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: *1/1/22 – 3/31/22*
Submission Date: *3/31/22*

Overview:

*Provide **BRIEF** highlights of activities performed during the reporting period.*

- Seeds of 40 species of native insect-pollinated wildflowers were obtained and planted in the greenhouse to produce transplants

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.

- The transplants will be used to establish the roadside adaptation trial for Objective 1

Accomplishments:

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

- N/A

Task, Milestone, and Budget Progress:

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		10%
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	8%
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	4/1/2022	4/30/2023
Milestone 9: Vegetation surveys conducted	List of species identified at each location	6/1/2022	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	10/1/22	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

Table 3: Budget Progress		
Project Budget	**Spend – Project to Date**	**% Project to Date (include the date)**
$324,765	$22,561 Federal + $17.755 URI match +$43,500 RIDOT cost share	25.8% as of 3/31/2022

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?

   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?

   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?

   N/A

Technology Transfer:

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	N/A	N/A	N/A	N/A	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	N/A	N/A	N/A	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?

   N/A

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. 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

*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	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 and transplant production

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	N/A	N/A	N/A

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	N/A	N/A	N/A

*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**
		List the amount	List the amount	Mark with an "x" where appropriate		
N/A	N/A	N/A	N/A	N/A	N/A	N/A

*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 – 3/31/22	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	N/A	N/A	N/A	N/A	N/A	N/A

Changes:

Dr. Gheshm has been on medical leave since early February. As a result, Katie had to take over production of transplants and was not able to develop protocols and coordinate volunteers for the vegetation surveys. Katie and her undergraduate student assistants will survey one location this summer as planned but the larger survey events involving community volunteers have been postponed until 2023. Also we will be supplementing the greenhouse-grown transplants with transplants purchased from native plant nurseries as without Dr. Gheshm's expertise we have struggled to establish some species.

Planned Activities:

List the activities planned during the next quarter.

- Installation of trial plots for Objective 1
- Collection of establishment data for Objective 2 plots seeded in September 2021
- Beginning of monthly species and coverage data collection
- Beginning of vegetation survey at one location