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Natural perils pricing and reserving

GIPC Natural Perils Working Group

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1 GIPC Natural Perils WG

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Agenda

1. Introduction to the Natural Perils Working Group
2. Natural perils pricing: some considerations
3. Reinsurance market dynamics
4. Catastrophe reserving
5. Discussion and questions

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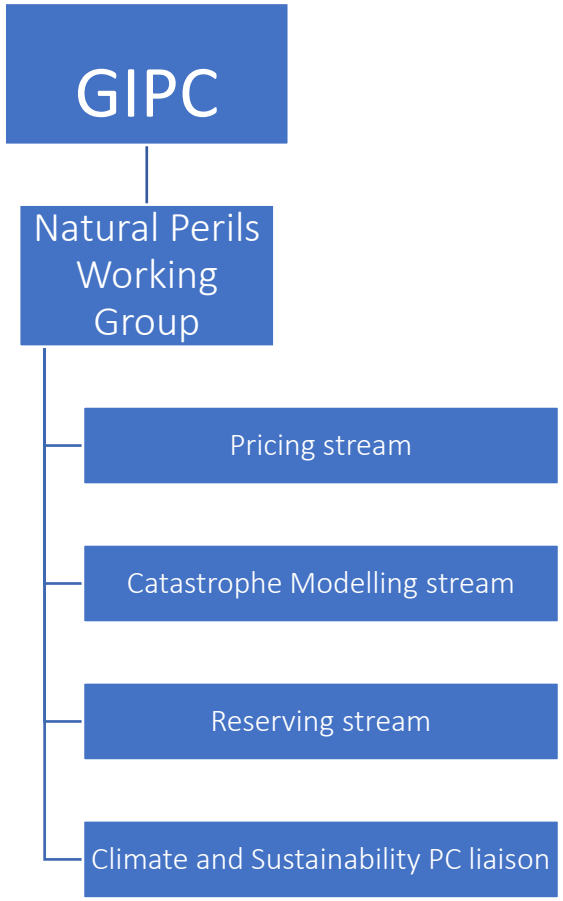
Introduction to the Natural Perils Working Group (NPWG)



- The Catastrophe Modelling stream (led by Adrian McGarva) recently updated the technical paper on 'The Use of Catastrophe Models by Actuaries'. This will be released to members in the coming weeks
- Sam Ingram is the lead for the Climate and Sustainability Practice Committee (CSPC) liaison, and her role is to act as a contact person for the flow of information between GIPC and CSPC
  - The NPWG provided feedback to the CSPC for the recent update to the “Climate Change – Technical Paper for Appointed Actuaries”
- Other NPWG activities have involved supporting GIPC in providing feedback on natural perils related Institute submissions (e.g. submissions to Senate inquiries)

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2 Natural perils pricing

Natural perils pricing considerations and reinsurance market dynamics

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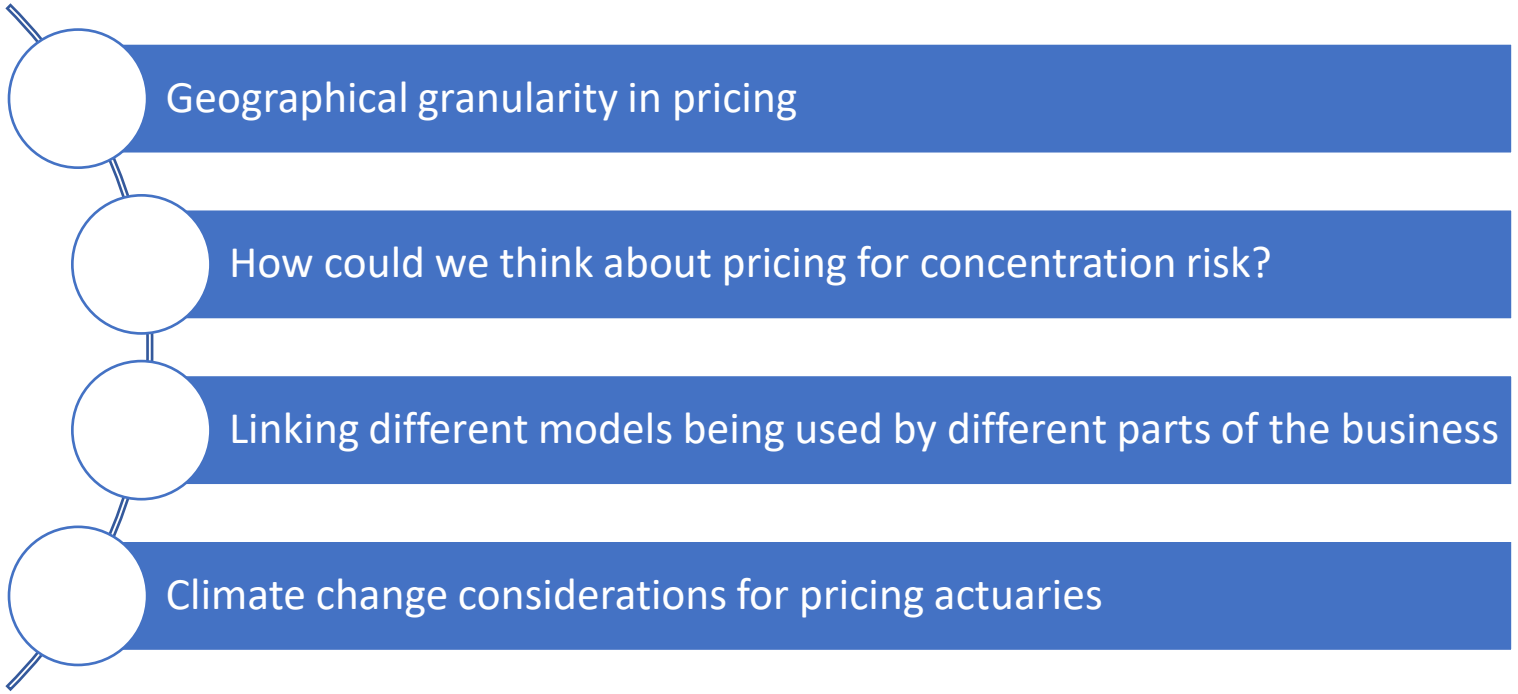
Natural peril pricing considerations

Today's ‘tasting menu’ of natural perils pricing considerations



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Natural peril pricing considerations

A full buffet of perils pricing considerations (not for today)

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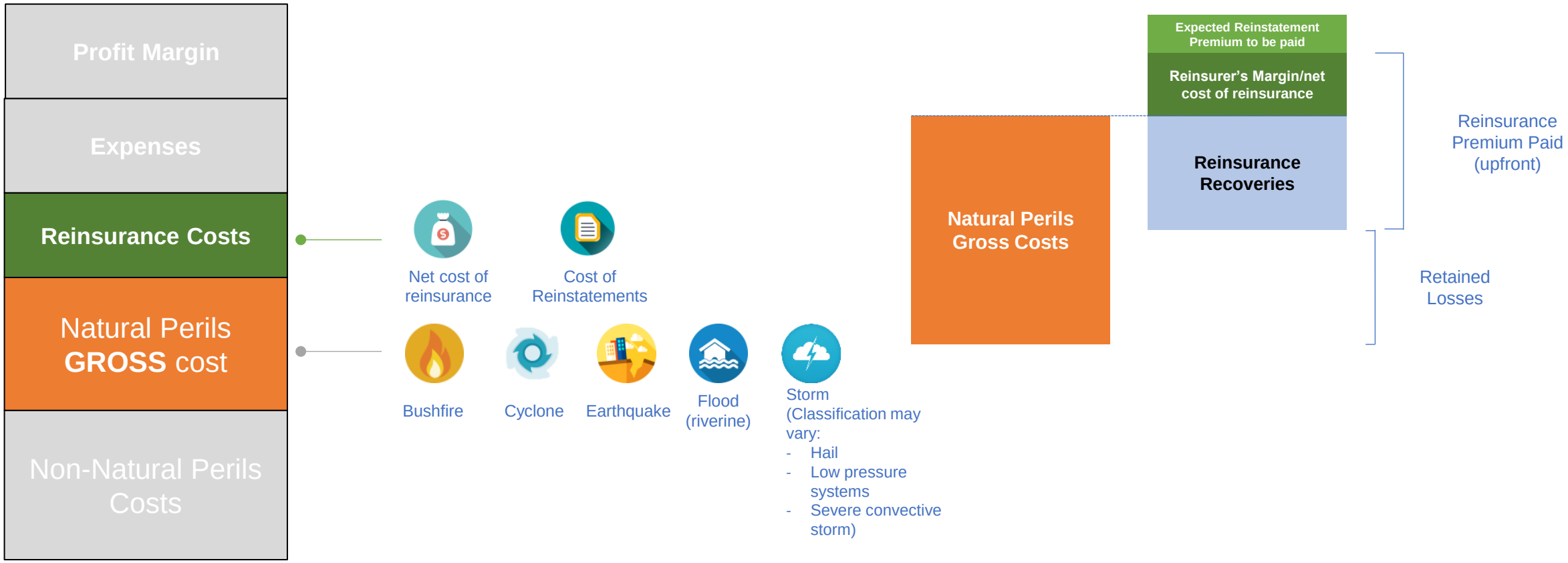
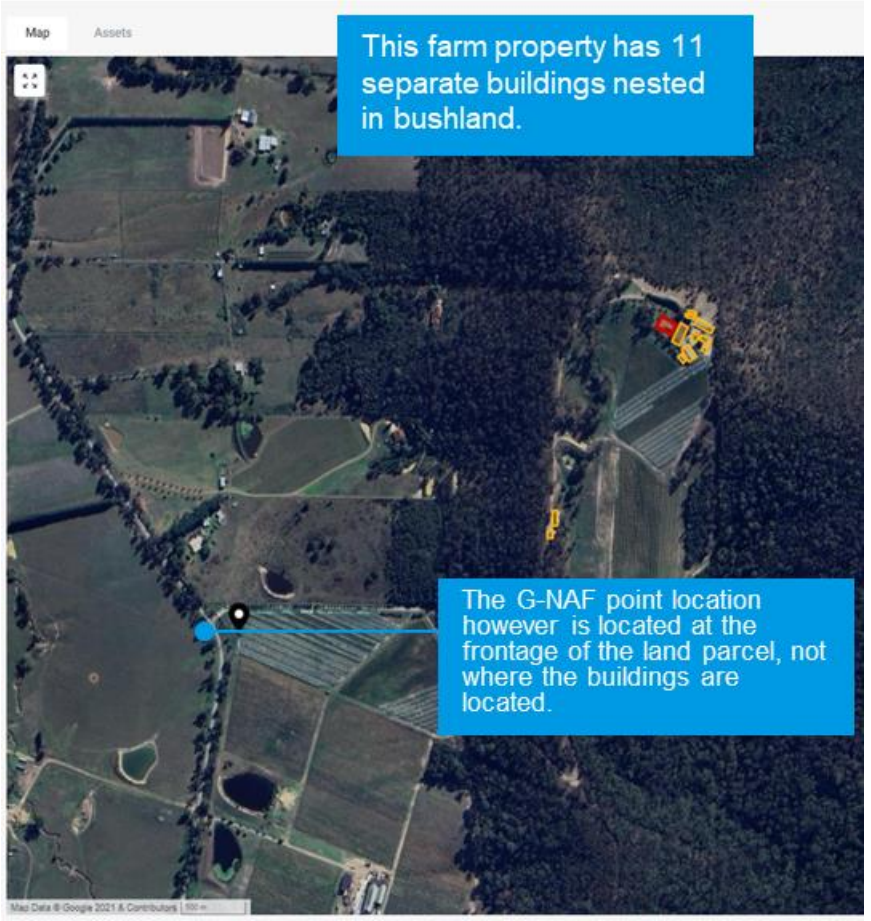
Technical perils premium pool



Allocating gross claims costs

- A key perils pricing decision for allocation of gross claims cost is determining the appropriate level of **geographical resolution** for each peril
- The decision will likely vary by peril
- Moving beyond G-NAF (address-level dataset) and towards **building footprints**:
    - Particular importance for Farm property and certain perils (e.g. bushfire, flood)
- Validating the level of geographical resolution in vendor models is critical
- Don't necessarily trust the vendor documentation – need to plot/visualise the modelled cost for some standardised properties



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Improving linkage between business processes

- For a particular peril, vendor model 1 is the catastrophe model **used by business for budgeting and capital allocation**
- Vendor model 2 is **already used** by the class of business **pricing team for address-level pricing**
- New model selection is not in scope
- Conclusion of model review:
  - Vendor model 2 performs better at address-level (more granular rating)
  - However we can only get a view of loss volatility from Vendor model 1 (as model 2 is a deterministic model)
  - Should we use only the address-level pricing model in our allocation of cost to policy-level?
- How to minimise any **disconnect** between the processes, while using each model to its best strength?

	Vendor model 1	Vendor model 2
Current use	Main Australian model used by the business in the budget process (i.e. determining class of business premium pool)	Main model used by pricing team for address-level cost allocation, **for both gross AAL and reinsurance costs**
Model granularity	Supports disaggregation down to 1km resolution	GNAF/building footprint
Model type	Stochastic model (catastrophe model)	Deterministic model (pricing model)

Improving linkage between business processes

Gross cost (AAL)

- Used vendor model 1 (catastrophe model) to give a view of gross claims cost (at say CRESTA level)
- Allocate this to address-level, using a blend of vendor model 2, and historical experience

Net cost of reinsurance

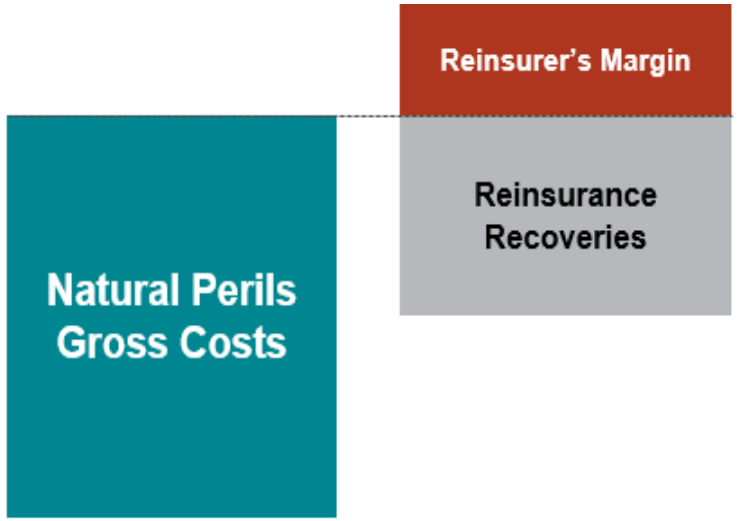
- Took an improved, but simple approach to allocation of the net cost of reinsurance
- Allocate using a blend of:
  - Vendor model 1 modelled volatility
  - Vendor model 1 modelled gross AAL
  - Vendor model 2 modelled gross AAL
  - Historical experience

Outcome

- Room for further sophistication (e.g. example on next slide)
- However making better use of available models given their relative strengths and weaknesses
- **Improving the linkage between corporate/Group budgeting processes and line of business policy-level pricing**

Net cost of RI: Concentration risk

- How should our allocation of the gross claims cost or AAL differ from the allocation of the net cost of reinsurance?
- The same concepts could apply to allocation of the profit margin/cost of capital
- ***The cost of reinsurance (and cost of capital) can vary by location***
  - Property lines pricing has evolved to reflect differences in risk at the location (address) level
  - Similar thinking can be applied to the cost of reinsurance (or cost of capital) at regional level (e.g. CRESTA zone or more granular)



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Allocating net cost of reinsurance (cyclone)

- Decent size insurer, writing only one line of property business in Australian
- Assume this is in a pre-cyclone pool world, or a class not covered by the pool (principles stand for most perils)
- A good spread of policies nationally
- Purchases a CAT reinsurance program from a panel of reinsurers giving it adequate coverage up to a 1 in 500 (say) PML loss
- For simplicity we shall ignore aggregate reinsurance, quota share, per risk XOL etc. for now
- We allocate the net cost of reinsurance in two ways as a comparison:
    1. **Allocation by reinsurance margin**
    2. **Allocation by gross perils AAL**

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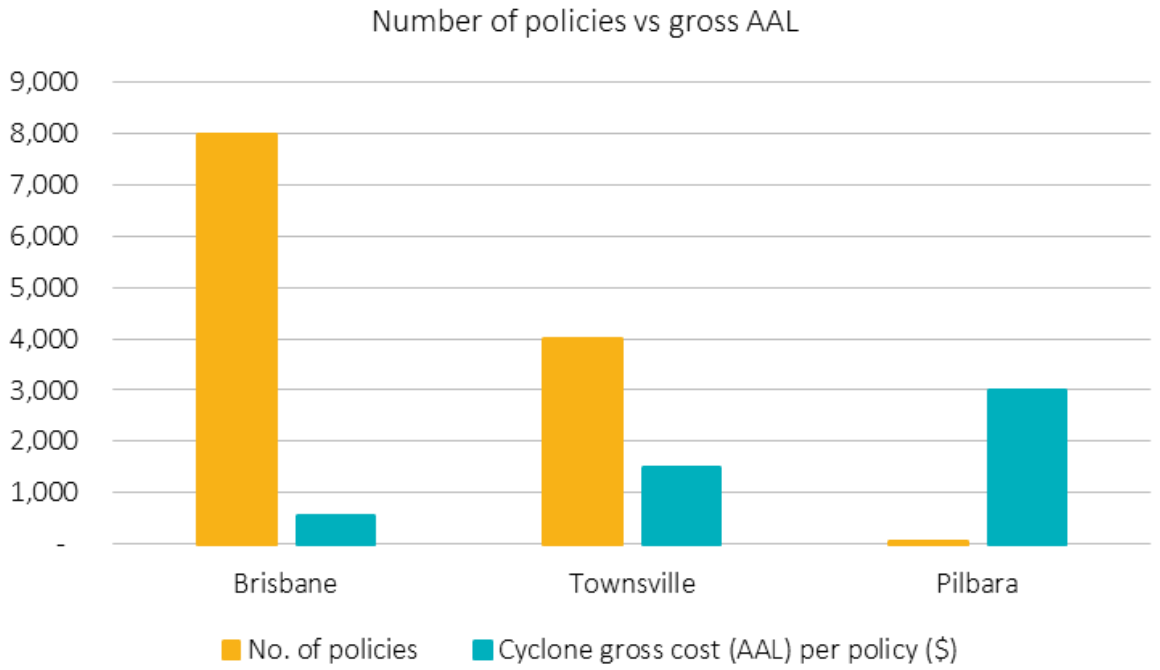
Allocating net cost of reinsurance (cyclone)

- Gross cyclone AALs and policy counts for 3 CRESTA regions shown on the right
- Pilbara has higher gross modelled cyclone AAL than Townsville, on a per policy basis
- However the concentration risk lies in Townsville (i.e. highest RI layers are purchased to cover Townsville)



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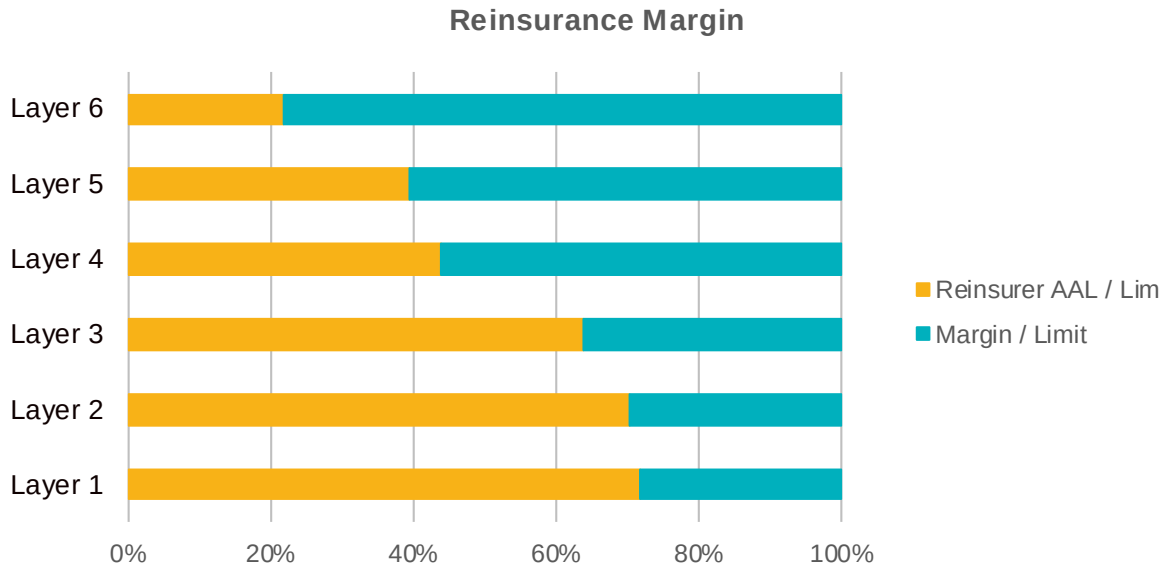
Allocating net cost of reinsurance (cyclone)

Reinsurance Recoveries

- **Layer 6 (200m XS 300m)**
- **Layer 5 (100m XS 200m)**
- **Layer 4 (100m XS 100m)**
- **Layer 3 (70m XS 30m)**
- **Layer 2 (18m XS 12m)**
- **Layer 1 (6m XS 6m)**

Event ID	Event	ICA Zone	Gross Loss	Frequency
123	Cyclone	Townsville	$150m	0.000004
123	Cyclone	Ingham	$10m	0.000004
123	Cyclone	Cairns	$30m	0.000004
123	Cyclone	Mackay	$20m	0.000004
123	Cyclone	Inland QLD	$5m	0.000004
234	Cyclone	Marlborough	$10m	0.00005
234	Cyclone	Ingham	$15m	0.00005
234	Cyclone	Sunshine Coast	$2m	0.00005
234	Cyclone	Brisbane	$3m	0.00005
…	…	…	…	…

- We can use a catastrophe modelling Event Loss Table to help us calculate the expected amount of reinsurance recoveries to help us assess the **reinsurers' expected loss ratio** (and thus their margin) in each CAT reinsurance layer by region.
- Higher reinsurance layers are expected to have lower loss ratios to support the capital required.
- The goal is to allocate the margin (by layer) to the ICA zones individually. We expect that Layer 5 and 6 should be allocated to areas of high concentration perils risk, such as Townsville.



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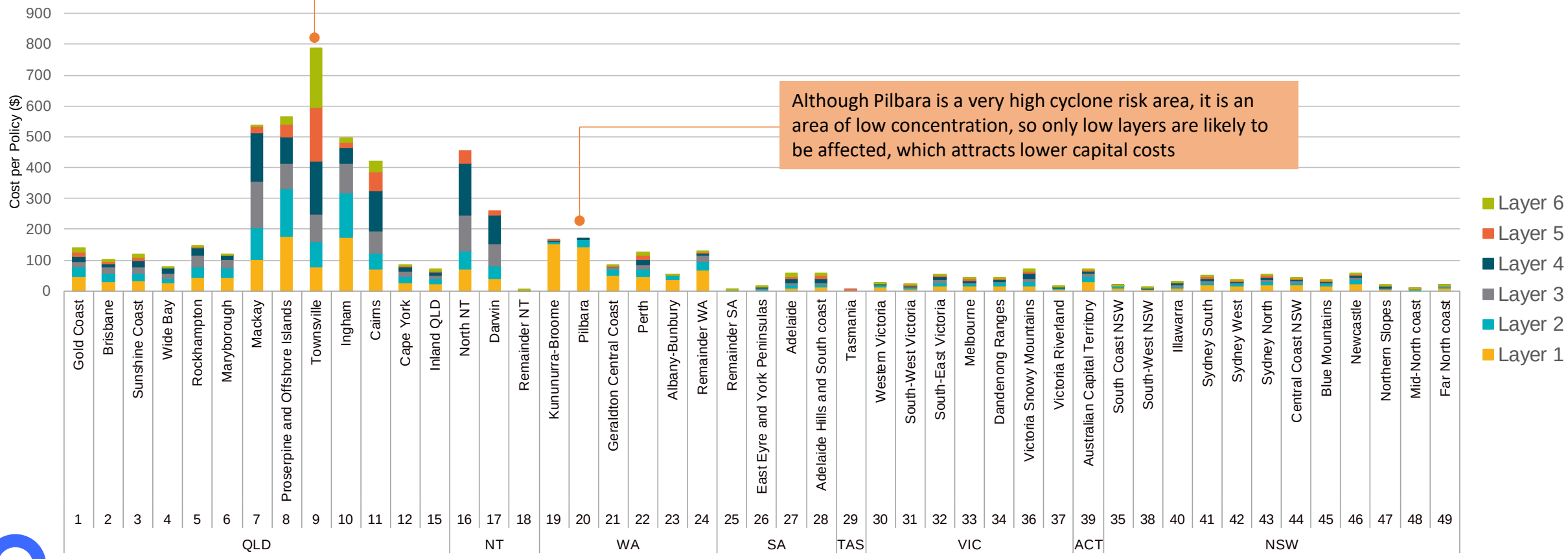
Net cost of RI by region (using margin)

Townsville is an area of high concentration, so its exposure can impact all layers, noting higher layers have higher capital costs

Because of this, each additional policy in Townsville requires more marginal capital (and cost) than an additional one in Pilbara

Although Pilbara is a very high cyclone risk area, it is an area of low concentration, so only low layers are likely to be affected, which attracts lower capital costs



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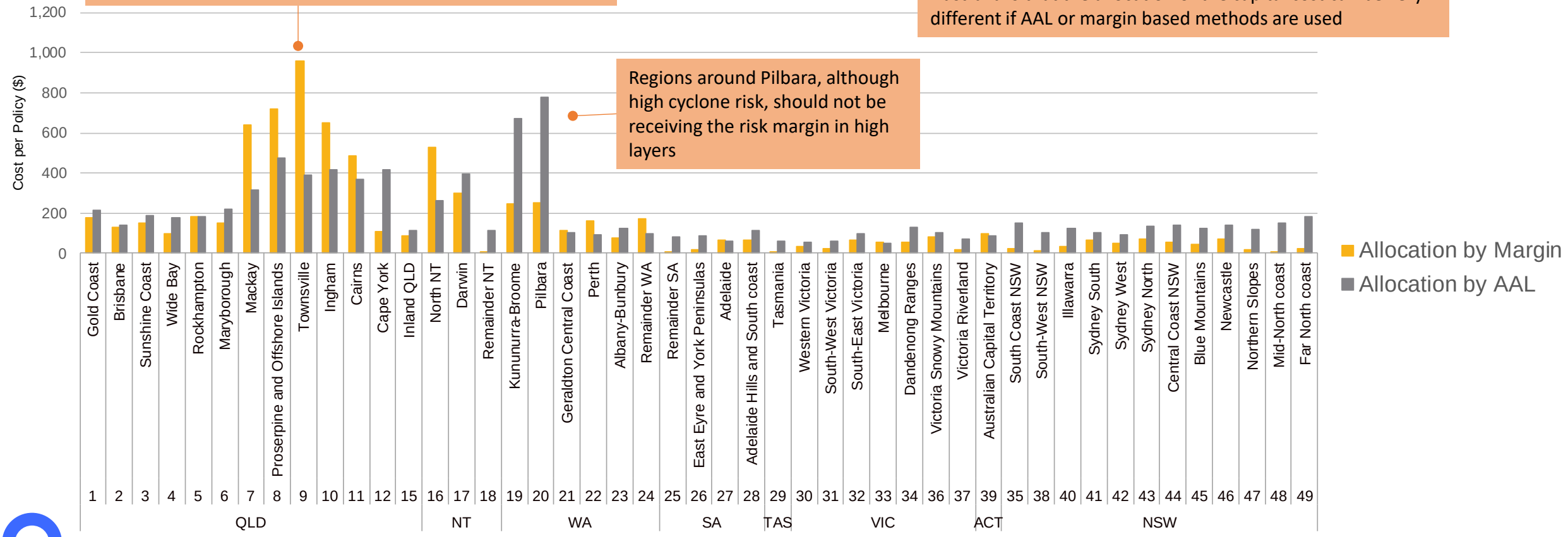
AAL vs Margin approach

Using an AAL approach will understate the Net Cost of RI as it does not adequately reflect the concentration risk in Townsville

The point of the hypothetical example of an insurer with high concentrations in Townsville and lower ones in other parts of Australia is that the allocation of the capital cost can be very different if AAL or margin based methods are used

Regions around Pilbara, although high cyclone risk, should not be receiving the risk margin in high layers



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Climate change considerations for pricing actuaries

A typical argument

- "Insurance contracts are generally 12 month, so react accordingly to any trends in underlying perils costs"
- “Already used to reinsurance costs and structures changing on an annual basis, and pricing is adjusted accordingly "

The argument may no longer hold

- Australian mandatory climate financial disclosures (Australian Sustainability Reporting Standards)
- Applicable to first group of reporting entities from 1st January 2025 – audit assurance to be phased in over time
- Insurers will need to perform scenario analysis to understand the financial effects of climate change
- Over the **medium-term** and **long-term** – as well as short-term
- Pricing actuaries could see this as an **opportunity** to engage in strategy and risk management discussions

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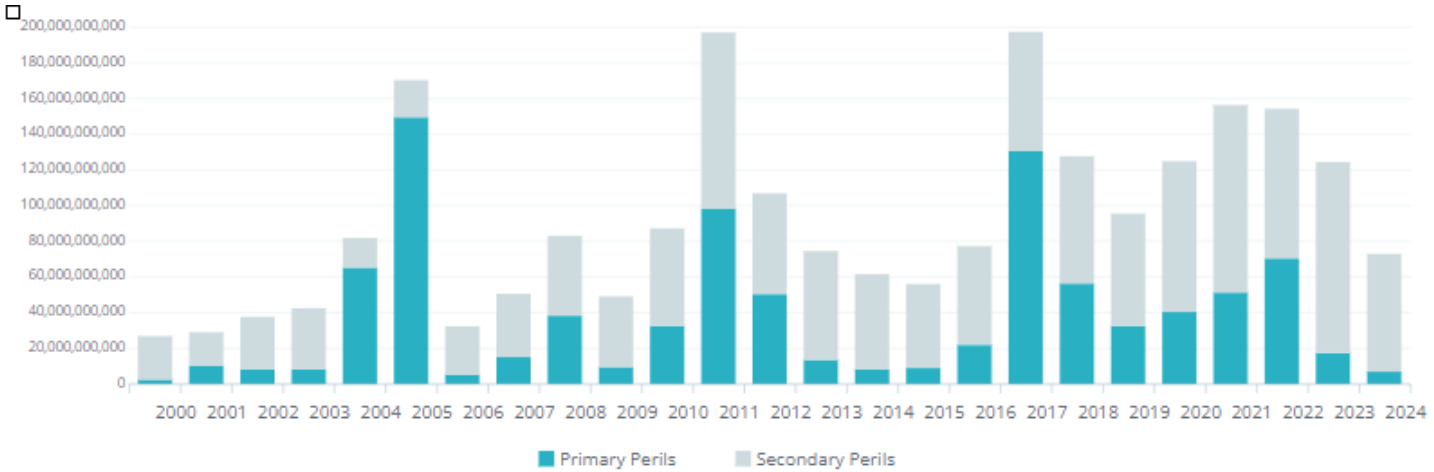
Reinsurance Market Dynamics

Global Insured NatCat Losses

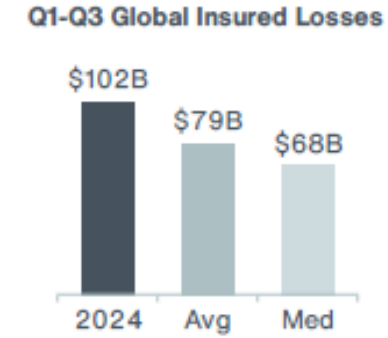
Secondary perils have been responsible for ~60% of all losses since 2017

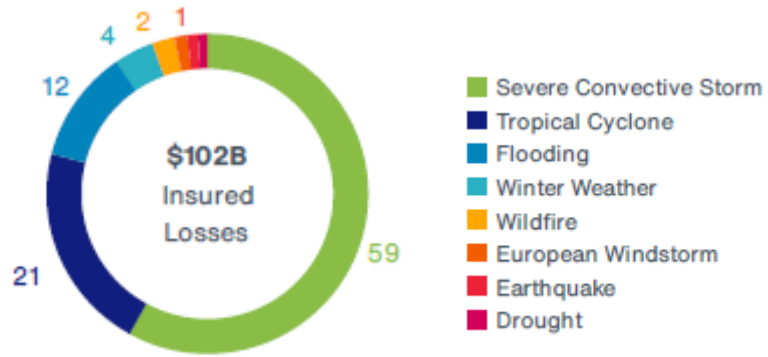
* Aon has tracked ~$73bn of global insured NatCat losses so far in 2024.
* Around half of the total was derived from severe convective storm activity in the U.S.
* The year has also featured significant flood events in Germany, Brazil, Canada, the United Arab Emirates and China.
* Primary peril losses remain low, but we are only midway through what is predicted to be a very active Atlantic hurricane season.



Primary Perils: Earthquake, European Windstorm, Tropical Cyclone.
Secondary Perils: Drought, Flooding, Severe Convective Storm, Wildfire, Winter Weather, Other.

Source: Aon's Catastrophe Insight Database, as of August 20, 2024 (subject to change).





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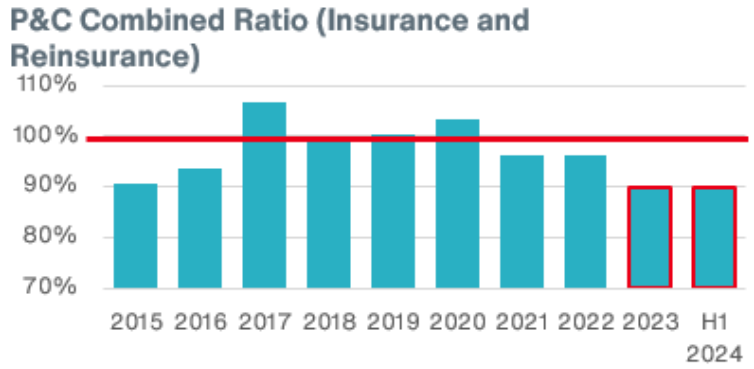
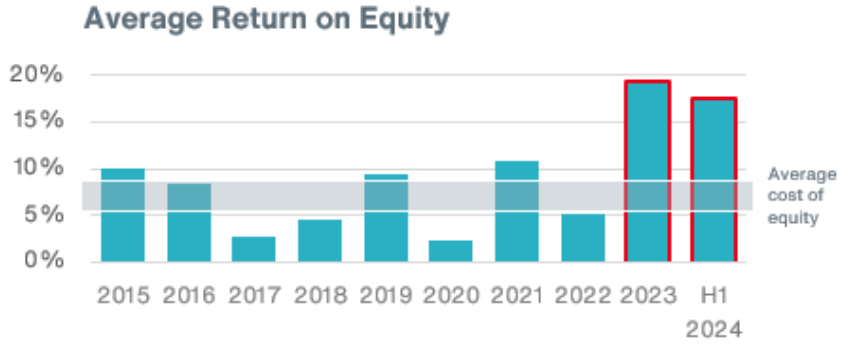
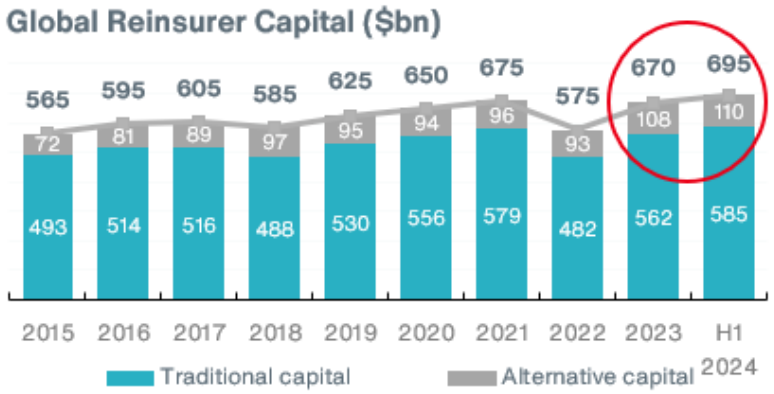
Reinsurance Market Dynamics

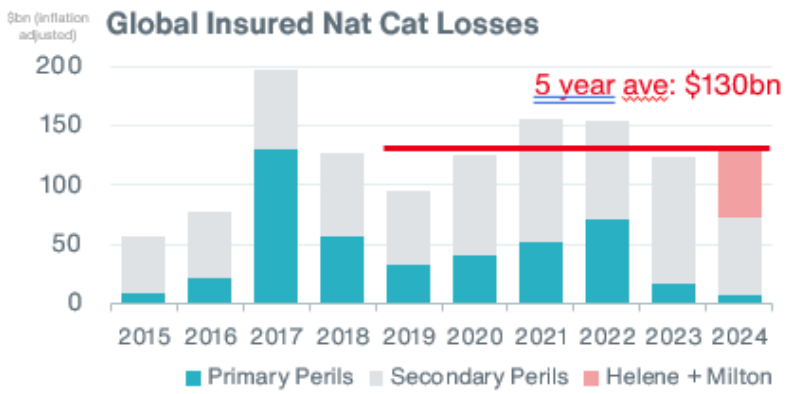
Global Reinsurers: 18 Months of Strong Performance

Average RoE doubling Cost of Equity, despite 74bn Insured Nat Cat Losses









Notes: Results based on Aon's Reinsurance Aggregate for 2006-2022 and Aon-calculated averages for 2023 and H1 2024
Primary Perils: Earthquake, European Windstorm, Tropical Cyclone. Secondary Perils: Drought, Flooding, Severe Convective Storm, Wildfire, Winter Weather, Other.
Source: Company financial statements, Aon's Catastrophe Insight Database, as of August 20, 2024 (subject to change).

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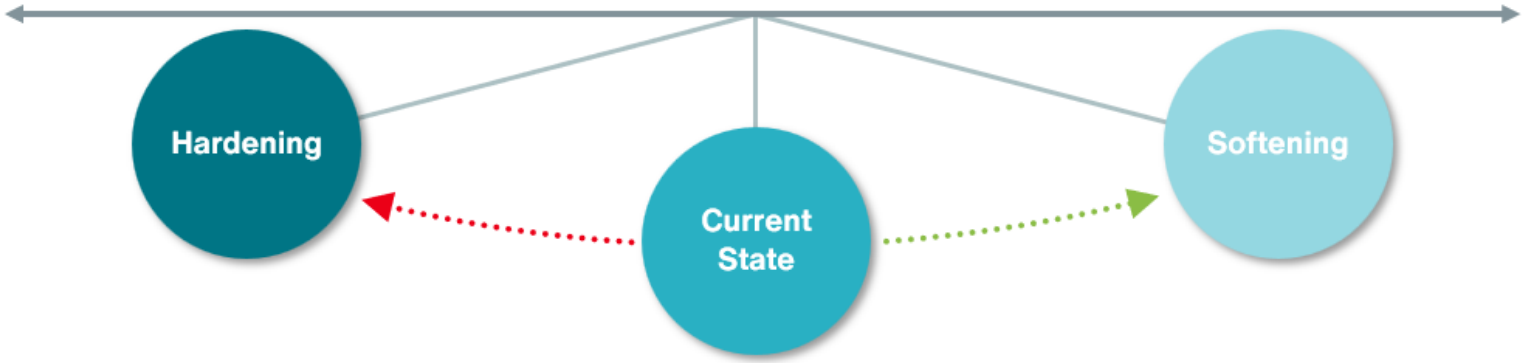
Reinsurance Market Dynamics

2025 Renewal Scenarios

Cat losses and capital inflows to drive outcomes

July 2024



Large peak peril losses ($50bn+)	**Cat Losses**	Losses within budgets
Accelerating loss cost trends	**Inflation**	Progressive normalisation
Return on equity below cost of equity	**Results**	Double-digit return on equity
Capital depletion	**Capital**	Capital growth
Shock events impact capital markets	**Uncertainty**	Benign news-flow

Source: Aon Business Intelligence.

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Reinsurance Market Dynamics

2025 Renewal Scenarios

Cat losses and capital inflows to drive outcomes

July 2024

A Very Active Atlantic Hurricane Season Is Forecast

Large peak peril losses ($5	**Cat Losses**	Losses within budgets
Accelerating	**Inflation**	Progressive normalisation
Return w cost of equity	**Results**	Double-digit return on equity
Capital depletion	**Capital**	Capital growth
Shock events impact capital markets	**Uncertainty**	Benign news-flow

Source: Aon Business Intelligence.

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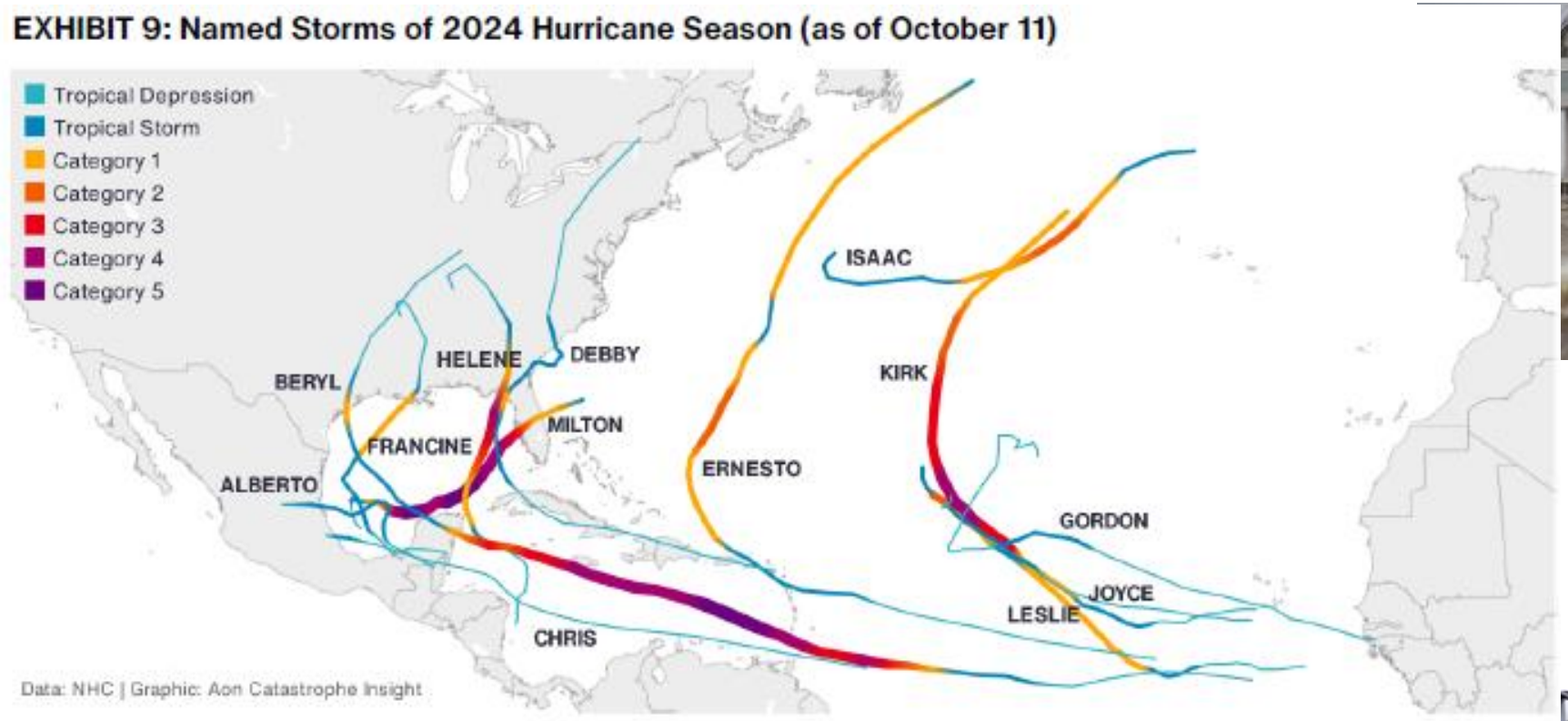
Reinsurance Market Dynamics



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Reinsurance Market Dynamics

January Renewal Market Environment

Reinsurance market healthier and more stable than post Ian

Q4 2022 (Post Ian)		Current Environment
Cat XL attachments were low, having remained relatively unchanged for 10 years despite inflation pressures	**Reinsurance Structure & Pricing**	Increased attachment points since 2023 especially for national/global writers Current rate levels in the US are positioned c. 50% than 1/1/22
High economic inflation leading to acceleration of loss cost trends	**Inflation**	Inflation has progressively normalized. Core inflation 3.2% in Aug 2024, the lowest since April 2021
Reinsurer capital dipped to $575Bn at YE 2022 and multiple Cat XOL markets ceased writing business (-15% YOY)	**Reinsurer Capital**	Peak global reinsurer capital levels of $695Bn at H1 2024
Material trapped capital following 5 years of catastrophe losses	**Trapped Capital**	Limited trapped capital pre-Milton following a clean 2023 and fresh ILS capital commitments
Assignment of Benefits and one-way attorney fees drove elevated loss costs	**Florida Regulatory Environment**	Reduced Statute of Limitations, removal of one-way attorney fees and Assignment of Benefits relative to time of HU Ian

3 Tips on reserving for catastrophes

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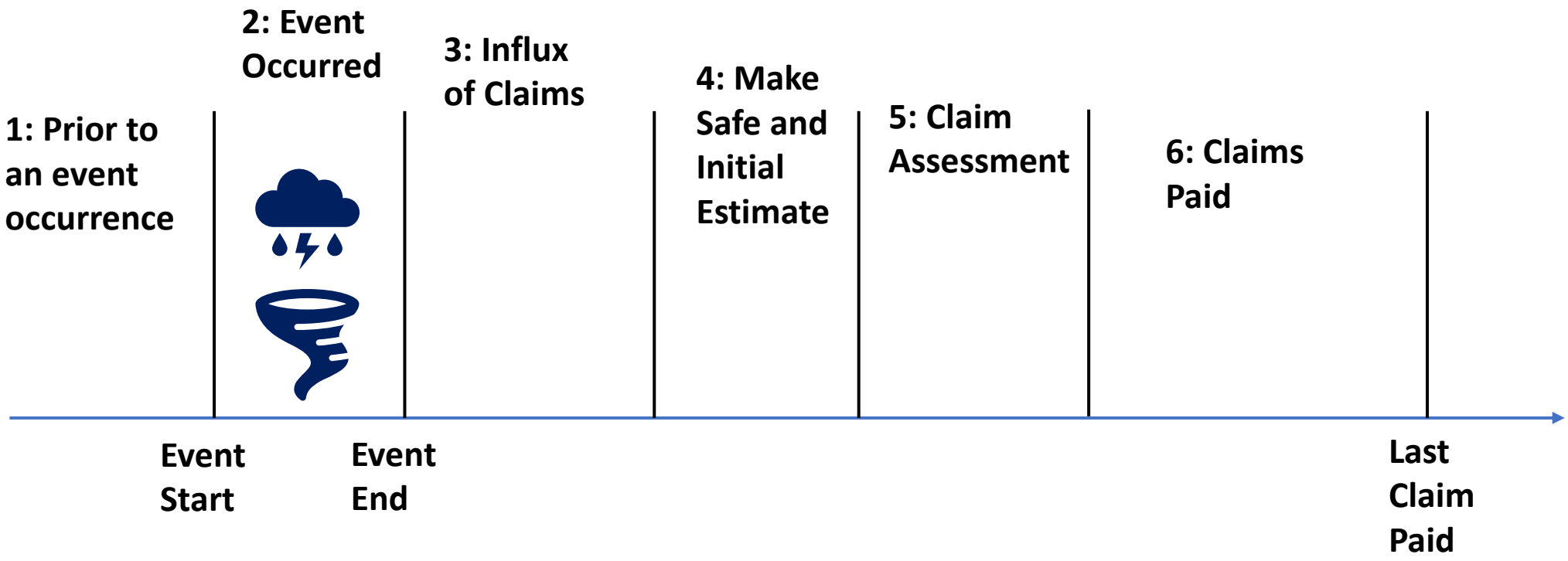
A Catastrophe Event Journey



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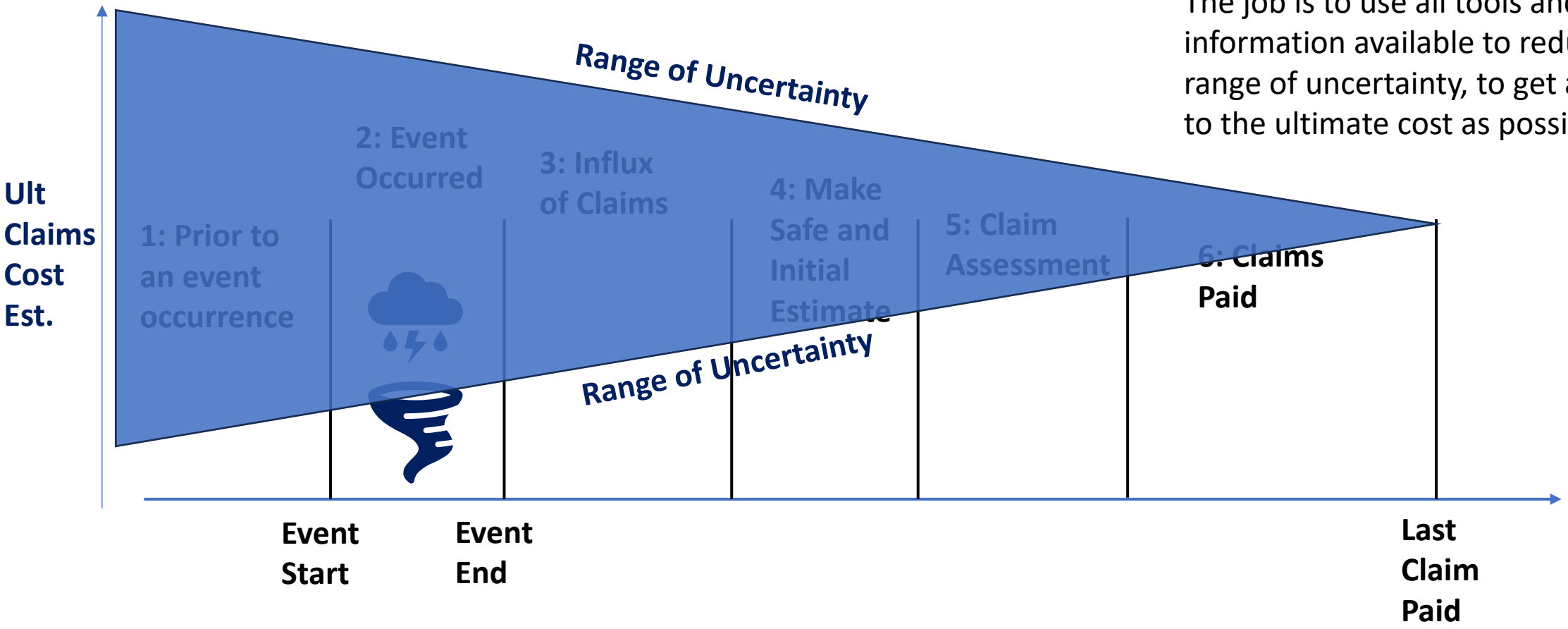
A Catastrophe Event Journey



The job is to use all tools and information available to reduce the range of uncertainty, to get as close to the ultimate cost as possible.

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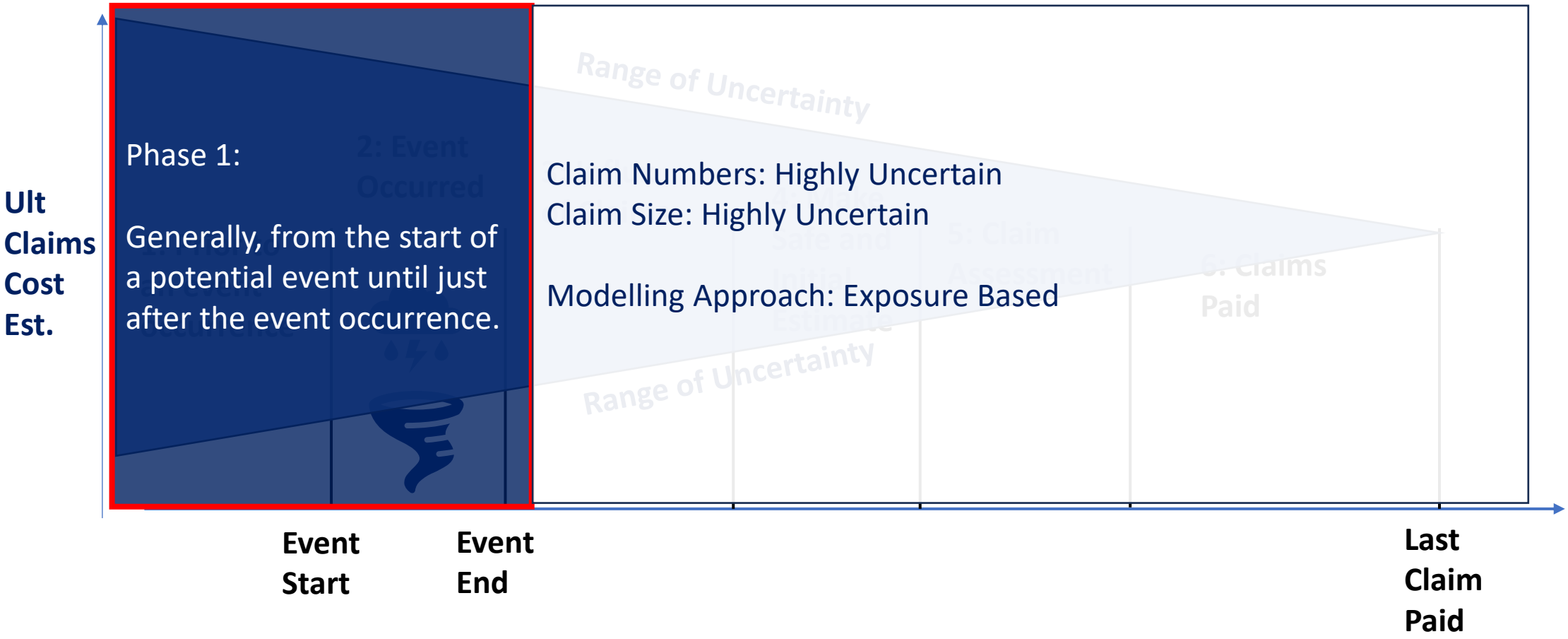
A Catastrophe Event Journey



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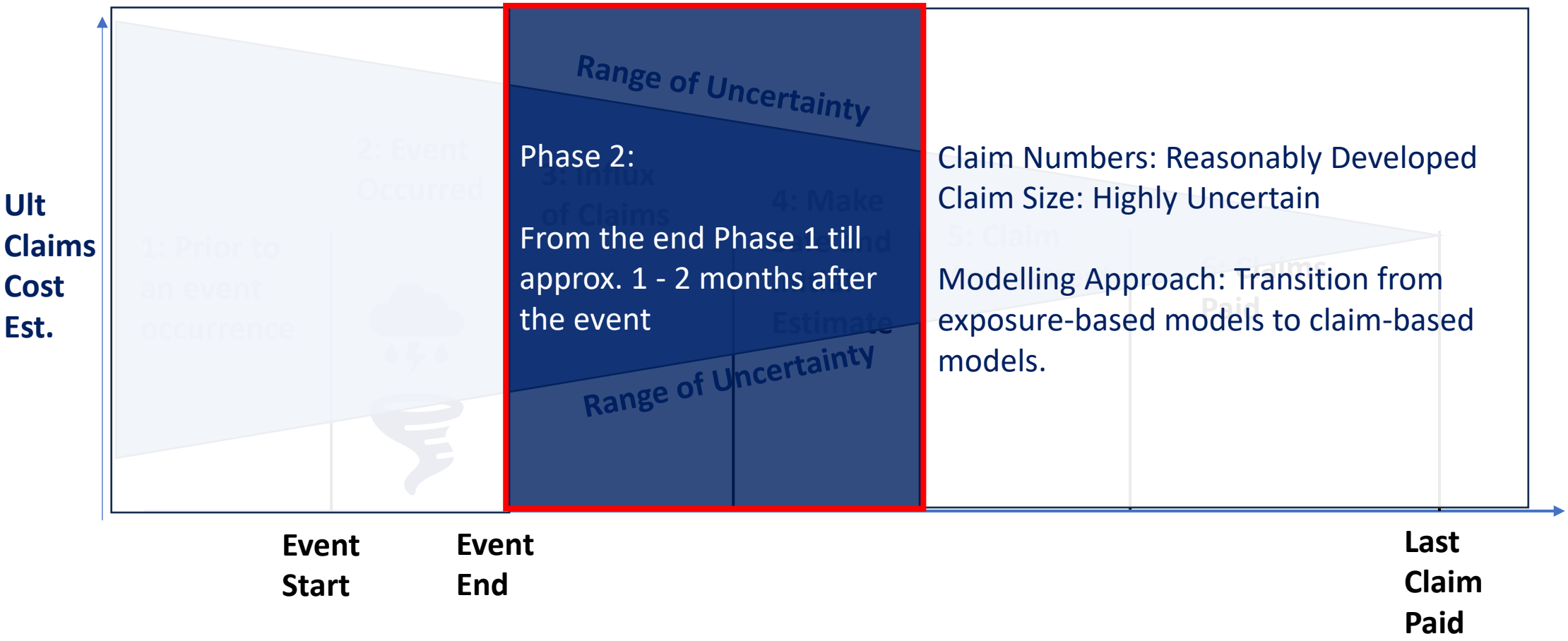
A Catastrophe Event Journey



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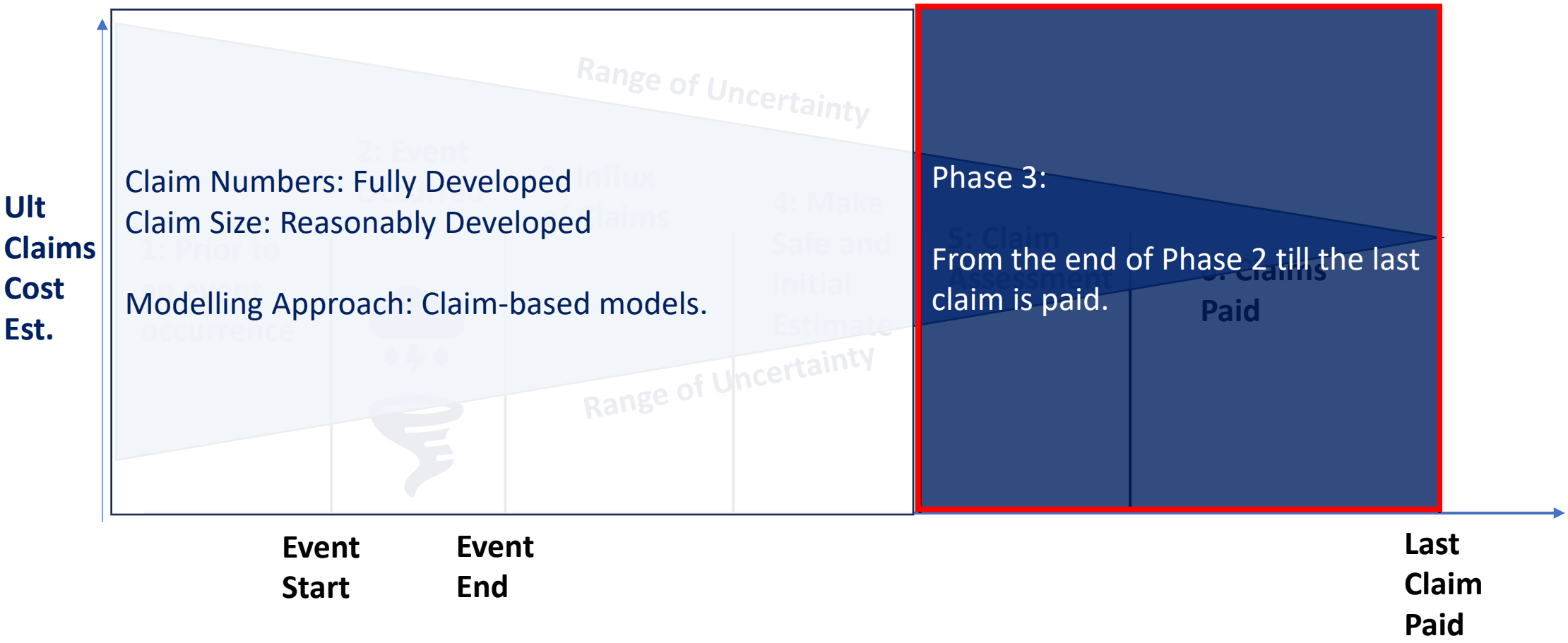
A Catastrophe Event Journey



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Remember!

- Every catastrophe event has its own idiosyncrasy, use your historical data to the limit of its insight but no further.

- Claims don’t happen on spreadsheets, look outside of the window, talk to claims experts.

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Consideration - Example

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Consideration - Example

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Consideration - Example

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Consideration - Example

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Considerations

- Examples of things to look out for:
  - Claims management practice changes
  - Building code changes
  - New AFCA rulings that set new precedents
  - Demand surge, construction industry capacity in affect area, remoteness of the location
  - New market dynamics, for example “storm chasers”
  - Potential reporting delays that can be materially different from the past
  - And so on….

- Other Complexities:
  - Reinsurance (e.g. Peril Coverages, Hours Clause, Multi event cost allocation, Cyclone pool etc.)
  - Seasonality in premium liability estimates
  - Policy exclusions
  - Etc.

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Thank you

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