Sebastian **Rowan**

PH.D CANDIDATE IN CIVIL AND ENVIRONMENTAL ENGINEERING

University of New Hampshire, Durham, NH

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I am Ph.D. candidate in civil and environmental engineering researching the impacts of flood events and climate change on people and communities. The goal of my research is to develop a more comprehensive understanding of the risks posed by floods to enable the development of mitigation efforts that prioritize long-term sustainability and community well-being.

Education

University of New Hampshire — *Durham, New Hampshire*

PH.D. CANDIDATE, CIVIL AND ENVIRONMENTAL ENGINEERING — *2025 (Expected)*

- Dissertation Title: Towards Sustainable Flood Risk Management: Incorporating Uncertainty and Environmental Impacts
- Developed model to estimate economic loss and greenhouse gas emissions from flood exposure to residential buildings using component-level fragility estimates in a **Python-based** Monte-Carlo simulation
- Quantified expected GHG emissions from flood exposure to residential buildings under current and future climate projections in a nation-wide, multi-frequency flood risk assessment

University of New Hampshire — *Durham, New Hampshire*

B.S. ENVIRONMENTAL ENGINEERING — *2016*

Experience

U.S. Army Corps of Engineers, Engineer Research Development Center — *Vicksburg, MS (Remote)*

ORISE GRADUATE RESEARCH FELLOW — *Sep. 2020 - Present*

- Implemented method to estimate greenhouse gas emissions from flood damage in USACE'S "go-consequences" flood consequence analysis tool
- Developed **Python** plug-in for USACE's Generation II Coastal Resilience Model (G2CRM) to assess social vulnerability in project study areas
- Developed **Python** plugin for **QGIS** to import data from the National Structures Inventory
- Co-lead economic consequence and social vulnerability analysis of future flooding in the Mississippi River Valley using **Python and R**
- Lead systematic literature review and meta-analysis to assess the effect of home damage on post-flood psychiatric morbidity to support USACE effort to comprehensively assess "Other Social Effects" of floods for planning studies
- Performed data analysis in **Python and R** using social vulnerability and other geospatial data to support Tier 1 Other Social Effects/Environmental Justice Analysis for the USACE New York/New Jersey Harbors and Tributaries Coastal Storm Risk Management Feasibility Study

University of New Hampshire — *Durham, NH*

RESEARCH & TEACHING ASSISTANT — *Aug. 2018 - Dec. 2020*

- (RA) Resilient Bridge Planning in Mozambique - Bridge Failure Risk from Flooding and Climate Change - Worked with stakeholders from the World Bank and the Mozambique National Roadway Agency to quantify flood risk posed to Mozamibique's national bridge portfolio under current and future climate projections using **R, Python, and QGIS**
- (TA) CEE 705: Introduction to Sustainable Engineering (Fall 2019, Fall 2020)
- (TA) CEE 502: Project Engineering (Spring 2019)

New Hampshire Department of Transportation, Bureau of Planning and Community Assistance — *Concord, NH*

CIVIL ENGINEER I-II — *Jan 2017 - Nov. 2018*

- Developed automated QA/QC processes for data entered into the statewide culvert and closed drainage systems database using **ArcGIS/Python**
- Developed data analysis pipelines in **SQL and Python** to produce standard reports to support Department-wide operations and assess progress on key performance metrics
- Deployed to Puerto Rico as part of FEMA's Roads and Bridges Task Force during the response to Hurricanes Irma and Maria to assist with data collection and reporting of roadway asset condition and repair status

University of New Hampshire InterOperability Laboratory — *Durham, NH*

10 GIGABIT ETHERNET TECHNICIAN — *Jun. 2014 - Dec. 2016*

New Hampshire Department of Environmental Services, Air Resources Division — *Concord, NH*

ENVIRONMENTAL TECHNICIAN — *Summer 2015*

Awards

UNH 3-MINUTE THESIS (3MT) COMPETITION — *2025*

- 3rd Place

Publications

Rowan, S., Bell, E. S., Mo, W., (Manuscript In Review). Economic valuation of residential flood damages considering the social cost of greenhouse gas emissions. *Sustainable Cities and Society*

Qiao, Y., Guo, Y., **Rowan, S.**, Medina, R., Espinet, X., Cullen, J., Meng, F., Cao, Z. (Manuscript in Review). Doubling of flood-induced bridge asset failure loss in Mozambique under 2050 climate. *Global Environmental Change*

Rowan, S., Yeates, E., (2024) The effect of home damage on post-flood psychiatric morbidity: A systematic review and meta-analysis. (Protocol), PROSPERO, `https://www.crd.york.ac.uk/PROSPERO/view/CRD42024618891`

Memarsadeghi, N. P., **Rowan, S.**, Sisco, A. W., Tavakoly, A. A., (2024). Enhancing resilience: Integrating future flood modeling and socio-economic analysis in the face of climate change impacts. *Science of the Total Environment*, `https://doi.org/10.1016/j.scitotenv.2024.174893`

Seigerman, C. K., McKay, S. K., Basilio, R., Biesel, S. A., Hallemeier, J., Mansur, A. V., Piercy, C., **Rowan, S.**, Ubiali, B., Yeates, E., & Nelson, D. R. (2023). Operationalizing equity for integrated water resources management. JAWRA Journal of the American Water Resources Association, 59(2), 281–298. `https://doi.org/10.1111/1752-1688.13086`

Galaitsi, S., Kurth, M., **Rowan, S.**, Yeates, E., & Kalaidjian, E. (2022). New York—New Jersey Harbor and Tributaries Coastal Storm Risk Management Feasibility Study—Tier 1 Other Social Effects/Environmental Justice Analysis. U.S. Army Corps of Engineers New York District. `https://www.nan.usace.army.mil/Portals/37/Appendix%20A12_Tier%201%20OSE_EJ_HATS.pdf`

Rowan, S., & Kwiatkowski, K. (2020). Assessing the Relationship Between Social Vulnerability, Social Capital, and Housing Resilience. *Sustainability*, 12(18), 7718. `https://doi.org/10.3390/su12187718`

Presentations

Rowan, S., Measuring what matters for flood risk management. *University of New Hampshire 3MT (3-Minute Thesis) Competition Finals; March 2025; Durham, NH.* Oral Presentation. `https://media.unh.edu/media/Sebastian%20Rowan%20-%20UNH%203MT%20Finals%202025%20-%20Third%20Place/1_da4qt06x`

Rowan, S., Memarsadeghi, N., Sisco, A., Tavakoly, A. An Assessment of the Socio-Economic Impacts from Climate Change and its Relationship with Vulnerability. *AGU23; December 2023; San Fransisco, CA.* Oral Presentation.

Rowan, S., Yeates, E., Mo, W. Estimating the Greenhouse Gas Emissions of Flood Damages. *AEESP Research & Education Conference; June 2023; Boston, MA.* Poster.

Rowan, S., Yeates, E. Predicting the Mental Health Impacts of Floods. *47th Annual Natural Hazards Research and Applications Workshop; July 2022; Virtual.* Poster.

Rowan, S., Yeates, E., Wells, E. Quantifying the Health Impacts of Floods - A Systematic Literature Review. *2021 UNC Water and Health Conference; October 2021; Virtual.* Poster.

Rowan, S., Kwiatkowski, K. Assessing the Relationship Between Social Vulnerability, Social Capital, and Housing Resilience. *45th Annual Natural Hazards Research and Applications Workshop; July 2020; Virtual.* Poster.

Rowan, S., Kwiatkowski, K., Qiao, Y. Resilient Bridge Planning in Mozambique: Bridge Failure Risk from Flooding and Climate Change. *2nd International Conference on Transportation System Resilience to Natural Hazards and Extreme Weather Events (TR2019); November 2019; Washington, D.C.* Oral Presentation.

Open Source Projects

sviBuildr *Active*

- An R package that allows users to download or construct the CDC's Social Vulnerability Index as a tidyverse or simple features data frame.
- Enables greater flexibility in region selection for SVI analyses than is possible with state- or national-level datasets hosted by CDC.

NSI Data QGIS Plugin *Active*

- A QGIS plugin that downloads data from the USACE National Structures Inventory for a specified region and adds it to a map.

nsipy *Active*

- A Python package to download data from the U.S. Army Corps of Engineers National Structures Inventory using the NSI API.

Skills

Programming Languages

- Python, R, Go, SQL, C++, MATLAB

Software

- QGIS, ArcGIS, go-consequences, AutoRAPID, Vensim, NVivo, Excel