

# ASCE Task Committee on Flood Safety Policies and Practices

Call to Action  
Progress Report and Issues



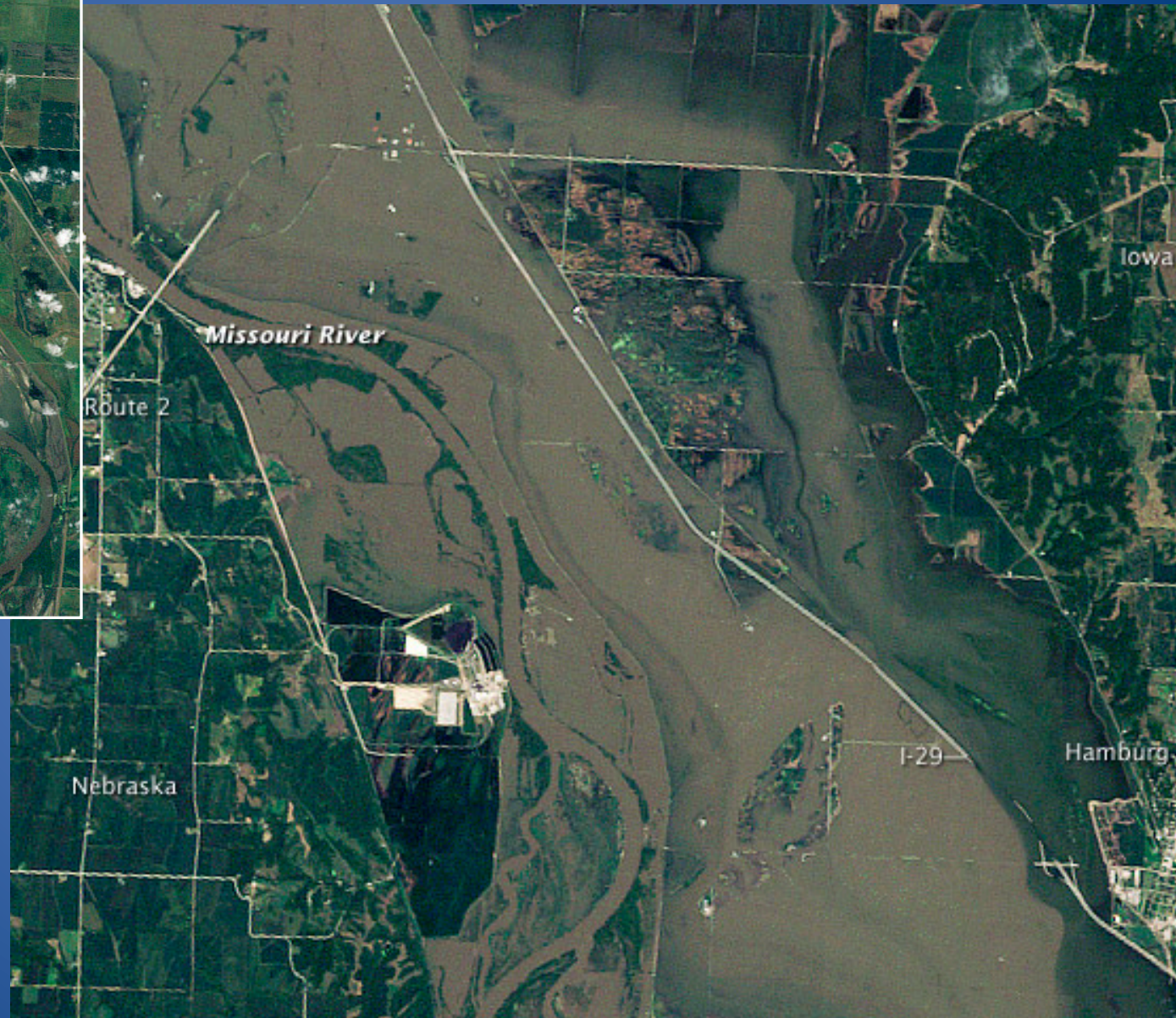
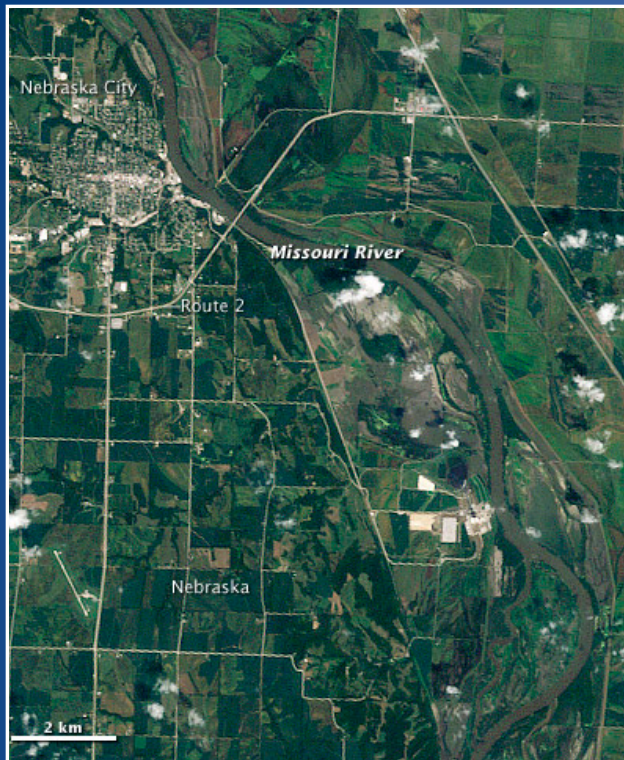
# Great Midwest Flood 1993



# Hurricane Katrina 2005



# Missouri River Flooding 2011



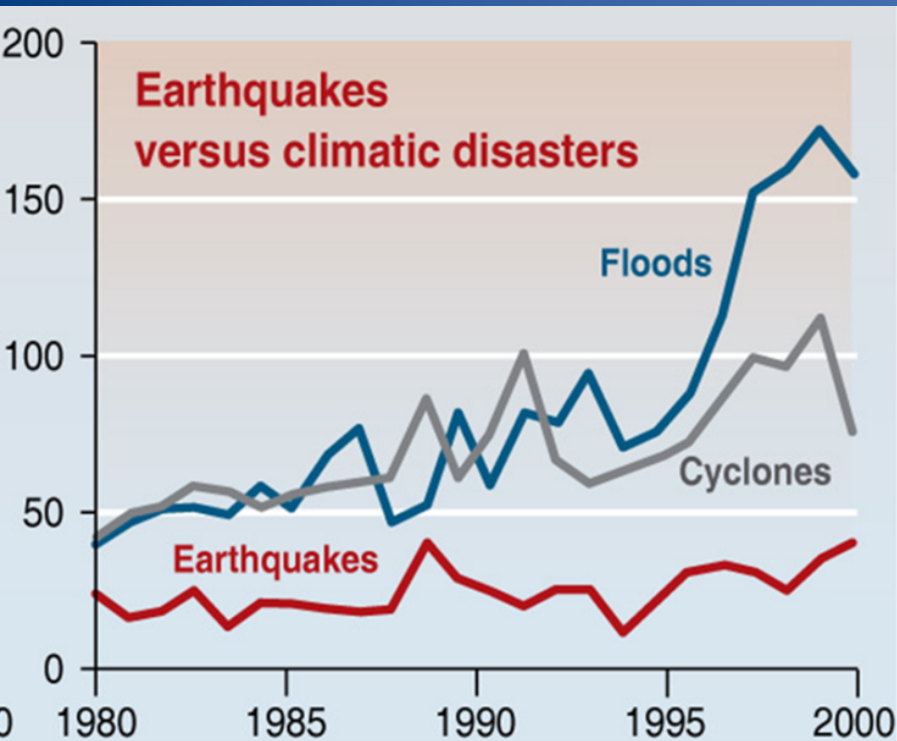
# Super Storm Sandy 2012



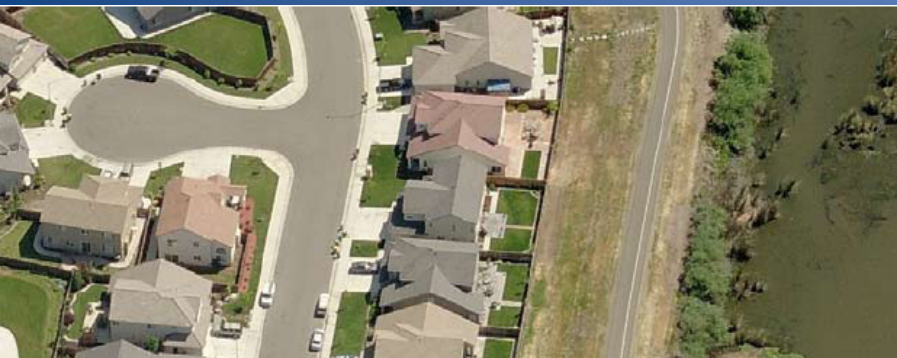


Cartoon by [Chris Britt/SJ-R](#)

# Flooding Demographics

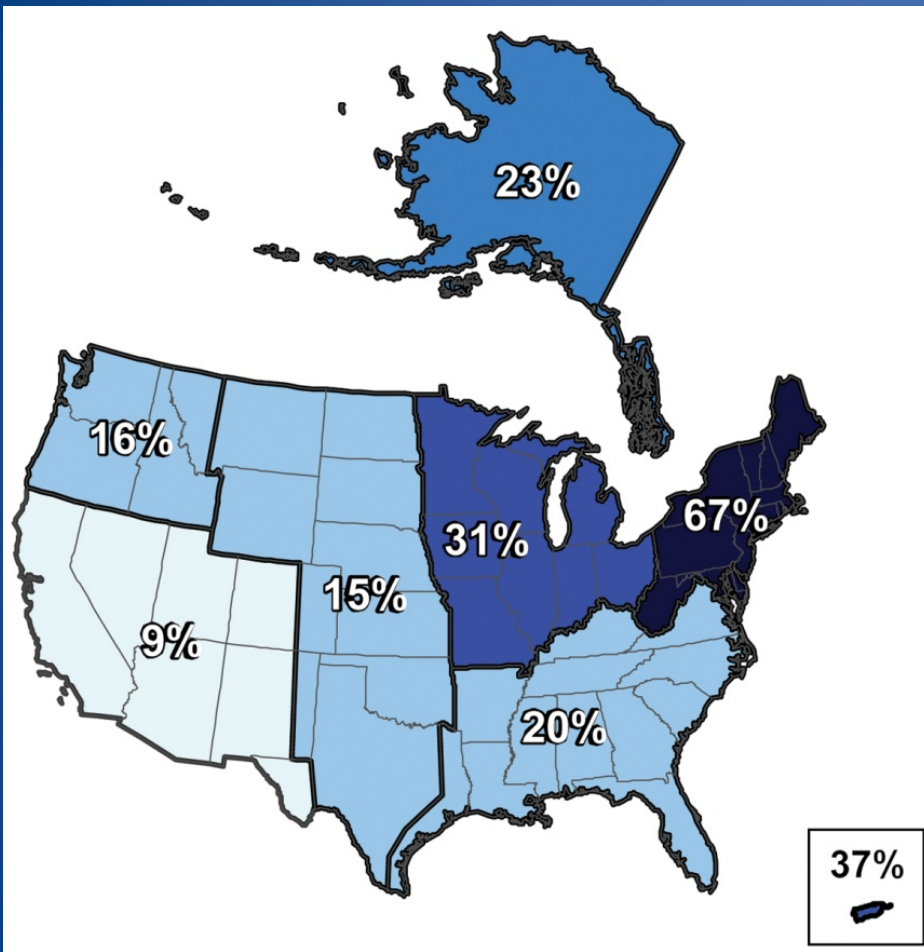


- Flooding is #1 natural hazard (Loss of life and property damage)
- ~17 % of urban land in 100-year flood zone.
- UMRB loss of 65 m acres of wetlands = size of Illinois.
- \$7.4 m in added flood damage per acre lost of wetlands (Brody, TX)
- FEMA predicts 100-year floods will grow by 40 to 45% over the next 90 years



San Joaquin County, California, 2010

# Changing Climate



**Increase in intensity of precipitation  
from 1958-2007**

(USGCRP Global Change Impacts in U.S.  
2009 , updated from Groisman et al.)

- Past century, overall precipitation up 7%
- heaviest downpours increased 20% over last 50 years
- 1st 6 months of 2014, record breaking floods droughts and wildfires
- Future = volatility & uncertainty



# Call to Action

- **Mississippi 1993, \$20 Billion**
- **Katrina 2005, \$100 Billion**
- **Ike 2008, \$40 Billion**
- **Mississippi 2011, \$10 Billion**
- **Irene 2011, \$25 Billion**
- **Sandy 2012, >\$80 Billion**
- **NFIP 19 Billion Deficit**



# Current National Flood Risk Policy

- Promotes construction in risk areas (EO will help)
- Ignores changing conditions
- Many FIRMs that are old, inaccurate, or nonexistent (unmapped areas)
- Undervalues natural resources and floodplain functions
- Transfer of who pays for Risk (NFIP Reform)
- Cycle of Disaster, Disaster Assistance, rebuild, Disaster



# The Problem

- Have lessons been learned, or merely observed?
- Have lessons been incorporated into public policy?
- Have lessons influenced engineering practice?
- If we know what we need to do, why aren't we doing it?



# The Problem (Cont.)

- No National (Not Federal) Vision on how to reduce flood risk
- Lack of good data or sound analysis on what the potential risk is.
- The nation's flood infrastructure (dams and levees) is in marginal or near failing condition?
- Climate change and population growth will further increase flood risk.
- The greatest task is to reverse many decades of past decisions that created these issues

# ASCE Hurricane Katrina Review (2007)

- Keep safety at the forefront of public priorities
- Quantify the risks
- Communicate the risks to the public and decide how much risk is acceptable
- Re-think the whole system (Land use, Flood Management Policy + NFIP),
- Put someone in charge
- Improve interagency coordination
- Upgrade engineering design standards
- Place safety first

# Challenges

- How do we manage flood risk without harm to our natural resources?
- How do we avoid the cycle of loss-and-repair?
- How do we allocate costs fairly?
- How do we account for a growing population and climate change?
- How do we achieve sustainability?
- Congressional dysfunction on how to proceed

# Committee Charge

- Investigate whether the lessons learned from failures during Hurricane Katrina and other flood disasters have been incorporated in the planning, design, construction and management of engineering water resource projects for the future
- Provide a basis for influencing needed change in public policy and engineering practice related to flood safety and flood management.

# Committee Members

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\*Members of the Hurricane Katrina External Review Panel

\*\*Hurricane Katrina Interagency Performance Evaluation Task Force (IPET)



# Committee Work Plan

- Reviewed past recommendations and findings from several published reports
- Developed and implemented an extensive questionnaire to understand progress made and challenges ahead
- Identified 11 flood prone areas in the US and abroad as study areas
- Interviewed local experts in these areas
- Identified compelling topics in flood safety
- Hosted a Summit entitled “Building a Framework for Flood Risk Management; Goals, Roles and Responsibilities, Resources and Systems.
- Prepared Final Report (CE Mag Article)

# Summit on Building a Framework for Flood Risk Management

- What are our National Overarching Goals?
- What are the Roles and Responsibilities
  - For each level of government (local, state, federal)
  - Individuals and Property Owners
- What Resources are Needed?
- What Approaches are Needed?

# Findings of Summit

- Flood safety continues to receive scant attention
- No common vision of how the nation should organize and coordinate to deal with flooding
- No sound analysis of the potential risk to the nation from flooding
- Flood infrastructure, primarily dams and levees, remains in near-failing condition with no plan to improve conditions
- Climate change and population growth will further stress this already difficult situation
- Limited progress has been made but more must be done
- Not enough emphasis on Non-Structural Sustainable Flood Management

# Action Items

- Look for opportunities to avoid development in high risk locations and include true cost/benefit for the extent and location of built resources that are needed
- Where risks exist in developed areas, ensure that communities are prepared to properly respond to emergencies to mitigate risk to life safety
- Preserve the basic natural resources that maintain social and environmental needs
- Determine new economic models and markets for our natural resources that include flood risk reduction

# What resources are available, and how are the resources applied?

- Phases

- Pre-disaster preparation—roles and responsibilities clearly defined
- Disaster response—coordination of resources to enable efficient and effective operation
- Post-disaster response—balance consideration of alternatives with immediate efforts to rebuild

- How do we avoid misapplication of resources?

# Sound Flood Risk Management Provides:

1. Effective and sustainable management of risks posed by floods to life safety, human health, economic activity, cultural heritage, and the environment.
2. Collaborative risk sharing and risk management at all levels of government and by all stakeholders.
3. Risk Informed policies and funding prioritization
4. Incorporation of natural processes to mitigate the consequences of flooding.

## Implementing flood risk management requires:

1. A common definition of flood risk and a consistent means of assessing risk.
2. Effective collaboration, clear communications, and well-defined roles at all levels of government, the private sector, and the public.
3. Balanced consideration of structural and non-structural measures for sustainable resilient infrastructure.
4. Basing land use decisions on sustainable flood risk management principles
5. Establishing of long-term, reliable funding mechanisms for flood risk reduction at the federal, state and local level.
6. Adapting flood risk management strategies to meet changing conditions.

# Recommendations

1. President and Congress need to address the infrastructure maintenance
  - Shared federal/state/local funding
  - National infrastructure bank
  - Local Funding mechanisms (similar to America Fast Forward Bonds)
  - Water infrastructure Finance and Innovation Act (pilot flood focused version)
  - ASCE needs to work with President and Congress to develop funding strategy
  - Identify of “full funding” for approved water projects



## Recommendations (Cont.)

2. FIFMTF working with states should develop 21<sup>st</sup> Century unified national program for flood management.
3. Congress should provide funding to conduct the national flood vulnerability study stipulated in the 2007 WRDA Act.
4. At all levels of government balance non-structural and structural flood mitigation
5. In planning mitigation consider both long-term and short term impacts (climate change, population, and infrastructure renewal)

## Recommendations (Cont.)

6. CEQ should develop guidelines to support implementation of federal principles and requirements that include public safety and ecosystem values equally in decision making. Provide incentives and create a framework that relates ecosystem benefits to other types of benefits.
7. FEMA, NOAA, USACOE , and USGS, should support the development of a coalition of nongovernment organizations to carry out a coordinated communication campaign concerning flood risk and actions to deal with the risk.

# Reasons for Optimism

# Reasons for Optimism

## FEMA Update BCA for Acquisitions

- Structures in the SFHA < \$250,000 will qualify for acquisition funding without a BCA Calculation
- Ecosystem Services Valuation (Dave Baxter, Earth Economics)
- Non Structural vs. Structural alternatives
- FEMA & ACOE using ECO Services in BCA for structural project funding (loss of ECO Services would be a negative)
- Provides a huge assist to non structural flood management like “Make Room for the River” over levees
- New Executive Order EO 13690 updates EO 11988

WHERE THEY DO FLOOD  
MANAGEMENT RIGHT  
Make Room for the River (RvR)  
began as idea in 1986, gained  
momentum in 1990s, US  
projects as inspiration



Netherlands  
Embassy

# New Approach for Flood Management

## Make Room for Rivers to safely accommodate floods.

### Grey Strategy

- Large, expensive projects
- Economies of scale
- Proven performance
- Exposure to failures, energy markets
- Long design and construction time
- End of pipe technology bears brunt of Climate Change

### Green Strategy

- Smaller, inexpensive projects
- Network requires numerous projects
- Proven on demonstration level
- Low energy inputs reduce exposure to market fluctuations
- Shorter design and construction time
- Resilient to impacts of climate change
- Allows for adaptation and flexibility

# Reconnecting the River...



- ✓ **Protect**: Floodplain acquisition through buyouts and relocations to restore beneficial functions of floodplains, establish greenways, parks, recreational space.

**Restore**: Setting levees back, retiring sensitive agricultural lands, and restoring riparian vegetation increases storage.



- ✓ **Replicate**: Implementing green infrastructure and working with nature reduces flood flows and enhance water quality.

# Areas of Progress Sustainable Green Flood Management (Make Room for the River)

Boulder, CO  
Milwaukee, WI  
Charlotte, NC  
Otter Creek, VE  
Portland, OR  
Denver, CO  
Napa, CA  
Ottawa, IL  
Pierce County,  
OR  
Sacramento, CA  
New Madrid  
Floodway







A wide-angle photograph of a vast, open field of golden-brown grass, likely a prairie or meadow. The field stretches to a flat horizon line. In the distance, a line of green trees is visible against the sky. The sky is a vibrant blue, filled with numerous fluffy white cumulus clouds of various sizes. The overall scene is bright and clear, suggesting a sunny day.

Questions?