

Rethinking Floodplain Management After Katrina

Perspectives on the NFIP, National Water Policy and Protecting and Restoring Natural and Beneficial Functions



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History and Background

- Long history of NWF focus on management of aquatic resources and dependant wildlife
- Management of floodplains
- Agencies involved in water → U.S. Army Corps of Engineers and FEMA/National Flood Insurance Program
- Katrina again has brought floodplain management to the forefront of the public debate



Floodplain Values

WATER RESOURCES

Natural Flood & Erosion Control

- Provide flood storage & conveyance
- Reduce flood velocities
- Reduce flood peaks
- Reduce sedimentation

Water Quality Maintenance

- Filter nutrients & impurities from runoff
- Process organic wastes
- Moderate temperature fluctuations

Ground Water Recharge

- Promote infiltration & aquifer recharge
- Reduce frequency & duration of low surface flows

BIOLOGICAL RESOURCES

Biological Productivity

- Support high rate of plant growth in floodplains
- Maintain biodiversity
- Maintain integrity of ecosystem

Fish & Wildlife Habitats

- Provide breeding & feeding grounds
- Create & enhance waterfowl habitat
- Protect habitats for rare & endangered species

Floodplain Values

HUMAN RESOURCES

Harvest of Wild & Cultivated Products

- Enhance agricultural lands
- Provide sites for aquaculture
- Restore & enhance forest lands

Recreational Opportunities

- Provide areas for active & passive uses
- Provide open space
- Provide aesthetic pleasure

Areas for Scientific Study & Outdoor Education

- Contain cultural resources (historic & archeological sites)
- Provide opportunities for environmental & other studies

Source: Adapted from the Federal Interagency Floodplain Management Task Force's Report. A Unified National Program for Floodplain Management 1994.

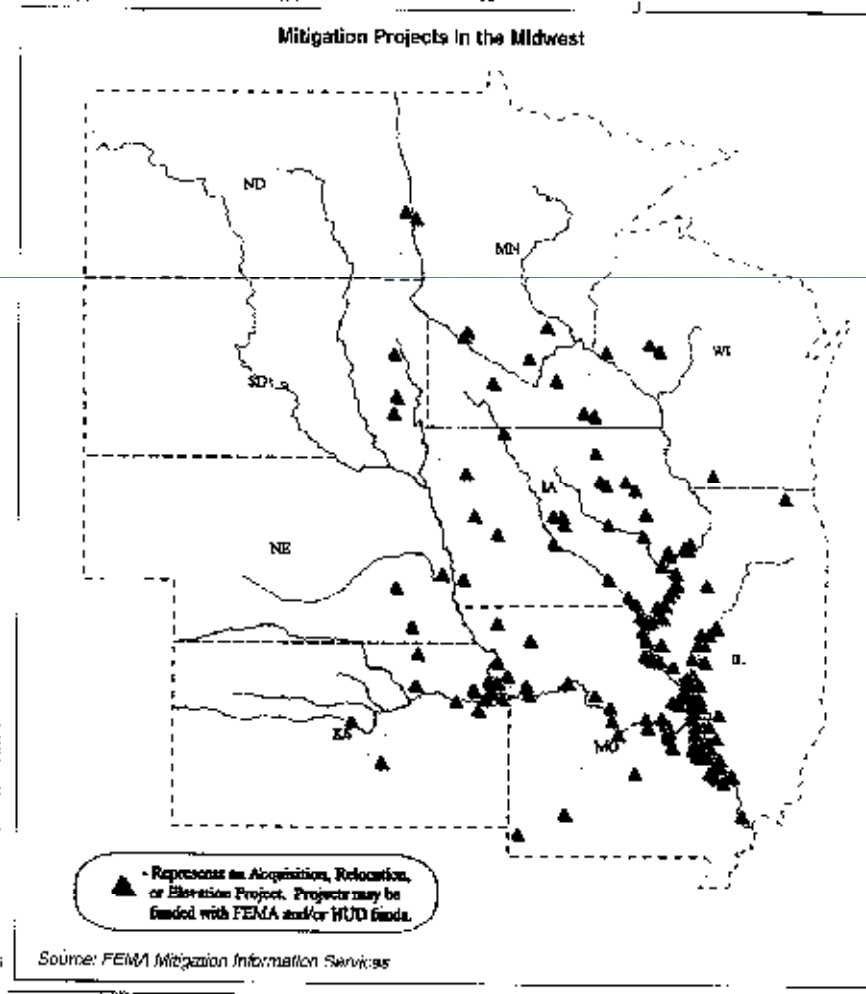
“Higher Ground”

- Great Mississippi Flood of 1993
- Hazard Mitigation Grants Program- focus on buyouts and relocations – Dec 1993
- “Sharing the Challenge”- July 1994
 - Major recommendations for improving floodplain programs
- Flood Insurance Reform Act 1994
 - ‘Repetitive losses’: less than 2% of properties generate 40% of NFIP losses
- “Higher Ground”- released July 1998
 - 2-year study
- Corps Reform Network formation started 1999

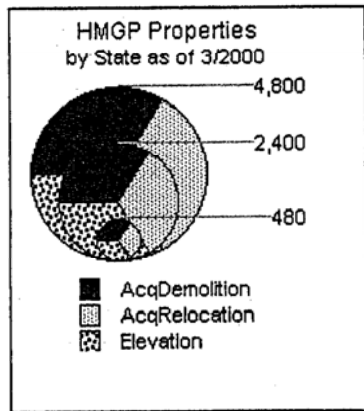
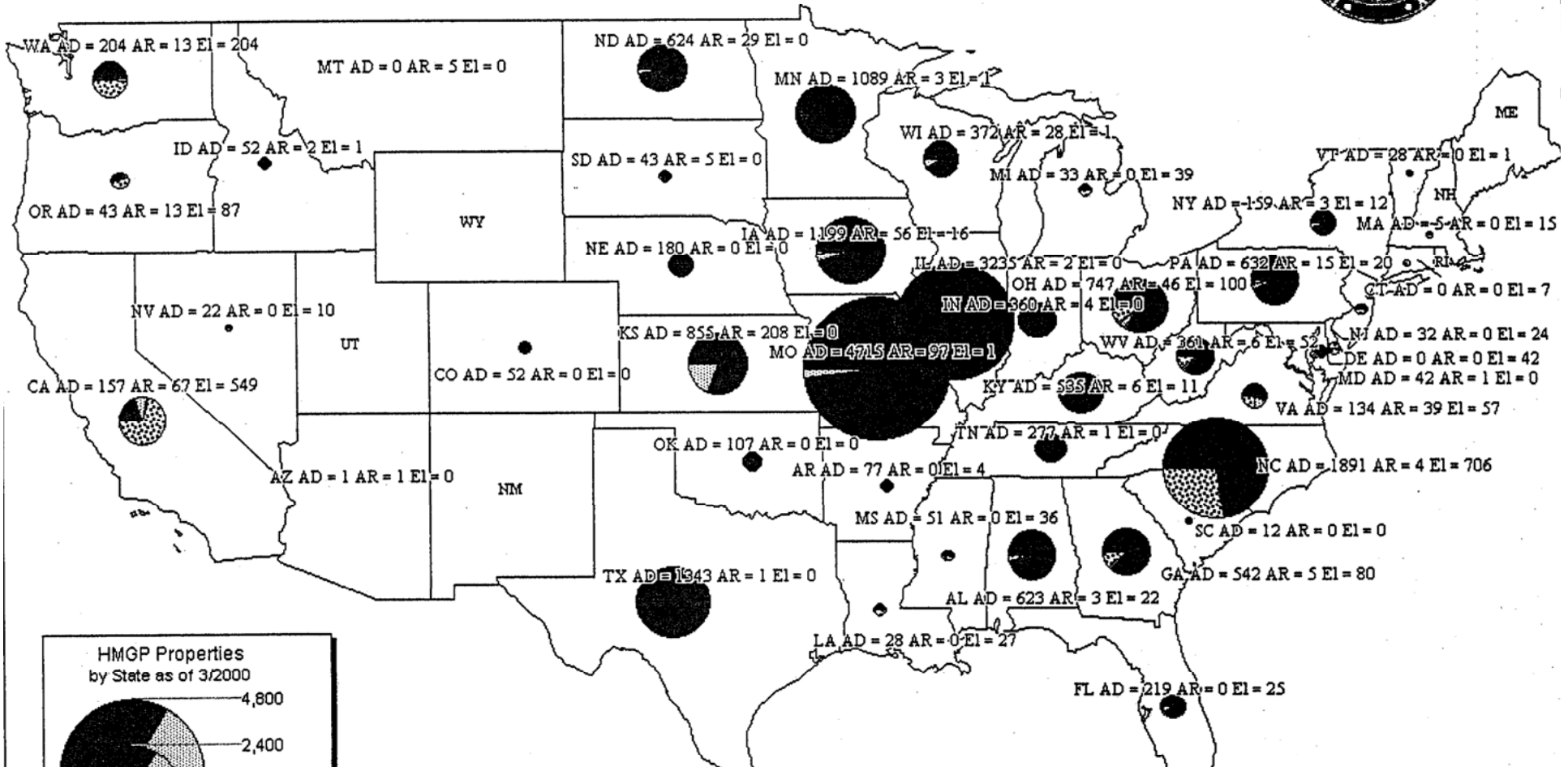
Major Findings of “Higher Ground”

- **Less than 2% of properties were generating nearly 40% of NFIP losses.**
- **10% of Single Family Homes Had Repetitive Losses Exceeding Their Value.**
 - For 5,629 homes, or almost 10 percent of the single family homes with repetitive losses, the cumulative flood insurance payments exceed the home’s value. In all, these homes were valued at \$308 million, but received \$416 million in insurance payments
- **Substantial Damage Rules Are Poorly Enforced.**
 - 15% (10,921) were “substantially damaged”. In all, 5,578 properties received \$167 million in insurance payments after suffering a 50 percent or greater loss in one flood.
- **20% of Repetitive Losses Occur Outside the Designated 100-Year Floodplain**
 - In all, 15,275 repetitive loss properties outside the designated 100-year floodplain received \$530 million in insurance payments.
 - Called into deep question the reliability of NFIP maps.

Hazard Mitigation Grants Program



FEMA Hazard Mitigation Grant Program (HMGP) Acquisition - Relocation - Elevation by State as of 03/2000



As of March, 2000:
AcqDemolition = 21,393
AcqRelocation = 663
Elevation = 2,151

Total = 24,207 Properties

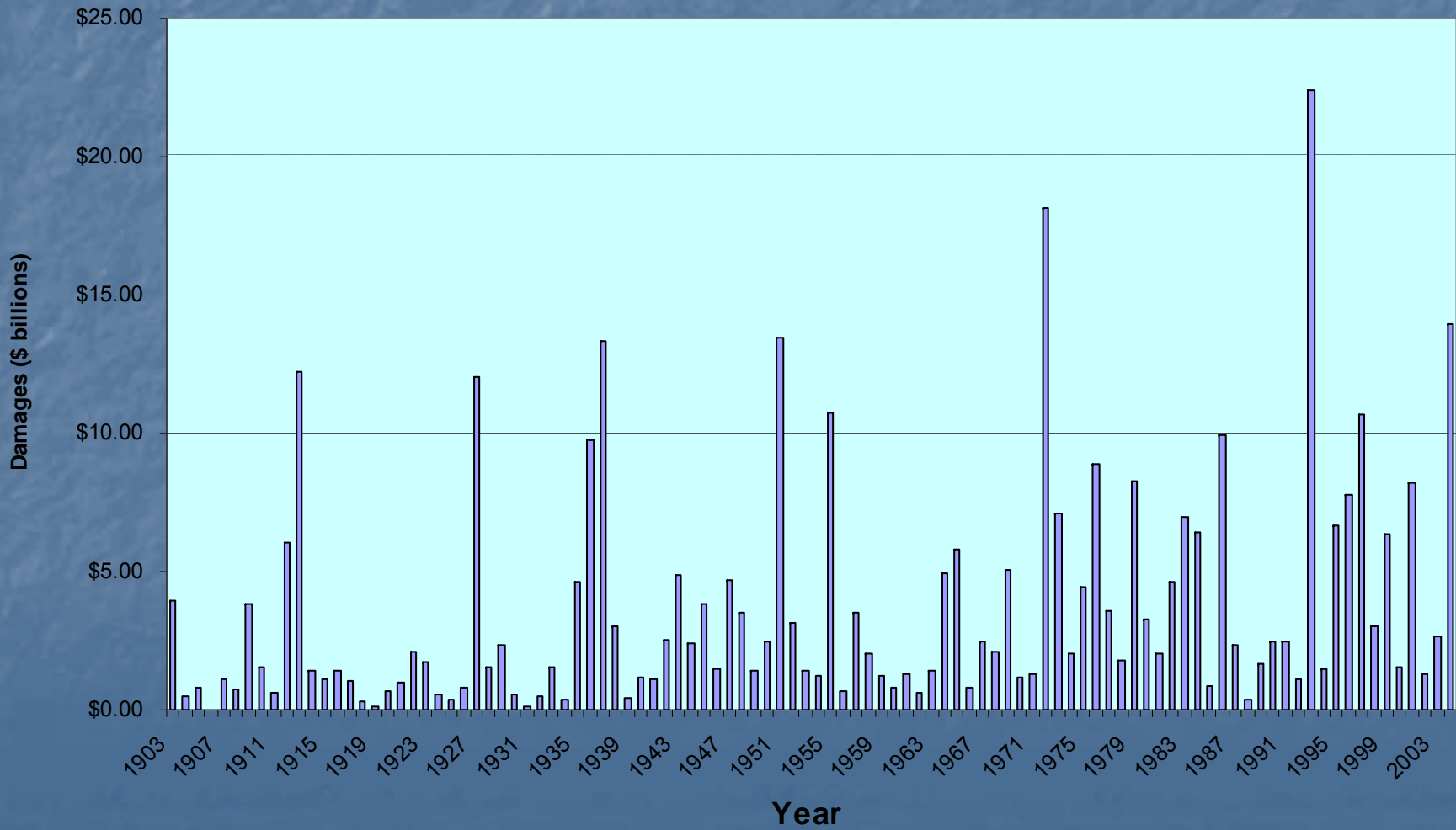
FEMA Mitigation Directorate 03/07/2000

Updated May, 2001:
Acquisition & Relocation = 26,929
Elevation = 2,828

Total = 29,757 Properties

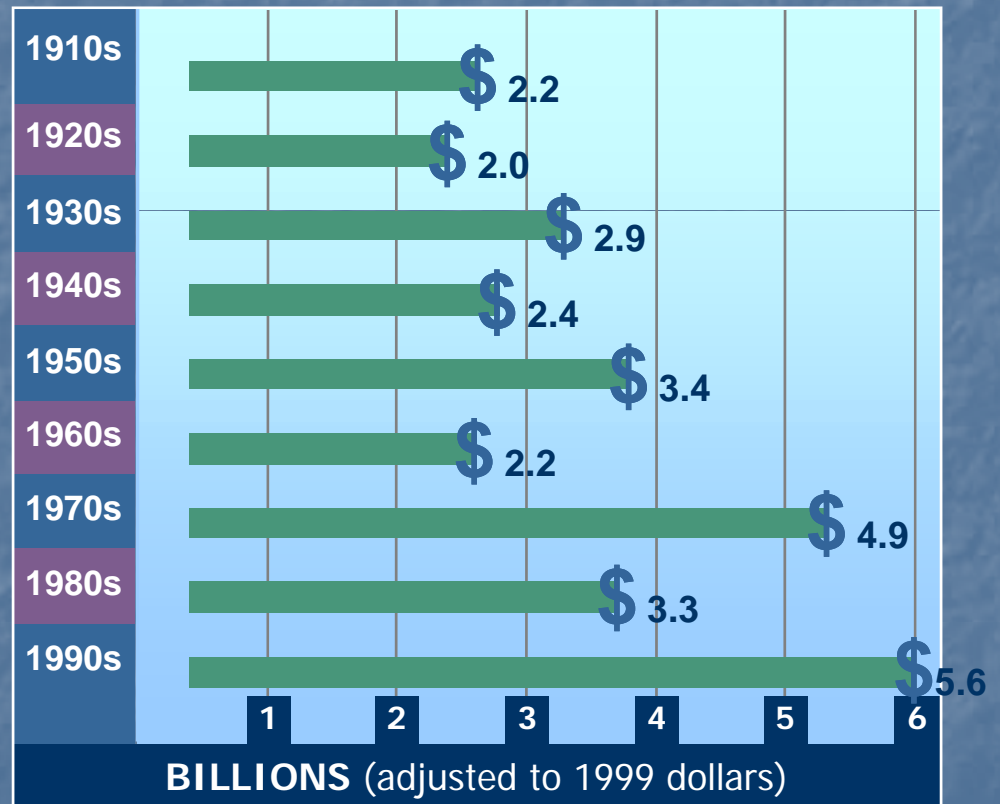
Major Findings

Flood Damages (constant dollars)

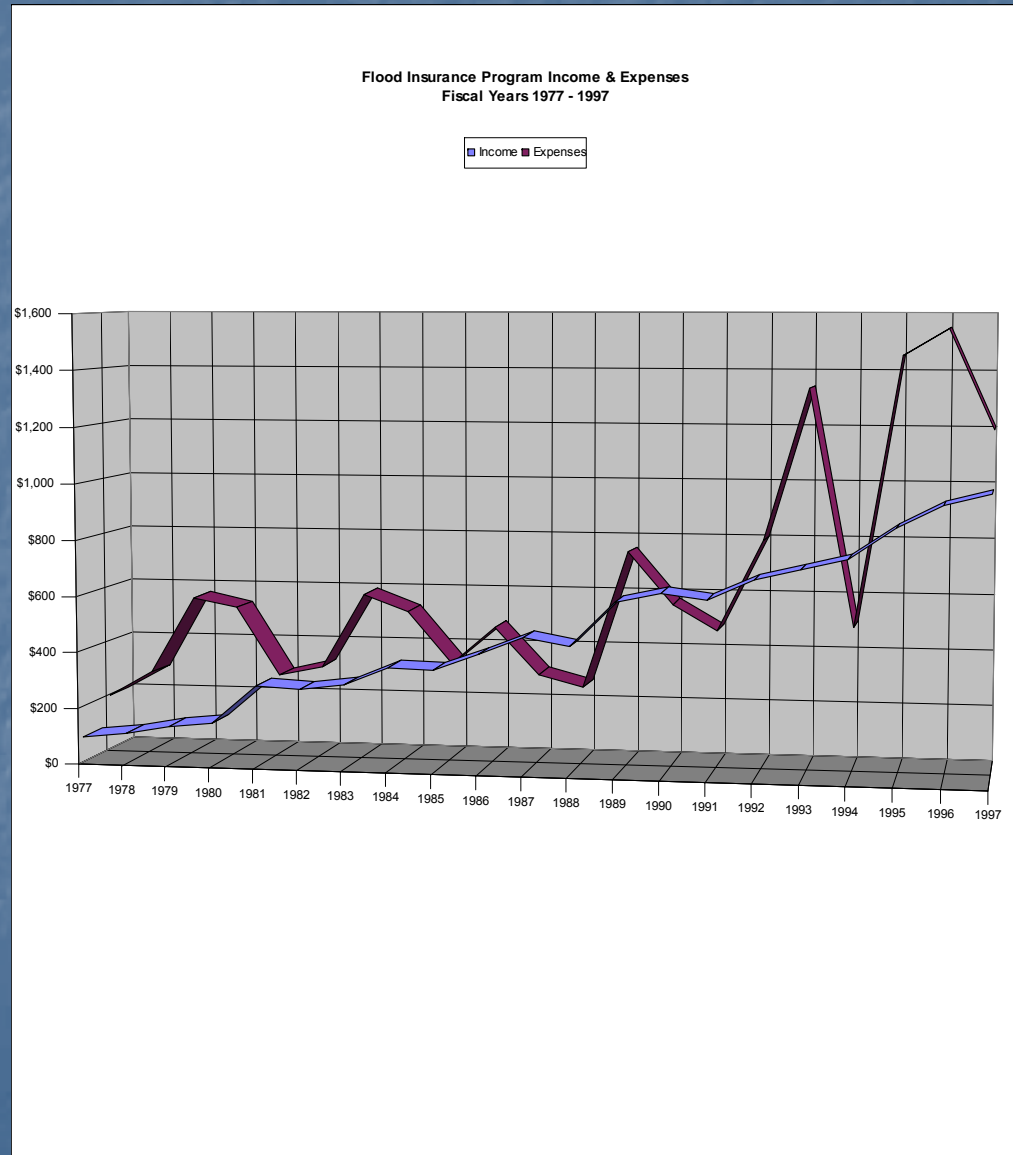


Major Findings: Trends in Flood Damages

- \$6 billion annually
- Four-fold increase from early 1900s
- Per Capita Damages increased by more than a factor of 2.5 in the previous century in real dollar terms

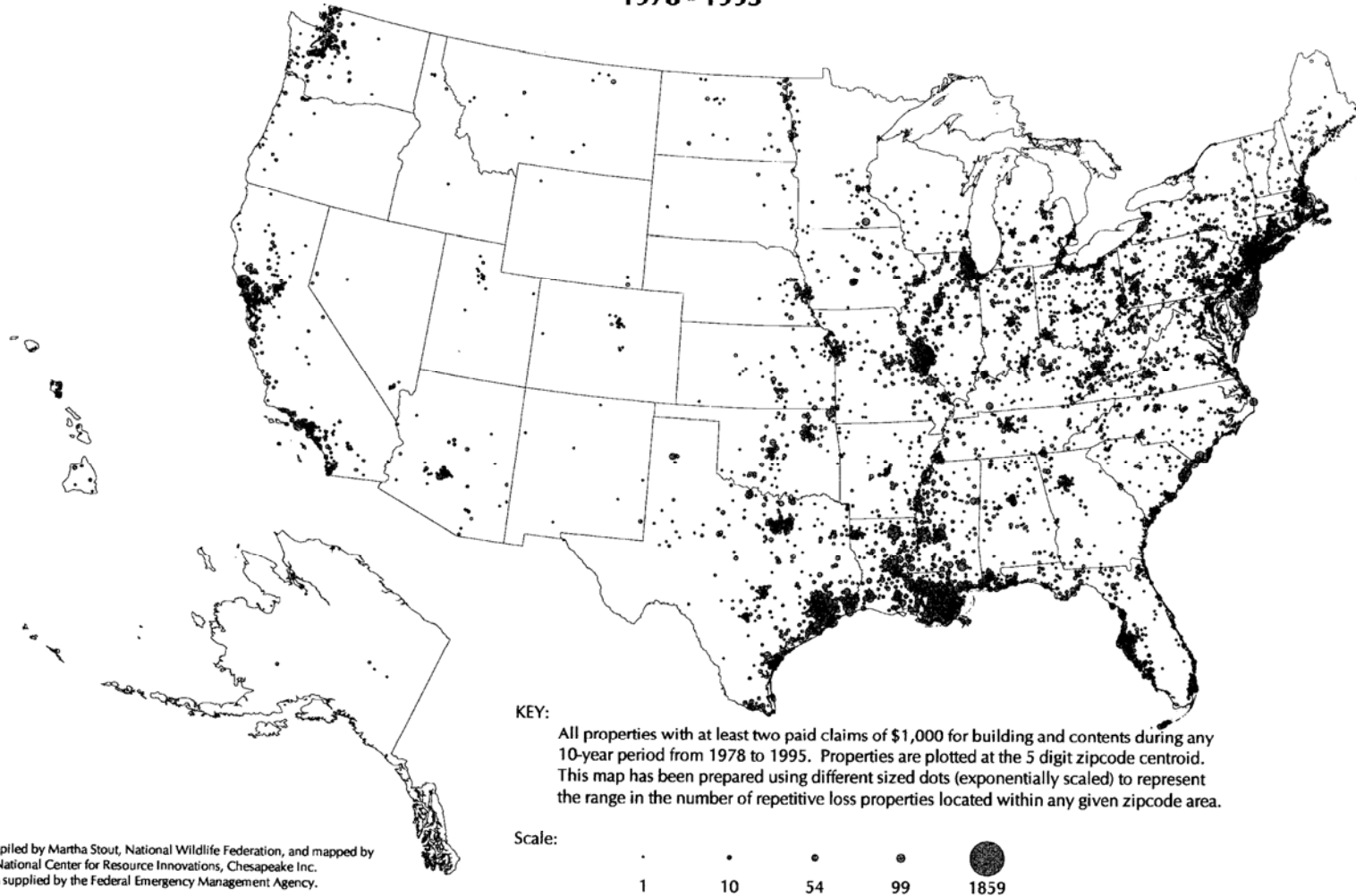


Major Findings: NFIP barely keeping ahead of costs



Major Findings

U.S. Properties with Repetitive Loss Claims Paid by the National Flood Insurance Program 1978 - 1995



Compiled by Martha Stout, National Wildlife Federation, and mapped by the National Center for Resource Innovations, Chesapeake Inc. Data supplied by the Federal Emergency Management Agency.

Frequency Distribution of Repetitive Losses Per Properties

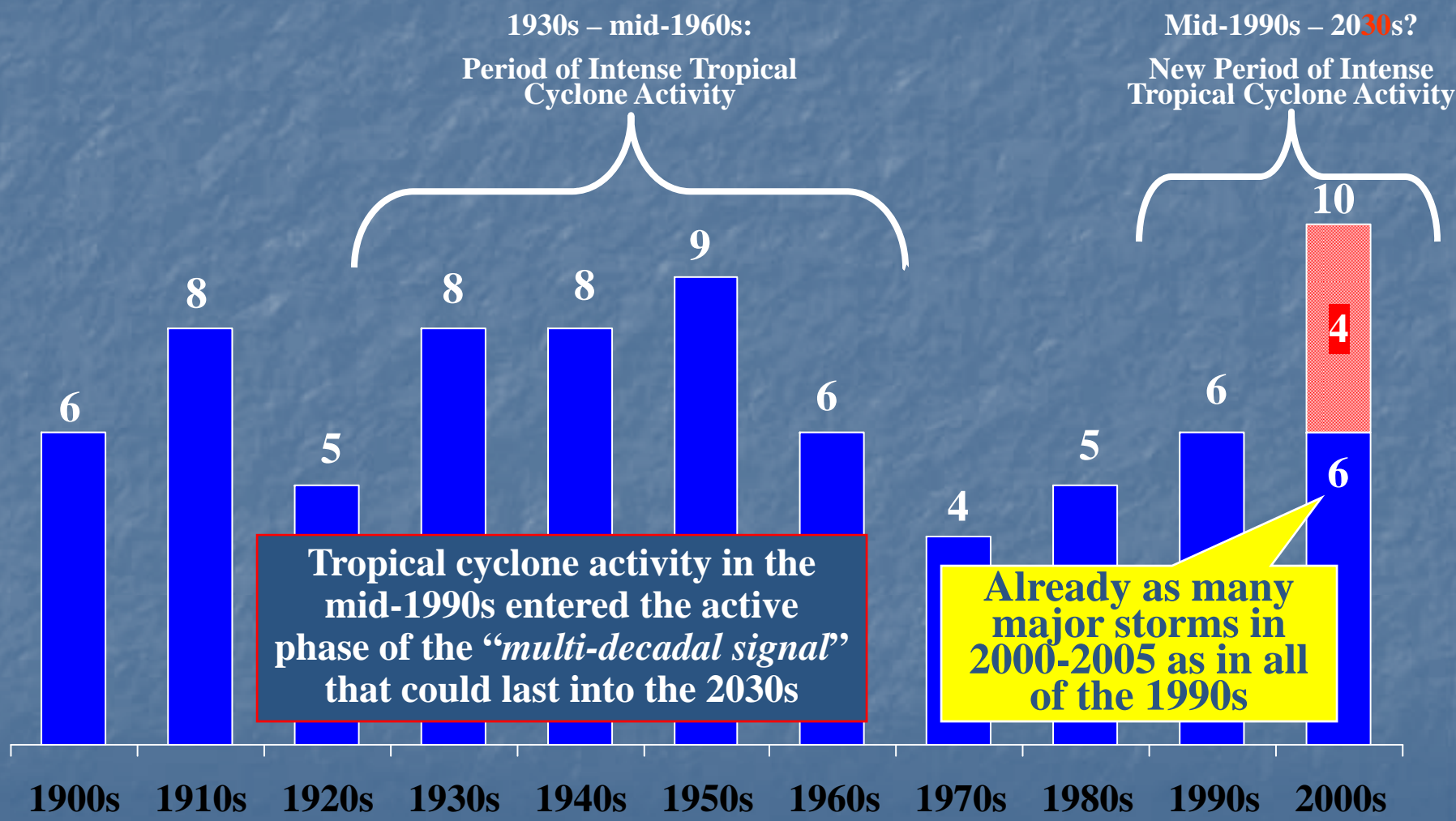
<u>Repetitive Loss Payments</u>	<u>Properties</u>	<u>Losses</u>
\$17,305,128	27	16-34
\$8,120,317	34	14-15
\$12,400,392	60	12-13
\$27,008,567	170	10-11
\$58,330,698	534	8-9
\$163,466,160	1,983	6-7
\$505,093,263	8,898	4-5
\$576,609,898	15,711	3
\$1,212,925,826	47,078	2
<u>Totals (as of August 1995)</u>		
\$2,581,260,251	74,501	200,182
<u>Totals (8/31/2006 Post-Katrina - today)</u>		
\$8,475,459,708	135,521	384,196
(non-mitigated) \$7,757,679,561	123,672	348,795

Repetitive Loss State Data

as of 08/31/2006

State	\$ Losses Total	Repetitive Loss Buildings Total
Louisiana	2,005,143,438.88	79,893
Florida	1,146,038,835.84	37,123
Texas	1,061,335,470.18	45,731
Mississippi	450,499,453.94	13,423
Alabama	362,148,631.72	10,644
New Jersey	333,347,782.85	21,362
Pennsylvania	345,596,619.48	14,889
North Carolina	324,110,711.10	17,337
New York	233,697,340.46	20,021
Missouri	193,572,586.62	12,603
California	164,091,361.67	10,644
Virginia	125,201,934.07	5,563
West Virginia	104,734,050.55	6,545
Massachusetts	100,128,084.78	6,673
South Carolina	71,721,884.48	3,200
Maryland	38,681,531.71	1,498 (24 th)

Number of Major (Category 3, 4, 5) Hurricanes Striking the US by Decade

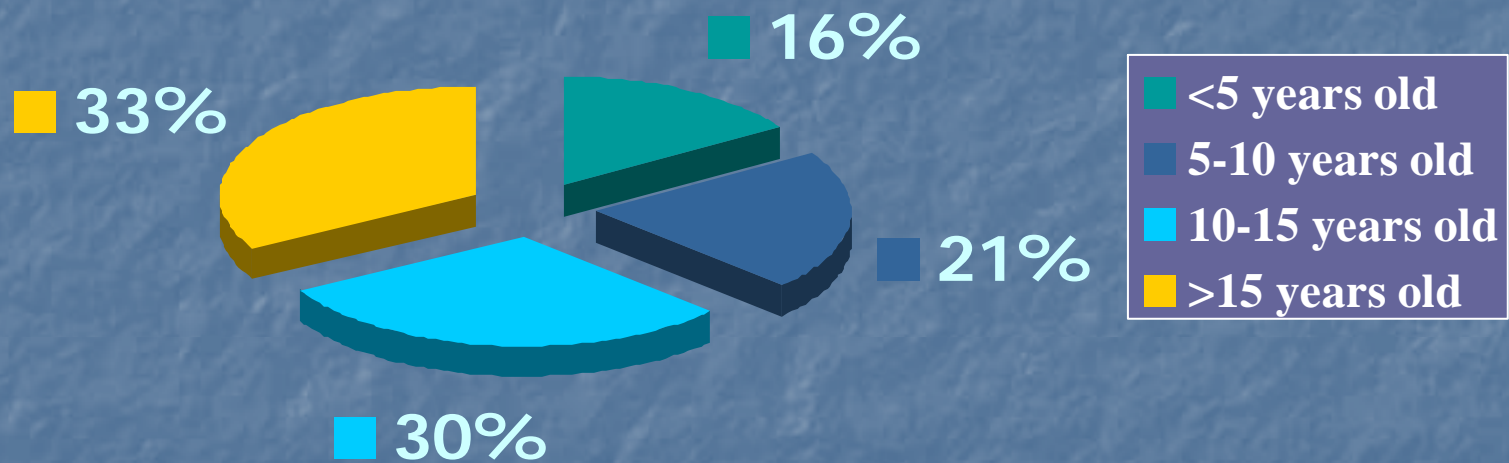


*Figure for 2000s is extrapolated based on data for 2000-2005 (6 major storms: Charley, Ivan, Jeanne (2004) & Katrina, Rita, Wilma (2005)).

Source: Tillinghast from National Hurricane Center: <http://www.nhc.noaa.gov/pastint.shtm>.

Findings

Age of Effective Map Panels



Results

- After 6 years and three Congresses- Bereuter, Blumenauer, Bunning Flood Insurance Reform Act of 2004 was passed
 - Included targeted funding for non-structural mitigation of repetitive loss properties
 - \$90 million annually authorized

Bereuter, Blumenauer, Bunning Flood Insurance Reform Act of 2004

- Long term goal: to buy-out or mitigate those properties that have been the largest financial drain (FEMA says cost is >\$200m/yr) on the NFIP
- Establishes \$40m pilot program for mitigation of “severe repetitive loss properties” (4+ losses >\$20k or 2+ losses >property value)
 - Mitigation offers will be made to properties that result in the greatest amount of savings to the NFIP in the shortest amount of time
 - If offer is refused, flood insurance premiums increase by 50% and subsequently with each claim up to actuarial rate
- Increases Flood Mitigation Assistance Program to \$40m annually and establishes \$10m/yr direct mitigation for individual repetitive loss properties
- Actuarial rates for federally leased properties on water-facing sides of dikes or levees, and properties sea-ward of sea walls or coastal flood control structures

But...

- When Katrina hit, FEMA had not completed regulations to begin work on the special repetitive loss mitigation program...\$90 million appropriated for FY2006 could not be spent
- FEMA Map Modernization program- 2001 initiative to update and digitize FEMA's maps.
 - Administration pledged \$200,000,000 annually for four years...ultimate costs may rise to \$5 billion
- Due to budget cuts, HMGP was only 7.5% instead of 15% at a time when the funds were desperately needed for Katrina recovery

Results

National Average Residential Property Costs and State Activity Tools for Acquisition, Relocation, Elevation, Floodproofing, Retrofit and Safe Room Projects all Mitigation Projects

Average Property Cost by Mitigation Activity Type					
Project Type Classification (Residential Only)	Approved Net Eligible Project Cost	Federal Share Obligated	Number Of Mitigated Properties	Average Project Cost	Average Fed Share
Acquisition	\$1,656,568,610	\$1,188,766,042	24,779	\$66,854	\$47,975
Elevation	\$148,627,695	\$136,431,368	2,241	\$66,322	\$60,880
Floodproofing	\$9,054,150	\$5,075,554	181	\$50,023	\$28,042
Relocation	\$21,298,491	\$15,985,858	191	\$111,510	\$83,696
Retrofit	\$60,312,583	\$45,202,435	1,807	\$33,377	\$25,015
Safe Room/Shelters	\$46,162,335	\$33,651,749	7,745	\$5,960	\$4,345
Grand Total	\$1,942,023,864	\$1,425,113,006	36,944	\$52,567	\$38,575

Katrina has changed the landscape

- After Katrina, Rita and Wilma, NFIP is now projected to exceed \$20 billion in debt to the U.S. Treasury
- Interest payments on debt will cost \$1 billion annually- half of all NFIP revenues



Katrina has changed the landscape



- Without a bailout NFIP will collapse
- Assume some bailout will be provided, but the program needs much sounder footing in the future



Questions for the Future

- What do we do about the levees to make them capable of withstanding storms equal to or greater than Katrina?



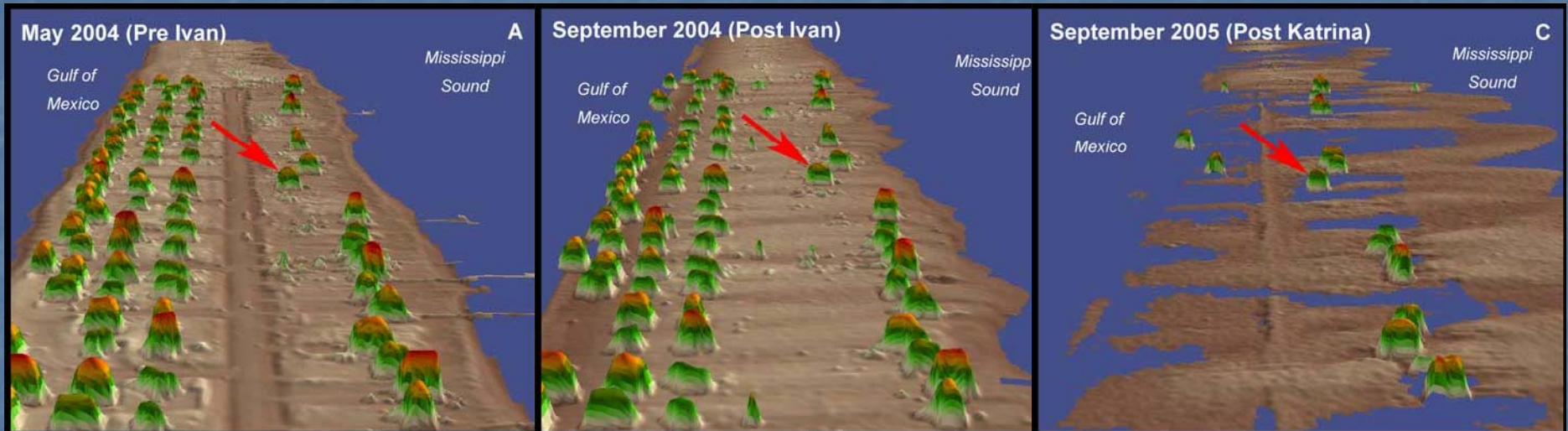
- How do we deal with enormous loss of coastal Louisiana wetlands due to:
 - Navigation projects
 - Massive canalization for oil and gas extraction and navigation
 - Major subsidization due to pumping oil, gas, and water for agriculture
 - General sea level rise

Questions for the Future

- Much of New Orleans was already classified within the 100-year floodplain due to problems with internal drainage, so how will rebuilding respond to already existing risks within the city?
- How will we respond to climate change factors—rising sea temperatures driving more potent and longer-duration hurricanes along the Gulf and Atlantic coasts?



Questions for the Future



Pre Ivan

Post Ivan

Post Katrina

Should we rebuild on coastal barrier islands like Dauphin Island?



Lessons from Katrina

- Federal programs have led to a false sense of security
 - Gulf Coast
 - BFE – Too low
 - Elevation – Not high enough
 - Hurricane Standards – not strong enough
 - Repeated Exposure to Hurricanes
 - New Orleans Area Levees
 - Promoted Development
 - Promoted Incorrect Development Like Slab on Grade
 - Promoted Unawareness of Risk
 - Promoted an Inadequate Emergency Evacuation Plan
 - Repeated Exposure to Hurricanes
- NFIP is Broke
 - \$20+ Billion Cost for 2005
 - Catastrophic Losses
- Future
 - More Hurricanes
 - Rising Sea Level

Lessons from Katrina

- Flood Plain Management for the Future
 - Raise NFIP rates for high hazard areas such as coastal
 - Do not provide flood insurance if the area is too hazardous
 - Require insurance to 500-year
 - Require insurance in “protected” areas behind levees – “natural floodplain”
 - Eliminate pre FIRM subsidy
 - Adhere to substantial damage
 - Regulate to higher standard than 100-year
 - Potentially in some Presidential disaster declarations, flood plain management authority shifts from local government to Federal government or Federal/State partnership

How Congress is Responding

- Supplemental Appropriations
 - Increased Funding for Levees
 - Lack of Commitment to Coastal Louisiana Wetland Restoration
- National Flood Insurance Program
- Corps of Engineers WRDA

National Flood Insurance Reforms

- House Financial Services Committee
- H.R. 4973, Flood Insurance Reform and Modernization Act of 2006, Passed House June 27, 2006, awaits Senate action
- Raise Treasury borrowing from \$18.5 b to \$25 b
- Phase-in actuarial rates for pre-FIRM vacation homes, non-primary residences, commercial properties beginning on enactment and primary residences upon sale to a new owner over 7 years – Linked to completion of mapping program – means years of delay
- GAO study of extending mandatory insurance purchase to natural 100-year floodplain and for all mortgages
- Increase coverage limits -- residential \$350k to \$470k and commercial \$1m to \$1.34 m
- Require mapping of 100-year and 500-year floodplains, natural floodplains behind levees or dam failure areas, storm surge areas, land subsidence, coastal erosion, sediment and mud flows, ice-affected areas
- \$1.5 billion over 5-years for mapping

National Flood Insurance Reforms

- S. 3589 Flood Insurance Reform and Modernization Act of 2006
Senate Banking Committee – first reported May 2006, report filed June 26, 2006
- Accelerated elimination of subsidies for pre-FIRM vacation homes, non-primary residences, and non-residences (commercial properties), severe repetitive losses and cumulative > FMV, substantial damage
- Map 500-year floodplain, natural floodplains behind levees and below dams, other flood related hazards (much of Sen. Reed's RI - S. 2005)
- Require insurance in residual risk areas behind levees, etc.
- Authorizes \$2.8 billion for mapping over 7 years
- National levees inventory – Parallel efforts underway in Public Works Committees
- Increasing fines for lender non-compliance
- Requires FEMA to develop catastrophic reserves in Flood Insurance Fund; set rates to recognize catastrophic years

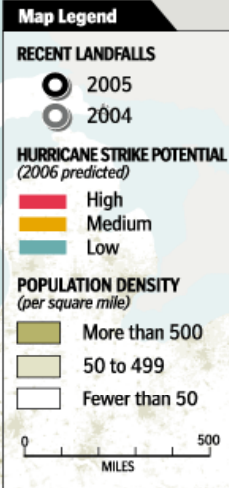
Water Resources Development Act

- Corps of Engineers – Water Resources Development Act (H.R. 2864, passed House 7/05; \$12 billion, 500+ projects, pre-Katrina; S. 728, passed Senate 7/06, \$14 billion, 300+ projects, pre-Katrina) Major reforms included
 - Major Policy issues and cost issues
 - Upper Mississippi River Navigation Expansion
- S. 2288, Water Resources Planning and Modernization Act of 2006 (Feingold –McCain) – Corps Reform legislation
 - **Key issues:**
 - Incorporate Katrina lessons – minimize vulnerabilities when using floodplains
 - Prioritization of Corps of Engineers projects by revived Water Resources Council (WR “Coordinating Council”)
 - Revise “Principles and Guidelines” for Planning Projects
 - Establish Independent Peer Review program
 - Mitigation to at least levels required by Corps Regulatory Program

Climatologists from the National Oceanic and Atmospheric Administration have forecast another busy hurricane season, which officially begins Thursday and lasts until Nov. 30. During an active season, between two and four hurricanes on average make landfall on the continental United States, they said.

NOAA does not determine where hurricanes are likely to hit, but forecasters from Colorado State University have analyzed past strikes and prevailing weather patterns to locate hurricane hotspots. The tip of Florida, the Carolinas and portions of the Gulf Coast are of particular concern.

AIR Worldwide, which conducts disaster-risk modeling, has studied the potential costs of catastrophic hurricanes hitting selected coastal cities. It projects that many locations could have insured losses much higher than those incurred when Katrina struck New Orleans.



LONG ISLAND
The island has little natural protection and is barely above sea level. Lower Manhattan could also suffer significant flooding. Weather patterns have typically steered hurricanes away.

\$100 billion
Possible insured losses from Category 4 hurricane strike.

BALTIMORE
Under the worst conditions, a Category 4 hurricane could bring a storm surge of up to 20 feet to the city and other parts of the Chesapeake Bay, according to computer models.

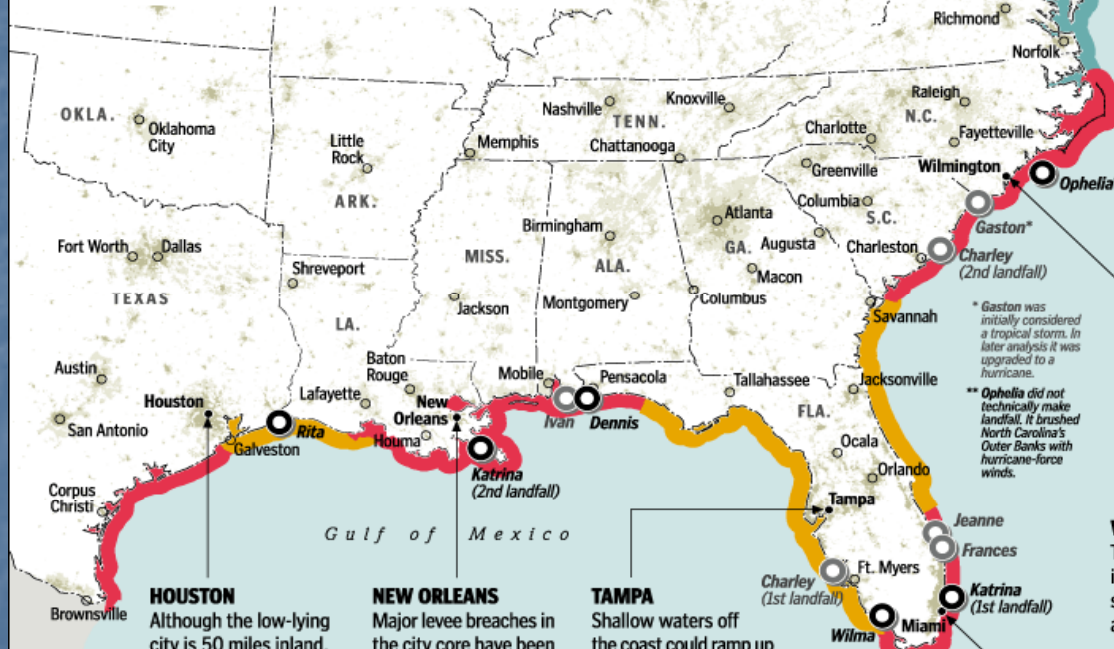
\$33 billion
Possible insured losses from Category 3 hurricane strike.

WILMINGTON
The area has suffered erosion and infrastructure damage from numerous strikes. Many nearby streams and rivers are prone to catastrophic flooding.
Insured loss projections not available.

* Gaston was initially considered a tropical storm. In later analysis it was upgraded to a hurricane.
** Ophelia did not technically make landfall. It brushed North Carolina's Outer Banks with hurricane-force winds.

NOTE: Damage projections include surrounding areas affected by hurricane.

SOURCES: NOAA, the Weather Channel, the Tropical Meteorology Project at Colorado State University, AIR Worldwide, LandScan, staff and wire reports



HOUSTON
Although the low-lying city is 50 miles inland, Galveston Bay could act as a major channel for a surge from the Gulf of Mexico, where warm waters often energize incoming hurricanes.
\$60 billion
Possible insured losses from Category 5 hurricane strike.

NEW ORLEANS
Major levee breaches in the city core have been repaired and floodgates are being installed on vulnerable canals, but civil engineers still have concerns about flaws in the levees.
\$38 billion
Estimated insured losses from Hurricane Katrina.

TAMPA
Shallow waters off the coast could ramp up a mighty surge of water as a hurricane approached, and Tampa Bay could function like a funnel into the city's downtown.
\$70 billion
Possible insured losses from Category 5 hurricane strike.

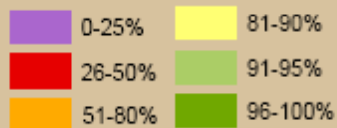
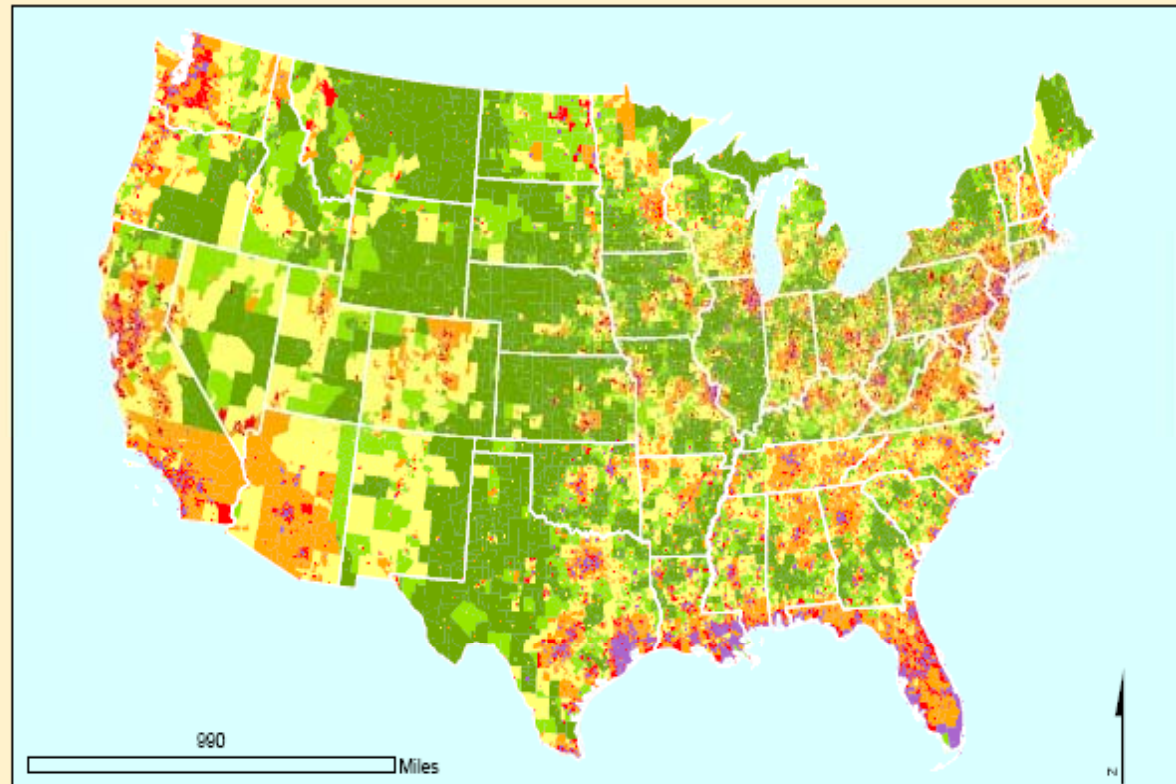
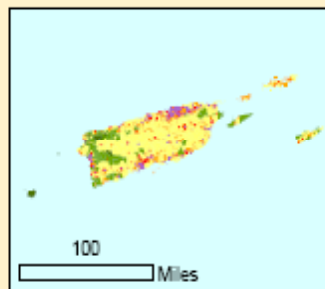
MIAMI
The city lies in the middle of a hurricane highway. The developed beachfront is vulnerable to wind damage, and the shallow coastal waters could kick up a high storm surge.
\$130 billion
Possible insured losses from Category 5 hurricane strike.

Where is Risk the Greatest?

Hawaii



Puerto Rico and US Virgin Islands

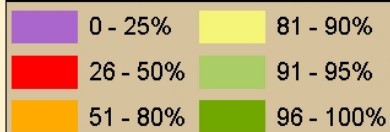
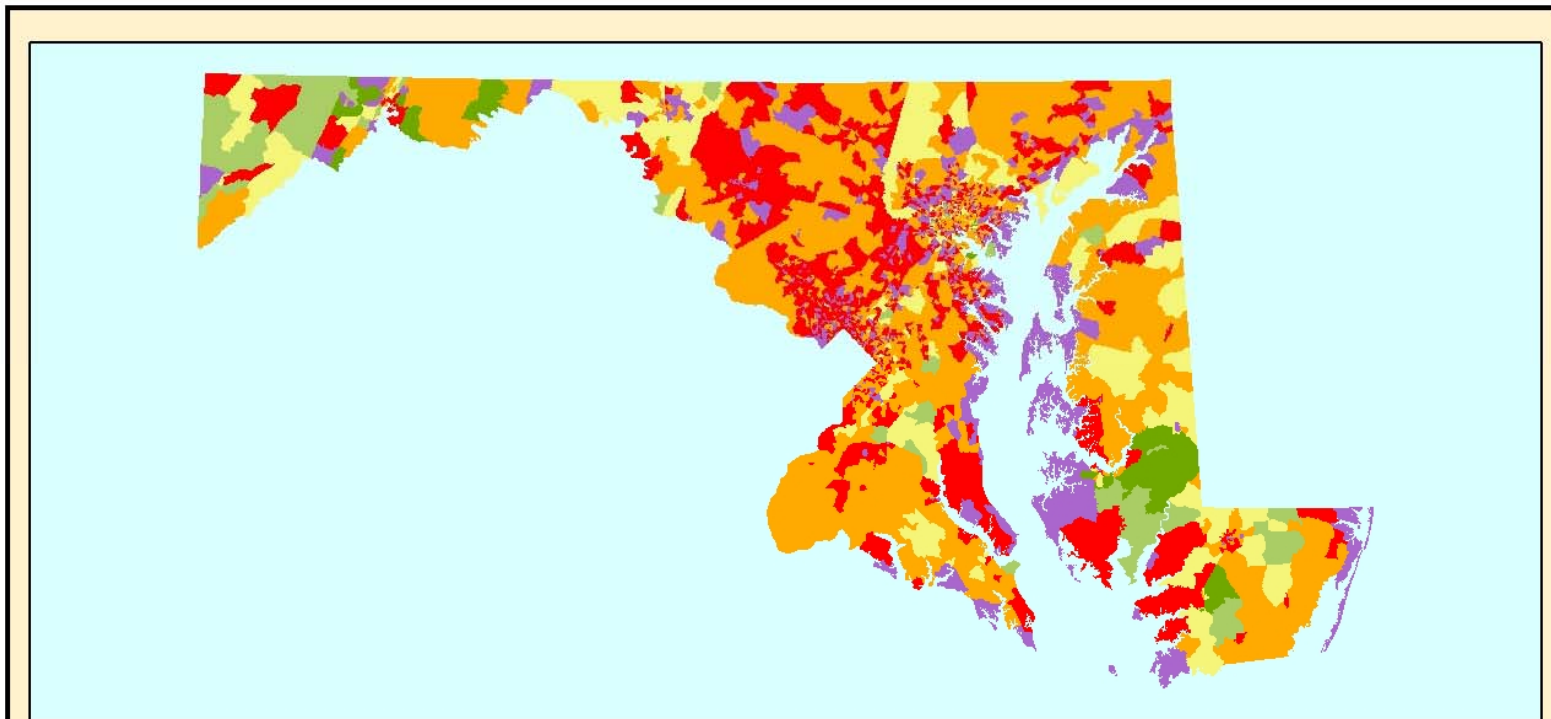


Risk Percentages* by Block Group

*Risk calculated as percentage of sum of 8 parameters including total population density, housing unit density, historic countywide population growth 1990-2000, flood policy density, claims density, repetitive loss density, repetitive loss property density, and declared disasters.

MapMod Team
December 2009

Flood Risk- Maryland

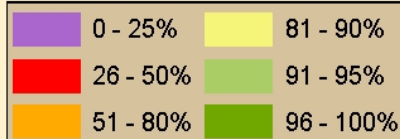
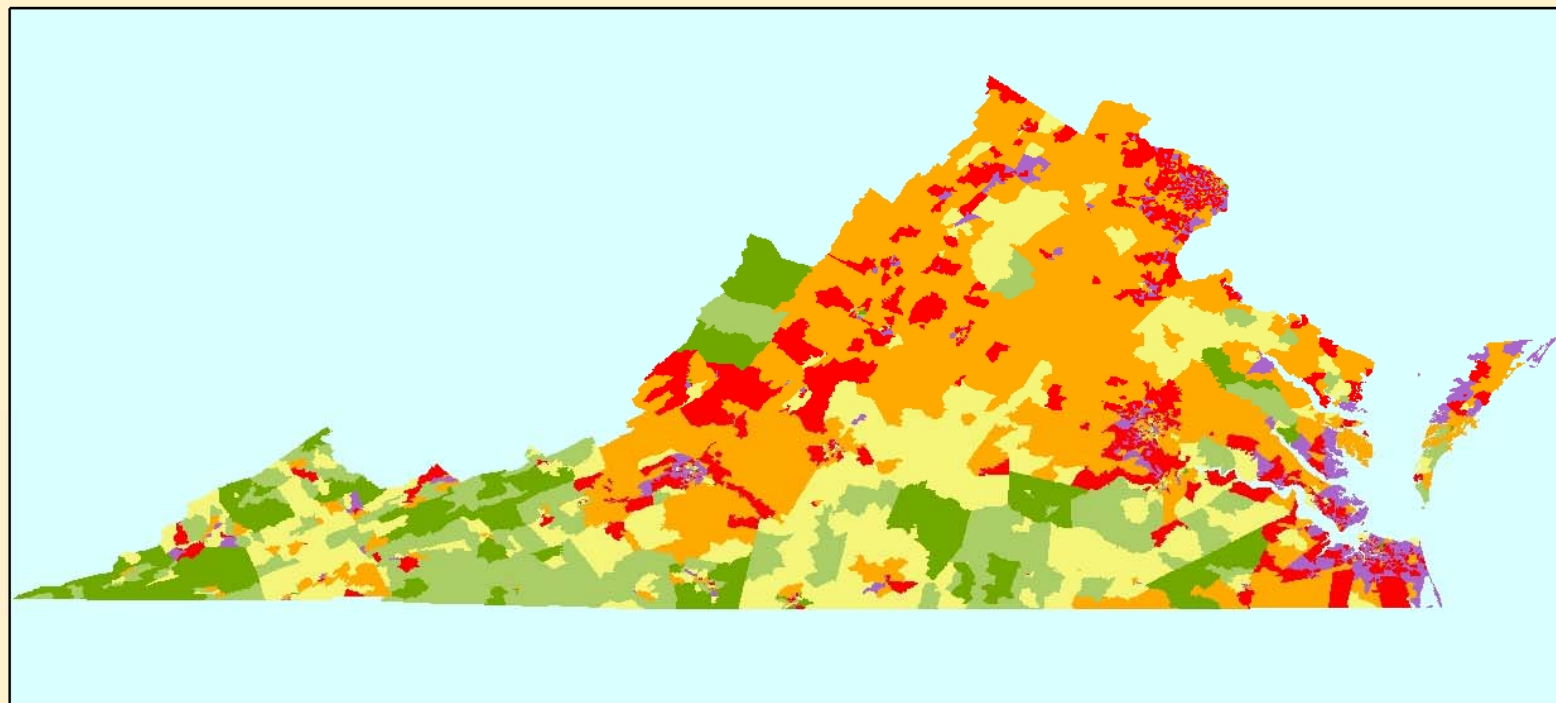


Maryland Flood Risk Percentages by Census Block Group

*Risk calculated from 10 parameters including total population density, historical population growth, predicted population growth, housing units, flood policies, single claims, repetitive losses, repetitive loss properties, number of stream and coastal miles on non-Federal lands, and declared disasters.

Map Mod Team
October 1 2006

Flood Risk- Virginia



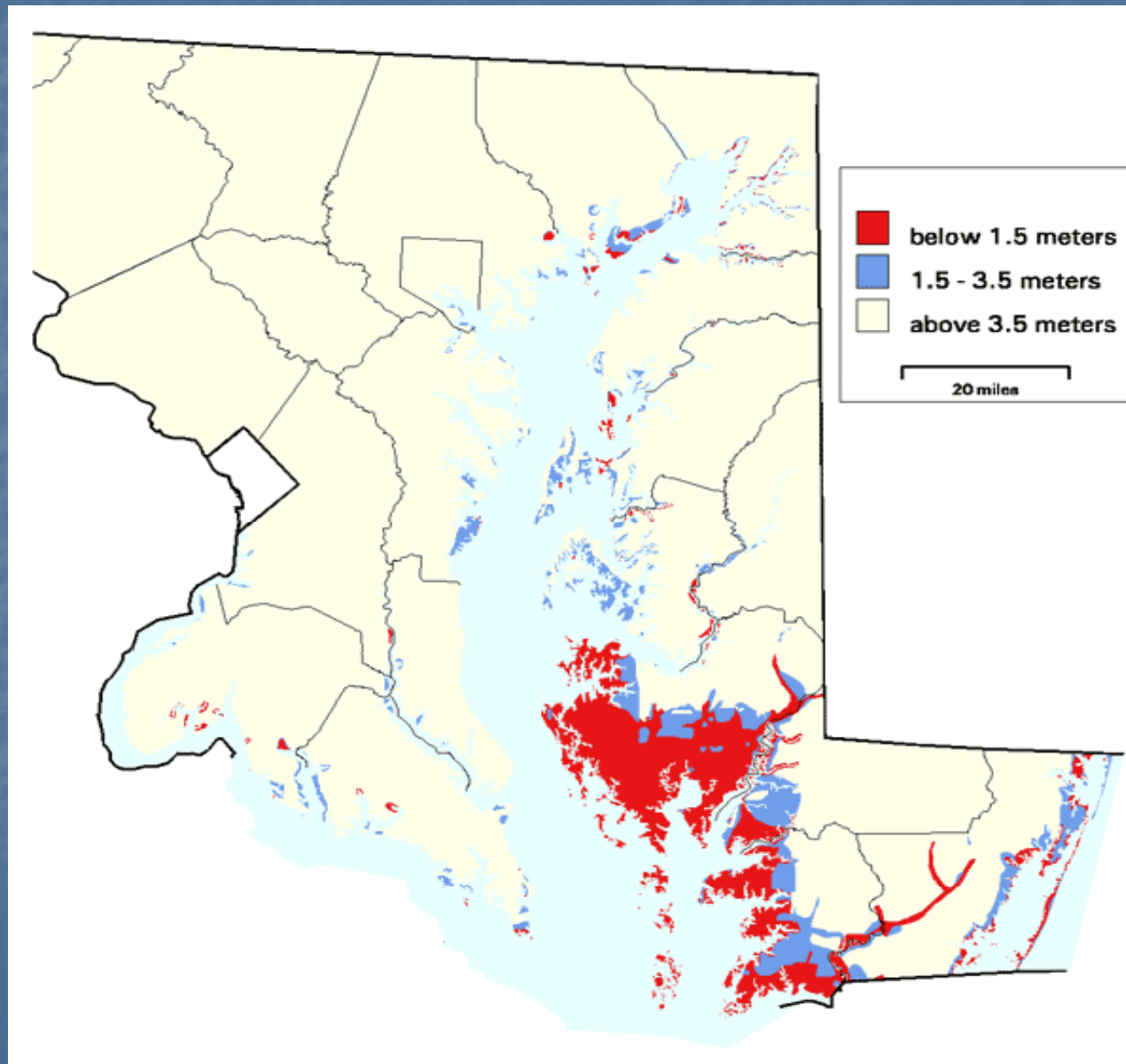
Virginia Flood Risk Percentages by Census Block Group

*Risk calculated from 10 parameters including total population density, historical population growth, predicted population growth, housing units, flood policies, single claims, repetitive losses, repetitive loss properties, number of stream and coastal miles on non-Federal lands, and declared disasters.

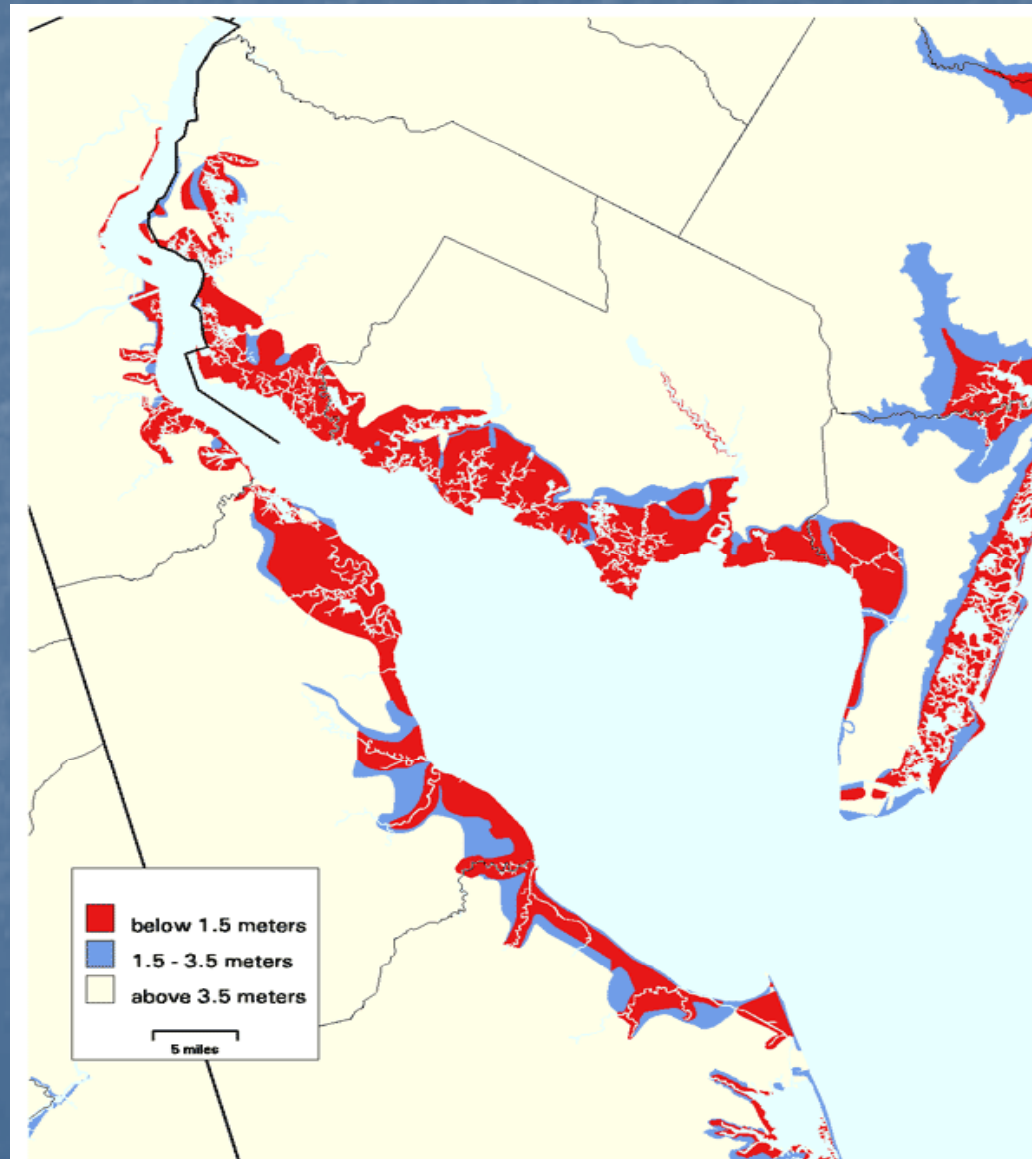
Map Mod Team
October 1, 2006

Maryland Coast

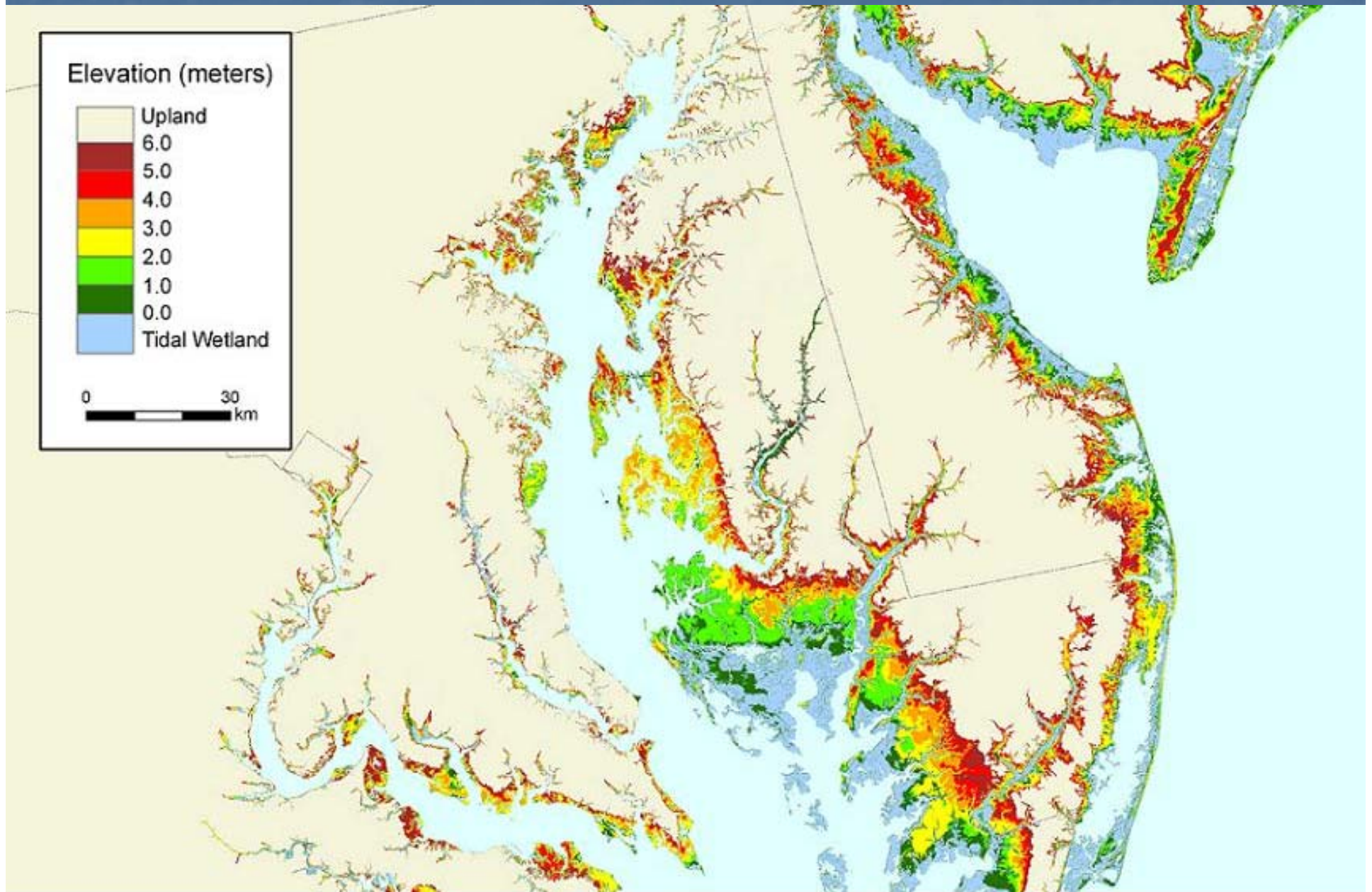
Sea-level Rise Potential Impact Areas



Delaware Bay Sea-Level Rise Potential Impact Areas



Maryland/Delaware with 1 meter contour delineations



Our View:

- Our view is it will be impossible to reverse the negative trends only by removing a few subsidies. Will require much stronger and wiser land use and building standards, continued aggressive efforts to buyout higher risk homes and businesses, much better hazard mapping, planning for ultimate development (“future conditions”), elimination of subsidies to build and locate in floodplains, and commitment to generally refrain from future floodplain development, while at the same time if we choose to remain in these areas, provide a very high level of protection for existing development.

What is likely to happen?

- Change difficult
- Likely short remainder of legislative year
- Growing Concern about “earmarks” and political corruption
- Strong Need for Administration Leadership
- Debate has begun

Questions???



Success Stories

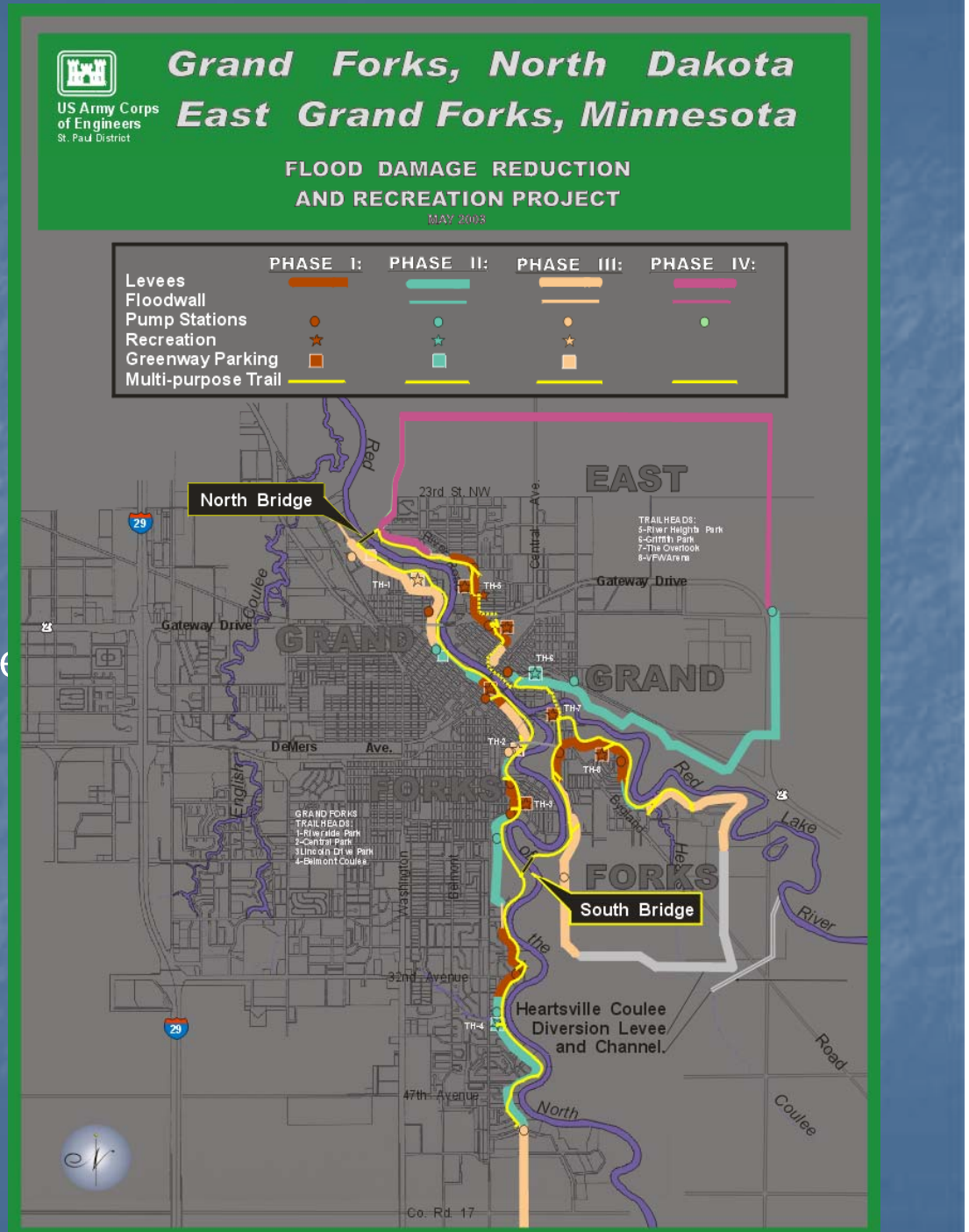
- Grand Forks, North Dakota
- Napa, California
- Tulsa, Oklahoma
- St. Charles County, Missouri
- Eastern North Carolina
- Albany, Georgia

Grand Forks, ND: Red River Flood of 1997



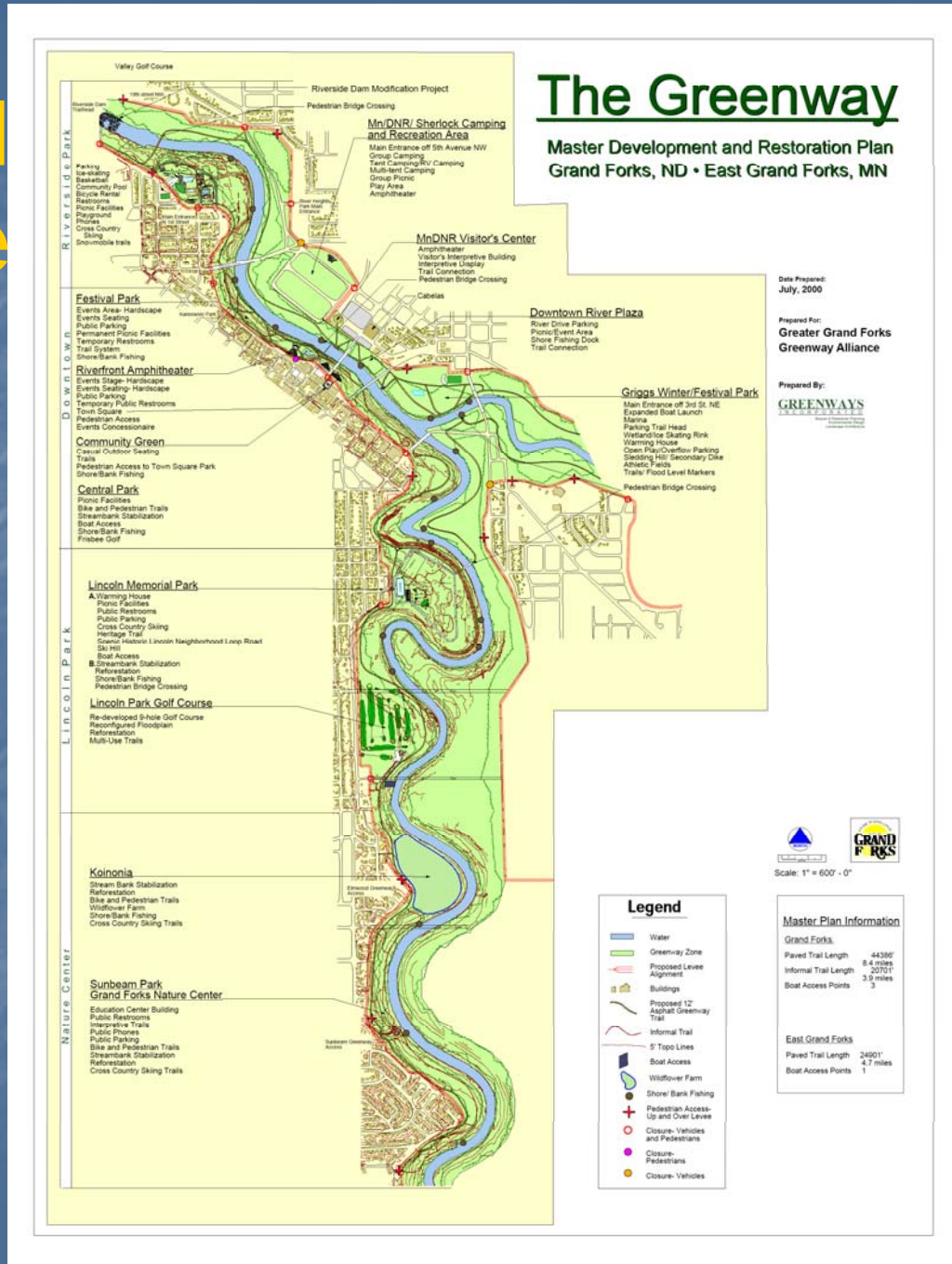
Grand Forks and Red River

- April 1997: 210-year flood event resulted in almost \$2 billion worth of damages
- \$400 million Army Corps system of floodwalls, levees, pump stations, diversion channels chosen with a unique greenway system within the floodways
- Lowland neighborhoods removed and turned into parklands and natural floodways

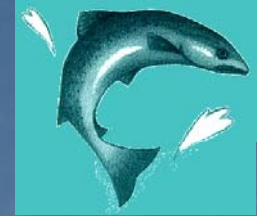


Grand Forks and Red River

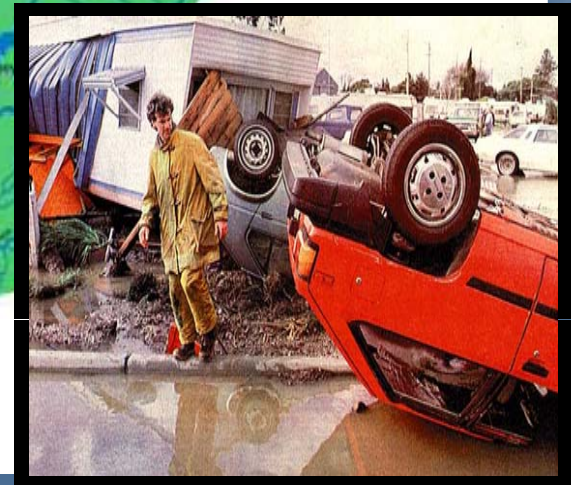
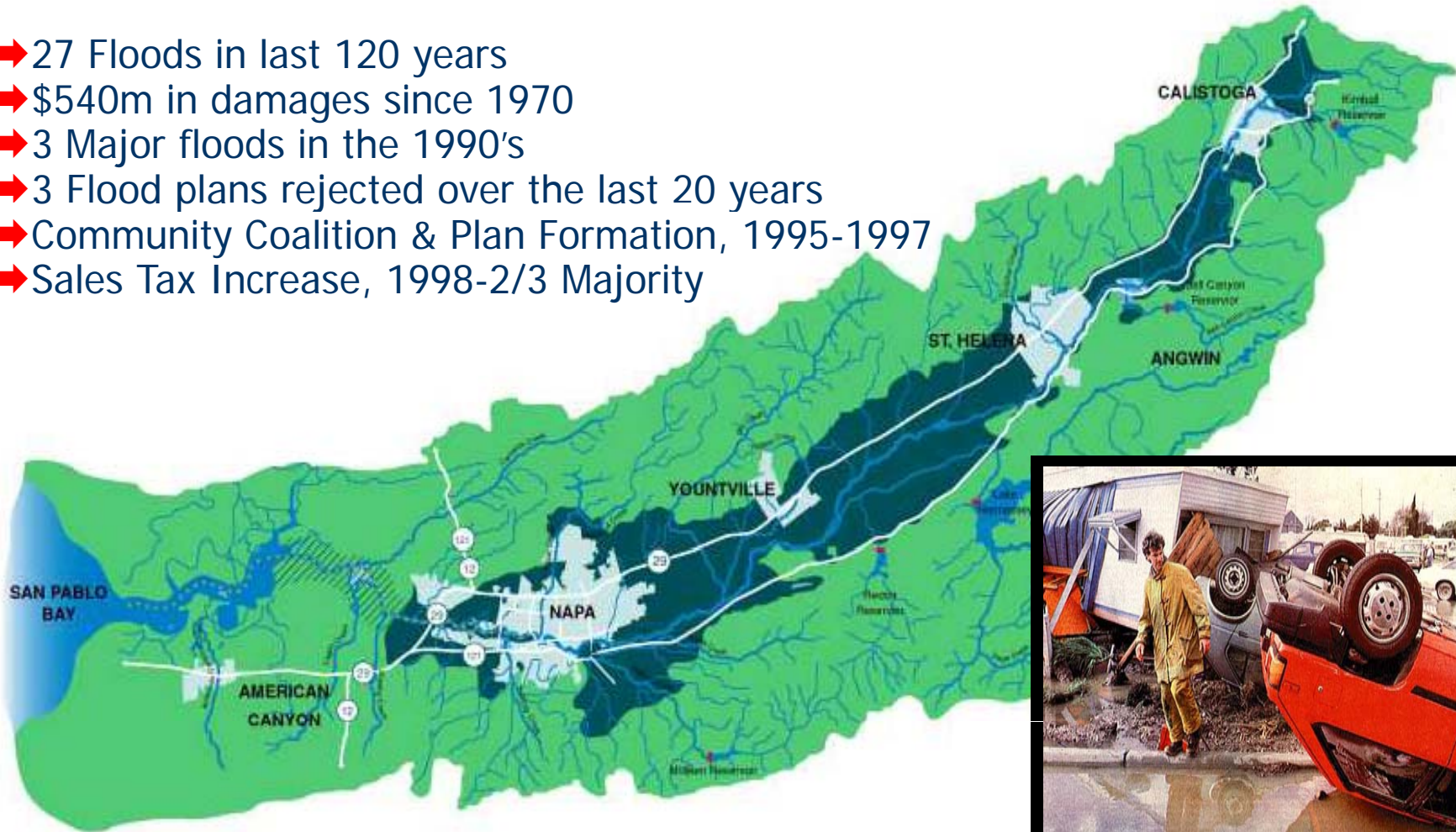
- The Greenway:
 - Linear corridor of open space areas, vegetation, and recreational features
 - 2,200 acres of public land
 - 20 miles of trails, parks and playgrounds, amphitheatres, golf course, boat ramps, etc.
- This year the 85% complete flood control project prevented \$150 million in flood damages



Napa River Watershed



- ➔ 27 Floods in last 120 years
- ➔ \$540m in damages since 1970
- ➔ 3 Major floods in the 1990's
- ➔ 3 Flood plans rejected over the last 20 years
- ➔ Community Coalition & Plan Formation, 1995-1997
- ➔ Sales Tax Increase, 1998-2/3 Majority



Restored Floodplain- Imola Avenue:



View of restored
marshplain terrace

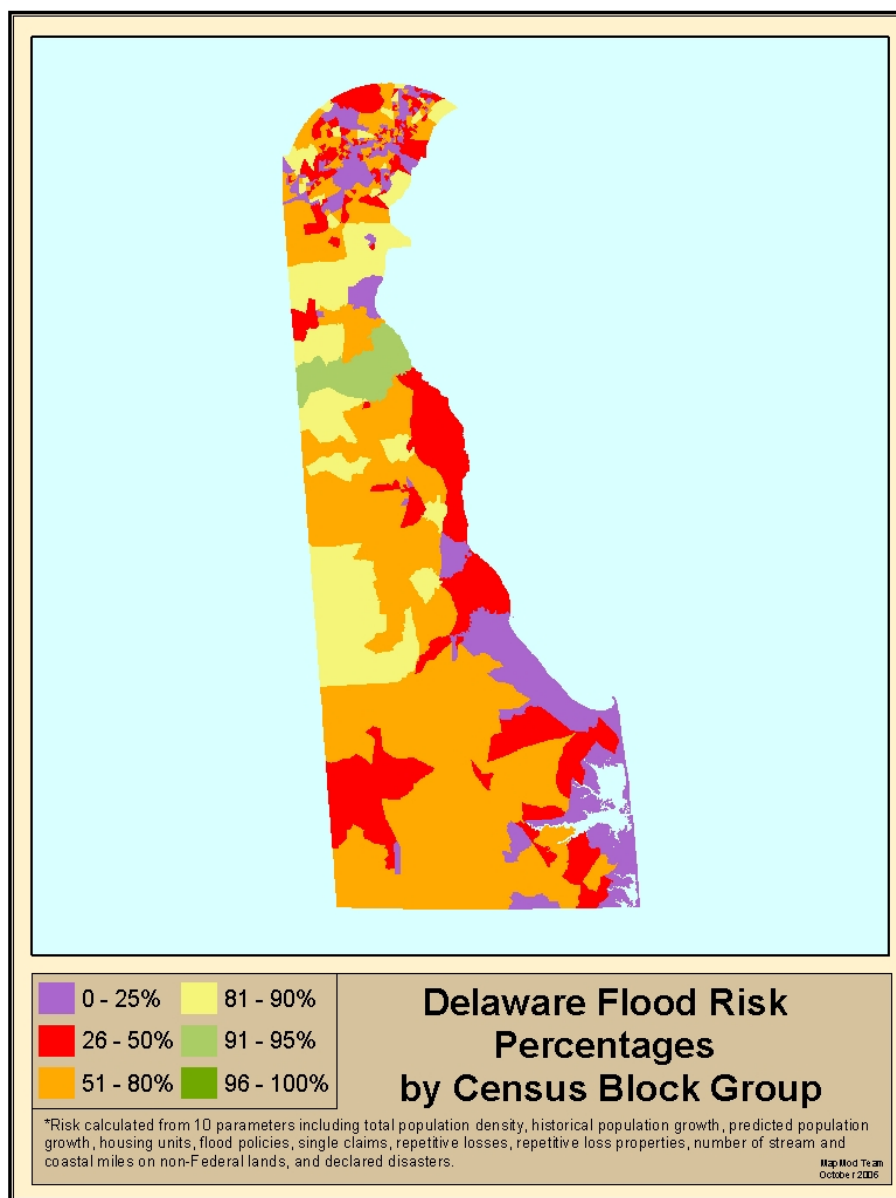
Before



After



Flood Risk- Delaware

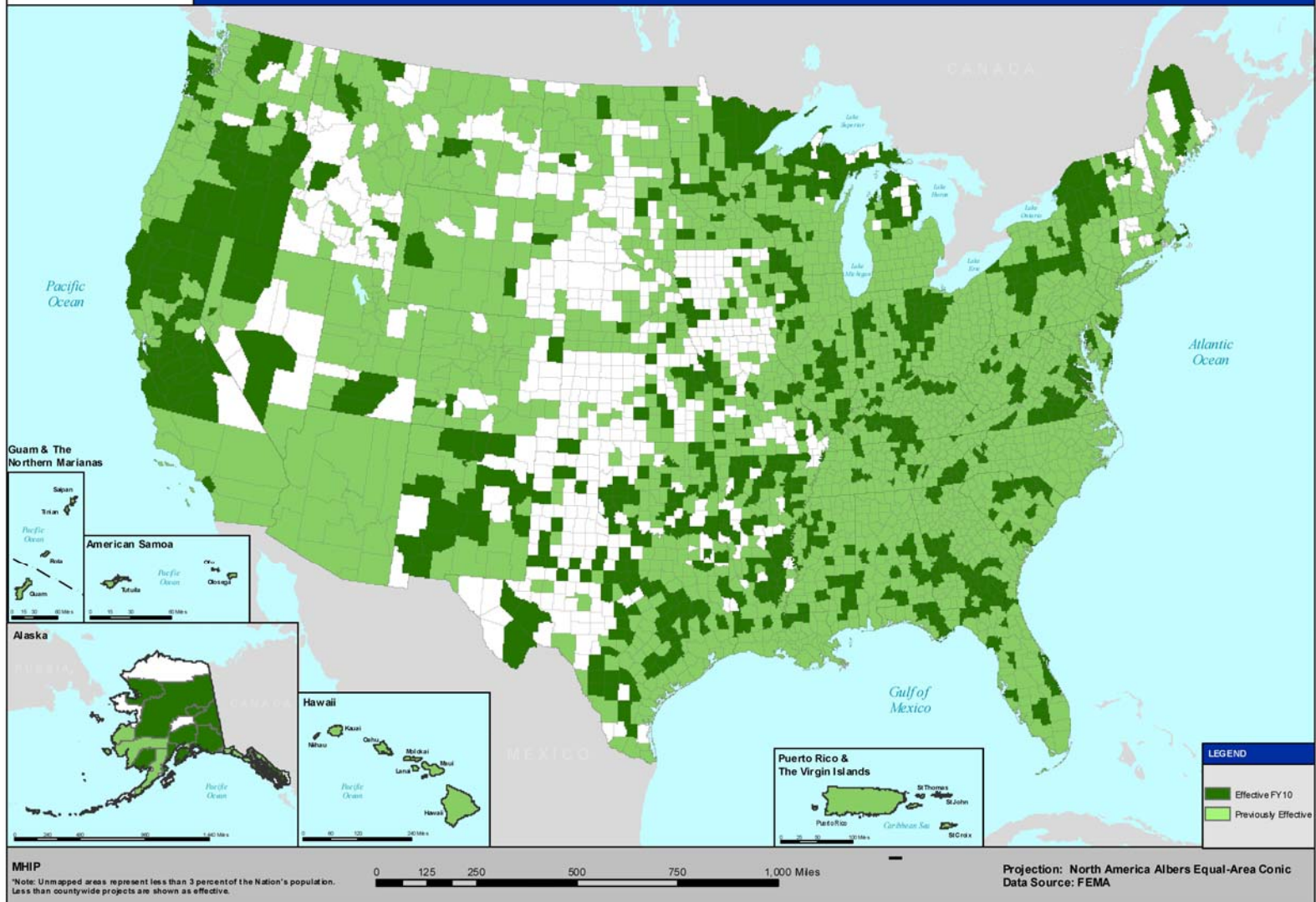


Flood Map Modernization Mapping Plan

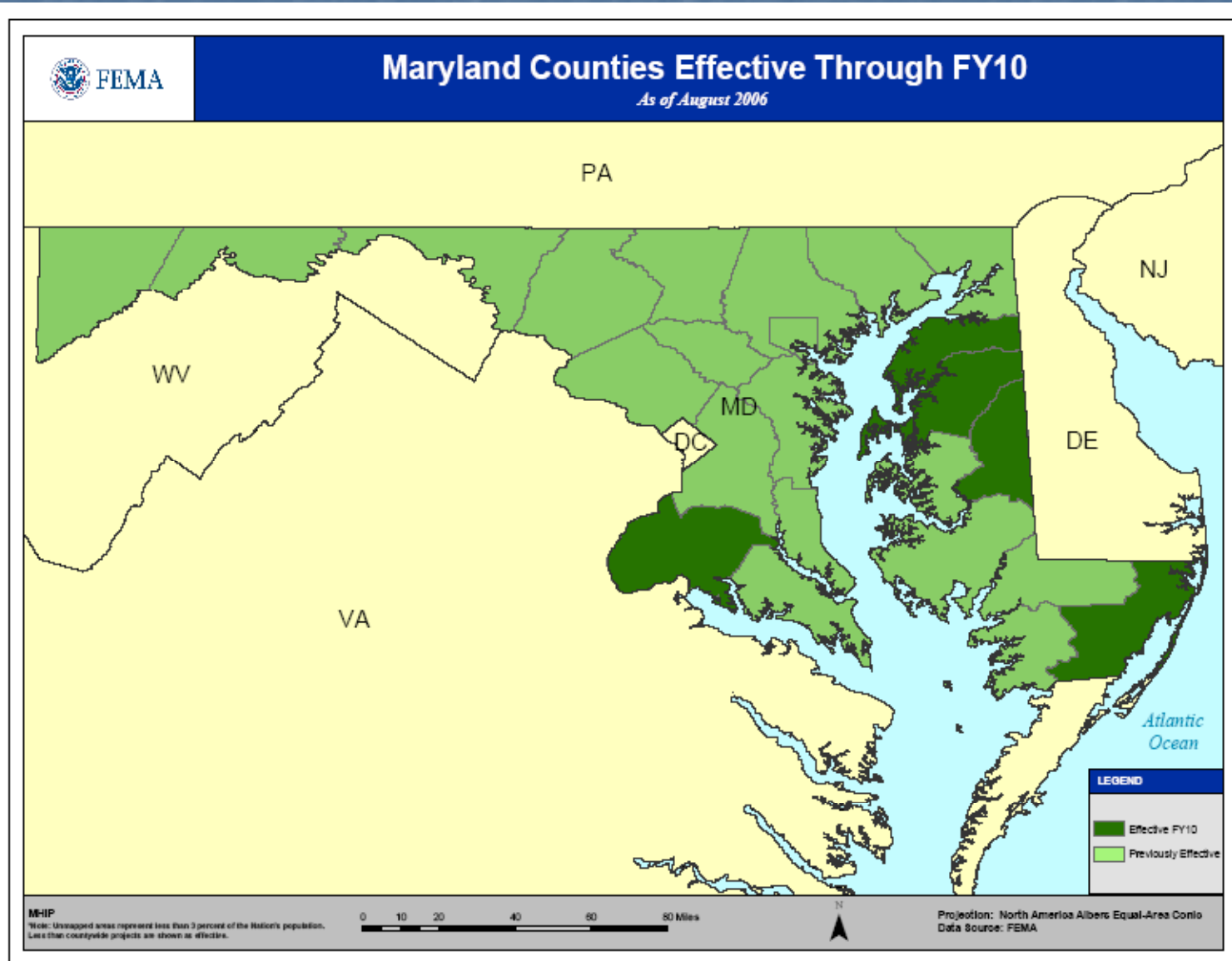


Map B-5. Counties Effective Through FY10

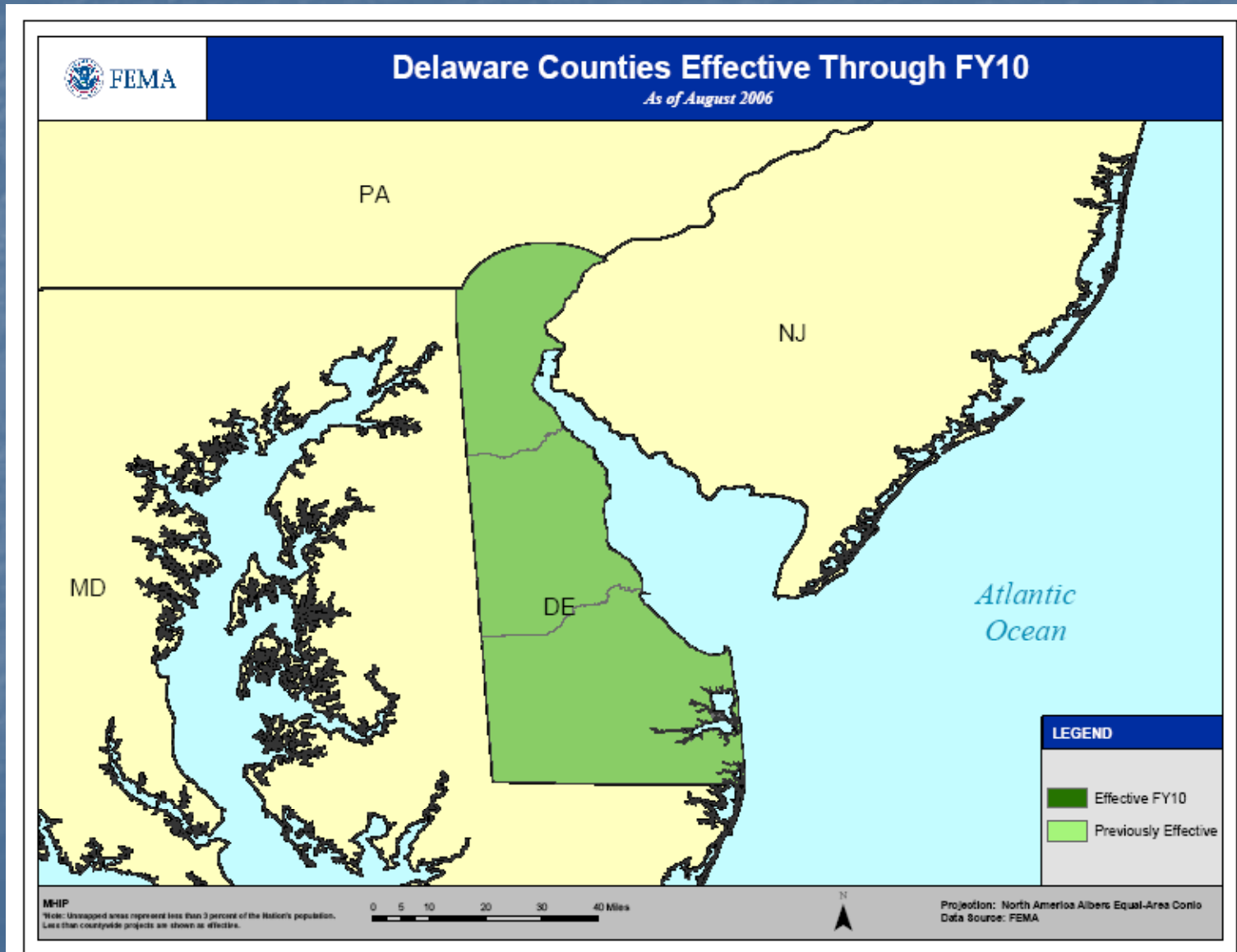
As of August 2006



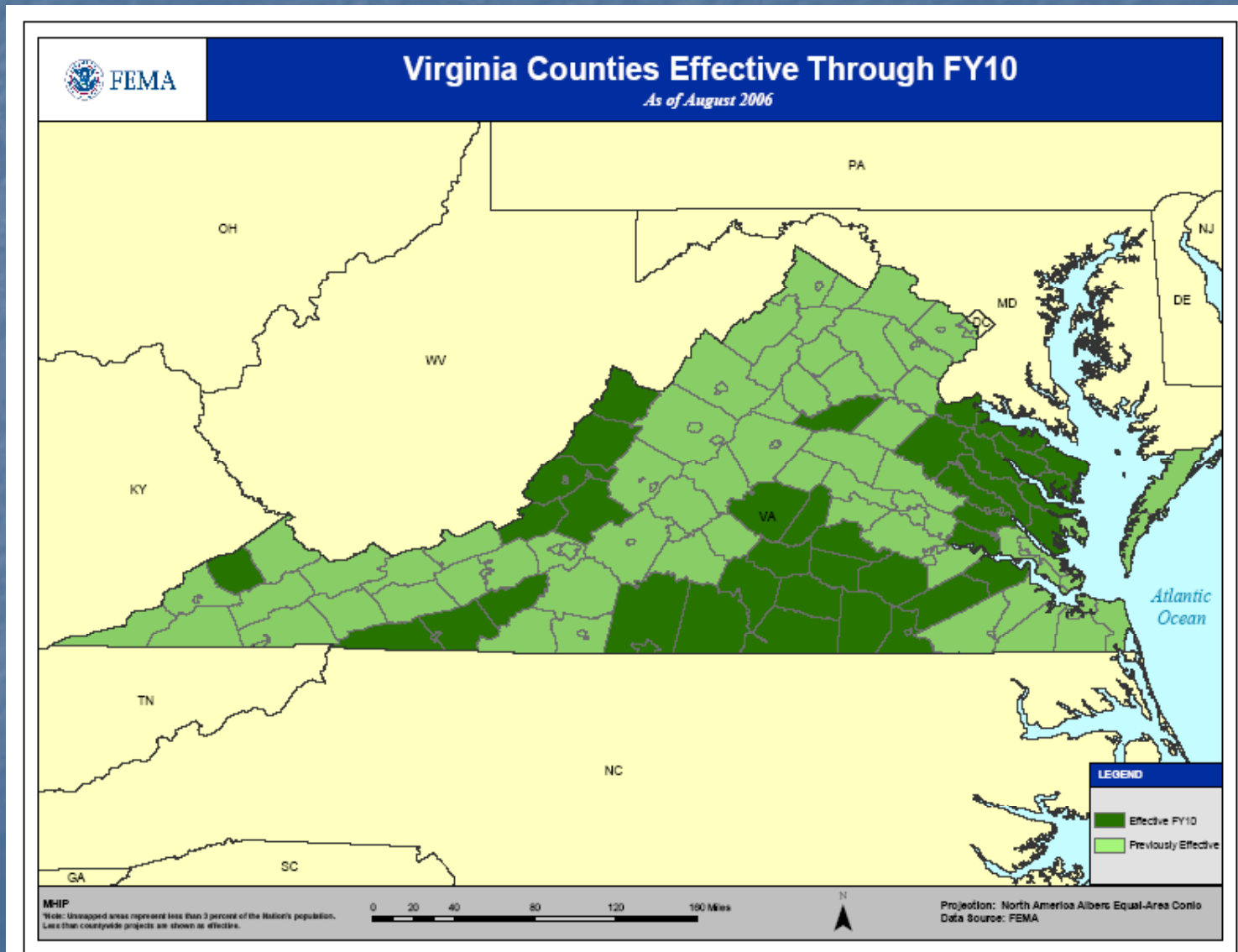
Flood Map Modernization Mapping Plan- Maryland



Flood Map Modernization Mapping Plan- Delaware



Flood Map Modernization Mapping Plan- Virginia



National Flood Insurance Reforms

- S. 3589 Flood Insurance Reform and Modernization Act of 2006
Senate Banking Committee – first reported May 2006, report filed June 26, 2006
- Interest in accelerated elimination of pre-FIRM vacation homes, non-primary residences, and non-residences (commercial properties)
- Incorporates much of S. 2005 “National Flood Mapping Act” (Sen. Jack Reed, RI)
- Map 500-year floodplain, natural floodplains behind levees and below dams, other flood related hazards
- Authorizes \$2.4 billion for mapping over 7 years
- National levees inventory – Parallel efforts underway in Public Works Committees