Overview of Disaster Resilience Changes, Framework, and Community Resilience Center of Excellence

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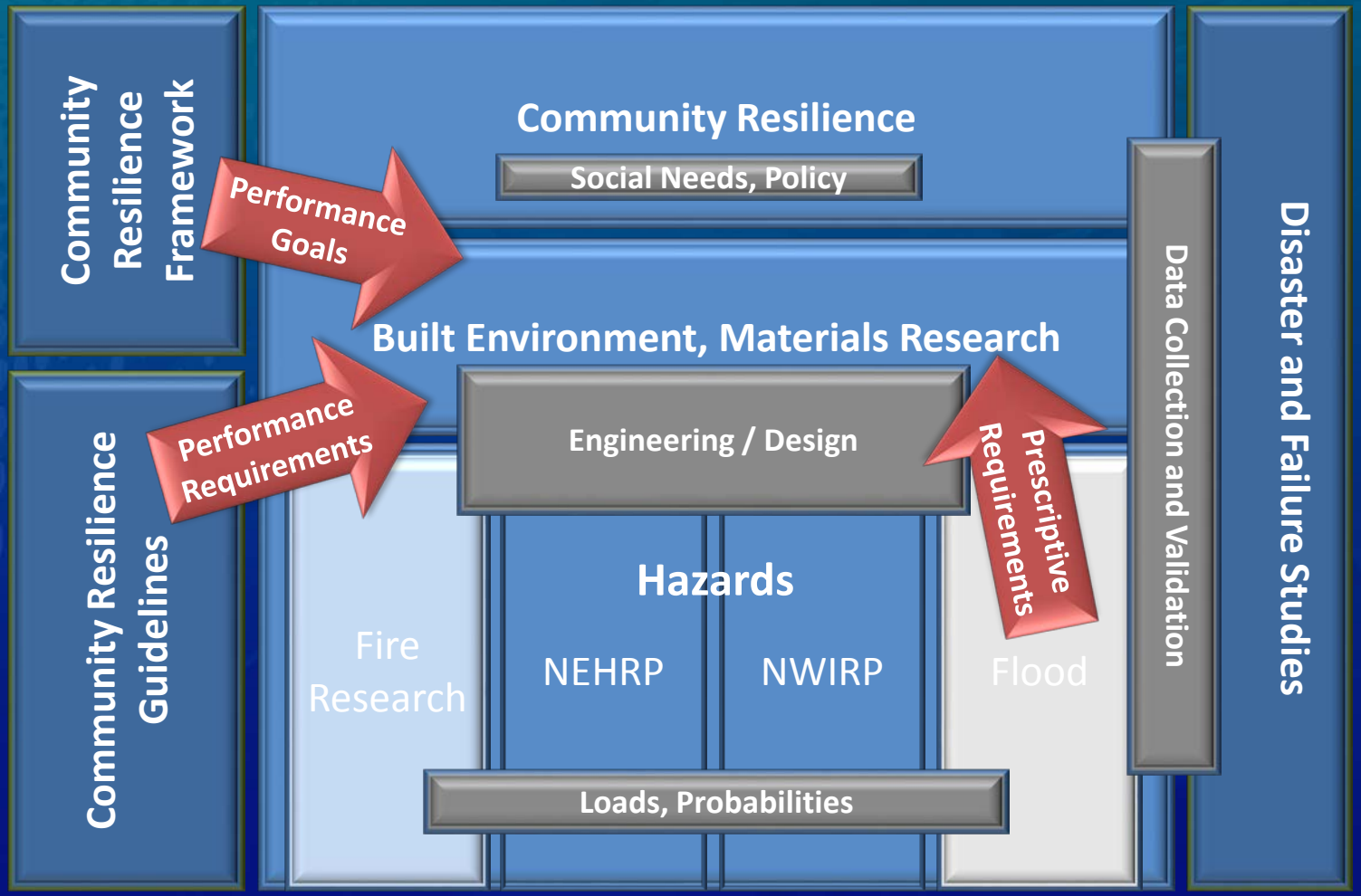
Outline

- Organizational Changes to Strengthen D&FSP
- Progress on Disaster Resilience Framework
- Resilience Fellows Program
- Community Resilience Center of Excellence
- Summary
- Discussion

Reminder: Statutory Authorities

- National Construction Safety Team (NCST)
- National Earthquake Hazard Reduction Program (NEHRP)
- National Windstorm Impact Reduction Program (NWIRP)
- NIST Organic Act Authorities for Building Failure and Fire Studies


Community Resilience Framework
Community Resilience
Social Needs, Policy
Performance Goals
Built Environment, Materials Research
Performance Requirements
Engineering / Design
Prescriptive Requirements
Data Collection and Validation
Disaster and Failure Studies
Community Resilience Guidelines
Hazards
Fire Research
NEHRP
NWIRP
Flood
Loads, Probabilities

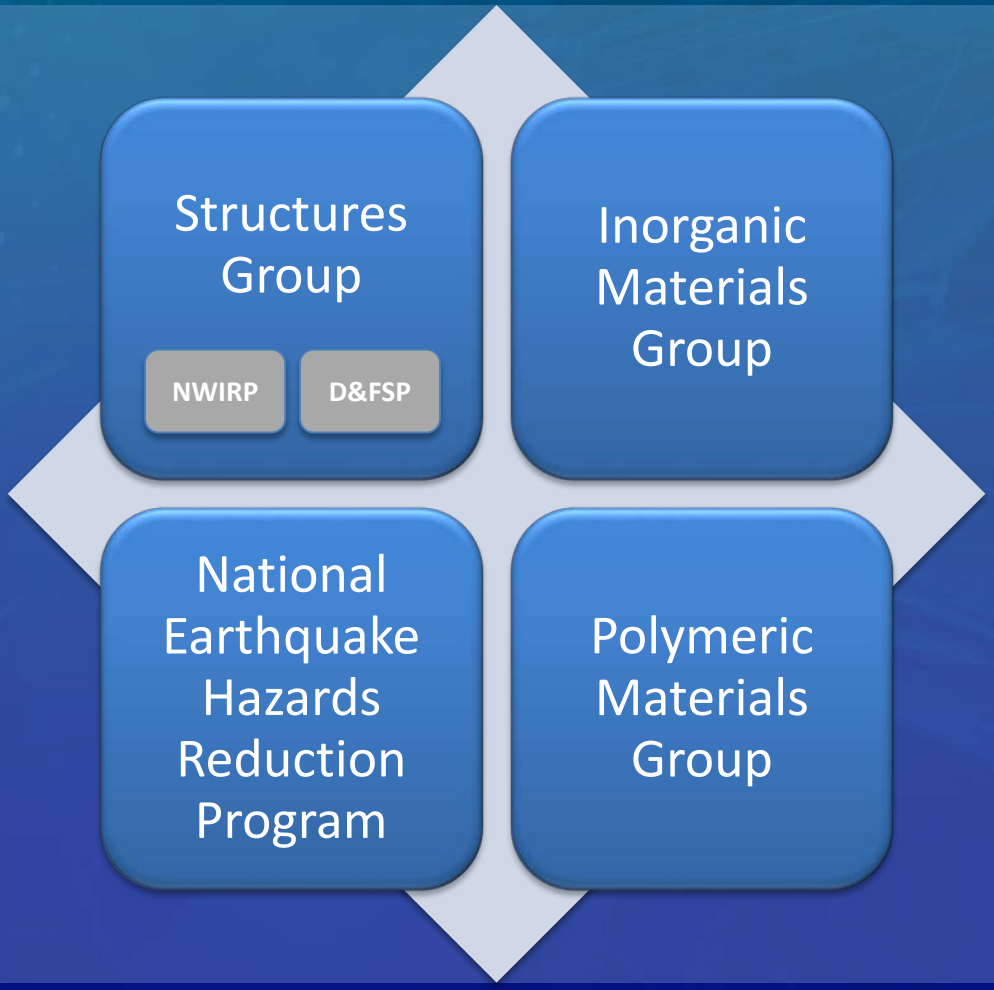
Organizational Changes
Materials and Structural Systems Division

- Create the Community Resilience Group within the Materials and Structural Systems Division

- Relocate the Disaster and Failure Studies Program (D&FSP) into the Community Resilience Group

Organizational Overview: FY14

Materials and Structural Systems Division



Organizational Changes: FY15

Materials and Structural Systems Division

Benefits of Realignment

- Brings Community Resilience work together into a single group structure.
- Formalizes the move beyond a focus on life safety and into function as a driving consideration.
- Programmatic and investigative objectives within same management structure enhances alignment for staff, particularly for future growth of D&FS program.
- Resilience Program requires data to establish the technical basis, inputs, and validation for modeling and D&FS is a significant mechanism, along with the Resilience COE.

Progress Report: Disaster Resilience Framework and Standards Panel

- Disaster Resilience Standards Panel will be formed to adopt and advance:
  - Disaster Resilience Framework
  - Disaster Resilience Guidelines

What is a “Framework”?

- Conceptual structure
- Educational tool
- Identifies mature standards
- Recommends best practices

* Not a standard

Stakeholder Engagement is Critical

Stakeholders include, but are not limited to:

- Codes and standards organizations
- State, local, and regional officials
- Insurance/re-insurance industry
- Architects
- Engineers
- Utility operators
- Urban planners
- Industry
- Emergency managers
- Relief organizations
- Regulators
- Academia

Federal Stakeholders

- Federal stakeholders include, but are not limited to:
  - Executive Office of the President (NSS, OSTP, NSTC)
  - Department of Homeland Security
  - Department of Commerce
  - Department of Defense
  - Environmental Protection Agency
  - U.S. Army Corps of Engineers
  - Department of Energy
  - Department of Health and Human Services
  - Department of Housing and Urban Development
  - Department of Transportation
  - U.S. Geological Survey
  - National Science Foundation

Disaster Resilience Framework 1.0

- The Disaster Resilience Framework focuses on the role that buildings and infrastructure systems play in ensuring community resilience.
- The Framework will:
  - Establish types of performance goals and ways to express them
  - Identify existing standards, codes, and best practices that address resilience
  - Identify gaps that must be addressed to achieve resilience
  - Capture regional differences in perspectives on resilience
- The Disaster Resilience Framework will be informed through a series of stakeholder workshops.

Framework Development Process

http://www.nist.gov/el/building_materials/resilience/disresworkshp.cfm

Framework Chapters – 50% Draft (Overview Chapters)

- **Ch. 1: Introduction and Scope**
  - Alignment with Other Programs
- **Ch. 2: The Community**
  - Social Vulnerabilities, Social Needs
  - Economic Development and Emergency Planning
- **Ch. 3: Overview of Built Environment**
  - Performance Goals, Hazard Events, Risk Equivalency
  - Mitigation Strategies
- **Ch. 4: Sectors, Interdependencies, and Cascading Effects**
  - Recovery Sequencing

Framework Chapters – 50%
(Sector Chapters)

- **Ch. 5: Building Sector**
  - Typical:
    - Goals
    - Systems (Schools, Healthcare, Governance…)
    - Regulatory Environment, including Codes and Standards
    - Tools and Strategies
- **Ch. 6: Transportation**
- **Ch. 7: Energy**
- **Ch. 8: Communications and Information**
- **Ch. 9: Water and Wastewater**

Framework Chapters – 50%
(Summary Chapters)

- **Ch. 10: Existing Tools and Metrics**
  - **Community**
  - **Sector-specific**

- **Ch. 11: Priority Action Plans and Research Needs**

Disaster Resilience Standards Panel (DRSP)

- The DRSP will represent the broad interests of the stakeholder community.

- The DRSP will be:
  - open to all interested participants
  - a self-governing entity

- The DRSP will lead development of:
  - Disaster Resilience Framework 2.0
  - Model Resilience Guidelines

Disaster Resilience Standards Panel (DRSP)

- Charter for DRSP being developed during breakout groups at the quarterly workshops
  - July 2014 - Focus on mission and vision
  - October 2014 – Organizational requirements to best fulfill mission and vision
  - January 2015 – Draft DRSP charter available for public comment
  - April 2015 – Formal establishment of the DRSP and review of *Draft* Resilience Framework
  - July 2015 – Adoption of Resilience Framework by DRSP

Community Resilience Fellows

- Two-year NIST funding provided through NIST Strategic and Emerging Research Initiatives (SERI*) program
  - Expertise in areas not traditionally strengths at NIST
  - Resilience Fellows Program will provide in-depth engagement to support development of the Resilience Framework
  - One to six months of effort each over the next year, including orientation period at NIST

* SERI is 1 to 3 yr term funding from the NIST annual appropriation for specific projects to jump-start efforts in selected new proposed initiative areas

Community Resilience Fellows

Expert	Expertise
Donald Ballantyne	Water Infrastructure
Joseph Englot	Transportation Infrastructure
Erich Gunther	Electrical Power Infrastructure
Stuart McCafferty	Electrical Power Infrastructure
Kevin Morley	Water Infrastructure
Chris Poland	Community Resilience
Liesel Ritchie	Sociology of Disasters
Jay Wilson	Emergency Planning and Response
Ted Zoli	Transportation Infrastructure

NIST Centers of Excellence

The NIST Centers of Excellence will:

- Enable collaborations between NIST and Leading Research Institutes in areas of emerging technology important for NIST.
- Provide new opportunities for training in measurement science.
- Enhance technical innovation through early alignment of measurement science with emerging and innovative new fields of research.

Community Resilience CoE Overview

- Funding: $4 million per year for five years, with possibility for an additional five year award.
- Application Process: Single application. No pre-application is required.
- Cost Share: Cost sharing is not required.

Community Resilience CoE

- NIST is initiating research to develop a systems-based modeling environment for evaluating the impacts of loss of function in the built environment and the consequential effects on community response and recovery.

- The envisioned computational modeling environment will be a research tool that will establish a scientific basis for understanding resilience at a community level.

- The long-term objective is to provide decision-makers and professionals with methods and tools to support cost-effective infrastructure designs and investments that make our communities more resilient

Community Resilience CoE

By combining NIST's expertise with performance-based studies of structures, community resilience, and disaster and failure studies with the Community Resilience Center of Excellence, the next level of science-based modeling and desired performance levels can be achieved to enhance community resilience through the following research areas:

1. Computational Modeling Environment for Community Resilience
2. Data Management Tools for Community Resilience Systems
3. Resilience Field Studies

Community Resilience CoE - Computational Modeling

- The COE will work towards an integrated, multi-scale, computational modeling environment to accelerate development of systems-level models to enable new standards and tools for enhancing Community Resilience
- The COE scope includes buildings and other structures, energy systems, transportation systems, communication and information systems, and water and wastewater systems.
- Sensitivity studies will examine the effect of parameters, such as event sequence, interdependencies, time, or cost, on the outcomes and community resilience.

Community Resilience CoE - Computational Modeling

- The modeling tools will support evaluation of the potential impact of disasters to buildings and infrastructure systems for:
  - Building and infrastructure interdependencies and cascading effects of failures among infrastructure systems and buildings;
  - Decision making for planning, risk mitigation, response, and recovery with specific consideration of corresponding infrastructure system performance; and
  - Metrics that quantify the state and improvement of community resilience with regard to the built environment and societal needs.

Community Resilience CoE - Data Management Tools

- The COE will foster the development of data architectures and data management tools to enable resilience planning for emergency and decision-making officials, code and standards professionals, engineering design experts, and researchers.
- The data management tools must include:
  - Development of standardized data ontology, format, and other informatics characteristics to enable the collection, storage, and data analysis appropriate for a spectrum of hazard types and resilience infrastructure data.
  - Development of a resilience data architecture that will accommodate system-level computational models with data for model input and validation.

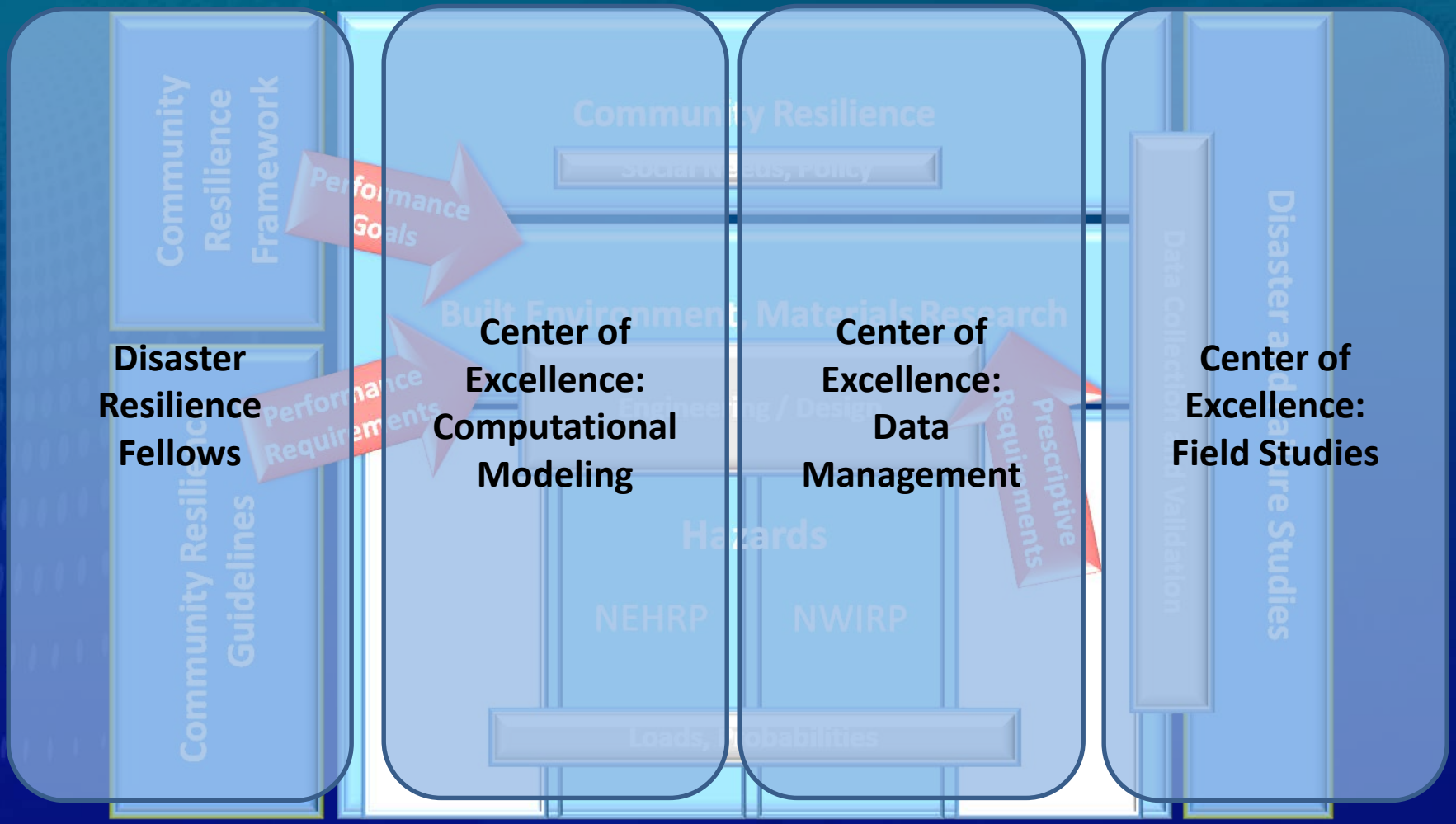
Community Resilience CoE - Resilience Field Studies

- The Resilience CoE will conduct studies to validate resilience data architectures, data management tools, and models for a variety of hazard events including:
  - Tornado, hurricane, earthquake, flood, Wildland-Urban Interface (WUI)
  - Effects of climate change
  - Effects of aging infrastructure

- These field studies will be an opportunity to exercise new data formats and collection methods.

Community Resilience CoE Timeline

- Application period closed September 12, 2014
- Administrative and technical review during September and October 2014
- Award decision anticipated in December 2014


Disaster Resilience Fellows
Center of Excellence: Computational Modeling
Center of Excellence: Data Management
Center of Excellence: Field Studies

Summary

- Issue: Statutory programs, particularly the Disaster and Failure Studies Program, have significant expectations associated with the authorities.

- Solutions:
  - Provide depth to deployment management by embedding the D&FS Program with Community Resilience Group.
  - Provide experience and resources to deployments through the Community Resilience CoE's annual field data collections.

Summary, cont'd

- Issue: Need to transition from a life safety objective to a view that the built environment serves a function and delivers on social needs.

- Solutions:
  - Community Resilience Group will be the source for science-based tools to measure resilience and sound decisions to prioritize, plan, and implement actions to achieve community needs .
  - Through the DRSP, a framework and guidelines will provide path for implementation by local communities.
  - Resilience Fellows will bridge the gap in expertise for critical infrastructure elements not presently at NIST.

Summary, cont'd

- Issue: Critical data to support development of science-based Community Resilience models and methods either does not exist or exists within 'sector silos.'

- Solutions:
  - Community Resilience CoE's annual field deployment will develop new data, data collection methods, and data management practices.
  - Resilience Fellows representing critical sectors bring expertise to the Framework; the DRSP will provide forum to begin sharing data across silos.

Contact Info:

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Links of Interest:

Materials and Structural Systems Division:
http://www.nist.gov/el/building_materials/index.cfm

Disaster Resilient Buildings Goal:
http://www.nist.gov/el/disresgoal.cfm

Disaster and Failure Studies Program:
http://www.nist.gov/el/disasterstudies/index.cfm

Community Resilience Program at NIST:
http://www.nist.gov/el/building_materials/resilience/index.cfm