

# What Floodplain Managers Want: Using Weather and Climate Information for Decision-Making

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**SOUTH CENTRAL**  
CLIMATE ADAPTATION SCIENCE CENTER

# Background

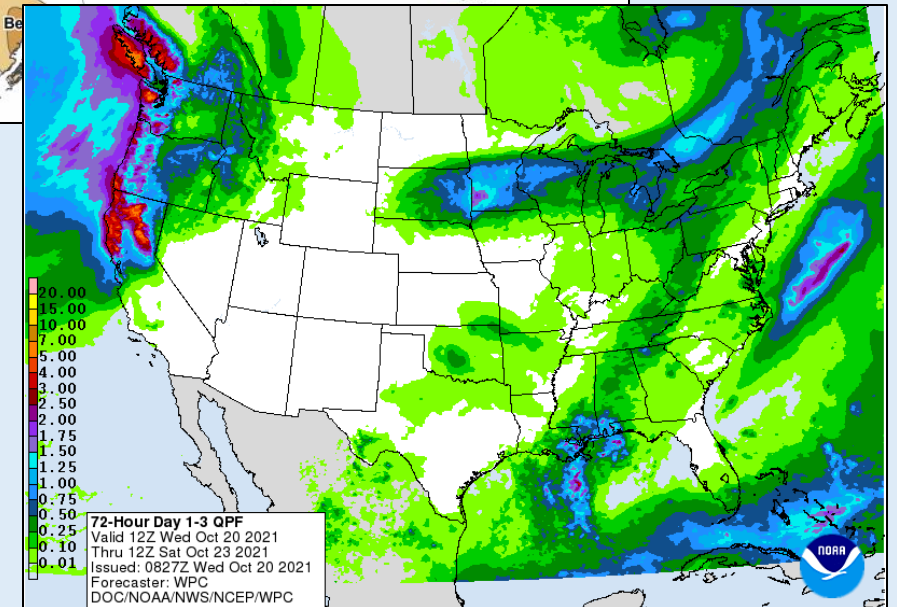
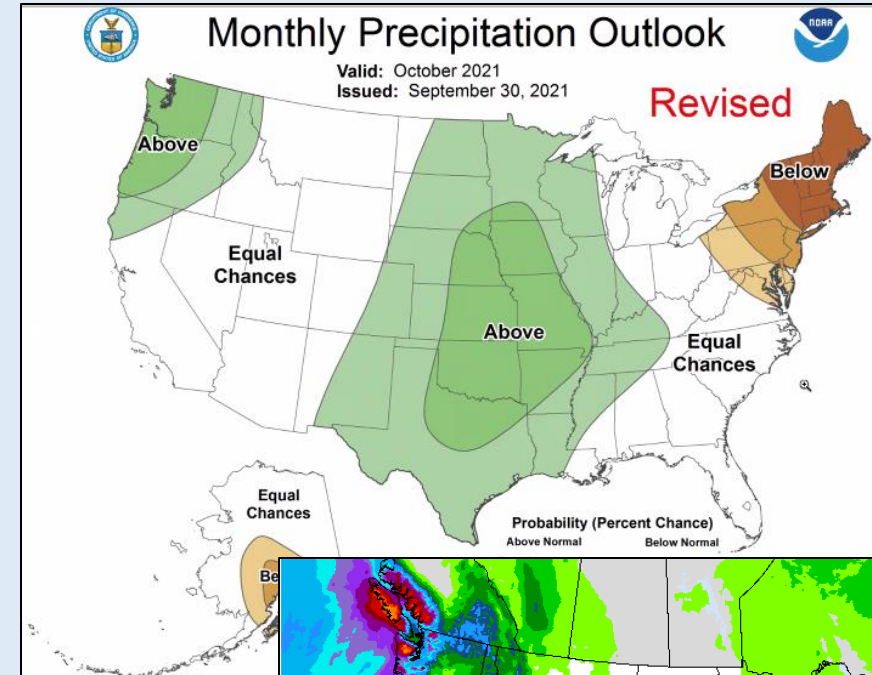
- Prediction of Rainfall Extremes at Sub-seasonal to Seasonal Periods (PRES<sup>2</sup>iP) project
- PRES<sup>2</sup>iP workshop in October 2021
- Prior research on how different natural resource managers are adapting to climate change



Flooding following Hurricane Harvey  
in Houston, TX

# Background

- Many reasons practitioners might not use weather or climate information
  - Difficult to understand
  - Hard to integrate new information into existing practices
  - So much information available

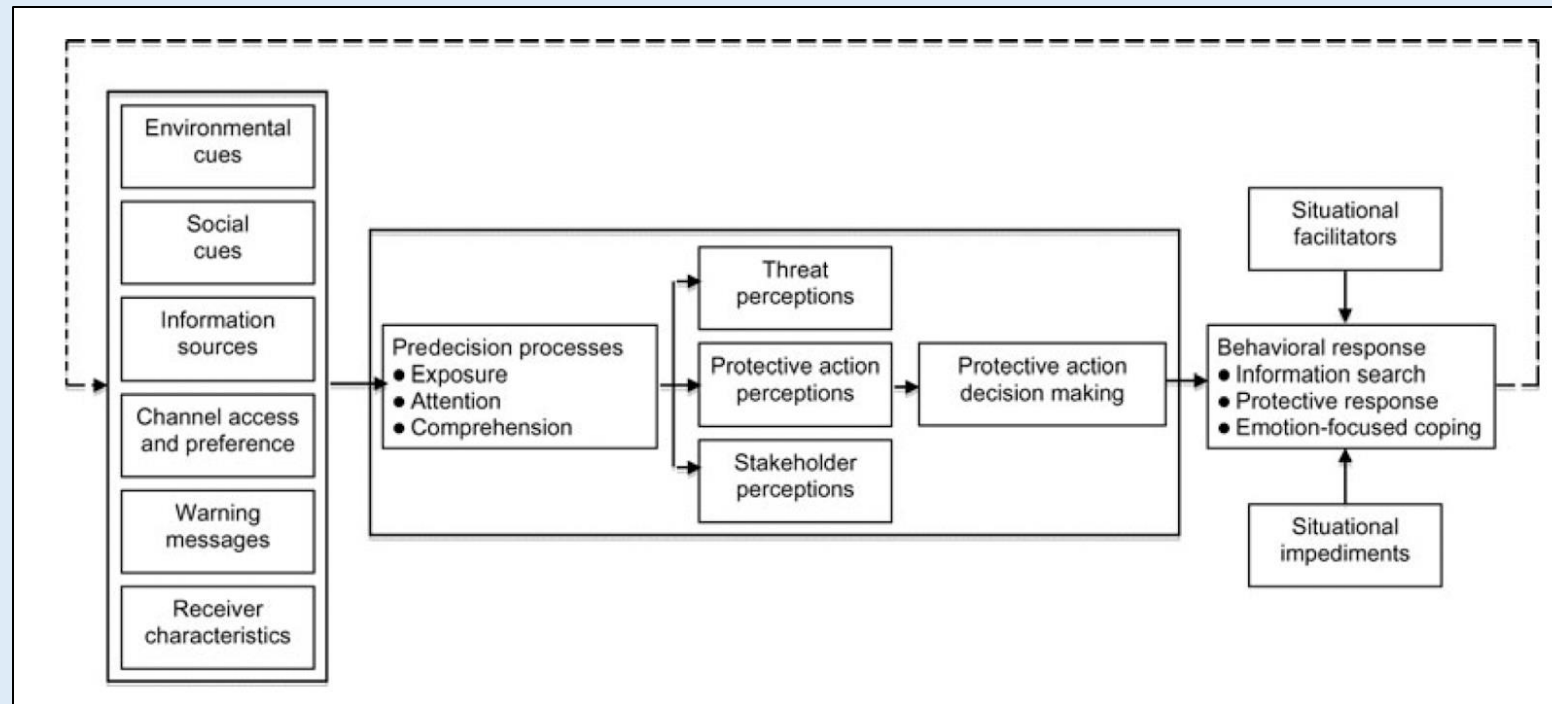


# Research Questions

- How does weather and climate information influence the decision-making of floodplain managers in Oklahoma?
  - What types of information are floodplain managers using and where do they get that information from?
  - What weather or climate information do floodplain managers wish they had when making decisions?

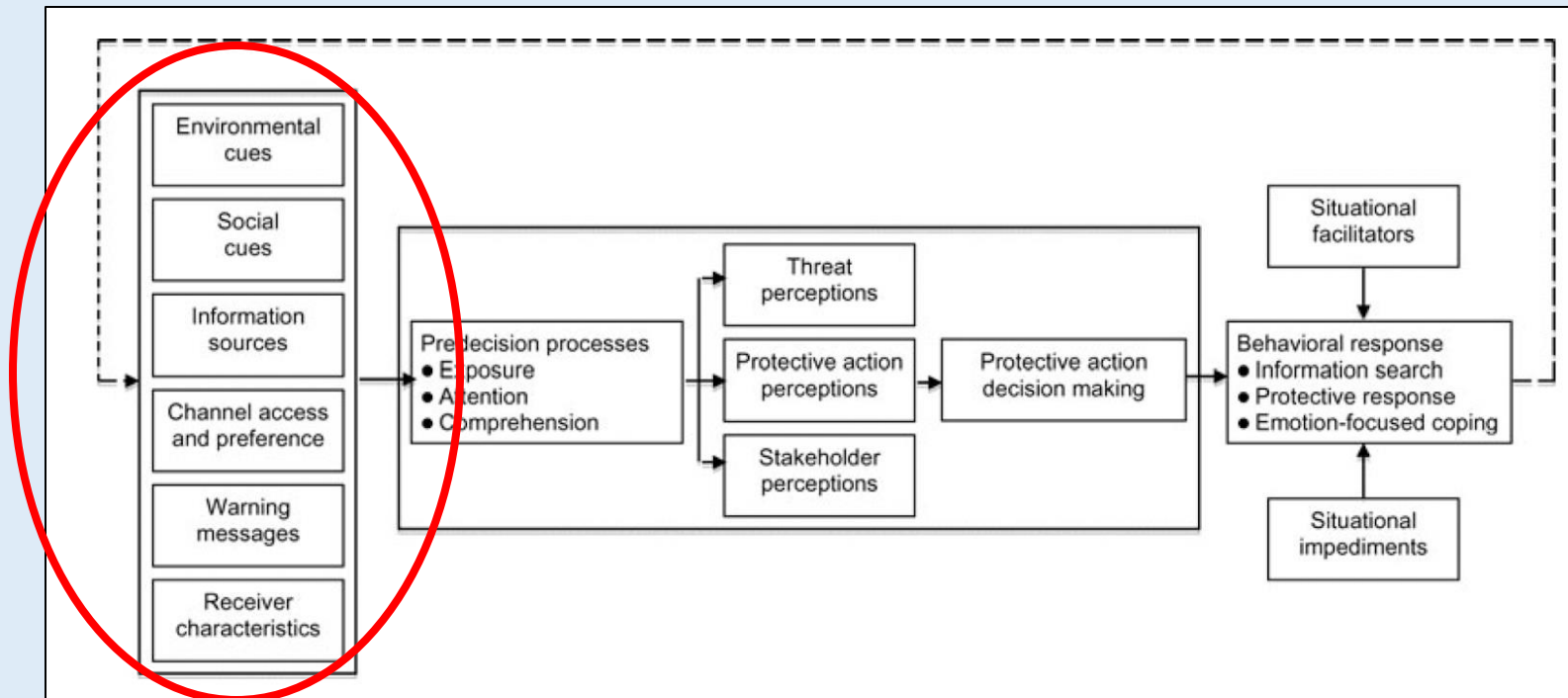
# Theoretical Background

- Protective Action Decision Model (PADM) from Lindell and Perry 2012
  - Applied mostly to short-term hazards that require quick responses, but less on hazards with longer lead times
  - Are decision-makers likely to act or continue seeking new information with greater advanced notice?



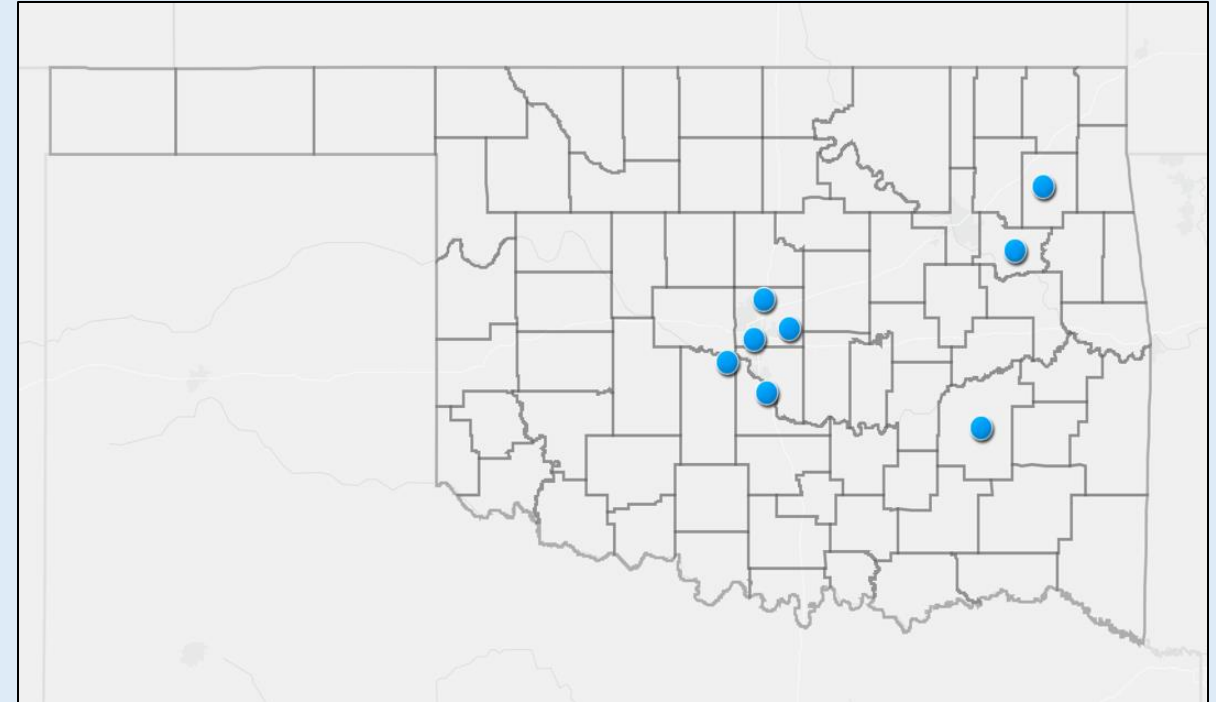
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# Methods

- Semi-structured interviews with floodplain managers across Oklahoma
- 8 interviews conducted via Zoom and transcribed
- 30 minutes - 1 hour
- Participants recruited from county floodplain managers, conference presentations, and personal recommendations



Geographic distribution of interview participants

# Methods

- Interview guide contained questions such as
  - **What forecast products** do you use in your job?
  - **Who do you work with** when making decisions?
  - **What information do you wish you had** when preparing for an extreme precipitation event?
- Analysis: Open coding (Braun and Clarke 2006) followed by thematic analysis (Saldana 2009)
  - 35 codes



# Results

Five themes:

1. Types of decisions
2. Information overload
3. Social network
4. Outside factors
5. Wishful thinking

# Theme 1 – Types of Decisions

**Description:** floodplain managers are making multiple kinds of decisions across time scales for their jurisdictions

<b>Short term decisions</b>	<b>Long term decisions</b>
<ul style="list-style-type: none"><li>• Planning out construction or road paving</li><li>• Preparing job sites ahead of precipitation events</li><li>• Securing topsoil and clearing storm drains</li><li>• Staging barricades to close roads</li><li>• Notifying residents about potential evacuations</li></ul>	<ul style="list-style-type: none"><li>• Scheduling facility maintenance</li><li>• Applying for federal funding to help relocate neighborhoods that frequently flood</li><li>• Designing new roads or bridges</li><li>• Developing plans (drainage, stormwater, hazard mitigation etc.)</li></ul>

# Theme 2 – Information Overload

**Description:** floodplain managers use a variety of weather information that they obtain from multiple sources

**Types of Information:** precipitation, temperature, radar/satellite, soundings, historical data

“I'm looking and seeing what the **radar predictions are from the weather, from the news channels, from the Weather Channel** and then I'm watching **real time radar** as its as that's happening. I'm using current data.”

**Sources of Information:** face to face communication, NWSChat, National Weather Service, Oklahoma Mesonet, TV/media, email

“**I think the mesonet is great too** because even on flooding events, if I look at the sites that are in the South Canadian Basin, **I can get a pretty good idea of if we're going to have a flood here on the Canadian River.**”

# Theme 3 – Social Network

**Description:** multiple people and relationships influence how floodplain managers make decisions

"He's pretty much a weather geek. So, he's a really great resource because he stays on top of all of this, and I like to just get his opinion on what he thinks is going to happen. **I'll make my own decision, but I'll certainly seek input from those people whose judgement I've learned to trust.**"

"So, when I'm seeing things that need to be done, **I talk to the mayor, I talk to the director of Public Works. I talk to our city planner, I talk to our Code Inspector, I may talk to our emergency manager. I talk to our street superintendent.** Every one of those people is involved in some way with stormwater or floodplain management, either from an administrative point of view or a technical point of view. "

# Theme 4 – Outside Factors

**Description:** other factors, such as budgets or amount of authority, influence decisions floodplain managers make

"Here in my particular situation, **I'm very limited on my authority. Not only in the field, but when it comes to city personnel too. I cannot dictate and tell crews what to do. I can make suggestions and I can run it up the chain of command.** For the most part, everybody's on board because nobody wants to see flood damage. But on the flip side of that, with the contractors in the field and depending on the site, I can't direct their work or tell them what to do, I can only make suggestions. Unless it's a safety hazard, we're not allowed to stop work."

**"The problem is that it all takes money. It, everything comes back to money.** And they [county commissioners] say you know 'We don't have the money to do that. We understand what you're saying, we know you can come up with a technical solution. But that technical solution costs money, and where is that money going to come from?'"

# Theme 5 – Wishful Thinking

**Description:** floodplain managers want information and forecasts that can't physically be predicted

“It would be cool if there was some sort of prediction you could count on. And if that prediction could say "well we need this bridge bottom beam elevation to be here because **in 20 years**, they're predicting an increase in water surface elevation and it's **99% accurate**." That'd be great.”

“Well, if you're talking about a million-dollar bridge, **I think the chance or accuracy would have to be like 90% that the water is going to rise**. If we're going to have to spend an extra \$200,000 on this bridge, it would have to be pretty accurate.”

# Conclusions

- Floodplain managers use many types of weather information from multiple sources, but it is only one factor in their decision-making
- Flow of information and decisions being made are disrupted by outside forces (i.e., budgets, county commissioners)
- Longer forecast lead times don't correlate to decisions being made in advance
- Need for climate-informed decision-making as the impacts of changing precipitation patterns are felt in cities

# Acknowledgements

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Questions?

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