



MOD-2: Evolution of Flood Modeling: Is the U.S. Ready?

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Agenda

- Background and introduction
- Flood Risk Assessment -- Vijay
- AIR Inland Flood Model for the U.S. -- Nalan
- Questions

Top Ten Insured Fresh Water Floods in History

Date	Country	Insured Losses* (USD Billions)
July – Nov 2011	Thailand	12
Aug 2002	Germany & Czech Republic	2.9
Jun 2007	United Kingdom	2.7
Aug 2005	Switzerland	2.4
Jan 2011	Australia	2.3
Jul-Aug 1997	Poland & Czech Republic	2.2
Dec 2010	Australia	2.1
Jul 2007	United Kingdom	2
Apr 1993	United States	1.9
Jun – Aug 1993	United States	1.6

* Trended to 2011

Source Swiss Re Report 2012

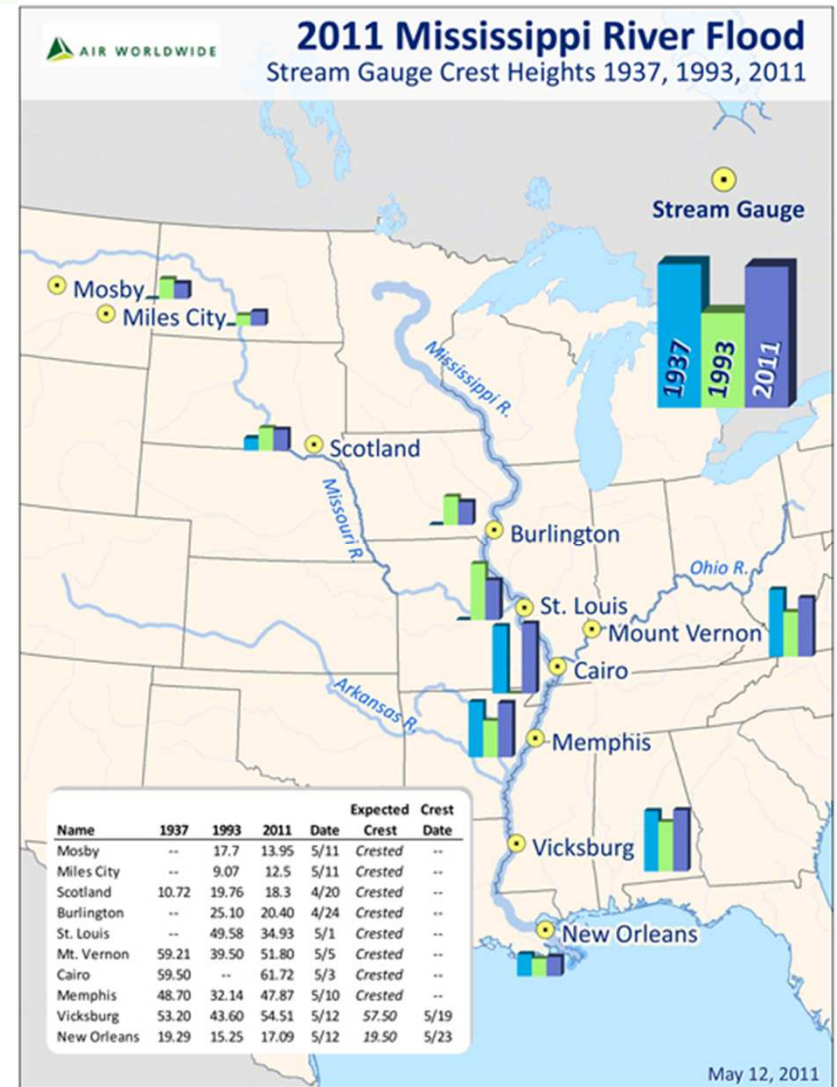


2011 Thailand Floods Caused Insured Losses of \$12 Billion and Economic Losses of \$40 Billion



2011 Mississippi River Floods Inundated Thousands of Properties and Hundreds of Thousands of Acres

- Heavy rains have caused the Mississippi to overflow its banks
- The water crested at 47.85 feet, just under a foot below the record (48.7 feet) set in 1937 when a massive flood inundated 20 million acres of farmland
- Flood inundated more than 3,000 properties in Memphis, including nearly 100 single-family homes
- Hundreds of thousands of acres of farmland were flooded



Overview of the National Flood Insurance Systems

Country	Flood Insurance Program	Key Characteristics
Germany	Private and Optional	<ul style="list-style-type: none"> - Flood risk map - Low penetration except in some prior mandatory regions
France	Public and Bundled	<ul style="list-style-type: none"> - High penetration rate - Price doesn't reflect risk - No risk-reducing incentive
U.K.	Private and Bundled	<ul style="list-style-type: none"> - Flood risk map - Old contracts are subsidized (2013) - High penetration rate
U.S.	Public and Optional	<ul style="list-style-type: none"> - Flood risk map - Adverse selection - Low penetration

Overview of the U.S. National Flood Insurance Program (NFIP)

- Established in 1968
 - Prior to that, flood was not an insurable peril
- Provides 5.6 million policyholders across the country with flood insurance in exchange for \$3.3 billion in premium paid in 2010
- Currently facing a \$17 billion deficit
- New changes have been made to the program as of July, 2012



Defining Different Types of Floods Can Be Challenging...

- Floods can take many different forms
 - Torrential Rainfall, Flash Flood
 - Dam Burst
 - River Flood
 - Storm Surge
 - Tsunami
 - Ice Jam, Mudflow, Groundwater, Lahar



...And So Is Providing Insurance for Them

- Adverse Selection – only people that know they live in flood prone areas are likely to buy flood insurance
- Insurance Awareness – many people might not even know they are living in flood-prone areas
- Technology – modeling tools are not always accurate or available
- Government – government can play a positive role by enforcing the building code but government support in the event of floods discourages people from buying insurance
- Aging and poorly maintained dams and levees – means the risk continues to increase over time

IS Flood an Insurable Risk? - Principal of Insurability

- **Mutuality:** A large number of people who are at risk must combine to form a risk community
- **Accessibility:** The expected loss burden must be assessable
- **Randomness:** The time at which the insured event occurs must not be predictable, and the occurrence itself must be independent of the will of the insured
- **Economic viability:** The community organized by the insured people must be able to cover its future, loss-related financial needs on a planned basis
- **Similarity of threat:** The insured community must be exposed to the same threat, and the occurrence of the anticipated event must rise to the need for funds in the same way for all concerned

