Evaluations of Two Regional TSMO Strategies for Improving the Response to Disabled Vehicles

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TRBAM Paper 23-00705

Presentation Outline

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Introduction

- Disabled vehicles are a very common occurrence on limited access roadways, accounting for 25% of roadway incidents in Florida.
- Safety service patrols (SSPs) respond to many disabled vehicles.
  - From July 2020 – July 2021, Florida's SSP (branded as Road Rangers, or RRs) responded to over 294,000 disabled vehicles statewide.
- Additional disabled vehicle response strategies exist, but effectiveness can vary by region.

National Survey Findings

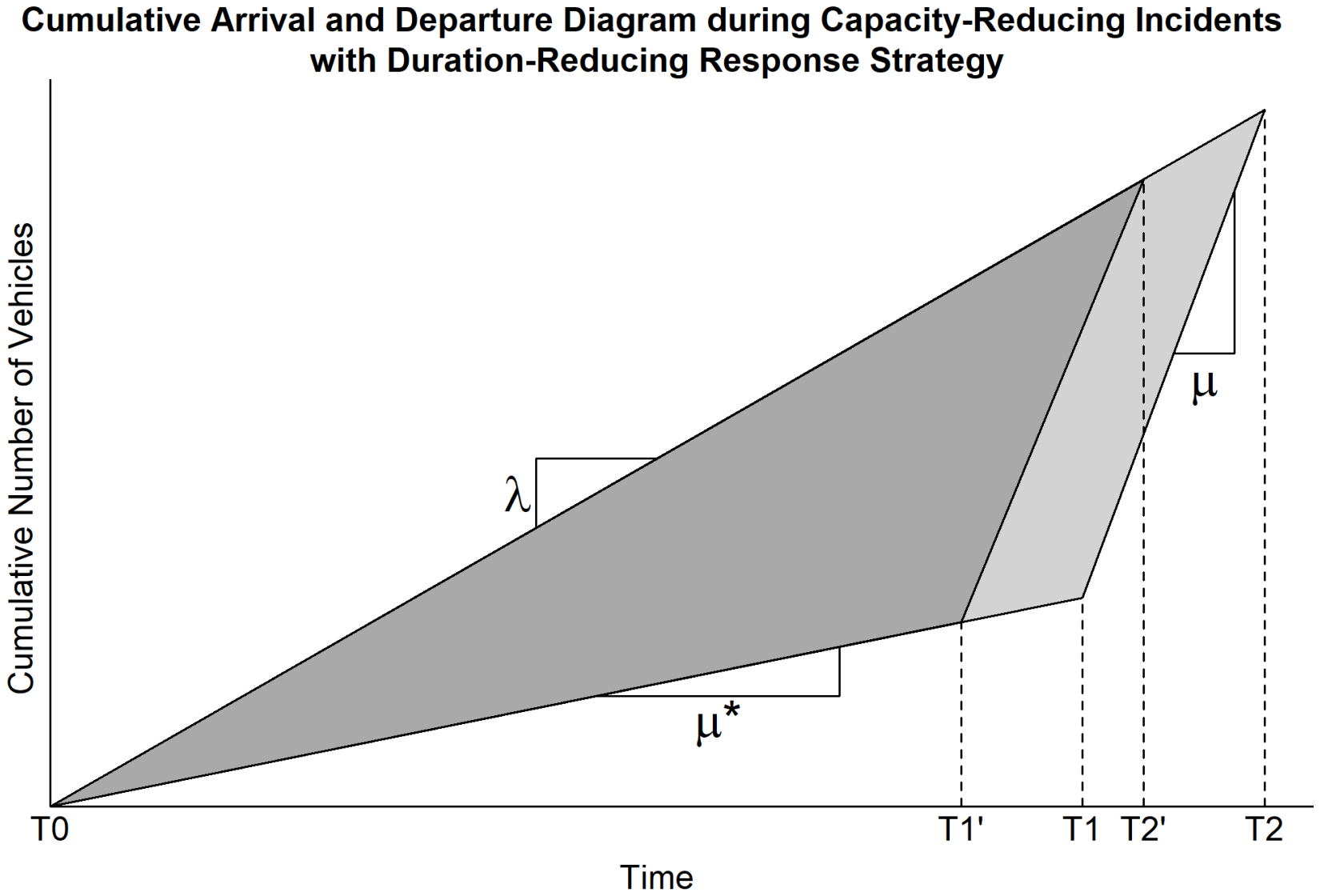
- A national survey of traffic incident management (TIM) stakeholders was conducted to understand the state of the practice regarding disabled vehicle response.
  - Total of 60 respondents from departments of transportation, law enforcement agencies, and SSPs.
  - Respondents prioritized response for lane-blocking disabled vehicles.
  - Common suggestions for program improvement were implementing/expanding SSPs and improving towing capabilities to quickly clear disabled vehicles.

Research Problem and Goal

- This research estimated the congestion reduction benefits of two potential response strategies for disabled vehicles in Florida: expanding RR patrols and implementing an instant dispatch tow (IDT) program.
  - Previous work focused on evaluating existing programs rather than estimating benefits for potential expansions or implementations.
  - No previous research has estimated the congestion reduction benefits for an IDT program.
- Can help agencies understand the most effective strategies for different areas.

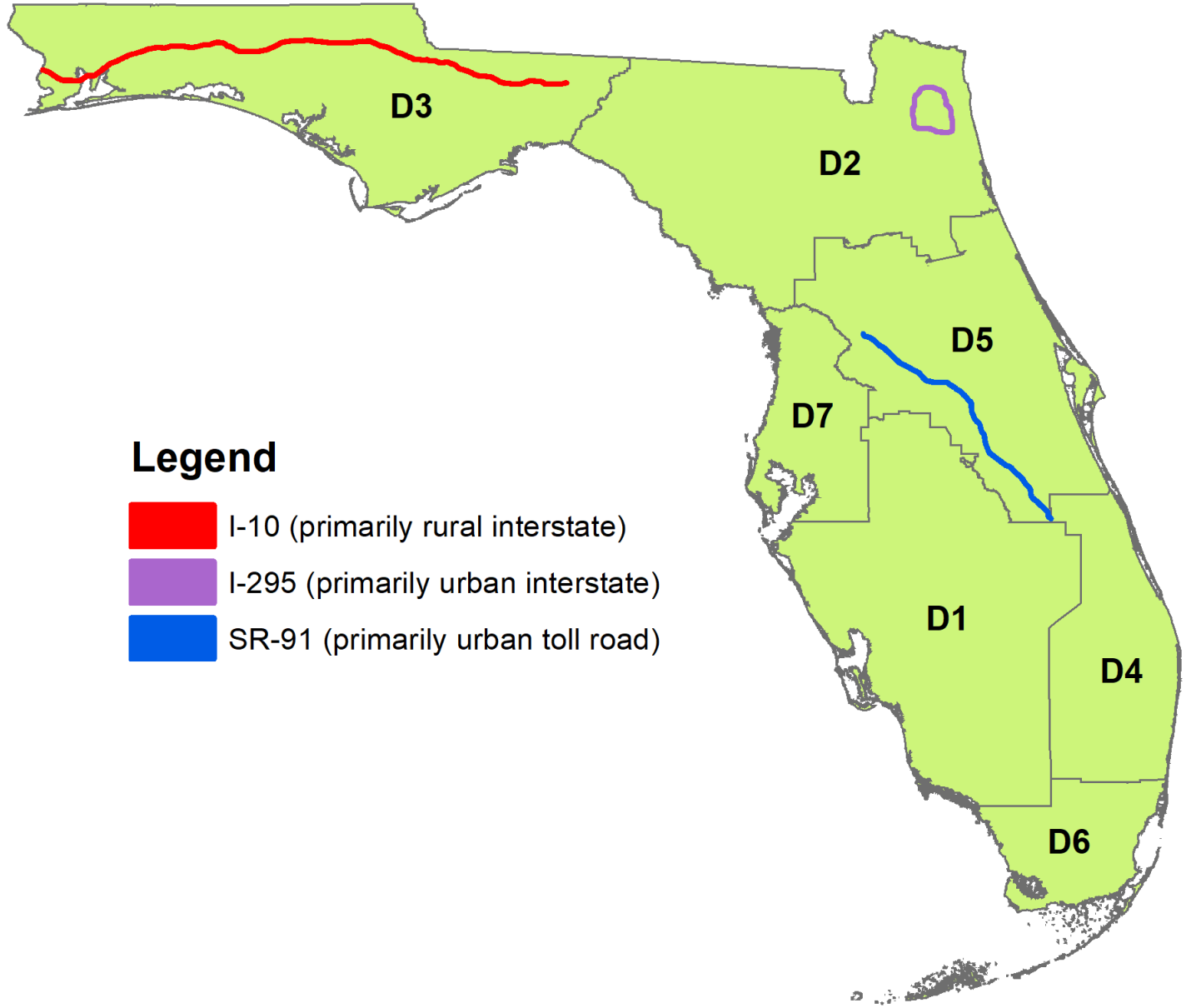
Methodology for Evaluating Congestion Reduction

- Focused on congestion reduction as primary benefit.
- Based on deterministic queueing theory.
- Flow estimated with AADT, K, and D factors.
- Capacities estimated using Highway Capacity Manual, 7th Edition.



Data Description

- Used traffic and incident data from 2019.
- Focused on three roadways with potential for RR expansion and IDT implementation.



Estimated Congestion Costs of Disabled Vehicles

- Lane-blocking incidents make up the bulk of congestion costs.
- Urban roadways experienced the greatest delays.

	I-295 in D2	I-10 in D3	SR-91 in D5
Number of Incidents	1,128	84	397
Vehicle Delay (veh-hours)	406,632	88,595	633,883
Congestion Cost (2019$)	$12,440,714	$2,913,455	$17,885,163
Congestion Cost per Incident (2019$)	$11,029	$34,684	$45,051

Benefit-Cost Evaluations of Expanding Road Ranger Patrols

- This strategy considered expanding the patrol hours of existing RR routes.
  - No new routes were considered.
- Assumed RRs drove a pickup truck, which has an average cost of $65/hour.
- Actual benefits of RR expansions are greater than those estimated since RRs respond to more than just disabled vehicles.

Benefit-Cost Evaluations of Expanding Road Ranger Patrols

	I-295 in D2	I-10 in D3
Number of Incidents	114	20
Percent Reduction in Incident Duration	59%	27%
Vehicle Delay Reduction (veh-hours)	45,897	13,421
Congestion Reduction Savings (2019$)	$1,404,587	$447,980
Cost of Expansion (2019$)	$324,480	$229,840
B/C Ratio	4.33	1.95
Savings per Incident (2019$)	$12,321	$22,399

Benefit Evaluations of Implementing an Instant Dispatch Tow Program

- Florida does not currently operate an IDT program, so program costs are uncertain.
- Experience from Oregon found that an IDT program reduced incident duration by 25%.
- Assumed IDT would only respond to lane-blocking disabled vehicles.
  - Future research can explore effective criteria for using IDT to respond to shoulder-blocking disabled vehicles.

Benefit Evaluations of Implementing an Instant Dispatch Tow Program

	I-295 in D2	I-10 in D3	SR-91 in D5
Number of Incidents	292	84	60
Vehicle Delay Reduction (veh-hours)	162,879	38,760	230,565
Congestion Reduction Savings (2019$)	$4,973,951	$1,274,637	$7,413,816
Savings per Incident (2019$)	$17,034	$15,174	$123,564
Maximum Cost per Incident to be More Cost Effective than RR Expansion (2019$)	$3,934	$7,782	N/A

Comparison of TSMO Strategies for Disabled Vehicle Response

- An IDT program would address more disabled vehicles and provide greater congestion reduction benefits than increasing RR patrols.
- RR patrols are already allocated effectively to address the bulk of disabled vehicle incidents, so exploring other programs like IDT can yield more benefits.
- Greater benefits in urban areas compared to rural areas.

Summary and Conclusions

- Recommend that an IDT program be used to address lane-blocking disabled vehicles over increasing SSP coverage.
  - An IDT program would be helpful on all roadways, but with priority for high-volume urban roadways with long incident durations.
  - IDT can provide benefits to other kinds of incidents beyond disabled vehicles, so real benefits are greater than those estimated in this research.
- Future research could incorporate more benefits, such as safety and environmental impacts, and use more detailed incident data in estimating congestion impacts.

Questions?

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