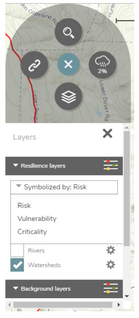
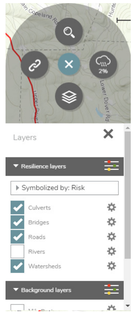
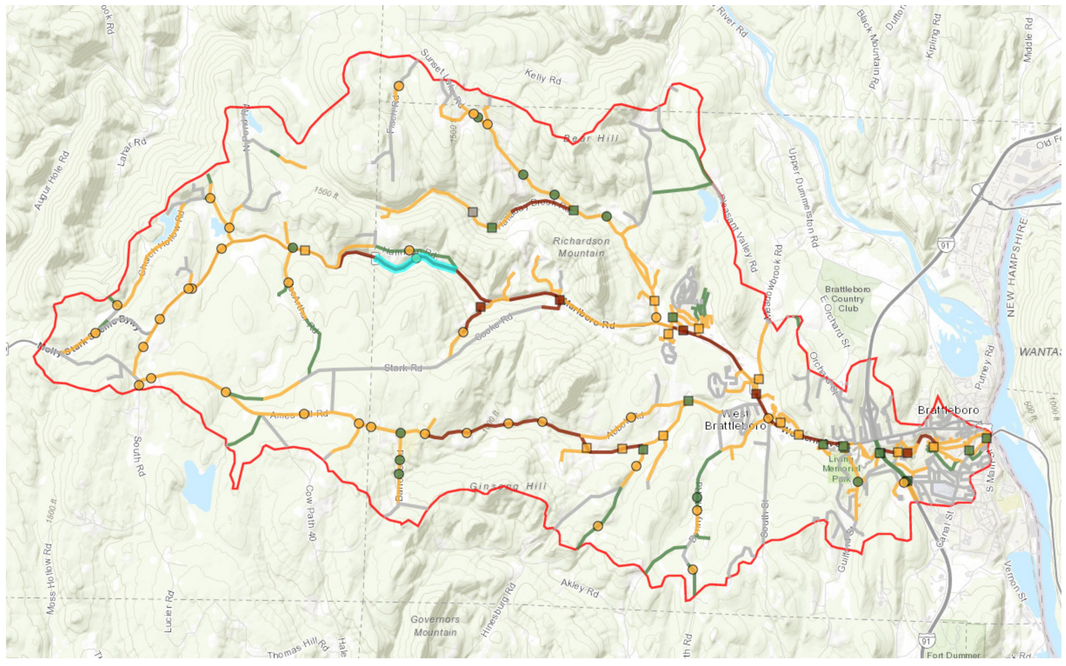
METHODS AND TOOLS FOR TRANSPORTATION RESILIENCE PLANNING

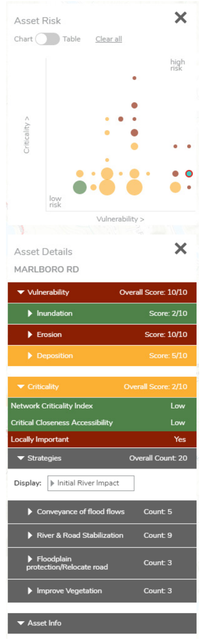
IDENTIFYING AND REDUCING FLOOD AND EROSION RISKS ON VERMONT ROADS

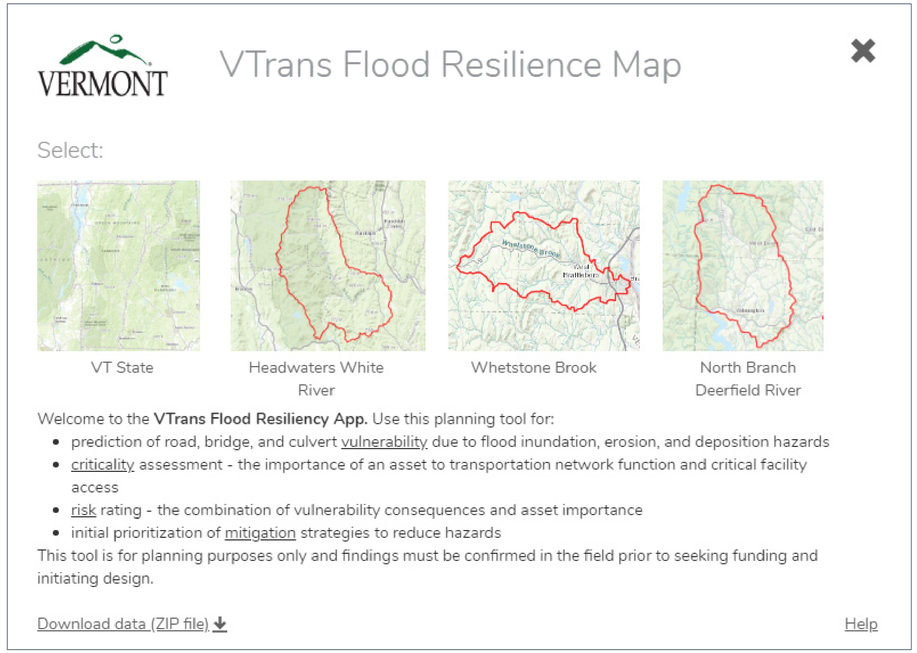
VERMONT AGENCY OF TRANSPORTATION











A novel vulnerability scoring system was created and linked to different levels of transportation failures (i.e., partial closure, full closure, partial failure, and complete failure). The vulnerability methods were found to be accurate predictors of potential damage locations. Simulations were performed to identify the links in the transportation network where failure due to flooding would cause the most travel delays or trip reductions. The criticality scoring system was assembled that rated the consequence of a link failure, the importance of a link to access critical facilities such as a hospital, and how important the road link is for local detour use. The vulnerability and criticality scores were combined to develop a risk score. High risk locations are vulnerable to damages and important for efficient travel, and thus are locations where greater investment is warranted.

Mitigation recommendations were established based on the characteristics that contribute to vulnerability and criticality for each location in the pilot watersheds. Mitigation options included vegetative practices in low risk locations and hard armor stabilization practices in high risk locations. Floodplain reconnection and river corridor conservation were also considered to reduce vulnerability to transportation infrastructure. The Vermont Transportation Resiliency Planning Tool (screen clips shown above) is now up and running to display results and improve transportation planning in the pilot watersheds.

American Council of Engineering Companies
Vermont Section
2018 Engineering Excellence Awards
Entry Category F: Studies, Planning, Consulting Engineering Services

PROJECT GOAL:
Create a more resilient transportation network in Vermont through improved planning.

PROJECT OUTCOMES:

- A method to systematically identify road segments, bridges, and culverts that are vulnerable to flood and erosion damages;
- A screen to pinpoint the most critical locations and mitigation options on the transportation network; and
- A web-based application to display risk information.

Williams Street closure due to flood inundation along Whetstone Brook during Tropical Storm Irene. Source: Town of Brattleboro.

Route 4 failure due to erosion on Mendon Brook during Tropical Storm Irene. Source: L. Grange and Mansfield Heliflight.

The results of this innovative, multi-discipline project may be used for project identification and planning, project prioritization, budgeting, resource and asset management, initial site assessment, starting the design alternatives analysis, emergency planning, recovery planning, conservation planning, and planning for continuity of business and future housing.

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