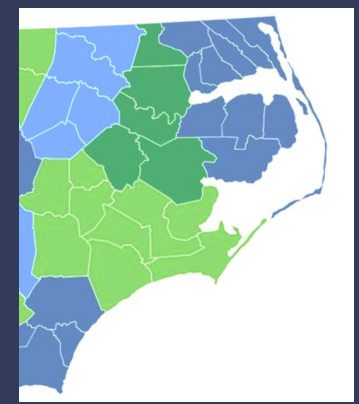




# Preparing for, Responding to, and Mitigating Compound Water Hazards for Resilient Rural Communities

“integrate economic, planning, and health research with atmospheric science to understand the nature and impacts of compound water hazards and produce actionable results of direct use to emergency managers and planners”

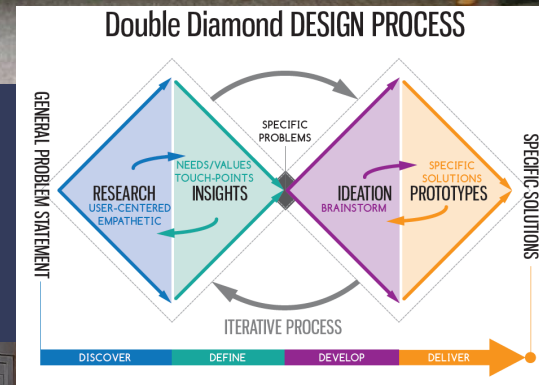
- Multi-hazard (compounded and cascading) management and planning are rare expertise
- There is often a divide between EMs and planners in the hazards cycle, which limits resiliency thinking
  - *“Best strategies/practices for merging planning/ floodplain management/ emergency management”*
- Resources are lacking in rural settings
- Few studies have examined joint economic and health impacts
- Many online tools and resources focus on one hazard at a time
- Therefore, compound, cascading, and consecutive hazards require a different approach to resiliency



# What We Learned about Compound Flooding:

- The threat is constant and clear
- Hazards (especially pluvial flooding) are growing in severity and frequency
- Municipal infrastructure damages interrupt the response phase, and those damages compound problems in recovery and healthcare access
- Tax loss makes it even more difficult for communities to recover
- Crops and field equipment are damaged
- It threatens quality of life and viability of small rural communities
- However, economic indicators are difficult to quantify
- Typical health concerns involve
  - Mold, water borne disease, and infestation of mosquitos
  - Stress and mental health (chronic & secondary)

February 2020



February 2022

# Obstacles to Mitigation

*"The problem here is that when the storm hits, whatever damage it's done, Santa Claus doesn't show up the next day. The state moves three times slower than cold molasses...Everybody's talking about Florence flood recovery; we're still trying to get Matthew taken care of."*

*"they're taking post-disaster money and shifting it to pre-disaster, which is not going to help rural America."*

*"every time we go out when we do flood recovery we're fixing something we should have never allowed to have happened in the first place"*



- Slow funding processes are not in-sync with local needs
- Current funding streams & processes do not reflect the complex, dynamic and changing nature of the compound flood problem
- ENC communities engage in mitigation activities that fall under four main areas, three of which are related to the pursuit of external funding and include – infrastructure maintenance and repair, clearing streams and channels, and implementing buyouts and elevation projects
  - **"Intended and Unintended Consequences of Buyout Programs as an Adaptive Response to Compound Flood Events and Coastal Inundation Risk in Rural Communities"**
- The fourth uses a combination of floodplain planning and management and regulations to minimize exposure to floods and to protect their vulnerable populations
- At the same time, ENC communities face several barriers to mitigation including lack of adequate funding to meet their needs, procedural complexities and bureaucratic delays, challenges related to land use planning, and fragmented jurisdictional authority
  - **EDGe\$ Tool <https://edges.nist.gov/> + Mental Modeling (handout available)**