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# Connecting the Insurance Industry and Academia on Catastrophe and Climate Modeling Webinar Series

March 20, 2023

# Panelists and Agenda

Welcoming Remarks	Lisa Slotznick, American Academy of Actuaries, President-Elect Sarah Kapnick, NOAA Chief Scientist Alex Isern, Assistant Director, NSF Directorate of Geosciences (GEO)
Panel Overview	Lisa Slotznick, American Academy of Actuaries, President-Elect and Chair, Academy Climate Change Joint Committee, and panel moderator
1	Panelist 1, Jeff Czajkowski, Director, NAIC Center for Insurance Policy and Research
2	Panelist 2, Justin Panther, Senior Manager, Catastrophe Modeling, Allstate Insurance
3	Panelist 3, Peter Ott, Vice President, Senior Property Treaty Underwriter, Swiss Re
Audience Questions and Dialogue	Lisa Slotznick, Moderator

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To understand and predict changes in climate, weather, oceans, and coasts; to share that knowledge and information with others; and to conserve and manage coastal and marine ecosystems and resources.





# NOAA's Authoritative Products and Services

## SERVICE DELIVERY & DECISION SUPPORT TOOLS

Comprehensive service delivery and decision support tools are necessary to build a Climate Ready Nation to meet the needs of businesses, federal partners and communities most vulnerable to climate and weather hazards.



## MODELING, PREDICTION & PROJECTION

With state-of-the-science modeling, prediction and projection capabilities, NOAA leverages high-performance computing and the use of artificial intelligence.



## RESEARCH & DEVELOPMENT

6,000 NOAA scientists and engineers develop cutting-edge applied research and applications to address pressing climate and weather challenges.



## DATA & INFORMATION STEWARDSHIP

NOAA's world-class data and information stewardship is leveraging cloud infrastructure and working to store and to provide to the public more user friendly and authoritative data sets.



## OBSERVATIONAL INFRASTRUCTURE

From the ocean floor to on orbit, NOAA's robust next-generation observational infrastructure and data dissemination observes and collects data 24/7.





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*“To promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense...”*

Photo Credit: Maria Barnes, NSF

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**Biological Sciences**



**Computer & Information Science & Engineering**



**Engineering**



**Geosciences**



**Integrative Activities**



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**Social, Behavioral & Economic Sciences**



**STEM Education**



**Technology, Innovation & Partnerships**

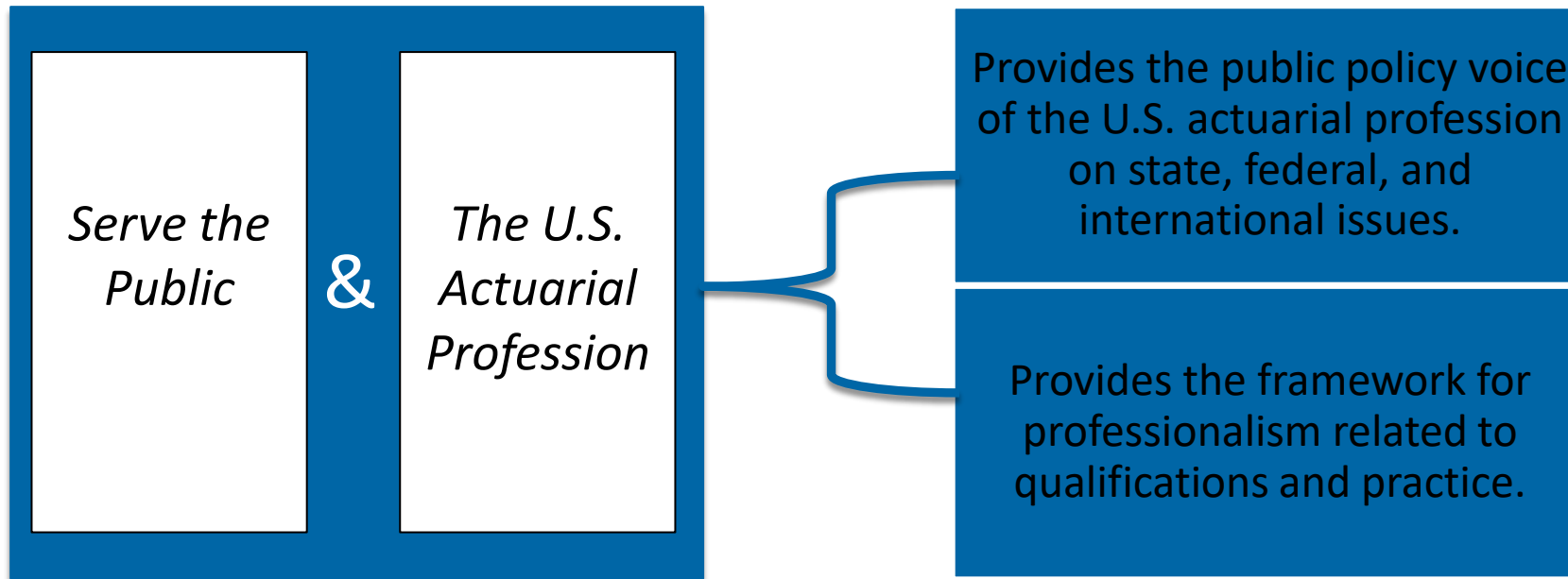


# About the American Academy of Actuaries



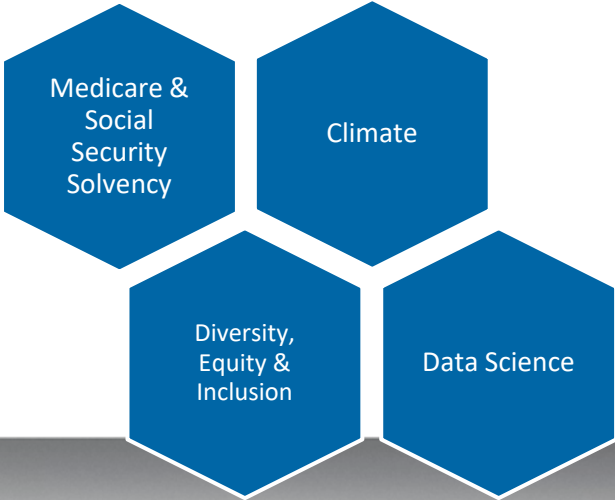
Lisa Slotznick, MAAA, FCAS  
American Academy of Actuaries  
President-Elect

# Academy Mission



# Public Policy

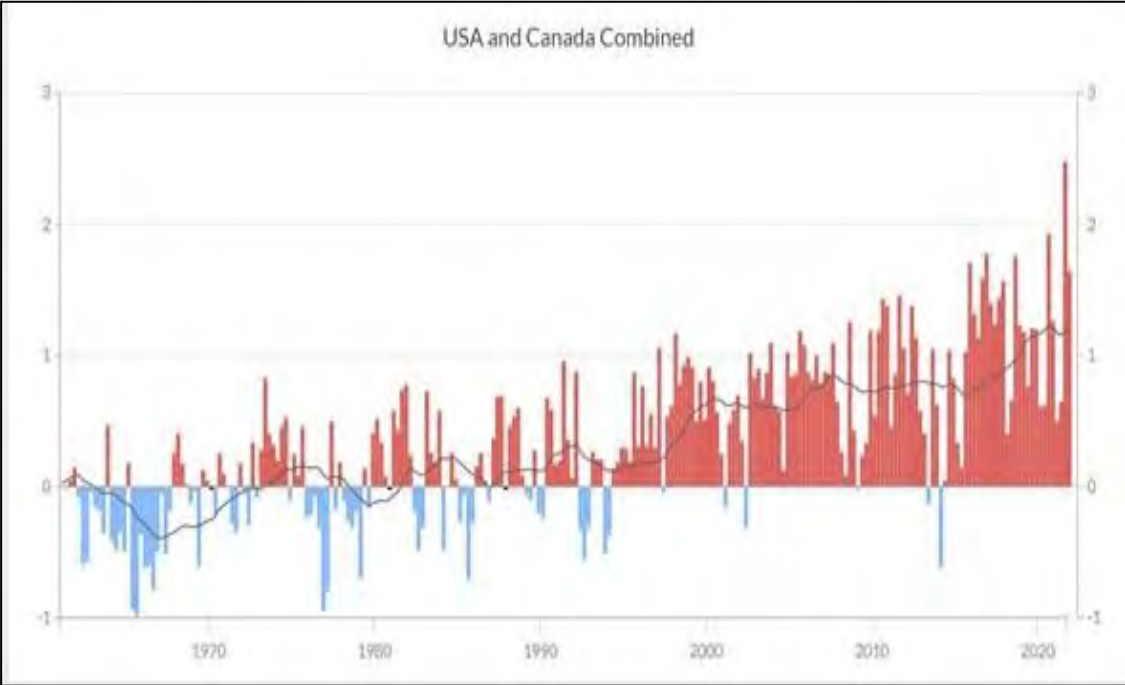
- Public Comment Letters
- Committee Testimony
- Publications and Research



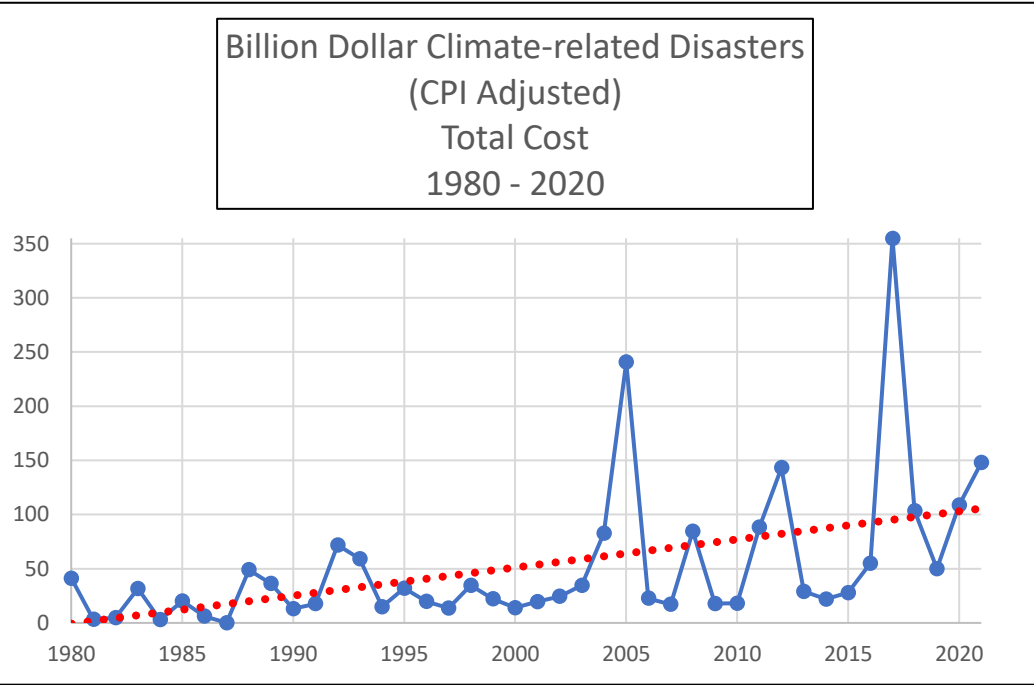


# Prelude: Climate Risk Increasing

Climate is becoming more extreme, and losses from climate-related events are increasing.



Source: [Actuaries Climate Index](#).



Source: [Billion Dollar Weather and Climate Disasters](#), NCEI, NOAA (Academy calculations)

# Regulatory View of Catastrophe and Climate Models



Jeff Czajkowski, PhD

Director, Center for Insurance Policy and Research  
National Association of Insurance Commissioners



# Blending CAT Models and Climate Models Dialogue – Insurance Regulatory Background

Jeffrey Czajkowski, Ph.D.

Center for Insurance Policy and Research, National Association of Insurance  
Commissioners

Industry Networking Forum

March 20, 2023

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# Key Points

- Climate/Natural Catastrophe Risk and Resiliency is, and has been, a key insurance regulatory priority
- Immediate importance => State insurance regulators are on the front lines of climate-related natural catastrophe preparedness and response, protecting policyholders and maintaining well-functioning insurance markets
- Monitoring and engaged on insurers' exposure to climate-related risk on both sides of their balance sheet - asset (investments) & liabilities (policy underwriting)
- ***CIPR CAT Modeling COE's focus on applied research => well-positioned for collaboration***

# NAIC Climate & Resiliency (EX) Task Force

## Membership

- Formed in 2020 and serves as the coordinating body for discussion and engagement on climate-related risk & resiliency issues
- 44 participating jurisdictions
- Co-Chaired by AK & CA

# Workstreams

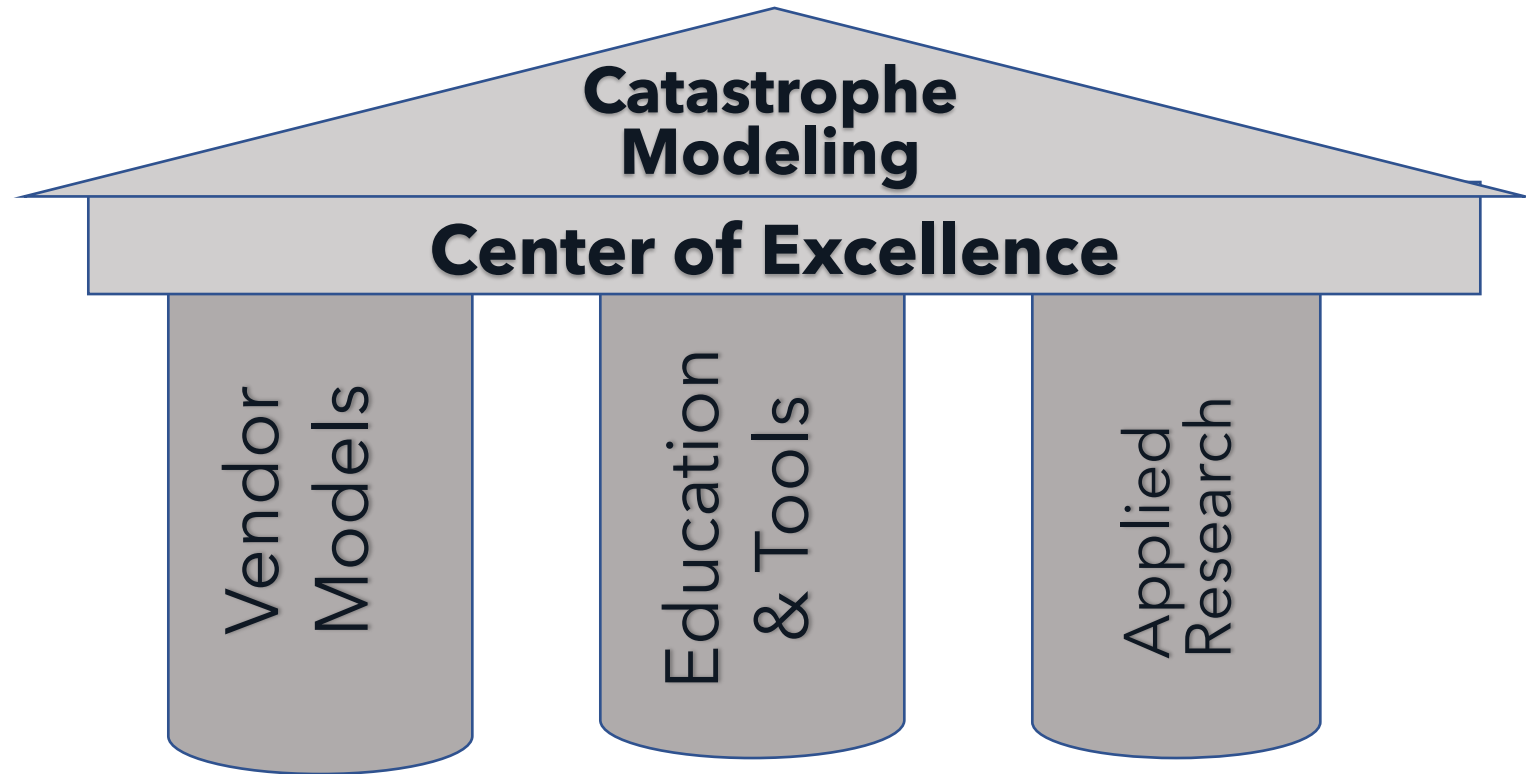
Facilitate discussion & engagement among 5 key themes:

- Solvency
- Climate Risk Disclosure
- Pre-Disaster Mitigation
- Innovation
- Technology



## MISSION STATEMENT

The purpose of the NAIC Catastrophe Modeling Center of Excellence (COE) is to **provide state insurance regulators with the necessary technical expertise, tools, and information to effectively regulate their markets.**







# Regulator Access to Catastrophe Modeling Information - *CAT COE (Restricted) SharePoint*



Casualty/Liability



Climate Risk



Cyber



Earthquake



Flood



Hurricane



Severe Connective Storms



Wildfires



Winter Storms

***Repository of model documentation, training materials, research papers and other tools for regulators.***



# Application of Wildfire Mitigation to Insured Property Exposure

**Demonstrate ability of CAT models to reflect structure-specific and community level mitigation.**

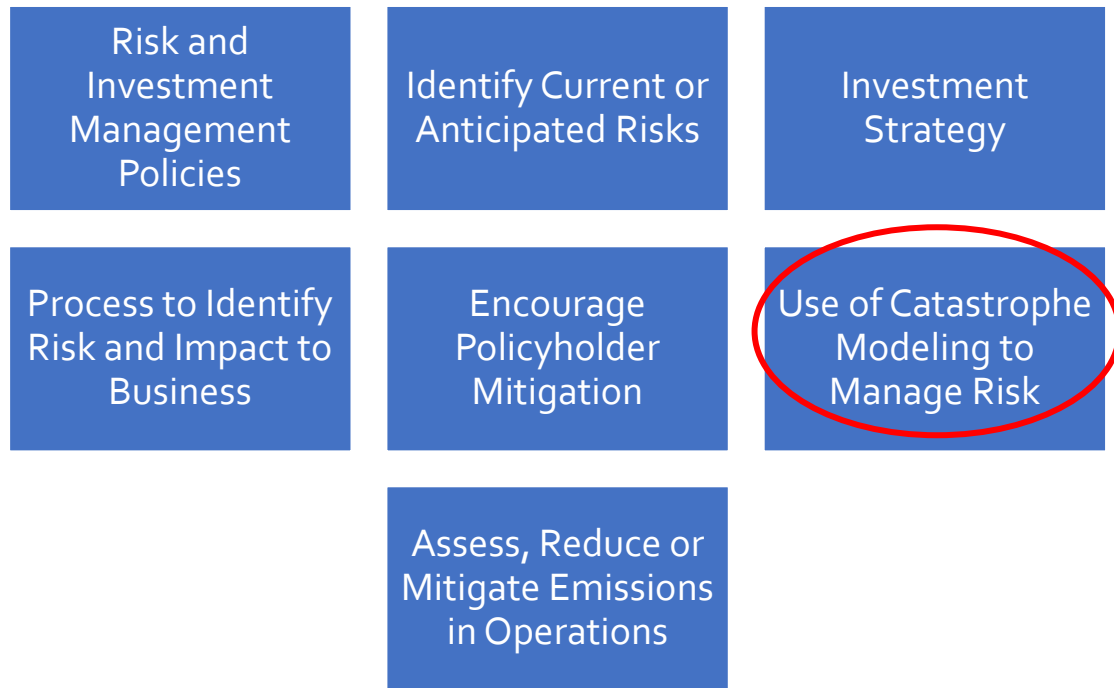
- ❑ Summary of IBHS & NFPA Firewise USA recommendations
- ❑ These mitigation benefits modeled for 3 sites in California, Oregon, Colorado
- ❑ A cost-benefit analysis of these mitigation features is examined and documented.



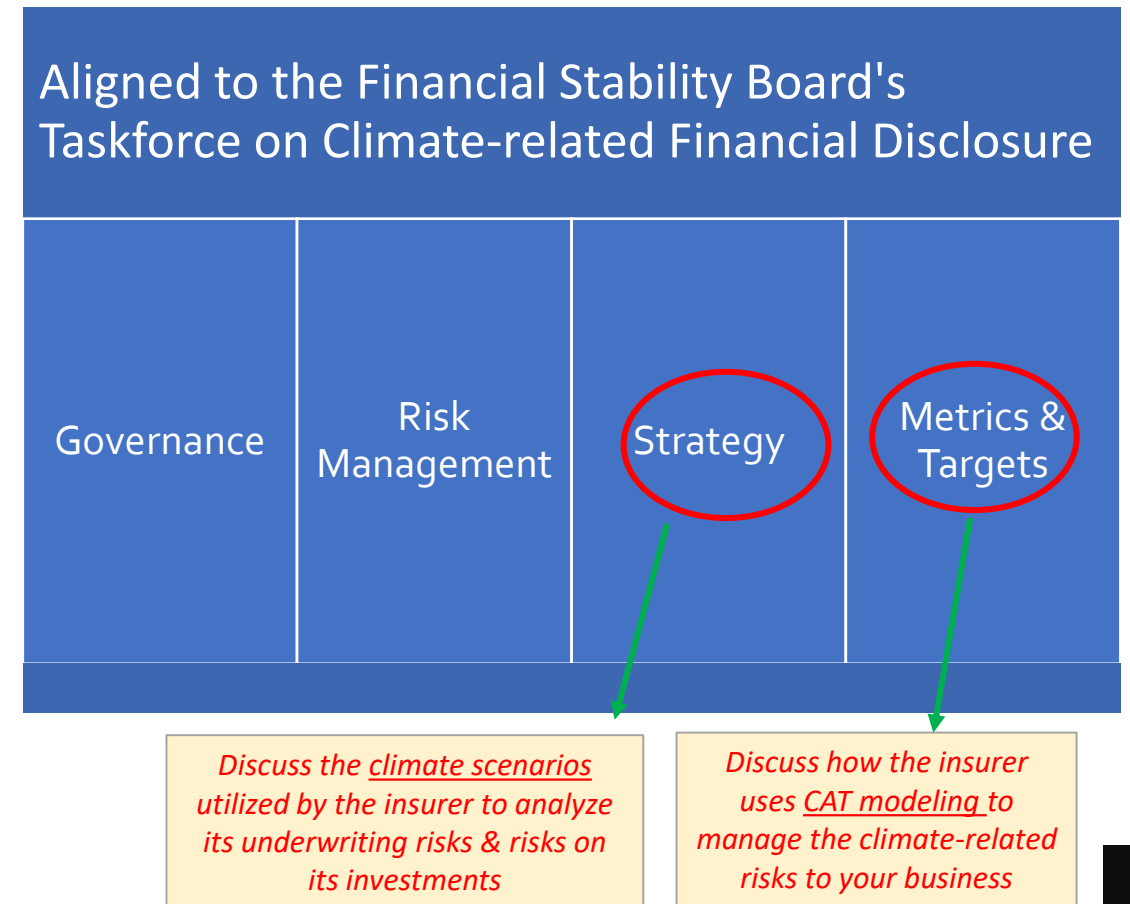
# Climate Risk Disclosure

- **Revised NAIC Climate Risk Disclosure Survey in 2022.** Implemented by 15 states and 85% of nationwide premium

## Former 8 Question Survey (since 2010)



## Revised Climate Risk Disclosure Survey



# Solvency

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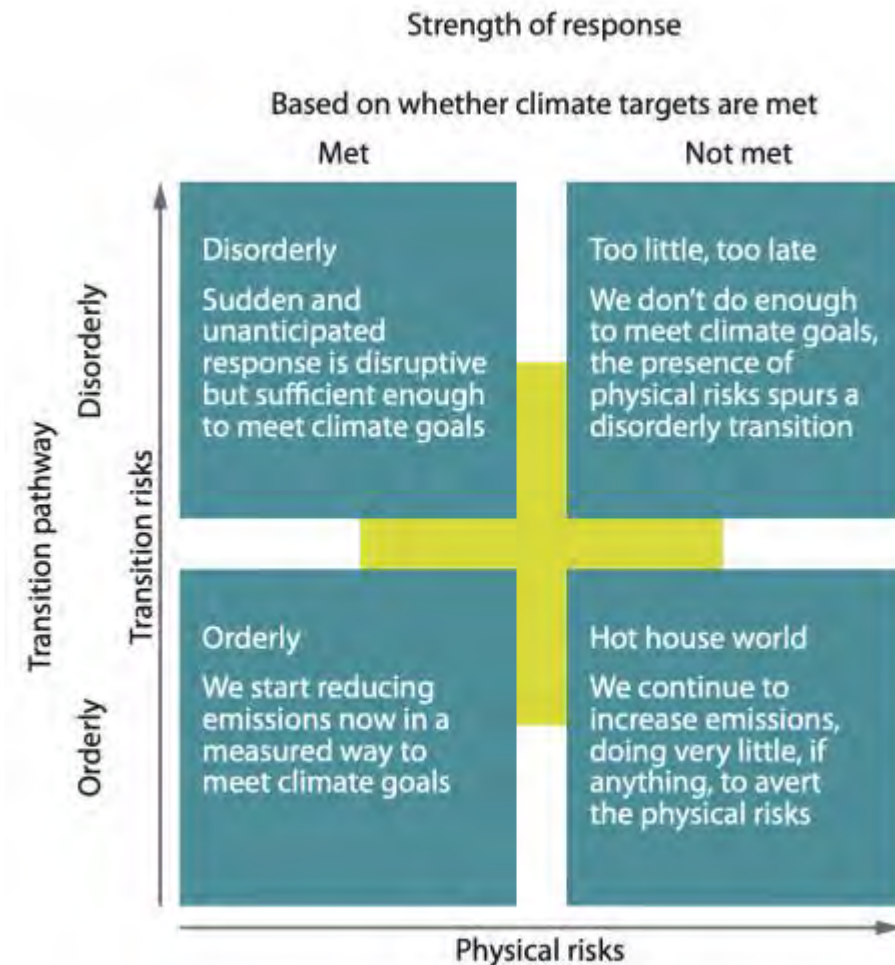
- Assess regulatory tools available to understand, address, and support insurance companies' planning for climate-related risk and exposure
  - ❑ **Referrals to relevant NAIC Financial Condition Committee Groups – Climate-based enhancements to Financial Solvency Tools**
    - Financial Analysis Handbook
    - Financial Condition Examiners Handbook
    - Own Risk Solvency Assessment (ORSA) Guidance Manual
  - ❑ **Climate Scenario Analysis Regulatory Public Discussion Forums**
    - Physical, Transition, Liability risk modeling approaches (leveraging CAT models)
    - Other Insurance Regulators Approach and Experience with Climate Scenario Analysis
    - Company Experience and Utilization of Climate Scenario Analysis
  - ❑ **Note: State DOI Specific Guidance for Domestic Insurers on Managing the Financial Risks for Climate Change – CT & NY =>** involving qualitative and quantitative analyses of physical and transition risk



# NAIC Applied Transition Risk Scenario Analysis - Insurer Investments

## Three step approach:

1. Use NGFS scenarios
2. the scenarios are translated into numerical stress factors
3. Stress factors are applied to 6 climate sectors to estimate the potential impact of these scenarios on the book value of insurers' investments.



Source: NGFS (2019a).

- “**orderly**” (early, ambitious transition), “**disorderly**” (late, disruptive action), both consistent with a temperature increase of 2°C by 2100
- a “hot house world” scenario consistent with a temperature increase of close to 4°C by 2100 and little or no transition policy.



# Key Points

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# Catastrophe Modeling Center of Excellence

**Providing regulators with technical expertise, tools, and information to effectively regulate their markets.**

<https://content.naic.org/research/center-of-excellence>

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# Insurer View of Catastrophe and Climate Models



Justin Panther, ACAS, CCRMP, CEEM, CCRA, ARM  
Senior Manager, Catastrophe Modeling  
Allstate Insurance Company



# Insurer View of Catastrophe and Climate Models

Justin Panther, ACAS, CCRMP, CCRA, CEEM, ARM  
Allstate Insurance Company

03.20.2023





## Executive Summary

Climate change presents Property-Liability businesses with increased risk and opportunity, likely requiring changes in protection offerings, profitability, and capital management

- Potential headwinds include impacts to insurance, investment, and reputational risk

Catastrophe and Climate Models are useful tools to help manage current and potential future risk from natural catastrophes

- Catastrophe models often focus on the risk for a given peril based on *current* climatological conditions, but allow a full translation to expected (re)insured loss
- Climate models often focus on the hazard for a given peril, with output that reflects *future* climatological conditions
- Differences in model structure result in unique applications/use cases for each
- Further benefits from both model types could be experienced by insurers and the general public with changes to their structure or broadened regulatory acceptance



## Climate Change Risk to Insurers

### Insurance Risk

- Potential for policyholder losses to increase based on climate change

### Investment Risk

- Potential for direct loss due to weather damage or changing business fundamentals

### Reputational Risk

- Potential for stakeholder dissatisfaction surrounding climate related actions



# Insurance Risk Management

Insurance Risk is managed through a variety of levers

## Pricing

- Climate Change is a slow-moving trend, allowing for revised rates as conditions evolve

## Underwriting

- Ability to reshape geographic footprint or set specific policy conditions for high-risk areas

## Reinsurance

- Ability to cede expected loss to other companies, mitigating potential impact of severe events

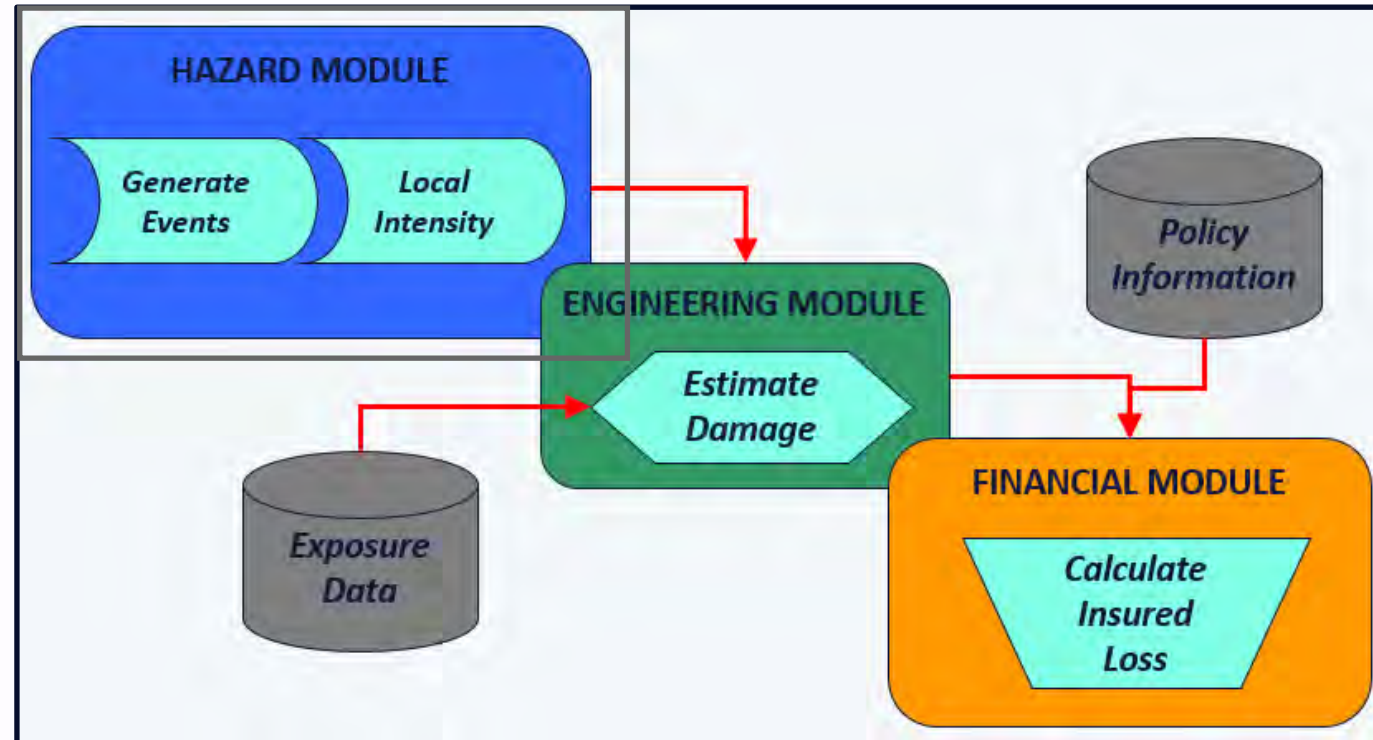




# Comparison of Catastrophe and Climate Models



## Catastrophe Models vs. Climate Models



Catastrophe Models leverage the above framework; Climate Models are often focused on just the hazard component



# Additional Limitations and Potential Considerations



## Additional Limitations & Considerations

### Model

- Expanded model usage (perils, states)
- Advancements in model transparency

### Regulatory and Public Acceptance

- Model use subject to regulatory approval

### Future Market

- Broader insurance availability
- Appropriate mitigation incentives; cost of risk signaling to public
- Ability to inform future building codes and development



# A Reinsurer's Perspective



Peter J. Ott

Vice President, Senior Property Treaty  
Underwriter

Swiss Re

# A Reinsurer's Perspective

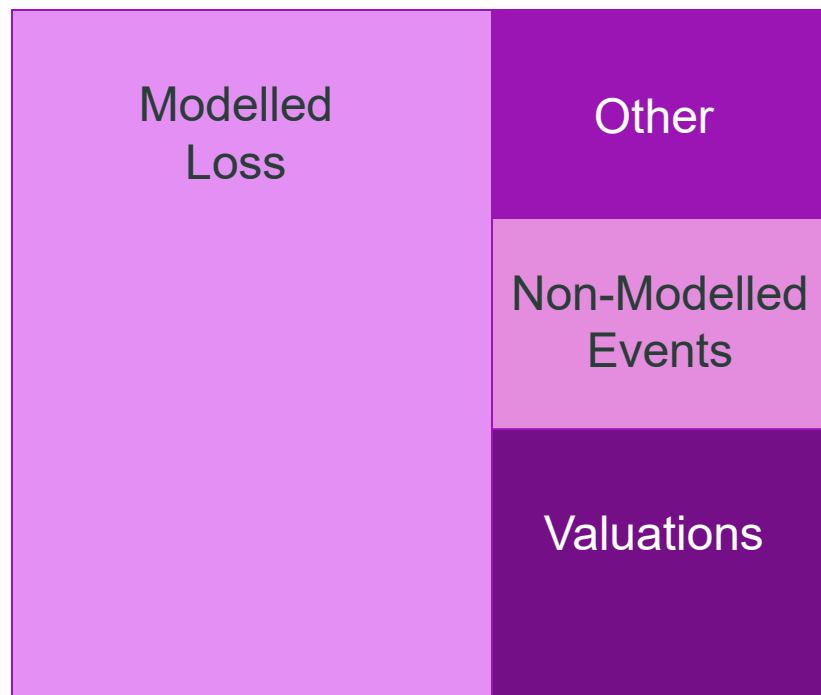


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2. Treaty Pricing Considerations
3. Reinsurer's Relationship with Insurer

# Actual Loss Vs. Modelled Loss

We need to identify and understand the sources of model miss



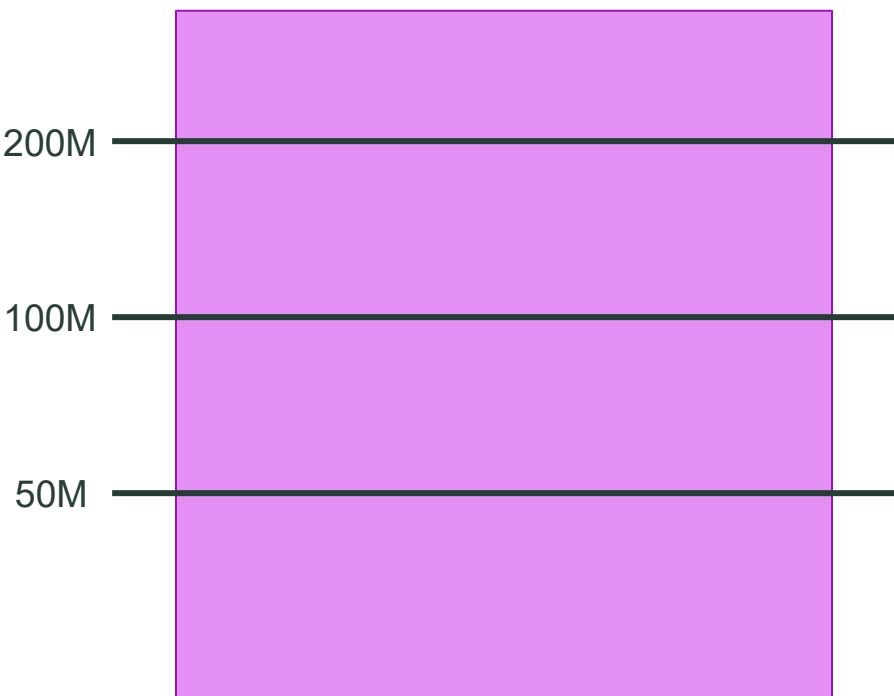
## Sources of Model Miss

- Under valuation of properties
- Non-modelled events (high frequency / low severity)
  - What events calibrate the models?
- Allocated loss adjusted expenses (ALAE)
- Contingent Business Interruption
- Short-term inflationary pressures
- State specific actions
- Response to unique policy conditions

# Treaty Pricing Considerations



# Reinsurance structures necessitate an understating of the entire loss distribution



- Catastrophe & Per-Risk Excess of Loss
- Specific layer mechanics are just as important as the ground up aggregate
- Aggregate covers
- How fast are aggregate losses hit in a time period?
- Parametric triggers
- Almost pure model probability question

Complex reinsurance structures can target areas of the distribution with the least certainty

# Reinsurer's Relationship with Insurer

# View of risk is often different between a Reinsurer and the Insurer

Insurers are usually constrained by individual state mandates

Insurers often adapt pricing post event loss, Reinsurers want to charge before the loss

How do Reinsurers adapt to changing primary coverages?



Any  
questions?

# Thank you!

Contact us

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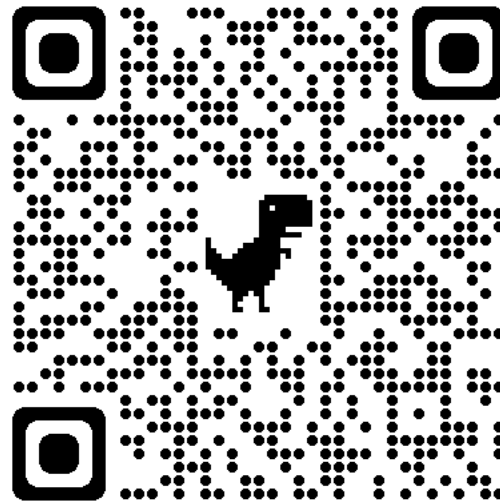
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# Thank You

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