

**Literature Review of Current Research on Communicating Flood Risks to At-Risk
Communities in the Lowermost Mississippi River Watershed**

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Abstract

Lower Louisiana communities face significant flood and drought risk due to their position at the base of the Mississippi River Watershed. Conditions upstream directly correlate to flood and drought conditions in the Lower Mississippi River Basin (LMRB). For example, increased precipitation and snowmelt in upstream watersheds results in heightened flood risk in the LMRB and dry conditions decrease water flow and increase drought risk in the LMRB. Efforts to communicate flood risk to at-risk communities are lacking in research that builds trust and enhances the effectiveness of these tools. The objective of this literature review is to evaluate the actionability of existing flood risk communication tools and establish recommendations to improve their impact and value to at-risk communities (recommendations should center at-risk communities in all decisions affecting their region). To do so, databases were searched to locate peer-reviewed sources that address this objective in detail and provide both broad flood communication information and resources specific to Jefferson, Orleans, St. Bernard, and Plaquemines parishes in Louisiana. All sources converged on the importance of multi-channel communication to reach all members of a population, transparent and two-way communication to build trust between authority figures and at-risk communities and members of different parishes, and pushing general flood information resources to the public rather than relying upon individuals to actively search for the information. Prominent research and knowledge gaps (lack of individualized, hyper-local information, inclusivity of lower socioeconomic backgrounds, and research that addresses which combinations of media work best for which populations) are identified to highlight areas of needed improvement in flood communication efforts.

Literature Review of Current Research on Communicating Flood Risks to At-Risk Communities in the Lowermost Mississippi River Watershed

Communities in lower Louisiana lie at the very base of a massive watershed, the Mississippi River Watershed. This downstream location creates heightened risk for flooding and drought. Weather conditions upstream, such as snowmelt and rainfall, can result in flooding downstream and above-normal temperatures and dry conditions can result in low water flow and drought risk. Communities that occupy flood-prone, lower-lying areas face significant flooding when runoff from a catchment overwhelms river channels (Van Der Wiel et al., 2018). Several large floods during the early 20th century spurred the construction of a system of levees and spillway structures designed to protect communities in these regions from future extreme discharge events (Munoz et al., 2017).

Land subsidence, defined as the “downward shifting of land surface relative to a surface datum” (Zou et al., 2015), is a prominent issue in the Lower Mississippi Basin that increases the potential for and severity of flooding. Areas in Jefferson, Orleans, and Plaquemines parish sink at a rate of 20 mm/year. This area is particularly susceptible to the impacts of climate change, salinization, and human activity such as pumping of water, withdrawal of underground water, and cutting erosion in the tributary riparian soils (Zou et al., 2015).

This review will address in detail the “actionability” (Mostafiz et al., 2022) of current communication methods used to improve the public’s knowledge of flood risk and responses to risk information. Communication efforts are essential in boosting community resilience to flood and drought hazards – ineffective communication between flood professionals and at-risk communities can lower public comprehension of received information, lower trust in authority figures, and lead to the presentation of contradictory information in the media (O’Sullivan et al.,

2012). Many communication tools are built with the assumption that at-risk individuals possess little knowledge of their own risk and thus presenting this information will allow them to respond properly (O’Sullivan et al., 2012). However, these communication tools often overlook community factors such as socio-cultural contexts, location, and psychological responses that limit the ways an individual or community can react to a flood emergency (O’Sullivan et al., 2012). This is referred to as “interpretive or decision uncertainty” (O’Sullivan et al., 2012) and informs us that a community and the individuals nested within it are unique in their perceptions of risk and therefore unique in their decision to respond or not respond to a communicated warning. Effective communication tools consider decision uncertainty and establish connections between individual and community impact to increase community resilience to flood hazards.

The purpose of this literature review is to synthesize material related to flood communication to at-risk communities in the Lowermost Mississippi River Watershed and make recommendations based on this information pertaining to improvements in risk communication and resource distribution. The material will first be presented broadly, and then narrow into communication tools used by Jefferson, St. Bernard, Orleans, and Plaquemines parishes in Louisiana to understand flood communication at a local scale. The review will present the issue of flooding in the Lower Mississippi River Basin as a consequence of interactions between weather conditions in the Upper Mississippi Watershed, land subsidence, geographic factors, climate change, and population characteristics. The review will focus on flooding with context given on drought risk and more research needed to understand drought communication.

Geographic and Social Context

The Lower Mississippi River Basin encompasses a total area of 107,000 square miles and stretches across Missouri, Arkansas, Tennessee, Mississippi, and Louisiana. This region houses

rivers, lakes, streams, wetlands, bayous, and sloughs. Broadly, it can be categorized into two distinct topographies: the Mississippi Alluvial Plain, which consists of the alluvial valley and floodplain of the Mississippi River, and the Southeastern Plains, which occupy the outskirts of the valley (US Department of Agriculture, 2012). Much of the lowland forests have been cleared for agricultural development that erodes the land and results in high sediment concentrations of alluvial valley streams. The sediments in the alluvial valley are high in phosphorous and vulnerable to erosion, making the area particularly susceptible to flooding (US Department of Agriculture, 2012).

Major flood hazards in the Lower Mississippi River Basin are not always from a local source; serious flooding often stems from activity upstream in the watershed. Historically, 100-year discharge events in the area converge on the following characteristics: above-average rainfall and snowmelt in Ohio, Tennessee, Missouri, and upper Mississippi River Basins, with more influence from snowmelt than precipitation (Van Der Wiel et al., 2018). Heavy, consistent rainfall that lasts for months is indicative of risk for a 100-year discharge event due to heavily saturated soils, as is extreme storm clustering during winter and spring months (Liu et al., 2025).

Drought risk in the Lower Mississippi River Basin also depends upon upstream factors. Unusually dry conditions in upstream watersheds, such as the Ohio River Basin, leads to decreased water flow in the Lower Mississippi River (NOAA, n.d.). Because drought risk is intensified by increasing temperatures and lowered precipitation/snow levels, it becomes of increasing concern with the influence of climate change; the time between rain events in upstream watersheds will likely continue to increase. Drought in the Lower Mississippi River Basin leads to hazards such as low water levels, decreased ecosystem health, saltwater intrusion, and decreased water quality.

Much of the research referenced in this review is influenced by climate change. Natural disasters such as floods will become increasingly common and severe and weather conditions more volatile. This makes predicting flood events increasingly difficult as confidence intervals widen in long-term forecasting. Therefore, flood risk communication tools and methods discussed in this review must account for and adjust to changing environmental and social conditions moving forward.

In the upstream watersheds, climate change decreases the reliability of previous trends in discharge events by decreasing snowmelt and increasing precipitation, which is likely to make predicting flood events more difficult (Van Der Wiel et al., 2018). Under an estimated warming of just 1.5 degrees Celsius, global flood risk is still predicted to double and historically significant floods increase in frequency (Turner, 2022).

In lower Louisiana communities, populations are high in density and diversity. Regions along bayous and the coast have deep roots in French, Cajun, and Creole heritage. Communities in lower-lying regions generally have a lower median household income and face higher rates of poverty. Financial instability is exacerbated by economic shocks (Dennison, 2014) created by severe weather events such as flooding. Additional health challenges face communities in Louisiana's industrial corridor (the area along the Mississippi River between Baton Rouge and New Orleans), who are experiencing health hazards due to exposure to toxins released by nearby petrochemical industries (Dennison, 2014). To communicate hazards to these lower Louisiana communities, major agencies such as the Federal Emergency Management Agency (FEMA), Louisiana State University AgCenter, the Water Institute, Louisiana Sea Grant, and the National Oceanic and Atmospheric Administration (NOAA) including the National Weather Service are involved.

Methods

The strategy in developing this literature review was first to establish parameters to guide the process. Focus was directed towards lower Louisiana communities (specifically Jefferson, Orleans, St. Bernard, and Plaquemines parish), and several questions were established to guide the initial research: How is flood information communicated to the public? Do communities have to actively search for the information, or are there organizations pushing to get information out to people?

To answer these questions, research articles, government plans, published reports, and journal articles were reviewed. Databases JSTOR, NOAA Institutional Repository, ResearchGate, USDA Agricultural Research Service, and PubMed were used. Keywords referenced in this review are as follows: flood communication tools, flood risk, flood risk communication, actionability, at-risk communities, lower Louisiana, Lower Mississippi River, Lower Mississippi River Basin. Published research referenced in this review spans a timeframe of 2012 – 2025, with flood communication tools in use in 2026. Sources are included that pertain to global flooding or flooding in a region outside of Louisiana if they contained broad information that could be applied locally. Peer-reviewed research articles, meta-analyses, sources referencing data from interviews, and sources published mostly within the last 10 years are included. Opinion pieces and non-peer-reviewed research articles are excluded.

Literature Review

Analysis of Flood Communication Methods

Social Media.

Mostafiz et al. (2022) and Louisiana Public Alerts, Warnings, and Notifications Plan establish that social media is widely effective in rapid communication with a large audience.

Both sources reference a “two-way” communication benefit of social media – there is an interactive line of communication open between stakeholders that can support a continuous stream of questions and answers. Both sources converge on the use of social media peaking during the response stage (Mostafiz et al., 2022), which suggests a gap in social media use/effectiveness as a warning system before a flood. It is most effective in damage assessment and relief and rescue attempts due to its ability to swiftly recruit volunteers (Mostafiz et al., 2022; Kryvasheyev et al., 2016), as it is strongest in its rapid distribution of actionable information to the public.

Despite this, both sources agree on key weaknesses of social media as an immediate warning system. During and after the stress of a natural disaster, a continuous flow of information from social media can easily overwhelm the public, and cellular and data network dips will dampen the effectiveness of the tool. It is also heavily reliant on staff members to maintain two-way communication with the public and assumes each member of the public to have the knowledge and ability to use it effectively. These weaknesses suggest social media to be more helpful when used as a risk communication tool that increases awareness of potential disasters and community risk through social networking, video sharing, and social blogging.

Mass Media.

Like social media, mass media is effective in reaching a large audience. It peaks in use during and after a flooding event and is largely used in short-term response - broadcasting official warnings, post-disaster relief, etc (Mostafiz et al., 2022). There is large demand for mass media during and after a flood event due to its ability to widely broadcast information from many different sources. Because of this, however, questions of credibility can arise – sources vary extensively in “degree of expertise, influence, and perceived credibility” (Mostafiz et al., 2022).

Information distributed through mass media contains opinions from “topical experts, community leaders, public eyewitnesses, and anecdotal comments from broadcasters or citizens” (Mostafiz et al., 2022), allowing massive amounts of content to be funneled to the public without identification of credibility. Karanikola et al. (2015) argues that mass media’s tendency to exaggerate events may be dangerous and lead to the assumption that issued warnings are not serious.

Regardless, mass media is agreed to occupy an important role in flood communication. Hilberts et al. (2025) points out that society’s heightened use of social media may fuel the spread of fear and misinformation during a stressful natural disaster – therefore, a balanced use of both social media and mass media may be helpful in countering this.

Citizen Science and Grassroots Efforts.

Unlike the media, citizen science/grassroot approaches to flood risk communication are considered to be “bottom-up” approaches. These include educational events and outreach programs that generally focus on long-term flood mitigation rather than immediate warning systems. Citizen science considers a wider variety of factors that accumulate into a community’s flood risk to more comprehensively communicate resources. Shepherd and van Vuuren (2014) identify “cultural and linguistically diverse community leaders” to be important in citizen science efforts to build credibility and trust and reach a larger audience. This approach is strongest in building public awareness and can support long-term change. Over time, data collected through citizen science can aid in piecing together a community’s past, present, and future experiences with flood mitigation (Mostafiz et al., 2022). The most prominent weakness of citizen science approaches is noted by Mostafiz et al. (2022): while it is important in increasing community

awareness, there is little actionable information conveyed that is relevant to individuals, suggesting this flood risk communication method to work best in tandem with others.

Actionability of Specific Tools Used in Jefferson, Orleans, St. Bernard, and Plaquemines Parishes

Jefferson, Orleans, St. Bernard, and Plaquemines parishes in lower Louisiana are examples of communities at particular risk to flooding, due in part to locational hazards. They are in a flood-prone area of the Lowermost Mississippi River Basin due to their proximity to the lower Mississippi River. Each parish has a government website with many resources for flood hazards. These resources include emergency alerts, general flood risk information, and flood risk tools that allow individuals to view Mississippi River levels, their flood zone, reported street flooding, and evacuation routes.

In Jefferson Parish, residents can register for emergency alerts by texting “JPALERT” to 888-777. The website immediately provides flood safety information and evacuation route maps where residents can enter a destination. To locate the Mississippi River levels, flash flood inundation maps, and Barataria Bay gauge provided by NOAA, residents must interact with the website.

Orleans Parish utilizes the same emergency alert system; residents text “NOLAREADY” to 777295 for alerts. Their website provides more general flood information – defining flooding, flooding causes, and the types of flooding. It is more difficult to navigate, and residents must interact with the website to locate Streetwise, a tool used to view reported street flooding, and Weatherwise, which provides an overview of all city weather stations. A Language Access Complaint Form can be found that allows residents to input experiences with emergency resources.

St. Bernard Parish uses the app and web-based platform Everbridge for emergency alerts. Their website requires a bit of searching and interaction to locate local flood information documents, the St. Bernard Parish Hazard Mitigation Plan, Parcel Viewer Map, Flood Zone Viewer, and LSU AgCenter Flood Map.

Likewise, Plaquemines Parish uses Everbridge for emergency alerts. Their website contains a Storm Tracker/Alerts Portal with a weather dashboard that updates with live weather conditions. Radars and emergency alerts can be found in this portal. A bit of interaction with the website leads to the discovery of the FEMA Flood Map Service Center, which allows residents to insert their address and find flood maps for their area.

Because internet access may be limited during a flood event, some of these tools may be difficult or impossible to access when needed. If residents have not previously familiarized themselves with the website, they may not be able to easily access tools that are more difficult to find – Louisiana Public Alerts and Notifications Plan cautions that flood communication tools are more effective when a community is aware of them before a disaster. Furthermore, tools such as Everbridge/text-alerts are rapid and effective but may not be accessible to older populations with less experience with new technology or individuals without access to a smartphone.

Sending these alerts through multiple systems, as suggested by Louisiana Public Alerts and Notifications Plan, may be more helpful in reaching each member of a population.

Synthesis of Findings

What Works

Louisiana Sea Grant is an example of an organization actively pushing resources to the public. There is public access to a wide variety of Louisiana flood resources, including recovery resources, safety information, important websites, and video resources, through their website. To

make the public aware of these resources, they distribute them through social media channels, present them at workshops and meetings, and deliver copies of flood information literature such as the Homeowners Handbook to Prepare for Natural Disasters to parish and municipal government offices, retailers such as Lowe's and Home Depot, and libraries. They also present at community outreach events and work with local floodplain managers groups in lower Louisiana to share and develop information. Their success is evident through the widespread use and distribution of the handout (the first release of the Homeowners Handbook to Prepare for Natural Disasters in Hawai'i went through 8 print runs and was adopted by Sea Grant programs in 7 other states (NOAA Sea Grant, 2014)) and through their 2019 Program Review by NOAA where they were rated as "highest performance: exceeds expectations by an exceptional margin" (LSG, n.d.). Their work in community resilience is evidenced by the completion of 1,036 workshops to improve resilience, 257 communities that have improved hazard resilience, 646 communities that have adopted sustainable development practices, and 25 Sea Grant programs that are considered Weather-Ready Ambassadors (NOAA Sea Grant, n.d.).

This approach to flood communication works effectively due to a use of multiple channels to communicate issues: it relies upon both social media and grassroots approaches and shares tools both online and in-person to reach different populations. Most importantly, Louisiana Sea Grant does not leave the public to search for the information themselves but rather actively pushes it out to them.

Persistent Barriers

Community Definition.

Divergence in how individuals define their own community creates challenges in community approaches to flood mitigation. When discussing their perceived flood risk, Habib et

al. (2023) participants each placed their community within different bounds: some chose to view their risk in the context of their own parish and some narrowed it into the context of their neighborhood, church group, and even family. Distrust between neighboring communities brought forth in Skilton et al. (2022) fragments individuals into groups and excludes sections of people from the definition of community. When this happens, solutions to complex, community-wide issues become limited. A flood communication tool meant to reach an at-risk community may not be received by all individuals due to undefined community needs and boundaries.

Role of Personal Experience.

Several sources (primarily Skilton et al. (2022)) converge on the importance of an individual's past experiences in their response to flood communication. There is a significant difference in the behavior of individuals who have prior experience with flooding and those who do not. Those personally impacted by a flooding event are more likely to seek out flood risk information, while it is more difficult to communicate issues to individuals without prior experience. Risk perception is unique to each individual based upon the presence or absence of their experiences with flooding, regardless of whether they live in the same community.

Trust in Authority Figures and Across Parish Lines.

It is established in several sources that building trust in authority figures and across parish lines is an important barrier in flood communication. For at-risk communities in lower Louisiana, receiving information from figures they do not trust has little to no impact. O'Sullivan et al. (2012) theorizes that the disparity between trust in emergency services and national and local authorities could be due to the clear, well-defined roles of emergency personnel – their contact information is also widely available and accessible 24/7. This may be the case also with parishes such as Jefferson, Orleans, St. Bernard, and Plaquemines, and may require further

research to understand. More specifically, distrust between parishes is also a key barrier in flood communication and mitigation efforts, as defined in the phrase, “We don’t want Lafayette’s water” (Skilton et al., 2022), where individuals living in parishes under Lafayette Parish angrily report receiving their flood water. More research is needed to facilitate communication across administrative boundaries.

Research Gaps

Individualized information.

In flood hazard communication tools discussed in Habib et al. (2023) and Mostafiz et al. (2022), there is a lack of hyper-local information. For example, testing flood hazard communication tools presented in Habib et al. (2023), participants searched for their own address to evaluate the flood risk of their property. They expressed desire for a webtool that allowed them to insert two locations to determine the safest route to a hospital during a flood event. Similarly, Mostafiz et al. (2022) converges on the lack of communication tools that operate at the micro-scale, as existing webtools operate at a “city-to-global level.”

Inclusivity of Lower Socioeconomic Backgrounds.

There is still more research required to understand what improvements in flood communication are needed to best support at-risk communities of lower socioeconomic background. This is hugely important in any flood communication decisions, as individuals of lower socioeconomic background are more likely to occupy areas of low-lying land that are at increased flood risk. A community’s “acceptable level of risk” (Skilton et al., 2022) will be higher if they occupy a low income area, as there is less opportunity to move or repair damage.

What Media Works Best for Which Populations.

Although multiple sources agree that multi-channel communication strategies are necessary to communicate risk and warnings to communities, research into combinations that work best for which populations is very limited. Mostafiz et al. (2022) attempts to suggest that communication should be conducted through a channel that reaches and satisfies the needs of most people, but this method is widely ineffective if different groups display strong preference for different channels. For example, O’Sullivan et al. (2012) reveals that at-risk communities do not always receive information through the channels that they prefer. To receive flood warnings, females prefer television, younger people prefer SMS messaging, and older populations may prefer to access information through more traditional channels. Although the results of O’Sullivan et al. (2012) pertain to individuals in the UK, the need for multiple communication channels is reflected in Habib et al. (2023) and thus establishes its relevance to populations in lower Louisiana.

Recommendations Based on the Literature

1. Provide communities with tools that are relevant to their own experience. This includes creating flood risk communication tools that are hyper-localized to inform individuals of their property, neighborhood, and community risk, relating current flood risk to a community’s past experiences, and using culturally appropriate terminology in communication efforts.
2. Build trust between authority figures and at-risk communities through transparent communication. Authority figures who are communicating flood information and warnings to the public should clearly define their roles, actions, and constraints to ensure that their actions have an impact.
3. Use a multi-channel communication strategy. No single flood communication tool will engage all populations, and different combinations of tools reach certain demographics.

4. Avoid simply passing along information and tools to at-risk communities by employing a two-way dialogue and centering community members in tool creation. When using tools like social media, ensure that staff are available to communicate back and forth with the public. Instead of creating tools for communities, create tools with communities, as they understand their own needs best.
5. Before implementing flood communication tools, allow individuals to test and evaluate them for relevance to their community's needs. This ensures they are inclusive and useful to all community members and populations.
6. Ensure that all flood communication tools, whether they are warnings or general information, are available in multiple languages and accessible to those who are deaf, blind, and intellectually or physically disabled.

Conclusion

In regard to communication methods used to convey flood risk and emergency warnings to at-risk communities in lower Louisiana, multiple channels of communication must be used. Communities do not engage with one flood risk communication tool in particular; rather, different demographics prefer different tools and therefore one tool will never reach all populations. Further research must be conducted to determine which combination of text-alerts, televised information, traditional literature, available websites, and interactive flood risk tools serve each unique population. To solidify effective two-way communication between at-risk communities and authority figures, issues of public trust must be addressed in depth; otherwise, even effective flood communication methods will fail due to lack of engagement. There are many reasons the public does not engage with flood risk information, so pushing resources to the public will increase their use rather than relying upon communities to seek them out.

If communication is conducted respectfully, collaboratively, and with regard to past experiences, socioeconomic and geographical barriers, and psychological variables, individuals in at-risk communities are more likely to take action in the face of flood threats and understand their personal connection to a greater community flood risk.

Resources Available For Public Use

[Louisiana Flood Risk and Resilience Viewer](#)

[Parish Office of Homeland Security and Emergency Preparedness Contacts](#)

[Disaster Resources - United Way Southeast Louisiana](#)

[LA Sea Grant - Louisiana Flood Resources](#)

[LA Department of Health Flood Info & Resources](#)

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