DFS Updates on Enhancing the Readiness of Teams

Sept 06, 2019
NCST Advisory
Committee Meeting

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National Institute of Standards and Technology
U.S. Department of Commerce

NIST's Disaster and Failure Studies Program

Statutory Thrust

- Evaluate hazard events against deployment criteria
- Manage identification, vetting, and onboarding of NCSTAC members
- Develop agenda, manage logistics, and set frequency for NCSTAC meetings
- Create annual NCST reports to Congress
- Coordinate statutory activities across programs related to disasters.
- Conduct field studies under various authorities

Procedures Thrust

- DFS SOP
- HOT Team membership, training, and credentials
- Field and safety protocols
- Human subjects protocols
- Manage equipment for disaster metrology and personnel protection
- Data preservation, security, and management plan
- Field tools (NDA's, permissions, survey inst.)
- MOUs with other agencies, academics, and others
- NIST Disaster Working Group

Research Thrust

- Research program focused on disaster metrology, including structural performance and social sciences
- Coordinate research activities with NIST EL Groups, disaster statutory programs, NIST EL Divisions, and other NIST Labs
- Coordination with the Center of Excellence of Risk-Based Community Resilience Planning on field studies
- NIST's Disaster Resilience Grants Program
- Outreach and dissemination

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Disasters Scored in FY18			
Date	Event	Event Consequence Score	Evacuation & Response Score
09/17/18	Hurricane Florence (North Carolina)*	**3.6/5.0**	**2.0/5.0**
08/25/18	Hurricane Lane (Hawaii)	**2.0/5.0**	**1.0/5.0**
08/05/18	Loloan Earthquake (Indonesia)	**3.4/5.0**	**2.9/5.0**
07/30/17	Carr WUI Fire (Redding, CA)	**2.5/5.0**	**3.0/5.0**
07/23/18	Greek WUI Fires (Kineta, Mati, and Rafina)	**2.8/5.0**	**3.2/5.0**
07/23/18	Apartment Building Collapse (Miami Beach, FL)	**3.0/5.0**	**1.0/5.0**
05/04/18	Leilani Estates Earthquake (HI)	**3.0/5.0**	**3.0/5.0**
05/01/18	Fire Induced Building Collapse (São Paolo, Brazil)	**3.6/5.0**	**3.6/5.0**
03/15/18	FIU Pedestrian Bridge (Miami, FL)	**4.2/5.0**	**3.0/5.0**
12/28/17	Bronx Apartment Fire (New York City, NY)	**3.0/5.0**	**2.0/5.0**
10/09/17	Tubbs Fire (Santa Rosa, CA)*	**4.7/5.0**	**5.0/5.0**

***NIST deployed a team**

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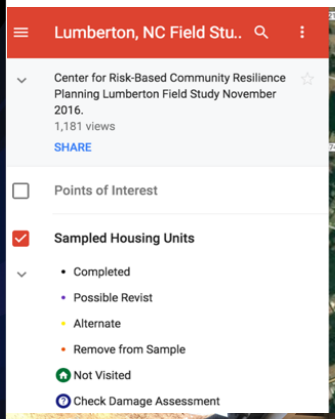
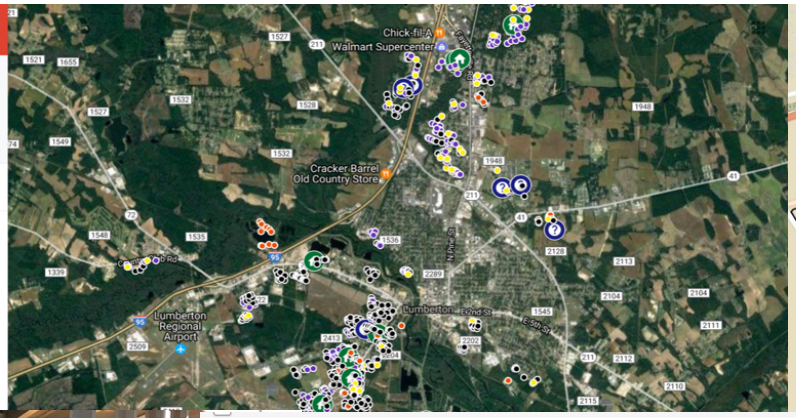
Research Thrust

Field Software, Hardware, and Survey Instruments





van de Lindt et al., 2018. NIST SP 1230

Resilience

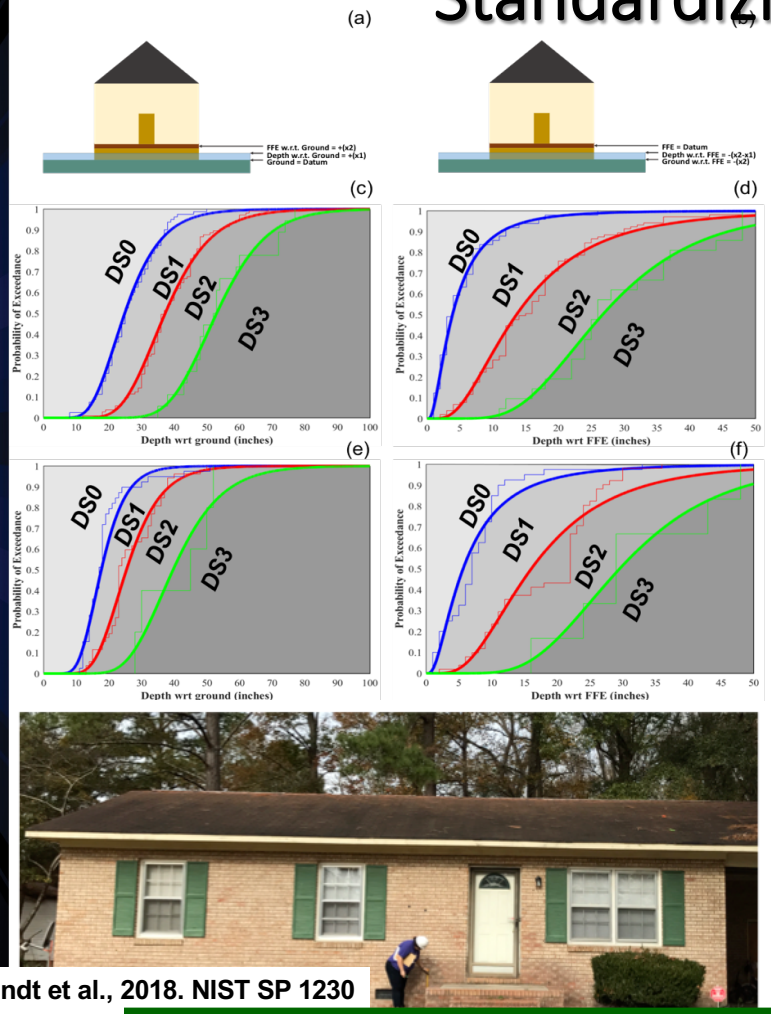
North Carolina Flood Field Study: Household Survey

Draft November 22, 2016

Note these initial questions are answered with respect to the sampled Housing Unit (HU) and the structure in which it is located.

Housing Unit/Sample Unit Description:				**Address:**_____ **Verified by Respondent?** YES NO	
Interview Attempt 1: Date/Time:		**Interview Attempt 2:** Date/Time:		**Interview Attempt 3:** Date/Time:	
Building Type:	1. Single Family	2. Multi-Family # of HUs _____	3. Manufactured/ Mobile home	4. Other: Describe	
Housing Unit (HU) appears occupied Habited or not habited?	YES: household present	YES, evidence of current habitation	Yes, occupied confirmed by neighbor	NO: not occupied, appears abandoned	NO, damage and not habitable
		Yes, occupied, confirmed by management	DK: Indeterminate/ uncertain	NO: not occupied, under repair/reconstruction.	
Interview Attempt Result code:	Result of Interview attempt 1: _____	Result of Interview attempt 2: _____	Result of Interview attempt 3: _____	**Appointment or follow up: day and time**	Day/time:_____
	Result/ completion codes: 1. **Completed interview** 2. **Incomplete/partial -** 3. **Not available or inconvenient** (try to avoid and set , appointment set	4. **Soft refusal** – closing team assignment. 5. **Hard Refusal** – contact captain, perhaps replacement 6. **No Answer** or response, but evidence or confirmed occupied	7. **Ineligible,** (needs follow interview attempt) 8. **Ineligible** (with information about previous residents)	9. **Ineligible total** – new construction – post HM 10. **Ineligible property** – structure not a residence 11. **Bad address** – could not locate HU.	12. **Not occupied residence,** abandoned property, home destroyed. 13. **No access.** Gated community or safety fence preventing entry to damage residence(s). *NOTE IF structure destroyed or abandoned, code as 12*

Standardizing Field Measurements



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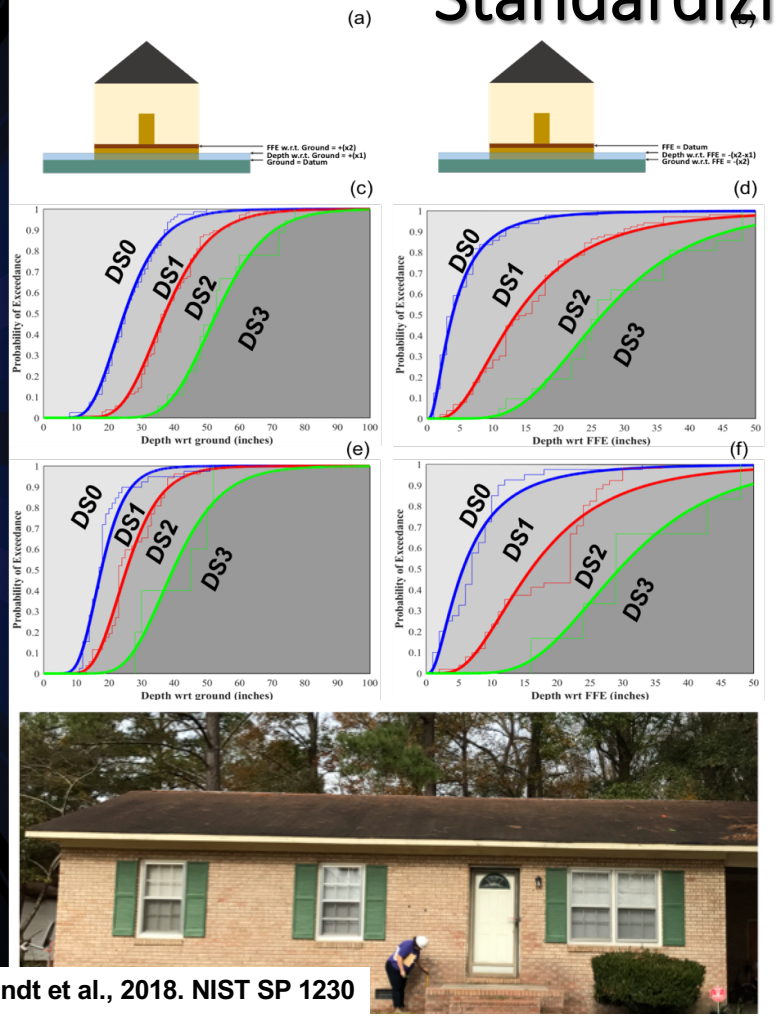

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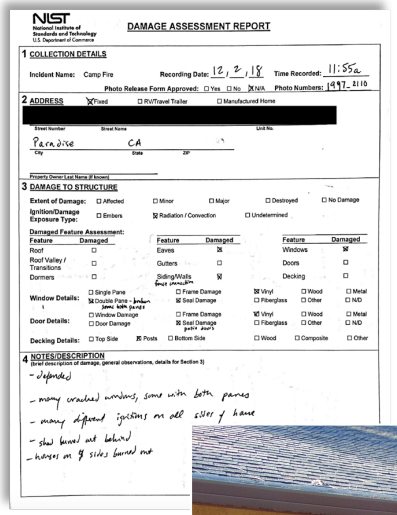
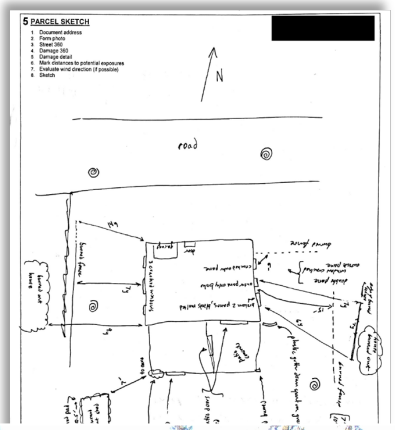
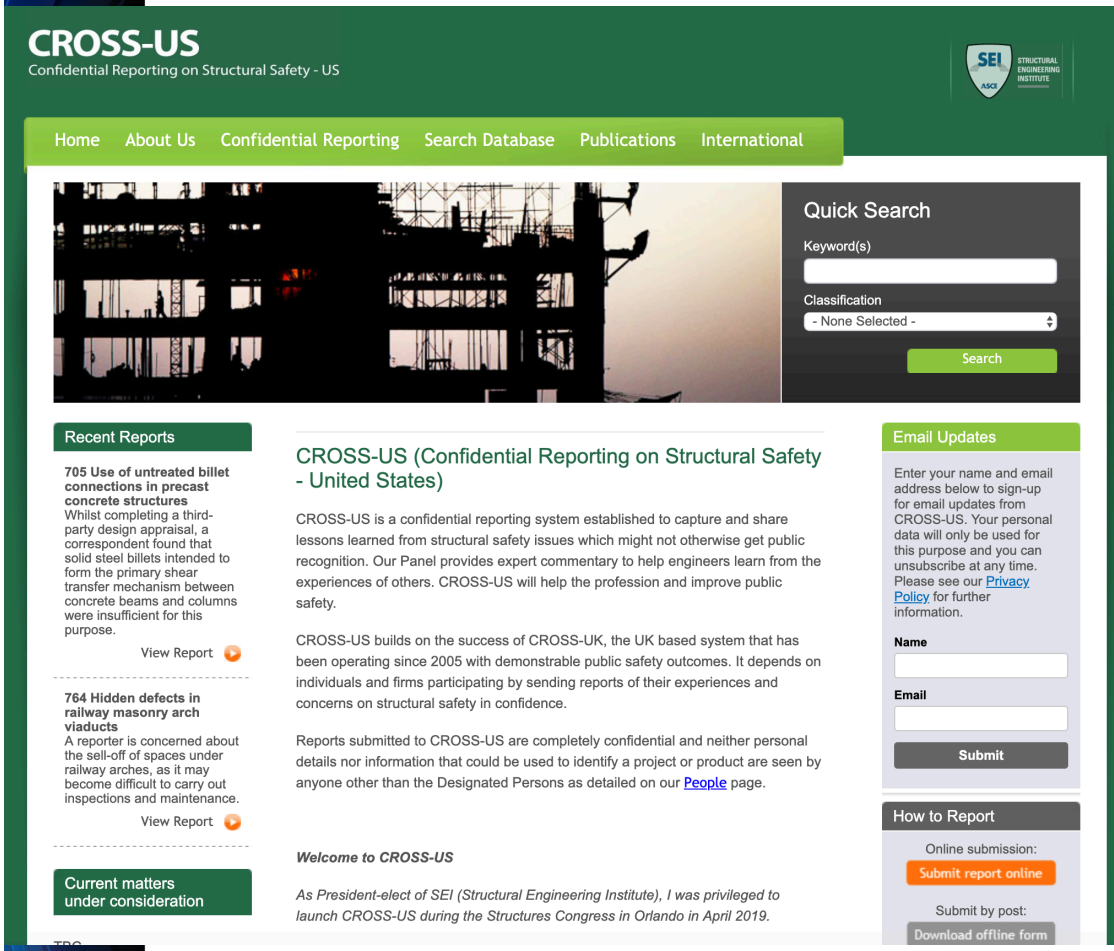
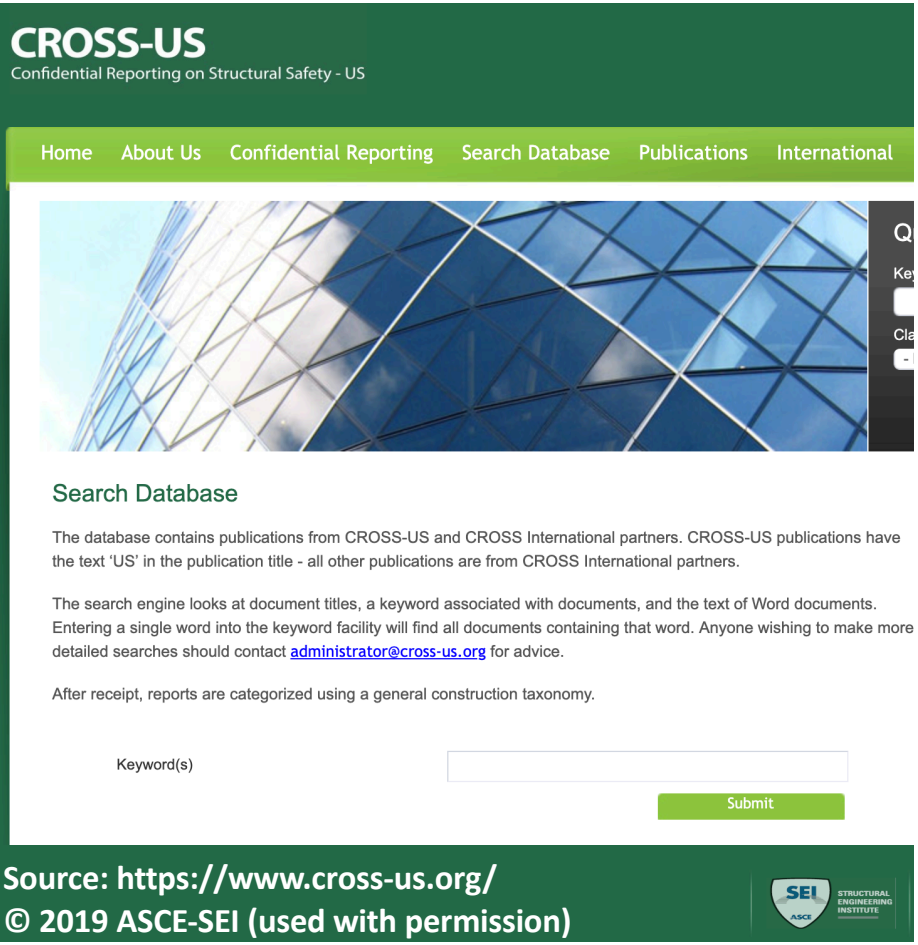




Damage:
Broken out windows
Melted window frame
Melted interior blinds

Confidential Reporting of Structural Safety (CROSS)-US





Source: https://www.cross-us.org/

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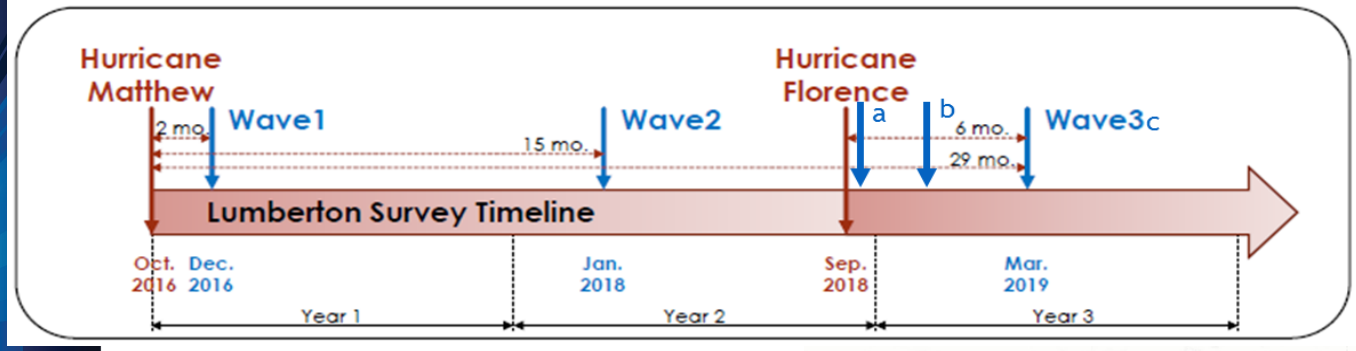
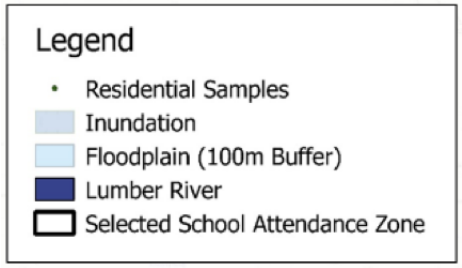
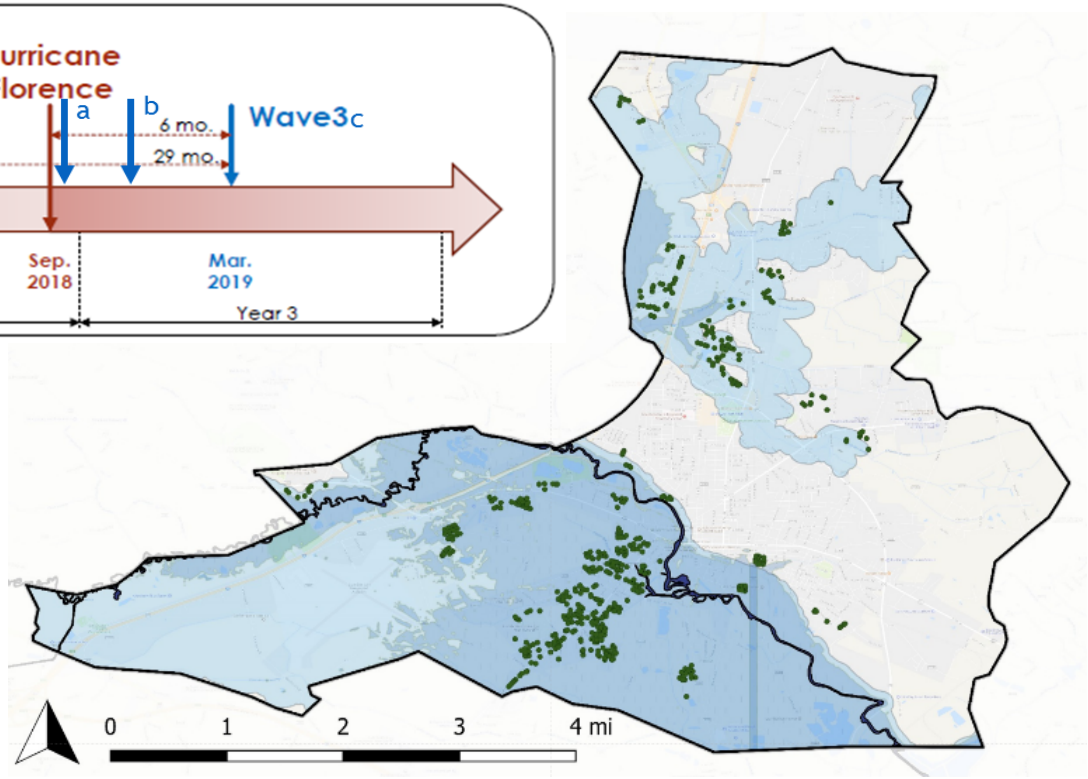
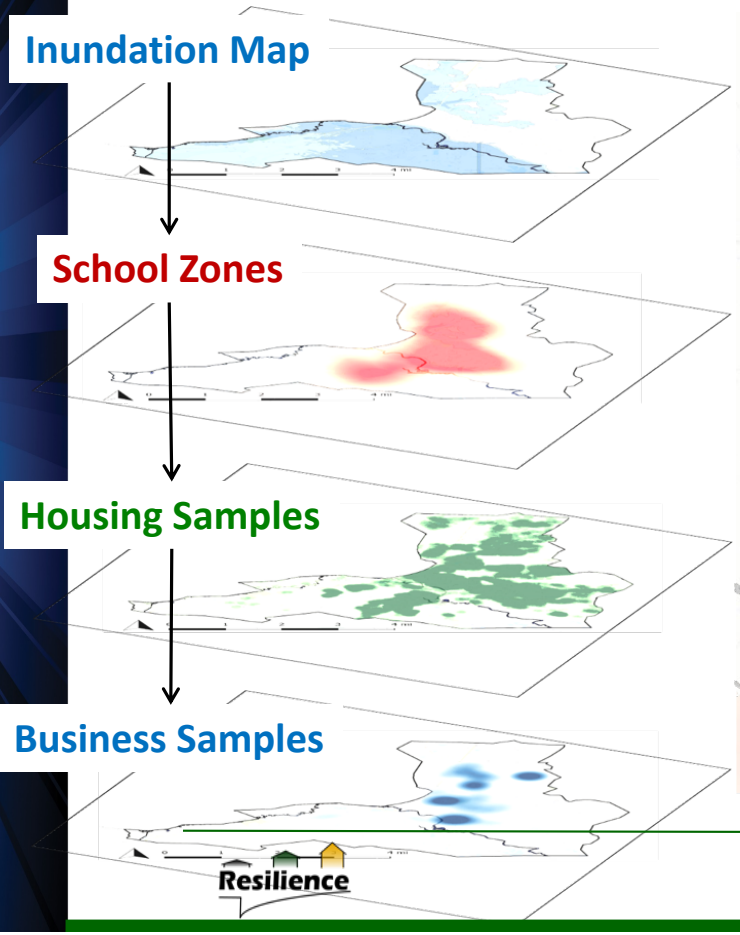
Longitudinal Study of Lumberton, North Carolina

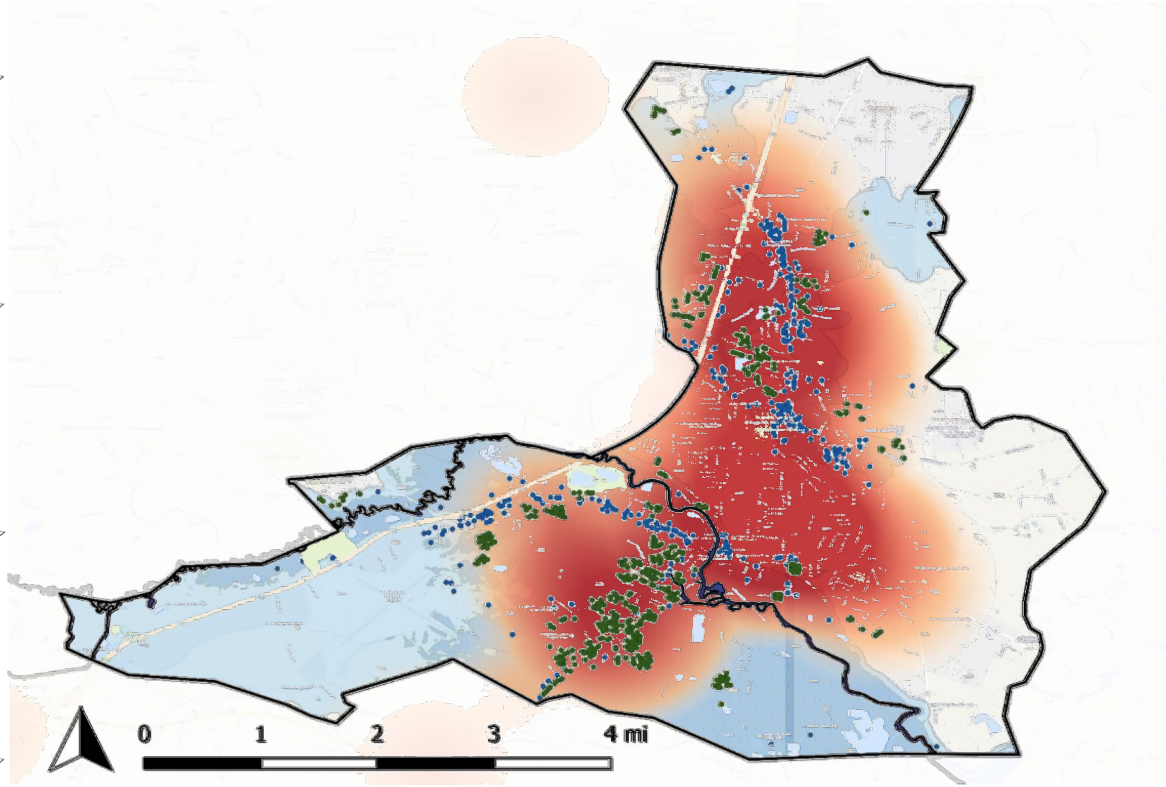






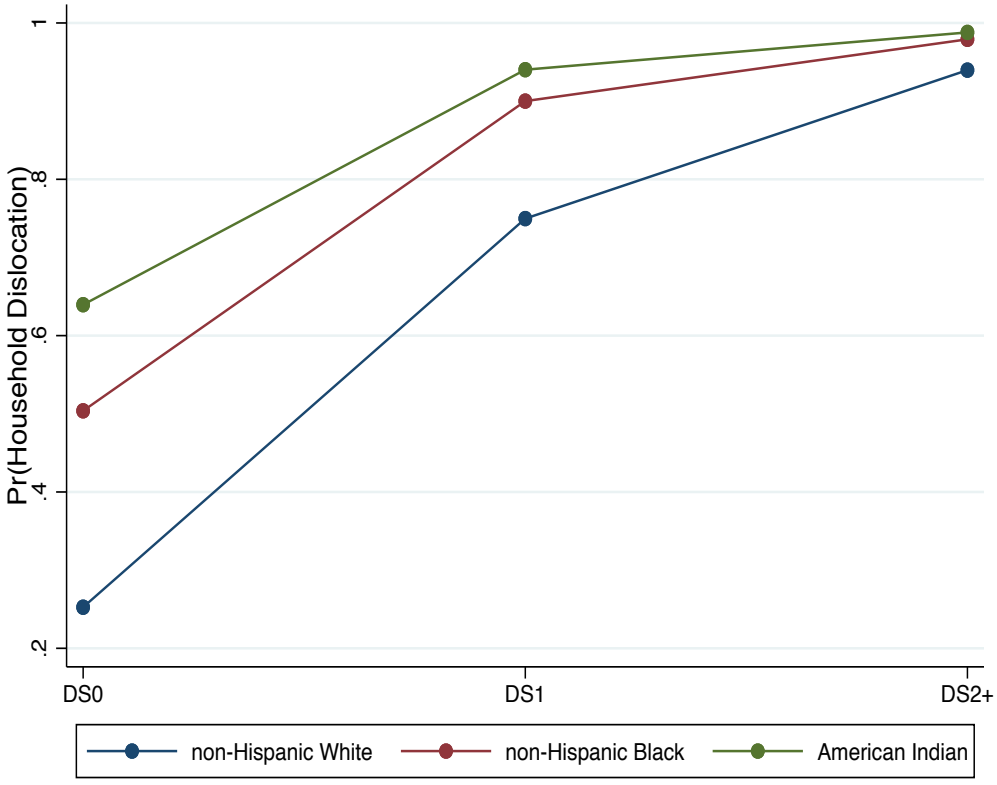
Disaster recovery: interdependencies through sampling





van de Lindt et al., 2018. NIST SP 1230

Disaster recovery: housing



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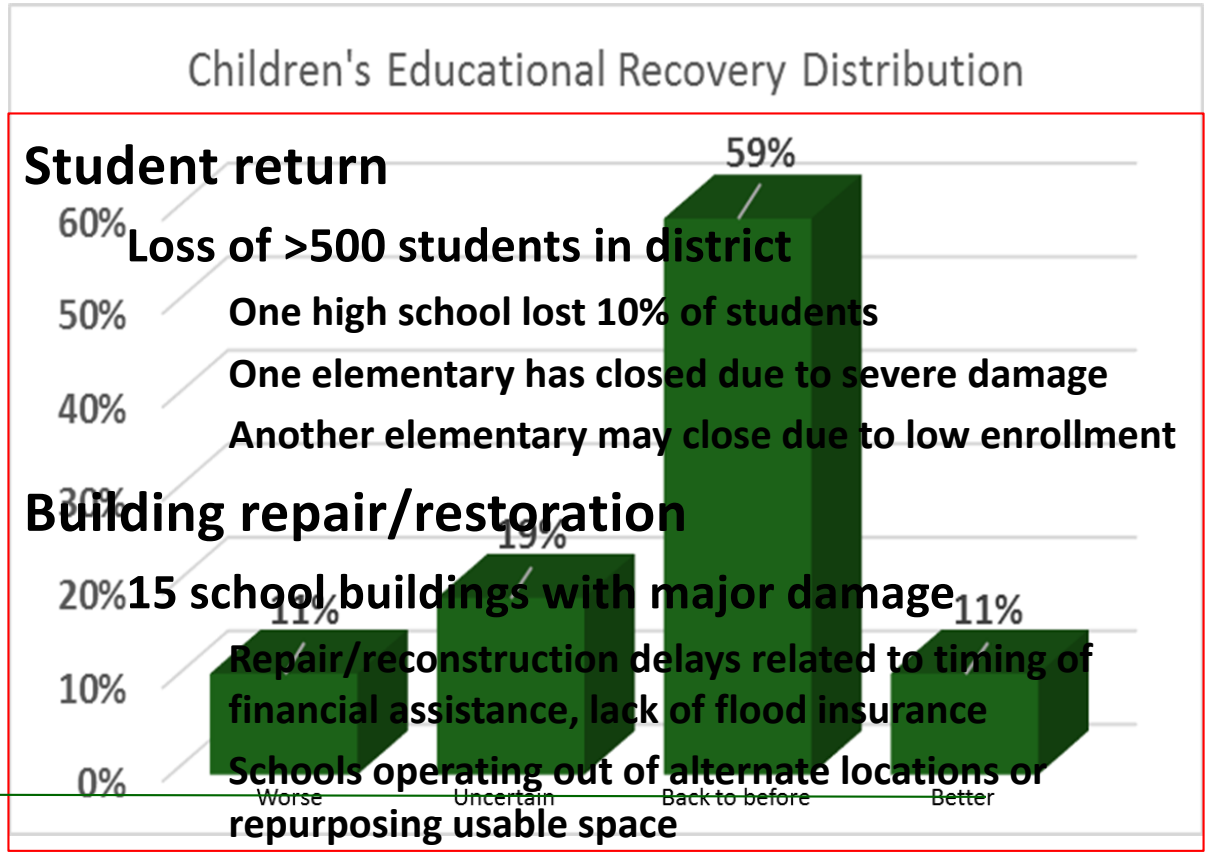
Disaster recovery: schools (preliminary data)

School Recovery

Indicators:

- Repair and restoration
- Recovery decisions
- Student return
- Perceived educational recovery



Student return

Loss of >500 students in district

One high school lost 10% of students

One elementary has closed due to severe damage

Another elementary may close due to low enrollment

Building repair/restoration

15 school buildings with major damage

Repair/reconstruction delays related to timing of financial assistance, lack of flood insurance

Schools operating out of alternate locations or repurposing usable space

(used with permission from Prof. Kuester)

Disaster Resilience Grants

Improving Disaster Resilience Through Scientific Data Collection with UAV Swarms

Award # 70NANB17H211 to the University of California, San Diego

Researchers: Falko Kuester (PI), Tara C. Hutchinson, Kevin W. Franke, Timothy W. McLain, and Nicholas A. Dembsey

NIST has awarded more than $6.6 million to study ways buildings can be made more resilient to hazards such as the 2011 Joplin tornado that destroyed this large store.

The Georgia Tech Research Corporation on behalf of Georgia Tech ($699,000)
To conduct research and develop analysis methods for improved damage assessments following a disaster, accounting for data uncertainty, differences in structures and hazard characteristics, and the performance of "lifelines" such as power, water, communications and wastewater systems.

Texas Tech University ($667,000)
To develop innovative methods for measuring and modeling short-term and long-term social and health effects of windstorms and their impact on the built environment.

Thank you

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