIA COUNTY
400
PORT ORANGE
421
DE LEON SPRINGS
92
A1A
4
NEW SMYRNA BEACH
LAKE COUNTY
DELAND
44
1
415
DELTONA
95
SEMINOLE COUNTY
BREVARD COUNTY
ORANGE COUNTY
LEGEND
National Highway System
Peak Season Reliability
Reliable in Peak Season (March)
Less Reliable in Peak Season (March)
R2CTPO Boundary
CMP Roadway Network
Scale in Miles
0
9
North
Source: NPMRDS 2019

Additionally, the percentage of CMP roadways with existing fiber optic cable was calculated as 30.1 percent. Currently, the existing fiber optic cable is primarily concentrated on major freeways and arterials. This addresses Performance Measure 1.2.6 shown in **Figure 6**. By expanding the fiber and communication network, more congestion and delay data will be available to traffic management staff and travel time reliability can be improved.

6.1.5. TRANSIT RIDERSHIP

The R2CTPO tracks the trends in transit ridership based on the Votran and Flagler County Public Transportation annual reporting databases. This analysis addresses Performance Measure 1.3.1 shown in **Figure 6**.

As shown in **Figure 23**, Votran transit ridership decreased by 30 percent and Flagler County Public Transportation ridership decreased by 61 percent from 2019 to 2020. The R2CTPO also tracks trends in ridership at the DeBary SunRail station, which is the only SunRail station in the R2CTPO planning area. As shown in **Figure 24**, ridership at this station decreased by 42 percent from 2019 to 2020. The COVID-19 pandemic likely caused both these declines, as the transit agencies changed service, and many people worked from home.

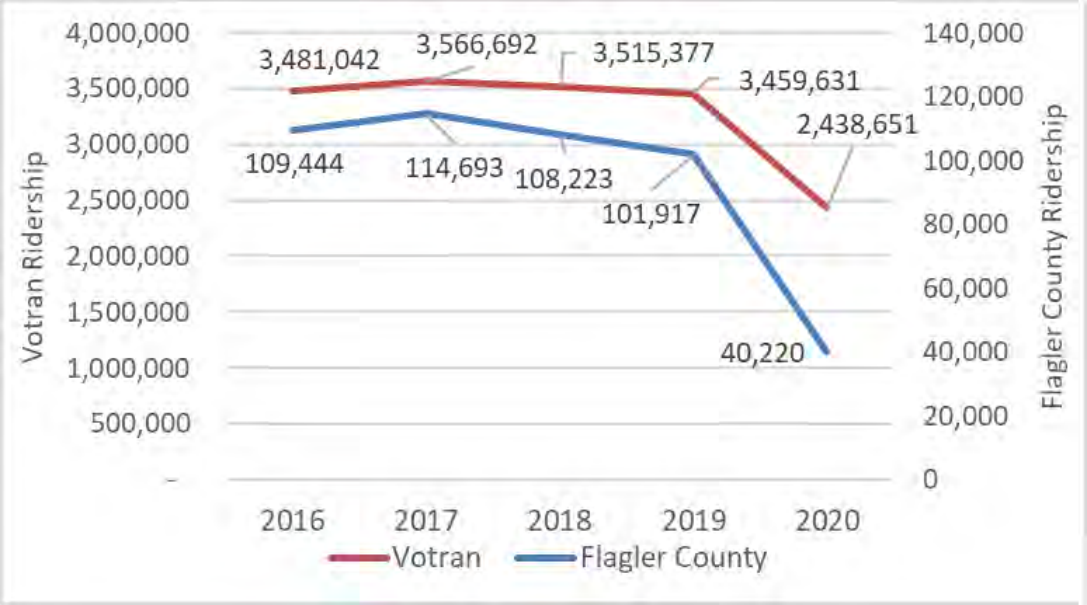


Figure 23: Votran and Flagler County Ridership

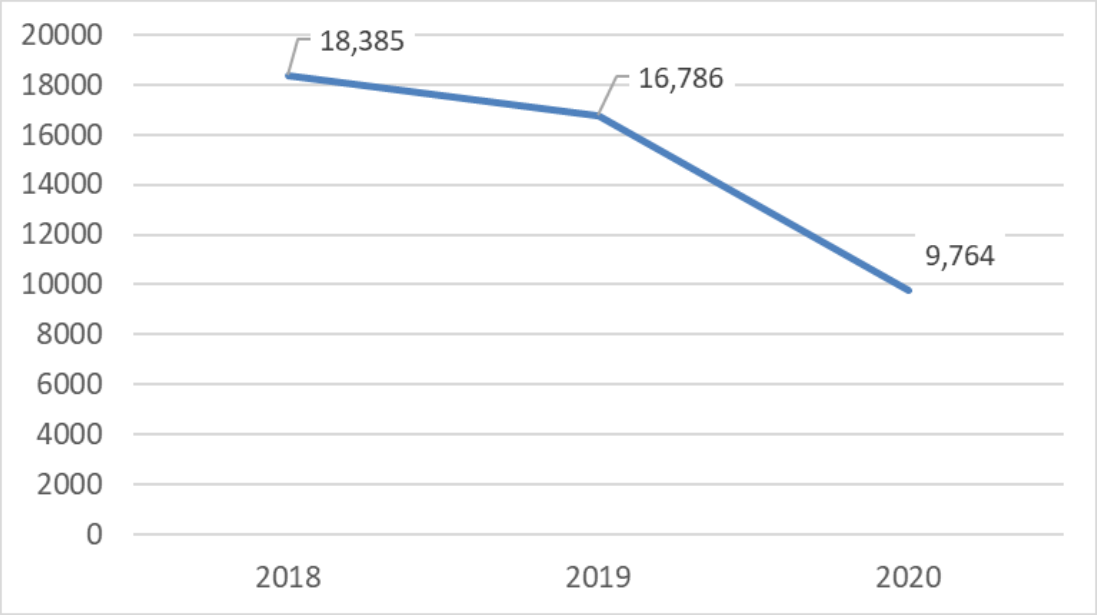


Figure 24: SunRail Ridership at DeBary Station

Performance Measure 1.3.2 reviews the percentage of fixed-route transit ridership on varying headway routes. Votran operates fixed-route transit service in the R2CTPO area, while Flagler Count Public Transit currently only operates on demand transit service. Votran operates 28 routes on a weekday fixed-route service. All 28 routes maintain consistent headways throughout the weekday with operating times generally between 4:00 AM and 8:00 PM (but may vary by route). Of these 28 routes, 16 routes (57 percent) operate on one-hour headways, six routes (21 percent) operate on thirty-minute headways, five routes (18 percent) operate only during the AM and PM peak hours, and one route (four percent) operates on two-hour headways. Additionally, seven of the 28 routes operate during nighttime (until midnight), and six of the 28 routes operate on Sunday. Votran also operates three on-demand "FLEX" service areas. As the R2CTPO planning area population continues to grow, both expanding transit service and reducing headways can assist in reducing congestion.

Transit signal priority (TSP) is not currently utilized in the R2CTPO planning area, thus Performance Measure 1.3.3 cannot be analyzed at this time. TSP is identified in local Transit Development Plans (TDPs) so as buses and more routes become equipped with this technology, the number of TSP roadways can be tracked in future CMP updates.

6.1.6. TRANSPORTATION ASSET MANAGEMENT

Performance Measure 1.4.1 is addressed in **Section 6.7.2: Statewide Performance Measures**.

6.1.7. INCIDENT RESPONSE

Performance Measures 1.5.1 and 1.5.2 address incident response measures on key facilities. FDOT's SunGuide software tracks incident response and clearance times for interstate roadways. Data was requested from SunGuide, but not received in time to report for this CMP update. SunGuide incidence response and clearance data is available for interstate facilities (I-95 and I-

4), and the data should be assessed in future CMP updates. Additionally, monitoring arterial incidence response and clearance time should be considered for future CMP updates if the data becomes readily available.

6.2. GOAL 2: ECONOMIC DEVELOPMENT

6.2.1. TRUCK RELIABILITY

The reliability of the roadways in the R2CTPO planning area for commerce and freight traffic is a critical part of the planning area's economy. To identify roadways where freight traffic travel times are more or less reliable, the TTTR can be calculated using the factors shown in **Table 10**.

Table 10: Truck Reliability Factors

Factor	Characteristic
Data Availability	Available for the National Highway System Only
Equation	TTTR – 95th Percentile Travel Time/50th Percentile Travel Time
Metric	No defined reliability threshold, rather the segments are compared against each other to identify unreliable spots

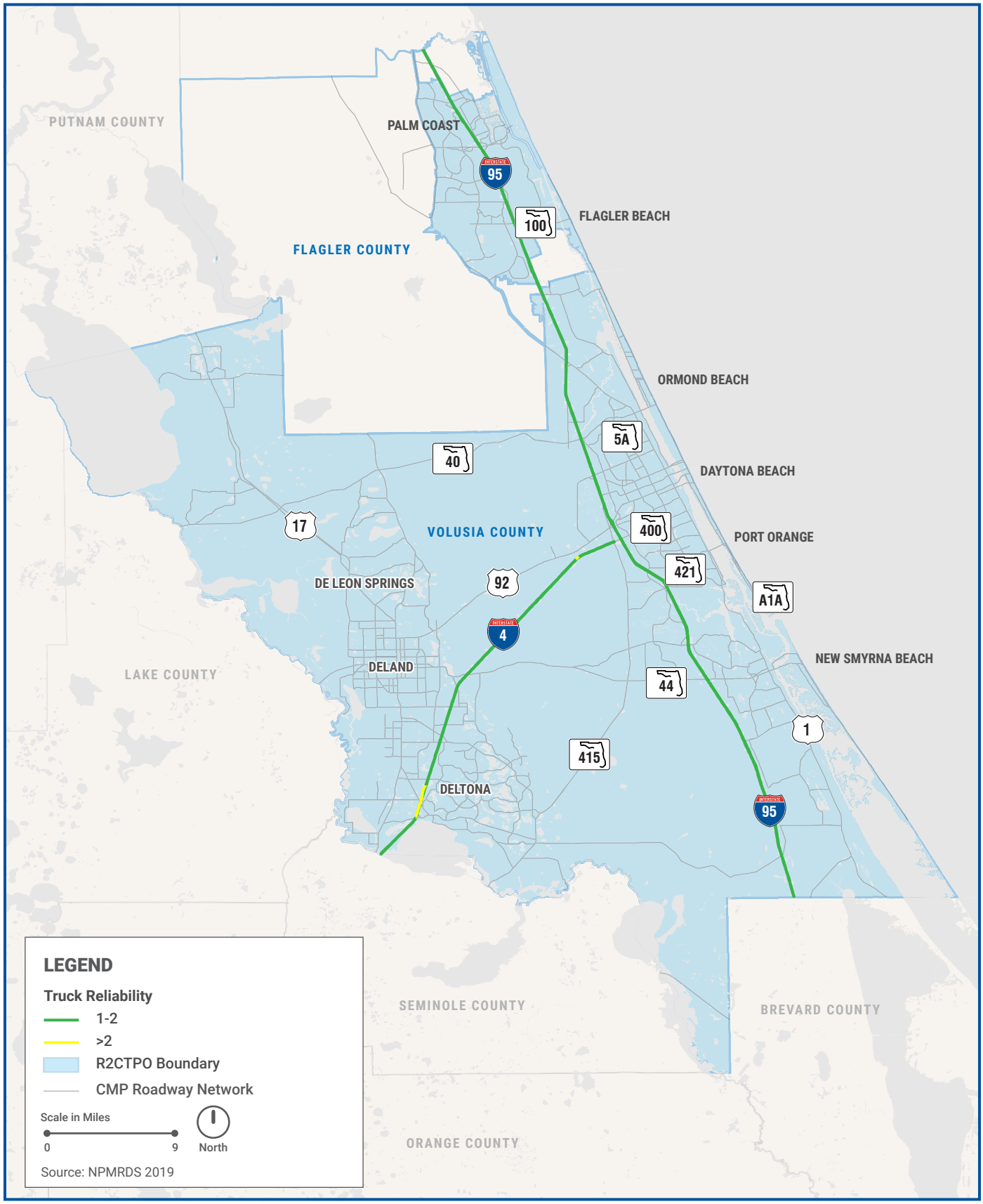
An example calculation of TTTR is shown below:

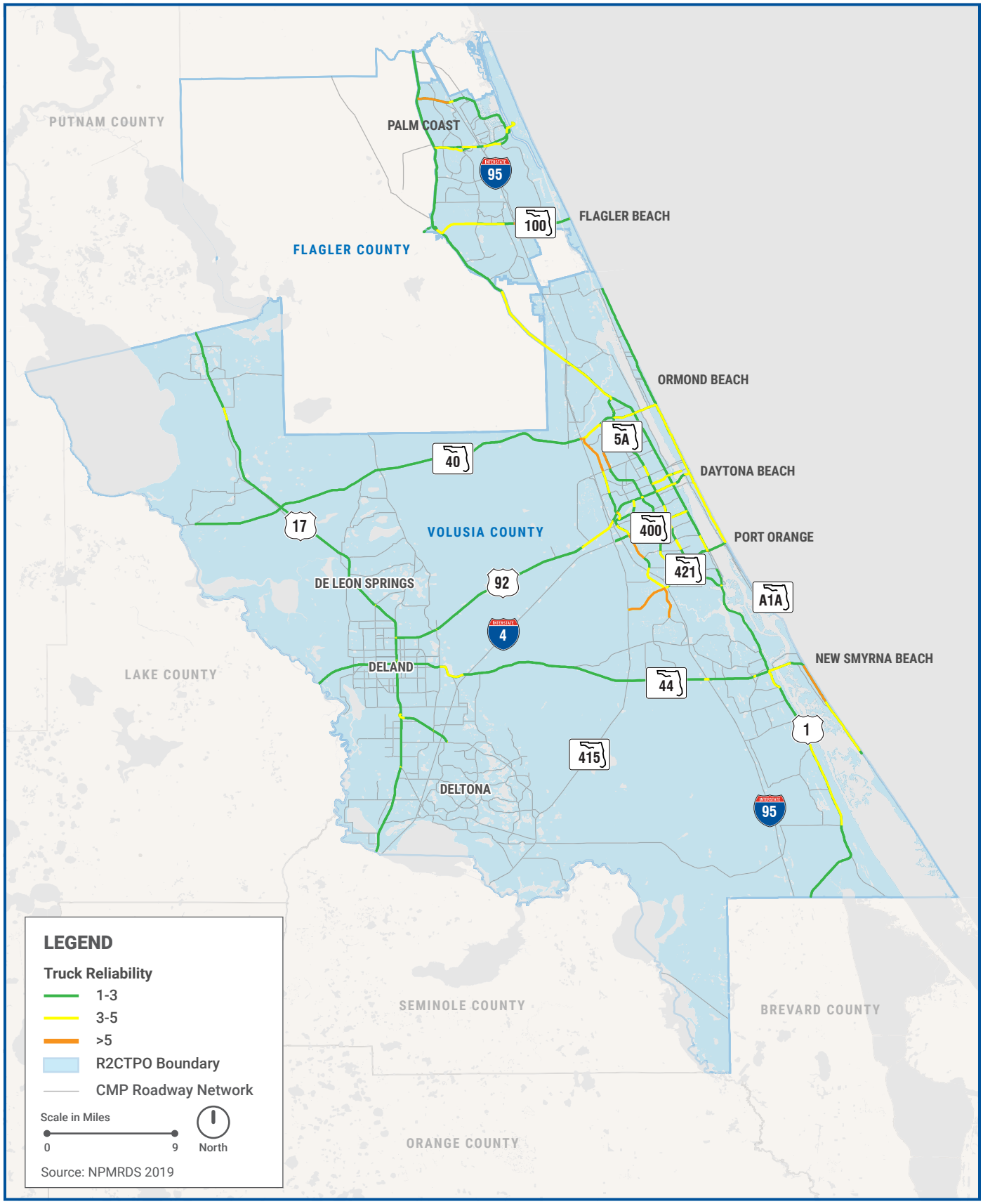
- 50 percent of the time, it takes 30 minutes or less to travel to a destination
- 5 percent of the time, it takes 90 minutes or more to a travel to the same destination
- TTTR = 90 minutes/30 minutes = 3.00 = Compare to Entire Network

Figure 25 and **Figure 26** show the truck reliability of Interstate and non-Interstate NHS roadways in the R2CTPO planning area. Several trends can be determined from these figures:

- Interstate roadways are more reliable for trucks than non-Interstate roadways.
- I-4 between the Dirksen Drive/Debary Avenue interchange and the Saxon Boulevard interchange is the least reliable Interstate roadway segment for trucks.
- TTTR on non-Interstate NHS roadways is worst in the Port Orange/Daytona Beach/Ormond Beach area.

This analysis addresses Performance Measure 2.1.1 as shown in **Figure 6**. Since this data is limited to NHS roadways, it may not fully represent truck reliability issues on other local roadways in the R2CTPO planning area.


PUTNAM COUNTY
PALM COAST
95
100
FLAGLER BEACH
FLAGLER COUNTY
ORMOND BEACH
5A
40
DAYTONA BEACH
17
VOLUSIA COUNTY
400
PORT ORANGE
421
DE LEON SPRINGS
92
A1A
4
NEW SMYRNA BEACH
LAKE COUNTY
DELAND
44
1
415
DELTONA
95
SEMINOLE COUNTY
BREVARD COUNTY
ORANGE COUNTY
LEGEND
Truck Reliability
1-2
>2
R2CTPO Boundary
CMP Roadway Network
Scale in Miles
0
9
North
Source: NPMRDS 2019


PUTNAM COUNTY
PALM COAST
95
100
FLAGLER BEACH
FLAGLER COUNTY
ORMOND BEACH
5A
40
DAYTONA BEACH
17
VOLUSIA COUNTY
400
PORT ORANGE
421
DE LEON SPRINGS
92
A1A
4
NEW SMYRNA BEACH
LAKE COUNTY
DELAND
44
1
415
DELTONA
95
SEMINOLE COUNTY
BREVARD COUNTY
ORANGE COUNTY
LEGEND
Truck Reliability
1-3
3-5
>5
R2CTPO Boundary
CMP Roadway Network
Scale in Miles
0
9
North
Source: NPMRDS 2019

6.2.2. ECONOMIC DEVELOPMENT FOR KEY FACILITIES AND ECONOMIC CENTERS

Performance Measure 2.2.1 addresses congestion on roadways adjacent to key facilities (Daytona Beach International Airport as an example) and Performance Measure 2.3.1 addresses transit connection to employment activity centers. At the time of this CMP update, the definition of key facilities and employment activity centers had not been determined thus these performance measures were not analyzed. Key facilities and employment activity centers should be defined as part of a future CMP update and once they are, these performance measures can be analyzed.

6.3. GOAL 3: ENHANCE CONNECTIVITY AND MODE CHOICE

6.3.1. ALTERNATIVE TRAVEL MODES

Performance Measure 3.1.1 addresses annual trips using Transportation Network Companies (TNCs), such as Uber and Lyft, and Performance Measure 3.1.2 addresses annual trips using micromobility. Regional data for TNCs or micromobility travel was not available at the time of this CMP update. If data becomes available, these Performance Measures can be analyzed in a future CMP update.

6.3.2. MULTIMODAL TRAVEL MODES

The third goal of the CMP is to provide connectivity and travel mode choice. Currently, only Volusia County has fixed-route transit while Flagler County provides demand response transit. The percentage of CMP roadways in Volusia County served by fixed-route transit was calculated as 30 percent. This fixed-route transit is provided entirely Votran, as Flagler County Public Transit does not currently provide fixed-route transit. It is important to note that both Votran and Flagler County Public Transit are evaluating their transit networks, and changes to routes and service type may occur over the next few years. This metric addresses Performance Measure 3.2.1. By expanding the transit network, more citizens will have access to another mode of travel.

Another important part of the providing mode choice in the transportation network in the R2CTPO planning area is the facilities for non-motorized travel. These facilities provide residents the opportunity to travel without a vehicle, saving residents money and reducing greenhouse gas emissions. As previously discussed, the bicycle and pedestrian network is shown in **Figure 9**. The percentage of bicycle and pedestrian facility coverage on CMP roadways is presented in **Figure 27**. The total miles of constructed and planned trail facilities are shown in **Figure 28**. These metrics address Performance Measures 3.2.2 and 3.2.3 as shown in **Figure 6**.

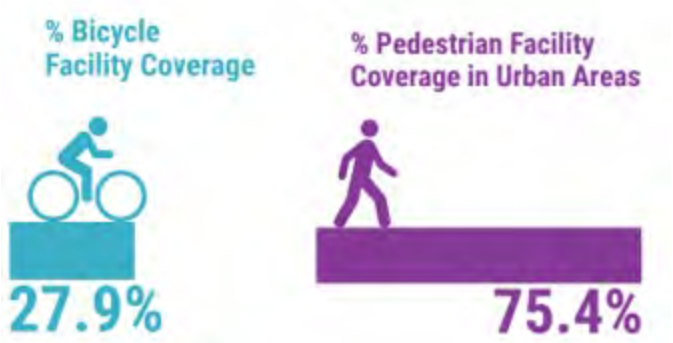


Figure 27: Bicycle and Pedestrian Facility Coverage

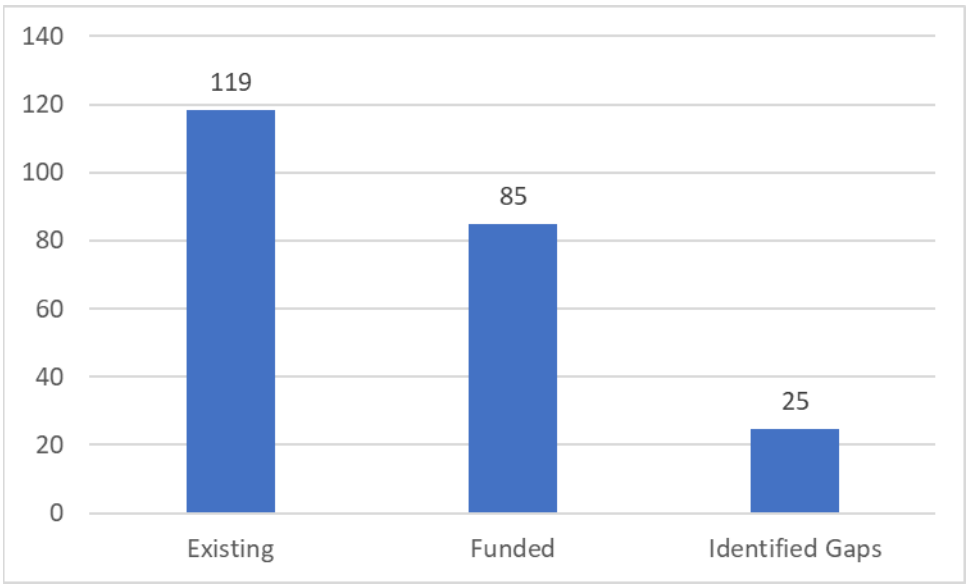


Figure 28: Miles of Trail by Type

6.4. GOAL 4: IMPROVE SAFETY

To determine the safety performance of CMP roadways, crash data for this report was obtained from the University of Florida's S4 Database for the years 2016 to 2020. The crash analysis completed in the CMP addresses Performance Measures 4.1.1 through 4.1.5 and 4.2.1 through 4.2.3.

6.4.1. R2CTPO PLANNING AREA SAFETY TRENDS

The R2CTPO planning area crash analysis was conducted in several steps:

- Volusia County and Flagler County 2016-2020 S4 crashes were downloaded.
- Crashes that occurred outside of the R2CTPO planning area boundary were removed.
- Crashes occurring in parking lots or on forestry service roads were excluded.
- Crash trends for the entire R2CTPO planning area were determined.

Table 11 summarizes R2CTPO safety performance measure results for crashes from 2016 to 2020. The Daily Vehicle Miles Traveled (DVMT) for the R2CTPO planning area, which was converted to 100 million VMT then used to calculate the crash rates, was obtained from the FDOT Transportation Data and Analytics Office.

Table 11: 2016-2020 R2CTPOSafety Statistics

Safety Metric	2016	2017	2018	2019	2020
Number of Fatalities	142	156	122	135	155
Rate of Fatalities (per 100M VMT)	2.01	2.14	1.63	1.78	2.11
Number of Serious Injuries	773	825	841	758	612
Rate of Serious Injuries (per 100M VMT)	10.77	11.30	11.26	9.97	8.33
Number of Non-Motorized (Pedestrian/ Bicycle) Fatalities and Serious Injuries	112	111	100	110	106

The total number of vehicle crashes (including motorcycles) and the total number of serious injury and fatal vehicle (including motorcycle) crashes are shown in **Figure 29** and **Figure 30**. The total number of vehicle crashes increased from 2016 to 2019, then decreased in 2020 likely due to the reduced vehicle traffic during the COVID 19 pandemic. Fatalities, however, increased from 2019 to 2020. While vehicle crashes and volumes decreased, fatal crashes increased likely due to increased vehicle speeds because less congestion was observed on roadways.

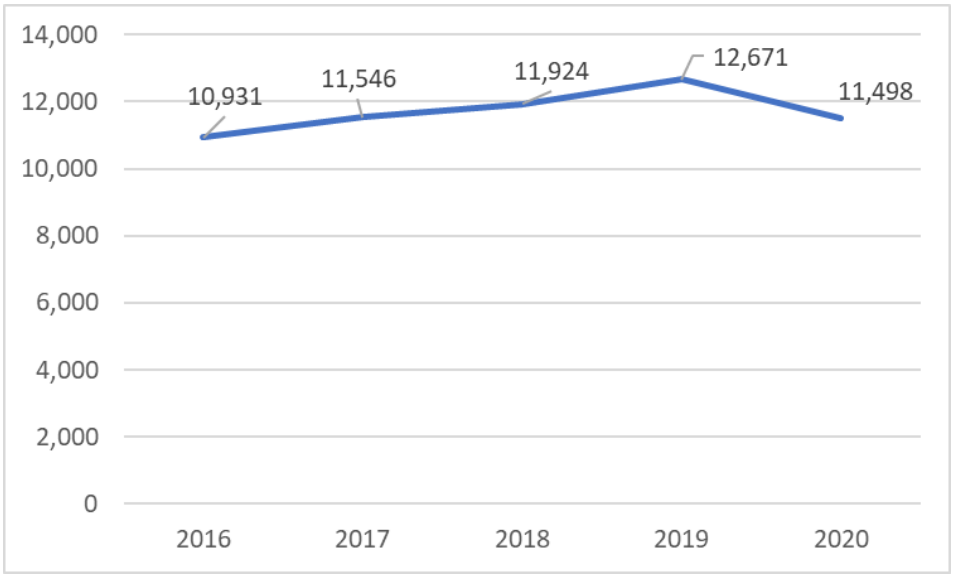


Figure 29: Vehicle and Motorcycle Crashes in R2CTPO Planning Area

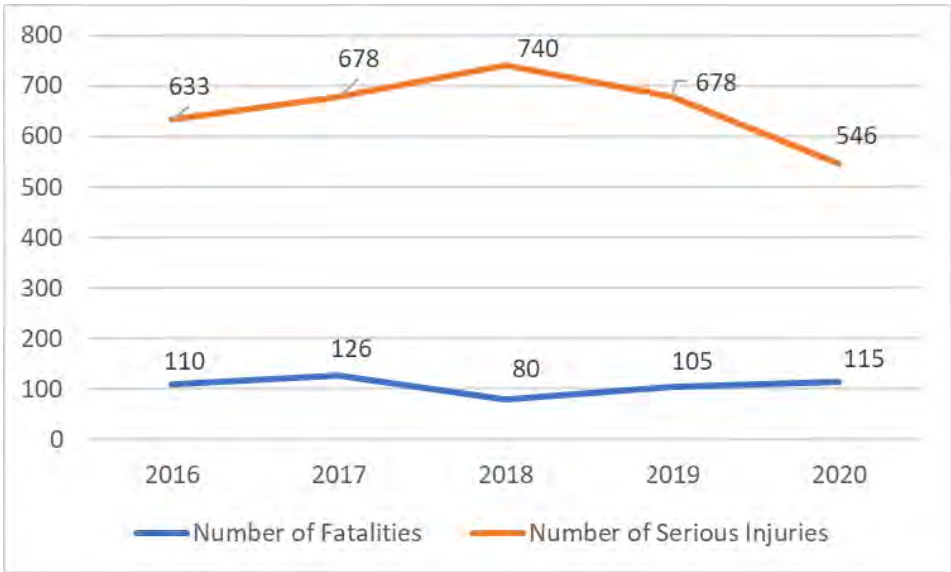


Figure 30: Serious Injury/Fatal Vehicle and Motorcycle Crashes in R2CTPO Planning Area

The total number of pedestrian and bicycle crashes and the total number of serious injury and fatal pedestrian and bicycle crashes are shown in **Figure 31** and **Figure 32**. Like vehicle crashes, total bicycle and pedestrian crashes increased from 2016 to 2019, and decreased in 2020. The number of bicycle and pedestrian fatalities, however, increased from 2019 to 2020. This increase may be caused by higher vehicle speeds and/or increased bicycle and pedestrian activity during COVID 19.

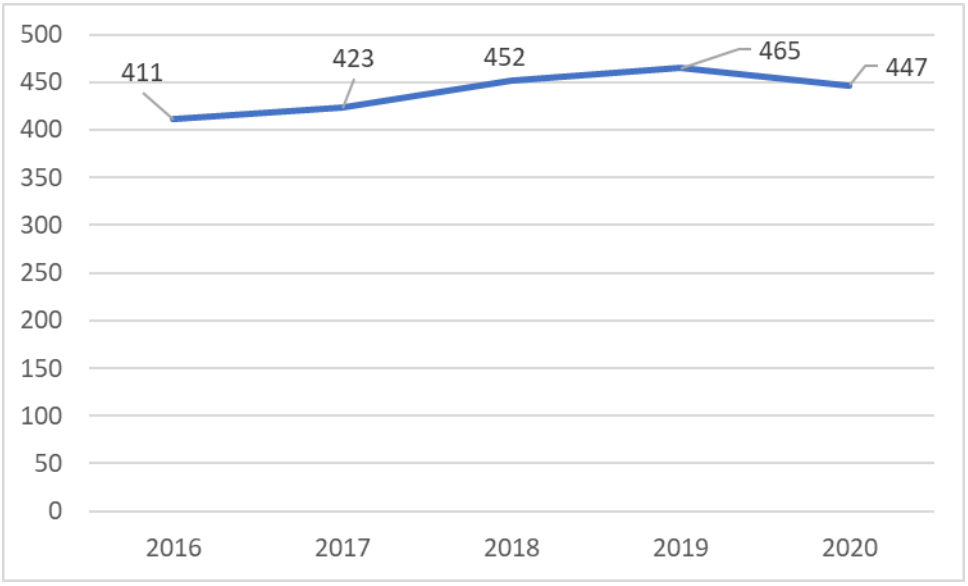


Figure 31: Bicycle and Pedestrian Crashes in R2CTPO Planning Area

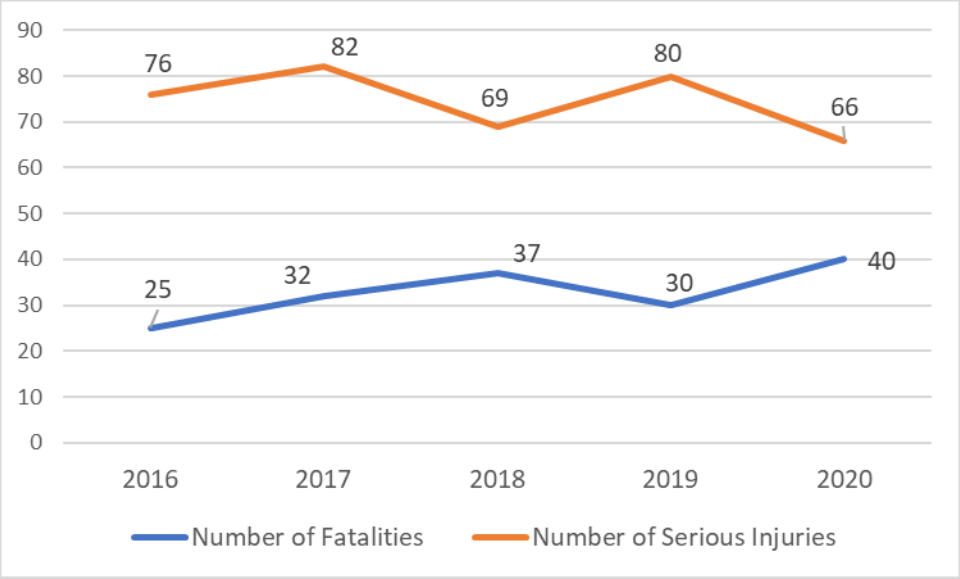


Figure 32: Serious Injury/Fatal Bicycle and Pedestrian Crashes in R2CTPO Planning Area

6.4.2. CMP NETWORK SAFETY ANALYSIS METHODOLOGY

With safety trends determined for the entire R2CTPO planning area, a detailed safety analysis focused on the CMP network was performed to identify high crash locations. The CMP network crash analysis was completed using the following process:

- Crashes that did not occur on CMP roadways were removed from the R2CTPO planning area crash dataset –
  - This was completed using a 75' buffer to select only crashes occurring in the vicinity of CMP roadways.
- The remaining crashes were then assigned to a specific CMP segment.

The various safety metrics in this section are summarized in 5-year increments to reduce the year-to-year anomalies and/or change in data reporting.

To gain an understanding of the severity of crashes, a crash severity score was calculated for each segment based on the Highway Safety Manual's Equivalent Property Damage Only (EPDO) Average Crash Frequency method. This method considers the FDOT crash costs for property damage only (PDO), possible injury, non-incapacitating injury, and incapacitating injury and fatal crashes. The average costs of each crash type are listed in **Table 12** as documented in Table 122.6.2 in Chapter 122 of the *2020 FDOT Design Manual (FDM)*. The *2020 FDM* was used since 2020 is the most recent year of safety data used in the analysis.

Locations with a higher severity score are experiencing more severe crashes. The score is calculated by multiplying the number of fatal, incapacitating injury, non-incapacitating injury, possible injury, and PDO crashes at each segment by a weighting factor developed based on the FDOT crash costs. The weighting factors used are shown in **Table 12**. A sample of this calculation is also provided below.

Table 12: Weighting Factors for Crash Severity Score

Severity	Crash Cost	Ratio	Weighting Factor
Fatal	$10,670,000	$10,670,000 / $7,700	1,386
Incapacitating Injury	$872,612	$872,612 / $7,700	113
Non-Incapacitating Injury	$174,018	$174,018 / $7,700	22
Possible Injury	$106,215	$106,215 / $7,700	14
PDO	$7,700	$7,700 / $7,700	1

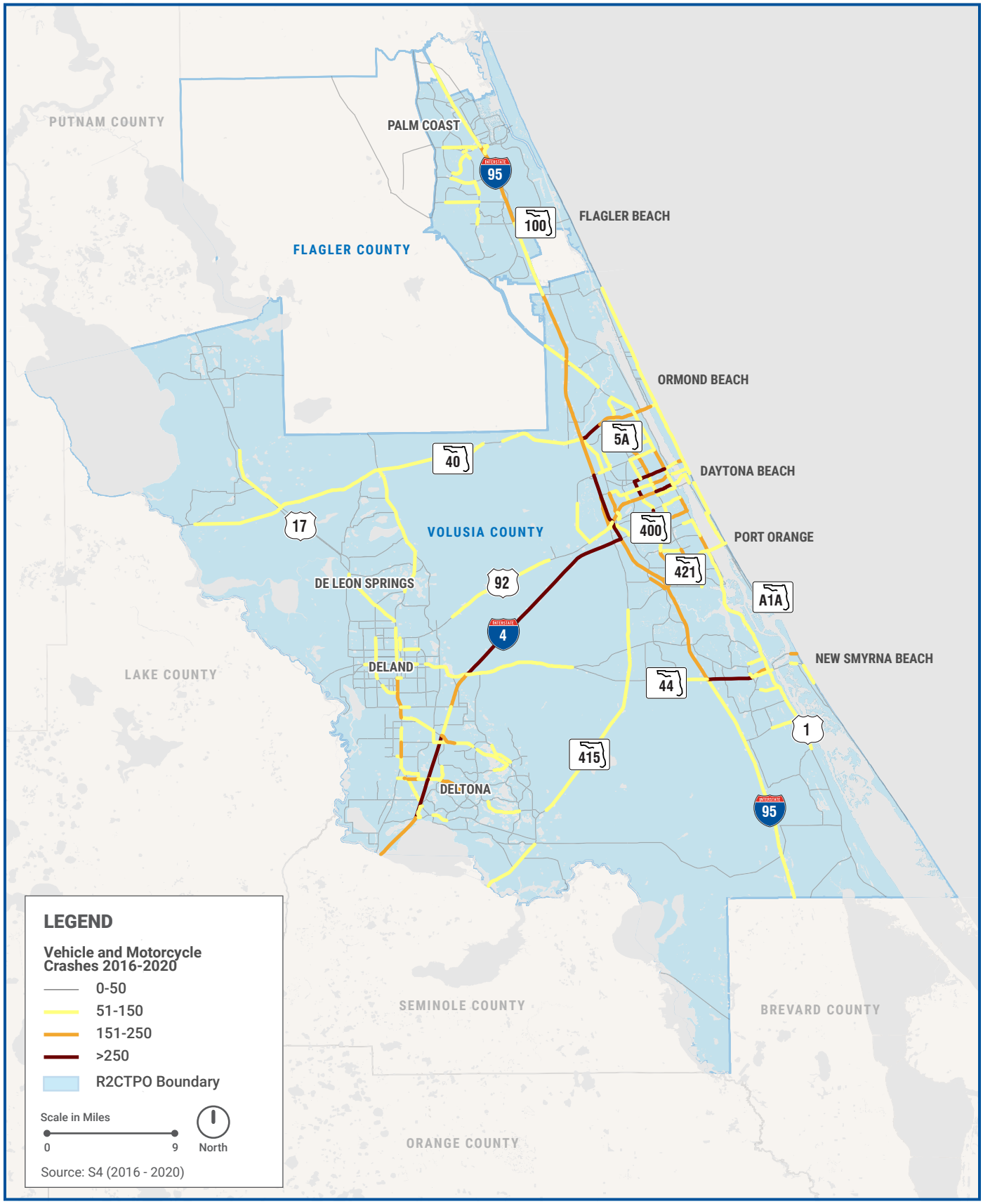
Example: Vehicle Severity Score Calculation for US 1 between Commonwealth Boulevard and Dunlawton Avenue (SR 421)

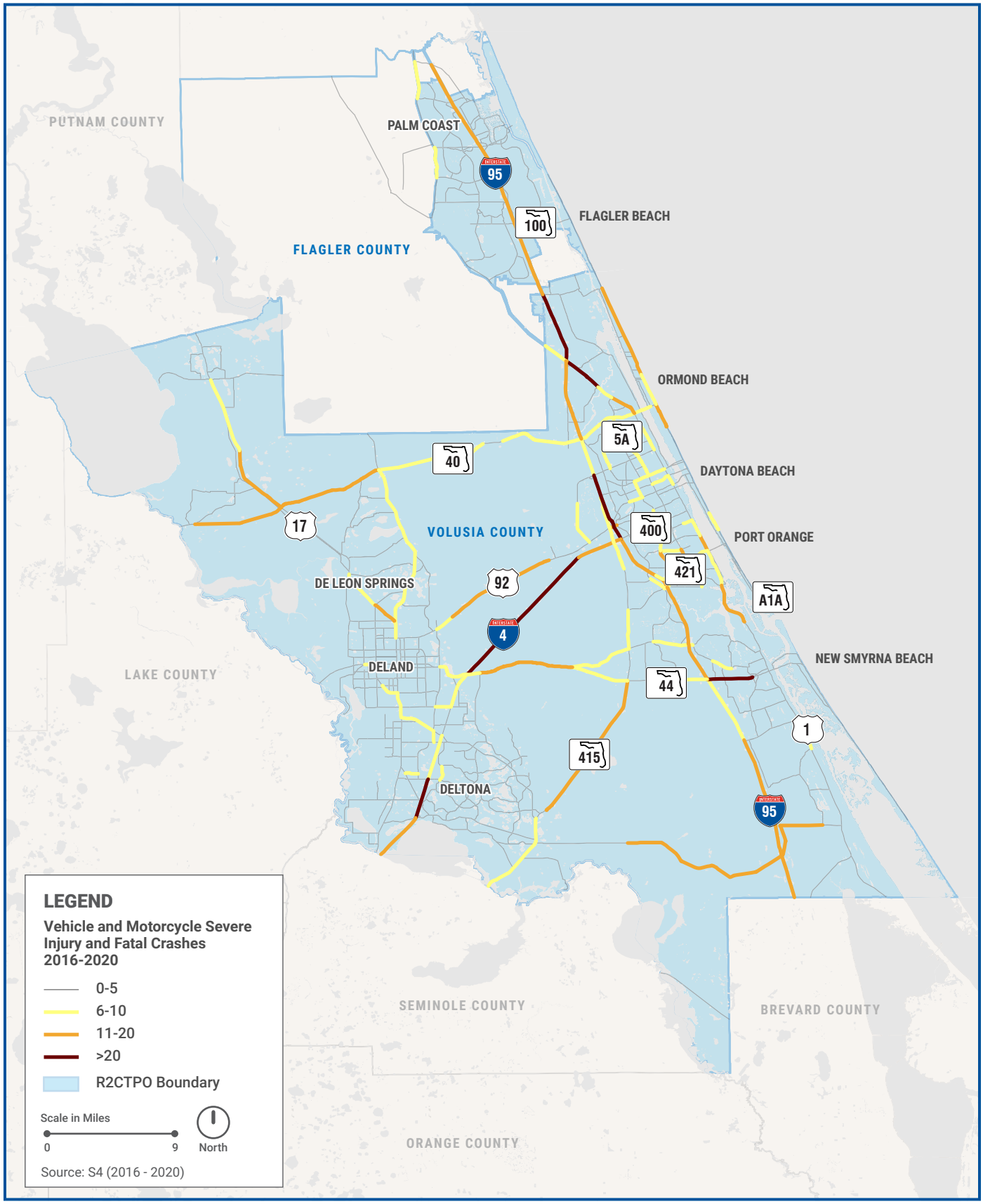
- 40 PDO crashes x 1 = 40
- 17 possible injury crashes x 14 = 238
- 15 non-incapacitating injury crashes x 22 = 330
- 6 incapacitating injury crashes x 113 = 678
- 1 fatal crashes x 1,386 = 1,386
- Total EPDO severity score = **2,672**
- Annual EPDO severity score = 2,672 / 5 years = **534**

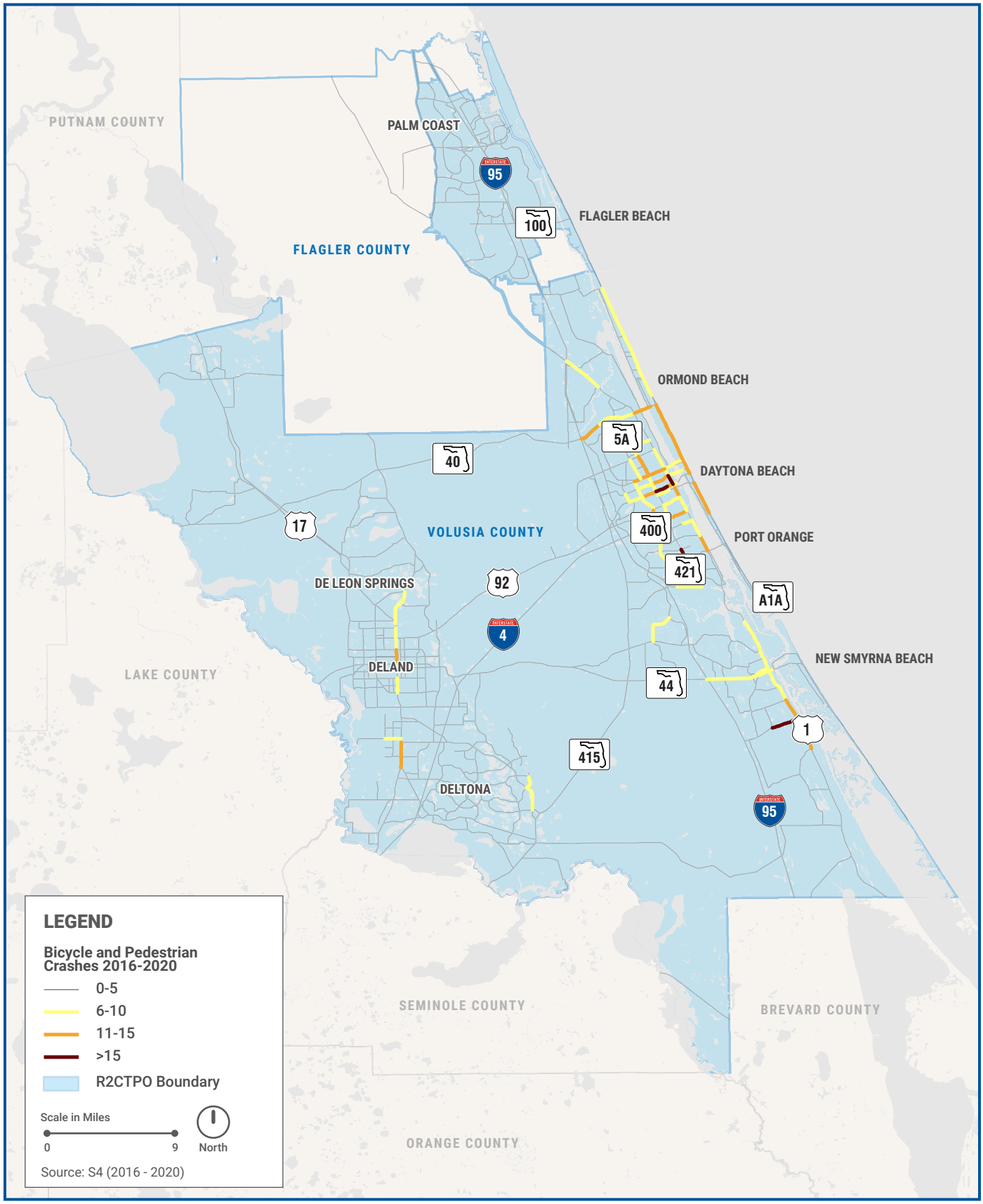
6.4.3. CMP ROADWAY NETWORK CRASHES BY SEGMENT

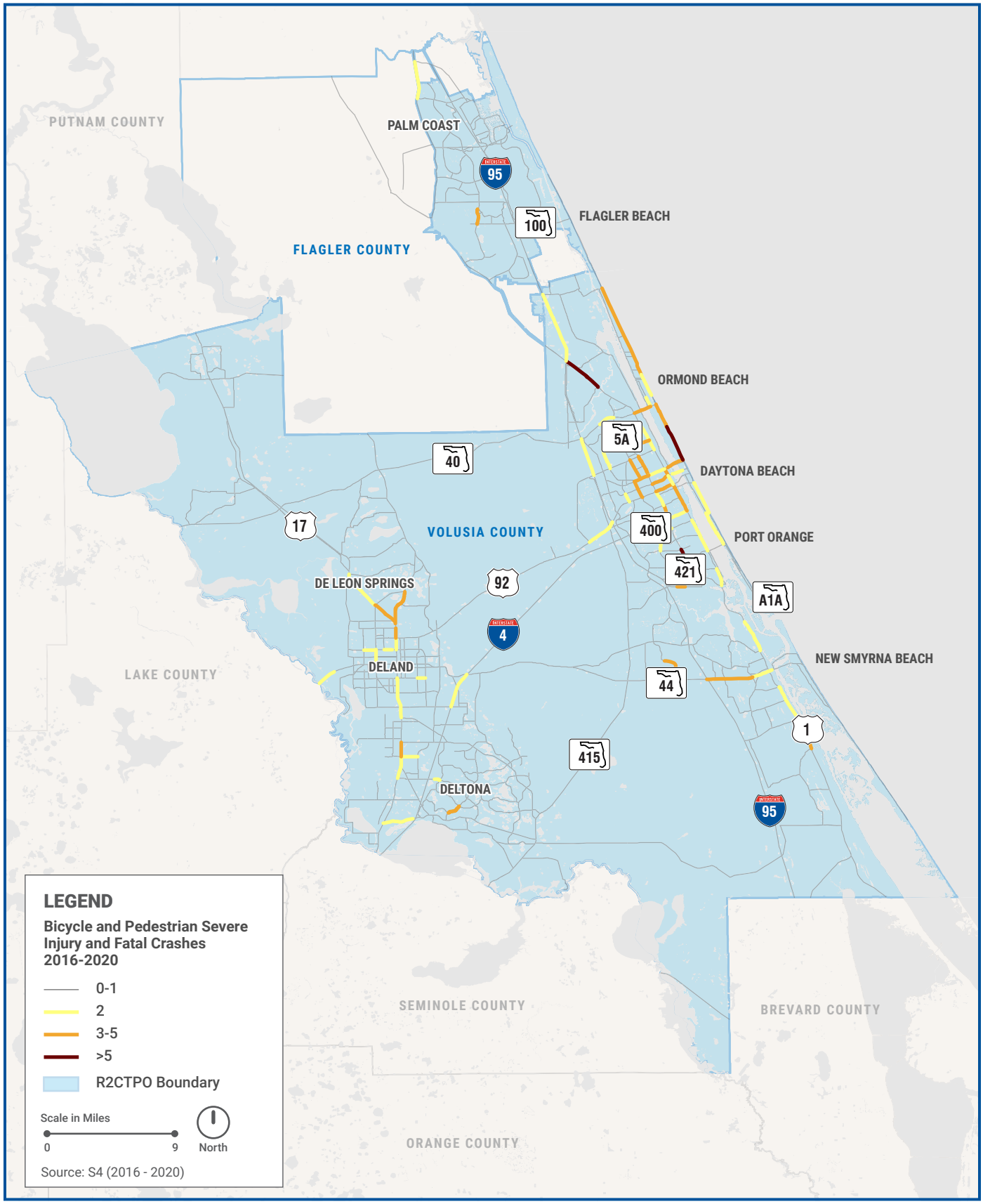
The total vehicle and motorcycle crashes for each CMP segment are shown in **Figure 33** and the serious injury and fatal vehicle and motorcycle crashes for each CMP segment are shown in **Figure 34**. The total pedestrian and bicycle crashes for each CMP segment are shown in **Figure 35** and the serious injury and fatal pedestrian and bicycle crashes for each CMP segment are shown in **Figure 36**. Observations from these figures include:

- The highest frequency of total vehicle and motorcycle crashes occur on I-4, I-95, and arterials in Daytona Beach.
- Multiple rural roadways like SR 40, US 92, and SR 415 generally have more serious injury and fatal vehicle and motorcycle crashes than higher volume urban roadways.
- The highest frequency of total bicycle and pedestrian crashes occur on arterials in Daytona Beach and Ormond Beach.
- There are high frequencies of serious injury and fatal bicycle and pedestrian crashes along SR A1A in Daytona Beach and Ormond Beach.


PUTNAM COUNTY
PALM COAST
95
100
FLAGLER BEACH
FLAGLER COUNTY
ORMOND BEACH
5A
40
DAYTONA BEACH
17
VOLUSIA COUNTY
400
PORT ORANGE
421
DE LEON SPRINGS
92
A1A
4
NEW SMYRNA BEACH
LAKE COUNTY
DELAND
44
1
415
DELTONA
95
SEMINOLE COUNTY
BREVARD COUNTY
ORANGE COUNTY
LEGEND
Vehicle and Motorcycle Crashes 2016-2020
0-50
51-150
151-250
>250
R2CTPO Boundary
Scale in Miles
0
9
North
Source: S4 (2016 - 2020)


PUTNAM COUNTY
PALM COAST
95
100
FLAGLER BEACH
FLAGLER COUNTY
ORMOND BEACH
5A
40
DAYTONA BEACH
17
VOLUSIA COUNTY
400
PORT ORANGE
421
DE LEON SPRINGS
92
A1A
4
NEW SMYRNA BEACH
LAKE COUNTY
DELAND
44
1
415
DELTONA
95
SEMINOLE COUNTY
BREVARD COUNTY
ORANGE COUNTY
LEGEND
Vehicle and Motorcycle Severe Injury and Fatal Crashes 2016-2020
0-5
6-10
11-20
>20
R2CTPO Boundary
Scale in Miles
0
9
North
Source: S4 (2016 - 2020)


PUTNAM COUNTY
PALM COAST
95
100
FLAGLER BEACH
FLAGLER COUNTY
ORMOND BEACH
5A
40
DAYTONA BEACH
17
VOLUSIA COUNTY
400
PORT ORANGE
421
DE LEON SPRINGS
92
A1A
4
NEW SMYRNA BEACH
LAKE COUNTY
DELAND
44
1
415
DELTONA
95
SEMINOLE COUNTY
BREVARD COUNTY
ORANGE COUNTY
LEGEND
Bicycle and Pedestrian Crashes 2016-2020
0-5
6-10
11-15
>15
R2CTPO Boundary
Scale in Miles
0
9
North
Source: S4 (2016 - 2020)


PUTNAM COUNTY
PALM COAST
95
100
FLAGLER BEACH
FLAGLER COUNTY
ORMOND BEACH
5A
40
DAYTONA BEACH
17
VOLUSIA COUNTY
400
PORT ORANGE
421
DE LEON SPRINGS
92
A1A
4
NEW SMYRNA BEACH
LAKE COUNTY
DELAND
44
1
415
DELTONA
95
SEMINOLE COUNTY
BREVARD COUNTY
ORANGE COUNTY
LEGEND
Bicycle and Pedestrian Severe Injury and Fatal Crashes 2016-2020
0-1
2
3-5
>5
R2CTPO Boundary
Scale in Miles
0
9
North
Source: S4 (2016 - 2020)

6.4.4. TOP 25 HIGH CRASH SEGMENTS

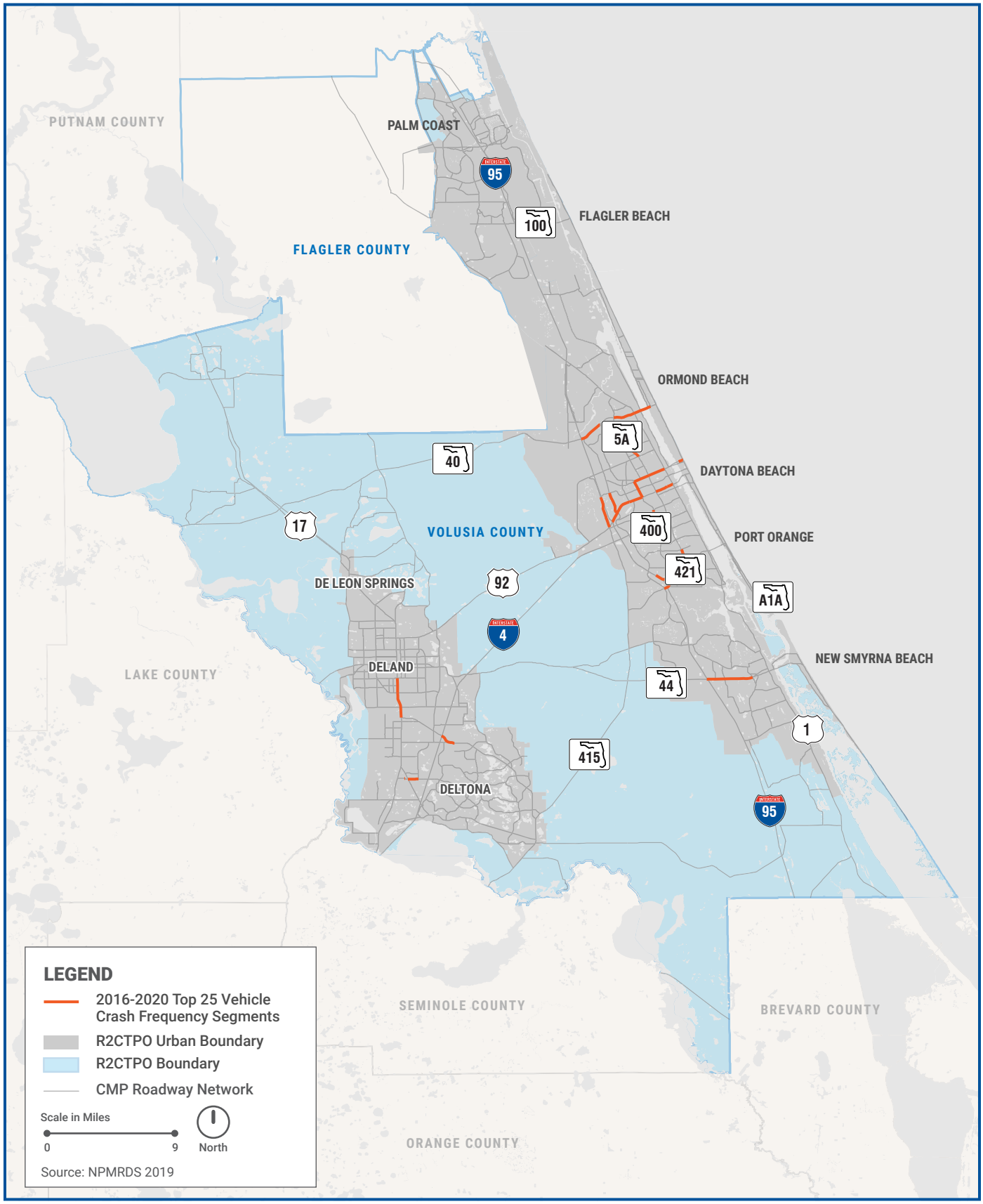
In addition to reporting the crash frequency and severity for each CMP segment, the Top 25 segments for the following categories were identified and mapped:

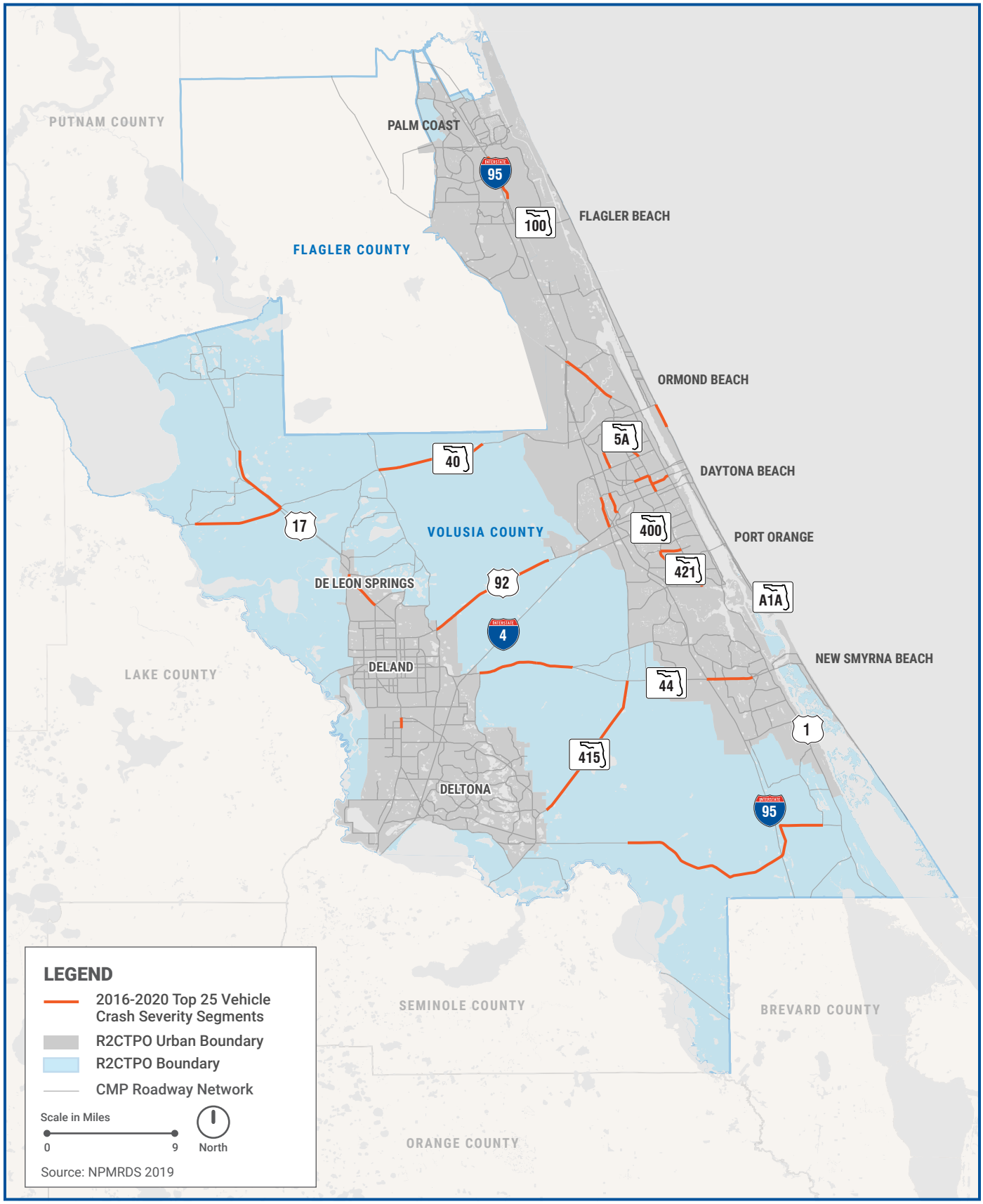
- Top 25 Vehicle Crash Frequency Segments;
- Top 25 Vehicle Crash Severity Segments;
- Top 25 Motorcycle Crash Frequency Segments;
- Top 25 Motorcycle Crash Severity Segments;
- Top 25 Bicycle Crash Frequency Segments;
- Top 25 Bicycle Crash Severity Segments;
- Top 25 Pedestrian Crash Frequency Segments; and
- Top 25 Pedestrian Crash Severity Segments.

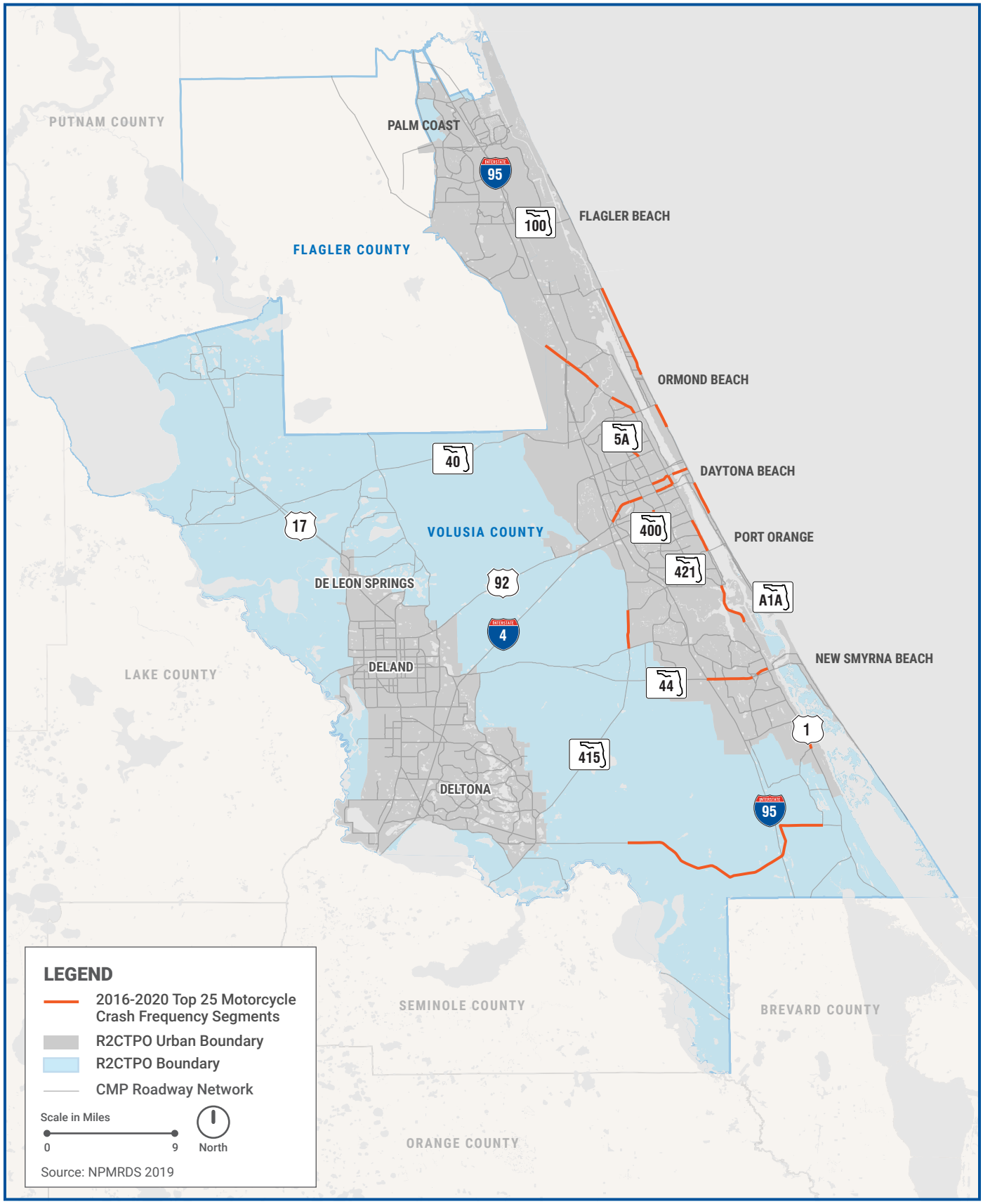
The Top 25 crash segments for each category are shown in **Figure 37** to **Figure 44**. Tables listing the Top 25 segments for each category are provided in **Appendix B**.

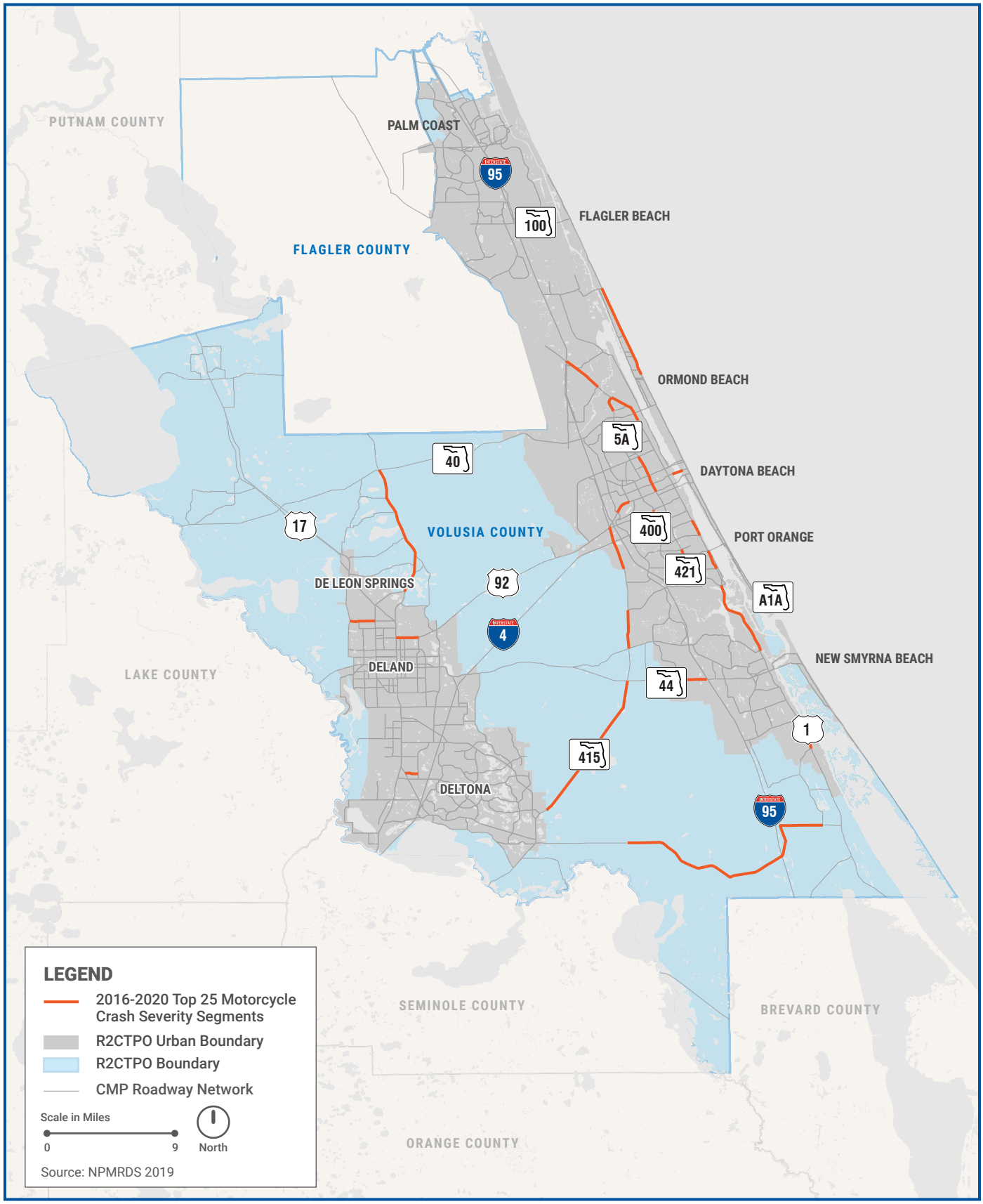
It is important to note that Interstate CMP roadway segments were not included in this analysis to better focus on non-Intestate high crash locations. Interstate segments are going to have a disproportionately higher number of total crashes and severe injury/fatal crashes, thus a majority of the Top 25 segments would be located on the Interstate roadways. Because R2CTPO and local funds are more likely to be applied to safety improvements on non-Interstate CMP roadways, the Top 25 high crash segment lists do not include Interstate segments. Observations from these figures include:

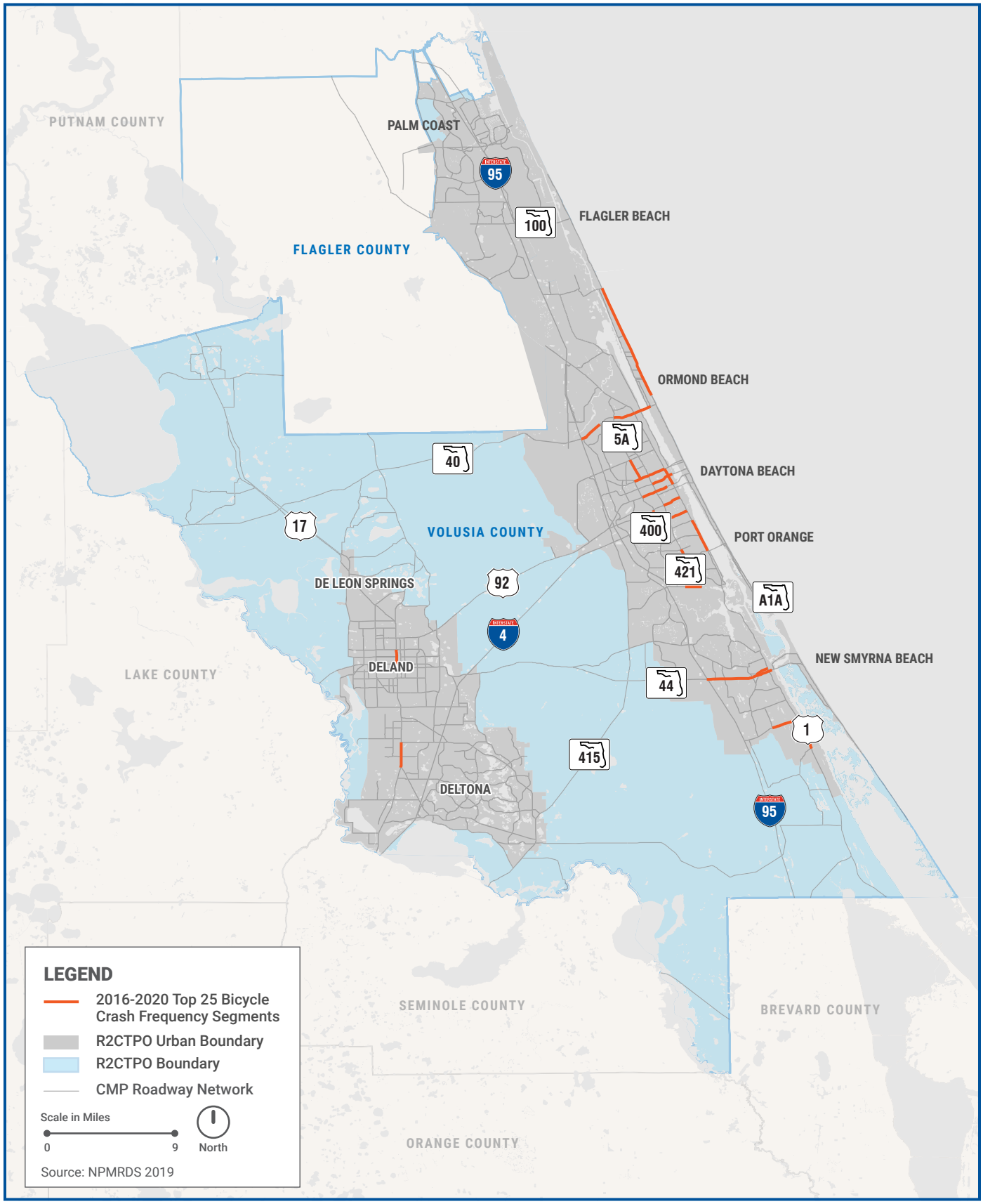
- Top 25 Vehicle and Motorcycle Crash Frequency Segments are mostly located within urban areas like Daytona Beach, Ormond Beach, and New Smyrna Beach.
- Top 25 Vehicle and Motorcycle Crash Severity Segments include more rural roadways segments (such as SR 40, US 92, and SR 415) than Top 25 Vehicle and Motorcycle Crash Frequency Segments. These rural roadways are likely to have higher speeds than urban roadways.
- Top 25 Bicycle and Bicycle Crash Frequency and Severity Segments are mostly located within urban areas like Daytona Beach, Ormond Beach, and New Smyrna Beach.

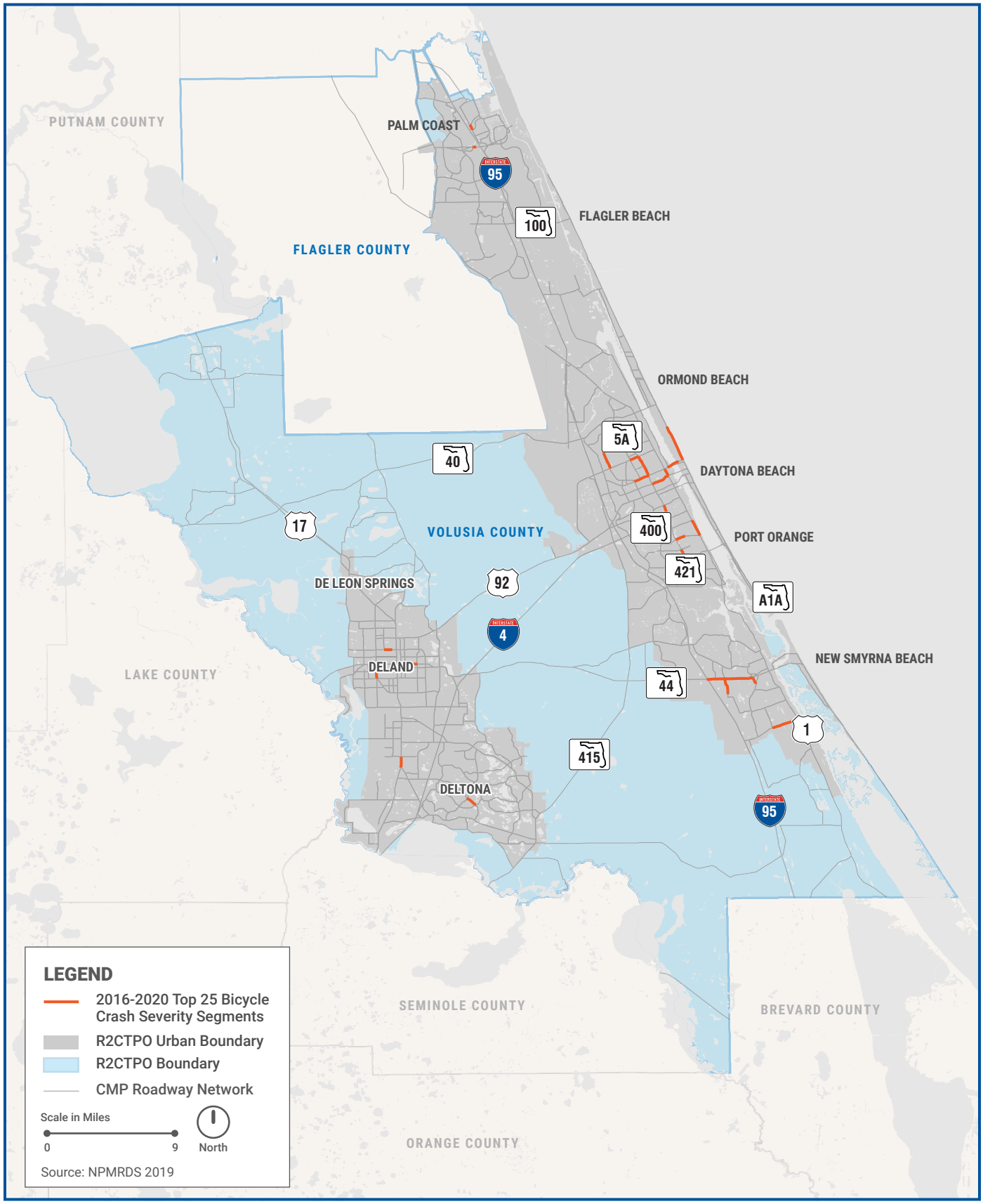

PUTNAM COUNTY
PALM COAST
95
100
FLAGLER BEACH
FLAGLER COUNTY
ORMOND BEACH
5A
40
DAYTONA BEACH
17
VOLUSIA COUNTY
400
PORT ORANGE
421
DE LEON SPRINGS
92
A1A
4
NEW SMYRNA BEACH
LAKE COUNTY
DELAND
44
1
415
DELTONA
95
SEMINOLE COUNTY
BREVARD COUNTY
ORANGE COUNTY
LEGEND
2016-2020 Top 25 Vehicle Crash Frequency Segments
R2CTPO Urban Boundary
R2CTPO Boundary
CMP Roadway Network
Scale in Miles
0
9
North
Source: NPMRDS 2019

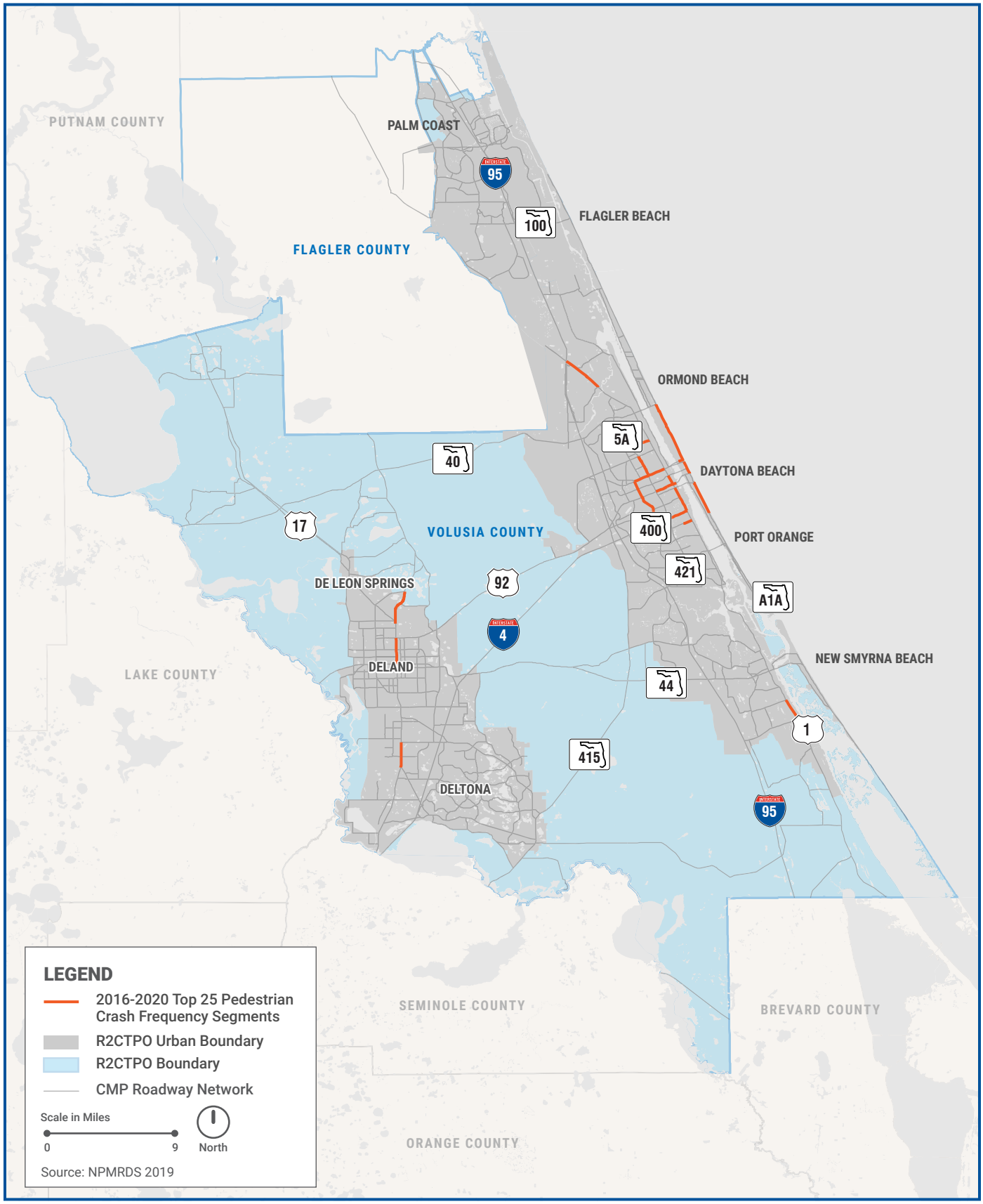

PUTNAM COUNTY
PALM COAST
95
100
FLAGLER BEACH
FLAGLER COUNTY
ORMOND BEACH
5A
40
DAYTONA BEACH
17
VOLUSIA COUNTY
400
PORT ORANGE
421
DE LEON SPRINGS
92
A1A
4
NEW SMYRNA BEACH
LAKE COUNTY
DELAND
44
1
415
DELTONA
95
SEMINOLE COUNTY
BREVARD COUNTY
ORANGE COUNTY
LEGEND
2016-2020 Top 25 Vehicle Crash Severity Segments
R2CTPO Urban Boundary
R2CTPO Boundary
CMP Roadway Network
Scale in Miles
0
9
North
Source: NPMRDS 2019

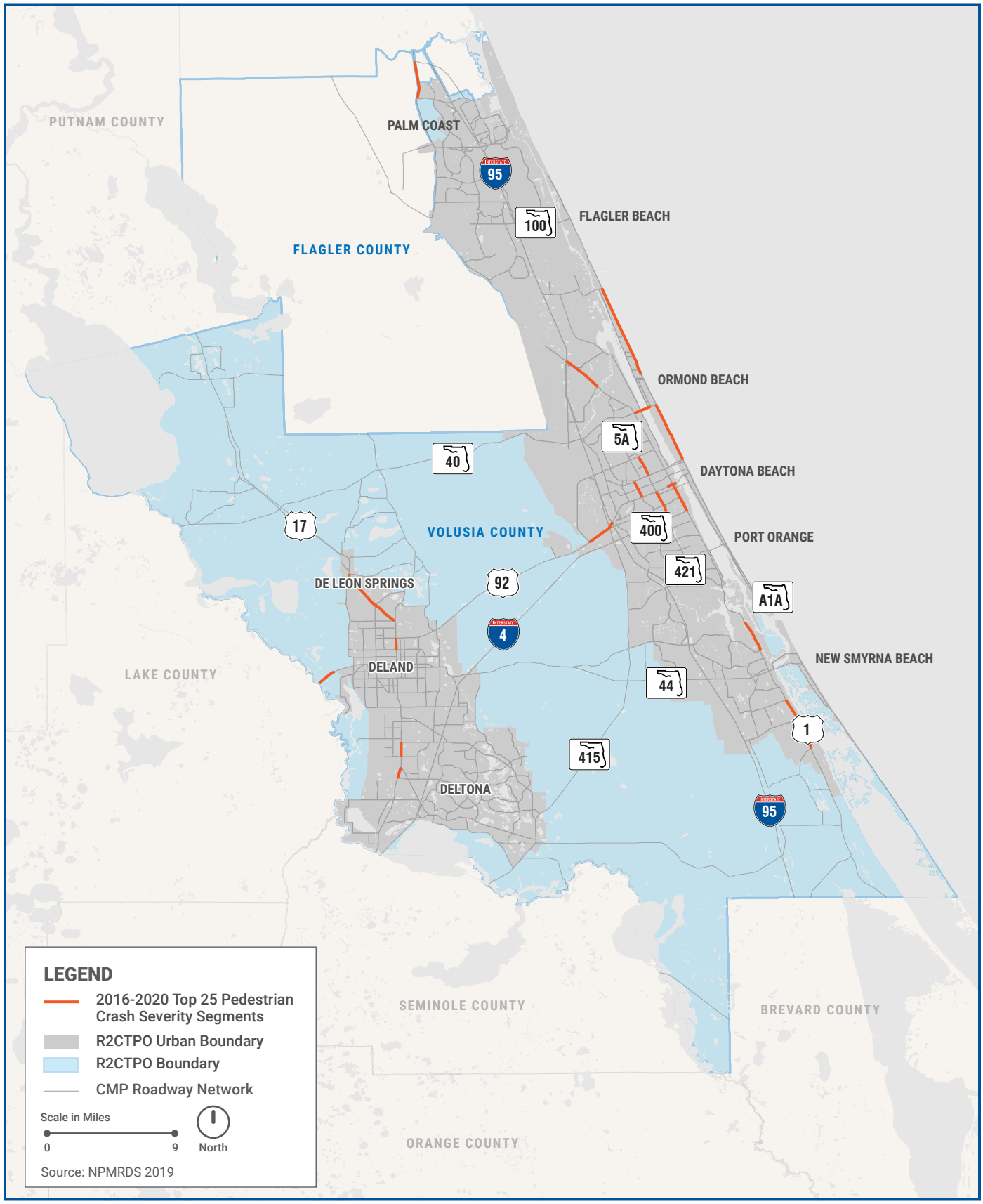

PUTNAM COUNTY
PALM COAST
95
100
FLAGLER BEACH
FLAGLER COUNTY
ORMOND BEACH
5A
40
DAYTONA BEACH
17
VOLUSIA COUNTY
400
PORT ORANGE
421
DE LEON SPRINGS
92
A1A
4
NEW SMYRNA BEACH
LAKE COUNTY
DELAND
44
1
415
DELTONA
95
SEMINOLE COUNTY
BREVARD COUNTY
ORANGE COUNTY
LEGEND
2016-2020 Top 25 Motorcycle Crash Frequency Segments
R2CTPO Urban Boundary
R2CTPO Boundary
CMP Roadway Network
Scale in Miles
0
9
North
Source: NPMRDS 2019


PUTNAM COUNTY
PALM COAST
95
100
FLAGLER BEACH
FLAGLER COUNTY
ORMOND BEACH
5A
40
DAYTONA BEACH
17
VOLUSIA COUNTY
400
PORT ORANGE
421
DE LEON SPRINGS
92
A1A
4
NEW SMYRNA BEACH
LAKE COUNTY
DELAND
44
1
415
DELTONA
95
SEMINOLE COUNTY
BREVARD COUNTY
ORANGE COUNTY
LEGEND
2016-2020 Top 25 Motorcycle Crash Severity Segments
R2CTPO Urban Boundary
R2CTPO Boundary
CMP Roadway Network
Scale in Miles
0
9
North
Source: NPMRDS 2019


PUTNAM COUNTY
PALM COAST
95
100
FLAGLER BEACH
FLAGLER COUNTY
ORMOND BEACH
5A
40
DAYTONA BEACH
17
VOLUSIA COUNTY
400
PORT ORANGE
421
DE LEON SPRINGS
92
A1A
4
NEW SMYRNA BEACH
LAKE COUNTY
DELAND
44
1
415
DELTONA
95
SEMINOLE COUNTY
BREVARD COUNTY
ORANGE COUNTY
LEGEND
2016-2020 Top 25 Bicycle Crash Frequency Segments
R2CTPO Urban Boundary
R2CTPO Boundary
CMP Roadway Network
Scale in Miles
0
9
North
Source: NPMRDS 2019


PUTNAM COUNTY
PALM COAST
95
100
FLAGLER BEACH
FLAGLER COUNTY
ORMOND BEACH
5A
40
DAYTONA BEACH
17
VOLUSIA COUNTY
400
PORT ORANGE
421
DE LEON SPRINGS
92
A1A
4
NEW SMYRNA BEACH
LAKE COUNTY
DELAND
44
1
415
DELTONA
95
SEMINOLE COUNTY
BREVARD COUNTY
ORANGE COUNTY
LEGEND
2016-2020 Top 25 Bicycle Crash Severity Segments
R2CTPO Urban Boundary
R2CTPO Boundary
CMP Roadway Network
Scale in Miles
0
9
North
Source: NPMRDS 2019

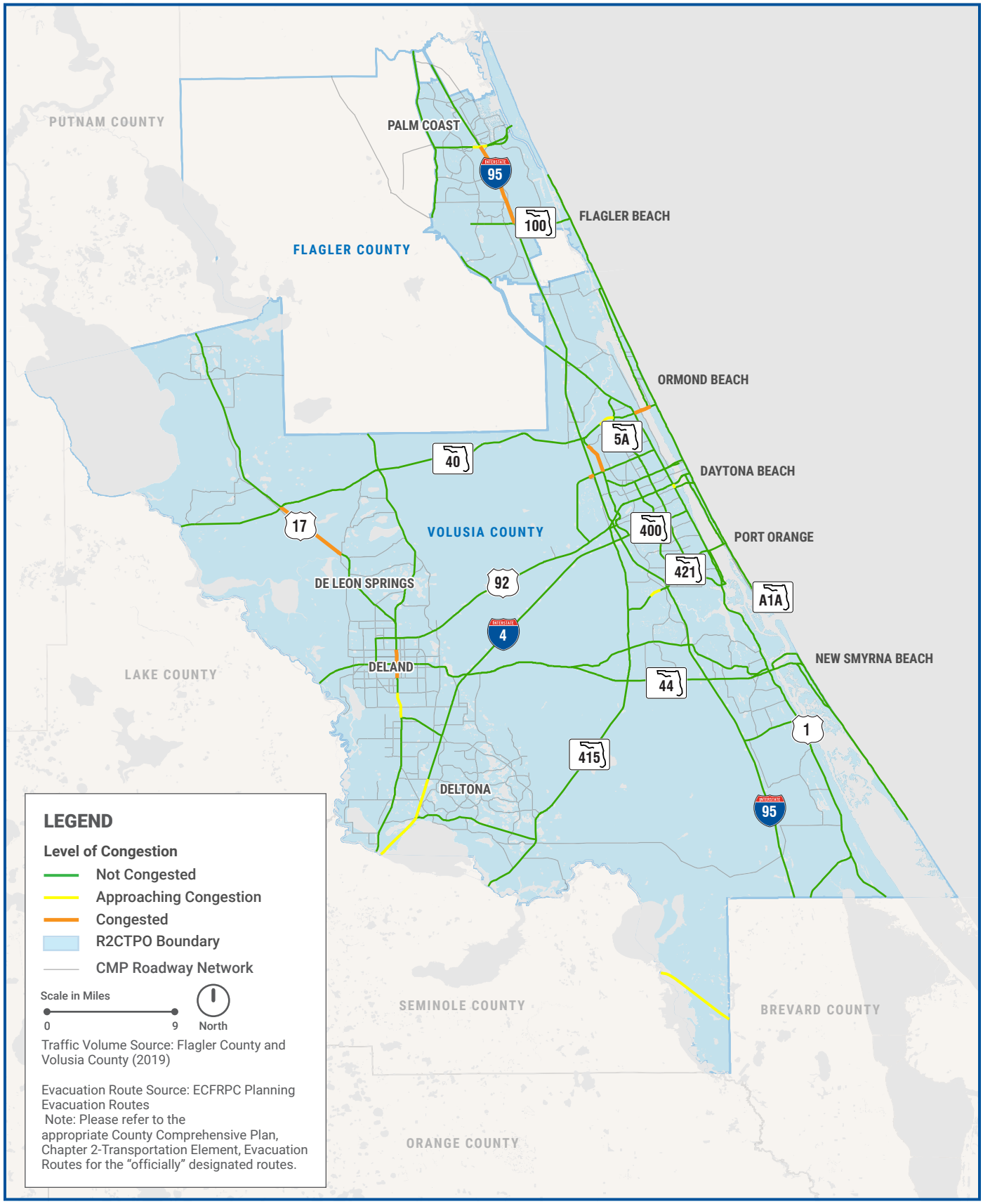

PUTNAM COUNTY
PALM COAST
95
100
FLAGLER BEACH
FLAGLER COUNTY
ORMOND BEACH
5A
40
DAYTONA BEACH
17
VOLUSIA COUNTY
400
PORT ORANGE
421
92
DE LEON SPRINGS
A1A
4
NEW SMYRNA BEACH
LAKE COUNTY
DELAND
44
1
415
DELTONA
95
SEMINOLE COUNTY
BREVARD COUNTY
ORANGE COUNTY
LEGEND
2016-2020 Top 25 Pedestrian Crash Frequency Segments
R2CTPO Urban Boundary
R2CTPO Boundary
CMP Roadway Network
Scale in Miles
0
9
North
Source: NPMRDS 2019


PUTNAM COUNTY
PALM COAST
95
100
FLAGLER BEACH
FLAGLER COUNTY
ORMOND BEACH
5A
40
DAYTONA BEACH
17
VOLUSIA COUNTY
400
PORT ORANGE
421
DE LEON SPRINGS
92
A1A
4
NEW SMYRNA BEACH
LAKE COUNTY
DELAND
44
1
415
DELTONA
95
SEMINOLE COUNTY
BREVARD COUNTY
ORANGE COUNTY
LEGEND
2016-2020 Top 25 Pedestrian Crash Severity Segments
R2CTPO Urban Boundary
R2CTPO Boundary
CMP Roadway Network
Scale in Miles
0
9
North
Source: NPMRDS 2019

6.4.5. EVACUATION ROUTE PERFORMANCE MEASURES

Evacuation routes form a critical part of the safety infrastructure in the R2CTPO. While these important roadways are not used as evacuation routes regularly, it is important to outfit these corridors with ITS improvements to help with the congestion and flow of traffic during evacuation related events. The level of congestion on evacuation routes is shown in **Figure 45** and addresses Performance Measure 4.3.1. While the evacuation route analysis for this CMP referenced roadways identified from the East Central Florida Regional Planning Council, refer to the appropriate County Comprehensive Plan, Chapter 2 – Transportation Element, Evacuation Routes for the "officially" designated routes. Volusia County is working to update their evacuation route database and the official evacuation routes will be updated in a future CMP.

Additionally, the percent of evacuation route centerline miles with existing fiber optic cable was also calculated at 33 percent. The evacuation route network has a slightly greater share of fiber optic cable than the entire CMP roadway network. This fiber can provide important communication capabilities during an evacuation event and addresses Performance Measure 4.3.2. As the fiber network continues to expand, the R2CTPO resiliency in dealing with evacuation events will increase as well.


PUTNAM COUNTY
PALM COAST
95
100
FLAGLER BEACH
FLAGLER COUNTY
ORMOND BEACH
5A
40
DAYTONA BEACH
17
VOLUSIA COUNTY
400
PORT ORANGE
421
DE LEON SPRINGS
92
A1A
4
NEW SMYRNA BEACH
LAKE COUNTY
DELAND
44
1
415
DELTONA
95
SEMINOLE COUNTY
BREVARD COUNTY
ORANGE COUNTY
LEGEND
Level of Congestion
Not Congested
Approaching Congestion
Congested
R2CTPO Boundary
CMP Roadway Network
Scale in Miles
0
9
North
Traffic Volume Source: Flagler County and Volusia County (2019)
Evacuation Route Source: ECFRPC Planning Evacuation Routes
Note: Please refer to the appropriate County Comprehensive Plan, Chapter 2-Transportation Element, Evacuation Routes for the "officially" designated routes.

6.5. GOAL 5: PROMOTE LIVABILITY

Another important goal of the CMP is to promote livability within the R2CTPO planning area. Monitoring the implementation of electric vehicles that reduce greenhouse gas emissions, as well as tracking air quality in the R2CPO planning area can help meet this goal and addresses Performance Measures 5.1.1 and 5.1.2.

6.5.1. ELECTRIC VEHICLES

The number and location of electric vehicle charging stations can be a useful metric to measure the readiness of the R2CTPO planning area for electric vehicles. **Figure 46** shows the total number of electric vehicle charging stations and units in 2020. Charging stations are locations with chargers and charging units are individual chargers. As of 2020, the R2CTPO area had a total of 55 charging stations and 137 charging units. **Figure 47** shows the location of the electric vehicle charging stations. As electric vehicles become more common, expanding charging infrastructure and making charging infrastructure accessible and convenient will be important for overall transportation network performance.

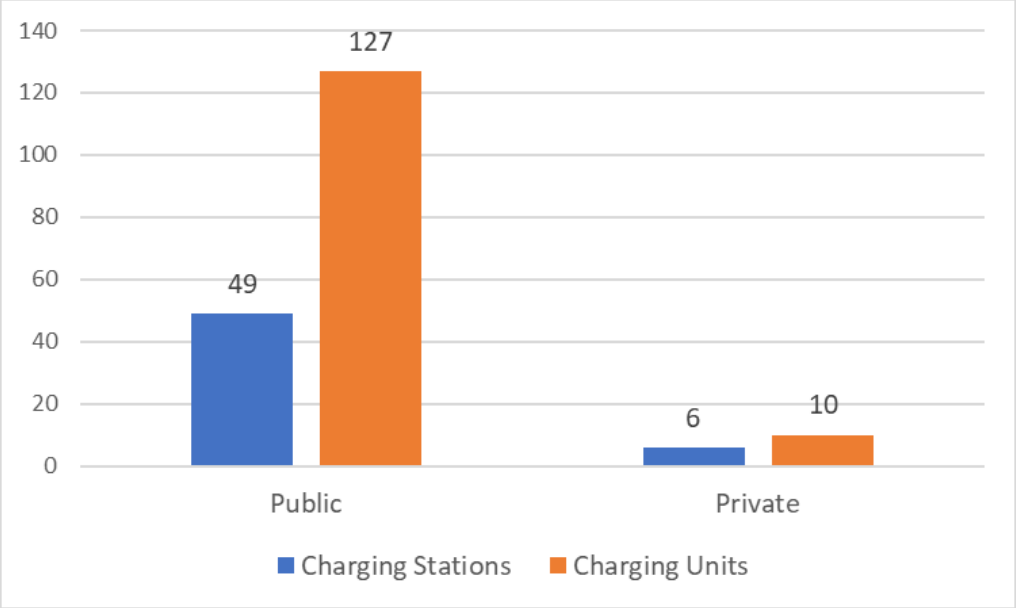
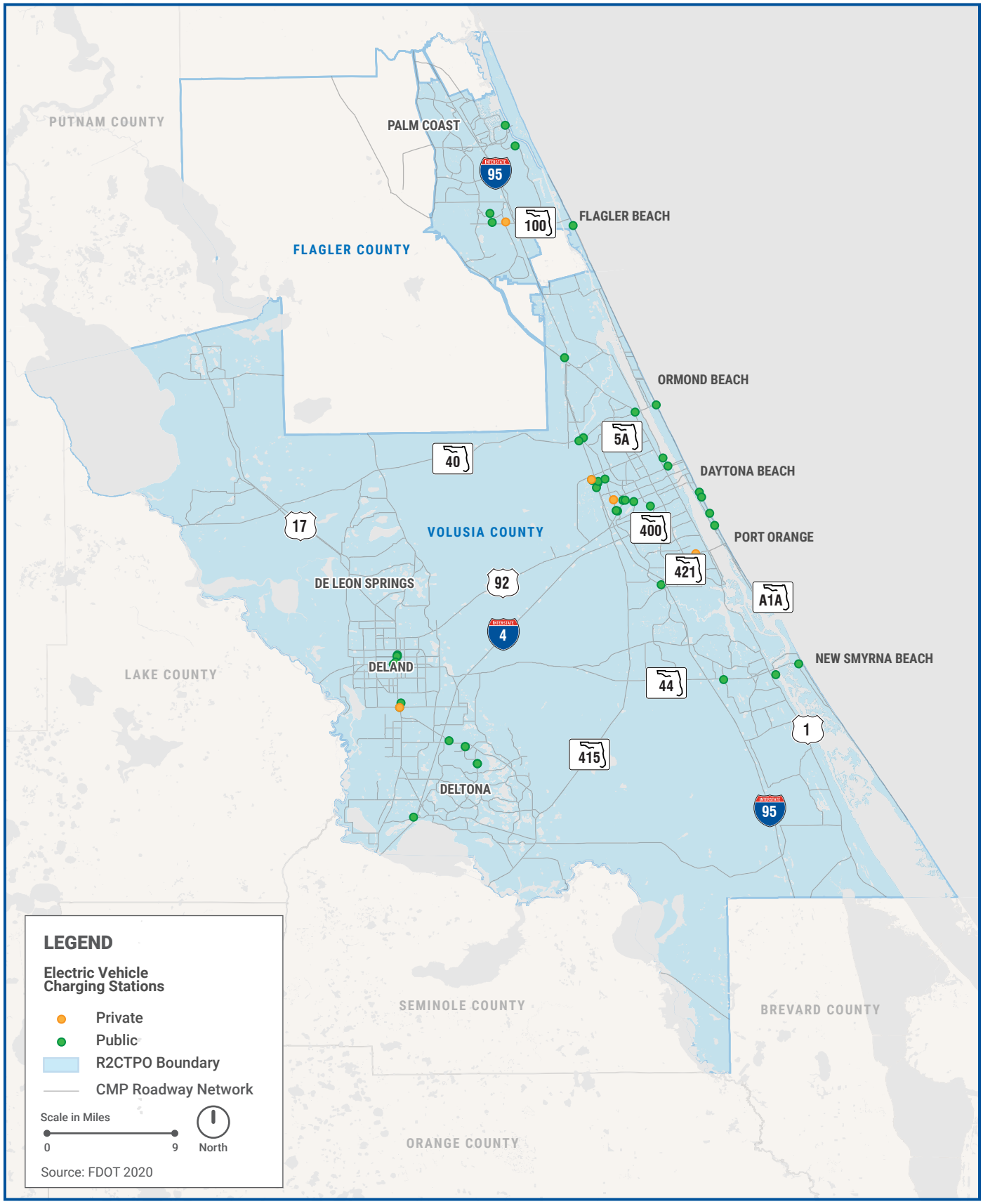


Figure 46: Electric Vehicle Charging Stations and Units


PUTNAM COUNTY
PALM COAST
95
100
FLAGLER BEACH
FLAGLER COUNTY
ORMOND BEACH
5A
40
DAYTONA BEACH
17
VOLUSIA COUNTY
400
PORT ORANGE
421
DE LEON SPRINGS
92
A1A
4
NEW SMYRNA BEACH
LAKE COUNTY
DELAND
44
1
415
DELTONA
95
SEMINOLE COUNTY
BREVARD COUNTY
ORANGE COUNTY
LEGEND
Electric Vehicle Charging Stations
Private
Public
R2CTPO Boundary
CMP Roadway Network
Scale in Miles
0
9
North
Source: FDOT 2020

6.5.2. AIR QUALITY INDEX

Data from the Florida Ozone Network, which is associated with the (FDEP), are summarized annually for monitoring stations in Volusia County and Flagler County. These stations are located at the Blind Services office in Daytona Beach and at the Flagler County Fairgrounds in Bunnell. Data from both stations indicate ozone readings fall below the current non-attainment standard of 70 parts per billion (ppb) in the R2CTPO planning area, as shown in **Table 13**.

Table 13: Air Quality Attainment Status Ozone Readings in ppb (2016 to 2020)

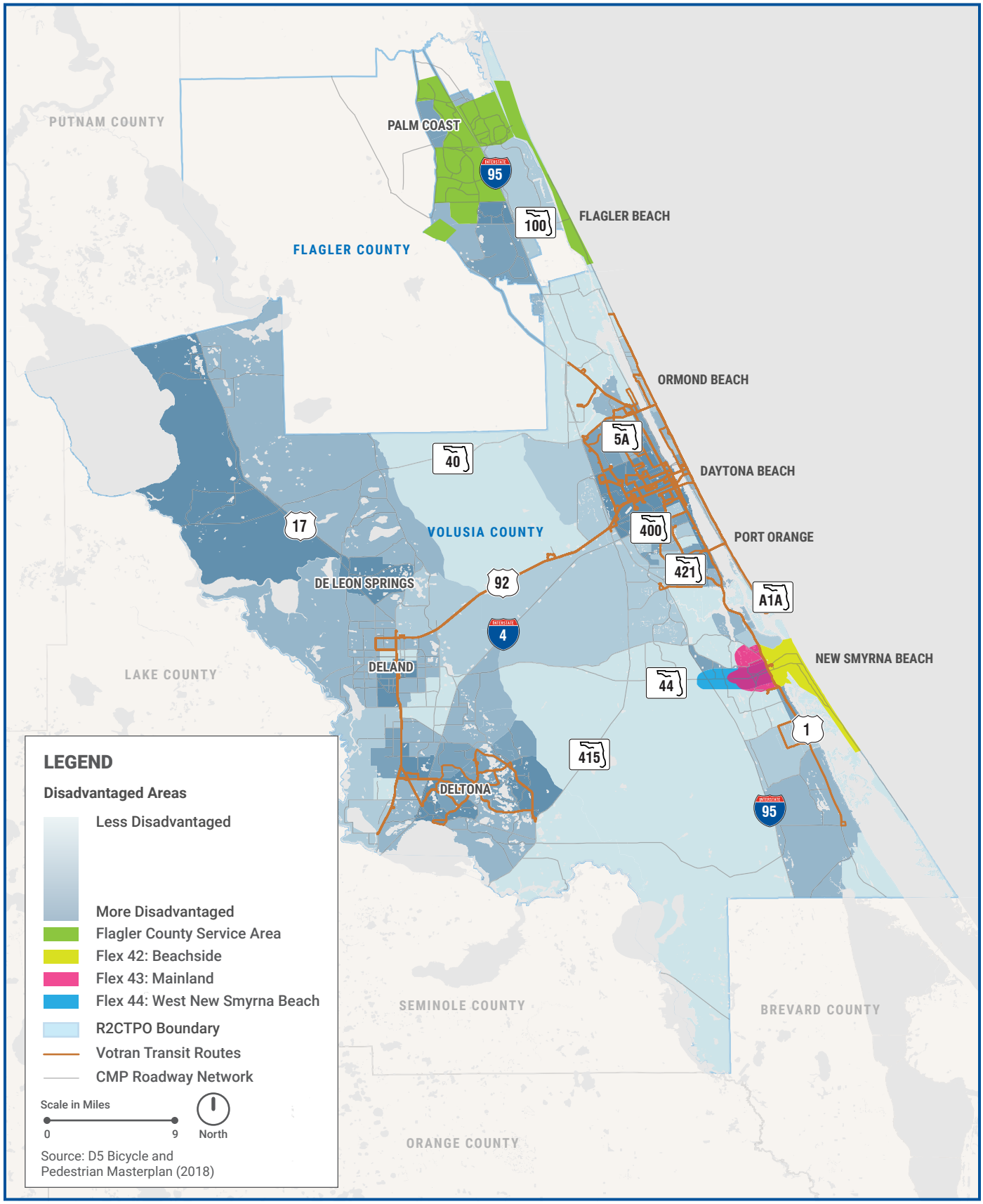
Year of Reading	Daytona Beach Station		Bunnell Station	
	Reading	Date	Reading	Date
2016	59	5/24/2016	59	11/18/2016
2017	62	5/27/2017	60	5/11/2017
2018	64	3/29/2018	60	3/24/2018
2019	56	3/24/2019	56	4/22/2019
2020	59	5/2/2020	53	4/11/2020
Attainment Status	**In Attainment**		**In Attainment**	

6.6. GOAL 6: PROMOTE EQUITY

The final goal of the CMP is to promote equity within the R2CTPO planning area. Reviewing how well transportation disadvantaged areas are served by transit providers can help meet this goal and addresses Performance Measures 6.1.1 and 6.1.2.

6.6.1. TRANSPORTATION DISADVANTAGED AREAS

Transportation disadvantaged areas for Volusia and Flagler County were determined as part of the FDOT District Five Bicycle and Pedestrian Master Plan. Multiple demographic factors identified areas where residents are more likely to rely on walking, biking, and transit as primary modes of transportation. This factor was scored in an index, with more disadvantaged areas scoring higher than less disadvantaged areas. Transportation disadvantaged areas in the R2CTPO planning area are shown in **Figure 48**, as well as their proximity to transit service.


PUTNAM COUNTY
PALM COAST
95
100
FLAGLER BEACH
FLAGLER COUNTY
ORMOND BEACH
5A
40
DAYTONA BEACH
17
VOLUSIA COUNTY
400
PORT ORANGE
421
DE LEON SPRINGS
92
A1A
4
NEW SMYRNA BEACH
LAKE COUNTY
DELAND
44
1
415
DELTONA
95
SEMINOLE COUNTY
BREVARD COUNTY
ORANGE COUNTY
LEGEND
Disadvantaged Areas
Less Disadvantaged
More Disadvantaged
Flagler County Service Area
Flex 42: Beachside
Flex 43: Mainland
Flex 44: West New Smyrna Beach
R2CTPO Boundary
Votran Transit Routes
CMP Roadway Network
Scale in Miles
0
9
North
Source: D5 Bicycle and Pedestrian Masterplan (2018)

6.6.2. TRANSIT COVERAGE

The R2CTPO tracks the percent of transit routes within a half mile of transportation disadvantaged areas and the percent of population and employment opportunities that are within a half mile of transit routes. These are shown in **Figure 49** and address Performance Measures 6.1.1. The R2CTPO also tracks average job accessibility by travel mode. This is shown in **Figure 50** and addresses Performance Measure 6.1.2.

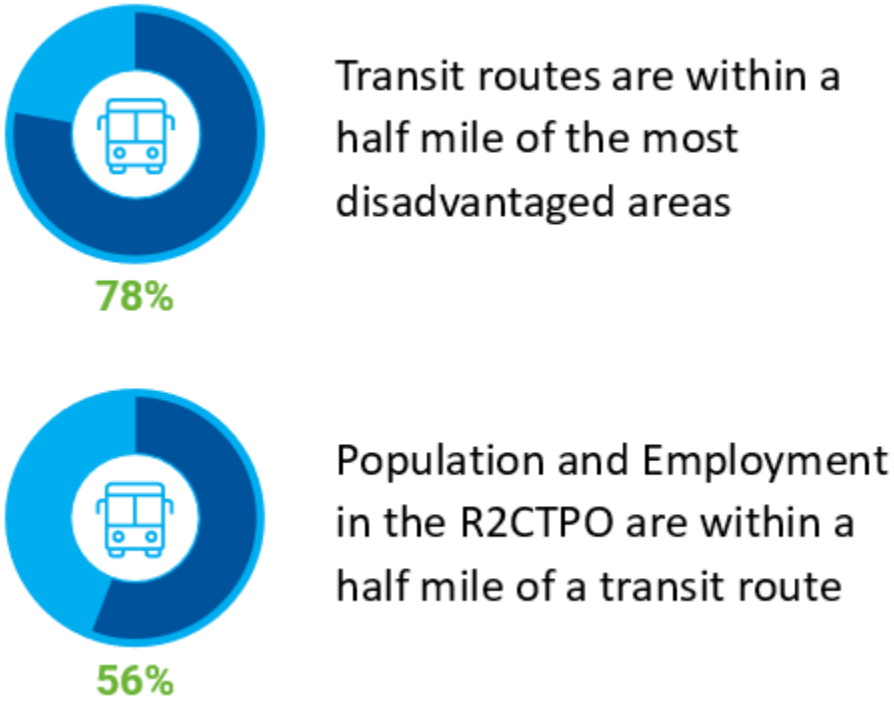


Figure 49: Transit Coverage in R2CTPO Planning Area

Figure 50: Job Accessibility by Mode

6.7. FEDERAL AND STATE PERFORMANCE MEASURES

6.7.1. FEDERAL PERFORMANCE MEASURES

FHWA placed an emphasis on system monitoring by posting a Notice of Proposed Rule Making (NPRM) in 2016 to propose national performance management measure regulations as required by the Moving Ahead for Progress (MAP-21) and the Fixing America's Surface Transportation (FAST) Act. Performance-based planning is key in making the most efficient investment of federal transportation funds by increasing accountability, transparency, and providing for better investment decisions that focus on key outcomes related to seven national goals:

1. Improving Safety;
2. Maintaining Infrastructure Condition;
3. Reducing Traffic Congestion;
4. Improving the Efficiency of the System;
5. Improving Freight Movement;
6. Protecting the Environment; and
7. Reducing Delays in Project Delivery.

The CMP provides metrics related to goals 1 through 5. Performance measures related to safety and congestion have also been developed. Safety is reviewed annually and congestion reviewed bi-annually. With a bi-annual CMP update, the R2CTPO is taking steps towards meeting FHWA performance measurement requirements which may lead to additional federal funding opportunities.

6.7.2. STATEWIDE PERFORMANCE MEASURES

FDOT has established performance measures and targets for the transportation network in the State. Florida's transportation system improvement needs exceed available funding, so resources must be invested in the most strategic, effective, and efficient ways possible. Performance measures provide useful "feedback" and are integrated into FDOT's business practices on three levels:

1. At the Strategic Level: Performance measures provide strategies for goal setting and achievement.
2. At the Decision-Making Level: Performance measures provide guidance in how resources should be allocated to specific needs.
3. At the Project Delivery Level: Performance measures help monitor the efficiency and effectiveness of projects and services in the Five-Year Program.

FHWA will not assess whether MPOs reach their targets. However, FHWA and FTA will review MPO adherence to performance management requirements as part of periodic transportation planning process reviews, including certification reviews, reviews of adopted and amended LRTPs and approval of MPO TIPs. The R2CTPO is integrating performance management and measures in all of its programs where appropriate. The CMP is one mechanism in which the R2CTPO will be reporting on how well it is performing and what efforts are underway to support the established targets.

6.7.3.STATEWIDE PERFORMANCE MEASURE MONITORING

The FDOT performance measures were determined to meet goals in four main areas. These areas, as well as the goals associated with them, are described below. These measures address CMP Performance Measure 1.4.1.

6.7.3.1. Performance Measure 1 (PM1) – Safety

The State has a long history of working towards lowering traffic fatalities and serious injuries through multiple approaches that include engineering, enforcement, education, and emergency management. Florida continues to rank high in crashes and is now embracing a vision of zero fatalities and serious injuries to place a higher emphasis on addressing safety issues. **Table 14** lists the established safety performance measures.

Table 14: Safety Performance Measures

Performance Measure	Description
Number of Fatalities	The total number of persons suffering fatal injuries in a motor vehicle crash during a calendar year.
Rate of Fatalities	The ratio of total number of fatalities to the number of vehicle miles traveled (VMT) in a calendar year.
Number of Serious Injuries	The total number of persons suffering at least one serious injury in a motor vehicle crash during a calendar year.
Rate of Serious Injuries	The ratio of total number of serious injuries to the number of VMT in a calendar year.
Number of Non-Motorized Fatalities and Non-Motorized Serious Injuries	The combined total number of non-motorized fatalities and non-motorized serious injuries involving a motor vehicle during a calendar year.

Table 15 displays the 2020 safety PM1 results for the R2CTPO planning area. The R2CTPO crash data is summarized from the S4 safety data gathered for the 2022 CMP. The DVMT for the R2CTPO planning area, which was converted to 100 million VMT then used to calculate the crash rates, was obtained from the FDOT Transportation Data and Analytics Office. The R2CTPO annual VMT is 73 (per 100 million VMT).

The R2CTPO 2020 safety targets as documented in R2CTPO Resolution 2020-03 are shown in **Table 15**. The 2020 safety results showed that two of the five 2020 safety targets were achieved.

Table 15: 2020 Safety Results

Performance Measure	2020 Statistics	R2CTO Target	R2CTPO Target Achieved
Number of Fatalities	155	118	X
Rate of Fatalities	2.11	1.55	X
Number of Serious Injuries	612	808	✓
Rate of Serious Injuries	8.33	10.60	✓
Number of Non-Motorized Fatalities and Serious Injuries	106	96	X

6.7.3.2. Performance Measure 2 (PM2) – Infrastructure, Bridge, and Pavement

FDOT established 2- and 4- year targets on May 18, 2018 to measure Pavement and Bridge performance. Roadways were categorized into two systems: 1.Interstate NHS; and 2. Non-Interstate NHS. **Table 16** shows the infrastructure performance measures and targets for PM2.

Table 16: Infrastructure Performance Measures

Performance Measure	2 Year Target	4 Year Target
Pavement		
% of Interstate pavements in GOOD condition	Not required	≥60%
% of Interstate pavements in POOR condition	Not required	≤5%
% of non-Interstate NHS pavements in GOOD condition	≥40%	≥40%
% of non-Interstate NHS pavements in POOR condition	≤5%	≤5%
Bridge		
% of NHS bridges (by deck area) classified in GOOD condition	≥50%	≥50%
% of NHS bridges (by deck area) classified in POOR condition	≤10%	≤10%

Although the R2CTPO does not directly have control over pavement and bridge conditions, the R2CTPO does support the State, county, and local jurisdictions on their efforts to improve existing pavement and bridge conditions. The R2CTPO can participate in resurfacing projects so they are made aware of pavement conditions and can advocate for inclusion of other roadway features

such as transit, bicycle, and pedestrian improvements (when financially feasible). **Table 17** shows the infrastructure performance measure results in 2020.

Table 17: 2020 Infrastructure Status

Performance Measure	R2CTPO	State of Florida	Target	Target Achieved
Pavement				
% of Interstate pavements in GOOD condition	82.6%	68.8%	≥60%	✓
% of Interstate pavements in POOR condition	4.4%	0.6%	≤5%	✓
% of non-Interstate NHS pavements in GOOD condition	-	-	≥40%	-
% of non-Interstate NHS pavements in POOR condition	-	-	≤5%	-
Bridge				
% of NHS bridges (by deck area) classified in GOOD condition	55.1%	63.7%	≥50%	✓
% of NHS bridges (by deck area) classified in POOR condition	0.2%	0.7%	≤10%	✓

Note: 2020 Non-Interstate Pavement Condition was not reported by FDOT due to data collection issues.

6.7.3.3. Performance Measure 3 (PM3) – System Performance

PM3 assesses network reliability by creating a ratio that compares the worst travel times on the roadway against the travel time that is typically experienced. This calculation is done for both person-miles traveled and truck traffic. **Table 18** reflects the 2- and 4-year targets set by the State. The two-year targets reflect the anticipated performance level at the end of calendar year 2019, while 4-year targets reflect anticipated performance at the end of 2021.

Table 18: System Performance Targets

Performance Measure	2 Year Target	4 Year Target
Interstate Reliability	75%	70%
Non-Interstate Reliability	Not required	50%
Freight Reliability	1.75	2.00

The availability of travel time data is critical to assessing how well the targets are being met for PM3. The installation and operation of traffic signal timing systems using ITS technologies directly impact the reliability of the system. **Table 19** shows the 2020 assessments for PM3 and how the R2CTPO compares to the State. As additional ITS projects are implemented, R2CTPO will be able to advance the performance of the system so that it continues to meet the targets and goals set.

Table 19: 2020 System Performance Results

Performance Measure	R2CTPO	State of Florida	Target (2 Year/4 Year)	Status
% of person-miles traveled on the Interstate that are reliable	100.0%	92.3%	75%/70%	✓
% of person-miles traveled on the non-Interstate NHS that are reliable	91.6%	93.5%	N/A/ 50%	✓
Truck travel time reliability index	1.13	1.34	1.75/2.00	✓

6.7.3.4. Transit Asset Management

Public transit services in Volusia County are provided by Votran, who is managed and operated under the Volusia County Council. Public transit services in Flagler County are provided by Flagler County Public Transportation, who is managed and operated under the Flagler County Board of County Commissioners. Votran and Flagler County Public Transportation are both Tier II agencies, operating less than 100 fixed route vehicles.

For each transit agency, performance management and measures have been established for transit services and are outlined in a Transit Asset Management Plan (TAM). Votran prepared and adopted their TAM in January 2022 and Flagler County Public Transportation adopted their TAM in 2021. The TAM must be updated every four years. Targets evolve around how well capital investments are working and if they are considered in a state of “good repair”. The R2CTPO will continue to support Votran and Flagler County Public Transportation in their efforts to provide public transit options for Volusia County and Flagler County. The TAM plan for each organization is available to view or download from the R2CTPO website. A summary of the required FTA measures each TAM addresses is provided below. These are shown in Appendix A of the Votran TAM and Page 13 of the Flagler County Public Transportation TAM.

- Percentage of revenue vehicles within a particular asset class that have either met or exceeded their useful life benchmark (ULB).
- Percentage of non-revenue, support-service and maintenance vehicles that have met or exceeded their ULB.
- Percentage of facilities within an asset class rated below condition 3 on the Transit Economic Requirement Model (TERM) scale.

6.7.3.5. Public Transportation Agency Safety Plan (PTASP) Performance Measure Targets

In addition to the TAM, certain transit agencies prepare a Public Transportation Agency Safety Plan (PTASP) each year to monitor safety conditions within their jurisdiction. Votran prepared and adopted their PTASP in January 2022 in alignment with the National Public Transportation Safety Plan. As part of the PTASP, Votran listed four performance targets to measure safety performance in their jurisdiction. A summary of the required performance targets that the PTASP addresses is provided below. These are shown in Section 3 of the Votran PTASP.

- Fatalities: Total number of reportable fatalities and rate per total vehicle revenue miles by mode –
    - A death or suicide confirmed within 30 days of a reported event. It does not include deaths in or on transit property that are a result of illness or other natural causes.
- Injuries: Total number of reportable injuries and rate per total vehicle revenue miles by mode –
    - Injury is defined as any damage or harm to persons as a result of an event that requires immediate medical attention away from the scene.
- Safety events: Total number of reportable events and rate per total vehicle revenue miles by mode –
    - Safety event is defined as a collision, derailment, fire, hazardous material spill, act of nature (Act of God), evacuation or Other Safety Occurrences not Otherwise Classified (OSONOC) occurring on transit right-of-way, in a transit revenue facility, in a transit maintenance facility, or involving a transit revenue vehicle and meeting established National Transit Database (NTD) thresholds.
- System Reliability/Major Mechanical Failure: Mean distance between major mechanical failures by mode –
    - Major mechanical failure is defined as a failure of some mechanical element of the revenue vehicle that prevents the vehicle from completing a scheduled revenue trip or from starting the next scheduled revenue trip because actual movement is limited or because of safety concerns.

Flagler County Public Transportation does not currently prepare a PTASP.

7. CONGESTION MANAGEMENT STRATEGIES

The identification and application of various congestion management strategies is central to the CMP. Having identified the congestion issues in the R2CTPO planning area, several categories of strategies were compiled, each with their own methods of reducing congestion. Identification of the congestion management strategies addresses Action 6 of the FHWA 8 Action Process shown in **Figure 4**.

7.1. IDENTIFICATION OF STRATEGIES

The identification and application of various congestion management strategies is central to the CMP. Rather than identify specific congestion management projects, the CMP's purpose is to provide a toolbox of actions and strategies the R2CTPO and partner agencies can refer to when addressing congestion management issues. The identification of congestion management strategies for the CMP was completed by referring to a variety of sources including:

- 2015 R2CTPO Congestion Management Process
- 2018 R2CTPO TSM&O Master Plan
- 2020 R2CTPO Connected and Automated Vehicle Readiness Study
- Industry best practices

During this process, more than 70 congestion management strategies were identified and categorized as shown in **Figure 51**. Underneath each category are a few key example strategies. The entire list of strategies identified as part of the CMP are shown in **Table 20** to **Table 22**. Definitions for each strategy are provided in **Appendix C**.

One of the specific strategies added based on local agency comments was implementing incremental (short- and mid-term) infrastructure improvements. With limited funding options for implementation, constructing lower-cost short/mid-term improvements could provide congestion relief/improve safety conditions in the interim while waiting for the "ultimate" improvement to be funded/constructed. The R2CTPO regularly incorporates planning "best practices" in regard to short/mid-term recommendations for studies, and will continue to advocate for implementing incremental infrastructure improvements.

Figure 51: Congestion Management Strategy Categories

Table 20: Congestion Management Strategies: Multimodal Systems

Strategy Category	Subcategory	Strategy
Transportation Demand Management	-	Continue Teleworking
		Encourage Carpooling and Park N Ride Expansion
		Encourage Carpooling/Vanpooling
		Encourage Employer Incentive Programs
		Expand First/Last Mile Options
Pedestrian/Bicycle	Add Infrastructure	Add New Sidewalks
		Add Designated Bicycle Lanes
		Add Bicycle and Pedestrian Intersection Enhancements
		Add Green Paint to Emphasize Bicycle Lanes
		Add Shared Lane Markings (Sharrow)
		Add Multi-Use Paths
		Add Raised Barriers (like “Zippers”) to Bicycle Lanes
		Add Grade Separated Crossings
	Implement Policies	Expand Micromobility Programs
		Implement Complete Streets Improvements
		Implement Safe Routes to School Study Recommendations
		Expand Trail Network

Table 20: Congestion Management Strategies: Multimodal Systems Continued

Strategy Category	Sub-category	Strategy
Transit	Add or Expand Service	Expand/Implement Fixed Bus Route Frequencies
		Expand On Demand Transit
		Provide Additional Seasonal/Special Event Transit Service
		Provide Express Bus Service
		Add New Fixed Guideway Transit Service
		Expand Transit Service Routes
		Extend SunRail Service to DeLand
		Add Votran Service to New DeLand SunRail Station
	Operational Improve-ments	Prepare for Transit Traffic Signal Priority
		Plan for Transit Queue Jump Lanes at Intersections
		Implement Transit Stop Enhancements
		Plan for Exclusive Transit Right Of Way (ROW)
		Update Transportation Impact Analysis (TIA) Guidelines for Transit
		Expand Electronic and Mobile Fare Collection
Policy & Land Use	-	Develop Multimodal/Transit-Oriented Development (TOD) Design Guidelines
		Encourage Urban Infill and Densification
		Encourage Mixed-Use Development
		Review Parking Codes
		Encourage Sufficient Transportation Capacity for Future Land Use/Zoning Amendment Applications
		Prioritize Local Road System Access for Developments
		Promote Transit Oriented Development
		Develop Local Complete Streets Policies

Table 21: Congestion Management Strategies: Roadway Management

Strategy Category	Subcategory	Strategy
Freight	-	Improve Freight-Related Curb Management
		Strengthen Freight Advanced Traveler Information System (FRATIS)
		Study Automated Truck Transfer Station Design Concepts
Special Event Management	-	Connect Regional TMCs, Emergency Operations Centers (EOCs), and Daytona International Speedway
		Utilize Dynamic Detours
		Expand Portable Dynamic Messaging Sign (DMS) Equipment Use
		Routine Interagency Planning for Events
		Enhance Law Enforcement in Key Areas
		Encourage Real-Time Parking Demand Information for Special Events
		Review and Update Event Traffic Management Plans Annually
		Review Social Media for Informal Events
Incident Congestion Management	-	Enhance Inter-Agency Communication Systems
		Expand Roving Patrols (e.g. Road Rangers)
		Shorten Incident Clearance Times
		Strengthen Traveler Information Systems

Table 21: Congestion Management Strategies: Roadway Management Continued

Strategy Category	Subcategory	Strategy
Arterial and Freeway Management	Improve Roadway System Management	Improve Work Zone Management
		Implement Wayfinding Signage Improvements
		Improve Parking Management Program
		Perform Interstate Ramp Metering
		Implement I-4 Beyond the Ultimate (BtU) Managed Lanes and Interim (Short/Mid-Term) Interchange/ Ramp Improvements
		Improve Access Management
		Implement Incremental Infrastructure (Short/Mid-Term) Improvements
		Expand Advanced Traffic Management System
		Improve Traffic Signal Operations
		Improve Curb Management
		Utilize Part-Time Shoulder Use
		Implement Advanced Railroad-Highway Intersections (Grade Crossings)
		Increase Law Enforcement Patrols on Roadways to Enforce Traffic Safety Laws
		Implement Alternative & Innovative Intersection Designs
		Improve Work Zone Management
	Expand ITS	Expand Roadway Monitoring Infrastructure (Primarily Fiber)
		Expand Traffic Management Center (TMC) Staffing
		Improve Traffic Data Information Management
		Implement Planned Traffic Monitoring and Data Collection Deployments

Table 22: Congestion Management Strategies: Emerging Technologies and Capacity

Strategy Category	Subcategory	Strategy
Emerging Technologies	Create Emerging Technologies Working Group	Create Data Marketplace and Encourage Data Sharing
	Invest in CAV/EV[1] Infrastructure and Asset Management	Expand EV Charging & Alternative Fueling Station Infrastructure
		Invest in Pavement Asset Management to Accommodate AV Sensors
		Electrify County/Transit Vehicle Fleets
	Share Best Practices for New Technology Policy	Develop EV-Ready Building Codes and Parking Ordinances
		Develop Fee Incentives for Developer-Built EV Infrastructure
Capacity	-	Improve Street Connectivity
		Add Lanes Through Restriping (No New Pavement)
		Add Lanes Through Roadway Widening
		Add Local/Collector Roadways for New Developments
		Add New Roadways

[1] CAV/EV: Connected and Automated Vehicle/Electric Vehicle

7.2. APPLICATION OF STRATEGIES

The identified congestion management strategies each have different applications and are applicable in different situations. A matrix (provided in **Appendix D**) was generated as an example of how to identify the applicability of each strategy to the goals and performance measures of the CMP. This matrix example used a subset of the complete strategy list and compared them just to the performance measures for Goal 1. When assessing a strategy, it is recommended to review the applicability across all CMP goals and performance measures. For each strategy, the R2CTPO and local agencies can determine how best to apply the strategy based on the congestion management issue and what performance measures the strategy would address.

8. CMP NEXT STEPS

This CMP provides an analysis of current congestion and safety conditions, as well as a toolbox of potential strategies to address identified congestion management issues. Establishing a consistent monitoring plan will help track trends for recurring issues or identify new hot spots for congestion or safety issues. Once the issues are studied, strategies should be programmed and their effectiveness evaluated, which addresses the final two Actions of the FHWA 8 Action Process.

8.1. MONITORING PLAN

The R2CTPO and partner agencies in the planning area manage the collection of data to allow for monitoring changes in the various performance measures, determine the impacts on congestion levels throughout the region, and report on the effectiveness of implemented strategies over time. Data such as traffic, travel time, and crash data are updated on an annual basis, if not more frequently. Other data sources, such as the ITS network, may be updated less frequently consistent with other relevant planning efforts. It is anticipated the data related to congestion management will be monitored bi-annually as part of future CMP updates, as discussed in **Section 8.3.1: Bi-annual Performance Monitoring**. In addition to data collection efforts discussed in **Section 5: Data Collection**, the future monitoring of system performance will also address Action 4 of the FHWA 8 Action Process shown in **Figure 4**.

8.2. PROGRAMMING AND IMPLEMENTATION OF STRATEGIES

The CMP is implemented through the identification and development of improvement projects. These projects should be utilized to alleviate existing “low-hanging fruit” operational and safety issues. The R2CTPO planning process is carried out in phases where the time elapsed from the planning phase through the construction phase could take 10 years or longer. Most strategies identified through the CMP are intended to be implemented in less than five years, but many can be implemented immediately. Longer term strategies that may be emerging but not fully ready for implementation, such as CV/AV policies and integration, have also been identified.

Once strategies are identified to address a congestion management issue, that project needs to be programmed/funded in the TIP and FDOT Five Year Work Program (if on a State Highway System facility). These strategies may also be translated to projects for implementation in future LRTPs if they are outside of the 5 year TIP/Work Program horizon. Programming congestion management strategies will address Action 7 of the FHWA 8 Action Process shown in **Figure 4**.

8.3. STRATEGY EFFECTIVENESS EVALUATION

The FHWA guidelines for CMPs stress the importance of evaluating the effectiveness of strategies implemented to address congestion (Action 8 of the FHWA 8 Action Process shown in **Figure 4**). Regulations require “a process for periodic assessment of the efficiency and effectiveness of implemented strategies, in terms of the area’s established performance

measures." This step helps determine the effectiveness of strategies that have been implement and whether any operational or policy adjustments are needed.

After appropriate strategies have been implemented, performance measures will be reviewed to identify the effectiveness of implemented strategies on alleviating congestion and supporting the congestion management goals and objectives. This can be performed during bi-annual performance monitoring or via project-specific assessments, as discussed below.

8.3.1. BI-ANNUAL PERFORMANCE MONITORING

As part of the bi-annual CMP update, the performance measures illustrated in **Figure 6** will also be analyzed/updated to track progress towards reducing congestion and improving safety. This monitoring may also include discussion on the effectiveness of implemented strategies in improving various performance measures. The ongoing monitoring of congestion management and safety performance measures, and their correlation to specific strategies, will enable decision-makers and agencies the opportunity to select the most effective strategies for continued or future implementation.

With this performance monitoring, performance measurement data could also be utilized for project prioritization criteria in the LRTP, TIP, and/or List of Priority Projects. Specific ways the CMP could be incorporated into regional prioritization may be addressed as part of the LRTP, TIP, and/or List of Priority Projects during their next update cycle.

8.3.2. PROJECT-SPECIFIC ASSESSMENTS

Evaluation of CMP-associated projects after their initial implementation can also be performed in coordination with the implementing agency. An example of this analysis could be measuring travel time savings along a corridor where traffic signal timing improvements have been made. Once these project-specific assessments have been completed, results can be presented to the R2CTPO committees and Board to help inform future congestion management project implementation decisions.

9. OUTREACH

As part of the development of the 2022 CMP, the project team coordinated with a Working Group composed of various stakeholders in the R2CTPO planning area noted below:

- FDOT District 5;
- Volusia and Flagler Counties;
- Votran and Flagler County Transit;
- Flagler County Emergency Management Department; and
- Cities of Daytona Beach, Deltona, and Palm Coast.

The Working Group helped the project team determine appropriate performance measures, reviewed analysis results, and coordinated on potential congestion management strategies. During this process, two Working Group meetings were held: 1. December 16, 2021 to kick off the project and review preliminary performance measures/analysis results; and 2. Review revised analysis and discuss potential congestion management strategies. The presentations and meeting summaries from those discussions are shown in **Appendix E**.

Additionally, the following presentations were made to the R2CTPO Board, the Technical Coordinating Committee, (TCC), and the Citizen's Advisory Committee (CAC):

- September 2021 Kick Off Presentation; and
- May 2022 Draft CMP Presentation.

These presentations are shown in **Appendix E**.

The draft CMP Report was sent to the Working Group, Board, and Committees to solicit any additional comments or suggestions. **Appendix E** provides the comments received and documents how those comments were addressed either in the final CMP Report or will be addressed as part of future planning efforts.

Appendix A: CMP Performance Measures

Table A-1: Performance Measures Assessed

Objective	Performance Measure	Status	Future Analysis
1.1	1.1.1 Level of Congestion on Roadways Connecting/Adjacent to Economic Centers	Not assessed because economic centers were not defined	PM can be assessed once economic centers are defined
	1.1.2 Percent of Roadway Miles Connecting/Adjacent to Economic Centers with Pedestrian/Bicycle Facilities	Not assessed because economic centers were not defined	PM can be assessed once economic centers are defined
	1.1.3 Percent of Roadway Miles Connecting/Adjacent to Economic Centers with Transit Routes	Not assessed because economic centers were not defined	PM can be assessed once economic centers are defined
1.2	1.2.1 Daily Vehicle Miles Traveled per Capita	Assessed	Will continue to be assessed
	1.2.2 Annual Vehicle Hours of Delay and Associated Cost per Capita	Assessed	Will continue to be assessed
	1.2.3 Level of Congestion (Volume to Capacity Ratio) on Roadways	Assessed	Will continue to be assessed
	1.2.4 Level of Travel Time Reliability on Interstate	Assessed	Will continue to be assessed
	1.2.5 Level of Travel Time Reliability on Non-Interstate National Highway System	Assessed	Will continue to be assessed
	1.2.6 Percent of Roadways with Existing ITS Fiber	Assessed	Will continue to be assessed
1.3	1.3.1 Total Transit Ridership (Votran, Flagler County, SunRail broken down individually)	Assessed	Will continue to be assessed
	1.3.2 Percent of Fixed-Route Transit Ridership on Varying Headway Routes	Assessed	Will continue to be assessed
	1.3.3 Number of Transit Signal Priority Service Roadways	Not assessed because TSP is not currently used on R2CTPO roadways	PM can be assessed when TSP is implemented
1.4	1.4 Adequately fund preservation of transportation assets (National Highway System Pavement Condition, Bridge Condition, and Transit Assets). [Pavement and Bridge Condition Performance Measures]	Assessed	Will continue to be assessed
1.5	1.5.1 Average Emergency Response Time (Key Roadways Only)	Data was not received for this analysis	PM can be assessed once data is provided
	1.5.2 Average Crash/Incidence Clearance Time (Key Roadways Only)	Data was not received for this analysis	PM can be assessed once data is provided

Table A-1 (Continued): Performance Measures Assessed

Objective	Performance Measure	Status	Future Analysis
2.1	2.1.1 Truck Travel Time Reliability (TTTR) on NHS	Assessed	Will continue to be assessed
2.2	2.2.1 Level of Congestion (Volume to Capacity Ratio) on Roadways Adjacent to Key Facilities	Not assessed because key facilities were not defined	PM can be assessed once key facilities are defined
2.3	2.3.1 Percent of Roadway Miles Connecting/Adjacent to Employment Activity Centers with Transit Routes	Not assessed because activity centers were not defined	PM can be assessed once activity centers are defined
3.1	3.1.1 Annual Trips Using Transportation Network Companies (TNCs)	Not assessed because TNC data was not available	PM can be assessed if data source is identified
	3.1.2 Annual Trips Using Shared Micromobility	Not assessed because micromobility was not available	PM can be assessed if data source is identified
3.2	3.2.1 Percent of Roadway Network Serviced by Transit Routes	Assessed	Will continue to be assessed
	3.2.2 Percent of Roadway Miles with Pedestrian/Bicycle Facilities	Assessed	Will continue to be assessed
	3.2.3 Total miles of Constructed Trail Facilities	Assessed	Will continue to be assessed
4.1	4.1.1 Total Number of Vehicle Crashes	Assessed	Will continue to be assessed
	4.1.2 Number of Fatalities in Vehicle Crashes	Assessed	Will continue to be assessed
	4.1.3 Fatality Rate in Vehicle Crashes	Assessed	Will continue to be assessed
	4.1.4 Number of Serious Injuries in Vehicle Crashes	Assessed	Will continue to be assessed
	4.1.5 Serious Injury Rate in Vehicle Crashes	Assessed	Will continue to be assessed
4.2	4.2.1 Total Number of Pedestrian/Bicycle Crashes	Assessed	Will continue to be assessed
	4.2.2 Number of Fatalities in Pedestrian/Bicycle Crashes	Assessed	Will continue to be assessed
	4.2.3 Number of Serious Injuries in Vehicle Crashes	Assessed	Will continue to be assessed
4.3	4.3.1 Level of Congestion (V/C) on Evacuation Routes	Assessed	Will continue to be assessed
	4.3.2 Percent of Evacuation Route Roadway Lane Miles with Existing ITS Fiber	Assessed	Will continue to be assessed
5.1	5.1.1 Total Number of Electric Vehicle Charging Stations	Assessed	Will continue to be assessed
	5.1.2 Average Annual Air Quality Index (AQI)	Assessed	Will continue to be assessed
6.1	6.1.1 Percent of Transit Routes within Half-Mile of Transportation Disadvantaged Areas	Assessed	Will continue to be assessed
	6.1.2 Percent of Population/Jobs within a Half-Mile of Transit Routes	Assessed	Will continue to be assessed

Appendix B: Safety Analysis

Top 25 Vehicle Crash Frequency Segments

Rank	Roadway	From	To	Annual Vehicle Crashes
1	SR 44	I-95	MISSION DR	80.0
2	SR 430 - MASON AVE.	SR 483/CLYDE MORRIS BLVD.	SR 5A/NOVA RD.	70.4
3	SR 40	I-95	CLYDE MORRIS BLVD.	62.4
4	SR 483 - CLYDE MORRIS BLVD.	US 92/ISB	SR 430/MASON AVE.	61.6
5	SR 430 - MASON AVE.	SR 5A/NOVA RD.	US 1	59.2
6	SR 483 - CLYDE MORRIS BLVD.	SR 400/BEVILLE RD.	AVIATION CTR PKWY/BELLEVUE	57.4
7	US 92	MARTIN LUTHER KING BLVD.	US 1	56.6
8	SR 421 - DUNLAWTON AVE.	CLYDE MORRIS BLVD.	SR 5A/NOVA RD.	55.0
9	US 92	SR 5A/NOVA RD.	MARTIN LUTHER KING BLVD.	53.2
10	SR 421 - DUNLAWTON AVE.	WILLIAMSON	CLYDE MORRIS BLVD.	47.0
11	SR 40	US 1	HALIFAX AVE.	46.6
12	WILLIAMSON BLVD.	US 92/ISB	DUNN AVE.	46.4
13	US 92	BILL FRANCE BLVD.	SR 483/CLYDE MORRIS BLVD.	45.6
14	US 92	I-95	WILLIAMSON BLVD.	44.8
15	SR 40	SR5A/NOVA RD.	US 1	43.8
16	SR 5A - NOVA RD.	SR 421/DUNLAWTON AVE.	MADELINE AVE	40.2
16	TOMOKA FARMS RD.	US 92/ISB	DUNN AVE.	40.2
18	SR 5A - NOVA RD.	LPGA BLVD.	HAND AVE.	39.8
19	US 17/92	SR 15A/TAYLOR RD.	BERESFORD AVE.	39.2
20	US 17/92	SR 472	SR 15A/TAYLOR RD.	38.6
21	US 92	WILLIAMSON BLVD.	BILL FRANCE BLVD.	36.0
22	YORKTOWN BLVD. (PO)	HIDDEN LAKE DR.	SR 421/DUNLAWTON AVE	35.6
23	SR 430 - SEABREEZE BRIDGE - WB	PENINSULA DR	SR A1A/ATLANTIC	34.8
24	HOWLAND BLVD.	I-4/SR 472	WOLF PACK RUN	33.8
25	SAXON BLVD.	ENTERPRISE RD.	VETERANS MEMORIAL PKWY.	33.4

Top 25 Vehicle Crash Severity Segments

Rank	Roadway	From	To	Vehicle Crash Severity
1	SR 44	PREVATT AVE.	PIONEER TR.	1519.5
2	SR 44	I-95	MISSION DR	1331.3
3	US 92	OLD DAYTONA RD.	RED JOHN DR.	1291.8
4	CLYDE MORRIS BLVD.	LPGA BLVD.	HAND AVE.	1247.5
5	TOMOKA FARMS RD.	US 92/ISB	DUNN AVE.	1098.8
6	US 17	SR 40	WASHINGTON AVE.	1083.6
7	US 17	SR 15A/CR 15A	REYNOLDS RD	1035.3
8	SR 40	SR 11	PINTO LANE	1022.4
9	OLD KINGS ROAD	OAK TRAILS BOULEVARD	HIDDEN LAKES ENTRANCE	848.8
10	DUNN/GEORGE ENGRAM/FAIRVIEW/MAIN	SR 5A/NOVA RD.	US 1	817.6
11	SR A1A - ATLANTIC AVE. NORTH	HARVARD DR.	SR 40/GRANADA BLVD.	809.4
12	SR 40	EMPORIA RD.	US 17	801.6
13	US 92	KEPLER RD.	OLD DAYTONA RD.	770.5
14	MAYTOWN RD.	PELL RD.	BEACON LIGHT RD.	707.8
15	SR 5A - NOVA RD.	US 92/ISB	SR 430/MASON AVE.	687.2
16	MADELINE AVE. (PO)	CLYDE MORRIS BLVD.	SR5A/NOVA RD.	670.2
17	US 1	SR 5A/NOVA RD.	AIRPORT RD.	666.1
18	SR 430 - MASON AVE.	SR 483/CLYDE MORRIS BLVD.	SR 5A/NOVA RD.	661.8
19	CLYDE MORRIS BLVD.	WILLOW RUN BLVD.	MADELINE AVE.	660.1
20	SR 5A - NOVA RD.	LPGA BLVD.	HAND AVE.	654.9
21	US 17/92	NEW YORK AVE	SR 472	624.5
22	SR 415 - STATE COUNT	ACORN LAKE RD	SR 44	608.8
23	WILLIAMSON BLVD.	US 92/ISB	DUNN AVE.	586.2
24	SPRUCE CREEK RD.	TAYLOR RD.	SR5A/NOVA RD.	570.0
25	US 1	AIRPORT RD.	I-95	569.5

Top 25 Motorcycle Crash Frequency Segments

Rank	Roadway	From	To	Annual Motorcycle Crashes
1	US 1	AIRPORT RD.	I-95	4.4
2	DUNN/GEORGE ENGRAM/FAIRVIEW/MAIN	PENINSULA DR.	SR A1A	4.0
3	SR 44	I-95	MISSION DR	3.8
4	SR A1A - OCEAN SHORE BLVD.	ORMOND MALL	HIGH BRIDGE RD	3.4
4	SR A1A - ATLANTIC AVE. NORTH	HARVARD DR.	SR 40/GRANADA BLVD.	3.4
6	US 1	I-95.	FLAGLER CO LINE	3.2
7	US 92	WILLIAMSON BLVD.	BILL FRANCE BLVD.	3.0
7	US 92	BILL FRANCE BLVD.	SR 483/CLYDE MORRIS BLVD.	3.0
7	US 1	SR 40/GRANADA BLVD.	SR 5A/NOVA RD.	3.0
10	SR 483 - CLYDE MORRIS BLVD.	SR 400/BEVILLE RD.	AVIATION CTR PKWY/BELLEVUE	2.8
10	SR 5A - NOVA RD.	LPGA BLVD.	HAND AVE.	2.8
10	US 1	ART CENTER AVE.	SR 5A/NOVA RD.	2.8
10	US 92	I-95	WILLIAMSON BLVD.	2.8
14	US 92	SR 5A/NOVA RD.	MARTIN LUTHER KING BLVD.	2.6
14	US 1	VOLCO RD.	SR 442/INDIAN RIVER BLVD.	2.6
14	US 1	REED CANAL RD.	BIG TREE RD.	2.6
14	SR A1A - ATLANTIC AVE. SOUTH	FLORIDA SHORES	SILVER BEACH AVE.	2.6
14	US 92	MARTIN LUTHER KING BLVD.	US 1	2.6
14	DUNN/GEORGE ENGRAM/FAIRVIEW/MAIN	BEACH ST.	PENINSULA DR.	2.6
14	MAYTOWN RD.	PELL RD.	BEACON LIGHT RD.	2.6
21	US 1	US 92/ISB	FAIRVIEW/MAIN ST.	2.4
21	DUNN/GEORGE ENGRAM/FAIRVIEW/MAIN	SR 5A/NOVA RD.	US 1	2.4
21	US 1	SR 421/DUNLAWTON AVE.	REED CANAL RD.	2.4
21	SR 44 (BUSINESS) - CANAL ST.	PIONEER TR.	US 1	2.4
21	TOMOKA FARMS RD.	PIONEER TR	TAYLOR RD.	2.4

Top 25 Motorcycle Crash Severity Segments

Rank	Roadway	From	To	Motorcycle Crash Severity
1	US 1	ART CENTER AVE.	SR 5A/NOVA RD.	968.4
2	US 1	REED CANAL RD.	BIG TREE RD.	925.8
3	SR 483 - CLYDE MORRIS BLVD.	SR 400/BEVILLE RD.	AVIATION CTR PKWY/BELLEVUE	906.1
4	SR 415 - STATE COUNT	ACORN LAKE RD	SR 44	893.1
5	US 1	COMMONWEATH	SR 421/DUNLAWTON AVE.	891.3
6	US 92	US 17	JACOBS RD.	876.8
7	TOMOKA FARMS RD.	SHUNZ RD.	US 92/ISB	858.6
8	US 1	AIRPORT RD.	I-95	826.0
9	SR A1A - OCEAN SHORE BLVD.	ORMOND MALL	HIGH BRIDGE RD	698.7
10	US 1	SR 40/GRANADA BLVD.	SR 5A/NOVA RD.	669.1
11	TOMOKA FARMS RD.	PIONEER TR	TAYLOR RD.	668.5
12	DUNN/GEORGE ENGRAM/FAIRVIEW/MAIN	BEACH ST.	PENINSULA DR.	646.3
13	US 1	VOLCO RD.	SR 442/INDIAN RIVER BLVD.	629.9
14	US 92	WILLIAMSON BLVD.	BILL FRANCE BLVD.	626.8
15	SR 5A - NOVA RD.	SR 430/MASON BLVD	LPGA BLVD.	611.6
16	SR 5A - NOVA RD.	WILMETTE AVE.	US 1	599.8
17	HARLEY STRICKLAND BLVD. (OC)	ENTERPRISE RD.	VETERAN'S MEMORIAL PKWY.	581.7
18	SR 44	AIRPORT RD.	I-95	581.5
19	US 1	TURNBULL BAY RD.	ART CENTER AVE.	581.4
20	GLENWOOD RD.	GRAND AVE.	SR 15A	577.0
21	SR 5A - NOVA RD.	US 92/ISB	SR 430/MASON AVE.	564.5
22	US 1	HAND AVE.	SR 40/GRANADA BLVD.	561.6
23	MAYTOWN RD.	PELL RD.	BEACON LIGHT RD.	438.5
24	SR 5A - NOVA RD.	SR 421/DUNLAWTON AVE.	MADELINE AVE	431.2
25	SR 11	CR 15A	SR 40	413.1

Top 25 Bicycle Crash Frequency Segments

Rank	Roadway	From	To	Annual Bicycle Crashes
1	SR 5A - NOVA RD.	SR 421/DUNLAWTON AVE.	MADELINE AVE	4.0
1	SR 442 - INDIAN RIVER BLVD.	AIR PARK RD.	US 1	4.0
3	SR 5A - NOVA RD.	SPRUCE CREEK RD.	SR 421/DUNLAWTON AVE.	2.2
4	US 92	SR 5A/NOVA RD.	MARTIN LUTHER KING BLVD.	2.0
5	US 1	US 92/ISB	FAIRVIEW/MAIN ST.	1.8
5	SR 400 - BEVILLE RD.	SR 5A/NOVA RD.	US 1	1.8
5	SR 40	I-95	CLYDE MORRIS BLVD.	1.8
8	DUNN/GEORGE ENGRAM/FAIRVIEW/MAIN	SR 5A/NOVA RD.	US 1	1.6
8	TAYLOR RD. (PO)	HENSEL RD.	SPRUCE CREEK RD.	1.6
10	US 17/92	SR 44/NEW YORK AVE.	PLYMOUTH AVE.	1.4
10	SR 430 - MASON AVE.	SR 483/CLYDE MORRIS BLVD.	SR 5A/NOVA RD.	1.4
10	SR 40	US 1	HALIFAX AVE.	1.4
10	US 1	SR 421/DUNLAWTON AVE.	REED CANAL RD.	1.4
14	US 17/92	RHODE ISLAND AVE.	GRAVES AVE.	1.2
14	US 1	VOLCO RD.	SR 442/INDIAN RIVER BLVD.	1.2
14	US 92	SR 483/CLYDE MORRIS BLVD.	SR 5A/NOVA RD.	1.2
14	SR A1A - OCEAN SHORE BLVD.	ORMOND MALL	HIGH BRIDGE RD	1.2
14	SR 44 (BUSINESS) - CANAL ST.	PIONEER TR.	US 1	1.2
14	SR A1A - OCEAN SHORE BLVD.	NEPTUNE AVE	ORMOND MALL	1.2
14	DERBYSHIRE RD.	SR 430/MASON AVE.	LPGA BLVD.	1.2
14	SR 44	I-95	MISSION DR	1.2
14	SR 44	MISSION DR.	LIVE OAK	1.2
14	DUNN/GEORGE ENGRAM/FAIRVIEW/MAIN	US 1	BEACH ST	1.2
14	BELLEVUE AVE. (DAY)	NOVA RD.	US 1	1.2
25	SR 483 - CLYDE MORRIS BLVD.	SR 400/BEVILLE RD.	AVIATION CTR PKWY/BELLEVUE	1.0
25	SR 430 - MASON AVE.	SR 5A/NOVA RD.	US 1	1.0
25	US 1	REED CANAL RD.	BIG TREE RD.	1.0
25	US 17/92	ENTERPRISE RD.	RHODE ISLAND AVE.	1.0
25	US 1	FAIRVIEW/MAIN ST.	SR 430/MASON AVE.	1.0
25	SR 40	SR5A/NOVA RD.	US 1	1.0

Top 25 Bicycle Crash Severity Segments

Rank	Roadway	From	To	Bicycle Crash Severity
1	SR 44	I-95	MISSION DR	336.0
2	DUNN/GEORGE ENGRAM/FAIRVIEW/MAIN	SR 5A/NOVA RD.	US 1	325.2
3	SR 421 - DUNLAWTON AVE.	CLYDE MORRIS BLVD.	SR 5A/NOVA RD.	309.0
4	SR A1A - ATLANTIC AVE. NORTH	SR430/SEABREEZE BLVD.	HARVARD DR.	304.5
5	SR 430 - SEABREEZE BRIDGE - WB	BEACH ST.	PENINSULA DR	304.3
6	US 17/92	ENTERPRISE RD.	RHODE ISLAND AVE.	289.9
6	US 1	REED CANAL RD.	BIG TREE RD.	289.9
8	SR 5A - NOVA RD.	SR 430/MASON BLVD	LPGA BLVD.	289.1
8	US 1	FAIRVIEW/MAIN ST.	SR 430/MASON AVE.	289.1
10	LPGA BLVD. (CO)	DERBYSHIRE RD.	SR5A/NOVA RD.	284.4
10	PALM COAST PARKWAY	CYPRESS POINT PARKWAY	I-95 SOUTH BOUND RAMPS	284.4
12	CLYDE MORRIS BLVD.	LPGA BLVD.	HAND AVE.	282.9
13	SR 5A - NOVA RD.	SR 400/BEVILLE RD.	BELLEVUE AVE.	280.1
14	PLYMOUTH AVE.	STONE ST.	CLARA AVE	279.9
14	REED CANAL RD.	SR5A/NOVA RD.	SAULS ST.	279.9
16	SR 44	AMELIA AVE.	HILL AVE.	277.3
17	MISSION DR.	SR 44	OLD MISSION RD.	277.1
17	SR 15A	BERESFORD AVE.	SR 44/NEW YORK AVE.	277.1
17	GLENCOE RD.	PAIGE AVE.	SR 44	277.1
17	SAXON BLVD.	PROVIDENCE BLVD.	NORMANDY BLVD.	277.1
17	OLD KINGS ROAD	FARMSWORTH DRIVE	FRONTIER DRIVE	277.1
22	SR 5A - NOVA RD.	SR 421/DUNLAWTON AVE.	MADELINE AVE	164.5
23	SR 5A - NOVA RD.	SPRUCE CREEK RD.	SR 421/DUNLAWTON AVE.	114.5
24	SR 442 - INDIAN RIVER BLVD.	AIR PARK RD.	US 1	96.2
25	SR 430 - MASON AVE.	SR 483/CLYDE MORRIS BLVD.	SR 5A/NOVA RD.	77.4

Top 25 Pedestrian Crash Frequency Segments

Rank	Roadway	From	To	Annual Pedestrian Crashes
1	US 92	SR 5A/NOVA RD.	MARTIN LUTHER KING BLVD.	2.4
2	SR A1A - ATLANTIC AVE. NORTH	SR430/SEABREEZE BLVD.	HARVARD DR.	2.2
3	US 1	AIRPORT RD.	I-95	2.0
3	SR 430 - SEABREEZE BRIDGE - WB	PENINSULA DR	SR A1A/ATLANTIC	2.0
5	US 1	SR 400/BEVILLE RD	BELLEVUE AVE.	1.8
5	US 1	US 92/ISB	FAIRVIEW/MAIN ST.	1.8
5	SR A1A - ATLANTIC AVE. SOUTH	FLORIDA SHORES	SILVER BEACH AVE.	1.8
5	SR A1A - ATLANTIC AVE. NORTH	HARVARD DR.	SR 40/GRANADA BLVD.	1.8
9	US 92	MARTIN LUTHER KING BLVD.	US 1	1.6
9	SR 5A - NOVA RD.	SR 430/MASON BLVD	LPGA BLVD.	1.6
9	SR 483 - CLYDE MORRIS BLVD.	US 92/ISB	SR 430/MASON AVE.	1.6
12	US 1	BELLEVUE AVE.	ORANGE AVE.	1.4
12	US 17/92	SR 44/NEW YORK AVE.	PLYMOUTH AVE.	1.4
12	US 92	US 1	BEACH ST.	1.4
12	SR 430 - MASON AVE.	SR 5A/NOVA RD.	US 1	1.4
16	US 1	SR 442/INDIAN RIVER BLVD.	PARK AVE.	1.2
16	US 17/92	ENTERPRISE RD.	RHODE ISLAND AVE.	1.2
16	US 17/92	RHODE ISLAND AVE.	GRAVES AVE.	1.2
16	US 17/92	PLYMOUTH AVE.	US 92/ISB	1.2
16	SR A1A - ATLANTIC AVE. NORTH	US 92/ISB	SR 430/OAKRIDGE BLVD.	1.2
16	SR 11	US 17	CR 15A	1.2
16	SR 400 - BEVILLE RD.	SR 5A/NOVA RD.	US 1	1.2
16	SR 430 - MASON AVE.	SR 483/CLYDE MORRIS BLVD.	SR 5A/NOVA RD.	1.2
16	SR 483 - CLYDE MORRIS BLVD.	SR 400/BEVILLE RD.	AVIATION CTR PKWY/BELLEVUE	1.2
16	SR 483 - CLYDE MORRIS BLVD.	AVIATION CTR PKWY/BELLEVUE	US 92/ISB	1.2
16	BIG TREE RD.	KENILWORTH AVE.	US 1	1.2
16	FLOMICH ST.	SR 5A/NOVA RD.	US 1	1.2

Top 25 Pedestrian Crash Severity Segments

Rank	Roadway	From	To	Pedestrian Crash Severity
1	US 1	AIRPORT RD.	I-95	935.6
2	SR A1A - ATLANTIC AVE. NORTH	SR430/SEABREEZE BLVD.	HARVARD DR.	920.3
3	US 1	SR 400/BEVILLE RD	BELLEVUE AVE.	873.2
4	SR 5A - NOVA RD.	SR 430/MASON BLVD	LPGA BLVD.	866.1
5	SR 483 - CLYDE MORRIS BLVD.	US 92/ISB	SR 430/MASON AVE.	864.3
6	US 17	GLENWOOD RD.	SR 15A/CR 15A	834.2
7	US 1	BELLEVUE AVE.	ORANGE AVE.	602.8
8	SR 5A - NOVA RD.	SR 400/BEVILLE RD.	BELLEVUE AVE.	581.7
9	US 1	SR 442/INDIAN RIVER BLVD.	PARK AVE.	572.4
10	US 1	VOLCO RD.	SR 442/INDIAN RIVER BLVD.	567.8
11	US 17/92	PLYMOUTH AVE.	US 92/ISB	562.0
12	US 1	ORANGE AVE.	US 92/ISB	558.8
13	US 1	TURNBULL BAY RD.	ART CENTER AVE.	554.7
14	SR 44	LAKE CO.	SHELL RD.	554.3
15	SR 40	US 1	HALIFAX AVE.	328.0
16	SR A1A - OCEAN SHORE BLVD.	ORMOND MALL	HIGH BRIDGE RD	327.0
17	US 92	MARTIN LUTHER KING BLVD.	US 1	322.6
18	SR A1A - ATLANTIC AVE. NORTH	HARVARD DR.	SR 40/GRANADA BLVD.	317.5
19	US 17/92	RHODE ISLAND AVE.	GRAVES AVE.	311.8
20	US 17	SR 15A/CR 15A	REYNOLDS RD	311.6
21	US 92	LPGA BLVD.	I-95	304.3
22	SR 5A - NOVA RD.	BELLEVUE AVE.	US 92/ISB	299.8
22	US 17/92	SAXON BLVD.	ENTERPRISE RD.	299.8
22	US1 (SR5)	OLD KINGS ROAD	MATANZAS WOODS PARKWAY	299.8
25	US 92	US 1	BEACH ST.	293.9

Appendix C: Congestion Management Strategies

Strategy Category	Strategy	Description
Transportation Demand Management	Continue Teleworking	Work with employers and employees to encourage for remote work, work from-home, and other telecommuting options.
	Encourage Carpooling and Park N Ride Expansion	Work with travelers to register and utilize carpooling and vanpooling. Ridesharing program effectiveness can be enhanced by including a guaranteed ride home program to allow for commuters who may have emergencies.
	Encourage Carpooling/Vanpooling	Work with vendors to deploy carsharing stations in the county.
	Encourage Employer Incentive Programs	Marketing/reward program partnerships between Votran/Flagler County Public Transportation and employers to encourage use of transit, cycling, or other means through subsidies.
	Expand First/Last Mile Options	Provide means for commuters to travel from transit stations to/from departure and arrival locations. Examples include micromobility and ridehailing (Uber/Lyft).
Pedestrian/Bicycle	**Add Infrastructure**	**Strategies that add new pedestrian/bicycle infrastructure.**
	Add New Sidewalks	Add pedestrian infrastructure to improve multimodal accessibility and pedestrian safety.
	Add Designated Bicycle Lanes	Add bicycle infrastructure to improve multimodal accessibility and bicyclist safety. Consider lane width reduction and lane repurposing to provide buffered bicycle lanes where needed.
	Add Bicycle and Pedestrian Intersection Enhancements	Improve bicycle and pedestrian infrastructure at intersections, including detection and signalization of bike/ped crossing devices. Use both visual and auditory signals for motorized and nonmotorized users. Also consider optimizing pedestrian signal timing and collision avoidance systems.
	Add Green Paint to Emphasize Bicycle Lanes	Paint pavement throughout the extent of a bicycle lane or cycle track on a corridor, or as a spot treatment in areas suitable for bike boxes or as an intersection crossing marking.
	Add Shared Lane Markings (Sharrow)	Apply bicycle stencil roadway markings in the middle of travel lanes indicating that persons on bicycles can share the travel lane with vehicles. Note that sharrow should only be used streets with 35 MPH, but preferably 25 MPH or lower and <3K AADT.
	Add Multi-Use Paths	Develop bi-directional paths or trails physically separated from vehicular travel lanes along roadways or completely off roadway ROWs that are shared by both, pedestrians and bicyclists. They play an integral role in recreation, commuting, and accessibility due to their appeal to users of all ages and skill levels.
	Add Raised Barriers (like "Zippers") to Bicycle Lanes	Utilize low-cost methods to provide greater separation/barriers between vehicle and bicycle lanes.
	Add Grade Separated Crossings	Construct grade-separated crossing as either a bridge (overcrossing) or a tunnel (undercrossing) that carries non-motorized traffic over or under a motorized corridor or other barrier to travel.
	Implement Policies	**Strategies that change pedestrian/bicycle policies.**
	Expand Micromobility Programs	Expand the coverage of the bikeshare and scooter share programs increase the use of micromobility transportation. Refer to policy guidance from municipalities like the City of Portland.
	Implement Complete Streets Improvements	Identify roadway context and function to ensure the respective demand is addressed with roadway improvements, potentially including sidewalks, trails, bicycle lanes, bus only lanes, or transit stop enhancements
	Implement Safe Routes to School Study Recommendations	Implement the recommendations of the R2CTPO Safe Routes to School Study.
	Expand Trail Network	Construct additional trails throughout region to increase connectivity.
Transit	**Add/Expand Service**	**Strategies that add new transit service.**
	Expand/Implement Fixed Bus Route Frequencies	Identify high ridership fixed transit routes for potential frequency enhancements, adding vehicles and operators to routes, effectively increasing levels of service on high demand transit routes.
	Expand On Demand Transit	Deploy on demand transit service that is flexible and personalized. Passengers call the transit operator, who dispatches a vehicle to pick up and drop off.
	Provide Additional Seasonal/Special Event Transit Service	Deploy seasonal fixed route transit service that targets key geographical travel markets with high peak season demand. Seasonal transit service provides necessary service during peak times of year without the operational costs of year-round service. The service is suspended in the off-peak season when it is underutilized.
	Provide Express Bus Service	Deploy express bus service providing high speed limited stop service between significant origin and destination activity centers.
	Add New Fixed Guideway Transit Service	Exclusive guideway (e.g. bus rapid transit, rail, people mover) providing high speed premium public transit service
	Expand Transit Service Routes	Provide additional transit routes throughout region to increase connectivity.
	Extend SunRail Service to DeLand	Extend SunRail rail service to DeLand to increase connectivity and reduce traffic.
	Add Votran Service to New DeLand SunRail Station	Extend Votran fixed route service to DeLand SunRail Station. This is already adopted in the Votran TDP.
	Operational Improvements	**Strategies that improve transit operations.**
	Prepare for Transit Traffic Signal Priority	Provide extra green time, shorter red time, or automatic exclusive green light at signalized intersections for street-running transit vehicles
	Plan for Transit Queue Jump Lanes at Intersections	Addition of travel lane at signalized intersections for buses to proceed before other vehicles.
	Implement Transit Stop Enhancements	Add amenities at transit stops, improving traveler information, accessibility comfort and/or safety. Amenities can include bicycle parking, bicycle/pedestrian access improvements, real time transit vehicle status information, shelter from the elements, etc.
	Plan for Exclusive Transit Right Of Way (ROW)	Dedication of travel lanes for transit operation, including bus-on-shoulder, reversible bus only lane, permanent directional bus only lanes.
	Update Transportation Impact Analysis (TIA) Guidelines for Transit	Revise TIA guidelines to encourage and support transit usage in urban areas.
	Expand Electronic and Mobile Fare Collection	Provide more options for transit riders to pay fares, including easier access to electronic fare cards and the implementation of mobile fare collection.

Strategy Category	Strategy	Description
Policy & Land Use	Develop Transit/Multimodal-Oriented Development (TOD) Design Guidelines	Land use and development guidelines that encourage mixed use development near or around existing and future transit hubs or stations.
	Encourage Urban Infill and Densification	Focus new development and redevelopment in areas with high levels of multimodal and transit accessibility, limiting the need for additional roadway infrastructure and encouraging the use of alternative modes of transportation.
	Encourage Mixed-Use Development	Land use guidelines that encourage mixed use development.
	Review Parking Codes	Consider changing parking codes to be more sustainable, such as reducing or removing parking requirements for new developments.
	Encourage Sufficient Transportation Capacity for Future Land Use/Zoning Amendment Applications	Review future land use and zoning amendments applications for sufficient transportation capacity prior to adopting. Alternatively, developers should provide an improvement(s) in exchange for the development entitlements being sought.
	Prioritize Local Road System Access for Developments	Review adopted densities and intensities and provide the necessary local road system from which primary access should be prioritized.
	Promote Transit Oriented Development	Encourage development design/layout that supports transit use. This can help to retain ridership and provide connections between jobs and under-served communities.
	Develop Local Complete Streets Policies	Planning and design principles that encourage the development of a roadway network that accommodates all users.
Freight	Improve Freight-Related Curb Management	Policies that inventory, optimize, allocate, and manage curb space to maximize mobility, safety, and access for the truck deliveries at the curb.]
	Strengthen Freight Advanced Traveler Information System (FRATIS)	Provides freight specific enhancements to traveler information systems, optimizes truck and load movements between freight facilities
	Study Automated Truck Transfer Station Design Concepts	Consider AV truck transfer station near Interstates to provide opportunity for AV operated truck to transfer trailer to human driver for non-Interstate delivery.
Special Event Management	Connect Regional Traffic Management Centers (TMCs), Emergency Operations Centers (EOCs), and Tourist Attractions/Areas	Encourage coordination across agencies and their management centers during high traffic events, especially at Daytona International Speedway.
	Utilize Dynamic Detours	Utilizing existing ITS devices to provide advance warning of large traffic events, as well as navigation guidance for those attending the event.
	Expand Portable DMS Equipment Use	Utilizing portable Dynamic Messaging Signage (DMS) equipment to reroute traffic and support an event traffic management plan.
	Routine Interagency Planning for Events	Use regular interagency meetings to plan for large traffic events and how traffic will be managed.
	Enhance Law Enforcement in Key Areas	Deployment of and/or increased law enforcement presence in areas with high crash activity.
	Encourage Real-Time Parking Demand Information for Special Events	Partner with private data companies (Google, Waze) to provide real-time parking demand information to drivers during special events.
	Review and Update Event Traffic Management Plans Annually	Develop traffic management plans for each large venue in the region that dictates what roads should be closed, how traffic should be rerouted, where vehicles should be parked, how event staff should be managed, etc.
	Review Social Media for Impromptu Events	Review social media to identify informally planned events that local agencies may not be aware of. This includes Truck Meets and other large informal events that can affect traffic.
Incident Congestion Management	Enhance Inter-Agency Communication Systems	Data can be tracked by the incident responders or operators at a traffic management center or emergency operations center with access to video of the scene. The partners needed for these measures would be all incident responders willing to support the objectives.
	Expand Roving Patrols (e.g. Road Rangers)	Increase the staff and vehicles used for road rangers to improve response times.
	Shorten Incident Clearance Times	Reduce travel time delay due to incidents by shortening incident clearance time and providing travelers with information to avoid the incident area.
	Strengthen Traveler Information Systems	Partner with commercial travel time/routing application developers to improve accurate routing/alternate routing during road work/congestion/incident times. Provide travel time information to social media applications.

Strategy Category	Strategy	Description
Arterial and Freeway Management	**Improve Roadway System Management**	**Strategies that improve overall transportation system management.**
	Improve Work Zone Management	ITS, Smart Work Zones and work zone enforcement for projects located on high traffic and/or high crash segments.
	Implement Wayfinding Signage Improvements	Enhancing wayfinding through the county with enhanced signage that improves traveler experience and orientation.
	Improve Parking Management Program	Review of parking policies, rates, and inventory/location to reduce traffic in multimodal context areas and improve parking efficiency. Can include mobile apps for parking information/payment and wayfinding signage.
	Perform Interstate Ramp Metering	Perform ramp metering on I-95 and I-4 for incident management.
	Implement I-4 BtU Managed Lanes and Interim (Short/Mid-Term) Interchange/ Ramp Improvements	Conversion of general purpose lanes into variably priced lanes to reduce traffic on general purpose lanes and provide an alternative option for travelers and/or incentivize carpooling or ridesharing. Additionally, pursue various porposed short/mid-term interchange improvements and implement these improvments prior to the I-4 BtU if feasible.
	Improve Access Management	Restrict access to arterials and other major roadways to reduce traffic congestion and improve safety.
	Implement Incremental Infrastructure (Short/Mid-Term) Improvements	Implement incremental (short/mid-term) infrastructure improvements at a location instead of waiting to construct the "ultimate" improvement. With limited funding options for implementation, constructing lower cost short/mid-term improvements could provide congestion relief/improve safety conditions in the interim while waiting for the "ultimate" improvement to be funded/constructed.
	Expand Advanced Traffic Management System	Expand system of Bluetooth sensors, closed circuit television (CCTV) cameras, and mobile platforms to transmit real-time data to the regional TMC for system monitoring and optimization.
	Improve Traffic Signal Operations	A variety of signalization strategies that include regular retiming of signals, installation of new signals, traffic signal preemption, and adaptive traffic signal (ATS) systems.
	Improve Curb Management	Policies that inventory, optimize, allocate, and manage curb space to maximize mobility, safety, and access for the wide variety of curb demands.
	Utilize Part-Time Shoulder Use	Policies that allow vehicles to use the shoulder during congested times of day to increase capacity.
	Implement Advanced Railroad-Highway Intersections (Grade Crossings)	New methods and protocols developed to improve the performance of traffic signal train preemption systems. This protocol provides connection between grade crossing active warning systems and the traffic signal controller using serial communications
	Increase Law Enforcement Patrols on Roadways to Enforce Traffic Safety Laws	Increase law enforcement staff assigned to roadway patrols to enforce traffic safety laws in targeted areas.
	Implement Alternative & Innovative Intersection Designs	Implement innovative intersections as determined through FDOT's ICE policies.
	Expand ITS - System Monitoring and Decision-Making	**Strategies that use ITS technologies to monitor regional travel, improve safety, and reduce congestion.**
	Expand Roadway Monitoring Infrastructure (Primarily Fiber)	Expand communications and monitoring infrastructure (fiber, wireless, cameras, speed detectors, etc.) to support remote monitoring and surveillance of the CMP network and provide data for real time traffic management.
	Expand Traffic Management Center Staffing	Transportation Management Centers (TMCs) serve as the nerve center of the transportation management system. Expand TMC staffing to manage peak, off peak, and weekend traffic congestion in the R2CTPO region.
	Improve Traffic Data Information Management	Transportation data analytics, archived data, and data management technologies can be used to the benefit of transportation agencies in determining results proven improvements and to effectively guide future planning.
	Implement Planned Traffic Monitoring and Data Collection Deployments	Continue and expand regular collection of traffic data using ITS devices to better support transportation planning efforts.
Emerging Technologies	**Create Emerging Technologies Working Group**	**Strategies that build relationships between agencies to prepare for emerging technologies.**
	Create Data Marketplace and Encourage Data Sharing	Create a data marketplace and supplement it with rigorous monitoring of transportation, land-use, and demographic data.
	Invest in CAV/EV Infrastructure and Asset Management	**Strategies that prepare local infrastructure for emerging technologies.**
	Expand EV Charging & Alternative Fueling Station Infrastructure	Partner with private companies to build alternative fueling stations throughout region.
	Invest in Pavement Asset Management to Accommodate AV Sensors	Continue improving pavement conditions throughout region. As part of normal resurfacing program, ensure that pavement meets the requirements of AV technology.
	Electrify County/Transit Vehicle Fleets	Electrify the vehicle fleet (maintenance, etc.) used by local agencies to encourage greater utilization of EVs in region.
	Share Best Practices for New Technology Policy	**Strategies that develop policies to support emerging technologies**
	Develop EV-Ready Building Codes and Parking Ordinances	Develop building codes that are compatible with the needs of EV and CAV vehicles (EV compatible charging outlets, dedicated parking areas, etc.)
	Develop Fee Incentives for Developer-Built EV Infrastructure	Develop policies that encourage developers to build EV infrastructure when new developments are built.
Capacity	Implement Intersection and Interchange Improvements	Intersection or interchange redesign to add capacity or optimize movements by reducing vehicle conflict points.
	Improve Street Connectivity	Establish connections where possible to provide accessibility improvements
	Add Lanes Through Restriping (No New Pavement)	Restriping existing facilities to maximize capacity within existing pavement/right-of-way.
	Add Lanes Through Roadway Widening	Roadway expansion via addition of through lanes.
	Add Local/Collector Roadways for New Developments	Encourage developers and jurisdictions to construct a system of local and collector roadways to support their density and intensity increases.
	Add New Roadways	Addition of new roadways to regional network.

Appendix D: Congestion Management Strategy Matrix

Strategies	Goal 1 - Develop Multimodal System					
	PM - Reduce Congestion/Delay/VMT	PM - Improves Mobility to Economic Centers	PM - Improves Travel Time Reliability	PM - Enhances ITS Network	PM - Enhances Transit Network Service	PM - Improves Incident Response Time
Transportation Demand Management						
Encourage Carpooling and Park N Ride Expansion	X	X	X			
Expand First/Last Mile Options	X	X				
Transportation & Land Use						
Develop Transit-Oriented Development (TOD) Design Guidelines					X	
Develop Local Complete Streets Policies		X				
Pedestrian/ Bicycle						
Expand Micromobility Programs	X	X				
Add Bicycle and Pedestrian Intersection Enhancements	X	X				
Transit						
Increase Fixed Bus Route Frequencies					X	
Provide Additional Seasonal/Special Event Transit Service					X	
Freight						
Improve Freight-Related Curb Management		X			X	
Special Event Management						
Routine Interagency Planning for Events	X					X
Arterial and Freeway Management						
Improve Parking Management Program		X				
Implement Alternative & Innovative Intersection Designs	X	X				
Expand Fiber Optic Communications Network				X		
Emerging Technologies						
Expand EV Charging & Alternative Fueling Station Infrastructure	X					
Capacity						
Implement Wayfinding Signage Improvements	X					
Implement Intersection and Interchange Improvements	X	X	X			

Appendix E: Outreach Summary

Working Group Meeting Materials

Working Group Meeting #1 Summary

2021 Congestion Management Process

December 16, 2021

In Person

10:00 – 12:00 PM

This meeting was held with the 2021 Congestion Management Process (CMP) Working Group to review the CMP Network and preliminary performance measure analysis. The Working Group includes representatives from the Florida Department of Transportation District 5 (FDOT D5), Volusia and Flagler Counties, local municipalities, and County Emergency Medical Services (EMS). The meeting attendees included:

- Tushar Patel and Heidi Trivett – FDOT D5
- Jon Cheney and Jay Williams – Volusia County
- Adam Mengel – Flagler County
- Brady Barry – Flagler County Fire Rescue
- Darren Greer, Brian Woodworth, and Andy Holmes – City of Daytona Beach
- Colleen Nicoulin and Stephan Harris – River to Sea Transportation Planning Organization (R2CTPO)
- Travis Hills, Adam Burghdoff, and Spencer Maddox – Kittelson & Associates, Inc. (KAI)

The presentation from the meeting can be found at the end of these notes. The following summarizes the key discussion points from the meeting. **Bold** represents follow up action items.

1. Travis led off the meeting by providing an overview of the CMP and reviewing the role of the Working Group.
    a. The Working Group attendees were comprised of members from FDOT D5, Volusia County, Flagler County, and the City of Daytona Beach.
    b. The Working Group members are largely focused on Traffic Operations and Safety (50%) and Transportation Planning (25%).
2. Travis provided an update on the CMP Schedule –
    a. The Goals/Objectives for the CMP have been established.
    b. The CMP Network has been developed and will be reviewed during the meeting.
    c. Performance measures are in progress and will be reviewed during the meeting.
    d. CMP strategies are the next step, which will begin in early 2022.
    e. Report documentation will begin in Spring 2022.
3. Travis reviewed the CMP Network –
    a. For all CMP Network maps, **KAI will add the data source and source date.**
    b. No comments from Working Group on the Roadway Network.

c. Pedestrian and Bicycle Network – Based upon feedback from the Working Group, **KAI will add funded trails to the Pedestrian and Bicycle Network.**

d. Transit Network –

i. The Working Group noted that Flagler County is looking to change their transit model from a flex route model to more of a fixed route service. Conversations with this change are preliminary. **KAI will document this in the report but will not make any changes to the Transit Network.**

ii. The Working Group also noted that Votran is currently working through potential route modifications. **KAI will document this in the report and use the latest available data for the Votran transit network.**

e. ITS Network – Volusia County noted that it has been installing 4G as an alternative to fiber, and that some corridors have ITS Adaptive Systems.

f. Evacuation Network – The Working Group noted the current Evacuation Route from Florida Division of Emergency Management is not representative of evacuation routes. **KAI will update the Evacuation Network based on Volusia and Flagler County GIS files.**

4. Travis reviewed the LRTP Goals and how they relate to the CMP.

a. The Working Group attendees were asked which two goals they would put the greatest emphasis on. Goal 4 – Safety and Goal 1 – Multimodal were the two goals that were prioritized by the Working Group.

5. Spencer reviewed the various Performance Measures being studied as part of the CMP –

a. Vehicle Performance Metrics (Congestion and Reliability)

i. "What affects vehicular travel the most in the R2CTPO?" The Working Group answered that Congestion affects vehicle travel the most (64%) followed by Event Demand (27%).

ii. "Which impacts daily travel more in the R2CTPO – Congestion or Reliability?" The Working Group responded unanimously that Congestion impacts daily travel more than Reliability.

iii. From 2015 to 2019, the daily VMT in the R2CTPO has increased similarly to the statewide daily VMT while the R2CTPO daily VMT per capita has remained relatively flat. This relationship suggests the main driver of the increased VMT is population growth.

iv. The Working Group noted that Special Events can be considered re-occurring congestion since they are planned. **KAI will update the slides and report to note this**.

b. Congestion Metrics

i. The most roadways which have the greatest number of congested centerline miles include I-95 in Palm Coast, Williamson Boulevard in Daytona Beach, Ormond Beach, and Port Orange, along with US 17 in Deland and unincorporated Volusia County.

ii. In the R2CTPO CMP network, there are 1,024.8 centerline miles that are not congested, 34.6 that are approaching congestion, and 23.5 that are

congested based on the volume-to-capacity thresholds discussed by the Working Group.

iii. **KAI will update the volume-to-capacity ratio breakpoints to the following:**

1. V/C < 0.90 – Not Congested
2. V/C – 0.90 to 1.0 – Approaching Congestion for Evacuation Routes
3. V/C – 0.90 to 1.1 – Approaching Congestion for non-Evacuation Routes
4. V/C > 1.0 – Congested for Evacuation Routes
5. V/C > 1.1 – Congested for non-Evacuation Routes

iv. **KAI will add total miles of non-congested, approaching congestion, and congested roadways to the map.**

c. Reliability Metrics

i. Using NPMRDS data on the national highway system (NHS), the NHS in the R2CTPO is mainly reliable throughout all time periods of the day. The interstate is 99.7% reliable, and the non-interstate segments are 92.7% reliable for vehicular level of travel time reliability.

ii. The NHS in the R2CTPO area tends to be less reliable on the weekend and peak season compared to the rest of the year. Travel patterns may be less predictable on the weekend and peak season based on tourist activity, which can make the travel time less reliable.

iii. For truck travel time reliability on the NHS, less-reliable locations for truck travel time are in urban areas such as Daytona Beach, Port Orange, New Smyrna Beach, and Palm Coast. The majority of interstate segments are reliable for truck travel.

iv. **KAI will investigate the reliability results for the following segments:**

1. US 1 between Volusia and Flagler County (Unreliable on Daily Reliability figure)
    a. This segment is identified as unreliable during the weekend time. **KAI will update the figure titles to provide more clarity on what is being shown.**
2. SR 15A were noted as congested due to truck traffic by the Working Group, but it is not shown on Truck Reliability.
    a. SR 15A/Spring Garden Avenue is not on the NHS, so it is not included in the TTTR network. Surrounding roadway segments are flagged as orange or yellow which may suggests a reliability issue in the area. **KAI will note network limitations in the report.**
3. SR 44/Kepler Road was noted as congested due to truck traffic, but it is not shown on Truck Reliability.
    a. SR 44 between Kepler Road and I-4 is an identified as a segment that is not reliable with truck travel time. Kepler Road is not on the NHS, so it is not included in the TTTR

network. The area surrounding Kepler Road are flagged as orange or yellow which may suggest a reliability issue. **KAI will note network limitations in the report and update the figures to provide greater emphasis on less reliable segments.**

d. Bicycle and Pedestrian Network
    i. For the R2CTPO, there is currently 75.4% pedestrian facility coverage and 27.9% bicycle facility coverage. Additionally, there is currently over 200 miles of existing and funded trails in the R2CTPO planning area.
    ii. The Working Group discussed the barriers to implemented Bicycle and Pedestrian facilities and the responses included the following:
        1. ADA Implementation
        2. Funding for new construction
        3. Right-of-Way

e. Safety Metrics
    i. Within the R2CTPO, the total number of yearly vehicular crashes increased from 2016 to 2019 and decreased in 2020 due to COVID-19. Vehicular fatalities, however, increased in 2020, highlighting the increase in high severity crashes during the pandemic.
    ii. The total number of yearly bicycle and pedestrian crashes increased from 2016 to 2019, and slightly decreased in 2020 due to COVID-19. Bicycle and pedestrian fatalities, however, have increased from 2016 to 2020.
    iii. The Working Group was asked to identify what contributed to the increase in fatalities and overwhelmingly responded with speeding as the key safety issue. Additional identified safety issues identified include:
        1. Not obeying Traffic Control Devices
        2. Vehicles not yielding for pedestrians
        3. Pedestrians not using crosswalks
        4. Increase in Conflicts (greater exposure for pedestrians and bicyclists)
    iv. **KAI will add multiple years of Safety data to the safety maps.**

f. Electric Vehicle Metrics
    i. Currently, there are a total of 55 electric vehicle charging stations with 137 individual electric vehicle charging units in the R2CTPO.
    ii. The Working Group discussed barriers to implement connected and autonomous vehicles as well as widespread electric vehicle adoption. Barriers to implementation include the following:
        1. Training/Funding for Emergency Services to address electric vehicle car fixes.
        2. Guidelines for residential streets for CAVs.
        3. Prepping infrastructure and ensuring last mile infrastructure is there for Cavs.

4. Electric vehicles are quieter than gas vehicles which visually impaired pedestrians will not be able to hear at crosswalks potentially creating conflicts.

g. Transit Metrics

i. Yearly transit ridership for Flagler County, Volusia County, and SunRail slightly decreased from 2016 to 2019, then dramatically decreased in 2020 due to COVID-19.

ii. Within the R2CTPO, 78% of transit routes are located within the most disadvantaged areas, and 56% of the population and employment in the R2CTPO are within a half mile of a transit route.

iii. The Working Group noted potential changes to transit network could occur in the future for both Flagler County and Volusia County.

6. Next Steps

a. KAI will update the performance measure mapping based on the action items above.

b. KAI will begin identifying CMP strategies based on the performance measures reviewed.

c. KAI will begin CMP documentation.

d. Working Group Meeting #2 will be scheduled for April 2022.

RIVER TO SEA TPO

Transportation Planning Organization

VISION - PLAN - IMPLEMENT

CONGESTION MANAGEMENT PROCESS

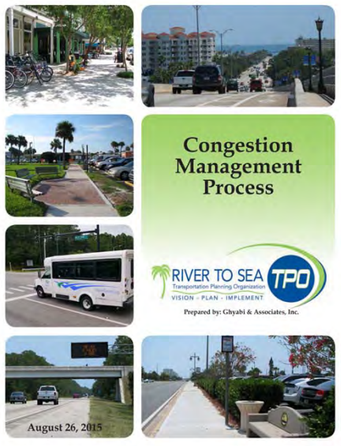
December 16, 2021

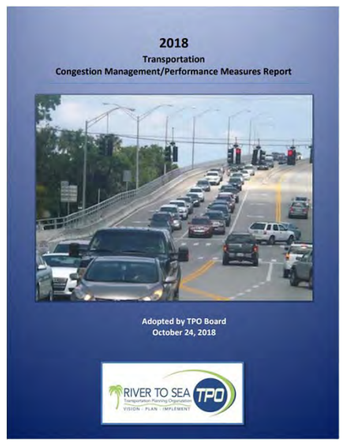
Working Group Meeting #1

Working Group Agenda

- Congestion Management Process Overview
- Role of the Working Group
- Upcoming Activities
- CMP Network
- Performance Measures by LRTP Goals
- Next Steps

Congestion Management Process (CMP) Overview





RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

What is Congestion Management?

Application of strategies to improve transportation system performance and reliability by reducing the adverse impacts of congestion on the movement of people and goods.

What is the CMP?

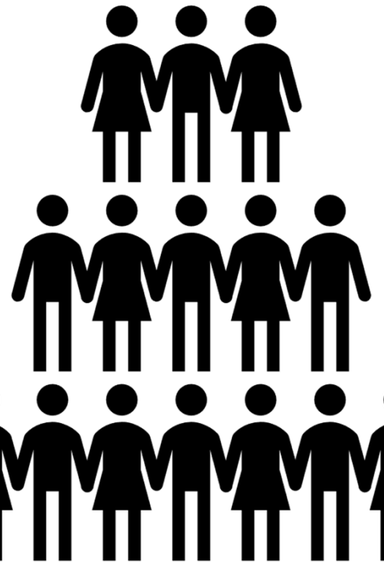
Systematic and regionally-accepted approach for managing congestion that provides accurate, up-to-date information on transportation system performance and assesses alternative strategies for congestion management that meet state and local needs.

What does it achieve long-term?

The CMP is intended to move systematic congestion management strategies into the funding and implementation stages.

Role of the Working Group

- Key stakeholders for the CMP
- Provides feedback
- Functions as a sounding board for the CMP
- Contributes to a collaborative process



RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

What Agency do you work for?

A. R2CTPO

B. FDOT

C. Volusia or Flagler County

D. Votran or Flagler County Transit

E. Local Municipalities (ie. City Staff)

F. Emergency Services

G. Other Agency/Consultant

Start the presentation to see live content. For screen share software, share the entire screen. Get help at **pollev.com/app**

What is your focus?

A. Traffic Operations & Safety

B. Roadway Design

C. Transportation Planning

D. Transit Operations and/or Planning

E. Emergency Services

F. Other

Start the presentation to see live content. For screen share software, share the entire screen. Get help at **pollev.com/app**

Upcoming Activities

Working Group Meetings

TCC/CAC and Board Presentations

SPRING – EARLY FALL 2021

1 – PROCESS

- Re-evaluate current CMP approach
- Update CMP and create easy-to-monitor process

2 – GOALS

- Create CMP specific goals and objectives that align with the LRTP

3 – NETWORK

- Develop a multimodal network that will be evaluated for congestion management purposes

FALL – WINTER 2021/22

4 – MEASURE

- Determine what we are going to measure and what data is available/needed

5 – STRATEGIES

- Identify and evaluate congestion management related strategies

SPRING 2022

6 – REPORT

- Document all steps and findings

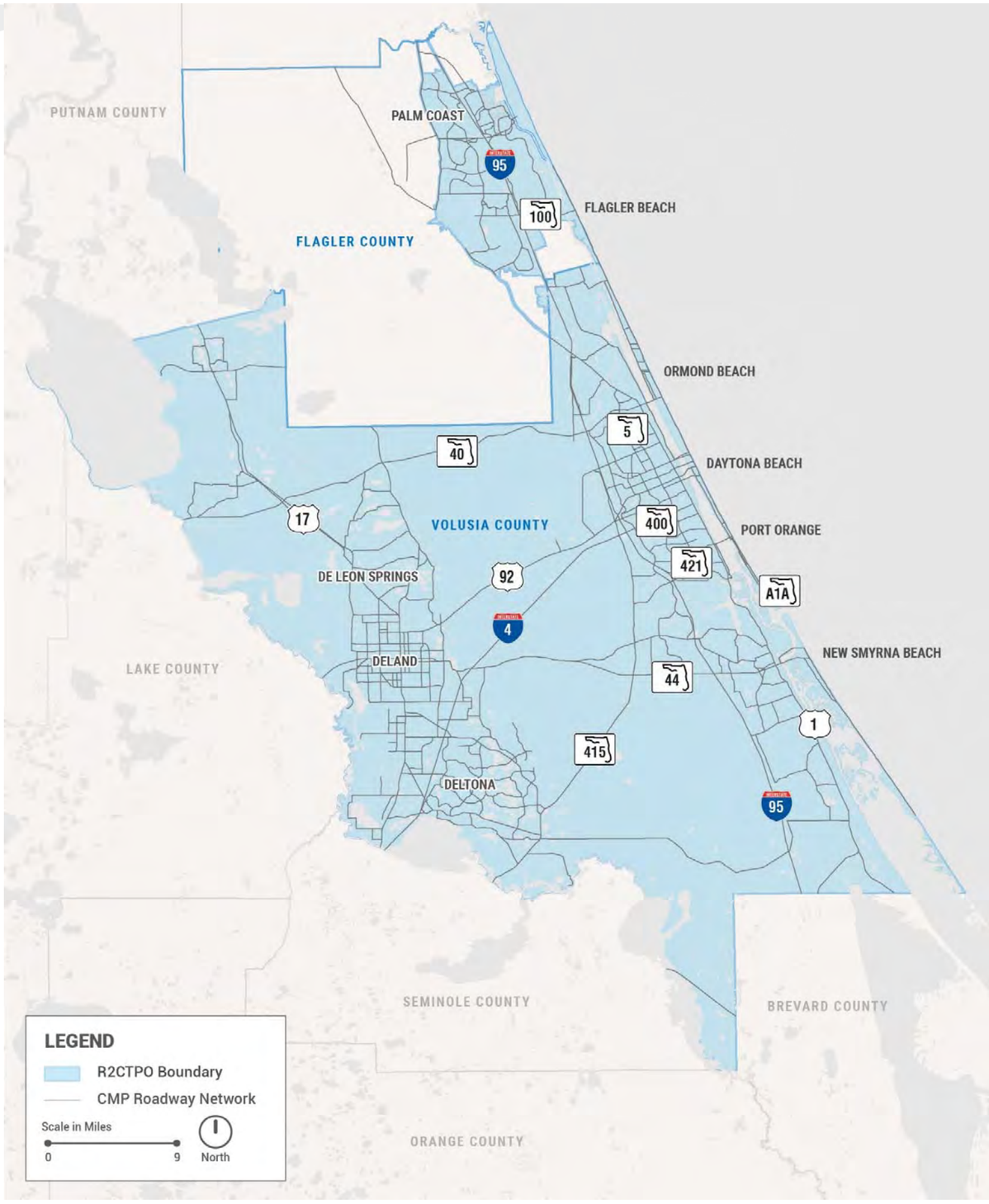
In Progress

RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

CMP Network

CMP Network

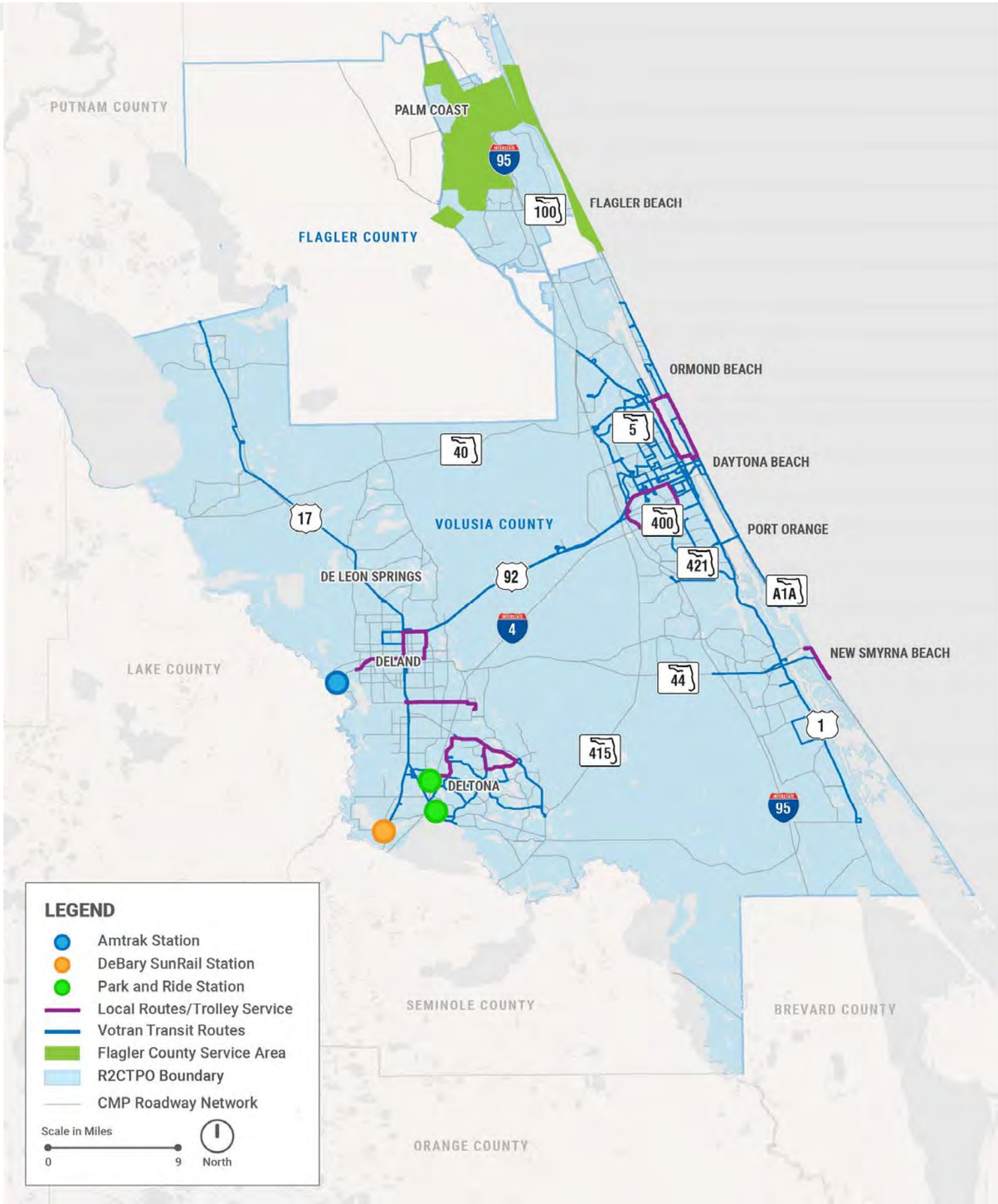
- **Roadway Network**
  - Count data coming from Volusia County count database and Palm Coast traffic counts



RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

CMP Network

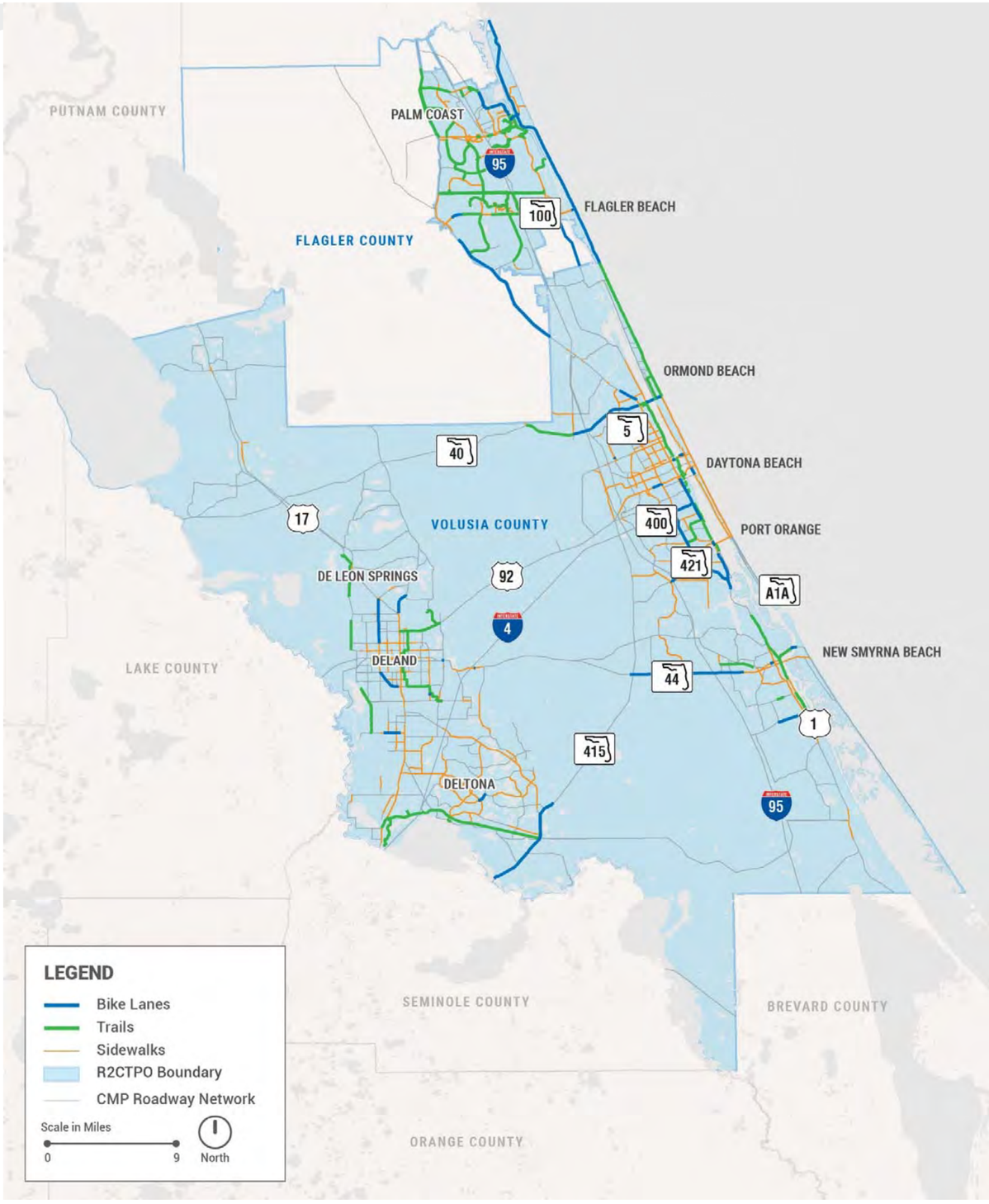
- Roadway Network
  - Count data coming from Volusia County count database and Palm Coast traffic counts
- **Transit Network**
  - Votran, SunRail, Flagler County



RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

CMP Network

- Roadway Network
  - Count data coming from Volusia County count database and Palm Coast traffic counts
- Transit Network
  - Votran, SunRail, Flagler County
- **Bicycle and Pedestrian Network**
  - Bicycle and Pedestrian Plan

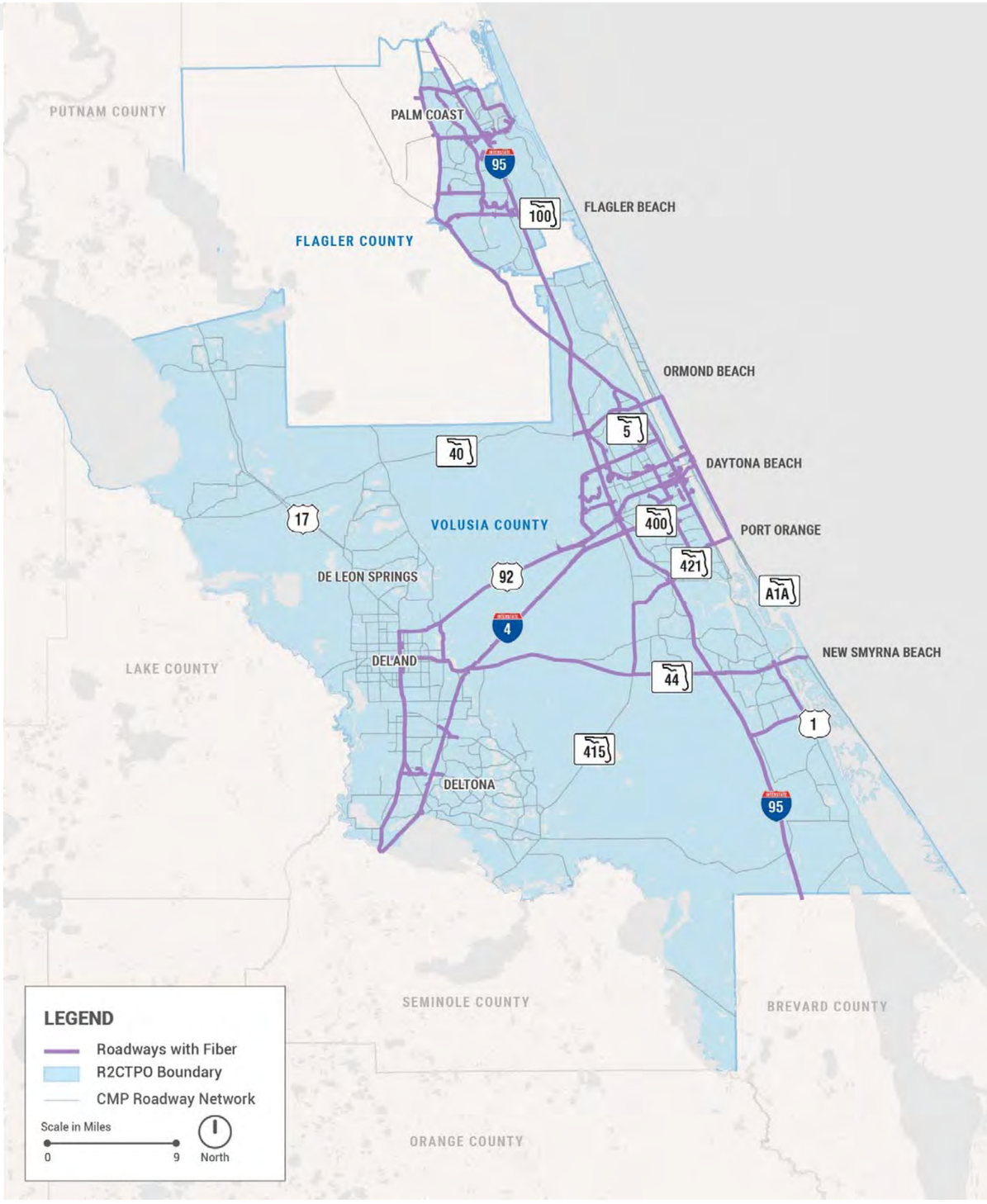


RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

CMP Network

- Roadway Network
  - Count data coming from Volusia County count database and Palm Coast traffic counts
- Transit Network
  - Votran, SunRail, Flagler County
- Bicycle and Pedestrian Network
  - Bicycle and Pedestrian Plan
- **ITS Network**
  - ITS Masterplan

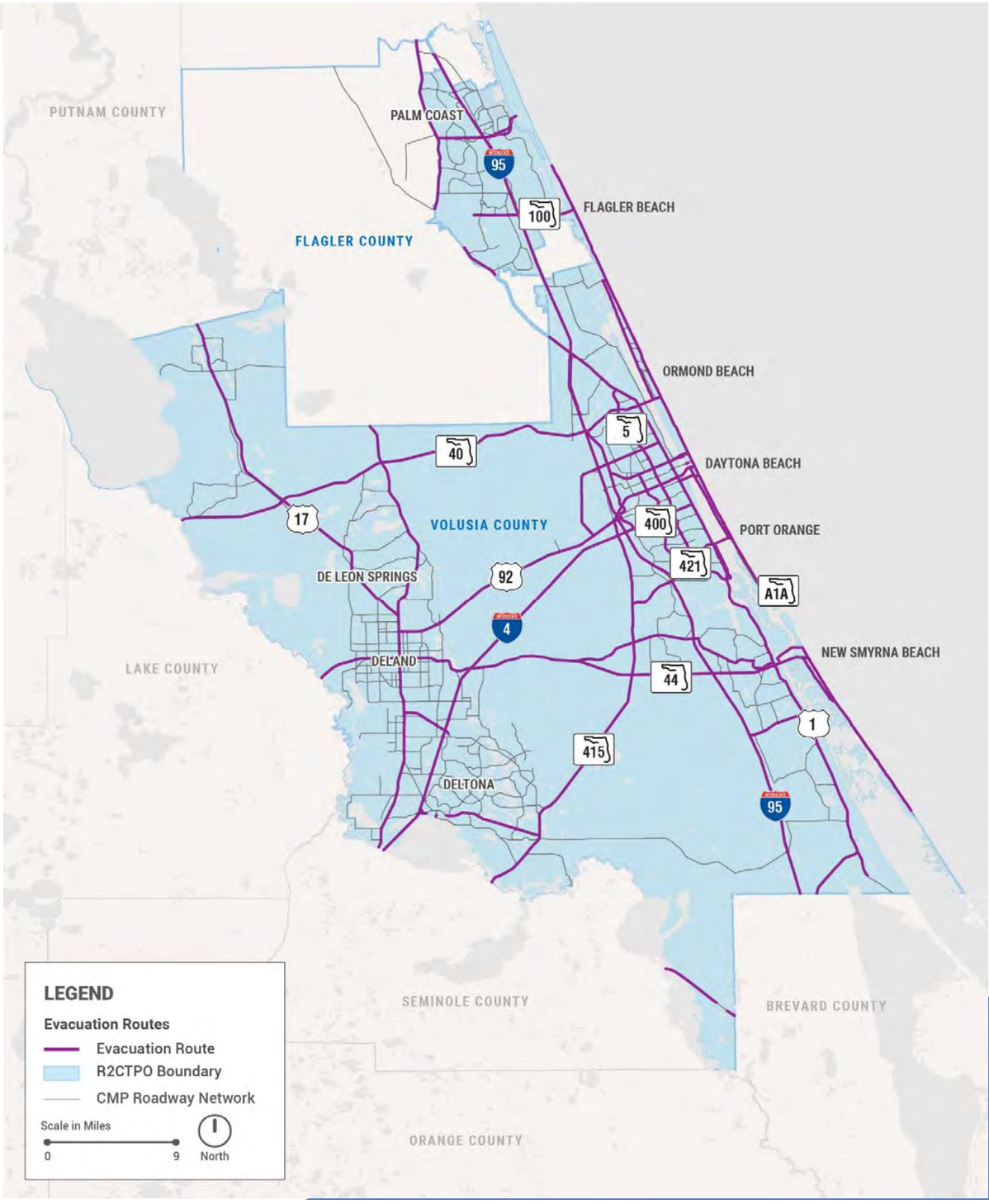
RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS



CMP Network

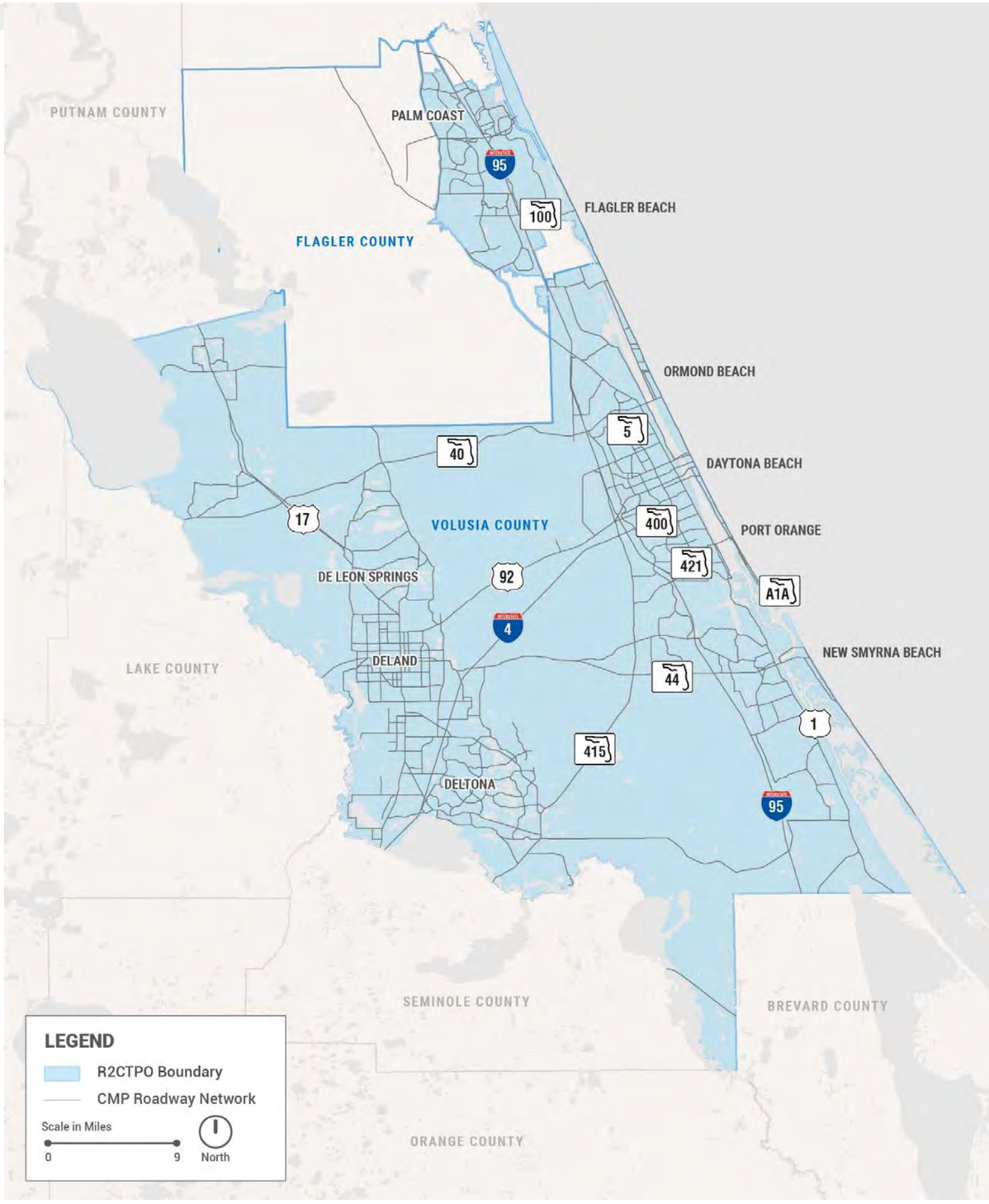
- Roadway Network
  - Count data coming from Volusia County count database and Palm Coast traffic counts
- Transit Network
  - Votran, SunRail, Flagler County
- Bicycle and Pedestrian Network
  - Bicycle and Pedestrian Plan
- ITS Network
  - ITS Masterplan
- **Evacuation Routes**
  - Florida Division of Emergency Management

RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS



Is any Network missing?

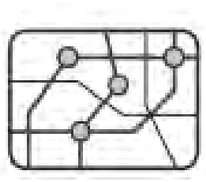
RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS



Long Range Transportation Plan Goals

Goal 1 – Multimodal

Goal 2 – Economic Development



Goal 3 – Connectivity

Goal 4 – Safety

Goal 5 – Livability

Goal 6 – Involvement

RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

Which two goals would you put the greatest emphasis on?

A. Goal 1 - Multimodal

B. Goal 2 - Economic Development

C. Goal 3 - Connectivity

D. Goal 4 - Safety

E. Goal 5 - Livability

F. Goal 6 - Involvement

Start the presentation to see live content. For screen share software, share the entire screen. Get help at **pollev.com/app**

Goal 1

Develop and Maintain a Balanced and Efficient Multimodal Transportation System

What affects vehicular travel the most in the R2CTPO?

A. Congestion

B. Reliability

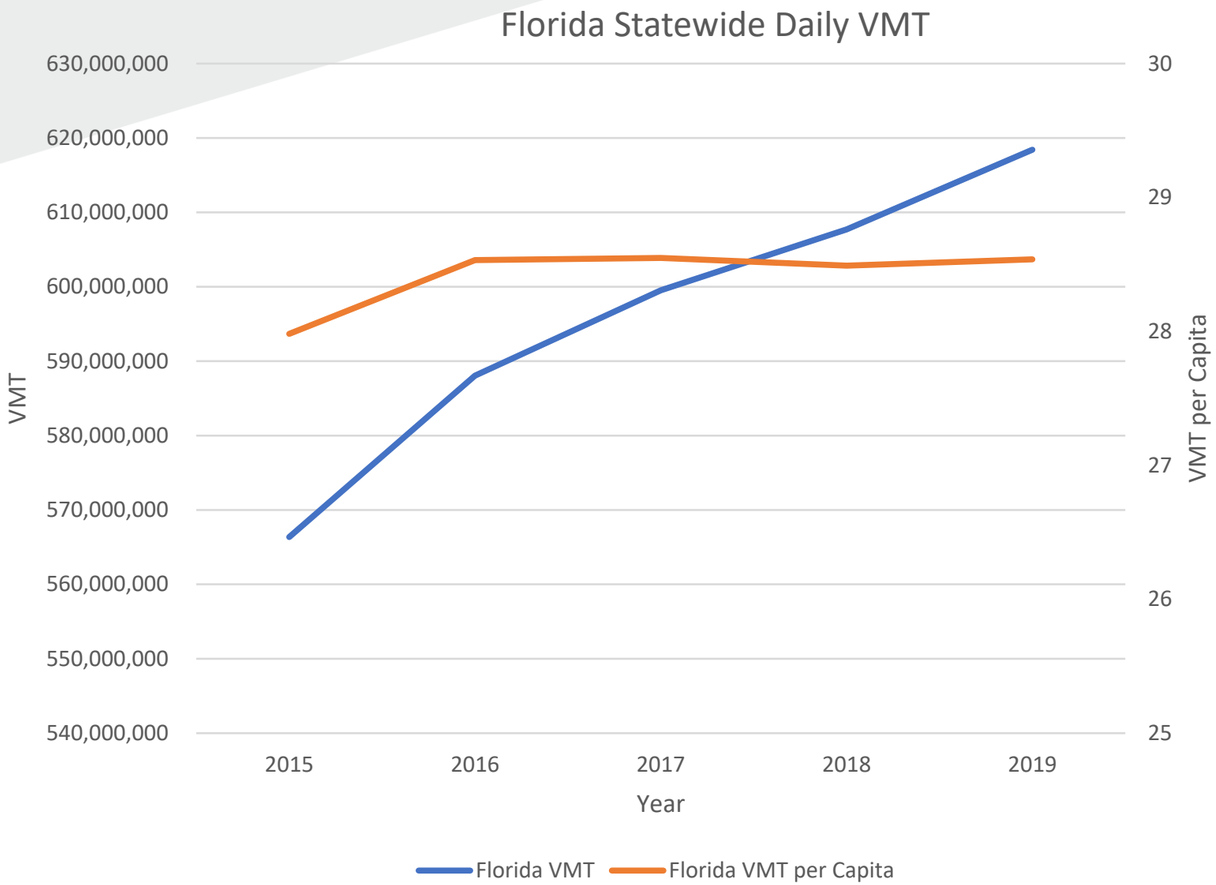
C. Way-finding/Navigation

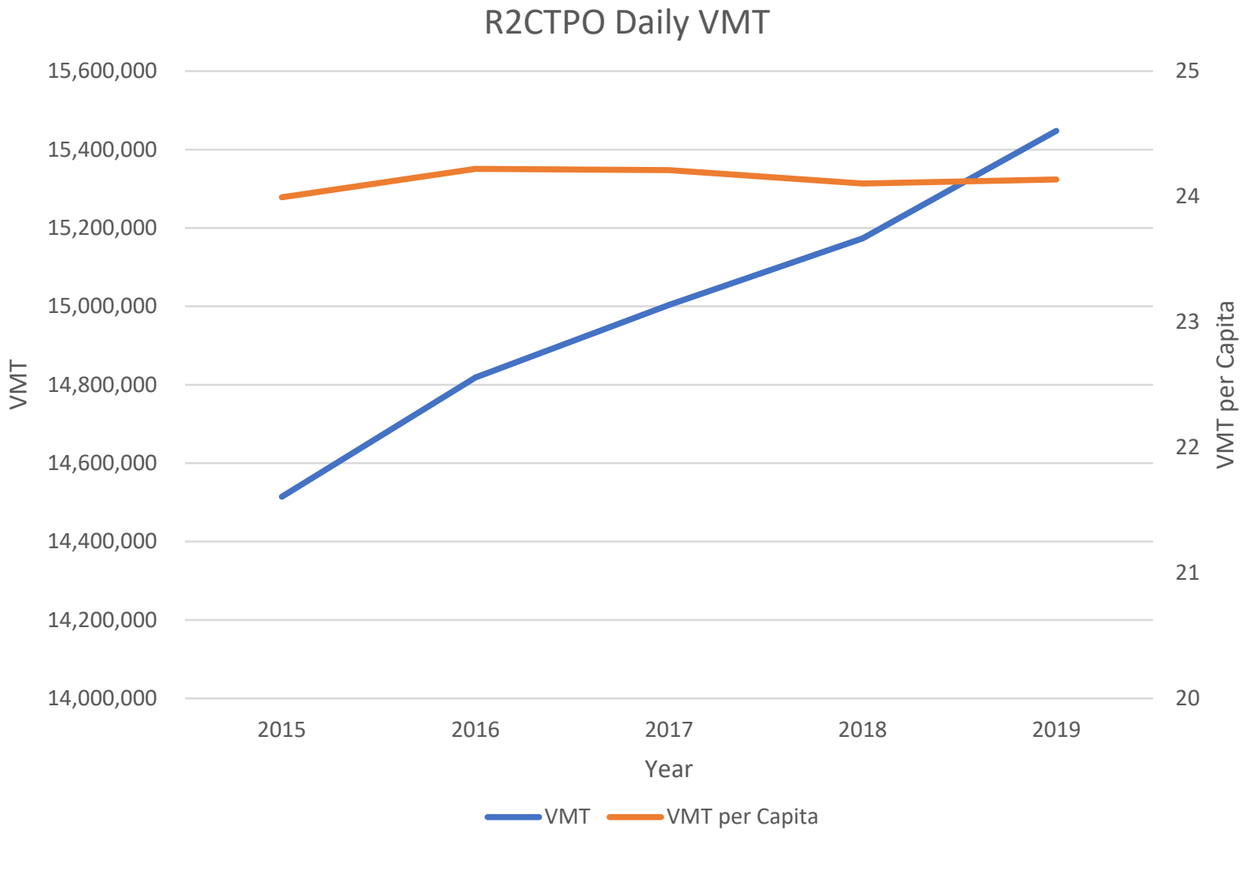
D. Event Demand

E. Other

Start the presentation to see live content. For screen share software, share the entire screen. Get help at **pollev.com/app**

Overall Daily Vehicle Miles Traveled Trends





RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

Congestion vs Reliability

Recurring Congestion	Non-Recurring Congestion
Bottlenecks (overcapacity)	Weather
	Work zones
Traffic-control devices (signal timing, stop control)	Incidents
	Travel demand fluctuations
	Special events

Reliability

Degree of certainty and predictability in travel times

RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

Based on your experience, which impacts daily travel more in the R2CTPO?

Congestion **A**

Reliability **B**

Start the presentation to see live content. For screen share software, share the entire screen. Get help at **pollev.com/app**

Goal 1

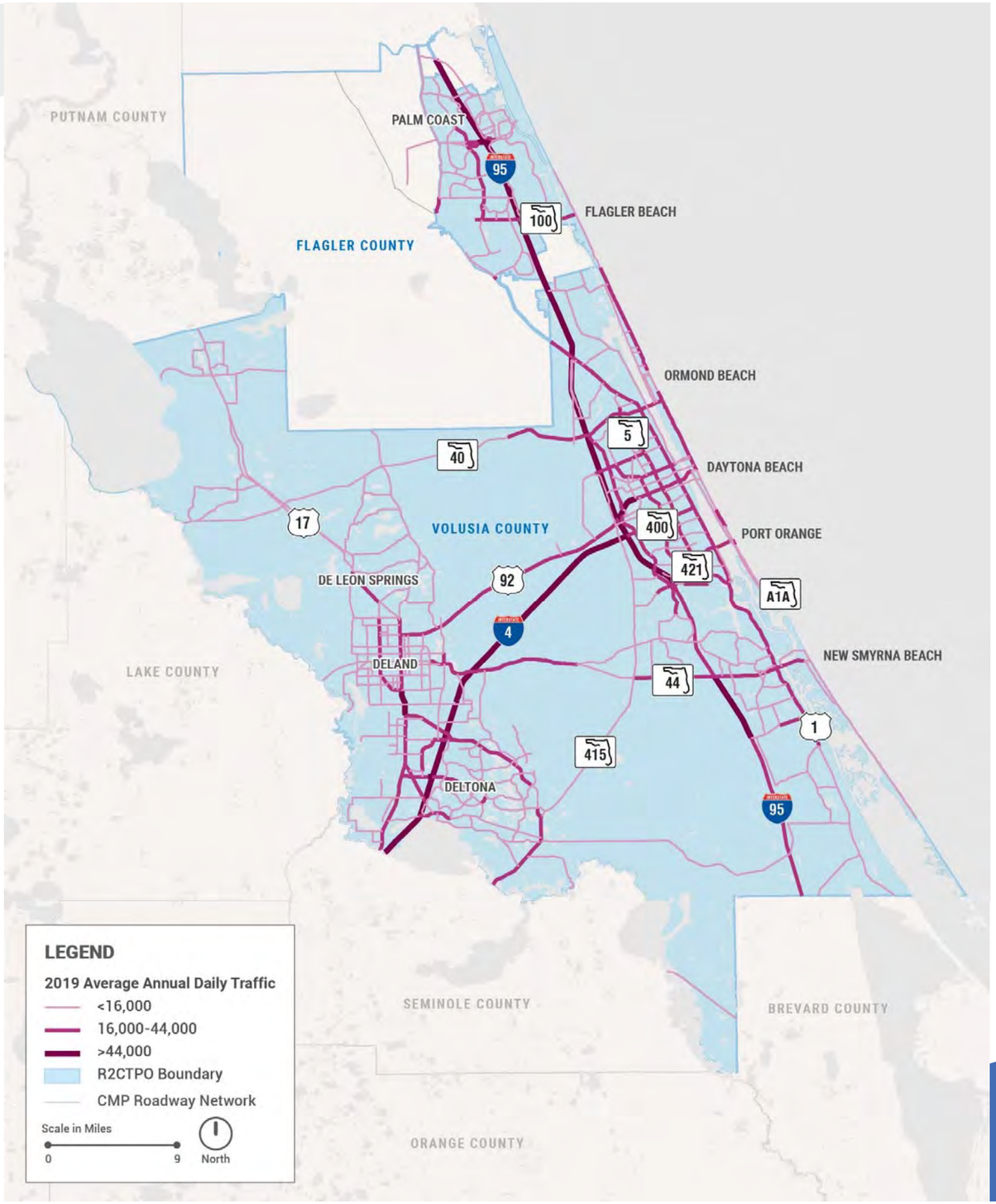
Congestion Metrics

Congestion

Data Comparison	Congestion
Data Availability	Available for the entire CMP Network
Equation	$\mathbf{V/C} = \frac{\boldsymbol{Segment\ AADT}}{\boldsymbol{Segment\ AADT\ Capacity}}$
Metric	V/C < 0.85 -> Not congested V/C between 0.85 and 1.0 -> Approaching Congestion V/C > 1.0 -> Congested

RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

2019 Average Annual Daily Traffic (AADT) on CMP Network

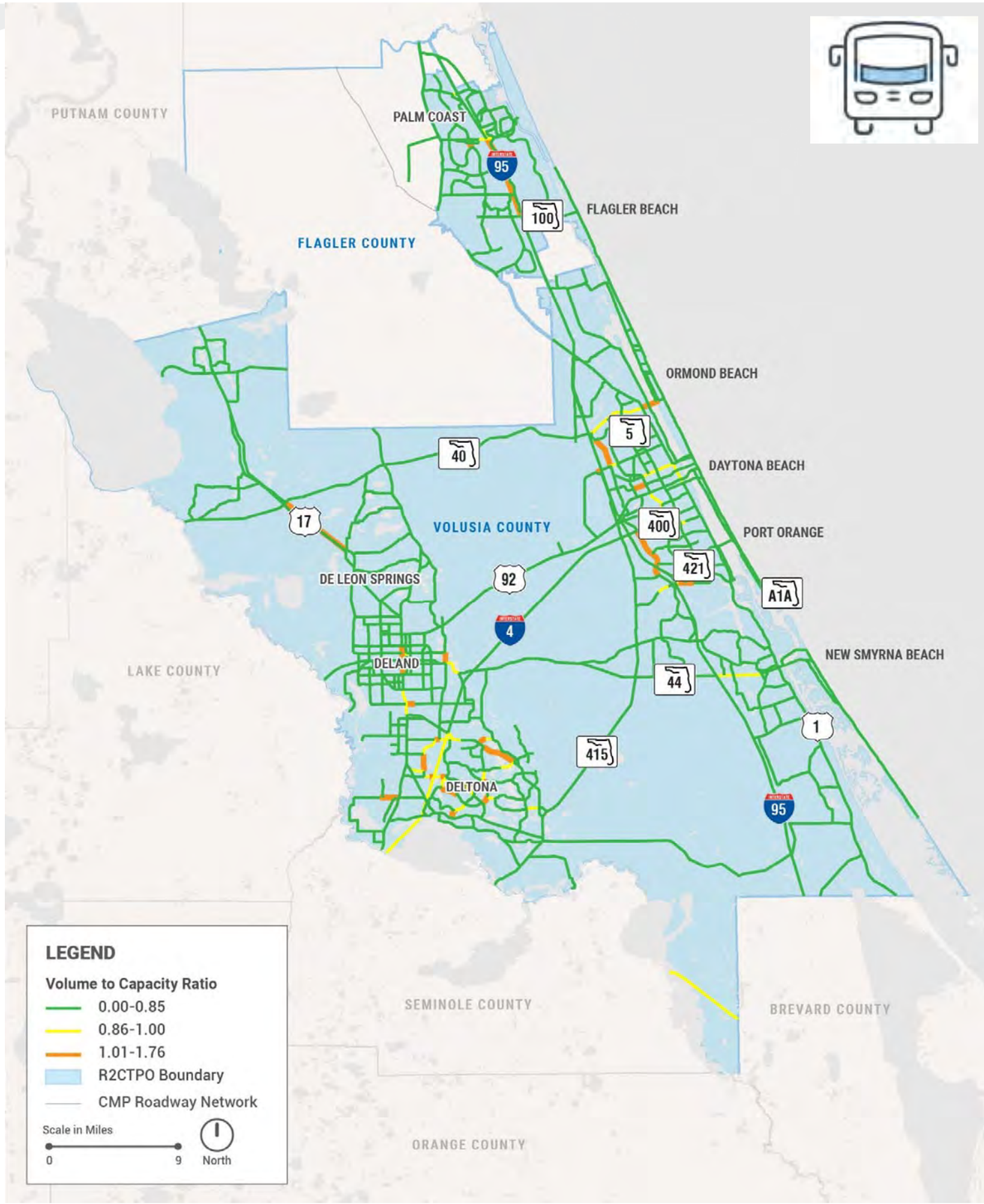


RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

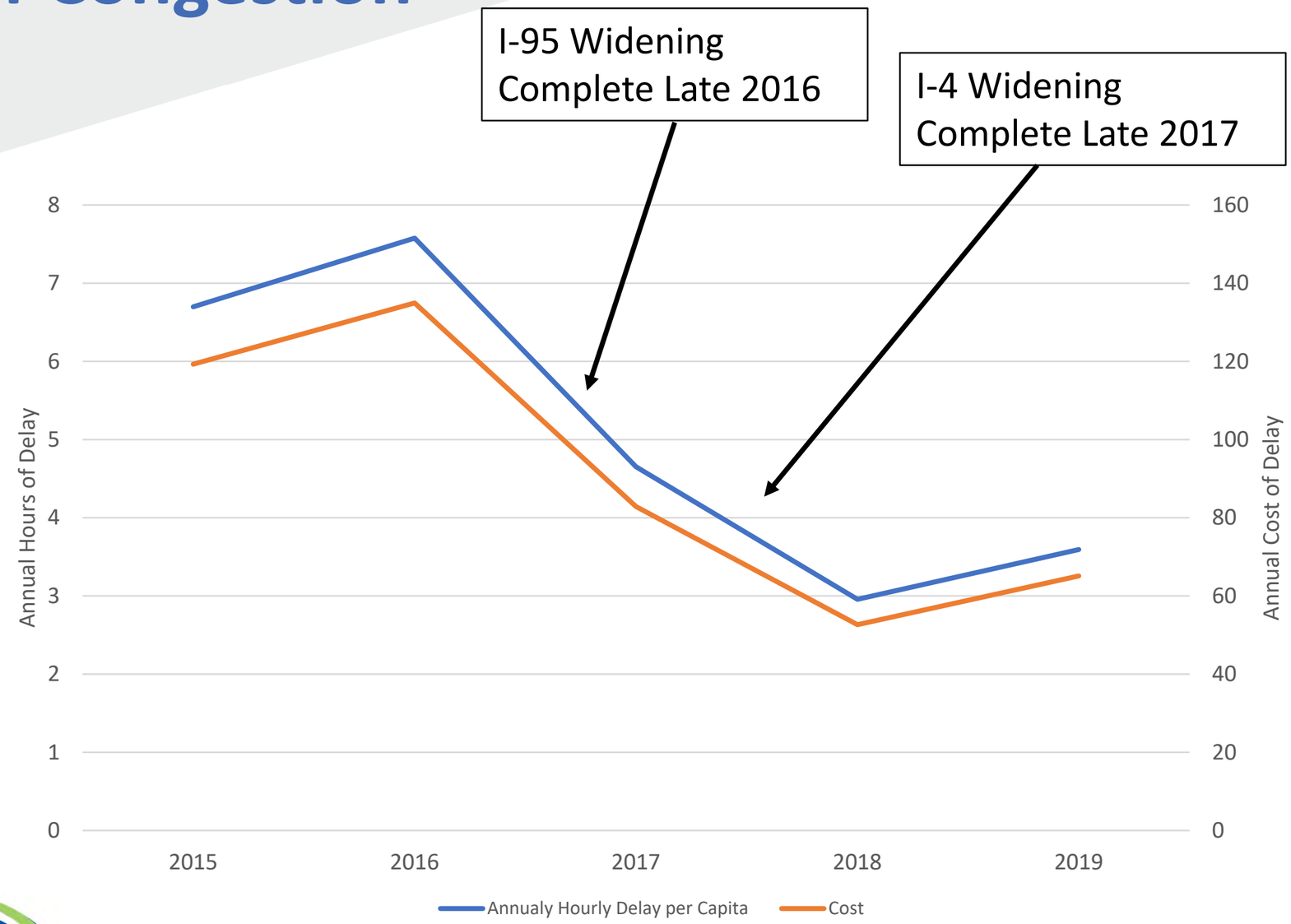
Daily Level of Congestion on CMP Roadways

City	Centerline Miles Over Capacity (V/C > 1.0)	Key Roadways
Deltona	6.6	Normandy Blvd, Saxon Blvd
Palm Coast	6.1	I-95
Daytona Beach	5.3	Williamson Blvd
Port Orange	2.1	Williamson Blvd, Taylor Rd
DeLand	1.9	US 17/92
Ormond Beach	1.9	Williamson Blvd, SR 40
Orange City	1.7	Veteran's Memorial Parkway
DeBary	1.2	Highbanks Rd
Unincorporated	6.3	US 17

RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS



The Cost of Congestion*



RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

*FDOT MPO reports for daily delay on the SHS. Cost based on ACS

Goal 1

Reliability Metrics

Reliability

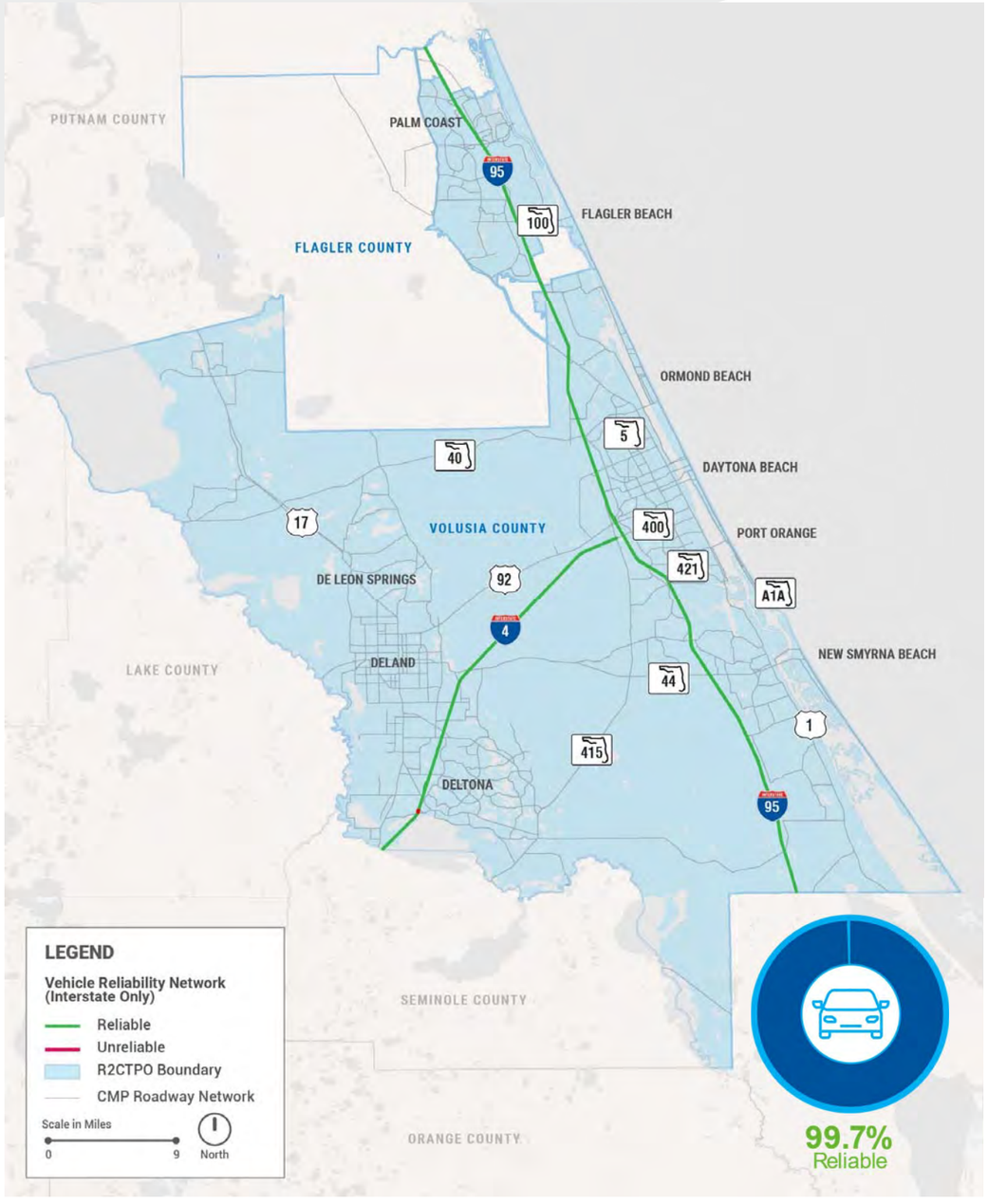
Data Comparison	Reliability
Data Availability	Available for the National Highway System Only
Equation	$\mathbf{LOTTR} = \frac{\boldsymbol{80th\ Percentile\ Travel\ Time}}{\boldsymbol{50th\ Percentile\ Travel\ Time}}$
Metric	LOTTR < 1.5 Reliable LOTTR >= 1.5 Unreliable

50% of the time it takes 30 minutes or less.
20% of the time it takes 50 minutes or more.

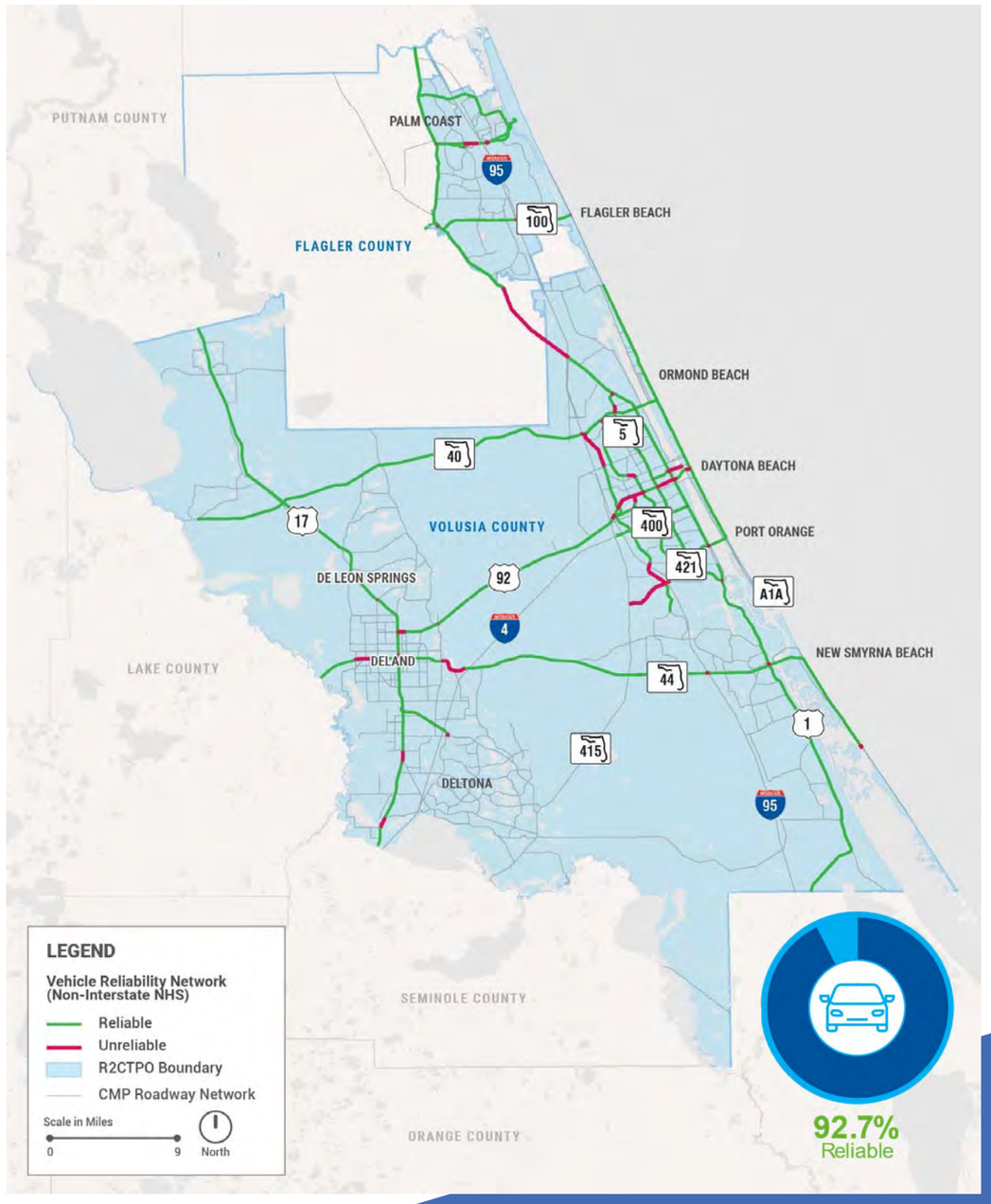
$$\mathbf{LOTTR} = \frac{\boldsymbol{50\ minutes}}{\boldsymbol{30\ minutes}} = \boldsymbol{1.67 = Unreliable}$$

RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

Travel Time Reliability – Interstate

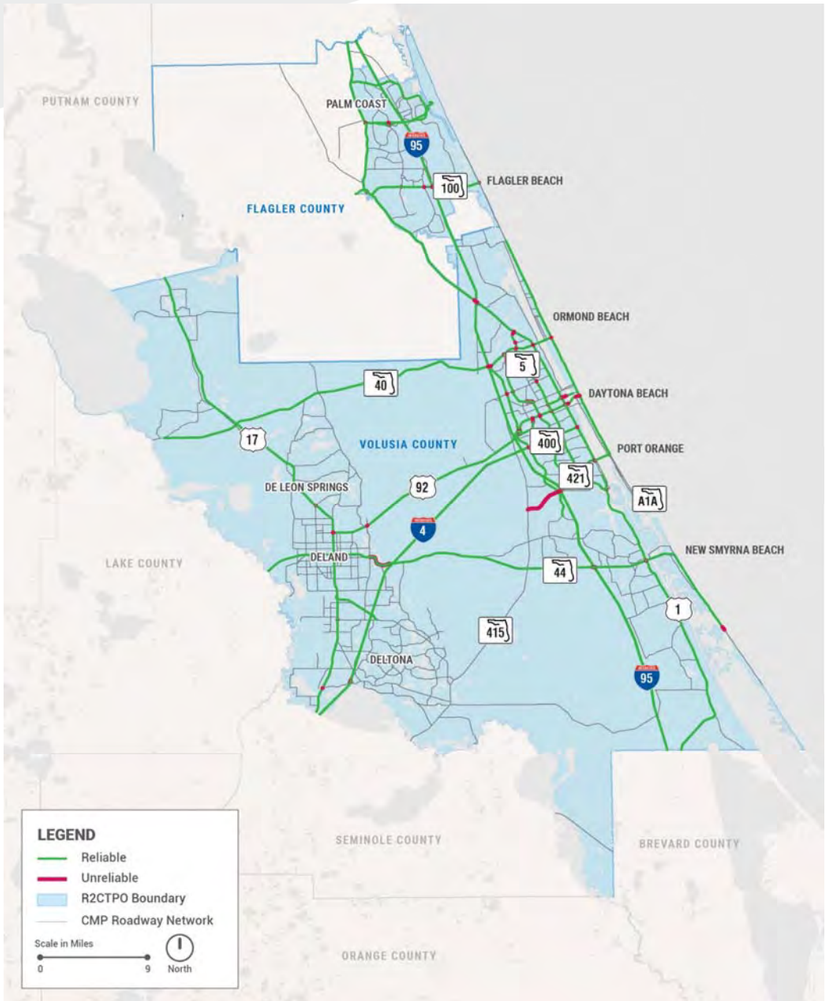


Travel Time Reliability – Non-Interstate

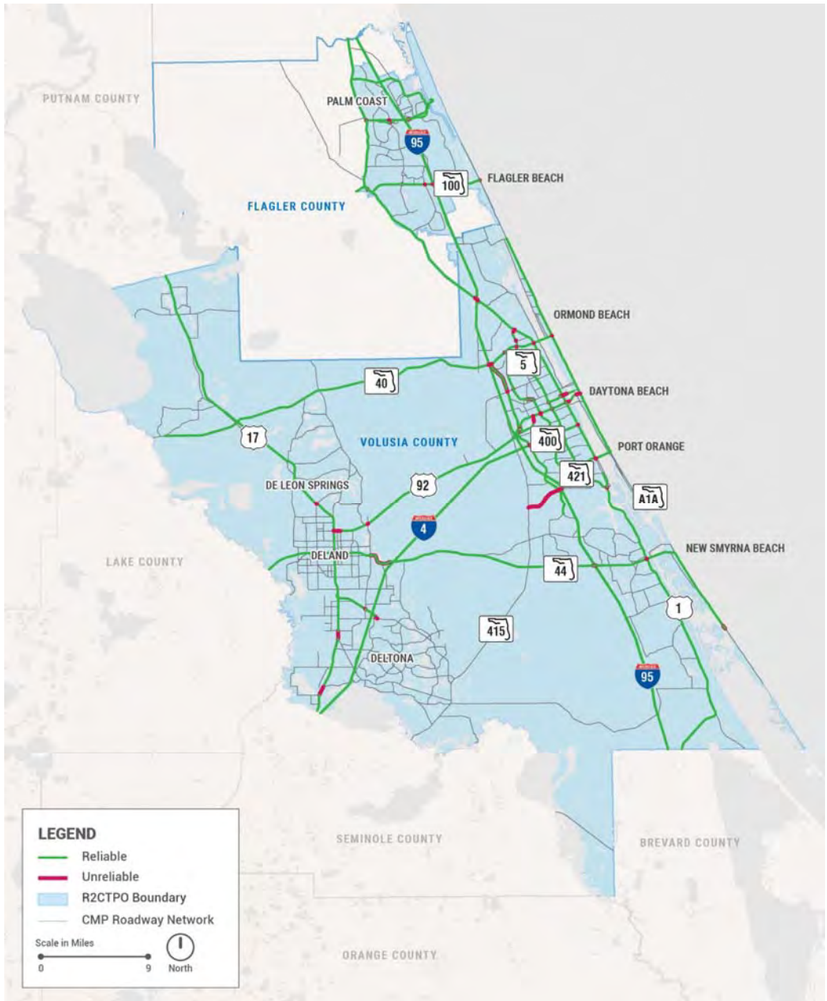


Travel Time Reliability Comparison

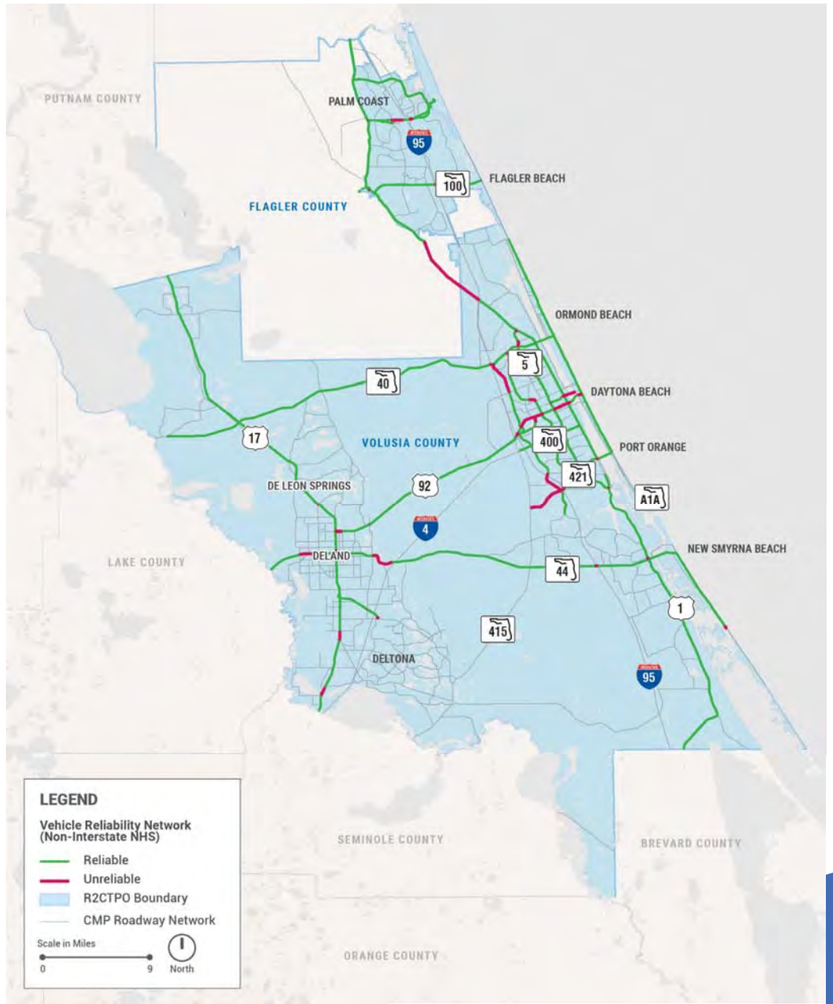
AM Peak Reliability



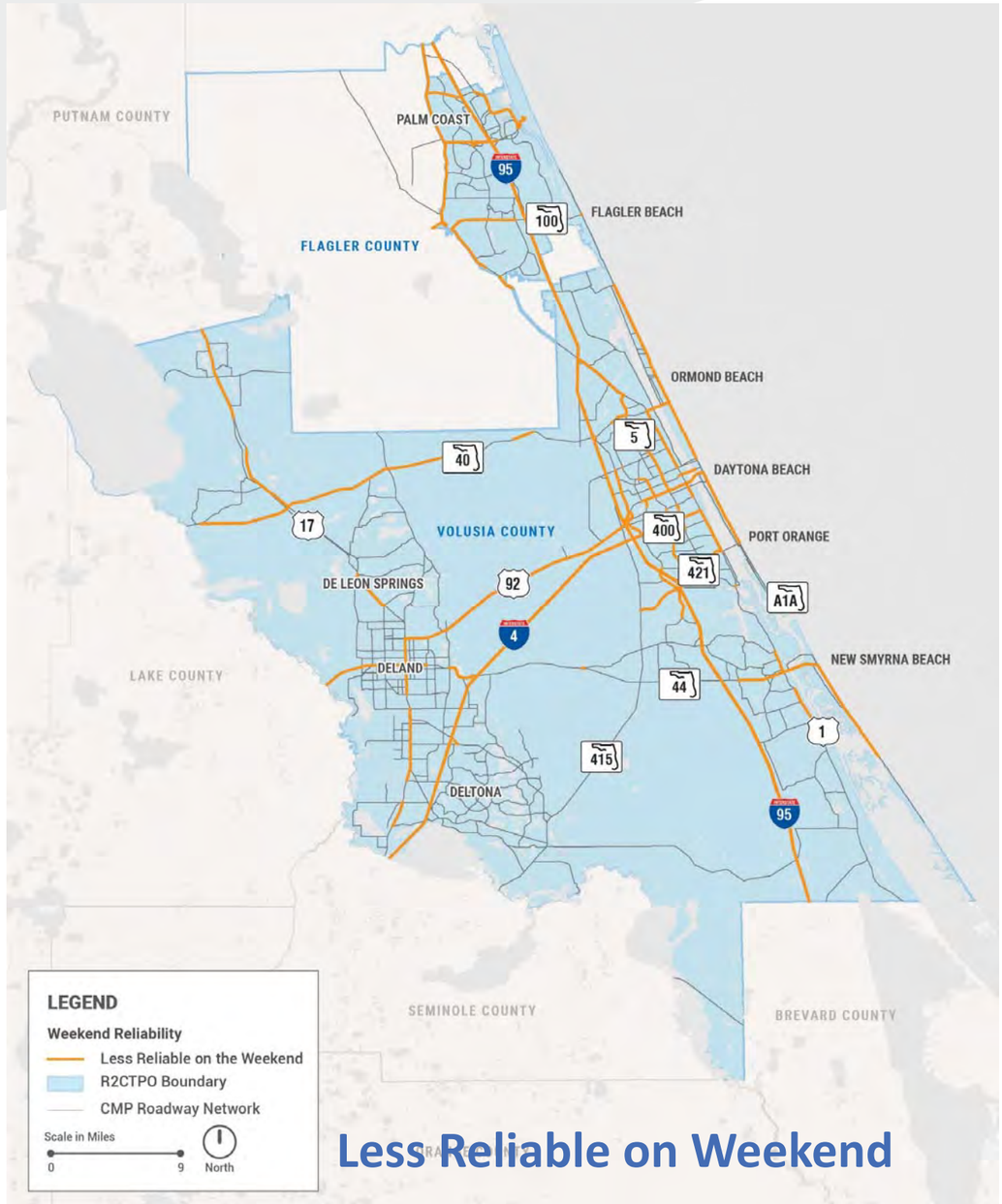
PM Peak Reliability



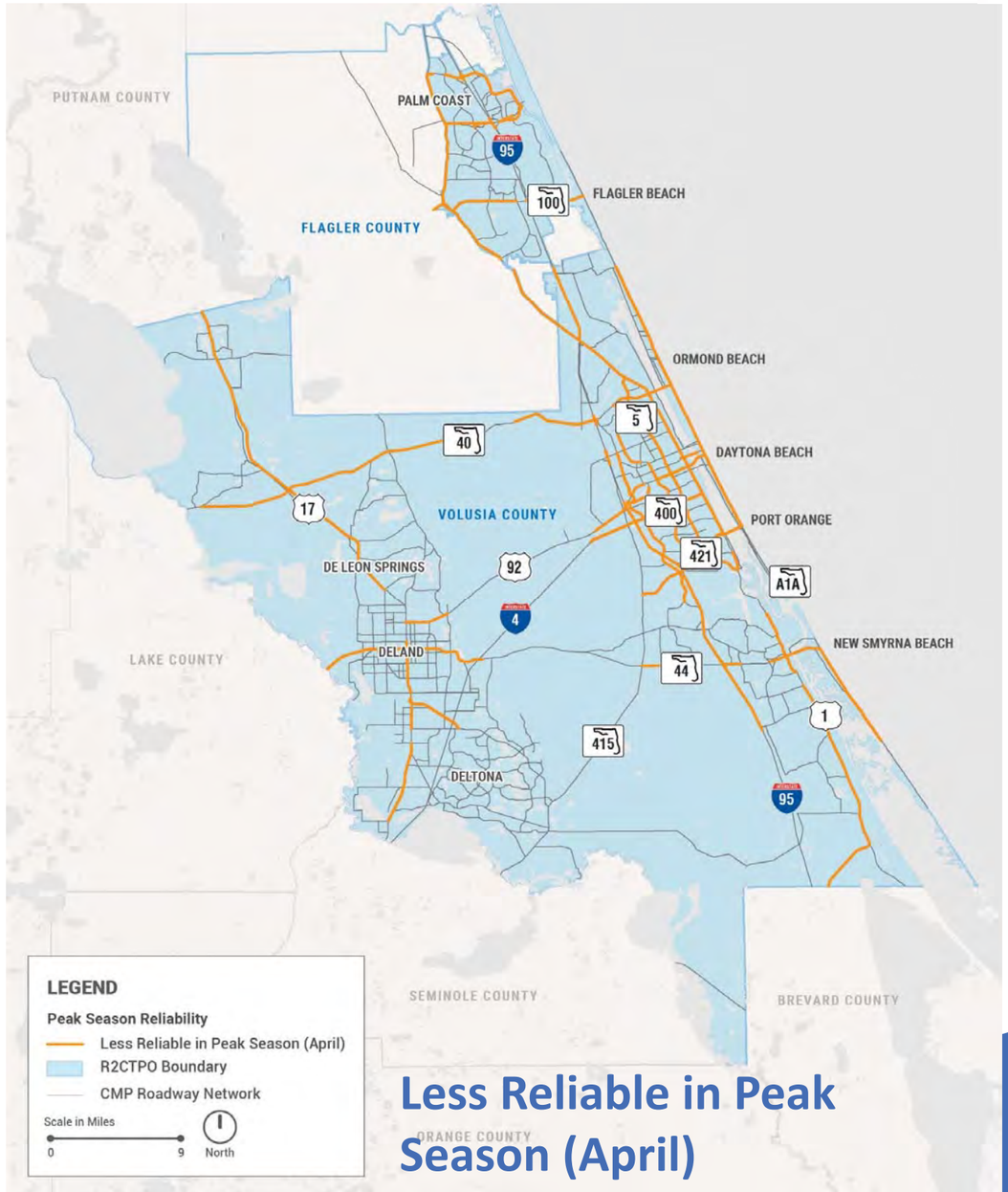
Overall Daily Reliability



Peak Season Travel Time Reliability



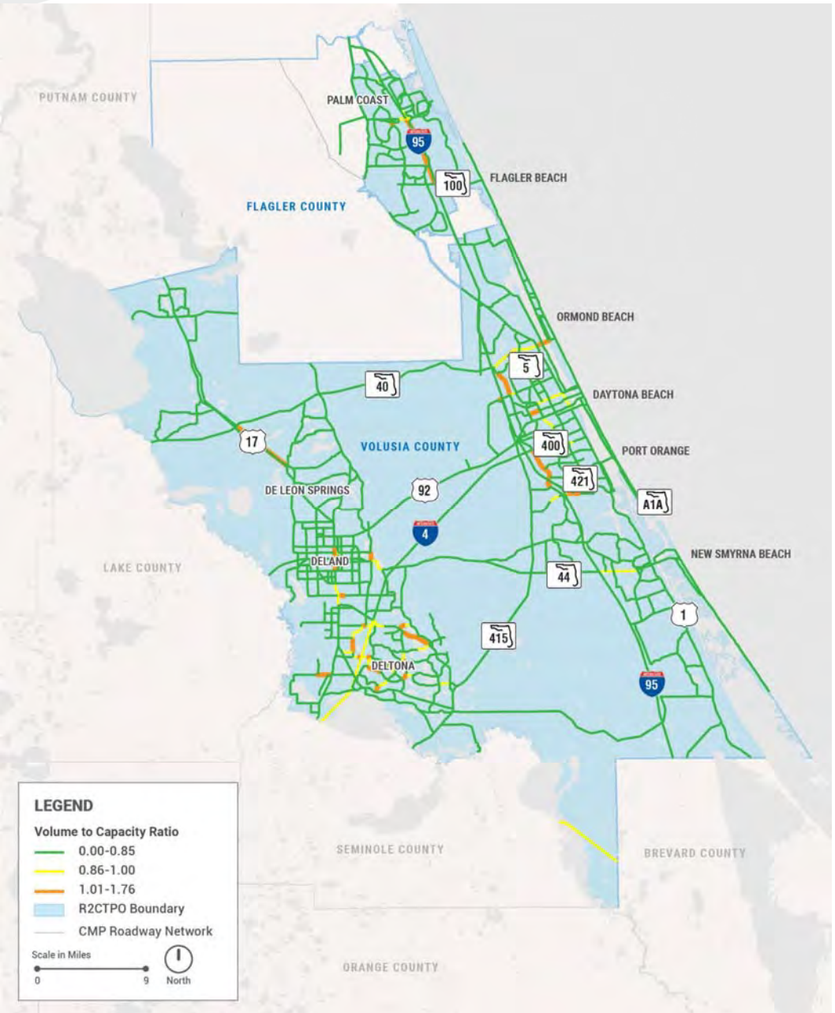
Less Reliable on Weekend



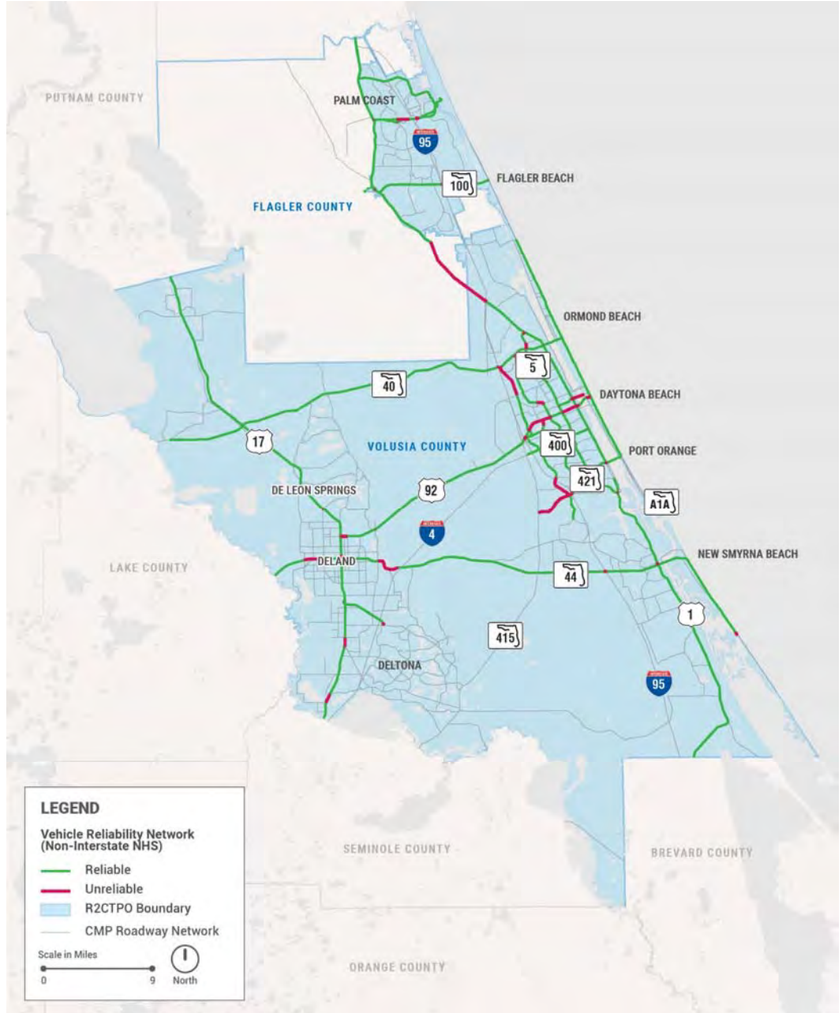
Less Reliable in Peak Season (April)

Any other mobility issues not identified by data?

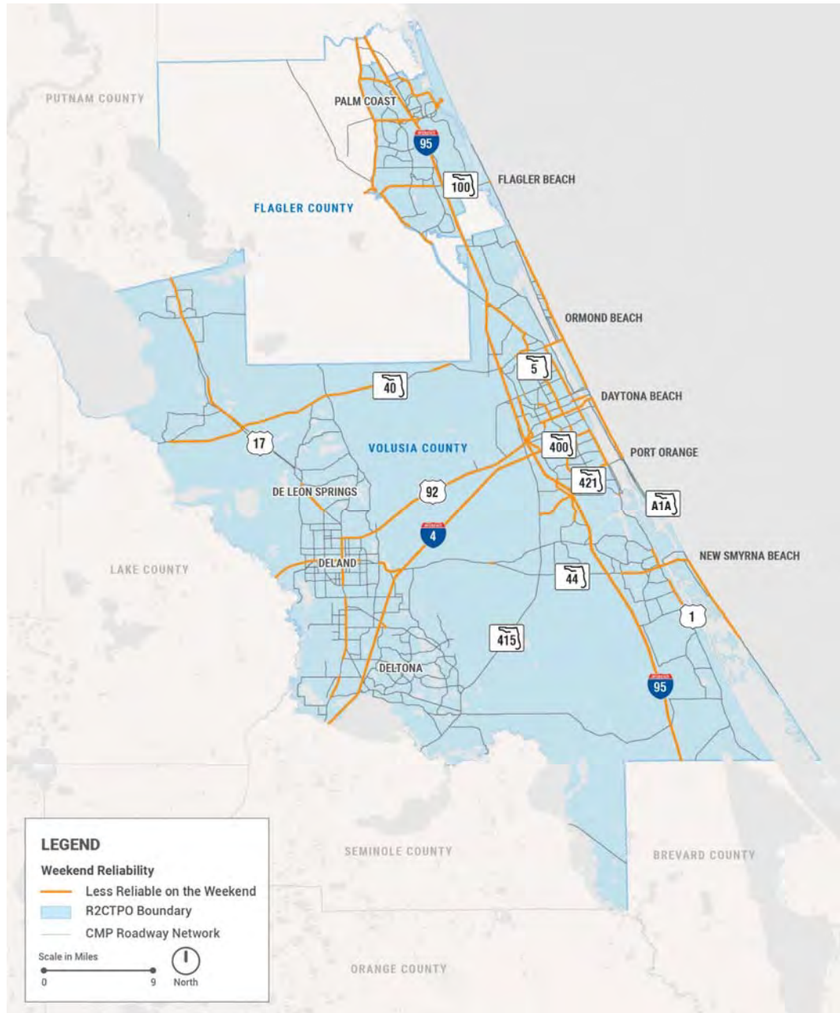
Daily Capacity



Daily Reliability



Weekend Reliability



Goal 2

RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

Support the Economic Development and Growth of the TPO Area and Region

Truck Travel Time Reliability

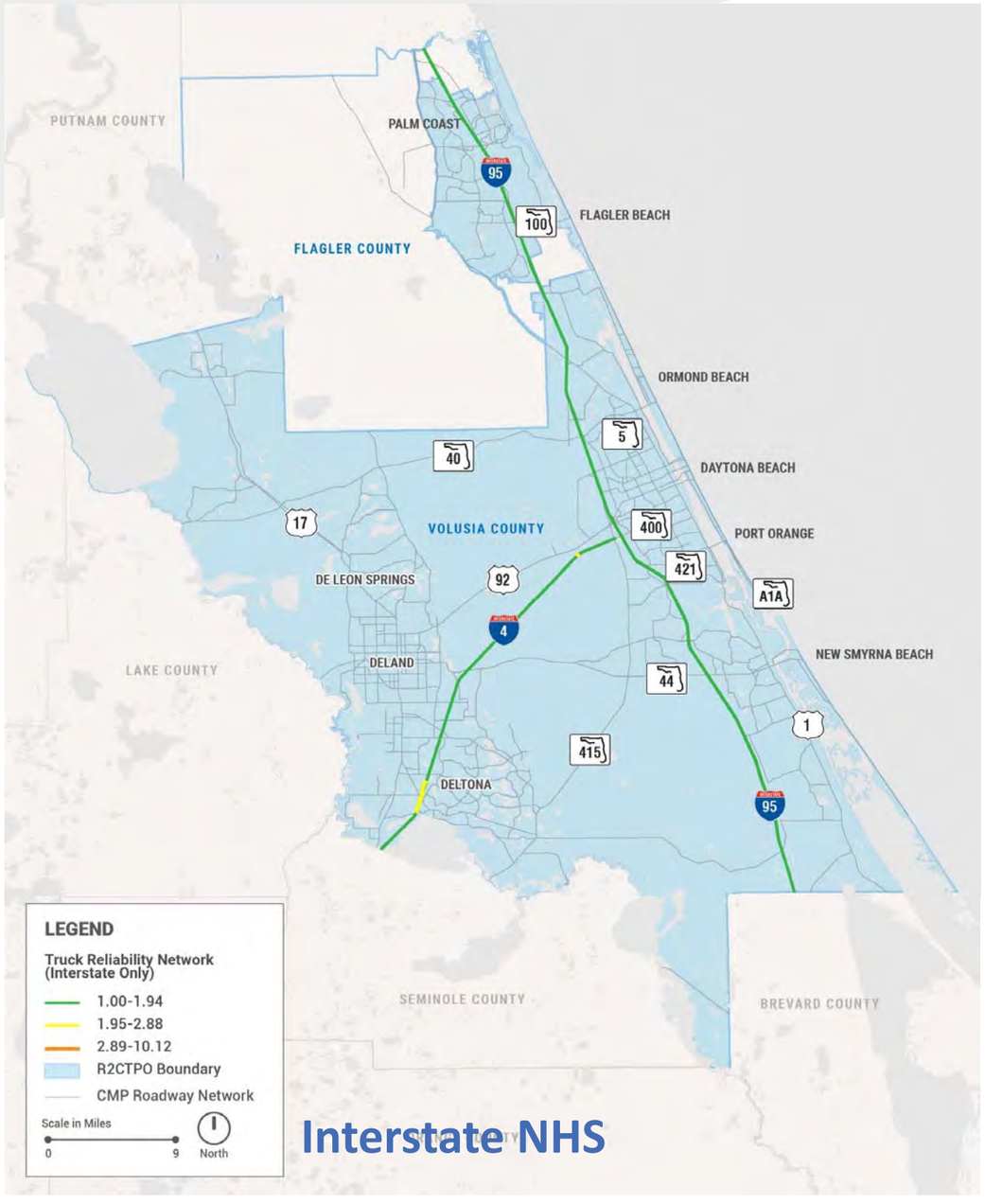
TTTR Breakdown	Reliability
Data Availability	Available for the National Highway System Only
Equation	$\mathbf{TTTR} = \frac{\boldsymbol{95th\ Percentile\ Travel\ Time}}{\boldsymbol{50th\ Percentile\ Travel\ Time}}$
Metric	No defined reliability threshold, rather the segments are compared against each other to identify unreliable spots.

50% of the time it takes 30 minutes or less.
5% of the time it takes 90 minutes or more.

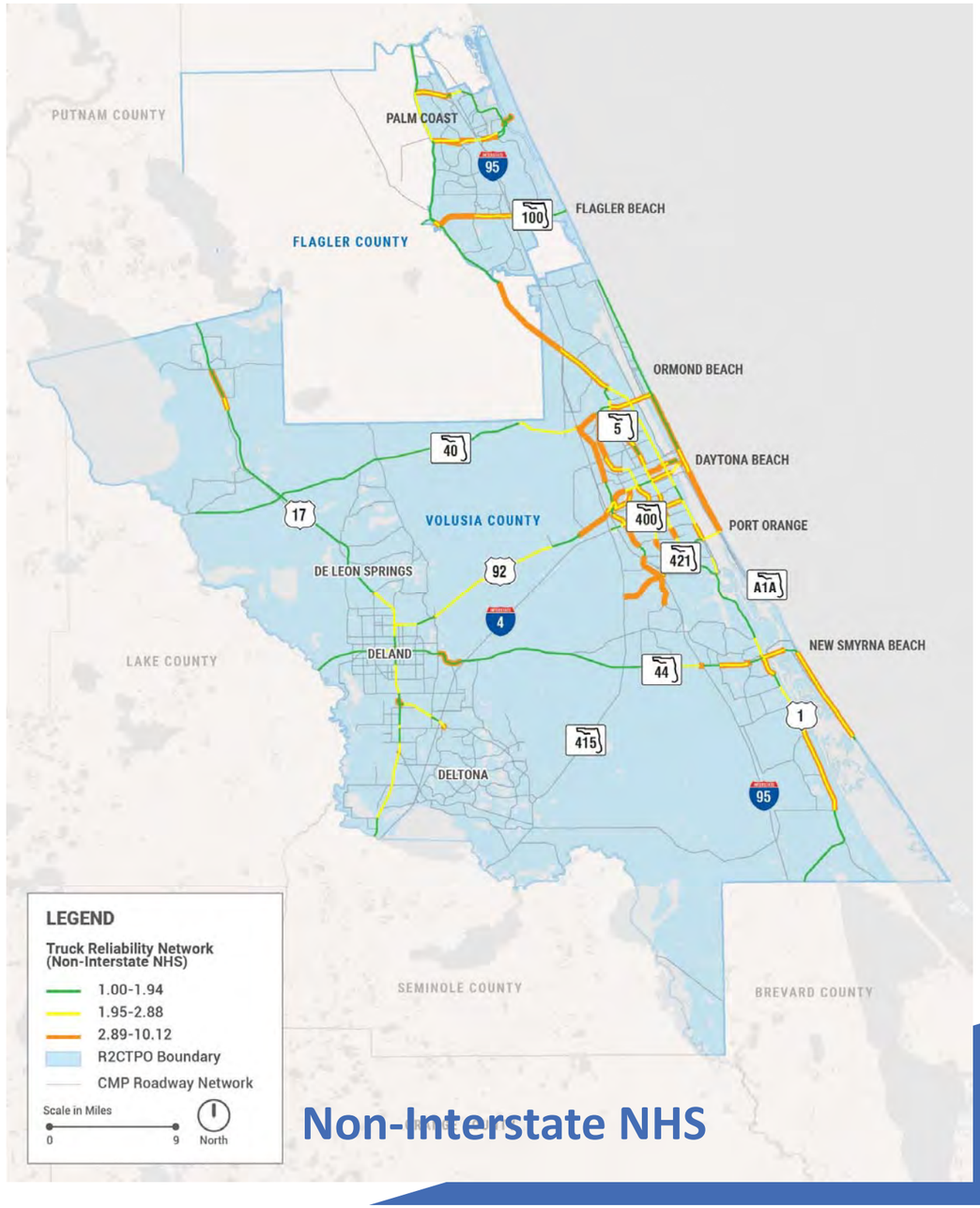
$$\mathbf{TTTR} = \frac{\boldsymbol{90\ minutes}}{\boldsymbol{30\ minutes}} = \mathbf{3.00} = \boldsymbol{Compare\ to\ Entire\ Network}$$

RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

Truck Travel Time Reliability on the NHS



Interstate NHS



Non-Interstate NHS

Based on your experience and knowledge, what are “hotspot” areas and current issues related to truck travel?

RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

Goal 3

RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

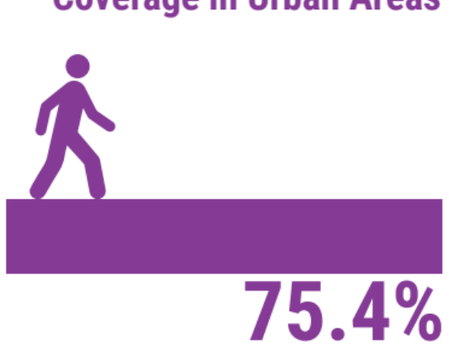
Enhance and Expand Transportation Connectivity and Choice for all Users

What are barriers to implementing bicycle and pedestrian facilities?

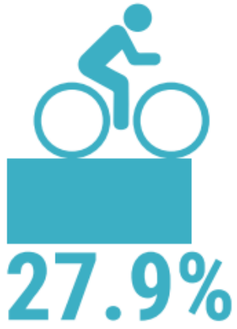
RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

Percent of Roadway Miles with Pedestrian/Bicycle Facilities

% Pedestrian Facility Coverage in Urban Areas



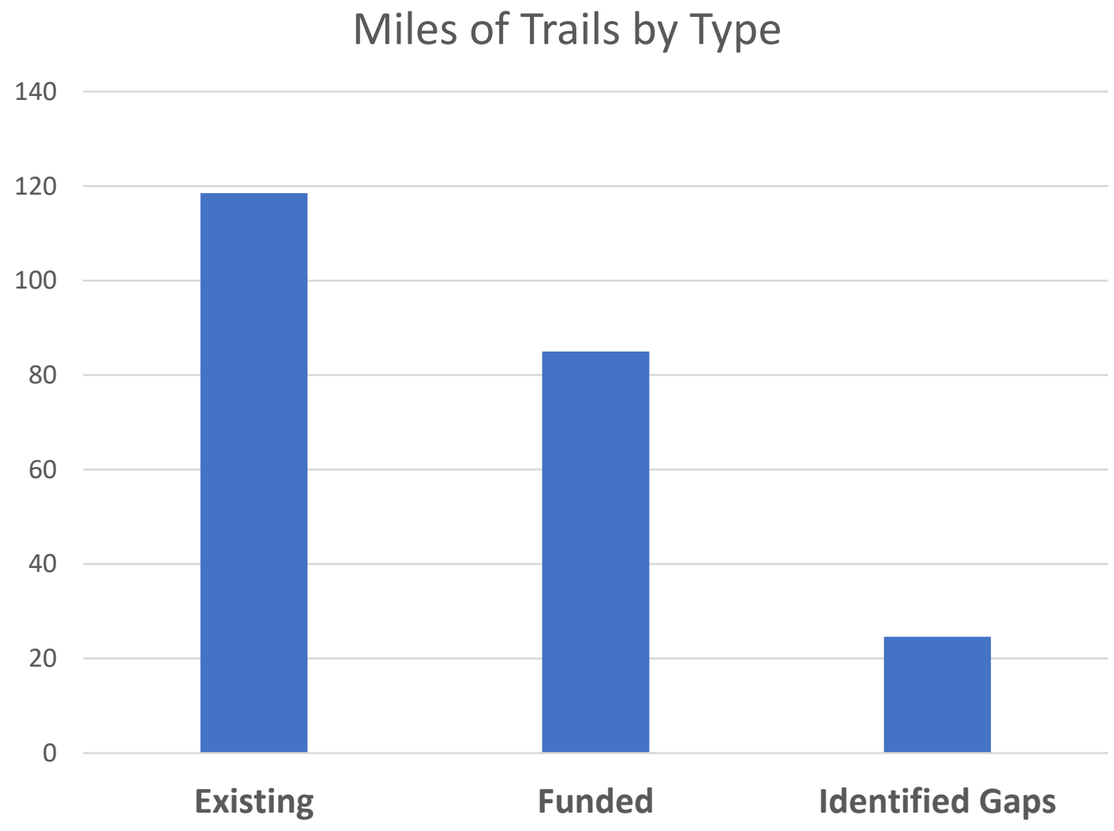
% Bicycle Facility Coverage



*2019 R2CTPO Mobility Profile by FDOT Forecasting and Trends office for NHS, SIS, SHS roadways

RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

Total Miles of Constructed Trail Facilities



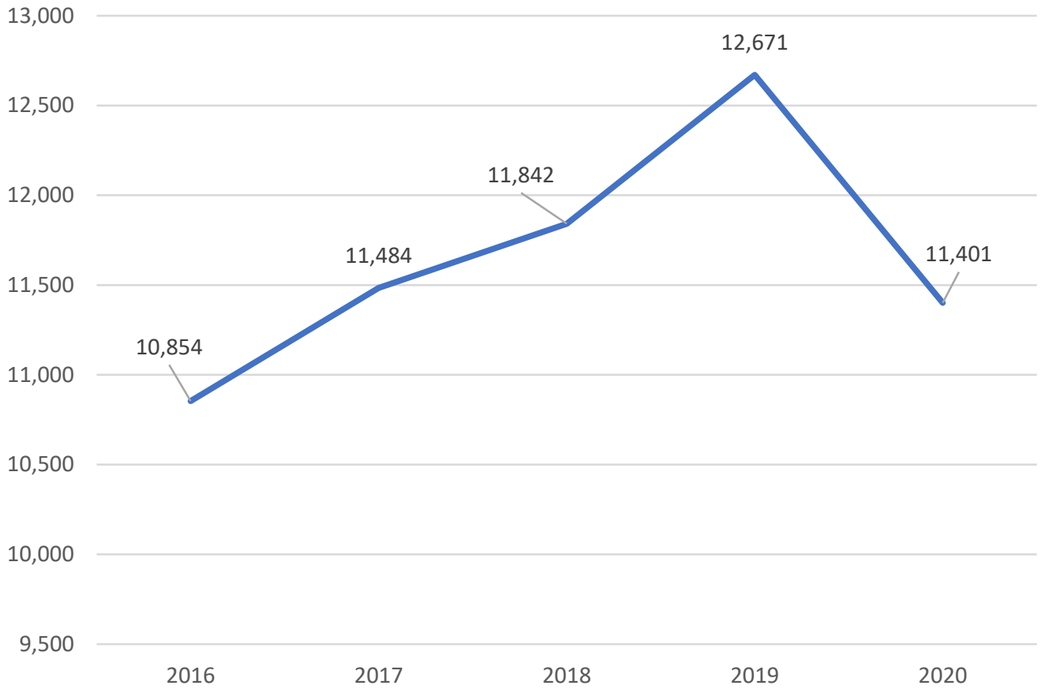
Goal 4

RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

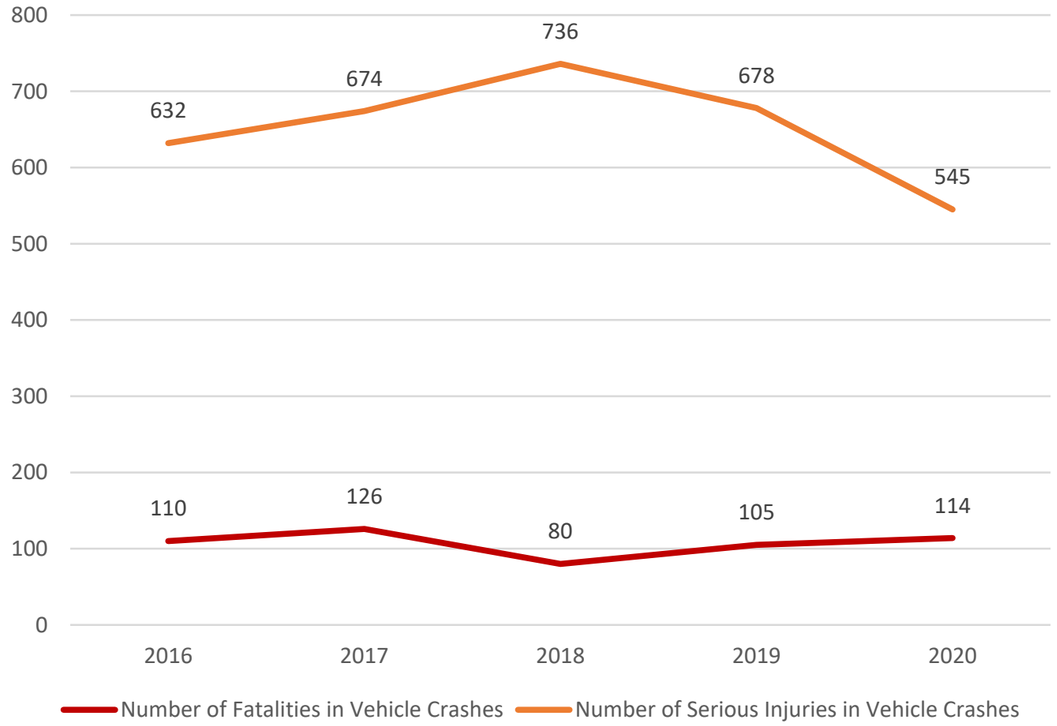
Eliminate or Reduce Crash-Related Fatalities and Serious Injuries (Safety) and Improve Security Throughout the Transportation Network

What are key safety issues in R2CTPO Area?

Total Number of Vehicle Crashes



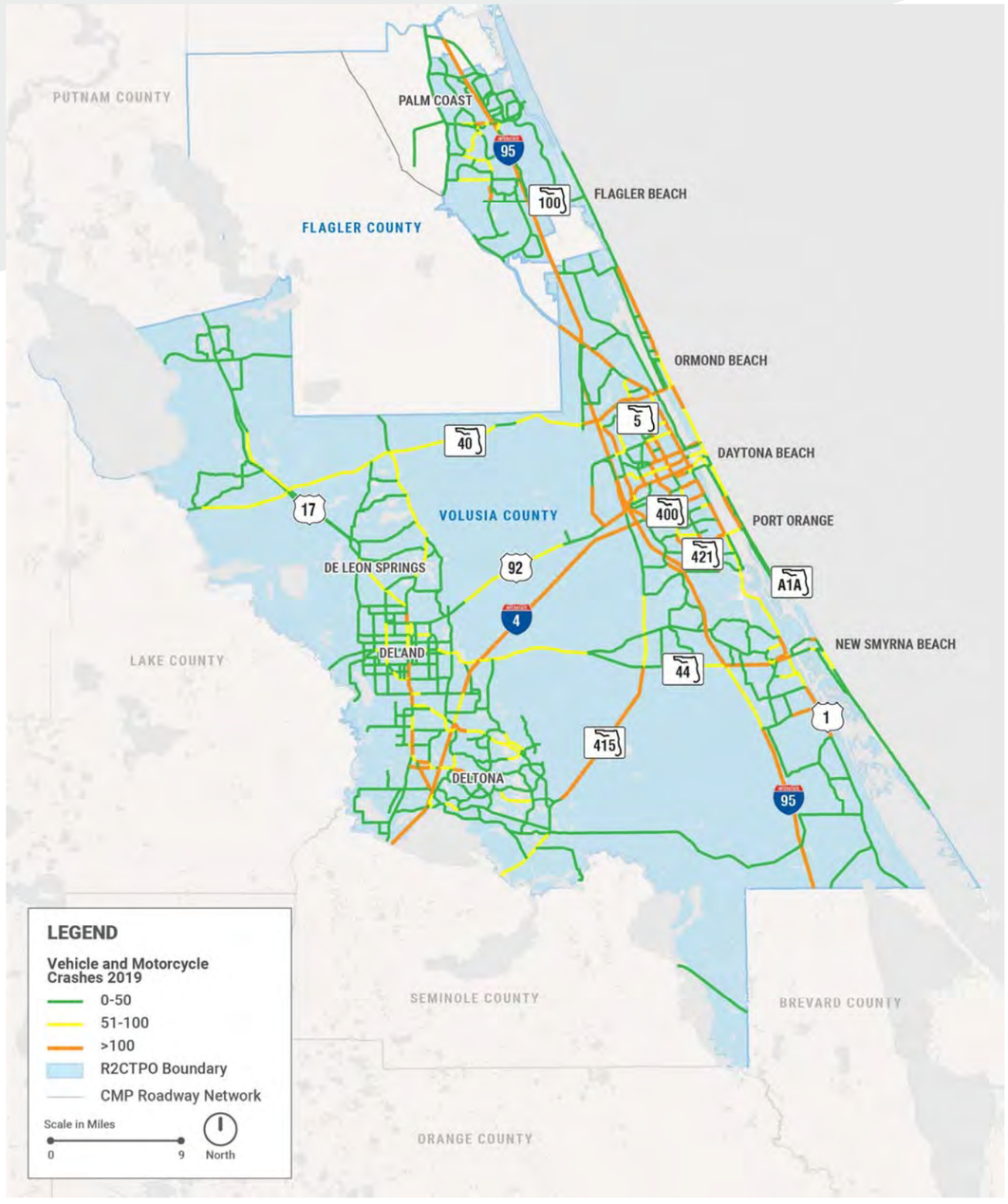
Number of Fatalities and Serious Injuries in Vehicle Crashes



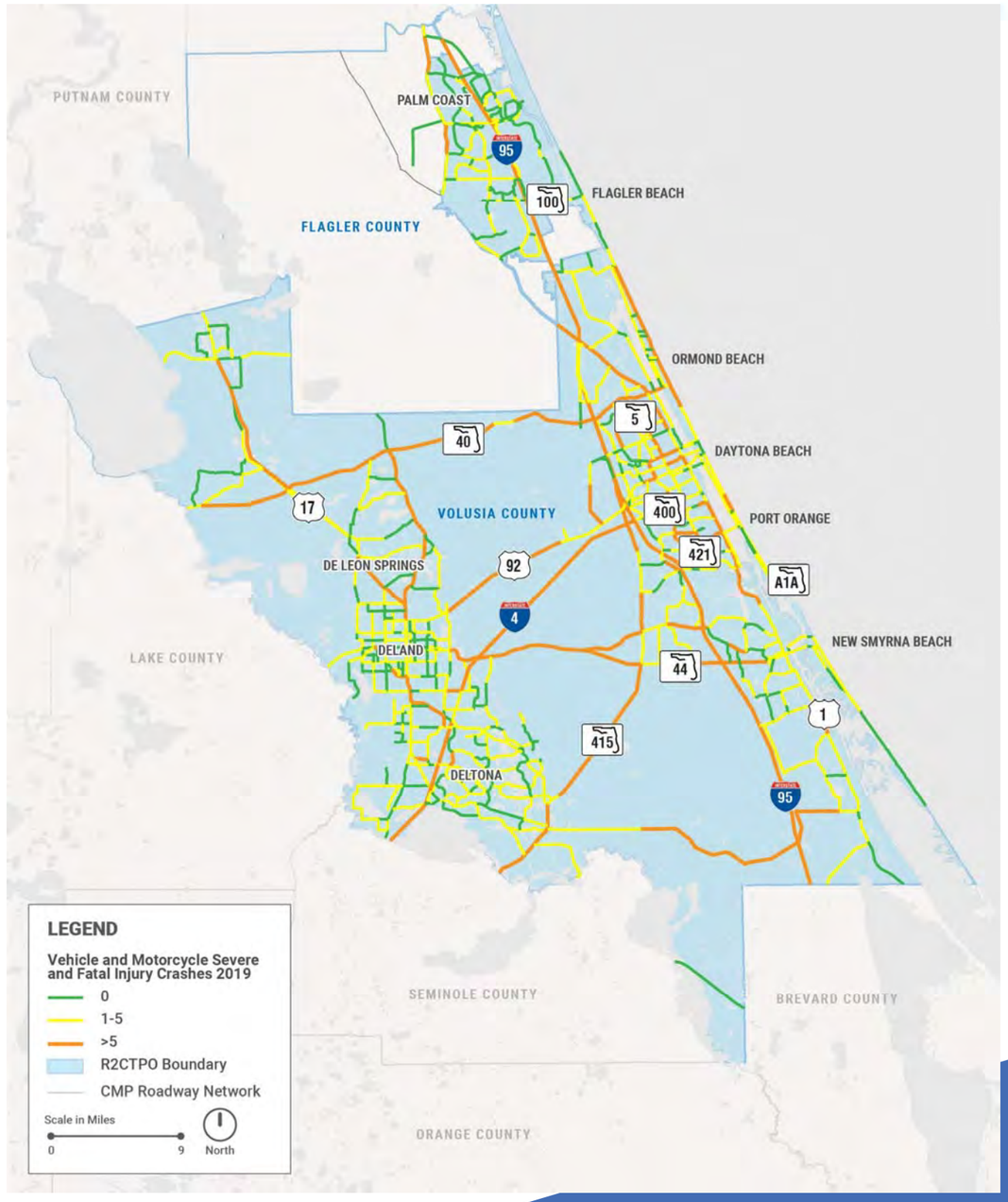
RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

Data Source: Signal Four Analytics (2016 – 2020)

Total Vehicle-Motorcycle Crashes

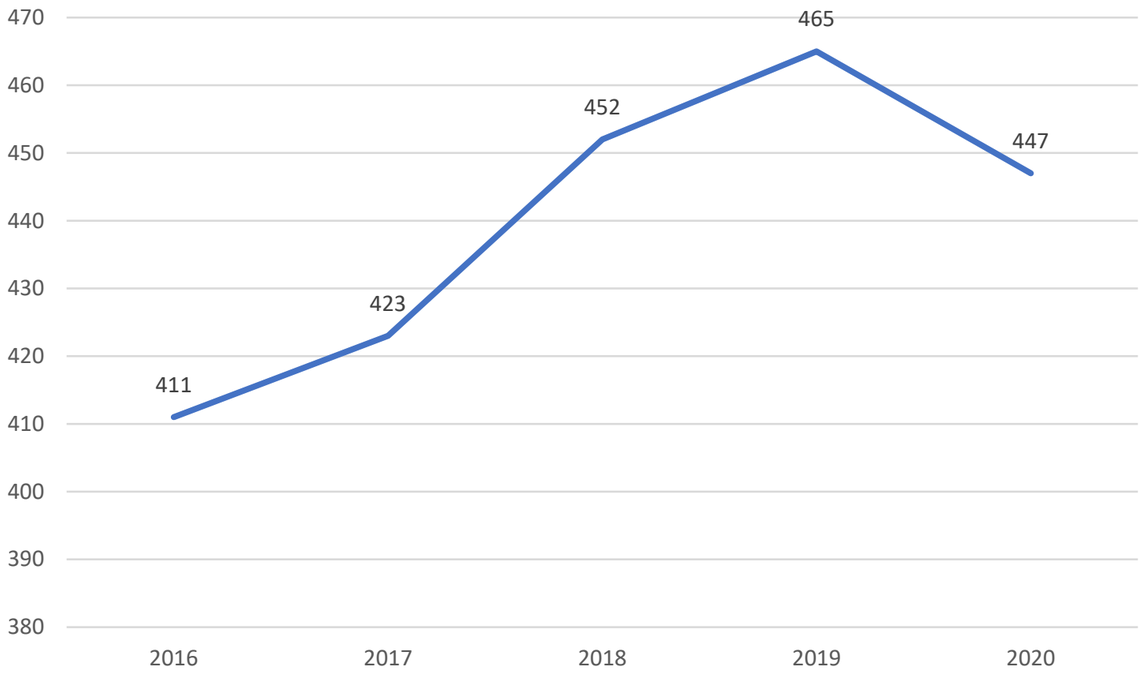


Fatal and Severe Injury Vehicle-Motorcycle Crashes

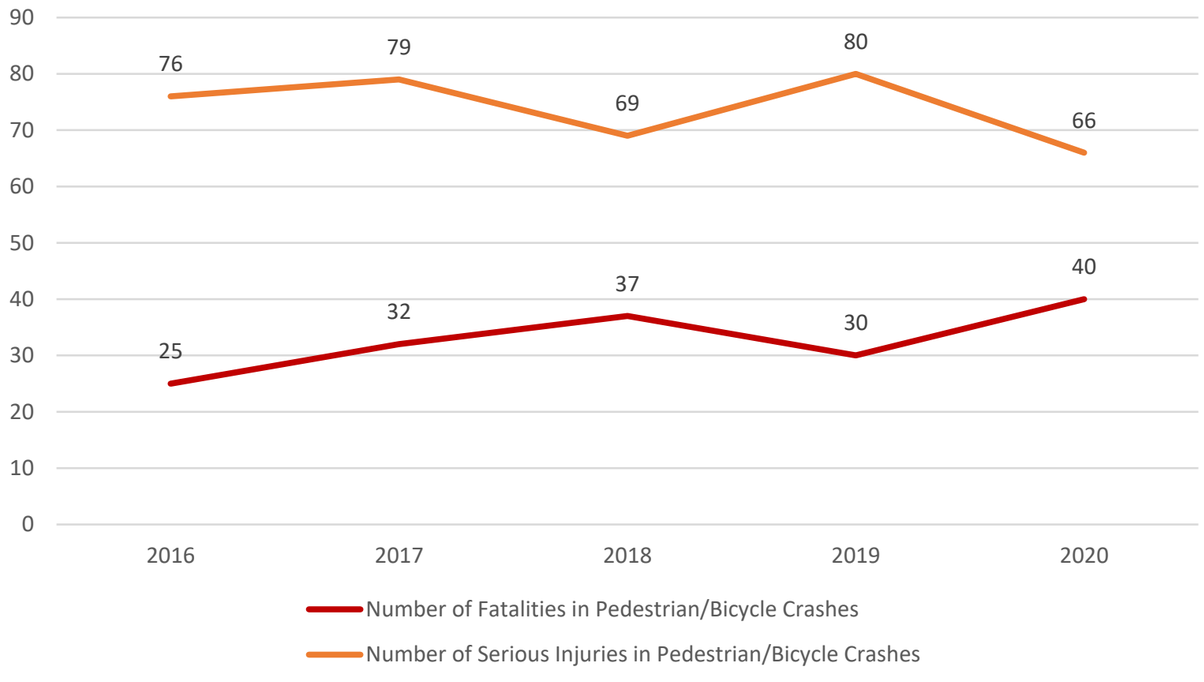


Data Source: Signal Four Analytics (2019)

Total Number of Pedestrian/Bicycle Crashes



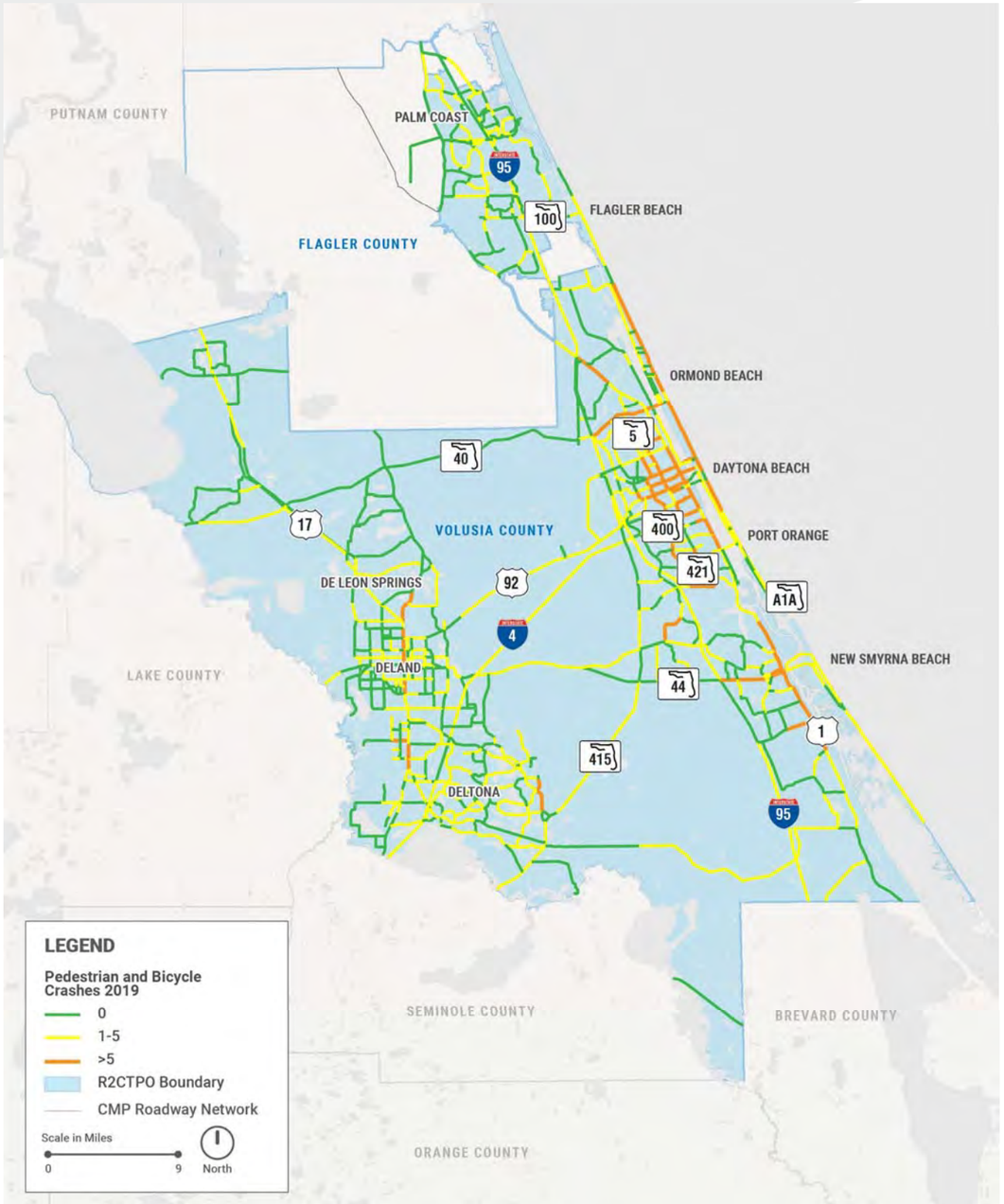
Number of Fatalities/Serious Injuries in Pedestrian/Bicycle Crashes



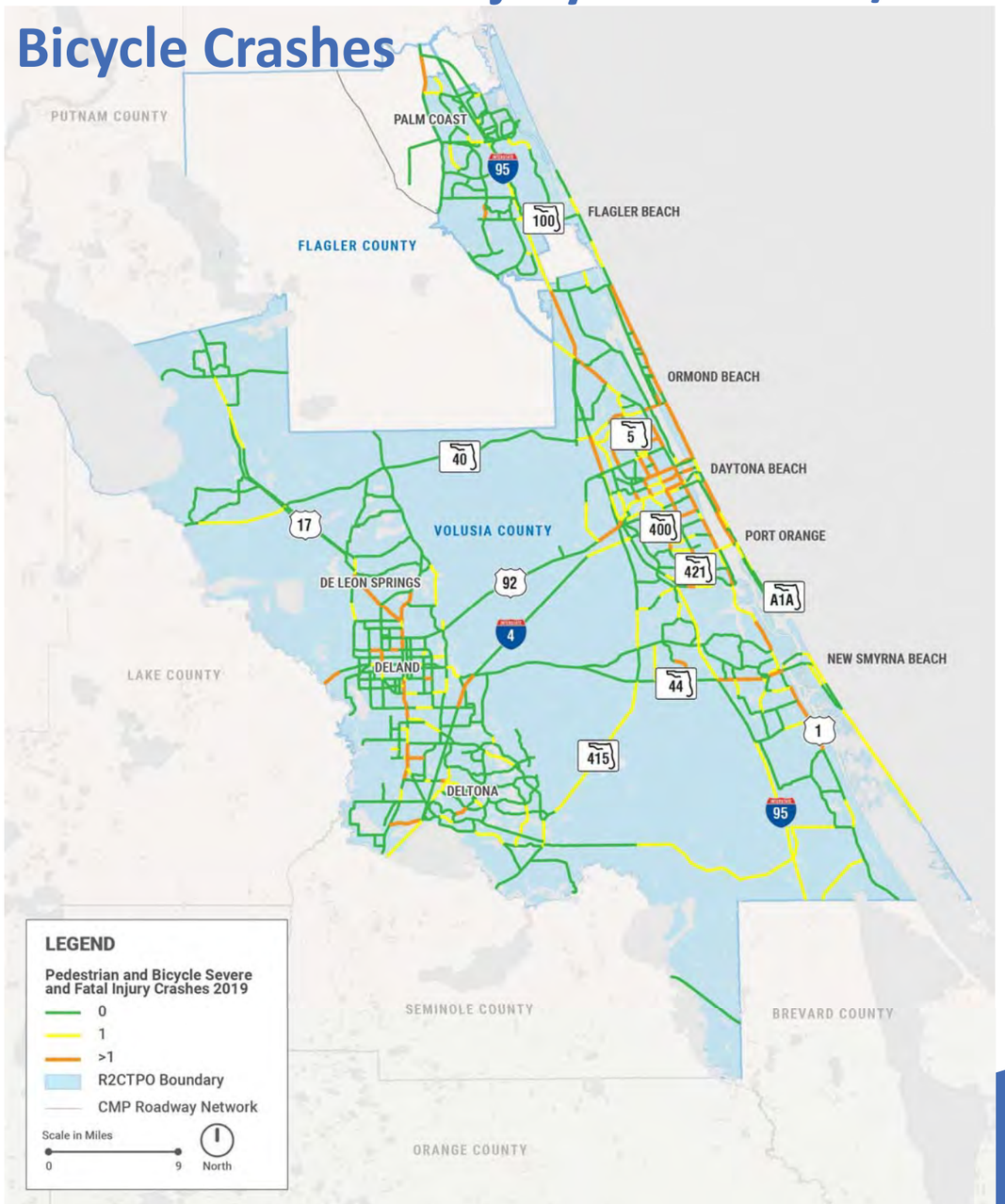
RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

Data Source: Signal Four Analytics (2016 – 2020)

Total Pedestrian/Bicycle Crashes



Fatal and Severe Injury Pedestrian/ Bicycle Crashes



Data Source: Signal Four Analytics (2019)

What factor do you think contributed the most to the increase in vehicular fatalities?

A. Distracted Driving

B. Increased Vehicle Speeds

C. Unsafe Driving Behavior (i.e. running red lights)

D. Other

Start the presentation to see live content. For screen share software, share the entire screen. Get help at **pollev.com/app**

What factor do you think contributed the most to the increase in pedestrian/bicycle fatalities?

A. Distracted Driving

B. Increased Exposure (more non-motorist activity)

C. Increased Vehicle Speeds

D. Unsafe Crossing Opportunities

E. Other

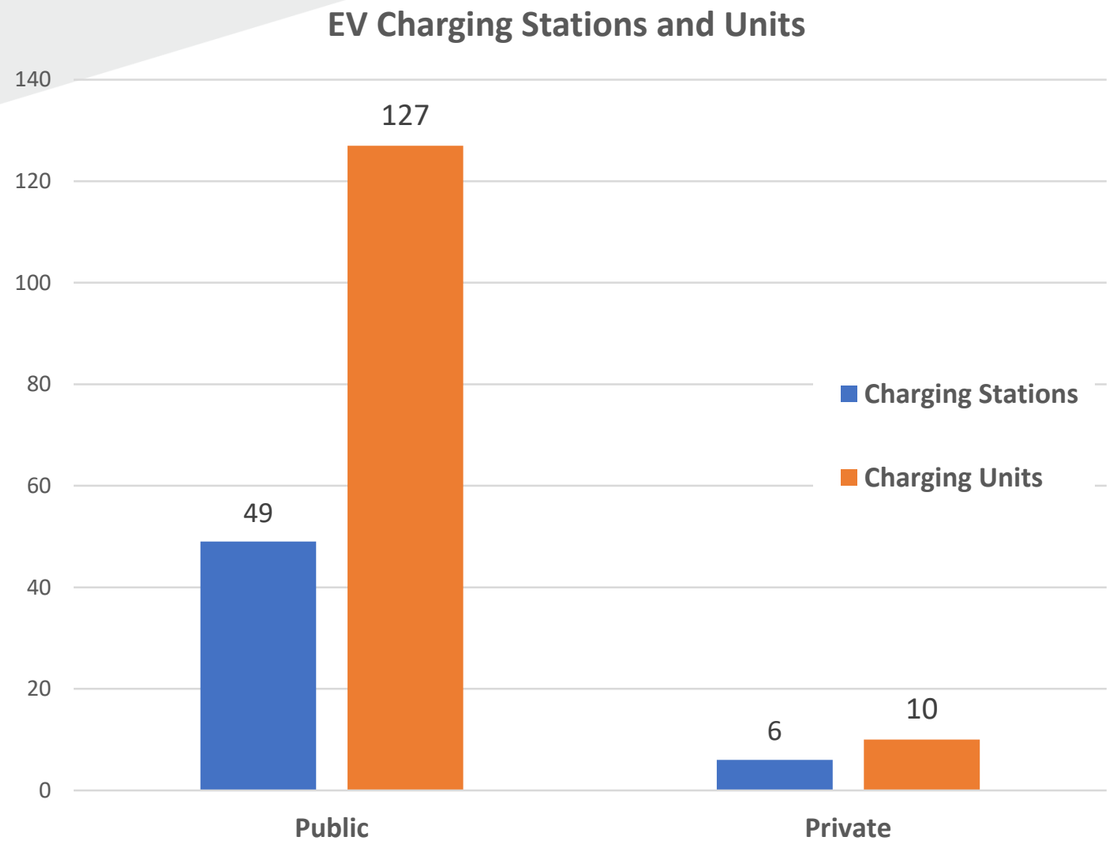
Start the presentation to see live content. For screen share software, share the entire screen. Get help at **pollev.com/app**

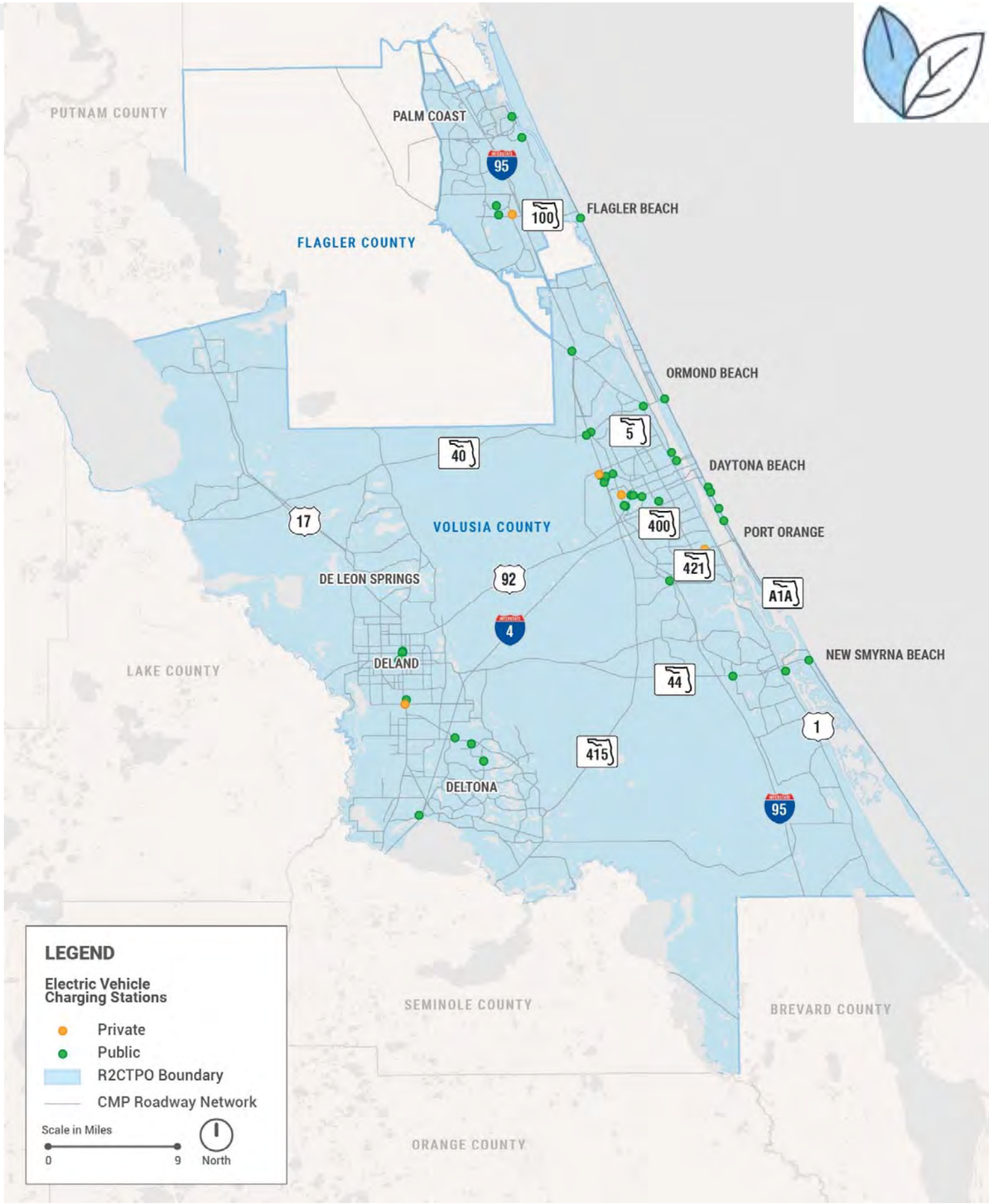
Goal 5

RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

Promote Livability by Providing, Protecting and Enhancing Social, Cultural, Physical and Natural Environmental Places

Total Number of Electric Vehicle Charging Stations





RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

Data Source: FDOT 2020

What are barriers to implementing autonomous, electric, and/or connected vehicles?

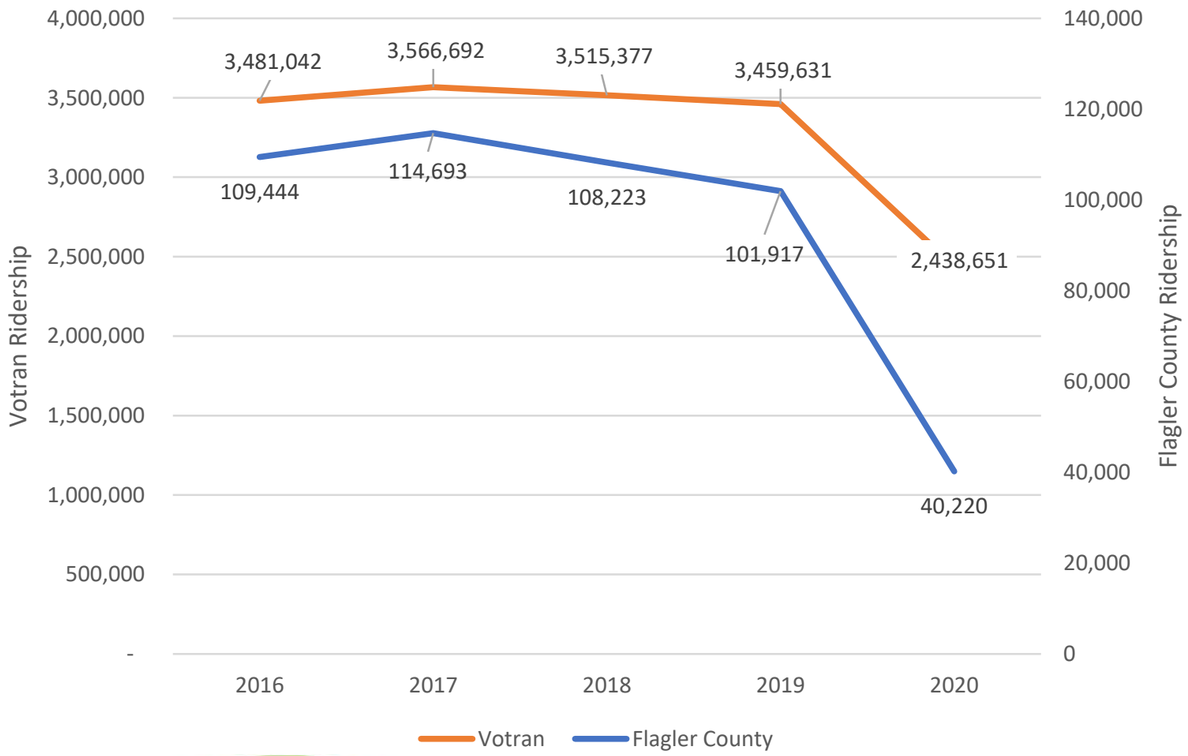
RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

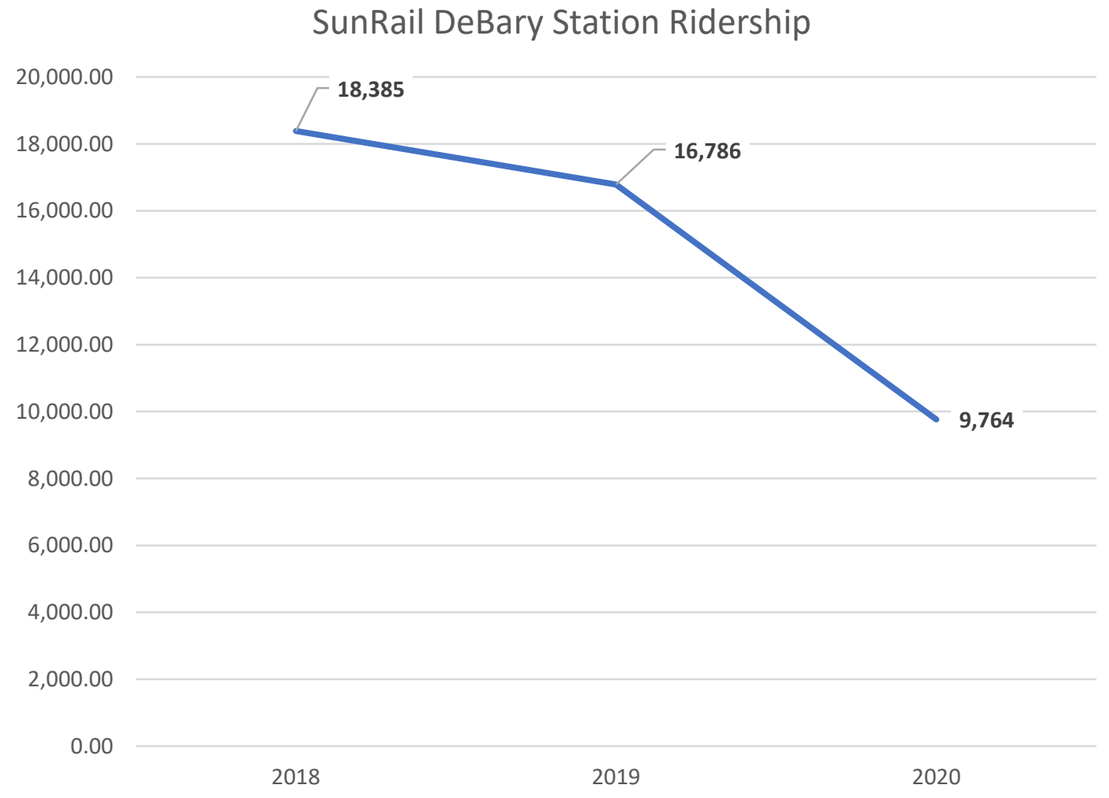
Goal 6

RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

Promote Equity, Transparency, and Opportunities for the Public to be Involved with their Transportation System

Transit Ridership





RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

Data Source: National Transit Database 2016 – 2020; SunRail Monthly Ridership Reports 2018 - 2020

Transit Coverage

78%

Transit routes are within a half mile of the most disadvantaged areas

56%

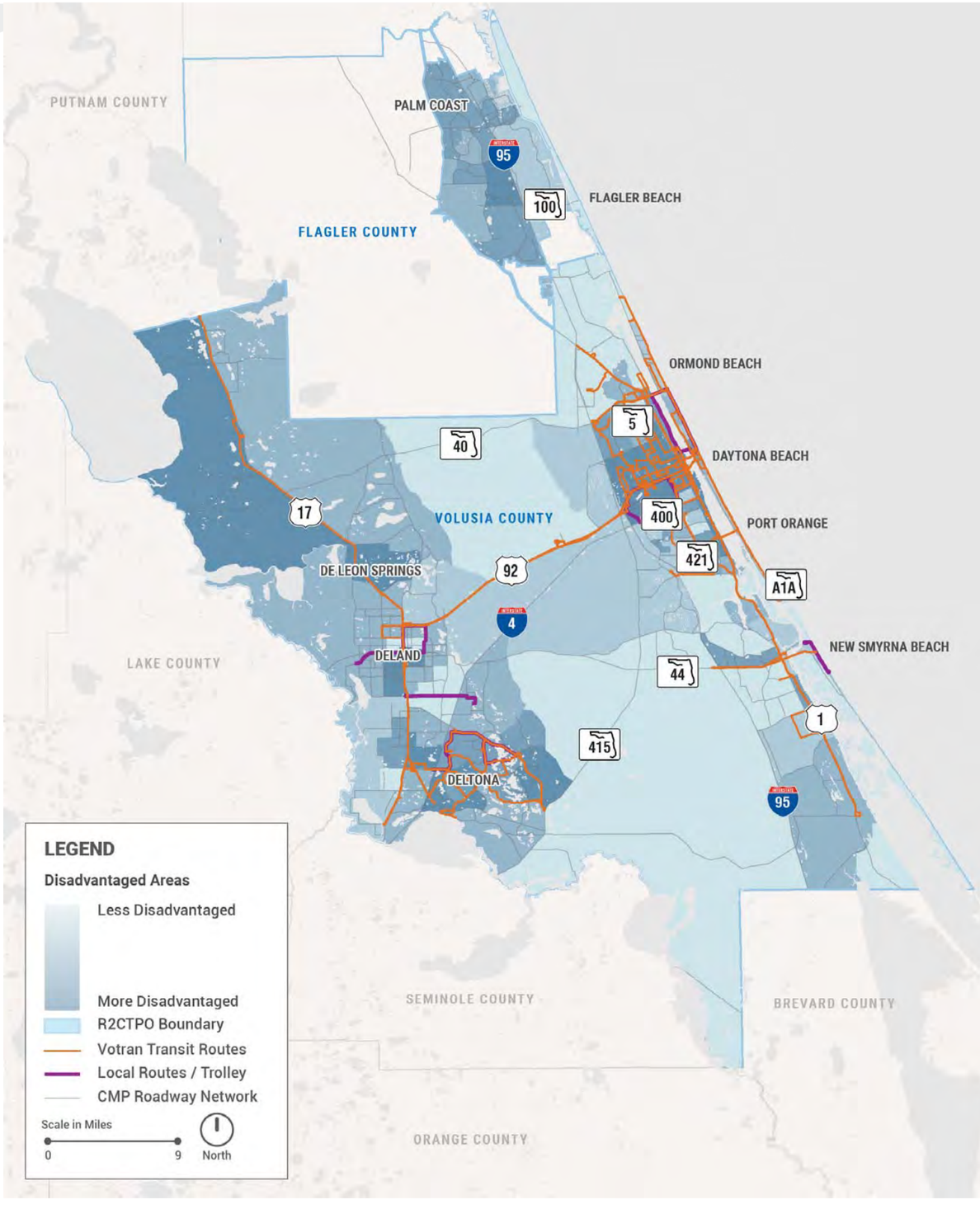
Population and Employment in the R2CTPO are within a half mile of a transit route

Average Job Accessibility by Automobile

Average Job Accessibility by Transit

RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

Source: FDOT D5, FDOT Central Office via University of Minnesota, Votran and Local Routes



Questions and Additional Thoughts?

Next Steps

- Incorporate feedback into Performance Measures
- Develop Congestion Management Strategies
- Draft CMP Report
- Working Group Meeting #2 – Early 2022

RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

Thank You!

Travis Hills, PE, RSP$_1$

thills@kittelson.com

RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

Working Group Meeting #2 Summary

2022 Congestion Management Process

April 18, 2022

In Person

1:30 – 3:00 PM

This meeting was held with the 2022 Congestion Management Process (CMP) Working Group to review the updates made based upon the previous Working Group Meeting and review the CMP strategies. The Working Group includes representatives from the Florida Department of Transportation District 5 (FDOT D5), Volusia and Flagler Counties, local municipalities, and County Emergency Medical Services (EMS). The meeting attendees included:

- Jeremy Dilmore – FDOT D5
- Jay Williams and Sean Castello – Volusia County
- Brian Woodworth and Andy Holmes – City of Daytona Beach
- Colleen Nicoulin and Stephan Harris – River to Sea Transportation Planning Organization (R2CTPO)
- Travis Hills, Adam Burghdoff, and Spencer Maddox – Kittelson & Associates, Inc. (KAI)

The presentation from the meeting can be found at the end of these notes. The following summarizes the key discussion points from the meeting. **Bold** represents follow up action items.

1. Travis led off the meeting by reviewing the agenda and providing a schedule update:
    a. The performance measures previously presented have been updated and finalized.
    b. CMP strategies are in progress and will be reviewed during the meeting.
    c. CMP report documentation has begun with a draft report anticipated to be completed by the end of the month.
2. Spencer reviewed key updates made based upon feedback from the last Working Group Meeting.
    a. The evacuation routes have been updated along with the reported congestion metrics consistent with Flagler and Volusia County standards.
    b. The safety metric maps have been updated to provide an improved visualization of crashes throughout the R2CTPO area.
3. Travis reviewed the FHWA CMP 8-Action process model and how the CMP, LRTP, and additional documents tie into the 8-Action process.
4. Travis outlined the how the congestion management strategies were developed, and the CMP strategy types that were defined. Travis emphasized that not all strategies are included in the presentation, and that feedback from strategies would be solicited through polls.

a. Transportation Demand Management
    i. "Which two TDM strategies do you see the most benefit of?" – The Working Group responded Teleworking (33%) and Carpooling (33%).

b. Policy & Land Use
    i. "Which two Policy & Land Use strategies do you see the most benefit of?" – The Working Group responded Mixed-Use Development (40%) followed by a three-way tie with Complete Street Policies, Multimodal/TOD Guidelines, and Urban Densification (20%).
        1. The Working Group noted other agencies are changing parking codes to be more sustainable. An example is Orlando eliminating parking requirements for new developments. Along with parking, Curb Space Management is another strategy to be considered. **KAI will incorporate parking strategies into the CMP.** Curb space management was already included in the long list of strategies but was not included in the presentation.

c. Pedestrian/Bicycle Strategies
    i. Pedestrian/Bicycle Strategies were broken down into two subcategories – "Add Infrastructure" and "Implement Policies"
        1. "Which two Pedestrian/Bicycle Infrastructure strategies do you see the most benefit of?" The Working Group responded with a tie between Add New Sidewalks and Add Pedestrian/Bicycle Intersection Improvements (38% each).
            a. Additional strategies the Working Group discussed include using collision avoidance systems for pedestrians that has been implemented in Gainesville, providing passive pedestrian detection at signals, and optimizing pedestrian timing at signals. Some of these strategies were already included in the CMP, and **KAI will incorporate any others that may not have been previously incorporated.**
        2. "Which two Pedestrian/Bicycle Policy Strategies do you see the most benefits of?" The Working Group responded with a tie between Complete Streets Improvements and Expand Trail Network and Local Connections (36% each) followed by Safe Routes to School Study Recommendations (29%).
            a. Working Group members from the City of Daytona Beach noted that the City currently views micromobility as more of a recreational activity than currently providing a transportation demand strategy.
            b. The Working Group also noted that the City of Portland has guidance on implementing micromobility. **KAI will review Portland's policy and reference in the CMP report if applicable.**

d. Transit Strategies

i. Transit strategies were separated into two subcategories – "Add / Expand Service" and "Operational Improvements"

1. "Which two Transit Service strategies do you see the most benefit of?" The Working Group responded Expand/Implement Transit Routes (42%) and Expand on Demand Transit (25%).

a. The Working Group noted that there has been success in developing "Flex" service areas in New Jersey, and there are existing Flex routes in Daytona Beach. Flagler County has also been discussing implementing Flex routes.

b. The Working Group also discussed connecting Votran to the new Deland SunRail Station. It was noted that the connection has already been included in Votran's TDP. **KAI will add the connection to SunRail as a strategy in the CMP.**

2. "Which two Transit Operational Improvement strategies do you see the most benefit of?" The Working Group responded Electronic/Mobile Fare Collection (45%) followed by a tie with Transit Signal Priority and Transit Stop Enhancements (27% each).

a. The Working Group noted that Queue Jump lanes may have potential to be used in combination with congestion pricing/HOT lanes where vehicles pay to use the transit queue jump lane.

e. Transportation System Management & Operations (TSM&O)

i. Transit strategies were broken down into three subcategories – "System Management", "Information Dissemination / Expand ITS", and "Special Event Management"

1. "Which two TSM&O System Management strategies do you see the most benefit of?" The Working Group responded Traffic Signal Operations (33%) followed by a two-way tie between Innovative Intersection Improvements and Access Management (25% each).

a. The Working Group noted that the Ramp Metering Studies can also be used for incident management, and that incident management is being reviewed at every new interchange along I-95. **KAI will update the Ramp Metering Strategy to include incident management.**

2. "Which TSM&O ITS strategies do you see the most benefit of?" The Working Group responded Traveler Information Systems (58%) and Roadway Monitoring Infrastructure (33%).

3. "Which TSM&O Event Management strategies do you see the most benefit of?" The Working Group responded Connect Traffic Centers (43%) and Enhanced Law Enforcement (29%).

a. The Working Group discussed that FDOT is receiving or has received access to Waze, Google, and other data information providers in order to better understand how

parking lots are being utilized during special events. FDOT is working to incorporate this data at their Traffic Management Centers so it can be reported back to the general public. Additionally, Google has started using Pebble for parking management with potential plans to integrate into Google Maps. **KAI will incorporate Parking Management as a strategy into the CMP report.**

f. Emerging Technologies
    i. Emerging Technologies were broken down into two subcategories "Data and Infrastructure" and "Policy Changes"
        1. "Which two Data and Infrastructure Emerging Technology strategies do you see the most benefit of?" The Working Group responded EV Charging Stations (46%) followed by a three-way tie between Emerging Technology Working Group, Data Marketplace, and Pavement Asset Management (15% each).
        2. "Which two Emerging Technology Policy Strategies do you see the most benefit of?" The Working Group responded EV-Ready Building Codes and EV Fee Incentive (40% each) followed by Automated Truck Transfer Stations (20%)

g. Roadway Strategies
    i. "Which two Roadway strategies do you see the most benefit of?" The Working Group responded Intersection/Interchange Improvements (43%) followed by Street Connectivity (36%).

5. Additional Takeaways
    a. The Working Group discussed the implementation of these strategies and how they can be mixed and matched to address congestion management. **KAI will incorporate how the strategies can be combined to address congestion management in the report.**
    b. The Working Group asked about Freight specific strategies as Freight did not have a specific category. Many strategies apply to both freight and vehicles. **KAI will create a Freight strategy category in the CMP report.**
6. Barriers to Implementation (besides funding)
    a. The Working Group discussed how locals can use this information to implement strategies. Public perception and opinion are important when implementing strategies, especially with elected officials. Additional barriers include people focusing on the short term instead of long-term planning, and some strategies such as ITS are not as visible for the general public, thus they are not viewed as being a higher priority strategy even though they provide significant benefit.
7. Next Steps
    a. **KAI will incorporate feedback from the working group into the CMP report.**
    b. Upcoming presentations
        i. Draft CMP to CAC/TCC May 17th and TPO Board May 25th.
        ii. CMP Adoption to CAC/TCC June 21st and TPO Board June 22nd.

RIVER TO SEA TPO
Transportation Planning Organization
VISION - PLAN - IMPLEMENT

CONGESTION MANAGEMENT PROCESS

April 18, 2022

Working Group Meeting #2

Working Group Agenda

- Schedule Update
- Working Group #1 Recap
- Congestion Management Strategies
- Next Steps

RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

Schedule Update

Working Group Meetings

TCC/CAC and Board Presentations

1 – PROCESS	2 – GOALS	3 – NETWORK	4 – MEASURE	5 – STRATEGIES	6 – REPORT
• Re-evaluate current CMP approach • Update CMP and create easy-to-monitor process	• Create CMP specific goals and objectives that align with the LRTP	• Develop a multimodal network that will be evaluated for congestion management purposes	• Determine what we are going to measure and what data is available/needed	• Identify and evaluate congestion management related strategies	• Document all steps and findings

In Progress

RIVER TO SEA TPO
Transportation Planning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

Upcoming Presentations

Draft CMP –

CAC/TCC: May 17th

TPO Board: May 25th

CMP Adoption –

CAC/TCC: June 21st

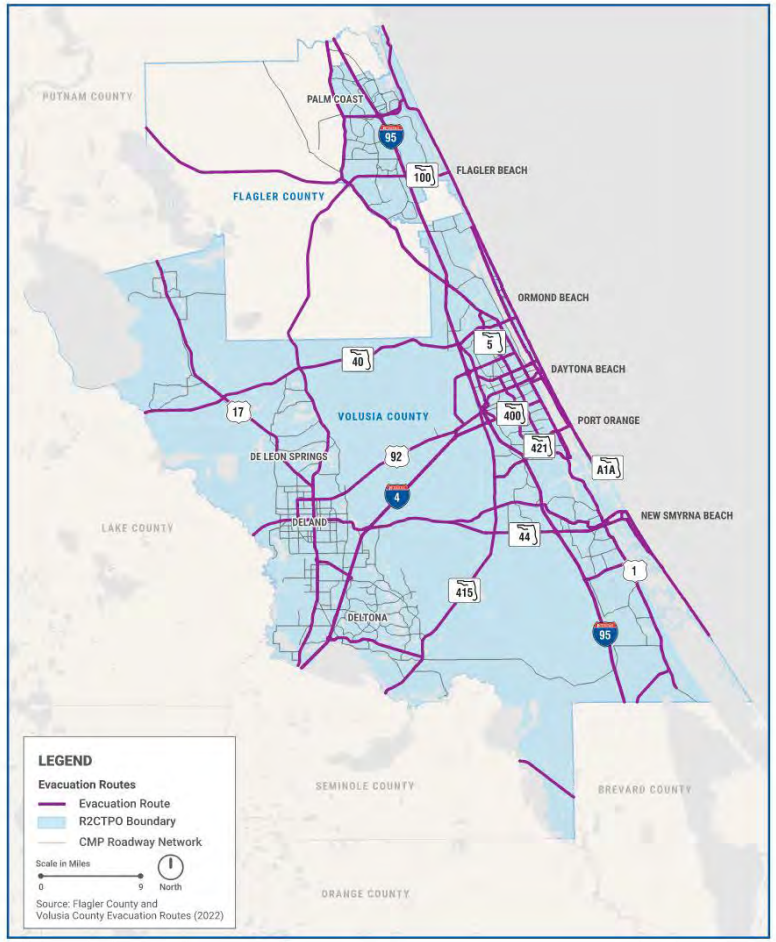
TPO Board: June 22nd

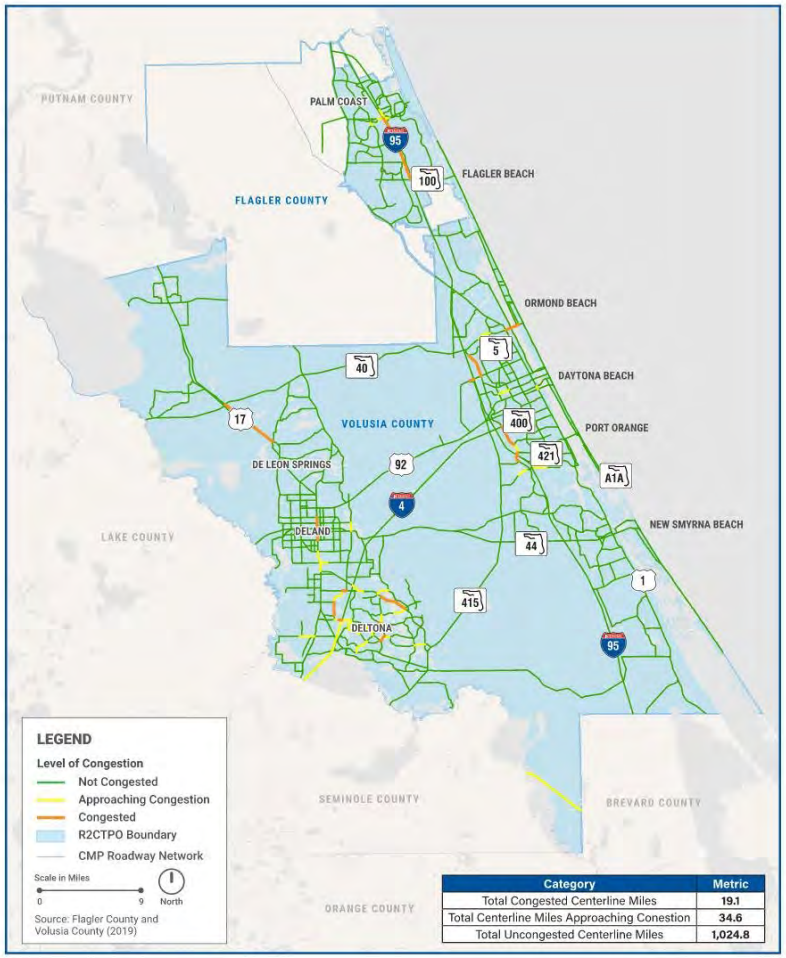
RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

RIVER TO SEA Transportation P anning Organization TPO
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

Working Group Meeting #1 Recap

Evacuation Route and Congestion Metrics





- Updated Evacuation Routes consistent with Volusia and Flagler County GIS data
- Updated Congestion thresholds for Volusia and Flagler County based on Working Group discussion

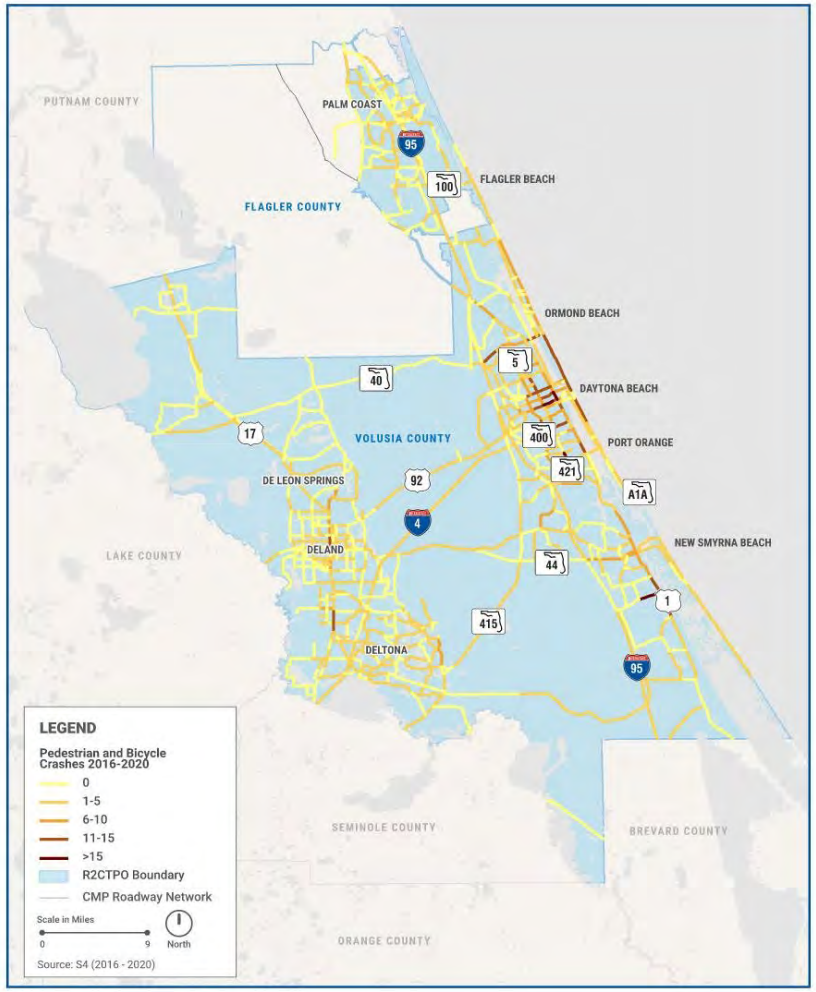
Metric for Non-Evacuation Route Roadways	• V/C < 0.90 is Not Congested • V/C >= 0.90 and < 1.10 is Approaching Congestion • V/C >= 1.10 – Congested
Metric for Evacuation Route Roadways	• V/C < 0.90 – Not Congested • V/C between 0.90 and 1.00 is Approaching Congestion • V/C >= 1.00 is Congested

Safety Metrics

RIVER TO SEA TPO Transportation Planning Organization VISION • PLAN • IMPLEMENT

CONGESTION MANAGEMENT PROCESS

Total Vehicle and Motorcycle Crashes by CMP Segment



RIVER TO SEA TPO Transportation Planning Organization VISION • PLAN • IMPLEMENT

CONGESTION MANAGEMENT PROCESS

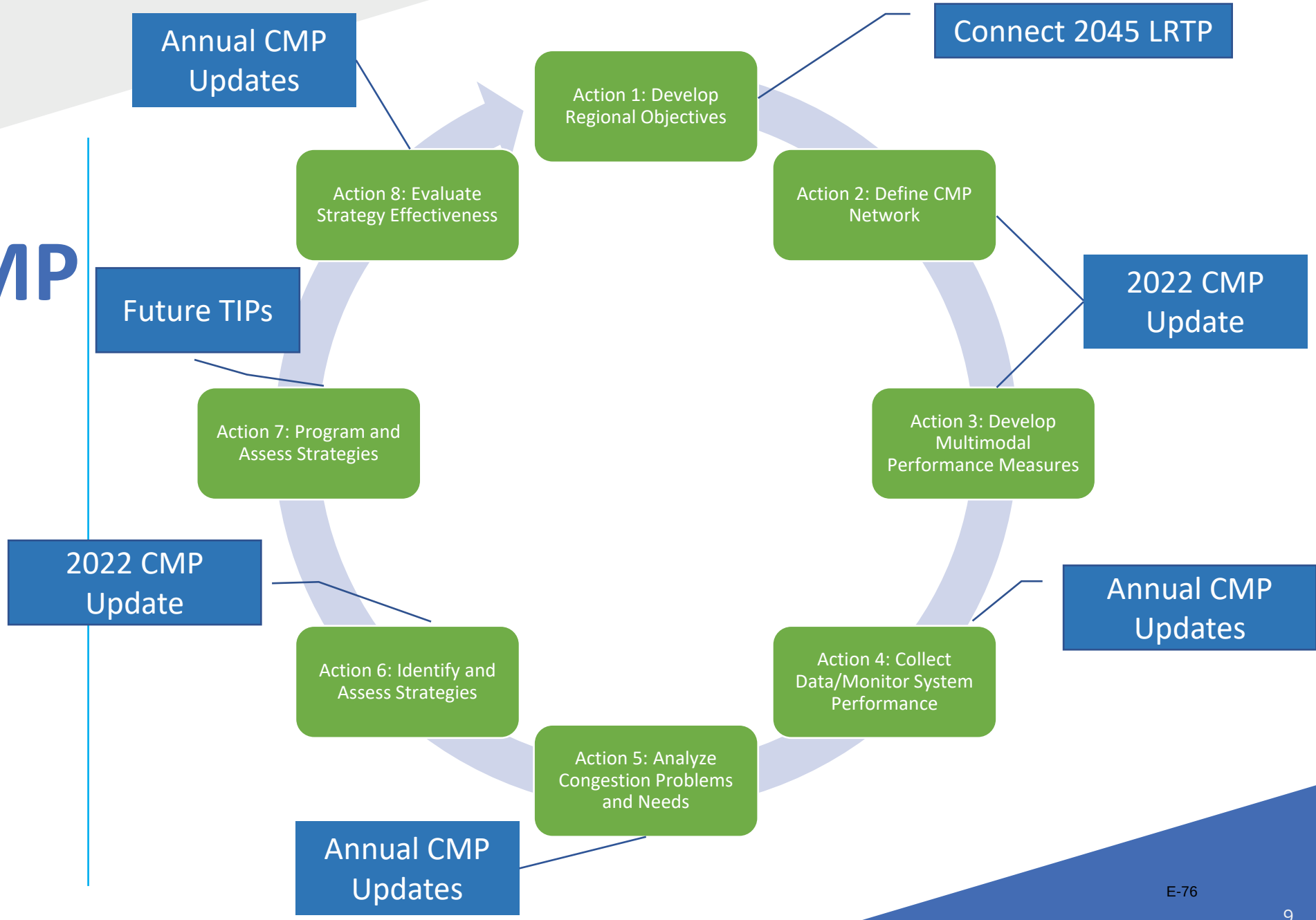
Total Pedestrian and Bicycle Crashes by CMP Segment

- Updated Safety visualizations from three to five bands to improve hotspot visualization
- Reporting Top 25 Segments with maps in CMP Report

RIVER TO SEA Transportation P anning Organization TPO
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

Overview of Congestion Management Process

FHWA CMP 8-Action Process Model

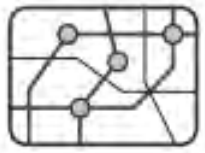


RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

Connect 2045 Long Range Transportation Plan Goals

Goal 1 – Multimodal

Goal 2 – Economic Development



Goal 3 – Connectivity

Goal 4 – Safety

Goal 5 – Livability

Goal 6 – Involvement

RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

RIVER TO SEA Transportation P anning Organization TPO
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

Congestion Management Strategies

Strategy Development

- Referenced FHWA's CMP Guidebook for guidance on strategy development
- Referred to previous R2CTPO plans:
  - R2CTPO ITS/TSM&O Master Plans
  - R2CTPO CAV Readiness Study
  - R2CTPO 2015 CMP
- Referred to CMPs from other FL TPOs for additional strategies
- Added strategies for priority categories like Special Event Management
- Removed strategies that were no longer relevant (Using Yellow Pages, etc.)

RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

R2CTPO CMP Strategy Types

- Transportation Demand Management
- Policy & Land Use
- Pedestrian/Bicycle
- Transit
- Transportation System Management & Operations (TSM&O)
- Emerging Technologies
- Roadway

RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

Transportation Demand Management Strategies

Strategies
Continue Teleworking
Encourage Carpooling and Park N Ride Expansion
Expand First/Last Mile Options
Encourage Employer Incentive Programs
Encourage Carsharing

RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

Which two TDM strategies do you see the most benefit of?

A: Teleworking

B: Carpooling

C: First/Last Mile Options

D: Employer Incentive Programs

E: Carsharing

Start the presentation to see live content. For screen share software, share the entire screen. Get help at **pollev.com/app**

Policy & Land Use Strategies

Strategies
Develop Local Complete Streets Policies
Develop Multimodal/Transit-Oriented Development (TOD) Design Guidelines
Encourage Urban Infill and Densification
Encourage Mixed-Use Development

RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

Which two Policy & Land Use strategies do you see the most benefit of?

A: Complete Streets Policies

B: Multimodal/TOD Guidelines

C: Urban Densification

D: Mixed-Use Development

Start the presentation to see live content. For screen share software, share the entire screen. Get help at **pollev.com/app**

Pedestrian/ Bicycle Strategies: Add Infrastructure

Strategies
Add New Sidewalks
Add Designated Bicycle Lanes
Add Bicycle and Pedestrian Intersection Enhancements
Add Multi-Use Paths
Add Grade Separated Crossings

RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

Which two Pedestrian/Bicycle Infrastructure strategies do you see the most benefit of?

A: Add New sidewalks

B: Add Designated Bicycle Lanes

C: Add Ped/Bike Intersection Improvements

D: Add Multi-Use Paths

E: Add Grade Separated Crossings

Start the presentation to see live content. For screen share software, share the entire screen. Get help at **pollev.com/app**

Pedestrian/ Bicycle Strategies: Implement Policies

Strategies
Expand Micromobility Programs
Implement Complete Streets Improvements
Implement Safe Routes to School Study Recommendations
Expand Trail Network and Local Connections to Network

RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

Which two Pedestrian/Bicycle Policy strategies do you see the most benefits of?

A: Micromobility Programs

B: Complete Streets Improvements

C: Safe Routes to School Study Recommendations

D: Expand Trail Network and Local Connections

Start the presentation to see live content. For screen share software, share the entire screen. Get help at **pollev.com/app**

Transit Strategies: Add/Expand Service

Strategies
Expand/Implement Fixed Bus Route Frequencies and Routes
Expand On Demand Transit
Provide Additional Seasonal/Special Event Transit Service
Provide Express Bus Service
Extend SunRail Service to DeLand

RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

Which two Transit Service strategies do you see the most benefit of?

A: Expand/Implement Transit Routes

B: Expand On Demand Transit

C: Provide Additional Seasonal/Special Event Service

D: Provide Express Bus Service

E: Extend SunRail Service

Start the presentation to see live content. For screen share software, share the entire screen. Get help at **pollev.com/app**

Transit Strategies: Operational Improvements

Strategies
Prepare for Transit Traffic Signal Priority
Plan for Transit Queue Jump Lanes at Intersections
Implement Transit Stop Enhancements
Expand Electronic and Mobile Fare Collection
Plan for Exclusive Transit Right of Way (ROW)

RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

Which Transit Operational Improvement strategies do you see the most benefit of?

A: Transit Signal Priority

B: Transit Queue Jumps

C: Transit Stop Enhancements

D: Electronic/Mobile Fare Collection

E: Transit ROW

Start the presentation to see live content. For screen share software, share the entire screen. Get help at **pollev.com/app**

TSM&O Strategies: System Management

Strategies
Improve Traffic Signal Operations
Implement Alternative & Innovative Intersection Designs*
Improve Access Management
Perform Ramp Metering Study
Implement I-4 BtU Managed Lanes

**Source: R2CTPO ITS Plan*

RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

Which two TSM&O System Management strategies do you see the most benefit of?

A: Traffic Signal Operations

B: Innovative Intersection Improvements

C: Access Management

D: Ramp Metering Study

E: I-4 BtU Managed Lanes

Start the presentation to see live content. For screen share software, share the entire screen. Get help at **pollev.com/app**

TSM&O Strategies: Information Dissemination/ Expand ITS

Strategies
Strengthen Traveler Information Systems
Expand Roadway Monitoring Infrastructure (ITS)
Add Traffic Management Center*
Implement Planned Traffic Monitoring and Data Collection Deployments

**Source: R2CTPO ITS Plan*

E-95

RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

Which TSM&O ITS strategies do you see the most benefit of?

A: Traveler Information Systems

B: Roadway Monitoring Infrastructure

C: Traffic Management Center

D: Data Collection Deployments

Start the presentation to see live content. For screen share software, share the entire screen. Get help at **pollev.com/app**

TSM&O Strategies: Special Event Management

Strategies
Review Social Media for Impromptu Events
Expand Portable DMS Equipment Use
Enhance Law Enforcement in Key Areas
Review and Update Event Traffic Management Plans Annually
Connect Regional Traffic Management Centers (TMCs), Emergency Operations Centers (EOCs), and Tourist Attractions/Areas

RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

Which two TSM&O Event Management strategies do you see the most benefit of?

A: Event Social Media Review

B: Portable DMS Use

C: Enhanced Law Enforcement

D: Update Event Management Plans

E: Connect Traffic Centers

Start the presentation to see live content. For screen share software, share the entire screen. Get help at **pollev.com/app**

Emerging Technologies Strategies: Data and Infrastructure

Strategies
Create Emerging Technologies Working Group*
Create Data Marketplace and Encourage Data Sharing*
Expand EV Charging & Alternative Fueling Station Infrastructure*
Electrify County/Transit Vehicle Fleets
Invest in Pavement Asset Management to Accommodate AV Sensors*

**Source: R2CTPO CAV Readiness Plan*

RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

Which two Emerging Technology strategies do you see the most benefit of?

A: Emerging Technology Working Group

B: Data Marketplace

C: EV Charging Stations

D: Fleet Electrification

E: Pavement Asset Management

Start the presentation to see live content. For screen share software, share the entire screen. Get help at **pollev.com/app**

Emerging Technologies Strategies: Policy Changes

Strategies
Develop EV-Ready Building Codes and Parking Ordinances
Develop Fee Incentives for Developer-Built EV Infrastructure
Study Automated Truck Transfer Station Design Concepts

RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

Which two Emerging Technology Policy strategies do you see the most benefit of?

A: EV-Ready Building Codes

B: EV Fee Incentives

C: Automated Truck Transfer Stations

Start the presentation to see live content. For screen share software, share the entire screen. Get help at **pollev.com/app**

Roadway Strategies

Strategies
Implement Intersection and Interchange Improvements
Improve Street Connectivity and Parallel Routes
Implement Wayfinding Signage Improvements
Add Lanes**
Add New Roadways**

***Strategies to add capacity are generally much more costly than TSM&O strategies and should be considered a last resort for reducing congestion*

E-103

RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

Which two Roadway strategies do you see the most benefit of?

A: Intersection/change Improvements

B: Street Connectivity

C: Wayfinding

D: Add Lanes

E: Add New Roadways

Start the presentation to see live content. For screen share software, share the entire screen. Get help at **pollev.com/app**

Are there additional congestion management strategies that have not been discussed?

RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

Besides funding challenges, what are other barriers to implementing these strategies?

RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

Next Steps

- Update Congestion Management Strategies
- Draft CMP Report
- Present Draft CMP to Committees/Board

RIVER TO SEA TPO
Transportation Planning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

Thank You!

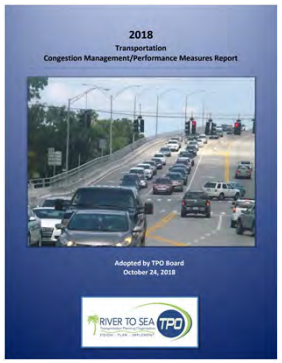
Travis Hills, PE, RSP_1

thills@kittelson.com

Board/Committee Presentations

RIVER TO SEA
Transportation Planning Organization
TPO
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS
September 2021
Kick-Off Presentation

Congestion Management Process (CMP) Overview



RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

What is Congestion Management?

Application of strategies to improve transportation system performance and reliability by reducing the adverse impacts of congestion on the movement of people and goods.

What is the CMP?

Systematic and regionally-accepted approach for managing congestion that provides accurate, up-to-date information on transportation system performance and assesses alternative strategies for congestion management that meet state and local needs.

What does it achieve long-term?

The CMP is intended to move systematic congestion management strategies into the funding and implementation stages.

Upcoming Activities

SPRING – EARLY FALL 2021

1 – PROCESS

- Re-evaluate current CMP approach
- Update CMP and create easy-to-monitor process

2 – GOALS

- Create CMP specific goals and objectives that align with the LRTP

3 – NETWORK

- Develop a multimodal network that will be evaluated for congestion management purposes

FALL – WINTER 2021/22

4 – MEASURE

- Determine what we are going to measure and what data is available/needed

5 – STRATEGIES

- Identify and evaluate congestion management related strategies

SPRING 2022

6 – REPORT

- Document all steps and findings

Working Group Meetings

TCC/CAC and Board Presentations

RIVER TO SEA TPO
Transportation Planning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

Thank You!

Travis Hills, PE, RSP$_1$

thills@kittelson.com

RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

RIVER TO SEA TPO

Transportation Planning Organization

VISION - PLAN - IMPLEMENT

CONGESTION MANAGEMENT PROCESS

May 2022

Draft CMP Presentation

Congestion Management Process (CMP) Overview

RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

What is Congestion Management?

Application of strategies to improve transportation system performance and reliability by reducing the adverse impacts of congestion on the movement of people and goods.

What is the CMP?

Systematic and regionally-accepted approach for managing congestion that provides accurate, up-to-date information on transportation system performance and assesses alternative strategies for congestion management that meet state and local needs.

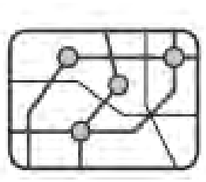
What does it achieve long-term?

The CMP is intended to move systematic congestion management strategies into the funding and implementation stages.

Connect 2045 Long Range Transportation Plan Goals

Goal 1 – Multimodal

Goal 2 – Economic Development



Goal 3 – Connectivity

Goal 4 – Safety

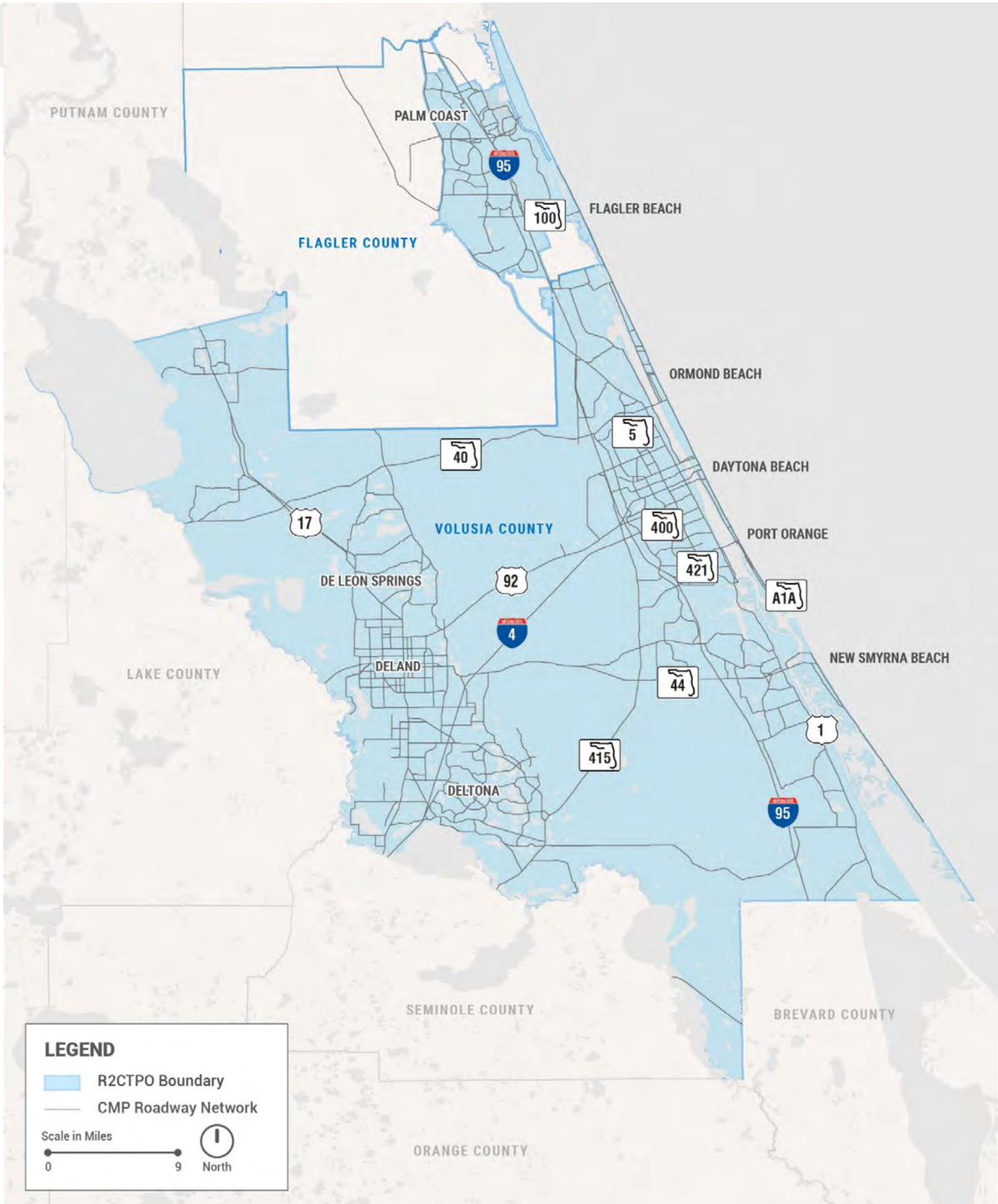
Goal 5 – Livability

Goal 6 – Involvement

RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

CMP Network

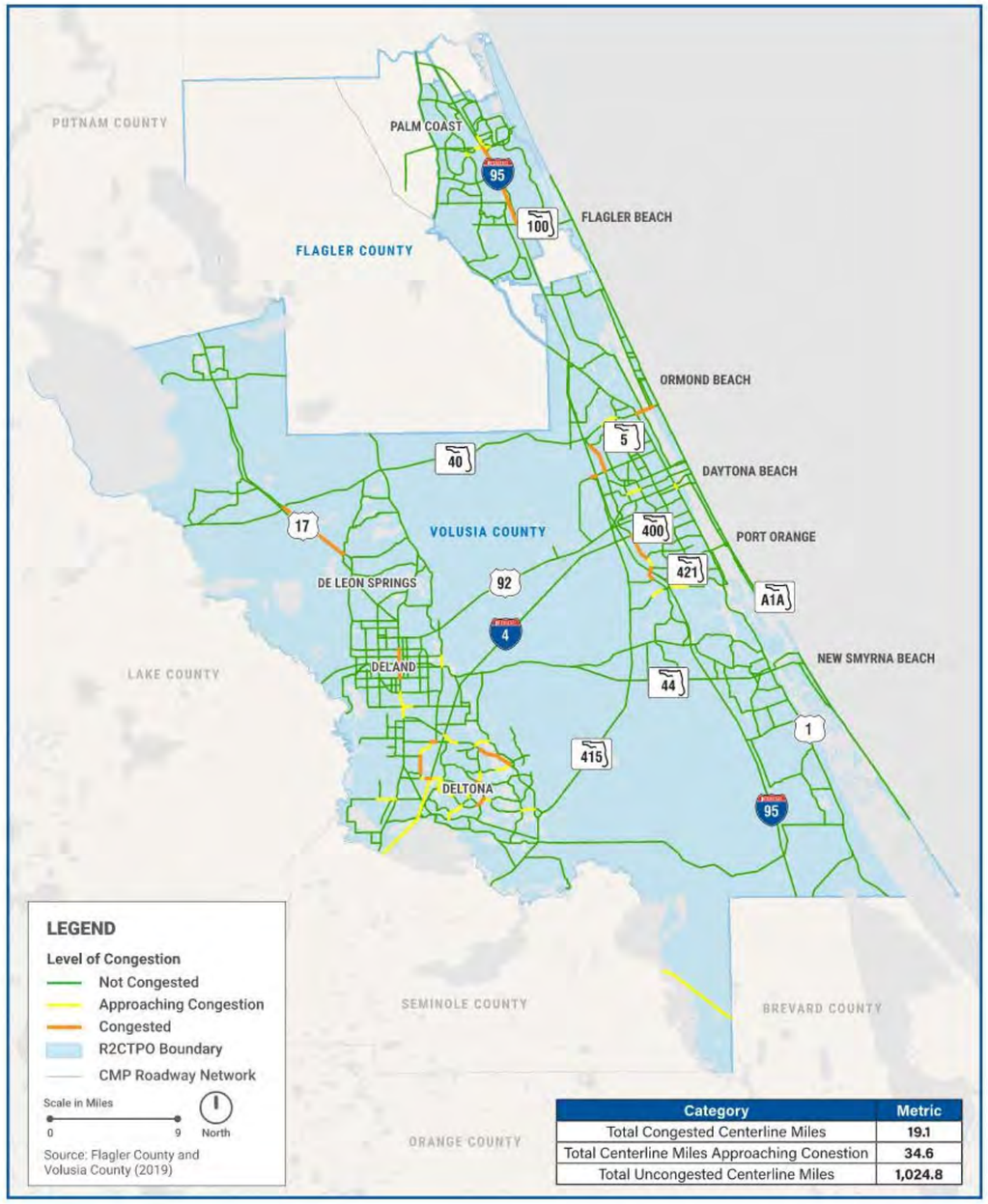
- Roadway Network
  - Count data coming from Volusia County count database and Palm Coast traffic counts
- Transit Network
  - Votran, SunRail, Flagler County
- Bicycle and Pedestrian Network
  - Bicycle and Pedestrian Plan
- ITS Network
  - ITS Masterplan
- Evacuation Routes
  - Florida Division of Emergency Management



RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

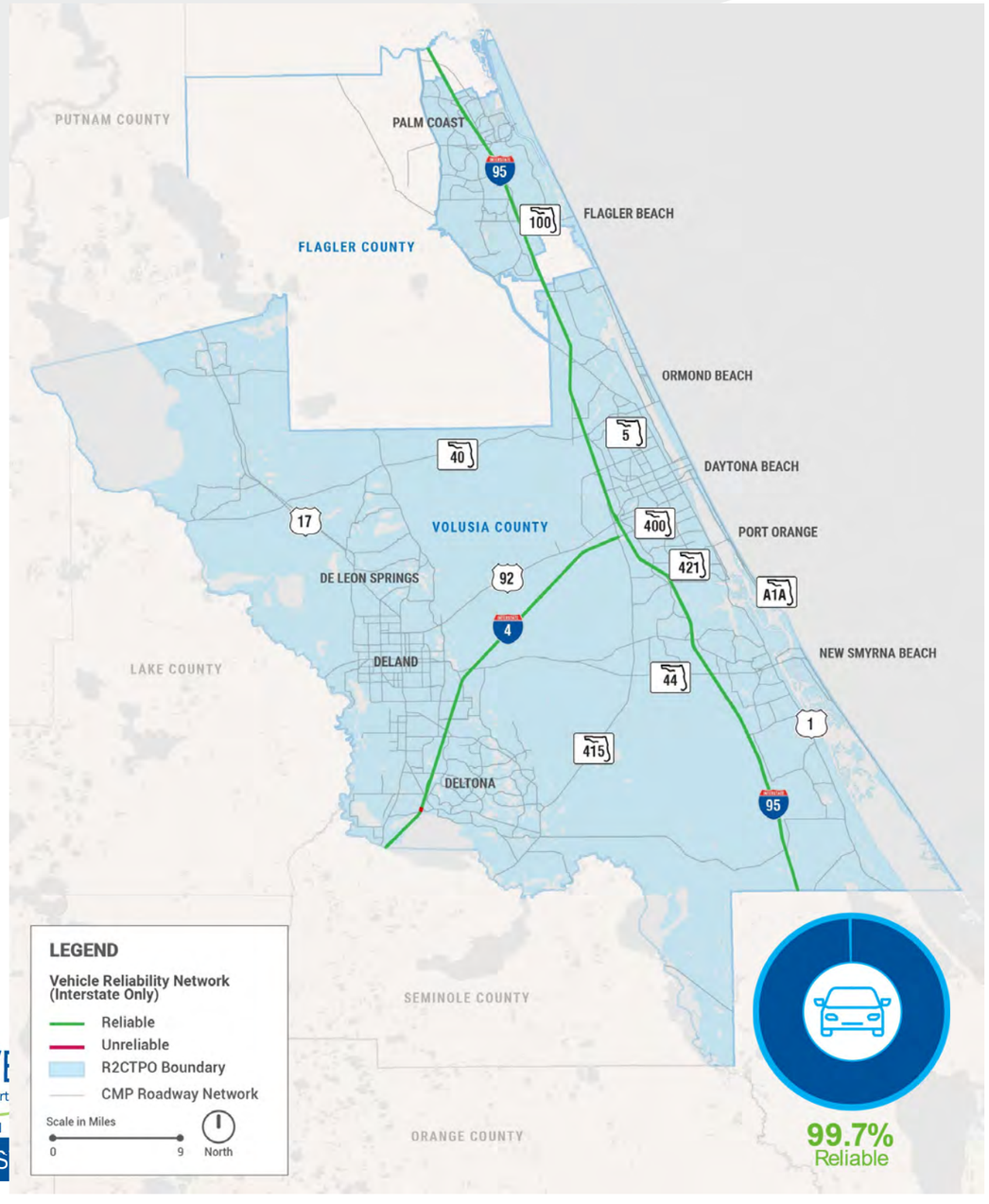
Daily Level of Congestion on CMP Roadways

City	Centerline Miles Over Capacity	Key Roadways
Palm Coast	5.8	I-95
Daytona Beach	4.0	Williamson Blvd.
Deltona	3.3	Normandy Blvd.
Ormond Beach	1.9	Williamson Blvd., SR 40
Orange City	1.7	Veteran's Memorial Parkway
DeLand	1.5	US 17/92
Port Orange	0.9	Williamson Blvd.
Total Centerline Miles Approaching Congestion – 34.6		
Total Uncongested Centerline Miles – 1024.8		

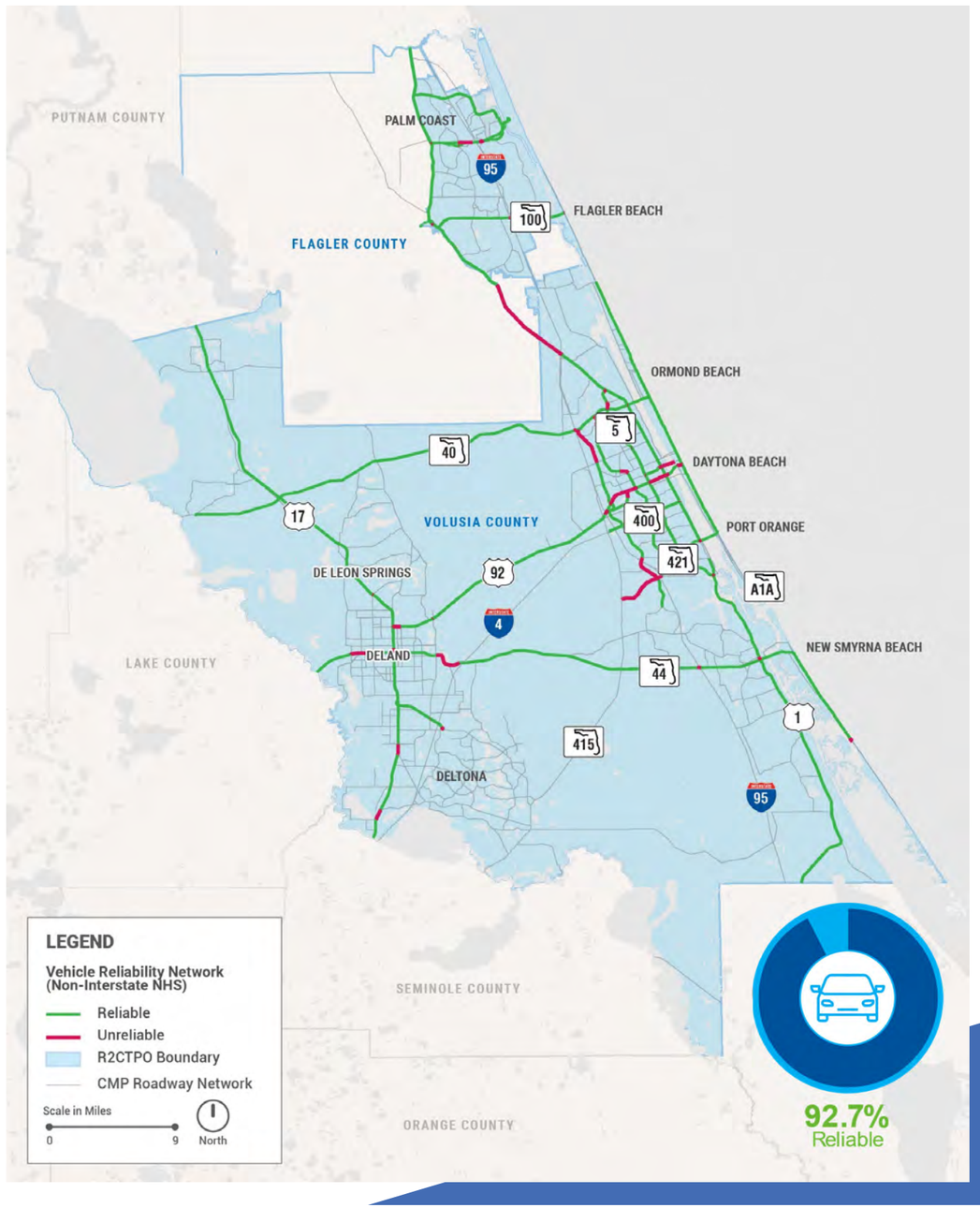


RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

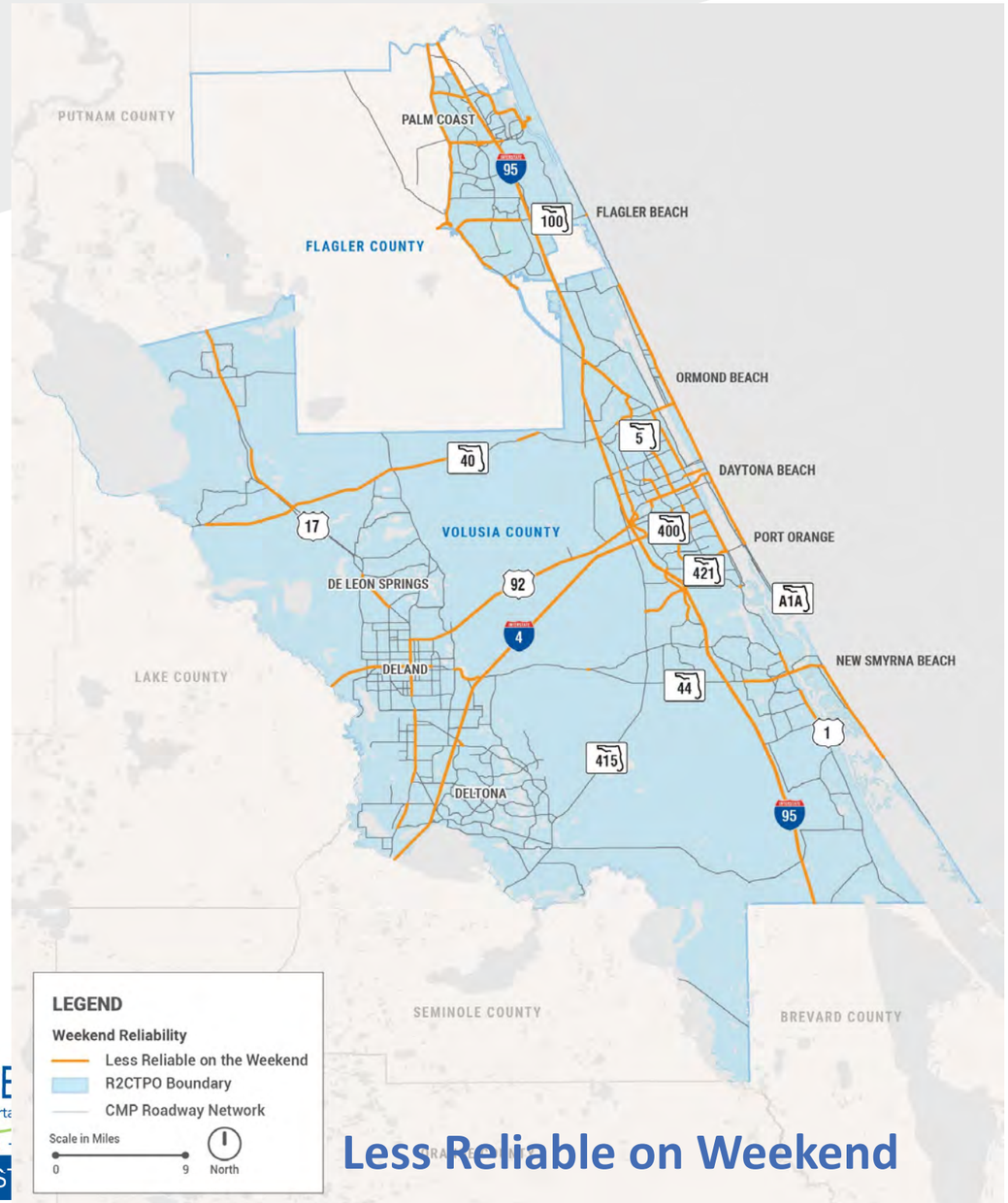
Daily Travel Time Reliability – Interstate



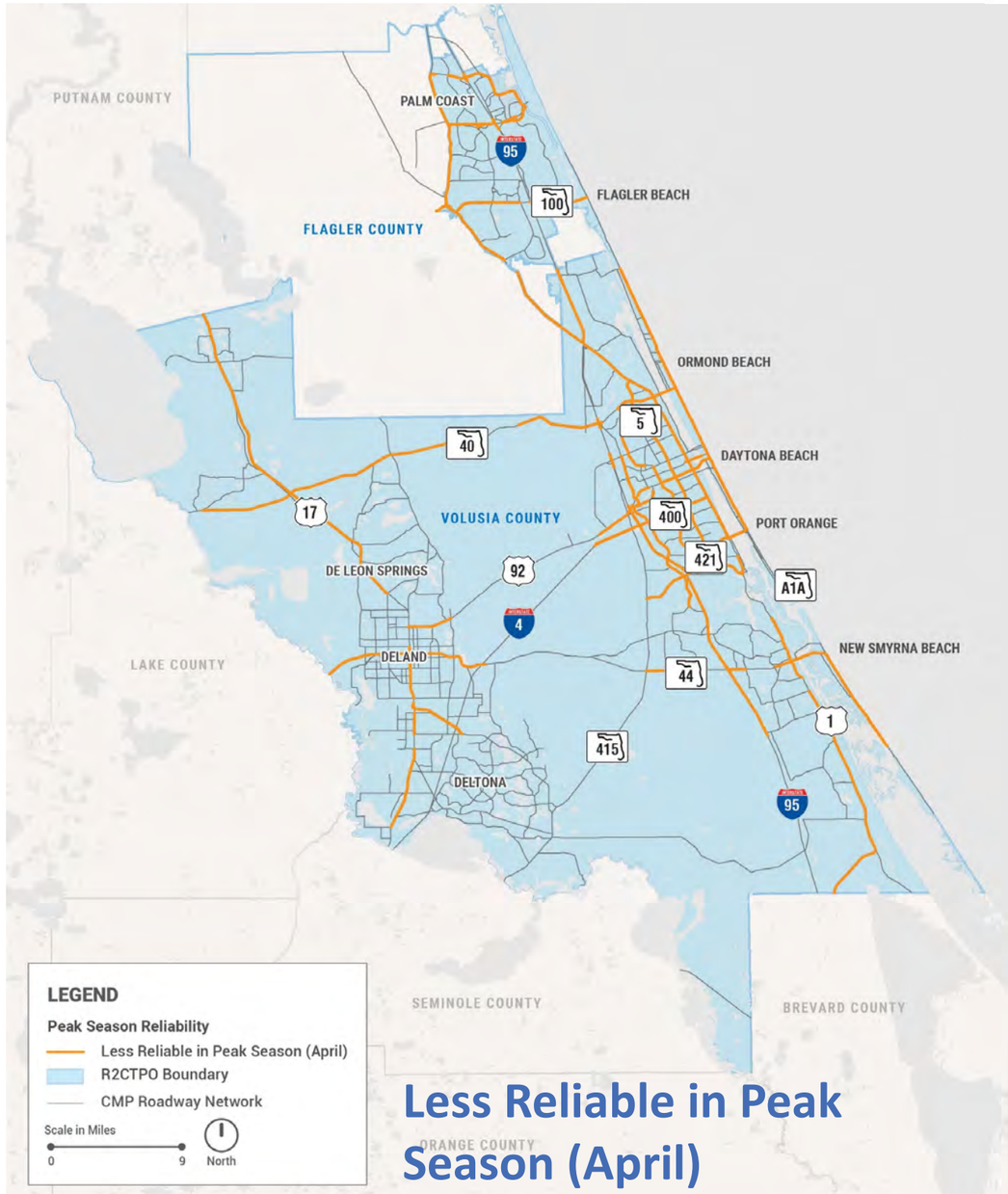
Daily Travel Time Reliability – Non-Interstate



Peak Season Travel Time Reliability



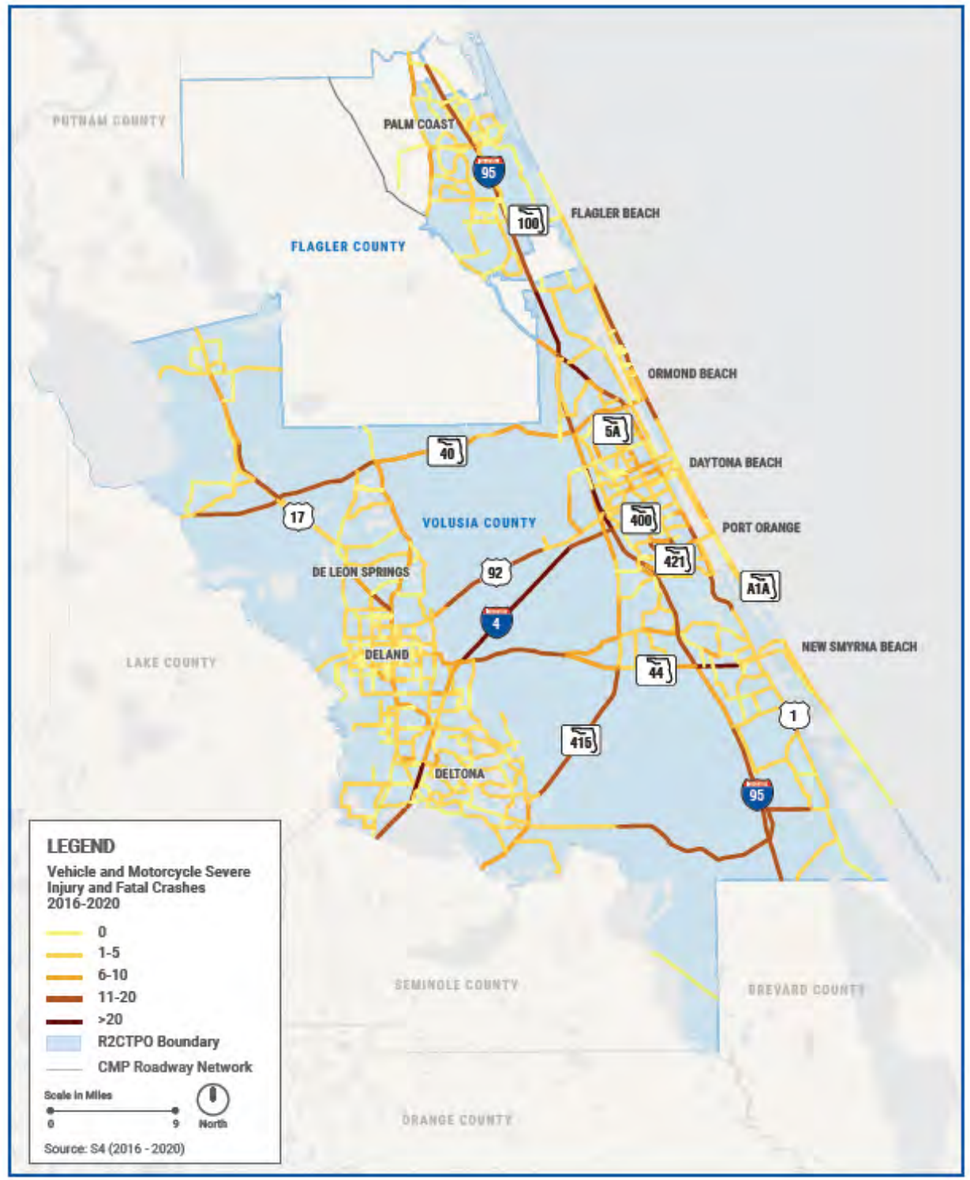
Less Reliable on Weekend



Less Reliable in Peak Season (April)

Vehicle/Motorcycle Crash Frequency

Vehicle/Motorcycle Crash Severity



R2CTPO CMP Strategy Types

- Transportation Demand Management
- Policy & Land Use
- Pedestrian/Bicycle
- Transit
- Freight
- Transportation System Management & Operations (TSM&O)
- Emerging Technologies
- Roadway

RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

Key Strategies Identified

- More than 70 total strategies identified
- Continue Teleworking/Carpooling
- Encourage Mixed-Use Development
- New Sidewalks and Adding Ped/Bike Intersection Improvements
- Implement Complete Streets Improvements and Expand Trail Network

RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

Key Strategies Identified

- Expand/Implement Fixed Route Transit Service and Expand Electronic and Mobile Fare Collection
- Improve Traffic Signal Operations and Strengthen Traveler Information Systems
- Expand EV Infrastructure and Develop EV-Ready Building Codes
- Implement Intersection/Interchange Improvements

RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

Special Event Management Strategies

- Expand Portable DMS Equipment Use
- Enhance Law Enforcement in Key Areas
- Review and Update Event Traffic Management Plans Annually
- Connect Regional Traffic Management Centers (TMCs), Emergency Operations Centers (EOCs), and Tourist Attractions/Areas

RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

Next Steps

Draft CMP Report Ready for Review

Revisions to Draft CMP Report based on Board/Committee Comments

Final CMP Adoption by Board/Committees at June Meetings

RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

Thank You!

Travis Hills, PE, RSP[1]

thills@kittelson.com

RIVER TO SEA TPO
Transportation P anning Organization
VISION - PLAN - IMPLEMENT
CONGESTION MANAGEMENT PROCESS

Draft CMP Report Comments

KITTELSON & ASSOCIATES
225 E ROBINSON STREET, SUITE 355
ORLANDO, FL 32801
P 407.540.0555 F 407.540.0550

RESPONSE TO COMMENTS

Date:	June 21, 2022
To:	Colleen Nicoulin, AICP, RSP, and Stephan Harris River to Sea TPO
From:	Travis Hills, PE, RSP_1
Project:	2022 Congestion Management Process
Subject:	Draft Report Response to Comments

This document responds to comments provided by various agencies in May/June 2022 for the 2022 Congestion Management Process Draft Report. These comments will be addressed (as applicable) in the Final CMP Report which will be complete by June 30, 2022.

Comments from Stephan Harris – River to Sea TPO

1. Include page numbers on all pages.

   Response: The only pages that do not have page numbers are the Cover Page and the figures. Both the Cover Page and the figures were created outside of Microsoft Word thus the reason page numbers were not originally included. Once the report is revised and page numbers are set, page numbers will be added to each of the figures. A page number will not be included on the Cover Page.

2. Figure 8 – Votran fixed-routes are not current. Use routes dated after June 2021. Also label the flex routes in New Smyrna Beach.

   Response: The Votran fixed routes will be updated for the current routes. Flex Routes 42, 43, and 44 will be labeled as an area on the figure.

3. Figure 9 – I'm not aware of a funded trail along SR A1A in Flagler Beach. I'm not aware of a funded trail along SR 40 west of US 17.

   Response: These two trails will be removed from the figure.

4. Figure 48 – Some of the Votran fixed-routes, such as US 17 leading to Pierson, no longer exist.

   Response: The Votran fixed routes will be updated for the current routes in the figure.

5. Section 6.7.3 – Add PTASP performance targets to this section.

Response: The Votran PTASP performance targets have been added as a new Section 6.7.3.5. Flagler County Transit does not have a PTASP, and this will be noted in the report.

6. Table 20 – Update to "Encourage Carsharing/Vanpooling" under Transportation Demand Management. Add "raised barriers, such as zippers, to bicycle lanes" to the Ped/Bike Infrastructure section. Add "Update Transportation Impact Analysis (TIA) Guidelines for transit" to the Transit Operational Improvements section.

   Response: These edits have been made to Table 20.

Comments from Carmen Rosamonda – City Manager at City of DeBary

7. Incident Congestion Management Strategy –

   Due to the plan's high level view, I believe it is unable to guide leadership to truly and timely resolve traffic problems associated with congestion related to incidents. I believe this Board needs to institute an Incident Congestion Management Strategy for designated problem areas and certain segments of roadway. It is well documented that Interstate 4, between mile marker 104 and 108 is one of the highest incident prone areas in the entire Interstate 4 corridor. Even though, FDOT recognizes this area as a problem, there is no process in place to actually manage and resolve congestion and safety concerns occurring in local communities resulting from these incidents. I believe the River to Sea TPO Board needs to establish this process and widen its scope to include not only for I-4 incident congestion but also the surrounding impacted areas.

   For example, for the last 3 years, I have been soliciting federal, state and local leaders to take action on the I-4 incident/accident prone area between mile marker 104-108. When incidents occur, I-4 traffic gets directed to inadequate local roads and neighborhoods. Dirksen Road is a county road connecting two federal highways, I-4 and Highway 17-92. It is the last exit before two federal highways cross the St. Johns River at the same location.

   When incidents occur, frustrated drivers once doing 70 mph, use Dirksen Drive (2-lane road) as their alternative route to get to Highway 17-92. Once Dirksen Drive backs up, drivers begin to cut through local neighborhood roads with 25 mph speed limits to get to Highway 17-92. Our families and children are at risk without notice.

   Why has this problem existed for more than two decades with no resolution? It is because the CMP is narrowly focused to just I-4 roadway. There is no consistent, cyclical process to address these problems and funnel much needed safety dollars toward local communities impacted by FDOT incident congestion.

Just recently, FDOT, Volusia County and City of DeBary held their first task force meeting to deal with this issue. Unfortunately, without a structured, consistent strategy in the CMP, these ad hoc task forces are hard to develop and usually produce marginal results.

Response: The CMP is intended to serve as a resource that provides information for local decision makers to plan for a safe and effective transportation system for all road users. Through tying the Connect 2045 LRTP goals and objectives to data-driven performance measures, the R2CTPO can monitor system performance and identify problem areas in Volusia/Flagler Counties. Rather than identify specific congestion management projects, the CMP's purpose is to provide a toolbox of actions and strategies the R2CTPO and partner agencies can refer to when addressing congestion management issues.

The R2CTPO Unified Planning Work Program (UPWP) supports the creation of Regional Planning Subarea Studies to address issues like the one you have raised. As indicated in your comment a task force has already been established with FDOT, Volusia County and the City of DeBary to address the congestion issue. Based on the findings from this task force, the congestion management strategies identified in Section 7 of the CMP Report could be recommended and programmed to address the issues you have raised. Additionally, an "Incident Congestion Management" strategy will also be added to Section 7 of the CMP report.

8. Incremental Infrastructure Improvement Strategy –

The leading cause of congestion is traffic stoppage. The number 1 cause is inadequate merging lanes which cause congestion on a consistent basis. For more than a decade, the eastbound I-4 merging lane at mile marker 104 is too short, uphill and on a bridge. Every weekday in the late afternoon, traffic backs up 3-5 miles. Traffic moves flows smoothly and consistently before and after this traffic jam every afternoon and they are the same number of traffic lanes. For the last ten years, the business and residential growth in north Seminole County are adding more and more eastbound afternoon traffic on Interstate 4. This congestion causes drivers to exit the Interstate and come through DeBary, impacting our local roads and residents. It appears that we are going to wait until Beyond the Ultimate to fix this problem. The Beyond the Ultimate project is not yet funded or engineered and projected completion may not be until 2030 or 2035. Ultimately, since the diagnosis of the problem ten years ago, do drivers have to wait nearly 20 years for relief?

This is why I recommend INCREMENTAL INFRASTRUCTURE IMPROVEMENT STRATEGY that can focus on these smaller problems, especially when they are aligned with the future vision and larger project. Extending the I-4 eastbound onramp at exit 104 is aligned with the Beyond the Ultimate project. Segmenting the project to target specific problem areas improves the chances for funding, accelerates problem resolution and driver satisfaction and has a lesser impact on local roads and communities.

For example, in January 2022, the City of DeBary added an additional deputy dedicated to traffic enforcement. For the last 5 months, Volusia Sheriff's Office has written 1377 citations, 62% were non-DeBary residents. This is a prime example of the impacts congestion has on local communities.

Response: The CMP, and R2CTPO general planning practices, support incremental infrastructure improvements (also known as short, mid, and long term project implementation). A short write up will be added to the CMP Report noting this, and a strategy will be added in Section 7 discussing the incremental improvement approach.

The "Implement I-4 Beyond the Ultimate (BtU) Managed Lanes" strategy will also be updated to note support for incremental improvements (like extending merge lanes or interim interchange improvements) that may occur prior to BtU implementation.

Comments from Volusia County

9. Overall, the report was thorough and very technical, which unfortunately made it hard for the average citizen (CAC), planner/city development staff (TCC) or elected official (TPO Board) to comprehend. Please remember the audience level that will be reading the report and the message you want to convey. In the Executive Summary, Section 1.1, Figure 1 could have easily been modified to add to columns – (1) Is there sufficient data to measure the PM (as opposed to referring to Appendix A) and (2) If measured, was goal achieved (Illustrated in Section 6 – way too far in the backend of the report). A simple green checkmark vs red cross would suffice to illustrate where the R2CTPO measures up.

   Response: The report will be reviewed for technical language and may be revised where appropriate.

   The goal of Figure 1 is to provide an overview of the Goals/Objectives/Performance Measures, not to dive into the details on which performance measures were assessed. This review is primarily discussed throughout Section 6 because there are nuances with the data analyzed, especially if a specific performance measure was not being assessed.

   For this CMP update, a "was the goal achieved" metric for each of performance measures was not established. This CMP was a major update from previous versions so the primary goal of this CMP was to establish the performance measures to be assessed and how they would be assessed. Some performance measures only have one year of data analyzed so there is no baseline for comparison. This is something that should be added to future CMPs now that performance measures have been established.

10. Very good use of numerous tables & charts to illustrate concepts.

    Response: Thank you!

11. Extremely good use of numerous GIS maps throughout report; however, really need to use more discretion in editing since a lot of the colors bleed into a fuzzy mess, which leads the audience into wondering what the main message is that the GIS maps are trying to illustrate. You want the maps to "pop" out areas/trends to convey the message. Showing all the data is not necessary (e.g., for the lower range values just showing the network base color would suffice). You also want the value ranges normalized for the audience (e.g., 0 □ 5, versus 0.25 to 4.88). This was especially prevalent in Section 6 figures. In the urban areas, really need to consider using "Insets". Advisory – be careful of using "yellow" color on blue background since not enough color contrast.

    Response: For the fuzzy maps, this may have been a printer/PDF reader error, or some resolution was lost when a "small" version PDF was created for distribution. The high resolution PDFs appear clearer and will be utilized for the final report submittal.

    The figures will be reviewed and coloring adjusted for the lower range values accordingly.

    For the rounding comment, the only figures where this type of rounding is found are the Truck Travel Time Reliability figures (2 figures total). These figures and the calculations to obtain the values will be reviewed to see if the legend numbers can be rounded.

    Insets will be considered where appropriate.

12. Executive Summary and Overview: General Observation: The Congestion Management Process seems to be more of a report, resource, or guide rather than a "Process," Please better explain how the report's information will be used in the prioritization process. Or better explain why this is called a process. Is it actually part of a process?

    Response: The overall Congestion Management Process is shown in Figure 2. There are a few Actions that are outside of the actual CMP report, but the goal of the CMP Report is to document how the different Actions are being performed by the R2CTPO. Throughout the CMP Report, the different Actions are referenced as they relate back to the entire "Process". This will be further clarified in the report.

13. General Observation: The report focuses on FHWA, state and county roadway with little to no city roadway monitoring. It seems to put the pressure on the state and counties to apply corrective measures; however, the main culprit of the growing congestion and safety issues on are system are attributed to the imbalance of local jurisdiction-approved development/growth and existing/planned roadway infrastructure plan. Local jurisdictions are approving urban and suburban development densities and intensities and requiring little to no on-site or local roadway planning from developers seeking those entitlements.

Response: Specific to Volusia County, the CMP focused on roadways where traffic counts were readily available, which ended up being primarily the State and County roadway network. If traffic counts are collected on city/local roadways in the future, these roadways can be added to the analysis network as part of future updates.

14. Figures 1 and 6 (same table but used in separate sections):
    a. Do the PM column background colors mean anything (blue & green) or is it to illustrate sub-sections to make them easier to read? If the latter, pls disregard comment.
    b. The overview on page 1 states that the TPO can use the data to prioritize projects. Goal 1 (Develop and maintain a balanced and efficient multimodal transportation system): The locals are making decisions with regard to how multimodal an area's transportation system will be, so how will the process apply to the locals? Will the process reward those jurisdictions that plan for mobility vs. those that just approve whatever the developers/landowners want? Some cities go the extra mile to plan supportive collector and local streets to facilitate good circulation, travel options, and reduced impacts on thoroughfares. Some do not.
    c. Goal 2 (Support the economic development and growth of the TPO area and region): How will the process reward those jurisdictions that strive to protect the thoroughfares intended to move freight and goods? Arterial capacity quickly disappears when locals fail to plan needed local and collector roads to support development intensities and densities. The current system of prioritization seems to reward those areas with the greatest amount of congestion. However, when those locations occur in areas where community planning is lacking, the current system fails by rewarding those same jurisdictions with capacity projects.
    d. Goals 3, 4, and 5: Again, if the CMP impacts project prioritization, then the jurisdictions that implement Goal 3 (Enhance and expand transportation connectivity and choice for all users), Goal 4 (Eliminate or reduce crash-related fatalities and serious injuries (safety) and improve security throughout the transportation network), and Goal 5 (Promote livability by providing, protecting and enhancing social, cultural, physical and natural environmental places) should be rewarded – not inadvertently penalized.

Response: For Part A, the colors are there to illustrate subsections.

For Parts B through D, the CMP performance measure data could be used in criteria for prioritizing projects in the LRTP, TIP, and/or List of Priority Projects, which will be clarified in the report. Specific ways the CMP could be incorporated into regional prioritization may be addressed as part of the LRTP, TIP, and/or List of Priority Projects during their next update cycle.

15. Table 2 & 3, pp's 5-6: How do these R2CTPO Key PM's compare to other peer TPO's? Are we doing better, same, or worse. That's what the elected officials need to know.

a. Table 2, page 5: DEO determined that the LOS on county and state roads within a local jurisdiction is that local jurisdiction's responsibility since they make land use and development decisions that impact LOS the most. If Table 2 were broken out by jurisdiction, perhaps it would gain local jurisdiction attention. Otherwise, most won't look at this as their issue since they don't own the congested roads.
b. Table 3, page 6: Again, consider breaking out Table 3 by jurisdiction especially considering the strong correlation between elevated risky driver behavior and crashes and low law enforcement traffic patrol presence.

Response: This CMP did not analyze the R2CTPO performance measures vs peer TPO performance measures, but this can be incorporated into future CMPs if desired.

For Part A, Table 2 will be updated to reflect congestion for each jurisdiction.

For Part B, the crash rates data is typically reported at the County/TPO level, not at the local jurisdiction level. The safety data in Section 6.4 does break down the high crash corridors in map format so the local jurisdiction can see if any high crash corridors are located in their area. For future CMPs, the crash rates can be analyzed at the local jurisdiction level.

16. Figure 3, page 7: Consider modifying or adding the following categories:
    a. Development (or add to Policy & Land Use):
        i. Ensure future land use and zoning amendments applications have sufficient transportation capacity prior to adopting. If they don't, require developers to provide an improvement(s) in exchange for the development entitlements being sought. Delaying this discussion to the site plan stage enables the developer to obtain concurrency through the routine method that should only be applicable toward those properties that already have development entitlements.
        ii. Ensure adopted densities and intensities have the necessary local road system from which primary access should be prioritized. This goes beyond analyzing the system of state and county thoroughfare capacities. Please see the graphic at the bottom.

Response: These will be added as strategies in the Policy & Land Use category.

17. Figure 3, page 7: Consider modifying or adding the following categories:
    a. Law Enforcement:
        i. Ensure law enforcement resources increase with population growth.
        ii. Prioritize roadway patrol and implementation of traffic safety laws.

Response: The first strategy is outside the bounds of the CMP and will not be added. The second strategy will be added in the Arterial and Freeway Management category.

18. Page 8, 2.1

a. Paragraph 2, throughout the report, it recommends "bi-annual update", how was this time frame derived since a lot of the data is produced annually. For example, previous year FDOT Traffic AADT counts come out around June of each year. Also refer to Page 11, 2.4 – Are there any requirements on from the fed's and state on how often the CPM should be updated? R2CTPO staff should bring this up for discussion at the MPOAC so that there is a best practice consistent.
b. Paragraph 3: We can use the data in the current CMP, but it will likely not change anything or have a positive influence since those responsible for producing congestion do not have facilities and systems that are being analyzed. Prioritization should include rewarding local jurisdictions that plan for transportation.

Response: For Part A, the FHWA CMP Guidebook notes "Although the CMP does not have an update cycle established by federal regulations, both the four-year certification review cycle and the four- or five-year MTP update cycle for each TMA provide a baseline for a re-evaluation/update cycle in the absence of an identified requirement. The CMP must, at minimum, be updated often enough to provide relevant, recent information as an input to each MTP update." Thus, the R2CTPO is proposing biannual updates of the CMP so there are up to two updates prior to each LRTP update cycle. This proposal does not preclude an annual update if one is needed.

For Part B, see previous response on prioritization.

19. 4.1, page 16: Why aren't we including the cities? The larger ones especially should have a number of important collector roadways.
    a. Figure 7: Remove "local" street not eligible for federal funding. Only include collectors, arterials and interstates. This should be done on all maps throughout the report.
    b. Figure 8: DeLand Amtrak Station is also a future SunRail Station. Recommend using orange color for "SunRail" and use dash circle line for future station.
    c. Figure 9: Pls update Trail Map (2017 data) with the Volusia County website, especially our Cross Florida Trail & River-to-Sea Trail. Map shows funded trails that are open to the public. Pls verify SR 415 trail from St Johns River north to Osteen. This was installed and opened to the public as part of the SR 415 widening project. Portions are coded as "bike lane".
    d. Figure 10: Advisory – May want to show the overall communication network since Volusia County uses a lot of 4G and point-to-point radio to control & monitor our traffic signal assets (i.e., signal controllers or CCTVs), especially our remote locations. In Volusia, we have communication access to 279 traffic signals (out of total of 345) or 81%.
    e. Figure 11 (2018 data): Pls update the CCTV & signal locations. If you have our Traffic Inventory spreadsheet, it lists where all 81 local CCTV's are located. We can also provide a metadata GIS file if you would prefer that.
    f. Figure 12 & 45 (Evacuation Routes): Pls revise the Source to read "ECFRPC Planning Evacuation Routes1" Footnote 1: Pls refer to the appropriate County Comprehensive Plan,

Chapter 2-Transportation Element, Evacuation Routes for the "officially" designated routes. {NOTE: We did follow-up with our GIS staff and the metadata file does reference the Regional Planning Agency. We are scheduling a meeting to correct this issue. Thank you for bringing this to our attention since hurricane routes impact economic development & roadway design criteria.]

Response: See previous response in regard to why collector roadways in cities were not included in the analysis. It is important to note that local roadways not having a Federal Functional Classification cannot have federal money applied for any potential projects. For Part A, the Volusia County count network will be reviewed for local roadways that may need to be removed.

Parts B, C, E, and F will be reviewed and revised as necessary in the report.

Part D will be addressed in a future CMP update.

20. 5.1, page 23: How can we also make the cities responsible in our regional issues? The performance measures seem to put the burden on Federal, state and counties. Consider adding other related performance measures such as: Number of Collector Roads built by developers in the last 5 years, Number of gated subdivisions approved, Number of planned local jurisdiction collector road lane miles in comprehensive plan, etc.

    Response: The Working Group for the CMP update included representation from city, county, and state agencies within the TPO planning area. It is recommended that continued communication take place between all local jurisdictions regarding congestion management so each jurisdiction is aware of the congestion issues and their impacts on performance measures.

21. 6.1.2, page 25: Include strategies for the cities to reduce VMT. (For Example: Design projects so they retain traffic on-site or require land use patterns that reduce trip lengths.)

    Response: The strategies discussed in Section 7 could also be utilized by the cities to help with congestion management.

22. Regarding congestion tracking, consider documenting how fast some roadways have failed, signifying that the local jurisdictions need to develop and implement CMP GOPs and strategies. Consider showing this through reviewing the difference between the number of congested roadway lane miles occurring between the following:

    2000-2019
    2005-2019
    2010-2019
    2015-2019

Response: This type of analysis may be incorporated into a future CMP update.

23. Table 8, page 29: Add a column that shows the percentage of over-capacity centerline miles. For example, if 3.3 centerline miles are congested of the total 6.6 within that jurisdiction, then 50% would be congested.

    Response: Table 8 will be updated to add this information.

24. Figure 16, page 30: Advisory – Relocate "SR 5A" shield since it hides the "Hand Ave" congested segment.

    Response: Figure 16 will be updated to relocate the roadway label.

25. Page 31:
    a. The report may want to discuss how some congestion cannot be corrected. For example, SR 44 in New Smyrna Beach will always have beach traffic congestion as long as the city maintains its attractive beach amenities, events, and business/entertainment attractions.
    b. Last Paragraph: How does expanded fiber network allow for more data collection? May want to reference expanded "communication" network.

    Response: Both parts of this comment will be updated in the report.

26. Figure 22 (Peak Season): Advisory – Why "April"? Typically, March is our peak season due to snow birds still here (ie., northerner's), Bike Week & Spring Break all occurring.

    Response: The reliability data will be reviewed to confirm if the peak season is March or April.

27. Page 39, 2nd paragraph, last sentence (TSP): Revise to read "… so as buses and more routes become equipped…" since a lot of the Volusia County local jurisdictions have installed Fire Pre-emption that is compatible with TSP. These jurisdictions include Deltona, Ormond Beach, Port Orange, NSB, Orange City, Debary. In addition, some of these projects were funded by the R2CTPO XU set aside funds.

    Response: The report will be revised based on this comment.

28. Page 39, Truck Reliability: The local jurisdictions need to be part of the Truck Reliability Factors and performance measures. They are making the land use and development decisions that are impacting roads needed for trucks. The way the report is written, they are not held accountable because they don't own those roads. Perhaps the CMP should involve them.

    Response: The Working Group for the CMP update included representation from city, county and state agencies within the TPO planning area and input was provided regarding Freight

specific strategies for the CMP report. It is recommended that continued communication take place between all local jurisdictions regarding land use and development approvals and the impacts to congestion management.

29. Figure 26: Legend: The Orange 2.89-10.12 range should be broken out more to illustrate any extreme TTR locations.

    Response: The analysis will be reviewed to potentially identify additional break points in the data and Figure 26 may be updated accordingly.

30. Page 43, 6.3 Multimodal Travel Modes: Consider expanding this section to discuss the importance of development design/layout that encourages transit use. This is a local jurisdiction planning and zoning issue. TOD is rarely developed, yet we strive to retain ridership and provide connections between jobs and under-served communities.

    Response: A strategy will be added to Section 7 to discuss development design/layout that encourages transit use.

31. Various "Total Number" maps like Figures 33 and 34: What is the rate? We expect high numbers of crashes on high volume roadways, so Figure 33 (for example) doesn't tell us much. The number of annual crashes per AADT would be more informative.

    Response: This type of analysis may be incorporated into a future CMP update.

32. Figures 33-36: Refer to previous Overview comment regarding normalizing legend #'s and just highlighting what's important to convey the message "How are we doing?" The lower values should just be the normal color of the transportation network.

    Response: The figures will be reviewed and updated accordingly.

33. Figures 37-44: Recommend showing the "urban" and "rural" boundaries within the R2CTPO Boundary to further convey the safety message, especially since Fed's & State have rural safety funding available to local agencies. This would also make the maps "pop" showing the hot spots. Most persons would anticipate more crashes in the urban area since more traffic & higher risk.

    Response: The figures will be reviewed and the urban/rural boundaries may be updated on figures where appropriate.

34. Page 62, Evacuation Routes: Pls refer to previous comment and then revise bullets, which reflect congested roads in jurisdictions that don't have evacuation routes (ie., DeLand & Volusia County).

Response: The CMP report will be revised in accordance with the two comments regarding evacuation routes.

35. Page 64, Promote Livability: The local jurisdictions have the greatest ability to impact and promote livability, so they need to be brought into the discussion. Consider breaking out Figure 46 by jurisdiction.

    Response: Cities were invited to participate in the Working Group for the CMP update. Figure 46 will be updated to show the EV charging station breakdown by jurisdiction as part of a future CMP update.

36. Figure 48: Pls have Votran verify "local routes/trolley" since we have none in Volusia to my knowledge unless this reflects "flex routes".

    Response: This figure will be updated to reflect Flex Routes 42, 43, and 44.

37. Page 70, Performance Measures –
    a. Safety: How does the state's efforts correlate with the reduced FHP presence patrolling our interstates? Dangerous and disrespectful driving behavior occurs more frequently in areas where little FHP presence is seen.
    b. Safety PM's: Why was the FDOT Vision Zero used as opposed to the R2CTPO 2% reduction?

    Response: For Part A, the R2CTPO will coordinate with FDOT for an answer to this question. For Part B, the safety performance measures will be revised to reference R2CTPO's two percent reduction.

38. Page 73, 6.7.3.4, bullets at the bottom: 1st bullet should spell out ULB; whereas, 2nd bullet shouldn't.

    Response: This will be revised in the report.

39. Page 74, Congestion Management Strategies: General Observation: The report checks off the What, When, and Where portions of the congestion issue, but the How and Why are still unclear. How do we get the decision makers involved so they actually apply the strategies? And why is congestion happening? Efforts are needed to determine what is going on in a particular areas.

    Response: This version of the CMP was intended as a major update to previous versions, specifically regarding performance measures and the data analyzed. The CMP report is not intended to address every potential issue nor be a standalone document, but to help all interested parties re-engage in conversations on congestion management. The R2CTPO will be identifying opportunities to engage decision makers to address congestion issues more regularly moving forward.

40. Table 20, Policy and Land Use: Consider adding 2: Encourage developers to develop more TND, TOD in mixed use developments. Also, require jurisdictions to construct a system of local and collector roadways to support their density and intensity increases. All access cannot be on the state and county arterials. These are just a few, but this section should be expanded.

    Response: These strategies will be added to Table 20.

41. Table 21: Freight: Add Protection of the state and county thoroughfare system. Stop local jurisdictions from approving projects that only connect to the adjacent thoroughfare because it's the only existing roadway. Plan a local roadway network around that thoroughfare road.

    Response: The Working Group for the CMP update included representation from city, county, and state agencies within the TPO planning area and input was provided regarding Freight specific strategies for the CMP report. It is recommended that continued communication take place between all local jurisdictions regarding connectivity, developing local roadway networks, and the impacts to congestion management.

42. Page 80, Table 22: Capacity: Consider adding:
    a. Add new local and collector roadways
    b. Prioritize access on local and collector roadways - observe the roadway system hierarchy.

    Response: These strategies will be added to Table 22 but it is important to note that local roadways not having a Federal Functional Classification cannot have federal money applied for any potential projects.

43. Page 80: The report lacks discussion of the importance of community planning and acknowledgment that poor planning impacts all of us. The negative impacts of poor planning don't stop at the municipal boundary of the local government implementing poor planning.

    Response: The CMP and all R2CTPO planning documents support planning "best practices". The R2CTPO will be coordinating with local jurisdictions outside of this CMP to engage in discussions regarding these "best practices" and ways good planning can mitigate congestion while improving safety.

44. Page 82, Biannual Performance Monitoring Report: Is requiring biannual updates practical when traffic counts are released once per year?

    Response: The timing of a biannual performance monitoring report was selected to coincide with the biannual CMP update. While biannual is proposed, this does not preclude an annual performance measure update if one is needed. The CMP report will be updated to clarify this.

45. Most of the troublesome spots that we know about are show in their report. One thing that I noticed was the report said there was a need for a TMC. We now have functioning TMC at our new county facility along US 92 & Daytona Beach still has their TMC off Bellevue Rd. Maybe our long term plan should include expanding TMC staff to cover peak, off peak and weekend traffic. The other observation is the need for additional fiber. It seems like any of our future County roadway projects should be required to install fiber for future connectivity.

    Response: The recommendations to expand TMC staff and add fiber to the existing network will be added in Section 7 of the CMP report.

RIVER TO SEA TPO
Transportation Planning Organization
VISION - PLAN - IMPLEMENT