21st Century ≠ 20th Century

"Toto, I've a feeling we're not in Kansas anymore"

AND IT IS NOT JUST ABOUT CLIMATE CHANGE!!

Climate Change Is Real!

- A strong, credible body of scientific evidence shows that climate change is occurring, is caused largely by human activities, and poses significant risks for a broad range of human and natural systems…

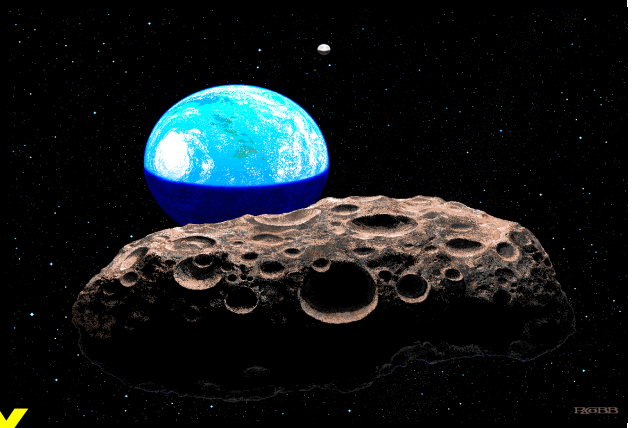
  Americas Climate Choices, National Academies (2011)

- Global climate is changing, and this is apparent across the U.S. in a wide range of observations. The climate change of the past 50 years is due primarily to human activities… Some extreme weather and climate events have increased in recent decades, and there is new and stronger evidence that many of these increases are related to human activities.

  Draft National Climate Assessment (2013)

The 21st Century

- Population Explosion
- Pressures for Development
- Crumbling Infrastructure
- Volatile, Uncertain, Complex, Ambiguous National and World Situations
- Climate Change and Disasters!



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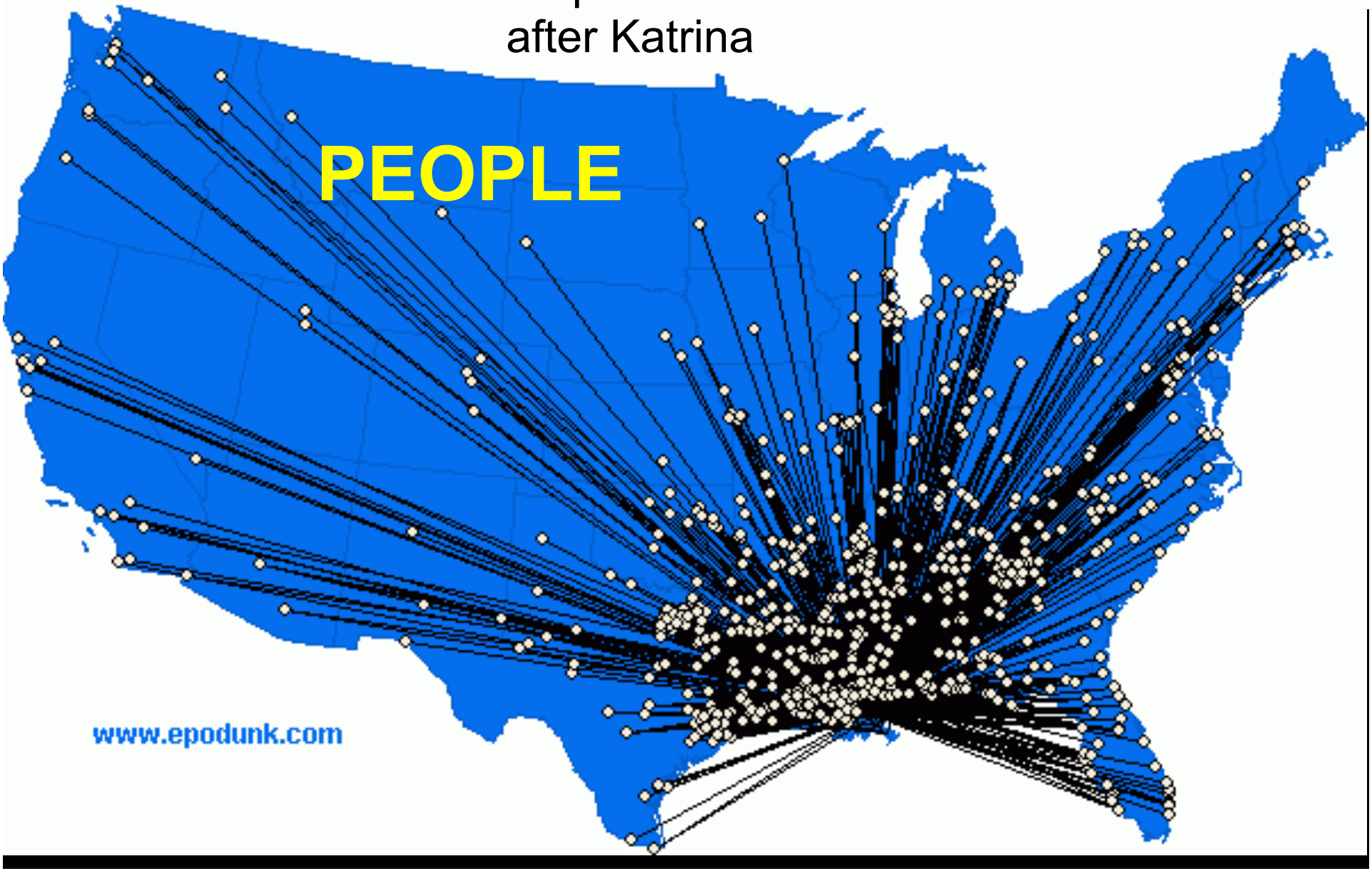
INFRASTRUCTURE

ECONOMY

Dispersion of New Orleans Residents after Katrina



It Is All About

Resilience

Working Today for a Better Tomorrow

RENEWABLE NATURAL RESOURCES FOUNDATION
CONGRESS ON COASTAL RESILIENCE AND RISK

What Resilience Means to Coastal Communities in the Face of Climate Change

- NOAA Center for Weather and Climate Prediction
- College Park, MD
- December 11, 2013

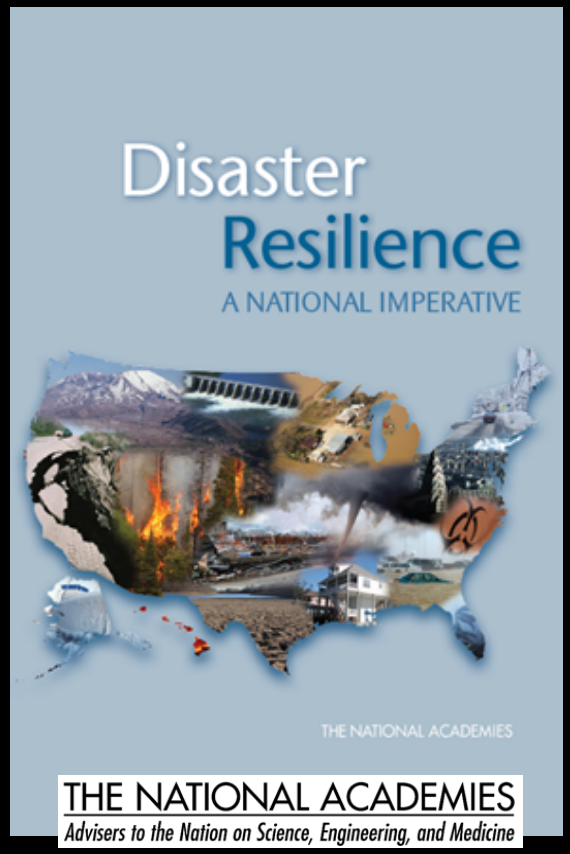
Gerald E. Galloway, Jr., PE, PhD
Center for Disaster Resilience
University of Maryland

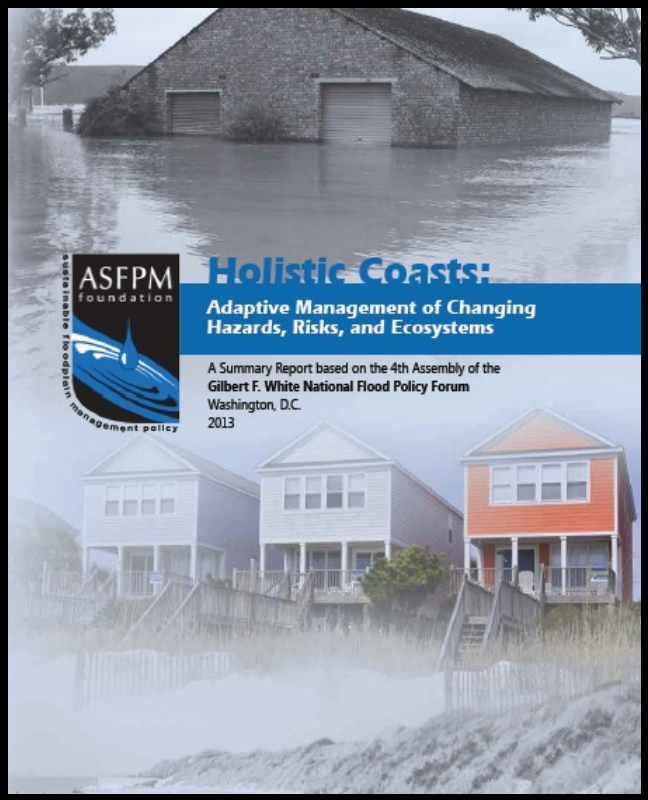
Fear the Turtle

4 Questions

- What Is Resilience?
- How Do We Manage (Coastal) Resilience?
- What Tools Can We Use to Increase Resilience and Decrease Risk?
- What Are The Problems in Getting to Resilience?

Two Reports + ASCE IWR



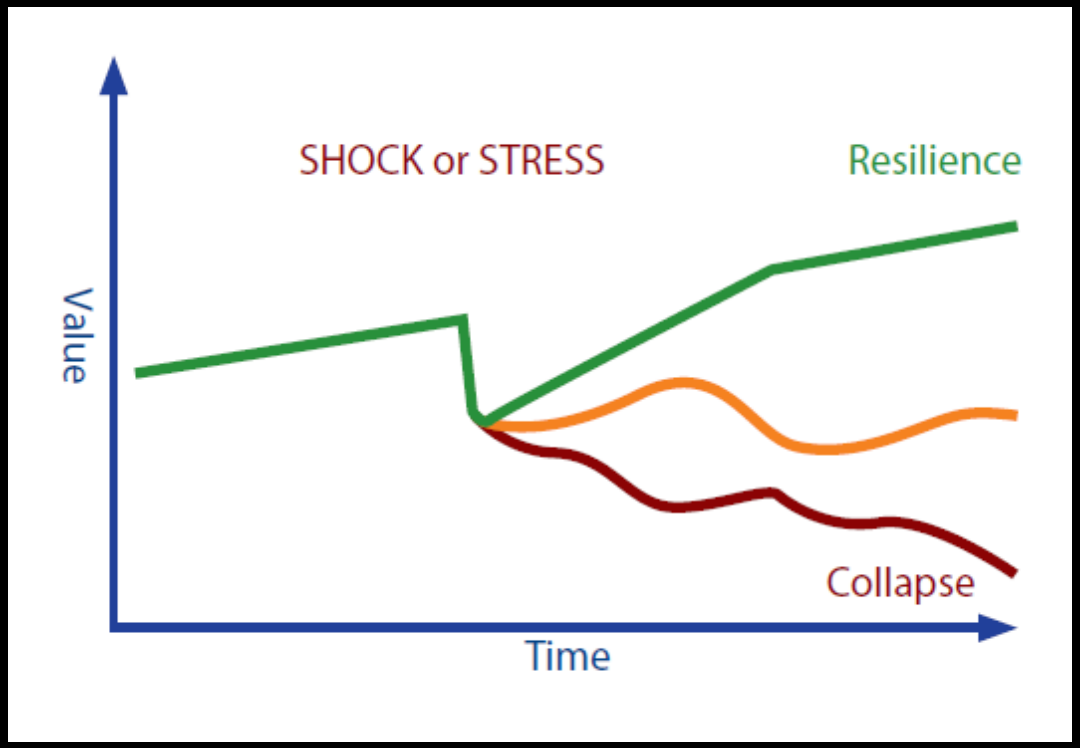


The Road from the Past Is Littered with Sound but Ignored Recommendations

1

Resilience

The ability to prepare and plan for, absorb, recover from or more successfully adapt to actual or potential adverse events.



Torrens Resilience Institute

Disaster losses could be reduced through increased attention to national resilience

- Beyond the unquantifiable costs of injury and loss of life from disasters, economic damages from natural disasters in the United States continue to grow
- No person or place is immune from disasters or disaster-related losses.
- A proactive approach that builds resilience will be more effective at reducing losses of life, property, and economic productivity than current approach

Where are We Now?

2

Developing (Managing) Resilience to Disasters Is a Big Part of the Solution

Understanding, Managing, and Reducing Disaster Risks

Reducing risk requires a disciplined process of identifying risk, developing and implementing a strategy to deal with that risk, and keeping that strategy up to date.

- **Risk management involves a range of interacting parties: federal, state, local government; home- and business owners; emergency managers; construction industry; insurers; markets; and others.**

- A variety of tools and approaches exist:

Structural (construction-related): e.g., levees, dams, floodways, disaster-resistant construction, "smart" building, and well-enforced building codes

Nonstructural (non-construction-related): e.g., natural defenses, risk mapping, zoning ordinances, economic incentives, hazard forecasting/warning, insurance, and catastrophe bonds

Social and Organizational: e.g. Community health systems; public-private partnerships, etc.

NATIONAL POLICY: A unified national policy is needed to address the full range of coastal challenges, players, and actions.

Linking Communities and Governance to Increase Resilience

A necessary first step to strengthen the nation's resilience and provide the leadership to establish a national "culture of resilience" is a full and clear commitment to disaster resilience by the federal government.

- Communities and the governance structures of which they are a part are complex, dynamic systems. Resilience to disasters requires that these multiple systems are robust and collaborative. .

- Experience in the disaster management community suggests that linked bottom-up-top-down networks are important for managing risk and increasing resilience.

Photo: Port of Los Angeles upgrade to address risk and sustainability
Source: Gerry Galloway

- Developing and maintaining community resilience requires identification of specific roles and responsibilities for government at all levels, the private sector, and local stakeholders

the WHITE HOUSE PRESIDENT BARACK OBAMA

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February 12
2013

The White House

Office of the Press Secretary

For Immediate Release

February 12, 2013

Presidential Policy Directive 21 –Critical Infrastructure Security and Resilience

Policy

It is the policy of the United States to strengthen the security and resilience of its critical infrastructure against both physical and cyber threats.

The Federal Government shall also engage with international partners to strengthen the security and resilience of domestic critical infrastructure and critical infrastructure located outside of the United States on which the Nation depends.

U.S. efforts shall address the security and resilience of critical infrastructure in an integrated, holistic manner to reflect this infrastructure's interconnectedness and interdependency.

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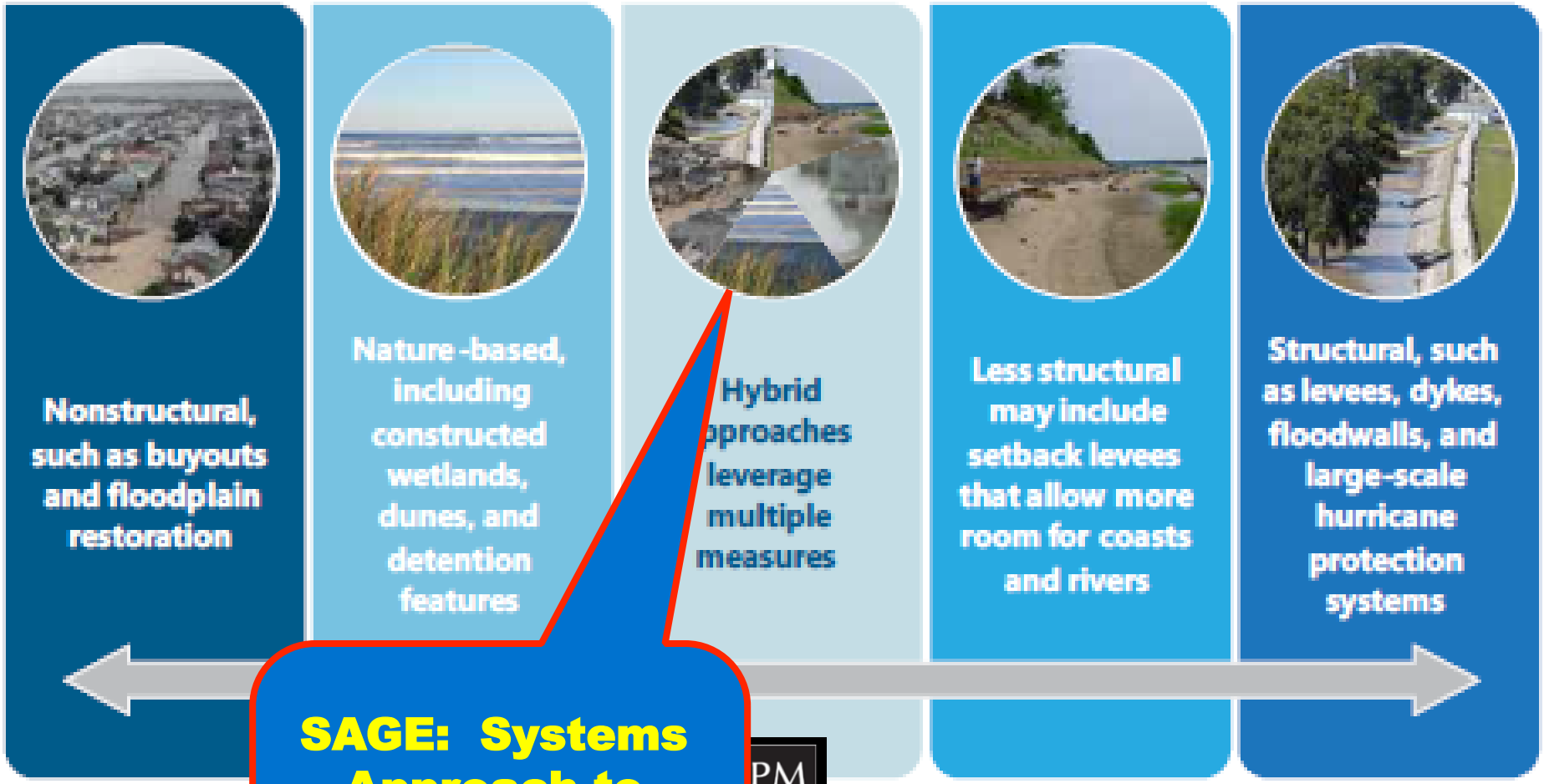
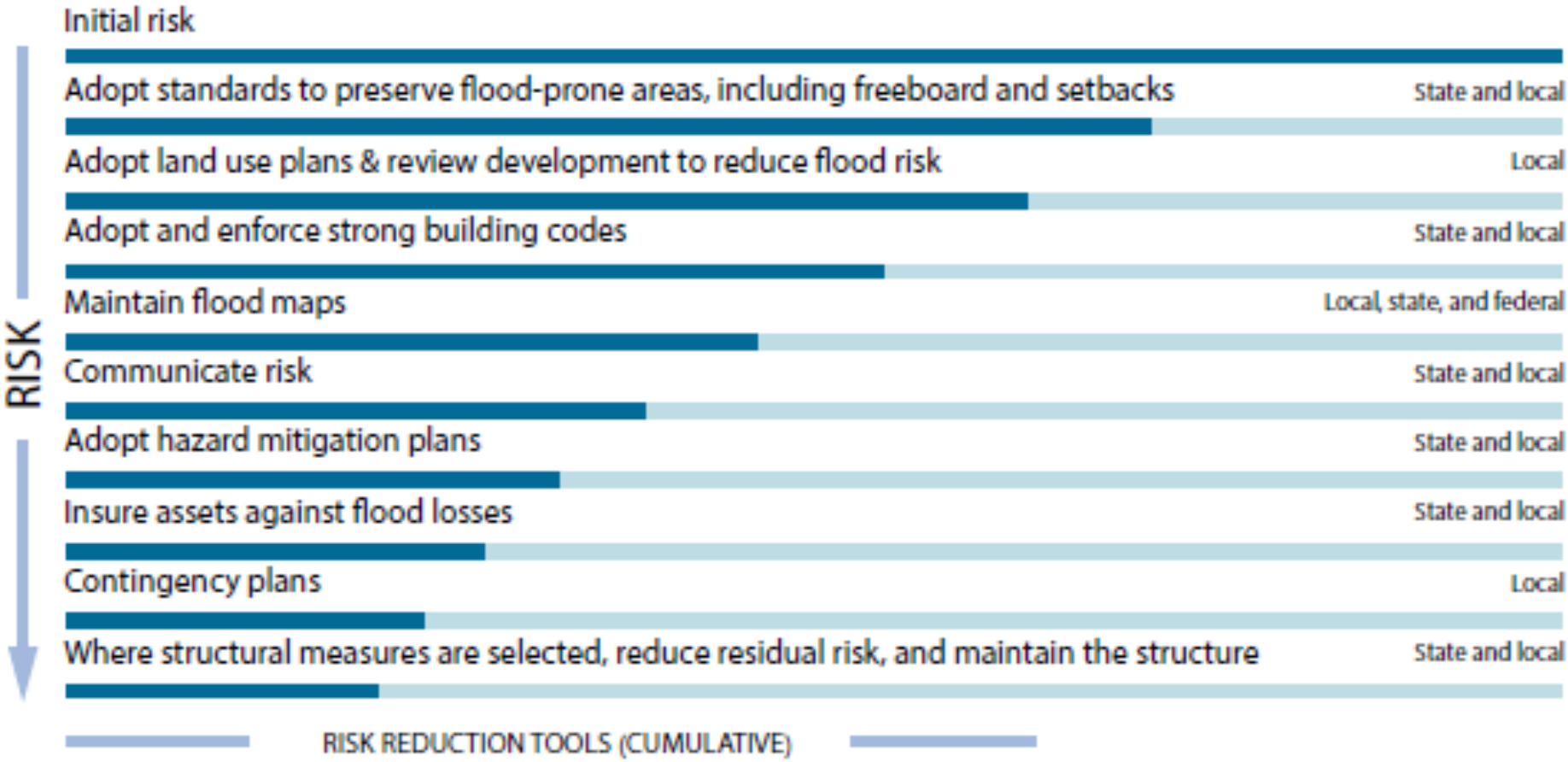
Resilience includes the ability to withstand and recover from deliberate attacks, accidents, or naturally occurring threats or incidents

3

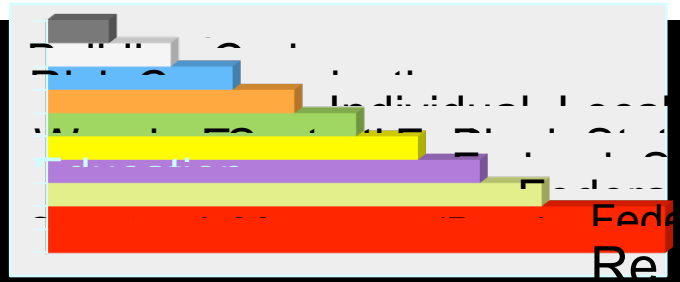
Developing Multi-faceted Strategies to Deal with Coastal Hazards



SAGE: Systems Approach to Geomorphologic Engineering

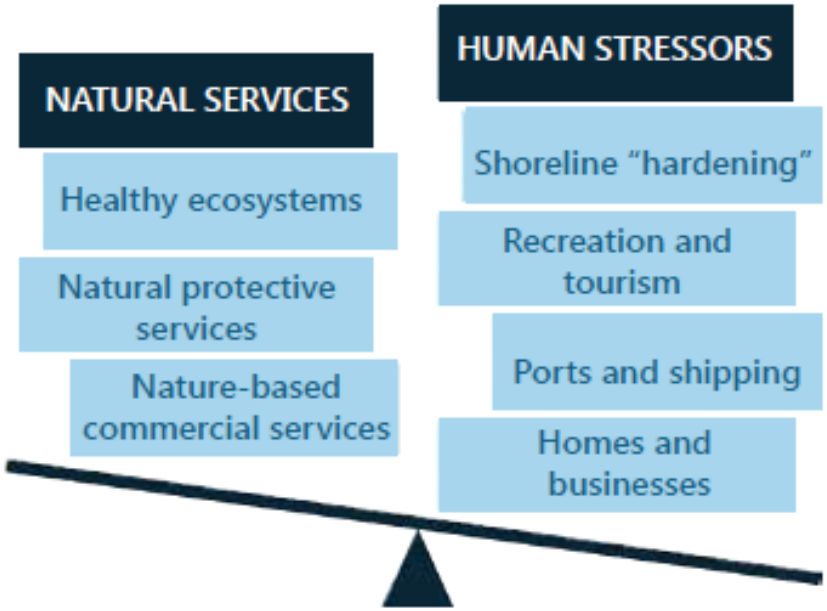


BUYING DOWN RISK: Communities and states have a wide range of tools available to manage and reduce risks associated with coastal hazards.

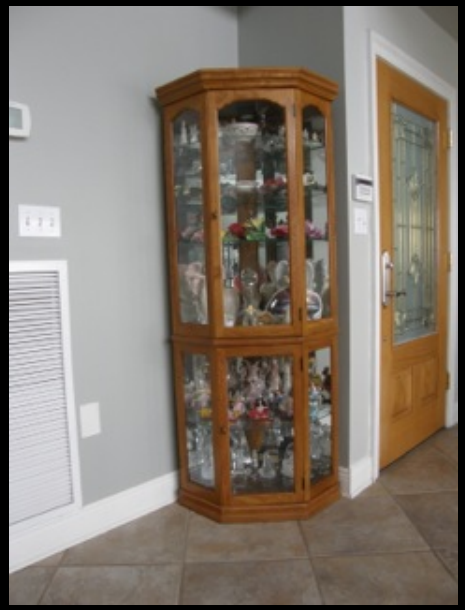


Natural coastal features such as dunes, mangroves, reefs, and marshes provide important protective services, including attenuation of surge and floodwaters, wave energy dissipation, and space for shoreline migration.

Healthy coastal ecosystems support sustainable fisheries, shellfish beds, recreation and tourism, and even pharmaceuticals.



Balancing Natural Resources against Human Stressors



Building Local Capacity—Resilience from the Bottom-Up

Community resilience begins with strong local capacity.

Photo: Fallon Paiute-Shoshone Tribal Administration doing emergency training, June 2012
Source: Casey Deshong/FEMA

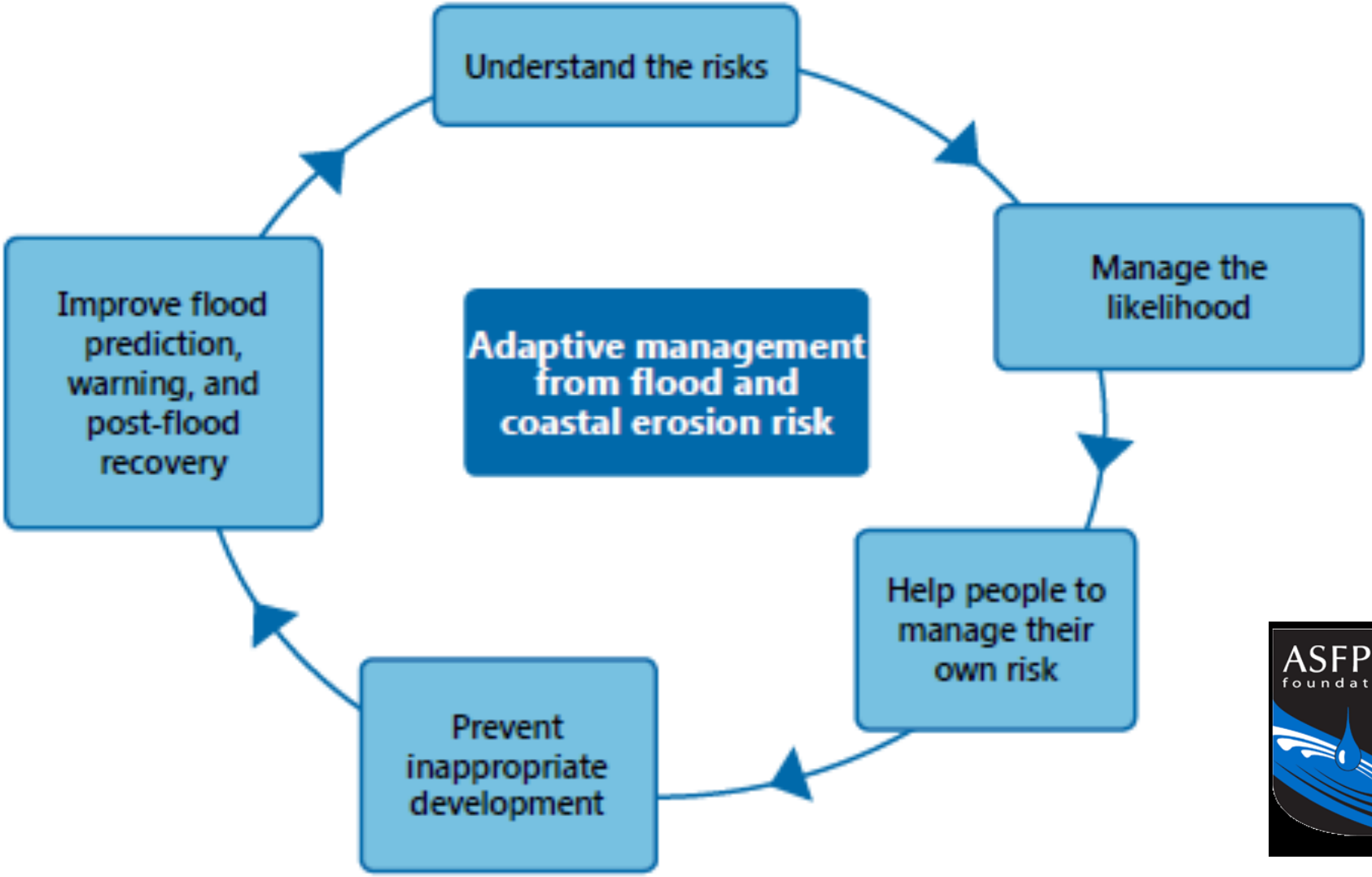
Building Community Capacity

- Engage the community in disaster policy planning
- Link public & private infrastructure performance to resilience goals
- Communicate risks, promote a culture of resilience
- Organize communities and families to prepare for disasters
- Adopt sound land-use practices and adopt and enforce building codes
- Build resilience into health and public welfare systems

Local conditions vary across the country; the nation's communities are unique. The risks faced by every community vary according to local hazards. Resilience is not just about disasters.

4

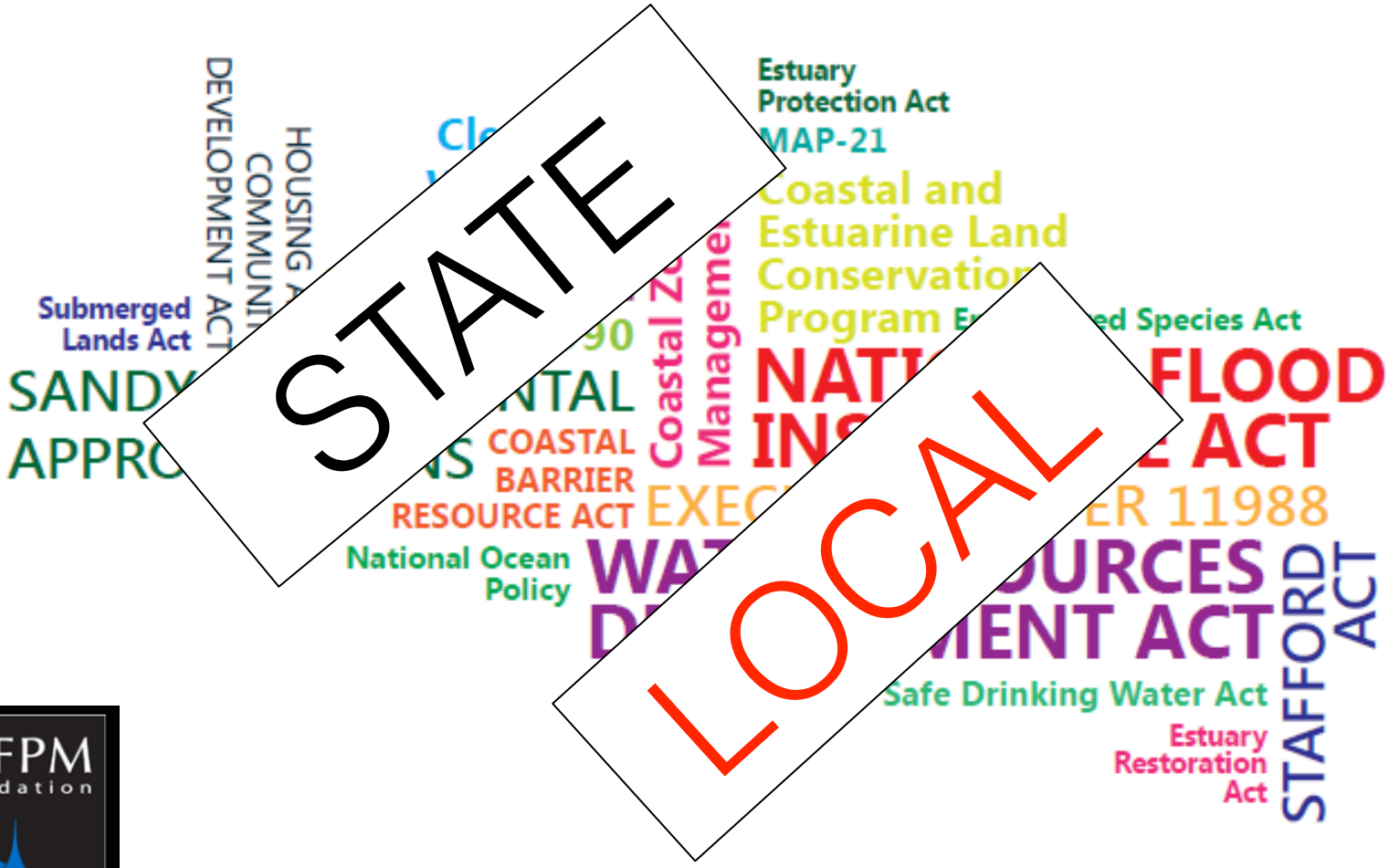
Challenges



ADAPTIVE MANAGEMENT OF FLOOD RISK IN A DYNAMIC ENVIRONMENT: While steps are not necessarily sequential, climate change and sea level rise, coupled with increased population growth in coastal zones, demands that we have reliable and accurate data and make sound land use decisions for the future. (Credit: adapted from DEFRA, 2011) [31]

Why People Don’t Know About Present and Future Exposure and Vulnerability?

- Exposure/vulnerability are bad news
- Exposure knowledge limits development
- Knowing establishes a requirement for action –and action, may not be feasible
- The threat is uncertain and therefore not taken as a problem
- We don’t give them the information they need –it costs “too much” to get



ASFPM foundation

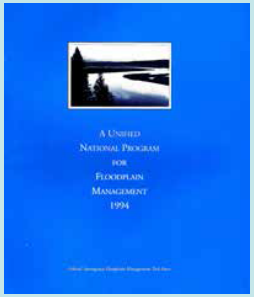
And So?

The Landscape of Resilience Policy

The nation does not have a overall vision or coordinating strategy for resilience. Implementation of PPD 8 {and PPD-21) will address some of these consistency and coordination issues.

- **Strong governance at all levels ke resilience**
- **Policies designed to improve nationa to take the long-term view of communi**
- **Government policies and practices ca unintended consequences that negative resilience.**
- **Gaps in policies and programs amon parts of the resilience process**
- **Gaps result from legislative authority within which agencies are directed to operate, lack of effective coordination of the roles and responsibilities, and lack of a unified resilience vision.**

A Unified National Program



Measuring Progress

Photo: Elevated home near Gulfport, MS
Source: E. Eide

The nation needs a consistent basis for measuring resilience that includes all of these dimensions.

- Existing national and international indicators measure different aspects of community systems and hazards.

- Comparison of the strengths and challenges of different frameworks for measuring resilience suggests the critical dimensions of a consistent resilience measurement system are:

  - the ability of critical infrastructure to continue to perform;
  - social factors (e.g., health, socioeconomic status) that enhance or limit a community's ability to recover;
  - indicators of the ability of buildings or structures to withstand different disasters (e.g., building codes, adopted and enforced);
  - factors that capture the special needs of individuals and groups.

Recommendations

Recommendation: **Federal government agencies should incorporate national resilience as an organizing principle**

Recommendation: **The public and private sectors in a community should work cooperatively to encourage commitment to and investment in a risk management strategy that includes complementary structural and nonstructural risk-reduction and risk-spreading measures or tools**

Recommendation: **Federal, state and local governments should support the creation and maintenance of broad-based community resilience coalitions at local and regional levels.**

***Recommendation*: All federal agencies should ensure they are promoting and coordinating national resilience in their programs and policies.**

Holistic Coasts

- **Require vertical integration of community, regional, and state and federal policies, laws, programs, and practices.**

- **Require horizontal alignment across watersheds, basins, ecosystems, and states to support an integrated approach to coastal resource management.**

- **Improve and better coordinate data collection and sharing efforts by government agencies, academic organizations, and other entities.**

- **Make coastal policy sustainable and economically and environmentally acceptable. Legislation should seek to apportion costs fairly and properly. Those that benefit should pay.**

- **Provide robust, forward-looking natural hazards related science and data to support community decision making.**

The Bottom Line

1. The World Around Us Is Changing and Climate Change is a Important Aspect
2. The Risks Associated with Natural and Human Disasters Are Increasing
3. Building Resilience Mitigates These Growing Risks
4. We Need to Be –at All Levels - in the Middle of the Resilience Effort

When life takes a nosedive, resilience needs to be your middle name

Linda Sapadin, Ph.D

Thank You