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This research brief is part of a call designed to help advance knowledge regarding how diverse community members perceive and prepare for inland flooding, understand observations and forecasts, receive alerts and warnings, make protective action decisions, and respond to and recover from the impacts of inland flood events.

ASSESSING THE 2023 FLOODS IN RURAL VERMONT

MULTIMODAL METHODOLOGY AND COMMUNITY SCIENCE FOR MITIGATION IN THE BLACK RIVER VALLEY

SUMMARY

Floods shape how communities live in, relate to, and understand their landscapes. Therefore, understanding how people create and communicate knowledge about inland flooding is critical to supporting disaster response, recovery, and mitigation.

In July 2023, torrential rain caused flooding across Vermont's Black River Valley. In the floods' aftermath, we worked closely with local partners in rural communities across the region to design this study. Together, we explored several key knowledge gaps, including: accurate and accessible mapping of flood impacts and resources; monitoring of stormwater infrastructure; data collection in rural, underserved areas; and visibility of impacted community members' stories.

Our interdisciplinary team worked closely with community members and local response and recovery professionals to understand how different types of knowledge and experiences of inland flooding can be better integrated and communicated. We used a mixed-methods approach that included community-based participatory research and ethnographic participant observation, participatory mapping using paper maps, community science mapping of critical infrastructure, and interviews.

Our findings provide insights into how to capture diverse, relevant, and immediately impactful data about human experiences during and after flooding. As inland flooding events increase in frequency and severity, this can ultimately strengthen response, recovery, and mitigation for rural climate disasters.

A house and railway in Proctorsville, Vermont that were damaged during acute flooding in July 2023. Photo credit: Charis Boke, 2023.

KEY FINDINGS

- Lived experiences of risk and vulnerability during the 2023 floods happened alongside emergent aid, solidarity, collaboration, and unexpected benefits for those in flood-impacted areas.

- Some impacted residents expressed their needs for faster disaster response and more effective communication from response and recovery professionals. Others expressed a sense of self-sufficiency and pushed back on the idea that state and federal aid was necessary for disaster recovery. These moments demonstrate the diverse array of needs, capacities, and approaches represented even in communities with a low population density.

- Roughly one-third of the sites that residents identified as experiencing direct damage from floodwaters (erosion, undercutting, inundation, seepage) were outside of the floodways and floodplain areas mapped by the Federal Emergency Management Agency.

- Sharing research materials and engaging with people at existing community events and meetings proved an effective way to gather diverse local knowledge. In addition, we found that sharing research materials at the meetings allowed for more hands-on conversations on how scientific disciplines, local knowledge, and community needs come together.

- There is a significant need for more data gathering and analysis in small rural communities. Publicly available qualitative and quantitative data on many key issues is limited due, in part, to the small size of municipal staffs, a lack of funding for gathering locally relevant data, and the tendency for municipal and regional workers to hold multiple roles and responsibilities.

RESEARCH IMPLICATIONS

- "Resources" and "risks" are not mutually exclusive in terms of how people experience them on the ground during inland flooding events. Thus, communication should be tailored to help residents with specific decision-making during emergencies, for instance, when to shelter in place versus when to relocate to a shelter.

- Local knowledge from impacted communities can strengthen regional and state organizational responses. Formal emergency response groups should actively seek out lessons from local communities' responses and organization efforts.

- Using multiple types of mapping can help assess the diverse issues faced by communities experiencing flooding. Locally attuned risk mapping can be informed by citizen science, community conversations, and local media engagement.

- A mixed-methods, community-engaged approach drawing from the expertise of a multidisciplinary team is extremely effective at generating diverse, relevant, and immediately impactful data about water's impacts on human experiences in rural areas during and after flooding.

A normally small stream surged with water during the flood, eroding all roadway material around a culvert and creating a 12-foot crevasse that made the road impassable. Photo credit: Tim Banker, 2023.

AUDIENCE

This research may be relevant to regional and state disaster response authorities who are interested in better gathering and incorporating knowledge from local communities. It will also be useful for scholars focused on small-scale flood mitigation and rural climate disasters, as well as educators training future professionals and practitioners in disaster-related fields.

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