Quarterly Progress Report:
Project Number and Title: Road Salt Impact Assessment (Safety Study)
Research Area: Thrust Area 4
PI: Jonathan Rubin, Ph.D., Professor, University of Maine
Co-PI(s): Ali Shirazi, Ph.D., Assistant Professor, University of Maine
Reporting Period: 4/1/2021 to 6/30/2021
Submission Date: 6/30/2021

Overview: (Please answer each question individually)

Provide BRIEF overview and summary of activities performed during the reporting period.

During the reporting period, the research team worked on modeling the frequency of lane departure crashes using the Negative Binomial (NB) model with panel datasets. Multiple panel datasets with monthly volume, geometric characteristics and weather data were created for modeling. Polygons were created in GIS software to assign weather variables to segment data. The models were developed for winter (November to April) and non-winter (May to October) periods. Codes were written in SAS to develop models that correlate lane departure crashes with different weather, volume and geometric characteristics variables. Different roadway facility types such as Interstates, Major collectors, Minor Collectors and Minor Arterials were considered for the analysis.

Different goodness of fit and statistical measures and tests were used to investigate the final models. Final models were selected, and finalized and the impact of various variables was determined. The research team found positive correlations between some weather factors and lane departure crashes, especially during the winter. The research team also calculated the marginal effects for each significant variable in the models. The marginal effect analysis helps in understanding the effect of each variable on number of crashes.

Since May 2021, the research team started modeling crash severities. Various variables such as surface condition, weather conditions, age of drivers, type of vehicles, type of crash, speeding, alcohol usage, seatbelt usage, etc. are being used in a multinomial logit model to analyze severity of crashes. The research team is also working on documenting the initial draft of literature review, data, explanatory analysis and modeling results. A paper was also drafted for 2021 Transportation Research Board (TRB) meeting.

Provide context as to how these activities are helping achieve the overarching goal(s) of the project…

One of the major goals for this project was estimating the frequency of lane departure crashes given a set of variables especially weather factors. During the previous reporting period, we developed models to accomplish this task. These models can show the relationship between the frequency of lane departure crashes and different exposure, geometric characteristics and weather factors. We also conducted marginal effect analysis which is useful in understanding the impact of each variable on crashes.

Describe any accomplishments achieved under the project goals…

During the previous reporting period, the research team completed the modeling of the frequency of lane departure crashes. Task 1 and 2 are near completion (some editing and review is necessary). Frequency models in Task 3 were developed and now the team is working on modeling the severity of crashes (75% of Task 3 is completed).

Complete the following tables to document the work toward each task and budget (add rows/remove rows as needed, make sure you complete the Overall Project progress row and include all tasks even if they have ended or have not been started)

Table 1: Task Progress			
Task Number	**Start Date**	**End Date**	**% Complete**
Task 1	08/15/2020	12/31/2020	90%
Task 2	08/15/2020	12/31/2020	90%
Task 3	01/01/2021	05/31/2020	75%
Task 4	06/01/2021	07/31/2021	20%
Task 5	08/01/2021	08/31/2021	30%
Overall Project:	08/15/2020	08/31/2021	70%

Table 2: Budget Progress		
Project Budget	**Spend – Project to Date**	**% Project to Date***
$66,435.14		

***Include the date the budget is current to: June 30, 2021**

Describe any opportunities for training/professional development that have been provided.

The project team have included a graduate student (a master student in Transportation Engineering) from September 2020 to assist the research team in reviewing the studies in literature, collecting data, writing codes to clean, compile and analyze data, developing statistical models and interpreting the results.

Describe any activities involving the dissemination of research results (be sure to include outputs, outcomes, and the ways in which the outcomes/outputs have had an impact during the reporting period. Please use the tables below for any Publications and Presentations in addition to the description of any other technology transfer efforts that took place during the reporting period.)… Use the tables below to complete information about conferences, workshops, publications, etc. List all other outputs, outcomes, and impacts after the tables (i.e. patent applications, technologies, techniques, licenses issued, and/or website addresses used to disseminate research findings).

Table 3: Presentations at Conferences, Workshops, Seminars, and Other Events				
Title	**Event**	**Type**	**Location**	**Date(s)**
N/A				

Table 4: Publications and Submitted Papers and Reports				
Type	**Title**	**Citation**	**Date**	**Status**
N/A				

Participants and Collaborators:

Use the table below to list all individuals who have worked on the project.

Table 5: Active Principal Investigators, faculty, administrators, and Management Team Members			
Individual Name	**Email Address**	**Department**	**Role in Research**
Dr. Jonathan Rubin	rubinj@maine.edu	School of Economics	PI
Dr. Ali Shirazi	shirazi@maine.edu	Civil and Environmental Engineering	Co-PI

Use the table below to list all students who have participated in the project during the reporting. (This includes all paid, unpaid, intern, independent study, or any other student that participated in this project.)

Table 6: Student Participants during the reporting period				
Student Name	**Email Address**	**Class**	**Major**	**Role in research**
Alainie Sawtelle		Master Student	Civil Engineering (Transportation)	Graduate Research Assistant

Use the table below to list any students who worked on this project and graduated during this reporting period.

Table 7: Student Graduates			
Student Name	**Role in Research**	**Degree**	**Graduation Date**
N/A			

Use the table below to list organizations have been involved as partners on this project and their contribution to the project.

Table 8: Research Project Collaborators during the reporting period						
Organization	**Location**	**Contribution to the Project**				
		Financial Support	**In-Kind Support**	**Facilities**	**Collaborative Research**	**Personnel Exchanges**
Maine Department of Transportation (Maine DOT)	Augusta, ME	x				

List all other outputs, outcomes, and impacts here (i.e. patent applications, technologies, techniques, licenses issued, and/or website addresses used to disseminate research findings). Please be sure to provide detailed information about each item as with the tables above.

N/A

Have other collaborators or contacts been involved? If so, who and how? (This would include collaborations with others within the lead or partner universities; especially interdepartmental or interdisciplinary collaborations.)

No new collaborators have been added

Who is the Technical Champion for this project?

Name: Mr. Robert A Skehan
Title: Director, Office of Safety
Organization: Maine Department of Transportation
Location (City & State): Augusta, ME
Email Address: robert.skehan@maine.gov
Changes:

N/A

Planned Activities:

The research team will model the severity of lane departure crashes during the next reporting period. The multinomial logit model will be used for the analysis. The team will use different goodness of fit and statistical tests or measures to explore the final models. The research team will also continue with documenting, reviewing and editing the results.