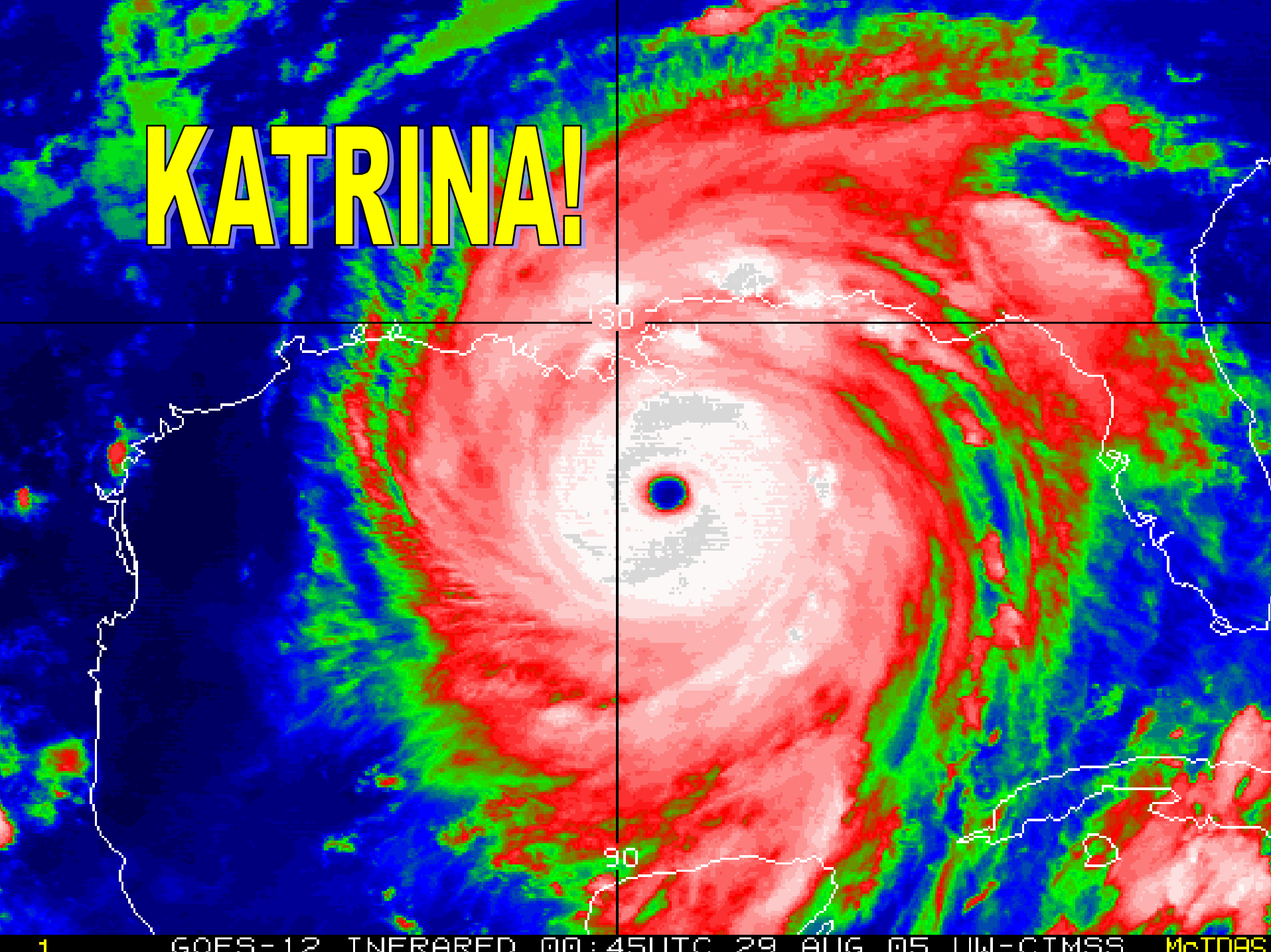
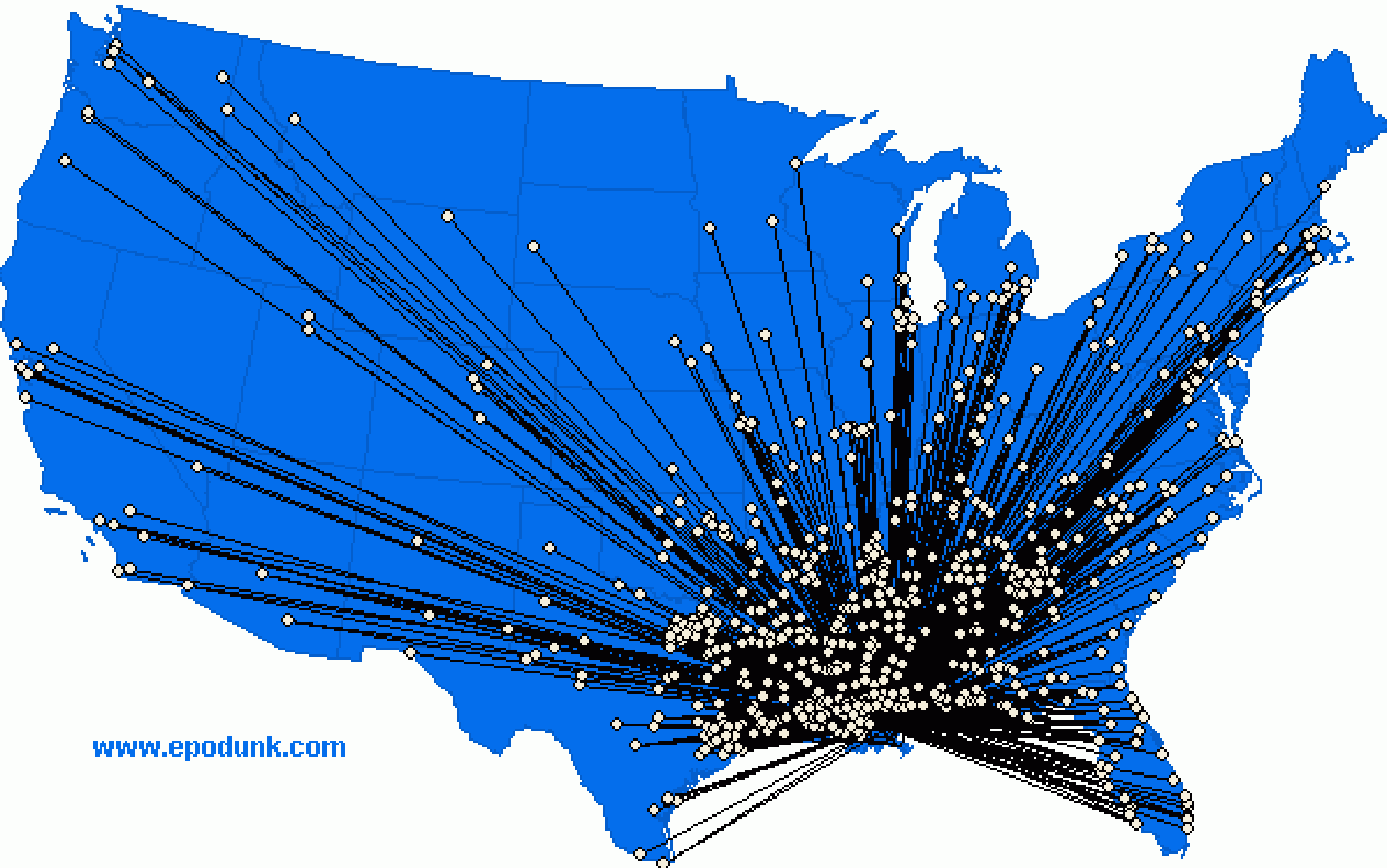


**FLOODS ARE AN ACT OF
GOD; FLOOD DAMAGES
RESULT FROM ACTS OF MEN.**

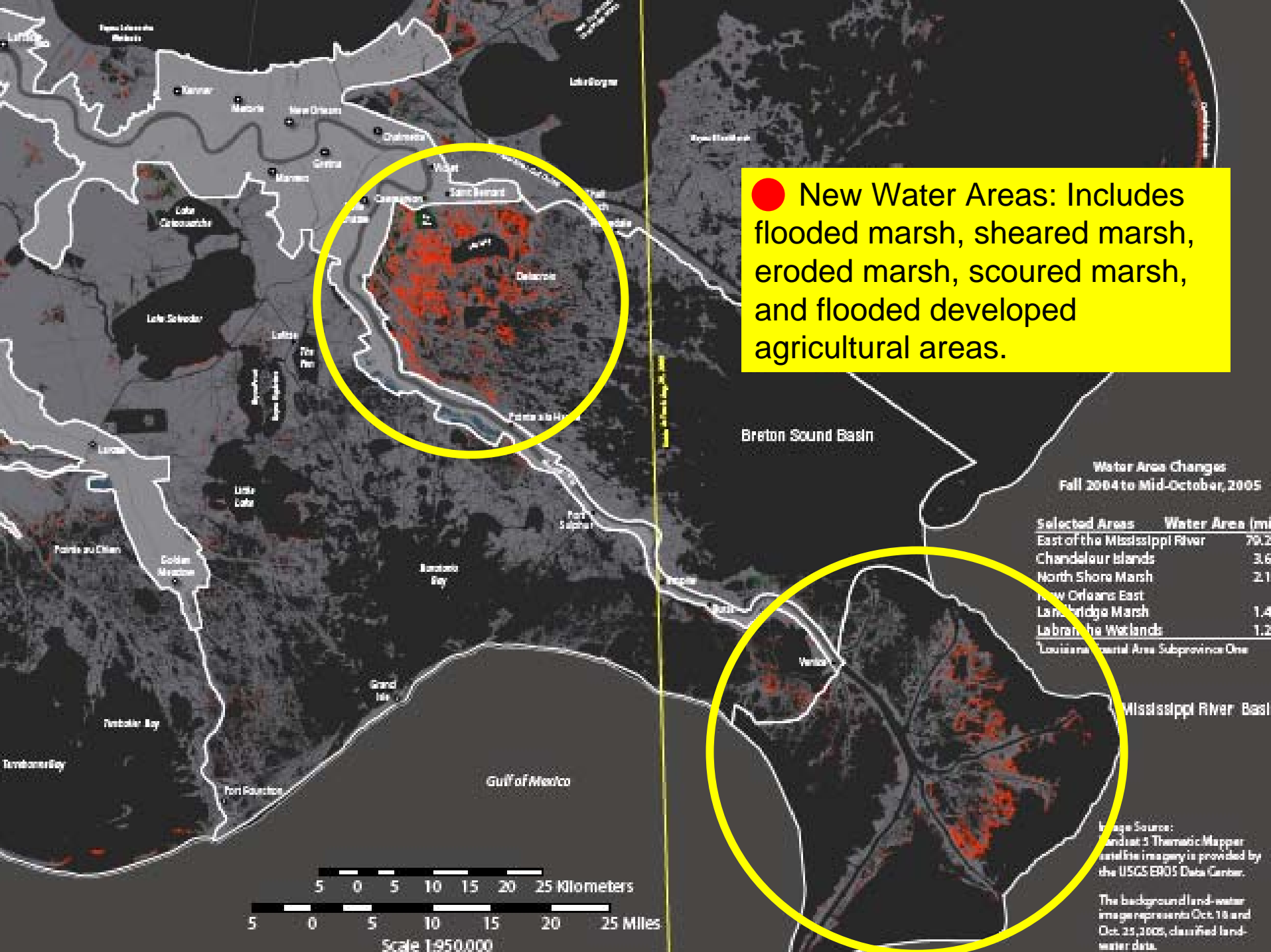
**House Document 465, 89th Congress, 2d Session:
A Unified National Program for Managing Flood Losses,
August 1966**

KATRINA!





www.epodunk.com



● **New Water Areas:** Includes flooded marsh, sheared marsh, eroded marsh, scoured marsh, and flooded developed agricultural areas.

Water Area Changes
Fall 2004 to Mid-October, 2005

Selected Areas	Water Area (mi ²)
East of the Mississippi River	79.2
Chandeleur Islands	3.6
North Shore Marsh	2.1
New Orleans East	1.4
Lafourche Wetlands	1.2
Louisiana Coastal Area Subprovince One	

5 0 5 10 15 20 25 Kilometers
5 0 5 10 15 20 25 Miles
Scale 1:950,000

Image Source:
Landat 3 Thematic Mapper
satellite imagery is provided by
the USGS EOS Data Center.

The background land-water
image represents Oct. 18 and
Oct. 25, 2005, classified land-
water data.





How Did This Happen?

FPMS/PAS Conference

Looking to the Future: Time To Do Something About Flood Damages

Napa, CA

December 4, 2007

Gerald E. Galloway, Jr., PE, PhD

**Water Policy Collaborative, University of Maryland
Maas-White Scholar, US Army Corps of Engineers IWR
President, American Water Resources Association**



Caution

THE SPEAKER DOES NOT REPRESENT ANYONE OR ANY AGENCY.

THE OPINIONS EXPRESSED ARE HIS OWN AND DO NOT REFLECT, NECESSARILY, THE POSITIONS OF AWRA, THE UNIVERSITY OF MARYLAND, THE ARMY CORPS OF ENGINEERS OR ANYONE ELSE.



Fear the Turtle



**WE HAVE MET
THE ENEMY
AND HE IS US.**



Floods Were Part of Early North American History



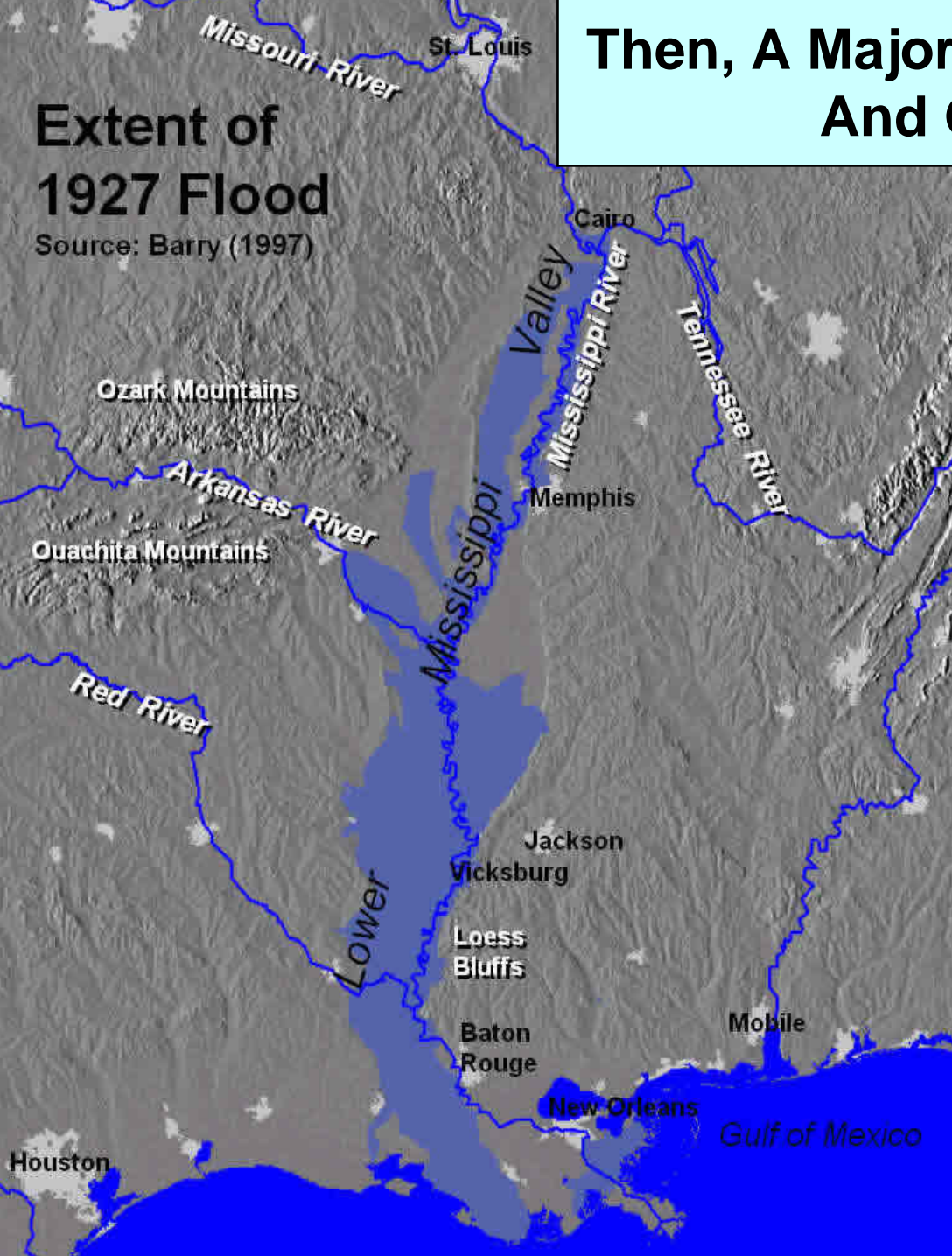
And People Tried to Deal wit the Flood Challenge



Then, A Major Flood Occurred in 1927... And Got Our Attention

Extent of 1927 Flood

Source: Barry (1997)



Lowell

And Again in 1936



Pittsburgh



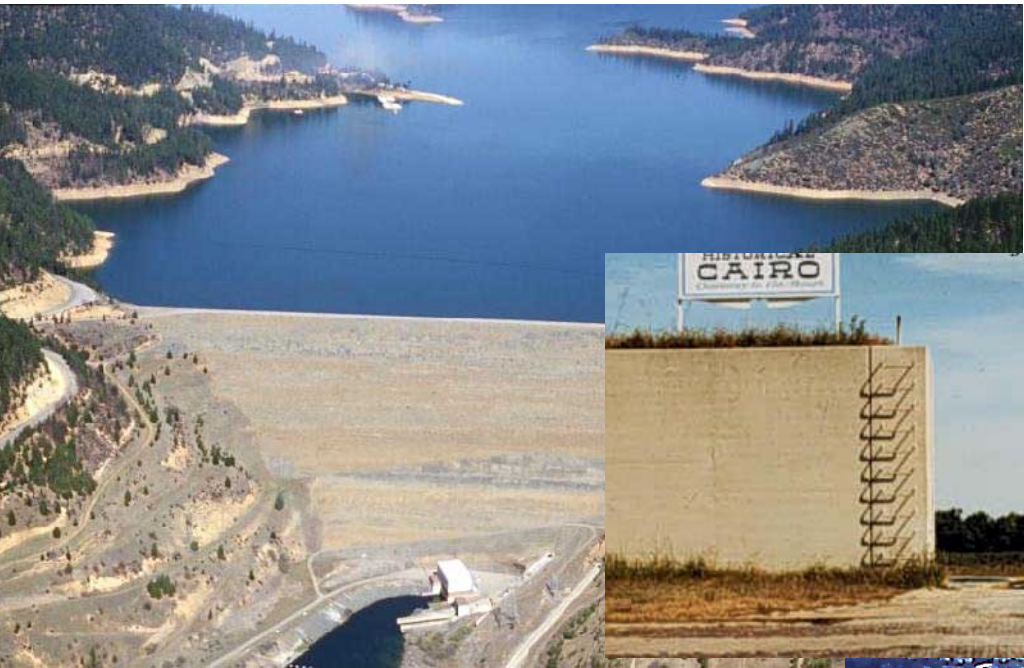
Early Guidance on Flood Damage Reduction

Flood Control Act of 1936 - The Nation

- ...destructive floods upon the rivers...constitute a menace to national welfare; it is the sense of Congress that ***flood control*** is a proper activity of the ***Federal Government***

People

In 1936 It Was **Control** the Floods!



**Keep the
Water Away**



And Flood Protection Was Extended Across the Nation



And the Flood Control Infrastructure Has Provided Protection to Millions

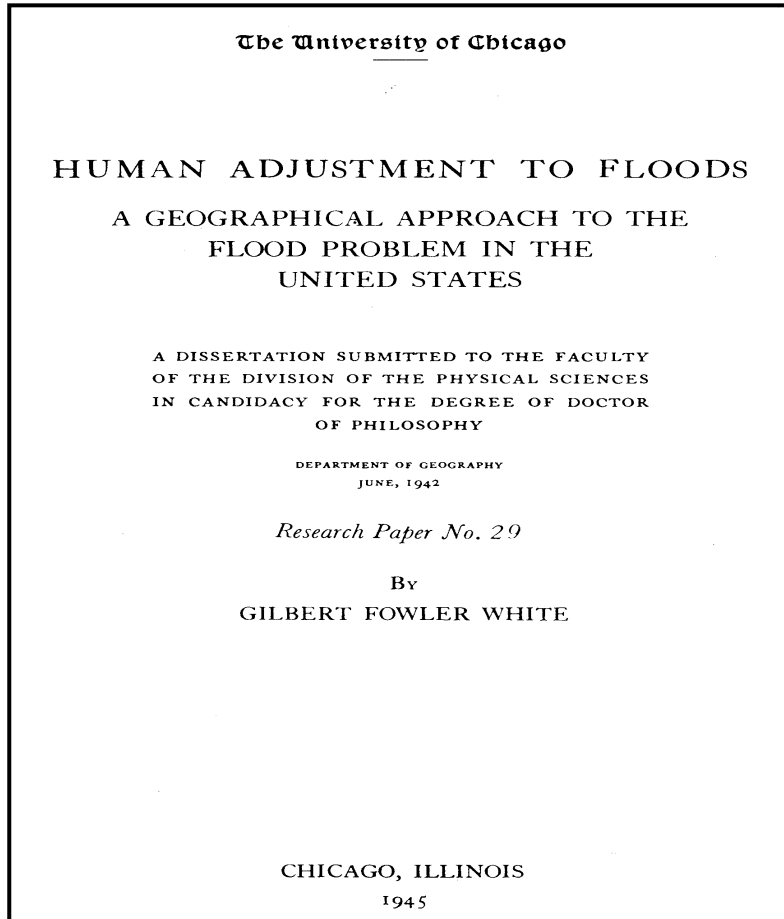


But It and Other Human Activity Caused Significant Environmental Degradation

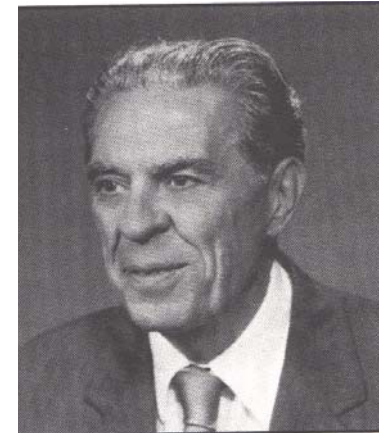


But Some Had Other Ideas

The Birth of Floodplain Management



Gilbert White



Jim Goddard

- **1953 -TVA Floodplain Management**
- **1960 - Corps Floodplain Management Services**



Thinking in Broader Terms



- **Senate Select Committee on Water Resources**
- **Water Resources Planning Act of 1965**
 - » **Water Resources Council - Coordination**
 - » **Basin Planning- Comprehensiveness**
 - » **Principles and Standards - 4 Accounts**

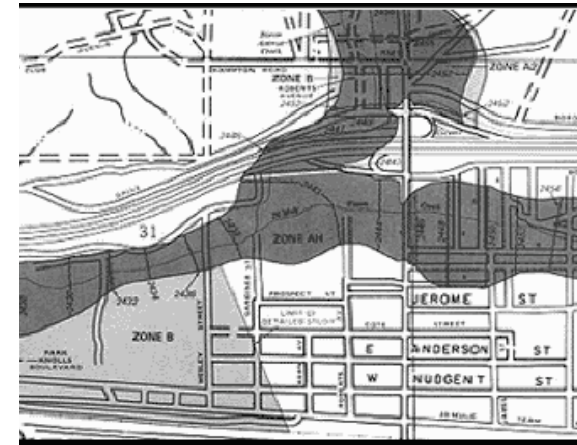
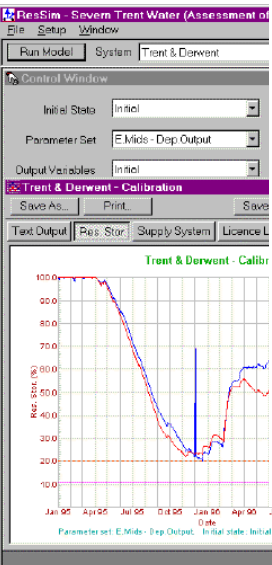
Understanding the Environment

- **Recognition of the Problem**
- **Environmental Movement**
- **NEPA and Follow-On Legislation**



National Flood Insurance Program

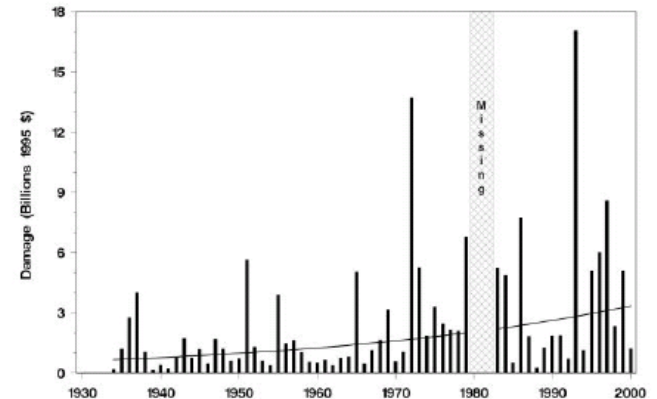
- » Established in 1968
- » Led to National Flood Hazard Mapping Program
- » Mandatory Purchase Provisions in 1973



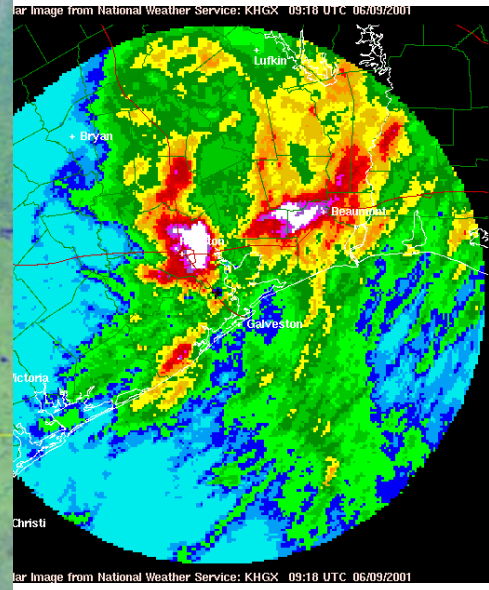
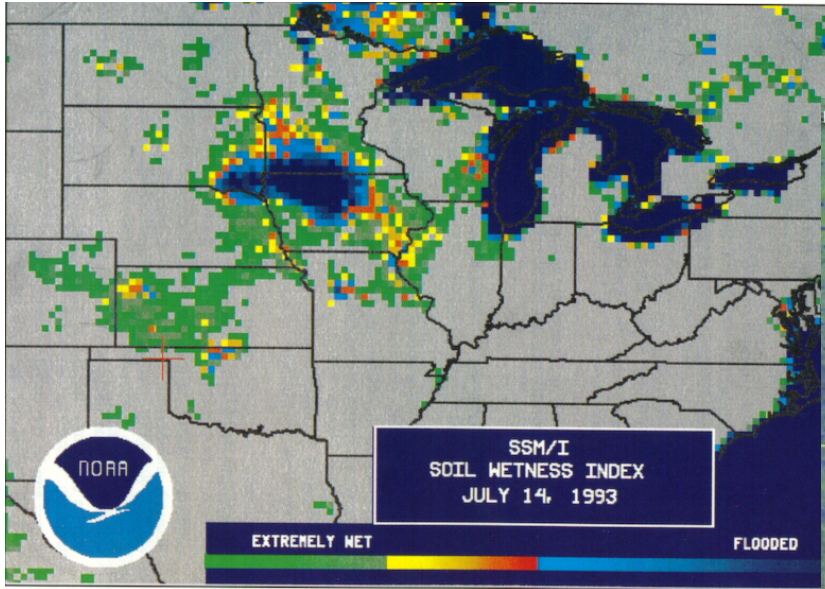
Spring is flood season
Get Flood Insurance

We Still Have a Flood Challenge

- 71 Years of Flood Control
- 39 Years of Flood Insurance
- Increasing Flood Damages
 - Average annual losses - \$6 Billion (BK)
- Inadequate Protection
- Inadequate Maintenance



- Major Floods Have Been Significant Hydrometeorologic Events



And Major Floods Will Continue to Occur

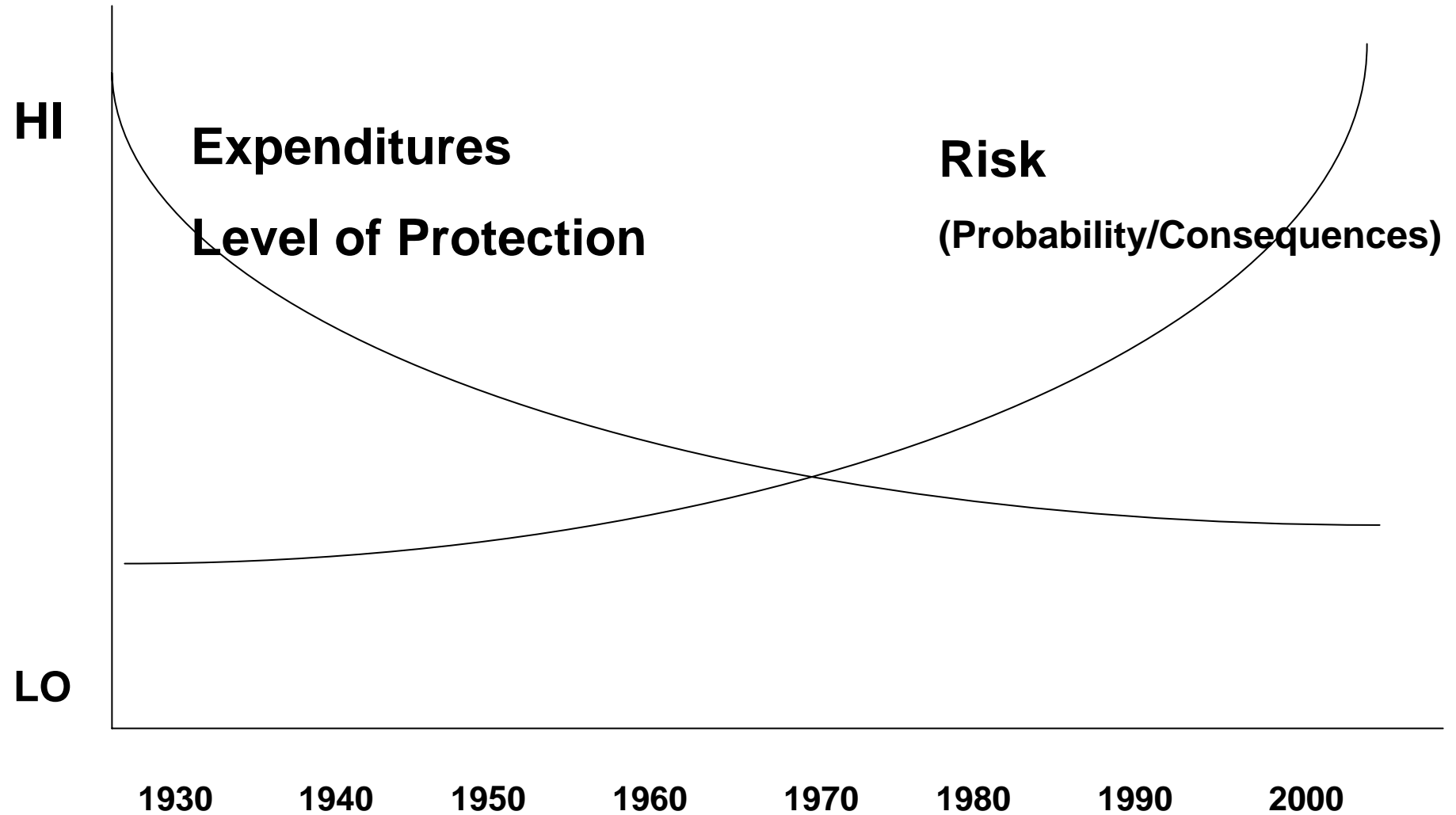
We Have Identified Needs

- Define Responsibilities
- Take Balanced and Systems Approach
- Revise Principles and Guidelines
- Avoid Unnecessary Use of Floodplain
- Increase the Level of Protection
- Use Non-structural Techniques
- Maintain and Upgrade Infrastructure
- Identify Risks – Structure Location and Condition
- Continue Insurance Reform
 - » Repetitive Losses
 - » Residual Risk

We Know
the
Solution



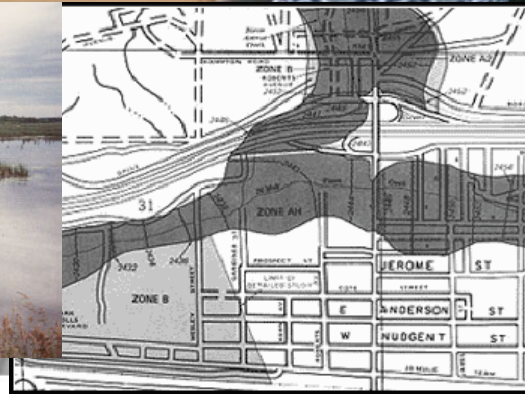
Losing Sight of the Mission



Tight (Short-Term) Economics....

Environmental Concerns

**Cost Sharing
and the 100-
year Flood
Standard**



Flood Protection Levels: Started Strong and Finished Weak

1936

Today

200-1250
Year

Rivers

500 -1000 year

>100 year (no standard)

Coasts

No standard

10,000 Year

200-300 year



We Are Letting People Believe They Are Safe

- The Assumption is Protection
- We Don't Talk About or Prepare for Disaster



We Don't Communicate Residual Risk

- Things Do Go Wrong and Consequences Can Be Estimated
- No Incentive or Requirement to Cover This Risk
- Exposure is Federal Government's



We Are Ignoring Policies that:

- Promote intensification in risk areas
- Ignore changing conditions
- Provide 35 year old H&H for current maps
- Ignore adverse impacts to existing properties
- Undervalue natural floodplain functions

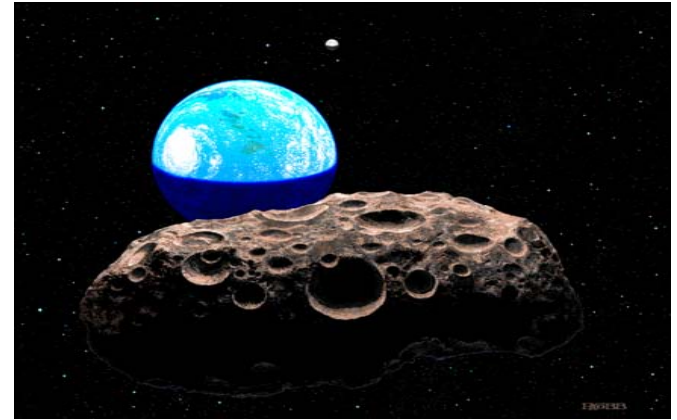


Where Are We Going?



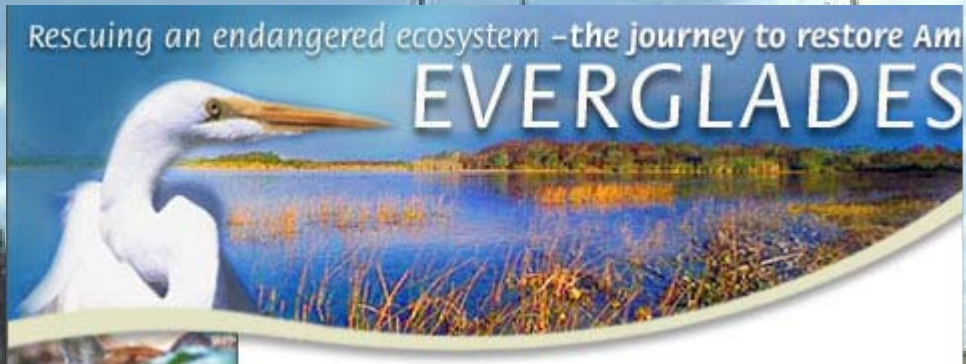
Photo by J Korn

Into the 21st Century!



- **Population Explosion**
- **Pressures for Development**
- **Scarce Resources**
- **Technological Surge**
- **Volatile, Uncertain, Complex, Ambiguous National and World Situations (\$\$\$)**

VUCA



CHESAPEAKE BAY FOUNDATION

Save the Bay

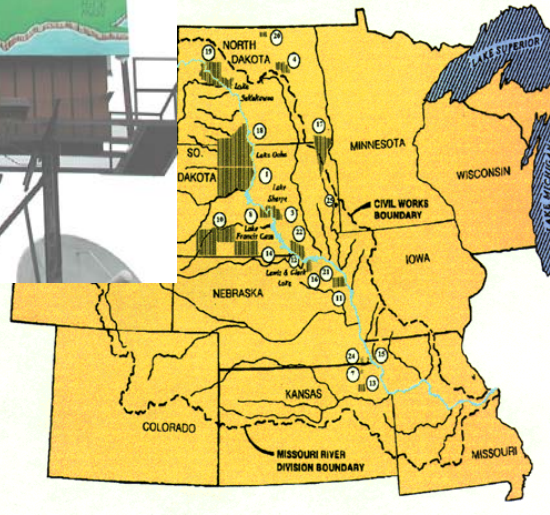
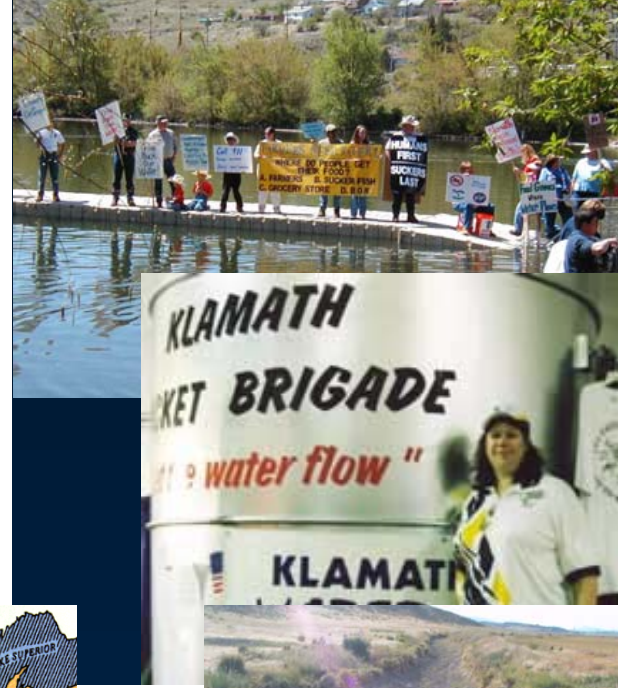


California Bay-Delta Authority

The mission of the California Bay-Delta Program is to develop and implement a long-term comprehensive plan that will restore ecological health and improve water management for beneficial uses of the Bay-Delta.

Restoration

Conflict!!



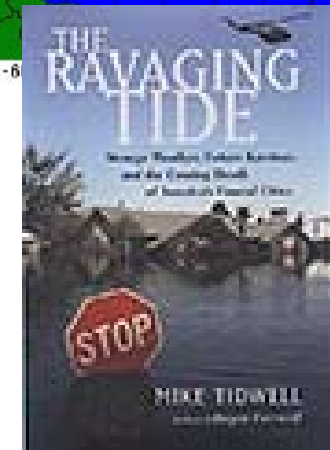
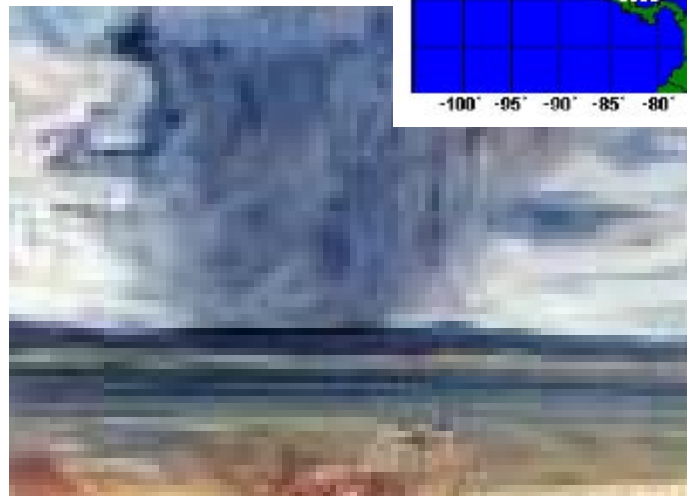
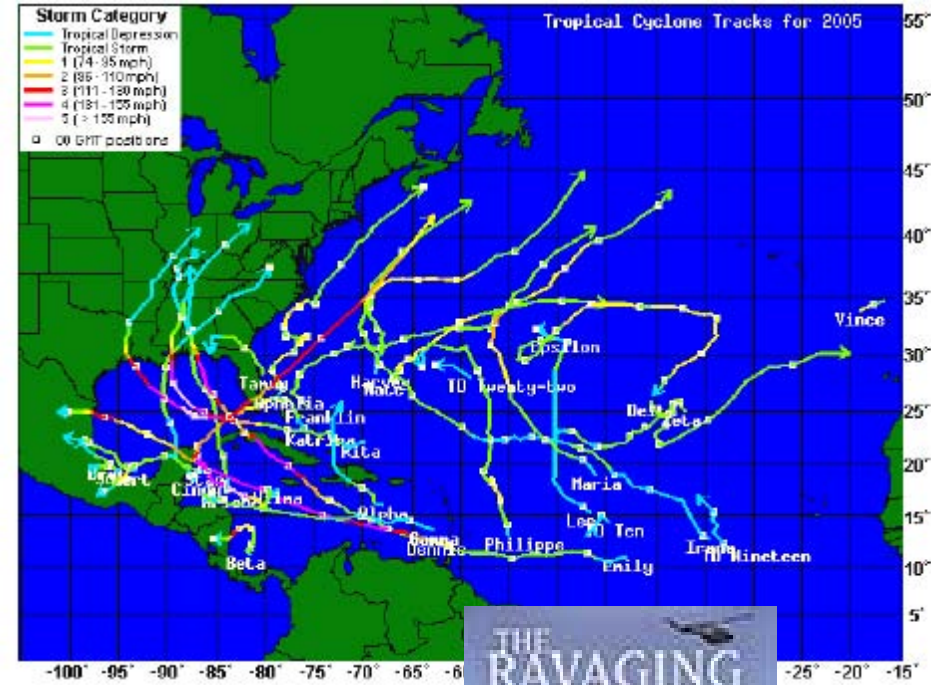
Infrastructure Shortfalls

- Annual Shortfall – Wastewater - \$12 Billion
- Annual Shortfall – Water treatment - \$11 Billion
- >3500 Unsafe Dams
- 30% Shortfall in Hydro
- Levee Backlog



Climate Change Bears

- Glacial Melt - Sea Level Rise
- Increased Hurricane Intensity -SST
- Increased Coastal and Riverine Flood Potential



Dealing with Climate Change: Project Foresight

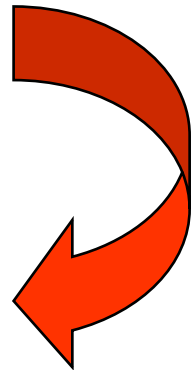


HM TREASURY

- 1) Maintain current flood policies and expenditure, accept reduced standards of flood protection and hence a substantial increase in flood risk, and live with the increase in Expected Annual economic Damage; or
- 2) Reduce flood risk by the application of a portfolio of flood response measures to levels at or similar to the present; or
- 3) Reduce flood risk further, which may be difficult in economic and sustainability terms under some scenarios, but feasible under others

Political Power

- Shift in center of gravity from federal to state level
 - » **Strong Governors**
 - Schwarzenegger
 - Spitzer
 - Bush
 - » **State Funding**
 - Everglades funding
 - California Bonds
 - Louisiana Off-Shore Oil Revenue
 - » **Dam Safety**
 - » **Water Quality**



Shifting Policies - WRDA 2007

- **2031. (a) National Water Resources Planning Policy-** It is the policy of the United States that all water resources projects should reflect national priorities, encourage economic development, and protect the environment by--
 - (1) seeking to maximize sustainable economic development;
 - (2) seeking to avoid the unwise use of floodplains and flood-prone areas and minimizing adverse impacts and vulnerabilities in any case in which a floodplain or flood-prone area must be used; and
 - (3) protecting and restoring the functions of natural systems and mitigating any unavoidable damage to natural systems.
- **(b) Principles and Guidelines-**

Not later than 2 years after the date of enactment of this Act, the Secretary shall issue revisions, consistent with paragraph (3), to the principles and guidelines for use by the Secretary in the formulation, evaluation, and implementation of water resources projects.

 - (3) **CONSIDERATIONS-** In developing revisions to the principles and guidelines under paragraph (2), the Secretary shall evaluate the consistency of the principles and guidelines with, and ensure that the principles and guidelines address, the following:
 - (A) The use of best available economic principles and analytical techniques, including techniques in risk and uncertainty analysis.
 - (B) The assessment and incorporation of public safety in the formulation of alternatives and recommended plans.
 - (C) Assessment methods that reflect the value of projects for low-income communities and projects that use nonstructural approaches to water resources development and management.
 - (D) The assessment and evaluation of the interaction of a project with other water resources projects and programs within a region or watershed.
 - (E) The use of contemporary water resources paradigms, including integrated water resources management and adaptive management.
 - (F) Evaluation methods that ensure that water resources projects are justified by public benefits.
- **(4) CONSULTATION AND PUBLIC PARTICIPATION-**

WRDA 2007 Sec 2031

National Water Resources Planning Policy

- It is the policy of the United States that all water resources projects should reflect national priorities, encourage economic development, and protect the environment by--
 - (1) seeking to maximize sustainable economic development;
 - (2) seeking to avoid the unwise use of floodplains and flood-prone areas and minimizing adverse impacts and vulnerabilities in any case in which a floodplain or flood-prone area must be used; and
 - (3) protecting and restoring the functions of natural systems and mitigating any unavoidable damage to natural systems WRDA

WRDA 2007 Sec 2031

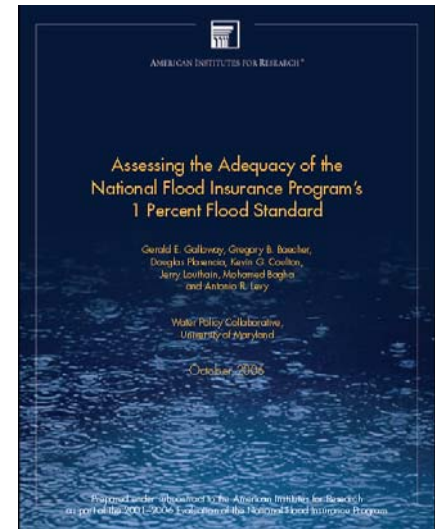
Principles and Guidelines

...ensure that the principles and guidelines address, the following:

- (A) The use of best available economic principles and analytical techniques, including techniques in risk and uncertainty analysis.
- (B) The assessment and incorporation of public safety in the formulation of alternatives and recommended plans.
- (C) Assessment methods that reflect the value of projects for low-income communities and projects that use nonstructural approaches to water resources development and management.
- (D) The assessment and evaluation of the interaction of a project with other water resources projects and programs within a region or watershed.
- (E) The use of contemporary water resources paradigms, including integrated water resources management and adaptive management.
- (F) Evaluation methods that ensure that water resources projects are justified by public benefits

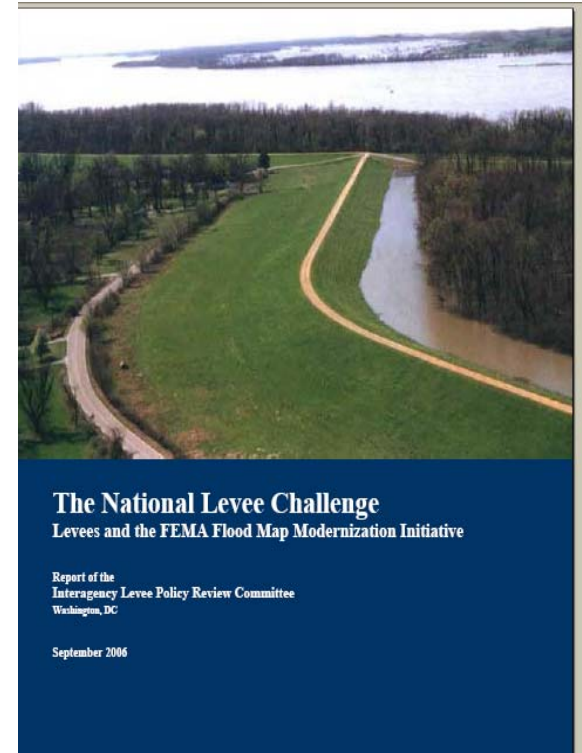
Potential Changes in NFIP

- Extend Insurance to 500 year Floodplain
- Require Insurance Behind Levees
- Consider Future Conditions Hydrology
- Charge Actuarial Rates in All Zones



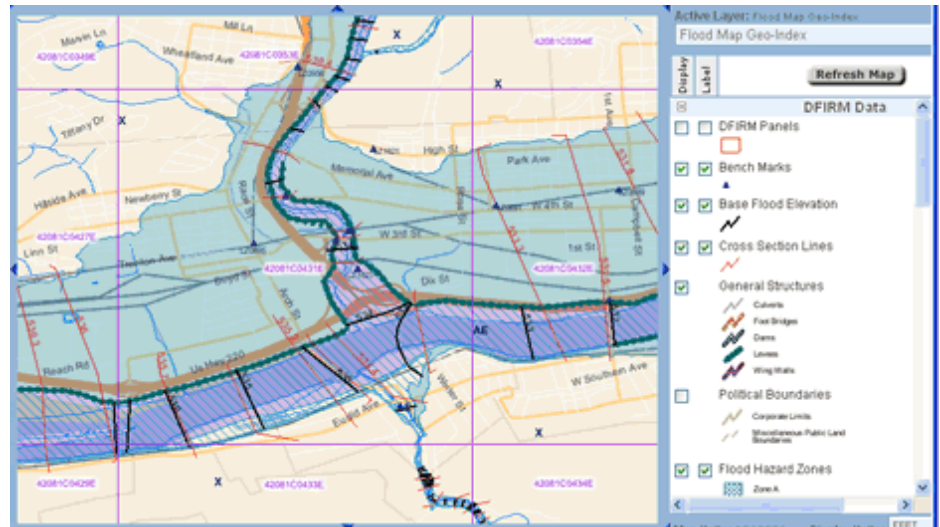
Levees

- Inspection and Assessment of Levees
 - » Decertifications
- Planning for Residual Risk
- Insurance Behind Levees
- Increased Risk Communication
- Move to Risk-Based Methodologies



Flood Map Modernization

- Improved Map Accuracy...but
 - » 54% Digital Conversions
 - » 33% No New H&H
- Strong Local Input ..in some states and municipalities
- Map Maintenance at Local Level

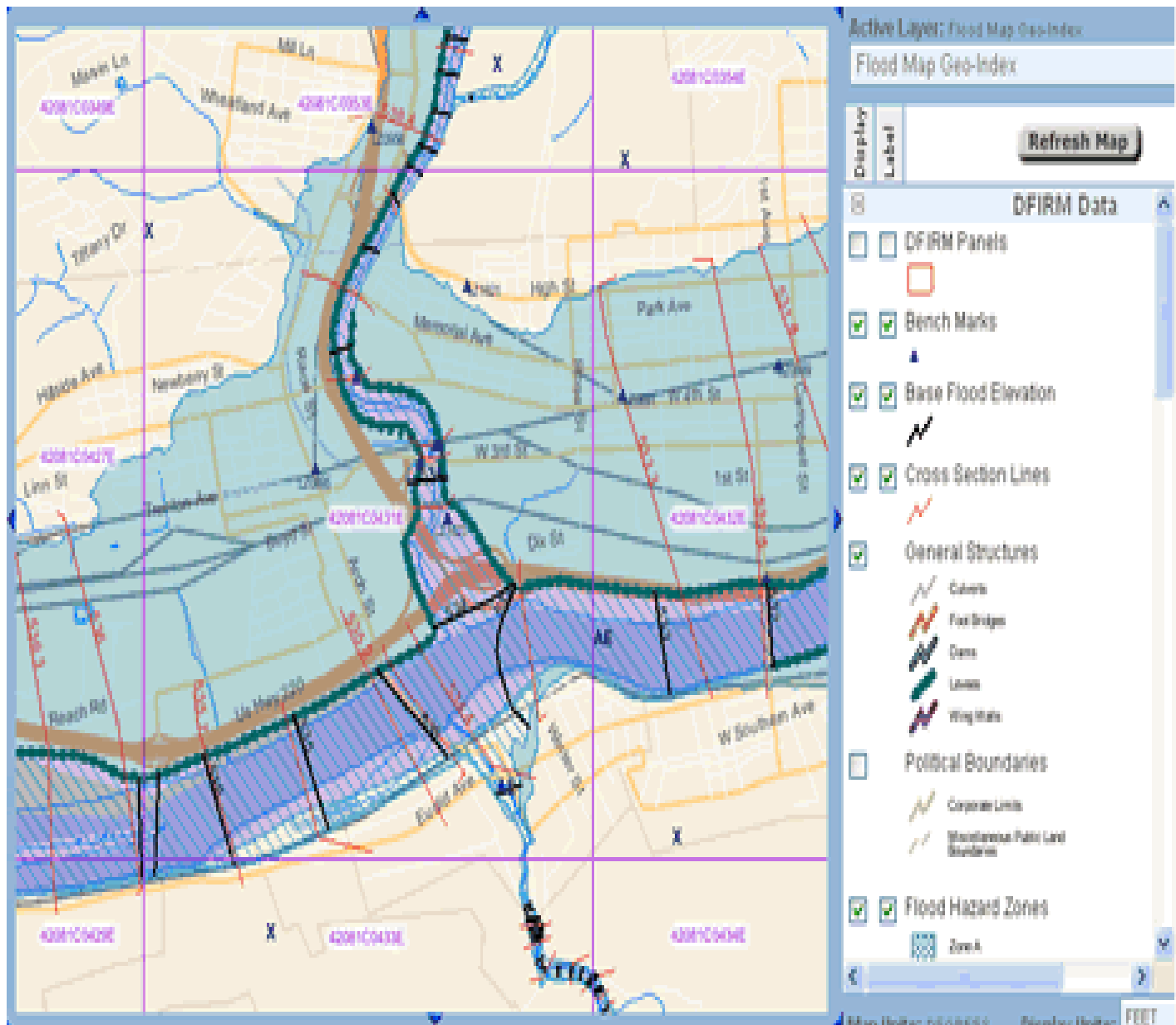


Flood Maps of Tomorrow

- Risk Mapping
- Multi-Hazard Risk Identification
- Individual Hazard Identification Systems
- Who Is in Charge?



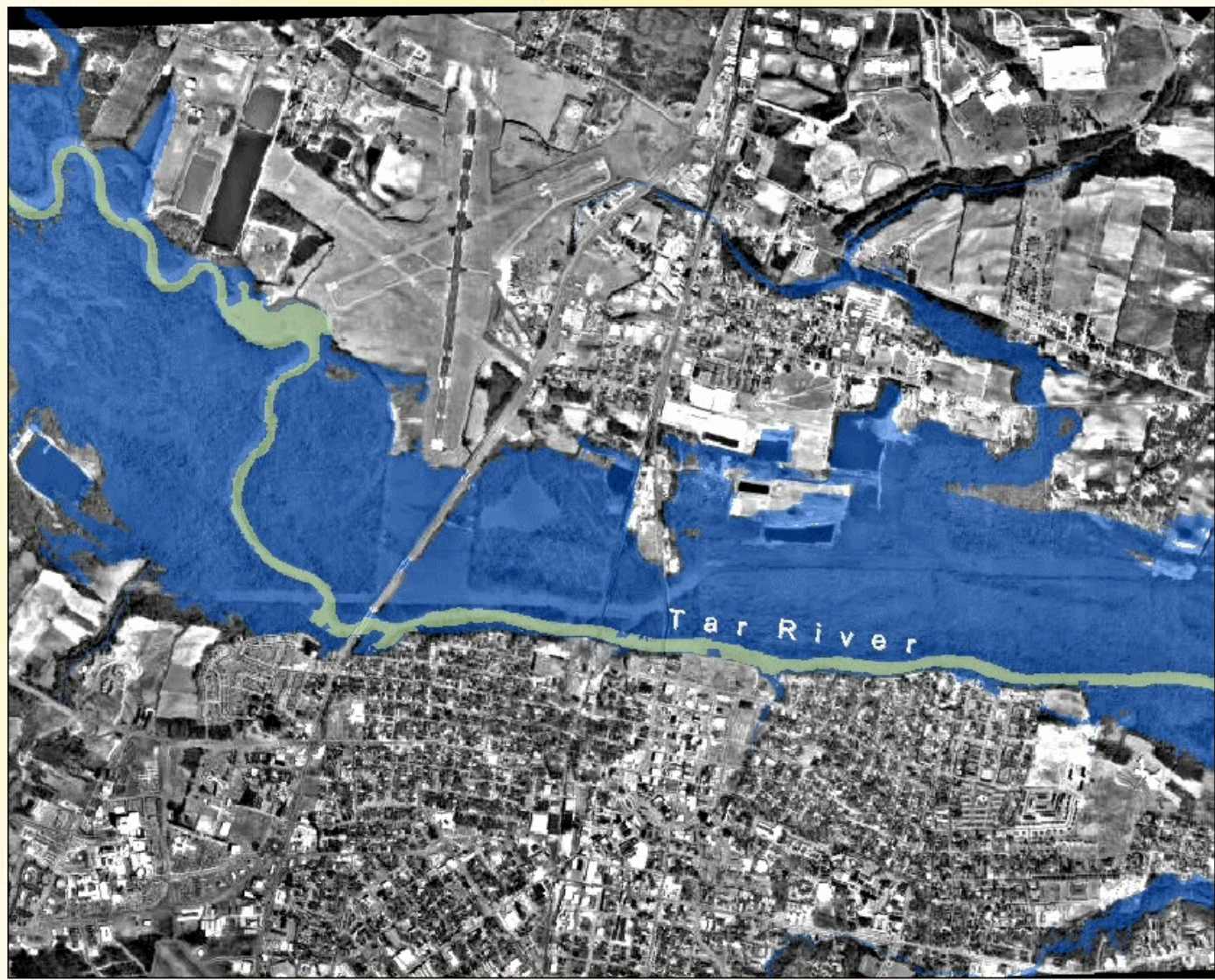
FEMA



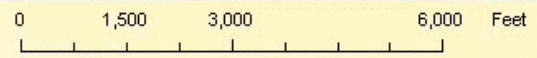
NOAA

Tar River Flooding Near Greenville, NC - Sept. 15-20, 1999

15th - 0100 (16.23 FT)

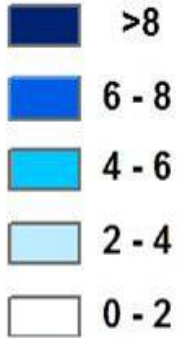


1 inch equals 2,260 feet

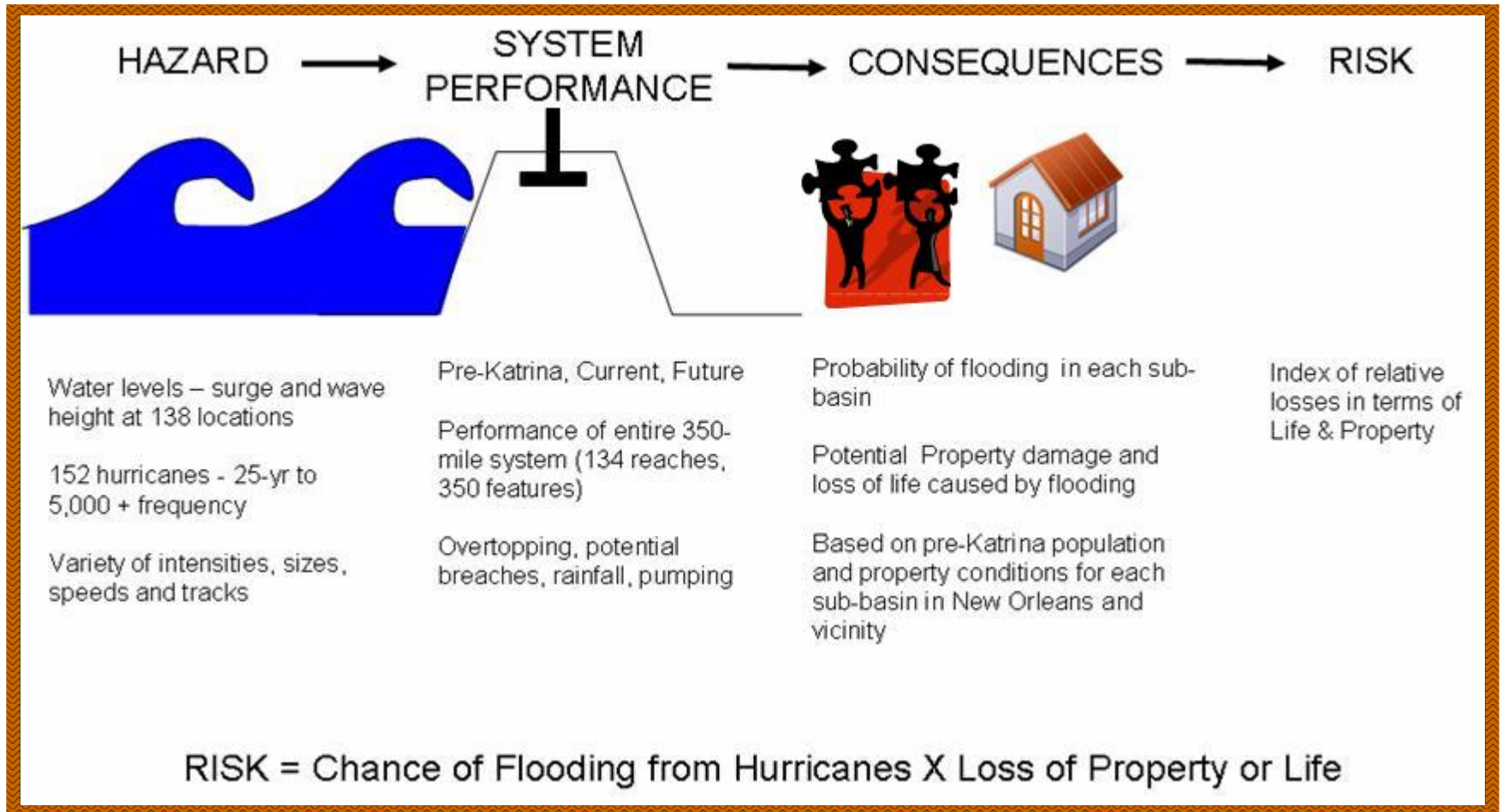


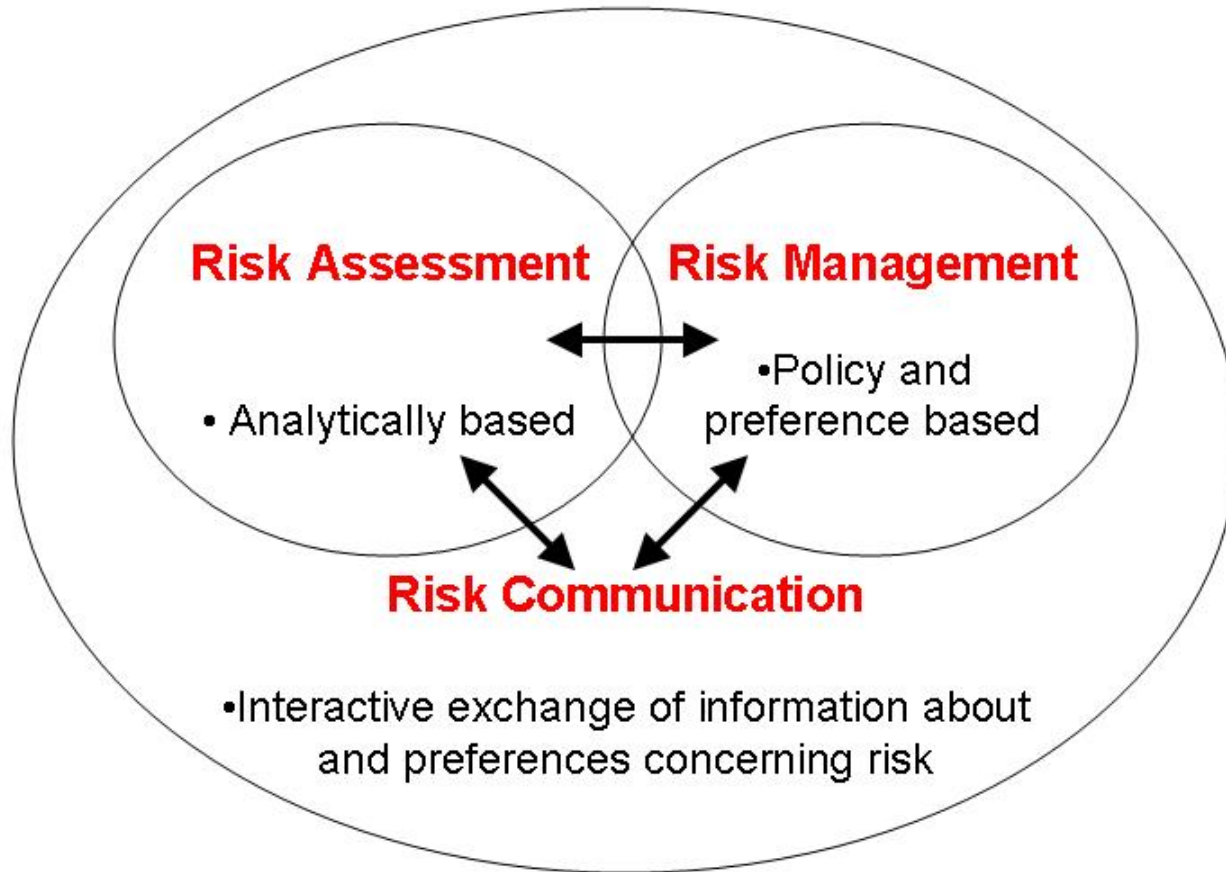
Corps

Feet of Flooding



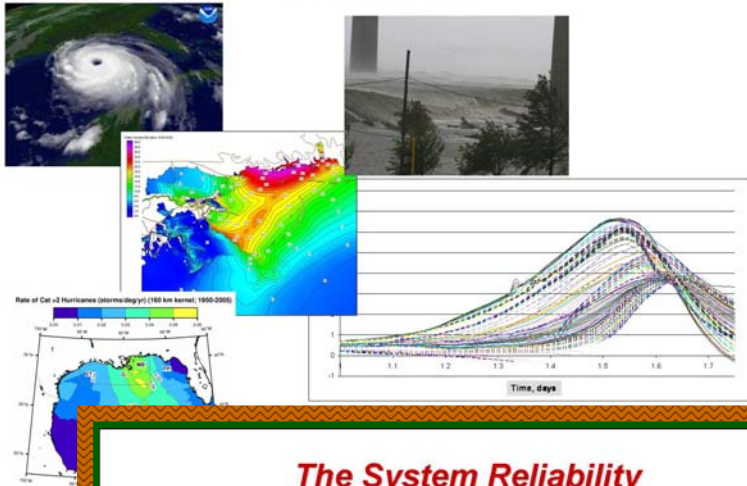
IPET Risk Assessment Model



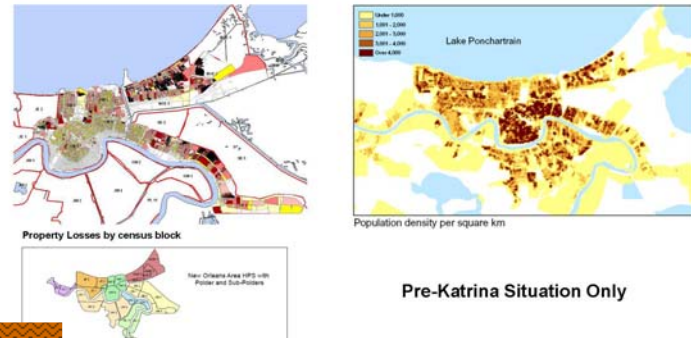


Sound Science

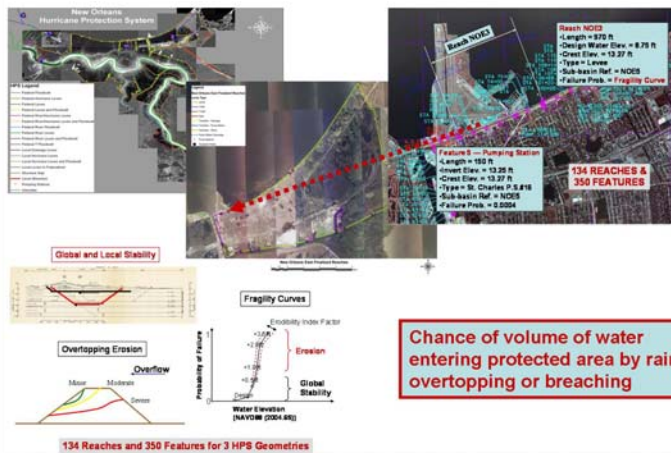
The Hazard



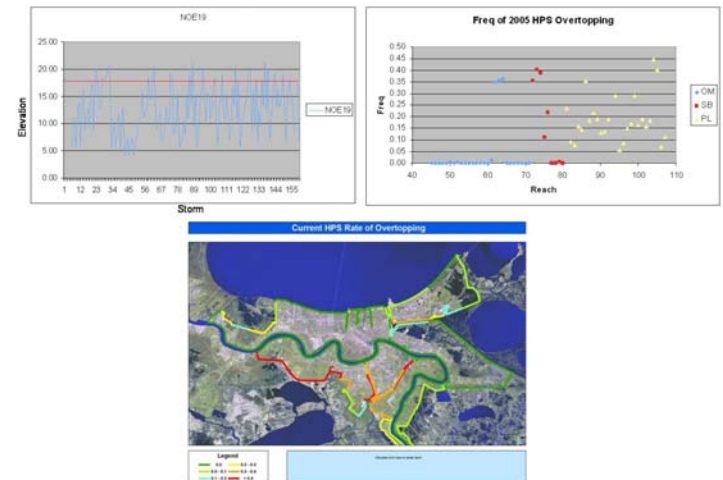
Consequences



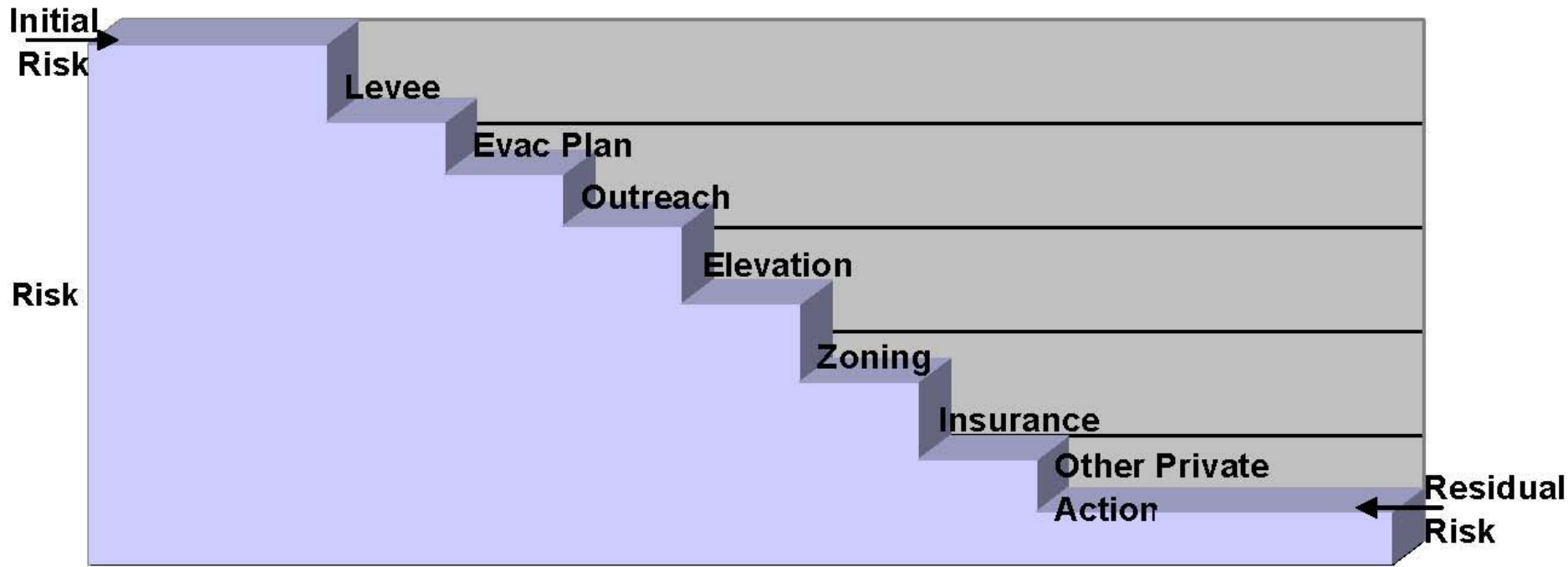
The System Reliability



Risk Assessment Information



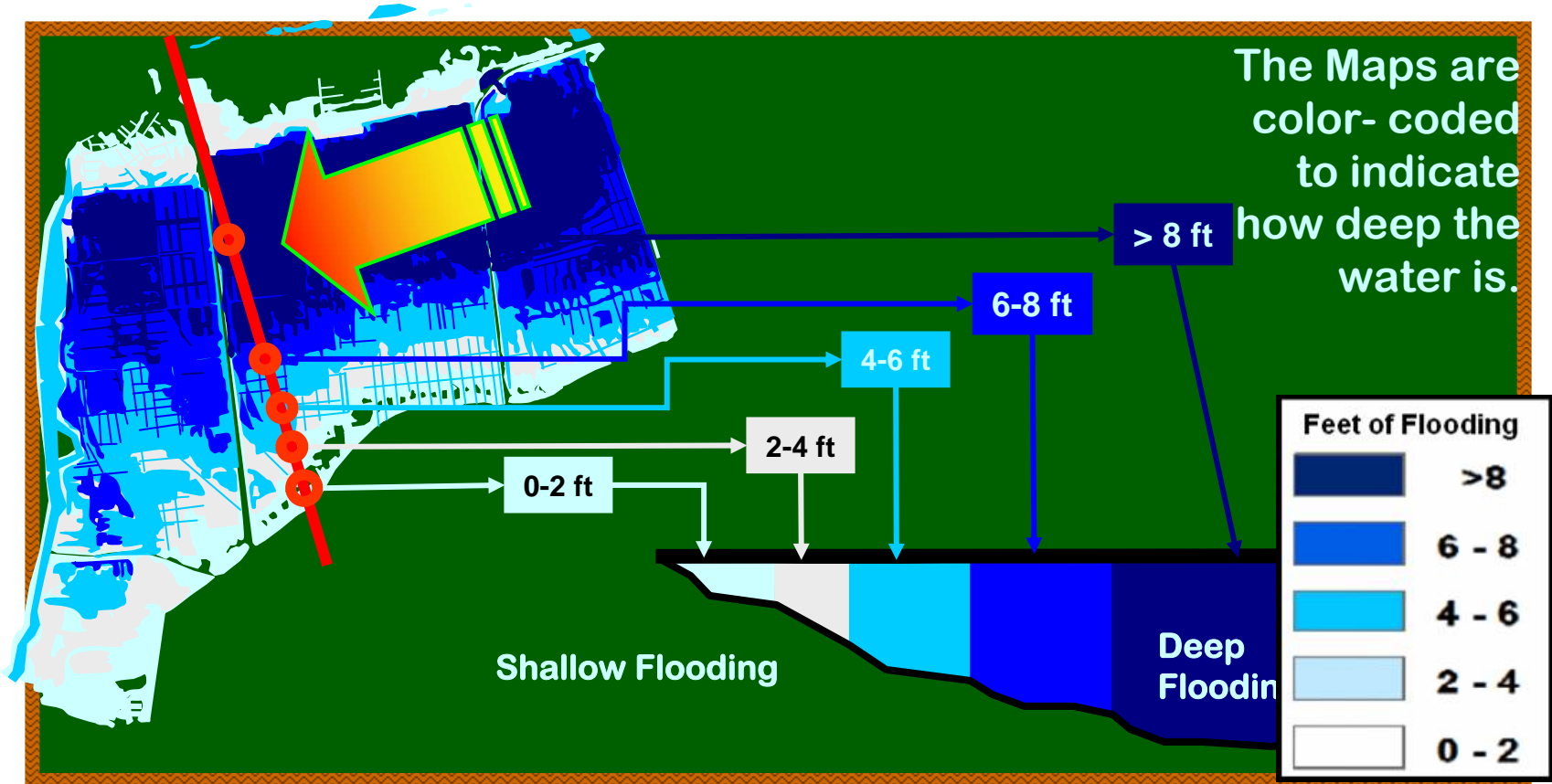
Risk Based Planning



Risk Reduction Tools (Cumulative)

Figure 2

Example of Public Product



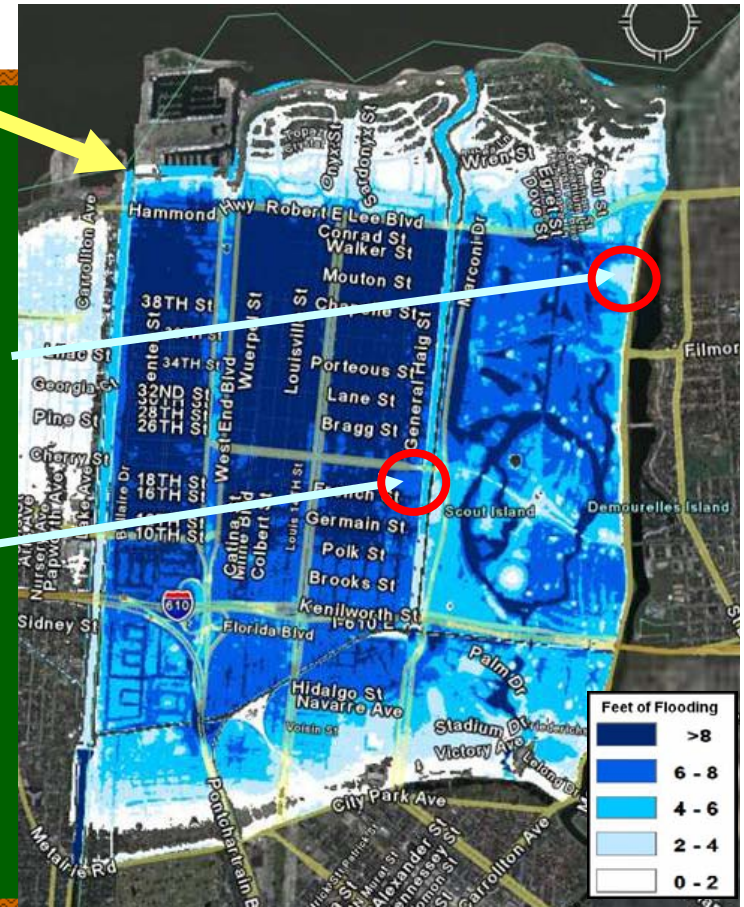
Before Katrina, there was a 1% chance every year of flooding this deep from Hurricanes

Lakeview

17th Street Canal

John F. Kennedy High School

Edward Hynes Elementary School



This is the same chance as having your car stolen in any year.

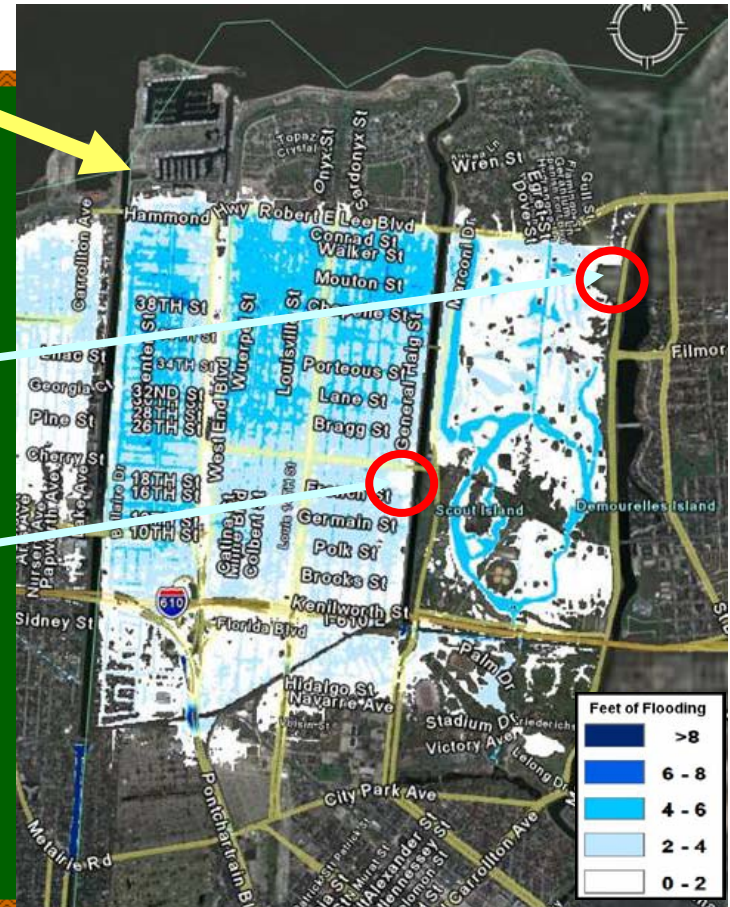
Today, there is a 1% chance every year of flooding this deep from Hurricanes

The current completed work has reduced the likely depth of flooding in Lakeview by over 5 feet.

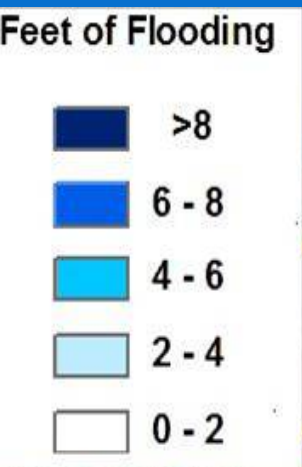
17th Street Canal

John F. Kennedy High School

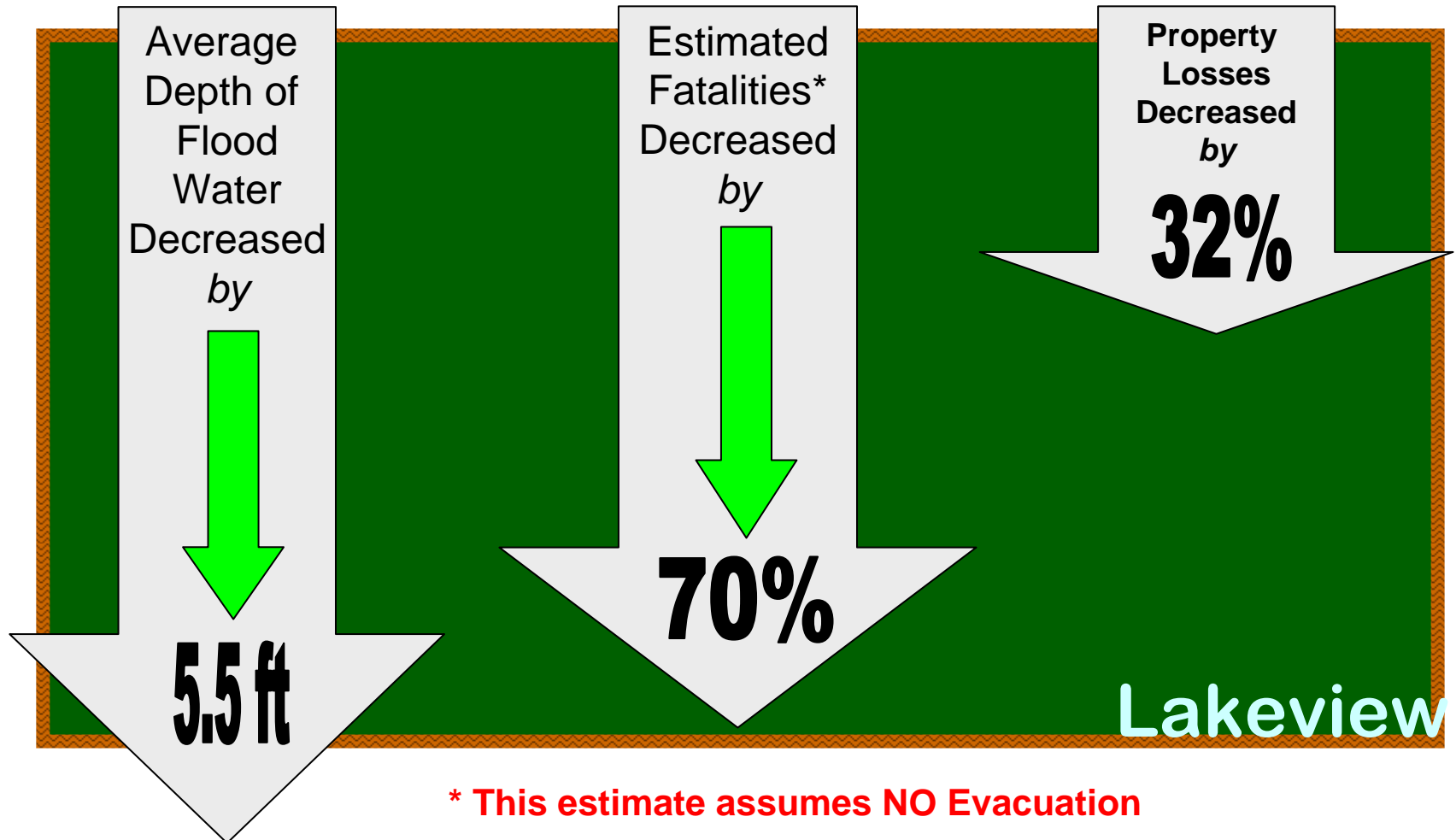
Edward Hynes Elementary School



Today, you have a **0.2% chance** (1 in 500) every year of flooding this deep from **Hurricanes**

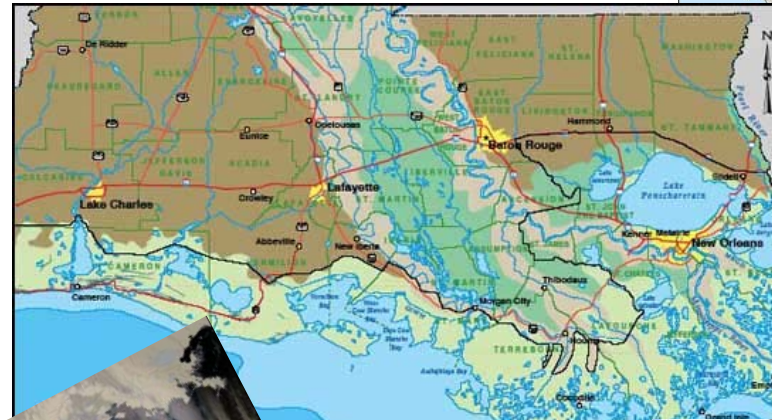
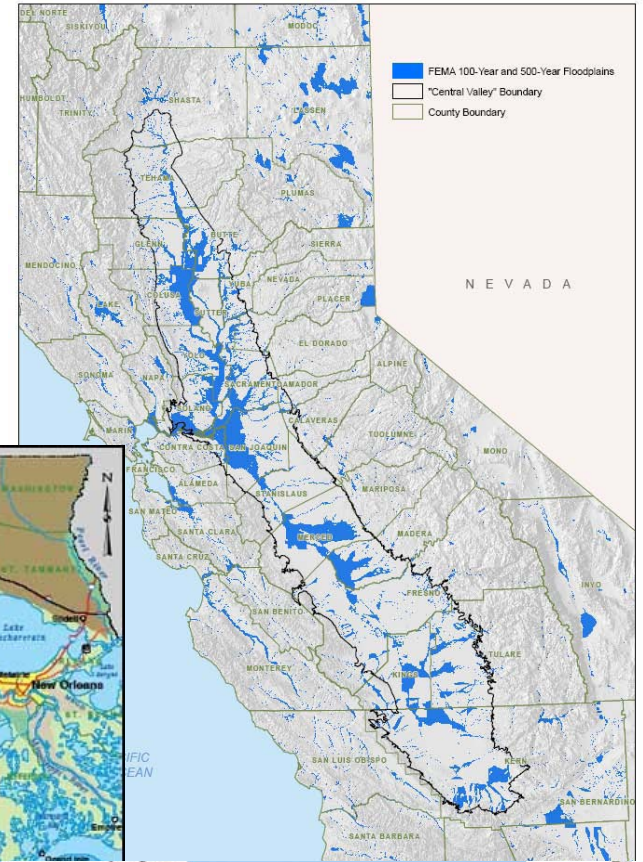


Reduction of Consequences



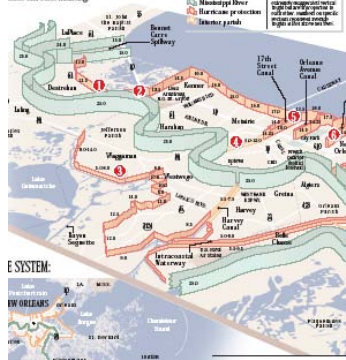
Opportunities

- NOLA
- Sacramento –San Joaquin
- Etc.



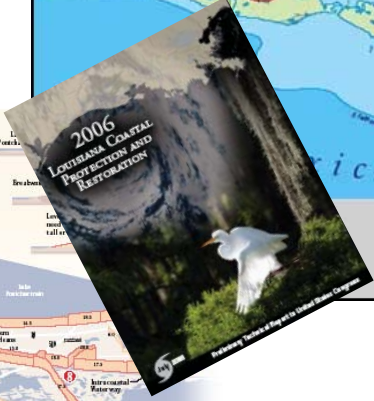
MASTERS OF EARTH AND CONCRETE

Levees that protect against flooding from both the Mississippi River and hurricanes are built by the Corps of Engineers and are maintained by local levee districts. The Corps and the local districts share the cost of maintenance leases, with the Mississippi River levees as a federal project. Local levee districts do maintain non-federal, lower elevation levees. Local levee districts share the cost of maintenance leases and state financing.



HEIGHT ISN'T EVERYTHING

Mississippi River levees are built by the Corps of Engineers and are maintained by local levee districts. The Corps and the local districts share the cost of maintenance leases, with the Mississippi River levees as a federal project. Local levee districts do maintain non-federal, lower elevation levees. Local levee districts share the cost of maintenance leases and state financing.



The FPMS COP Needs to:

- Work as a Team
 - » Horizontally/Vertically
 - » Across Corps - Regulatory/Planning/Etc
- Provide Links to States - Silver Jackets
- Know the Territory
- Push/demand Non-Structural
- Push Comprehensiveness
- Use Authorities to Make Things Happen (LCA)
- Remember the Federal Interest is Not Necessarily the Local Interest

The Bottom Line

- We Have Let the Corps Floodplain Management Program Wither
- FPMS/PAS Are a Critical Component of Flood Damage Reduction-Risk Management
- We Need FPMS/PAS to Help Lead a Multi-Program Effort to Ensure Wise Use of the Floodplain –NOW!

Professionalism

Our ethical responsibility is to do what is best for the community, not what is best for the federal government or the Corps or us.



FPMS/PAS Is Here!!



Thank You