



Cambridge Centre for Risk Studies  
**Advisory Board Research Showcase – 23 January 2018**

# **Multi-Line Insurance Exposure Data Schema**

## **Global Exposure Accumulation and Clash (GEAC)**

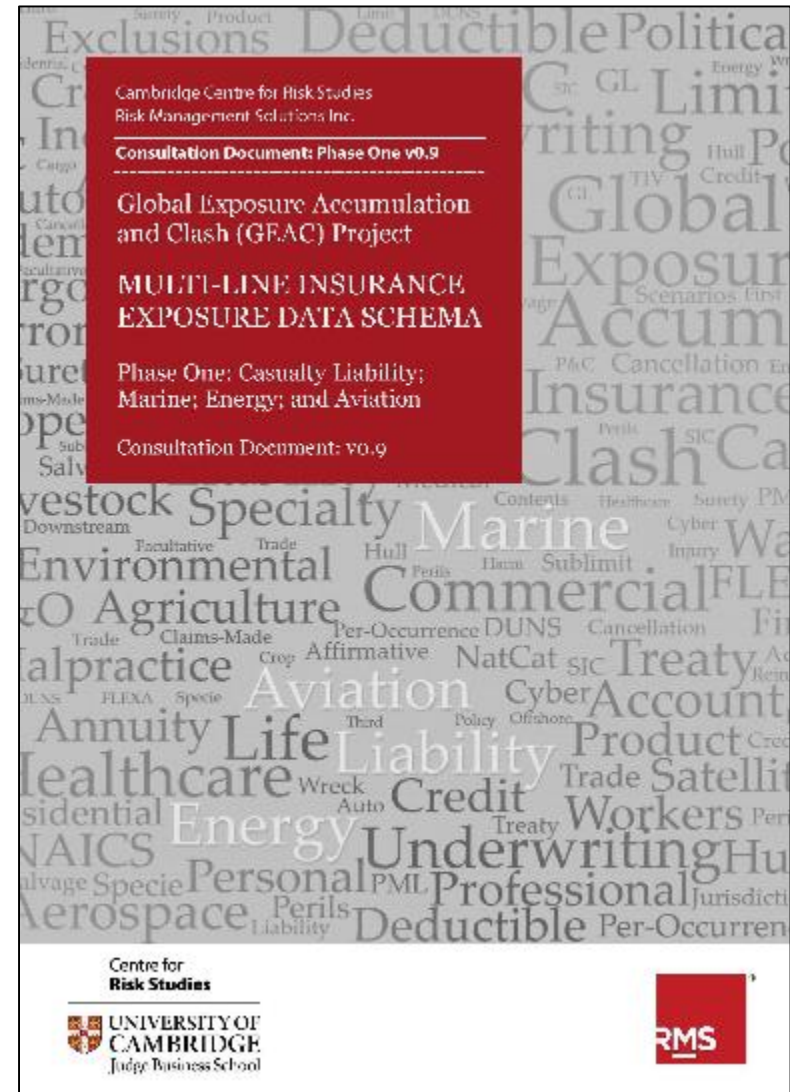
Centre for  
**Risk Studies**

 **UNIVERSITY OF  
CAMBRIDGE**  
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# Project Overview

- 2016 - 2018 project to develop a Multi Line Data Schema:
  - A Multi Line Data Schema for promotion as a data standard
  - A published open source schema and report
- Development of a number of clash scenarios that demonstrate proof-of-concept for scenario overlays
  - *Hurricane Kayla* currently in development
  - Pandemic and Global Conflict Scenario to be completed Spring 2018
- Built on success from Cyber Insurance Exposure Data Schema, 2016



# Aims and Objectives

- Define an open source exposure data standard for most significant lines of insurance business
- Provide a standard minimum set of exposure data fields, enabling insurance industry participants to:
  - Provide a comprehensive and standardized framework for monitoring and reporting exposure enterprise-wide
  - Improve interchanges of data between market players
  - Apply accumulation risk model scenarios for a majority of lines of business
  - Support clash model analysis for scenarios that impact multiple lines of insurance.
  - Enable a new generation of models and risk analytics.
- Aid in the development of a more unified industry

***The Centre for Risk Studies will embrace the role of a data secretariat***

# Total Exposure Value: Commercial Lines

Aggregate limits, Asset value under management

Property



Casualty Liability



Personal Accident



\$10,000 Trillion To Scale

- Physical Damage
- Duty of care 3<sup>rd</sup> party
- Injury, illness or death
- Financial Asset Devaluation
- Revenue Loss. Business Interruption
- Digital asset loss (cyber)

Distribution of **\$105 Quadrillion** (\$105,000 Trillion) Insured Exposure Worldwide

No specific limit for compulsory auto 3<sup>rd</sup> party liability; average upper limits assumed

Estimated total insured exposure values, aggregate limits. Pension asset value under management

# Prioritisation of Lines of Businesses: Schema Development

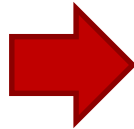
Phase 1	Phase 2	Phase 3
Casualty Liability	Agriculture	Political and Security Risk
Marine (Hull and Liability)	Trade Credit	Annuities and Pensions (Group and Individual)
Aviation	Surety	Personal Accident
Energy	Specialized Underwriting Classes	Auto Insurance (Commercial and Personal Lines )
	Life and Health (Group and Individual)	Other Commercial and Personal Non-Life Lines

Certain lines of business are considered to be well developed and will not have their schemas advanced. These include:

- Commercial Property
- Commercial Cyber

# Schema Principles and Design

- Exposure and accumulation focus
- Simple as possible
- Separate risk objects from insurance coverage
- Hierarchical
- Extensible
- Use of existing standards where ever possible.
- Schema structured around coverage

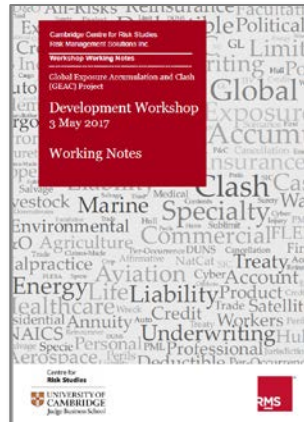


- Blocks of information
  - Series of dictionaries
- Separating risk objects from insurance coverage
- Represent common practice for as much of the market as possible
  - Identify equivalences in terminology and concepts.
- Identification of similarities and patterns across different classes of insurance.
- Developed through consultations with underwriters, risk managers, and industry stakeholders
- Exercise in anthropology

# Project Progression



GEAC V0.1  
Consultation



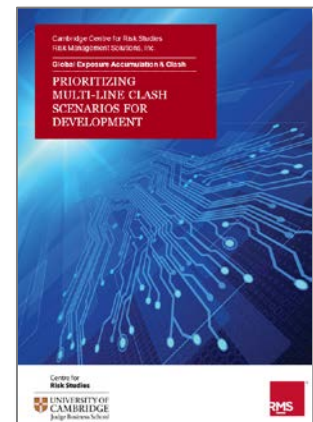
GEAC Spring  
Proceedings



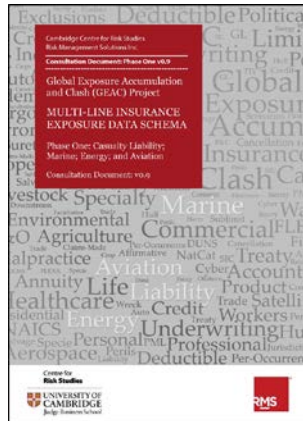
Phase 1  
V0.5 Consultation



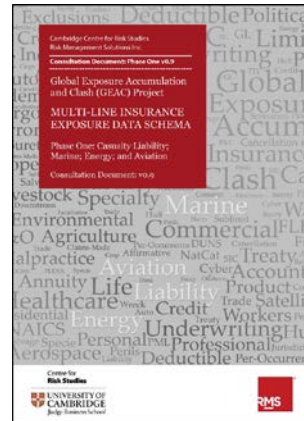
Phase 1  
V0.9 Consultation



GEAC  
Scenario Consultation



Phase 2  
V0.5 Consultation



Phase 3  
V0.5 Consultation  
(In Preparation)

## Events and Workshops:

- London GEAC Workshop: May 3<sup>rd</sup> 2017
- Scenario Development Workshop: September 6<sup>th</sup> 2017
- Hoboken GEAC Workshop: September 27<sup>th</sup> 2017
- *(Upcoming)* London GEAC Workshop: February 28<sup>th</sup>, 2018

# Applying the Schema: Hurricane Kayla

- Developing three clash scenarios to trial schemas functionality.
  - Hurricane, Pandemic, Global Conflict
- Developed in partnership with insurance industry stakeholders
- Currently working on “Hurricane Kayla”
  - Counterfactual Hurricane Katrina
    - How might a future version of the 2005 Hurricane Katrina inflict much heavier losses on the non-property insurance classes?





# Exploring the Exposure: Marine Case Study

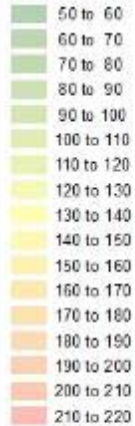
## Marine Asset Overview: Gulf Of Mexico

### Legend

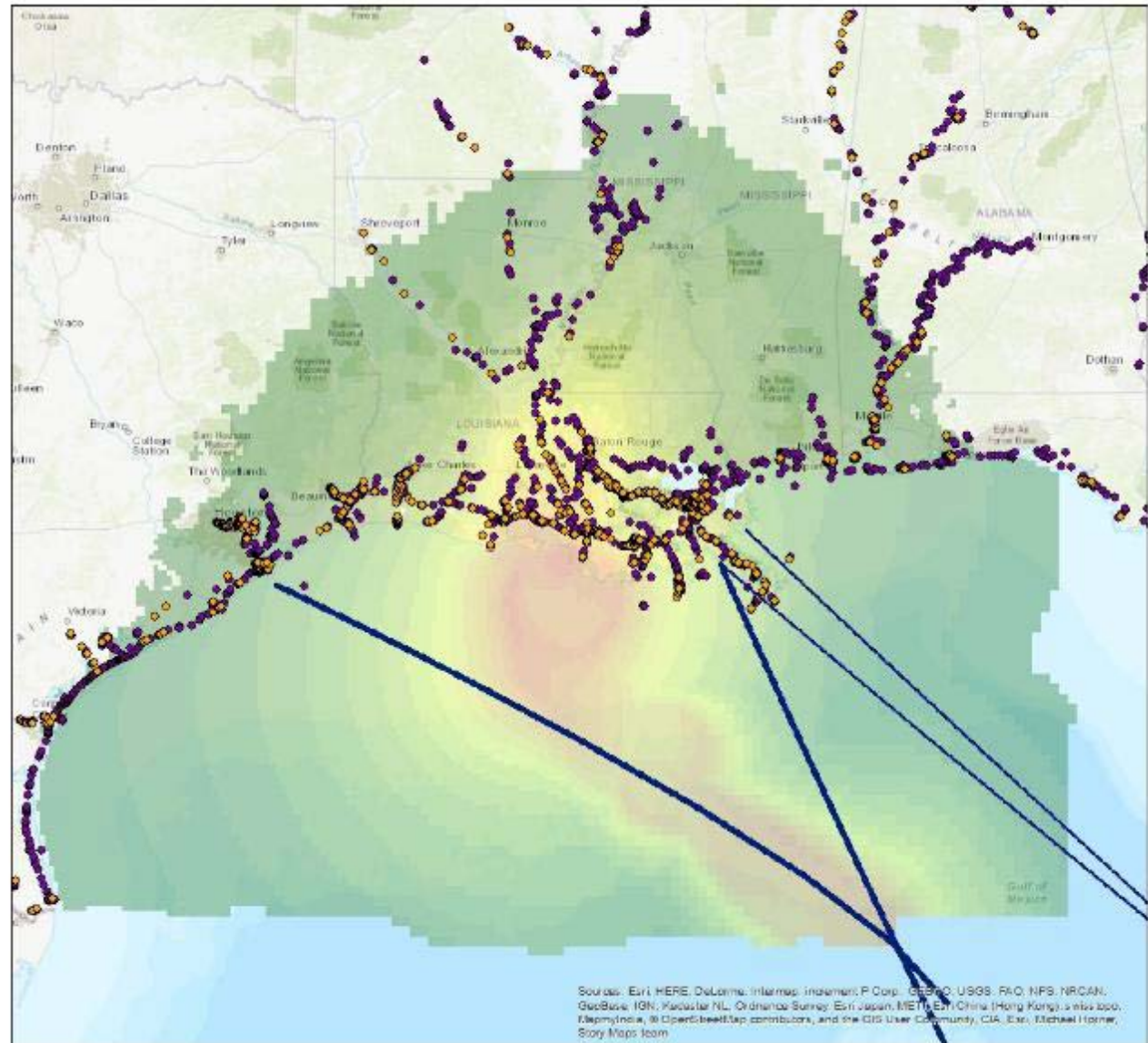
- Oil and Gas Specific Ports
- Container and General Usage Ports

### Hurricane Kayla Storm Path

Speed: Miles per Hour



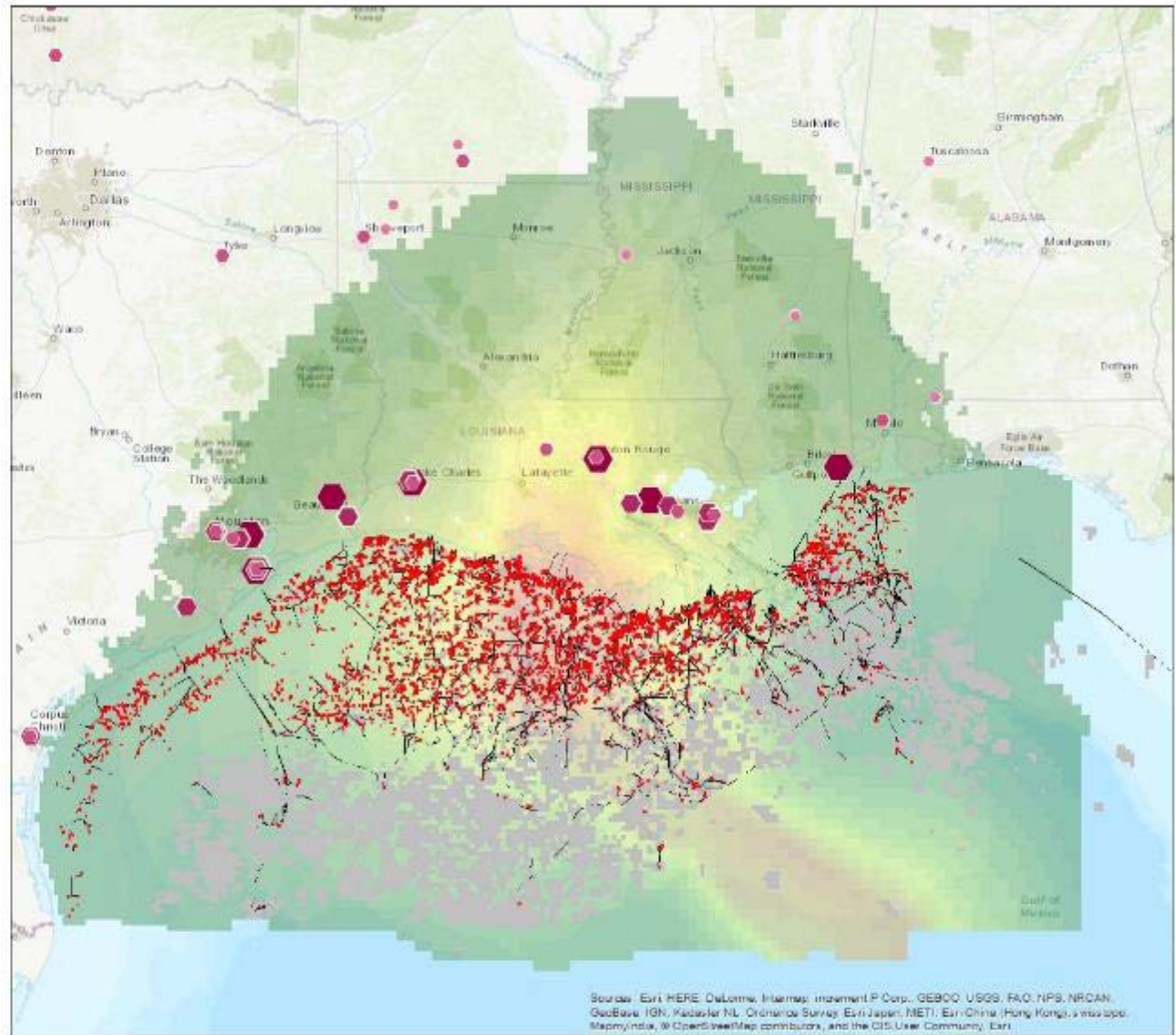
Blue lines indicate approximate shipping routes. The width of the line indicates the volume of traffic.



Sources: Esri, HERE, DeLorme, Intermap, indegent, P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), Swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community, CIA, Esri, Michael J. Turner, Story Maps team

# Exploring the Exposure: Energy Case Study

## Energy Asset Overview: Gulf Of Mexico



# Interpreting the Loss Process: Coverage Trigger Pathways

- We want to identify the various ways that types of insurance and their coverages could suffer loss under various circumstance in the scenario
- Could additional things go wrong that make these assumptions more severe?
- Provides a systematic approach to going through all of the schema coverages to ensure that all potential CTPs are identified and modeled



# Coverage Trigger Pathway (CTP)

**Class of Insurance:** Casualty Liability

**Type of Insurance:** Professional Liability

**Pathway:** Hurricane causes damage to buildings which appear to suffer losses 'worse than expected', leading to law suits against architects and engineers for failure in their duty of care to design to code

**Precedent:** Baseline Construction & Restoration Co of La v Favrot Realty Partnership No 076429 Orleans Parish Civ. District Court

## CTP Variables:

- How many buildings could be deemed to have 'not been designed to code'?
- How many law suits could potentially be generated?
- How many of them might come to trial or develop into a class action?
- How large might the settlements be?

This four stage 'model' enables a loss to be estimated, and sensitivity analysis to be carried out on the assumptions

## Pathway Overview

### Number of Buildings

- └ Of those, % of buildings which suffer damage
    - └ Of those, % which could be deemed to not have been designed to code
      - └ Of those, % which a lawsuit is established
        - └ Of those, % which come to trial or class action
- = Proposed number of Professional Liability building damage cases**

# Leading the Way to Better Clash Modelling

- Clash modelling is a current challenge being felt across the insurance industry, and having a standardized schema is the first crucial step towards alleviating this
- Schema incorporates inputs from various organizations, sectors, and experts, providing a more uniformed and wholistic outcome
- Testing of schema on clash scenario validates work to date, and provides confidence for future industry use.
- Global Exposure Accumulation and Clash project is paving the path for insurance clash modelling across life and non-life classes.

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