

# Presentation #22-01574: Analyzing Disabled Vehicle Incident Durations and Crash Response to Identify Service Patrol Expansions and Reduce the Need for Law Enforcement Involvement



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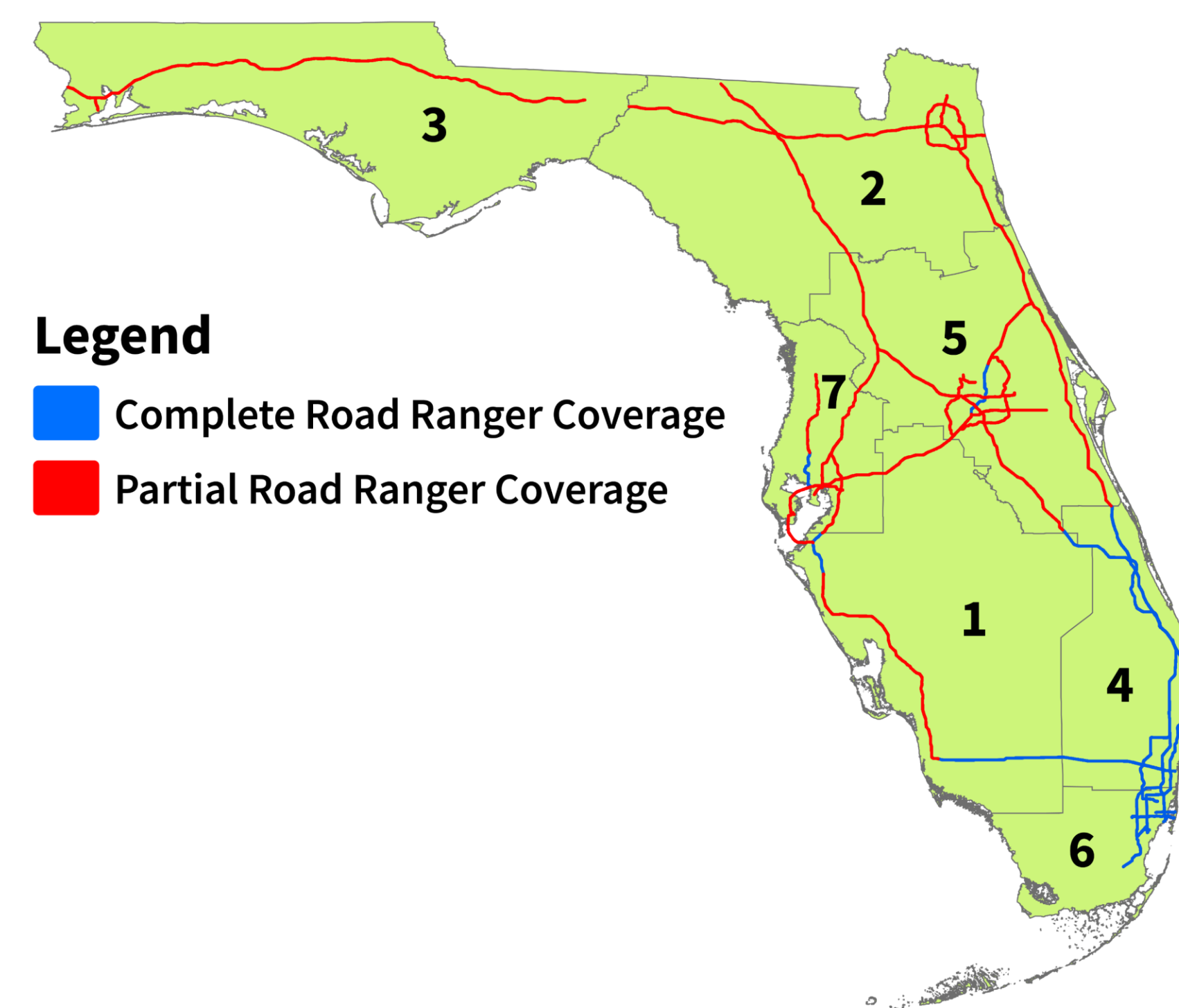
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## RESEARCH BACKGROUND

- Road Rangers (RRs) are Florida's branded safety service patrol (SSP) that respond to many types of incidents, including disabled vehicles.
- From July 2017–June 2018, over 60% of all incidents RRs responded to were for disabled vehicles, which are typically non-crash incidents.
- In this same period, RRs detected and reported 67% of all roadway incidents, demonstrating their value as a proactive discipline.
- Not all RRs operate around-the-clock, which could leave disabled vehicles to be left as roadway hazards and put motorists at risk.
- Law enforcement officers would have to respond to and assist these disabled vehicles, reducing their ability to quickly respond to crashes and other incidents.
- RRs can also assist law enforcement with responding to crashes.



RR Coverage by District in 2019

## RESEARCH OBJECTIVES

- Analyze disabled vehicle incident characteristics with respect to location and time.
- Illustrate the variability of disabled vehicle incidents throughout Florida.
- Analyze disabled vehicle crash data to understand the importance of RRs in the timely response to these crashes.
- Recommend beats where RR hours of operation can be expanded.

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## ANALYSIS OF DISABLED VEHICLE INCIDENTS

- 59% (213,423) of all disabled vehicle incidents in 2019 occurred on roadways with partial coverage, and 20% of these incidents occurred once patrols had ended.
- I-10 in District 3 had the most disabled vehicle incidents occur once patrols ended, suggesting that adjusting RR patrol hours on this roadway could help address more incidents.

RR Patrol Status	Number of Incidents	Disabled Vehicle Incident Duration (Minutes)		
		Average	Median	Longest Average
Active	170,487	49	18	97 (Florida's Turnpike)
Inactive	42,936	100	31	167 (I-10 in District 3)

- Of the 29 studied roads, 12 had a statistically significant difference in disabled vehicle incident duration between RR patrol periods (active or inactive) based on t-test results.
- Roads without a significant difference would not be considered a high priority for patrol hour expansions due to similar active and inactive durations.

Duration Comparison	Interpretation	Example
Inactive < Active	Suggests roadway has good practices for responding to disabled vehicles after hours.	I-75 in District 1 (56 < 63)
Inactive > Active	Indicates room for improving/adjusting patrol times to address disabled vehicles after hours.	I-10 in District 3 (167 > 69)

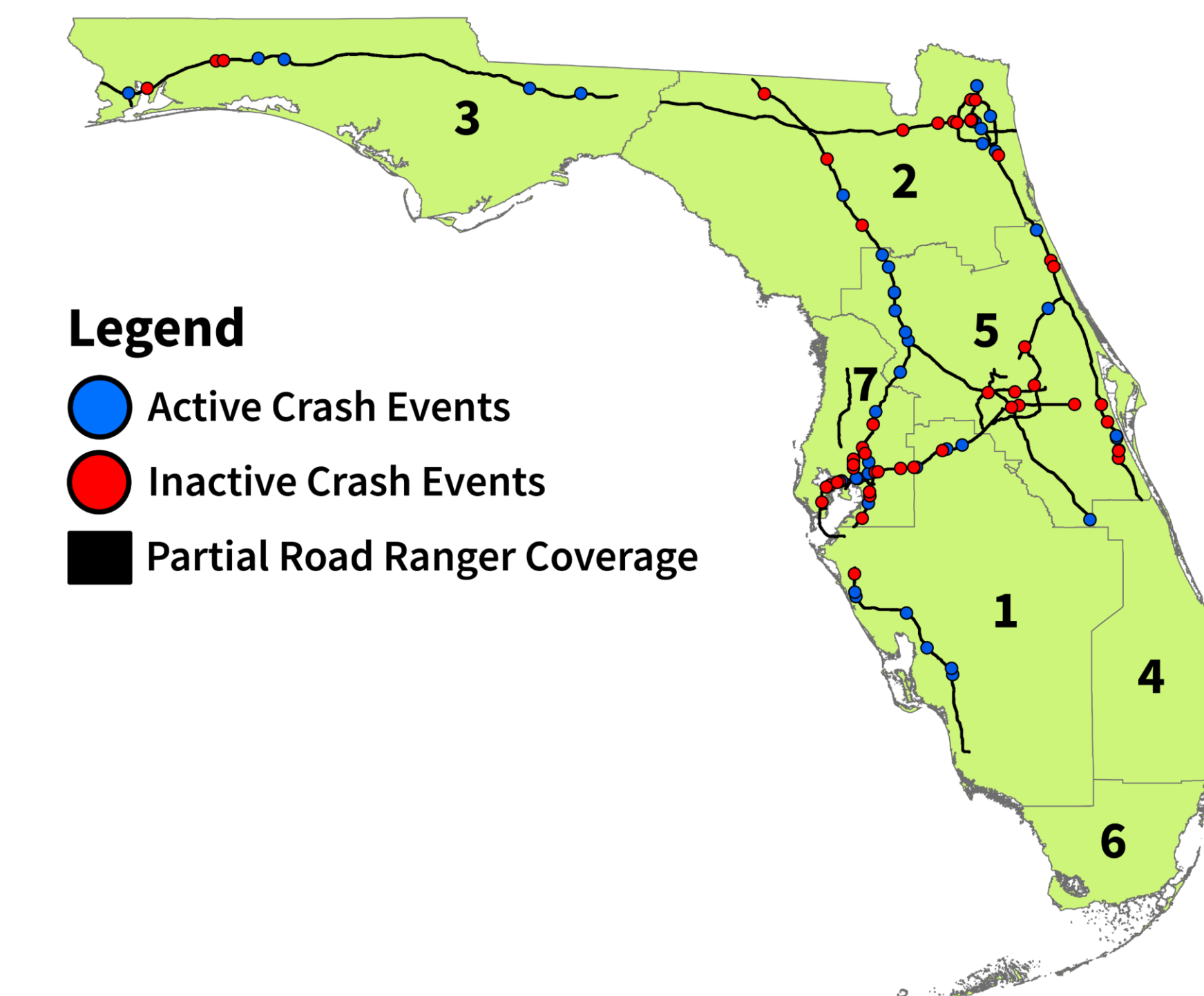
- Comparing the percentage of active and inactive incidents showed that I-4 in District 5 had the smallest percentage of inactive incidents (1%) while I-10 in District 3 had the largest percentage of inactive incidents (54%).
- Comparing the percentage of inactive incidents and the percentage of time RR patrols on a roadway are inactive in a week can reveal which roadways have effective scheduling.
- All studied roadways had an inactive hour percentage greater than the inactive incident percentage. If any roadway had a higher percentage of inactive incidents than the percentage of inactive hours in a week, it would be a high priority to expand coverage hours on that roadway.

Difference in Percentages	Interpretation	Example
Large	Suggests current patrol hours are effective at addressing most incidents.	I-95 in District 5 (54%)
Small	Indicates many incidents occur after patrols have ended; adjusting hours could help.	I-10 in District 3 (3%)

- Based on these analyses, I-10 in District 3 would benefit the most from increasing the patrol hours of RRs, but this would need to be coupled with increased fleet sizes to be effective.

## ANALYSIS OF DISABLED VEHICLE CRASHES

- 55% (95) of disabled vehicle crashes in 2019 occurred on roadways with partial coverage, and 56% (53) of these crashes occurred during inactive patrol periods.
- These 95 crashes resulted in 77 injuries and 3 fatalities, with 70% of these injuries and 2 fatalities occurring during inactive patrol periods.
- A disproportionately high number of crashes occurred in District 7, which had 28 of the 95 crashes (including 21 during inactive hours), so expanding patrol hours in District 7 could help prevent these crashes.



Legend  
 ● Active Crash Events  
 ● Inactive Crash Events  
 ■ Partial Road Ranger Coverage

Disabled Vehicle Crashes on Roads with Partial RR Coverage

- To see if RR presence on a roadway had a significant impact on the crash timeline, t-tests were performed on four durations related to crashes.

Duration	Mean Disabled Vehicle Crash Duration (Minutes)		t	df	Two-tailed p-value
	Active	Inactive			
Detection	3	3	-0.78	93	0.4354
Notification	3	5	1.07	93	0.2859
Arrival	7	9	0.58	93	0.5601
Response Activities	71	106	2.72	93	0.0077*

- Results indicate that RRs significantly reduce the average crash duration through reducing the duration of response activities.