

<b>UTC Project Information – Project 4.4</b>	
Project Title	Bridge-stream network assessment to identify sensitive structural, hydraulic and landscape parameters for planning flood mitigation
University	University of Vermont
Principal Investigator	Mandar Dewoolkar, Ph.D.
PI Contact Information	Email: <a href="mailto:mdewoolk@uvm.edu">mdewoolk@uvm.edu</a> Phone: 802-656-1942 Address: 33 Colchester Ave., Burlington, VT 05405
Co-PIs	Donna Rizzo, Ph.D. and Arne Bomblies, Ph.D.
Co-PI Contact Information	Dr. Rizzo: donna.rizzo@uvm.edu, 802-656-1495 Dr. Bomblies: abomblie@uvm.edu, 802-656-2215
Funding Source(s) and Amounts Provided (by each agency or organization)	Federal \$160,564 UVM \$141,029 VTrans \$45,000
Total Project Cost	\$346,893
Agency ID or Contract Number	69A3551847101
Start and End Dates	Start 7/1/18 End 6/30/20
Brief Description of Research Project	Bridge rehabilitation or new bridge design is often performed as needed for individual bridges without much consideration for how the change affects other bridges, properties, roads, etc. This is often a concern raised by stakeholders when they hear about planned changes in their river corridor. This project will develop an analysis method to understand how localized changes at a given bridge, stream or road affect the entire river corridor. This will help transportation agencies in managing their bridge and stream assets for maintenance and capital planning for upgrades, and also address stakeholder concerns raised in response to planned alterations.
Describe Implementation of Research Outcomes (or why not implemented)  Place Any Photos Here	This study, as far as is known, is only the second to quantify the flood impacts on hydraulic bridge infrastructure under high-risk transient conditions on a river scale; and is the first study to do so on multiple rivers, and compare and contrast the model results across multiple rivers leading to an attempt of making some generalizable conclusions for bridge-stream networks in mountainous region in temperate climates. The results also showed how floodplain reconnection can be an effective method in certain situations to reduce potential adverse flood impacts on infrastructure. The developed screening framework is valuable for resource prioritization, holistic design of bridges, and bridge and river rehabilitation projects.
Impacts/Benefits of Implementation (actual, not anticipated)	The hydrodynamic models developed in this project have been leveraged to simulate and rank suites of floodplain reconnection projects that lessen flooding impacts to infrastructure and maximize phosphorus load reductions in support of Vermont's Functioning Floodplain Initiative ( <a href="https://dec.vermont.gov/rivers/ffi">https://dec.vermont.gov/rivers/ffi</a> ). Additionally, the models have supported validation of a low-complexity hydraulic modeling approach (e.g., Height Above Nearest Drainage) to characterize floodplain-channel



	<p>connectivity and highlight reaches at greater erosion risk to inform river conservation/restoration priorities. The project engaged Vermont Agency of Transportation and Vermont Agency of Natural Resources personnel, 6 graduate students, and 10 undergraduate students. The study results were presented at the Vermont Department of Transportation, Transportation Infrastructure Durability Center conferences, and the Friends of the Mad River in Vermont. A manuscript on this study is currently under consideration with a peer-reviewed journal.</p>
<p>Web Links</p> <ul style="list-style-type: none"><li>• Reports</li><li>• Project website</li></ul>	<p>None yet developed.</p>