

Competition in the US Flood Market – How to Select Risks?

Rob Porter – Head of Catastrophe Research



SOMPO CANOPIUS

Introduction

- Flood risk in the US
- National Flood Insurance Program
- Flood Mapping in US
- Opportunities
- Selecting Risks
 - Aggregation issue
 - Non-stationarity
 - Correlation

Mississippi River

“Little European river... it would just be a holiday job... to wall it, and pile it, and dike it, and tame it down, and boss it around... But this ain't that kind of a river”

Mark Twain

Flood Risk in the US

Historic Floods

- A history of major river flooding
- Mississippi flooding 1927, 1993
- Tropical Storm Alison 2001
- Hurricane Katrina 2005



Mississippi flood 1993

Key Factors

- Varied climatic regions
- Different scale catchments
- Large scale intervention in places
- Storm surge & surface water risk
- Huge population changes



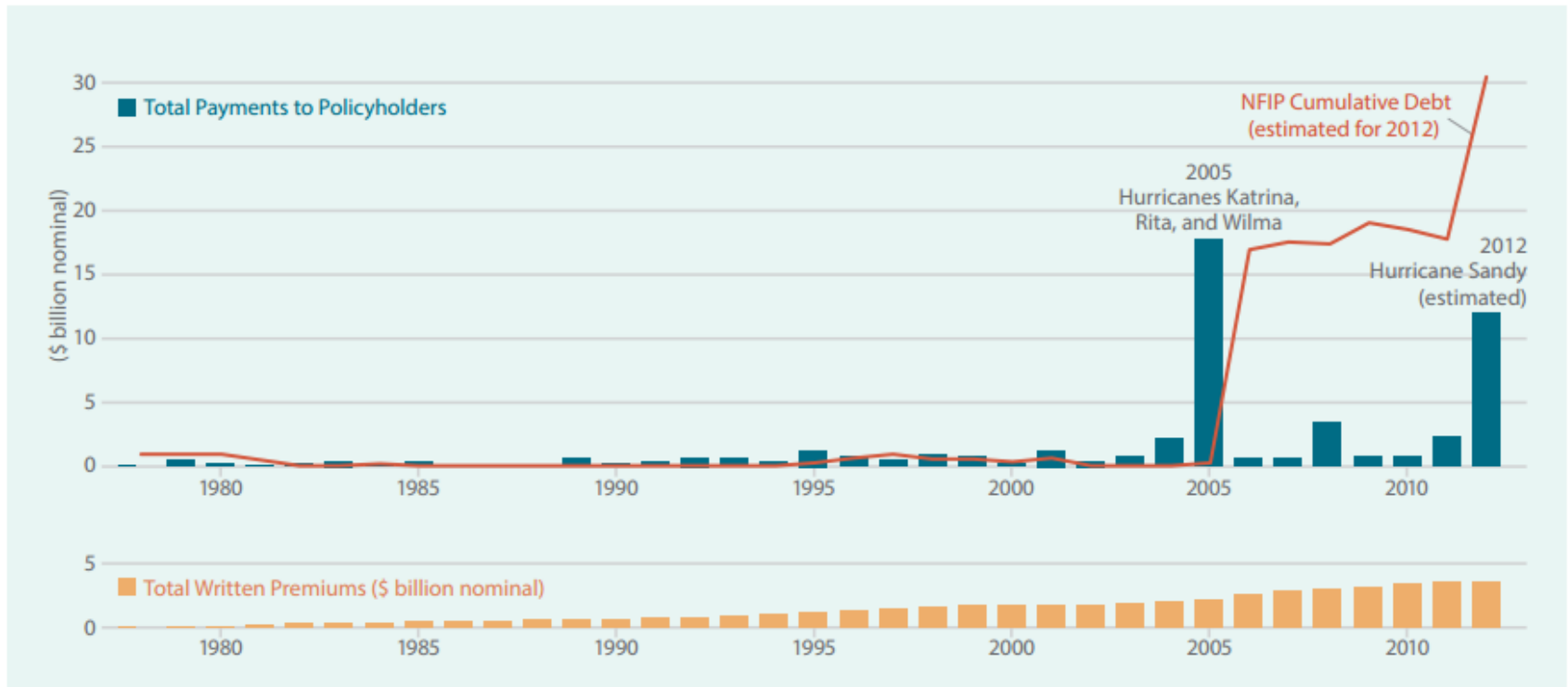
Tropical Storm Allison 2001

Flood Insurance in the US

- Flood generally excluded from standard homeowners
- National Flood Insurance Program (NFIP) established 1968
- Insurance at below market rate
- Community commitment to improving local flood management
- Write You Own Insurance
- Requirements to buy flood insurance



Problems with the NFIP



Reforming the NFIP

- Biggert-Waters Flood Insurance and Reform Act
- Homeowners Flood Insurance Affordability Act
- Flood Insurance Market Parity and Modernization Act
- Tackling debt
- Improving take up rates
- Private market participation



KEYBRIDGE
RESEARCH

REFORMING THE NATIONAL FLOOD INSURANCE PROGRAM:
AN EVALUATION OF POLICY ALTERNATIVES

Prepared For:
Federal Emergency Management Agency
NFIP Reform Working Group

Prepared By:
Mark W. MacFarland
Adam Karpson
Jeff Jensen
Katie Henderson

August 9, 2011

NFIP Reform:
Phase III Report

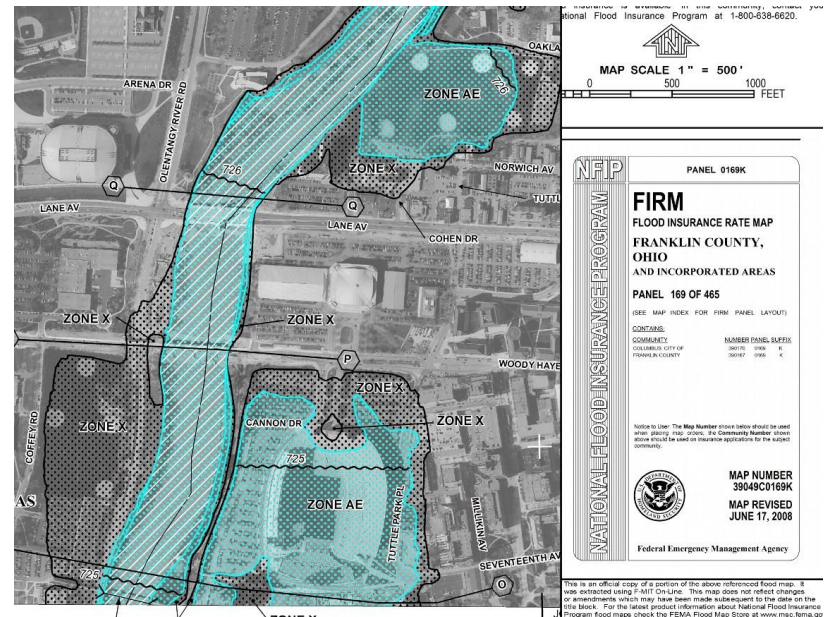


FEMA

August 2011

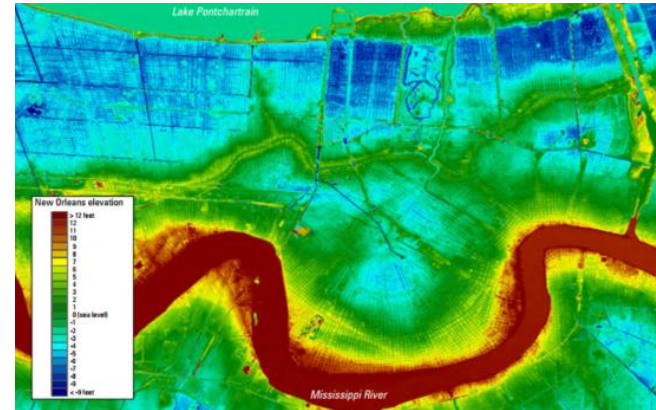
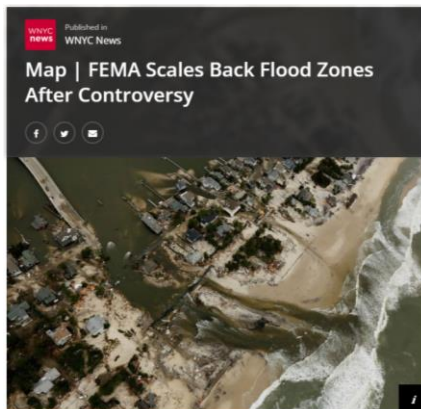
Flood Insurance Rate Maps (FIRMs)

- Early flood mapping program
- Analogous to Environment Agency maps
- Integral to insurance pricing
- Risks differentiated based on:
 - Return period
 - Nature of flooding
 - Depth of flooding



FIRM issues

- Dated hydrology
- Poor topography
- Erratic coverage
- Poor risk differentiation
- Political pressure
- Paper maps!



FIRM issues - examples

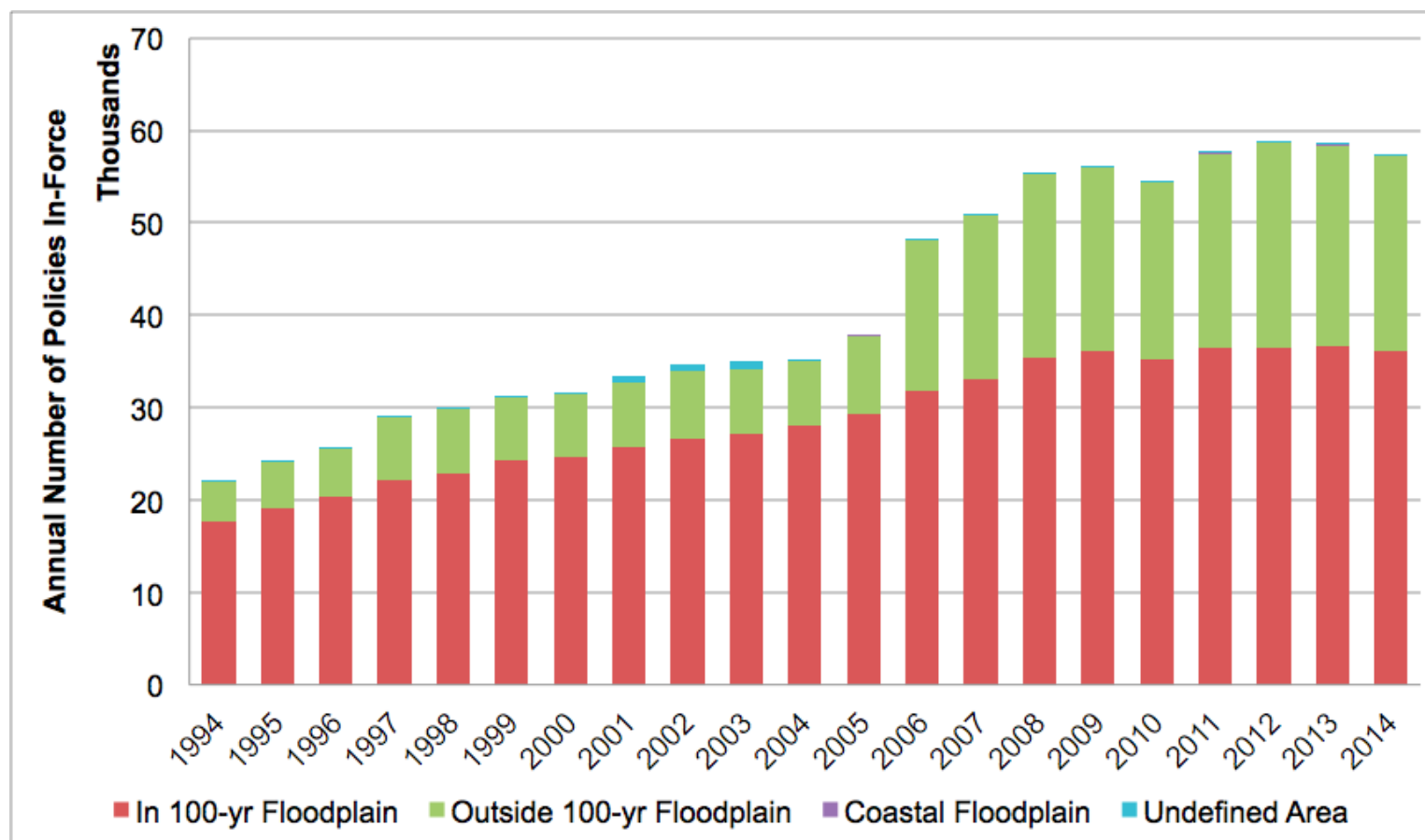


Misalignment

What happened to the
flood extent?



NFIP Claims analysis



Opportunities

Flood insurance rate maps drive purchasing
...but the maps aren't a good indicator of risk
...and market is being opened up to insurers

		FIRM Hazard	
		HIGH	NO
Actual Hazard	HIGH	More competition on price	Potential to develop market
	NO	Offer lower rates	More certainty to homeowners

How do we know the actual hazard though?

Probabilistic Cat Models v Hazard Maps

	Probabilistic Models	Hazard Maps
Strengths	<ul style="list-style-type: none">• Aggregate between risks• Account for policy terms• Incorporates vulnerability• Generates a price	<ul style="list-style-type: none">• Higher resolution• Point probability• Transparent
Weaknesses	<ul style="list-style-type: none">• Resolution compromise• Enough events?	<ul style="list-style-type: none">• Doesn't generate a price• Can't aggregate risks

Are probabilistic catastrophe models reliable enough for risk selection and pricing?

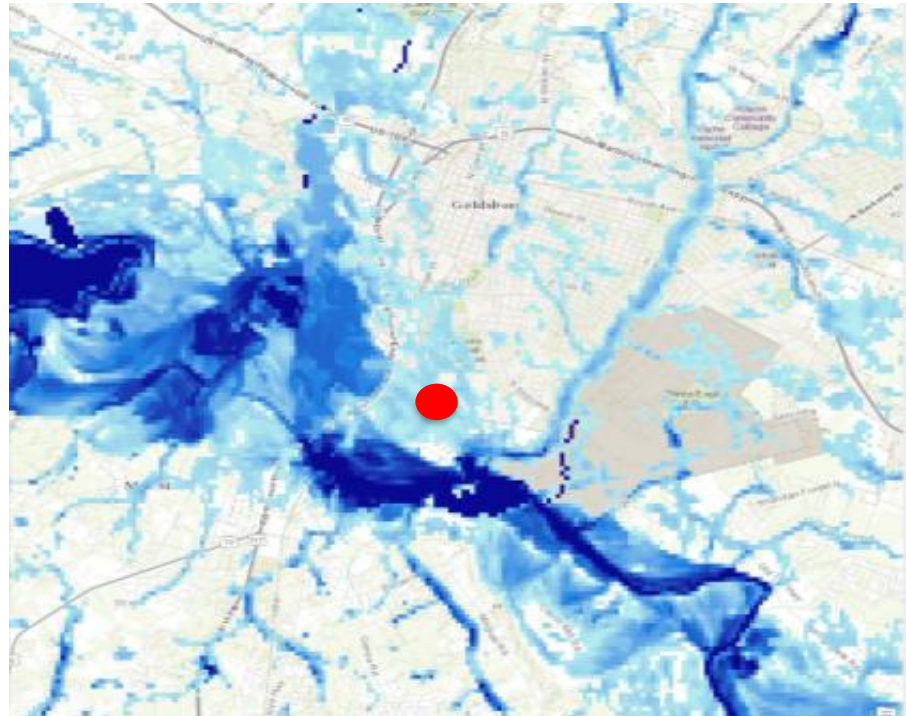
Using Hazard Maps

Key Considerations

- Return period of flooding
- Interested in depth as well?
- Building elevation useful?
- Do you need to price?
- Risk selection only?

Other Considerations

- Geocoding
- Point v polygon
- Flood defences

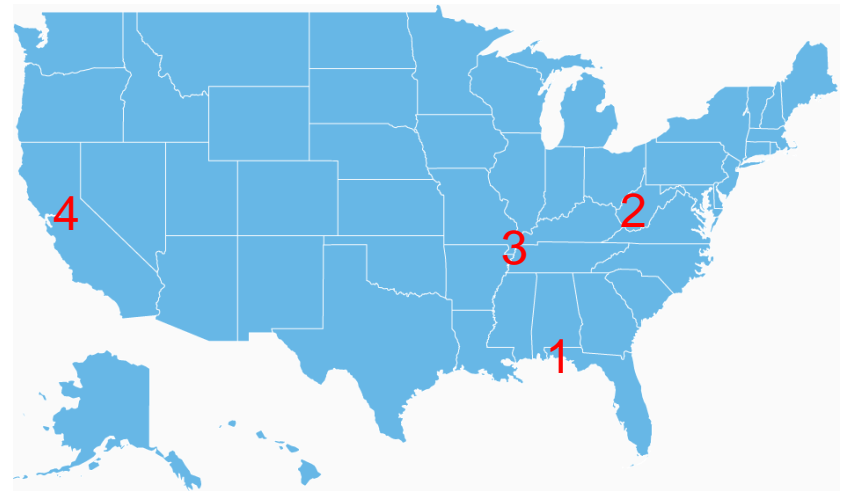


Monitoring Aggregations

Can the following aggregate?

1. Beachfront panhandle Florida
2. Inland West Virginia
3. Mississippi riverfront in Tennessee
4. Sacramento, California

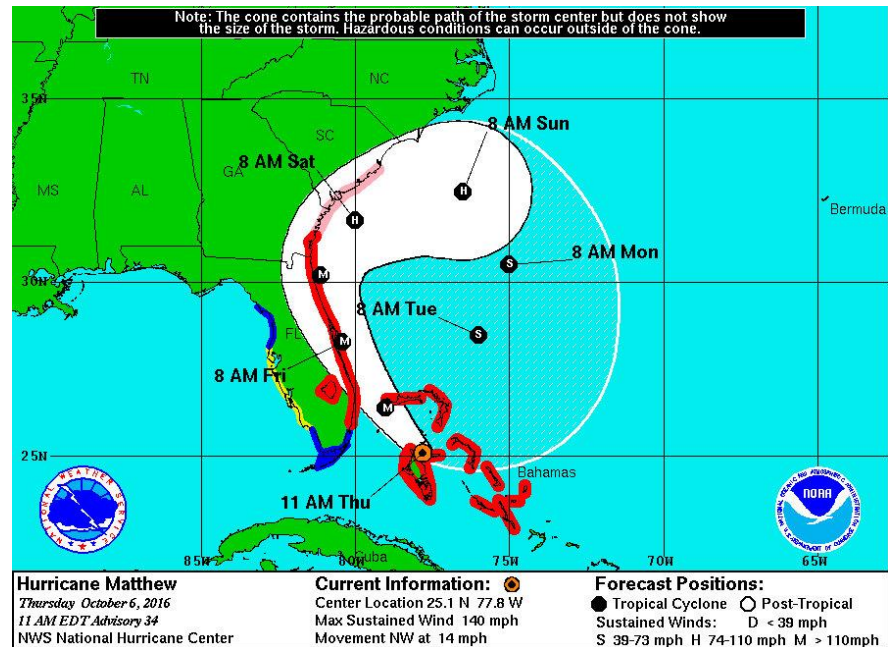
- Hurricane Ivan
- Ohio River floods
- Continental scale issues?



Correlation with other perils

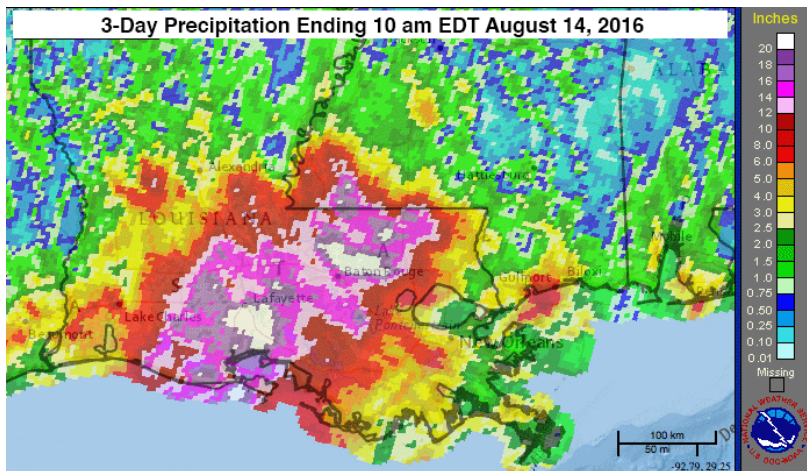
- Hurricane is biggest risk to capital for Lloyd's insurers
- Storm surge, fluvial and surface water flooding components of hurricane

*Hurricane Matthew:
significant proportion of
losses from storm surge
and fluvial flooding*

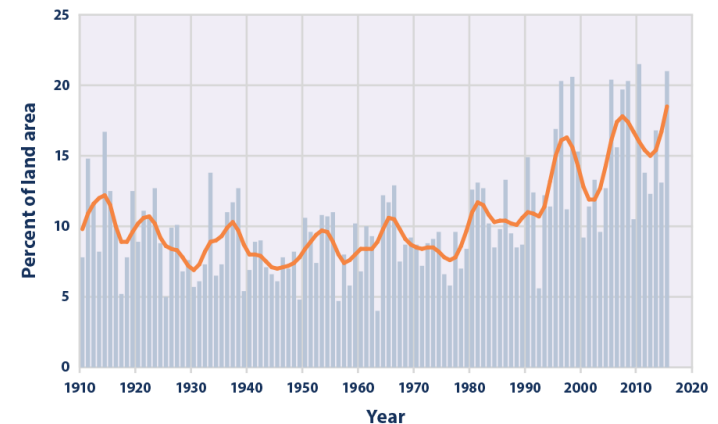


Non-Stationarity

- Changing climate
- Change in frequency and intensity of intense rainfall?
- 2015 South Carolina floods
- 2015, 2016 Houston floods
- 2016 Louisiana floods



*Rainfall in Louisiana
2016*



*Increasing areas subject to
intense rainfall*

Conclusion

- Heavy state influence in US flood market
- NFIP beset by problems
- Increased private market role
- Improvements in hazard
- Complexities of writing risks:
 - Correlation
 - Non-stationarity
 - Monitoring aggregations

Who won (and what does it mean for US flood market)?

Chance of winning

