NIST Community Resilience Tools and Research

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Website: http://www.nist.gov/el/resilience/
Google: NIST Community Resilience

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Community Resilience Measurement Challenges

• **Metrics**
  - Identifying a minimum set of metrics to inform community resilience status

• **Data**
  - Varying spatial and temporal scales of data; Lack of recovery data to inform models

• **Models**
  - Integrate physical, social, economic data and analyses; Validate at community scale

• **Decision Support**
  - Short and long term decisions, before and after disruptive events
NIST Community Resilience Program

Community Engagement: Outreach, Collaboration, and Input

• Resilience needs of communities – planning, data, tools, guidance
• Data and decision ‘levers’ – being used or needed

Science-Based Tools: Assess resilience and support informed decision making

• Guidance and best practices – social, economic, built systems
• Modeling – pre- and post-event performance assessment, alternate outcomes
• Metrics – quantitative and qualitative measures
• Economics – Small business, supply chain, resilience dividend
• Codes and standards – Improved design and assessment methods

Disaster and Failure Studies: Metrology for field studies and data collection

• Improved field tools and methods
• Integrated and longitudinal data collection
• Loss of functions and services
Community Resilience Planning Guide

- Planning at the community scale
- Links social needs and building and infrastructure performance
- Establish community resilience goals
- Local government is the logical convener for comprehensive resilience planning

Economic Decision Guide

- Standard approach for consistently evaluating investment decisions (ASTM Standard E3130)

EDGe$ Software Tool

- Tool to assist decision-makers with resilience planning choices
- Beta version available at User Guide with example planning scenarios: NIST.SP.1214.pdf
Center for Risk-Based Community Resilience Planning

Led by Colorado State University with ~12 institutions
Completing its 5th year of collaboration with NIST

Objectives

- **Community model (IN-CORE)**
  - Integrated, systems analysis tool
  - Buildings, infrastructure, dependencies
  - Population dislocation, housing, social institutions
  - Tax base, revenue/income
  - Decision support
  - First release with 2 case studies – December 2019

- **Data management tools**
  - Multi-disciplinary, multi-scale data integration
  - Standard formats

- **Field studies**
  - Validate models and tools
  - Testbeds - Seaside, OR; Galveston, TX; Shelby County, TN
  - Hindcast - Joplin, MO
  - Field Study – Lumberton, NC
NIST and CoE Longitudinal Field Study

Lumberton, NC Impacts from 2016 Hurricane Matthew

• Novel field study data collection methods:
  • Focus around social dimensions (*e.g.*, *education*) critical to community resilience
  • Surveys and sampling plans ensure representation of physical damage, socio-demographics, and housing types
  • GIS-enabled structured surveys that integrate physical and social impacts

Hazard Event
Oct 2016

Wave 1
Nov 2016

Wave 2
Jan 2018

Hazard Event
Sep 2018

Wave 3
Apr 2019

NIST Special Publication
(NIST SP 1230)
## Summary of Potential Next Steps

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