Quarterly Progress and Performance Indicators Report:
Project Number and Title: 2.15 Incorporation of Pollinator Plantings to Enhance Ecosystem Functions and Durability of Transportation Right-of-Way Infrastructure

PI: *Rebecca Brown, U. Rhode Island*
Co-PI(s): *none*
Reporting Period: *10/1/2021 – 12/31/2021*
Submission Date: *12/20/2021*

******IMPORTANT: Please fill out each section fully and reply with N/A for questions/sections with nothing to report. For ease of reporting to the USDOT, please do not remove, or change the order of, any sections/text. You may remove/add each rows in tables as needed. Thank you! ******
The report is due on the last day of the reporting period in .doc format to tidc@maine.edu.

Overview:

*Provide **BRIEF** highlights of activities performed during the reporting period. This summary should be written in lay terms for a general audience to understand. This should not be an extensive write up of findings (those are to be included in the final report), but a high-level overview of the activities conducted during the last three months **no more than 3 bullet points at no more than 1 sentence each** ….*

- The seed establishment study plots were created and the native grass/wildflower seed mix was planted.
- Wildflower species were selected to be screened for tolerance to the roadside environment

Meeting the Overarching Goals of the Project:
How did the previous items help you achieve the project goals and objects? Please give one bullet point for each bullet point listed above.

- Creating replicated plots established using the methods being tested is the first part of evaluating the methods' effectiveness. objective 2: evaluate the effectiveness of different methods of establishing pollinator meadows from seed in the roadside environment.
- We do not have capacity to test all possible insect-pollinated forbs for adaptation to the roadside environment (objective 1) so a subset of 30 species needed to be selected.
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Accomplishments:
List any accomplishments achieved under the project goals in bullet point form…

- Cool season grasses had emerged in all establishment plots by late November. Other species are not expected to emerge until Spring, when data collection will begin.

Task Progress and Budget:
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: Title	**Start Date**	**End Date**	**% Complete**

Task 1.1: Roadside Adaptation Study	10/1/2021		5%
Task 1.2: Establishment Methods Study	9/1/2021		15%
Task 1.3: Conduct Vegetation Surveys			
Task 1.4: Analyze data and write papers			
Phase 1 Overall	9/1/2021	Planned 8/30/2023	4%
Phase 2 Overall	Enter the Phase 2 Actual Start Date	Enter the Phase 2 Planned/Actual End Date	Enter the Phase 2 % Complete
Phase 3 Overall	Enter Phase 3 Actual Start Date	Enter Phase 3 Planned/Actual End Date	Enter Phase 3 % Complete

Table 2: Milestone Progress

Milestone #: Description	Corresponding Deliverable	Start Date	End Date
Milestone 1: Species for adaptation study identified and seed obtained	List of species and ecotypes to include in study	10/1/2021	12/31/2021
Milestone 2: Transplants produced for adaptation study	Inventory of transplants	12/15/2021	4/30/2022
Milestone 3: Adaptation study	Photographs of installed plots	5/1/2022	6/30/2022
Milestone 4: Data collected on summer survival	Data set with monthly plant counts and growth measures	6/1/22	10/31/22
Milestone 5:Data collected on winter survival	Data set with survival counts and regrowth measures	4/1/23	6/30/23
Milestone 6: Establishment method study plots installed on roadside	Photographs of installed plots	9/1/21	10/30/21
Milestone 7: Monthly seedling count and ground cover data collected	Dataset with 5 months of data from all 20 plots	5/1/2022	9/30/22
Milestone 8: Survey areas identified and events planned	Written protocol and plan for at least 4 survey events	1/1/2022	4/30/2022
Milestone 9: Vegetation surveys conducted	List of species identified at each location	4/30/22	9/30/22

Milestone #10: Establishment data analyzed and report written	Report on effectiveness of establishment methods	10/1/22	4/30/23
Milestone #11: Survey data analyzed and report written	Report on naturally occurring insect-pollinated species on roadsides	10/1/22	4/30/23
Milestone #12: Roadside adaptation data analyzed and report written	Report recommending species for use on roadsides	5/1/23	8/30/23

Note: Dates in red are projected.

Table 3: Budget Progress

Project Budget	Spend – Project to Date	% Project to Date (include the date)
$324,765	$10,116 Federal + $43,500 cost share	16.5% as of 12/15/2021
Enter Phase 2 Full Budget	Enter Phase 2 Full Spend Amount (Federal + Cost Share)	Enter Phase 2 % Spent
Enter Phase 3 Full Budget	Enter Phase 3 Full Spend Amount (Federal + Cost Share)	Enter Phase 3 % Spent

Is your Research Project Applied or Advanced?

☒ **Applied** (*The systematic study to gain knowledge or understanding necessary for determining the means by which a recognized and specific need may be met.)*

☐ **Advanced** *(An intermediate research effort between basic research and applied research. This study bridges basic (study to understand fundamental aspects of phenomena without specific applications in mind) and applied research and includes transformative change rather than incremental advances. The investigation into the use of basic research results to an area of application without a specific problem to resolve.)*

Education and Workforce Development:

Answer the following questions (N/A if there is nothing to report):

1. Did you provide any workforce development or training opportunities to transportation professionals (already in the field)? If so, what was the training? When was it offered? How many people attended? (i.e. The research team provided an in the field training for the SAR technology for 3 maintenance crew members of the MassDOT on 3/31/2021. The members learned how to use the technology and interrupt the data.)
   N/A
2. Did you hold meetings with any transportation industry organizations or DOTs? If so, what was the meeting's purpose? When was it offered? How many people attended? (i.e. The research team held a meeting with MaineDOT to update them on the progress of the research findings and how the findings can be implemented on 3/31/2021. 15 DOT maintenance members were present at the meeting.)
   N/A

3. Did you host/participant in any K-12 education outreach activities? If so, what was the activity? What was the target age/grade level of the participants? How many students/teachers attended? When was the activity held? (i.e. 25 8th graders and 2 teachers visited the concrete lab and created small concrete trinkets like Legos on 3/31/2021. They learned about the different types of fibers that can be used in the concrete.)

N/A

Technology Transfer:

Complete all of the tables below and provide additional information where requested. Please provide ALL requested information as this is one of the most important sections for reporting to the USDOT. ***ONLY provide information relevant to this reporting period.***

Use the table below to complete information about conference sessions, workshops, webinars, seminars, or other events you led/attended where you shared findings as a result of the work you conducted on this project:

Table 3: Presentations at Conferences, Workshops, Seminars, and Other Events

Type	Title	Citation	Event	Location	Date(s)
i.e. Conference, Symposium, DOT/AOT presentation, Seminar, etc.	Presentation Title	Full Citation	Name of event (i.e. TIDC 1st Annual Conference) or who was the presentation given to?		
N/A					

Use the table below to report any publications, technical reports, peer-reviewed articles, newspaper articles referencing your work, graduate papers, dissertations, etc. written as a result of the work you conducted on this project. Please list only completed items and exclude work in progress.

Table 4: Publications and Submitted Papers and Reports

Type	Title	Citation	Date	Status
i.e. Peer-reviewed journal, conference paper, book, policy paper, magazine/newspaper article	Publication title	Full citation		i.e. Submitted, accepted, under review
N/A				

Answer the following questions (N/A if there is nothing to report):

1. Did you deploy any technology during the reporting period through pilot or demonstration studies as a result of this work? If so, what was the technology? When was it deployed?
   N/A

2. Was any technology adopted by industry or transportation agencies as a result of this work? If so, what was the technology? When was is adopted? Who adopted the technology?
   N/A
3. Did findings from this research project result in changing industry or transportation agency practices, decision making, or policies? If so, what was the change? When was the change implemented? Who adopted the change?
   N/A
4. Were any licenses granted to industry as a result of findings from this work? If so, when? To whom was the license granted?
   N/A
5. Were any patent applications submitted as a result of findings from this research? If so, please provide a copy of the patent application with your report.
   N/A
6. Did industry organizations or DOTs provide cost-share (cash or in-kind) to your research during the reporting period? Who was the organization? Please provide an in-kind support invoice from the organization with your report (this is kept confidential and used for record keeping purposes only).
   RIDOT provided 144 hours of maintenance operations time – equipment and crew – for installing the establishment study plots

Please add figures/images that can be included on the website and/or in marketing/social media materials to further clarify your research to the general public. This is very important to our Technology Transfer initiatives.

Insert figures here

Describe any additional activities involving the dissemination of research results not listed above under the following headings:

Outputs:
Definition: Any new or improved process, practice, technology, software, training aid, or other tangible product resulting from research and development activities. They are used to improve the efficiency, effectiveness, and safety of transportation systems. List any outputs accomplished during this reporting period:

- N/A

Outcomes:
Definition: The application of outputs; any changes made to the transportation system, or its regulatory, legislative, or policy framework resulting from research and development activities. List any outcomes accomplished during this reporting period:
N/A
Impacts:
Definition: The effects of the outcomes on the transportation system such as reduced fatalities, decreased capital or operating costs, community impacts, or environmental benefits. The reported impacts from UTCs are used for the assessment of each UTC and to make a case for Federal funding of research and education by demonstrating the impacts that UTC funding has had on technology and education. NOTE: The U.S. DOT uses this information to assess how the research and education programs (a) improve the operation and safety of the transportation system; (b) increase the body of knowledge and technologies; (c) enlarge the pool of people trained to develop knowledge and utilize technologies; and (d) improves the physical, institutional, and information resources that enable people to have access to training and new technologies. List any outcomes accomplished during this reporting period:

- N/A

Participants and Collaborators:

Use the table below to list individuals (compensated or not) who have worked on the project other than students.

Table 5: Active Principal Investigators, faculty, administrators, and Management Team Members				
Individual Name & Title	**Dates involved**	**Email Address**	**Department**	**Role in Research**
Rebecca Brown, Professor	8/15/21 – 12/30/21	brownreb@uri.edu	Plant Sciences and Entomology	Project Leader
Rahmatallah Gheshm, Post-Doc	8/15/21 – 12/30/21	rgheshm@uri.edu	Plant Sciences and Entomology	Field work leader

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

Table 6: Student Participants during the reporting period								
Student Name	**Start Date**	**End Date**	**Advisor**	**Email Address**	**Level**	**Major**	**Funding Source**	**Role in research**
Katie Marcil	9/1/2021	12/30/21	R. Brown		Master's	Biological and Environmental Science – Sustainable Agriculture and Food Systems	University non-TIDC match (teaching assistantship)	Assisting with field plot establishment

Use the table below to list any students who worked on this project and graduated or received a certificate during this reporting period. Include information about the student's accepted employment (i.e. the student is now working at MaineDOT) or if they are continuing their students through an advanced degree (list the degree and where they are attending).

Table 7: Students who Graduated During the Reporting Period

Student Name	Degree/Certificate Earned	Graduation/Certification Date	Did the student enter the transportation field or continue another degree at your university?
N/A			Please list the organization or degree

Use the table below to list any students that participated in Industrial Internships:

Table 8: Industrial Internships			
Student Name	**Degree/Certificate Earned**	**Graduation/Certification Date**	**Did the student enter the transportation field or continue another degree at your university?**
N/A			Please list the organization or degree

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

Table 9: Research Project Collaborators during the reporting period						
Organization	**Location**	**Contribution to the Project**				
		Financial Support	**In-Kind Support**	**Facilities**	**Collaborative Research**	**Personnel Exchanges**
		List the amount	List the amount	Mark with an "x" where appropriate		
RIDOT	Rhode Island		144 hours Operations support	x		
Ernst Conservation Seeds	Meader, PA		20 lbs wildflower seed mix values at $510			

*Use the table below to list **individuals** that have been involved as partners on this project and their contribution to the project.*
*(**List your technical champion(s) in this table.** This also includes collaborations within the lead or partner universities who are not already listed as PIs; especially interdepartmental or interdisciplinary collaborations.)*

Table 10: Other Collaborators

Collaborator Name and Title	Contact Information	Organization and Department	Date(s) Involved	Contribution to Research
	For internal use only			(i.e. technical champion, technical advisory board, test samples, on-site equipment, data, etc.)
Susan Votta	Susan.votta@dot.ri.gov	RIDOT Environmental	8/15/21 – 12/30/21	Technical champion
Trevor Jones	Trevor.jones@dot.ri.gov	RIDOT Environmental	8/15/21 – 9/30/21	Site access and logistics
Patrick Maguire	Patrick.Maguire@dot.ri.gov	RIDOT Maintenance	9/1/21 – 10/15/21	Coordination of in-kind support (labor and equipment) from RIDOT Maintenance for study establishment
William Whelan	William.whelan@dot.ri.gov	RIDOT Maintenance	10/1/21 – 10/15/21	Crew boss and coordinator for seeding of seed establishment study plots.

Use the following table to list any transportation related course that were taught or led by researchers associated with this research project:

Table 11: Course List

Course Code	Course Title	Level	University	Professor	Semester	# of Students
i.e. CE 123		Grad or undergrad?	Where was the course taught?	Who taught the course?	Enter Spring, Fall, Summer, Winter and the year	How many students were enrolled in the class?
N/A						

Changes:

List any actual or anticipated problems or delays and actions or plans to resolve them (list no-cost extension requests here)…

List any changes in approach and the reasons for the change…
n/a

Planned Activities:

List the activities planned during the next quarter.

- Produce transplants for Task 1.1 (milestone 2)
- Identify vegetation survey sites and plan events for Task 1.3 (milestone 8)