Quarterly Progress Report:
Project Number and Title: Road Salt Impact Assessment
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: 10/1/2020 to 12/31/2020
Submission Date: 12/31/2020

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 continued reviewing the literature related to the impact of winter weather on roadway safety. Critical safety variables were identified and the project team worked with the Maine DOT to obtain safety data needed for the study. Once data were obtained, the research team worked on cleaning and compiling the data for further analysis. Multiple codes and scripts were written in R to clean, merge and combine the data for different conditions. The research team also investigated fatal crashes documented in FARS as well as data from other sources such as Maine public map viewer. The research team investigated different data sources to obtain weather variables as well. A dataset is being prepared including critical weather variables. The research team worked with the Maine DOT to obtain a GIS map of the highway network to combine weather data with other roadway variables. During the reporting period, the preliminary analysis of crash and weather condition has been started and is in progress. Lane departure crashes in different regions were investigated. Single and multi-unit and truck crashes were investigated. Likewise, data are being investigated for different conditions such as Urban vs. rural, Wet vs. Dry surface, age of the driver and the cost of crash. The research team plan to start developing models in January 2021.

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

Reviewing the existing studies is critical to understand the problem, investigate the current practice, explore the critical data variables, and identify the models for statistical analysis. Critical studies in literature were reviewed to achieve this goal. The research team closely worked with Maine DOT to acquire data needed for the project. Detailed crash, geometric characteristics as well as exposure data (e.g.: AADT) assist the team to develop necessary models for the analysis. Obtaining weather variables is also an important step in this research. Research team investigated multiple avenues to obtain these data variables. In addition, before developing models for roadway safety analysis, it is important to create a "uniform" dataset that includes crash, exposure (e.g.: AADT), roadway geometric characteristics and weather variables. Multiple codes and scrips were written to achieve this goal to create a uniform dataset. GIS was another tool that is being used in order to map the data. Preliminary analysis is a step used to understand the data before modeling. For this purpose, the research team investigated data under different conditions such as Urban vs. rural and Wet vs. Dry conditions, age of the driver and the cost of crash. These analyses assist the project team to understand the pattern in data before developing the models.

Describe any accomplishments achieved under the project goals…

During the last reporting period, the research team reviewed multiple studies related to the topic of the project, identified critical variables needed for modeling, collected data related to weather conditions, wrote scripts to clean, merge and compile the data, and created datasets which will be used for modeling in Spring 2021. Preliminary analysis has also been started and expected to be completed in January 2021. Significant progress has been achieved with regard to Task 1 and 2.

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	75%
Task 3	01/01/2021	05/31/2020	10%
Task 4	06/01/2021	07/31/2021	Not Started
Task 5	08/01/2021	08/31/2021	Not Started
Overall Project:	08/15/2020	08/31/2021	20%

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

***Include the date the budget is current to: December 31, 2020**

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

The project team 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				

<u>Participants and Collaborators:</u>

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 preliminary analysis is expected to be finished next month (in January). The research team plans to start modeling in January. The Negative Binomial distribution will be tested as one of the primary models for the analysis.