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
Research Area: New Systems for Longevity and Constructability
PI: *Rebecca Brown, U. Rhode Island*
Co-PI(s): *none*
Reporting Period:*7/1/2022 – 9/30/2022*
Submission Date: *10/3/2022*

****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.*

- Monthly data collection on all roadside plots
- Weeding and mulching of transplanted plots
- Installation of signs to prevent mowing in study area

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.

- Data collection efforts contribute to objectives 1, 2 and 3
- Weeding and mulching contributes to objective 1
- Restricting mowing contributes to objective 3 by allowing identification of flowering species.

Accomplishments:
List any accomplishments achieved under the project goals in bullet point form…

- Distinct differences in plant species were observed between establishment method treatments
- Transplants established and survived despite significant drought in July and August

Task, Milestone, and Budget Progress:
Complete the following tables to document the work toward each task and budget

Table 1: Task Progress

Task Number: Title	Start Date	End Date	% Complete
Task 1.1: Roadside Adaptation Study	10/1/2021		50%
Task 1.2: Establishment Methods Study	9/1/2021		50%

Task 1.3: Conduct Vegetation Surveys	5/15/2022		15%
Task 1.4: Analyze data and write papers			
Phase 1 Overall	9/1/2021	Planned 12/31/2023	40%
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	5/31/2022
Milestone 3: Adaptation study	Photographs of installed plots	5/15/2022	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	6/1/2022	9/30/22
Milestone 8: Survey areas identified and events planned	Written protocol and plan for at least 4 survey events	4/1/2023	4/30/2023
Milestone 9: Vegetation surveys conducted	List of species identified at each location	6/1/2023	9/30/23
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	10/1/23	12/30/2023
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	$53,203 Federal + $1,580 URI Cash match +$35,000 URI time as match +$43,500 RIDOT cost share	41% as of 9/30/2022
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 4: Presentations at Conferences, Workshops, Seminars, and Other Events

Type	Title	Citation	Event & Intended Audience	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 5: Submitted/Accepted Publications, Technical Reports, Theses, Dissertations, 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 (by org. submitted to)
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). None this quarter.

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 6: 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 – 3/31/22	brownreb@uri.edu	Plant Sciences and Entomology	Project Leader
Rahmatallah Gheshm, Post-Doc	8/15/21 – 1/31/22	rgheshm@uri.edu	Plant Sciences and Entomology	Field work leader
Gabrielle Torphy, Research Assistant	3/1/22 – 3/31/22	gtorphy@uri.edu	Plant Sciences and Entomology	Greenhouse worker
Jeremy Kiracofe, temporary research assistant	4/15/22 – 6/15/22		Plant Sciences and Entomology	Greenhouse and field site laborer
Carl Sawyer, temporary research associate	8/1/22 – 10/31/22		Plant Sciences and Entomology	Assist with field data collection

*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 7: 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	9/30/22	R. Brown		Master's	Biological and Environmental Science – Sustainable Agriculture and Food Systems	This project	leading transplant plot establishment and field data collection
Gabriella Biancone	5/1/22	6/15/22	R. Brown		Undergraduate	Wildlife Conservation Biology	This project	Assisting with transplant plot establishment

Zoe Lin	5/1/22	6/30/22	R. Brown		Undergraduate	Marine Biology	This Project	Assisting with field data collection
Helio Nhumaio	8/1/22	8/31/22	R. Brown		Undergraduate	Biotechnology	This Project	Assisting with weeding and mulching of plots

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 during the reporting period (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 8: 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 during the reporting period:

Table 9: 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 during the reporting period.*

Table 10: Research Project Collaborators during the reporting period						
Organization	**Location**	**Contribution to the Project**				
		Financial Support	**In-Kind Support**	**Facilities**	**Collaborative Research**	**Personnel Exchanges**
N/A		List the amount	List the amount	Mark with an "x" where appropriate		

*Use the table below to list **individuals** that have been involved as partners on this project and their contribution to the project during the reporting period. (**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 11: Other Collaborators				
Collaborator Name and Title	**Contact Information**	**Organization and Department**	**Date(s) Involved**	**Contribution to Research**
Susan Votta		RIDOT Environmental	8/15/21 – 6/30/22	Technical champion
Trevor Jones		RIDOT Environmental	8/15/21 – 9/30/21	Site access and logistics
Patrick Maguire		RIDOT Maintenance	9/1/21 – 10/15/21	Coordination of in-kind support (labor and equipment) from RIDOT Maintenance for study establishment
William Whelan		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 during the reporting period:

Table 12: 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:

A no-cost extension was approved to extend the project end date to 12/31/2023. Labor shortages during April and May delayed establishment of the transplant plots until June and prevented us from collecting establishment data for May. Additional establishment data will be collected in 2023 to compensate. Dr. Gheshm passed away in April, and Katie Marcil has taken over leading the fieldwork. She is doing an excellent job, but there is a learning curve. One of the undergraduate students hired for the summer quit the project after the first month, and we were unable to hire a replacement. The other student left at the end of July due to housing issues. Carl Sawyer, who is a retired research associate with decades of experience in roadside vegetation research, was hired as a temporary employee to assist with data collection. In September Katie Marcil took a leave of absence from her graduate studies. Carl will finish the data collection but no other progress is expected during the upcoming quarter.

Planned Activities:

List the activities planned during the next quarter.

- Completion of field data collection