GuyCarpenter

CLIMATE CHANGE'S INFLUENCE ON SEVERE WEATHER: RAMIFICATIONS FOR NYSIR

July 23, 2024

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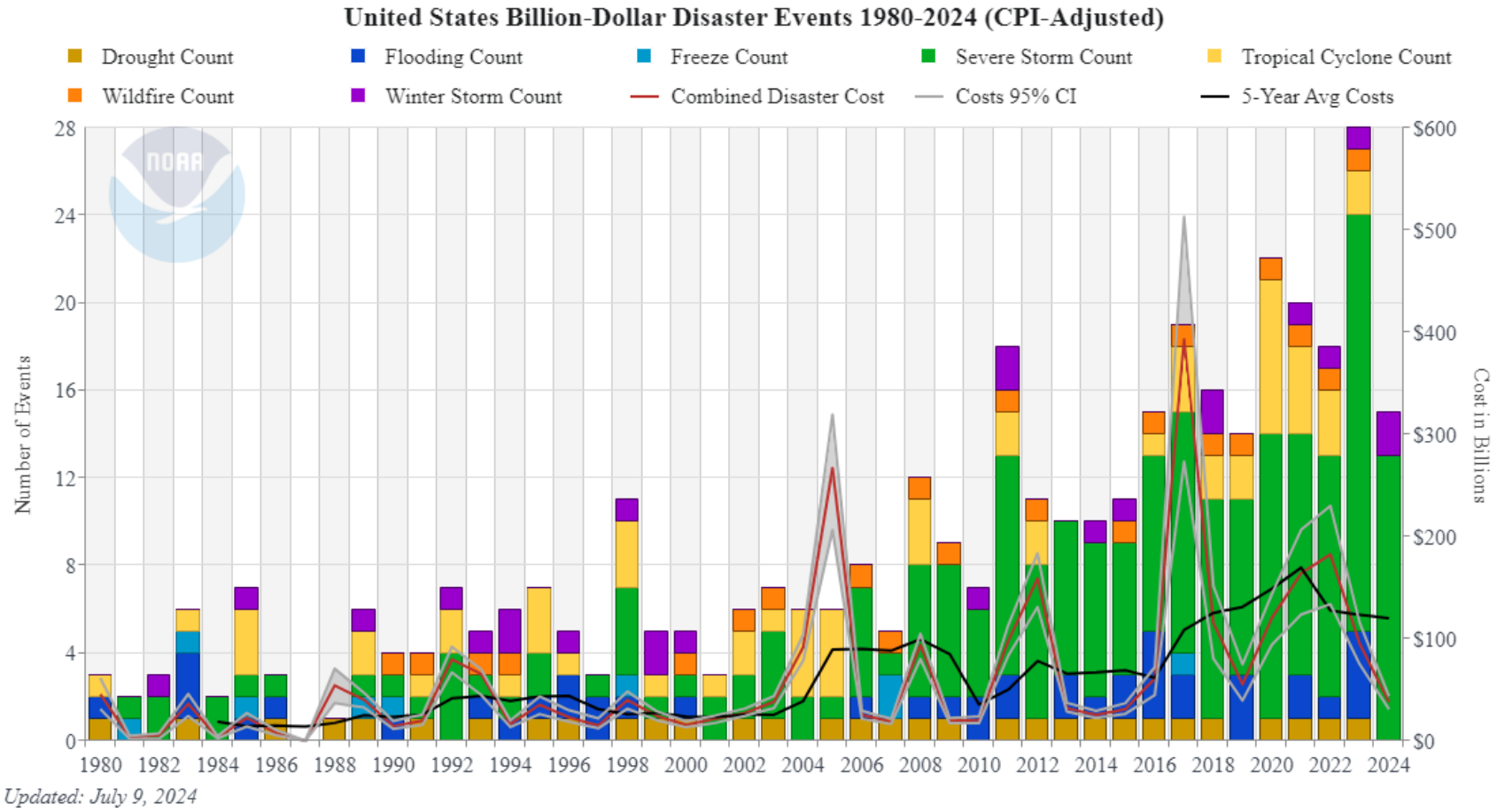
A business of Marsh McLennan

1. The Urgency to Address Climate Risks
2. The Evolving Physical Risk Landscape
3. Guy Carpenter Offering
4. NYSIR Portfolio Results

Agenda

The Urgency to Address Climate Risks

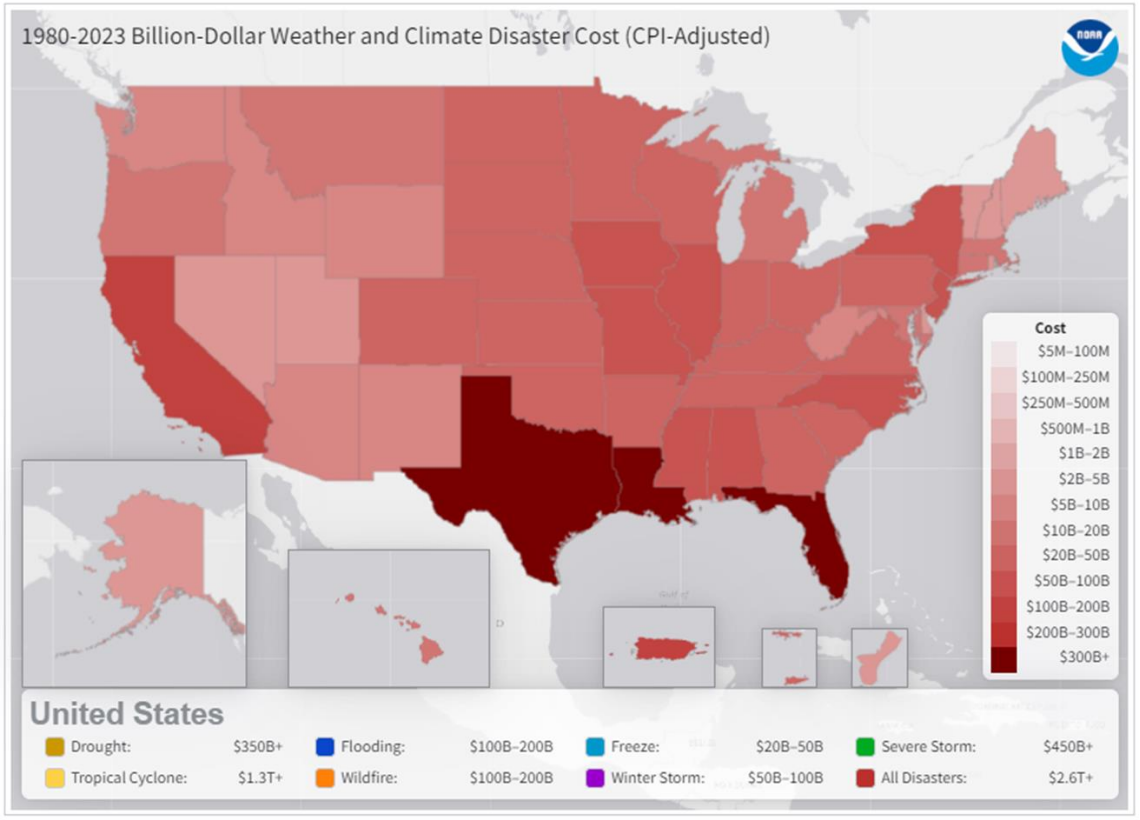
Increasing Frequency of US Billion Dollar Loss Events

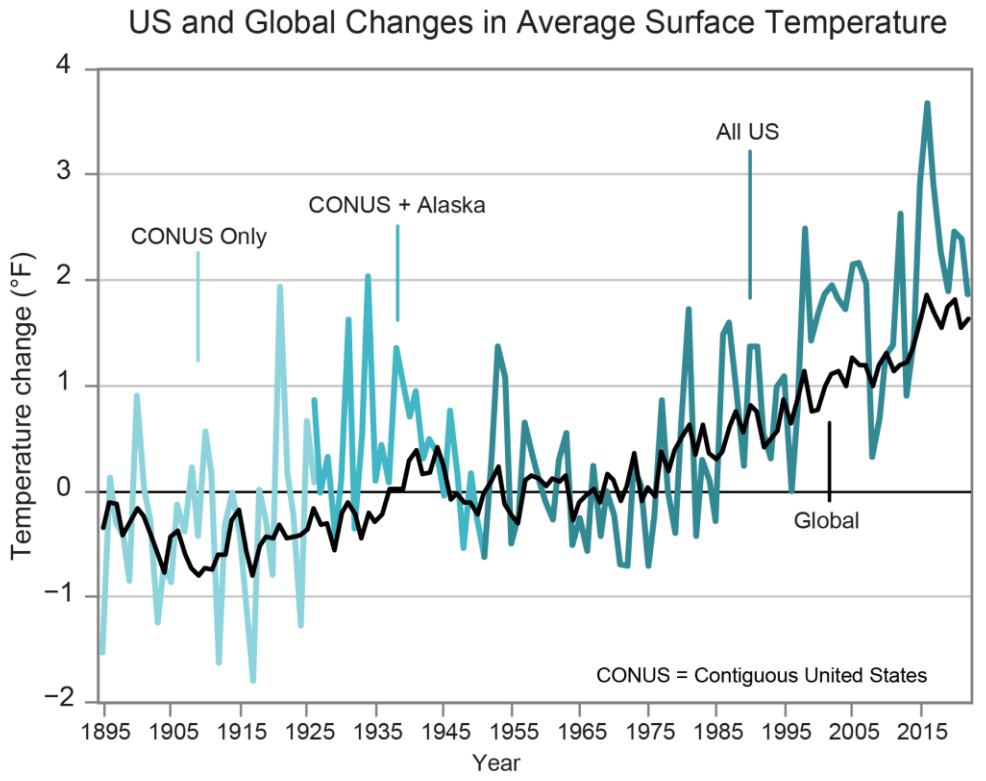


28 billion-dollar loss events were recorded in 2023 which broke the previous record (23 events) for most billion-dollar loss events in a year.

Increase in Losses Has Coincided With Temperature Increase

Largest Losses Are Observed in the Gulf States

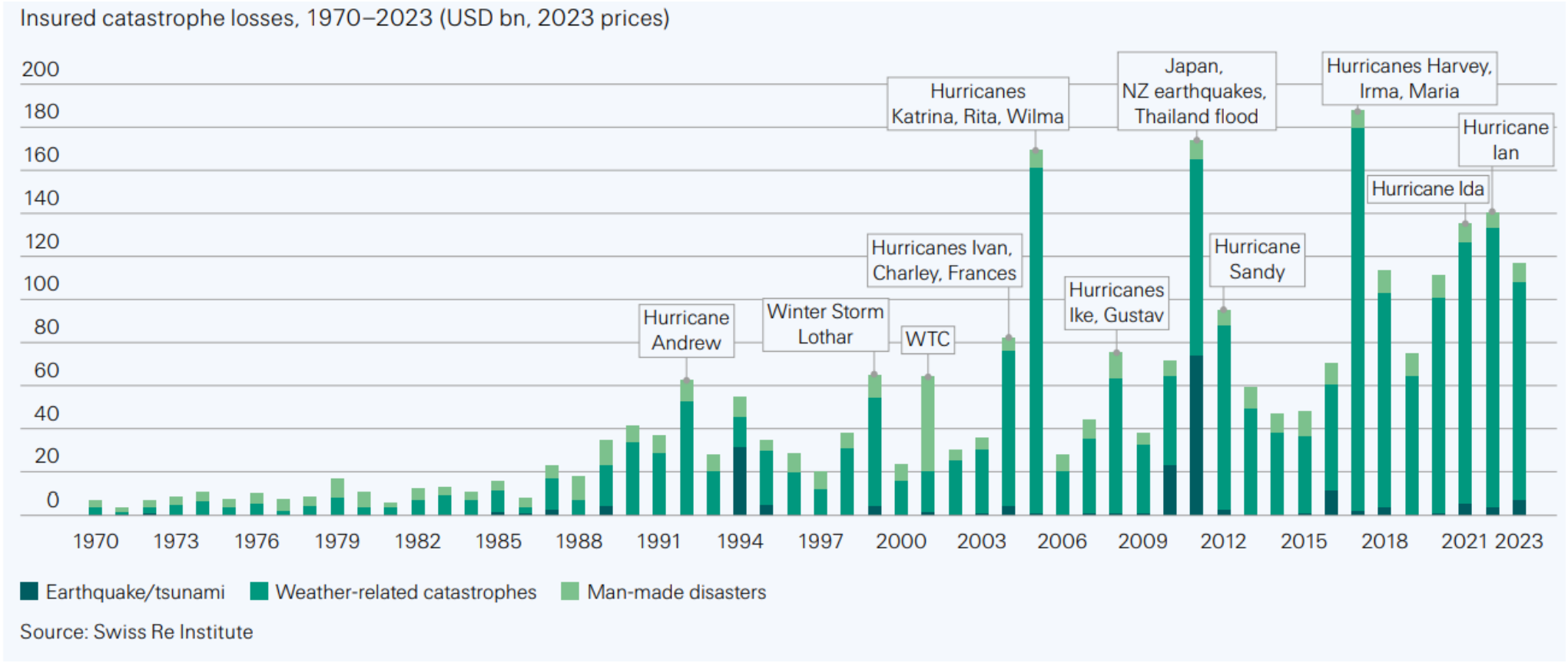




US temperature trends and fluctuations are slightly larger than the global ones.

Global Insured Losses Show a Similar Trend

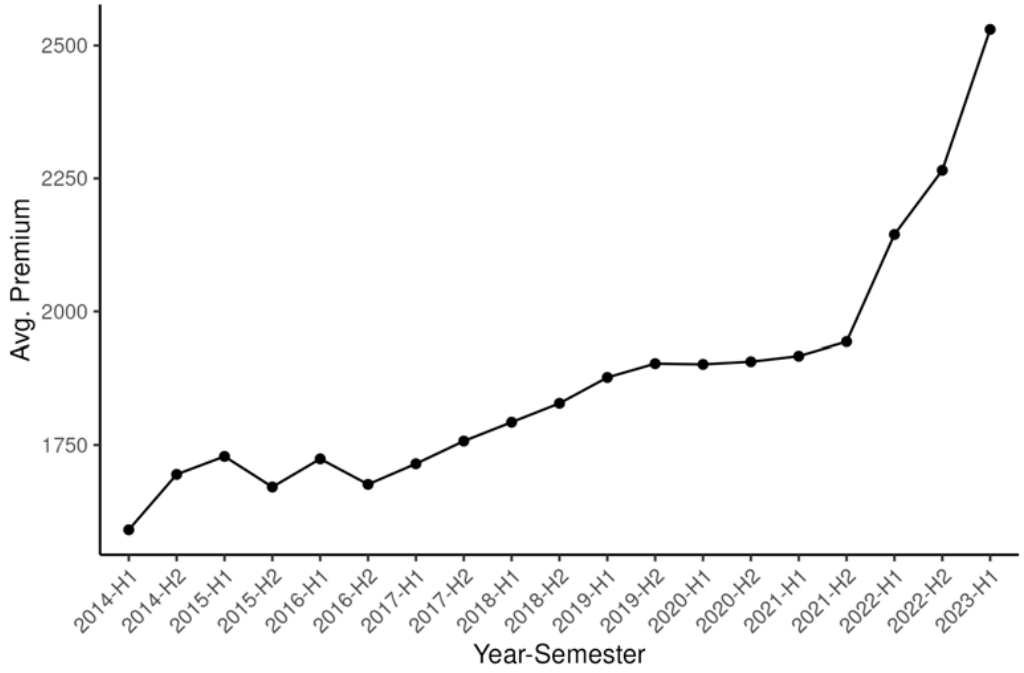
4 Years in a Row over $100 billion and 6 of the last 7 years

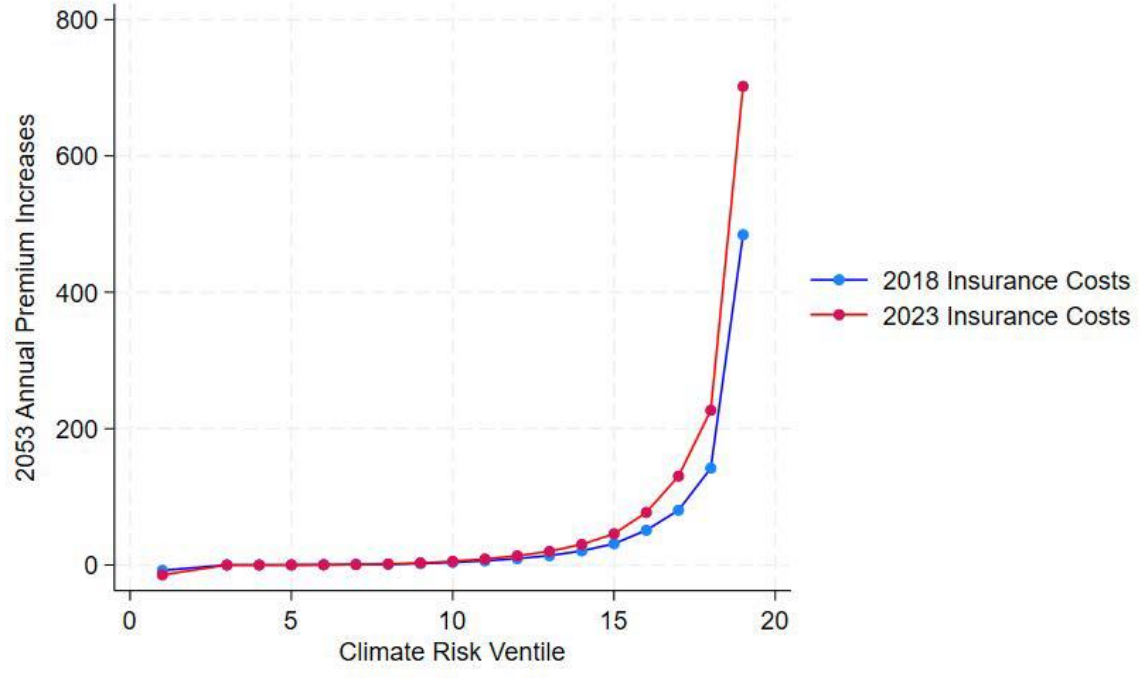


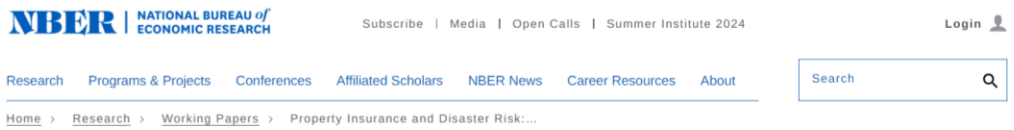
The share of insured losses from so-called secondary perils was roughly 81% (thunderstorms, hail and tornadoes, floods, droughts, wildfires, landslides, snow, freeze) in 2023, almost double the share in 2022.

Insurance Premiums Are Responding

Study Shows Premiums Have Skyrocketed; Projects Premiums in Higher Risk Locations To Accelerate





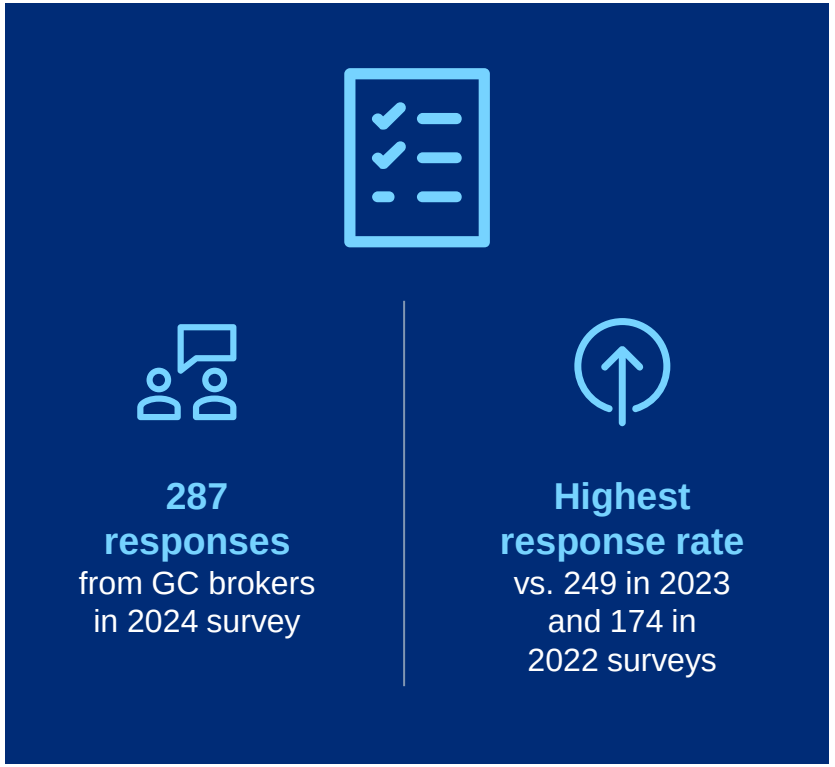


Property Insurance and Disaster Risk: New Evidence from Mortgage Escrow Data

Benjamin J. Keys & Philip Mulder

Climate Change Renewal Sentiment

Internal 2024 Survey



Which markets are discussing climate change?

Which perils are most prominent in the climate change discussion?

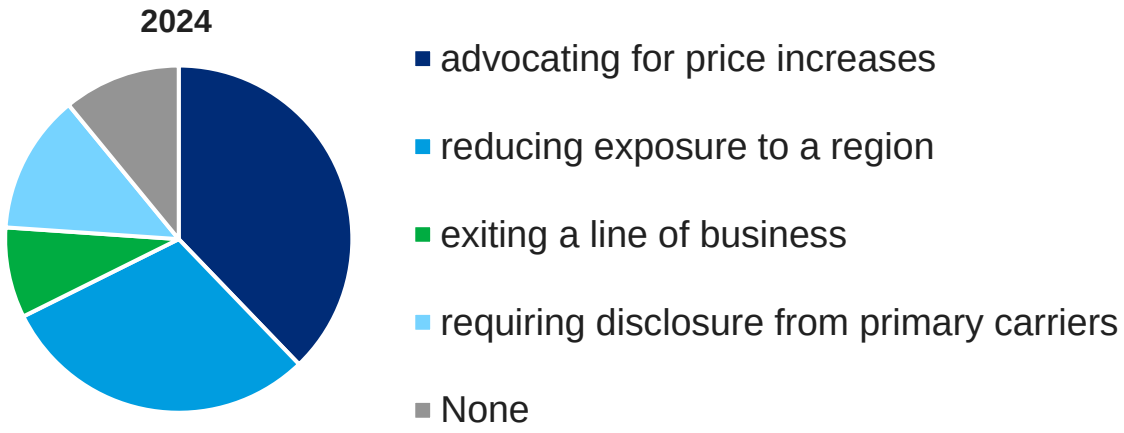
What actions are being considered by markets?

How important is the topic of climate change in renewal conversations?

We aim to conduct the survey annually to track sentiments for the previous year's renewals. This is the fourth consecutive survey we've carried out and includes an additional question on emissions disclosure.

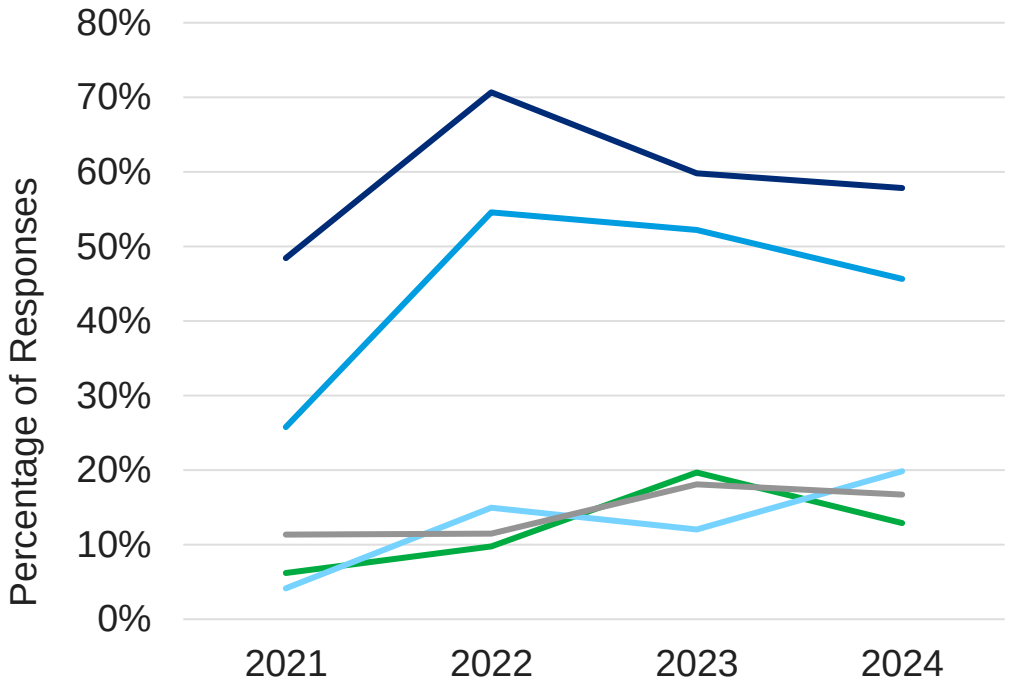
Climate Change Renewal Sentiment- GC Broker Survey

What actions do markets take when concerned about climate change?



Additional Individual Responses

- Higher attachment points
- Reducing hours in loss occurrence and limiting hours for aggregation
- Increased retentions
- Exclusions on fossil fuel intensive activities
- Adjusting models and view of risk

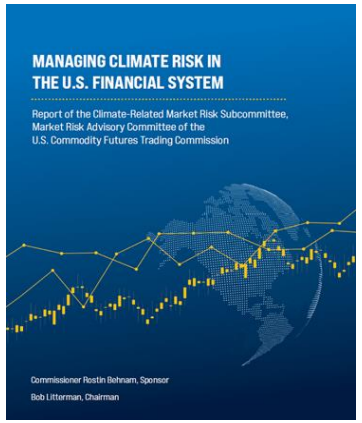


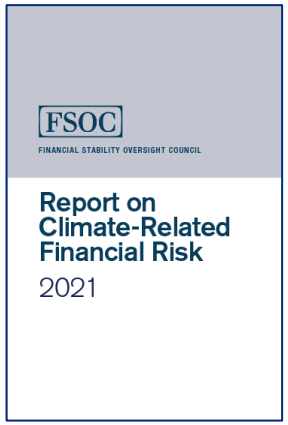
The percent of responses that answered "requiring disclosure from primary carriers" has quadrupled from 2021 to 2024.

US Regulatory and Rating Agency Influences Growing

March 6, 2024 – The Securities and Exchange Commission adopted rules to enhance and standardize climate-related disclosures by public companies and in public offerings.

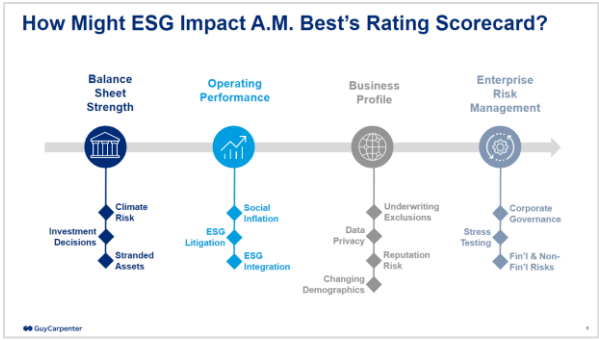
Federal





State

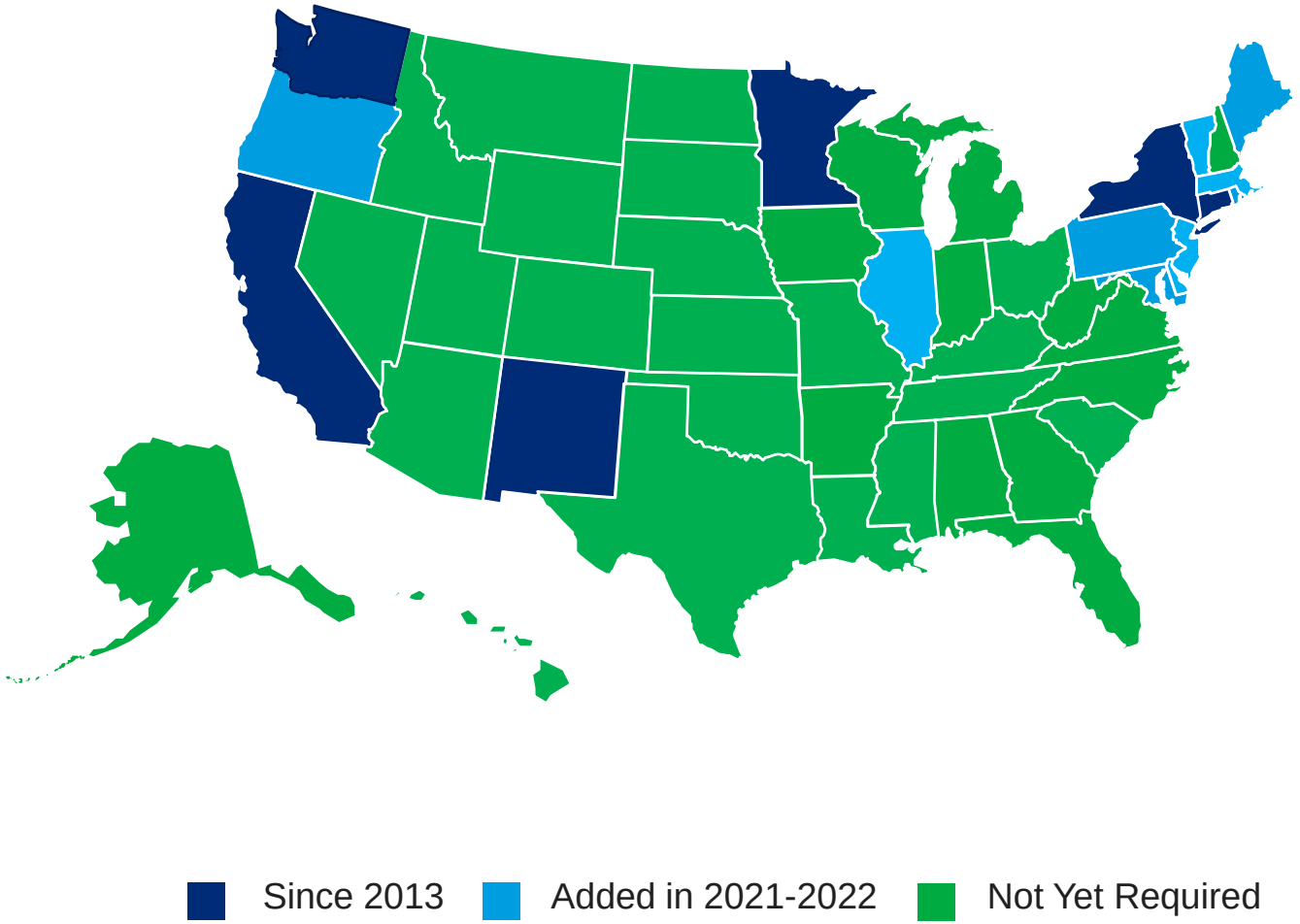
Ratings Firms



National Association of Insurance Commissioners Survey

NAIC Aligned Climate Risk Survey With TCFD Standard

- In 2022, Illinois became the 16th state requiring NAIC survey participation for insurers with $100 million or more in premiums. The survey covers well over 80% of the entire US insurance market.
- NAIC Notice to Insurers is typically sent in July and survey responses are due at the end of August.
- Close-ended questions are mandatory for the first time this reporting year.



NAIC Climate Risk Disclosure Survey

2024 NAIC Pilot Study

Based on NAIC communication-6 states are actively participating in an optional 2024 pilot study

The New York State Department of Financial Services would like to invite your company to participate in a pilot climate scenario survey…The NAIC has been tasked by the Solvency Workstream of the Climate and Resiliency (EX) Task Force with the development of a climate scenario methodology for property and casualty insurers that are exposed to weather-related risks in the US, in conjunction with their property portfolios…

The proposed NAIC climate scenario methodology **compares baseline Probable Maximum Losses** (PMLs) filed in RBC filings for hurricane and wildfire perils **to "Climate-conditioned" PMLs** for the same book of business. Climate-conditioned PMLs reflect the view of CAT modelers of the impact of climate risk on severity and frequency of hurricanes and wildfires over future time horizons (2030, 2040 and 2050).

Excerpt From Excel Template for Client

DISCLOSURE OF CLIMATE CONDITIONED CAT EXPOSURE FOR HURRICANE

Hurricane	Reference	Climate Conditioned Modeled Losses for 2030 (1) Direct and Assumed	(2) Net	3† Ceded Amounts Recoverable
(1) Worst Year in 50	Company Records			
(2) Worst Year in 100	Company Records			
(3) Worst Year in 250	Company Records			
(4) Worst Year in 500	Company Records			
(5) Worst Year in 1000	Company Records			

View of climate risk used

(1) If a Climate Conditioned Catalog developed by a commercial CAT model vendor is used, provide name and version of the catalog

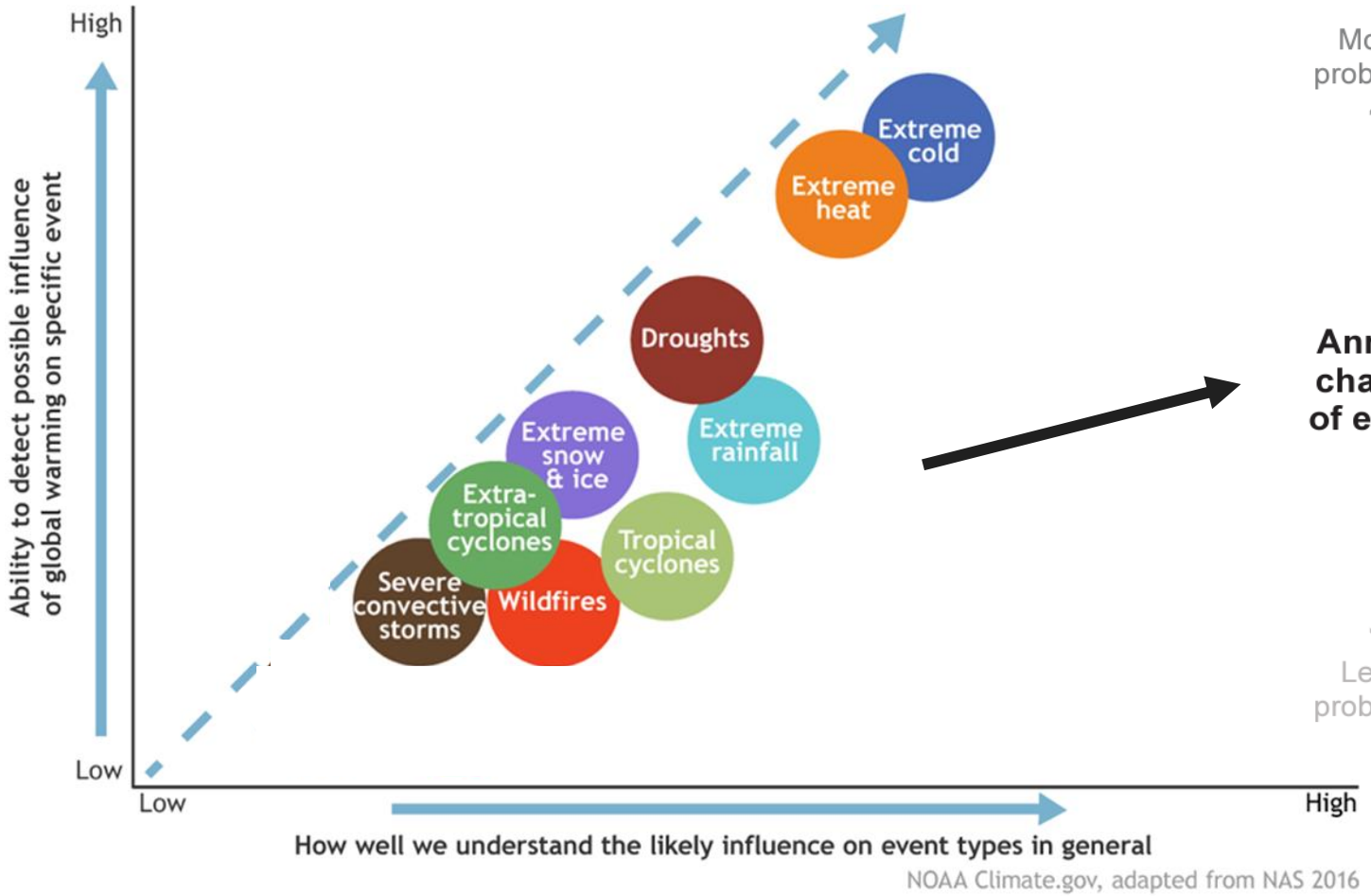
(2) If it is internally developed by the company, provide a brief description of assumptions/adjustments made

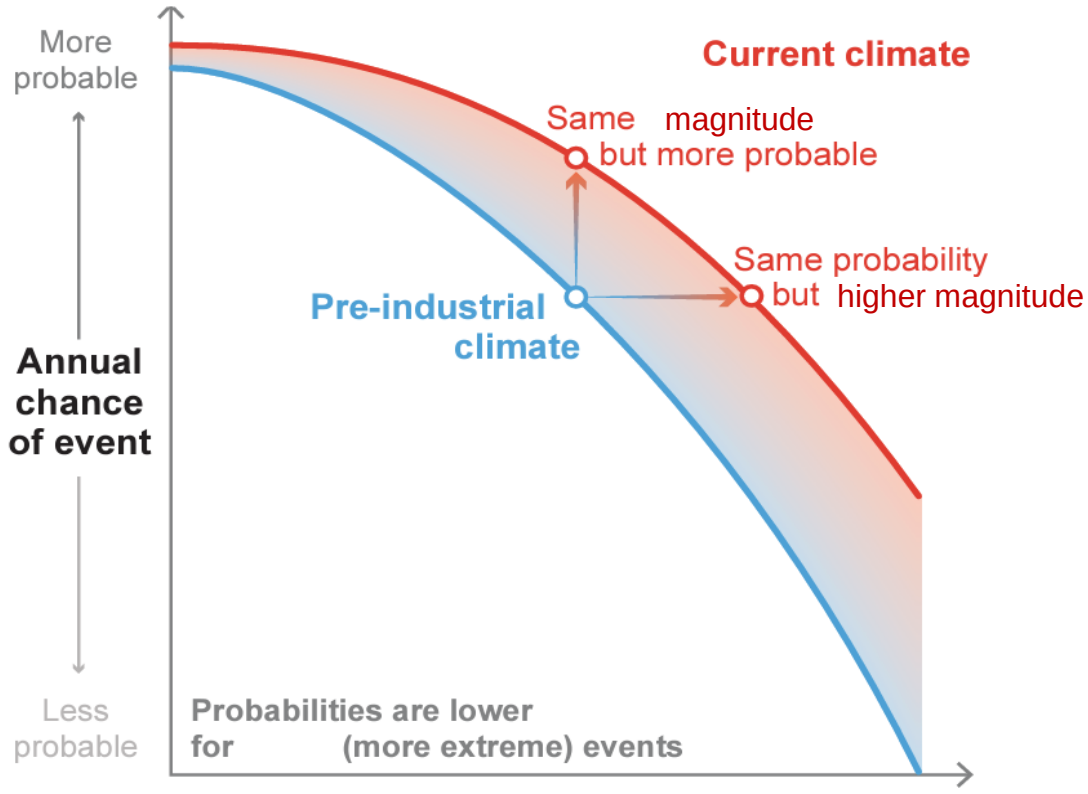
Excerpt From Letter to Client

The Evolving Physical Risk Landscape

Increased Probability and Magnitude of Extreme Events

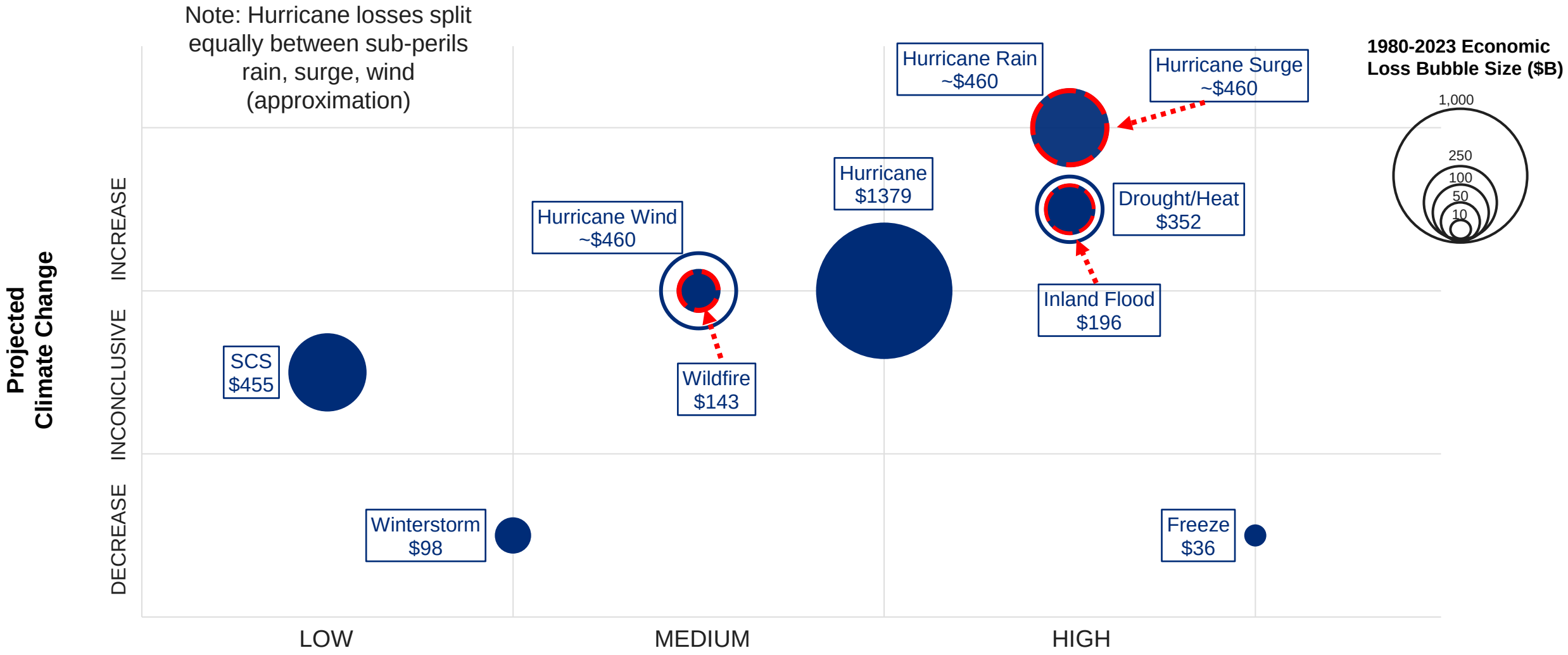
Our understanding of the influence of climate change on extreme events has improved





Source: IPCC (2021)

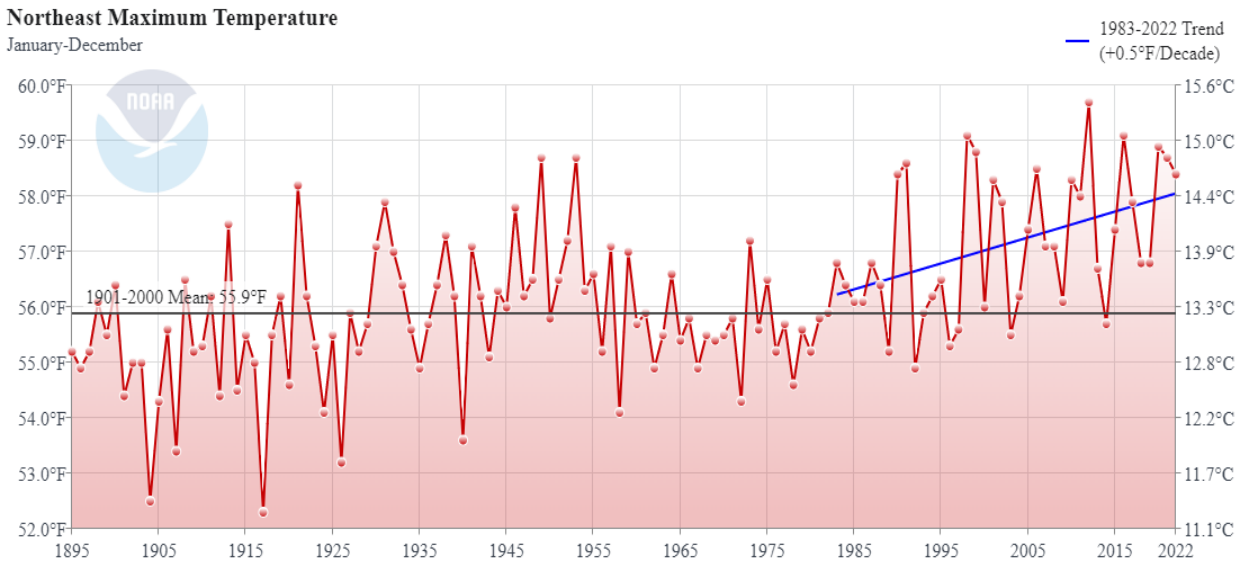
US 2024 Peril Assessment of Climate Change Impact
1980-2023 Economic Loss Bubble Size ($B)

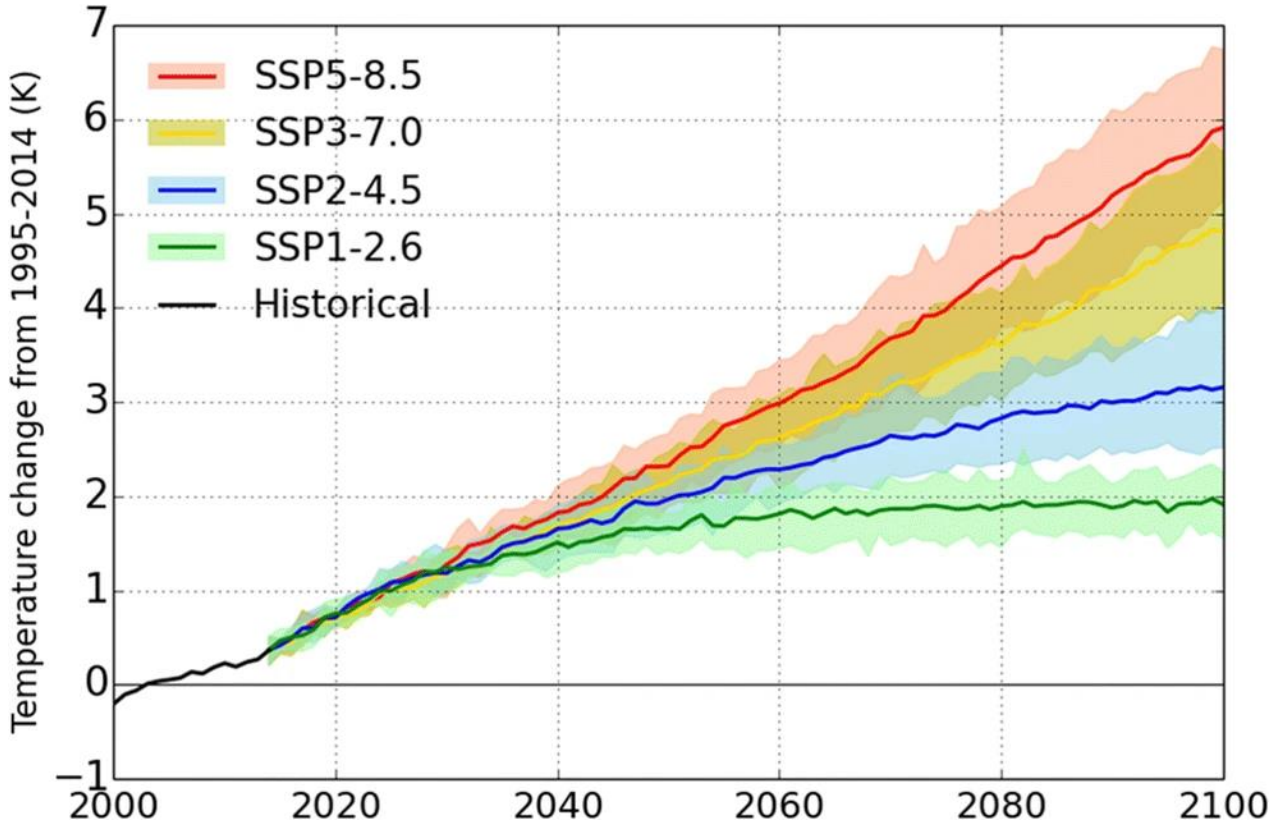


Source: NOAA Billion Dollar Database

Temperature Extremes

Projections for additional warming throughout the 21st century suggests more daily extremes

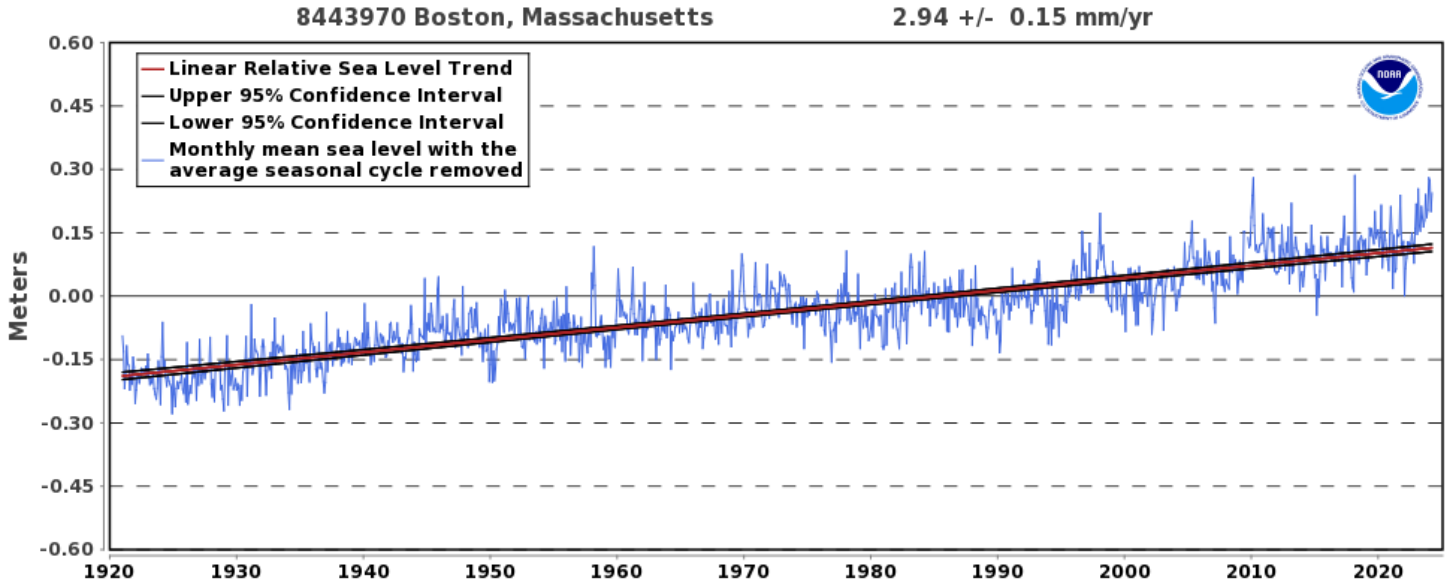


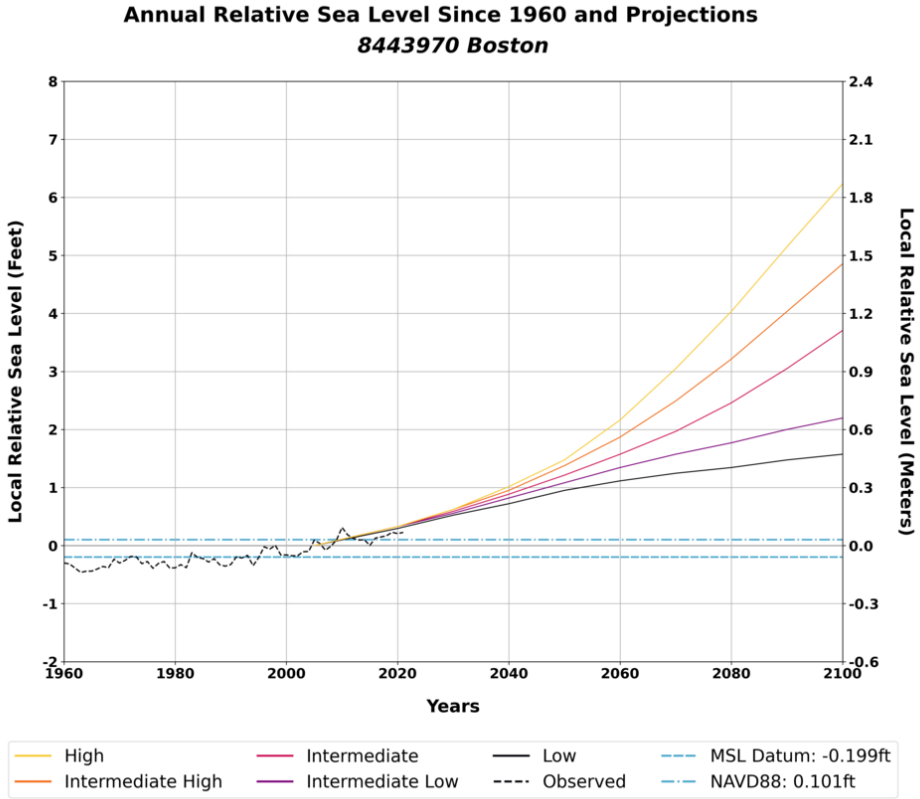


The average annual temperature in the Northeast US has warmed by ~2.5 degrees Fahrenheit over the last 125 years. An increase of ~2.5 more degrees Fahrenheit is projected in the next 30 years.

Sea Level Rise – Accelerating Threat

Boston, Massachusetts

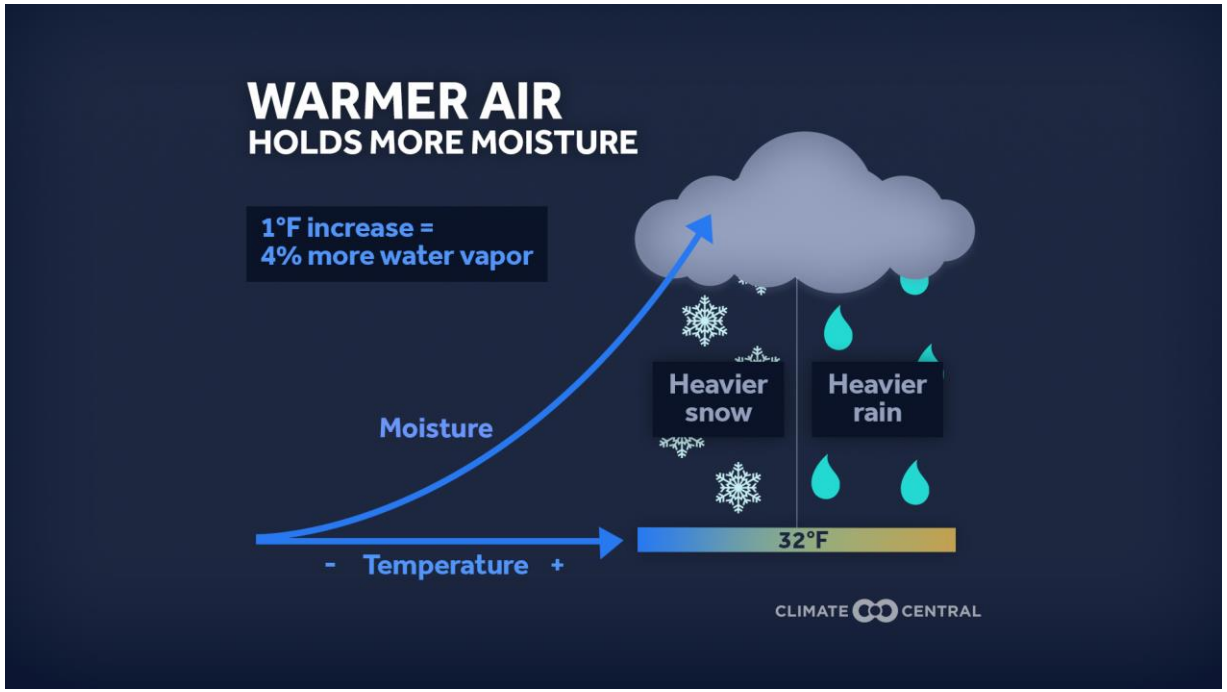


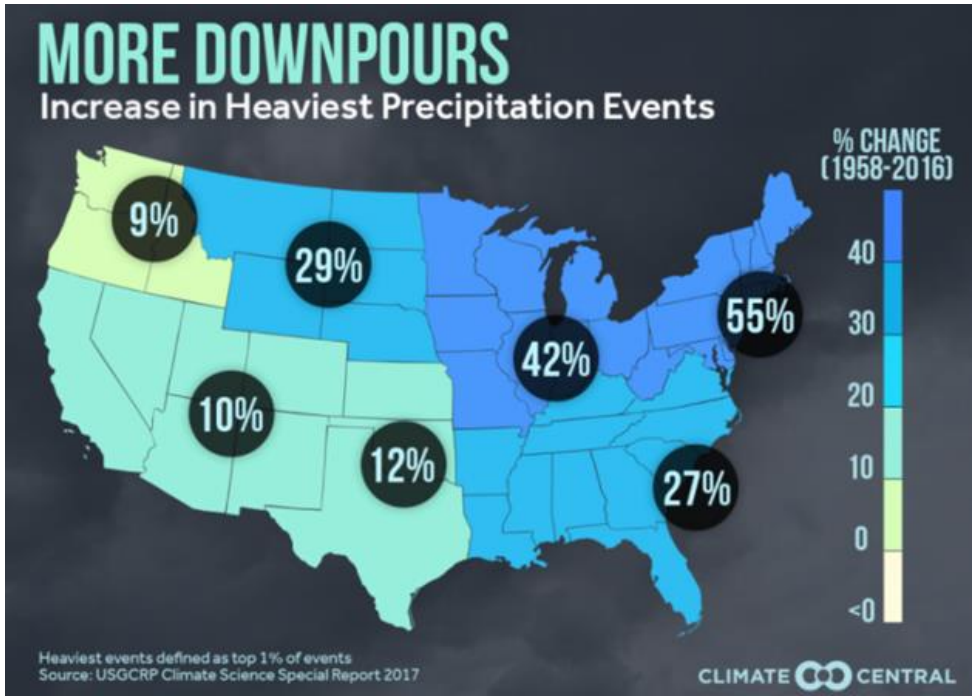


~10 inches of sea level rise in the last 75 years, ~10 inches of sea level rise projected in the next 25 years

Precipitation Extremes Have Increased

Heaviest precipitation events increased by 55% in the Northeast from 1958-2016

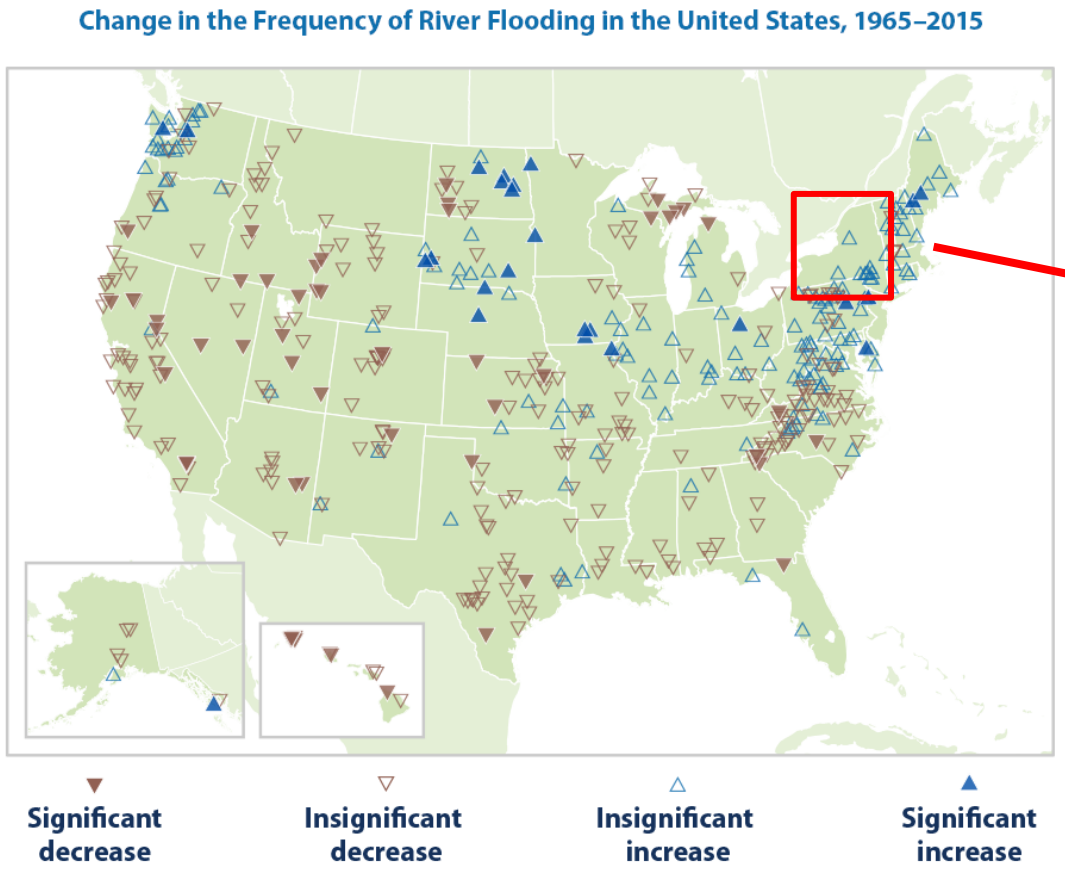




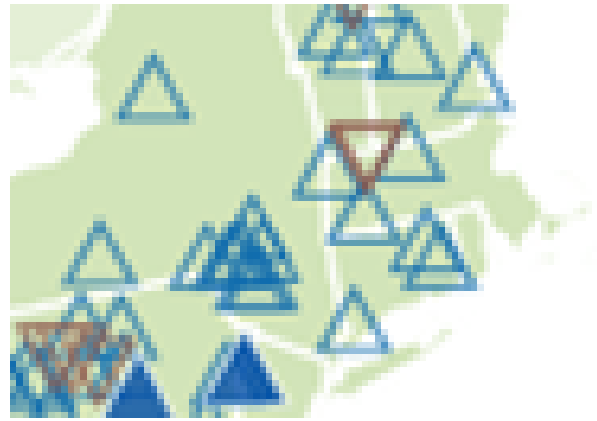
The relationship between the "water-holding ability" of the atmosphere, temperature, and pressure is defined by the Clausius-Clapeyron equation. This relationship means the atmosphere can hold approximately 7% more water per degree temperature rise.

More Rain Has Translated to More NE US River Flooding

Opposite signals in general for the northern and southern US

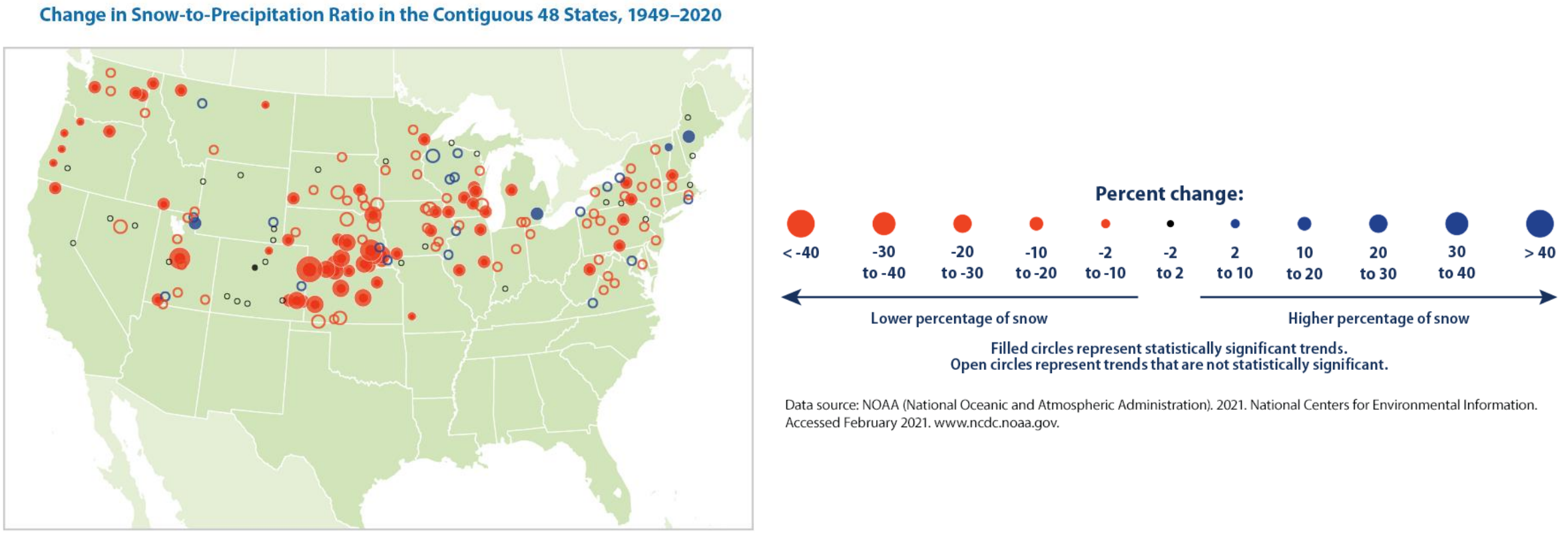


Data source: Slater, L., and G. Villarini. 2016 update and expansion to data originally published in: Mallakpour, I., G. Villarini. 2015. The changing nature of flooding across the central United States. Nature Climate Change 5:250–254.



How Much Precipitation Falls as Snow?

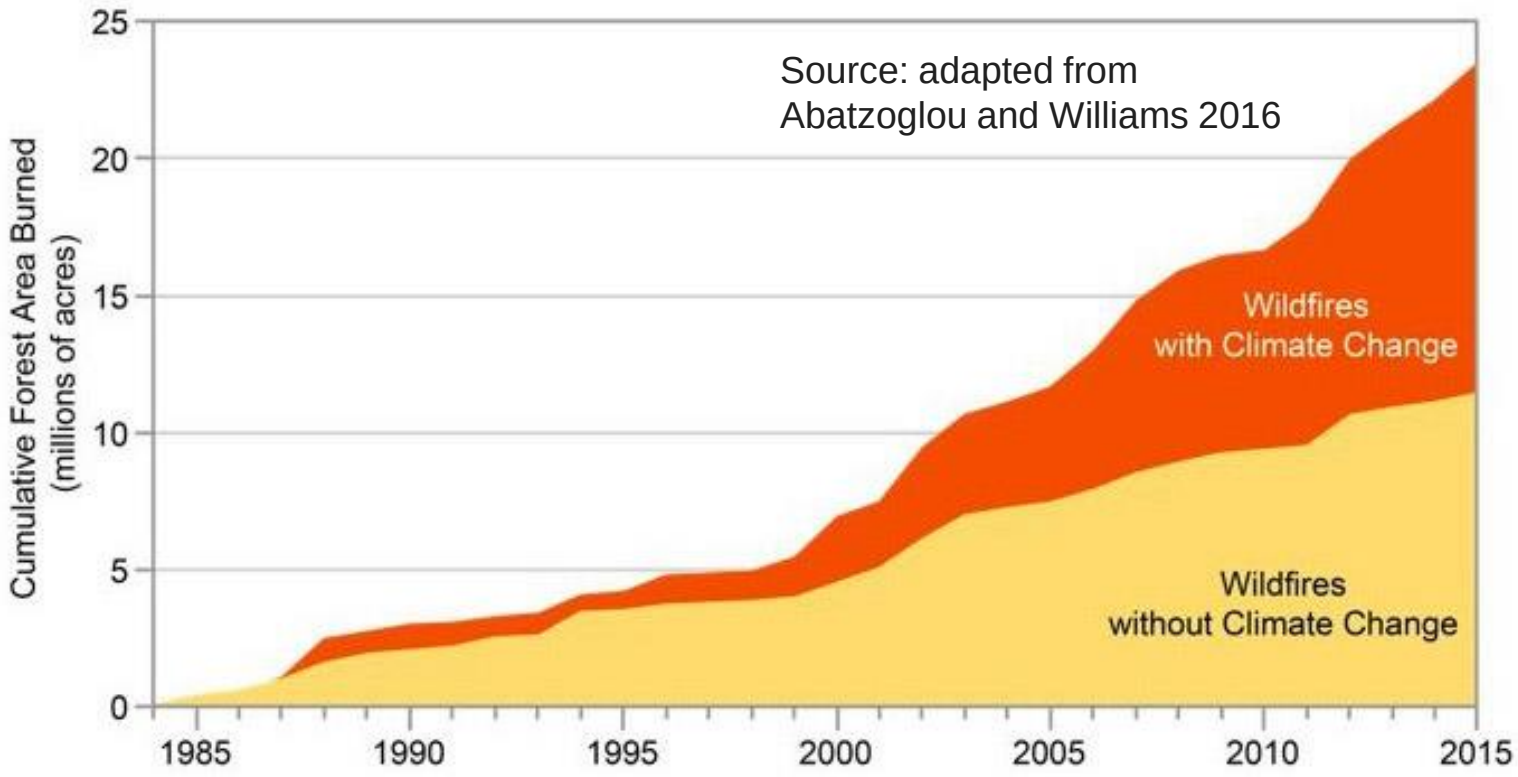
There is an observed decrease in the proportion of precipitation falling as snow



This figure shows the percentage change in winter snow-to-precipitation ratio from 1949 to 2020 at 177 weather stations in the contiguous 48 states.

Climate Change and Wildfire

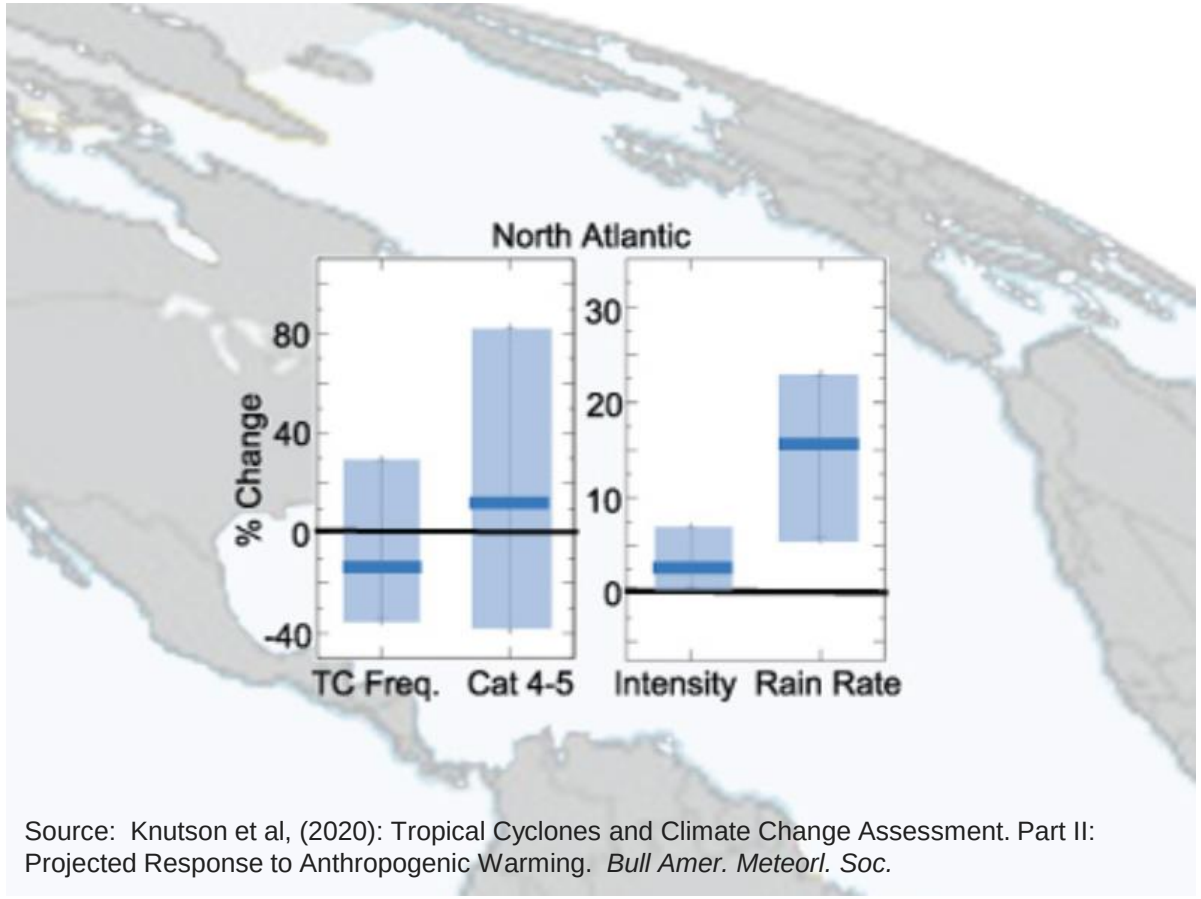
Recent IPCC Report (2021) notes growing confidence in climate change impact on fire weather



The cumulative forest area burned by wildfires has greatly increased between 1984 and 2015, with analyses estimating that the area burned by wildfire across the western United States over that period was twice what would have burned had climate change not occurred.

Climate Change and Hurricanes

2°C warming of planet, ~2050



Source: Knutson et al, (2020): Tropical Cyclones and Climate Change Assessment. Part II: Projected Response to Anthropogenic Warming. *Bull Amer. Meteorl. Soc.*

Hurricane Climate Change Impacts

Descending Order of Confidence

Higher Storm Surge

- Sea level rise, most prominently low lying islands and coastal cities

Heavier Rainfall

- Warmer atmosphere holds more moisture
- Warmer sea surface temperatures increase evaporation off ocean
- Slower moving storms

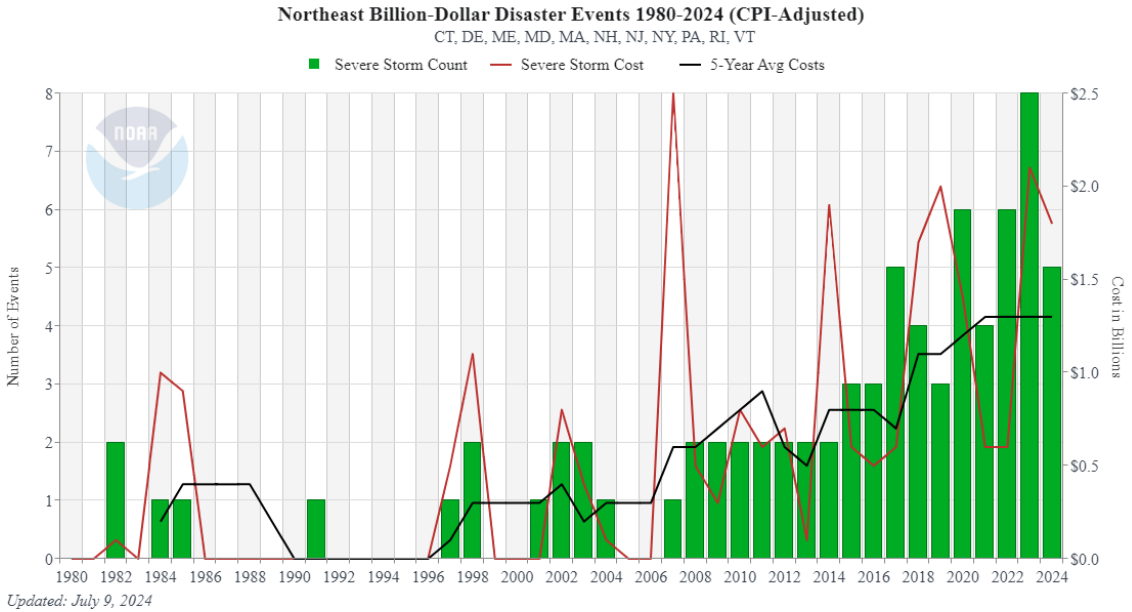
Higher Ceiling of Intensity

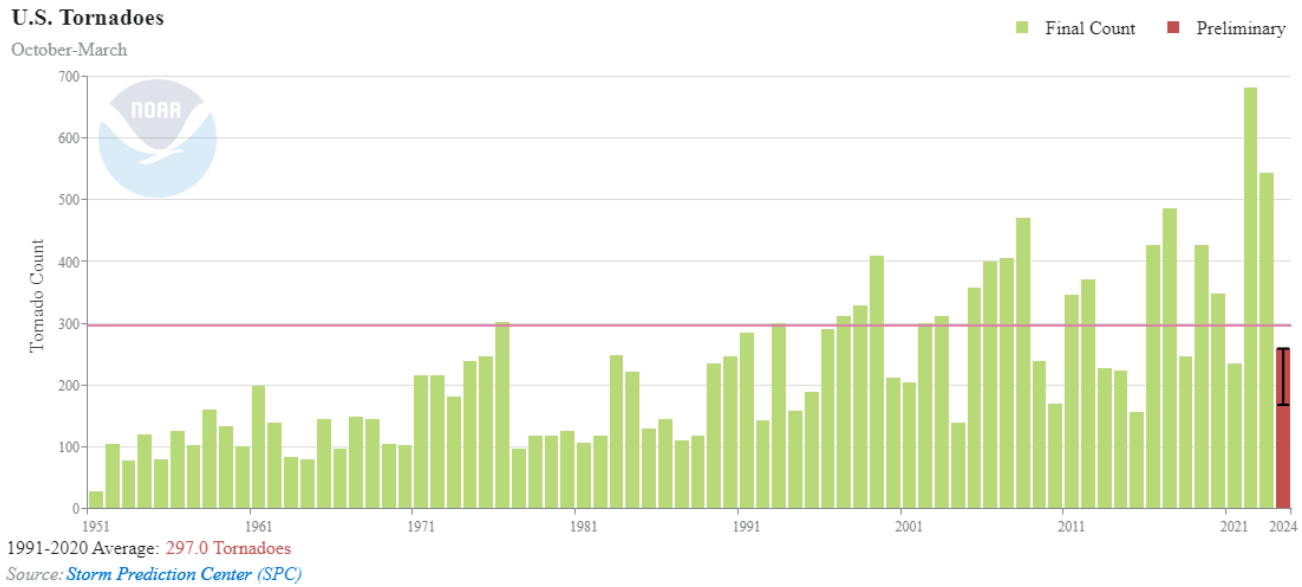
- Strongest storms expected to be stronger (warmer oceans)
- Rapid intensification (RI) potentially more likely

Lower confidence:
total number of tropical cyclones globally and ratio that make landfall

Climate Change and Severe Convective Storms

Potential expansion of severe convective season and geographies



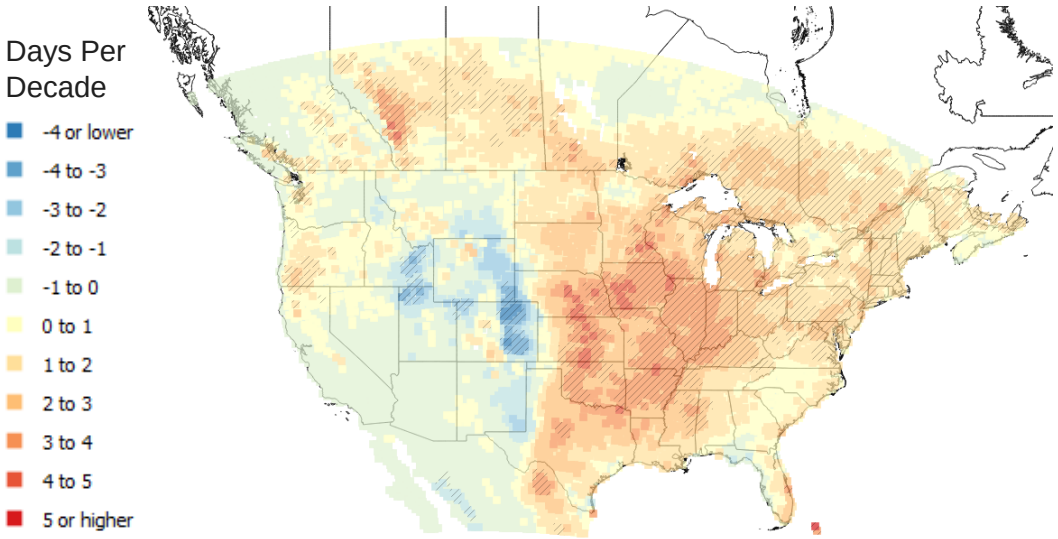


Competing factors make projections inconclusive. Some consensus developing for a longer severe thunderstorm season, eastward migration of conducive severe convective conditions, and busier fringe seasons (winter/fall).

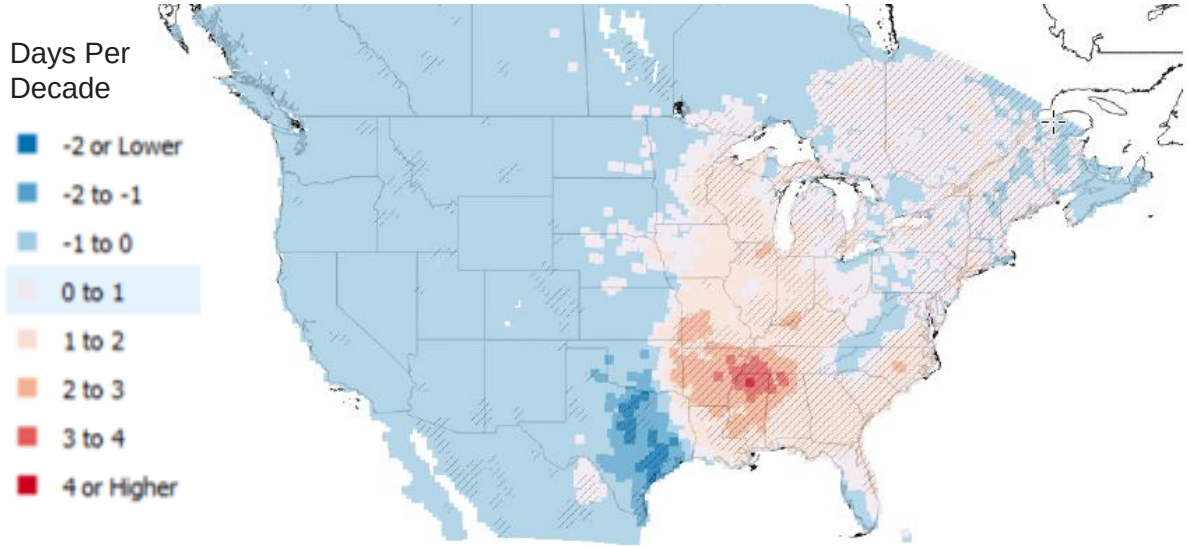
Shifts in Weather Conditions for Larger Hail / Strong Tornadoes

Recent lift in weather loss contribution likely due to upward trend in higher populated areas

Trend in Significant Hail (2”+)



Significant Tornado Trend (EF2+)

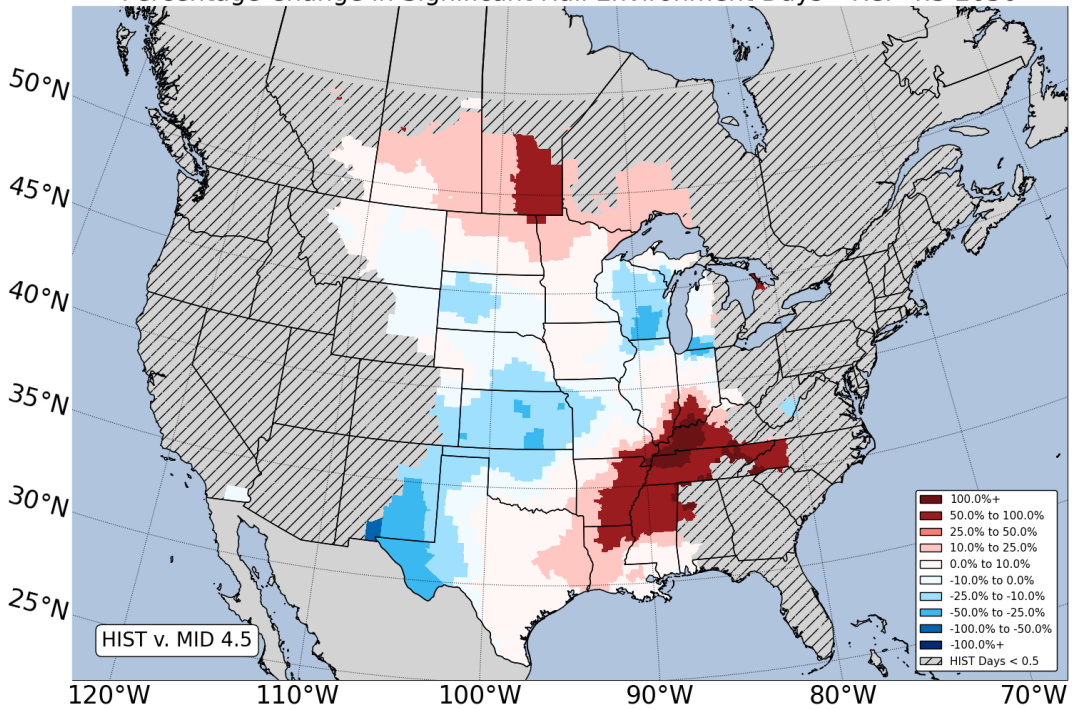


While climate projections of Severe Convective Storm risk are extremely uncertain, trends in the atmosphere since 1980 suggest the hail and tornado belt is moving into more heavily populated regions of the country.

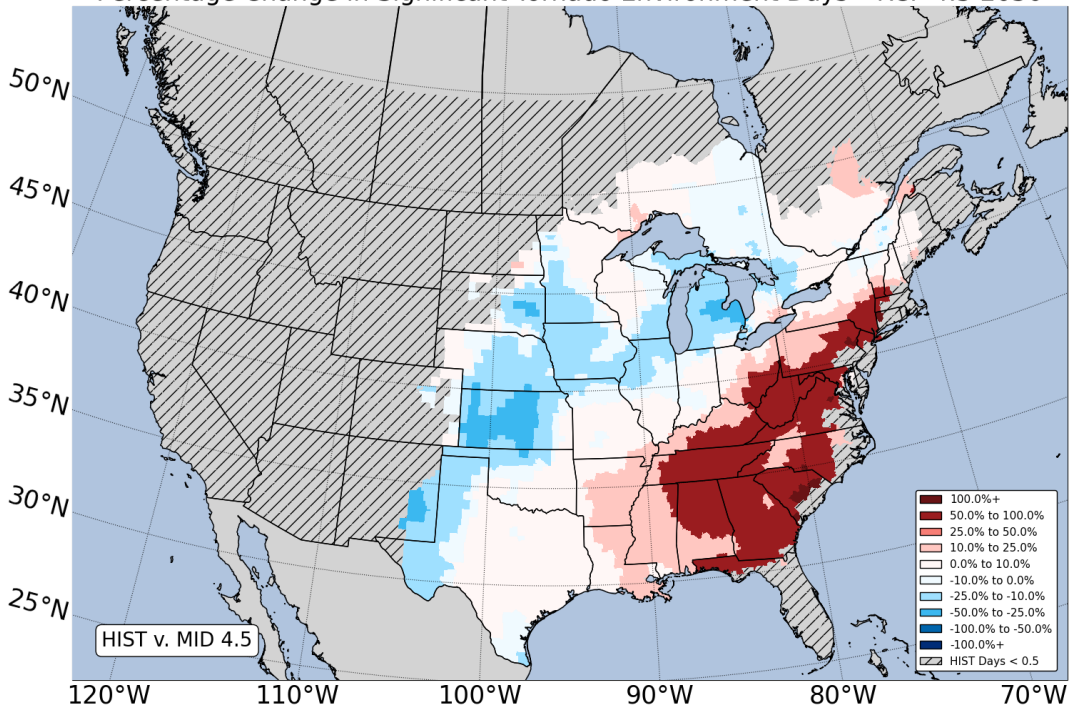
Significant Hail and Tornado Environment Days Projections

2050 Climate Change Projections-RCP 4.5

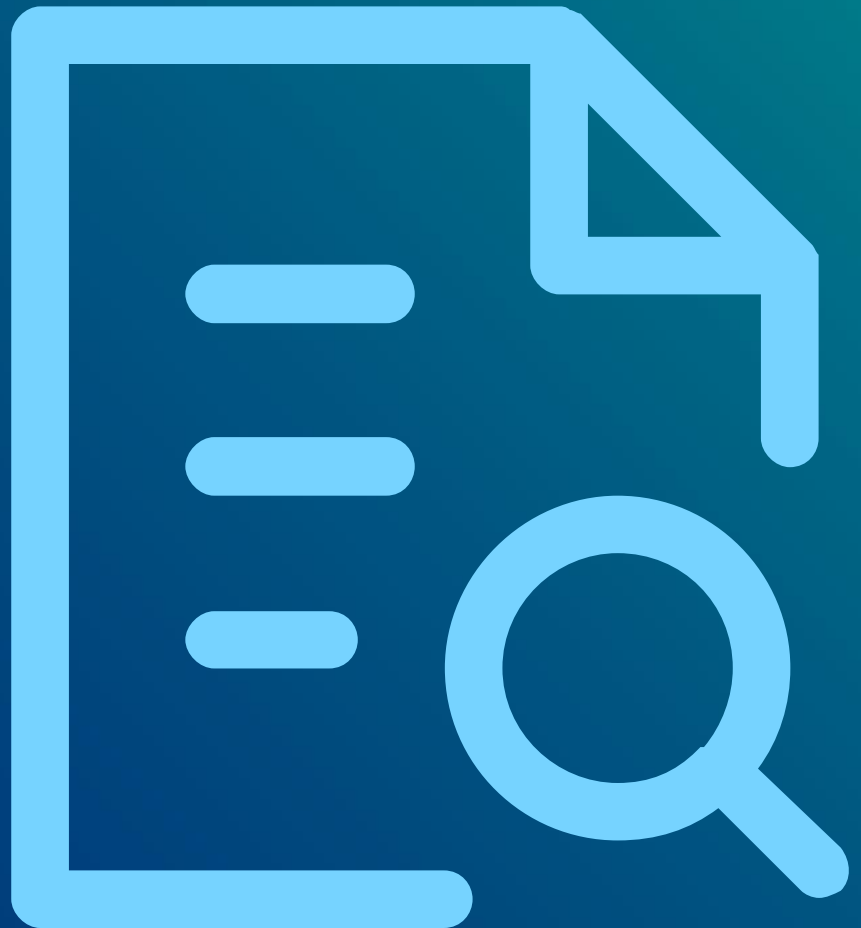
Percentage Change in Significant Hail Environment Days – RCP 4.5 2050



Percentage Change in Significant Tornado Environment Days – RCP 4.5 2050



Guy Carpenter Offering- Climate Change



Comprehensive Climate Change Analysis Toolkit

Physical Risk From Climate Change – A Snapshot of GC Offering

GC Products	Cat Model Adjustments	Risk Score Adjustments	MSA in Present Climate	Education
	Probabilistic climate change views on baseline risk	**Climate change view for our global risk scores and AAL layers**	**Suitability of vendor models under climate change to date**	**Briefings of the latest science, regulation and industry trends**
What GC Clients Get	Materiality assessments and scenario modelling Nat Cat PMLs (gross and net of reinsurance) Modelling for ORSA submissions and industry regulatory stress tests Available for Global Inland Flood, EU SCS, EU WS, US HU, AU TC, JP TC, ZA SCS; Under development for US WF.	Risk concentrations with global coverage Percentage (out of total) of assets vulnerable to physical risk for portfolio management Assessment of impact on cost of reinsurance Available for EU WF, US SLR, SCS, WF, and HU; global multi-peril risk layers	Quantification of cat model over/under-estimation of current risk Model suitability validation including for Lloyd's market Support for internal capital models and ORSA submissions Available for UK, Germany, Belgium Inland Flood and Italy, France SCS; Key perils and geographies can be developed on request	Briefings on global regulatory, policy developments and market conditions Literature reviews and briefing notes on latest climate change science Executive training and workshops Available for all key perils and geographies

Climate Change Analysis Toolkit

Catastrophe Model Adjustments – Future Roadmap

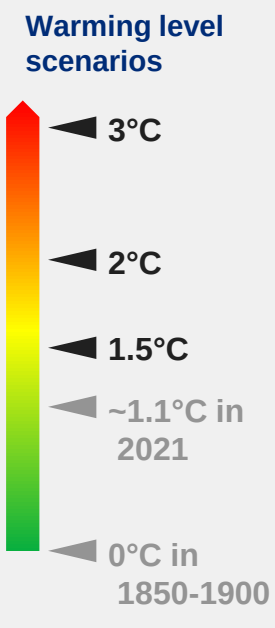
Perils

- **Wildfire***
- Convective Storm
- **Tropical Cyclone****
- Sea Level Rise

Scenarios

High-emission
pathway SSP5-8.5
or RCP 8.5

Mid-emission
pathway SSP2-4.5
or RCP 4.5



Tools

- Peer Benchmarking Against Industry Peers
- Supports Regulatory Requirements
- AAL and PML Projected Changes
- Portfolio Specific Insights

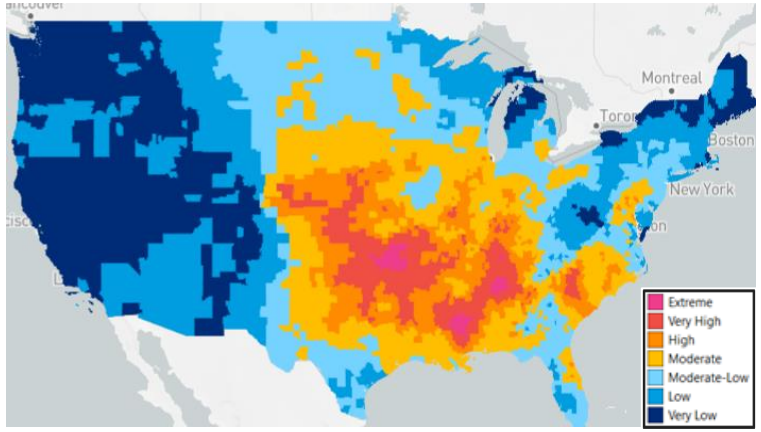
We provide a mid-emission scenario as standard. Bespoke alternative scenarios can be provided for risk management or regulatory requirements.

*Planned Release in 2024

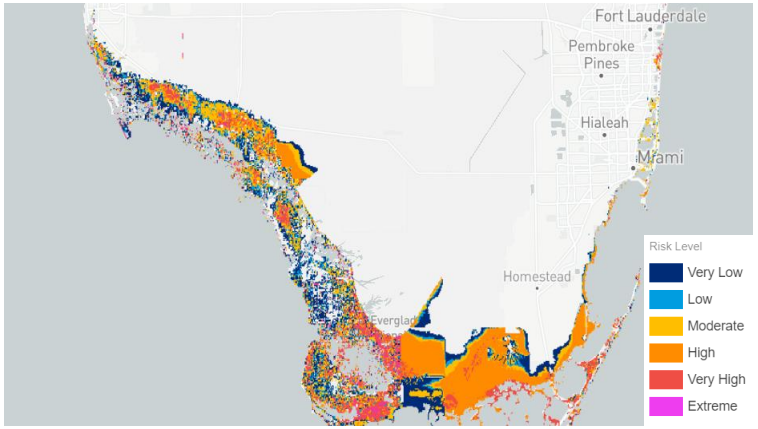
**Already Released in 2024

Climate Change Analysis Toolkit

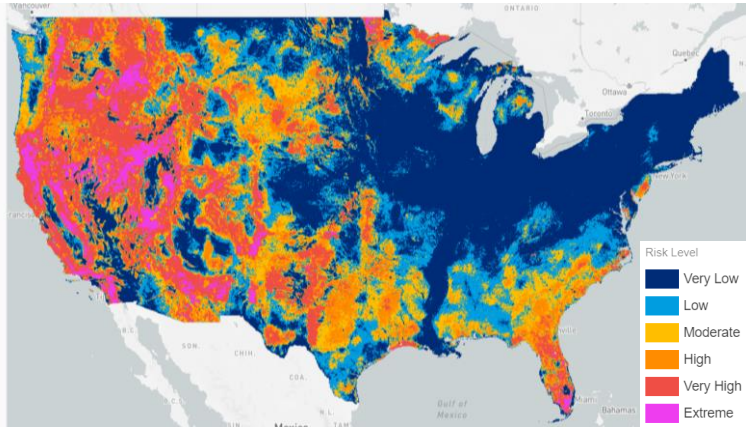
STORMi- 2040 (Trended)



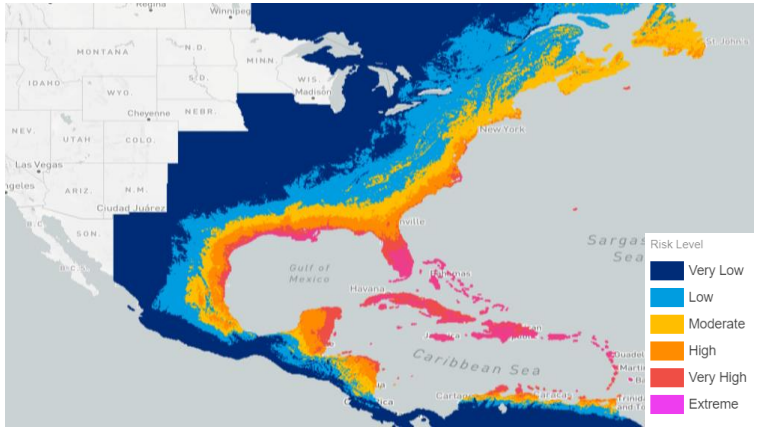
Sea Level Rise- 2060



Wildfire Risk Score- 2050 RCP 4.5



Hi-Res HuRMi- 2050 RCP 4.5



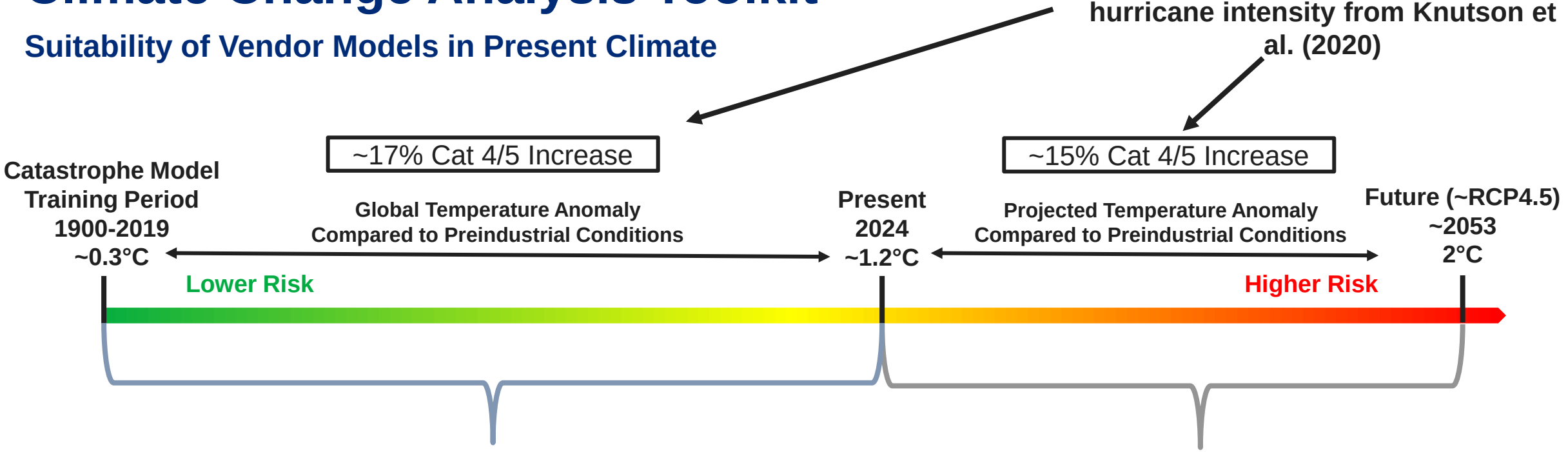
Risk scores provide a holistic view of the frequency and severity of key perils across the United States. Scores are available via GC platforms.

Why Develop Climate Change Risk Scores?

- Regularly updated layers to account for the latest science on peril frequency and severity
- Enables portfolio risk management, risk selection, rate making, and strategic growth
- Benchmarking to peers in present day and future climate
- Available in regions without cat model coverage
- Supports regulatory requirements

Climate Change Analysis Toolkit

Suitability of Vendor Models in Present Climate



Present Day Risk

- Stationarity in the hazard is assumed when the catastrophe model was developed but the temperature has changed during the historical period which equates to a change in risk.
- Near term projections using this baseline will imply a large increase in risk from present day because the middle of the catastrophe training period is ~1960.

Future Risk

- Most common assessment of climate risk by the industry, which is typically required by regulators.
- A 2024 baseline rather than a catastrophe model baseline period will imply a smaller increase in future risk because of the additional warming between the catastrophe model training period and 2024.

Climate Change Analysis Toolkit

Education

Workshops and Conferences

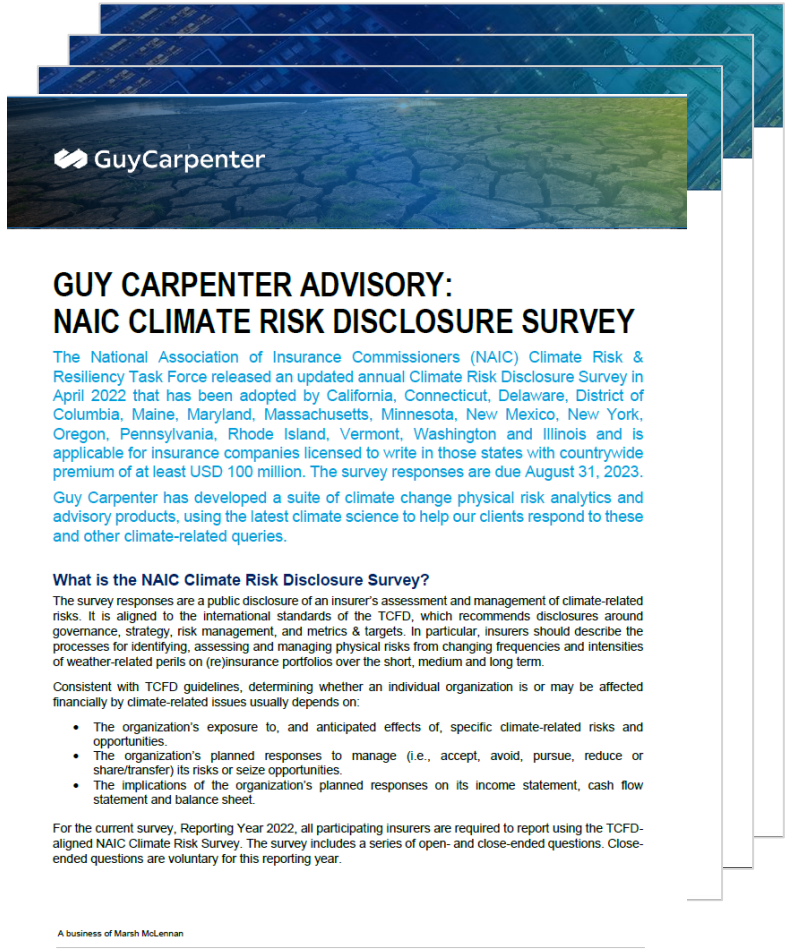
Explaining climate science, its impact on extreme weather, and modeling techniques to Boards or employees at any level

Literature Reviews

Executive summaries of the latest science on climate change and extreme weather impacts

Market Insights

Tracking the evolving regulatory environment, the extent companies are incorporating climate change analytics into decisions, and the role of climate change in reinsurance negotiations



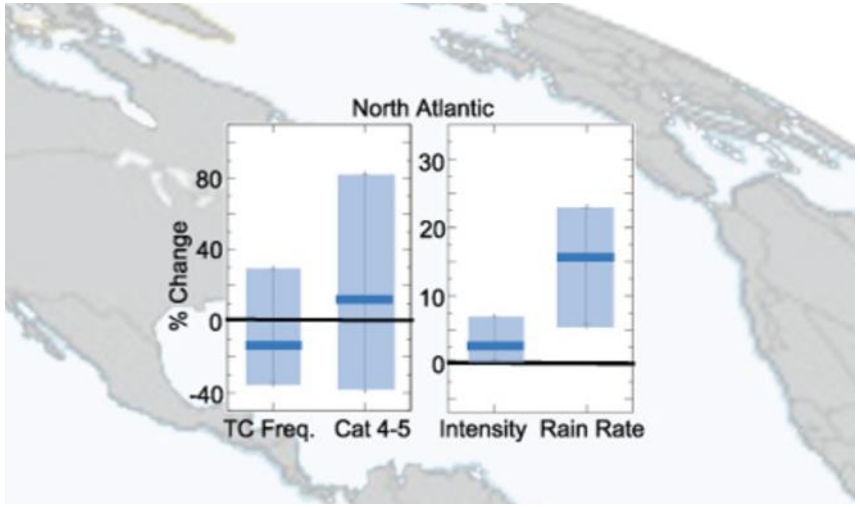
NYSIR Portfolio Results

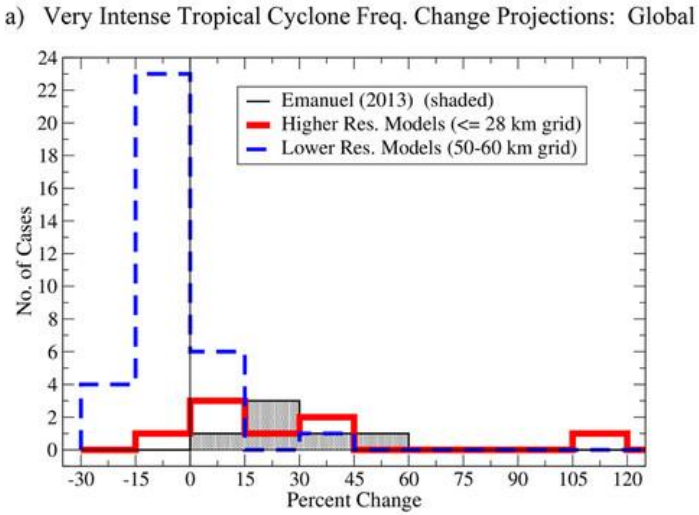
North Atlantic Tropical Cyclone – Methodology

Overview

Scientific Foundation for Projected Views

- Present-Day events reweighted to account for a potential increase in severe category 4-5 hurricanes under projected climate states while preserving net basin landfalls for overall tropical cyclones
- Projected increase in category 4-5 hurricanes estimated following Knutson et al., (2020) and Jewson (2021)
- Emphasis on higher-percentile scenarios, as justified by more recent high-resolution hurricane modeling research





Projecting tropical cyclones in the North Atlantic to be more intense but not exhibit any change in frequency.

Tropical Cyclone Risk Score Breakdown

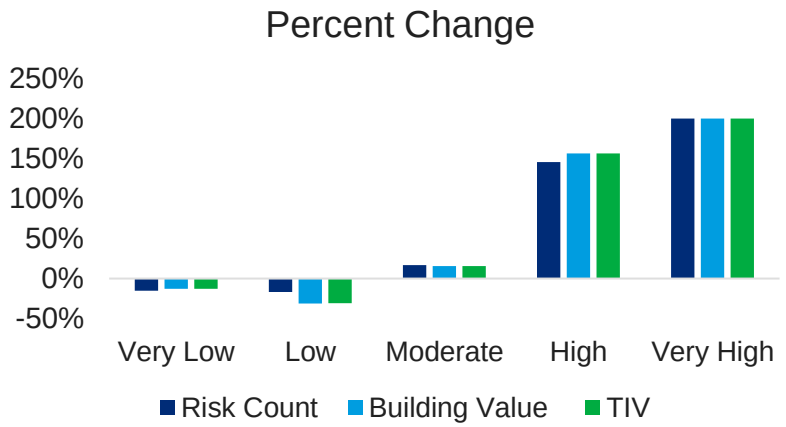
Total Portfolio

Present Day

Hurricane Risk Category	TIV (M)	% Tot	% Agg	Building Value (M)	% Tot	Risks	% Tot
Extreme	0.0	0.0%	0.0%	0.0	0.0%	-	0.0%
Very High	0.0	0.0%	0.0%	0.0	0.0%	-	0.0%
High	49.9	0.1%	0.1%	47.7	0.1%	8	0.1%
Moderate	31,742.5	51.0%	51.1%	30,571.7	51.2%	3,681	42.7%
Low	14,480.4	23.3%	74.3%	13,911.3	23.3%	2,387	27.7%
Very Low	15,972.9	25.7%	100.0%	15,160.9	25.4%	2,539	29.5%
Hurricane Risk Totals	**62,245.7**	**100.0%**		**59,691.6**	**100.0%**	**8,615**	**100.0%**

2050 RCP4.5

Hurricane Risk Category	TIV (M)	% Tot	% Agg	Building Value (M)	% Tot	Risks	% Tot
Extreme	0.0	0.0%	0.0%	0.0	0.0%	-	0.0%
Very High	2.6	0.0%	0.0%	2.6	0.0%	2	0.0%
High	407.1	0.7%	0.7%	388.9	0.7%	51	0.6%
Moderate	37,135.4	59.7%	60.3%	35,789.0	60.0%	4,358	50.6%
Low	10,632.2	17.1%	77.4%	10,159.8	17.0%	2,022	23.5%
Very Low	14,068.4	22.6%	100.0%	13,351.3	22.4%	2,182	25.3%
Hurricane Risk Totals	**62,245.7**	**100.0%**		**59,691.6**	**100.0%**	**8,615**	**100.0%**



~$2.6 million more TIV in the Very High bin

~6x new risks in the High bin

Tropical Cyclone Risk Score Breakdown

County Comparison

- Suffolk County TIV in the High risk bin is 8X higher in 2050
- Westchester County TIV in Moderate bin is 2x higher in 2050

Present Day

County	State	Tier	Extreme	Very High	High	Moderate	Low	Very Low
Suffolk County	NY	Tier 1	0.0	0.0	49.9	14,716.9	0.0	0.0
Nassau County	NY	Tier 1	0.0	0.0	0.0	12,987.5	789.6	0.0
Westchester County	NY	Tier 2	0.0	0.0	0.0	3,673.2	4,328.1	0.0

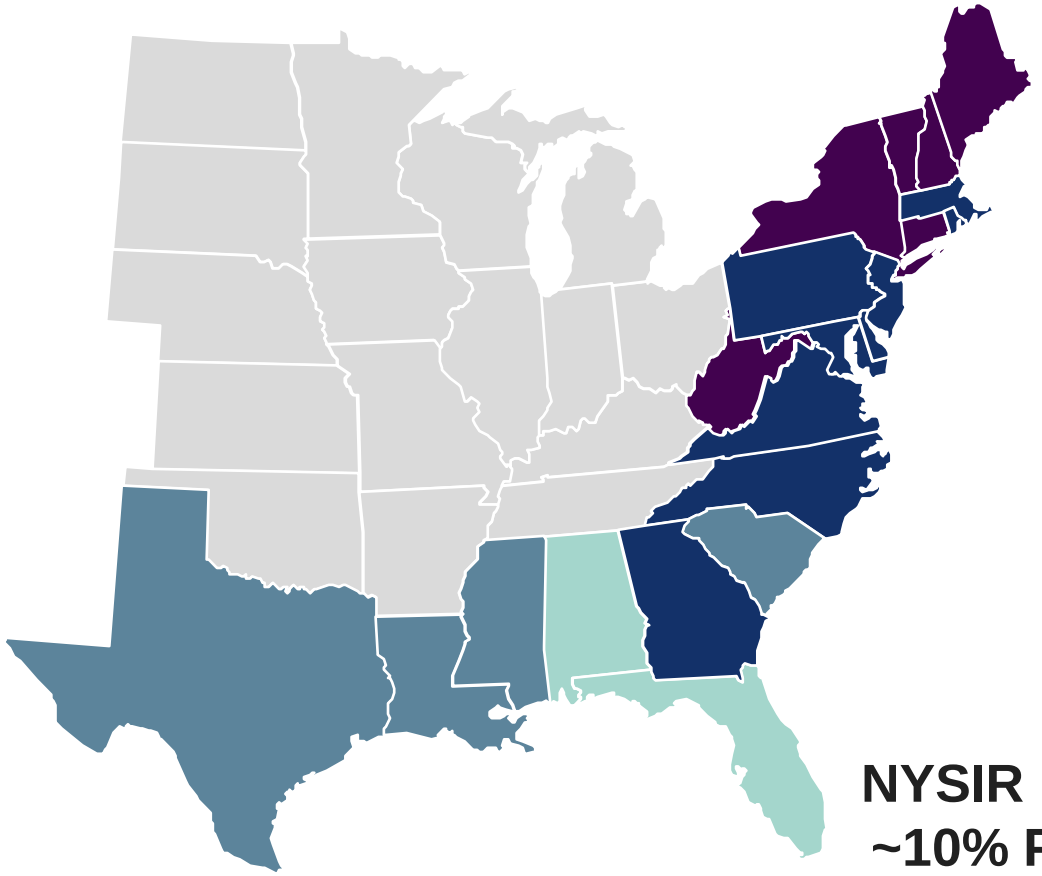
2050 RCP4.5

County	State	Tier	Extreme	Very High	High	Moderate	Low	Very Low
Suffolk County	NY	Tier 1	0.0	2.6	407.1	14,357.1	0.0	0.0
Nassau County	NY	Tier 1	0.0	0.0	0.0	13,777.1	0.0	0.0
Westchester County	NY	Tier 2	0.0	0.0	0.0	7,012.9	988.3	0.0

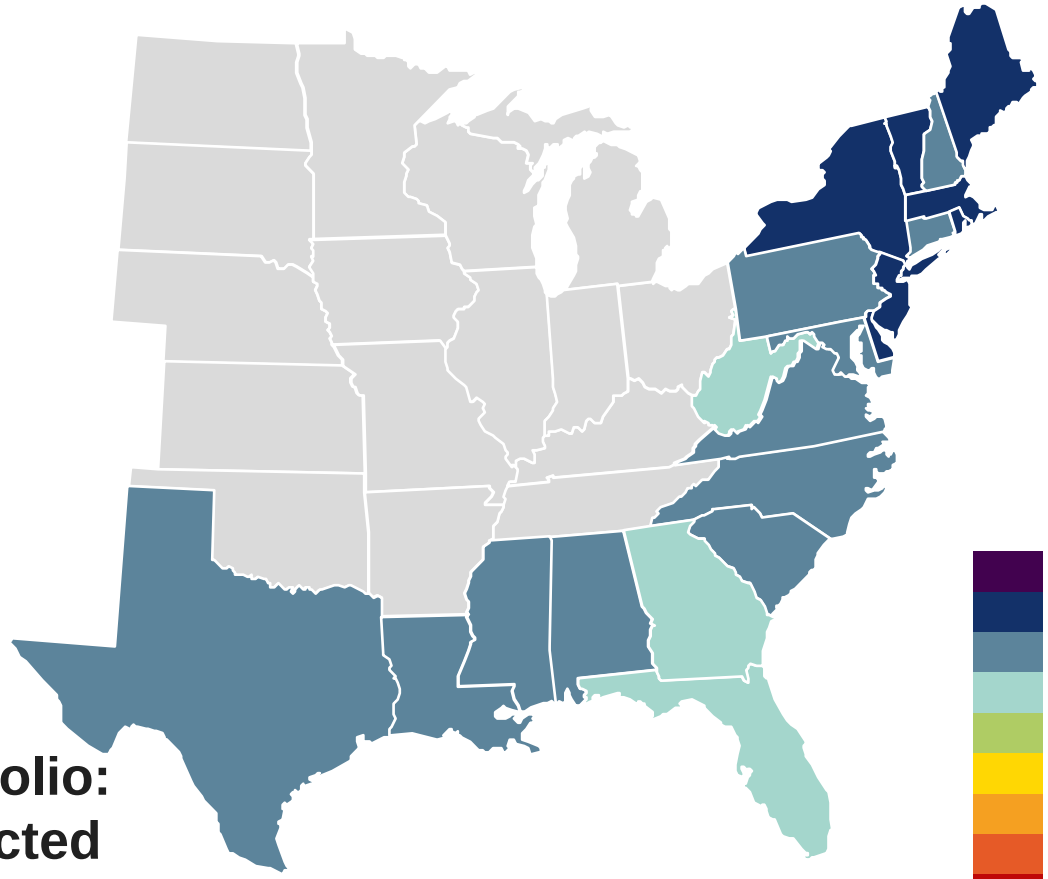
Tropical Cyclone Catastrophe Model Adjustments: Likely

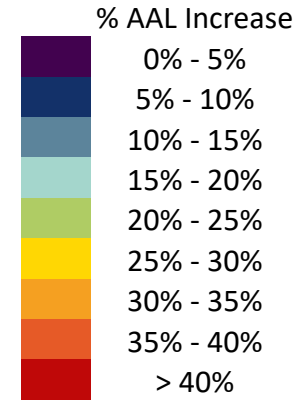
2050 AAL Projection: RCP4.5, 75th Percentile

Applied to Vendor Model A
Overall: ~13%



Applied to Vendor Model B
Overall: ~15 %



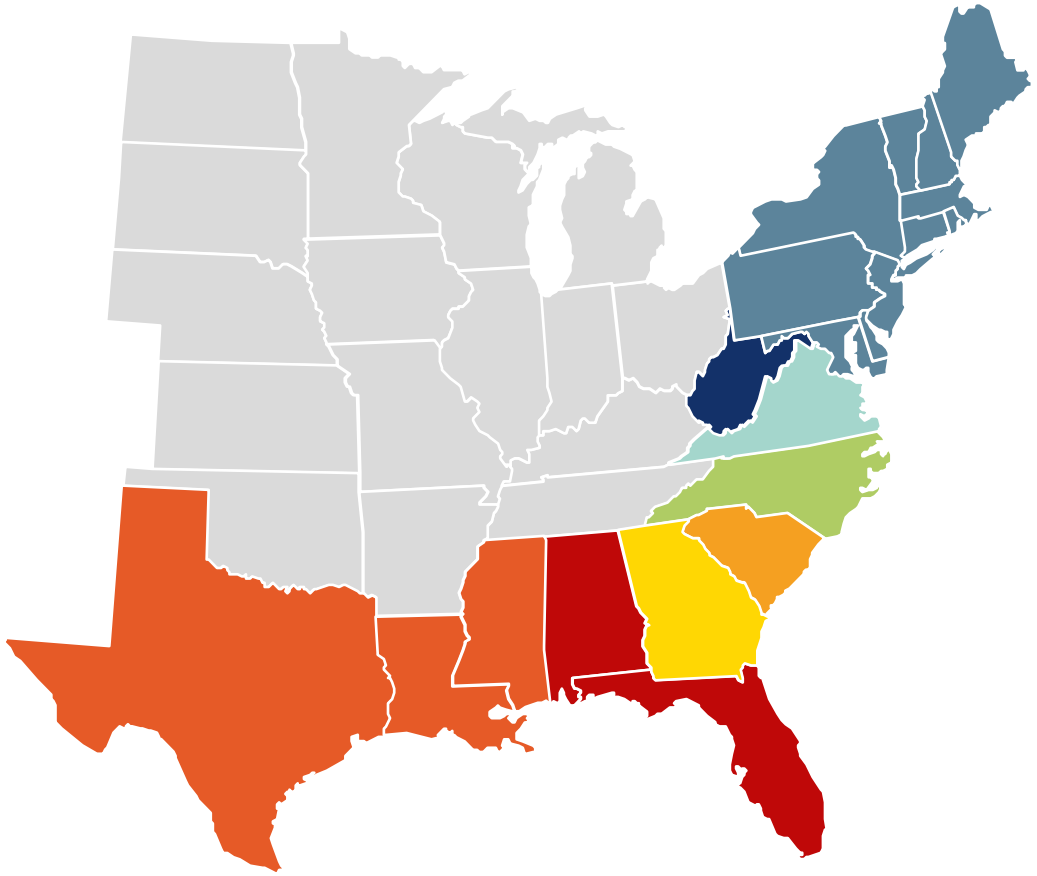


NYSIR Portfolio: ~10% Projected Increase in AAL for Verisk

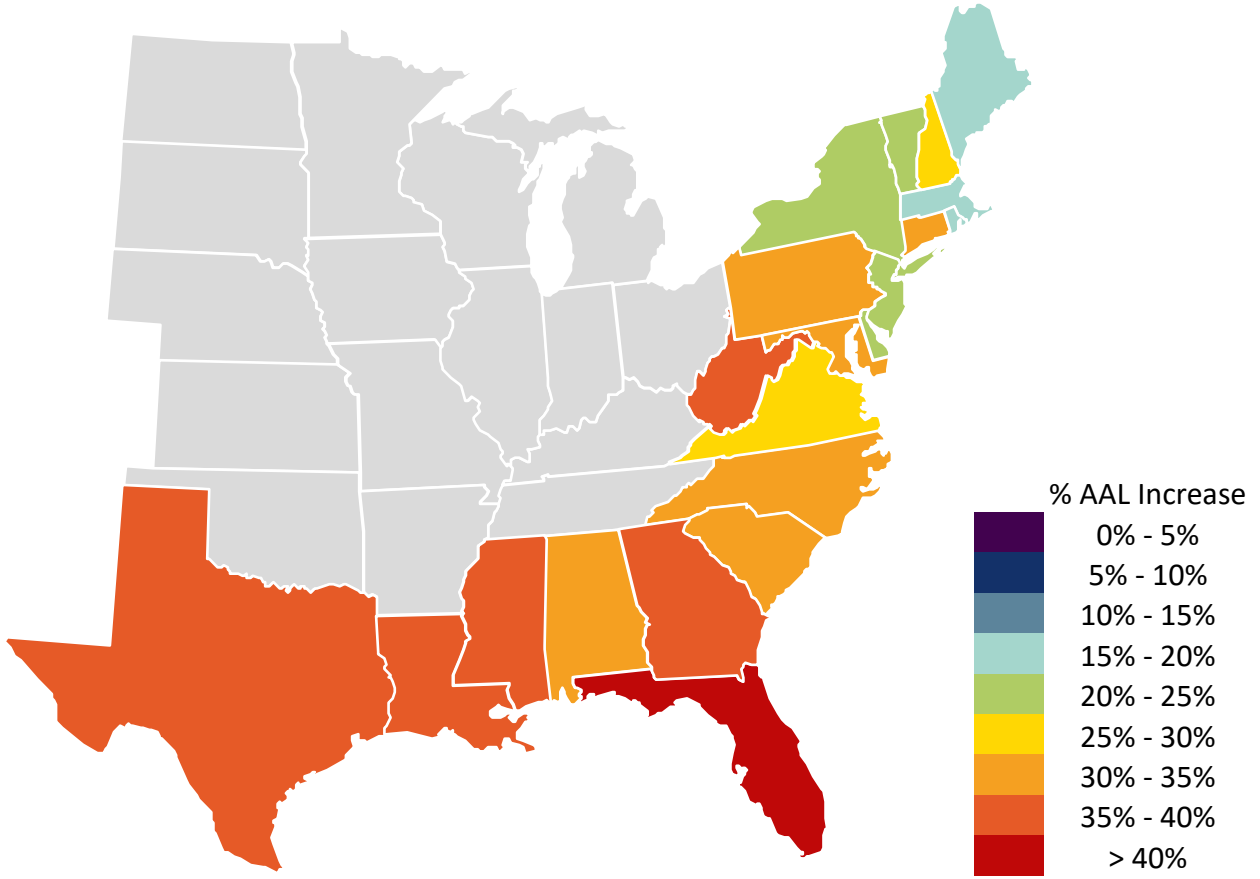
Tropical Cyclone Catastrophe Model Adjustments: Extreme

2050 AAL Projection: RCP8.5, 90th Percentile

Applied to Vendor Model A
Overall: 36%

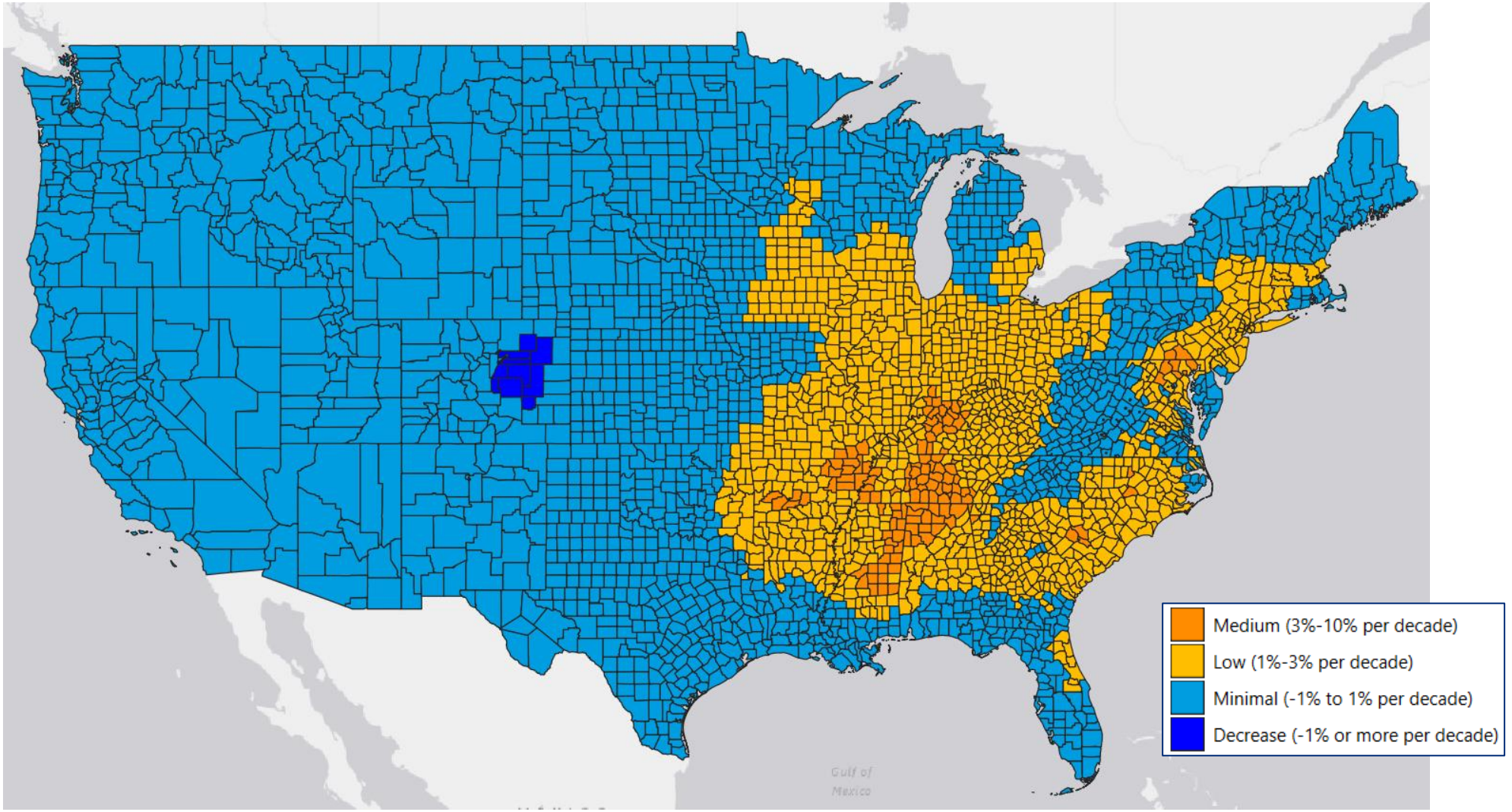


Applied to Vendor Model B
Overall: 40%



Baseline SToRMi and SToRMi 2040 Differentiation

Notable Risk Increases in Eastern Half of US



Climate Adjustment Methodology

In Partnership with Northern Illinois University

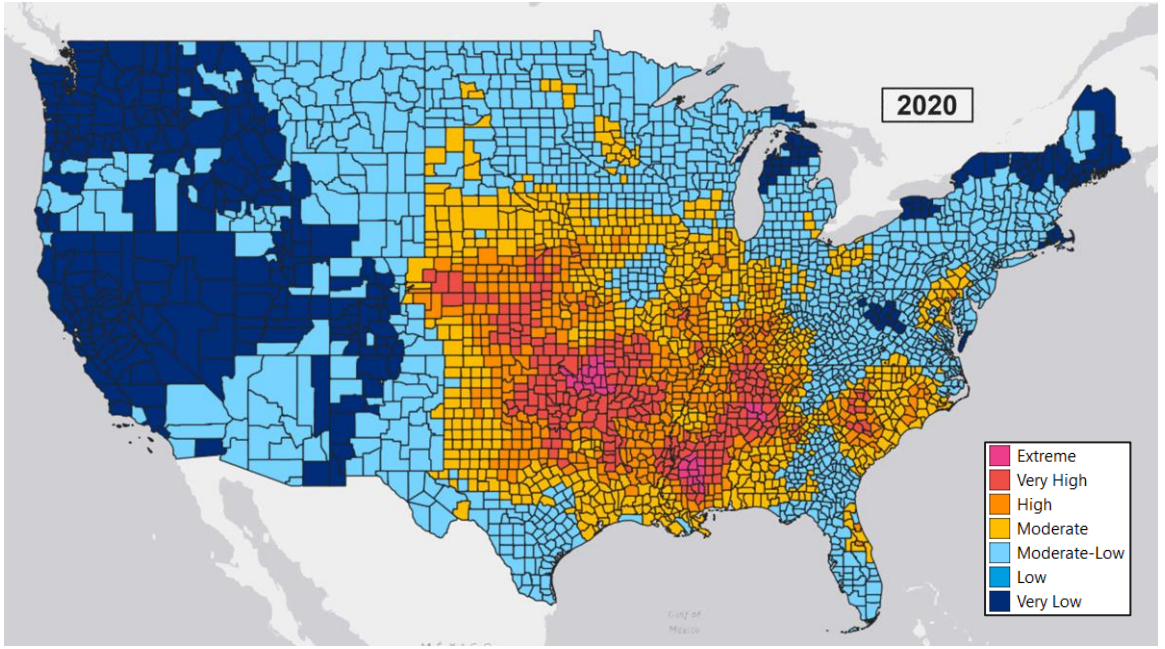
Northern Illinois University

- Atmospheric trend data in large hail and significant tornado potential were calculated from the North American Regional Reanalysis (NARR) dataset over the period of 1979-2020 and obtained through Northern Illinois University.

- Projecting these trends forward to two different decadal timestamps, 2030 and 2040, factors were derived to extrapolate current day hail and tornado observations into projected future climates.

- SToRMi 2030 and 2040 iterations were created by freezing the baseline SToRMi values defining bin breaks and non-trended values, then applying the factors as stated above

2020 / 2030 / 2040 Animation



While similar in appearance to the baseline SToRMi, over 40% of counties see a material change in their value. Most of those counties see modest increases, although ten counties see a modest decrease in risk.

SToRMi

Total Portfolio

Present Day

SToRMi Category	TIV	% Tot	% Agg	Building Value	% Tot	Risks	% Tot
Extreme	-	0.0%	0.0%	-	0.0%	-	0.0%
Very High	-	0.0%	0.0%	-	0.0%	-	0.0%
High	-	0.0%	0.0%	-	0.0%	-	0.0%
Moderate	-	0.0%	0.0%	-	0.0%	-	0.0%
Moderate-Low	6,832,820,216	11.0%	11.0%	6,555,528,127	11.0%	1,310	15.2%
Low	45,624,796,554	73.3%	84.3%	43,862,598,852	73.5%	5,904	68.5%
Very Low	9,788,066,037	15.7%	100.0%	9,273,475,541	15.5%	1,402	16.3%
Negligible		0.0%	100.0%		0.0%		0.0%
	62,245,682,807	**100.0%**		**59,691,602,520**	**100.0%**	**8,616**	**100.0%**

2040 Trended

SToRMi Category	TIV	% Tot	% Agg	Building Value	% Tot	Risks	% Tot
Extreme	-	0.0%	0.0%	-	0.0%	-	0.0%
Very High	-	0.0%	0.0%	-	0.0%	-	0.0%
High	-	0.0%	0.0%	-	0.0%	-	0.0%
Moderate	-	0.0%	0.0%	-	0.0%	-	0.0%
Moderate-Low	9,669,280,897	15.5%	15.5%	9,272,945,522	15.5%	1,821	21.1%
Low	42,788,335,873	68.7%	84.3%	41,145,181,457	68.9%	5,393	62.6%
Very Low	9,788,066,037	15.7%	100.0%	9,273,475,541	15.5%	1,402	16.3%
Negligible		0.0%	100.0%		0.0%		0.0%

~$3.2 billion more TIV in the Moderate-Low bin

~511 new risks in the Moderate-Low bin

SToRMi

County Comparison

Orange County is projected to move to the Moderate-Low Bin

Present Day

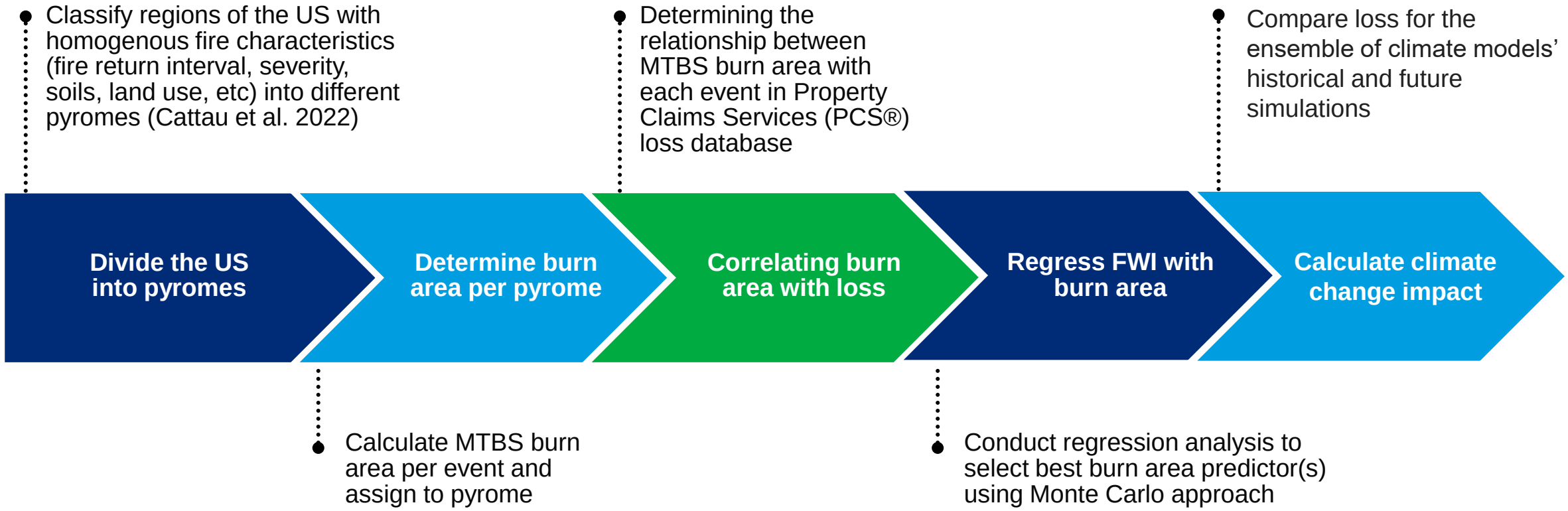
SToRMi Category	State	County	TIV	% Tot	TIV/ Sq Mile	Building Value
Low	NY	ORANGE COUNTY	2,096,079,447	3.4%	2,499,363	2,016,884,711
Moderate-Low	NY	ROCKLAND COUNTY	2,007,808,233	3.2%	10,072,296	1,940,808,553
Moderate-Low	NY	DUTCHESS COUNTY	1,950,144,944	3.1%	2,362,817	1,873,379,713

2040 Trended

SToRMi Category	State	County	TIV	% Tot	TIV/ Sq Mile	Building Value
Moderate-Low	NY	ORANGE COUNTY	2,096,079,447	3.4%	2,582,338	2,016,884,711
Moderate-Low	NY	ROCKLAND COUNTY	2,007,808,233	3.2%	11,572,128	1,940,808,553
Moderate-Low	NY	DUTCHESS COUNTY	1,950,144,944	3.1%	2,451,054	1,873,379,713

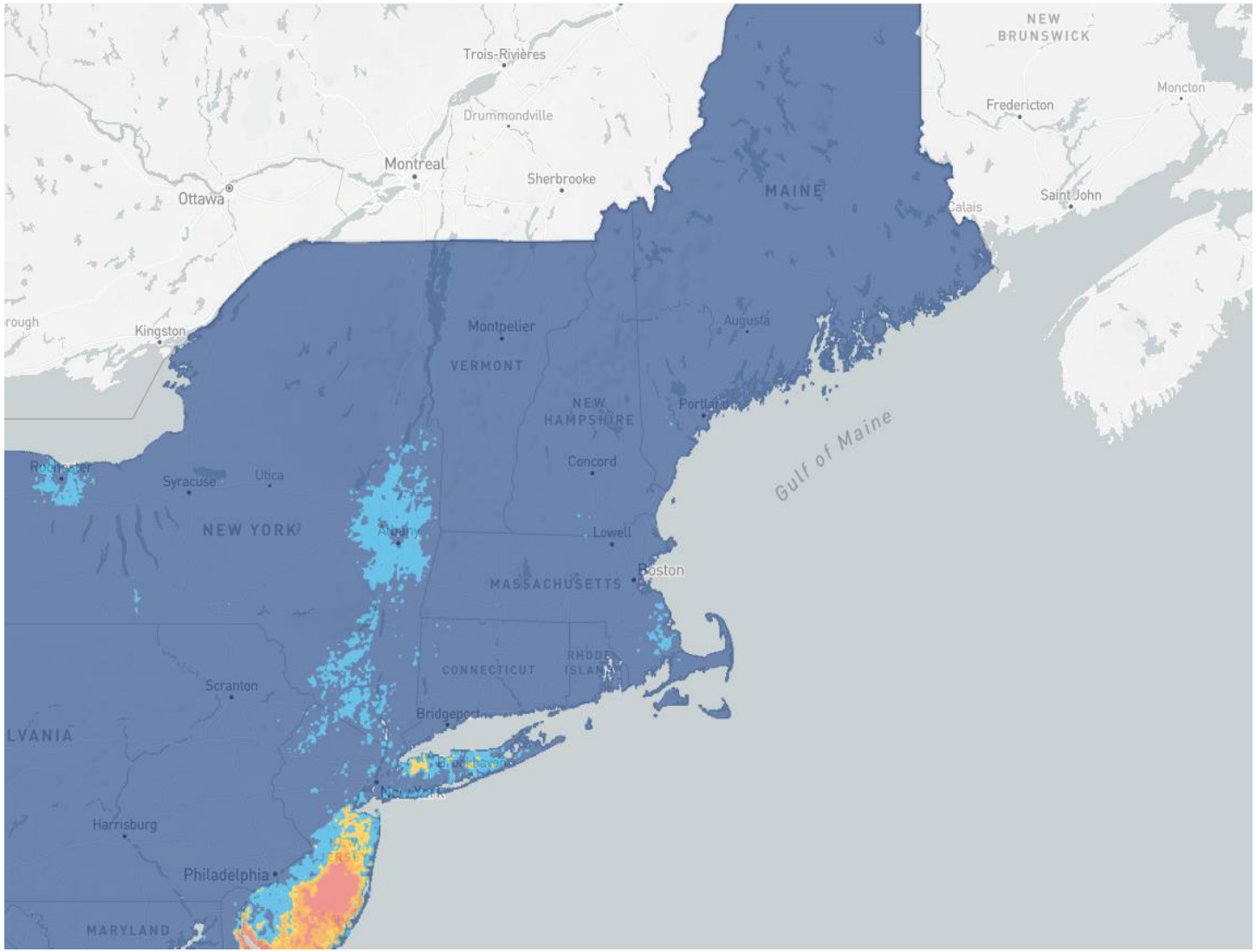
Climate Change Risk Score Methodology

Understanding the Relationship Between PCS Loss, MTBS Burn Area, and FWI



Northeast Results

GC Advantage Point



Wildfire Risk Score Breakdown

Total Portfolio

Present Day

Wildfire Risk Category	TIV	% Tot	% Agg	Building Value	% Tot	Risks	% Tot
Extreme	-	0.0%	0.0%	-	0.0%	-	0.0%
Very High	-	0.0%	0.0%	-	0.0%	-	0.0%
High	-	0.0%	0.0%		0.0%		0.0%
Moderate	615,391,231	1.0%	1.0%	592,044,404	1.0%	126	1.5%
Low	10,562,671,769	17.0%	18.0%	10,125,685,735	17.0%	1,381	16.0%
Very Low	51,067,619,307	82.0%	100.0%	48,973,872,381	82.0%	7,109	82.5%

50% more TIV in Moderate Bin

~32 new risks in the Moderate bin

2050 RCP8.5

Wildfire Risk Category	TIV	% Tot	% Agg	Building Value	% Tot	Risks	% Tot
Extreme	-	0.0%	0.0%	-	0.0%	-	0.0%
Very High	-	0.0%	0.0%	-	0.0%	-	0.0%
High	-	0.0%	0.0%	-	0.0%	-	0.0%
Moderate	922,983,506	1.5%	1.5%	886,128,325	1.5%	158	1.8%
Low	13,262,063,581	21.3%	22.8%	12,706,884,160	21.3%	1,774	20.6%
Very Low	48,060,635,720	77.2%	100.0%	46,098,590,035	77.2%	6,684	77.6%

Wildfire Risk Score Breakdown

County Comparison

Nassau County TIV in Moderate bin is 2x higher in 2050

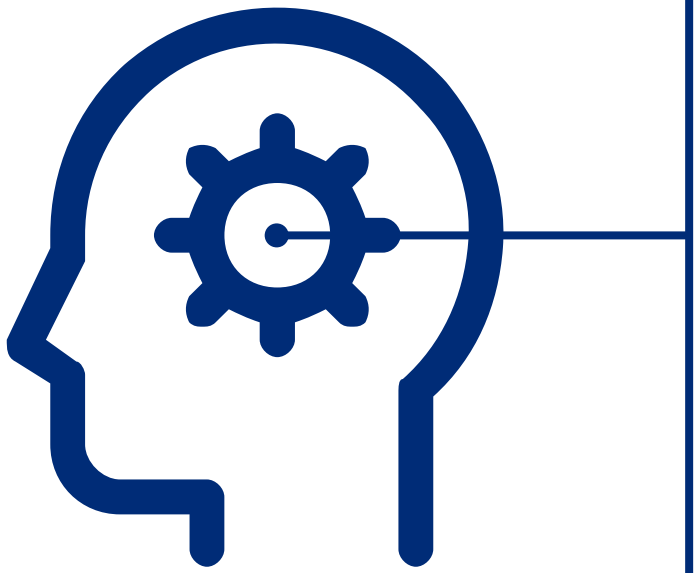
Present Day

County	State	Extreme	Very High	High	Moderate	Low	Very Low	Grand Total
SUFFOLK COUNTY	NY	0.0	0.0	0.0	436.4	5,121.5	9,208.8	14,766.8
NASSAU COUNTY	NY	0.0	0.0	0.0	179.0	2,694.0	10,904.2	13,777.1
WESTCHESTER COUNTY	NY	0.0	0.0	0.0	0.0	334.6	7,666.6	8,001.2

2050 RCP8.5

County	State	Extreme	Very High	High	Moderate	Low	Very Low	Grand Total
SUFFOLK COUNTY	NY	0.0	0.0	0.0	571.6	5,568.2	8,626.9	14,766.8
NASSAU COUNTY	NY	0.0	0.0	0.0	351.3	2,634.5	10,791.2	13,777.1
WESTCHESTER COUNTY	NY	0.0	0.0	0.0	0.0	622.3	7,378.9	8,001.2

Conclusions: Climate Change and Severe Weather



- Simultaneous changes in weather, exposure growth, and inflation have resulted in a sharp increase in industry losses over the last decade.
- Improved modelling and physical understanding of the influence of climate change on extreme weather has led to increased confidence that climate change has already caused and will accelerate worsening impacts across perils and geographies.
- Guy Carpenter is meeting the challenge of evolving physical risks with catastrophe model adjustments and climate change risk scores. These products suggest that climate change may increase the probability of flood risk from extreme rain, wildfire risk from extreme heat, and **wind risk from stronger hurricanes.**

Appendix

Bridging the Gap: Climate Change and Extreme Weather

IPCC (2021) Report Shows Growing Confidence in Climate Change Influence on Observed and Projected Changes

Change in Indicator	Observed (since 1950)	Attributed (since 1950)	Projected at GWL (°C)		
			+1.5	+2	+4
Warm/hot extremes: Frequency or intensity	↑	✓ Main driver	↑	↑	↑
Cold extremes: Frequency or intensity	↓	✓ Main driver	↓	↓	↓
Heavy precipitation events: Frequency, intensity and/or amount	↑ Over majority of land regions with good observational coverage	✓ Main driver of the observed intensification of heavy precipitation in land regions	↑ in most land regions	↑	↑ in most land regions
Agricultural and ecological droughts: Intensity and/or frequency	↑ in some regions	✓ in some regions	↑ in more regions compared to observed changes	↑ in more regions compared to 1.5°C of global warming	↑ in more regions compared to 2°C of global warming
Precipitation associated with tropical cyclones	↑	✓	↑ Rate +11%	↑ Rate +14%	↑ Rate +28%
Tropical cyclones: Proportion of intense cyclones	↑	✓	↑ +10%	↑ +13%	↑ +20%
Compound events: Co-occurrent heatwaves and droughts	↑ (Frequency)	✓ (Frequency)	↑ (Frequency and intensity increases with warming)		
Marine heatwaves: Intensity & frequency	↑ (since 1900)	✓ (since 2006)	↑ Strongest in tropical and Arctic Ocean		
Extreme sea levels: Frequency	↑ (since 1960)	✓	↑ (Scenario-based assessment for 21st century)		

medium confidence *likely/high confidence* *very likely* *extremely likely* *virtually certain*

Area of Concern Methodology

Goals

Identify areas with present-day wildfire risk and classify the potential increase in risk in a future climate scenario

Methodology

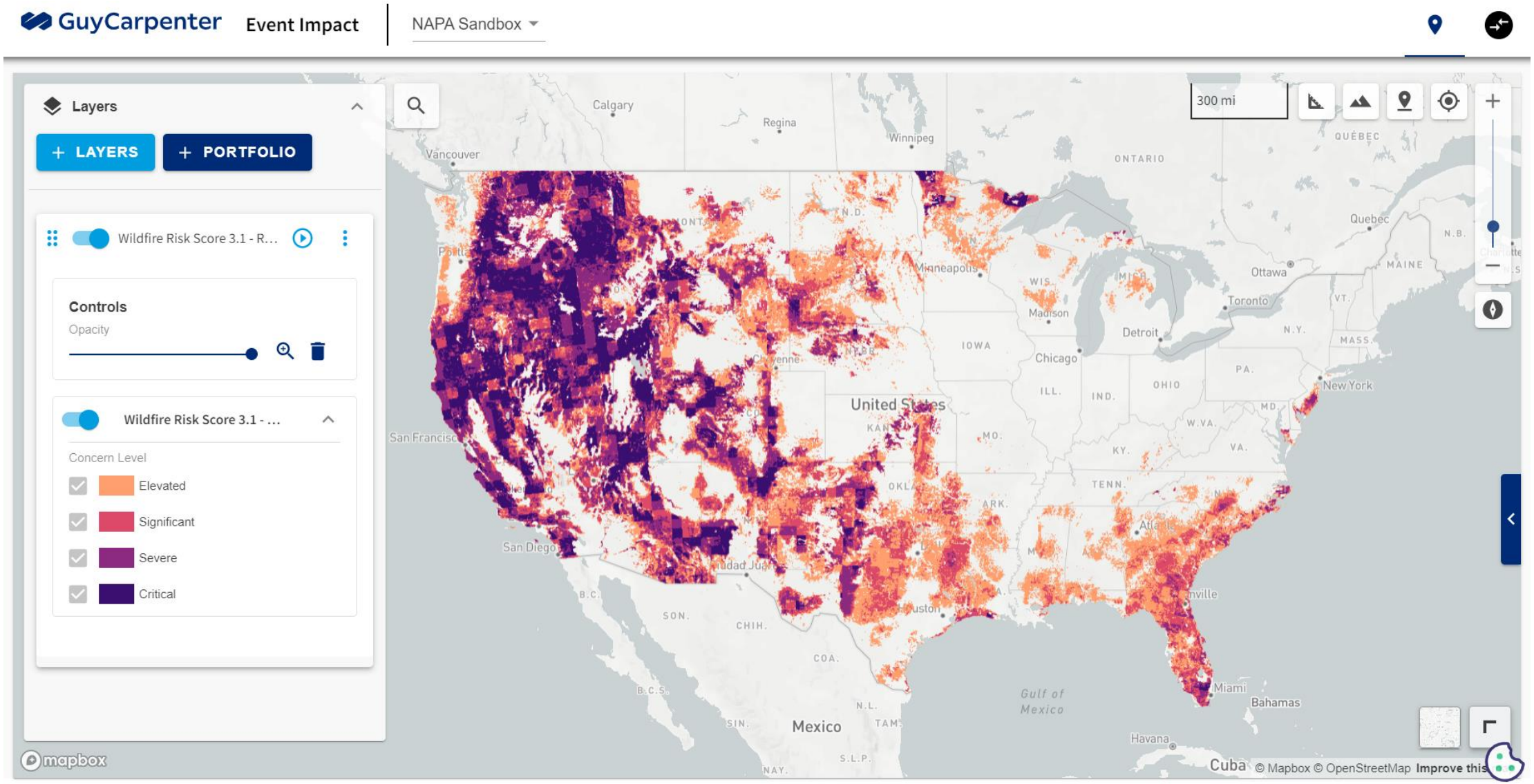
- Isolate the WFRS 3.0 areas with Moderate or higher risk
- Bin the pyrome level increase factors into three categories:
  - < 20%
  - 20-40%
  - >= 40%
- Create four "concern" classifications and apply them using the **rubric to the right**

Solution

Area of Concern

	Baseline Risk			
Projected Increase	**Moderate**	**High**	**Very High**	**Extreme**
< 20%	**Elevated**	**Elevated**	**Significant**	**Severe**
20% - 40%	**Elevated**	**Significant**	**Severe**	**Critical**
>= 40%	**Significant**	**Severe**	**Critical**	**Critical**

Area of Concern Map



Northeast Results

GC Advantage Point

V.3.1 RCP4.5 Area of Concern