National Center for Employee Development (NCED)

Norman, OK

Oct 27-28, 2014

NIST Community Resilience Program – Third Stakeholder Workshop

Therese McAllister, PhD, PE
Leader, Community Resilience Group

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

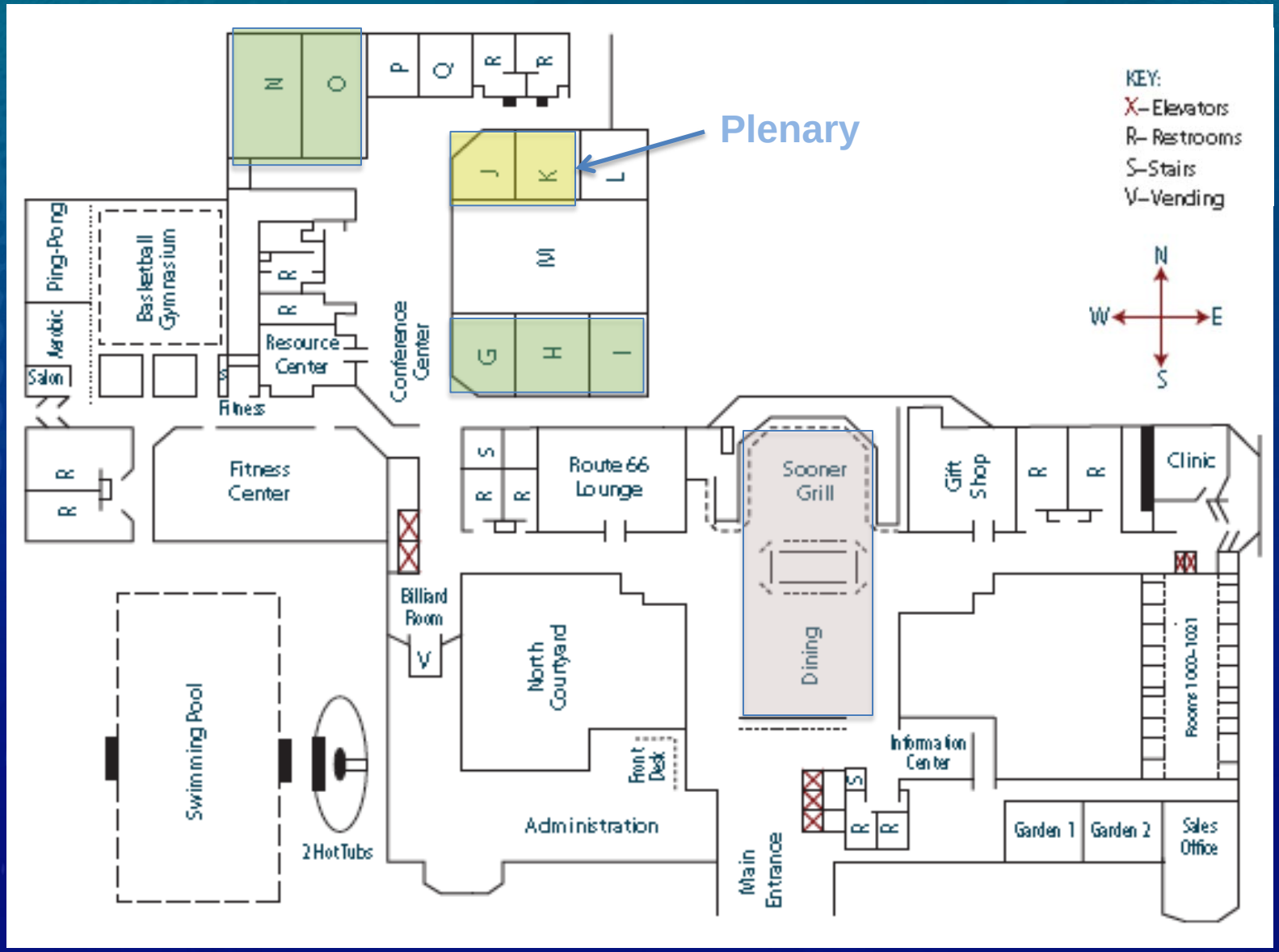
Workshop Agenda
Monday, October 27

8:30-9:15	Introduction
9:30-12:00	Session 1: Breakout
	Performance Goals
12:00-1:00	Lunch Break
1:00-2:00	Keynote Interview
	Resilience Lessons from Joplin and Moore
2:00-2:15	Transition Break
2:15-5:00	Session 2: Breakout
	Dependencies of Sectors
6:00-7:00	Networking Session

Workshop Agenda
Tuesday, October 28

8:30-10:15	Session 3: Plenary
	Dependencies Discussion
10:15-10:30	Transition Break
10:30-11:30	Session 4: Breakout
	Key Dependencies
11:30-12:30	Lunch Break
12:30-1:20	Wrap Up Session
	Prepare Sector Report
2:40-5:00	Optional Tour: National Weather Center

Event Locations



Framework Chapters – 50% (Overview Chapters)

- Ch. 1: Introduction and Scope (75% draft)
- Ch. 2: The Community
  - Social Community and Performance Goals
- Ch. 3: Community Resilience for the Built Environment
  - Performance Goals
  - Mitigation and Recovery Strategies
- Ch. 4: Interdependencies and Cascading Effects
  - Buildings and Infrastructure Systems

Framework Chapters – 50% (Sector Chapters)

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

Framework Chapters – 50% (Summary Chapters)

- Ch. 10: Existing Tools and Metrics (75% Draft)
  - Community and Sector-specific
  - Prioritization of Alternatives
- Ch. 11: Recommendations and Next Steps (75% Draft)

- Economic Considerations for Community Resilience (75% Draft)
  - Economic Sectors and Development
  - Planning and Decision Making

Breakout Session Locations

1. Community Resilience (Ch 3) & Metrics (Ch 10) – Salon G
2. Buildings (Ch 5) – Salon H
3. Infrastructure Systems – Salon I
   - Transportation (Ch 6)
   - Power (Ch 7)
   - Communication (Ch 8)
   - Water (Ch 9)
4. Social Aspects – Salon N
5. DRSP – Salon O

Framework & Workshop Team

NIST

- Jason Averill
- Dave Butry
- Steve Cauffman
- Howard Harary
- Erica Kuligowski
- Terri McAllister
- Nancy McNabb

Authors

- Erin Ashley
- Jeff Kotcamp
- Frank Lavelle
- David Mizzen
- Bob Pekelnicky
- Chris Poland
- Adrienne Sheldon
- Scott Tezak
- Peter Vickery
- Kent Yu

Conference Planner

- Tonia Bohnen

Facilitators

- Paget Donnelly
- Katie Jereza
- Mauricio Justiniano
- Ann Terranova
- Walt Zalis

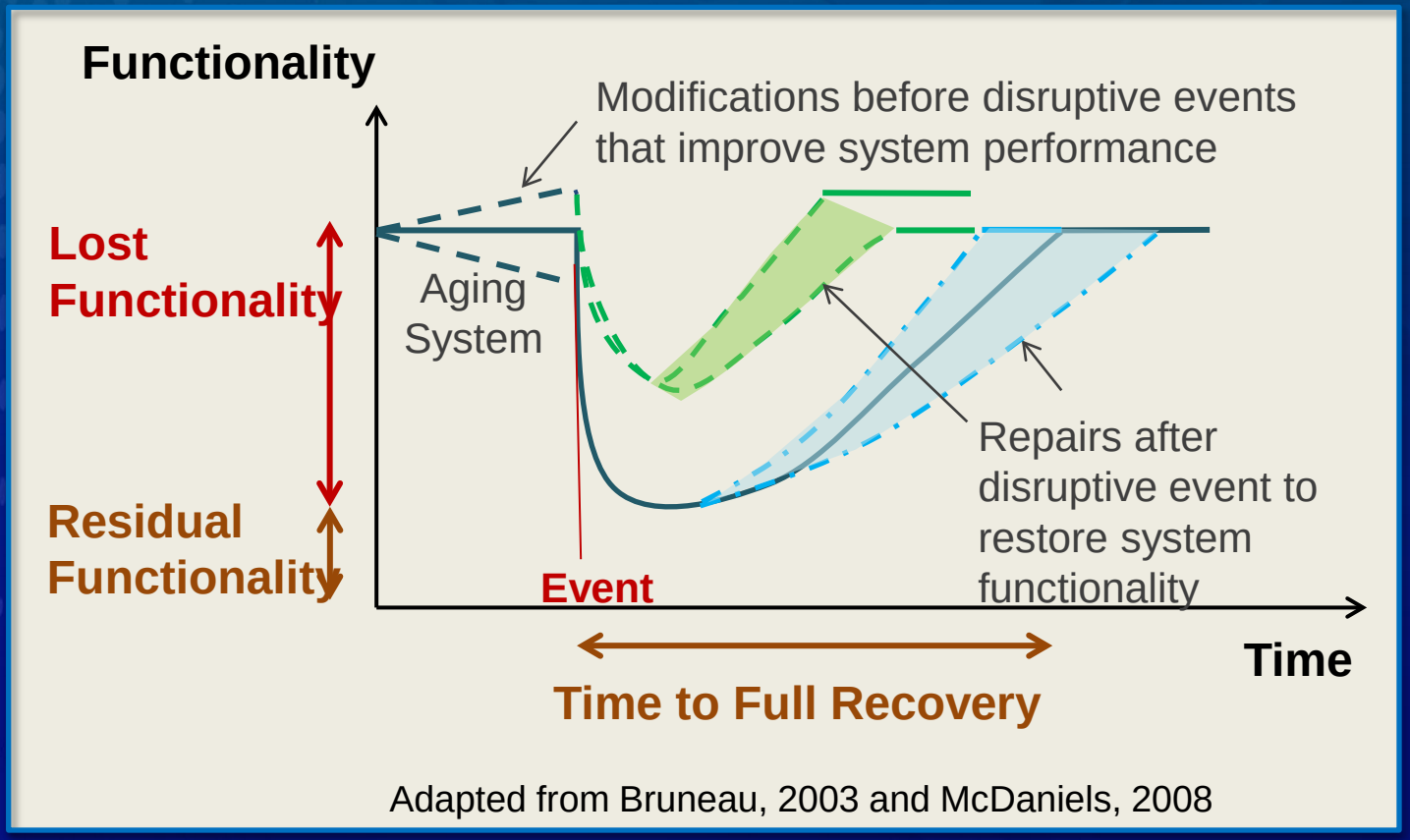
Goals of Sessions

- Develop example community performance goals for recovery
- Identify key dependencies between sectors
- Learn about concerns and issues for community resilience

Resilience Concept

Maintain acceptable levels of functionality during and after disruptive events

Recover full functionality within a specified period of time



Adapted from Bruneau, 2003 and McDaniels, 2008

Example Community Performance Recovery Goals

Disturbance

Hazard level

Affected Area

Disruption Level

Restoration Time

Desired

30%

60%

90%

Actual - X

Disturbance		
(1)	Hazard	Any
	Hazard Level	Expected
	Affected Area	Community
	Disruption Level	Moderate

Restoration times		
(2)	30%	Restored
	60%	Restored
	90%	Restored
(3)	X	Current

Functional Category: Cluster	Overall Recovery Time for Hazard and Level Listed								
	Phase 1 – Response			Phase 2 – Workforce			Phase 3 – Community		
	Days 0	Days 1	Days 1-3	Wks 1-4	Wks 4-8	Wks 8-12	Mos 4	Mos 4-36	Mos 36+
Critical Facilities									
Buildings	90%								
Transportation		90%							
Energy						90%			
Water			90%						
Waste Water				90%					
Communication	90%								
Emergency Housing									
Buildings			90%						
Transportation			90%						
Energy							90%		
Water			90%						
Waste Water				90%					
Communication				90%					
Housing/Neighborhoods									
Buildings				90%					
Transportation					90%				
Energy							90%		
Water				90%					
Waste Water					90%				
Communication				90%					
Community Recovery									
Buildings								90%	
Transportation								90%	
Energy							90%		
Water				90%					
Waste Water								90%	
Communication				90%					

Footnotes:

1 Specify hazard being considered
Specify level -- Routine, Expected, Extreme
Specify the size of the area affected - localized, community, regional
Specify severity of disruption - minor, moderate, severe

2 30% 60% 90% Restoration times relate to number of elements restored within the cluster

3 X Estimated 90% restoration time for current conditions based on design standards and current inventory

Hazard Event and Performance Level Definitions

Event	Performance Level
Routine	**Hazard level is below the expected (design) level and occurs more frequently.** Buildings and systems should remain fully useable and not experience any significant damage that would disrupt the flow of normal living.
Expected (Design)	**Design hazard level.** Buildings and systems should remain functional at a level sufficient to support the response and recovery of the community. This level is based on the design level normally used for buildings.
Extreme	**Maximum considered occurrence based on the historic record and changes anticipated due to climate change.** Critical facilities and infrastructure systems should remain functional. Other building and infrastructure systems should perform at a level that protects the occupants and allows them to egress without assistance. In addition, emergency response plans should be based on scenarios that represent this extreme level.

Affected Area

Event	Definition
Localized	**Damage and lost functionality is contained within an isolated area of the community.** While the Emergency Operations Center (EOC) may open, it is able to organize needed actions within a few days and allow the community to return to normal operations and manages recovery.
Community	**Significant damage and loss of functionality is contained within the community, such that assistance is available from neighboring areas that were not affected.** The EOC opens, directs the response and turns recovery over to usual processes once the City governance structure takes over.
Regional	**Significant damage occurs beyond community boundaries.** Area needing emergency response and recovery assistance covers multiple communities in a region, each activating their respective EOCs and seeking assistance in response and recovery from outside the region.

Disruption Level

Event	Definition
Minor	**All required response and recovery assistance is handled within the normal operating procedures of the affected community agencies, departments, and local businesses with little to no disruption to the normal flow of living.** **Critical facilities and emergency housing are functional and community infrastructure is functional with local minor damage.**
Moderate	**Community EOC activates and all response and recovery assistance is orchestrated locally, primarily using local resources.** **Critical facilities and emergency housing are functional and community infrastructure is partially functional.**
Severe	**Response and recovery efforts are beyond the authority and capability of local communities that are affected and outside coordination is needed to meet the needs of the multiple jurisdictions affected.** **Professional services and physical resources are needed from outside of the region. Critical facilities and emergency housing have moderate damage but can be occupied with repairs, community infrastructure is not functional for most needs.**

Example Community Performance Recovery Goals

Functional Category
Critical Facilities
Emergency Housing
Neighborhoods
Community

Recovery Time
Desired
30%
60%
90%
Actual - X

Disturbance		
(1)	Hazard	Any
	Hazard Level	Expected
	Affected Area	Community
	Disruption Level	Moderate

Restoration times		
(2)	30%	Restored
	60%	Restored
	90%	Restored
(3)	X	Current

Functional Category: Cluster	Overall Recovery Time for Hazard and Level Listed								
	Phase 1 – Response			Phase 2 – Workforce			Phase 3 – Community		
	Days 0	Days 1	Days 1-3	Wks 1-4	Wks 4-8	Wks 8-12	Mos 4	Mos 4-36	Mos 36+
Critical Facilities									
Buildings	90%								
Transportation		90%							
Energy						90%			
Water			90%						
Waste Water				90%					
Communication	90%								
Emergency Housing									
Buildings			90%						
Transportation			90%						
Energy							90%		
Water			90%						
Waste Water				90%					
Communication				90%					
Housing/Neighborhoods									
Buildings				90%					
Transportation					90%				
Energy							90%		
Water				90%					
Waste Water					90%				
Communication				90%					
Community Recovery									
Buildings								90%	
Transportation								90%	
Energy							90%		
Water				90%					
Waste Water								90%	
Communication				90%					

Footnotes:

1 Specify hazard being considered
Specify level -- Routine, Expected, Extreme
Specify the size of the area affected - localized, community, regional
Specify severity of disruption - minor, moderate, severe

2 30% 60% 90% Restoration times relate to number of elements restored within the cluster

3 X Estimated 90% restoration time for current conditions based on design standards and current inventory

Performance Levels for After-Event Evaluation

Category	Buildings Performance Standard
A	**Safe and Operational** Essential facilities such as hospitals and emergency operations centers
B	**Safe and usable during repair** “Shelter in place” residential buildings, neighborhood businesses and services, and buildings needed for emergency operations
C	**Safe and not usable** The minimum needed to save lives. These facilities may be repaired or needed to restore the economy.
D	**Unsafe – partial or complete collapse** Damage that will lead to casualties

Performance Levels for After-Event Evaluations

Category	Infrastructure System Performance Standard
I	Resume 100% service within days
II	Resume 90% service within weeks and 100% within months
III	Resume 90% service within months and 100% within years

Interdependencies

- Social/Organizational Systems
  - Government, Emergency Response, Neighborhoods, Workforce, etc.
- Building Clusters
  - Critical Facilities
  - Emergency Housing
  - Workforce / Neighborhoods
  - Community Recovery
- Infrastructure Systems
  - Transportation
  - Power
  - Communication
  - Water & Wastewater

Sector Interdependencies

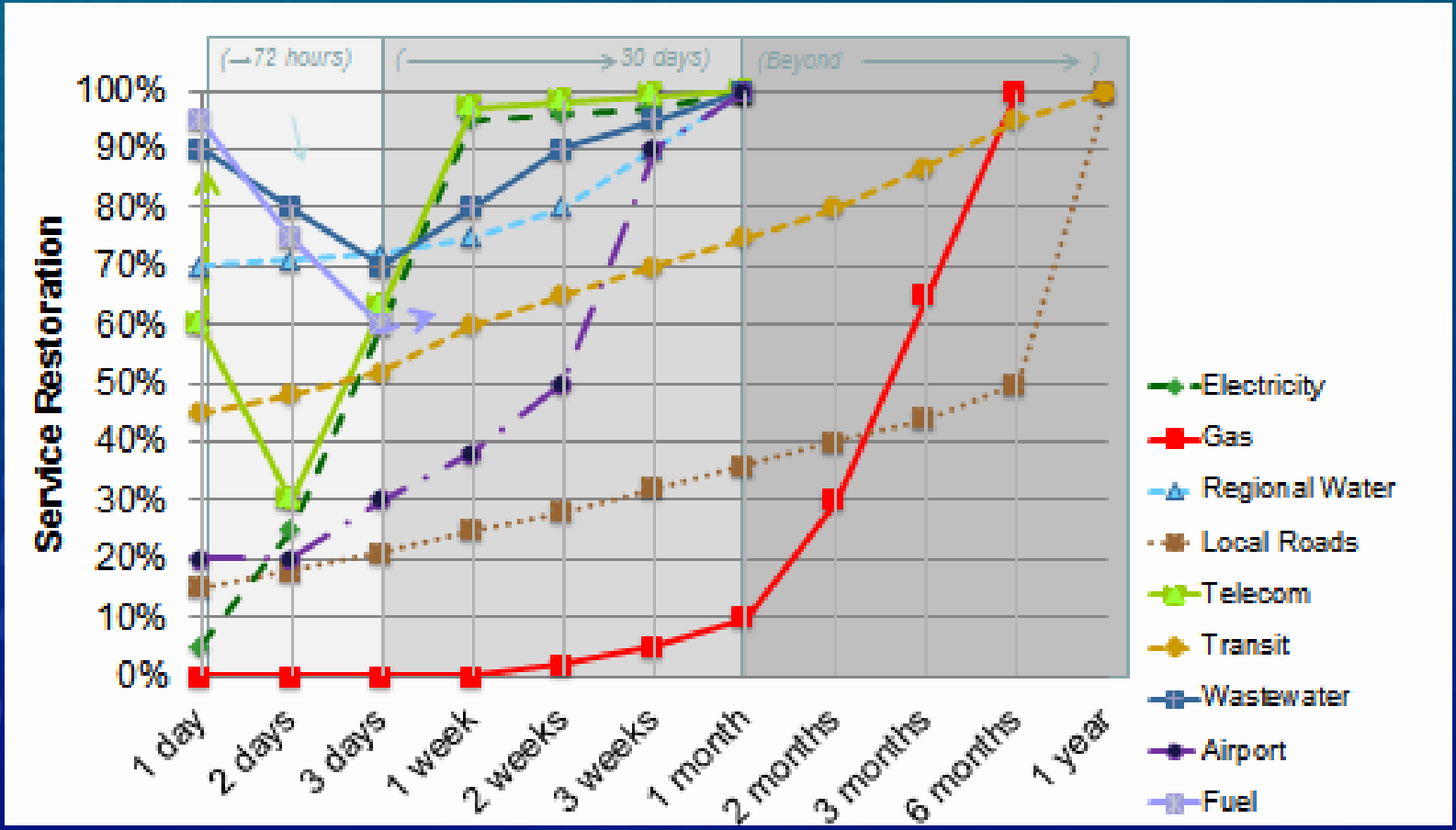
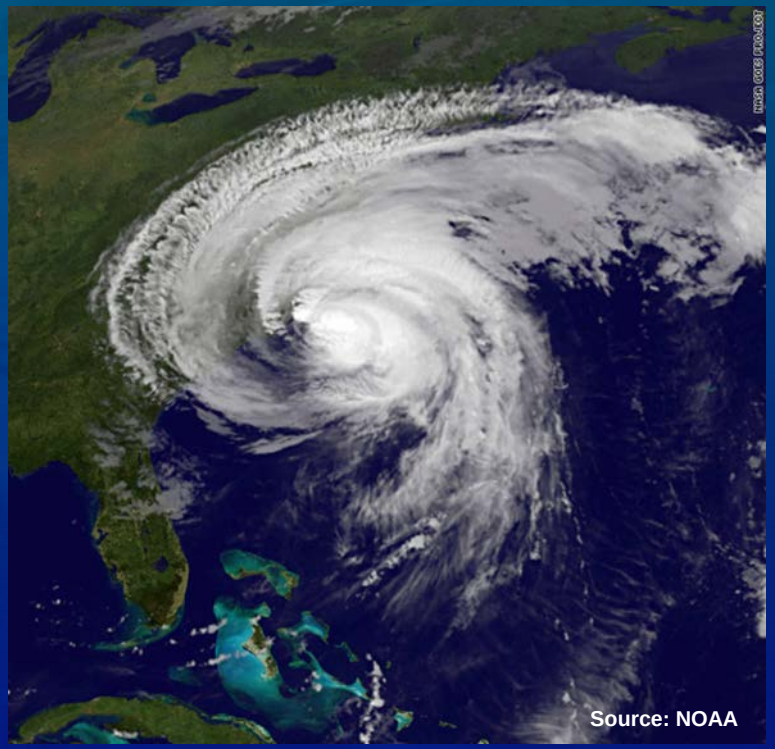


Figure 4-1. Potential Service Restoration Timeframes following a Scenario M 7.9 Earthquake on the San Andreas Fault. (CCSF Lifelines Council 2014)

A Successful Workshop will…

- Advance the Framework scope and content
- Engage you as stakeholders for continued input
- Develop interest for membership in the DRSP



Questions ?

Hazard Events

Hazards	Types and Effects
Wind	Storms, hurricane, tornadoes
Earthquake	Ground shaking, faulting, landslides, liquefaction
Inundation	Riverine flooding, coastal flooding, tsunami
Fire	Building, wildfire
Snow/ Rain	Freeze/thaw
Man-made	Blast, vehicular impact

Pathway to Community Resilience

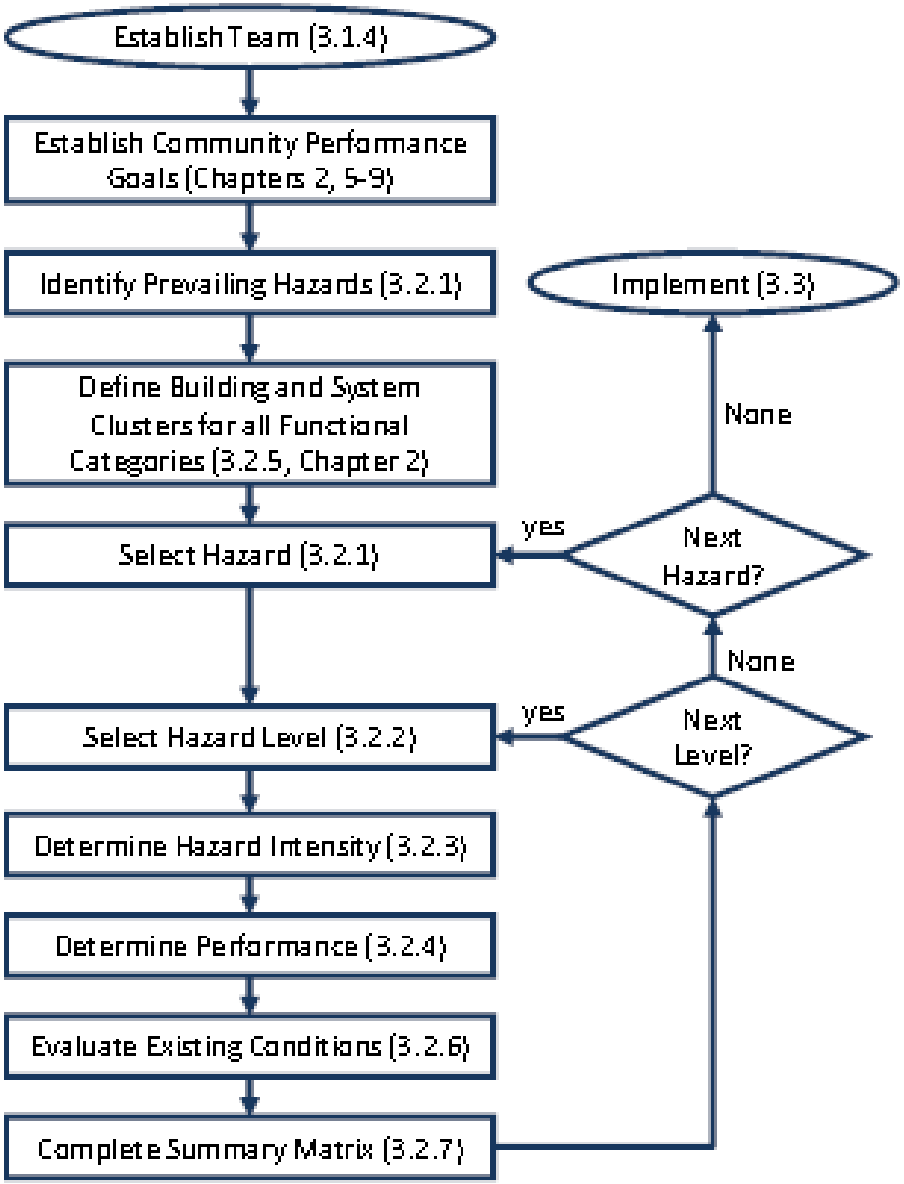


Figure 3-1: Flow Chart for Developing Resilience Plan