

Work Zone Speed Camera

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Introduction

Over the last several years work zones have seen a relatively steady increase in crashes, year over year. Each crash is not only disruptive but potentially deadly.

Washington State Department of Transportation (WSDOT) first requested speed camera use in active workzones during the 2023 legislative session, law passed in July 2023. Camera units were then deployed starting in 2025.



Fig. 1. Above: Image of Work Zone Speed Camera enforcement sign - Photo provided by WSDOT



Fig. 2. Above: Image of Work Zone Speed Camera enforcement trailer

Units are operated by Elovate under contract, who are responsible for sending potential violations to Washington State Patrol. Privacy protections in Washington and regulations regarding the transfer of private data require preprocessing of captured images.

Our objective was to develop on previous work by WSDOT to measure and display results of ongoing deployments on drive behavior. Including investigation of spatial speeding behavior and lingering impacts (or 'Halo effects') of deployments.

Methodology

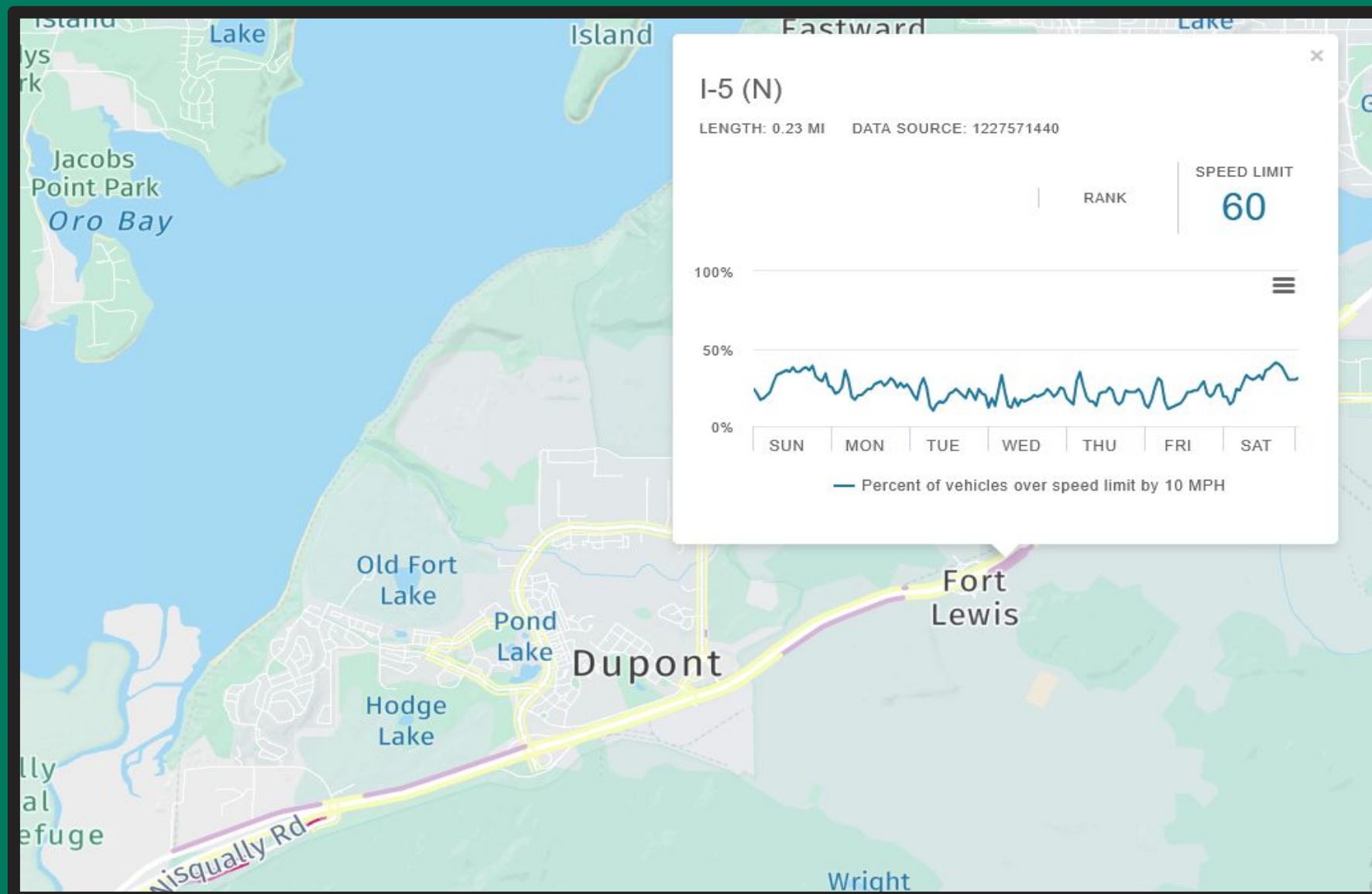


Fig. 3. Above: Image of I-5 ClearGuide software, showing the base report of one segment.



Fig. 4. Site visit to Ship Canal Bridge project located on I-5

Site Visits:
 Elovate Office
 I5 Ship Canal

Tools:
 Iteris
 Python
 Excell

Spatial Speeding Graphs

Percent of traffic speeding data was collected per road segment for all dates where camera units were deployed for more than one hour. Values were averaged across all dates between 7AM and 3PM, using Python's pandas, numpy, and scipy libraries then averaged per road segment. Comparative baselines were developed for each work zone for periods either before camera deployments began or after the project had finished, depending on the status of each project. Exclusively Tuesday, Wednesday, and Thursday data was used for comparison. Pearsons correlations were also calculated between distance from camera units and both average and difference in percent speeding.

Halo Effect Long Term

Prospective graphs were developed using the 85th percentile vehicle speed at the deployed camera milepost. Speeds recorded during deployment periods were compared to both a pre-deployment baseline from the month prior to enforcement and average conditions during active enforcement. This comparison was used to evaluate whether reduced speeds persisted after enforcement periods, indicating a potential halo effect.

Halo Effect Short Term

Graphs were also developed using the percentage of vehicles speeding on a given section of roadway on days were preceded and followed by deployments to analyze the impact of no enforcement day to day.

Results and Discussion



Fig. 6. Map by WSDOT showing the location of the I-5 project, with mileposts marked.

Zooming in on I-5 southbound, near Joint Base Lewis-McChord (JBLM), where one camera unit was deployed near milepost 118.

Right, project extent. Left, spatial speeding graphs; top average percent, bottom difference between deployed and undeplayed.

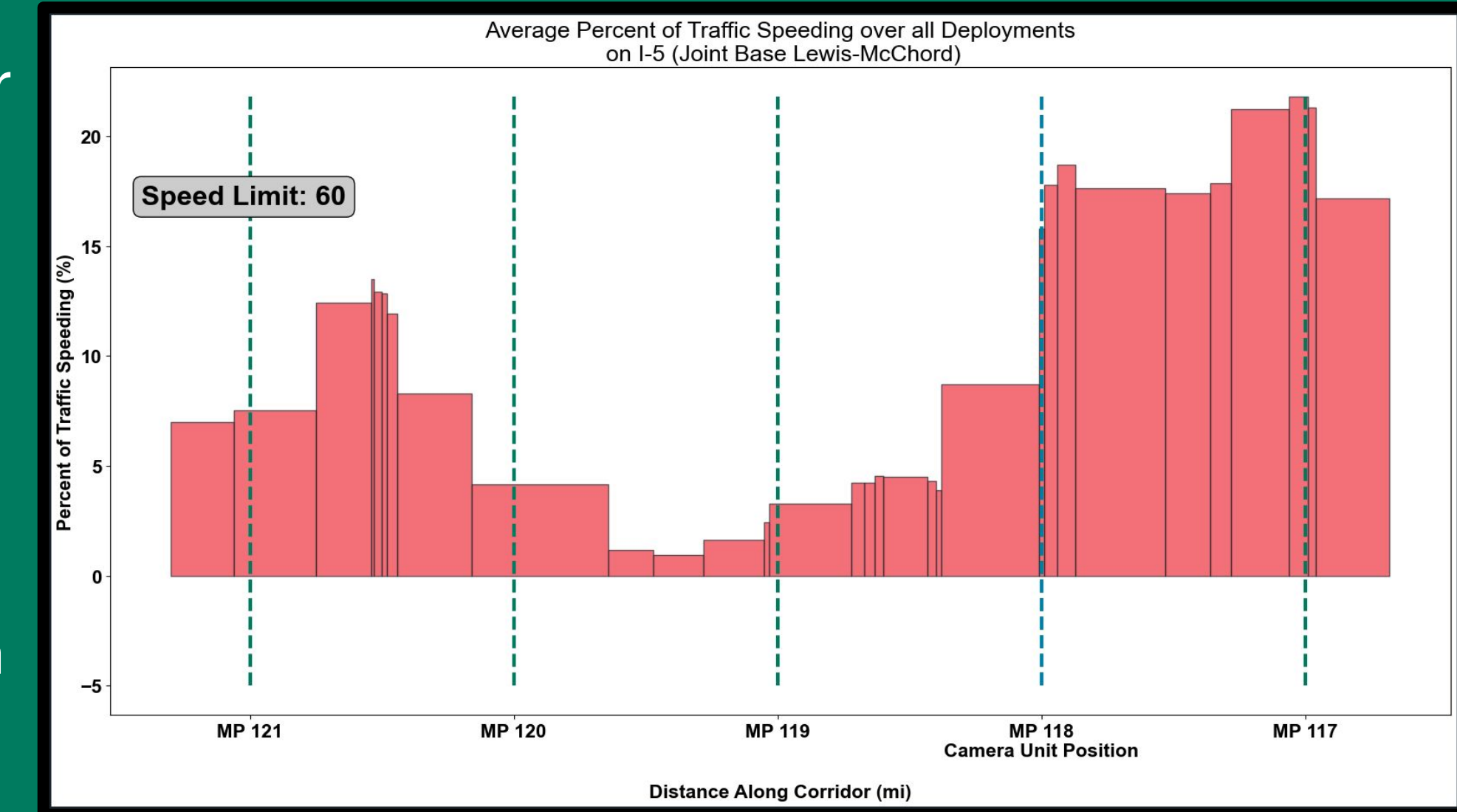


Fig. 7. Plot showing the average percent of traffic speeding across a given segment of workzone for I-5 southbound near JBLM.

Speeding particularly drops off in the mile preceding the deployed camera units, degree varies considerably depending on not only project but also traffic volume and time of day. Position within the project extent also matters considerably, as locations of entrances and exits impact driver behavior.

While I-5 near JBLM showed an average decrease of approximately 3% within one mile of the camera unit, other deployments saw between 1% and 5%.

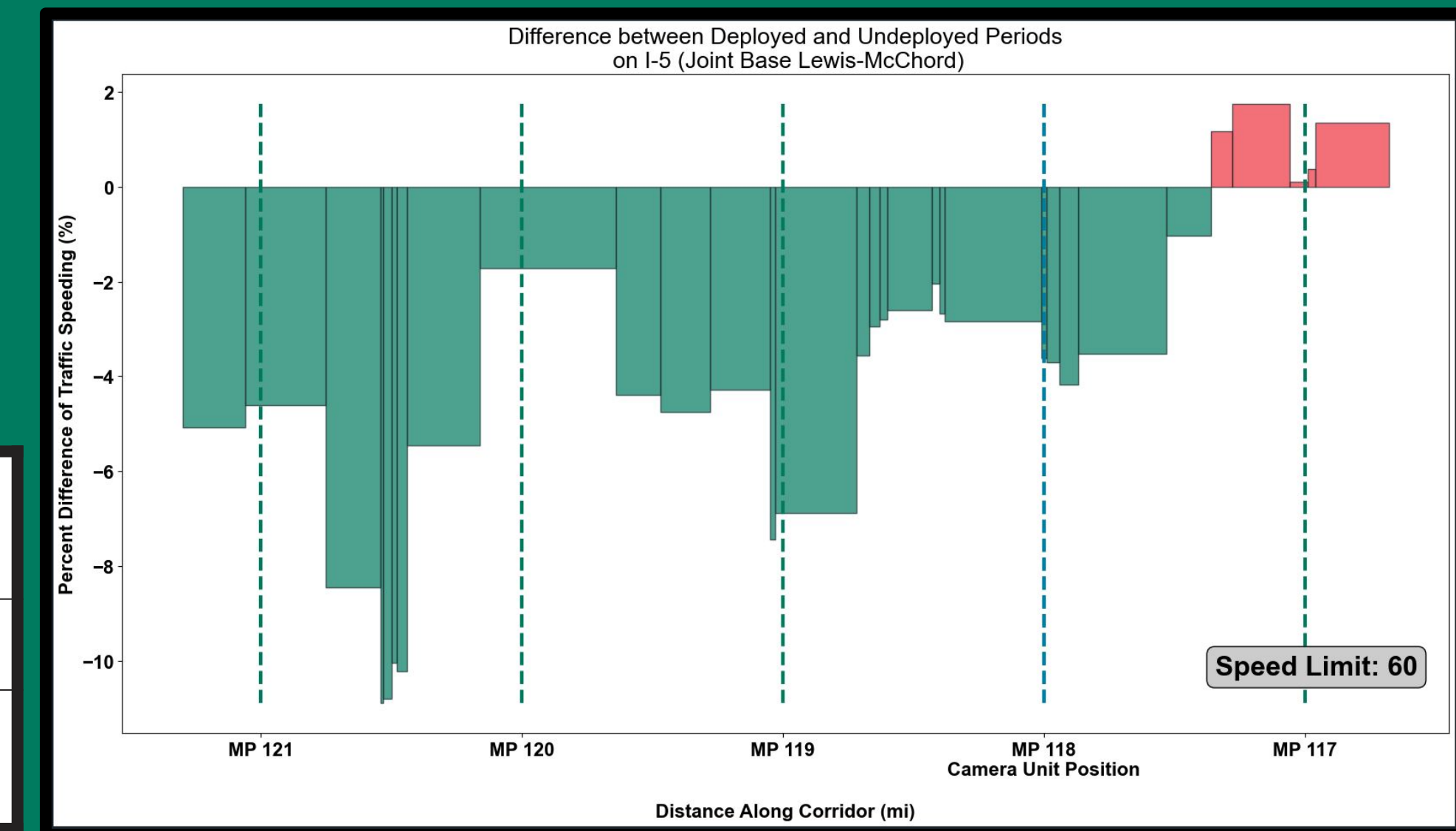


Fig. 8. Plot showing the average difference percent of traffic speeding between deployed and undeplayed periods across a given segment of work zone for I-5 southbound near JBLM.

Correlation Coefficient	
Mean	0.424
Difference	0.797

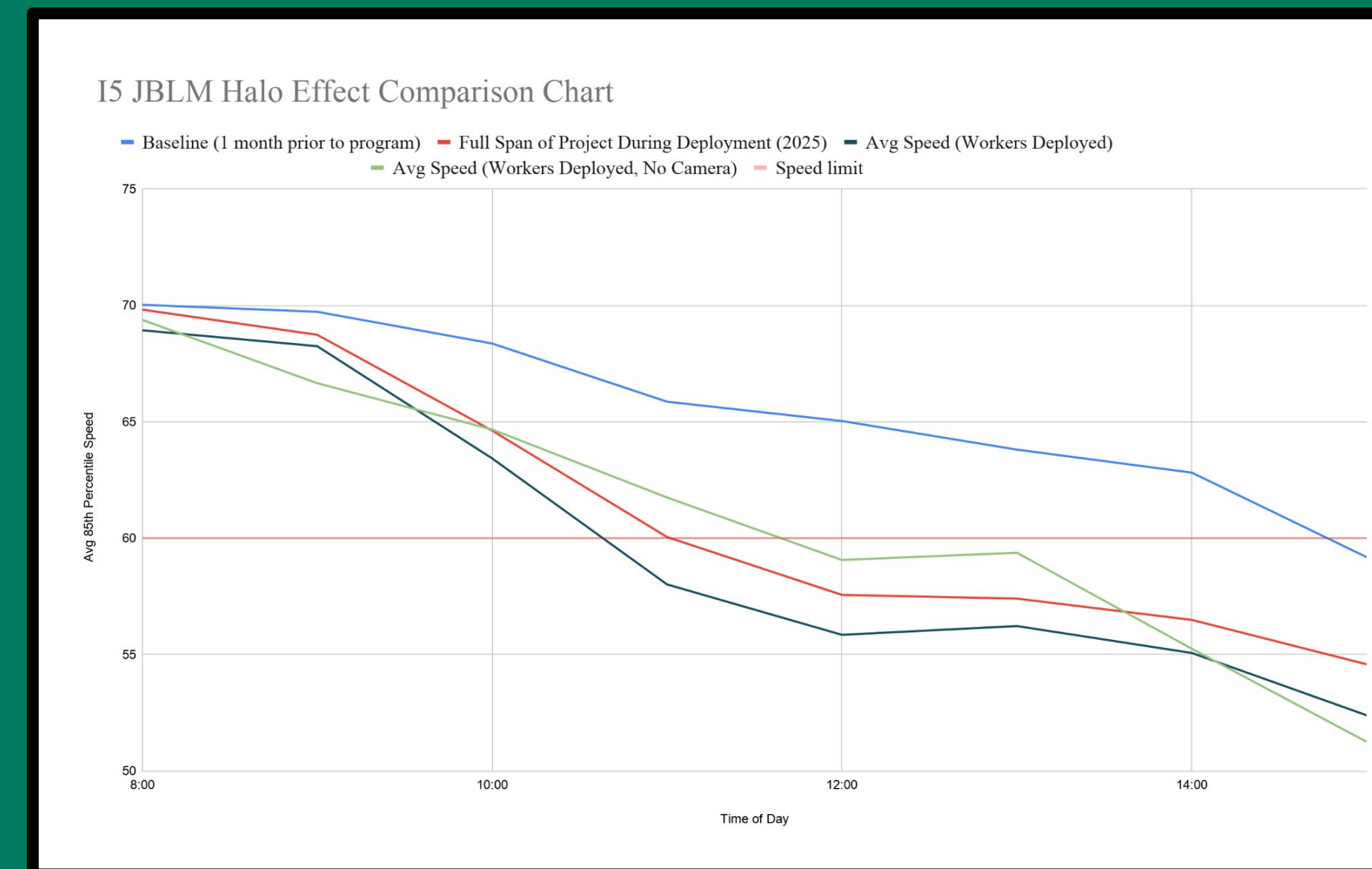


Fig. 10. Plot showing average speeds before program start, the entire duration of deployments, and when workers were present without camera units compared to speed limit.

Two day 'skips' - periods of two days with no deployments that were bookended by deployments - were found and the percentage of vehicles speeding at 12:00 on the furthest upstream single segment of the roadway were found. These results were plotted for each four day span. Speeding is shown to increase even with a resumption of enforcement after a two day skip. Results should be considered preliminary due to the limited dataset, and larger scale analysis would likely produce clearer trends.

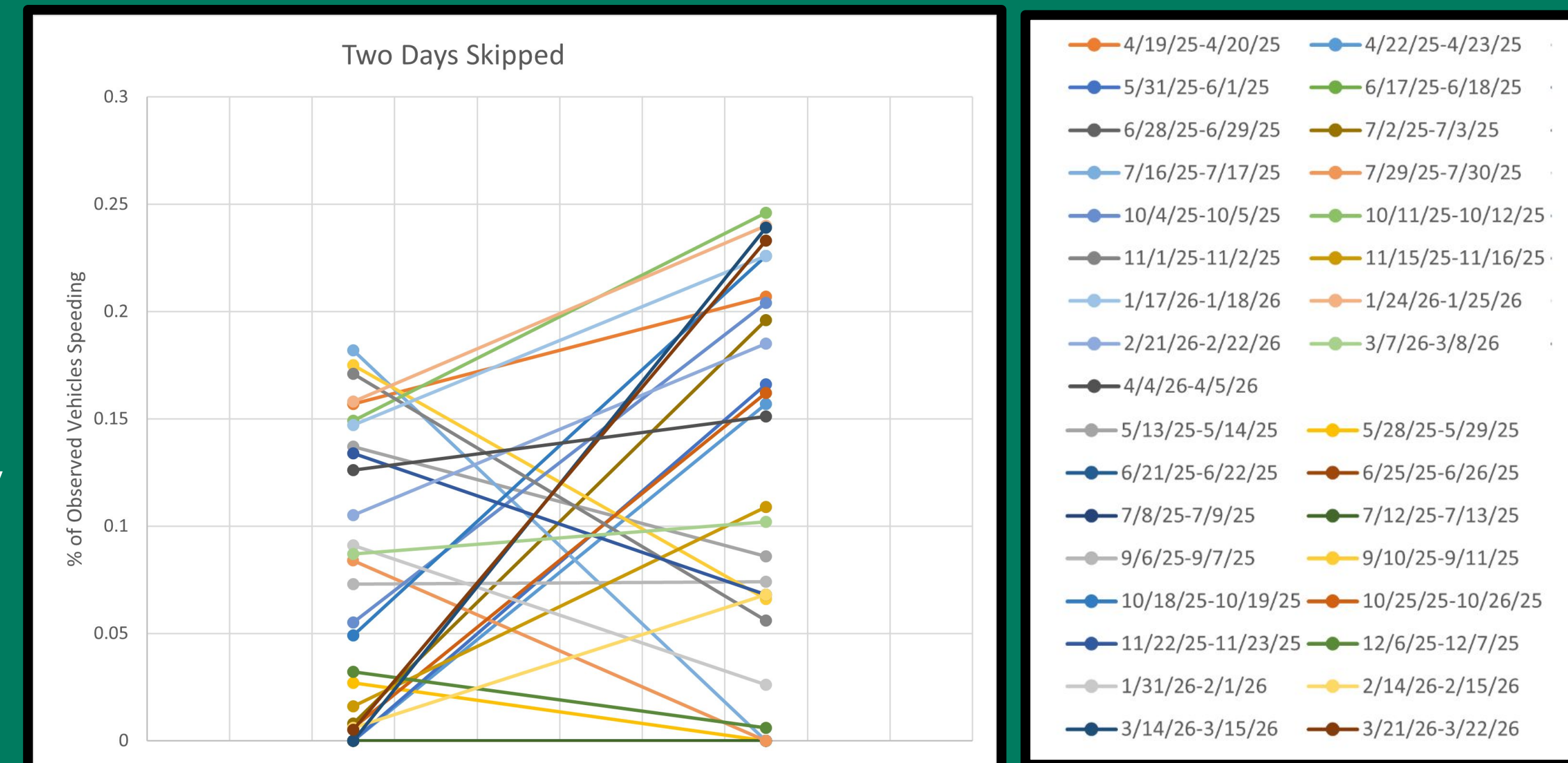


Fig. 11. Plot showing percent of vehicles speeding before and after two day gaps between deployments of camera units at a site.

The analysis compares average 85th percentile speeds at the JBLM site across 2025 and 2026, including periods before and during WZSC deployment. Relative to pre-WZSC conditions (1 month prior), average 85th percentile speeds show a consistent and significant decline throughout the project period. Notably, this trend is persistent both with and without camera deployment, indicating a broader "halo effect" influencing driver behavior.

Conclusions and Recommended Work

Our preliminary analyses demonstrate potential trends within driver behavior following WZSC development. However, the current dataset and processing of workflow limit the ability to create fully conclusive results. Future work should focus on improving the efficiency of data collection, as the current process requires manual downloading and organization of large quantities of speed data from Iteris. While an API is not currently available, the development of one is currently in the works and would significantly improve the scalability and automation of future analyses. The current models should also be refined further such that they can be applied to a greater scale across additional corridors, expanding the dataset providing more reliable identification of recurring patterns within driver behavior.

Acknowledgements

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