# Introduction to Disaster Risk Reduction as a Foundation of Community Resilience

NHMA
Natural Hazard Mitigation Association

DISASTER
RISK REDUCTION
Ambassador Curriculum

# Welcome!

**Edward A. Thomas, Esq.**

**Donna Boyce, J.D.**

# Community Resilience and Disaster Risk Reduction

Photo courtesy of Elisa T. Harrison; Elliott Bay, Seattle WA

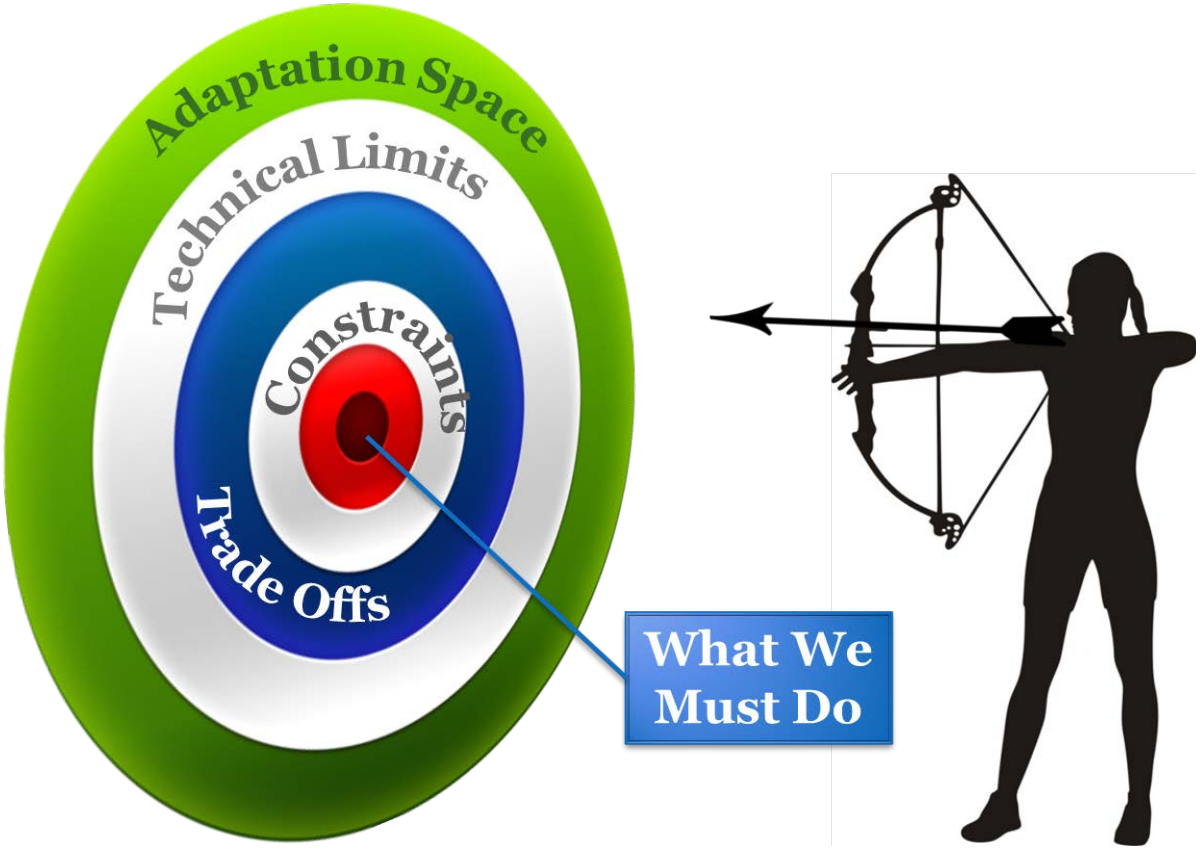
# Learning Objectives

1. Define community resilience and disaster risk reduction
2. Define mitigation and climate adaptation from a community perspective
3. Explain the role of disaster risk reduction as a foundation of community resilience

# Resilience and Disaster Risk Reduction

Resilience and climate adaptation are moving targets due to:

- Climate
- Population
- Type of development
- Other factors



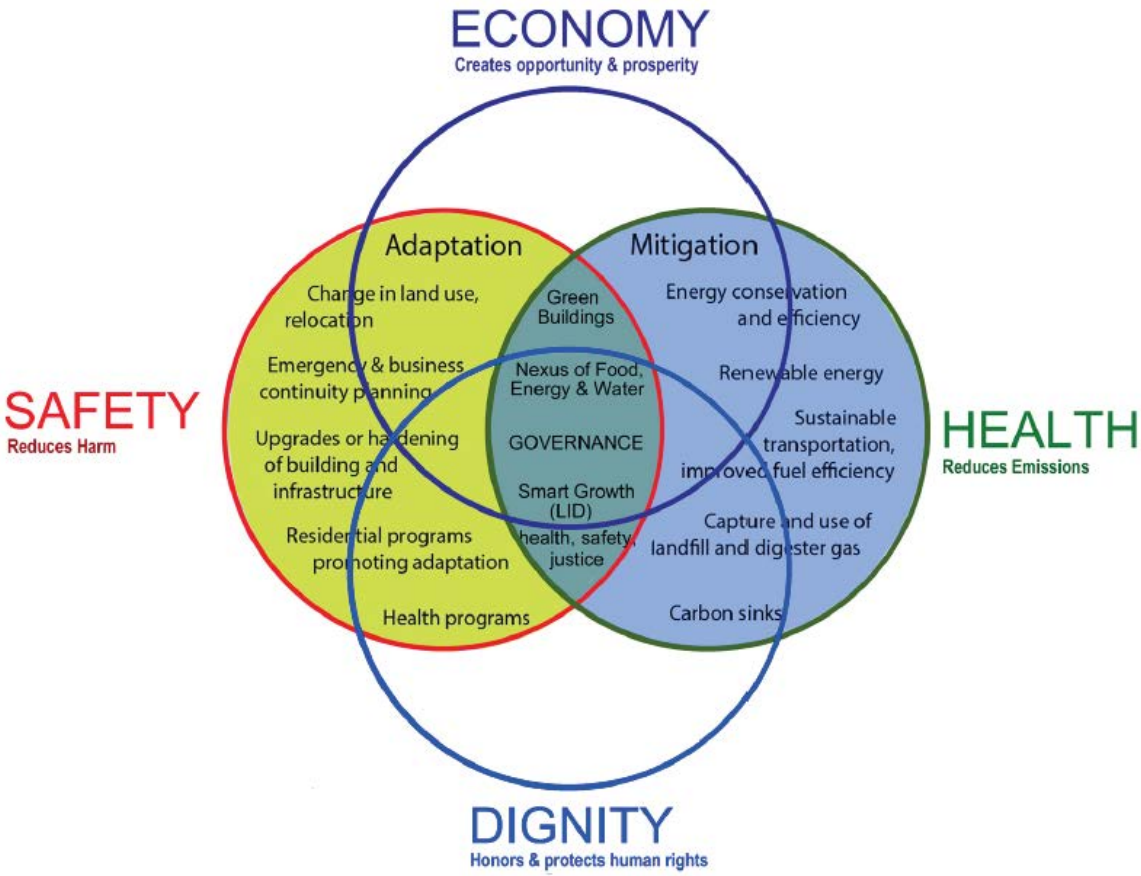

**Think of the arrows being shot at the target as development resources**

# What is Community Resilience?

"the capacity of a community to anticipate, plan for, and mitigate the risks — and seize the opportunities — associated with environmental and social change"

Richard G. Wilkinson and Kate Pickett, The Spirit Level: Why More Equal Societies Almost Always Do Better, (New York: Bloomsbury Press, 2009)

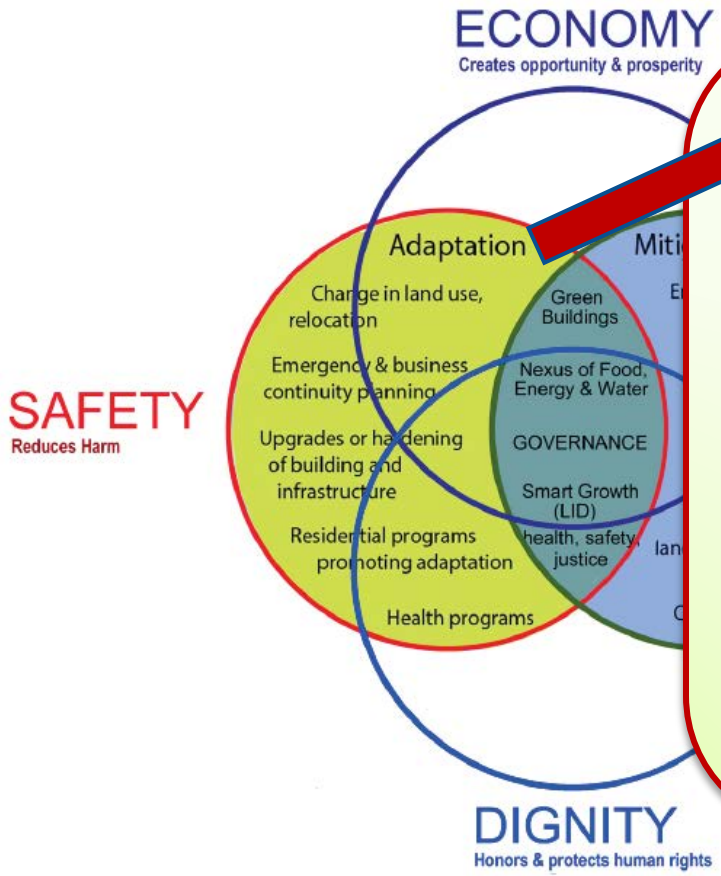
# Four Circles of Resilience and Sustainability




- **Economy:** Creates opportunity and prosperity
- **Health:** Reduces emissions
- **Dignity:** Honors and protects human rights
- **Safety:** Reduces harm

Credit: The OARS List (Organizations Addressing Resilience and Sustainability) http://www.theoarslist.com/ - Used with permission

# Four Circles of Resilience and Sustainability (cont.)

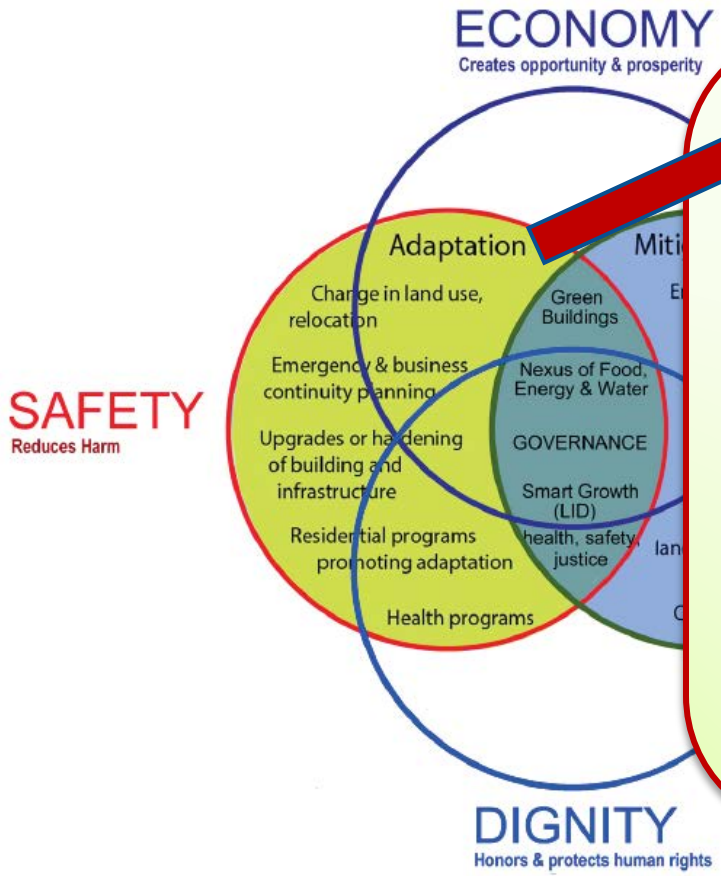



## Adaptation

***What is climate adaptation?***

Credit: The OARS List (Organizations Addressing Resilience and Sustainability) http://www.theoarslist.com/ - Used with permission

# Four Circles of Resilience and Sustainability (cont.)



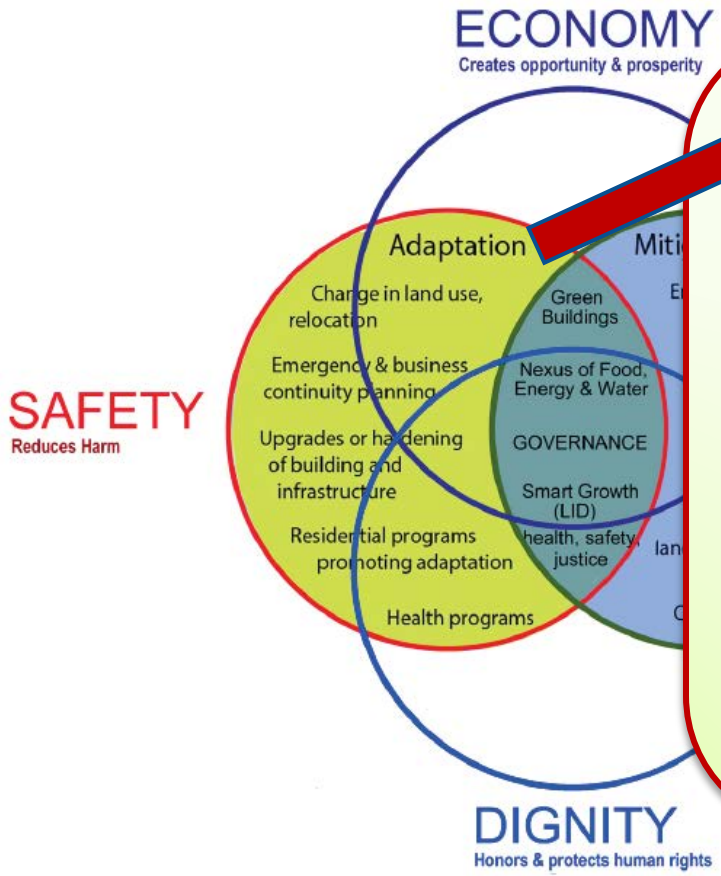

## Adaptation

***What is climate adaptation?***

- Actions taken to help communities cope with changing climate condition
- Actions taken to lower the risks posed by the consequences of climatic changes

Credit: The OARS List (Organizations Addressing Resilience and Sustainability) http://www.theoarslist.com/ - Used with permission

# Four Circles of Resilience and Sustainability (cont.)

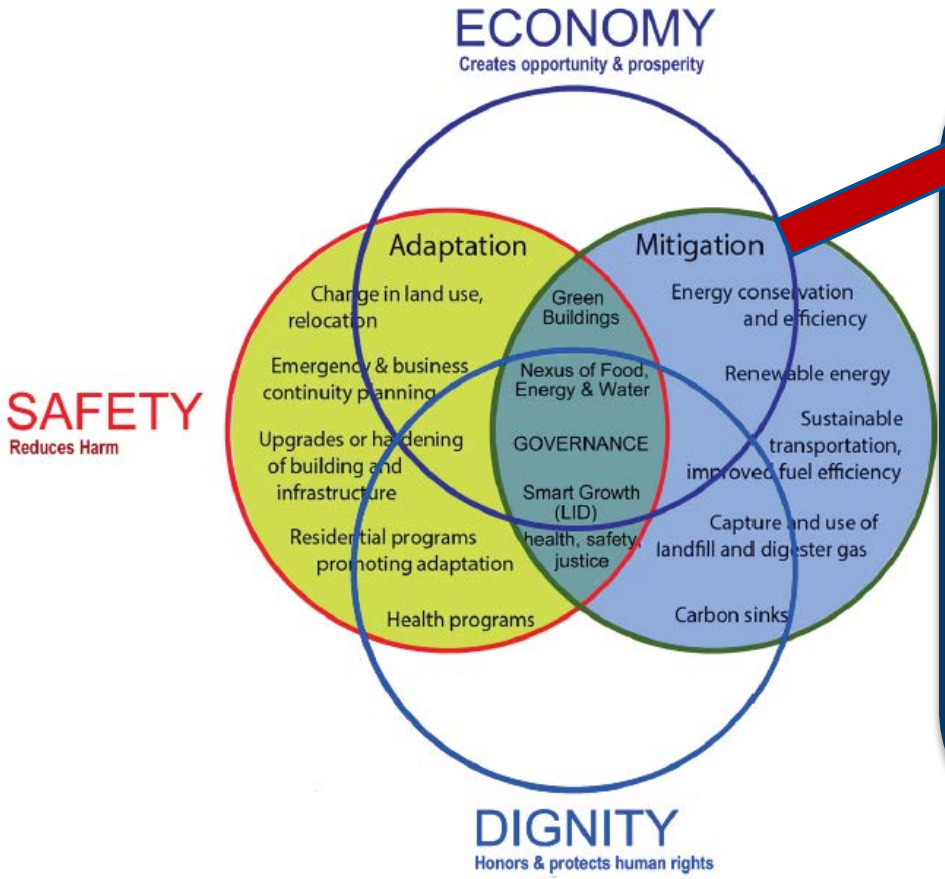



## Adaptation Actions

- Change in land use, relocation
- Emergency and business continuity planning
- Upgrades or hardening of building and infrastructure
- Residential programs promoting adaptation
- Health programs

Credit: The OARS List (Organizations Addressing Resilience and Sustainability) http://www.theoarslist.com/ - Used with permission

# Four Circles of Resilience and Sustainability (cont.)

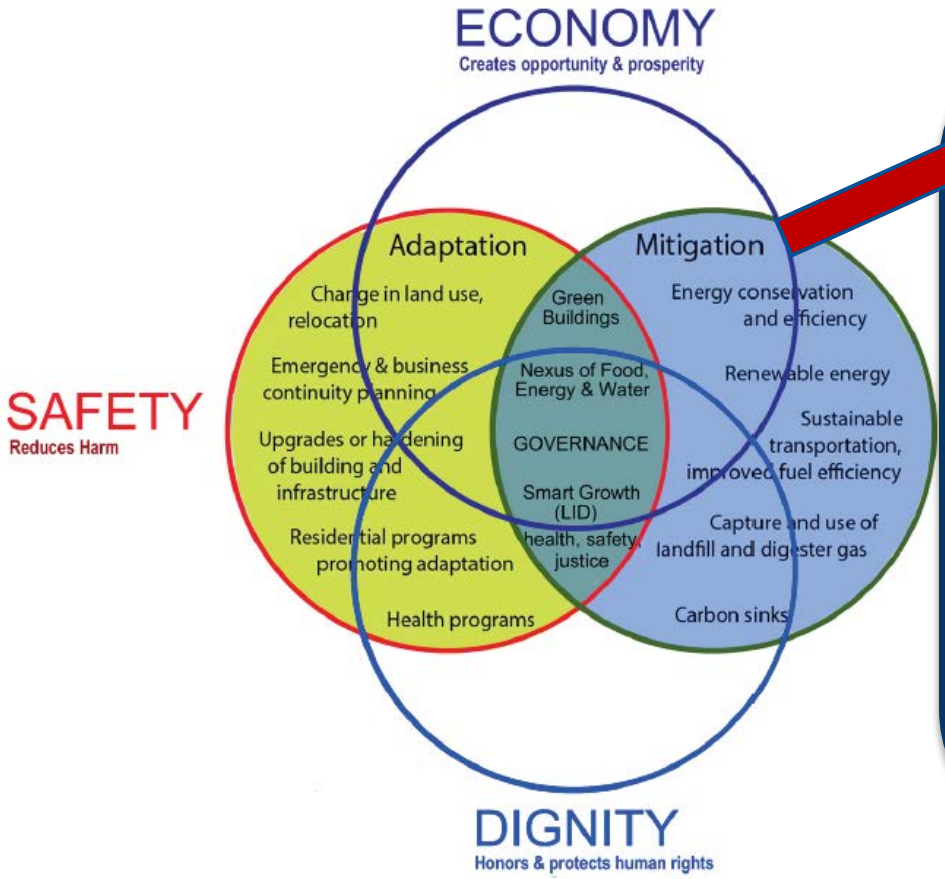



## Mitigation

***What is mitigation?***

Credit: The OARS List (Organizations Addressing Resilience and Sustainability) http://www.theoarslist.com/ - Used with permission

# Four Circles of Resilience and Sustainability (cont.)




## Mitigation

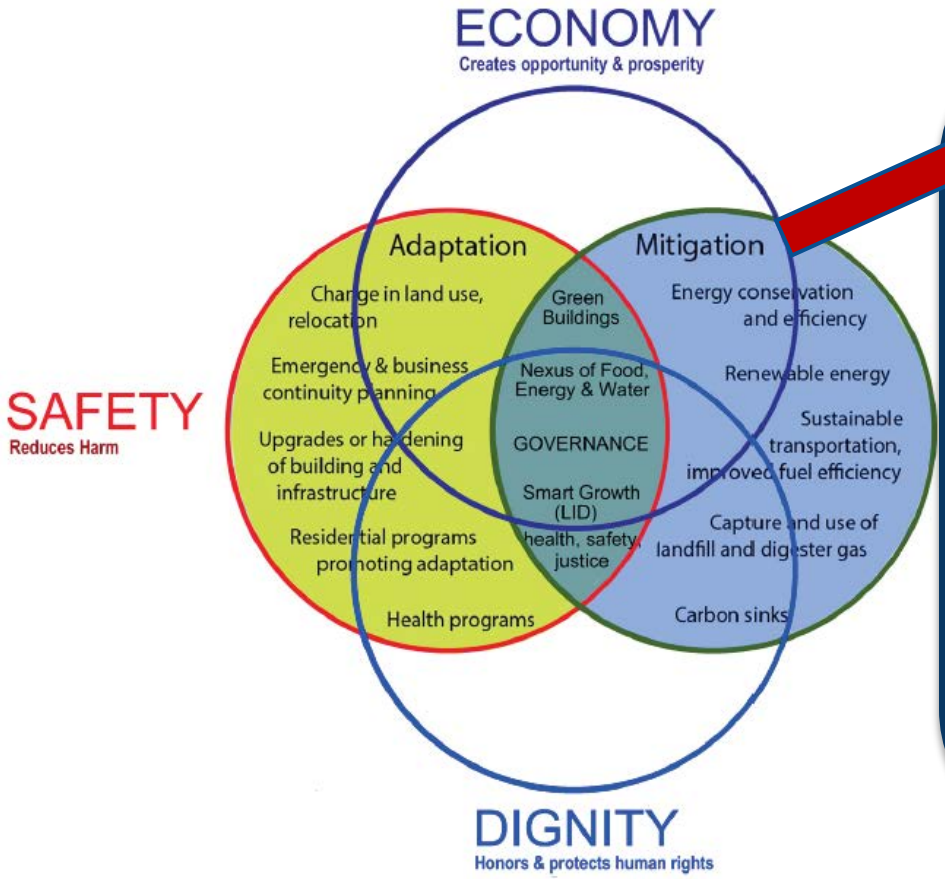
***What is mitigation?***

"Mitigation is the effort to reduce loss of life and property by lessening the impact of disasters"

~ Federal Emergency Management Agency (FEMA)

Credit: The OARS List (Organizations Addressing Resilience and Sustainability) http://www.theoarslist.com/ - Used with permission

# Four Circles of Resilience and Sustainability (cont.)



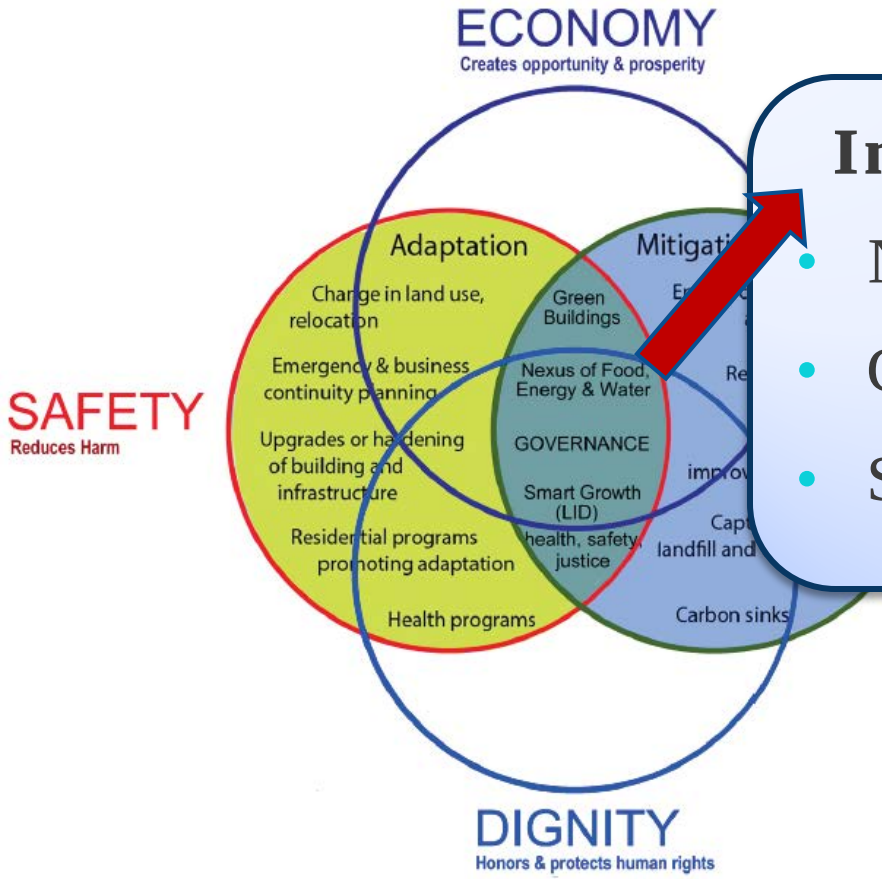

## Mitigation Actions

- Energy conservation and efficiency
- Renewable energy
- Sustainable transportation, improved fuel efficiency
- Capture and use of landfill and digester gas
- Carbon sinks

Credit: The OARS List (Organizations Addressing Resilience and Sustainability) http://www.theoarslist.com/ - Used with permission

DISASTER RISK REDUCTION Ambassador Curriculum

# Four Circles of Resilience and Sustainability (cont.)




**Intersection of the 4 Circles**

- Nexus of food, energy, water
- Governance
- Smart growth

Credit: The OARS List (Organizations Addressing Resilience and Sustainability) http://www.theoarslist.com/ - Used with permission

# Disaster Risk Reduction

Goal is to reduce the risk to life and property, which includes **existing** structures and **future** construction, in the **pre and post-disaster** environments

Legislation

Local Ordinances

Mitigation Projects

Building Practices

Land Use

Federal Emergency Management Agency (FEMA):
https://www.fema.gov/what-mitigation

# Who is Responsible for the Safety and Security of Your…

- Family?
- Home?
- Business?
- Community?
- Government?

Photo: Eliud Echevarria / FEMA.gov

# Disaster Risk Reduction (cont.)

## FEMA Strategic Plan 2014-2018


### STRATEGIC PRIORITY 4

ENABLE DISASTER RISK REDUCTION NATIONALLY

★★★

**Key Outcomes**

- The whole community uses the best-available data and analytic tools to make better risk-informed decisions before, during, and after disasters.
- Whole community partners make resilient investments in development and rebuilding.
- Congressionally mandated reforms are implemented to advance flood insurance affordability, financial stability of the National Flood Insurance Program, and reduction of the risks and consequences of flooding nationwide.

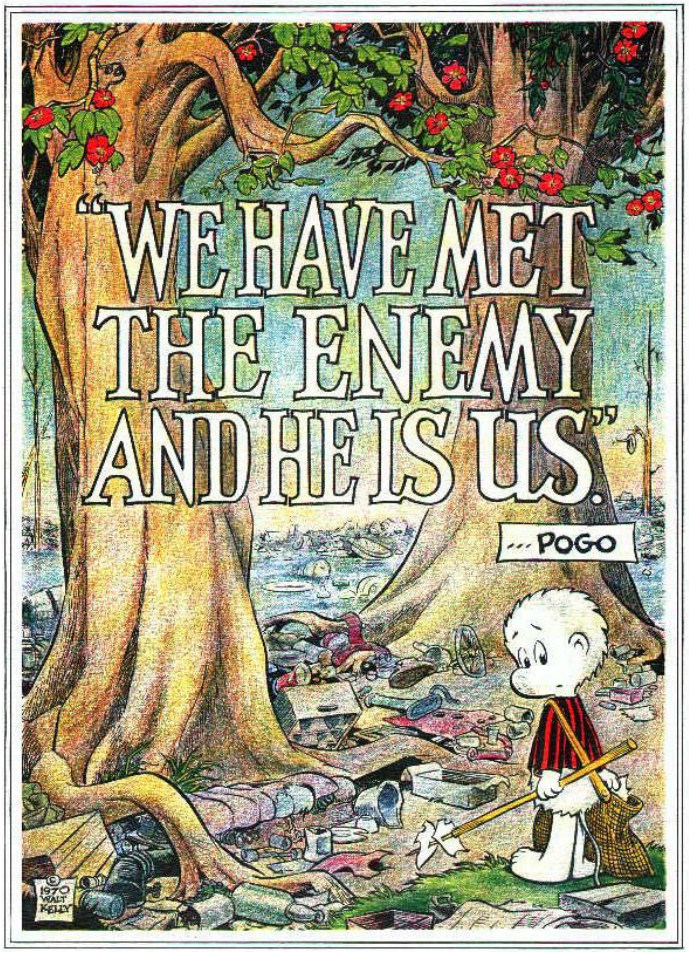
# Does Mother Nature Cause Disasters?

**"Floods are acts of nature; but flood losses are largely acts of man."**

~ Dr. Gilbert F. White

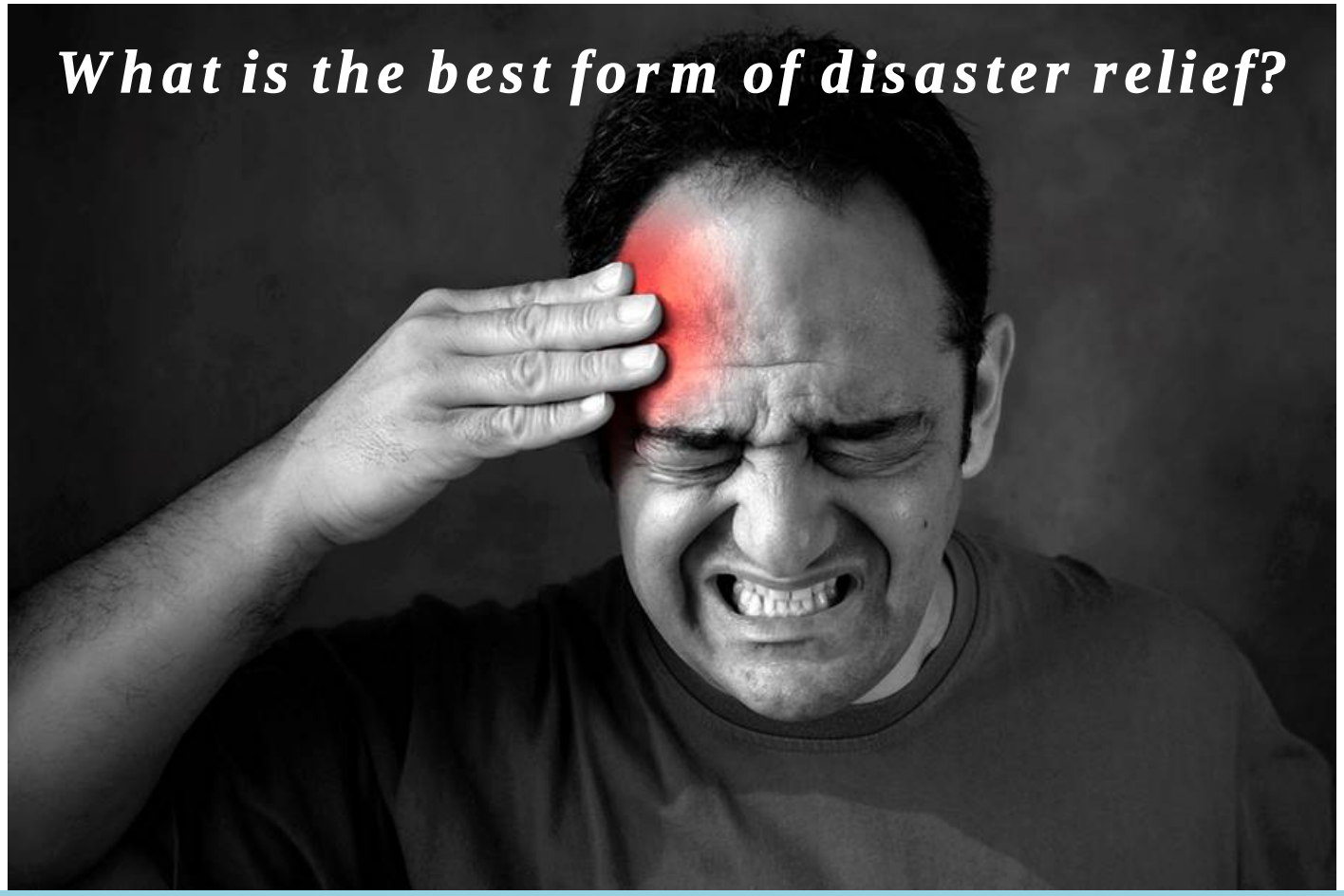
Photo: Floodwater surrounds homes in Nichols, South Carolina following Hurricane Matthew

# We Have Met the Enemy…




The cause of devastation and misery following predictable natural processes is not Nature, but rather *human engineering, architecture, and construction with narrow-focus planning*

# Fundamental Thought




Migralex.com

# Fundamental Thought (cont.)

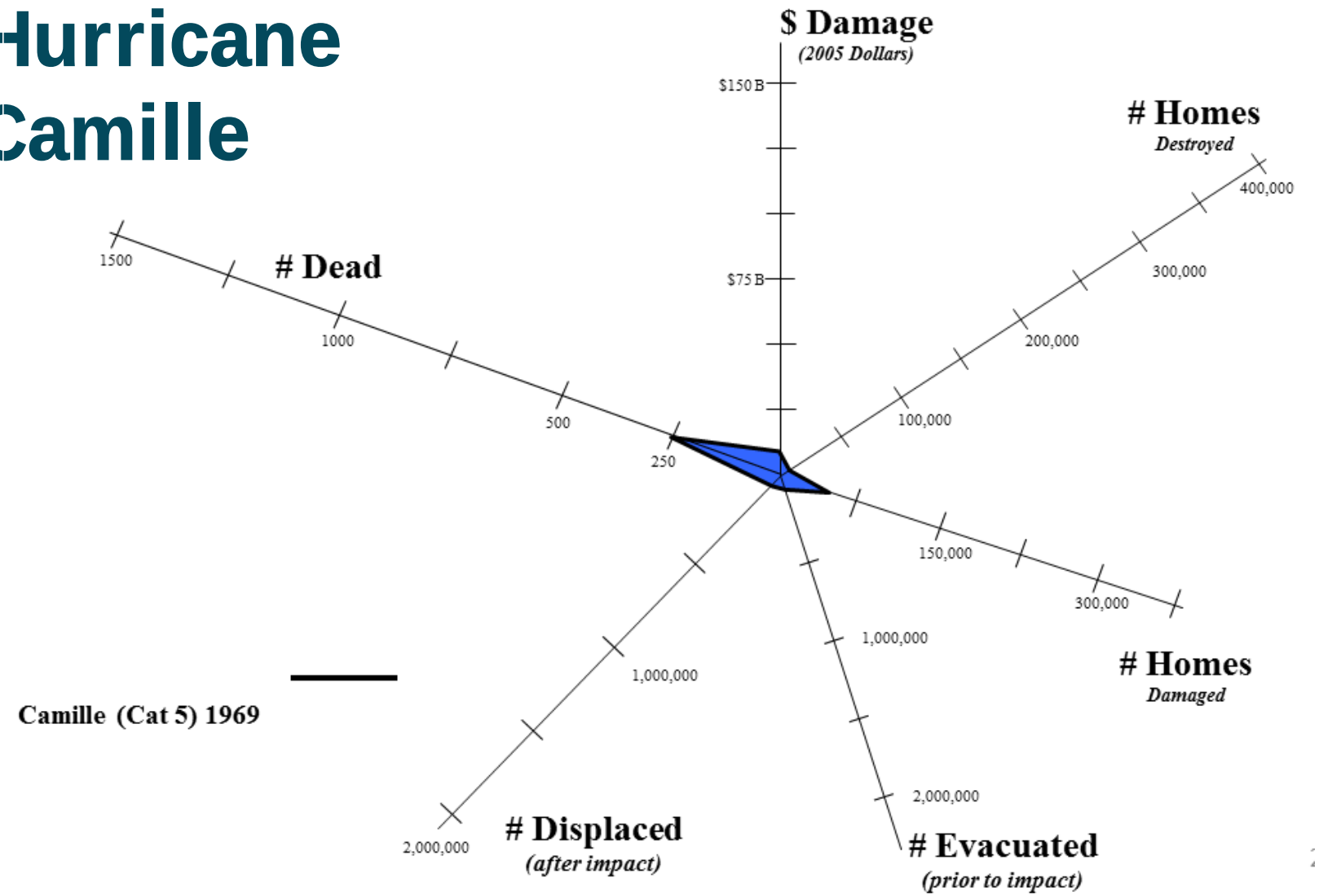
***No disasters at all!***

# Trends in Damages Following Natural Events

- Wind, flood, earthquake, wildfire losses are increasing dramatically
- Sea level rise is creating more challenges
- Climate uncertainty, variability, and change may be creating even more challenges
- Demographic trends indicate great future challenges

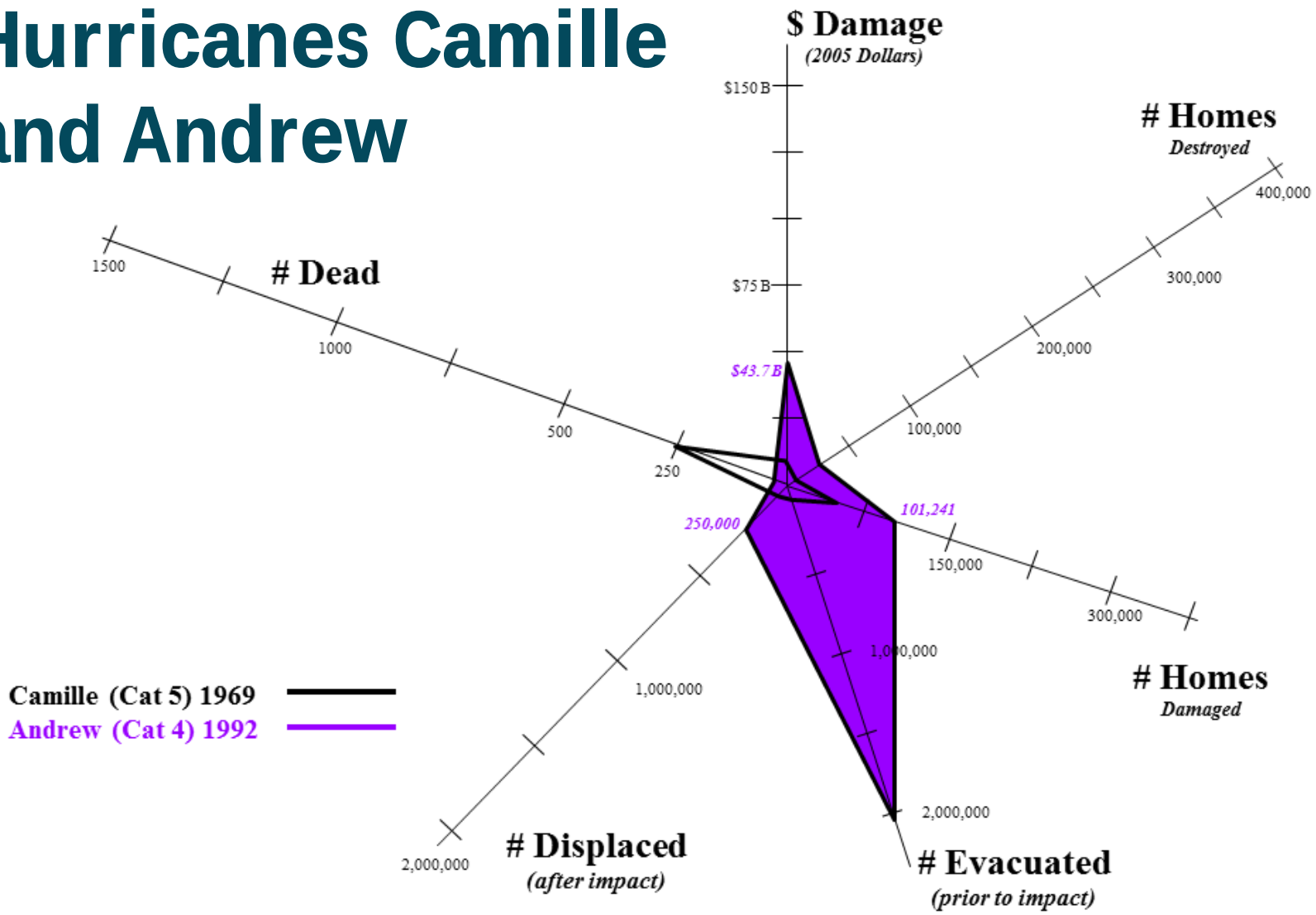
Prepare for wildfires before they happen. Learn more at https://www.ready.gov/wildfires. Photo by Jana Baldwin - Mar 15, 2016

# Hurricane Camille



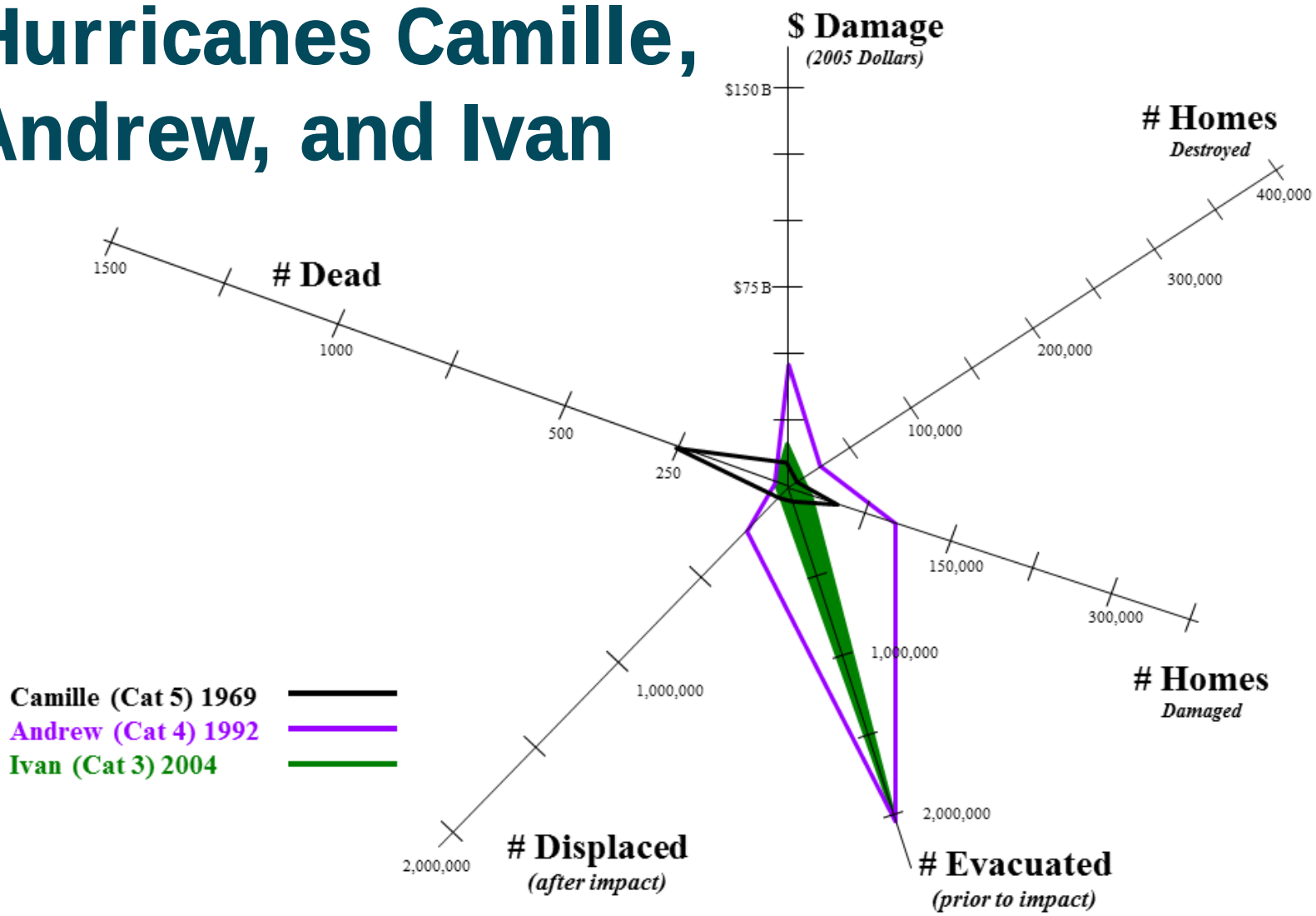

Department of Defense Photo - Courtesy of Jim Joseph, former Director of Pennsylvania Emergency Management Agency

# Hurricanes Camille and Andrew



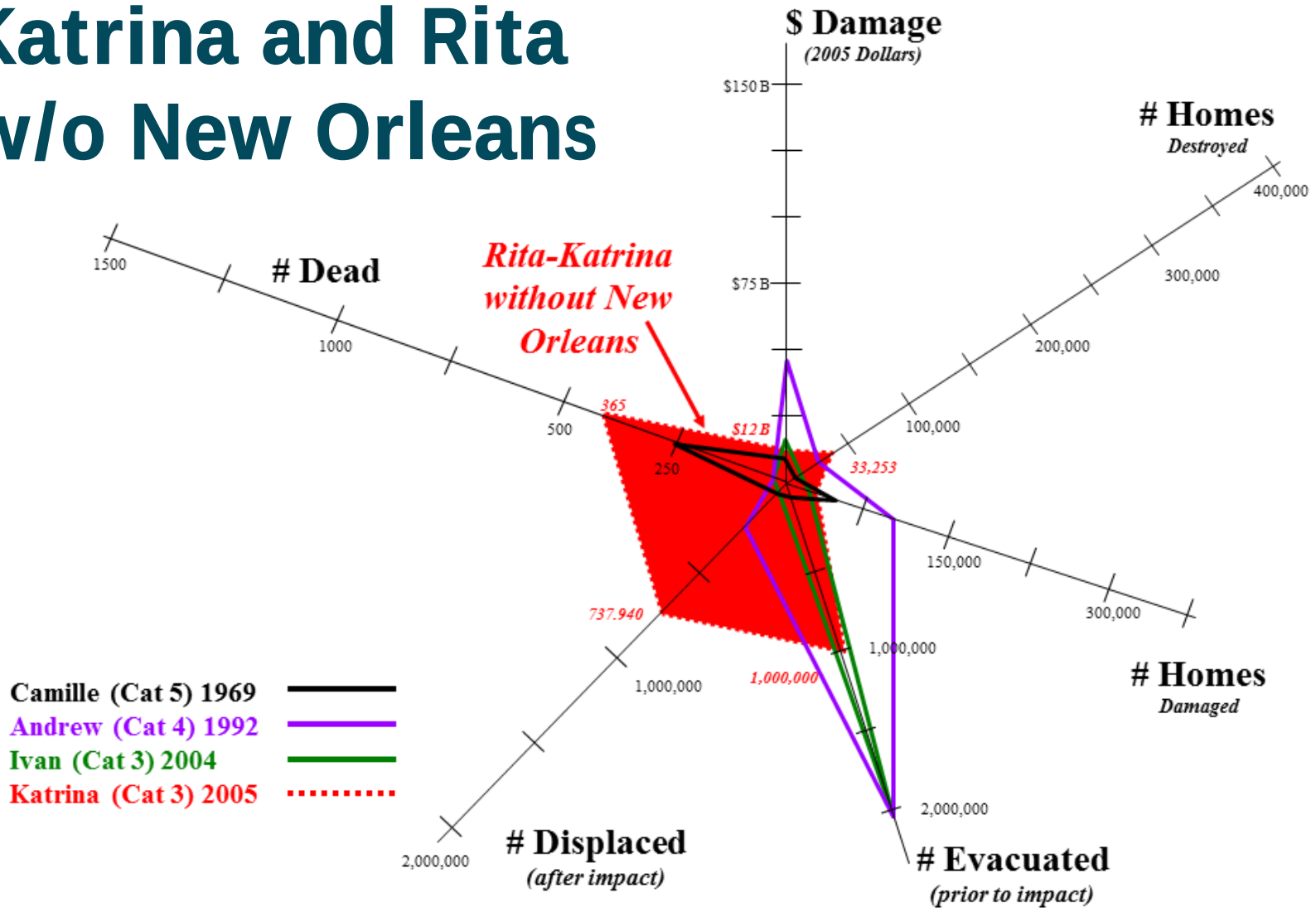

Department of Defense Photo - Courtesy of Jim Joseph, former Director of Pennsylvania Emergency Management Agency

# Hurricanes Camille, Andrew, and Ivan



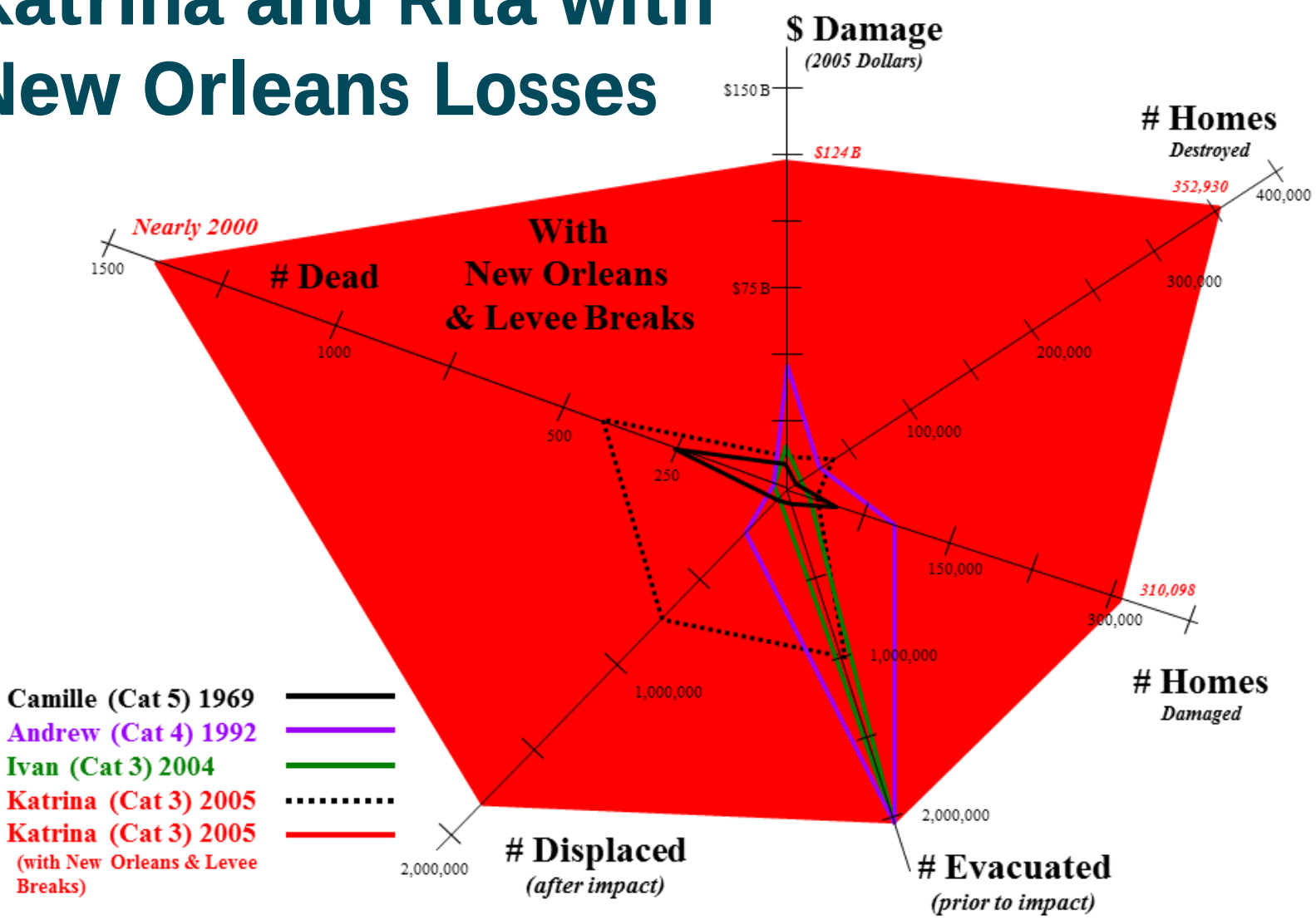

Department of Defense Photo - Courtesy of Jim Joseph, former Director of Pennsylvania Emergency Management Agency

# Katrina and Rita w/o New Orleans



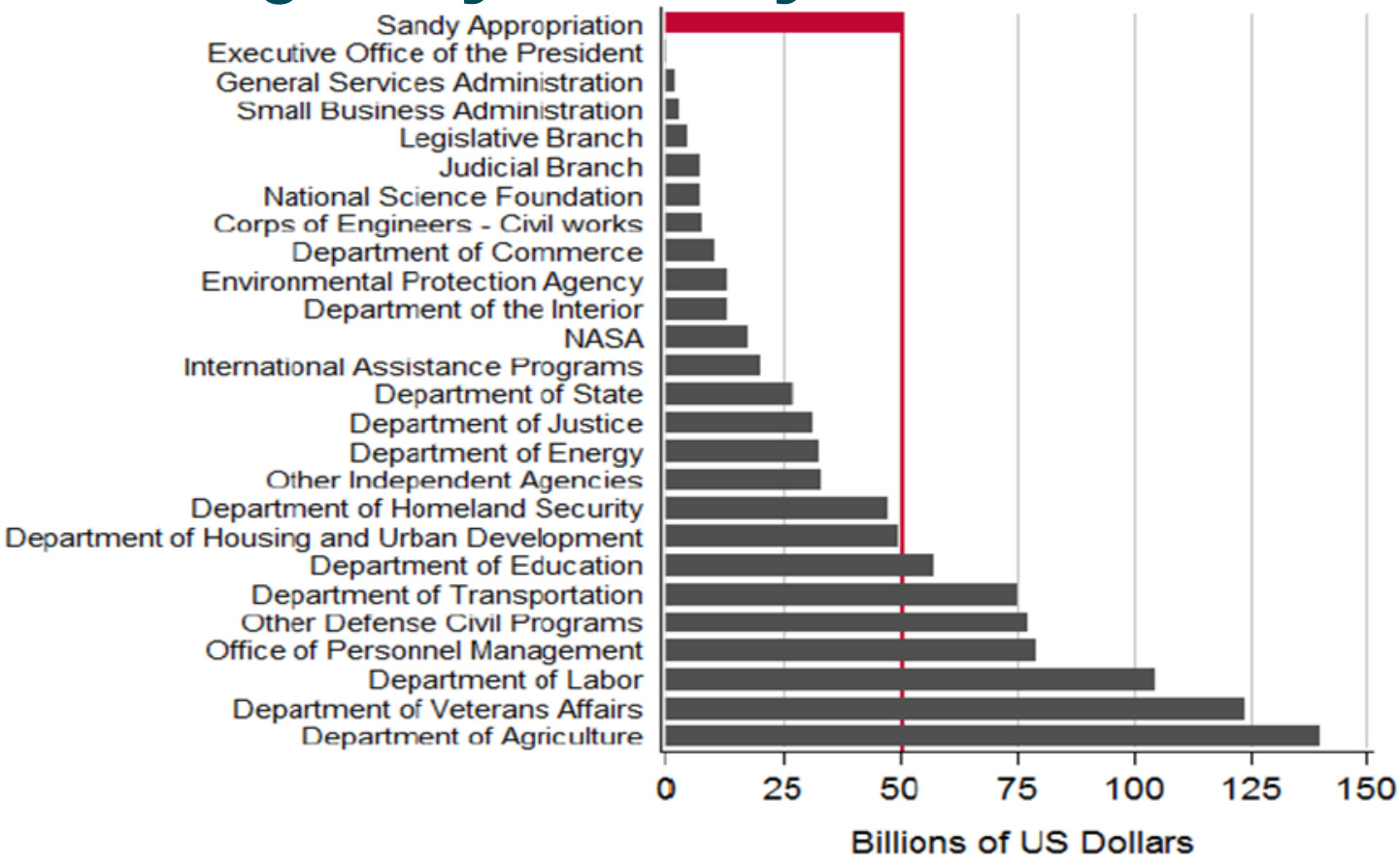

Department of Defense Photo - Courtesy of Jim Joseph, former Director of Pennsylvania Emergency Management Agency

# Katrina and Rita with New Orleans Losses

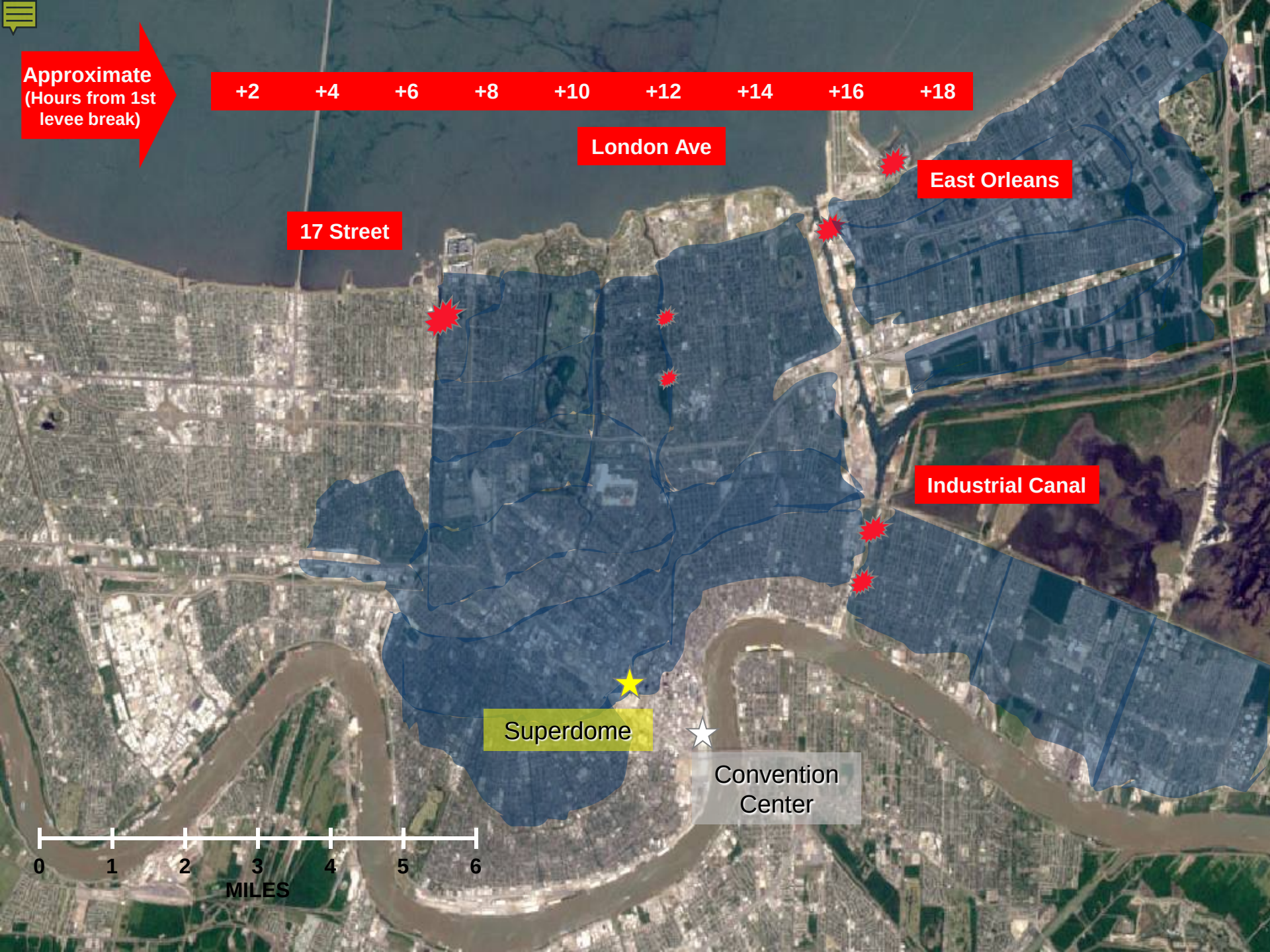



Department of Defense Photo - Courtesy of Jim Joseph, former Director of Pennsylvania Emergency Management Agency

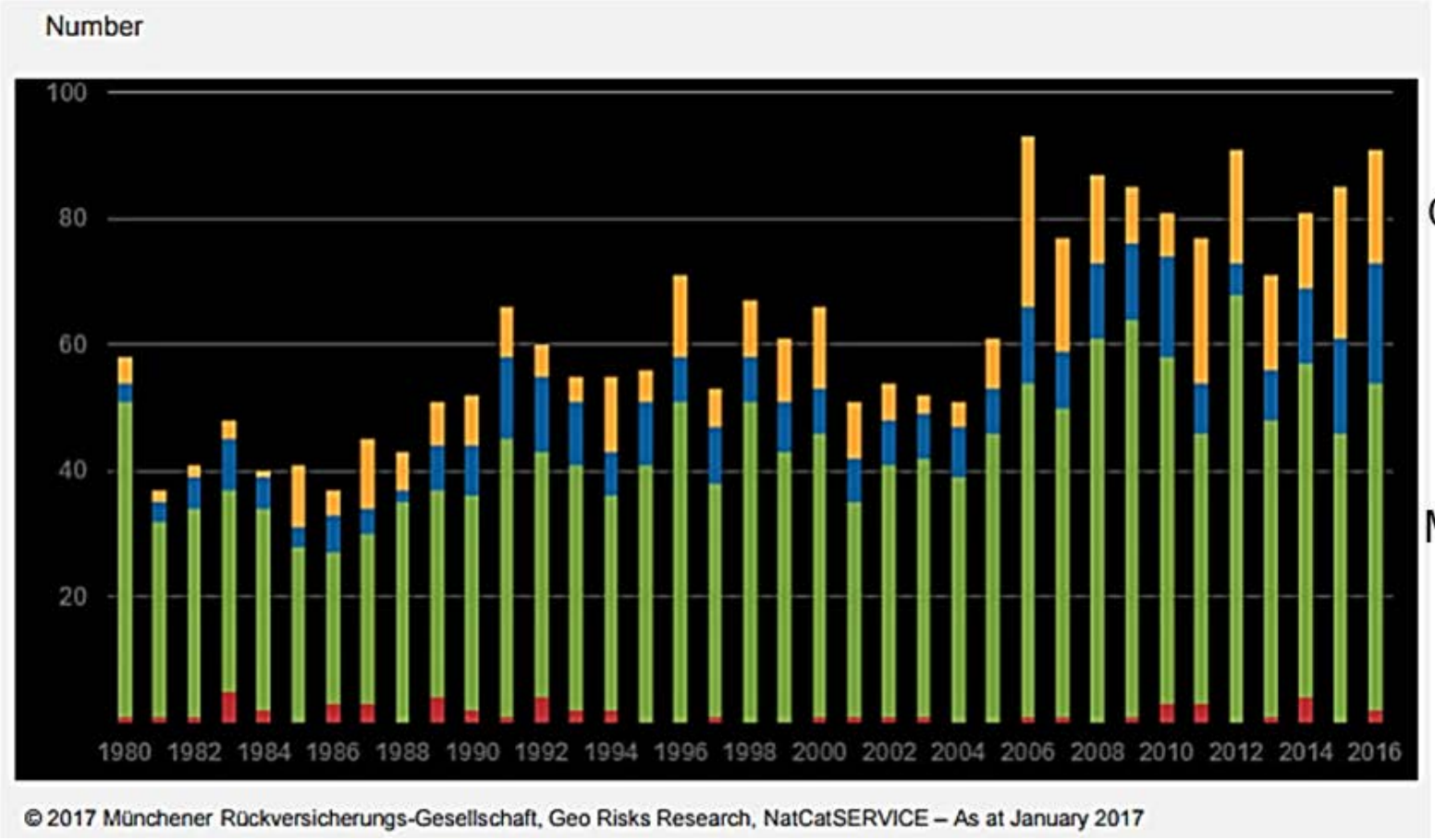
# Sandy Supplemental Compared with 2012 Agency Outlays




Source: Fiscal Year 2014 Historical Tables Budget of the US OMB, Wash. DC


Approximate
(Hours from 1st levee break)
+2
+4
+6
+8
+10
+12
+14
+16
+18
London Ave
17 Street
East Orleans
Industrial Canal
Superdome
Convention Center
0
1
2
3
4
5
6
MILES

# Loss Events in the U.S. (1980-2016)




Events

Climatological

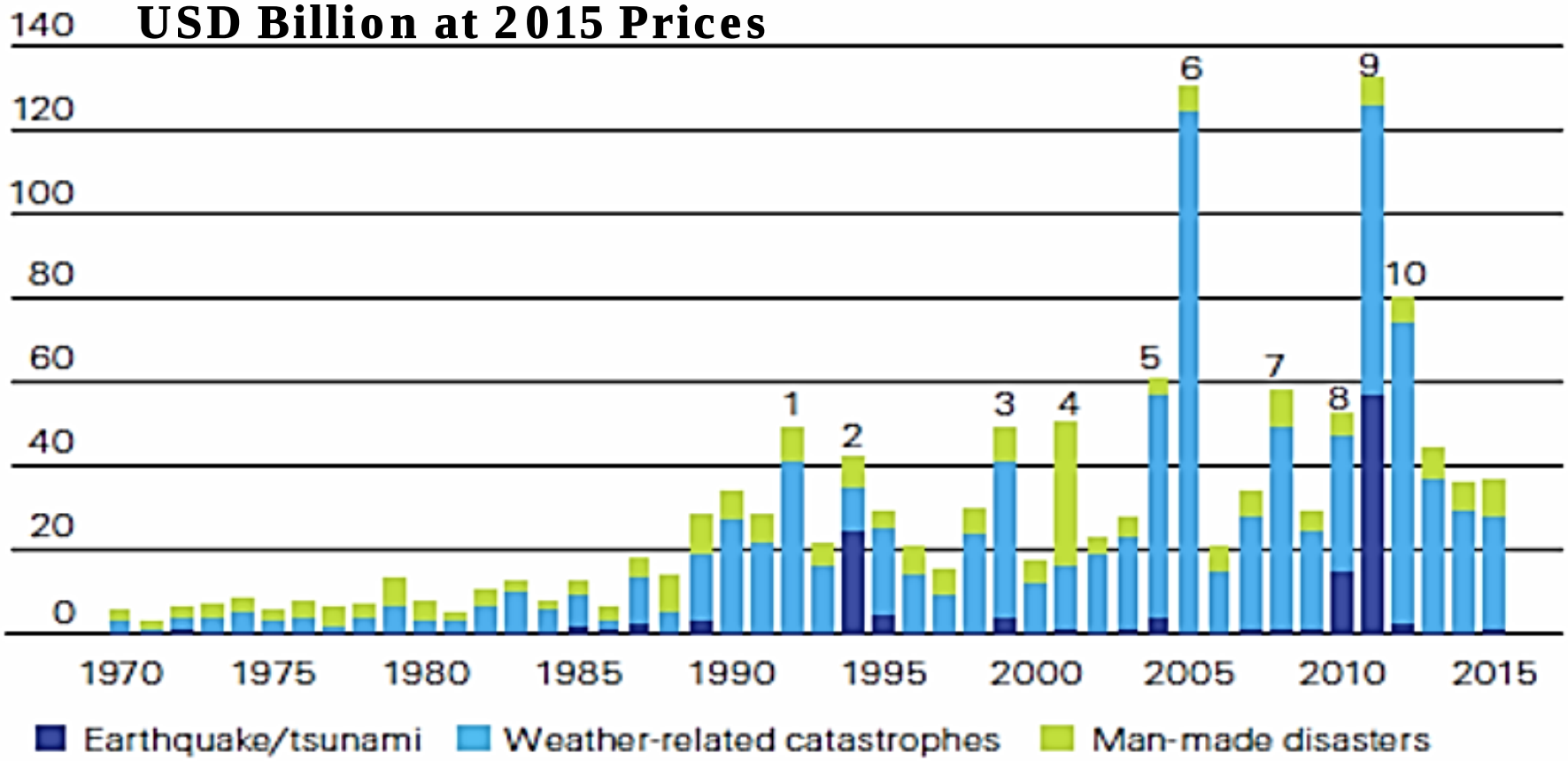
Hydrological

Meteorological

Geophysical

Source: Munich RE, NatCatSERVICE, Loss Events in the U.S. 1980-2016

# Insured Catastrophe Losses Worldwide

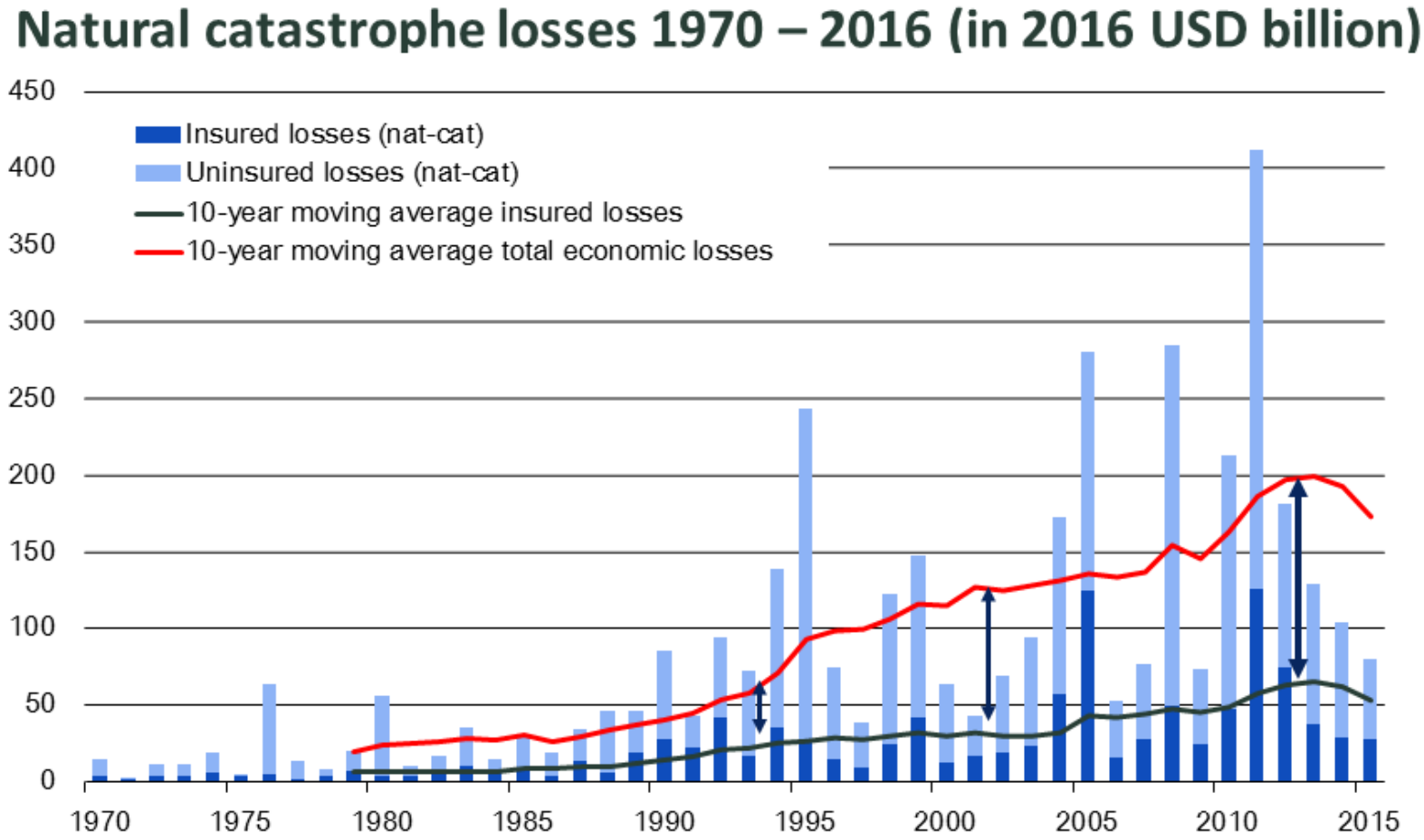



Source: Swiss Re Economic Research & Consulting and Cat Perils.

Source: Swiss Re, *Natural Catastrophes and Man-Made Disasters in 2015*
http://media.swissre.com/documents/sigma1_2016_en.pdf

# Uninsured Losses from Natural Catastrophes

## A Growing Burden for Individuals, Businesses, and Government




Source: Swiss Re Economic Research & Consulting and Cat Perils

# Cost of Disasters

***How much do you think the Federal Government spent on disasters since 1983?***

# Cost of Disasters (cont.)

***How much do you think the Federal Government spent on disasters since 1983?***

- Billion-Dollar Weather and Climate Disasters: Overview, NOAA
- Focusing on Disaster Costs Before Rather Than After They Happen, Insurance Journal, August 6, 2014

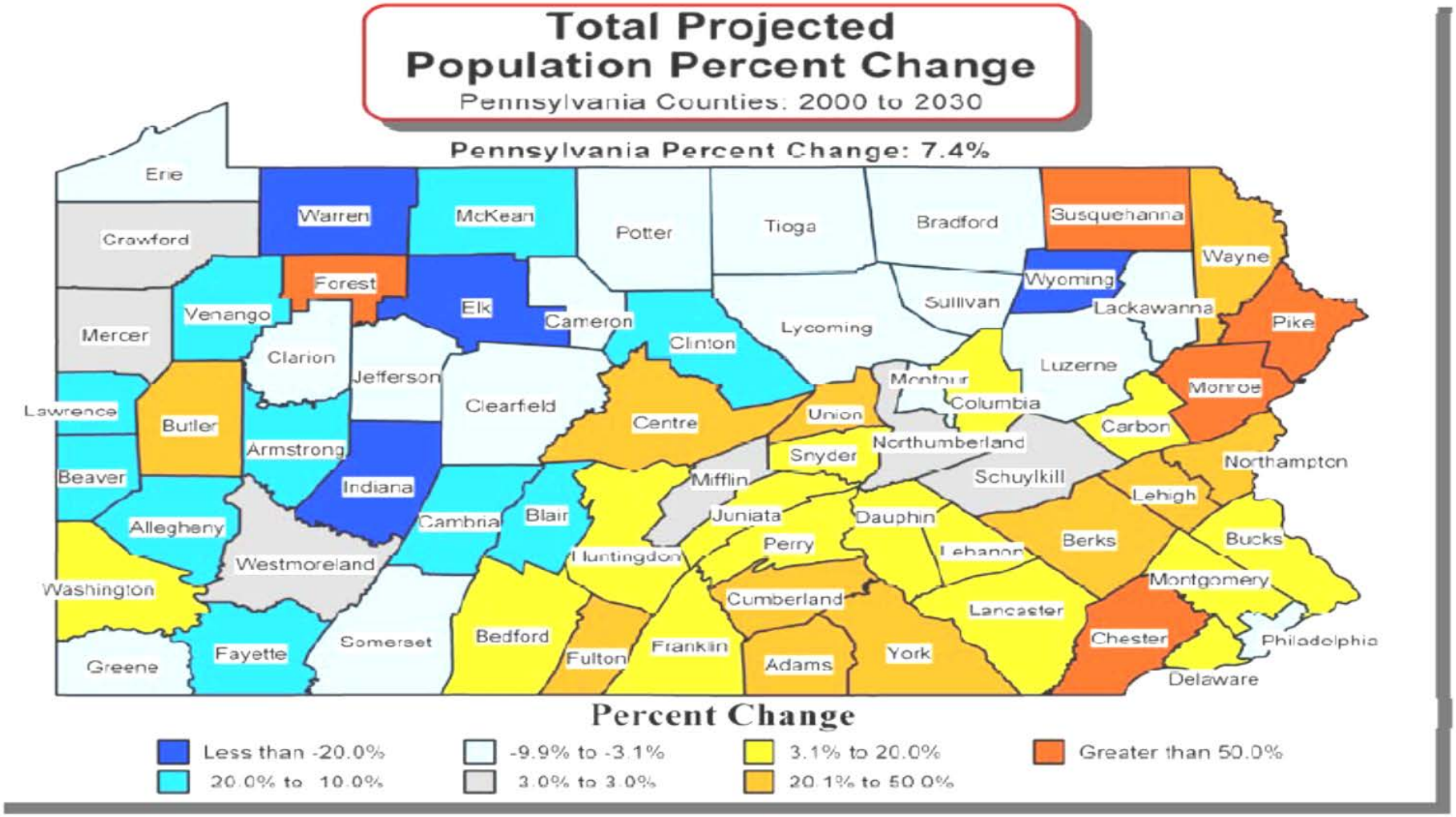
# Demographic Trends: The Future

"**More than half** of the built environment of the United States we will see in 2050 **does not exist today**."

~ Dr. Arthur "Chris" Nelson, FAICP at Rocky Mountain Land Use Institute, March 13, 2015

Update on information contained in: *Journal of the American Planning Association*, Vol. 72, No. 4, Autumn 2006

# Pennsylvania Population Projections

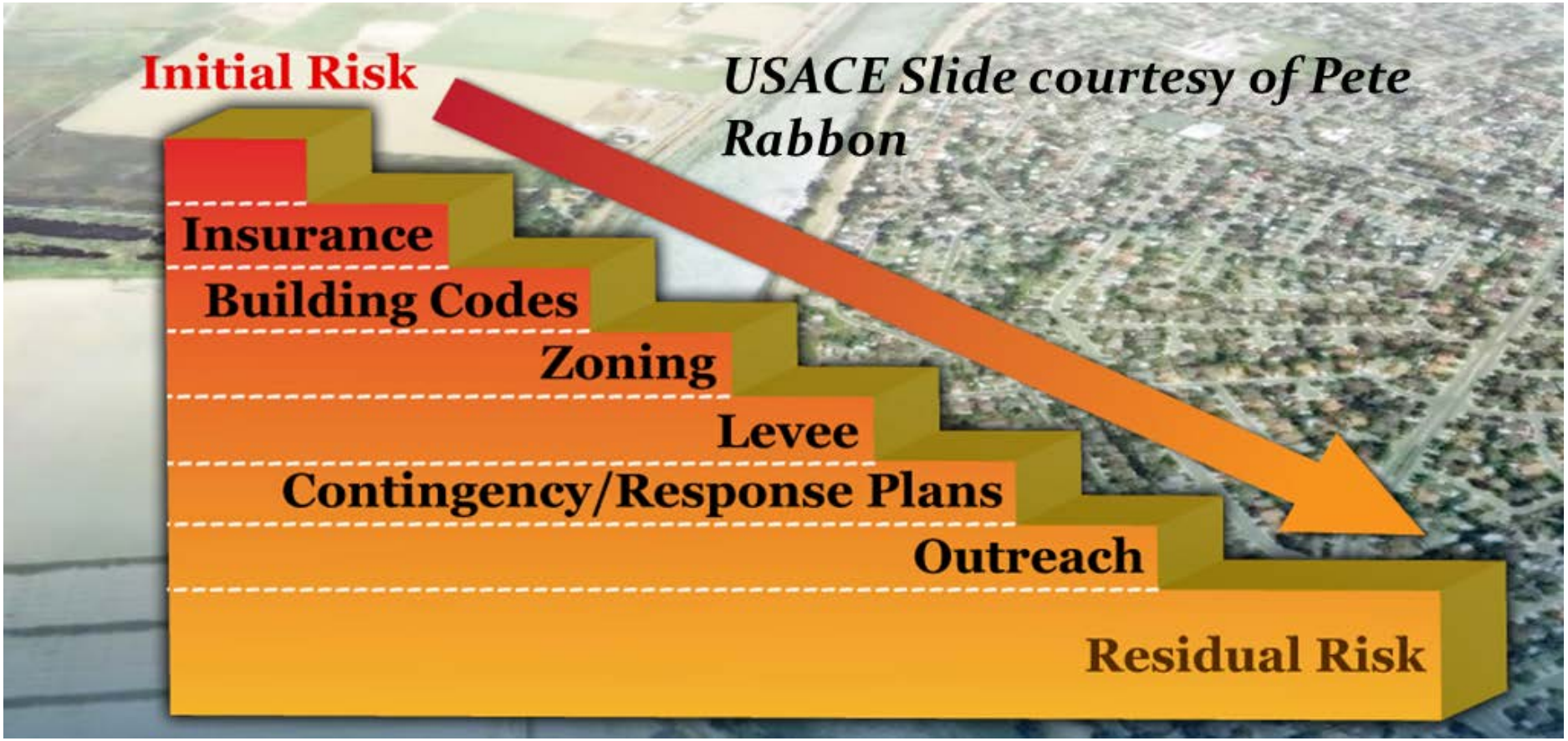


# Demographic Trends: The Opportunity

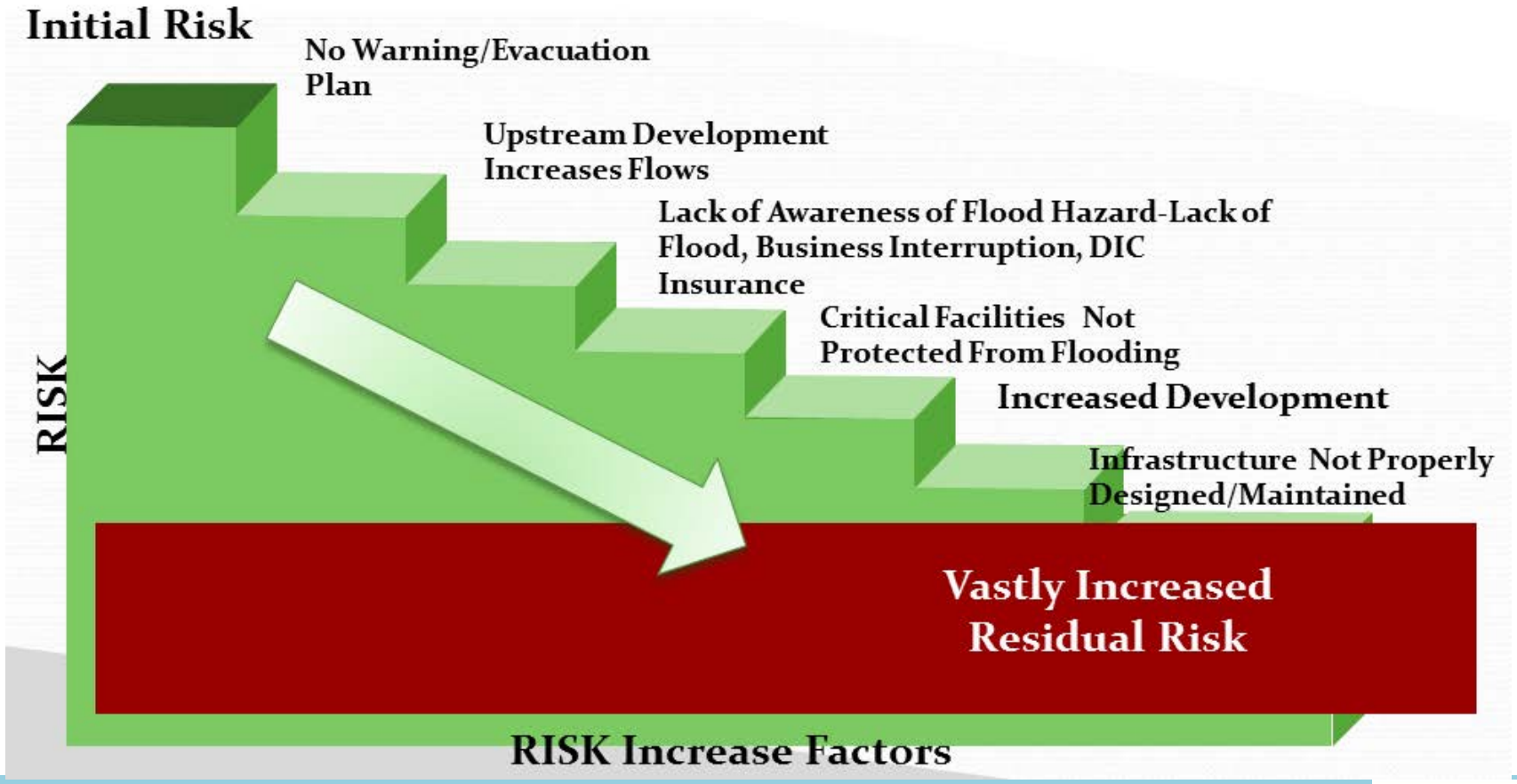
***In light of this demographic trend, what is the opportunity for disaster risk reduction?***

# All Stakeholders Contribute to DRR

## Risk Reduction Actions (Cumulative)



# Stakeholders May Also Contribute to Increased Risk!



# A Solution

## Go Beyond Federal Minimum Standards

| Safe Development | No Adverse Impact | Community Rating System Model |
| --- | --- | --- |
| • Looks at all hazards | • Safe, resilient development | • Development decision-making<br>• Planning<br>• Emergency preparedness |

# Safe Development Choices

Well planned **development that protects** people, property, environment, and precious water resources while reducing the potential for litigation

**OR**

Some current **practices that are known to harm** people, property, and natural floodplain functions… and may lead to litigation and other challenges

# Safe Development is Affordable

**Elevation and floodproofing costs add very small sums and have a significant societal payback**

(American Institutes for Research)

**Hazard mitigation has a proven 4-1 payback when retrofitting past mistakes**

(Multihazard Mitigation Council)

**Safe design or redesign following a disaster has a payback of 10-1 or greater**

(Other organizations)

# What Can Be Done?

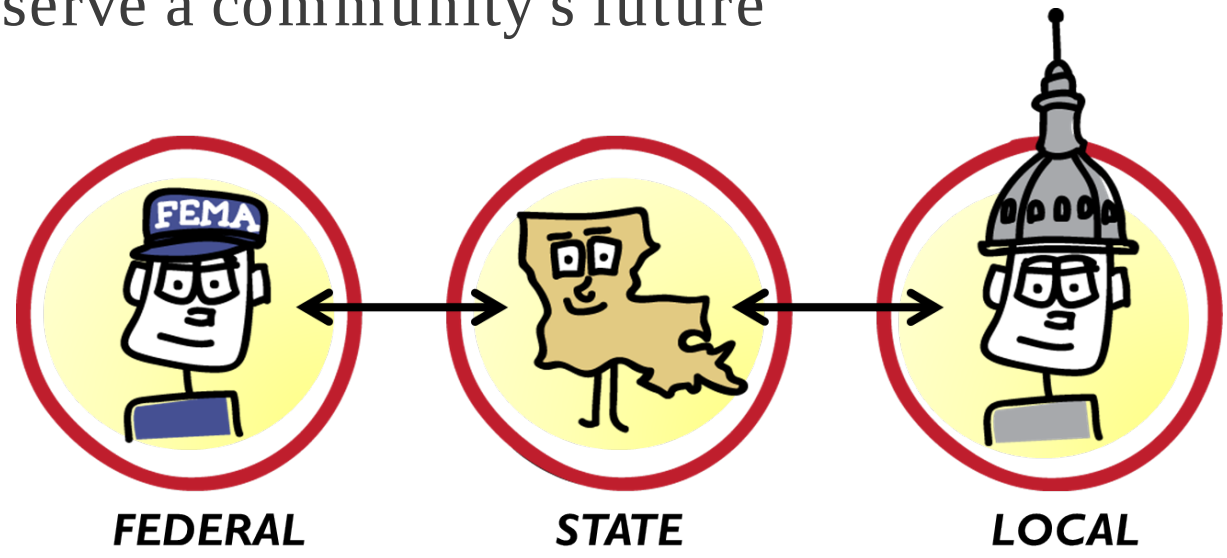
Encourage

- **Encourage safe development** by:
  - Removing perverse incentives
  - Rewarding good planning, safe building, and safe reconstruction
- **Participate in the opportunities** to change local regulations, policy and practices, as well as federal, state, and local legislation over the next few years

Participate

# Government Responsibility

- Fundamental duty
- Protect the present
- Preserve a community's future



# We Will Demonstrate throughout this Workshop and DRR Curriculum that…

**Safe Development** and **Low Impact Development** designed to reduce disaster losses TRULY ARE:

A. Legal

B. Equitable

C. Practical

D. Defensible in Court

E. Economical and Efficient

# Another Reason…

***Why else should professionals and the government do something about this?***

***Liability***

# Situations Where Governments and Landowners May be Held Liable

**Examples:**

- Construction of a road causes damage
- Stormwater system increases flows
- Development blocks watercourse
- Bridge without adequate opening
- Grading land increases runoff
- Flood control structure causes damage
- Filling wetland causes damage
- Issuing permits for development which causes harm to a third party

# Increase in Cases Involving Land Use (cont.)

- Huge increase in Taking Issue Cases and related controversies involving development

Common thread: courts have modified Common Law to require an **Increased Standard of Care** as the state of the art of Hazard Management has improved

- Government is vastly more likely to be sued for undertaking activity, or permitting others to take action which causes harm, than it is for strong, fair regulation

# Standard of Care

- Duty of Care
- Duty to Make Safe
- Duty to Warn

# Disaster Risk Reduction Messages

Repeatedly deliver knowledgeable messages of disaster vulnerability reduction, safety, and security, with regional and locally based mitigation suggestions

Build **safe rooms**, and have higher **wind load building standards** in areas subject to high probability of high winds/tornadoes

# Disaster Risk Reduction Messages (cont.)


Carry out community and individual **wildfire protection** in areas subject to such risks

Design and retrofit to reduce **earthquake** damage

# Disaster Risk Reduction Messages (cont.)

- Enroll in the Community Rating System (CRS) Program
- Build with higher freeboard, generally 4 feet or more above Base Flood Elevation (BFE), in areas subject to floods
- Understand the limitations of flood frequency projections based on the past, which include many unrealistic assumptions

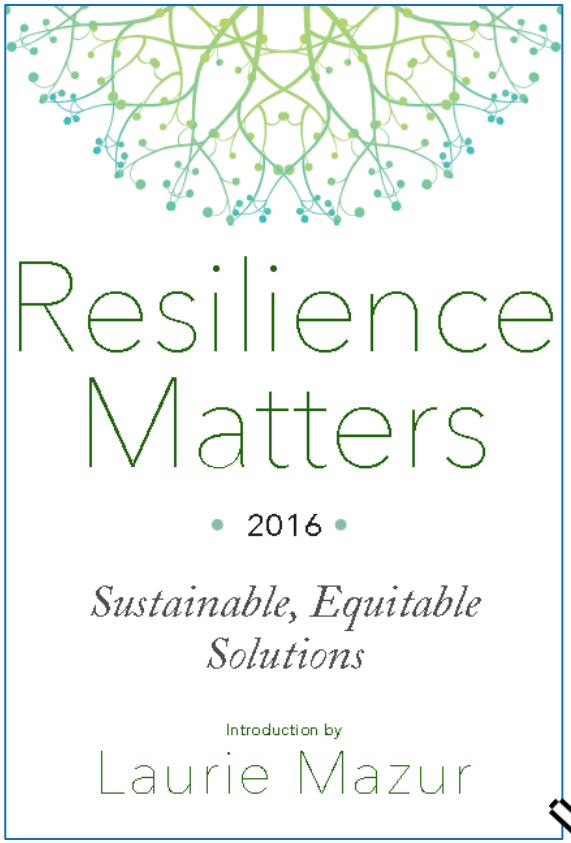
# Disaster Risk Reduction Messages (cont.)

Recognize the need to protect **water quality**, ecosystem services, and threatened and threatened/ endangered species

Module 18: *Design for Flood Resilience: Part I, Floodplain Management and Flood Resistant Design*

Module 19: *Design for Flood Resilience: Part II, Green Infrastructure / Low Impact Development*

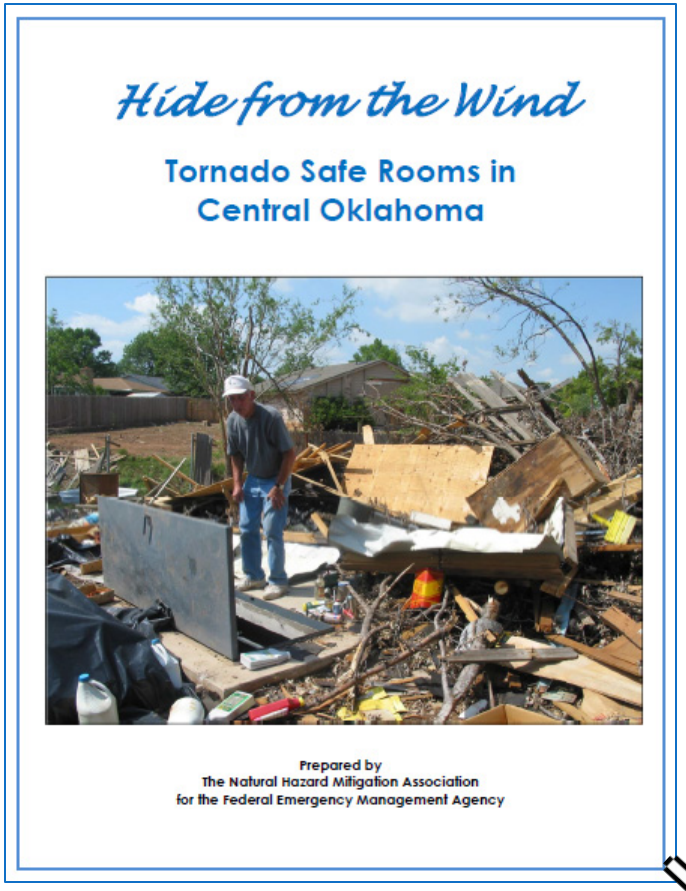
# *Resilience Matters: Sustainable, Equitable Solutions*




- Produced in 2016 by Island Press [Urban Resilience Project]
- A compilation of short-form articles, by well renowned resilience experts, addressing community resilience in the era of climate variability

[click to view report]

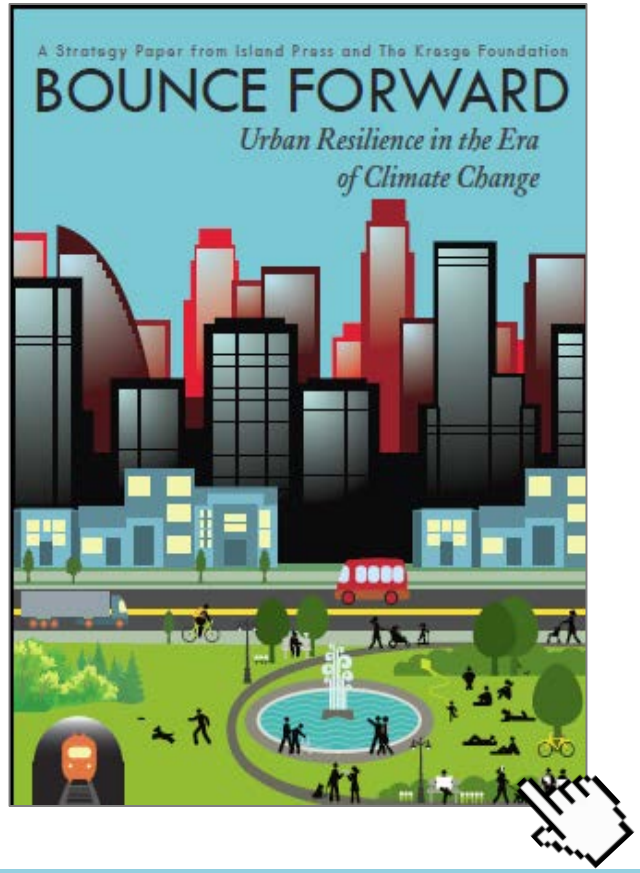
# NHMA Report: *Hide from the Wind*

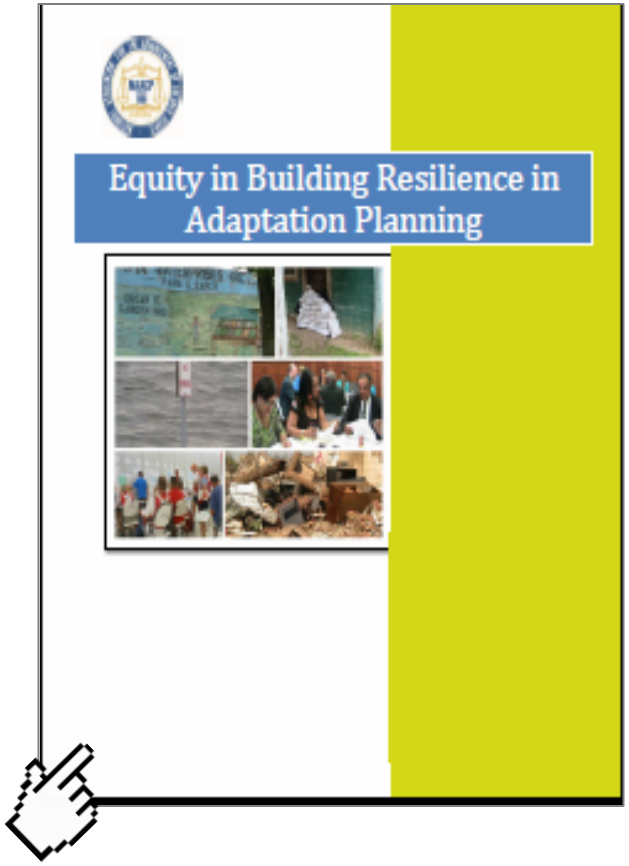



- Funded by FEMA under the 2014 Cooperating Technical Partner (CTP) Agreement with the NHMA
- Describes how a change in perception and in community development action can transform how we as a society deal with all natural hazards

[click to view report]

# Publications that Promote Resilience and DRR for All




[click to view publications]

# Important Considerations as We Move Forward Together


- Choose better standards to protect resources and people
- Make allies and friends to get our message across
- Find the common values and start there
- Play a key role in planning a safe and sustainable future

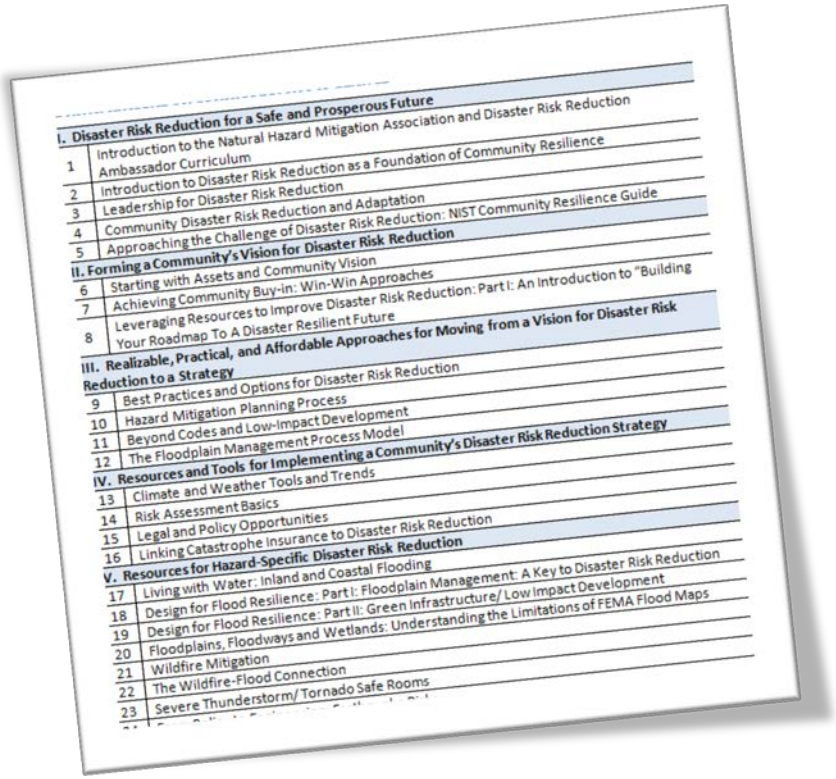
# Review of Key Learning Objectives

1. Define **community resilience** and **disaster risk reduction**

2. Define **mitigation** and **climate adaptation** from a community perspective

3. Explain the **role of disaster risk reduction as a foundation of community resilience**

# DRR Ambassador Curriculum



| | |
|---|---|
| **I. Disaster Risk Reduction for a Safe and Prosperous Future** | |
| 1 | Introduction to the Natural Hazard Mitigation Association and Disaster Risk Reduction Ambassador Curriculum |
| 2 | Introduction to Disaster Risk Reduction as a Foundation of Community Resilience |
| 3 | Leadership for Disaster Risk Reduction |
| 4 | Community Disaster Risk Reduction and Adaptation |
| 5 | Approaching the Challenge of Disaster Risk Reduction: NIST Community Resilience Guide |
| **II. Forming a Community's Vision for Disaster Risk Reduction** | |
| 6 | Starting with Assets and Community Vision |
| 7 | Achieving Community Buy-in: Win-Win Approaches |
| 8 | Leveraging Resources to Improve Disaster Risk Reduction: Part I: An Introduction to "Building Your Roadmap To A Disaster Resilient Future |
| **III. Realizable, Practical, and Affordable Approaches for Moving from a Vision for Disaster Risk Reduction to a Strategy** | |
| 9 | Best Practices and Options for Disaster Risk Reduction |
| 10 | Hazard Mitigation Planning Process |
| 11 | Beyond Codes and Low-Impact Development |
| 12 | The Floodplain Management Process Model |
| **IV. Resources and Tools for Implementing a Community's Disaster Risk Reduction Strategy** | |
| 13 | Climate and Weather Tools and Trends |
| 14 | Risk Assessment Basics |
| 15 | Legal and Policy Opportunities |
| 16 | Linking Catastrophe Insurance to Disaster Risk Reduction |
| **V. Resources for Hazard-Specific Disaster Risk Reduction** | |
| 17 | Living with Water: Inland and Coastal Flooding |
| 18 | Design for Flood Resilience: Part I: Floodplain Management: A Key to Disaster Risk Reduction |
| 19 | Design for Flood Resilience: Part II: Green Infrastructure/ Low Impact Development |
| 20 | Floodplains, Floodways and Wetlands: Understanding the Limitations of FEMA Flood Maps |
| 21 | Wildfire Mitigation |
| 22 | The Wildfire-Flood Connection |
| 23 | Severe Thunderstorm/ Tornado Safe Rooms |

Please refer to the **DRR Ambassador Curriculum At-a-Glance** in your Participant Guide

# Thank You!

NHMA
Natural Hazard Mitigation Association

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- **Questions and/or comments**
- **Contact information**

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