Leveraging Weather and Transportation Data in Support of Winter Maintenance Operations Performance

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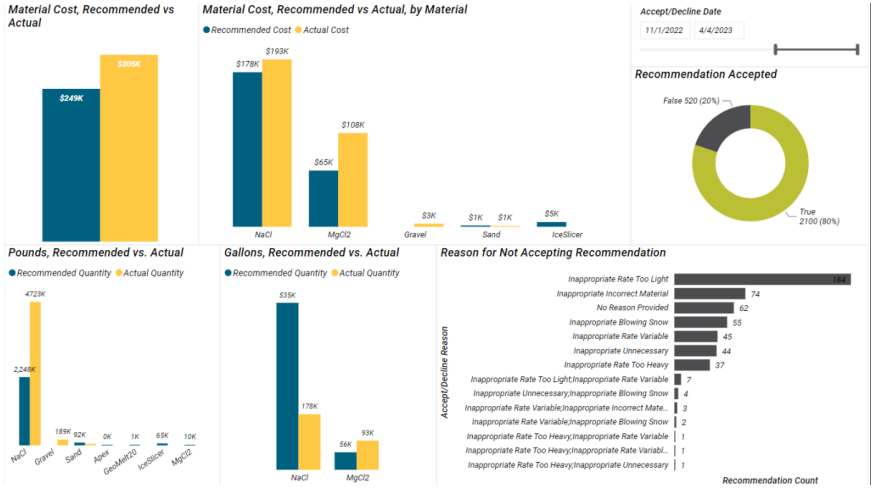
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Introduction and Motivation

- Nebraska DOT (NDOT) and the transportation community face unprecedented challenges
  - Staffing shortages
  - Changed travel patterns and preferences in the aftermath of the pandemic
  - Increasingly variable weather conditions
- This study seeks to provide strategic guidance to NDOT in the development of winter maintenance performance metrics
- **Objective: Utilize available weather, mobility, traffic camera, and maintenance data to develop a performance framework**





Performance Framework

Weather Information

Road Information

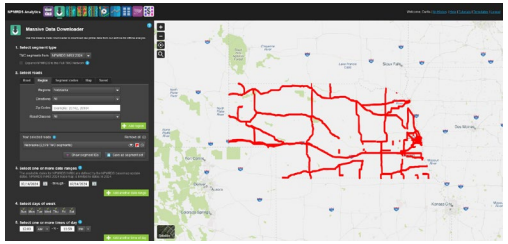
Speed

Crashes

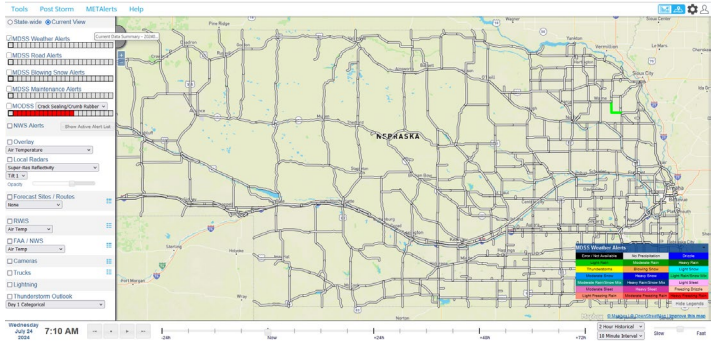
Closures

Maintenance Information

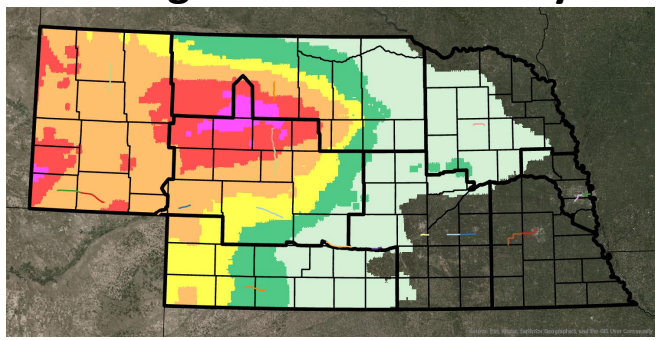
RITIS



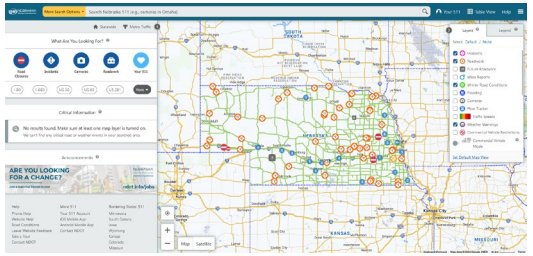
MDSS



Categorial Snow Severity

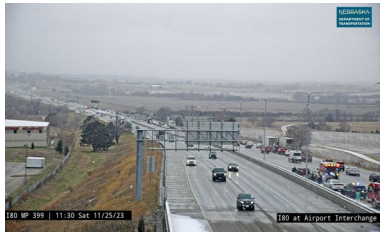


CARS511



Road Pavement Condition

Traffic Cameras

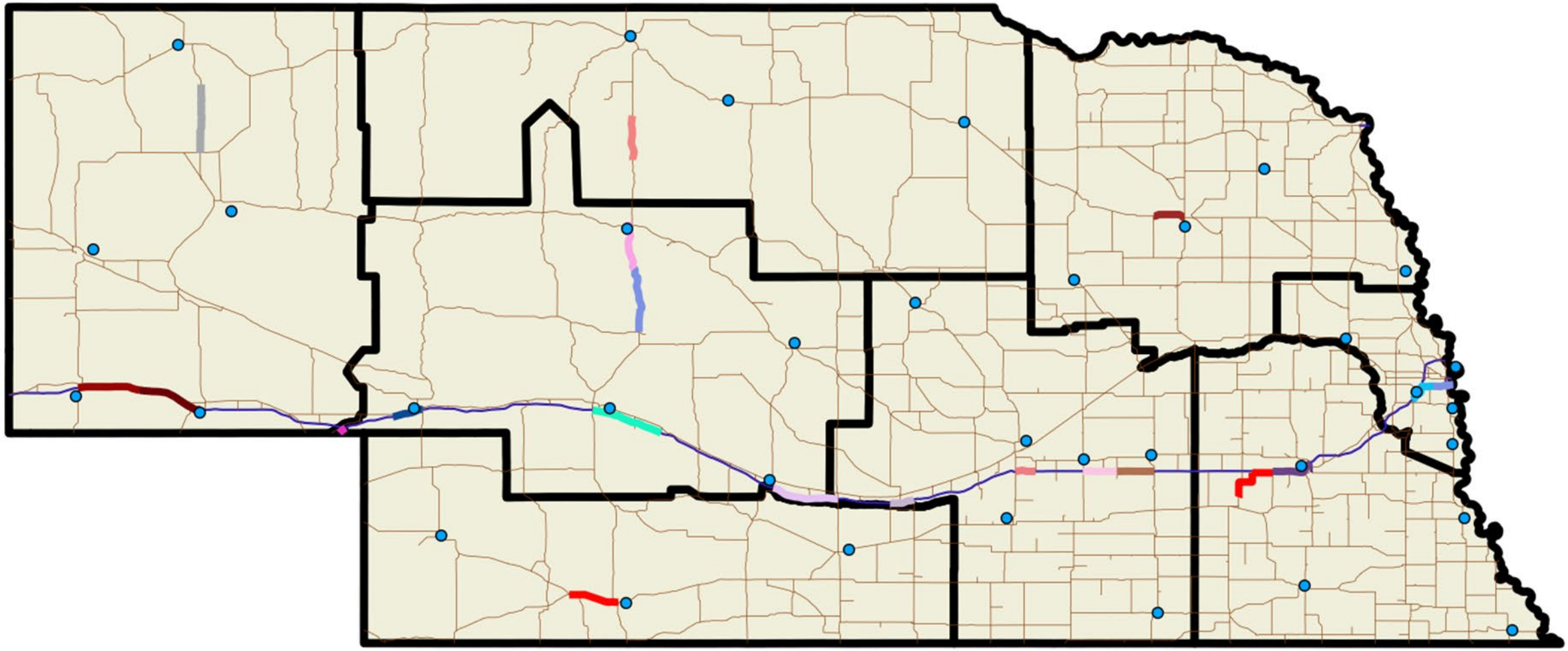




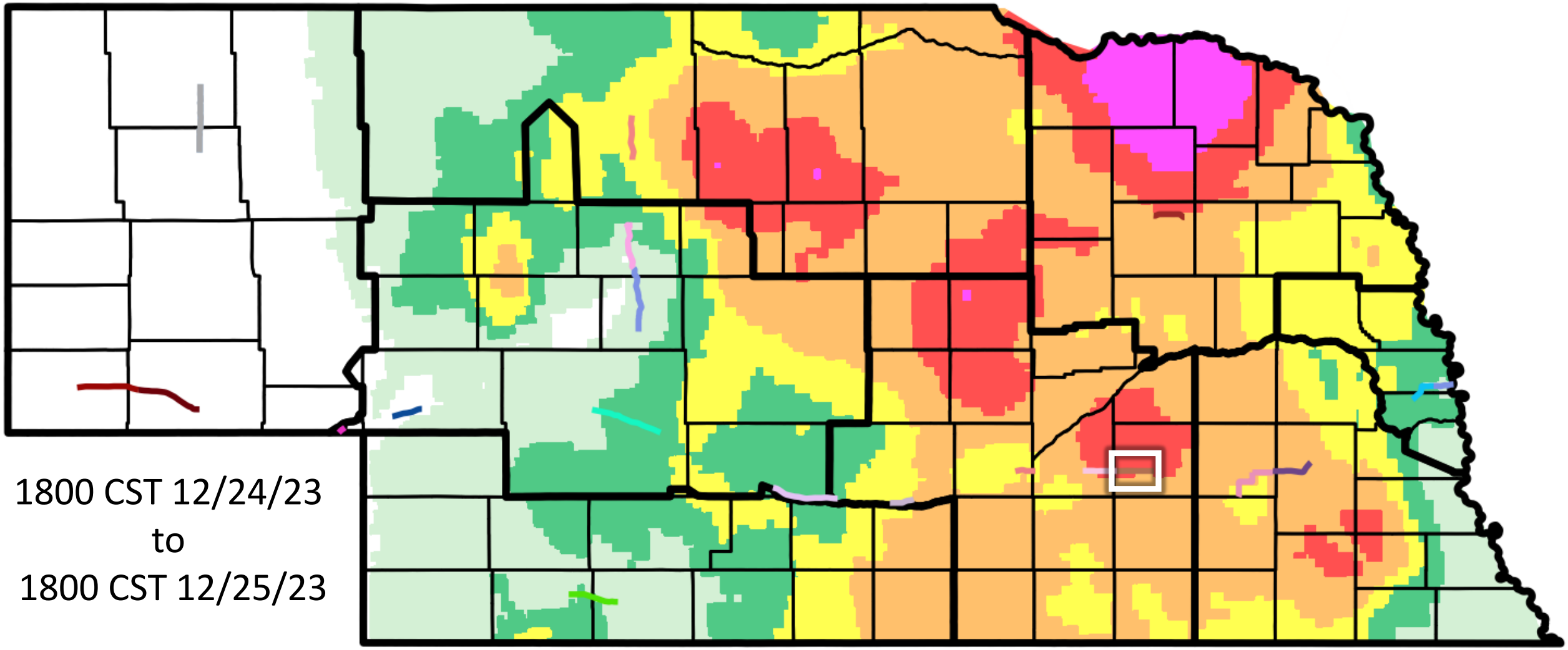
How bad was the weather, how bad did the road pavement get, and how quickly did the roads recover?

Study Region

- Performance will be assessed at select road segments across Nebraska



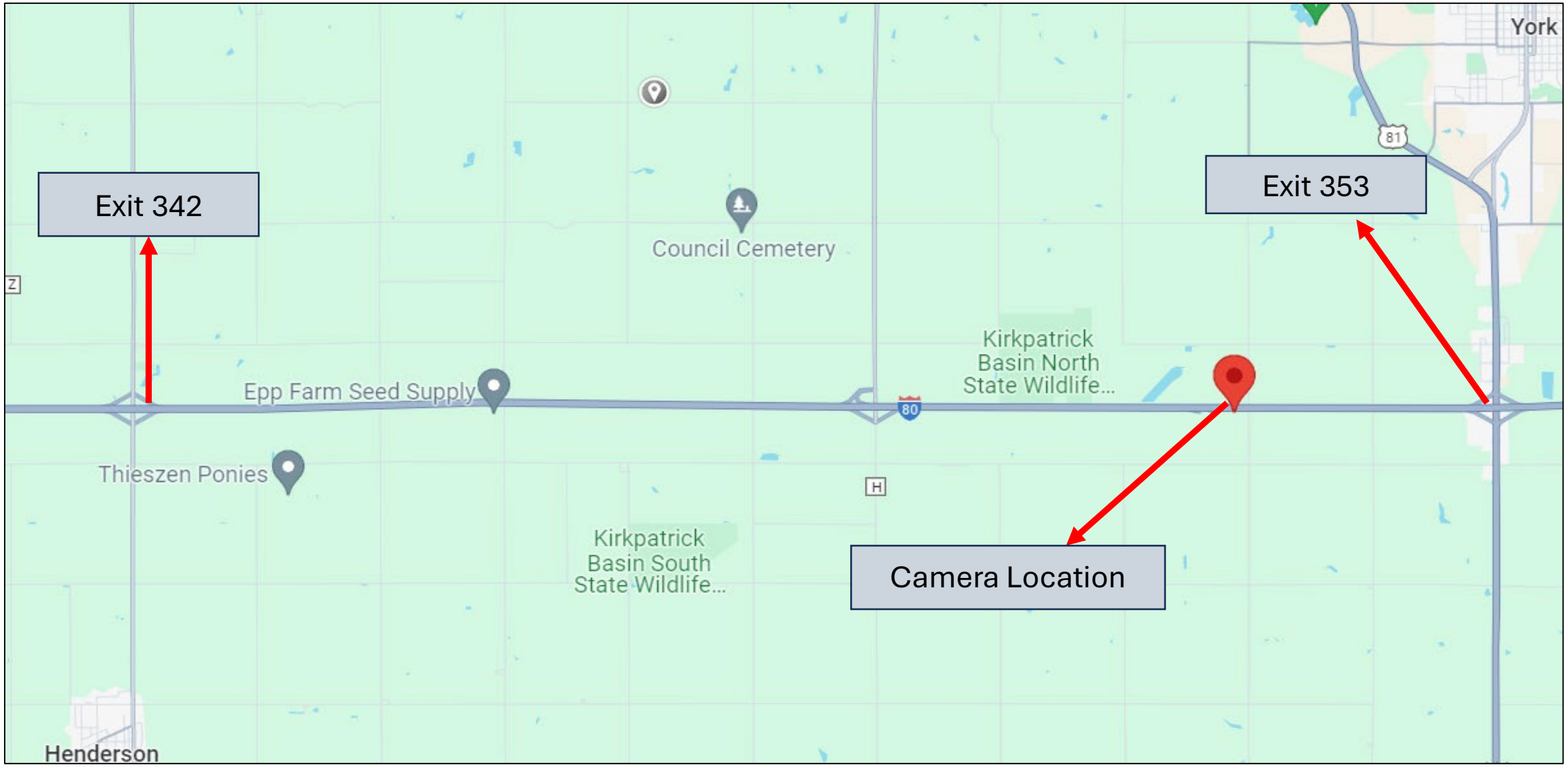
23-28 Dec 2023 Snowfall Severity Index



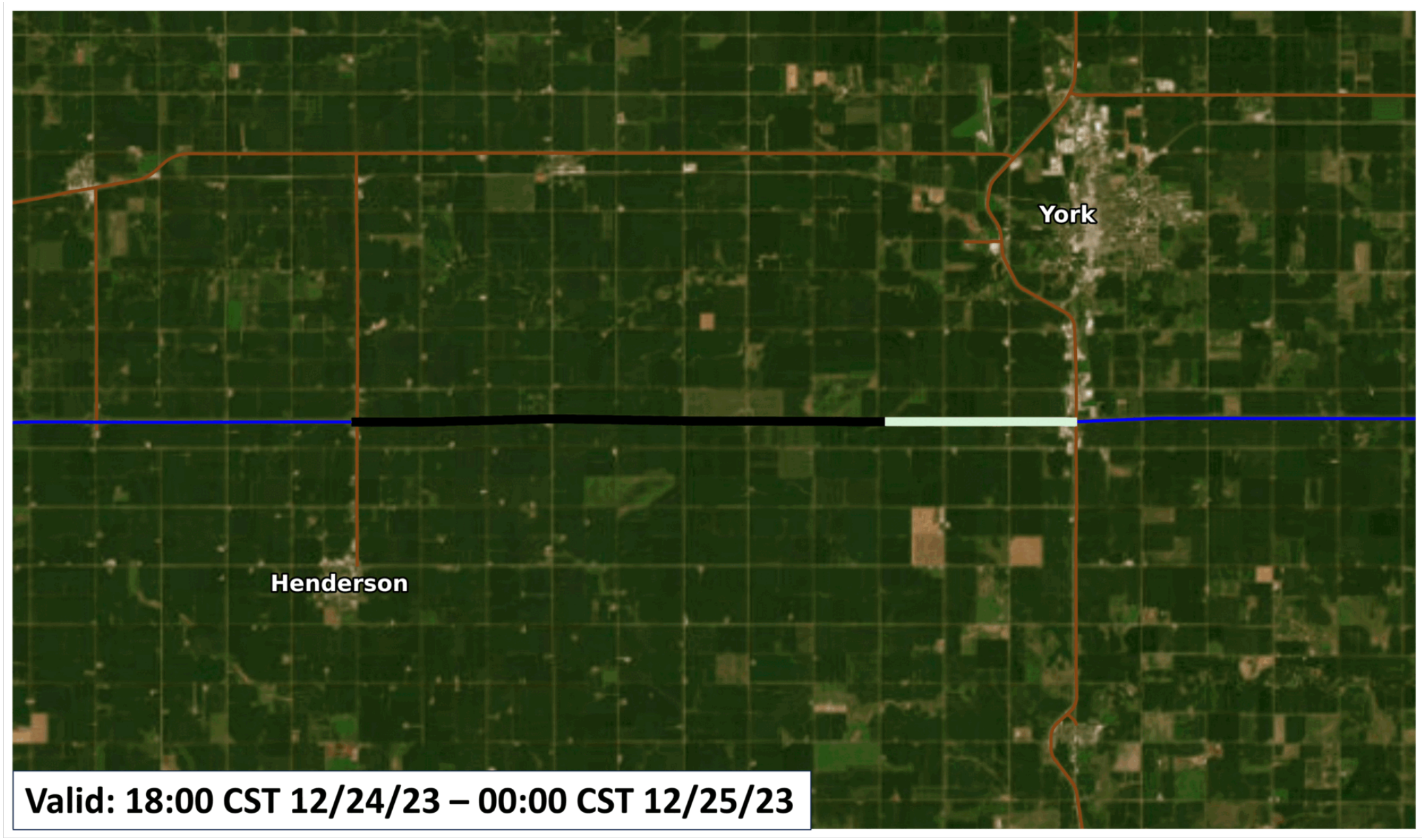
1800 CST 12/24/23
to
1800 CST 12/25/23

Category 1 2 3 4 5 6

Henderson to York Segment



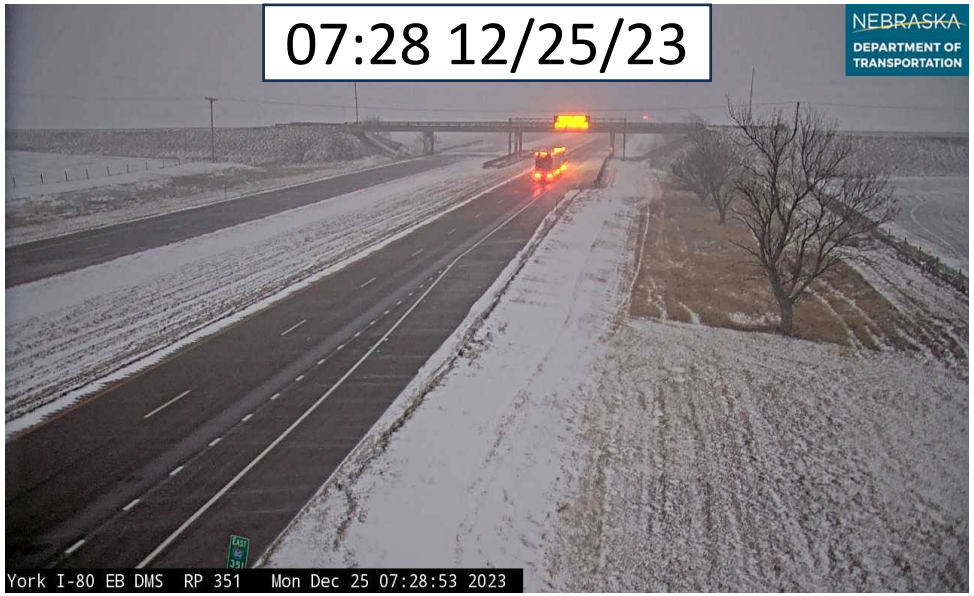
Segment Weather Conditions




NEBRASKA
DEPARTMENT OF
TRANSPORTATION
York I-80 EB DMS RP 351 Sun Dec 24 18:03:53 2023

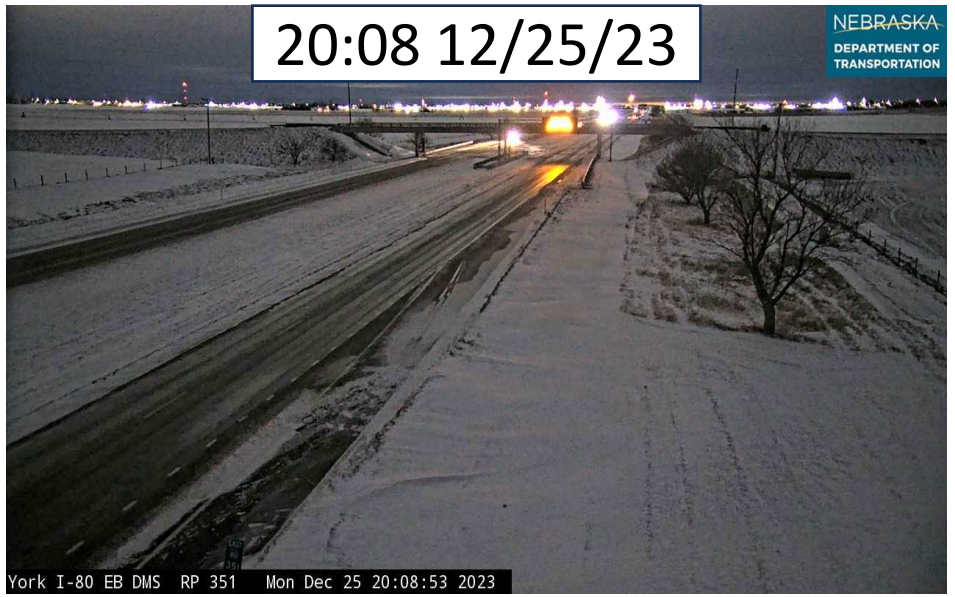
York Traffic Camera

CARS511
I-80@MM352
road closed
due to a crash
at 11:36 CST

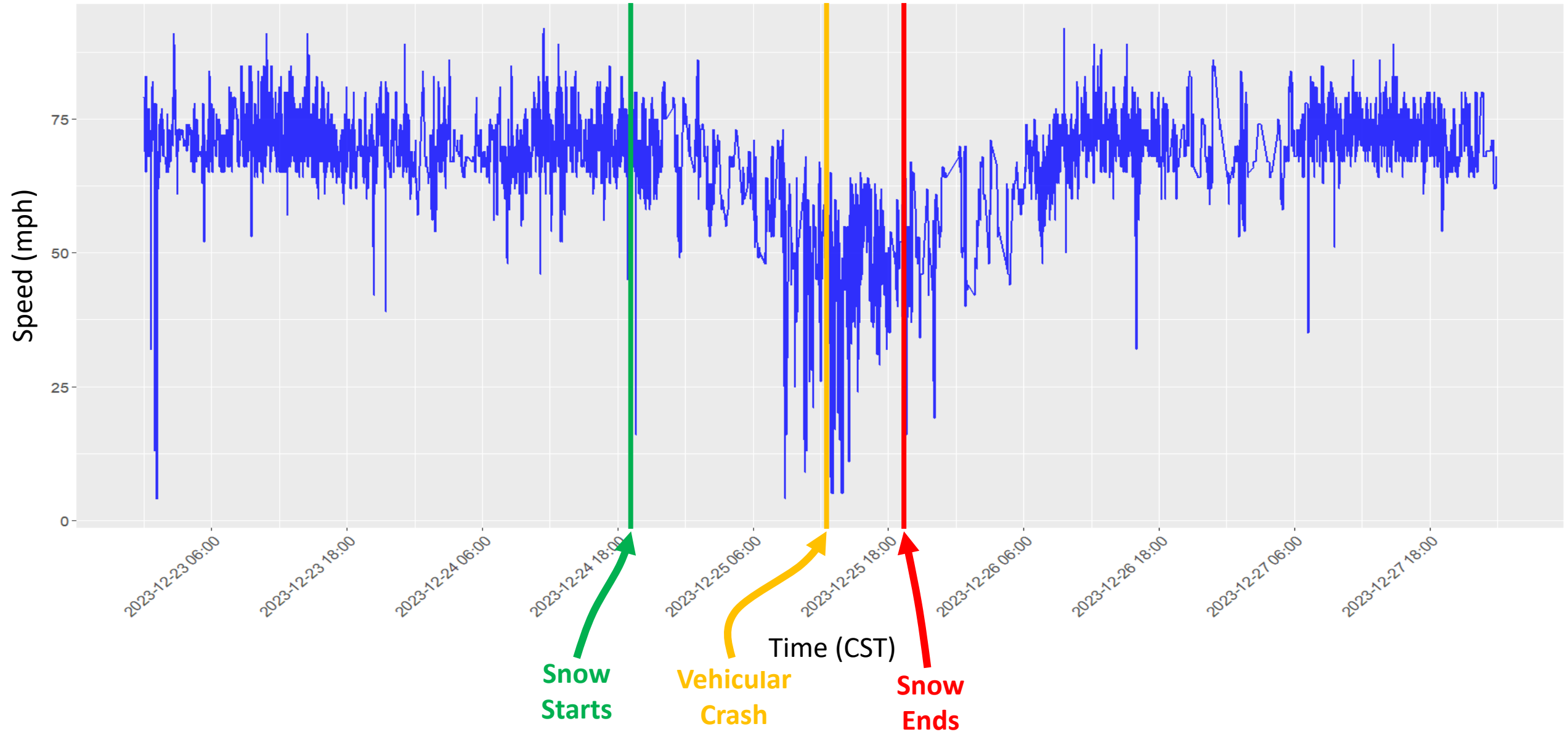








Segment Traffic Speed

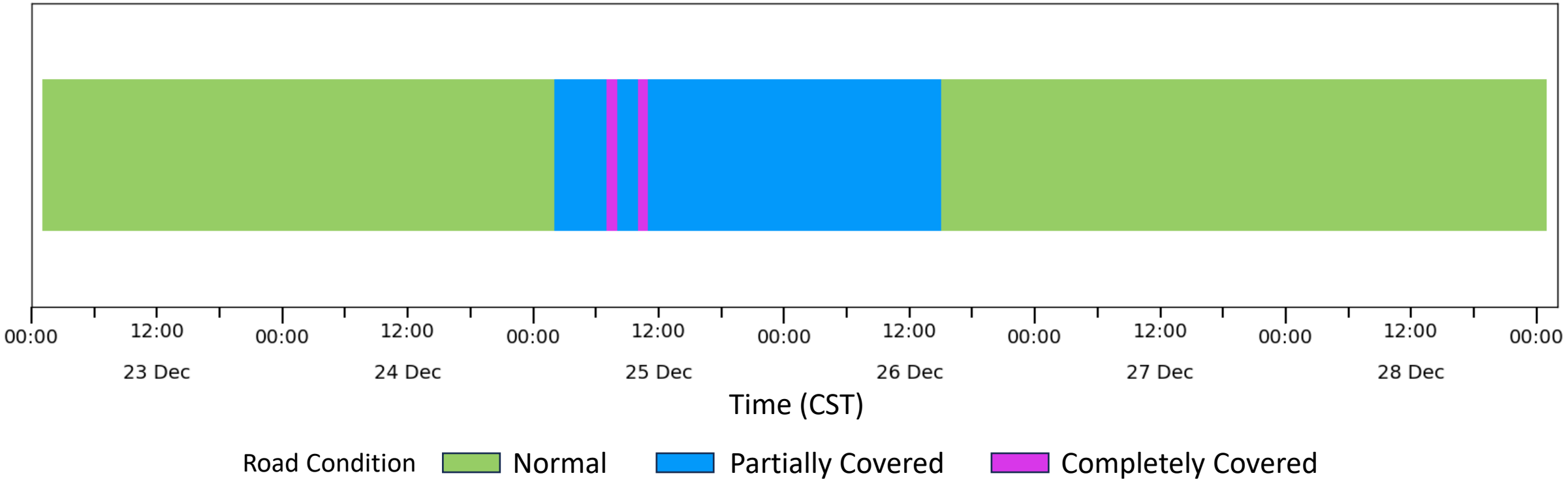


Segment Maintenance and Road Condition Data

Maintenance

Applied Material	Number of Trucks	Truck Miles
18,640 lbs prewet Sodium Chloride	9	163

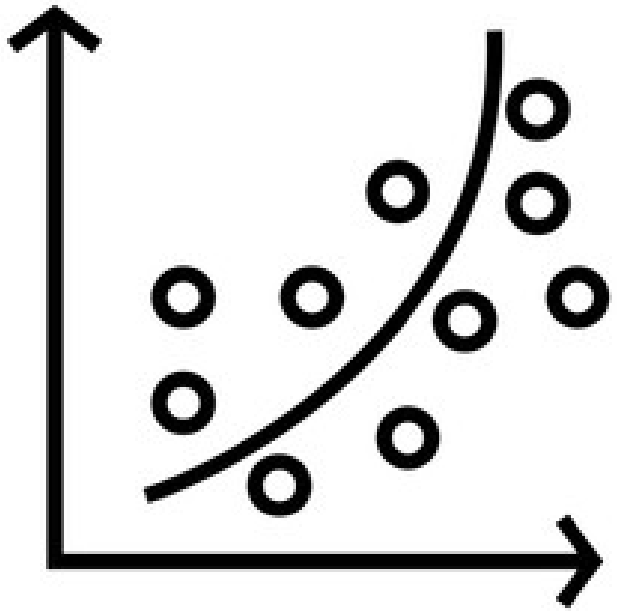
Road Conditions



Next Steps

- Integrate datasets to show how precipitation duration and intensity, normalized by maintenance activity, impact the duration of reduced traffic speeds and degraded road conditions
- Apply this performance framework to road segments for other case studies
- Run statistics on weather, road, and maintenance data along all segments to quantify performance and decipher any patterns





Questions?



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