

Understanding the Motivation for Supporting Government-Led Nature-Based Solutions for Flood Resilience

Meredith Hovis^{1,2}, Cornelius Ojo³, Gavin Smith³,
Chelsea Kasney¹, & Jordan Davidson¹

1. College of Science & Engineering, University of North Carolina Wilmington
2. Center for Marine Science, University of North Carolina Wilmington
3. College of Design, North Carolina State University

✉ Email hovism@uncw.edu for questions or to learn more!

INTRODUCTION

- Flooding is the most common and among the costliest disasters in the U.S. (\$180-496B annually)^{1,2}
- Urban, coastal cities like Wilmington, NC, (pop. of ~130,000) face a high risk of compound flooding
- Traditional gray infrastructure (e.g., levees, dams) is costly and limited in co-benefits for humans and ecosystems; NbS use natural or restored ecosystems (e.g., wetlands, forests) to address societal challenges like flooding³
- **Implementation of NbS is constrained by policy and regulatory challenges, alongside public knowledge gaps, public skepticism, and lack of funding^{4,5}**

Research questions:

1. Which psychological factors best predict public support for NbS?
2. How do technical assistance and cost coverage shape NbS acceptance?

Stormwater wetland, Wade Park, Wilmington, NC



Clear Run Branch, Wilmington, NC, storm restoration project

METHODS

Data collection:

- Sent 500 randomly selected addresses in Wilmington postcards with survey link, 9 community organizations distributed survey, 35 in-person completions
- N=153

Survey items:

- **Coping appraisal variables:**
 - Flood preparedness plan, perceive NbS effectiveness
- **Threat appraisal variables:**
 - Fear for safety during rainfall, perceived future flood risk, and prior flood damage
- **External variables:**
 - Willingness to adopt NbS if costs and technical assistance provided

KEY TAKEAWAYS

Coping > Threat

Individuals care more about “can we do it?” rather than “how bad is it?”

Technical help matters

NbS seen as complex; residents want support to implement

Financial paradox

Full financial subsidies may undermine motivation

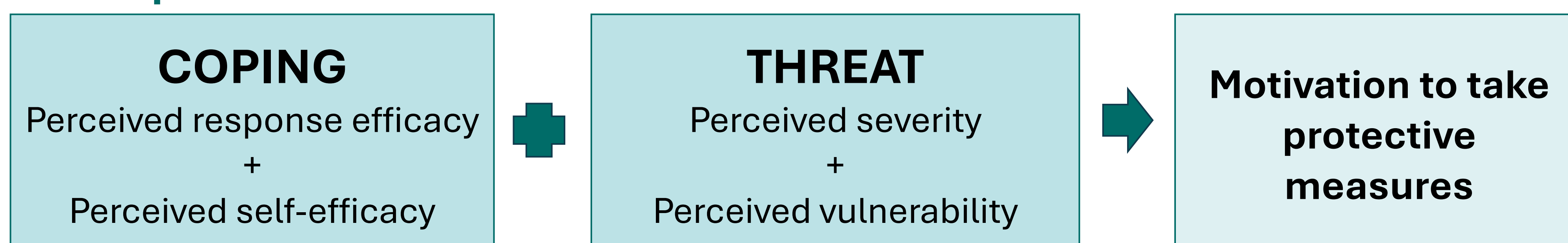
Preparedness disconnect

Personal preparedness may *not* translate into collective NbS support

THEORETICAL FRAMING

- **Protection Motivation Theory (PMT)** proposes that individuals make protective decisions based on two core appraisal pathways⁶:
 1. Coping appraisal: *will this solution work, and can I realistically do it?*
 2. Threat appraisal: *how serious is the risk, and how likely am I to be affected?*

Conceptual Model:



RESULTS

- Model significance $p < .001$
- $R^2=0.51$; Adj. $R^2=0.479$

Predictors of support:

- Technical assistance ($p < .001$)
- Belief in NbS effectiveness ($p < .001$)
- Perceived future flood risk ($p < .001$)

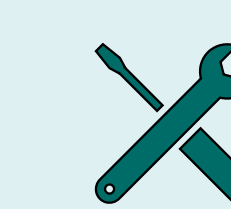
Not significant:

- Fear for home safety, prior flood damage, personal preparedness

Negative relationship:

- Cost coverage reduced support ($p < .001$)

APPLICATIONS



Embed technical support:

- Make technical assistance a core of NbS programs



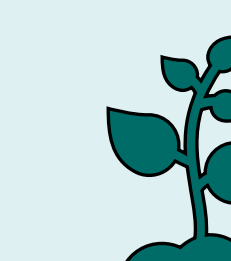
Show it works:

- Use local evidence and demonstrations to build trust in NbS effectiveness



Rethinking funding models:

- Matching grants or cost-share approaches to motivate participation



Highlight co-benefits:

- Emphasize added values (recreation, biodiversity, aesthetics) to boost community buy-in

REFERENCES

1. U.S. Congress JEC, 2024, 2. Bresnahan et al., 2025, 3. Hovis et al., 2021, 4. Brumberg et al., 2025, 5. Kroeger et al., 2025, 6. Rogers, 1975, 1983