Draft: 3/28/22

Catastrophe Risk (E) Subgroup
Virtual Meeting (*in lieu of meeting at the 2022 Spring National Meeting*)
March 22, 2022

The Catastrophe Risk (E) Subgroup of the Property and Casualty Risk-Based Capital (E) Working Group of the Capital Adequacy (E) Task Force met March 22, 2022. The following Subgroup members participated: Wanchin Chou, Chair, George Bradner, and Qing He (CT); Halina Smosna, Chair, Gloria Huberman, HauMichael Ying (NY); Laura Clements and Giovianni Muzzarelli (CA); Jane Nelson (FL); Judy Mottar (IL); Gordon Hay (NE); Anna Krylova (NM); Tom Botsko (OH); Andrew Schallhorn (OK); and Miriam Fisk, Monica Avila, and Rebecca Armon (TX). Also participating were: Adrienne Lupo (DE); Brock Bubar (ME); and Julie Lederer (MO).

1. Adopted its Feb. 22, 2022; Jan. 25, 2022; and Dec. 16, 2021, Minutes

Mr. Chou said the Subgroup met Feb. 22, 2022; Jan. 25, 2022, and Dec. 16, 2021. During these meetings, the Subgroup took the following action: 1) adopted proposal 2021-15-CR (Adding KCC Models), which the Subgroup exposed for a 30-day public comment period ending Nov. 26, 2021; 2) adopted proposal 2021-17-CR (Adding Wildfire Peril for Informational Purposes Only), which the Subgroup exposed for a 60-day public comment period ending Feb. 13, 2022; 3) received an update from the Catastrophe Model Technical Review Ad Hoc Group. The update included the discussion of the survey questions created by the members within the group, which were based on *Actuarial Standard of Practice (ASOP) No. 38—Catastrophe Modeling (for All Practice Areas)*; 4) discussed three different kinds of catastrophe models that deviate from the vendor models. The Subgroup will focus on discussing the vendor catastrophe models with adjustments or different weight first; 5) discussed the issue of double counting in the R5 component. The Subgroup asked the interested parties to review the current methodology and provide comments in the upcoming meetings; 6) discussed the possibility of adding flood peril in the Rcat component. Industry asked the Subgroup to consider the materiality issue with respect to whether the flood peril is warranted, given the exposure of the industry; and 7) heard a presentation from Milliman on the private flood market.

Mr. Botsko made a motion, seconded by Ms. Clements, to adopt the Subgroup's Feb. 22, 2022 (Attachment Five-A1); Jan. 25, 2022 (Attachment Five-A2); and Dec. 16, 2021 (Attachment Five-A3) minutes. The motion passed unanimously.

2. Discussed its Working Agenda

Ms. Smosna summarized the changes of the 2022 working agenda, which included the following substantial changes: 1) adding the exposure and adoption dates to the "evaluate the possibility of allowing additional third-party models or adjustments to the vendor models to calculate the cat model losses" item; 2) removing the "modify instruction to PR027 Interrogatories that clarify how insurers with no gross exposure to earthquake or hurricane should complete the interrogatories" item; 3) adding the adoption date to the "implement wildfire peril in the Rcat component (for informational purposes only)" item; and 4) adding "evaluate the possibility of modifying exemption criteria for different cat perils in the PR027 interrogatories" and "evaluate the possibility of enhancing the independent model instructions" items under the new items section. Without hearing any comments from state insurance regulators and industry, Ms. Smosna said the working agenda will be forwarded to the Property and Casualty Risk-Based Capital (E) Working Group for consideration.

3. Discussed the Insured Loss Threshold for Wildfire Peril

Ms. Smosna asked the Subgroup to consider using the same threshold of 25 million or greater estimated insurer losses for wildfire peril as the earthquake and hurricane perils. She said any received comments regarding this item will be discussed during the Subgroup's next meeting on April 19.

4. Exposed Proposal MOD 2021-17-CR (Wildfire Information-Only Reporting Exemption)

Scott Williamson (Reinsurance Association of America—RAA) said this modification applies only to those smaller companies, where the modeling requirements would impose a cost and compliance burden that represent an outsized cost relative to the incremental benefit of providing the modeled data for information-only purposes. He stated that this exemption option is intended only to apply to the information-only reporting for wildfire, while the Subgroup continues to evaluate materiality and model maturity. It would no longer be available when the wildfire peril is added to the Rcat component unless the companies qualify under the exemptions listed in PR027 Interrogatory items C(7), C(8), or C(9).

The Subgroup agreed to expose proposal MOD 2021-17-CR for a 14-day public comment period ending April 5.

5. Discussed the Independent Model Review Instruction in the Rcat Component

Mr. Chou said some written comments related the instructions to review an internal model were received from the Missouri Department of Commerce and Insurance (DCI) earlier (Attachment Five-A4). Ms. Lederer said the DCI asked the Subgroup to look into the following items in the internal model review instructions: 1) consider rewording item 3 to make the Subgroup's intention clear; 2) consider reviewing the comparison of internal model estimates to actual results for historical events; and 3) experiencing difficulty in receiving written documentation from the group-wide supervisor. She also stated that the DCI did not engage an outside consultant to review the model as this model is highly confidential. It was quite a heavy lift for reviewing based on the Rcat instructions. Ms. Lederer also said the DCI is not aware of any other companies that applied for permission to use their internal models in other states.

Mr. Chou urged the interested parties to review the current PR027 internal model instructions and provide comments or wordings to the NAIC staff in next three weeks. He said any received information will be discussed during the Subgroup's next meeting on April 19.

6. Discussed the Issue of Double Counting in the R5 Component

Ms. Smosna said the NAIC did not receive any comments on this item since the Subgroup's last meeting on Feb. 22. She said the wildfire peril will follow the same process as the other perils to adjust the R5 component based on the PR100's data collection. The Subgroup agreed unanimously.

7. Discussed Other Matters

Mr. Chou said that the AIR Worldwide, Risk Management Solutions (RMS), and Karen Clark & Company (KCC) are the only third-party commercial vendor wildfire models agreed to be used by the Subgroup. He stated that the Subgroup only agreed on using the CoreLogic model for earthquake and hurricane peril and ARA HurLoss and Florida Public Model (FPHLM) for hurricane peril only. These clarifications will be reflected in the 2022 Risk-Based Capital (RBC) PR027 instructions.

Having no further business, the Catastrophe Risk (E) Subgroup adjourned.

SharePoint/NAIC Support Staff Hub/Member Meetings/Spring 2022 National Meeting/Task Forces/CapAdequacy/Cat Risk SG/03-22propertycatsg.docx

Draft: 3/4/22

Catastrophe Risk (E) Subgroup
Virtual Meeting
February 22, 2022

The Catastrophe Risk (E) Subgroup of the Property and Casualty Risk-Based Capital (E) Working Group of the Capital Adequacy (E) Task Force met Feb. 22, 2022. The following Subgroup members participated: Wanchin Chou, Co-Chair, and Qing He (CT); Halina Smosna, Co-Chair, Gloria Huberman, and HauMichael Ying (NY); Robert Ridenour, Vice Chair, and Jane Nelson (FL); Laura Clements, Lynne Wehmueller, and Giovanni Muzzarelli (CA); Judy Mottar (IL); Anna Krylova (NM); Tom Botsko (OH); Andrew Schallhorn (OK); and Miriam Fisk and Rebecca Armon (TX). Also participating was: Julie Lederer (MO).

1. Consider Adoption of Proposal 2021-17-CR (Adding Wildfire Peril for Informational Purposes Only)

Mr. Chou said the Subgroup identified wildfire as one of the major drivers of U.S. insured losses during the previous meeting. He also stated that a referral letter from the Climate and Resiliency (EX) Task Force was received on March 15, 2021, to recommend that the Subgroup consider: 1) expanding the current catastrophe framework to include other perils such as wildfire, flood, and/or convective storms that may experience a greater tail risk under projected climate-related trends; and 2) implementing two perils in the risk-based capital (RBC) framework by year-end 2022 if possible. He said a response was sent by the Subgroup on April 26, 2021, indicating that the catastrophe models are complicated; the Subgroup will need time to review and gain a better understanding so the costs and benefits for using the models are justified. He also said a proposal to include wildfire peril in the Rcat component for informational purposes only was developed and exposed for a 60-day public comment period ending Feb. 13. He stated that the Subgroup received three comment letters during the exposure period; some minor editorial changes in the proposal were made based on the received comment letters to clarify that this proposal is for informational purposes only and no timeline has been set for the RBC implementation until the needed enhancements and statistical impacts are implemented. In addition, the exemption interrogatory clearly indicated that the exemption rules to address the minimal wildfire exposure are consistent with the earthquake and hurricane perils.

Matthew Wulf (Swiss Re) recommended that the Subgroup consider extending the informational purposes only period to allow companies the time to responsibly incorporate either a vendor or internal model fully into pricing, risk selection, and capital management processes. Matthew Vece (American Property Casualty Insurance Association—APCIA) also supported an extended, multi-year period for informational-only filings until all the concerns are addressed before incorporated into RBC for solvency purposes, as wildfire models are still in the new stage of development, and the models are more prone to yielding inconsistent results, especially in the tail of the distribution. Jonathan Rodgers (National Association of Mutual Insurance Companies—NAMIC) and Scott Williamson (Reinsurance Association of America—RAA) said they summitted a comment letter on Feb. 13. Mr. Rodgers suggested that the filing only be required for companies that currently employ the approved models. He also stated that the comment letter clearly indicates that both NAMIC and the RAA do not think wildfire models are ready to be relied upon for solvency purposes; exploring other opportunities to address this peril during the for informational purposes only period is worth consideration. Mr. Botsko recommended that the Subgroup move the proposal forward, as the Subgroup agreed to take time to evaluate the impact and allow more time for the modelers to enhance their modeling approach with this new peril. Mr. Williamson asked the Subgroup to consider adopting the proposal with a carve out for companies that do not currently employ the model. Ms. Smosna asked for clarity around the term “employ” and whether Mr. Williamson means “license” models or “use” models, because many companies use models through their broker relationships and do not actually license the models. Mr. Williamson stated that he intended the term “employ” to refer to companies that license the models. Ms.

Smosna expressed concern that that might leave out too large a universe of companies from the informational-only process. Mr. Chou said the Subgroup will continue working with the RAA to resolve the exemption issues in the near future. He also encouraged all the interested parties to keep reviewing the comments and continue discussing the outstanding issues in the upcoming meetings.

Having no further comments, Mr. Botsko made a motion, seconded by Mr. Ridenour, to adopt proposal 2021-17-CR. The motion passed unanimously.

2. Discussed the Independent Model Review Instructions in Rcat

Mr. Chou said during the previous discussion, the Subgroup identified three different kinds of catastrophe models that deviate from the vendor models: 1) internal catastrophe models; 2) vendor catastrophe models with adjustments or different weight; and 3) derivative models based on the vendor models. He stated that the Subgroup will focus on discussing the vendor catastrophe models with adjustments or different weight first. He said he believes the PR002 Attestation and PR027 Catastrophe Risk pages will require further modification to better accommodate this type of model. Ms. Lederer said the Missouri Department of Commerce and Insurance (DCI) has used the RBC instructions to review an internal catastrophe model. She said she would like to offer some comments to the Rcat instructions in the upcoming meeting. Mr. Chou also asked the industry to review the instructions and provide comments at the Spring National Meeting.

3. Discussed the Issue of Double Counting in the R5 Component

Ms. Smosna said the wildfire peril will follow the same process as the other perils to adjust the R5 component based on the PR100s data collection. She said any received comments regarding this item will be discussed in the upcoming meeting.

4. Heard a Presentation Regarding the Private Flood Market

Nancy Watkins (Milliman) provided a presentation on: 1) flood market background; 2) the need for flood catastrophe models; 3) flood and catastrophe model regulation; and 4) flood model evaluation (Attachment Five-A1a). Mr. Chou said currently, the Subgroup just started the discussion on: 1) the materiality of the flood peril; and 2) the RBC financial solvency regulations. He stated that Ms. Watkins will be invited back for another presentation if the Subgroup decides to further study this peril.

Lastly, Mr. Chou said the Subgroup will continue discussing all the outstanding issues at the Spring National Meeting.

Having no further business, the Catastrophe Risk (E) Subgroup adjourned.

SharePoint/NAIC Support Staff Hub/Member Meetings/Spring 2022 National Meeting/Task Forces/CapAdequacy/Cat Risk SG/02-22propertycatsg.docx

# U.S. Private Flood Market

## NAIC Catastrophe Risk (E) Subgroup

## February 22, 2022

**Nancy Watkins, FCAS, MAAA**
**Principal & Consulting Actuary, Milliman**

## Agenda

- Flood market background
- The need for flood catastrophe models
- Flood and catastrophe model regulation
- Flood model evaluation

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## Flood risk is increasing…




***"The rain broke records set just 11 days before by Tropical Storm Henri, underscoring warnings from climate scientists of a new normal on a warmed planet: Hotter air holds more water and allows storms to gather strength more quickly and grow ever larger."***

New York Times, September 7, 2021

***"The United States is expected to experience as much sea level rise by the year 2050 as it witnessed in the previous hundred years…sea levels along the coastline will rise an additional 10-12 inches by 2050 with specific amounts varying regionally, mainly due to land height changes."***

National Oceanic and Administration Association, February 15, 2022

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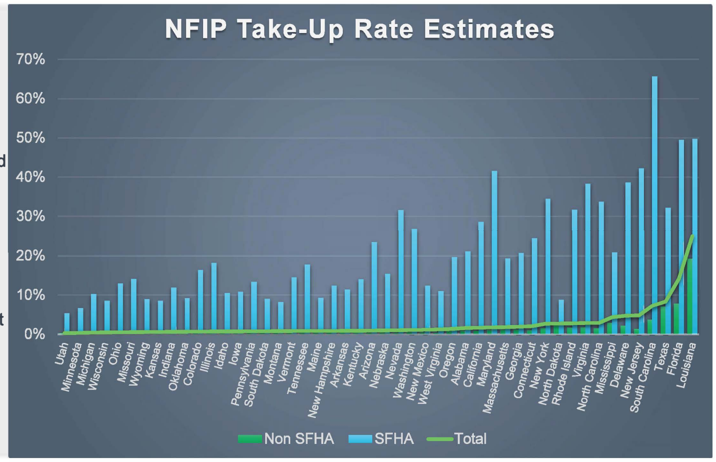
## …but the U.S. flood insurance market is underserved

- Current U.S. residential flood insurance market
  - Estimated **4%** of SFHs have flood insurance (2021)
  - NFIP: **$3.6B** total premium on **4.8M** policies (2019)
  - Private insurers reported **$735M** in Private Flood DWP (2020) vs. **$577M** in DWP (2019)
  - About **one-third** of Private Flood DWP is estimated to be residential
  - **175** private carriers writing flood insurance (2020) vs. 152 in 2019
  - Potential U.S. residential flood insurance market is between **$37B** and **$47B** of DWP
- For comparison purposes, 2020 HO DWP was **$110B**

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## What makes an insurance market sustainable?

### Availability

- Insurer can manage and measure the risk
- Insurer can charge premiums that represent the cost of risk transfer

### Affordability

- Policyholders are able to pay the premium

### Reliability

- Insurer will be able to pay claims
- System will be stable over the long term

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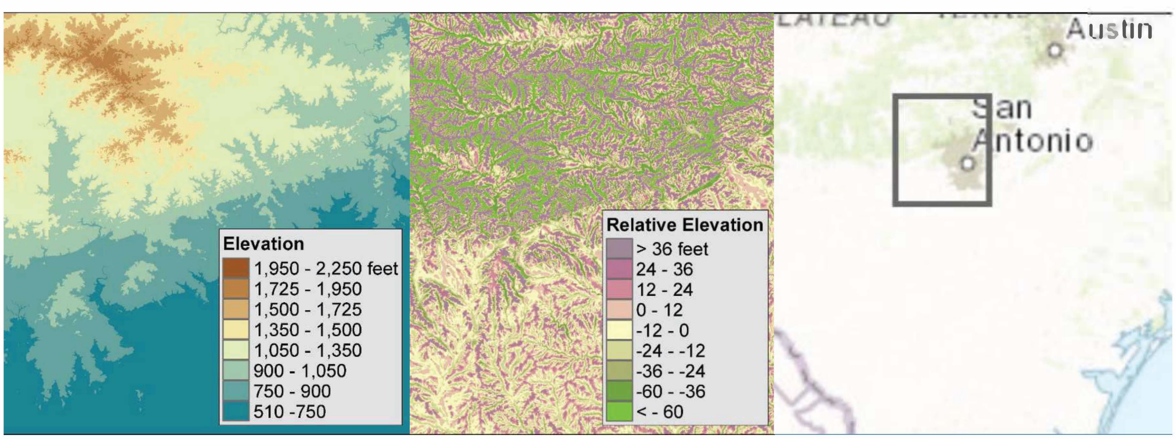
## Flood risk is local

Varies greatly over short distances and requires granular rating

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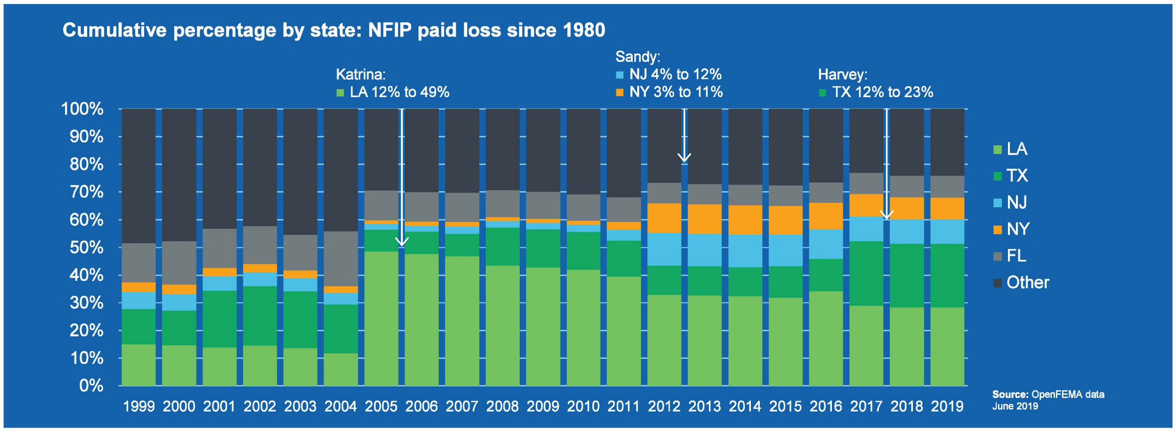
## Flood risk is catastrophic

Requires advanced catastrophe models for risk measurement and management

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## National Flood Insurance Program

Supplementing historical experience with advanced catastrophe models

FEMA is updating the NFIP risk rating methodology through the implementation of a new pricing methodology called Risk Rating 2.0.

The methodology leverages industry best practices and cutting-edge technology to enable FEMA to deliver rates that are actuarily sound, equitable, easier to understand and better reflect a property's flood risk.

Risk Rating 2.0 was implemented for new policies in October 2021 and will apply to renewal policies in April 2022.

As part of the rate development process, FEMA supplemented NFIP's historical loss experience with commercial catastrophe models for inland flood and storm surge.

Description of RR 2.0 methodology and data sources: https://www.fema.gov/flood-insurance/risk-rating

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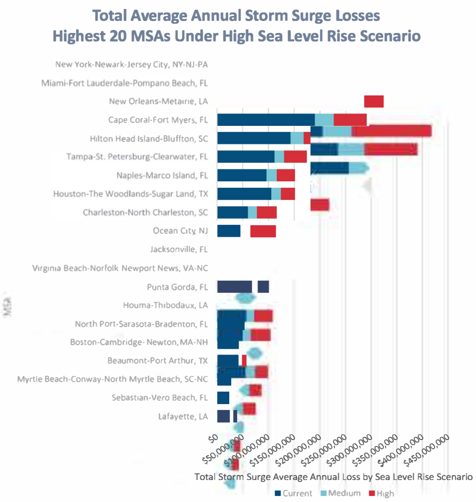
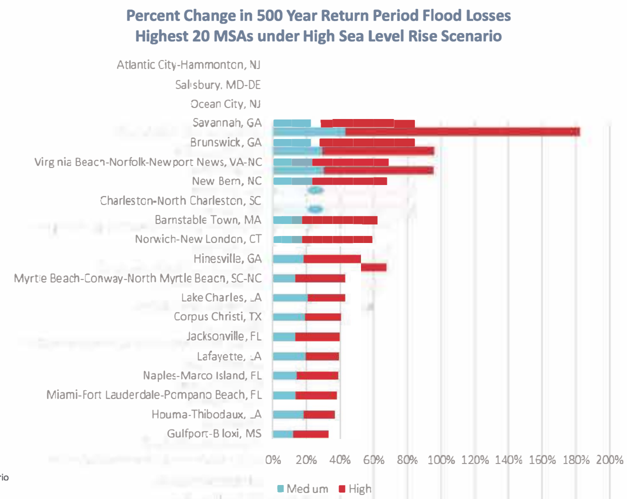
## Flood models are used to estimate the effect of sea-level rise



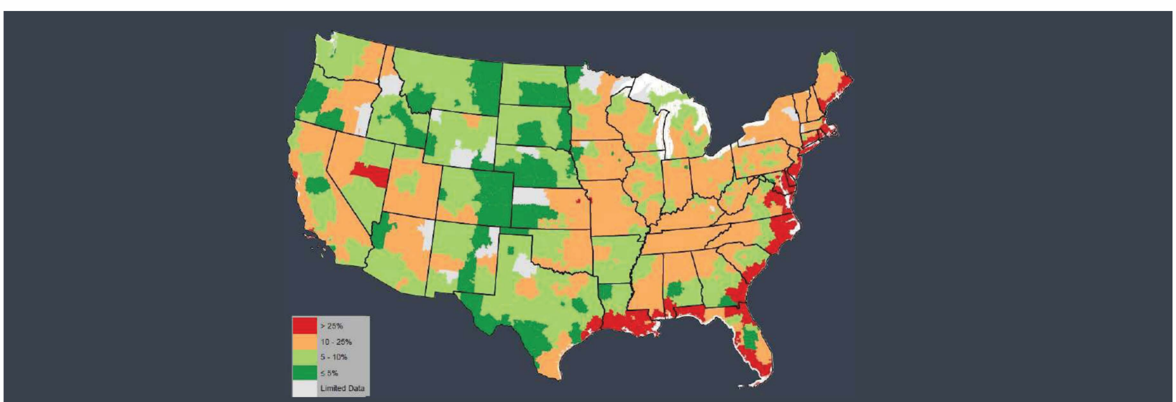




Milliman https://www.soa.org/globalassets/files/resources/research-report/2020/soa-flood-report.pdf



## Flood models are necessary for climate-readiness

Under a high climate scenario, an estimated 750k single-family properties in the US will face major repricing by 2050




https://www.milliman.com/en/insight/unpriced-costs-of-flooding-an-emerging-risk-for-homeowners-and-lenders

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## Catastrophe model treatment varies widely among states

- Prohibition of the use of catastrophe models for some or all purposes in establishing rates
- Silent on the use of catastrophe models
- Questionnaires and case-by-case model validation
- Regulations piggybacking on other state reviews
- Statewide body for scientific and technical review of catastrophe models

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## How different states treat catastrophe models

**Florida**

Models used in rate filings must be accepted by Florida Commission on Loss Projection Methodology, which conducts extensive reviews of hurricane and now flood models

**South Carolina**

Models must be approved in South Carolina; historically have followed Florida's lead

**Hawaii**

Models must be accepted but historically have not been reviewed frequently, resulting in the requirement to use old models

**California**

Not allowed for setting overall rate levels (except for Earthquake and Fire Following Earthquake). Allowed for setting rate relativities, granular territory definitions, underwriting/tiering.

**New York**

Does not allow catastrophe models

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## Evaluation of emerging models

Specific actuarial techniques

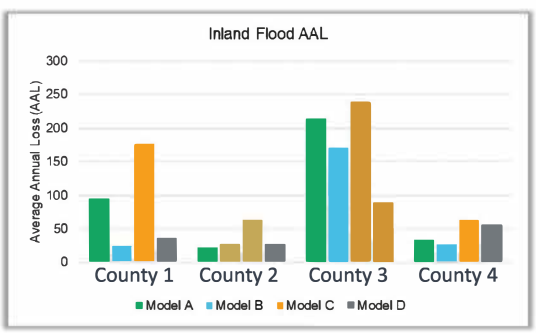
- Calibration versus out-of-sample validation
- Reasonability checking
  - Is the aggregate AAL believable?
  - How often does it produce unreasonable location level AALs?
  - Does it produce logical relationships with risk?
  - Does it produce discontinuities?
- Does it reflect important variables that alter vulnerability?
- Does it include all important sub-perils?
- How does it compare to other models (if available)?
- Give special consideration to outliers



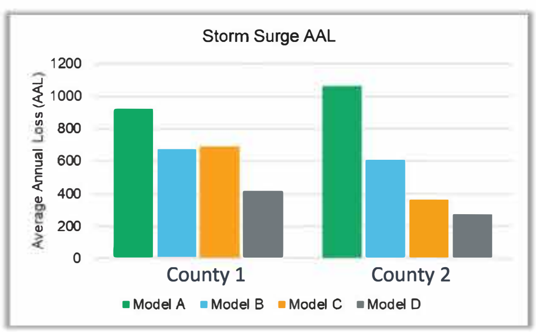
## Example: Annual Average Loss (AAL) by model

Average AAL impacts the rate level

Wide disparities exist across different models for inland flood




Storm surge also shows sizeable variation of AALs across models





## Example: Inspection of individual risks

Which modeled AALs are most reasonable?

Beach house

| Model A | Model B | Model C |
|---|---|---|
| $1,000 | $30 | $20,000 |

Inland property

| Model A | Model B | Model C |
|---|---|---|
| $1,500 | $3 | $30 |

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## Example: Correlation among models

Higher agreement in relative risk for storm surge than inland flood

### Inland flood (4 counties)

| | Model A | Model B | Model C | Model D |
|---|---|---|---|---|
| Model A | 1.00 | 0.26 | 0.36 | 0.33 |
| Model B | | 1.00 | 0.30 | 0.23 |
| Model C | | | 1.00 | 0.34 |
| Model D | | | | 1.00 |

*None of the models are highly correlated for inland flood*

### Storm surge (2 counties)

| | Model A | Model B | Model C | Model D |
|---|---|---|---|---|
| Model A | 1.00 | 0.88 | 0.85 | 0.81 |
| Model B | | 1.00 | 0.85 | 0.91 |
| Model C | | | 1.00 | 0.83 |
| Model D | | | | 1.00 |

*Significantly higher correlation among storm surge AALs*

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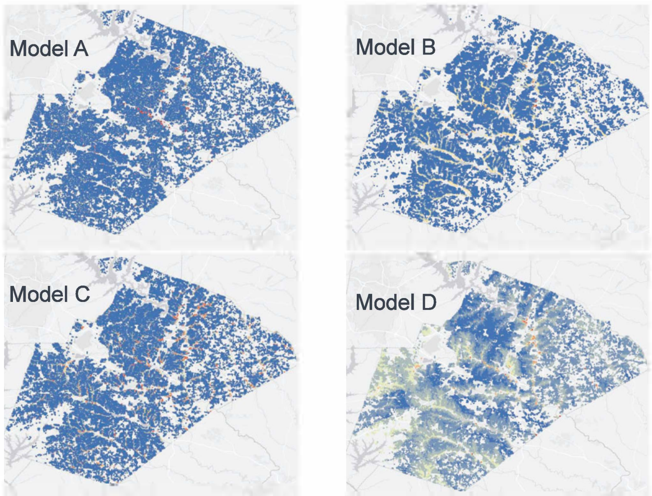
## Example: Spatial analysis of inland flood




- Model A shows limited high AALs
- Model B shows high AALs farther away from rivers
- Model C shows more high-AAL locations, generally very close to rivers
- Model D shows high AALs the farthest away from rivers

*AALs*
- 0 - 25
- 26 - 50
- 51 - 100
- 101 - 200
- 201 - 500
- 501 - 1,000
- 1,001 - 5,000
- 5,001 - 35,832

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## Proposal for catastrophe model clearinghouse

**Multi-disciplinary panel to develop standards, select expert reviewers, and manage model review process**

**Third-party experts chosen by panel to perform confidential reviews**

- Consistent professional review team for all models for a given peril
- Expert team would depend on nature of model but could include engineers, scientists, technologists, actuaries, claims experts, other professionals

**Voluntary participation by states who wish to rely on expert model review**

- Retention of state-level control of ultimate determination of acceptability
- States may add filing-specific questions regarding model usage

**Potential clearinghouse deliverables**

- Standardized modeler disclosures
- Market basket output for state level regulatory analysis, comparison
- Third-party expert reports reviewing model compliance with standards, suitability for specific purposes

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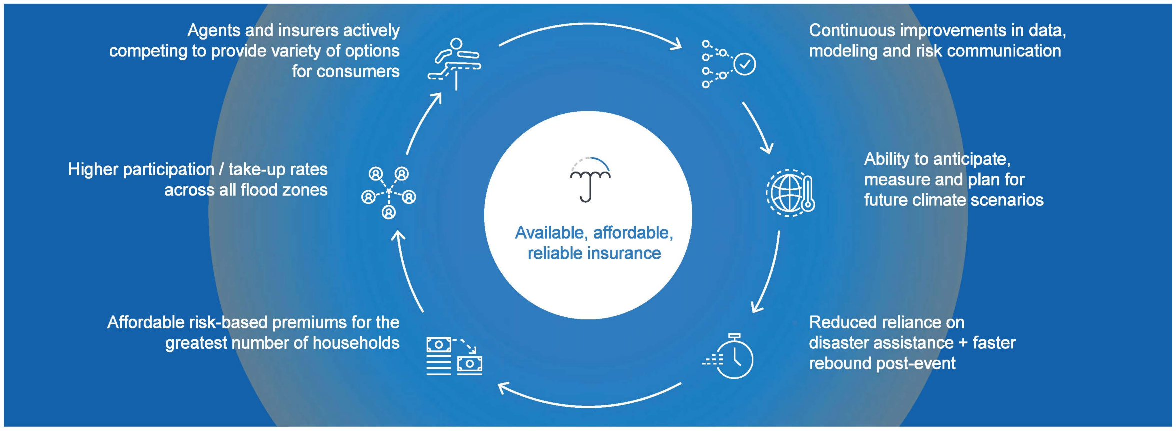
## Vision for sustainable private flood insurance market

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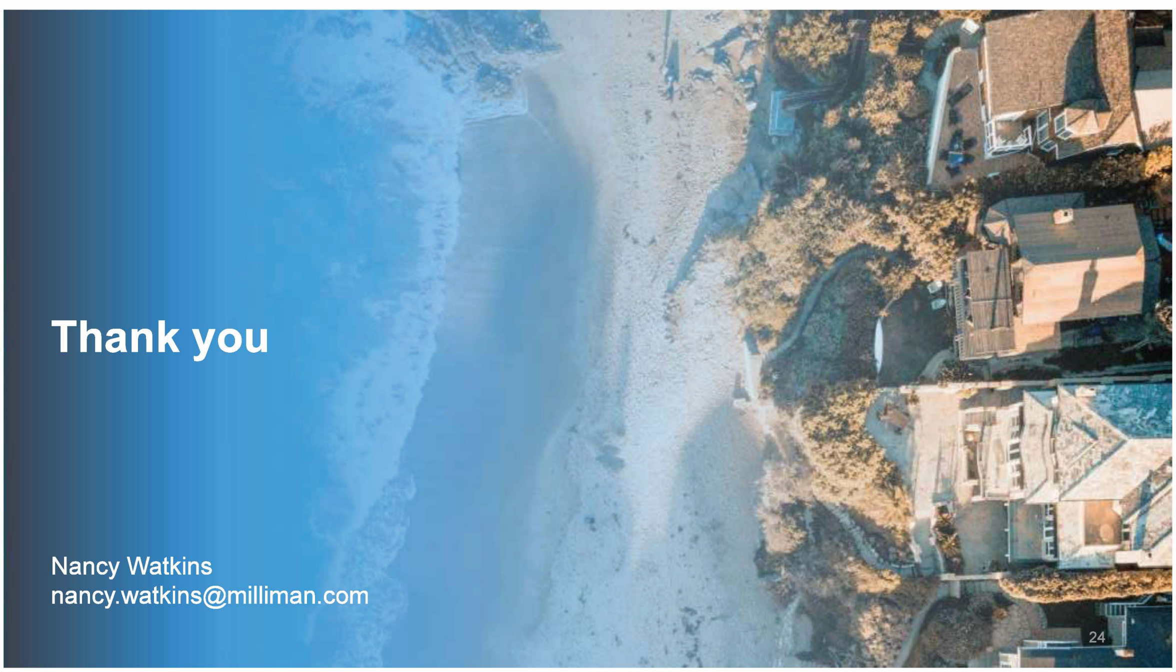

Draft: 2/2/22

Catastrophe Risk (E) Subgroup
Virtual Meeting
January 25, 2022

The Catastrophe Risk (E) Subgroup of the Property and Casualty Risk-Based Capital (E) Working Group of the Capital Adequacy (E) Task Force met Jan. 25, 2022. The following Subgroup members participated: Wanchin Chou, Chair, and Qing He (CT); Robert Ridenour, Vice Chair, and Jane Nelson (FL); Laura Clements and Giovanni Muzzarelli (CA); Judy Mottar (IL); Gordon Hay (NE); Anna Krylova and Leatrice Geckler (NM); Halina Smosna and Gloria Huberman (NY); Tom Botsko and Dale Bruggeman (OH); Andrew Schallhorn (OK); Will Davis (SC); and Miriam Fisk, Rebecca Armon, and Monica Avila (TX).

1. Discussed the Possibility of Adding Flood Peril in the Rcat Component

Mr. Chou said the Subgroup received a referral letter from the Climate and Resiliency (EX) Task Force in March 2021, which recommended that the Subgroup consider expanding the current catastrophe framework to include other perils such as wildfire, flood, and/or convection storms that may experience a greater risk under projected climate-related trends. He also said a response from the Subgroup stated that it was focusing on developing the risk charge for the wildfire perils at that time due to limited resources. He said last year, the Subgroup completed: 1) reviewing three different wildfire vendor models; and 2) adopting the Karen Clark & Company (KCC) earthquake and hurricane models. As the wildfire instructions and risk-based capital (RBC) structure is currently exposed for comments, he believes now is a good time to start reviewing the next peril; i.e., flood. He stated that the flood model review ad hoc group will be established next month to start the review process. He said he anticipates that the process will be similar to the wildfire model review process, which will include six different phases: 1) introduction to flood models; 2) in-depth technical reviews; 3) impact studies (model comparison); 4) developing RBC risk charge; 5) exposing the flood peril RBC structure and instructions for information purposes only; and 6) modifying the structure and instructions based on the comments and feedback. He urged all the interested parties to contact NAIC staff if they are interested in joining the ad hoc group. Scott Williamson (Reinsurance Association of America—RAA) encouraged the Subgroup to consider the materiality issue with respect to whether the flood peril is warranted, given the exposure of the industry. He also asked NAIC staff to perform a materiality analysis to determine if it makes sense to proceed further. Mr. Botsko recommended that the Subgroup consider conducting a company survey to determine if the exposure of not only the flood but also the convective storms are significant enough to study further. Ralph Blanchard (Travelers) said he is concerned that adding flood peril may have issues on removing the double counting in the R5 component, as flood can be caused by multiple perils. Nancy Watkins (Milliman) recommended that the Subgroup consider reviewing the Alabama Department of Insurance (DOI) Private Flood Insurance Survey as a good starting point.

2. Discussed the Independent Model Review Instructions in Rcat

Mr. Chou said last year, the Subgroup discussed three different kinds of catastrophe models that deviate from the vendor models: 1) internal catastrophe models; 2) vendor catastrophe models with adjustments or different weight; and 3) derivative models based on the vendor models. He stated that the industry provided some valuable information during the discussion, such as recommending that Subgroup: 1) consider developing a basic approval process if the Subgroup decides to rely on models in order to ensure the use of models are consistent and comparable across companies; and 2) review the RBC instructions, as it clearly indicated that a company should use the same data, modeling, and assumptions that the insurer uses in its own internal catastrophe risk management process. He said he believes adding this charge of reviewing the PR002 and PR027 instructions and blanks to the ad hoc group is worth considering, as both items are related to the model review process. He also stated that this is just a continued improvement of the RBC instructions and blanks; this is a high priority for the Subgroup, and it will be reflected in the Subgroup's working agenda soon. Matthew T. Wulf (Swiss Re) said Swiss Re and its domiciliary state will continue working with the Subgroup on this item in the future. Mr. Blanchard said Travelers will continue supporting the idea of treating adjustments to the vendor models differently from the totally separate models.

3. Discussed the Issue of Double Counting in the R5 Component

Mr. Chou said the current RBC formula PR100 through PR122 require insurers to provide actual catastrophe losses incurred separately by Annual Statement Line of Business for each of the last 10 accident years. The purpose of requiring the reporting of actual catastrophe losses is to avoid double counting catastrophe losses in the formula. Mr. Chou stated that the catastrophe risk element of the RBC formula is based on the results of catastrophe models run by the insurer. The existing R5 industry factors are derived from industry total loss data, which includes actual catastrophe losses, so it is necessary to study these actual catastrophe losses to avoid the double counting that would otherwise take place. Mr. Chou asked the industry to review the current methodology and provide comments in the next meeting.

4. Discussed Other Matters

Mr. Chou said proposal 2021-17-CR (Adding Wildfire Peril for Informational Purposes Only) was exposed for a 60-day public comment period ending Feb. 13. He encouraged all the interested parties to review the materials and submit comments for discussion in the upcoming meeting.

Lastly, Mr. Chou said he is pleased to announce the appointment of Ms. Smosna as co-chair of the Subgroup. He said he will work closely with Ms. Smosna to ensure the Subgroup completes all its charges successfully in the future.

Mr. Chou said the Subgroup will continue discussing all the outstanding issues in the meeting next month.

Having no further business, the Catastrophe Risk (E) Subgroup adjourned.

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Draft: 1/24/21

Catastrophe Risk (E) Subgroup
Virtual Meeting
December 16, 2021

The Catastrophe Risk (E) Subgroup of the Property and Casualty Risk-Based Capital (E) Working Group of the Capital Adequacy (E) Task Force met Dec. 16, 2021. The following Subgroup members participated: Wanchin Chou, Chair, and Amy Waldhauer (CT); Laura Clements and Giovanni Muzzarelli (CA); Judy Mottar (IL); Gordon Hay (NE); Halina Smosna (NY); Tom Botsko and Dale Bruggeman (OH); Andrew Schallhorn (OK); Will Davis (SC); and Miriam Fisk and Monica Avila (TX).

1. <u>Adopted Proposal 2021-15-CR (Adding KCC Models)</u>

Mr. Chou said the Florida Commission on Hurricane Loss Projection Methodology (FCHLPM) reviewed and verified the Karen Clark & Company (KCC) hurricane model on June 19, 2019, and June 4, 2021. The Subgroup believed the KCC models seem to qualify under the same standards as the other modeling firms have for earthquakes and hurricanes. Mr. Chou said a proposal was created to include the KCC earthquake and hurricane models as one of the NAIC approved third-party commercial vendor models to calculate the catastrophe risk charge, which was exposed for a 30-day public comment period. He also stated that the Subgroup received one comment letter during the exposure period. Glen Daraskevich (KCC) said the KCC supports the proposed update to the list of NAIC-approved catastrophe models and appreciates the Subgroup's goal of keeping the list current with market usage.

Mr. Botsko made a motion, seconded by Ms. Mottar, to adopt proposal 2021-15-CR. The motion passed unanimously.

2. <u>Heard an Update from its Catastrophe Model Technical Review Ad Hoc Group</u>

Mr. Chou said the ad hoc group met Dec. 6 to discuss the survey questions created by the members within the group, which was based on *Actuarial Standard of Practice (ASOP) No. 38—Catastrophe Modeling (for All Practice Areas)*. He said the survey results indicated that the ad hoc group gained a better understanding on different aspects of different models during a series of question and answer sections.

Ms. Smosna stated that the ad hoc group reviewed the technical documentation provided by three vendors: Risk Management Solutions (RMS), AIR, and KCC. Also, the ad hoc group posed questions to each noted vendor and had several follow up discussions with them separately. Ms. Smosna said the ad hoc group also acknowledged that although these are the best tools available to assess wildfire risk, limitations exist. A notable limitation across all three vendors includes the data vintage. In addition, Ms. Smosna indicated that the ad hoc group noted that although the key vendors are subject matter experts (SMEs), this does not negate the fact that wildfire models are in their infancy. Moreover, she said the ad hoc group comfortably stated that the vendors are experts and have dedicated huge resources to wildfire modeling; but going further and being able to state that the level of capital required for wildfire exposure is adequate based upon the modeling is a conclusion that cannot be validated by the ad hoc group. She concluded that at this point, the ad hoc group members only have a basic understanding of each vendor model and are reasonably familiar with the major model components and how those components interrelate.

Mr. Chou said the issue of the wildfire-prone areas was also discussed during the meeting. He stated that identifying the potential wildfire-prone areas will provide better determination of exemption from the wildfire charge. In addition, he provided a brief overview on the wildfire structure to the ad hoc group. He said the structure will be included in the 2022 risk-based capital (RBC) formula just for informational purposes only. He also stated that the structure will not go live until all the outstanding issues are resolved. Lastly, he said the ad hoc group will not meet until the Subgroup starts reviewing the next peril.

3. Exposed Proposal 2021-17-CR (Adding Wildfire Peril for Informational Purposes Only)

Mr. Chou said while the Subgroup reviewed the possibility of expanding the current catastrophe framework to include other perils that may experience a greater tail risk under projected climate-related trends, the wildfire has been identified as one of the major drivers of the U.S. insured losses. He suggested that setting up a proposal to include wildfire peril in the Rcat component for informational purposes only to address this risk is necessary. He also indicated that the wildfire peril will not be included in the RBC calculation until all the outstanding issues are resolved. Lastly, he urged all the interested parties to review the proposal and provide comments during the exposure period.

Mr. Botsko expressed the Subgroup's appreciation to the ad hoc group for its efforts in reviewing the wildfire models. Ralph Blanchard (Travelers) proposed to include Florida in the wildfire-prone areas. Steve Broadie (American Property Casualty Insurance Association—APCIA), Scott Williamson (Reinsurance Association of America—RAA), and Matthew Wulf (Swiss Re) requested to extend the 30-day exposure to 60 days due to the holiday season and the need for more time to review.

The Subgroup agreed to expose proposal 2021-17-CR for a 60-day public comment period ending Feb. 13.

Mr. Chou said the Subgroup will continue discussing all the outstanding issues in the meeting next month.

Having no further business, the Catastrophe Risk (E) Subgroup adjourned.

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Hi Wanchin and Eva,

We note that agenda item 2 of Tuesday's call is on the RCAT independent model review instructions. Since the Missouri Department of Commerce and Insurance (DCI) has used these instructions to review an internal catastrophe model, we would like to offer the subgroup our comments.

**Background on the DCI's review**

On April 7, 2017, the Catastrophe Risk Subgroup granted permission for Swiss Re to use its internal model for year-end 2017 RCAT reporting. For subsequent year-ends, this permission came from the Missouri DCI.

In order to grant Swiss Re initial permission for year-end 2018 reporting, the DCI performed an in-depth review of the company's model, centered around the seven requirements in the RCAT instructions. We relied on written information from the company, phone calls with the company, and in-person meetings with the company and the group-wide supervisor. Our review was informative and valuable. It was also extremely time-consuming for the DCI (and, I assume, for the company as well). Performing a thorough review based on the requirements in the RCAT instructions could be difficult for small insurance departments with limited technical staff.

As mentioned above, the DCI performed an in-depth review in 2018. For subsequent year-ends, our review has been much more high-level and has focused on any follow-up items from the previous year. While the RCAT instructions indicate that ongoing review should happen through the exam process, this may be too infrequent in some cases, especially since the company could be asked to re-file prior RBC reports if the regulator identifies a concern. Companies large enough to use their own model are probably only examined every five years. The DCI would prefer to perform an annual review and remain updated on any changes to the model. This seems particularly important as more perils are added to the RCAT charge.

**Our comments on the seven items in the RCAT instructions**

Taken as a whole, the seven requested items in the RCAT instructions seem reasonable. Gathering information on these items allowed for a thorough review and made the DCI comfortable granting permission for Swiss Re to use its model.

We offer the following comments on several of the items:

1. Regarding item 3:
    a. We do not know what it means to validate a peril or for perils to include both U.S. and global exposures. We raised these concerns in 2017 before the instructions were finalized. In order to attempt to comply with this item, we interpreted it as we saw reasonable. Namely, we checked that:
        i. If the insurer has exposure to the perils covered by the RBC catastrophe risk charge (earthquake and hurricane), those perils are contemplated in the RBC charge, and
        ii. The insurer is including both U.S. and non-U.S. exposures in the RBC charge.
    b. Whether or not our interpretation is correct, we recommend rewording this item to make the subgroup's intention clear.

2. Regarding item 6:
    a. It appears that complying with this item is challenging for several reasons:

   i. If an insurer has been relying on its internal model for many years, it may not maintain a license for a vendor model.
   ii. If an insurer aggregates losses, instead of exposures, across accounts, it may not be able to produce a portfolio of exposures for input into a vendor model.
   iii. It can be difficult, if not impossible, to identify drivers of differences between an internal model and a vendor model. First, the models are extremely complex, relying on numerous modules and impacted by various assumptions within those modules. Second, vendor model licenses often prohibit "back engineering" of the model's parameterizations, so the company may not have full insight into the model's assumptions.
  b. Given these difficulties, would it be possible to add alternative methods of comparison to the RCAT instructions? We have found it helpful to review a comparison of internal model estimates to actual results for historical events.

3. Regarding item 7: We experienced difficulty in receiving written documentation from the group-wide supervisor.

Thank you for allowing us to share our experiences with the RCAT instructions.

Sincerely,

Julie

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