

# Stakeholders' Perceptions of the 2023 Historic Floods in Vermont: Risk Communication, Crisis Response, Vulnerability and Lessons Learned

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**Abstract:** In July 2023, the state of Vermont experienced a powerful storm that rapidly unleashed as much as 9 inches of rain over the course of around 48 hours, causing flooding across the state. Advanced forecasts failed to capture the severity of the storm, leaving communities with limited time to prepare, while local officials had little time to plan and communicate. Three focus groups were held with a group of stakeholders who work in the Winooski River watershed of Vermont, a region particularly affected by the floods. These participants had first-hand experience from working during this historic crisis. The first focus group collected data describing how these stakeholders would respond to a "potential" crisis. It fortuitously occurred months before an actual crisis. This allowed for collection of pre- and post-crisis data, which gave this study a unique temporal assessment of how the risk and crisis communication process unfolded, providing distinctive learning outcomes and recommendations that can, ultimately, help to save lives and infrastructure impacted by future flood events.

**Keywords** — Crisis, Risk, Communication, Floods.

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## INTRODUCTION

Extreme climate events, such as floods are increasing in magnitude and frequency, putting entire communities at risk, and forcing people in harm's way to quickly decide how to best protect themselves. How people receive, process and respond to information about extreme events is crucial to saving lives and minimizing damage. The coordination among the various stakeholders involved in a crisis response makes the process even more complex. Federal, state, local officials, volunteers, and other groups play unique and, at times, overlapping roles during the preparation, response, recovery and mitigation stages of a disaster.

In July 2023, the state of Vermont experienced a powerful storm that caused flash flooding and river flooding across the state, with some of the greatest impacts occurring in the Winooski River watershed region.

This study aims to provide practical insight based on the perceptions of stakeholders who worked during the Vermont Floods. A series of focus groups (pre- and post-crisis) were held with the participation of stakeholders who work in and/or support the Winooski River watershed of Vermont. Learning from emergency managers who participated in the crisis response to a historic flood provides necessary context to flood response and mitigation measures, helping to highlight potential barriers in the process that can influence the public's decision-making before, during and after a flood event [1].

## LITERATURE REVIEW

The World Economic Forum conducted a risk likelihood and impact assessment and found that extreme weather events and natural disasters are two of the highest risks worldwide. Between 1995 and 2015, floods have accounted for nearly half of all disasters in the world [2]. By 2050, US flood risk will show a 26.4% (24.1–29.1%) increase [3].

Flood risk management is defined as “a holistic and continuous societal analysis, assessment, and reduction of flood risk” [4, p.6]. This process is always challenging as different actors are involved in the decision-making process during the pre-flood, flood response and post-flood stages. The coordination and communication among these various stakeholders (e.g., emergency managers, town officials, etc.) can have serious impacts on the communities at risk.

Risk communication is a dialogical process. People make risk decisions according to a dialogue about the possibilities and outcomes of a potential event [5]. While risk communication should involve a dialogue between those with some control over the risk and those potentially impacted by an event that might or might not happen, crisis communication focuses on responding to a real but not necessarily foreseen event that puts people in harm's way. Crisis communication is, therefore, a more time-sensitive process.

From a crisis communication perspective and grounded on the tenets of Experiential Learning Theory [6], researchers and practitioners should consider that effective crisis messages must include components of affect, cognition, and behavior. Warning messages should raise awareness, inform/explain, and provide clear actionable steps so people are able to make informed decisions and take action to protect themselves. Or, as [7] argue: “Warnings are more likely to be responded to with some protective action if they are understood, believed, and personalized” (p. 5-8).

## METHODS

A group of professional emergency managers, regional planners, watershed and river managers, dam safety and town officials who worked in and/or supported the Winooski River watershed in the state of Vermont were convened for 3 focus groups designed to study the governance, communications, and actions in response to major flooding events. The first session (March 2023) occurred just a few months before the historic “Great Vermont Flood of 2023” that impacted the state in July. This allowed the collection of pre- and post-crisis data, which provided a unique temporal assessment of how preparation, response, and recovery, including risk and crisis communication, unfolded.

Each focus group session lasted approximately 3 hours and involved the similar set of participants. The first session (pre-crisis) was held in person (n=12). The post-crisis focus groups (n=10 and n=11) had a hybrid format (in person and virtual) as some of the participants were still managing flood events and could not be physically present.

Protocols were prepared in advance and guided the sessions. The first session considered the participants' previous experiences with floods in the region. It focused on their interactions with the public before, during and after flood events, the types of information needed to communicate with the public and the most concerning flood threats in the region. The second and third focus groups concentrated on the historic July 2023 floods, including preparation efficacy, communication strategies, other aspects discussed during the first session and how they played out during a real event.

All focus group sessions were video/audio recorded and transcribed. Extensive notes were taken by the researchers. These notes and transcriptions were coded, and major themes were identified using the grounded theory approach [8]. A thematic analysis of the data was conducted. Themes and findings were then shared with participants for member

checks, where participants confirm the researchers' interpretations of the data, as well as the validity of information. Participants' feedback was provided through email and an online feedback form. The researchers, then, augmented and rectified the reports accordingly.

## RESULTS AND DISCUSSION

### *PRE-CRISIS PERCEPTIONS*

During the first focus group (pre-crisis), participants discussed their previous experiences with floods in the region, the most concerning flood threats, their interactions with the public and the types of information needed to communicate with them. The session occurred just over 3 months before the historic floods that hit the state of Vermont in July 2023.

Flash floods, erosion events and major dam failures were perceived as the largest flood threats in the region, creating the most serious concerns about impacts to life and property. Participants also shared their concerns with the social trauma among those who experienced catastrophic flooding, and the anxiety that future flooding threats could cause.

Concerning pre-crisis communication, participants shared that push warning messages used by the National Weather Services (NWS) and VT Emergency Management (VEM) were seen as invasive and perceived as less relevant in times of crisis, due to their use in non-crisis situations (such as a major crash on the interstate highway). These communication methods are sender-focused and assume that sharing accurate messages is enough to ensure appropriate responses from the public. However, there are limitations to this assumption. Disaster communication research shows that a sender-focused approach is insufficient, as audiences are not motivated to respond if they do not see personal relevance in what is being communicated [9]. A one-size fits all approach to crisis communication is, therefore, ineffective.

Conference calls and online meetings organized by VEM when storms approach the state were deemed as useful tools in anticipation to potential flood events. These sessions are usually widely attended and viewed as helpful by town officials, police chiefs, and fire chiefs. Participants also shared the important role of nonprofit organizations and community resilience groups in the coordination of pre-flood communication with vulnerable populations.

### *POST-CRISIS PERCEPTIONS*

During the response to the Great Vermont Flood of 2023, the VEM team was understaffed. As the storm hit the state, the team was responsible for looking at trends, answering information requests, developing maps and reports, and deploying assets to assist with life-saving measures.

The NWS provided multiple briefs per day, informing the deployment and acquisition of resources, while Regional Planning Commissions (RPC) – political subdivisions that provide planning services to their local constituents – collected information from towns and converted them into Situational Reports (SitRpts). RPCs were also instrumental in communicating with people without internet access and coordinating local post-crisis webinars and trainings.

It was widely recognized by the participants that the post-crisis communication during the 2023 floods lacked coordination in some important situations. For example, in addition to their routine assignments, technical staff responsible for dam safety were also responsible for crisis communication. This added responsibility could potentially become a risk, as these professionals should be dedicated to the safety procedures of the dams, and not have to be concerned with communication logistics such as cell phone reception.

A key post-crisis communication issue identified by the focus group participants was the volume of information shared only with those who provided prior consent or actively sought it. One participant in the focus group stated: "It's really whether or not people are tied into things like Front Porch Forum [a community-building online forum local to Vermont and New York]; they're either looking for it or they've consented to get in and asked for it..."

Vermont's Agency of Human Services designated a professional to prioritize communication with vulnerable populations. Although more awareness about the impacts of flooding on vulnerable populations was recognized by the focus group participants, there was a common agreement that gaps in support persisted.

During the COVID-19 outbreak, vulnerable populations were disproportionately affected in the state of Vermont. Some of the same communities also disproportionately experienced the impacts of this historic flood, specifically those living in manufactured home parks that tend to be adjacent to rivers. COVID-19 has also exposed the need to raise awareness of language barriers in some communities. However, participants shared that during the July 2023 flood response, the needs of people who spoke English as a second language were still not effectively addressed.

Regarding the post-crisis support provided by volunteers, mutual aid from local communities appeared to have worked, although there was some variation in the levels of participation across the state. There were designated downtown associations that helped recruit volunteers. These associations play an important role in bringing social capital to response. However, it remains difficult for some towns to coordinate with volunteers.

### *RECOMMENDATIONS – PRE-CRISIS*

By most accounts, the responses of the state, regional, and local emergency responders to the Great Vermont Flood of 2023 were commendable. Professionals and volunteers alike worked long hours over many days and weeks to ensure that the response and early recovery from the emergency conditions were carried out, potentially saving lives, personal property, and untold trauma.

The lack of county infrastructure and strong reliance on local control placed a great deal of responsibility on elected, appointed, or volunteer local officials to serve as local incident commanders. While it is believed that local officials stepped up and did their best to respond to the Great Vermont Flood of 2023, the communication flow between local and state officials could be improved, particularly during times of major crisis. During the pre-crisis phase, the assessment of risk is more effective when expert judgment is considered. However, the capacity of local communities to manage risks varies drastically across Vermont.

In many communities, social capital and community involvement are limited. Pre-planning, such as having Flood Emergency Response Plans, is lacking or outdated. During an emergency, the response of real people on the ground is crucial. Currently, there is a lack of human capacity on the ground to help direct response, however, sometimes this human capacity can emerge from formal organizations or informal networks.

To address these issues, it is recommended that routine incident command/emergency management/communication training and orientation is provided to local officials. Furthermore, the state should advance community-wide discussions on flood risks, trade-offs, and adaptation measures that could be undertaken to mitigate them.

### *RECOMMENDATIONS – POST-CRISIS*

Among Vermont’s competing priorities for resources, emergency management planning and response requires attention, increasing the capacity of VEM at the county or regional scales. Several times over the course of the focus groups the observation that the state has just three regional emergency managers for 261 towns was mentioned. In times of crisis, when “simplicity, credibility, verifiability, consistency and speed” [5, p. 8] matter most, ensuring that the team is well resourced and prepared is paramount to achieve an effective communication and response, protecting lives and infrastructure. A gap analysis pertaining to the roles and responsibilities of actors in the emergency response and immediate recovery network across the state of Vermont is, hence, recommended.

A key feature of preparation and response to flooding disasters is the communication systems in place to convey forecast and real-time information about anticipated and existing flood conditions. While the communication channels around the response to the July 2023 floods were sufficient and resulted in good outcomes, redundant and clear channels of communication, particularly between dam engineers, hydrological modelers, emergency managers, and local and state officials, are needed. Lapses or challenges in conveying information in real time to the right people could result in misinformation or lack of information regarding risks and recommended actions. In most cases, channels and protocols exist, but are not always well understood, and staff is limited. Timely comprehensible, translated risk communication to the public and vulnerable communities during crisis situations is, therefore, recommended, as well as cross-training to temporary staff that are mobilized during flood events. Greater education, guidelines, and resources for volunteers and residents regarding the public health risks of living and volunteering in flood hazard zones are also necessary.

The focus group discussions also elevated the concern and need to assess gaps and generate recommendations for risk communication “two-way” channels, plans and protocols, including ascertaining communication logistics amongst meteorological, hydrological, and emergency response professionals, as well as, locally elected, appointed, and volunteer leaders, and major infrastructure providers. Categories such as dam safety, transportation and road closures, emergency shelter sites, and requests for volunteers should be included in these assessments.

We posit that the recovery process needs to point to a safer outcome rather than the same outcome. After a flood, clear communication and expeditious processes in place are decisive elements to minimize impacts.

### **CONCLUSION**

Future flood events on the scales of The Great Vermont Flood of 2023 are inevitable. To think that “it can’t get worse” next time is short-sighted and could possibly result in greater catastrophic losses of life and property. While the emergency response to the Great Vermont Flood of 2023 was adequate, further action is needed to ensure that there is capacity in place for effective response to a flood crisis of equal or greater severity when it — very likely — occurs.

This study resulted in a policy brief that was recently shared with members of Vermont’s House Appropriations and Environment & Energy Committees, and Senate Appropriations and Natural Resources & Energy Committees. The hope is that this can be an example of moving from research to operations, influencing policy change and ultimately, saving life and infrastructure impacted by future floods. Furthermore, the triangulation of this data with additional research conducted at a national level (surveys and simulation-based experiments) will lead to even more generalizable recommendations.

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