From Risk to Resilience: Enhancing Communication for Floodplain Communities Along the Shunganunga Creek

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Background:

- **Topeka, Kansas**, experiences a **variety of weather hazards**, including **flash flooding** along the **Shunganunga Creek**, where **10 of the 21** most **recent crests** and **seven of the nine historical crests** occurred within **the past decade**.

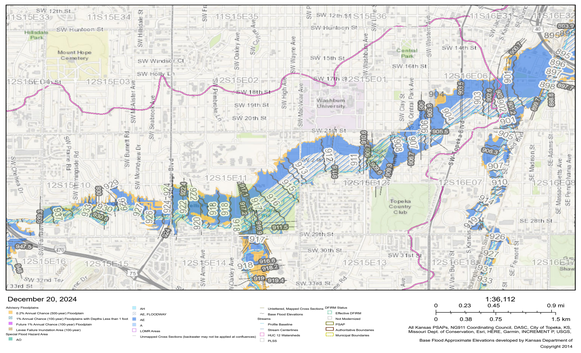


Fig. 1. FEMA Floodplain Map along Shunganunga

Flash Flood: Defined as a **sudden, intense flood** that **develops** within a **few hours of heavy rainfall**, creating **rapidly rising water** levels for **low-lying areas.**

Risk Perception (Slavic 1987; Jean 2023)

- Floodplain **residents** often **underestimate risk** due to their **reliance on infrastructure** (ex., levees) and **limited access to risk information**, perpetuating a **false sense of security.**
- **Social, cultural, situational and economic factors**, such as income and trust in authorities, **shape flood risk perception** and the **likelihood of adopting protective behaviors.**

Protection Motivation Theory (PMT; Rogers 1975)

- PMT explains that people take **protective actions** based on their:
  - **Threat Appraisal:** perceived severity and vulnerability.
  - **Coping Appraisal**: response efficacy and self-efficacy.

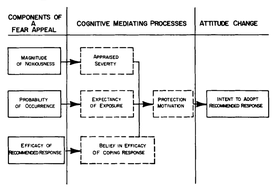


Fig. 2. Schema of the Protection Motivation Theory

Methods:

- **Participants:** Recruited 10 residents from the Shunganunga Creek, selected through critical case sampling (Patton 2021).
- **Procedures:** Semi-structured interviews conducted via Zoom.
- **Thematic Analysis:** Systematically reading through data to identify recurring patterns, or themes (Braun and Clarke 2019).
- **Validation Strategies:** Ensured quality through reflexivity, thick description, and member checking (Cresswell and Poth 2018).

Demographic	Participants (%)
Gender	
Female	50%
Male	50%
Race	
White	90%
Black	10%
Years Lived in KS	
0-20	10%
20-40	50%
40-60	20%
60-80	20%

Table 1. Demographic Data



Fig. 3. 2007 Shunganunga Creek Flood, shared by Linda with permission

Floodplain communities require tailored, actionable flood risk communication to address their unique circumstances.

Results:

RQ 1: How do social, cultural, and situational factors shape residents' perceptions of flooding risks compared to other weather-related hazards in the Shunganunga Creek area?

Socioeconomic Inequities

- ***Riley:*** "I see how Shunga **affects the communities**, especially in [inner city community] and the surrounding areas. That's **not personal to me**, but I see how it affects the community. **I see how that area, specifically the lower income parts of Topeka**, are affected **more than just environmentally**, like **how it's placed** in Topeka, but also like the areas and **neighborhoods**."

The Role of Proximity and Lived Experience

- ***Linda:*** "If we were **still over there** on [street by the creek], I would definitely **be paying more attention** to it **than I do**. I'm in the center of town now. **I'm nowhere near there**. I think that's probably why I hesitate; **I'm not fearful of it. I remember that after the flood**, it seemed like every time they would come and say, 'We're supposed to be getting heavy rains or something,' my mom would **start putting the furniture up on boxes**. That went on for a while till she got **comfortable.**"

Competing Hazards Diminish Flood Risk Perception

- ***Riley:*** [My family] was in a **traumatic tornado event**. It was the last bad tornado that hit western Kansas. Because of that, my dad has always been **overly prepared for storms**. I think that, geographically, some **rural areas** are much **more prepared for storms**. They have **tornado shelters, basements,** and **storm doors that have real protection**."

Cultural Norms and Community Dynamics

- ***Aaron:*** "When I use the word **community**, it is **not just where you live**. Right? The community is the **people that are in your corner**. That's the community that **helps guide you and raises you**... Do we still have that **sense of community**? I must say **no**... It's different. We're **scared to talk to folks.**"

RQ2: How can risk communication messages be improved to enhance threat and coping appraisal in floodplain areas, thereby motivating residents to take protective actions?

Enhancing Threat Appraisal Through Clear and Relatable Messaging

- ***Bryce:*** "If you have people who **know how to connect with people personally** and **relate** to them, show them that '**I'm not some random scientist from New York** telling you what to do with your life. I am **somebody like you** who **lives** in a house **down the road** and who is **in the same boat as you**.' I think that that **relationship** would **help a lot**."

Strengthening Coping Appraisal through Accessible Measures and Actionable Guidance

- ***Matthew:*** "**Having that checklist of [flood recommendations]** is **important**, and **then you can do the other [actions]** if you have **time to do them**. A quick **3 or 5 top priorities** to do in this **emergency**... and **communicating** that **ahead of time, I think is helpful**."

Address Heightened Anxiety and Trauma from Previous Floods

- ***Linda:*** "Well, I suppose I was **trying to stay calm** because I had the **kids here**. I **wasn't frightened**, but I think **because I lived through it before**. When you **live through catastrophes**, you kind of get that **PTSD** stuff **going on."**

Leverage Community Knowledge, Resources, and Networks

- ***Bryce:*** "**Print out** a couple of hundred like **pamphlets** and **put them in people's mailboxes** and **doors** and say, 'If **you would like to be informed about the risks that you might face living in this community** and some **steps** that you might take if you want to talk to a weather expert. **If you want to talk to a scientist**, if you want to talk to a **community leader, come to this.'"**

Discussion:

- **Shunganunga** residents' **responses align** with **Protection Motivation Theory**, verifying its **validity** in guiding **protective behaviors** in **floodplain communities**.
- **Residents closer** to **Shunganunga Creek** and with **past** flooding **experience** are **more aware** of **flood risks**, but **threats** like **tornadoes** and **winter storms overshadow flood risk perception**, **reducing preparedness.**
- **Clear, relatable flood risk messaging resonates** with Shunganunga Creek residents by **acknowledging past flooding trauma** and offering **actionable steps** to build **trust** and **enhance preparedness.**
- **Leveraging community knowledge** and **networks** fosters **trust** and **collaboration, empowering residents** to **adopt protective measures** and **strengthen resilience** against **future flooding.**

Policy Recommendations:

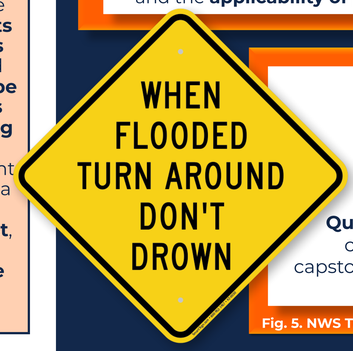
- Work with the **Kansas Adjutant General's Department** to **create** a **Kansas Response Plan** that includes **flash flooding** hazards.
- **Reconsider current actionable guidance.** Getting to higher ground **may not be realistic** for **floodplain communities** with **limited mobility, high poverty rates,** or **older populations.**
- Hold **community events** about **existing NWS resources** and **incorporate assistance information** in more educational graphics.
- Establish a **formal program** to more **effectively engage vulnerable regions** in conversations about flood risk and **expand data collection** yearly to **quantify trends** in **perception** and **evaluate** the **effectiveness of actions** taken.



Fig. 4a and 4b. Examples of Existing NWS Flash Flood Infographics

Limitations:

- **Insights specific** to the **Shunganunga Creek may not apply** to **other floodplain areas** due to **differing social, economic, and geographic conditions.**
- **Limited participation** from **stakeholders may restrict** the **depth** of the **qualitative analysis** and the **applicability of proposed strategies.**



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Fig. 5. NWS Turn Around Don't Drown®