

## **Quarterly Progress Report:**

**Project Number and Title:** #C5.2018: Leveraging High-Resolution LiDAR and Stream Geomorphic Assessment Datasets to Expand Regional Hydraulic Geometry Curves for Vermont: A Blueprint for New England States

**Research Area:** Thrust 1 Develop improved road and bridge monitoring and assessment tools

**PI:** Kristen Underwood, Ph.D.; University of Vermont

**Co-PI(s):** Arne Bomblies, Ph.D.; Donna M. Rizzo, Ph.D.; University of Vermont

**Reporting Period:** 4/1/2021 – 6/30/2021

**Submission Date:** 6/30/2021

## **Overview: (Please answer each question individually)**

- GIS analysis is complete and has developed catchment-scale variables that will serve as potential explanatory variables in statistical models to predict bankfull channel dimensions for ungauged locations.
- Statistical analyses are underway to develop relationships between catchment- and reach-scale explanatory variables and bankfull channel dimensions (response variables) compiled from stream geomorphic assessment (SGA) datasets.

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

By relying on SGA datasets to expand the number of observations, and by exploring additional predictor variables that may better refine regression estimates, our objective is to improve the prediction ability and reduce estimation uncertainty using Regional Hydraulic Geometry Curves.

**Table 1: Task Progress**

<b>Task Number</b>	<b>Start Date</b>	<b>End Date</b>	<b>% Complete</b>
Task 1: Compile Expanded Set of Observation Sites	6/1/2019	1/31/2020	100%
Task 2: Compile Regression Variables	9/1/2019	6/30/2020	100%
Task 3: Develop and Test Statistical Models	1/1/2020	11/30/2020	75%
Task 4: Summary Report	3/1/2020	1/14/2021	65%
Overall Project:	6/1/2019	Planned End: 5/31/2020 Actual End: 8/31/2021	

**Table 2: Budget Progress**

<b>Project Budget</b>	<b>Spend – Project to Date</b>	<b>% Project to Date*</b>
\$141,244	\$139,093	98.4%

*\*Include the date the budget is current to.*

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

*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)

**Table 4: Publications and Submitted Papers and Reports**

Type	Title	Citation	Date	Status

Encouraged to add figures that may be useful (especially for the website)...

Insert figures here

### 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
Kristen Underwood	<a href="mailto:Kristen.Underwood@uvm.edu">Kristen.Underwood@uvm.edu</a>	UVM CEE	PI
Donna Rizzo	<a href="mailto:Donna.Rizzo@uvm.edu">Donna.Rizzo@uvm.edu</a>	UVM CEE	Co-PI
Arne Bomblies	<a href="mailto:Arne.Bomblies@uvm.edu">Arne.Bomblies@uvm.edu</a>	UVM CEE	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
	Email is not included in the external report and is only used for internal purposes.	(i.e. Junior, Master's Ph.D)		

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

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
		Mark the appropriate contribution with an “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.

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.)

**Table 9: Other Collaborators**

Collaborator Name and Title	Contact Information	Organization and Department	Contribution to Research
Nick Wark, Hydraulics Manager	(802) 828-3987 Nick.Wark@vermont.gov	VT Agency of Transportation	(i.e. Technical Champion)

Who is the Technical Champion for this project?

Name: Nick Wark

Title: Hydraulics Manager

Organization: VT Agency of Transportation

Location (City & State): 219 North Main Street, Barre, VT 05641

Email Address: Nick.Wark@vermont.gov

### **Changes:**

Discuss any actual or anticipated problems or delays and actions or plans to resolve them...

Recently-approved extension of the project end date to 8/31/2021 will enable the PI to finish data analysis and reporting amid other ongoing workloads, while working remotely during the ongoing COVID pandemic.

Discuss any changes in approach and the reasons for the change...

### **Planned Activities:**

Description of future activities over the coming months.

- Finish statistical analyses to generate updated empirical relationships.
- Summarize findings in a report.