

## Climate Resilience Through Multidisciplinary Big Data Learning, Prediction & Building Response Systems (CLIMBS)



### Quantify Community Resilience

#### Context

Following the devastating floods and tornadoes of 2022 in Kentucky, a collaborative research partnership was launched to advance climate resilience. This work has the potential to shape not only community recovery but also emergency management policies, plans, and programs nationwide. Project 6, one of seven, under the CLIMBS initiative, engages directly with affected communities.

#### Literature Review

This research will contribute to recent studies on climate change and hazard mitigation in the United States. An article by de Koning et al. (2019) highlights the behavioral motives that drive the choices for flood damage mitigation and relocation in eight coastal cities in the United States. Caretta, Rothrock, and Zegre (2022) explored the climate change perspectives of students from Appalachia. This research offers insights on how to use a mixed-method approach to capture views on climate change and place. This project builds upon the work of Burke et al. (2020), which explores the diversity of climate knowledge, literacy, and cultures in Southern Appalachia. Research by Corbin (2023) highlights the existing strengths and needs of the community, informing the design of mitigation measures for rural Central Appalachia. Brock Carlson and Caretta's (2023) photovoice project on gas pipeline development in Appalachia offers additional insights into the methodology and visual research tools for studying climate change and its perspectives.

#### Objective

This research explores community concerns about climate change and future weather-related hazards, while also examining the actions residents have taken to build resilience and reduce disaster risks.

#### Project Research Questions

- How do climate change and disasters reinforce risks, vulnerabilities, and inequalities for vulnerable communities in Kentucky? What equity concerns should be considered?
- How will the increase and severity of hazards shift Kentucky's disaster management and climate risk reduction strategies?
- What regional partnerships are essential to advocating for climate change mitigation and disaster risk management? By collaborating on regional climate concerns, these partners should pursue what specific climate action initiatives?

#### Methodology

A mixed-methods approach, incorporating observational and qualitative ethnographic research, as well as an online survey, participant observation, and formal and informal interviews, was conducted over eight weeks in Leslie County and Eastern Kentucky, Central Appalachia. The online survey remains open, and interviews are ongoing, informing future dissertation research and ongoing project collaboration.

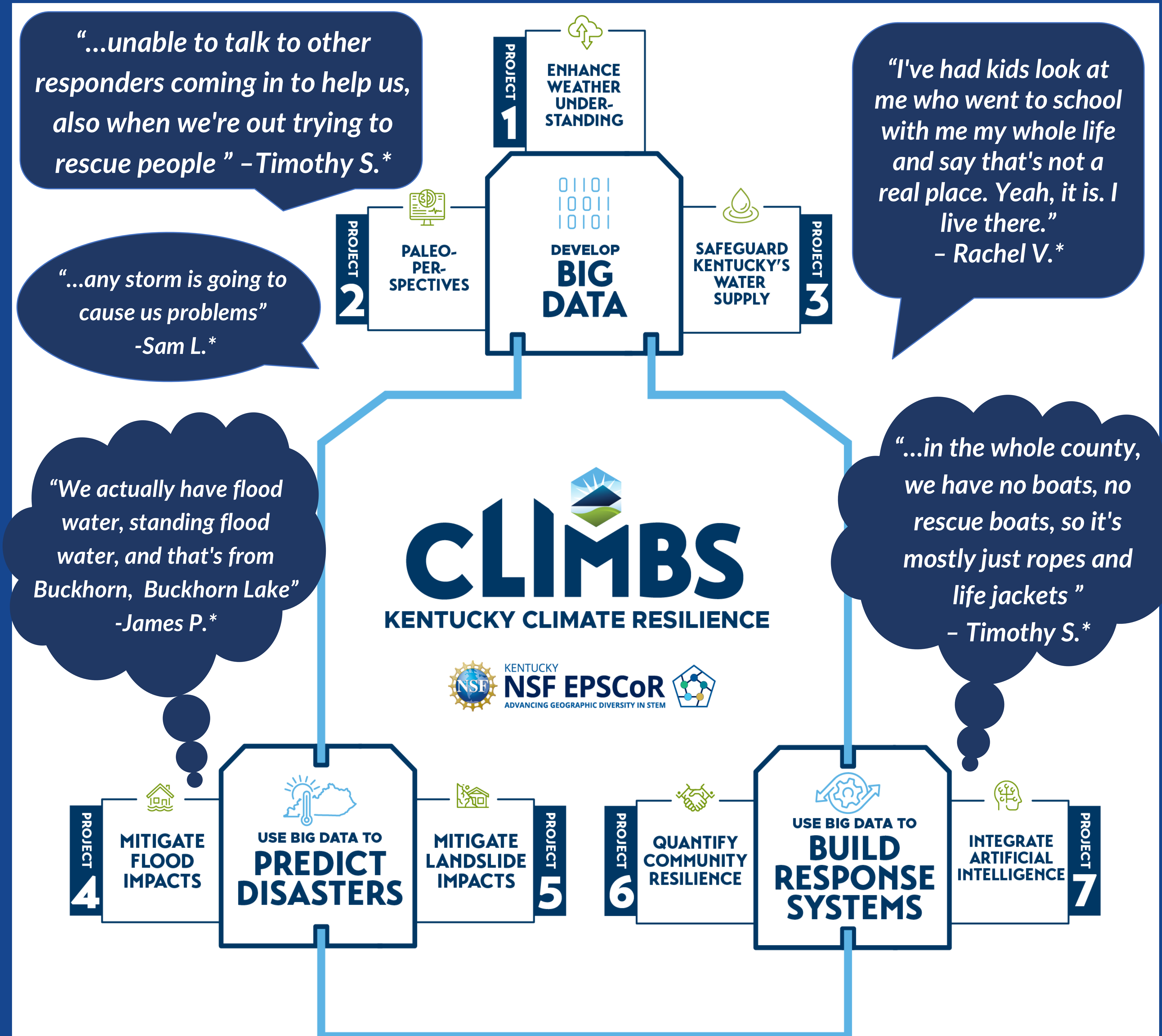
# “...and the creek don't rise: Disasters, Climate, and Resiliency in Appalachia”

This work would not be possible without the communities and people in Eastern Kentucky.

**BACKGROUND:** Community-engaged research can provide a deeper understanding of a specific area (i.e., Eastern Kentucky) and help shape disaster policies and programs. Rural communities are often self-sufficient and resilient, relying on local knowledge and mutual aid networks to respond to and recover from disasters.

**HYPOTHESIS:** If interdependent systems are rooted in community and place and informed by local knowledge, these systems can be resilient to compounding hazard events.

## Preliminary Themes & Analysis in Vignettes Inform the CLIMBS



\*Names were changed to protect identities



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#### Initial Findings:

Small and rural communities often struggle to prioritize resources and prepare for emergencies. Ad hoc *community mutual aid* steps up to fill the gaps, addressing immediate needs and supplementing government plans and programs that have barriers for community members or take too long to implement. Local knowledge is not the center of programs and plans, and at the local levels, the capacity is too thin.

#### Next Steps:

In addition to the preliminary findings gathered in this project, the data from Projects 1-7 will inform the future direction of research plans. As Project 6 moves forward, survey results and interview findings will be analyzed and interpreted to ensure the integration of local knowledge into any modeling assumptions.

#### Conclusions

Emergency management must embrace whole-community planning by meeting people where they are. True resilience comes from empowering communities, valuing local knowledge, and ensuring community members and organizations have a voice at the table. Ad hoc mutual aid highlights the gaps in current systems—and addressing these gaps is critical for stronger preparedness and response. Lastly, emergency management should consider adding anthropologists to their toolkits, and as a discipline, it must integrate the social sciences into the “Science of Disasters”.

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