

Draft date: 10/24/24

2024 Fall National Meeting  
Denver, Colorado

**JOINT MEETING OF THE PROPERTY AND CASUALTY RISK-BASED CAPITAL (E) WORKING GROUP  
AND CATASTROPHE RISK (E) SUBGROUP**

Monday, November 18, 2024

8:00 – 9:30 a.m.

Gaylord Rockies Hotel—Aurora Ballroom C/D—Level 2

**ROLL CALL**

**PROPERTY AND CASUALTY RISK-BASED CAPITAL (E) WORKING GROUP**

Tom Botsko, Chair	Ohio	Melissa Robertson	New Mexico
Wanchin Chou, Vice Chair	Connecticut	Ni Qin	New York
Charles Hale	Alabama	Will Davis	South Carolina
Rolf Kaumann/Eric Unger	Colorado	Miriam Fisk	Texas
Virginia Christy	Florida	Adrian Jaramillo	Wisconsin
Sandra Darby	Maine		

NAIC Support Staff: Eva Yeung

**CATASTROPHE RISK (E) SUBGROUP**

Wanchin Chou, Chair	Connecticut	Alexander Vajda	New York
Virginia Christy, Vice Chair	Florida	Tom Botsko	Ohio
Rolf Kaumann/Eric Unger	Colorado	Andrew Schallhorn	Oklahoma
Travis Grassel	Iowa	Will Davis	South Carolina
Sandra Darby	Maine	Miriam Fisk	Texas
Melissa Robertson	New Mexico		

NAIC Support Staff: Eva Yeung

**AGENDA**

1. Consider Adoption of the Working Group and Subgroup’s Summer National Meeting Minutes—*Tom Botsko (OH)* Attachment A
2. Consider Adoption of Proposal 2024-22-CR (2015-2023 Severe Convective Storm Event List)—*Wanchin Chou (CT)* Attachment B
3. Consider Adoption of Proposal 2024-23-CR (Jan thru Oct 2024 Cat Event List)—*Wanchin Chou (CT)* Attachment C



4. Hear Updates from the Wildfire Model Review Ad Hoc Group Regarding the CoreLogic Wildfire Model Review—*Virginia Christy (FL)*
5. Discuss the Working Group and Subgroup’s Working Agenda —*Tom Botsko (OH)* Attachment D
6. Hear the Panel Discussion “The State of the Flood Insurance Market: Trends, Challenges, and Opportunities” —*Wanchin Chou (CT)* Attachment E
7. Discuss Any Other Matters Brought Before the Working Group and Subgroup—*Tom Botsko (OH)*
8. Adjournment

## Draft Pending Adoption

Attachment Five  
Capital Adequacy (E) Task Force  
8/14/24

Draft: 8/19/24

Property and Casualty Risk-Based Capital (E) Working Group  
and the Catastrophe Risk (E) Subgroup  
Chicago, Illinois  
August 14, 2024

The Property and Casualty Risk-Based Capital (E) Working Group of the Capital Adequacy (E) Task Force met in Chicago, IL, Aug. 14, 2024, in joint session with the Catastrophe Risk (E) Subgroup of the Property and Casualty Risk-Based Capital (E) Working Group of the Capital Adequacy (E) Task Force. The following Working Group members participated: Tom Botsko, Chair (OH); Wanchin Chou, Vice Chair (CT); Charles Hale (AL); Rolf Kaumann and Eric Unger (CO); Virginia Christy and Bradley Trim (FL); Sandra Darby (ME); Melissa Robertson (NM); and Miriam Fisk (TX). The following Subgroup members participated: Wanchin Chou, Chair (CT); Virginia Christy, Vice Chair, and Bradley Trim (FL); Rolf Kaumann (CO); Travis Grassel and Mike Yanacheak (IA); Sandra Darby (ME); Melissa Robertson (NM); Tom Botsko (OH); and Miriam Fisk (TX). Also participating were: Kevin Dyke (MI); John Rehagen and Debbie Doggett (MO); Christian Citarella (NH); and Steve Drutz (WA).

1. Adopted the Working Group and Subgroup's June 17; June 10; April 25; April 23; and Spring National Meeting Minutes

Botsko said the Working Group met June 17 and April 25. During these meetings, the Working Group took the following action: 1) adopted proposal 2023-14-P (Underwriting Risk Line 1 Factors), which it had exposed for a 30-day public comment period that ended May 25; 2) adopted proposal 2023-17-CR (Climate Scenario Analysis), which it had re-exposed for a 22-day public comment period that ended April 8 (however, the Financial Condition (E) Committee adopted proposal 2024-20-CR to replace the 2023-17-CR during its Aug. 2 meeting); 3) adopted proposal 2024-10-P (Other Health Line), which it had exposed for a 30-day public comment period that ended April 16; 4) adopted proposal 2024-11-P (Underwriting Risk Lines 4 & 8 Factors), which it had exposed for a 30-day public comment period that ended April 16; 5) discussed potential modifications in the risk-based capital (RBC) statistics; 6) discussed the study of flood risk in the Catastrophe Risk (E) Subgroup; and 7) heard updates from the American Academy of Actuaries (Academy) on its current underwriting risk projects.

Botsko said the Subgroup met June 10 and April 23. During these meetings, the Subgroup took the following action: 1) adopted proposal 2023-17-CR (Climate Scenario Analysis), which it had re-exposed for a 22-day public comment period that ended April 8; 2) exposed a referral from the Capital Adequacy (E) Task Force regarding the geographic concentration issue; 3) discussed wildfire peril impact analysis; 4) discussed CoreLogic's wildfire model review; 5) discussed the possibility of adding flood period to the Rcat component; and 6) heard an update regarding severe convective storm peril.

Darby made a motion, seconded by Grassel, to adopt the Working Group's June 17 (Attachment XXX) and April 25 (Attachment XXX) minutes; the Subgroup's June 10 (Attachment xx) and April 23 minutes (Attachment xx); and the Working Group and Subgroup's joint March 17 minutes (see NAIC Proceedings – Spring 2024, Capital Adequacy (E) Task Force, Attachment XX). The motion passed unanimously.

2. Adopted the 2024 P/C RBC Newsletter

Botsko said the 2024 property/casualty (P/C) RBC newsletter reflects all proposals the Working Group adopted for year-end 2024. He said that since last year, the purpose of this adoption is to consider the newsletter's content,

## Draft Pending Adoption

Attachment Five  
Capital Adequacy (E) Task Force  
8/14/24

and the format will be revised. The final version of the newsletter will be posted to the Working Group's web page in September.

Chou made a motion, seconded by Darby, to adopt the Working Group's 2024 P/C RBC newsletter (**Attachment XXX**). The motion passed unanimously.

### 3. Discussed 2023 RBC Statistics

Botsko said the 2023 P/C RBC statistics were run June 27. He said 2,546 P/C RBC filings were loaded into the NAIC database, up from 2,522 in 2022. He stated that 51 companies triggered an action level in 2023: 1) 17 were in company action level; 2) 14 were in regulatory action level; 3) four were in an authorized control level (ACL); and 4) 16 were in a mandatory control level. Also, 23 companies triggered the trend test. However, the aggregate RBC percentage decreased slightly from 586% in 2022 to 578% in 2023. Botsko also stated that last year, the interested parties suggested that adding the operational risk component would provide a complete picture of the RBC formula. The Working Group added the operational risk amount to the Year 2023 column in the RBC statistics this year. Lastly, he indicated that the statistics will only show six years of information beginning this year. Botsko said that anyone who needs historical information can contact NAIC staff.

### 4. Discussed its Working Agenda

Botsko summarized the following substantial changes to the Working Group's 2024 working agenda: 1) updating comments on items P1, P4, P8, P9, P10, P11, and P12; 2) providing edits to P6 to clarify R5 ex-CAT factors; and 3) adding one item for the Subgroup in the "New Item" section.

### 5. Discussed the Geographic Concentration Issue

Chou said, as mentioned during the June 10 meeting, the Capital Adequacy (E) Task Force asked the Subgroup to further investigate the geographic concentration issue and report findings at the national meeting. He also stated that Subgroup members had several conversations with Florida and Louisiana state insurance regulators and rating agency representatives to learn their reinsurance monitoring process. Chou said the next step would be determining whether this issue could be handled using the RBC formula or if alternative solutions must be discussed with the Reinsurance (E) Task Force. He urged all interested parties to provide feedback to the Subgroup at its next meeting.

### 6. Heard Updates on the Severe Convective Storm Peril

Chou said, as mentioned during the Subgroup's June 10 meeting, the Severe Convective Storm Review Ad Hoc Group planned to do the following after the completion of the severe convective storm impact analysis: 1) have another in-depth review based on the 2024 data; and 2) work with vendor modelers to re-run the impact analysis.

### 7. Discussed the Wildfire Peril Impact Analysis

Chou reiterated that the Subgroup will invite the modelers to conduct another in-depth analysis of wildfire peril after the CoreLogic wildfire model review is completed. Then, the modelers will share model results with the states that have signed nondisclosure agreements (NDAs). He also stated that he and NAIC staff will follow up with the previous Ad Hoc Group members to discuss the impact analysis review plan. Lastly, Chou said he anticipates that updates will be provided at the Fall National Meeting.

## Draft Pending Adoption

Attachment Five  
Capital Adequacy (E) Task Force  
8/14/24

### 8. Discussed the CoreLogic Wildfire Model Review

Christy said the Wildfire Model Review Ad Hoc Group is picking up the review of the wildfire models by reviewing the final submission from CoreLogic. CoreLogic will be reviewed utilizing the same six-phase approach done for the other commercial modelers in 2022. She also stated that CoreLogic provided its initial presentation in July, and the technical presentation is currently being scheduled. Lastly, she anticipated that the review would be completed by November and updates would be shared during the Fall National Meeting.

### 9. Discussed the Possibility of Adding Flood Peril to the Rcat Component

Chou said that on March 15, 2021, a referral letter from the Climate and Resiliency (EX) Task Force was received to recommend the Subgroup consider expanding the current catastrophe framework to include other perils, such as wildfire, flood, and/or severe convective storms that may experience a greater tail risk under projected climate-related trends. He stated that the Subgroup responded to the Task Force that it plans to review those perils one at a time. As of today, the wildfire and severe convective storm perils are included in the Rcat component for informational purposes. The next peril the Subgroup will focus on is flood. Chou indicated that during the June 10 meeting, Botsko expressed his concerns about the flood peril in private industry being extremely small, and while monitoring its growth is important, the Subgroup still needs to analyze whether it should move forward with including this peril in the Rcat component. He said he understood Botsko's concerns and agreed that the Working Group and Subgroup should gather more information to determine whether it should be included in the Rcat component. His preliminary plan for the information-gathering process is to encourage industry and vendor modelers to provide feedback to the Subgroup before the upcoming meetings.

### 10. Discussed How to Handle Flood Peril with the FCHLPM

Chou said that to gain more information to develop a better review process on flood, he invited Donna Sirmons (Florida Commission on Hurricane Loss Projection Methodology—FCHLPM) to discuss how it handles flood peril. Sirmon said FCHLPM flood standards include seven categories: 1) general standards; 2) meteorological standards; 3) hydrological and hydraulic standards; 4) statistical standards; 5) vulnerability standards; 6) actuarial standards; and 7) computer/information standards. She also stated that a model must pass all standards to be determined acceptable, and Karen Clark & Company is the only modeler approved by the FCHLPM. Sirmons also indicated that there are challenges in modeling the peril of flood, validating the modeled results, and in the FCHLPM's review of the flood models. Chou said this valuable information will give the Subgroup some basic ideas for developing the flood reviewing process. Several technical questions were raised regarding reviewing the vendor models during the meeting. As some of the questions were related to confidentiality concerns, Chou invited all interested parties to join the Ad Hoc Group to discuss this issue in depth.

### 11. Heard an Update from the Academy P/C RBC Committee on Current and Future Research Topics

Botsko said that during the first half of 2024, the Academy supported the Working Group in implementing the updated premium and reserve risk charges. The updated charges generally moved toward being consistent with those indicated in the P/C RBC Committee's *Update to P&C RBC Underwriting Factors and Investment Income Adjustment Factors*, published in August 2023. He also indicated that the work on diversification by line of business for premium risk and reserve risk continues and anticipates that the report will be published in 2025. Currently, the Academy is working on project planning for the rest of 2024 and 2025. Lastly, Botsko said the Academy will share a more detailed update on the project plan with the Working Group in the upcoming months.

## Draft Pending Adoption

Attachment Five  
Capital Adequacy (E) Task Force  
8/14/24

Botsko said the Working Group and Subgroup plan to meet in the fall to continue the discussion.

Having no further business, the Property and Casualty Risk-Based Capital (E) Working Group and Catastrophe Risk (E) Subgroup adjourned.

SharePoint/NAIC Support Staff Hub/ Member Meetings/E Cmte/CADTF/2024-Summer/PCRBCWG

## Capital Adequacy (E) Task Force

### RBC Proposal Form

- |   |   |  |
|---|---|--|
| <input type="checkbox"/> Capital Adequacy (E) Task Force          | <input type="checkbox"/> Health RBC (E) Working Group     | <input type="checkbox"/> Life RBC (E) Working Group  |
| <input checked="" type="checkbox"/> Catastrophe Risk (E) Subgroup | <input type="checkbox"/> Investment RBC (E) Working Group | <input type="checkbox"/> Op Risk RBC (E) Subgroup    |
| <input type="checkbox"/> C3 Phase II/ AG43 (E/A) Subgroup         | <input type="checkbox"/> P/C RBC (E) Working Group        | <input type="checkbox"/> Stress Testing (E) Subgroup |

<p style="text-align: right;"><b>DATE:</b> <u>10/1/2024</u></p> <p><b>CONTACT PERSON:</b> <u>Derek Noe</u></p> <p><b>TELEPHONE:</b> <u>816-783-8973</u></p> <p><b>EMAIL ADDRESS:</b> <u>dnoe@naic.org</u></p> <p><b>ON BEHALF OF:</b> <u>Catastrophe Risk (E) Subgroup</u></p> <p><b>NAME:</b> <u>Wanchin Chou</u></p> <p><b>TITLE:</b> <u>Chair</u></p> <p><b>AFFILIATION:</b> <u>Connecticut Department of Insurance</u></p> <p><b>ADDRESS:</b> <u>153 Market St,</u> <u>Hartford, CT 06103</u></p>	<p style="text-align: center;"><b><u>FOR NAIC USE ONLY</u></b></p> <p>Agenda Item # <u>2024-22-CR</u></p> <p>Year <u>2024</u></p> <hr/> <p style="text-align: center;"><b><u>DISPOSITION</u></b></p> <p><input type="checkbox"/> ADOPTED _____</p> <p><input type="checkbox"/> REJECTED _____</p> <p><input type="checkbox"/> DEFERRED TO _____</p> <p><input type="checkbox"/> REFERRED TO OTHER NAIC GROUP _____</p> <p><input checked="" type="checkbox"/> EXPOSED <u>10/9/24</u></p> <p><input type="checkbox"/> OTHER (SPECIFY) _____</p>
---	--

#### IDENTIFICATION OF SOURCE AND FORM(S)/INSTRUCTIONS TO BE CHANGED

- |   |   |  |
|---|---|--|
| <input type="checkbox"/> Health RBC Blanks    | <input type="checkbox"/> Property/Casualty RBC Blanks | <input type="checkbox"/> Life RBC Instructions                   |
| <input type="checkbox"/> Fraternal RBC Blanks | <input type="checkbox"/> Health RBC Instructions      | <input type="checkbox"/> Property/Casualty RBC Instructions      |
| <input type="checkbox"/> Life RBC Blanks      | <input type="checkbox"/> Fraternal RBC Instructions   | <input checked="" type="checkbox"/> OTHER <u>Cat Event Lists</u> |

#### DESCRIPTION OF CHANGE(S)

2015-2023 U.S. and non-U.S. Convective Storm Event Lists

#### REASON OR JUSTIFICATION FOR CHANGE \*\*

New events were determined based on the sources from Swiss Re, Aon Benfield, Willis Re, Gallagher Re, and NOAA.

#### Additional Staff Comments:

\*\* This section must be completed on all forms.

Revised 11-2013

Type of Event	Name	Date	Location	Overall losses when occurred
Convective Storm	Thunderstorms, tornadoes, hail	3/25/2015 - 3/26/2015	OK, AR, MO KS	300-600m
Convective Storm	Thunderstorms, hail, flood	3/31/2015 - 4/1/2015	AR, TX, AL, OK, GA, TN, MS	100-600m
Convective Storm	Thunderstorms, hail, tornadoes, flood	4/2/2015 - 4/3/2015	KS, KY, MO	100-300m
Convective Storm	Thunderstorms, hail, tornadoes, flood	4/7/2015 - 4/10/2015	MO, IL, NC, IN, OH, KY, TX, IA, AR, MI, WV, WI, PA, OK, KS, TN	1-3b
Convective Storm	Thunderstorms, hail, tornadoes, flood	4/16/2015 - 4/17/2015	TX, OK, KS	100-300m
Convective Storm	Thunderstorms, hail, tornadoes, flood	4/18/2015 - 4/21/2015	TX, AR, GA, PA, SC, AL, TN, KS, FL, OK, MS	600m-1b
Convective Storm	Thunderstorms, hail, tornadoes, flood	4/24/2015 - 4/28/2015	TX, LA, KY, AL, GA, FL, MS	600m-1b
Convective Storm	Thunderstorms, hail, tornadoes, flood	5/3/2015 - 5/4/2015	MN, NE, IA, WI, KS	100-300m
Convective Storm	Tornado outbreak (122), hail, strong wind	5/6/2015 - 5/13/2015	OK, TX, CO, NE, SD, KS	600m-1b
Convective Storm	Thunderstorms, hail, tornadoes, flood	5/15/2015 - 5/17/2015	TX, OK, MO, CO, KS, NE	100-300M
Convective Storm	Thunderstorms, hail, tornadoes, flood	5/23/2015 - 5/28/2015	TX, OK, KS, LA, CO, AR, GA, OH, SC	1.46b
Convective Storm	Thunderstorms, hail, tornadoes, flood	5/28/2015 - 5/30/2015	TX, OK, CO, KS	100-300m
Convective Storm	Thunderstorms, hail, tornadoes, flood	6/3/2015 - 6/8/2015	CO, IL	300-600m
Convective Storm	Thunderstorms, hail, tornado, flood	6/10/2015 - 6/11/2015	IL	25-100m
Convective Storm	Thunderstorms, hail, tornadoes, flood	6/21/2015 - 6/25/2015	CO, IL, NJ, MD, IA, PA, SD, MI, VA, WI, CT, NY, DE, ND	600m-1b
Convective Storm	Thunderstorms, hail, tornadoes, flood	6/29/2015 - 6/30/2015	MN, PA	100-300m
Convective Storm	Thunderstorms, hail, tornadoes, flood, land	7/12/2015 - 7/14/2015	IL, MN, IN, KY, OH, TN, WI	300-600m
Convective Storm	Thunderstorms, hail, tornadoes, flood	7/17/2015 - 7/20/2015	MN, IN	25-100m
Convective Storm	Thunderstorms, hail, tornadoes, flood	8/2/2015 - 8/4/2015	IL, MI, MA, WI, RI, ME, NY	600m-1b
Convective Storm	Thunderstorms, hail	10/3/2015 - 10/4/2015	NM	25-100m
Convective Storm	Thunderstorms, hail	10/5/2015 - 10/7/2015	TX	25-100m
Convective Storm	Thunderstorms, hail, flood	10/20/2015 - 10/23/2015	TX, NM	100-300m
Convective Storm	Thunderstorms, hail, flood	10/29/2015 - 10/31/2015	TX, LA	100-300m
Convective Storm	Thunderstorms, hail, tornadoes, flood	12/23/2015 - 12/24/2015	GA, TN, IN, AL, MS, IL, AR	100-300m
Convective Storm	Thunderstorms, tornadoes, flood, blizzards	12/26/2015 - 12/28/2015	TX, MO, IL, OK, GA, IN	600m-1b
Convective Storm	Thunderstorm, flood, landslides	1/31/2016 - 2/1/2016	CA	25-100m
Convective Storm	Thunderstorms, wind	2/19/2016 - 2/20/2016	MI, IL	100-300m
Convective Storm	Thunderstorms, tornadoes, hail	2/22/2016-2/25/2016	TX, NC, LA, FL, GA, VA, NY, SC, PA, MA, AL, CT, MS, DC, DE	600m-1b
Convective Storm	Thunderstorms, hail, flood	3/5/2016 - 3/11/2016	LA, TX, CA, MS, AR, TN, OK	300-600m
Convective Storm	Thunderstorms, tornadoes, hail	3/13/2016 - 3/14/2016	SC, AR, NC	100-300m
Convective Storm	Thunderstorms, tornadoes, hail	3/13/2016 - 3/15/2016	IL, WA, CA	100-300m
Convective Storm	Thunderstorms, hail	3/17/2016 - 3/18/2016	TX, LA, MS, AR, FL, AL	600m-1b
Convective Storm	Thunderstorms, hail	3/27/2016	IN	25-100m
Convective Storm	Thunderstorms, hail, tornadoes, flood	3/30/2016 - 4/1/2016	TX, OK, MS, AR, AL, LA, KS	100-300m
Convective Storm	Thunderstorms, hail	4/2/2016 - 4/3/2016	IN, OH, NJ, IL, PA, MD, VA, NY, DE, DC	100-300m
Convective Storm	Thunderstorms, tornadoes, hail	4/25/2016 - 4/28/2016	TX, KS, MO, IN, WV, OK, IL, NC, MS	600m-1b
Convective Storm	Thunderstorms, hail, tornadoes, flood	4/29/2016 - 5/3/2016	TX, AR, VA, IN, NC, MD, OK, GA, MO, IL, WV	1-3b
Convective Storm	Thunderstorms, tornadoes, hail	5/7/2016 - 5/10/2016	NE, KY, TX, OK, CO, TN, KS	600m-1b
Convective Storm	Thunderstorms, tornadoes, hail	5/11/2016 - 5/12/2016	MO, TX, NE, IL	600m-1b
Convective Storm	Thunderstorms, hail	5/16/2016 - 5/19/2016	TX	100-300m
Convective Storm	Thunderstorms, tornadoes, hail	5/21/2016 - 5/28/2016	TX, MT, KS, MO, CO	600m-1b
Convective Storm	Thunderstorms, tornadoes, flood	5/29/2016 - 6/2/2016	TX	100-300m
Convective Storm	Thunderstorms, hail	6/6/2016 - 6/7/2016	CO	100-300m
Convective Storm	Thunderstorms, hail	6/16/2016 - 6/18/2016	VA, GA, AL, SC	100-300m
Convective Storm	Thunderstorms, hail	6/16/2016 - 6/18/2016	ND, SD, MN	100-300m
Convective Storm	Thunderstorms, hail, flood	7/5/2016 - 7/7/2016	MN, TN, KY, WI	100-300m
Convective Storm	Thunderstorms, hail	7/7/2016 - 7/9/2016	CO, MI, NC, TN	100-300m
Convective Storm	Thunderstorms, hail, tornadoes	7/13/2016 - 7/15/2016	CO, OK, IL, AR, MO, KS	300-600m
Convective Storm	Thunderstorms, hail	7/20/2016 - 7/21/2016	MN	25-100m
Convective Storm	Thunderstorms, hail, flood	7/30/2016 - 8/1/2016	MD, NJ, NY, PA, VA	100-300m
Convective Storm	Thunderstorms, hail, tornadoes, flood	8/24/2016 - 8/25/2016	IN, OH	25-100m
Convective Storm	Thunderstorms, hail, tornadoes, flood	9/19/2016 - 9/23/2016	WI, MN, IA	100-300m



Convective Storm	Thunderstorms, tornadoes	11/28/2016 - 12/1/2016	TN, AL, GA, SC, MS, LA, NC	100-300m
Convective Storm	Hailstorm	3/23/2016	TX	1-3b
Convective Storm	Hailstorm	4/10/2016 - 4/15/2016	TX, FL	1-3b
Convective Storm	Hailstorm	7/28/2016 - 7/29/2016	CO, WY	1-3b
Convective Storm	Hailstorm	11/4/2016 - 11/6/2016	TX, NM	300-600m
Convective Storm	Thunderstorms, tornadoes	1/1/2017 - 1/3/2017	GA, TX, AL, LA, MS	100-100m
Convective Storm	Tornadoes	1/18/2017 - 1/23/2017	CA, GA, MS, TX, FL, AL, LA, SC	600m-1b
Convective Storm	Thunderstorms, tornadoes, hail	2/7/2017	LA, AL, FL, MS	100-300m
Convective Storm	Thunderstorms, hail, tornadoes, flood	2/19/2017 - 2/20/2017	TX	100-300m
Convective Storm	Windstorm, flood	2/19/2017 - 2/21/2017	CA	25-100m
Convective Storm	Thunderstorms, tornadoes, hail	2/25/2017	VA, PA	100m-300m
Convective Storm	Thunderstorms, tornadoes, hail	2/28/2017 - 3/2/2017	IL, MO, IN, KY, OH, TN, GA, IA, AR, NC, VA, AL, SC, WV, MD, MI	1-3b
Convective Storm	Thunderstorms, tornadoes, hail	3/6/2017 - 3/9/2017	MO, MI, NY, MN, IA, OH, IL, WI, AR, OK, NE	1-3b
Convective Storm	Thunderstorms, hail	3/21/2017 - 3/22/2017	SC, TN, GA, NC	600m-1b
Convective Storm	Thunderstorms, tornadoes, hail	3/28/2017 - 3/31/2017	TX, VA, NC, OK	100-300m
Convective Storm	Thunderstorms, hail, tornadoes, flood	4/2/2017 - 4/3/2017	TX, GA, LA, MS, AL, SC, FL, AR, NC	100-300m
Convective Storm	Thunderstorms, tornadoes, hail	4/4/2017 - 4/6/2017	AL, KY, GA, VA, SC, TX, MO, NC, TN, FL, MD, OK, AR, KS, DC	600m-1b
Convective Storm	Thunderstorms, tornadoes	4/10/2017 - 4/11/2017	TX, IL, IN	100-300m
Convective Storm	Thunderstorms, hail, tornadoes, flood	4/21/2017 - 4/25/2017	TX, TN, OK, NC, VA, SC	600m-1b
Convective Storm	Thunderstorms, tornadoes, hail	4/26/2017	TX	25-100m
Convective Storm	Thunderstorms, tornadoes, hail	5/3/2017 - 5/5/2017	TX, LA, GA, VA, NC	100-300m
Convective Storm	Thunderstorms, tornadoes, hail	5/15/2017 - 5/18/2017	IL, WI, MN, OK, IA, NY	600m-1b
Convective Storm	Thunderstorms, tornadoes, hail	5/27/2017 - 5/28/2017	MO, TN, VA, OK, KY	300-600m
Convective Storm	Thunderstorms, hail	6/2/2017 - 6/4/2017	TX	100-300m
Convective Storm	Thunderstorms, tornadoes, hail	6/12/2017 - 6/14/2017	TX, WY, Midwest	600m-1b
Convective Storm	Thunderstorms, tornadoes, hail	6/16/2017 - 6/19/2017	NE, IA, KS, MO, PA, IL, VA, NY	300-600m
Convective Storm	Thunderstorms, tornadoes, hail	6/27/2017 - 6/29/2017	NE, IA, IL	1-3b
Convective Storm	Thunderstorms, hail, tornadoes, flood	7/11/2017 - 7/12/2017	IL, MN	100-300m
Convective Storm	Thunderstorms, hail	7/21/2017 - 7/23/2017	IL, KS, MO	300-600m
Convective Storm	Thunderstorms, hail, tornadoes, flood	8/5/2017 - 8/8/2017	TX, OK, LA, KS, MO	100-300m
Convective Storm	Thunderstorms, hail, flood	10/14/2017 - 10/15/2017	IL, MO, KS	100-300m
Convective Storm	Thunderstorms, hail	11/5/2017 - 11/6/2017	OH, MO	100-300m
Convective Storm	Thunderstorms, tornadoes, hail	3/26/2017 - 3/28/2017	TX, OK, AL, TN, KY, MS	1-3b
Convective Storm	Thunderstorms, tornadoes, hail	5/8/2017 - 5/11/2017	CO, NM, OK, TX, MO	1-3b
Convective Storm	Hailstorm	6/11/2017	MN, WI	1-3b
Convective Storm		1/8/2018 - 1/10/2018	CA	<1,000m
Convective Storm		2/24/2018 - 2/26/2018	KY, TN, MO, AR	<1,000m
Convective Storm		3/18/2018 - 3/21/2018	TX, LA, AL, MS, GA, FL, SC	>1,000m
Convective Storm		4/6/2018 - 4/7/2018	TX, LA, MS, OK	<1,000m
Convective Storm		4/13/2018 - 4/17/2018	TX, OK, MO, AR, LA, MS, IA, KS, VA, NC, SC, GA, FL	<1,000m
Convective Storm		4/28/2018 - 5/5/2018	KS, MO, IA, IL	>1,000m
Convective Storm		5/12/2018 - 5/16/2018	Northeast, Midwest, Southern	>1,000m
Convective Storm		6/3/2018 - 6/6/2018	Southwest	<1,000m
Convective Storm		6/12/2018 - 6/13/2018	Midwest	<1,000m
Convective Storm		6/18/2018 - 6/20/2018	Midwest	>1,000m
Convective Storm		6/24/2018 - 6/26/2018	Midwest	<1,000m
Convective Storm		6/29/2018 - 7/1/2018	Midwest	<1,000m
Convective Storm		7/19/2018 - 7/22/2018	Midwest, Southern	>1,000m
Convective Storm		7/21/2018 - 7/26/2018	Northeast	<1,000m
Convective Storm		7/26/2018 - 7/29/2018	Midwest, Southern	<1,000m
Convective Storm		7/30/2018 - 7/31/2018	Southwest	<1,000m
Convective Storm		8/6/2018 - 8/7/2018	Midwest	<1,000m
Convective Storm		9/20/2018 - 9/21/2018	Midwest	<1,000m

Convective Storm	10/31/2018 - 11/1/2018	Midwest	>1,000m
Convective Storm	11/14/2018 - 11/16/2018	Northeast	<1,000m
Convective Storm	2/1/2019 - 2/3/2019	CA	<100m
Convective Storm	2/23/2019 - 2/26/2019	Midwest, Northeastern	<1,000m
Convective Storm	2/26/2019 - 2/28/2019	CA	<100m
Convective Storm	3/3/2019 - 3/4/2019	Southern	<1,000m
Convective Storm	3/23/2019 - 3/25/2019	Southern	>1,000m
Convective Storm	3/26/2019 - 3/27/2019	FL	<1,000m
Convective Storm	4/5/2019 - 4/7/2019	Southern	<1,000m
Convective Storm	4/12/2019 - 4/15/2019	Midwest, Southeast	<1,000m
Convective Storm	4/17/2019 - 4/20/2019	Southern	<1,000m
Convective Storm	4/23/2019 - 4/25/2019	Southern	<1,000m
Convective Storm	4/30/2019 - 5/2/2019	Midwest, Southern	<1,000m
Convective Storm	5/7/2019 - 5/10/2019	Southern	<1,000m
Convective Storm	5/13/2019	NC	<1,000m
Convective Storm	5/16/2019 - 5/17/2019	Midwest	<1,000m
Convective Storm	5/17/2019 - 5/18/2019	TX	<1,000m
Convective Storm	5/20/2019 - 5/22/2019	Midwest, Southern	<1,000m
Convective Storm	5/24/2019 - 5/25/2019	Southern	<100m
Convective Storm	5/26/2019 - 5/29/2019	All regions	>1,000m
Convective Storm	6/4/2019 - 6/6/2019	Midwest	<1,000m
Convective Storm	6/9/2019 - 6/10/2019	Southern	<1,000m
Convective Storm	6/15/2019 - 6/16/2019	IN	<100m
Convective Storm	6/16/2019 - 6/17/2019	TX	<1,000m
Convective Storm	6/23/2019 - 6/24/2019	TX	<1,000m
Convective Storm	6/29/2019 - 6/30/2019	IL, NY	<100m
Convective Storm	7/4/2019 - 7/5/2019	CO	<1,000m
Convective Storm	7/7/2019 - 7/8/2019	Southern	<1,000m
Convective Storm	7/17/2019 - 7/18/2019	MN, WY	<1,000m
Convective Storm	7/19/2019 - 7/23/2019	Northeast, Midwest	<1,000m
Convective Storm	7/26/2019 - 7/27/2019	MN	<1,000m
Convective Storm	8/4/2019 - 8/5/2019	MN, WI	<1,000m
Convective Storm	8/6/2019	ND, SD	<1,000m
Convective Storm	8/10/2019 - 8/11/2019	MT	<1,000m
Convective Storm	8/14/2019 - 8/18/2019	Midwest	<1,000m
Convective Storm	8/25/2019 - 8/26/2019	Midwest, South	<1,000m
Convective Storm	9/10/2019 - 9/11/2019	Midwest	<1,000m
Convective Storm	9/27/2019 - 9/28/2019	Midwest	<100m
Convective Storm	10/16/2019 - 10/17/2019	Northeast	<1,000m
Convective Storm	10/20/2019 - 10/21/2019	Southern	>1,000m
Convective Storm	10/26/2019 - 10/27/2019	CA	<100m
Convective Storm	10/31/2019 - 11/1/2019	Northeast, South	<1,000m
Convective Storm	11/19/2019 - 11/21/2019	AZ	<100m
Convective Storm	11/26/2019 - 11/28/2019	Midwest	<1,000m
Convective Storm	1/10/2020 - 1/12/2020	Midwest, Southern	<1,000m
Convective Storm	2/5/2020 - 2/8/2020	South, Northeast	<1,000m
Convective Storm	2/8/2020 - 2/11/2020	AZ, CA	<100m
Convective Storm	3/2/2020 - 3/4/2020	Midwest, Southern	>1,000m
Convective Storm	3/17/2020 - 3/20/2020	Midwest, Southern	<1,000m
Convective Storm	3/27/2020 - 3/30/2020	Midwest, Southern	>1,000m
Convective Storm	4/7/2020 - 4/9/2020	Northeast, Midwest	>1,000m
Convective Storm	4/10/2020 - 4/14/2020	Northeast, Southern	>1,000m
Convective Storm	4/18/2020 - 4/20/2020	Southern	<1,000m

Convective Storm	4/21/2020 - 4/24/2020	Southern	>1,000m
Convective Storm	4/24/2020 - 4/26/2020	Southern	<1,000m
Convective Storm	4/27/2020 - 4/30/2020	South, Northeast	<1,000m
Convective Storm	5/2/2020 - 5/3/2020	Southern	<1,000m
Convective Storm	5/4/2020 - 5/5/2020	Southern	>1,000m
Convective Storm	5/7/2020 - 5/8/2020	Southern	<1,000m
Convective Storm	5/13/2020 - 5/15/2020	Midwest, Northeast	<1,000m
Convective Storm	5/16/2020 - 5/21/2020	South, Northeast	<1,000m
Convective Storm	5/20/2020 - 5/24/2020	Southern	>1,000m
Convective Storm	5/25/2020 - 5/26/2020	TX	<100m
Convective Storm	5/27/2020 - 5/28/2020	TX	>1,000m
Convective Storm	6/2/2020 - 6/3/2020	Northeast	<1,000m
Convective Storm	6/4/2020	SD	<1,000m
Convective Storm	6/5/2020 - 6/11/2020	Midwest	<1,000m
Convective Storm	6/6/2020 - 6/9/2020	Southern	<1,000m
Convective Storm	6/19/2020 - 6/21/2020	TX	<1,000m
Convective Storm	7/5/2020 - 7/7/2020	Northeast	<1,000m
Convective Storm	7/10/2020 - 7/12/2020	Midwest	<1,000m
Convective Storm	7/17/2020 - 7/19/2020	Midwest	<1,000m
Convective Storm	7/25/2020 - 7/27/2020	TX	<1,000m
Convective Storm	8/4/2020 - 8/5/2020	CO	<1,000m
Convective Storm	8/8/2020 - 8/11/2020	Midwest	>1,000m
Convective Storm	8/13/2020 - 8/17/2020	Midwest, Southern	<1,000m
Convective Storm	8/26/2020 - 8/28/2020	Northeast	<1,000m
Convective Storm	8/29/2020 - 8/30/2020	TX	<100m
Convective Storm	9/5/2020 - 9/6/2020	IA, MN	<1,000m
Convective Storm	9/7/2020 - 9/9/2020	ID, UT	<1,000m
Convective Storm	10/7/2020 - 10/8/2020	Northeast	<1,000m
Convective Storm	10/25/2020 - 10/28/2020	CA, OK	<1,000m
Convective Storm	11/10/2020 - 11/12/2020	Midwest, Southern	<1,000m
Convective Storm	11/15/2020 - 11/16/2020	Northeast	<1,000m
Convective Storm	11/30/2020 - 12/1/2020	Northeast	<100m
Convective Storm	1/11/2021 - 1/13/2021	Western	<1,000m
Convective Storm	1/17/2021 - 1/20/2021	CA	<1,000m
Convective Storm	1/25/2021 - 1/26/2021	Southern	<100m
Convective Storm	1/24/2021 - 1/29/2021	AZ, CA	<1,000m
Convective Storm	2/25/2021 - 2/26/2021	TX	<1,000m
Convective Storm	3/9/2021 - 3/11/2021	MN	<100m
Convective Storm	3/9/2021 - 3/11/2021	Midwest, Southern	<1,000m
Convective Storm	3/22/2021 - 3/23/2021	TX	<1,000m
Convective Storm	3/24/2021 - 3/26/2021	Northeast, Midwest	>1,000m
Convective Storm	3/27/2021 - 3/29/2021	Northeast, Midwest, Southern	<1,000m
Convective Storm	4/6/2021 - 4/8/2021	TX	<1,000m
Convective Storm	4/9/2021 - 4/11/2021	Southern	<1,000m
Convective Storm	4/9/2021 - 4/14/2021	LA, TX	<1,000m
Convective Storm	4/15/2021 - 4/16/2021	TX	>1,000m
Convective Storm	4/27/2021 - 5/2/2021	Southern, Northeast	>1,000m
Convective Storm	5/3/2021 - 5/4/2021	Southern, Northeast	<1,000m
Convective Storm	5/7/2021 - 5/11/2021	Southern, Midwest	<1,000m
Convective Storm	5/14/2021 - 5/19/2021	Southern, Midwest	<1,000m
Convective Storm	5/26/2021 - 5/28/2021	South, Northeast	<1,000m
Convective Storm	5/25/2021 - 5/26/2021	Northeast	<1,000m
Convective Storm	5/29/2021 - 5/31/2021	Midwest	<1,000m

Convective Storm		6/7/2021 - 6/9/2021	TX	<100m
Convective Storm		6/11/2021 - 6/14/2021	Midwest, Northeast	<1,000m
Convective Storm		6/17/2021 - 6/20/2021	Midwest, Northeast	>1,000m
Convective Storm		6/24/2021 - 7/1/2021	Midwest	<1,000m
Convective Storm		7/8/2021 - 7/10/2021	Midwest	<1,000m
Convective Storm		7/9/2021 - 7/11/2021	Southern	<1,000m
Convective Storm		7/22/2021 - 7/25/2021	AZ, NM	<1,000m
Convective Storm		7/24/2021	MI	<100m
Convective Storm		7/26/2021 - 7/27/2021	MN, WI	<1,000m
Convective Storm		7/28/2021 - 7/29/2021	Midwest, Northeast	<1,000m
Convective Storm		8/1/2021	TX	<100m
Convective Storm		8/7/2021 -8/9/2021	Midwest	<100m
Convective Storm		8/10/2021 - 8/13/2021	Midwest, Northeast	<1,000m
Convective Storm		8/10/2021 - 8/16/2021	AZ	<1,000m
Convective Storm		8/17/2021 - 8/19/2021	Western	<1,000m
Convective Storm		8/21/2021 - 8/22/2021	TN	<100m
Convective Storm		8/26/2021 - 8/28/2021	Midwest	<1,000m
Convective Storm		9/6/2021 - 9/7/2021	Midwest	<1,000m
Convective Storm		9/15/2021 - 9/17/2021	Midwest	<100m
Convective Storm		9/24/2021 - 9/29/2021	Southern	<100m
Convective Storm		9/30/2021 - 10/2/2021	TX	<100m
Convective Storm		10/4/2021 - 10/7/2021	Southern	<1,000m
Convective Storm		10/10/2021 - 10/11/2021	Southern	<1,000m
Convective Storm		10/10/2021 - 10/12/2021	Western	<100m
Convective Storm		10/24/2021 - 10/28/2021	Western, Southern	<1,000m
Convective Storm		10/24/2021 - 10/25/2021	Midwest	<100m
Convective Storm		10/25/2021 - 10/27/2021	Northeast	<1,000m
Convective Storm		10/24/2021 - 10/25/2021	Northeast	<100m
Convective Storm		11/11/2021 - 11/13/2021	WA	<100m
Convective Storm		11/14/2021 - 11/16/2021	TX	<100m
Convective Storm		11/10/2021 - 11/11/2021	TX	<100m
Convective Storm		12/10/2021 - 12/11/2021	South, Eastern, Central	>1,000m
Convective Storm		12/13/2021 - 12/16/2021	TX	>1,000m
Convective Storm		12/17/2021 - 12/18/2021	TX	<100m
Convective Storm		12/21/2021	FL	<100m
Convective Storm		1/21/2022 - 1/22/2022	GA, SC	>25m
Convective Storm		2/21/2022 - 2/22/2022	MO, KY	>500m
Convective Storm		3/5/2022 - 3/7/2022	MO, IA, IL, WI, IN	>250m
Convective Storm		3/11/2022 - 3/13/2022	FL, GA	>50m
Convective Storm		3/14/2022 - 3/16/2022	TX, FL, GA, SC	>100m
Convective Storm	New Orleans Tornado	3/21/2022 - 3/23/2022	TX, LA, MS, AL, OK	>250m
Convective Storm		3/29/2022 - 3/31/2022	TX, OK, AR, LA, AL, MS, FL, TN	>500m
Convective Storm		4/2/2022 - 4/4/2022	MS, LA, AR, TX, OK	>50m
Convective Storm		4/3/2022 - 4/7/2022	MS, AL, GA, FL, SC, NC, TN	>500m
Convective Storm		4/10/2022 - 4/14/2022	MO, AR, TX, LA, IA, NE, KS, MS, AL, TN, KY, MN, WI	>1b
Convective Storm		4/15/2022 - 4/17/2022	AR, MS, LA, FL, AL	>250m
Convective Storm		4/21/2022 - 4/24/2022	TX, OK, KS, NE, SD, IA	>250m
Convective Storm	Andover Tornado	4/26/2022 - 4/30/2022	NC, VA, KS, MO, NE, OK	>100m
Convective Storm	Tornadoes, Hail	5/1/2022 - 5/3/2022	TX, OK, AR, KS, KY, OH,	>500m
Convective Storm	Tornadoes, Hail	5/4/2022 - 5/6/2022	TX, OK, MS, FL, GA, SC, NC, VA, TN, KY	>250m
Convective Storm	Thunderstorms, Hail	5/9/2022 - 5/10/2022	MN, WI, TX	>1b
Convective Storm	Upper Midwest Derecho	5/11/2022 - 5/12/2022	ND, SD, MN, IA, NE	>1b
Convective Storm	Tornadoes, Hail	5/13/2022 - 5/16/2022	IL, MO, TX, OK, KA, NE, NC, NY, NH, CO	>250m

Convective Storm	Tornadoes, Hail	5/17/2022 - 5/19/2022	KS, NE, OK, MO, IL, KY	>25m
Convective Storm		5/19/2022 - 5/22/2022	MN, WI, MI, IN, OH, AR, TX	>1b
Convective Storm	Tornadoes, Hail	5/23/2022 - 5/25/2022	TX, NC, SC, MS, IL	>50m
Convective Storm	Tornadoes, Hail	5/29/2022	NE, SD, MN	>25m
Convective Storm	Tornadoes, Hail	5/30/2022 - 6/2/2022	MN, IA, NE, SD, KS, OK, TX, VA, OH	>250m
Convective Storm		6/1/2022 - 6/3/2022	NM, CO, TX	>25m
Convective Storm	Tornadoes, Hail	6/4/2022 - 6/8/2022	KS, NE, MO, IN, OH, OK, AR, TX	>1b
Convective Storm	Tornadoes, Hail	6/11/2022 - 6/17/2022	KS, NE, SD, MN, OH, KY, MI, IN, WI, VA, NC, SC	>1b
Convective Storm	Tornadoes, Hail	6/22/2022 - 6/23/2022	OH, KS, MN, KY, ND, SD	>25m
Convective Storm	South Dakota Derecho	7/1/2022 - 7/7/2022		>250m
Convective Storm		7/7/2022 - 7/13/2022	MT, ND, SD, MN, NE, IA	>250m
Convective Storm		7/21/2022 - 7/25/2022	ND, SD, NE, KS, IL, IN, OH, WI, IA, MN, MI	>500m
Convective Storm		8/1/2022 - 8/4/2022	WV, PA, IL, WI, MN, MI, MD	>25m
Convective Storm		8/11/2022 - 8/12/2022	WA, OR, ID, MT	>25m
Convective Storm		8/20/2022 - 8/21/2022	IA, IL, IN, OH, MO	>250m
Convective Storm		8/27/2022 - 8/29/2022	MN, IA, IL, MI	>25m
Convective Storm		8/28/2022 - 9/6/2022	TX, OK, KS	>100m
Convective Storm		9/18/2022 - 9/21/2022	IL, MO, IA, WI, MI	>250m
Convective Storm		10/1/2022 - 10/4/2022	CO, UT, AZ	>25m
Convective Storm		10/15/2022 - 10/26/2022	OK, AR, NE, ND, MN	>100m
Convective Storm		10/24/2022 - 10/25/2022	TX	>100m
Convective Storm	Southern Plains Tornadoes	11/4/2022 - 11/5/2022	TX, LA, OK, AR	>100m
Convective Storm		11/4/2022 - 11/5/2022	WI, IA, IL	>25m
Convective Storm		11/11/2022	TX, VA	>25m
Convective Storm	Western PA Hail	11/27/2022	PA	>25m
Convective Storm		11/29/2022 - 11/30/2022	LA, MS, AL, GA, FL, AR, TN, KY	>25m
Convective Storm	Mid-December Tornadoes	12/13/2022 - 12/14/2022	TX, OK, LA, AR, MS, AL, FL, GA	>100m
Convective Storm	Selma Tornado	1/12/2023	MS, AL, GA, TN, KY, NC, SC	>250m
Convective Storm	Houston Tornado	1/24/2023	TX, LA	>100m
Convective Storm		2/7/2023	TX, LA, MS	>100m
Convective Storm		2/15/2023 - 2/17/2023	OK, AR, MO, MS, TN	>100m
Convective Storm	Southern Plains Derecho	2/26/2023 - 2/28/2023	TX, OK, KS, MO, IL, IN, OH	>250m
Convective Storm		3/1/2023 - 3/3/2023	TX, AR, OK, LA, KY, IN, OH	>1b
Convective Storm	Dallas Hail	3/16/2023 - 3/17/2023	TX, OK	>250m
Convective Storm	Mississippi Tornado	3/23/2023 - 3/28/2023	TX, OK, MO, IL, AR, TN, MS, AL, GA, LA	>1b
Convective Storm		3/30/2023 - 4/1/2023	NE, IA, MO, IL, WI, AR, TN, KY, IN, OH, MI, NJ, MD	>1b
Convective Storm		4/2/2023	TX, LA, MS	>25m
Convective Storm		4/3/2023 - 4/5/2023	IA, WI, IL, MO, KY, IN, OH, TX	>1b
Convective Storm	Missouri Tornadoes	4/14/2023 - 4/16/2023	KS, NE, MO, IL, AR, TX, LA	>250m
Convective Storm	Oklahoma Tornadoes	4/18/2023 - 4/22/2023	KS, NE, IA, WI, IL, OK, TX	>1b
Convective Storm		4/23/2023 - 4/27/2023	TX, FL	>500m
Convective Storm		4/28/2023 - 5/1/2023	TX	>500m
Convective Storm		5/2/2023 - 5/9/2023	TX, NE, MO, IL, IA, IL, KY, KS	>1b
Convective Storm		5/9/2023 - 5/16/2023	CO, KS, TX, OK, LA, NE, IA, KY	>1b
Convective Storm		5/17/2023 - 5/20/2023	TX	>1b
Convective Storm		5/22/2023 - 5/26/2023	TX, NM, CO	>250m
Convective Storm		5/23/2023 - 5/25/2023	ID, MT	>25m
Convective Storm		5/31/2023 - 6/4/2023	NM, TX, TN, PA	>100m
Convective Storm		6/5/2023 - 6/8/2023	KS, TX, TN, VA	>100m
Convective Storm		6/9/2023 - 6/14/2023	TX, OK, AR, MS, AL, TN, GA, LA	>1b
Convective Storm		6/15/2023 - 6/19/2023	TX, OK, LA, MS, AL, FL, KS, AR, MO	>1b
Convective Storm		6/15/2023 - 6/16/2023	OH, MI, VA	>250m
Convective Storm		6/21/2023 - 6/26/2023	TX, CO, NM, WY, NE, SD, IA, MN, AR, IN, KY	>3b

Convective Storm	Midwest Derecho	6/28/2023 - 7/4/2023	CO, KS, NE, IL, MO, IA, IN, KY, PA	>1b
Convective Storm		7/3/2023 - 7/9/2023	SC, NC, VA	>250m
Convective Storm		7/5/2023 - 7/10/2023	TX, OK, CO, KS, NE	>1b
Convective Storm	Illinois Tornadoes	7/9/2023 - 7/14/2023	NE, IA, SD, IL, MI, MN	>500m
Convective Storm		7/15/2023 - 7/19/2023	KS, MO, NE	>250m
Convective Storm		7/19/2023 - 7/21/2023	MI, OH, PA, TN, AL	>1b
Convective Storm		7/19/2023 - 7/20/2023	MN	>25m
Convective Storm		7/25/2023 - 7/31/2023	MN, WI, IA, IL, IN, OH, MO, KS, NE	>500m
Convective Storm	Arizona Duststorm	7/25/2023 - 7/30/2023	NY, NH, VT, PA, MA	>25m
Convective Storm		8/4/2023 - 8/8/2023	MO, KS, CO, IL, NC, PA, NE	>500m
Convective Storm		8/10/2023 - 8/11/2023	SD, NE, MN, IA, MO, WI, MI	>1b
Convective Storm		8/12/2023 - 8/15/2023	OH, PA, NY, KY, TN, NC, SC, GA	>25m
Convective Storm		8/22/2023 - 8/24/2023	MI, OH, PA	>250m
Convective Storm		8/31/2023 - 9/2/2023	AZ, CA, NV	>25m
Convective Storm		9/9/2023 - 9/11/2023	KS, NE, TX, OK	>250m
Convective Storm		9/12/2023 - 9/14/2023	TX	>25m
Convective Storm		9/23/2023 - 9/24/2023	MN, SD, NE, KS, MO, OK, TX	>500m
Convective Storm		9/26/2023 - 9/27/2023	MO, IL, KY	>25m
Convective Storm		10/2/2023 - 10/5/2023	TX, KS, NE, OK	>250m
Convective Storm		10/23/2023 - 10/24/2023	WI, MN	>100m
Convective Storm	Tornados	10/24/2023 - 10/26/2023	TX	>100m
Convective Storm	Tornadoes, Hail	12/8/2023 - 12/10/2023	LA, TN, KY, MS, AL, FL, NC	>250m

Year	Event Type	Begin	End	Event	Country	Affected Area (Detail)	Munich Re NatCATService Insured losses (in original values, US\$m) Criteria: insured losses equal/greater US\$ 25m. Tries to reflect non-US losses only	Swiss Re Sigma: Insured Loss Est. US\$m (mid point shown if range given) Mostly reflect total US and nonUS losses combined.	
	Convective Storm	01/08/15	01/11/15	Windstorm Elon-Felix	Germany, Norway, UK, Sweden, Denmark				358m
	Convective Storm	03/06/15	03/18/15	Hailstorm, floods	India				106m
	Convective Storm	03/24/15	03/25/15	Thunderstorms, flood	China				25+m
	Convective Storm	04/06/15	04/09/15	Thunderstorms, hail	China				25+m
	Convective Storm	04/18/15	04/21/15	Thunderstorms, hail, flood	China				50+m
	Convective Storm	04/21/15		Thunderstorms, hail	India				25+m
	Convective Storm	05/05/15	05/08/15	Thunderstorms, hail	China				50+m
	Convective Storm	05/13/15		Tornadoes	Germany				54m
	Convective Storm	05/29/15	06/01/15	Thunderstorms, hail	China				75+m
	Convective Storm	06/21/15	06/23/15	Thunderstorms, hail	China				25+m
	Convective Storm	07/21/15	07/22/15	Thunderstorms, hail, tornadoes, flood	Canada				100-300m
	Convective Storm	08/04/15	08/05/15	Thunderstorms, hail	Canada				25-100m
	Convective Storm	10/24/15	10/25/15	Thunderstorms, hail, flood	Egypt				25+m
	Convective Storm	04/25/15		Hailstorm	Australia				306m
	Convective Storm	02/22/16	02/25/16	Thunderstorms, tornadoes	Canada				600m-1b
	Convective Storm	03/08/16	03/11/16	Thunderstorms, hail	UAE, Oman				100m
	Convective Storm	04/20/16	04/25/16	Thunderstorm, hail	China				25+m
	Convective Storm	06/23/16		Thunderstorm, hail, tornado	China				100+m
	Convective Storm	06/23/16		Thunderstorms, hail	Netherlands				527m
	Convective Storm	06/24/16	06/25/16	Thunderstorm, hail, flood	Germany				253m
	Convective Storm	06/28/16	06/30/16	Thunderstorms, hail, tornado, flood	Canada				64m
	Convective Storm	07/15/16	07/16/16	Thunderstorms, hail, flood	Canada				56m
	Convective Storm	07/18/16	07/20/16	Thunderstorm, hail, tornadoes	Canada				74m
	Convective Storm	07/30/16	08/01/16	Thunderstorms, hail, tornadoes, flood	Canada				327m
	Convective Storm	11/11/16		Thunderstorms, hail	Australia				197m
	Convective Storm	07/22/16		Hailstorm	Canada				56m
	Convective Storm	02/01/17	02/02/17	Windstorm Kurt, Live, Marcel	France, Spain				86m
	Convective Storm	02/23/17	02/24/17	Windstorm Thomas	UK, Germany, Belgium, Netherlands, Ireland				292m
	Convective Storm	03/06/17	03/07/17	Windstorm Zues	France				341m
	Convective Storm	03/08/17	03/09/17	Windstorm	Canada				84m
	Convective Storm	05/23/17	05/24/17	Thunderstorms, hail, flood	Canada				52m
	Convective Storm	08/06/17	08/10/17	Thunderstorms, hail, flood	Italy				168m
	Convective Storm	10/05/17		Windstorm Xavier	Germany, Poland, Czech Republic, Netherlands				420m
	Convective Storm	10/09/17	10/10/17	Thunderstorms, hail, flood	South Africa				81m
	Convective Storm	10/16/17	10/18/17	Windstorm	Canada				87m

	Convective Storm	10/29/17		Windstorm Herwart	Germany, Austria, Denmark, Poland, Czech Republic, Slovakia, Hungary				390m
	Convective Storm	12/19/17		Thunderstorms, hail, flood	Australia				296m
	Convective Storm	02/18/17		Hailstorm	Australia				400m
	Convective Storm	06/22/17	06/23/17	Hailstorm Paul, Hailstorm Rasmund	Germany, Hungary				721m
	Convective Storm	06/24/17	06/28/17	Thunderstorms, hail, flood	Italy				132m
	Convective Storm	07/21/17	07/27/17	Hailstorm	Switzerland				88m
	Convective Storm	07/27/17		Thunderstorms, hail, flood	Turkey				185m
	Convective Storm	01/01/18		Windstorm Ingmar	France				<226m
	Convective Storm	01/03/18		Windstorm Burglind	Austria, Belgium, France, Germany, Ireland, Luxembourg, Netherlands, Switzerland, U.K.				1020m
	Convective Storm	01/17/18	01/18/18	Windstorm Friederike	Belgium, France, Germany, Great Britain, Netherlands, Italy, Central Europe				2,100m
	Convective Storm	01/23/18	01/24/18	Windstorm Georgina	Ireland, Norway, U.K.				<226m
	Convective Storm	09/19/18	09/20/18	Windstorm Dorcas-Elena	Ireland, Norway, U.K.				<226m
	Convective Storm	09/23/18		Windstorm Fabienne	Germany, Austria, Switzerland				<226m
	Convective Storm	04/10/18	04/11/18	Tornadoes	New Zealand				51m
	Convective Storm	May	June		Central/western Europe				900m
	Convective Storm	12/20/18		Hailstorm	Australia				492m
	Convective Storm	03/09/19	03/10/19	Windstorm Dragi-Eberhard	Belgium, France, UK, Germany, Czech Republic, Poland, Slovakia, Netherlands, Luxembourg				851m
	Convective Storm	06/20/19	06/23/19	Windstorm	Italy				277m
	Convective Storm	07/08/19	07/10/19	Windstorm	Italy				165m
	Convective Storm	11/17/19		Sunshine Coast Hailstorm	Australia				112m
	Convective Storm	12/10/19	12/22/19	Ewindstorm Elsa-Fabien	Spain, Portugal, France				149m
	Convective Storm	06/10/19	06/13/19	European Hailstorm	Germany, Poland, Slovenia, Czech Republic				830m
	Convective Storm	01/20/20		Hailstorm	Australia				1,250m
	Convective Storm	02/08/20	02/11/20	Windstorm Sabine/Ciara	Austria, Belgium, Switzerland, Germany, Denmark, France, UK, Ireland, Luxembourg, Netherlands, Norway, Sweden				2,200m
	Convective Storm	02/15/20	02/17/24	Windstorm Victoria-Dennis	Belgium, Denmark, France, Germany, Ireland, Luxembourg, Netherlands, Norway, Sweden, UK				372m
	Convective Storm	09/26/20	09/27/20	Windstorm Odette	Belgium				28+m
	Convective Storm	09/30/20	10/03/20	Windstorm Alex-Brigitte	UK, Spain, Portugal, France, Italy, Austria, Poland, Czech Republic				340m
	Convective Storm	10/31/20		South East Queensland Hailstorm	Australia				905m
	Convective Storm	01/08/21	01/10/21	Windstorm Filomena	Spain				259m
	Convective Storm	01/18/21	01/20/21	Windstorm Christoph	UK, Norway				106-159m
	Convective Storm	03/10/21	03/13/21	Windstorm Klaus-Luis	France, Belgium, UK, Ireland, Germany, Netherlands, Luxembourg				192m
	Convective Storm	10/20/21	10/23/21	Windstorm Aurore	France, Belgium, Germany, Poland, Luxembourg, Czech Republic				362m
	Convective Storm	11/26/21	11/28/21	Windstorm Arwen	UK				330-396m
	Convective Storm	06/18/21	07/01/21	Europe Hailstorm	Austria, Czech Republic, Germany, Poland, Switzerland, Slovakia, France, Italy				2,132m
	Convective Storm	06/24/21		Tronado	Czech Republic				200m
	Convective Storm	10/28/21	10/29/21	Hail	Australia				733m
	Convective Storm	01/16/22	01/17/22	Windstorm Hannelore	Norway, Sweden, Denmark, Poland, Finland, Lithuania, Liechtenstein				>25m
	Convective Storm	01/29/22	01/30/22	Windstorms Malik, Nadia, Valtteri	Denmark, Germany, Sweden, Austria, Czech Republic, UK, Norway, Poland, Slovakia, Lithuania, Latvia				>100m
	Convective Storm	02/06/22	02/07/22	Windstorm Roxana	Germany, France, UK, Belgium				>25m



	Convective Storm	02/16/22	02/21/22	Windstorms Dudley, Eunice, Franklin	Germany, Belgium, Netherlands, Luxembourg, UK, Ireland, France, Poland, Czech Republic, Austria, Denmark, Switzerland				>1b
	Convective Storm	04/06/22	04/07/22	Windstorm Nasim	Germany, Belgium, France, UK, Netherlands				>25m
	Convective Storm	05/20/22		Emmelinde	France, Germany				>100m
	Convective Storm	05/22/22	05/25/22	Finja	France, Italy, Austria, Hungary, Switzerland, Slovenia				>100m
	Convective Storm	06/02/22	06/06/22	Leocardia, May	France, Switzerland, Germany, Slovenia, Austria, Czech Republic, Hungary				>250m
	Convective Storm	06/19/22	06/24/22	Petra, Qiara	France, Germany, Switzerland, Italy, Czech Republic, Poland				>1b
	Convective Storm	06/26/22	06/29/22	Rebecca, Scarlett	France, Czech Republic, Germany, Italy, Poland, Netherlands, Austria				>250m
	Convective Storm	06/30/22	07/01/22	Ulrike	France, Germany, Poland				>25m
	Convective Storm	07/20/22		Carolin	Switzerland, France, Denmark, Austria, Poland				>25m
	Convective Storm	08/17/22	08/21/22	Karin, Lavinia	France, Italy, Austria, Switzerland, Slovenia,				>100m
	Convective Storm	05/21/22		Southern Canada Derecho	Canada				>250m
	Convective Storm	07/18/22	07/21/22		Canada				>25m
	Convective Storm	01/15/23	01/18/23	Windstorm Gerard/Gero	Belgium, Switzerland, Czech Republic, Germany, France, UK				>25m
	Convective Storm	02/16/23	02/18/23	Windstorm Otto/Ulf	Germany, Denmark, UK, Norway, Poland, Sweden				>25m
	Convective Storm	03/07/23	03/10/23	Windstorm Larisa/Diethelm	Austria, Belgium, Czech Republic, Germany, France, Ireland, UK, Netherlands, Luxembourg				>25m
	Convective Storm	03/30/23	03/31/23	Windstorm Mathis/Markus	Belgium, Switzerland, Czech Republic, Germany, France, UK				>25m
	Convective Storm	07/04/23	07/06/23	Windstorm Poly	Germany, Italy, Netherlands				>25m
	Convective Storm	11/01/23	11/03/23	Windstorm Ciaran/Emir	Bulgaria, Germany, Spain, France, UK, Ireland, Italy, Netherlands				>1b
	Convective Storm	11/04/23	11/05/23	Windstorm Domingos/Fred	Spain, France				>100m
	Convective Storm	11/15/23	11/17/23	Windstorm Frederico/Linus	Germany, France, UK				>25m
	Convective Storm	12/20/23	12/22/23	Windstorm Pia/Zoltan	Austria, Belgium, Czech Republic, Germany, Denmark, France, UK, Netherlands, Norway				>100m
	Convective Storm	12/26/23	12/28/23	Windstorm Gerrit/Bodo	Ireland, UK				>25m
	Convective Storm	06/18/23	06/23/23	Lows Kay, Lambert	Austria, Belgium, Czech Republic, Germany, France, Slovakia				>250m
	Convective Storm	07/06/23		Zargoza	Spain, France				>25m
	Convective Storm	07/11/23	07/13/23		Austria, Czech Republic, France, Germany, Italy, Slovenia, Serbia				>250m
	Convective Storm	07/17/23	07/19/23		Austria, Bosnia, Croatia, Germany, Italy, Serbia, Slovakia, Slovenia				>1b
	Convective Storm	07/20/23	07/25/23		Bosnia, Switzerland, Germany, France, Serbia, Hungary, Italy, Serbia, Slovakia, Slovenia, Romania				>1b
	Convective Storm	08/12/23	08/16/23	Arend, Bernd	Austria, Czech Republic, Germany, France, Italy, Poland				>100m
	Convective Storm	08/24/23	08/30/23	Denis, Rae	Austria, Czech Republic, France, Germany, Italy, Lithuania, Latvia, Norway, Poland, Spain, Switzerland				>1b
	Convective Storm	07/01/23			Canada				>25m
	Convective Storm	07/13/23			Canada				>25m
	Convective Storm	07/15/23	07/16/23		Canada				>25m
	Convective Storm	07/20/23	07/21/23		Canada				>25m
	Convective Storm	08/03/23			Canada				>25m
	Convective Storm	08/23/23	08/25/23		Canada				>25m
	Convective Storm	08/24/23			Canada				>25m
	Convective Storm	05/23/23	05/26/23		Australia				>25m
	Convective Storm	12/23/23	12/26/23		Australia				>100m

Source: Munich Re's NAT CAT Service, Swiss Re Sigma and Aon Benfield

**From:** Colleen Scheele <[cscheele@namic.org](mailto:cscheele@namic.org)>  
**Sent:** Tuesday, October 15, 2024 12:43 PM  
**To:** Noe, Derek <[dnoe@naic.org](mailto:dnoe@naic.org)>  
**Subject:** RE: 2024-22-CR Severe Convective Storm (2024)

**CAUTION:** This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi Derek,

Following up on this question. Having the states available would help identify the storms so the storm is not double counted in the R5 component of the RBC and the Rcat component of the RBC. If you can't remove the correct events, then the RBC result may not be accurate.

Thank you!

Colleen

**From:** Colleen Scheele  
**Sent:** Friday, October 11, 2024 9:45 AM  
**To:** [dnoe@naic.org](mailto:dnoe@naic.org)  
**Subject:** 2024-22-CR Severe Convective Storm (2024)

Hi Derek,

I have a quick question on the 2024-22 CR Severe Convective Storm listing. Towards the end of the list, there are just regions listed. Is there a reason that there are regions as opposed to states?

Members have mentioned that it is difficult to match up some of the storms on the list with the cat coded storms in their systems without the impacted states.

Let me know if you would like to discuss. Thank you.

Colleen Scheele  
Public Policy Counsel- Financial & Tax Policy  
D. 317.876.4260

3601 Vincennes Road | Indianapolis, Indiana 46268  
317.875.5250 | [www.namic.org](http://www.namic.org)

## Capital Adequacy (E) Task Force

### RBC Proposal Form

- |   |   |  |
|---|---|--|
| <input type="checkbox"/> Capital Adequacy (E) Task Force          | <input type="checkbox"/> Health RBC (E) Working Group     | <input type="checkbox"/> Life RBC (E) Working Group  |
| <input checked="" type="checkbox"/> Catastrophe Risk (E) Subgroup | <input type="checkbox"/> Investment RBC (E) Working Group | <input type="checkbox"/> Op Risk RBC (E) Subgroup    |
| <input type="checkbox"/> C3 Phase II/ AG43 (E/A) Subgroup         | <input type="checkbox"/> P/C RBC (E) Working Group        | <input type="checkbox"/> Stress Testing (E) Subgroup |

<b>DATE:</b> <u>11/1/2024</u>	<b><u>FOR NAIC USE ONLY</u></b>
<b>CONTACT PERSON:</b> <u>Eva Yeung</u>	Agenda Item # <u>2024-23-CR</u>
<b>TELEPHONE:</b> <u>816-783-8407</u>	Year <u>2024</u>
<b>EMAIL ADDRESS:</b> <u>eyeung@naic.org</u>	<b><u>DISPOSITION</u></b>
<b>ON BEHALF OF:</b> <u>Catastrophe Risk (E) Subgroup</u>	<input type="checkbox"/> ADOPTED <span style="float: right;"><u>1<sup>st</sup> release:</u></span> <span style="margin-left: 100px;"><u>2<sup>nd</sup> release:</u></span>
<b>NAME:</b> <u>Wanchin Chou</u>	<input type="checkbox"/> REJECTED _____
<b>TITLE:</b> <u>Chair</u>	<input type="checkbox"/> DEFERRED TO _____
<b>AFFILIATION:</b> <u>Connecticut Department of Insurance</u>	<input type="checkbox"/> REFERRED TO OTHER NAIC GROUP
<b>ADDRESS:</b> <u>153 Market St,</u> <u>Hartford, CT 06103</u>	<input checked="" type="checkbox"/> EXPOSED <span style="float: right;"><u>1<sup>st</sup> release:</u></span> <span style="margin-left: 100px;"><u>2<sup>nd</sup> release:</u></span>
	<input type="checkbox"/> OTHER (SPECIFY) _____

#### IDENTIFICATION OF SOURCE AND FORM(S)/INSTRUCTIONS TO BE CHANGED

- |   |   |  |
|---|---|--|
| <input type="checkbox"/> Health RBC Blanks    | <input type="checkbox"/> Property/Casualty RBC Blanks | <input type="checkbox"/> Life RBC Instructions                   |
| <input type="checkbox"/> Fraternal RBC Blanks | <input type="checkbox"/> Health RBC Instructions      | <input type="checkbox"/> Property/Casualty RBC Instructions      |
| <input type="checkbox"/> Life RBC Blanks      | <input type="checkbox"/> Fraternal RBC Instructions   | <input checked="" type="checkbox"/> OTHER <u>Cat Event Lists</u> |

#### DESCRIPTION OF CHANGE(S)

2024 U.S. and non-U.S. Catastrophe Event Lists

#### REASON OR JUSTIFICATION FOR CHANGE \*\*

New events were determined based on the sources from Swiss Re and Aon Benfield.

#### Additional Staff Comments:

\*\* This section must be completed on all forms.

Revised 11-2013

Type of Event	Name	Date	Location	Overall losses when occurred
Hurricane	Patricia	2015		25+ million
Hurricane	Joaquin	2015		25+ million
Wildfire	Butte Fire	9/9/15-10/1/15	Amador County, California	~ 300 million
Wildfire	Valley Fire	9/12/15-10/15/15	Lake, Napa and Sonoma County, California	~ 700 million
Hurricane	Matthew	2016	Florida, North Carolina, South Carolina, Georgia and Virginia	\$ 2,698,400,000
Hurricane	Hermine	2016	Florida, North Carolina, South Carolina, Georgia and Virginia	\$ 245,640,000
Wildfire	Erskine Fire	6/23/16-7/11/16	Lake Isabella, Kern County, California	~26 million
Wildfire	Soberanes Fire	7/22/16-9/30/16	Soberanes Creek, Garrapata State Park, Santa Lucia Preserve, Monterey County, California	> 200 million
Wildfire	Chimney Fire	8/13/16-9/6/16	Santa Lucia Range, San Luis Obispo County, California	> 25 million
Wildfire	Clayton Fire	8/13/16-8/26/16	Lake County, California	>25 million
Wildfire	Gatlinburg Wildfire	11/29/16-12/5/16	Sevier County, Gatlinburg, Pigeon Forge, Tennessee	~637 million
Wildfire	Northern California Wildfires	10/8/17-10/31/17	Northern California	~ 11 billion
Wildfire	Southern California Wildfires	12/4/17-12/23/17	Southern California	~ 2.2 billion
Hurricane	Harvey	2017	Texas, Louisiana	25+ million
Hurricane	Jose	2017	East Coast of the United States	25+ million
Hurricane	Irma	2017	Eastern United States	25+ million
Hurricane	Maria	2017	Southeastern United States, Mid-Atlantic States	25+ million
Hurricane	Nate	2017	Louisiana, Mississippi, Alabama, Tennessee and Eastern United States	25+ million
Tropical Storm	Alberto	2018	Southeast, Midwest	25+ million
Hurricane	Lane	2018	Hawaii	25+ million
Tropical Storm	Gordon	2018	Southeast, Gulf coast of the United States, Arkansas and Missouri	25+ million
Hurricane	Florence	2018	Southeast, Mid-Atlantic	25+ million
Hurricane	Michael	2018	Southeastern and East Coasts of United States	25+ million
Wildfire	Spring Creek Fire	6/27/18-7/11/18	Spring Creek, Colorado	< 100 million
Wildfire	Carr, Mendocino California Wildfires	7/23/18-8/15/18	Northern California	>1,000 million
Wildfire	Northern California Camp Wildfire	11/8/18-11/25/18	Butte County, California	>7.5 billion
Wildfire	Southern California Woolsey Wildfires	11/8/18-11/21/18	Los Angeles and Ventura County, California	2.9 billion
Hurricane	Dorian	2019	Southeast, Mid-Atlantic	500+ million
Hurricane	Barry	2019	Southeast, Midwest, Northeast	300+ million
Tropical Storm	Imelda	2019	Plains, Southeast	25+ million
Tropical Storm	Nestor	2019	Southeast	25+ million
Hurricane	Lorenzo	2019	Louisiana, Mississippi, Texas and Arkansas	25+ million
Wildfire	Saddleridge Wildfire	10/10/19-10/23/19	Sylmar, Los Angeles, Calimesa, Riverside County, California	<1,000 million
Wildfire	Kincadee Wildfire	10/23/19-11/6/19	Northeast of Geyserville, Sonoma County, California	<1,000 million
Tropical Storm	Cristobal	2020	Southeast, Plains, Midwest	150 million
Tropical Storm	Fay	2020	Southeast, Northeast	400 million
Hurricane	Hanna	2020	Texas	350 million
Hurricane	Isaias	2020	Southeast, Mid-Atlantic, Northeast	> 3 billion
Hurricane	Laura	2020	Plains, Southeast, Mid-Atlantic	> 4 billion
Hurricane	Sally	2020	Southeast (Alabama, Mississippi, Louisiana)	> 1 billion
Tropical Storm	Beta	2020	Plains, Southeast	25+ million
Hurricane	Delta	2020	Gulf Coast of United States, Southeast, Northeast (AL, GA, NC, SC, MS, LA, TX)	> 2 billion
Hurricane	Zeta	2020	Gulf coast of the United States, Southeastern United States, Mid-Atlantic	> 1.5 billion
Wildfire	Cameron Peak	08/13/20-12/02/20	Roosevelt National Forest, Larimer County, Colorado	~71 million
Wildfire	SCU Lighting Complex Wildfire	8/16/20-9/16/20	San Francisco Bay Area, Central Valley Santa Clara, Alameda, Contra Costa, San Joaquin, Merced, Stanislaus	<1,000 million
Wildfire	Beachie Creek Wildfire	8/16/20-10/10/20	Approx. 2 miles south of Jaw Bones flats in rugged terrain deep in the Opal Creek Wilderness.	>1,000 million
Wildfire	CZU Lightning Complex Wildfire	8/16/20-9/22/20	San Mateo and Santa Cruz Counties, California	>1,000 million
Wildfire	LNU Lightning Complex WildFire	8/17/20-10/2/20	Lake, Napa, Sonoma, Solano, and Yolo Counties, California	> 1,000 million
Wildfire	Carmel Fire	8/18/20-9/4/20	Carmel Valley, California	<1,000 million
Wildfire	North Complex Fire	8/18/20-10/12/20	Plumas and Butte Counties, California	<1,000 million
Wildfire	Creek Fire	9/4/20-10/12/20	Fresno and Madera Counties, California	<1,000 million
Wildfire	Bobcat Fire	9/6/20-10/23/20	Central San Gabriel Mountains, in and around the Angeles National Forest California	< 1,000 million
Wildfire	Babb Road Fire	9/7/20-9/18/20	Malden and Pine City, Palouse County of Eastern Washington	<1,000 million
Wildfire	Almeda Fire	9/7/20-9/16/20	Jackson County, Oregon	<1,000 million
Wildfire	Holiday Farm Fire	9/7/20-10/3/20	Willamette National Forest	<1,000 million

Wildfire	Echo Mountain Complex Fire	9/7/20-9/23/20	north of Lincoln City, Oregon	<100 million
Wildfire	Riverside Fire	9/8/20-10/3/20	Valley Drive between Misty Ridge Drive and Mitchell Avenue, Oregon	<100 million
Wildfire	Slater Fire	9/8/20-10-9/20	Northern California and Southern Oregon	<100 million
Wildfire	Glass Fire	9/27/20-10/19/20	Napa and Sonoma Counties, California	> 1,000 million
Wildfire	East Troublesome Fire	10/14/20-11/9/20	Grand County, Colorado	~543 million
Tropical Storm	Claudette	2021	Gulf Coast of the United States, Georgia, Carolinas	> 350 million
Hurricane	Elsa	2021	East Coast of the United States	1.2 billion
Tropical Storm	Fred	2021	Eastern United States (particularly Florida and North Carolina)	1.3 billion
Hurricane	Henri	2021	Northeastern United States	550 million
Hurricane	Ida	2021	Gulf Coast of the United States (especially Louisiana), East Coast of the United States (especially the Northeastern United States)	44 billion
Tropical Storm	Nicholas	2021	LA, TX	>1.1b
Tropical Storm	Wanda	2021	Southern United States, Mid-Atlantic United States, Northeastern United States	>200 million
Wildfire	Bootleg Wildfire	7/17/21-8/6/21	Northwest of Beatty, Oregon	<1,000 million
Wildfire	Dixie Wildfire	7/14/21-10/5/21	Butte, Plumas, Tehama, Lassen and Shasta Counties, California	>1,000 million
Wildfire	Caldor Fire	8/14/21-10/5/21	El Dorado National Forest and other areas of the Sierra Nevada in El Dorado, Amador, and Alpine County, California	<1,000 million
Wildfire	Corkscrew Fire	8/15/21-8/30/21	Ford, WA; Tum Tum, Springdale, City of Deer Park, Loon Lake, Clayton, H395, Scoop Mt	<100 million
Wildfire	Marshall Fire	12/30/21-1/1/22	Boulder County, Colorado	~ 2 billion
Wildfire	Calf Canyon/Hermits Peak Fire	4/6/22-8/22/22	San Miguel County, Mora County, Taos County	> 25 million
Wildfire	McKinney Fire	7/29/22-9/7/22	Siskiyou County, Northern California	> 25 million
Wildfire	Cedar Creek Fire	8/1/22-present	Central Oregon	> 25 million
Wildfire	Mosquito Fire	9/6/22- present	Northern California, Placer County, El Dorado County	> 25 million
Hurricane	Hurricane Fiona	9/18/22-9/20/22	PR	>3 billion
Hurricane	Ian	9/23/22-10/2/22	Florida and the Carolinas, FL, GA, NC, SC, VA	>110 billion
Hurricane	Hurricane Nicole	11/9/22-11/11/22	FL, GA, SC	>1 billion
Wildfire	Hawaii Wildfire	8/8/23-8/17/23	Hawaii	> 25 million
Hurricane	Hurricane Hilary	8/17/23-8/22/23	West, Southwest United States	> 25 million
Wildfire	Washington Wildfire	8/18/23-8/22/23	Washington	> 25 million
Hurricane	Hurricane Idalia	8/27/23-8/31/23	Southeastern United States	> 25 million
Hurricane	Hurricane Lee	9/14/23-9/17/23	Northeast United States	> 25 million
Tropical Storm	Ophelia	9/22/23-9/26/23	East Coast of the United States	> 25 million
Severe Convective Storm		1/8/24-1/10/24	Nationwide	> 25 million
Winter Storm		1/11/24-1/18/24	Nationwide	> 25 million
Severe Convective Storm		1/19/24-1/22/24	Nationwide	> 25 million
Severe Convective Storm	Jan Southern SCS	1/22/24-1/26/24	Nationwide	> 25 million
Severe Convective Storm	Early Feb Outbreak	2/8/24-2/13/24	Midwest, Southeast	> 25 million
Severe Convective Storm	Polar Front & SCS	2/26/24-2/29/24	Nationwide	> 25 million
Severe Convective Storm	Western US Storm	2/28/24-3/4/24	Nationwide	> 25 million
Wildfire	Smokehouse Creek Fire	2/26/24-3/9/24	Texas	> 25 million
Severe Convective Storm		2/28/24-3/2/28	Ohio, Pennsylvania	> 25 million
Severe Convective Storm	Early March Storm Complex	3/6/24-3/11/24	Southeast, Midwest	> 25 million
Winter Storm	Colorado Snow Storm	3/13/24-3/15/24	Colorado	> 25 million
Severe Convective Storm	Mid-March SCS Outbreak	3/12/24-3/17/24	Northeast	> 25 million
Severe Convective Storm	San Antonio Hail & SCS	3/21/24-3/23/24	Texas	> 25 million
Severe Convective Storm	Late March Southern SCS	3/24/24-3/28/24	California, Southeast	> 25 million
Severe Convective Storm	Early April Outbreak	3/31/24-4/4/24	California, Midwest	> 25 million
Severe Convective Storm	Southern SCS & Floods	4/6/24-4/12/24	Nationwide	> 25 million
Severe Convective Storm	April Mid-Atlantic SCS	4/14/24-4/16/23	US	> 25 million
Severe Convective Storm	April Plains & Midwest SCS	4/15/24-4/16/24	Texas, Missouri	> 25 million
Severe Convective Storm	Central & Eastern Outbreak	4/17/24-4/20/24	Southeast	> 25 million
Severe Convective Storm	Texas April SCS	4/19/24-4/21/24	Texas	> 25 million
Severe Convective Storm	Late April Central SCS	4/25/24-4/29/24	Midwest, Southwest	> 25 million
Severe Convective Storm	Early May Hail	4/30/24-5/2/24	Kansas, Oklahoma, Texas	> 25 million
Severe Convective Storm	Texas SCS	5/3/24-5/5/24	Texas	> 25 million
Severe Convective Storm	Early May SCS	5/6/24-5/10/24	Nationwide	> 25 million
Severe Convective Storm	Southern SCS	5/11/24-5/14/24	Southwest, Southeast	> 25 million

Severe Convective Storm	Houston Derecho	5/15/24-5/19/24	Southwest, Southeast	> 25 million
Severe Convective Storm	Mid-May SCS	5/17/24-5/22/24	Nationwide	> 25 million
Severe Convective Storm	Late May Plains Outbreak	5/23/24-5/24/24	Southwest, Midwest	> 25 million
Severe Convective Storm	Late May Central & East SCS	5/25/24-5/26/24	Nationwide	> 25 million
Severe Convective Storm	Dallas SCS	5/27/24-5/29/24	Southwest	> 25 million
Severe Convective Storm	Denver SCS	5/30/24-6/1/24	Southwest, Southeast	> 25 million
Severe Convective Storm	TX Hail & MD Tornadoes	6/2/24-6/5/24	Nationwide	> 25 million
Severe Convective Storm	Early June Outbreak	6/6/24-6/10/24	Nationwide	> 25 million
Severe Convective Storm	Colorado June SCS	6/9/24-6/10/24	Colorado	> 25 million
Severe Convective Storm	Midwest Mid-June Outbreak	6/12/24-6/13/24	Southwest, Midwest	> 25 million
Severe Convective Storm	Central & East Mid-June SCS	6/14/24-6/18/24	Nationwide	> 25 million
Wildfire	South Fork & Salt fires	6/17/24-6/25/24	New Mexico	> 25 million
Severe Convective Storm	Central & East Late-June SCS	6/19/24-6/23/24	Nationwide	> 25 million
Tropical Storm	Tropical Storm Alberto	6/19/24-6/20/24	Texas, Louisiana	> 25 million
Severe Convective Storm		6/24/24-6/26/24	Nationwide	> 25 million
Severe Convective Storm	US Lat-June Outbreak	6/27/24-6/30/24	Nationwide	> 25 million
Severe Convective Storm	Early July Plains Outbreak	7/1/24-7/4/24	Nationwide	> 25 million
Severe Convective Storm	Southeast SCS	7/1/24-7/4/24	Nationwide	> 25 million
Hurricane	Hurricane Beryl	7/1/24-7/12/24	Texas, Louisiana, the Ohio Valley, and the Lower Peninsula of Michigan	> 25 million
Severe Convective Storm	Early July Central Outbreak	7/6/24-7/7/24	Nationwide	> 25 million
Severe Convective Storm	Chicago Derecho & SCS	7/13/24-7/18/24	Nationwide	> 25 million
Severe Convective Storm	Arizona Monsoon SCS	7/14/24-7/15/24	Arizona	> 25 million
Severe Convective Storm	Late July Central Outbreak	7/19/24-7/20/24	Nationwide	> 25 million
Severe Convective Storm	July Southwest Monsoon	7/15/24-7/21/24	Nationwide	> 25 million
Severe Convective Storm	Late July US SCS Outbreak	7/24/24-8/1/24	Nationwide	> 25 million
Wildfire	Park Fire California	7/24/24-8/20/24	California	> 25 million
Severe Convective Storm	Early Aug Eastern Outbreak	8/2/24-8/3/24	Nationwide	> 25 million
Severe Convective Storm	Minnesota Aug SCS	8/3/24-8/5/24	Minnesota	> 25 million
Hurricane	Hurricane Debby	8/3/24-8/14/24	Florida, Georgia, and the Carolinas	> 25 million
Severe Convective Storm	Northeast July SCS	8/4/24-8/6/24	Northeast	> 25 million
Severe Convective Storm	Mid August SCS	8/12/24-8/19/24	Nationwide	> 25 million
Severe Convective Storm	August Northern Outbreak	8/22/24-8/30/24	Nationwide	> 25 million
Hurricane	Hurricane Francine	9/9/24-9/14/24	Mississippi and Louisiana	> 25 million
Severe Convective Storm	Oklahoma City Hail & SCS	9/21/24-9/24/24	Oklahoma	> 25 million
			Florida, Carolinas, Georgia, Alabama, Tennessee, Kentucky, Virginia, West Virginia, Illinois, Indiana,	
Hurricane	Hurricane Helene	9/24/24-9/29/24	Ohio	> 25 million
Hurricane	Hurricane Milton	10/5/24-10/12/24	Florida, Georgia	> 25 million

Year	Event Type	Begin	End	Event	Country	Affected Area (Detail)	Munich Re NatCATService Insured losses (in original values, US\$m) Criteria: insured losses equal/greater US\$ 25m. Tries to reflect non-US losses only	Swiss Re Sigma: Insured Loss Est. US\$m (mid point shown if range given) Mostly reflect total US and nonUS losses combined.	
2015	Hurricane	08/16/92	08/28/92	Hurricane Andrew	Bahamas	Bahamas			> 25 million
2015	Hurricane	10/20/15	10/24/15	Hurricane Patricia		Central America, Mexico	N/A	N/A	> 25 million
2015	Typhoon	06/26/15	07/13/15	Typhoon Chan-hom (Falcon)		Guam, Northern Mariana Islands, Philippines, Japan, Taiwan, Chian, Korea, Russian Far East	N/A	N/A	> 25 million
2015	Severe Tropical Storm	07/01/15	07/10/15	Severe Tropical Storm Linfa (Egay)		Philippines, Taiwan, China	N/A	N/A	> 25 million
2015	Typhoon	07/02/15	07/18/15	Typhoon Nangka		Marshall Islands, Mariana Islands and Japan	N/A	N/A	> 25 million
2015	Typhoon	07/29/15	08/12/15	Typhoon Soudelor (Hanna)		Mariana Islands, Japan, Philippines, Taiwan, Eastern China and South Korea	N/A	N/A	> 25 million
2015	Typhoon	08/13/15	08/30/15	Typhoon Goni (Ineng)		Mariana Islands, Japan, Philippines, Taiwan, China, Russia and Korea	N/A	N/A	> 25 million
2015	Severe Tropical Storm	09/06/15	09/11/15	Severe Tropical Storm Etau		Japan, Russian Far East	N/A	N/A	> 25 million
2015	Typhoon	09/19/15	09/30/15	Typhoon Dujuan (Jenny)		Ryukyu Islands, Taiwan, East China	N/A	N/A	> 25 million
2015	Typhoon	09/30/15	10/05/15	Typhoon Mujigae (Kabayan)		Philippines, Vietnam and China	N/A	N/A	> 25 million
2015	Typhoon	10/12/15	10/21/15	Typhoon Koppu (Lando)		Northern Mariana Islands, Philippines, Taiwan, Ryukyu Islands	N/A	N/A	> 25 million
2015	Typhoon	12/03/15	12/08/15	Storm Desmond		Ireland, Isle of Man, United Kingdom, Iceland, Norway and Sweden	N/A	N/A	> 25 million
2015	Hurricane	09/28/15	10/15/15	Hurricane Joaquin		Caribbean Islands, Portugal	N/A	N/A	> 25 million
2015	Earthquake	04/27/15		Earthquake	Nepal		N/A	N/A	> 25 million
2015	Earthquake	09/22/15		Earthquake	Chile		N/A	N/A	> 25 million
2015	Wildfire	11/25/15	12/02/15	Pinery Bushfire	Australia	Lower Mid North, Light River, West Barossa, South Australia, Australia			\$75m
2015	Wildfire	12/25/15		Wye River, Separation Creek bushfires,	Australia	Great Ocean Road region of Victoria, Australia			~\$110m
2016	Hurricane	08/28/16	09/06/16	Hurricane Hermine		Dominican Republic, Cuba, The Bahamas	N/A	N/A	> 25 million
2016	Tropical Cyclone	02/16/16	02/22/16	TC Winston		South Pacific Islands	N/A	N/A	> 25 million
2016	Earthquake	02/06/16		Earthquake	Taiwan	Asia	N/A	N/A	> 25 million
2016	Earthquake	01/03/16		Kaohsiung EQ	India, Bangladesh, Myanmar	Asia	N/A	N/A	> 25 million
2016	Earthquake	02/14/16		Christchurch EQ	New Zealand	Oceania	N/A	N/A	> 25 million
2016	Earthquake	04/14/16	04/16/16	Kumamoto EQs	Japan	Asia	N/A	N/A	> 25 million
2016	Earthquake	04/16/16		Ecuador EQ	Ecuador	South America	N/A	N/A	> 25 million
2016	Tropical Cyclone	05/14/16	05/23/16	CY Roanu	Sri Lanka, India, Bangladesh, China	Asia	N/A	N/A	> 25 million
2016	Earthquake	08/24/16		Italy EQ	Italy	Europe	N/A	N/A	> 25 million
2016	Tropical Cyclone	09/14/16	09/16/16	STY Meranti	China, Taiwan, Philippines	Asia	N/A	N/A	> 25 million
2016	Tropical Cyclone	07/08/16	07/12/16	STY Nepartak	China, Taiwan	Asia	N/A	N/A	> 25 million
2016	Tropical Cyclone	09/26/16	09/29/16	TY Megi	Taiwan, China	Asia	N/A	N/A	> 25 million
2016	Earthquake	09/10/16		Kagera EQ	Tanzania, Uganda	Africa	N/A	N/A	> 25 million
2016	Tropical Cyclone	08/29/16	09/01/16	TY Lionrock	China, Japan, South Korea	Asia	N/A	N/A	> 25 million
2016	Tropical Cyclone	09/19/16	09/22/16	TY Malakas	Japan, China	Asia	N/A	N/A	> 25 million
2016	Tropical Cyclone	08/18/16	08/20/16	TS Dianmu	China, Vietnam	Asia	N/A	N/A	> 25 million
2016	Tropical Cyclone	07/31/16	08/03/16	TY Nidia	China, Philippines Vietnam	Asia	N/A	N/A	> 25 million
2016	Tropical Cyclone	08/02/16	08/10/16	HU Earl	Belize, Mexico, Caribbean Islands	Caribbean Islands, Mexico and Central America	N/A	N/A	> 25 million
2016	Tropical Cyclone	08/22/16	08/23/16	TS Mindulle	Japan	Asia	N/A	N/A	> 25 million
2016	Tropical Cyclone	09/06/16	09/08/16	HU Newton	Mexico	North America (non-U.S.)	N/A	N/A	> 25 million
2016	Tropical Cyclone	10/04/16	10/07/16	STY Chaba	Japan, Korea	Asia	N/A	N/A	> 25 million
2016	Tropical Cyclone	10/16/16	10/22/16	STY Haima	Philippines, China	Asia	N/A	N/A	> 25 million
2016	Tropical Cyclone	10/14/16	10/20/16	TY Sarika	Philippines, China, Vietnam	Asia	N/A	N/A	> 25 million
2016	Earthquake	10/26/16		Central Italy EQ	Italy	Europe	N/A	N/A	> 25 million
2016	Earthquake	10/27/16		Central Italy EQ	Italy	Europe	N/A	N/A	> 25 million
2016	Earthquake	10/21/16		Tottori	Japan	Asia	N/A	N/A	> 25 million



2016	Hurricane	09/28/16	10/10/16	Hurricane Matthew		Carribbean Islands and Eastern Canada	N/A	N/A	> 25 million
2016	Hurricane	08/28/16	09/06/16	Hurricane Hermine		Dominican Republic, Cuba, The Bahamas	N/A	N/A	> 25 million
2016	Wildfire	01/06/16		Waroona-Yarloop Bushfire	Western Australia				~\$71.25m
2016	Wildfire	05/01/16	05/26/16	Canada Wildfire	Canada	Fort McMurray			\$3.52b
2016	Wildfire	11/22/16	11/27/16	November 2016 Israel Fires	Israel	Various regions in Israel, mainly in Haifa, Judean Mountains and the Sharon Plain			>\$25m
2017	Earthquake	01/18/17		Earthquake	Italy	Europe	N/A	N/A	> 25 million
2017	Earthquake	01/28/17		Earthquake	China	Asia	N/A	N/A	> 25 million
2017	Earthquake	02/10/17		Earthquake	Philippines	Asia	N/A	N/A	> 25 million
2017	Earthquake	03/27/17		Earthquake	China	Asia	N/A	N/A	> 25 million
2017	Cyclone	03/28/17	04/05/17	CY Debbie	Australia	Queensland, New South Wales, New Zealand	N/A	N/A	> 25 million
2017	Earthquake	05/11/17		Earthquake	China	Asia	N/A	N/A	> 25 million
2017	Typhoon	07/29/17	07/31/17	TY Nesat & TS Haitang	China, Taiwan, Philippines	Asia	N/A	N/A	> 25 million
2017	Typhoon	08/07/17	08/09/17	Typhoon Noru	Japan	Asia	N/A	N/A	> 25 million
2017	Earthquake	08/08/17		Earthquake	China	Asia	N/A	N/A	> 25 million
2017	Typhoon	08/23/17	08/24/17	TY Hato	China	Macau, Hong Kong	N/A	N/A	> 25 million
2017	Typhoon	08/25/17	08/28/17	TY Pakhar	China	Asia	N/A	N/A	> 25 million
2017	Hurricane	08/25/17	09/02/17	Hurricane Harvey		Caribbean Islands and Central America	N/A	N/A	> 25 million
2017	Hurricane	08/30/17	09/16/17	Hurricane Irma		Caribbean Islands and Cape Verde	N/A	N/A	> 25 million
2017	Hurricane	09/05/17	09/26/17	Hurricane Jose		Caribbean Islands and Eastern Canada	N/A	N/A	> 25 million
2017	Hurricane	09/16/17	10/03/17	Hurricane Maria		Caribbean Islands, UK, Francs and Spain	N/A	N/A	> 25 million
2017	Earthquake	09/07/17		Earthquake		Mexico, Guatemala	N/A	N/A	> 25 million
2017	Earthquake	09/19/17		Earthquake	Mexico	Mexico City	>200	N/A	> 25 million
2017	Hurricane	10/04/17		Hurricane Nate		Central America, Cayman Islands, Cuba Yucatan Peninsula	N/A	N/A	> 25 million
2017	Wildfire	06/06/17		Knysna Fires	South Africa	Knysna region of the Western Cape			~\$146m
2017	Wildfire	07/01/17	08/01/17	British Colummbia Wildfires	Canada	British Columbia			>\$78m
2017	Wildfire	10/15/17	10/16/17	Iberian Wildfires	Portugal	Northern Portugal and Northwestern Spain			~\$210m
2018	Earthquake	02/06/18		Earthquake	Taiwan				> 25 million
2018	Earthquake	02/16/18		Earthquake	Mexico				> 25 million
2018	Cyclone	02/09/18	02/20/18	CY Gita	Tonga, Fiji, Samoa, New Zealand				> 25 million
2018	Earthquake	02/26/18		Earthquake	Papua New Guinea				> 25 million
2018	Earthquake	03/05/18		Earthquake	Papua New Guinea				> 25 million
2018	Cyclone	03/17/18		CY Marcus					> 25 million
2018	Tropical Storm	05/23/18	05/27/18	Tropical Storm Mekunu	Yamen, Oman , Saudi Arabia				> 25 million
2018	Tropical Storm	06/02/18	06/07/18	Tropical Storm Ewinar	Vietnam, China, Taiwan, Philippines and Ryukyu Islands	Guangdong Province, Jiangxi, Fujian, Zhejiang Provinces, and Hainan Island.			> 25 million
2018	Earthquake	06/18/18		Earthquake	Japan				> 25 million
2018	Super Typhoon	07/10/18	07/12/18	STY Maria	China, Taiwan, Guam and Japan	Fujian province, Yantze River Basin, Japan's Ryukyu Islands			> 25 million
2018	Tropical Storm	07/17/18	07/24/18	TS Sonh-Tinh	Vietnam, China, Loas	Japan, Russian Far East			> 25 million
2018	Tropical Storm	07/22/18	07/25/15	TS Ampil	China	Jiangsu, Zhejiang, Shandong, and Hebei			> 25 million
2018	Typhoon	07/27/18	08/03/18	TY Jongdari	Japan, China				> 25 million
2018	Earthquake	08/05/15	08/09/18	Earthquake	Indonesia				> 25 million
2018	Tropical Storm	08/09/18	08/15/18	TS Yagi	Philippines, China	Zhejiang, Anhui, Jiangsu and Shandong Provinces.			> 25 million
2018	Tropical Storm	08/13/18	08/19/18	TS Bebinca	China	Hong Kong, Guangdong and Hainan			> 25 million
2018	Typhoon	08/16/18	08/18/18	TY Rumbia	China	Shanghai, Jiangsu, Zhehiang, Anhui, Shandong and Henan			> 25 million
2018	Typhoon	08/23/18	08/25/18	TY Soulik	Japan, South Korea, China and Russia	Haenam County, South Jeolla Province			> 25 million
2018	Typhoon	09/04/18	09/05/18	RY Jebi	Japan, Mariana Islands, Taiwan, Japan, Russian Far East and Artic				> 25 million
2018	Earthquake	09/06/18		Earthquake	Japan	Hokkaido			> 25 million
2018	Super Typhoon	09/15/18	0918/18	STY Mangkhut	N. Mariana Islands, Philippines, China and Hong Kong				> 25 million

2018	Hurricane	Leslie	09/23/18	Hurricane Leslie	Azores, Bermuda, Europe	Azores, Bermuda, Madeira, Iberian Peninsula, France		> 25 million
2018	Hurricane		10/07/18	10/16/18	Hurricane Michael	Central American, Yucatan Peninsula, Cayman Islands, Cuba, Atlantic, Canad		> 25 million
2018	Wildfire	May-18	Aug-18	Sweden Wildfires	Sweden	ranging from north of Arctic Circle to the southern County of Scania.		>\$87m
2018	Wildfire	Jul-18		Greece Wildfires	Greece	Attica, Greece		~38.1m
2019	Cyclone	05/03/19	05/05/19	Cyclone Fani	India, Bangladesh			>500 million
2019	Earthquake	06/17/19		Earthquake	China			> 25 million
2019	Tropical Storm	08/01/19	08/08/19	Tropical Storm Wipha	China, Vietnam			> 25 million
2019	Typhoon	08/09/19	08/11/19	Typhoon Lekima	China			> 855 million
2019	Typhoon	08/15/19	08/16/19	Typhoon Krosa	Japan			>25 million
2019	Hurricane	08/31/19	09/07/19	Hurricane Dorian	Caribbean, Bahamas, Canada			>1 billion
2019	Typhoon	09/05/19	09/08/19	Typhoon Lingling	Japan, China, Korea			>5.78 billion
2019	Typhoon	09/08/19	09/09/19	Typhoon Faxai	Japan			> 7 billion
2019	Hurricane	09/19/19	09/22/19	Hurricane Humberto	Bermuda			>25+ million
2019	Hurricane	09/17/19	09/26/19	Hurricane Lorenzo	Portugal			>25+ million
2019	Earthquake	11/26/19		Earthquake	Albania			>25+ million
2019	Cyclone	11/08/19	11/11/19	Cyclone Matmo (Bulbul)	India, Bangladesh			>25+ million
2019	Typhoon	10/01/19	10/02/19	Typhoon Hagibis	Japan			> 7 billion
2019	Earthquake	12/18/19		Earthquake	Philippines			>25+ million
2019	Wildfire	Sep-19	Mar-20	Australian Bushfires	New South Wales, Queensland, Victoria, South Australia, Western Australia, Tasmania and Northern Territory			~910 million
2020	Earthquake	03/22/20		Earthquake	Croatia			>25+ million
2020	Cyclone	04/01/20	04/11/20	Cyclone Harold	Solomon Islands, Canuatu, Fiji, Tonga			> 25+ million
2020	Tropical Storm	05/31/20		Tropical Storm Amanda	El Salvador, Guatemala, Honduras			> 25+ million
2020	Tropical Storm	06/01/20	06/05/20	Tropical Storm Cristobal	Mexico, Guatemala, El Salvador			150 million
2020	Hurricane	07/25/20	07/27/20	Hurricane Hanna	Mexico			350 million
2020	Hurricane	07/28/20	08/01/20	Hurricane Isaias	Caribbean, Canada			> 3 billion
2020	Hurricane	08/22/20	08/25/20	Hurricane Laura	Caribbean			> 4 billion
2020	Typhoon	05/15/20	05/22/20	Typhoon Amphan	India, Bangladesh, Sri Lanka			15 billion
2020	Tropical Storm	06/03/20	06/04/20	Tropical Storm Nisarga	India			> 25+ million
2020	Typhoon	08/03/20	08/04/20	Typhoon Hagupit	China, Taiwan			> 100+ million
2020	Hurricane	10/05/20	10/12/20	Hurricane Delta	Jamaica, Nicaragua, Cayman Island, Yucatan Peninsula			> 2 billion
2020	Hurricane	10/24/20	10/30/20	Hurricane Zeta	Cayman Islands, Jamaica, Central America, Yucatan Peninsula, Ireland, United Kingdom			> 1.5 billion
2020	Cyclone	04/01/20	04/11/20	Cyclone Harold	Solomon Islands, Canuatu, Fiji, Tonga			> 25+ million
2020	Hurricane	10/31/20	11/14/20	Hurricane Eta	Colombia, Jamaica, Central America, Cayman Islands, Cuba, The Bahamas			> 7.9 billion
2020	Hurricane	11/14/20	11/19/20	Hurricane Iota	ABC Islands, Colombia, Jamaica, Central America			> 1.4 billion
2020	Typhoon	11/22/20	11/23/20	Typhoon Goni	Philippines, Vietnam, Cambodia, Laos			> 400+ million
2020	Typhoon	11/08/20	11/15/20	Typhoon Vamco	Philippines, Vietnam, Laos, Thailand			> 400+ million
2020	Wildfire	10/04/20		Lake Ohau Fire	New Zealand	Northwest of Lake Ohau Village		~\$25m
2020	Wildfire	02/05/21		Perth Hills Wildfire	Australia	Shire of Mundaring, Shire of Chittering, Shire of Northam City of Swan		~\$63m
2021	Earthquake	01/14/21	01/14/21	West Sulawesi	Indonesia			> 58.1 million
2021	Earthquake	02/13/21	02/13/21	Fukushima Prefecture Offshore	Japan			1.3 billion
2021	Tropical Cyclone	05/17/21		Tropical Cyclone Tautae	India			> 25+ million
2021	Tropical Storm	06/19/21	06/23/21	Tropical Storm Claudette	Oaxaca, Veracruz, Atlantic Canada			> 25+ million
2021	Earthquake	06/21/21	06/21/21	China	Yunnan Dali			> 25+ million
2021	Earthquake	06/21/21	06/21/21	China	Southern Qinghai			> 25+ million
2021	Hurricane	07/01/21	07/14/21	Elsa	Lesser Antilles, Greater Antilles, Venezuela, Colombia, Atlantic Canada, Greenland, Iceland			50 million
2021	Typhoon	07/16/21	07/31/21	In-fa (Fabian)	Philippines, Ryukyu Islands, Taiwan, China, North Korea			> 25+ million
2021	Tropical Storm	08/11/21	08/20/21	Fred	Lesser Antilles, Greater Antilles, Southern Quebec, The Maritimes			25 million
2021	Hurricane	08/13/21	08/21/21	Grace	Lesser Antilles, Greater Antilles, Yucatan Peninsula, Central Mexico			513 million
2021	Earthquake	08/14/21	08/14/21		Haiti			1 billion

2021	Hurricane	08/26/21	09/04/21	Ida	Venezuela, Colombia, Jamaica, Cayman Islands, Cuba, Atlantic Canada			> 250 million
2021	Earthquake	09/07/21	09/07/21	Guerrero	Mexico			200 million
2021	Earthquake	09/16/21			China			> 25+ million
2021	Hurricane	09/12/21	09/18/21	Nicholas	Yucatan Peninsula, Tamaulipas			1.1 billion
2021	Hurricane	09/10/21	09/11/21	Larry	Canada			80 million
2021	Cyclone	10/02/21	10/04/21	Cyclone Shaheen	Oman, Iran, India, Pakistan, United Arab Emirates, Saudi Arabia, Yemen			> 25+ million
2021	Earthquake	10/07/21	10/07/21		Japan			> 25+ million
2021	Tropical Storm	10/10/21	10/14/21	Tropical Storm Kompasu	Philippines, Hong Kong, China			245 million
2021	Earthquake	10/16/21	10/16/21		Indonesia			> 25+ million
2021	Tropical Cyclone	10/24/21	11/02/21	Apollo	Italy, Malta, Tunisia, Algeria, Libya, Turkey			> 25+ million
2021	Tropical Storm	10/31/21	11/07/21	Wanda	Atlantic Canada, Bermuda, Azores			> 25+ million
2021	Earthquake	11/14/21	11/14/21		Iran			> 25+ million
2021	Tropical Cyclone	12/14/21	12/18/21	Rai (Odette)	Caroline Islands, Palau, Philippines			> 25+ million
2022	Wildfire	01/15/22	02/28/22	Corrientes	Corrientes Province, Argentina			> 25+ million
2022	Earthquake	03/16/22		Fukushima Earthquake	Japan			2.8 billion
2022	Tropical Storm	04/08/22	04/12/22	Megi	Philippines			>25+ million
2022	Typhoon	08/28/22	09/07/22	Hinnamnor	Japan, Taiwan, Philippines, South Korea, Russian, Far East			>25+ million
2022	Earthquake	09/05/22		Luding Earthquake	Luding County in Sichuan province			>25+ million
2022	Hurricane	09/14/22	09/28/22	Fiona	Leeward Islands, Puerto Rico, Dominican Republic, Lucayan Archipelago, Bermuda, Eastern Canada, Saint Pierre and Miquelon, Greenland			660 million
2022	Hurricane	09/23/22	10/02/22	Ian	Trinidad and Tobago, Venezuela, Colombia, ABC Islands, Jamaica, Cayman Islands, Cuba			> 110 billion
2022	Hurricane	10/07/22	10/10/22	Julia	Trinidad and Tobago, Venezuela, ABC islands, Colombia, Nicaragua, El Salvador, Honduras, Guatemala, Panama, Mexico			>400 million
2023	Wildfire	02/01/23	03/06/23		Chile			>25 million
2023	Earthquake	02/06/23	02/20/23		Turkey, Syria			> 25 million
2023	Cyclone	02/12/23	02/17/23	Gabrielle	New Zealand			> 25 million
2023	Typhoon	05/23/23	05/31/23	Mawar	Guam			> 25 million
2023	Earthquake	06/16/23		France Earthquake	France			> 25 million
2023	Wildfire	08/15/23	09/21/23	Kelowna Wildfire	Canada			> 25 million
2023	Wildfire	08/24/23	09/30/23	Bush Creek Wildfire	Canada			> 25 million
2023	Earthquake	09/08/23			Morocco			> 25 million
2023	Typhoon	07/26/23	08/01/23	Doksuri	Philippines, Taiwan, China, Vietnam			> 25 million
2023	Typhoon	08/26/23	09/03/23	Saola	Eastern Asoa			> 25 million
2023	Typhoon	09/03/23	09/07/23	Haikui	Philippines, Taiwan, China			> 25 million
2023	Typhoon	09/27/23	10/11/23	Koinu	China, Japan, Philippines			>25 million
2023	Hurricane	10/22/23	10/25/23	Otis	Southern Mexico, primarily Guerrero			> 25 million
2023	Earthquake	12/18/23		Jishishan Earthquake	China			> 25 million
2024	Earthquake	01/01/24		Noto Earthquake	Ishikawa Japan			>25 million
2024	Severe Convective Storm	01/20/24	01/22/24	Windstorm Isha	Belgium, Switzerland, Germany, Denmark France, Great Britain, Ireland, Netherlands, Norway			>25 million
2024	Severe Convective Storm	01/23/24	01/24/24	Windstorm Jocelyn	Great Britain, Ireland, Demark, Germany, Netherlands, Norway, Poland			>25 million
2024	Severe Convective Storm	01/31/24	02/01/24	Windstorm Ingunn	Norway, Great Britain, Ireland, Sweden			>25 million
2024	Wildfire	02/01/24	03/22/24	Chile Wildfires	Chile			>25 million
2024	Severe Convective Storm	02/12/24	02/23/24	Windstorm Louis	Western & Northern Europe			>25 million
2024	Severe Convective Storm	02/14/24		Victoria Valentine's Day SCS	Australia			>25 million
2024	Severe Convective Storm	02/21/24	02/23/24	Windstorm Nelson	France, Portugal, Spain, Great Britain			>25 million
2024	Severe Convective Storm	03/30/24	04/03/24	Easter Weekend SCS	Czech Republic, France, Italy, Poland			>25 million
2024	Earthquake	04/03/24		Hualien Earthquake	Taiwan			>25 million
2024	Severe Convective Storm	04/03/24	04/08/24		Australia			>25 million
2024	Severe Convective Storm	04/04/24	04/07/24	Windstorm Olivia	Ireland, Great Britain, France, Spain, Portugal, Netherlands			>25 million
2024	Severe Convective Storm	04/16/24		Hyogo Hailstorm	Japan			>25 million
2024	Severe Convective Storm	05/14/24	05/17/24		Western & Central Europe			>25 million
2024	Severe Convective Storm	06/06/24	06/10/24	Storm Tina	Austria, Demark, Hungary, Switzerland, Slovakia, Romania			>25 million
2024	Severe Convective Storm	06/17/24	06/20/24	Storm Wibke	Denmark, France, Czech Republic, Poland, Switzerland, Belguim			>25 million
2024	Severe Convective Storm	06/10/24	06/16/24		Chile			>25 million



**CAPITAL ADEQUACY (E) TASK FORCE  
 WORKING AGENDA ITEMS FOR CALENDAR YEAR 2024**

<b>2024 2025 #</b>	<b>Owner</b>	<b>2024Priority</b>	<b>Expected Completion Date</b>	<b>Working Agenda Item</b>	<b>Source</b>	<b>Comments</b>	<b>Date Added to Agenda</b>
<b>Ongoing Items – P&amp;C RBC</b>							
P1	Cat Risk SG	1	Year-end <b>2024-2025</b> or later	Continue development of RBC formula revisions to include a risk charge based on catastrophe model output: a) Evaluate other catastrophe risks for possible inclusion in the charge - determine whether to recommend developing charges for any additional perils, and which perils or perils those should be.	Referral from the Climate and Resiliency Task Force. March 2021	<b>03/17/24 Proposal 2023-15-CR was adopted by the Subgroup, Working Group, and the Task Force during the Spring National Meeting 4/23/24 Proposal 2023-17-CR was adopted during April 23 interim Cat Risk SG meeting. 4/25/24 Proposal was adopted during the April 25 PCRBC WG interim meeting.</b>	4/26/2021
P2	PCRBCWG	1	Ongoing	Review and analyze the P/C RBC charges that have not been reviewed since developed.			3/23/2023
<b>Carryover Items Currently being Addressed – P&amp;C RBC</b>							

P3	P&C RBC WG	1	Year-end 2025 or later	Evaluate a) the current growth risk methodology whether it is adequately reflects both operational risk and underwriting risk; b) the premium and reserve based growth risk factors either as a stand-alone task or in conjunction with the ongoing underwriting risk factor review with consideration of the operational risk component of excessive growth; c) whether the application of the growth factors to NET proxies adequately accounts for growth risk that is ceded to reinsures that do not trigger growth risk in their own right. <i>Referral to the Academy:</i> <a href="https://naiconline.sharepoint.com/teams/FRSRBC/PRBC/2018%20Calls%20-%20PRBC/PCRBC/06_14/attC01_Growth%20Risk%20Referral%20to%20Academy.pdf">https://naiconline.sharepoint.com/teams/FRSRBC/PRBC/2018%20Calls%20-%20PRBC/PCRBC/06_14/attC01_Growth%20Risk%20Referral%20to%20Academy.pdf</a>	Refer from Operational Risk Subgroup	1) Sent a referral to the Academy on 6/14/18 conference call.	1/25/2018
P4	P&C RBC WG	1	2024 Summer Meeting or later	Continue working with the Academy to review the methodology and revise the underwriting (Investment Income Adjustment, Loss Concentration, LOB UW risk) charges in the PRBC formula as appropriate.		11/16/23 The Academy provided a presentation on their Underwriting Risk Report at the Joint PCRBC And Cat Risk SG meeting. 3/17/23 Proposal 2024-11-P was exposed for a 30-day public comment period during the Spring National Meeting. 4/25/24 Proposal 2024-11-P was adopted during the PCRBCWG interim meeting.	6/10/2019
P5	P&C RBC WG	1	2025 Summer Meeting or later	Evaluate the Underwriting Risk Line 1 Factors in the P/C formula.			7/30/2020

P6	Cat Risk SG	1	2025 <del>Spring</del> <del>Summer</del> Meeting	Quantify the R5 Ex-cat Factors for wildfire peril (for informational purposes only) Evaluate the possibility of adding PR018A to determine the R5 excluding the wildfire peril in <del>additional</del> addition to earthquake, and hurricane.			3/21/2023
P7	Cat Risk SG	2	<del>2025-2026</del> Spring Meeting	Evaluate the impact of flood peril to the insurance market			3/21/2023
<del>P8</del>	<del>PCRBCWG</del>	<del>1</del>	<del>2024 Spring Meeting</del>	<del>Adding pet insurance line in the RBC PR017, 018, 035 and RBC Schedule P, parts due to the adoption of the Annual Statement Blanks proposal 2023-01BWG.s</del>		<del>3/17/24 Proposal 2023-14-P was adopted by the Subgroup, Working Group, and the Task Force during the Spring National Meeting.</del>	<del>7/27/2023</del>
P9	Cat Risk SG	1	2024 Summer Meeting	Create a new disclosure to collect more information about insurers catastrophe reinsurance programs. <i>Referral from Reinsurance (E) Task Force:</i> <a href="https://naiconline.sharepoint.com/teams/FRSRBC/PRBC/2024%20Calls%20-%20Joint/03_17_NM/Att2c-%20Referral%20from%20RTF%20to%20PCRBCWG%20(1).docx">https://naiconline.sharepoint.com/teams/FRSRBC/PRBC/2024%20Calls%20-%20Joint/03_17_NM/Att2c-%20Referral%20from%20RTF%20to%20PCRBCWG%20(1).docx</a>	Refer from Reinsurance (E) Task Force	3/17/24 Proposal 2023-13-CR was adopted by the Subgroup, Working Group, and the Task Force during the Spring National Meeting.	2/20/2024
P10	PCRBCWG	1	2024 Summer Meeting	Update PR019, Line 25 Annual Statement Source and the Statement Value to avoid double counting on Stop-Loss premium.		3/17/24 Proposal 2024-10-P was exposed for a 30-day public comment period during	2/20/2024

							the Spring National Meeting- 4/25/24 Proposal was adopted during 4/25 PCRBCWG interim meeting-	
<del>P11P8</del>	Cat Risk SG	1	<del>2024-2025</del> Summer Meeting	Create additional Rcat pages to collect commercial Cat modelers product information known as "Climate Conditioned Catalogs", which would provide an estimate of climate change for hurricane and wildfire.	Refer from Solvency Workstream of the Climate & Resiliency (EX) Task Force	1/29/24 Proposal 2023-17-CR was exposed for a 30-day public comment period at the Cat Risk SG Interim Meeting on Jan. 29. 8/2/24 Proposal 2023-17-CR didn't get adopted in Financial Condition (E) Committee. Instead, the Committee adopted industry proposal 2024-20-CR MOD on August 2.	1/29/2024	



P9	Cat Risk SG	2	2025 Fall Meeting	Consider: 1) further investigating all geographic concentration related issues. 2) possibly modifying the property and casualty (P/C) risk-based capital formulas		6/10/24 Exposed a referral from the Tas Force for a 30-day comment period ending July 10.	
P12	PCRBCWG	1	2024 Spring Meeting	Change the RBC Schedule P short tail lines to vendor link, which will pull directly from the Annual Statement, Schedule P short tail lines as the adopted blanks proposal 2023-16BWG modified the Schedule P short tail lines to show 10 years of data beginning in 2024.		2/21/24 Blanks Proposal 2023-16BWG was adopted at the BWG meeting. 3/17/24 Proposal 2024-01-P was adopted by the Subgroup, Working Group, and the Task Force during the Spring National Meeting.	
<b>New Items – P&amp;C RBC</b>							
P13	Cat Risk SG	2	2025 Fall Meeting	Consider: 1) further investigating all geographic concentration related issues. 2)3) possibly modifying the property and casualty (P/C) risk-based capital formulas		6/10/24 Exposed a referral from the Tas Force for a 30-day comment period ending July 10.	

--	--	--	--	--	--	--	--	--

**Historical Comments:**

**P1:**

4/26/21 - The SG exposed the referral for a 30-day period.

6/1/21 - The SG forwarded the response to the Climate and Resiliency Task Force.

2/22/22 - The SG adopted proposal 2021-17-CR (adding the wildfire peril for informational purposes only). The SG continues reviewing other perils for possible inclusion in the Rcat.

8/11/22 – The TF adopted Proposal 2022-04-CR (2013-2021 Wildfire Event Lists)

9/26/22 – The SG formed an ad hoc group to conduct review on severe convective storm models.

7/18/23-The SG is finishing reviewing the following SCS vendor models: RMS, Verisk, KCC, and Corelogic.

12/2/23-Proposal 2023-15-CR (Convective Storm for Informational Purposes Only Structure) was exposed for a 30-day comment period at the Joint P/C RBC and Cat Risk SG meeting.

[03/17/24 Proposal 2023-15-CR was adopted by the Subgroup, Working Group, and the Task Force during the Spring National Meeting](#)

[4/23/24 Proposal 2023-17-CR was adopted during April 23 interim Cat Risk SG meeting.](#)

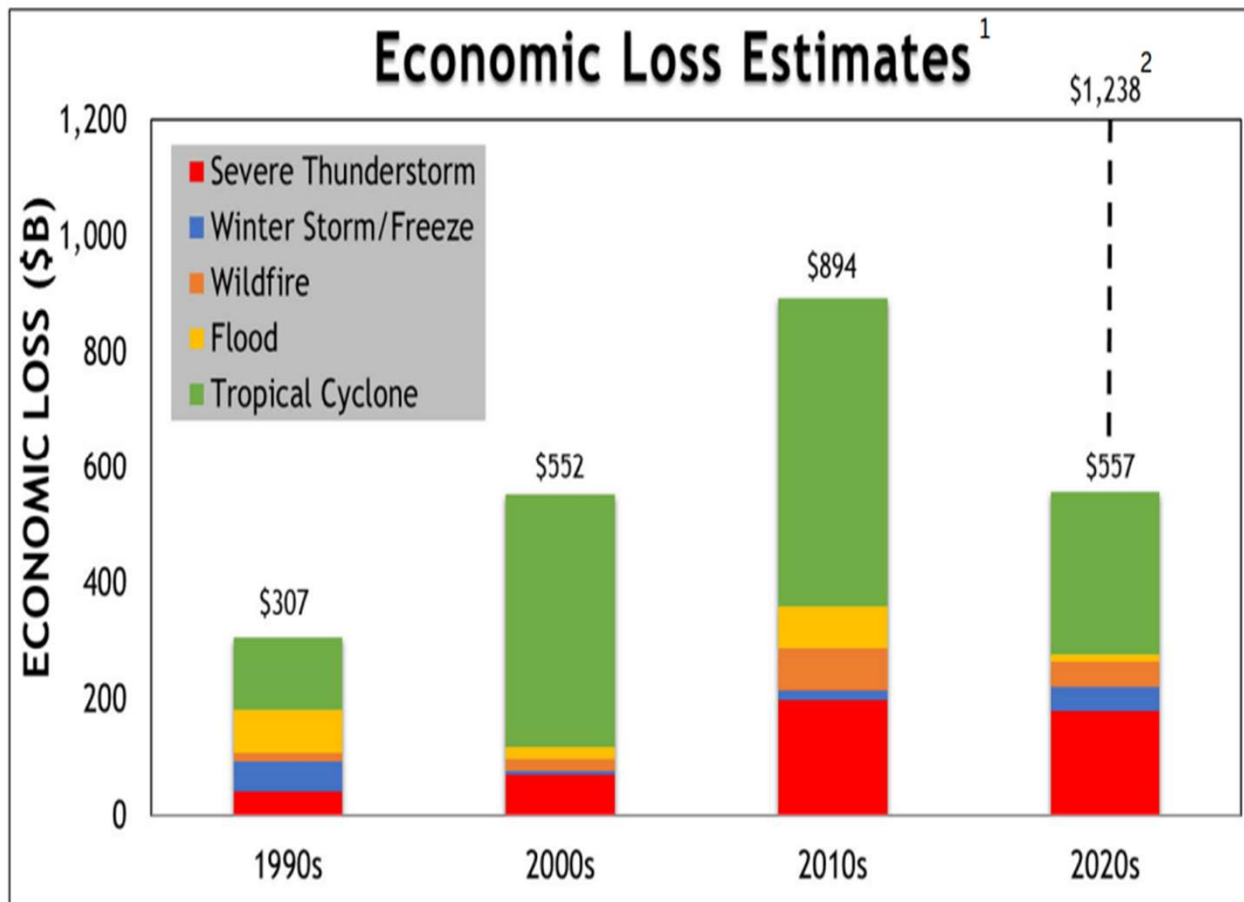
# The State of the Flood Insurance Market: Trends, Challenges, and Opportunities

November 18, 2024

# Information About This Panel Discussion

- The presenters' statements and opinions are their own and do not necessarily represent the official statements or opinions of the Casualty Actuarial Society, American Academy of Actuaries, or any other actuarial organization, nor do they necessarily express the opinions of their employers.
- This discussion is in compliance with the requirements of applicable law, including federal antitrust laws.
- This program, including remarks made by attendees, may be recorded and published. Additionally, it is open to the news media.

# US Catastrophes – Economic Losses by Decade

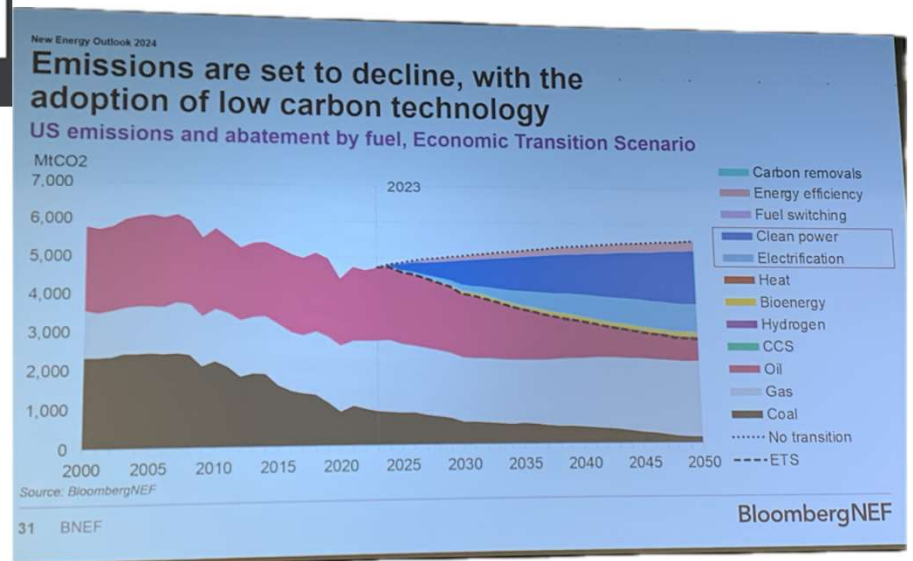
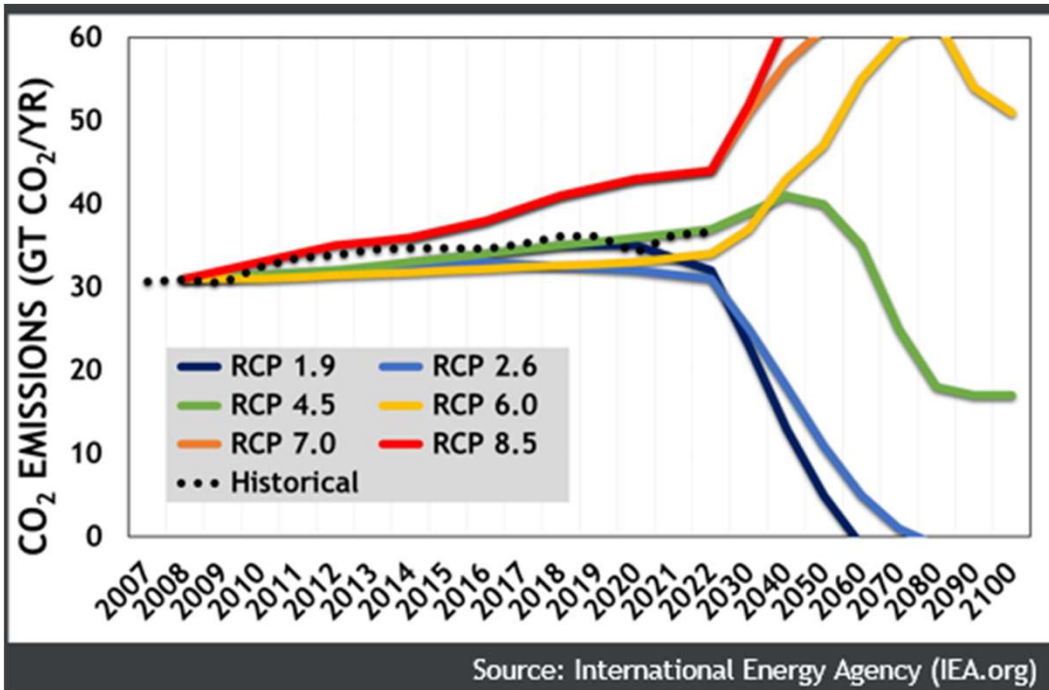


<sup>1</sup> NCEI Billion-Dollar Weather and Climate Disasters (CPI-adjusted): <https://www.ncei.noaa.gov/access/billions/events>

## Top 15 Loss Events (\$B)

1) Hurricane Katrina (2005)	\$200
2) Hurricane Harvey (2017)	\$159
3) Hurricane Ian (2022)	\$119
4) Hurricane Maria (2017)	\$114
5) Hurricane Sandy (2012)	\$88
6) Hurricane Ida (2021)	\$85
7) Hurricane Irma (2017)	\$64
8) Hurricane Andrew (1992)	\$60
9) Midwest Flooding (1993)	\$46
10) Hurricane Ike (2008)	\$42
11) Hurricane Ivan (2004)	\$34
12) Hurricane Michael (2018)	\$31
13) Hurricane Florence (2018)	\$30
14) California Wildfires (2018)	\$30
15) Hurricane Wilma (2005)	\$30

# Climate Changes – $\Delta 2.5^{\circ}\text{C}$ ? Green Energy?



# Trends / Challenges / Opportunities



# Presenters

## **Moderator**

Wanchin Chou, MAAA, FCAS, CPCU, CSPA, CCRMP, Chairperson, Committee on Cyber Risk

## **Panelists**

George Bradner, MAAA, Asst. Deputy Commissioner and Director Property & Casualty Division

Greg Dietzen, FCAS, MAAA, Consulting Actuary, Milliman, Inc.

Matthew Nielsen, CCRMP, Senior Vice President, Moody's





# Connecticut Storm History

## A Framework for Connecticut

By George Bradner, Asst. Deputy Commissioner  
& Property Casualty Director  
Connecticut Insurance Department (CID)



# ...Our Reality



Sandy – October 2012



Irene – August 2011



October 2011  
Nor'easter



# Connecticut's Risks

**The insured value of residential and commercial properties in coastal counties now exceeds \$13 trillion.**

- **CT Coastal Property: \$675 billion worth of property insured on CT coastline, 7th highest of 18 Atlantic states**
- **Value of insured coastal property: Comprises 64% of all insured property in the state, 3<sup>rd</sup> only to FL & NY**
- **Trees: Nearly 60% of CT is forested. One of the most heavily forested states, among the most densely populated.**
- **Flooding!!!!**



# Disaster Declarations

<u>January 2011 Record Snowstorm</u> (FEMA DR 1958)	\$ 9.4 million
<u>Tropical Storm Irene August 2011</u> (FEMA DR 4023)	
PA/IA/SBA:	\$ 13.7 million
<u>October Nor'easter October 2011</u> (FEMA DR 4046)	\$ 114.5 million
<u>Super Storm Sandy October 2012</u> (FEMA DR 4087)	
PA/IA/SBA:	\$ 138.2 million
<u>February 2013 Severe Winter Storm</u> (FEMA DR 4106)	\$ 31.0 million
<u>January 2015 Sever Snow Storm</u> (FEMA DR 4213)	\$ 9.5 million
<u>May 2018 Tornado Outbreak</u> (FEMA DR 4385)	\$ 20.1 million
<u>September 2018 Severe Storms &amp; Flooding</u> (FEMA DR 4410)	\$ 3.0 million
<u>August 2020 Tropical Storm Isaias</u> (FEMA DR 4580)	\$ 40.7 million
<u>September 2021 Remnants of Hurricane IDA</u> (FEMA DR 4629)	\$ 8.2 million
PA/IA/SBA	
<u>August 2024 Sever flooding Western CT IDA</u> (FEMA DR TBD)	\$ TBD
PA/IA/SBA	
Natural Disaster	\$ 388.3 million

Connecticut has had 16 Federal Disaster declaration in the past 23 years 11 have occurred since 2010



# Storms By The Numbers

Storm	Claims	Claims \$ Paid	Complaints to CID
Sandy (2012)	61,791	\$493M	134
Irene (2011)	60,000	\$235M	237
2011 Nor'easter	93,000	\$247M	60
Winter 2010-11	n/a	\$165M	n/a

# Flooding

- *Flood is the overflow of water onto normally dry land, which can cause widespread devastation to critical infrastructure and property.*

**Pluvial Flood**  
(Surface Water & Flash 7 Urban)



Source: Digital Asset Library

**Fluvial Flood**  
(Riverine)



Source: Digital Asset Library

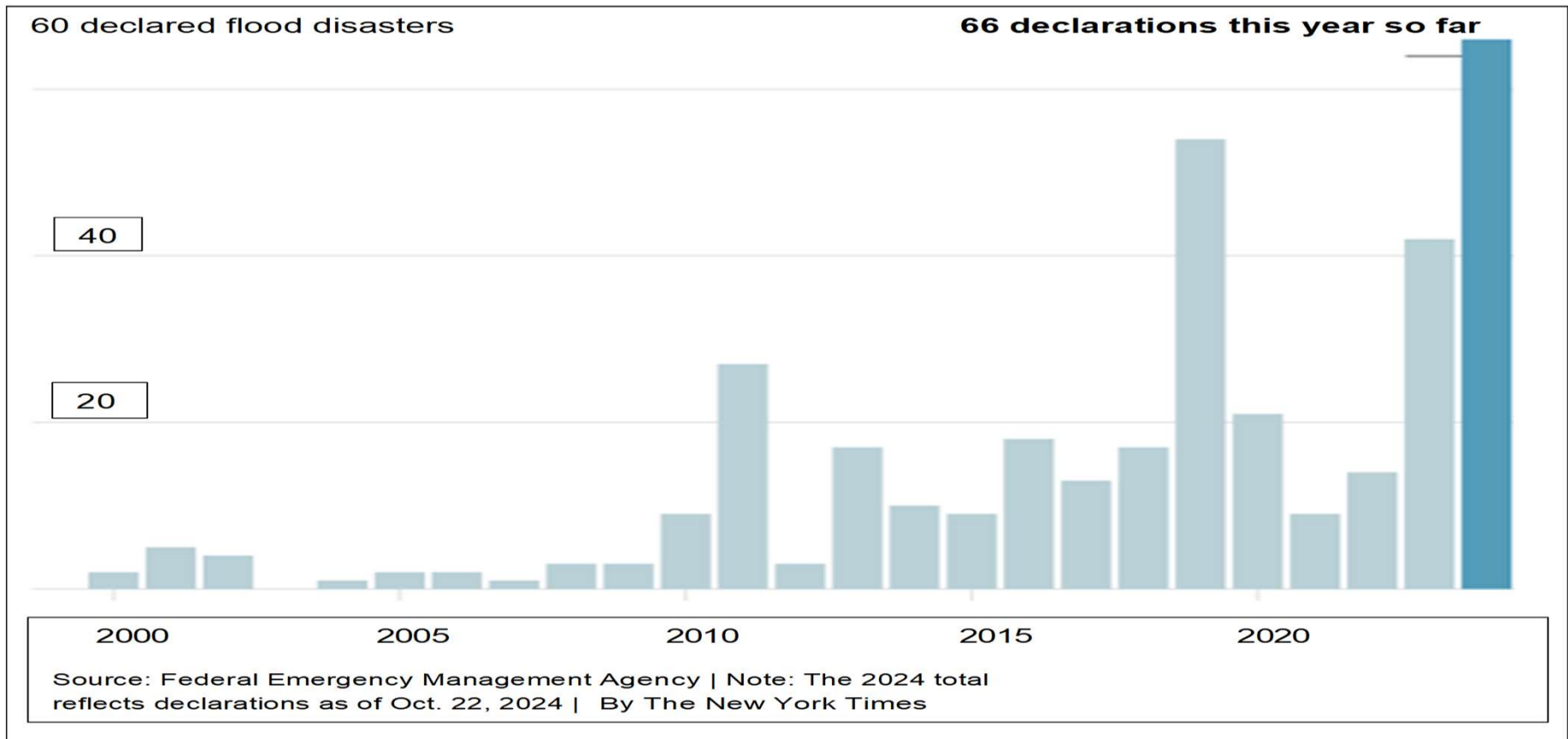


- WHAT IS THE RISK.....
- Floods & Storms are not going away....
- Frequency of Flooding and catastrophic events are increasing

# “If it rains you can flood”

- Flooding is the fastest growing risk impacting all states.

**A surge in U.S. flood disasters**



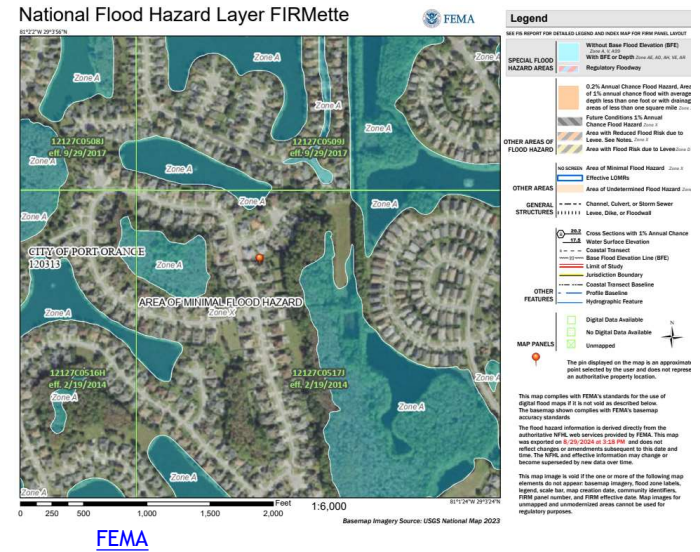


# FEMA Flood Zone Mapping Limitations

“There are limitations that we need to address,” Grimm said. “What the maps right now are mainly covering are that coastal flood hazard and the riverine flood hazard for larger riverine watersheds. Michael Grimm, acting deputy associate administrator of FEMA’s Federal Insurance and Mitigation Administration<sup>1</sup>

- \* FEMA Flood Zones do account for coastal flood hazard and the riverine flood hazard for larger riverine watersheds
- \* Maps are mandated to be updated every 5 years, but new ones take an average of 7 years to complete
- \* FEMA maps are not designed for Extreme Rainfall events (pluvial/flash/urban flooding)
- \* FEMA maps consider current conditions and do not consider climate change

Source: [Washington Post](https://www.washingtonpost.com/news/energy-environment/wp/2017/07/26/fema-flood-maps-are-not-designed-for-extreme-rainfall-events-urban-flooding/)



FEMA Flood Classification	Hazard Description
Beginning with the letters 'A' or 'V'	Special Flood Hazard Area (SFHA). High risk areas with at least a 1 in 4 chance of flooding.
B, X (shaded)	Area of moderate flood hazard, usually the area between the limits of the 100- year and 500-year floods. B Zones are also used to designate base floodplains of lesser hazards, such as areas protected by levees from 100-year flood, or shallow flooding areas with average depths of less than one foot or drainage areas less than 1 square mile.
C, X (unshaded)	Area of minimal flood hazard, usually depicted on FIRMs as above the 500-year flood level. Zone C may have ponding and local drainage problems that don't warrant a detailed study or designation as base floodplain.

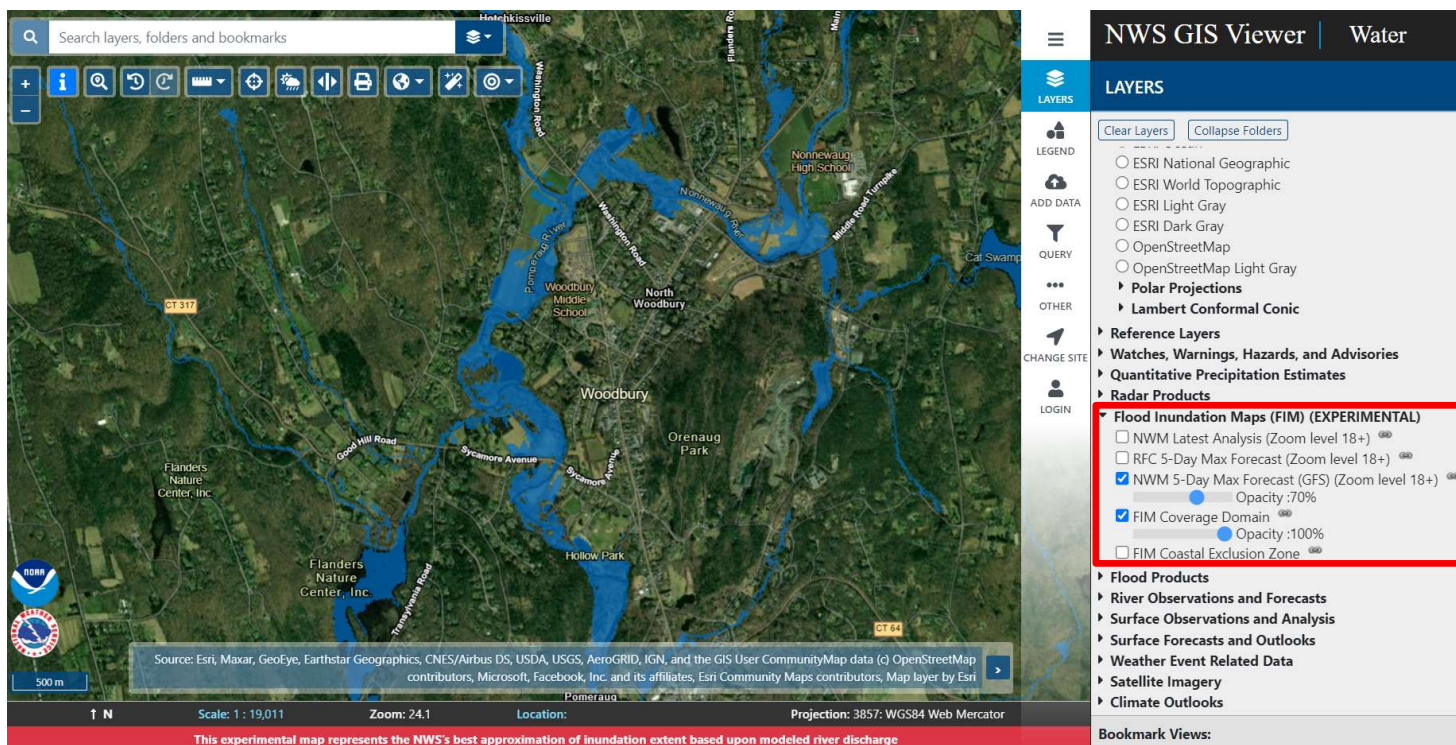
Source: [FEMA](https://www.fema.gov/national-flood-hazard-layer)

# Category 2 Surge Flooding Outside FEMA V & A Zones, Groton CT



- Cat 2 Surge
- Zone A
- Zone X500

[National Hurricane Center](#)   [FEMA](#)





# Sandy By The Numbers

Sandy FEMA Numbers	# Applicants/ Claims	Eligible Applicants	Claims \$ Paid	Average Paid
*Individual Households	8,715	2,969	\$15.3M	\$5,156
SBA	9,781 <small>Apps issued</small> 1,870 <small>Received</small>	830	\$52.1M	\$62,771
**NFIP	6,171	**5,478	\$247M	\$42,838
Public Assistance	n/a	n/a	\$65.3M <small>Estimated</small>	n/a
Total			\$359.0M	

\*IHP MAX AWARD: \$31,900 X 38 AWARDS (as of 3/2014)

\*\* As of January 2014

# Unmet Need/Un-Insured Loss

- \$20k Finished Basement (no insurance)
- \$120k Home Elevation (\$7k-\$10k/per foot elevation)
- \$42k Uninsured Flood (above basement level)
- \$22k Additional Living Expense (1 year rental costs @ \$2k/month)
  
- \$200k potential Unmet need or uninsured loss
  
- CONSUMERS DON'T UNDERSTAND THEIR UNMET NEED OR UNINSURED LOSS RISK....THE GAP



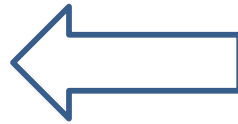
## DO stronger Building standards work?



<https://disastersafety.org/hurricane/2010-ibhs-research-center-grand-opening/>



# Stronger Homes Stronger Insurance Market



- Fewer losses
- Carriers stay in the market
- Accessibility & affordability



High Risk Area  
High Premiums  
Carriers leave market  
Few choices for consumers

## NFIP changes

Change	Why it was made
Replacement cost	Inequitable subsidization
CAT models	Comprehensive view of risk
Geographic rating factors	Intuitive risk drivers
Prior claims rating factor	2+ claims in 10 years
Levee data	Novel approach to evaluate risk

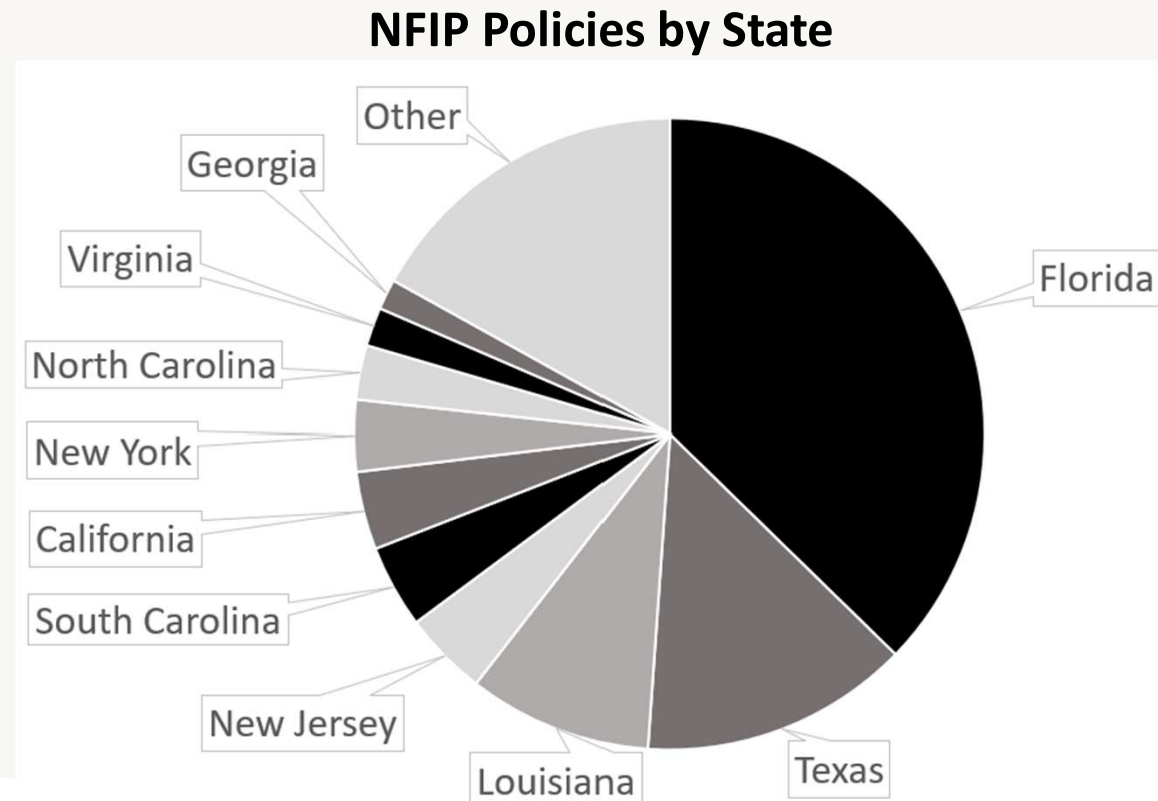
### Unchanged

- Annual premium increase limits
- Maps to determine mandatory purchase



## Flood market size

- **4%** of single-family homes insured
- NFIP as of Sept. 2024
  - **\$4.0B** premium
  - **4.7M** policies



### Sources

1. Milliman analysis of data from OpenFEMA, SNL, US Census
2. FEMA Pivot Portal

## Flood market size

- U.S. private insurers flood premium:
  - **\$1.03B** in 2021, **\$1.29B** in 2022, **\$1.40B** in 2023
  - ~30% residential
- Non-U.S. private insurers (Alien, Lloyd's) private flood premium:
  - **\$0.99B** in 2021, **\$1.35B** in 2022
  - ~20% residential
- Private flood premium in 2022: Admitted **26%**, Non-Admitted **74%**

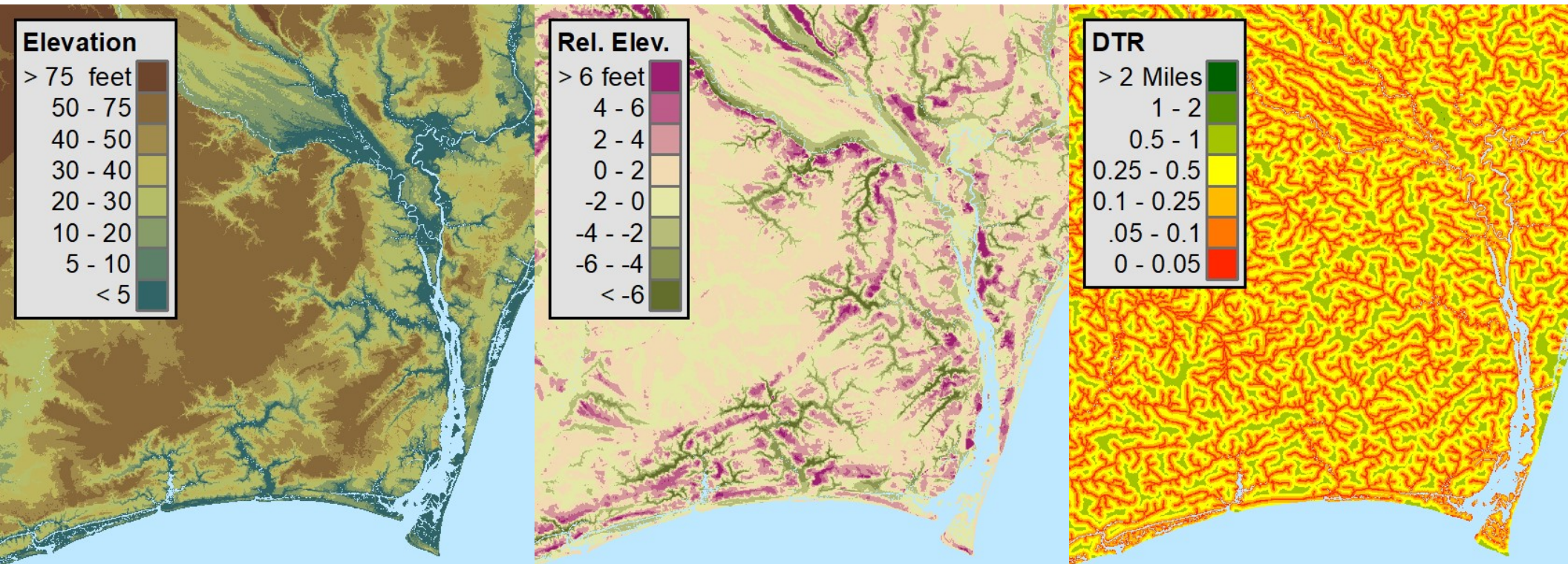
### Sources

1. NAIC Annual Statement data via SNL
2. NAIC Surplus Lines Industry Summary

## Private flood basics

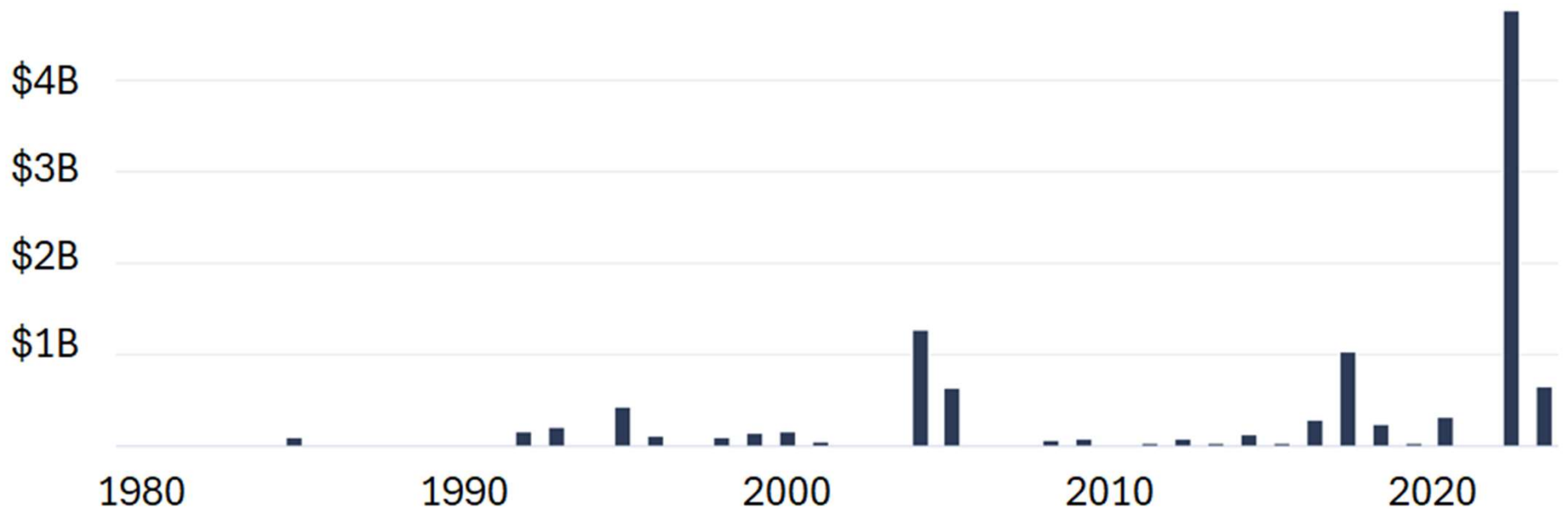
- Supplements the NFIP in the market
  - Loss of use, ordinance or law, personal property replacement cost
  - Higher limits
  - Different views of risk
- Acceptable for mandatory purchase requirement
- CAT models and Geographic Information Systems

# Geographic Information Systems (GIS)



# Historical loss data is insufficient

## Florida NFIP Claims Payments

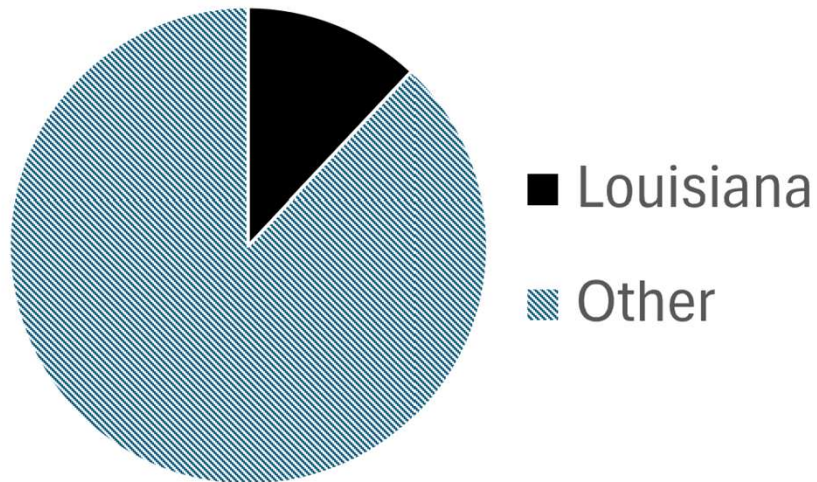


Source: [floodsmart.gov](https://www.floodsmart.gov)

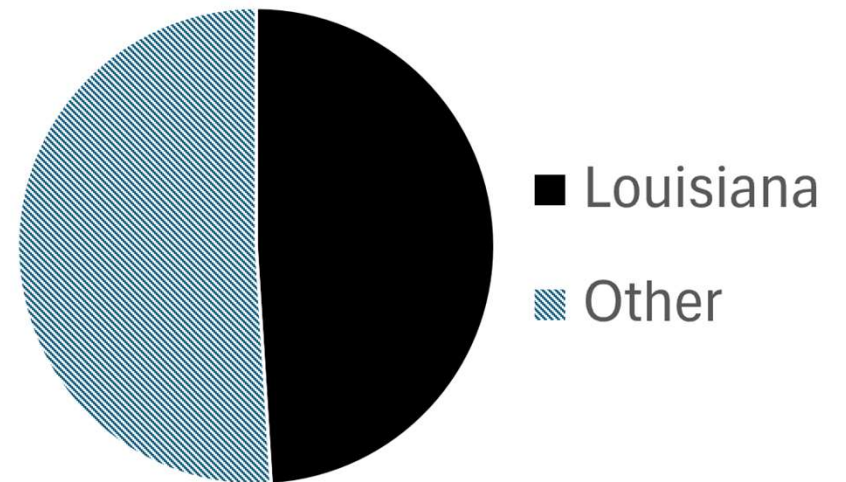
# Historical loss data is insufficient

## Cumulative NFIP Losses

1980 to 2004



1980 to 2005



Source: OpenFEMA

MOODY'S



# US Inland Flood Model Overview

# Flood Generating Mechanisms

## Fluvial Major Rivers



### Major Floodplain Model

- Major rivers leaving their embankments, overtopping or breaching defenses, flooding surrounding area
- Driven by heavy precipitation or snow melt in the affected area or upstream
- Large-scale, both spatially and temporally

## Pluvial Surface Water, Minor Rivers



### Minor Floodplain Model

- Excess rainfall or snowmelt that does not infiltrate or drain, causes flooding independent of flooding from major rivers
- Localized to medium scale flooding
- Flow velocity can lead to extensive damage

## Coastal Storm Surge



### Subperil to Wind Models

- Coastal Flooding typically from the oceans or seas
- Result of extreme tidal conditions caused by severe weather
- Loss amplifying factors salt water and wave action



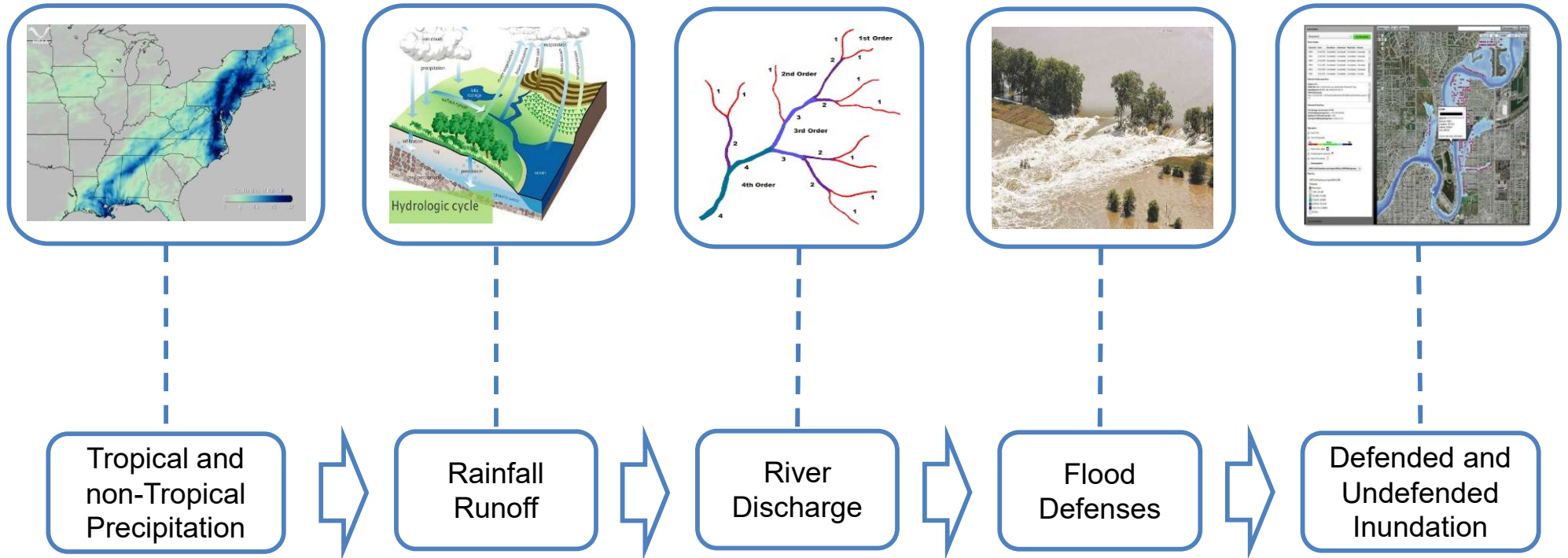
## Complex interactions

- Precipitation
- Coastal-inland interactions
- Characteristics of watershed
- Antecedent conditions
- Built environment & defenses
- Spatial and temporal resolution
- Exposure concentration
- Regionality in vulnerability



Midland, Michigan, U.S. May 20, 2020. PHOTO BY REUTERS

# Flood Hazard Framework



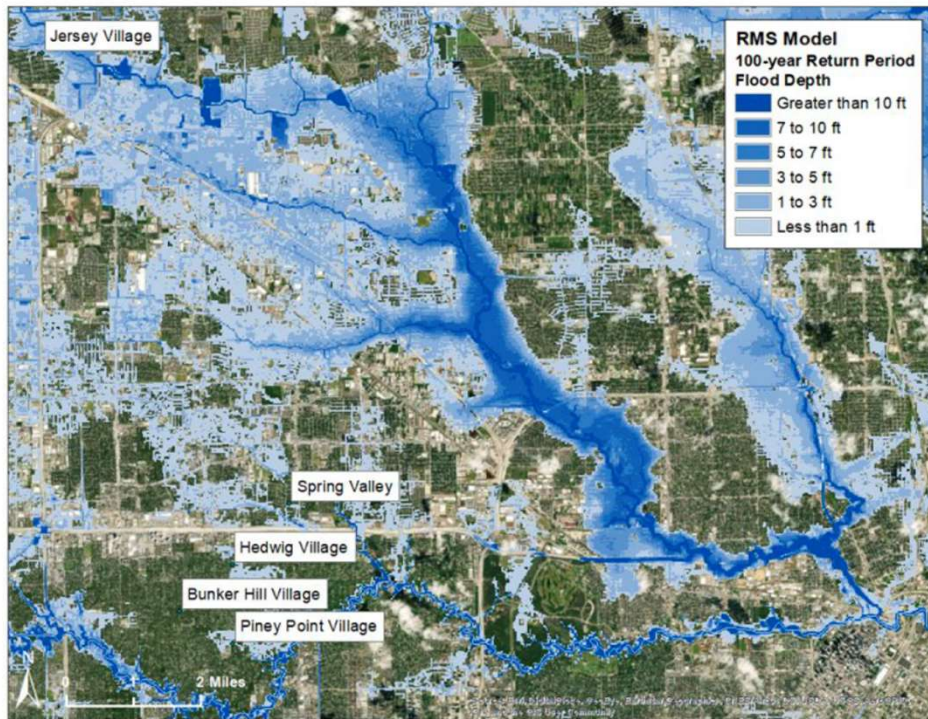
# Major basins and river network in the U.S. Inland Flood HD

- Covering an area of over 8.1 million km<sup>2</sup>
- 12 basins with a combined total of approximately 15,000 catchments (average size of ~ 310 mi<sup>2</sup> or 500 km<sup>2</sup>)
- River network of around 370,000 miles (600,000 km) length



# Inundation Validation Example

RMS modeled 100-year defended major and minor floodplain



FEMA 100-year flood floodplain from the Digital Flood Insurance Rate Maps

