# Flood Resilience: Risks, Mitigation and Funding Solutions

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Monday, 16 May 2011

# International Perspective – Disaster Funding Frameworks

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- The US National Flood Insurance Program (NFIP)
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# The US National Flood Insurance Program

- Enacted in 1968
- Flood insurance is made available in exchange for local floodplain management to reduce future losses
- Eligibility is both community and individual risk based
- Three Key Components:
  - Flood Insurance
  - Floodplain Management
  - Flood Hazard Mapping
- Policies are issued both by FEMA and "WYO" insurers
- Broad flood source coverage: storm surge, "riverine", flash
- Program routinely expires and is re-enacted with great effort

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# Why Was the NFIP Enacted?

"For decades, the national response to flood disasters was generally limited to constructing flood-control works such as dams, levees, seawalls, and the like, and providing disaster relief to flood victims. This approach did not reduce losses, nor did it discourage unwise development. In some instances, it may have actually encouraged additional development. To compound the problem, the public generally could not buy flood coverage from insurance companies, and building techniques to reduce flood damage were often overlooked.

In the face of mounting flood losses and escalating costs of disaster relief to the general taxpayers, the U.S. Congress created the NFIP. The intent was to reduce future flood damage through community floodplain management ordinances, and provide protection for property owners against potential losses through an insurance mechanism that requires a premium to be paid for the protection."

Source: FEMA "Answers to Questions About the National Flood Insurance Program"

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# NFIP Coverage (USD)

- Limits of up to \$250k/\$500k residential/non-residential buildings
- Limits of up to \$100k/\$500k residential/non-residential contents
- Residential buildings @replacement cost if insured to 80% value, contents @ACV
- Mortgage lenders require flood insurance in flood zones
- Other features:
  - "Increased Cost of Compliance"
  - Deductibles
  - No Additional Living Expense
- Special requirements for "Repetitive Loss Properties"

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# **NFIP Rating**

- Rating factors include the amount of coverage purchased; location; age of the building; building occupancy; design of the building; and, for buildings in SFHAs, elevation of the building in relation to the Base Flood Elevation (BFE)
- Broad rate classifications
- Simple rating schedule
- CBO comments: "The program's explicit subsidies lower the cost of living in high-risk properties. Moreover, they <u>undermine</u> the incentives for policyholders to carry out mitigation measures—such as flood-proofing or elevating properties—because the subsidized rates are not affected by such measures."

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## **NFIP Statistics (USD)**

- At July 31, 2009:
  - 5.6 million policies in force
  - \$1.2 trillion of insured value
  - \$3.1 billion annual premium
- 80% claimed to be "full risk", where rates should cover expected loss
- 20% explicitly subsidized
- The Congressional Budget Office estimates a structural deficit of \$1.3 billion per year
- The NFIP lost \$17 billion in 2005, largely due to Katrina, Rita, and Wilma

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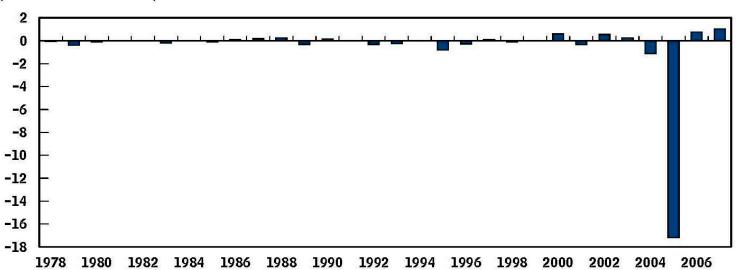
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# **NFIP Financial Results by Year**

#### The NFIP's Net Profit or Loss on Insurance Operations, 1978 to 2007

(Billions of nominal dollars)



Source: Congressional Budget Office based on Thomas L. Hayes and D. Andrew Neal, *Actuarial Rate Review: In Support of the Recommended May 1, 2009, Rate and Rule Changes* (Federal Emergency Management Agency, National Flood Insurance Program, August 2009), Exhibit B1, available at www.fema.gov/library/viewRecord.do?id=3742.

Notes: NFIP = National Flood Insurance Program.

These data exclude the federal policy fee paid by policyholders and the expenses covered by the fee. The data also exclude about \$1.5 billion in payments for principal and interest on the program's debt since 2005.

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## Was Katrina a Surprise?



#### **Hurricane Pam Exercise Concludes**

Release Date: July 23, 2004 Release Number: R6-04-093

BATON ROUGE, La. -- Hurricane Pam brought sustained winds of 120 mph, up to 20 inches of rain in parts of southeast Louisiana and storm surge that topped levees in the New Orleans area. More than one million residents evacuated and Hurricane Pam destroyed 500,000-600,000 buildings. Emergency officials from 50 parish, state, federal and volunteer organizations faced this scenario during a five-day exercise held this week at the State Emergency Operations Center in Baton Rouge.

The exercise used realistic weather and damage information developed by the National Weather Service, the U.S. Army Corps of Engineers, the LSU Hurricane Center and other state and federal agencies to help officials develop joint response plans for a catastrophic hurricane in Louisiana.

"We made great progress this week in our preparedness efforts," said Ron Castleman, FEMA Regional Director. "Disaster response teams developed action plans in critical areas such as search and rescue, medical care, sheltering, temporary housing, school restoration and debris management. These plans are essential for quick response to a hurricane but will also help in other emergencies."

"Hurricane planning in Louisiana will continue," said Colonel Michael L. Brown, Deputy Director for Emergency Preparedness, Louisiana Office of Homeland Security and Emergency Preparedness. "Over the next 60 days, we will polish the action plans developed during the Hurricane Pam exercise. We have also determined where to focus our efforts in the future."

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Source: FEMA

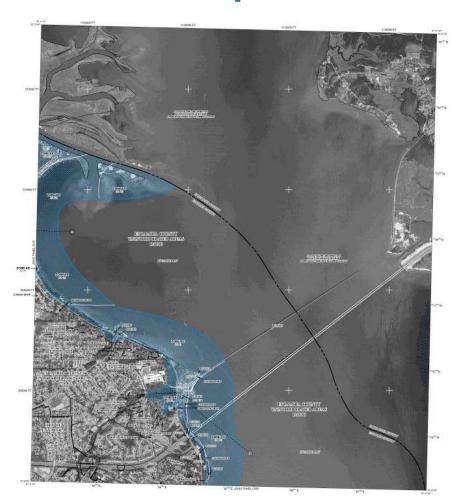
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## **Detailed Maps Online**







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#### **GAO Comments**

"While Congress and FEMA intended that NFIP be funded with premiums collected from policyholders rather than with tax dollars, the program is, by design, not actuarially sound. NFIP cannot do some of the things that private insurers do to manage their risks. For example, NFIP is not structured to build a capital surplus, is likely unable to purchase reinsurance to cover catastrophic losses, cannot reject high-risk applicants, and is subject to statutory limits on rate increases. In addition, its premium rates do not reflect actual flood risk.

"Addressing the financial challenges facing NFIP would likely require actions by both FEMA and Congress that involve trade-offs, and the challenges could be difficult to remedy. For example, <u>reducing subsidies could increase collected premiums but reduce program participation</u>."

Source: Government Accountability Office, "NATIONAL FLOOD INSURANCE PROGRAM", September 22, 2010

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#### **NFIP Pros and Cons**

#### Pros:

- Creates strong incentives for community level flood management
- Addresses availability and affordability issues
- Protects mortgage lenders and consumers
- Provides structured relief after major events
- Has led to excellent flood plain maps and other information
- Clear flood definition

#### Cons:

- Has suffered significant deficits
- Has to be re-enacted every few years
- Arguably has encouraged development in flood prone areas <u>and</u> made hurricane over-development issues worse
- Has led to claims confusion in hurricane losses

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# **Overdevelopment & Hurricanes**





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#### Wind vs. Water



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# The Makings of a Property Insurance Crisis

Historical underpricing & subsidies

High-risk overdevelopment

Huge loss in 1992

New technology (GIS, models)

Rate increases/non-renewals

Government reaction

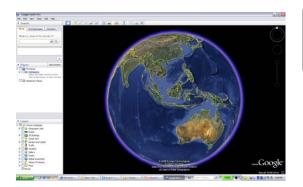
Pools designed to lower premiums

Fitful efforts to mitigate

Pressure for more development

More huge losses in 2004-2005









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## **GIS 2008 - A Top 10 List:**

Ways technology provides forensic information on risks

- #10 High Resolution Satellite Photos
- #9 DVR History of Recorded TV programs
- #8 Web surfing, text message, and e-mail logs
- #7 Credit Card Statement Analysis
- #6 Genetic Testing Results
- #5 Global Positioning Device (GPS)
- #4 Black Box Insurance Discounts
- #3 Credit Scoring
- #2 Geo-coding and proximity to fire hazards
- #1 Flood Plain Maps

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#### **GIS 2008 - Eureka!!!!**





With the latest release of flood plain information I can now *individually rate* each and every flood insurance policy based on house location. I'm going to revolutionize the insurance market!

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#### **GIS 2008:**

# What Happens When Technology Happens?

- Technology isn't going away
  - Information is becoming more and more available
  - Actuarial tools are becoming more and more advanced
- Pooled rates will no longer be sustainable
  - Availability Problems
  - Affordability Issues
- Will situation only be solvable with Government intervention?

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#### **GIS 2008:**

#### What does this mean to actuaries?

- Technology/data is changing the nature of our work in powerful ways
  - The pace of change can be lightning fast
  - Should we be thinking about implications before the issues arise?
- Market forces will drive using information, even if this has troublesome consequences
  - "Doing the right thing" may be commercially impossible
  - Government intervention may follow
- Actuaries will face a number of interesting ethical or professional dilemmas
  - Do our standards adequately address the issues?
  - Should the Institute discuss the issue?
  - Should we care?

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#### **Observations**

- In Australia, the private market has proven very capable of funding disaster losses and sending economic signals
- In the US, the combination of disasters and new technology led to market disruption and government intervention
  - New technology plus major disasters can create turmoil
  - Care must be taken in crafting focused solutions
  - Moral hazard may be created if rates are subsidized
- The US NFIP offers lessons about how a government flood program can be structured

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### **Questions**

- Should the government make flood maps generally available?
- Who is responsible for...
  - Development in flood plains sanctioned by councils?
  - Changes in technology which expose riskiness?
- Should the past and future be split:
  - Some common responsibility for past legal development?
    - If yes, can the private market provide subsidies?
    - If no, is non-insurance an issue?
  - No subsidy for future development?
  - Strict rebuilding (mitigation) requirements in flood areas?
- Is the status quo sustainable?

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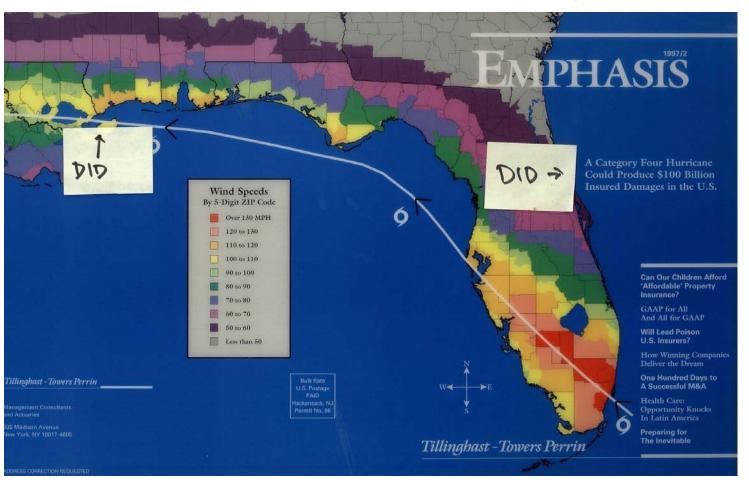
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## Can We Afford Affordability?



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