Swiss Re

The Economic Impacts of Risk

New Orleans – 100 Resilient Cities

SWISS RE 150 YEARS

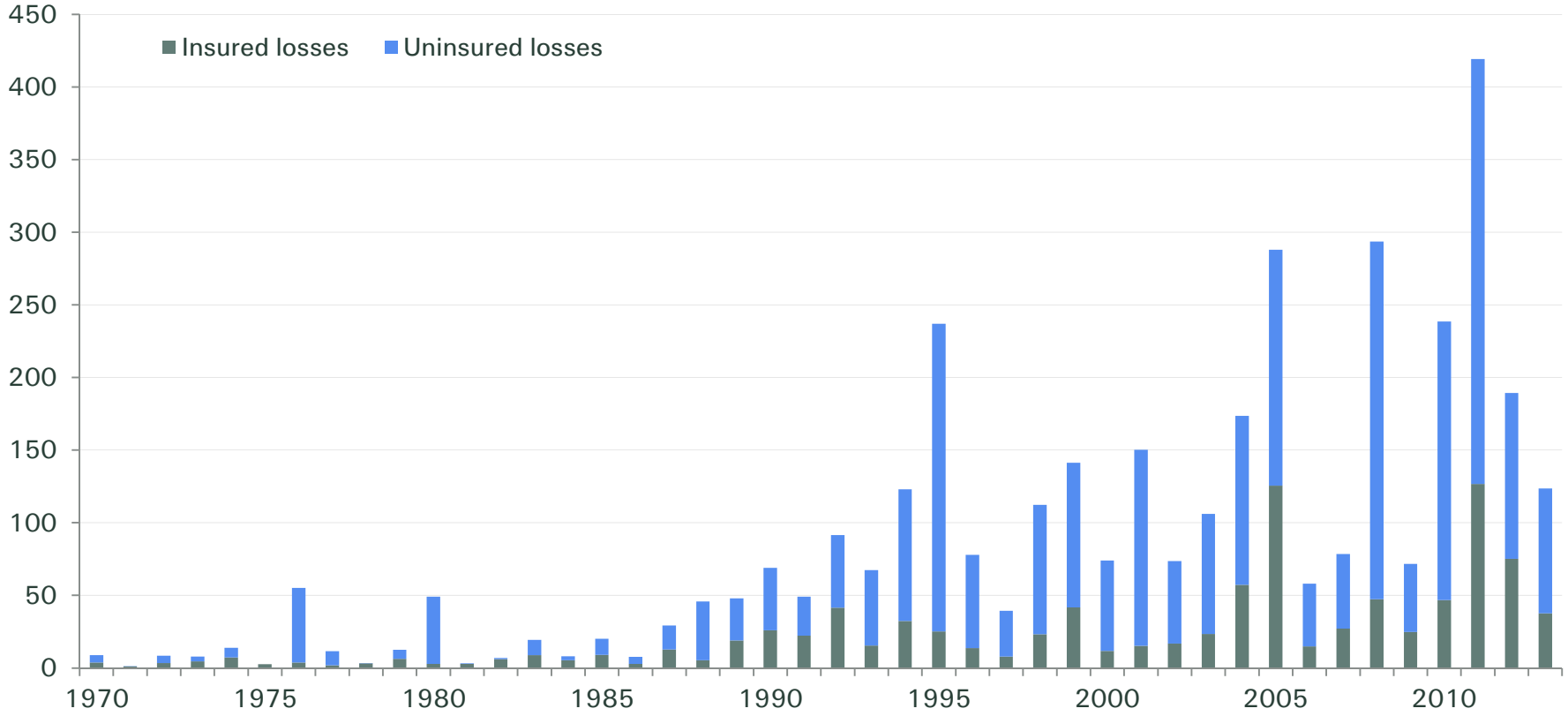
Table of Contents / Agenda

- The Rising Cost of Disasters
- Natural Disaster Exposures of New Orleans
- Economics of Climate Adaptation
- Comprehensive Risk Management
- Case Studies

The Rising Cost of Disasters

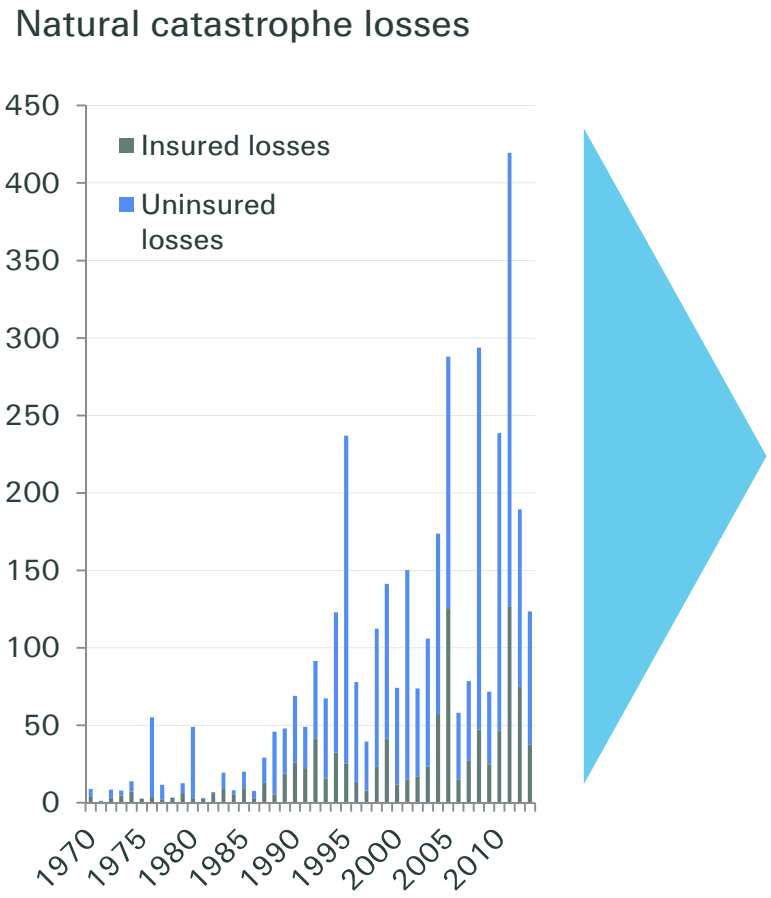
The cost of disasters is growing and the portion absorbed by governments and its citizens are even greater.

Natural catastrophe losses 1970-2013, in USD billion (2013 prices)



Source: Swiss Re Economic Research & Consulting, *sigma* catastrophe database

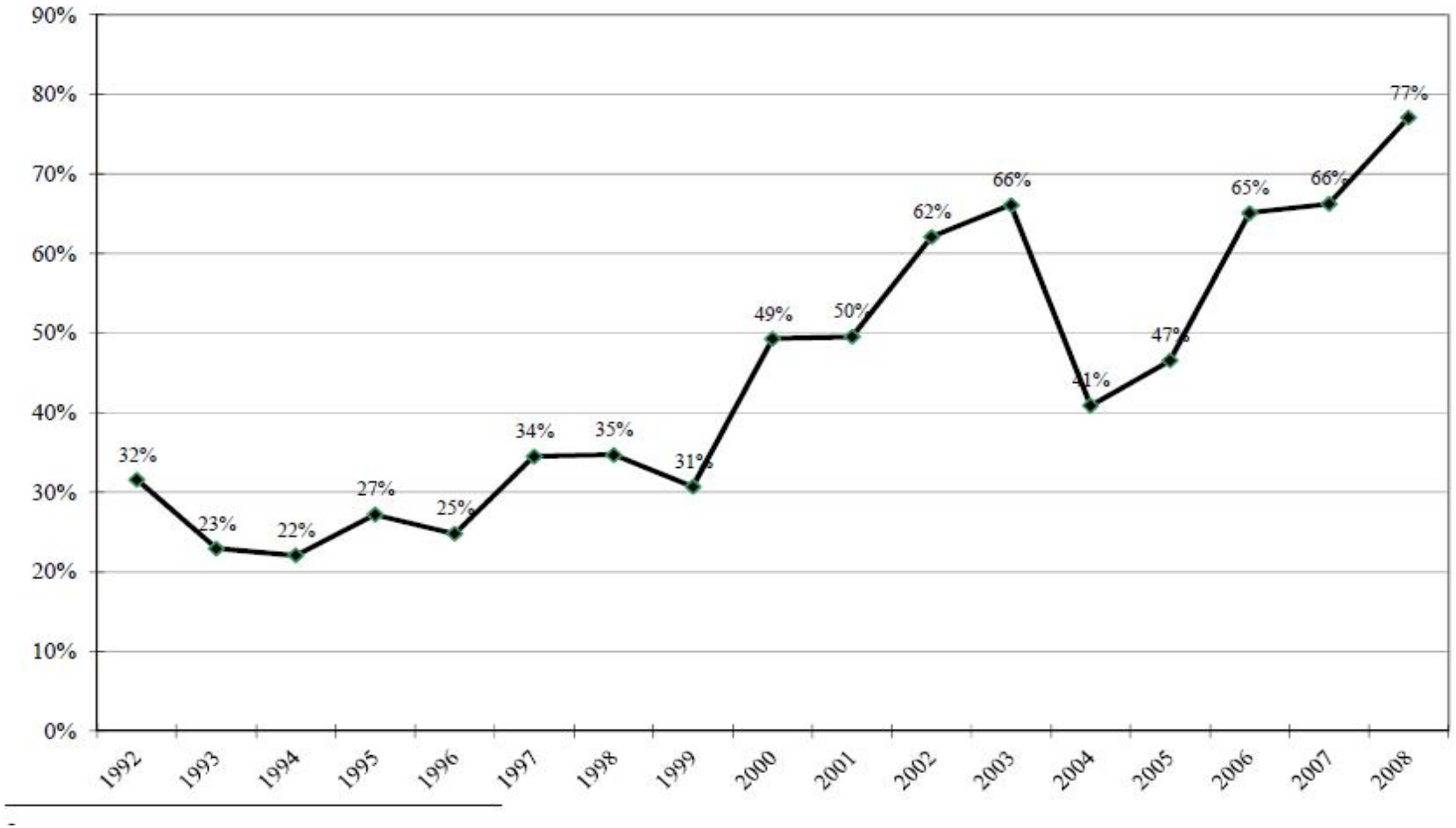
Disasters place a significant burden on the public sector



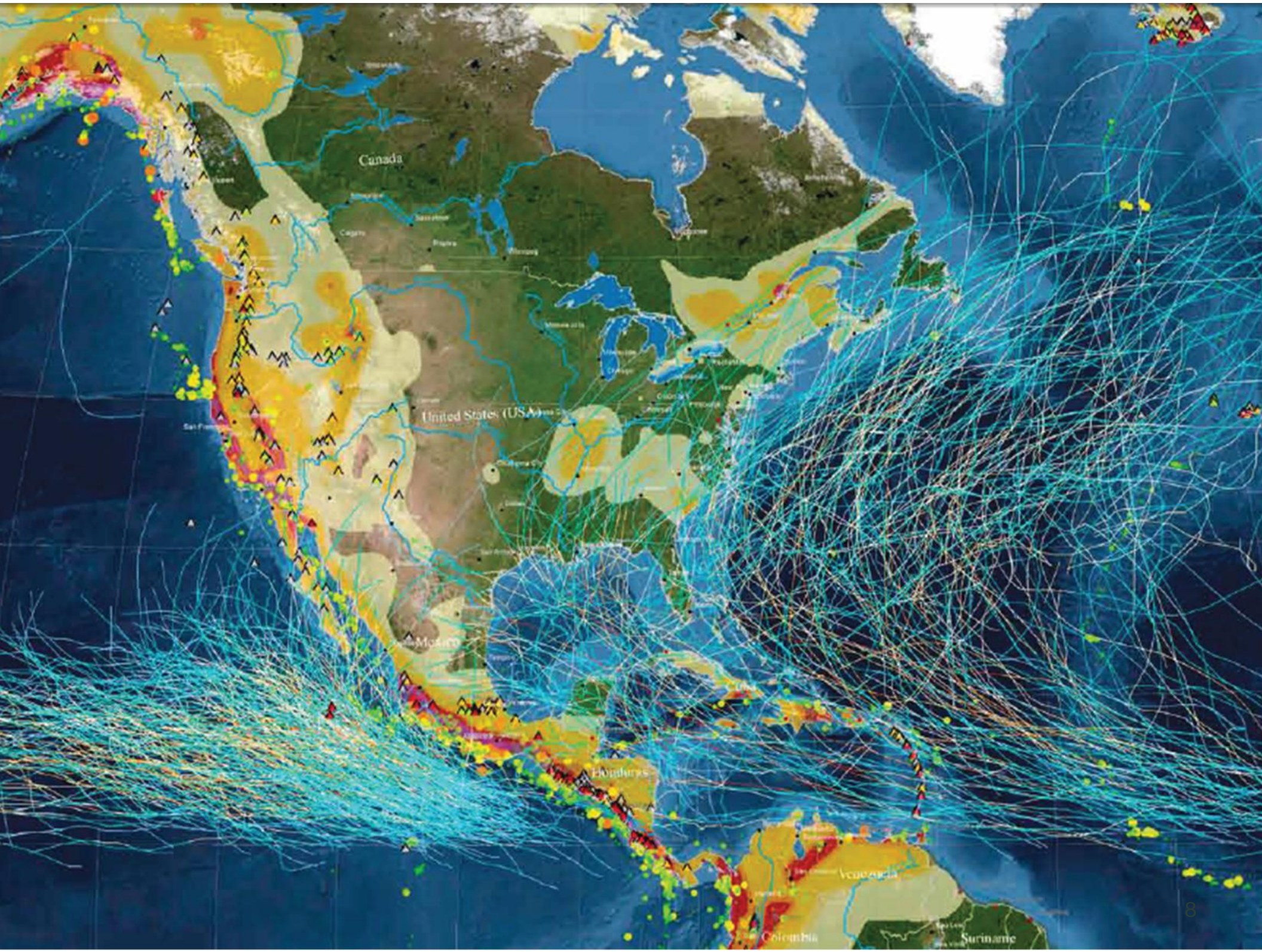
- Despite prevention and mitigation efforts, no country can fully insulate itself against extreme natural disasters
- The brunt of economic losses from natural disasters ends up with individuals, corporations and governments, both on national and sub-national level
- Government budgets are impacted by:
  - Primary effects include immediate expenses for emergency relief efforts, costs for rebuilding public infrastructure or loss of capital and durable goods
  - Secondary effects, for instance, include lower economic growth, lower tax and non-tax revenues, budget deficits, increased indebtedness and costs from refinancing, higher inflation or currency movements

The proportion of economic losses absorbed by the USG: Is this sustainable?

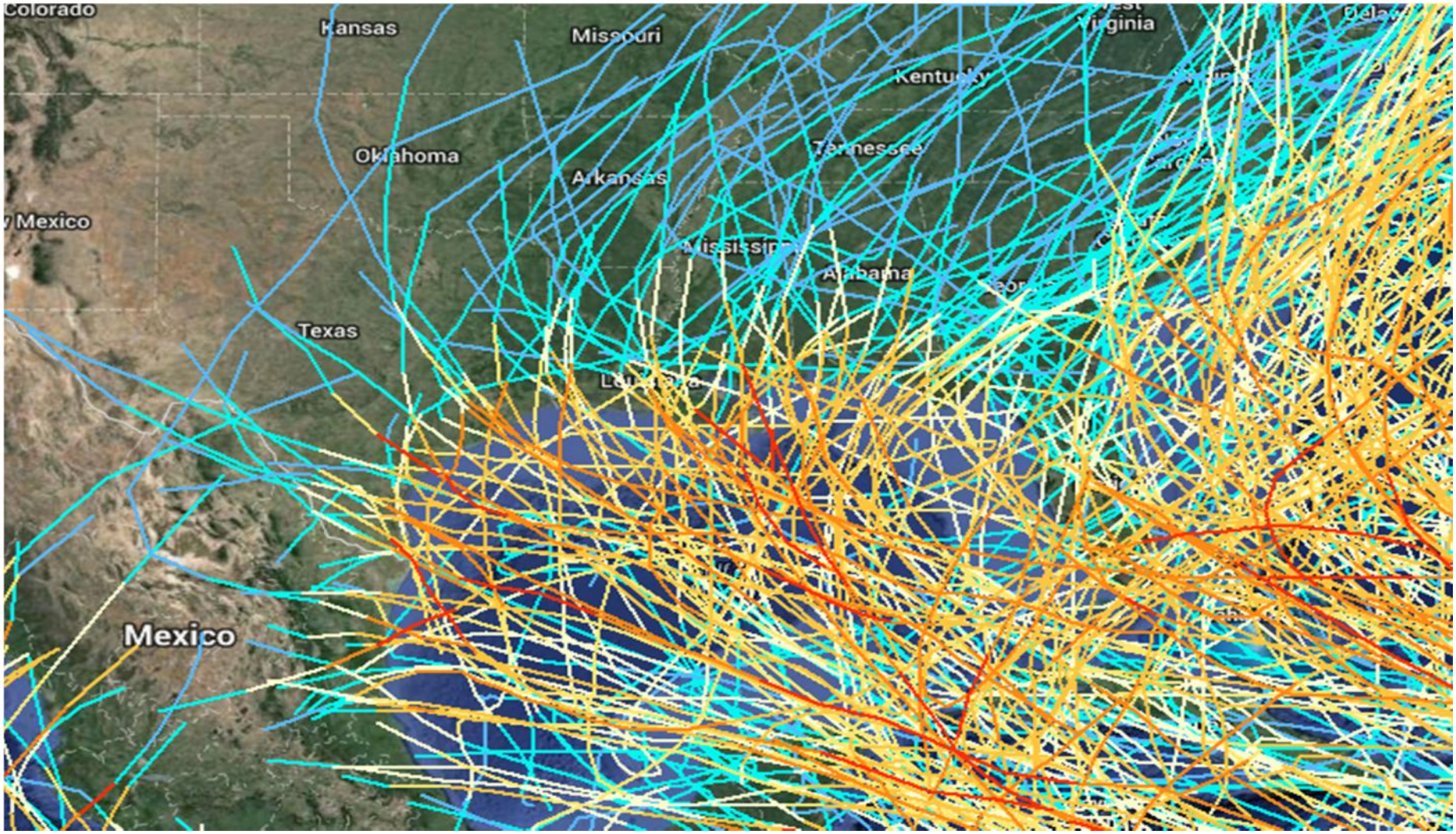
Figure 4: Ratio of Total Federal Government Disaster Expenditures to Measured Losses
Source: Cummins, Suher, and Zanjani (2010)[2]



Natural Disaster Exposures of New Orleans

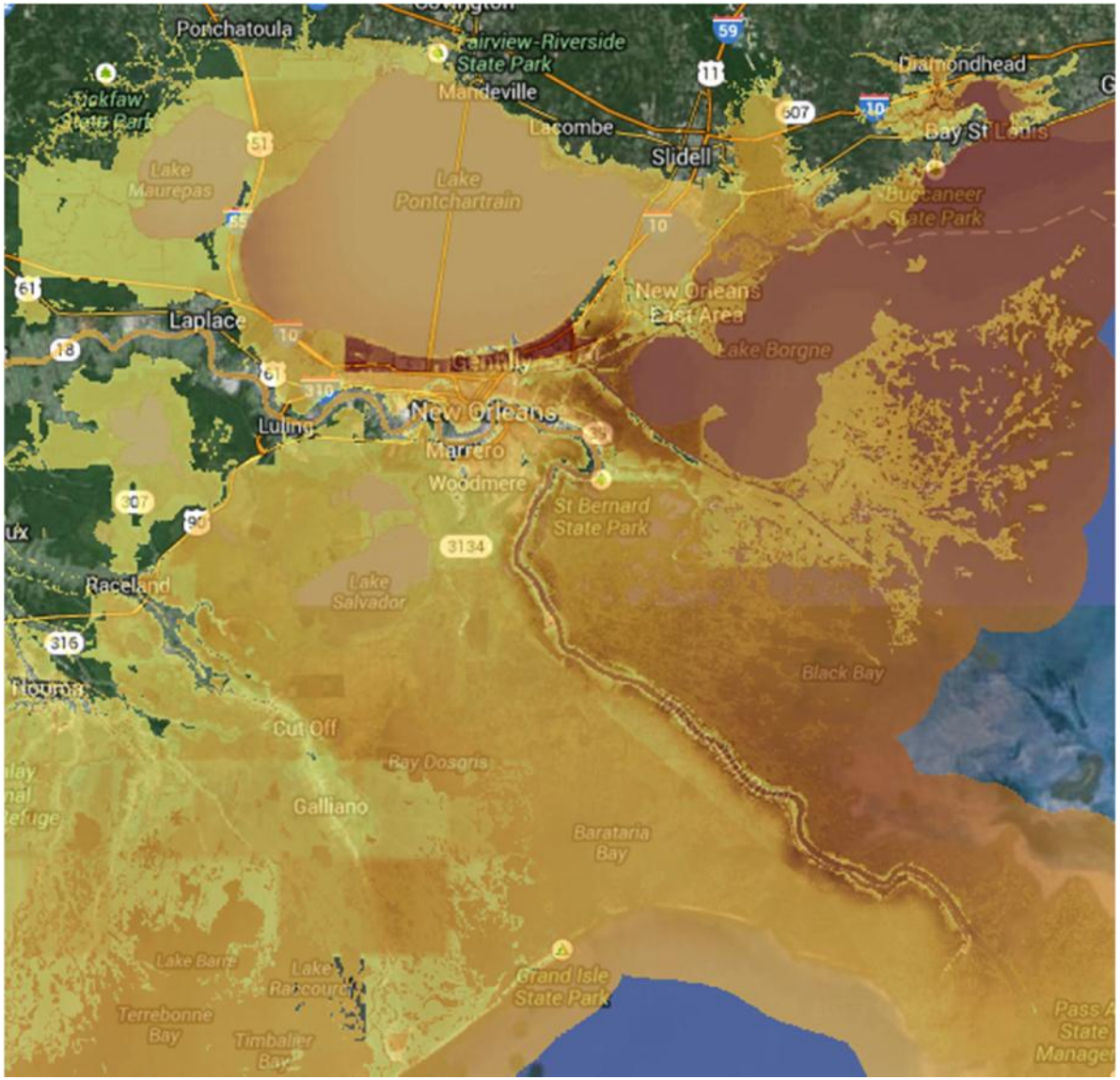

Canada
United States (USA)
Honduras
Colombia
Suriname

Historical Tropical Cyclone Tracks
1891-2008



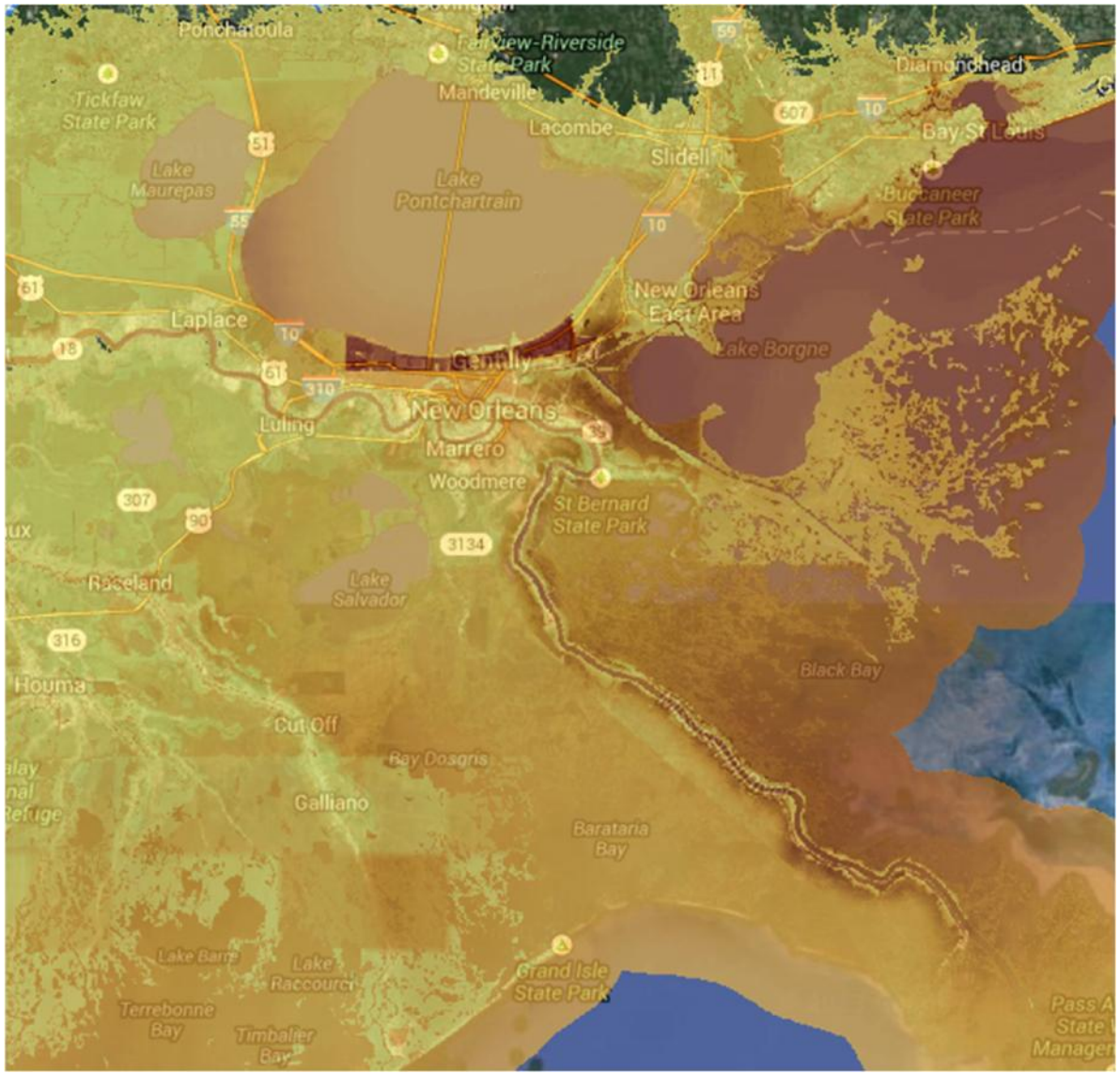
Source: Swiss Re CatNet

Storm Surge – Category 1 Hurricane



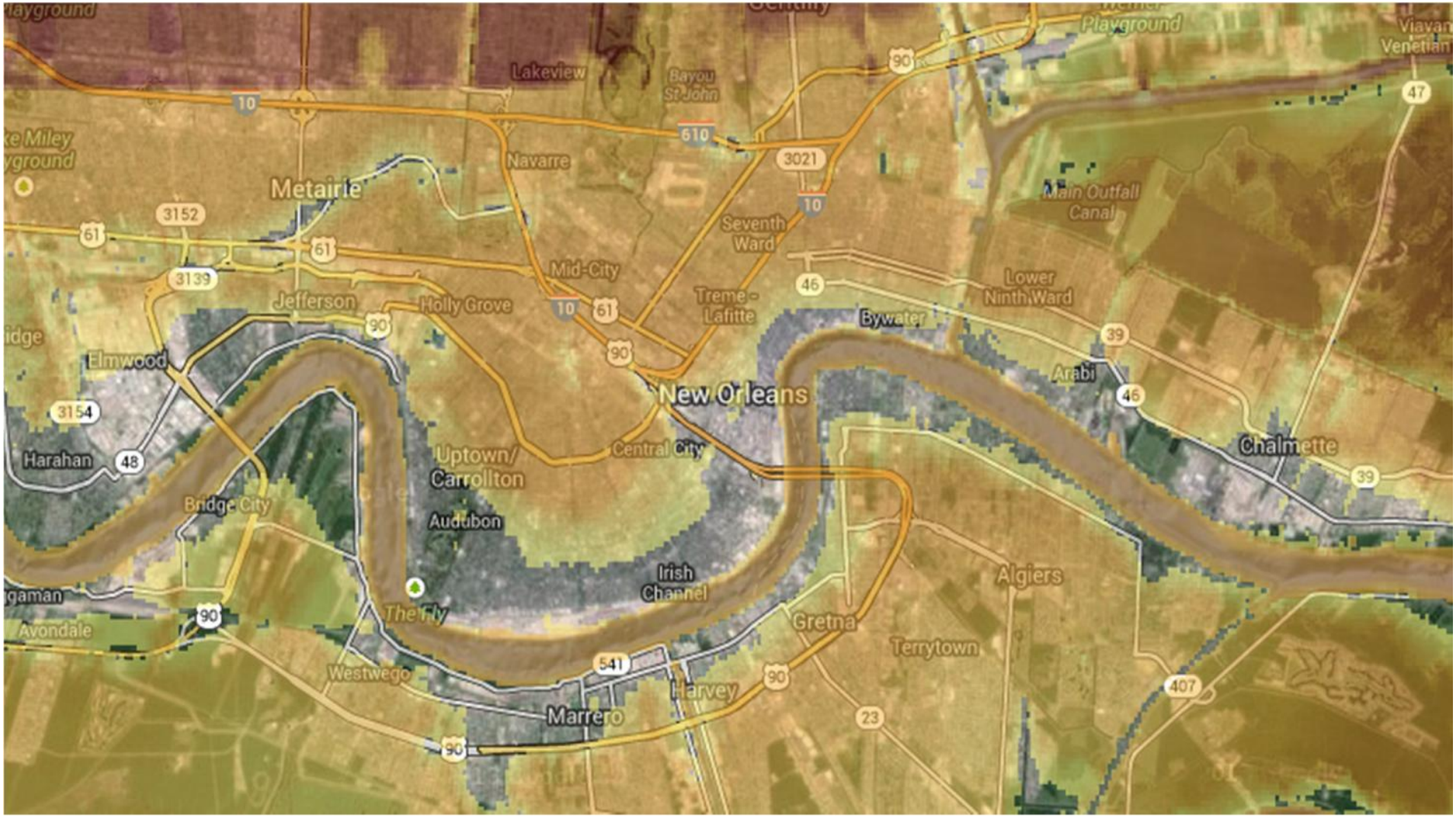
Source: Swiss Re CatNet/SLOSH

Storm Surge – Category 5 Hurricane



Source: Swiss Re CatNet/SLOSH

Storm Surge – Category 1 Hurricane



Source: Swiss Re CatNet/SLOSH

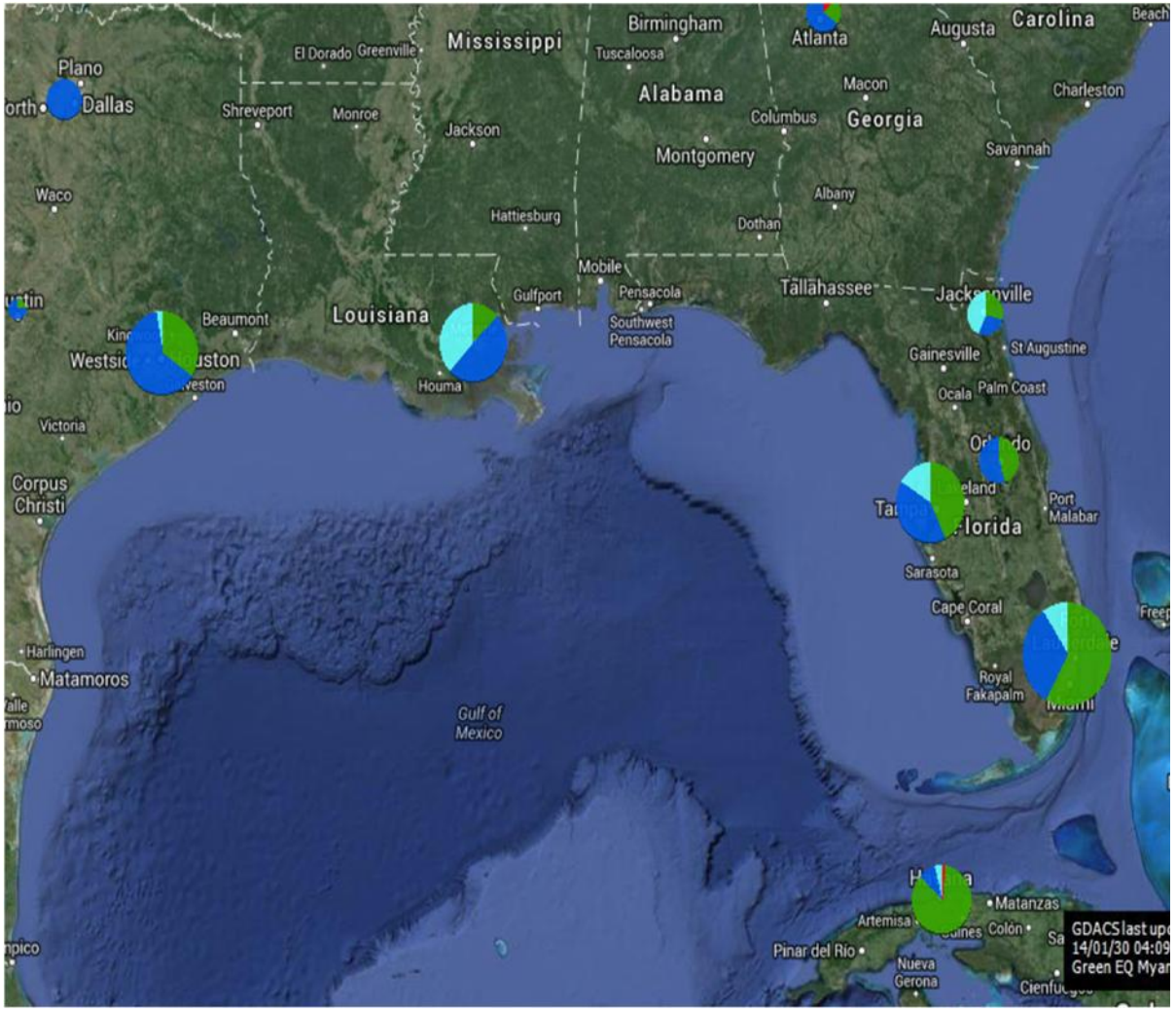
River Flood Exposure

Source: Swiss Re CatNet/FEMA

People Affected by Disasters

New Orleans' two greatest threats are river flooding and storm surge.

- Storm Surge: 528,000 people or 56% of the total population
- River Flood: 695,000 or 73% of the population
- Hurricane/Storm: 182,000 or 19% of the population



Source: Swiss Re CatNet

Mind the Risk – How does New Orleans compare to other cities?

Economics of Climate Adaptation

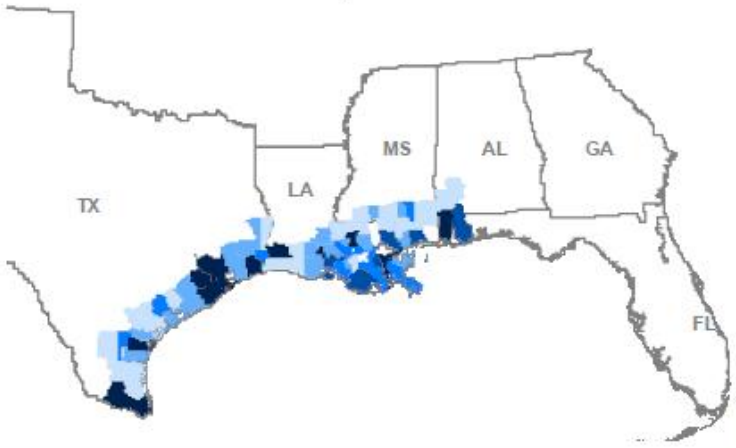
Analysis scope includes 77 counties along the Gulf Coast, involving an asset value of over $2 trillion

US Gulf coast case study

Key areas examined within 70 miles of the coast

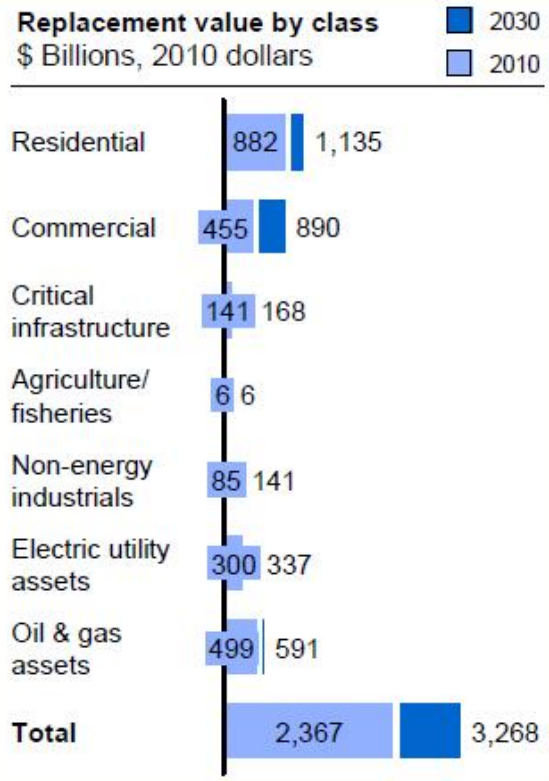
US Gulf Coast region and counties in scope[1]

2010 GDP ($M)	Basic metrics	
≤1,000	*Counties*	77
1,000-2,500	*Area*	61,685 sq. mi
2,500-5,000	*GDP*	$634 B
5,000-10,000	*Population*	11.7 million
>10,000		



Asset values by class

Replacement value by class
$ Billions, 2010 dollars



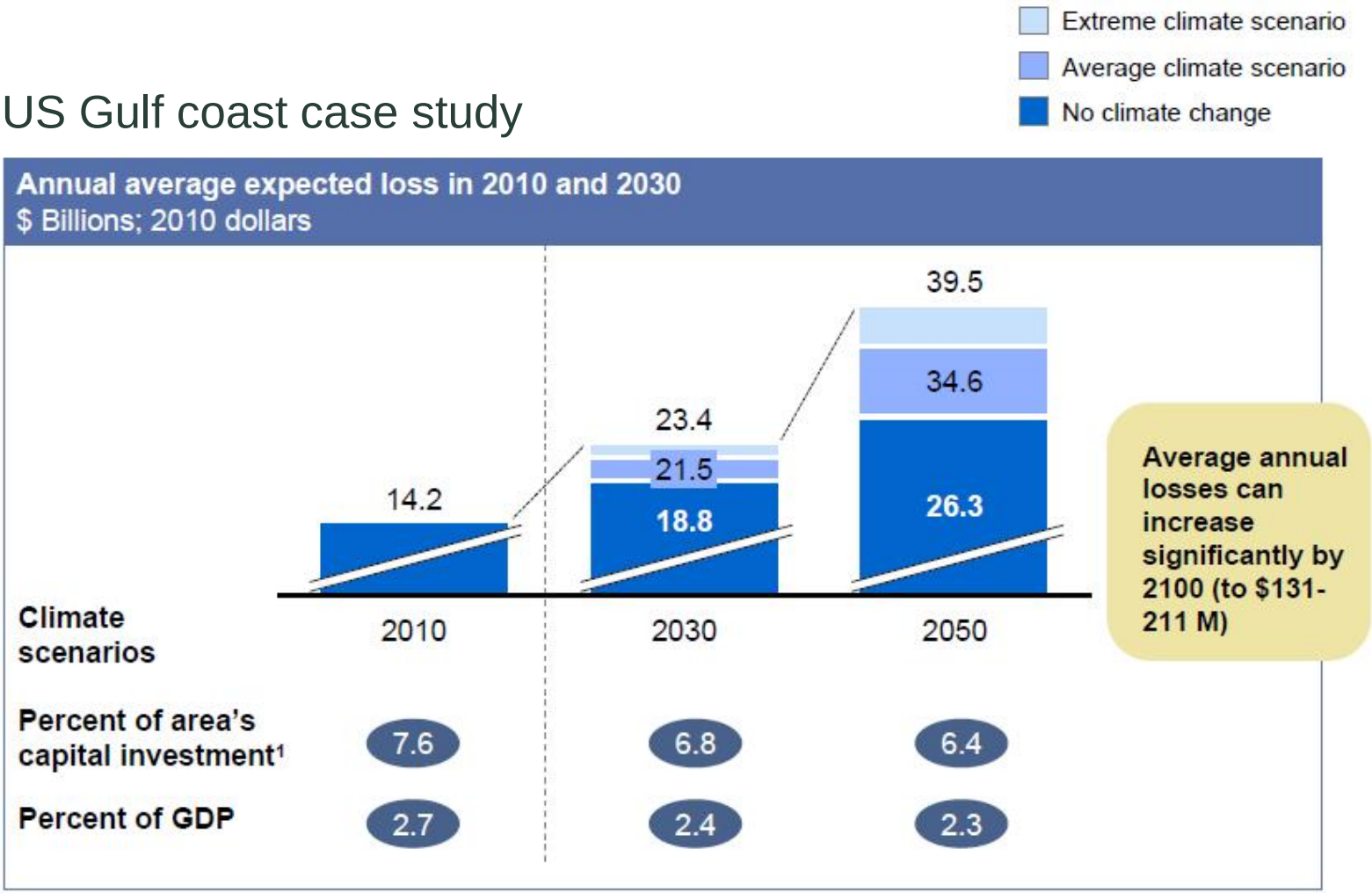
1 Includes 30 Louisiana parishes

Source: ESRI; Energy Velocity

Source: ECA group

The risk profile of the region will shift going forward

US Gulf coast case study

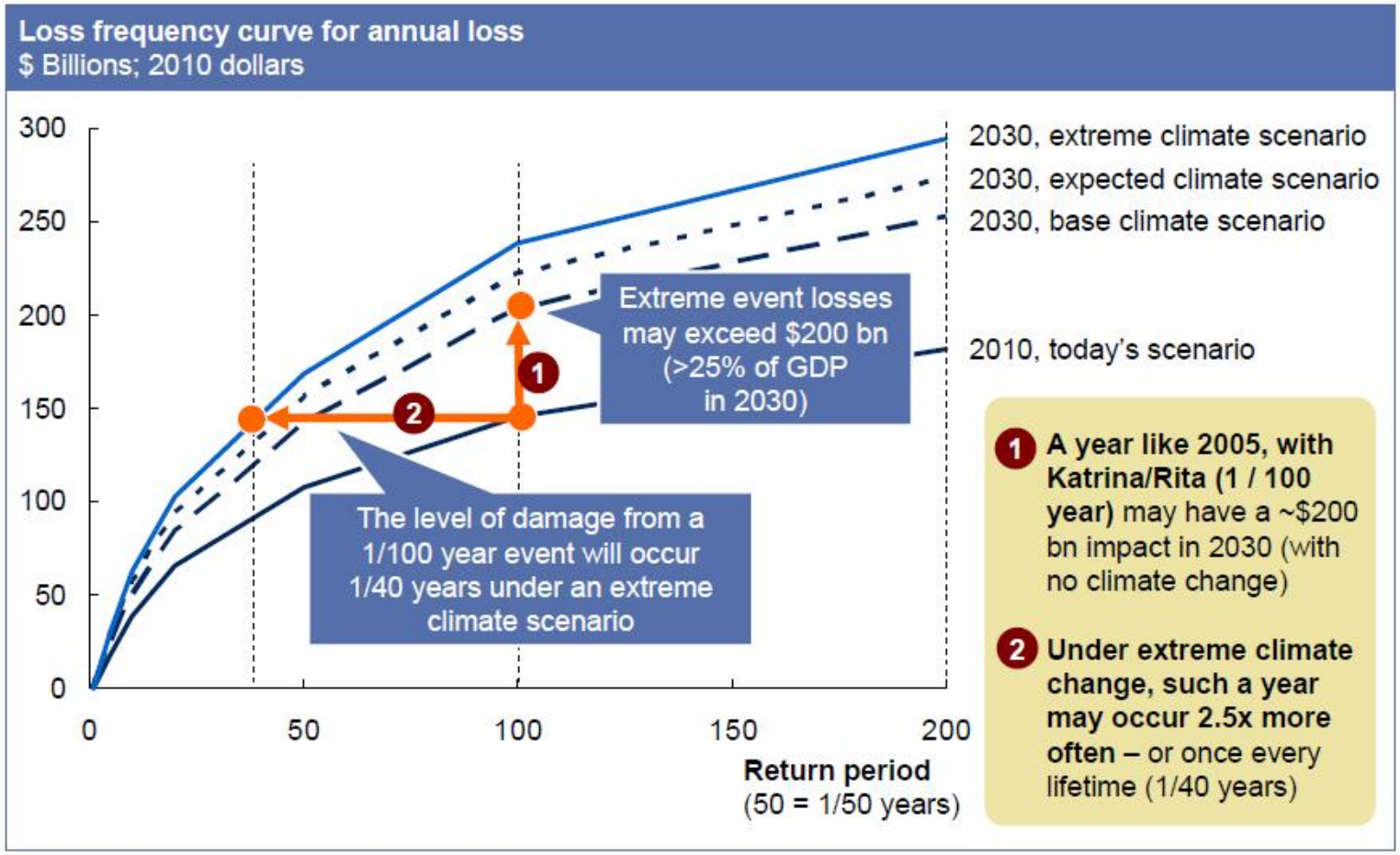


1 No climate change; includes impact of subsidence
2 Based on BEA historical average of capital investment (private and total government expenditures) as a percentage of GDP

Source: Swiss Re

The risk profile of the region will shift going forward

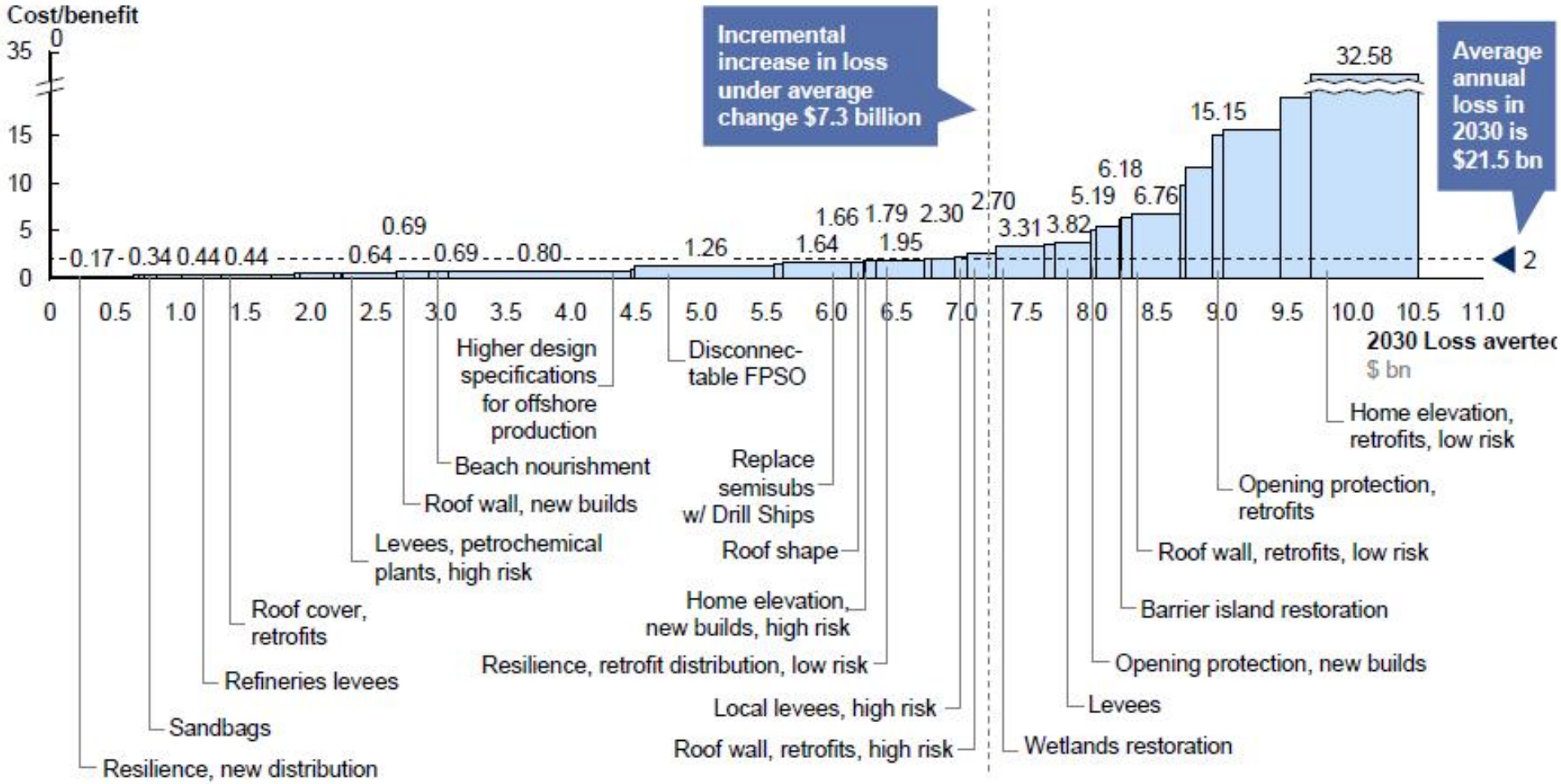
US Gulf coast case study



Source: Swiss Re

More than 33% of loss can be averted by cost-effective measures

US Gulf coast case study

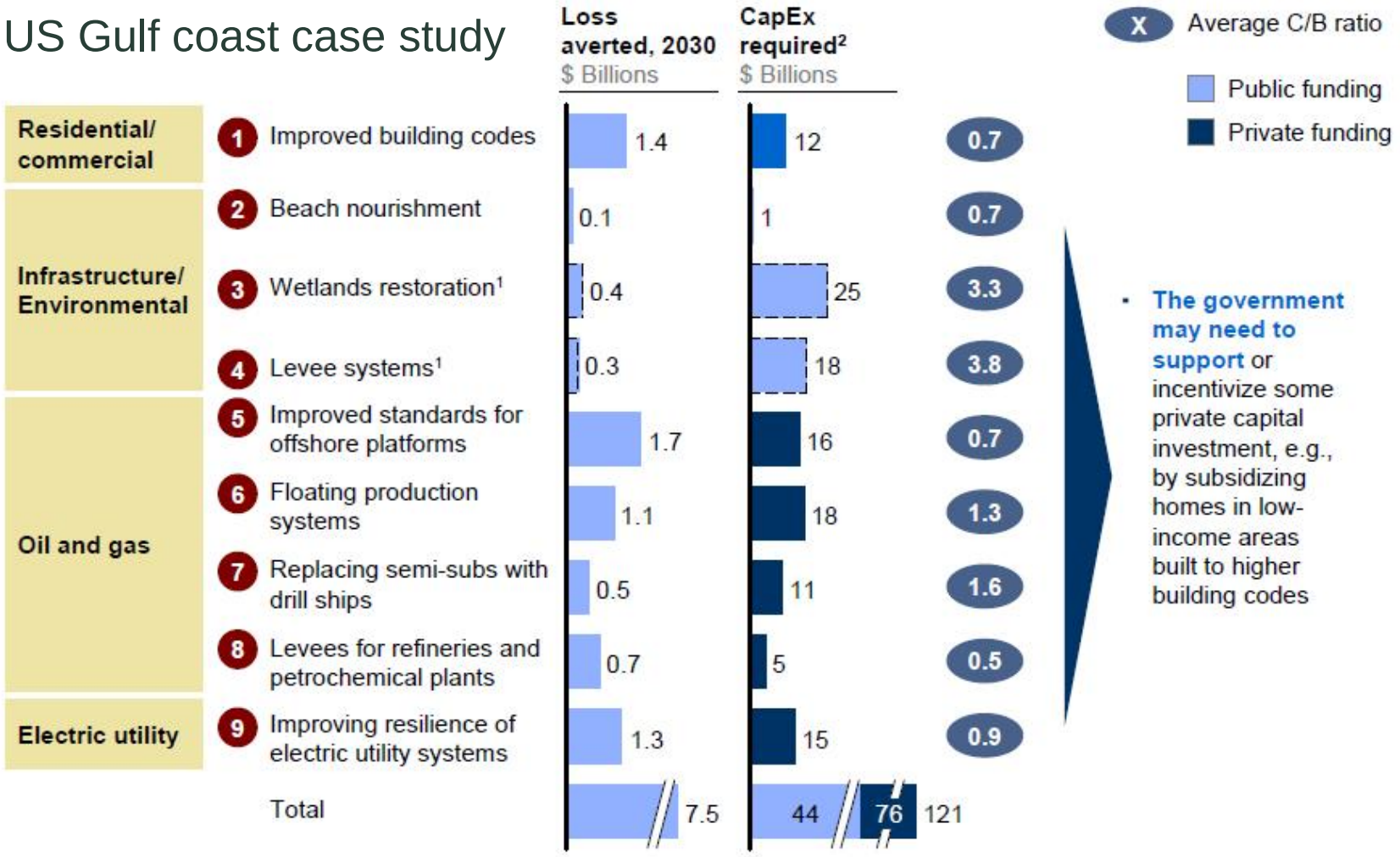


1 Estimated present value out to 2030 at 2009 dollars

Source: ECA group

Measures are analyzed in respect of costs (CapEx) and benefits (averted loss) in great detail

US Gulf coast case study



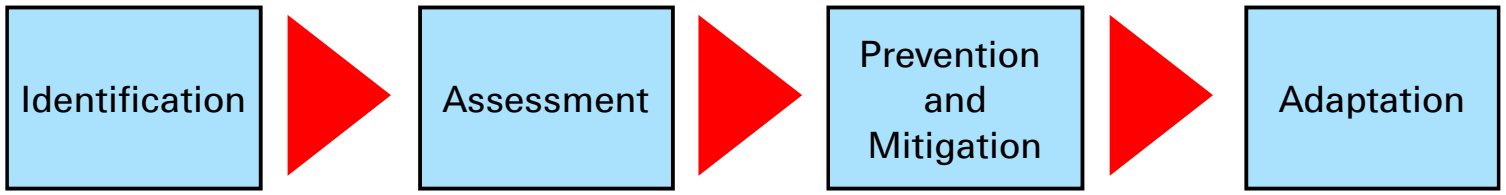
1 Included despite high C/B ratios due to strong co-benefits, risk aversion
2 Total capital investment, non-discounted, across 20 years

Source: ECA group

Comprehensive Risk Management

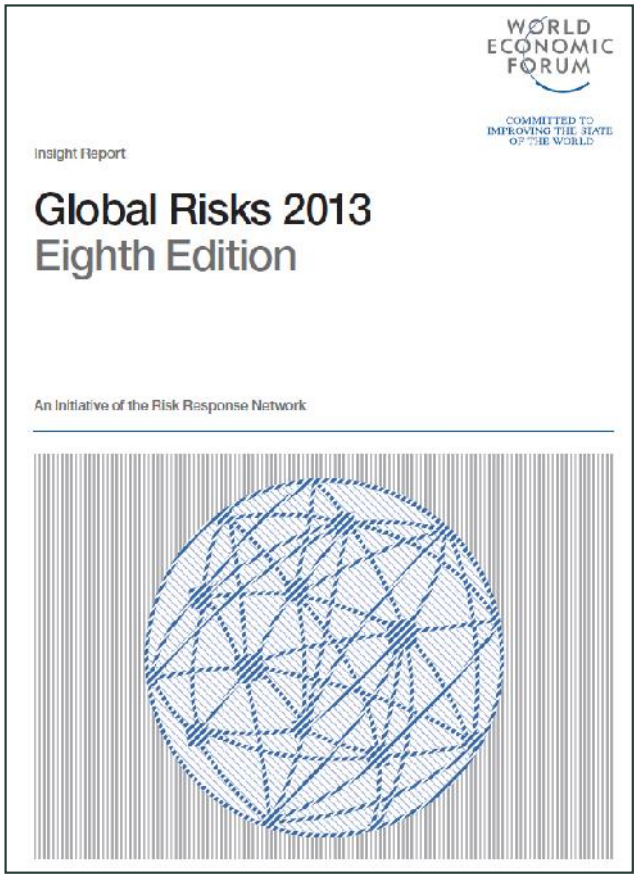
Country Risk Management: Making societies more resilient

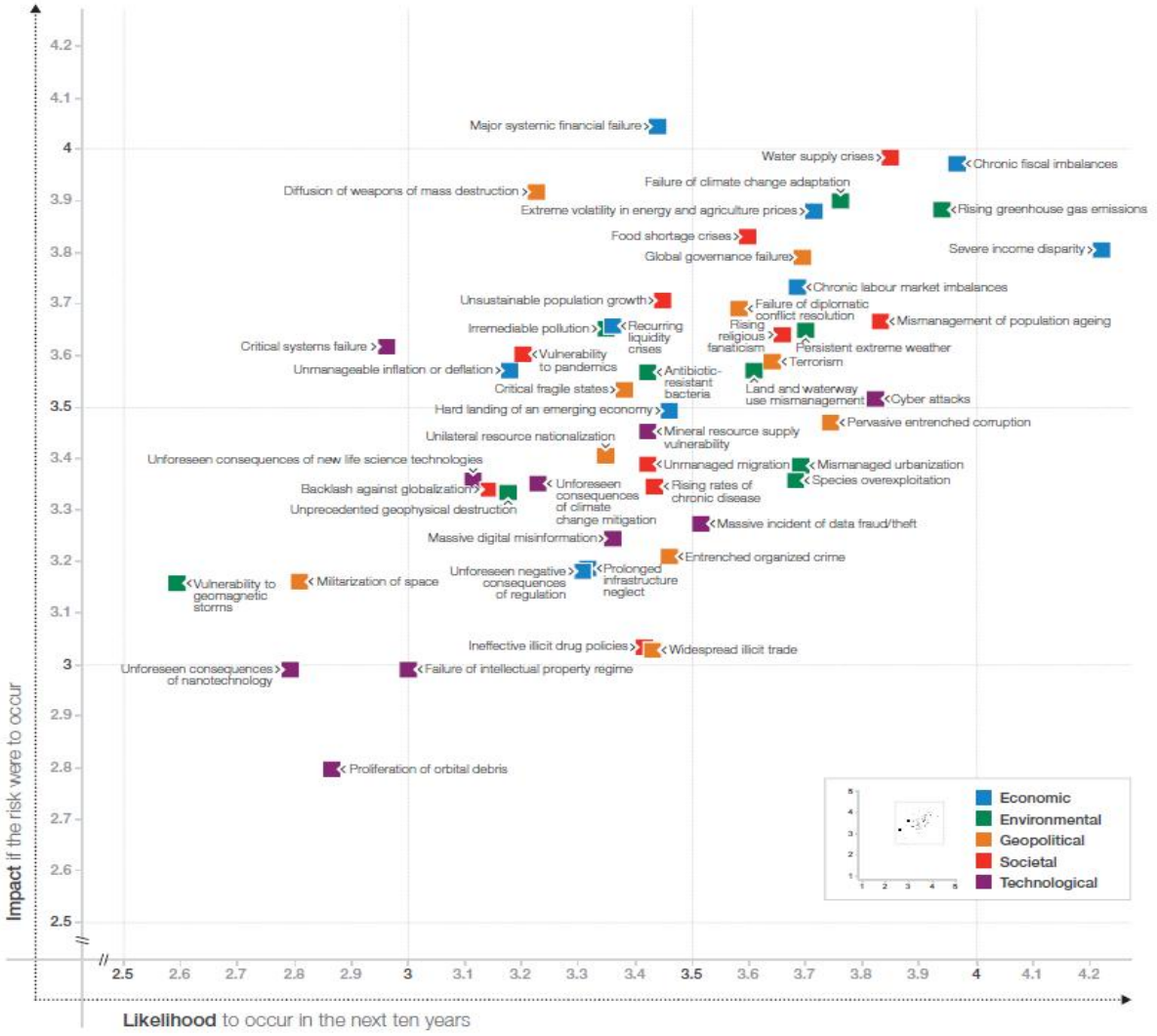
- Societies are becoming more vulnerable as the risks they face become more interconnected
- Integrated risk management approaches can help countries to identify and prepare for risks



- Such an all-hazard approach demands a high level of coordination across government, political and private sector bodies
- A Country Risk Office or Ministry could be responsible for managing such a prioritized risk landscape, taking an holistic approach to risks before events occur and ultimately reducing the risk burden to society

The public and the private sector are exposed to a broad variety of risks





Source: Extract from World Economic Forum, Global Risk Report 2013

SONAR: Early Warning System – What risks are on the horizon?

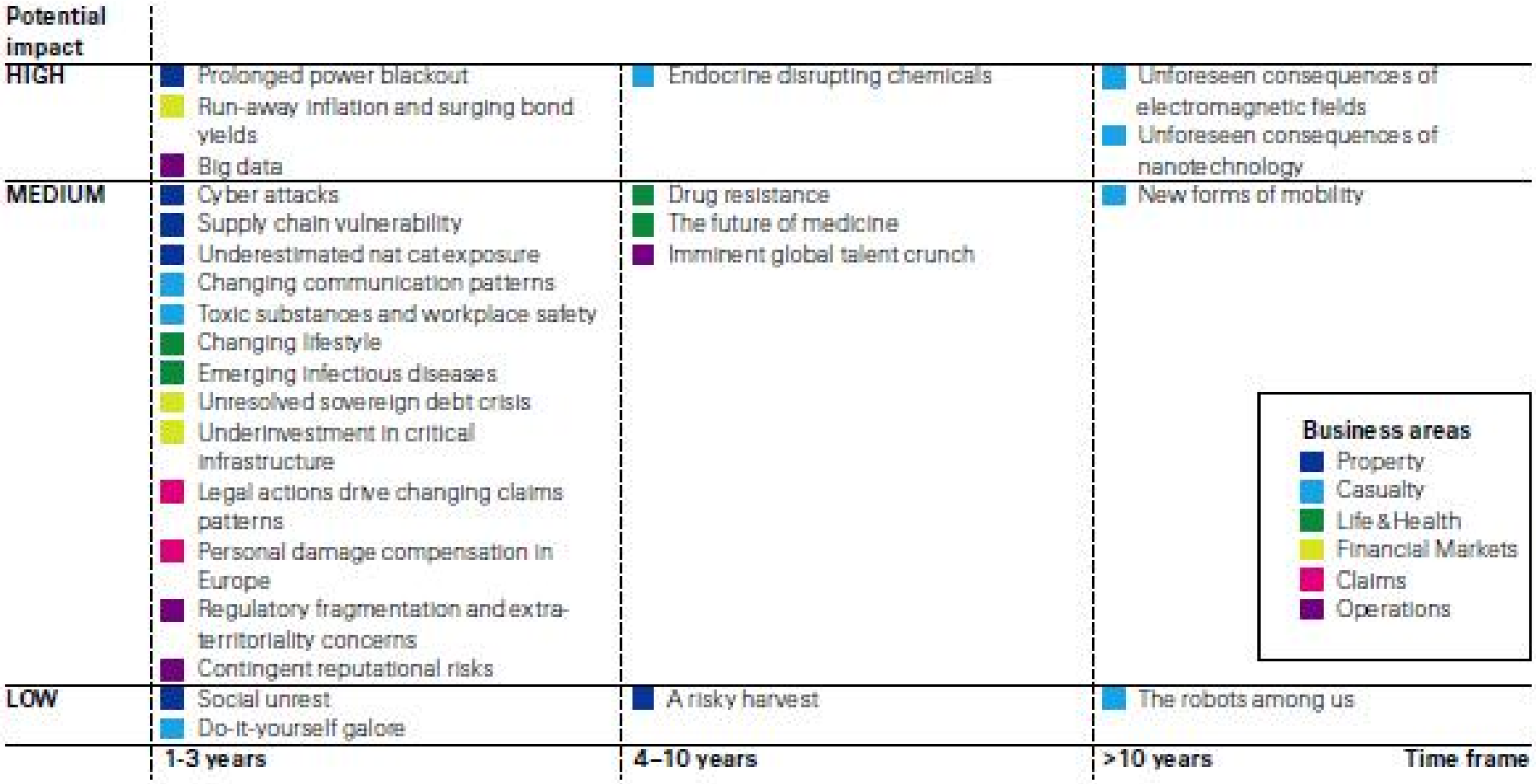


Figure 1
Overview of the emerging risk topics covered in this report by timeframe and potential impact. Colour coding indicates which area of the insurance business would potentially be most impacted by the respective risk.

Case Studies

Case study Mexico: MultiCat - Funding for immediate relief efforts after disasters

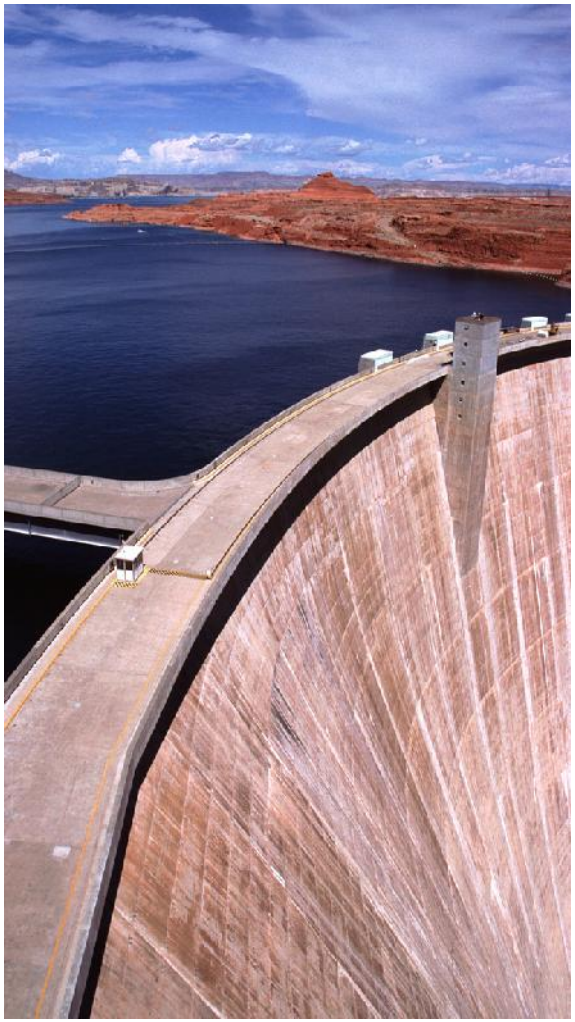
Solution features

- Insured perils: Earthquake and hurricane
- Payments to be used for immediate emergency relief after a disaster
- Parametric catastrophe bond: USD 315 million
- Trigger type: Index
  - Earthquake: physical trigger (quake magnitude)
  - Hurricane: physical trigger (barometric pressure)
- Time horizon: October 2012 – November 2015
- Renewed cat bond launched through the World Bank's MultiCat facility and third cat bond for Mexico

Involved parties

- Insured: Fund for Natural Disasters (FONDEN) of Mexico
- Reinsured: AGROASEMEX S.A.
- Arranger: World Bank Treasury
- Swiss Re: Co-lead manager and joint bookrunner

Case study Uruguay: Largest Energy Risk Transfer to Protect Against Drought Risk



Solution features

- Insured peril: Drought
- Payments to be used to purchase energy from alternative sources when drought conditions cause lack of hydro power
- Derivative contract: between UTE, Uruguayan state-owned hydro-electric power company, and World Bank Treasury. Risk is then placed in the market
- Payment mechanics:
  - Trigger: Level of rainfall monitored at weather stations
  - Settlement: Market price of brent crude oil
- Time horizon: January 2014– July 2015
- Transaction Size: USD 500 million
- Largest of it's kind in the weather risk management market

Involved parties

- Client: UTE (Uruguayan state-owned power company)
- Arranger: World Bank Treasury
- Risk Takers: Swiss Re and Allianz

Case study United States: Alabama – First parametric cover for a government in an industrialized country

Solution features

- Insured peril: Hurricane
- Payments to offset economic costs of hurricanes
- Trigger type: Disaster occurring within a defined geographic area ("box") along coast (“cat-in-the-box”)
- Trigger based on wind speed of hurricane eye as it passes through pre-determined box
- Payout in as little as two weeks
- Time horizon: July 2010 – July 2013
- First parametric catastrophe risk transfer for a government in an industrialized country

Involved parties

- Insured: State Insurance Fund of Alabama
- Swiss Re: Lead structurer and sole underwriter

Case study Caribbean:
Caribbean Catastrophe Risk Insurance Facility (CCRIF)

Solution features

- The CCRIF offers parametric hurricane and earthquake insurance policies to 16 CARICOM governments
- The policies provide immediate liquidity to participating governments when affected by events with a probability of 1 in 15 years or over
- Member governments choose how much coverage they need up to an aggregate limit of USD 100 million
- The mechanism will be triggered by the intensity of the event (modelled loss triggers)
- The facility responded to events and made payments:
  - Dominica & St. Lucia after earthquake (2007)
  - Turks & Caicos after Hurricane Ike (2008)
  - Haiti , Barbados, St. Lucia, Anguilla and St. Vincent (2010)

Involved parties

- Reinsurers: Swiss Re and other overseas reinsurers
- Reinsurance program placed by Guy Carpenter
- Derivative placed by World Bank Treasury

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