



# Climate Risk The New Paradigm



Prepared for the



Climate and Resiliency Innovation  
Workstream

# Demex Presenters

➤ **Stephen Bennett**, COO and Chief Climate Officer

Steve is an attorney and weatherman-turned-entrepreneur whose 25-year career includes working for The Weather Channel and the Scripps Institution of Oceanography, as well as founding EarthRisk Technologies. Steve's mission is to bridge the gap between climate volatility and business operations.

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➤ **Carlos A Oliveras**, EVP and Head of Insurance

Carlos is a passionate insurance executive with over 35-years of global leadership experience within the P&C insurance, brokerage, reinsurance, specialty, and alternative risk marketplace. He drives the Demex growth and strategy across the insurance vertical.

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# Pick the City

- **On Sunday, December 26<sup>th</sup>, 2021, this city reached a high temperature of 67°F:**
  - Houston, TX
  - Kodiak, AK
  - Chicago, IL
  - San Francisco, CA
  
- **On Sunday, February 16<sup>th</sup>, 2021, this city had a low temperature of 11°F :**
  - Houston, TX
  - Kodiak, AK
  - Chicago, IL
  - San Francisco, CA

# Pick the City

## ➤ **On Sunday, December 26<sup>th</sup>, 2021:**

- Houston, TX: 75°
- Kodiak, AK: 67° (35° warmer than the warmest December temperature ever recorded)
- Chicago, IL: 43°
- San Francisco, CA: 48°

## ➤ **On February 16<sup>th</sup>, 2021:**

- Houston, TX: 12° (38° colder than the average low temperature of 50°)
- Kodiak, AK: 25°
- Chicago, IL: 8°
- San Francisco, CA: 47°

# Climate change is here, and few understand their climate-linked economics

Facing increasingly volatile weather, those looking to insure financial climate resilience require a hyper-local approach that is fully calibrated to their unique operation.

# 2022 Demex Ski Report

## Snowfall isn't what it used to be: The Colorado Conundrum

Madeline McFarland, Climate Resilience Analyst

### Colorado Shifts

In December, resorts in Colorado worried about the unpromising beginning of ski season. In Denver, over 230 days passed without snow, the second-longest stretch in a century. Estimates of the state's snowpack were around half of what snowpack usually was at that time. Warm temperatures limited snow-making, a strategy used in the absence of snowfall. In response, some resorts delayed the opening dates of the winter ski season.

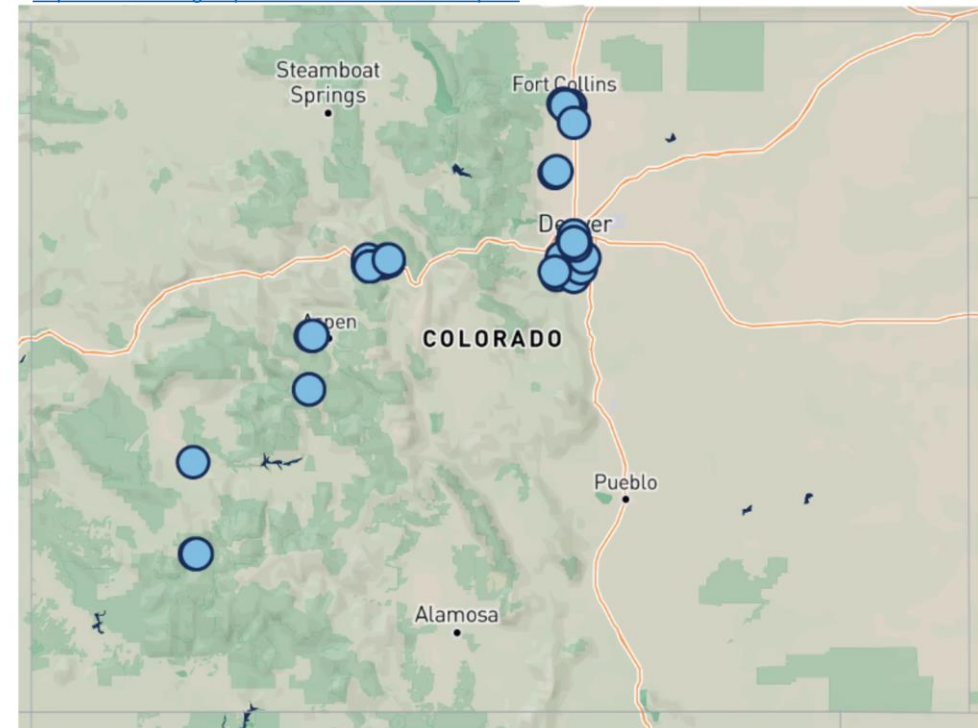
Then conditions in Colorado changed. By March, many resorts surpassed last year's snowfall. Storms brought 27 inches of snow in 10 days to ski areas in Summit County like Breckenridge. In response, resorts across the state extended their ski seasons, including seven of Vail Resorts properties. This winter is now Vail Mountain's longest continuous snow season in its history.

The onset of climate change has shifted global weather patterns. Extreme events and volatility for weather such as snowfall, precipitation, and temperature are more common than they used to be. As weather patterns change, meteorologists and scientists agree that extreme weather is part of a "new normal."

For the hospitality and service industries, volatile and changing patterns in snowfall have repercussions on businesses that depend on reliable snowfall from year-to-year. The ski industry, valued at a total \$788 billion, and the resorts associated with ski mountains are at particular risk. Extremely mild winters can lead to significant lost revenue. Researchers have, for example, estimated that the five least-snowy winters between 2001 and 2016 cost the ski industry \$1 billion and over 17,000 jobs in each poor season.

Climate change particularly affects the state of Colorado, where the ski industry is vital to the state and its economy. Colorado's ski industry produces an estimated annual \$4.8 billion for the state, as well as 46,000 jobs and \$1.9 billion in income from wages. Analysis of climate trends at the locations of major hotels shows that most of the hotels experiencing the strongest downward snowfall trends in Colorado are on the slopes throughout the Rocky Mountains.

<https://thedemexgroup.com/2022-demex-ski-report/>



Resorts with Strongly Decreasing Snowfall Trends. Source: Demex Solutions Center

# Aloha

<https://demexclimatecenter.com/#/results/WorldCities/Kahului,%20HI,%20USA/1590249/Summer/Rain/2>

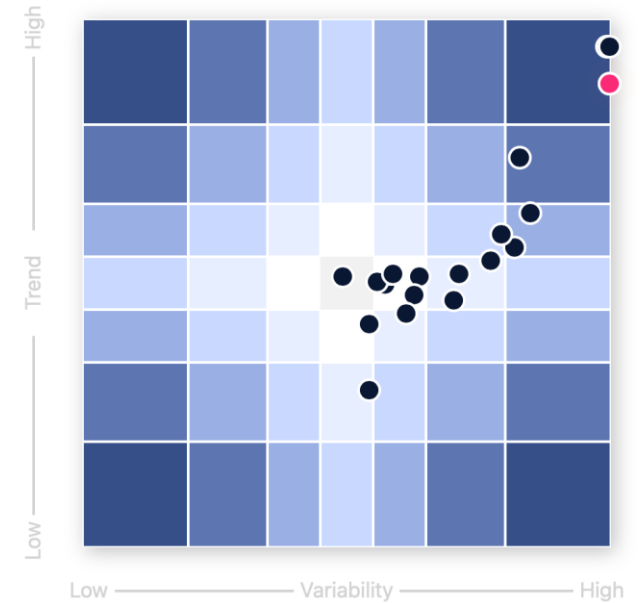
## Kahului, HI, USA Jun-Aug Rain



Trend Score	76
Trend Strength	Strong
Variability Score	100
Variability Strength	Strong

### What this means

For businesses in Kahului, HI, USA, summer rainfall has strongly increased over the past ten years when compared to the full record of weather (shown in the Trend Score). In the same period, there is much more year-to-year variability (shown in the variability score). In other words, it's been much wetter and the range of rain from year to year is much greater. Dive into the full report below or [learn how the DCI works.](#)



### How to read this

The four corners of the chart represent the most extreme changes in climate trend and variability, while the center of the chart represents no change relative to historical climate. The vertical axis represents the given climate trend from decrease (bottom) to increase (top), and the horizontal axis represents climate variability from consistency (left) to variability (right).

The vertical axis represents the climate trend, so points higher on the chart have experienced a recent increase in the given weather variable, while points lower on the chart have experienced a recent decrease.

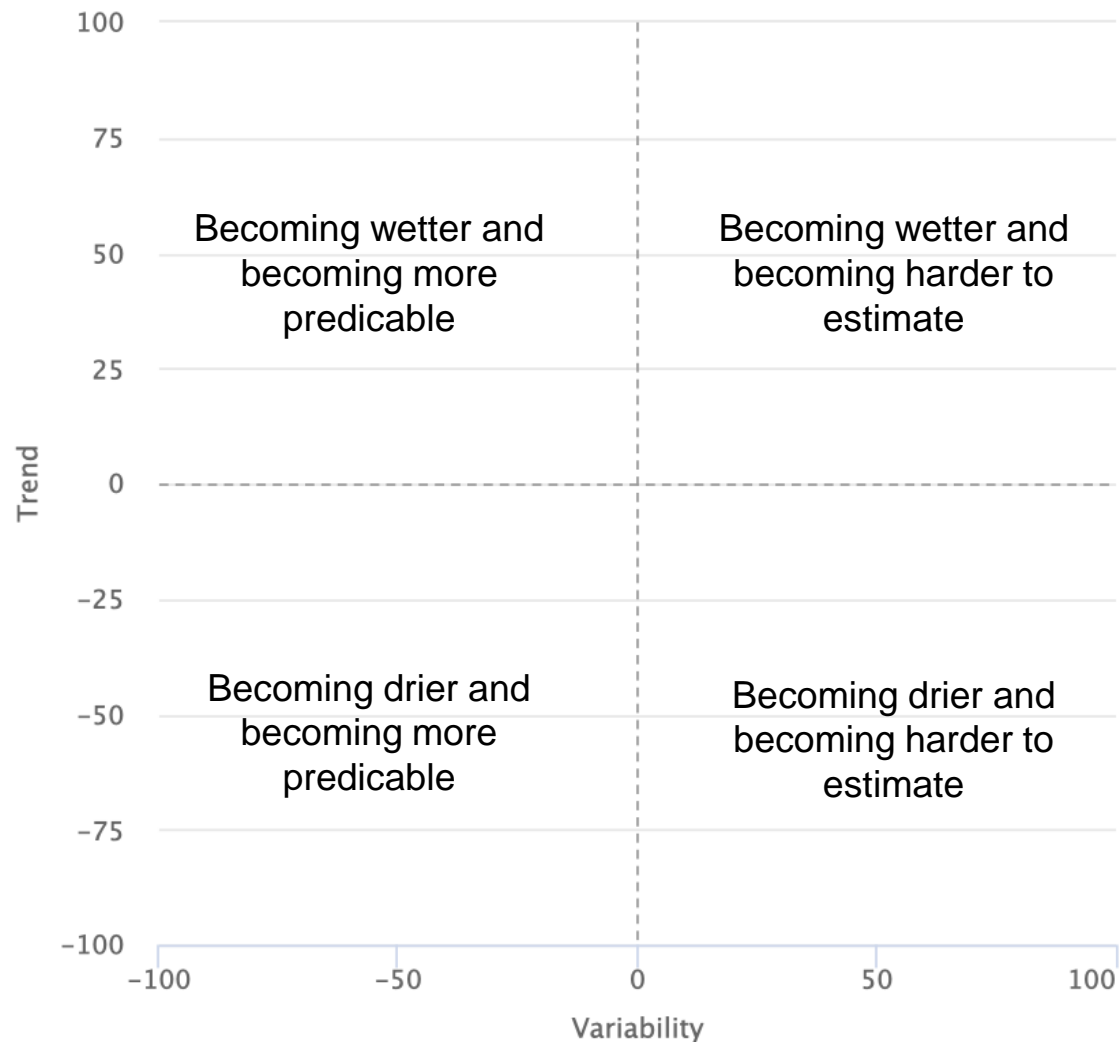
The horizontal axis represents climate variability, so points on the left side of the chart have shown a recent increase in the consistency of a given weather variable, while points on the right side of the chart have shown to be recently less consistent.



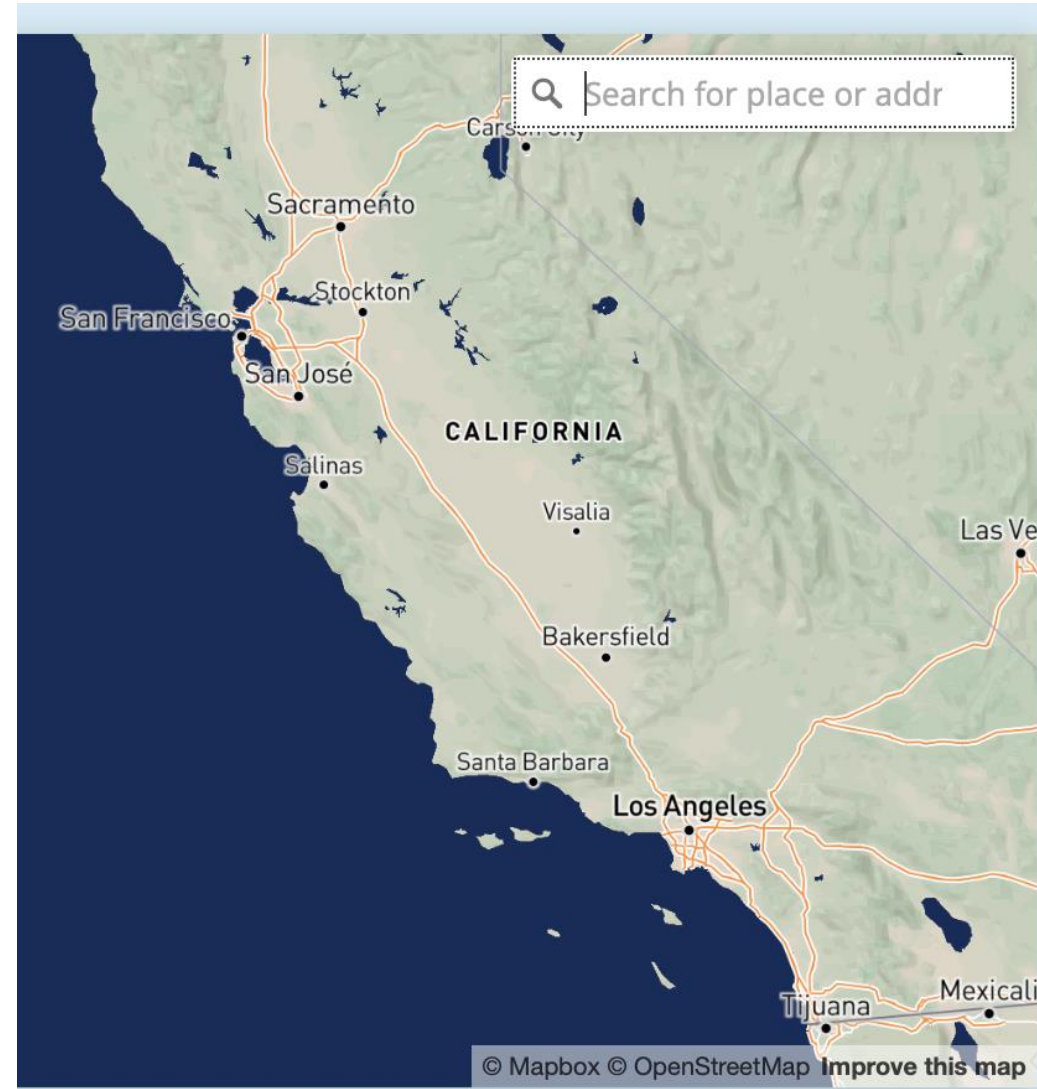


# California Dreamin'

Trend vs. Variability



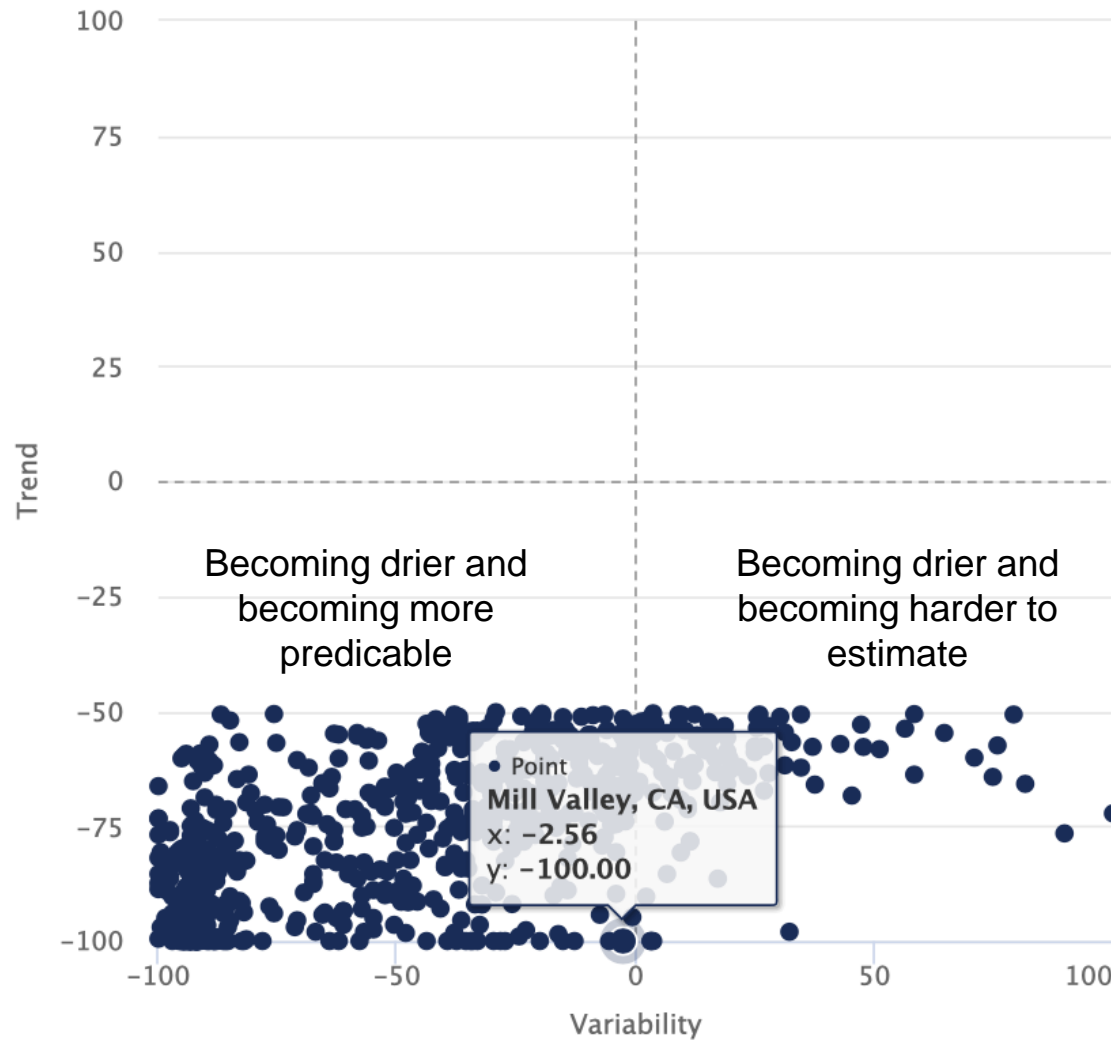
<https://quotes.thedemexgroup.tech/SolutionsCenter/App/#/ClimateRiskAssessment/6>



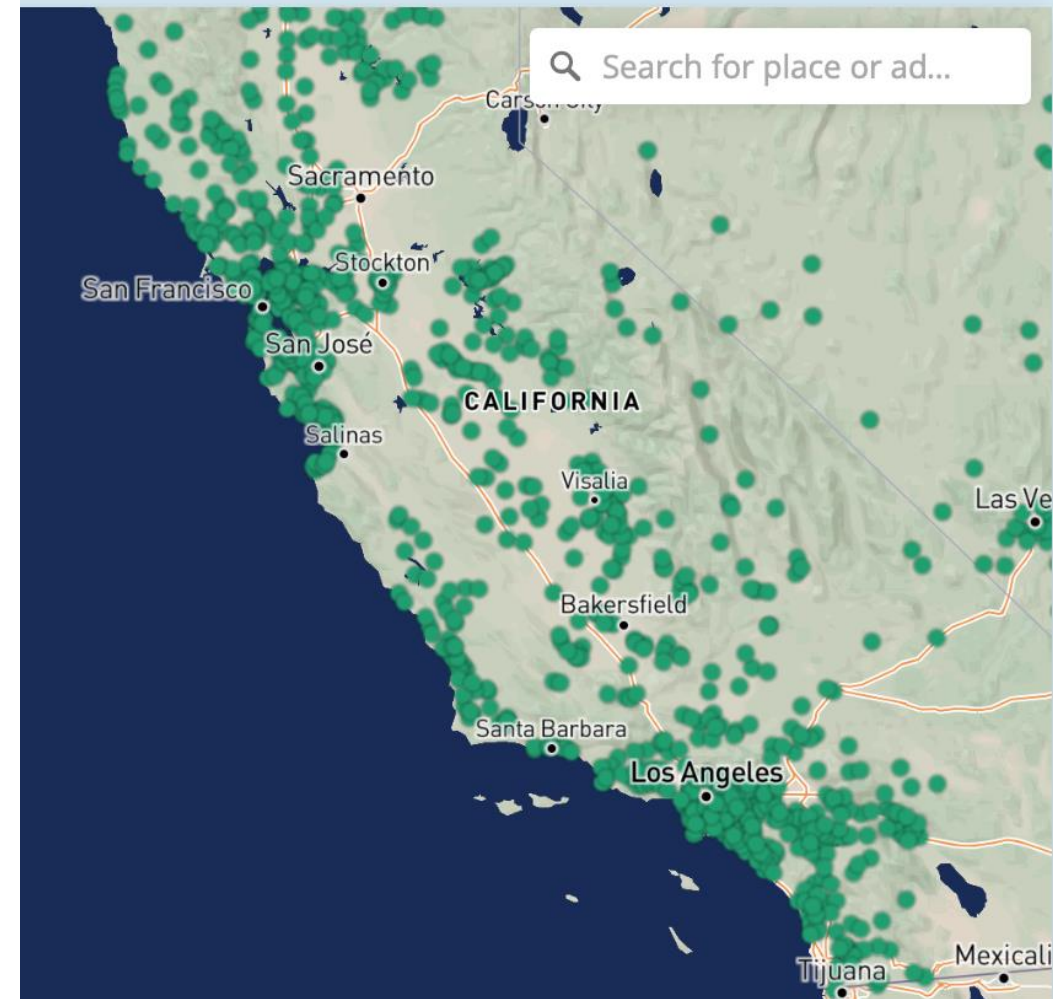


# Water Woes

Trend vs. Variability

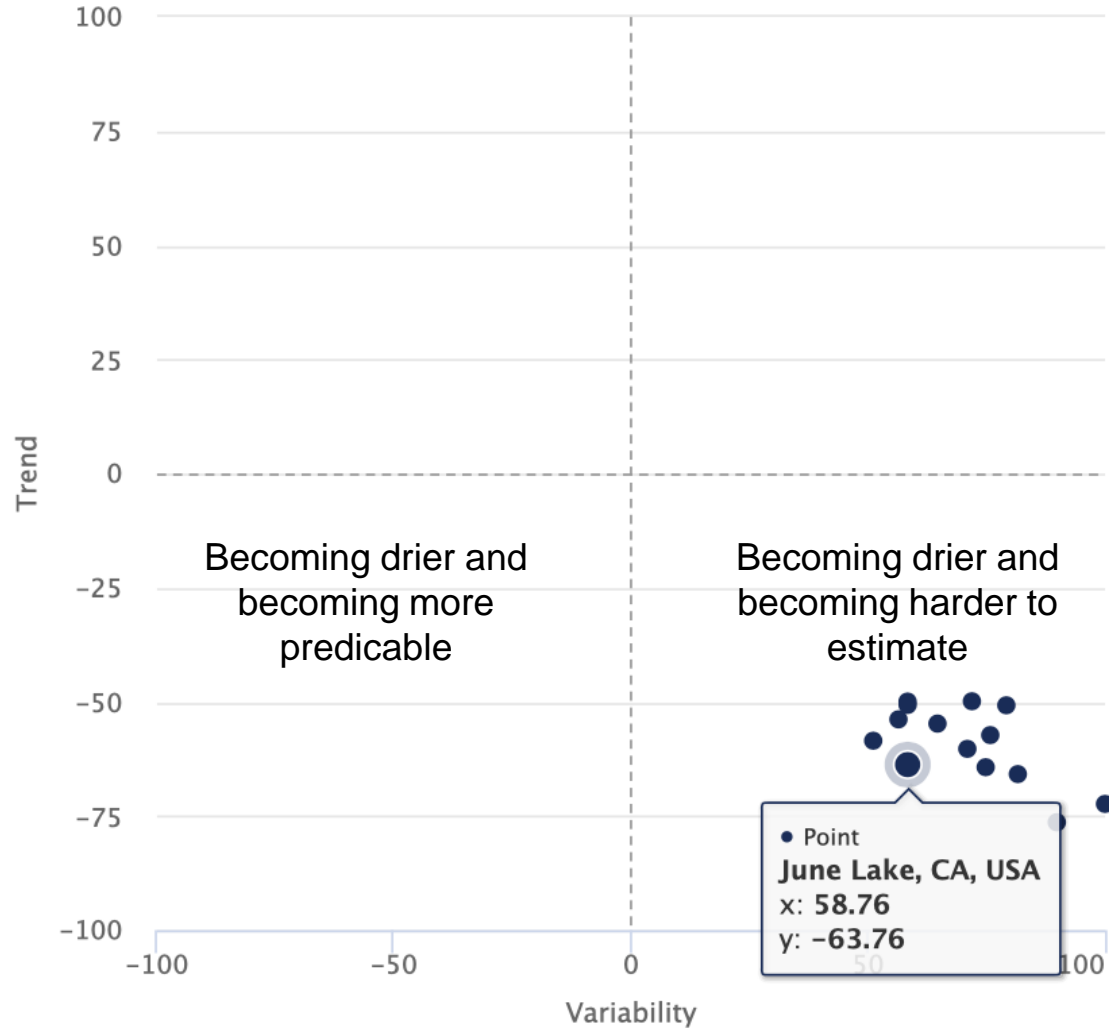


<https://quotes.thedemexgroup.tech/SolutionsCenter/App/#/ClimateRiskAssessment/6>

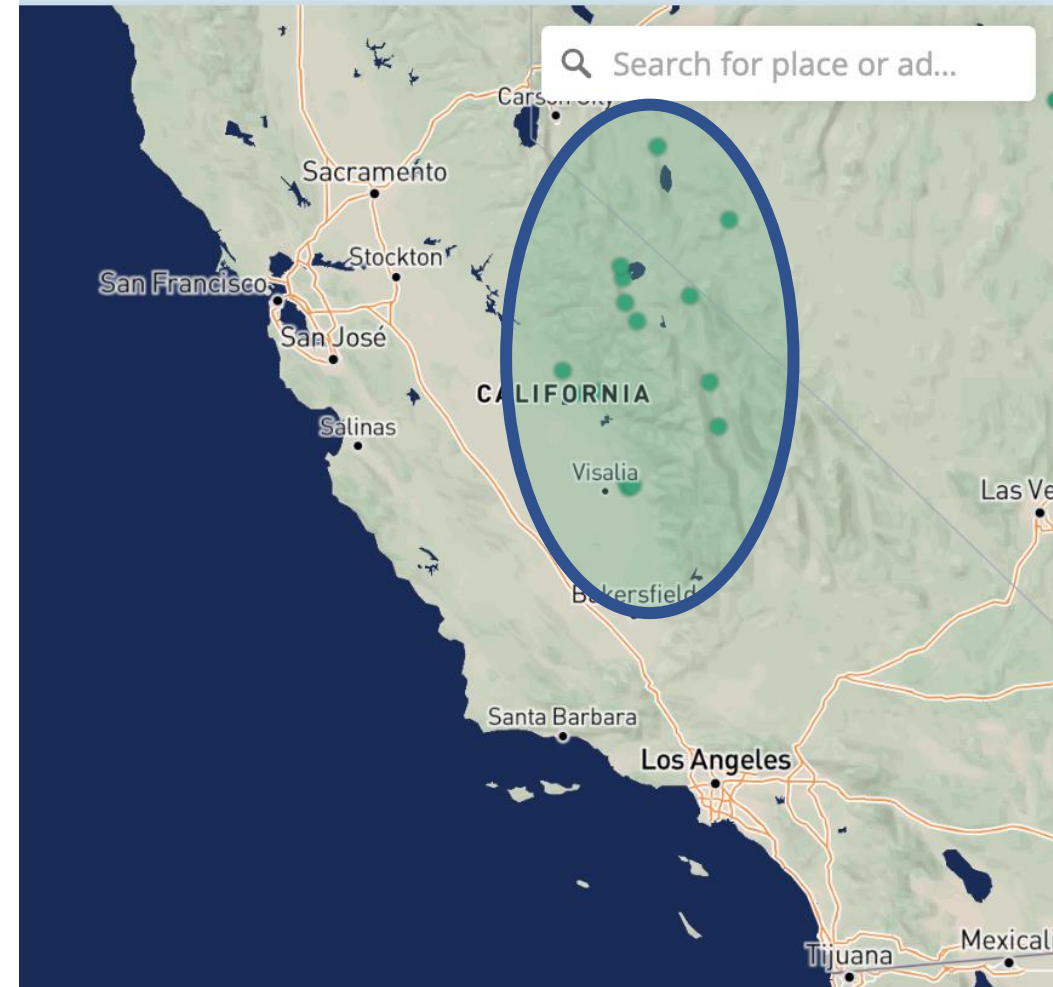


# Water Woes

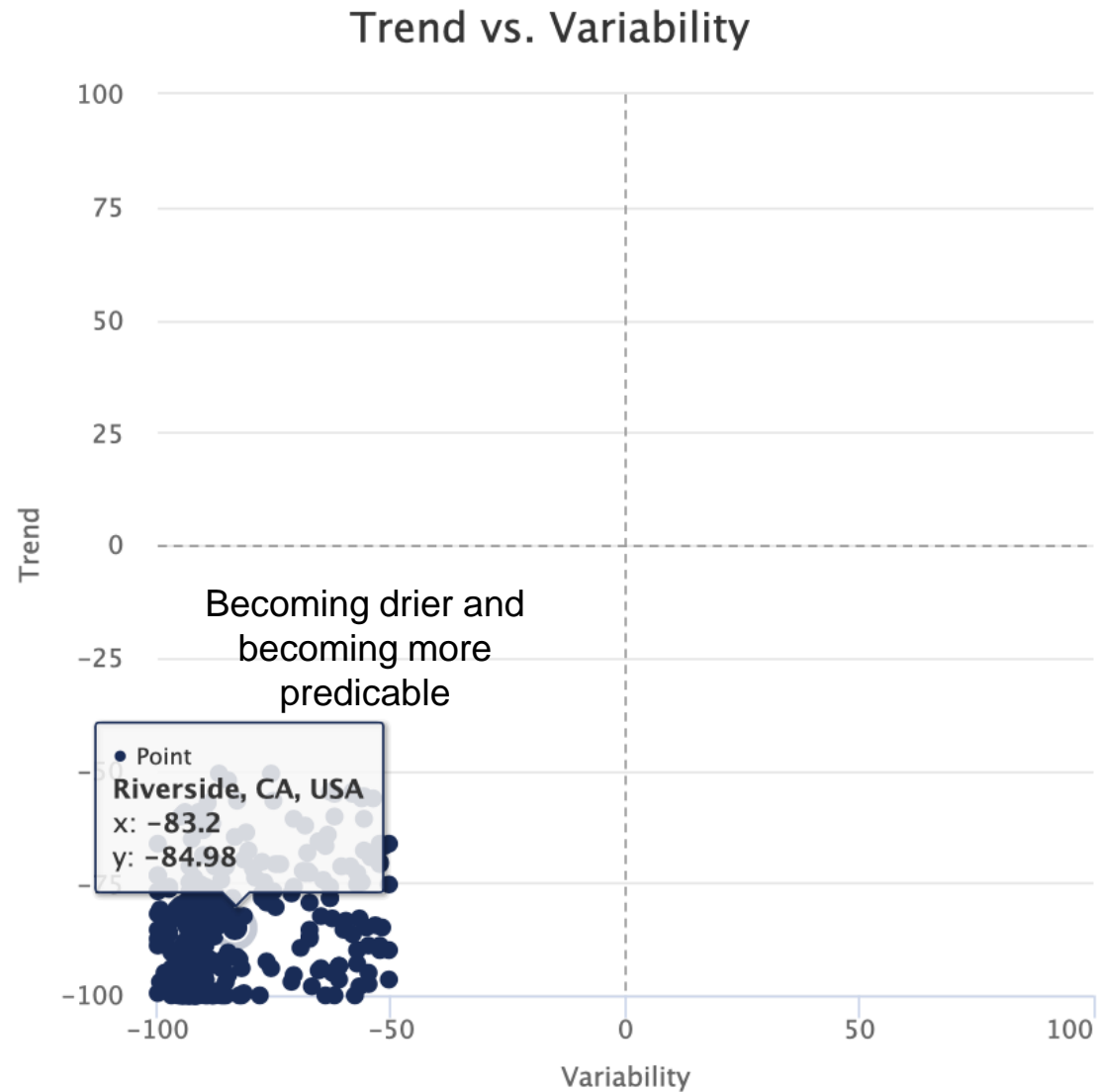
## Trend vs. Variability



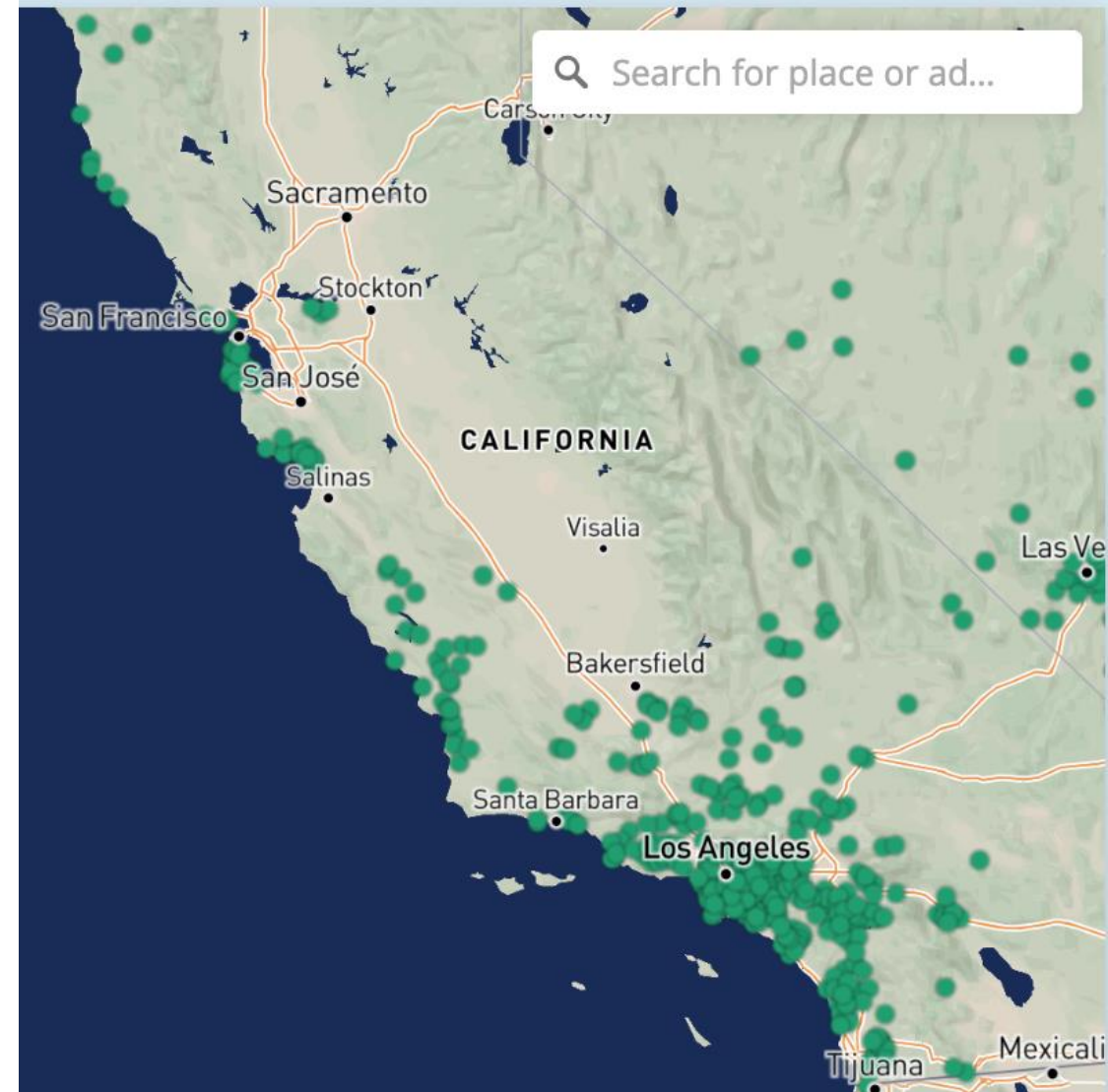
<https://quotes.thedemexgroup.tech/SolutionsCenter/App/#/ClimateRiskAssessment/6>



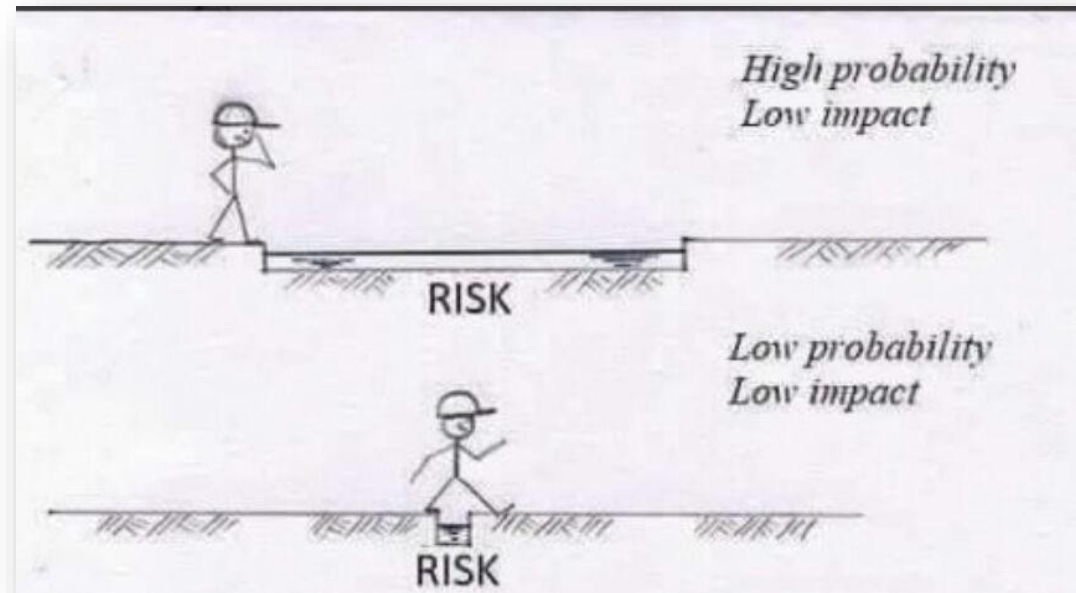
# Water Woes



<https://quotes.thedemexgroup.tech/SolutionsCenter/App/#/ClimateRiskAssessment/6>

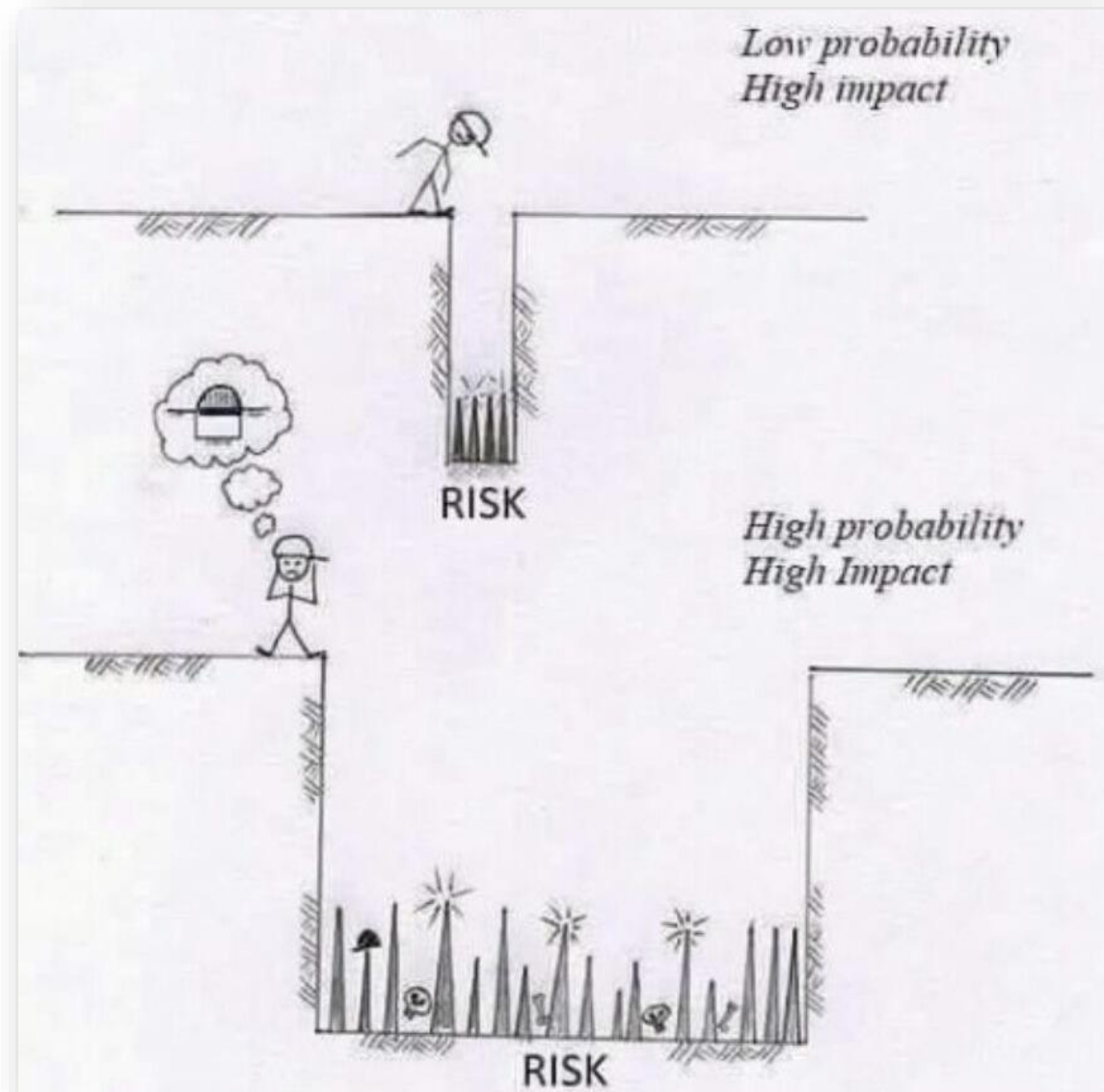


# You must see the gap before bridging it





# You must see the gap before bridging it



# You must see the gap before bridging it

<https://www.artemis.bm/news/demex-launches-appraisals-as-pathway-to-parametric-climate-hedging/>

*"It is only by being able to identify, analyse and quantify climate risk exposure and its potential impacts, that informed decisions related to hedging and risk transfer can be taken.*

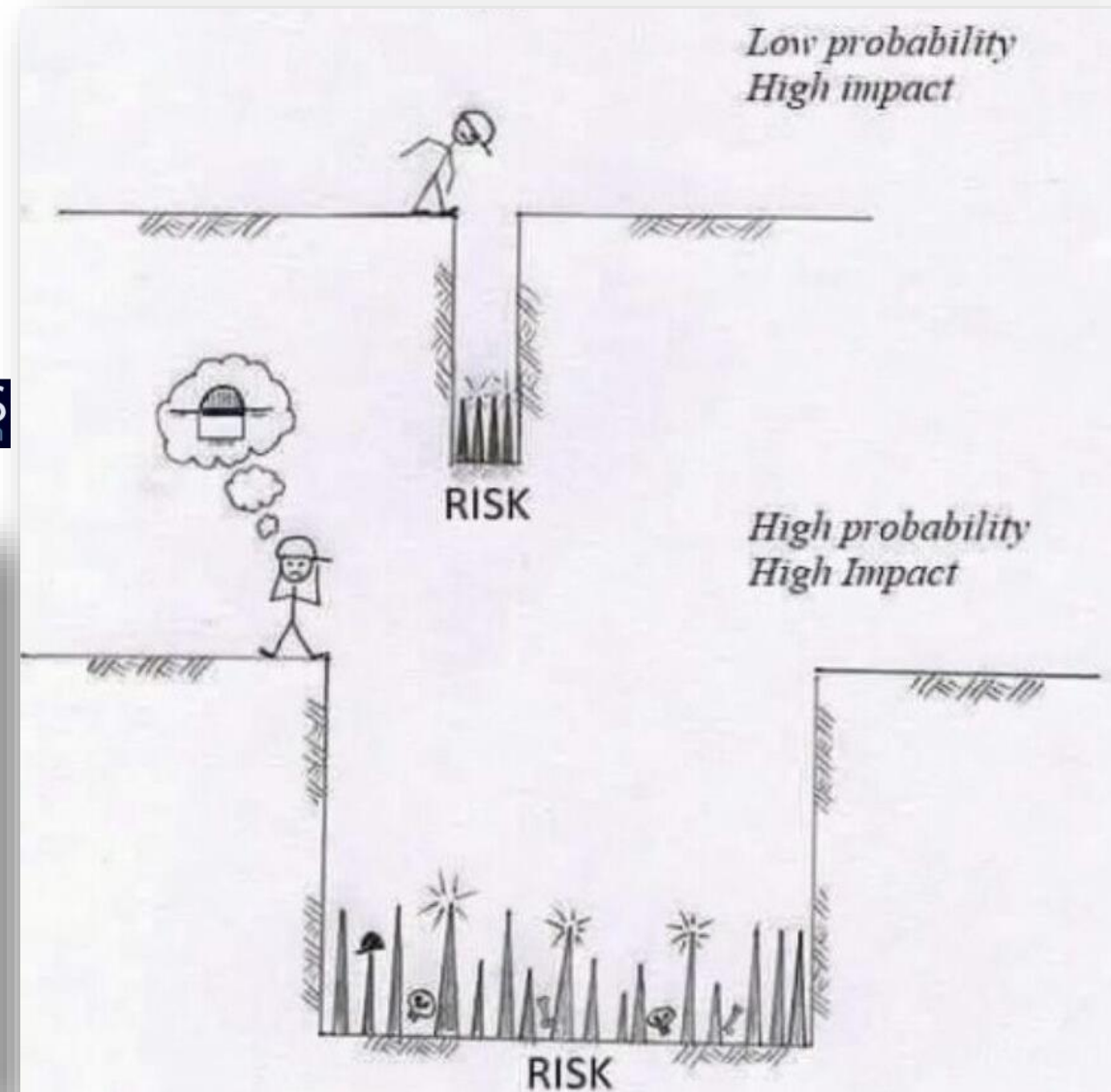
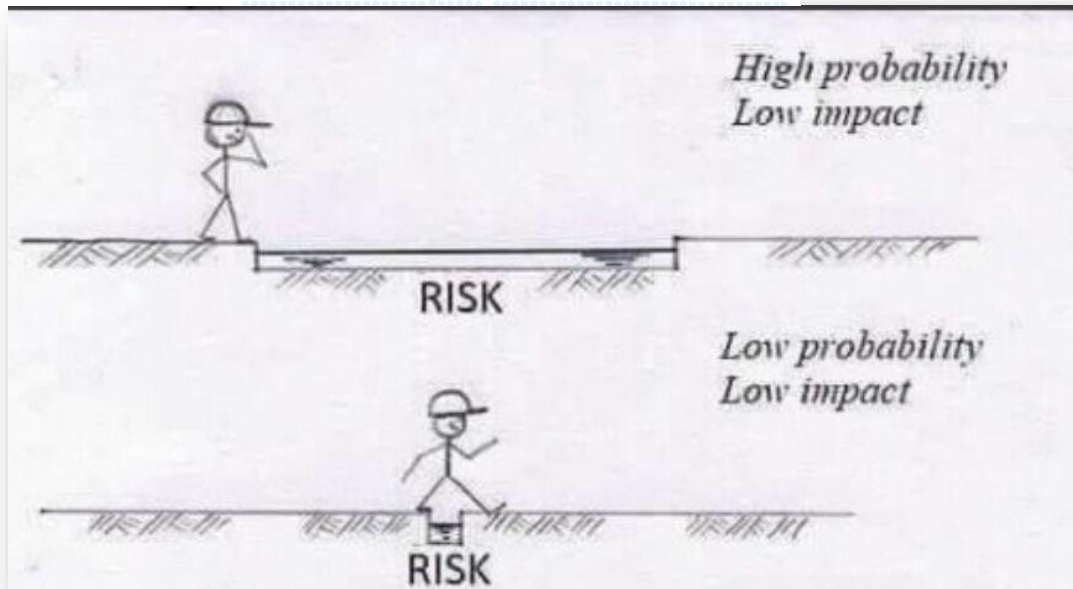
*With many of these embedded climate risks currently unquantified and even unidentified in many cases, services like this can also be a precursor stimulant for the use of risk transfer where it has never been contemplated before."*

Demex launches Appraisals as pathway to parametric climate hedging



16TH MARCH 2022 - AUTHOR: STEVE EVANS

Share: 



# The Demex Group

*InsurTech paving the way to climate resilience.*

- After 10 years of development at a global reinsurer, and backed by Anthemis, IA Capital, QBE Ventures, and Blue Bear Capital, The Demex Group was formed in 2019 to create customized climate risk solutions.
- Although initially focused on snow solutions, Demex now provides a multitude of comprehensive solutions to address financial volatility across many sectors, managing previously uninsurable climate-linked risks at scale.
- Our cutting-edge technology was developed by a team with decades of experience across tech, financial and risk management, capital markets, commodities, insurance, climate science, and energy. We provide our clients with customized solutions for: climate impact appraisals & assessments, and insurance risk-transfer.

INSURANCE  
JOURNAL

DEMEX



## NAIC Report Outlines Ways to Address Climate-Related Risks

By Don Jergler | November 18, 2021

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The National Association of Insurance Commissioners released the report calling out measures to adapt to and deal with the risks posted by climate change.

The report, [Adapting to Emerging Risks: The State-Based Regulatory System is Focused on Climate and Resiliency](#), notes that the NAIC and state insurance regulators are addressing climate-related risks through the three main pillars of insurance regulation: financial risk analysis; insurance market availability and affordability; and consumer education and outreach.

### Extreme Temperature Insurance

A technology firm and a managing general agent are partnering to offer extreme temperature insurance to commercial properties across the U.S.

The extreme temperature coverage is parametric, with claims directly linked to temperature, according to Vave, an algorithmic underwriting MGA, and The Demex Group, a climate risk analytics and technology firm. When the temperature passes a predefined threshold – for example, below 20°F in winter – a claim is immediately triggered, [the Insurance Journal reported](#) in an article on Wednesday.

<https://www.insurancejournal.com/news/national/2021/11/18/642917.htm>



# We pioneered a comprehensive approach to climate risk management

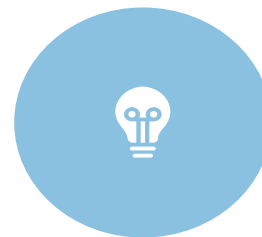


Demex takes three steps to address climate-related risks at scale



**Model**

Using our big data platform, we create custom parametric models to capture weather exposures across your portfolio



**Assess**

Using a market risk framework, we assess how weather variability is impacting your economics



**Manage**

We integrate the parametric models and climate assessments into a comprehensive risk management program

**We instantly crunch millions of weather time series to assess every point around the world.**

**We integrate big data and scalable analytics to develop actionable climate risk management across an unlimited offering of financial instruments globally.**

# The Demex Group | NAIC

## *Areas for Collaboration*

The NAIC's Climate and Resiliency Task Force is chartered to coordinate the NAIC's domestic and international efforts on climate and resiliency issues, including **dialogue among regulators, the industry, insurance consumers and other stakeholders**. The Task Force addresses national issues and **provides states information and tools to support their own individual markets**.

[https://content.naic.org/cmte\\_ex\\_climate\\_resiliency\\_tf.htm](https://content.naic.org/cmte_ex_climate_resiliency_tf.htm)

## NAIC

Regulator

### 2022 Adopted Charges

The **Climate and Resiliency (EX) Task Force** will:

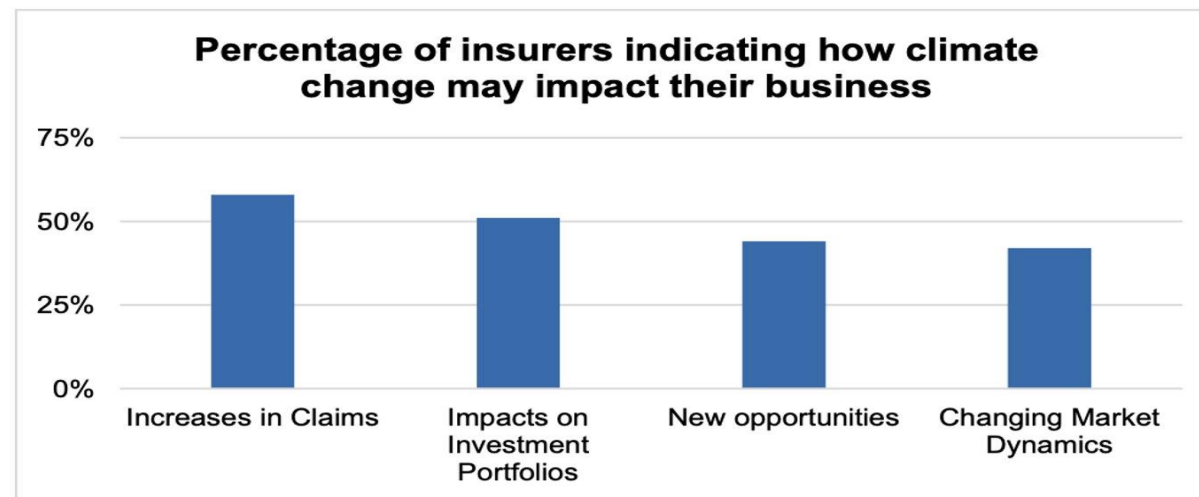
1. Consider appropriate climate risk disclosures within the insurance sector, including:
  - Evaluation of the Climate Risk Disclosure Survey.
  - Evaluation of alignment with other sectors and international standards.
2. Evaluate financial regulatory approaches to climate risk and resiliency in coordination with other relevant committees, task forces and working groups, such as the Financial Condition (E) Committee and the Financial Stability (EX) Task Force, including:
  - Evaluation of the use of modeling by carriers and their reinsurers concerning climate risk.
  - Evaluation of how rating agencies incorporate climate risk into their analysis and governance.
  - Evaluation of the potential solvency impact of insurers' exposures, including both underwriting and investments, to climate-related risks.
  - Evaluation and development of climate risk-related disclosure, stress-testing, and scenario modeling.
3. Consider innovative insurer solutions to climate risk and resiliency, including:
  - Evaluation of how to apply technology and innovation to the mitigation of storm, wildfire, other climate risks and earthquake.
  - Evaluation of insurance product innovation directed at reducing, managing and mitigating climate risk, and closing protection gaps.
4. Identify sustainability, resilience and mitigation issues and solutions related to the insurance industry.
5. Consider pre-disaster mitigation and resiliency and the role of state insurance regulators in resiliency.

# Climate Appraisals

*One way we can help the NAIC, States, Municipalities and Businesses*

- Climate Risk is recognized as an economic imperative and disclosure reports are increasingly prevalent

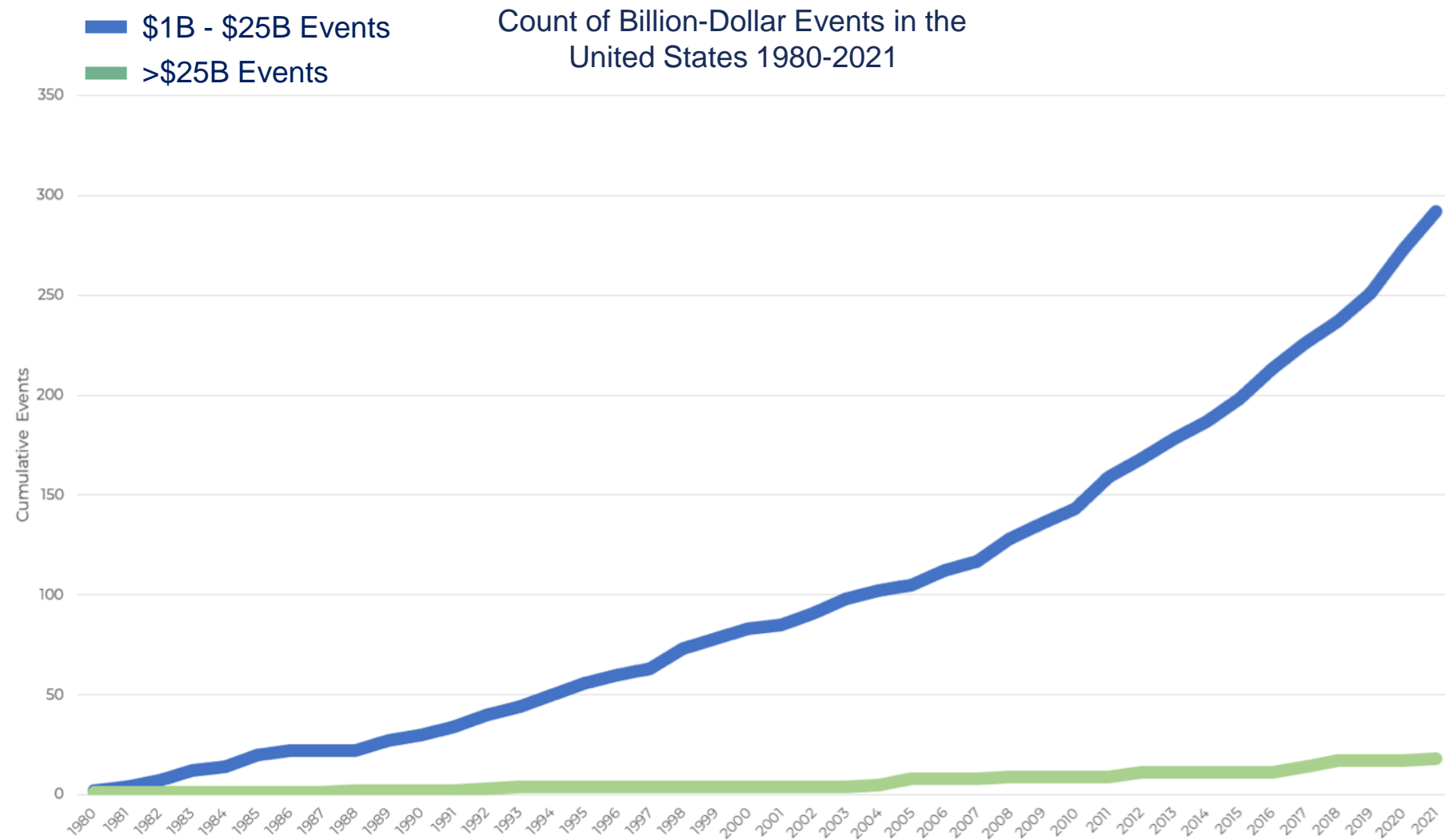
US SIF Survey,  
2019 Data



- Appraisals are the essential starting point for Climate Risk Assessment.
- Climate Risk Appraisals from Demex directly address future business performance.
  - Lenders appraise climate-driven shifts for risk of borrower defaults.
  - Business owners appraise climate-driven shifts in costs and revenue.
  - Investors appraise climate-driven shifts in projected returns across their portfolios.
  - Insurers appraise risks from climate change on their underwriting portfolio and profitability.
- Appraisals form a pathway toward Demex derived parametric insurance and climate hedging for complete financial solutions.

# Climate Appraisals

*Protection gap is growing*

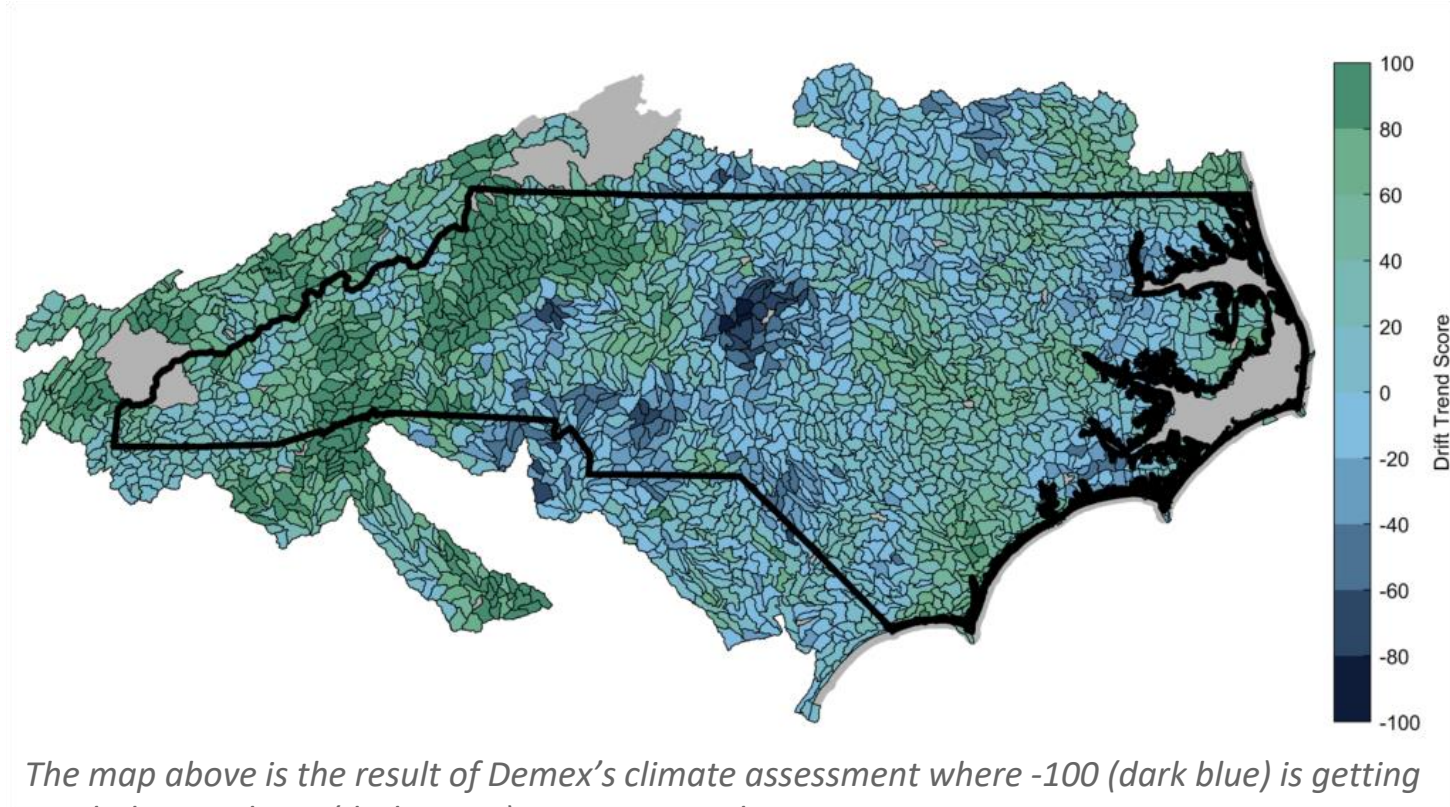


# Climate Appraisal Case Study...part 1

A major carrier believes the 3rd-party flood analysis they obtain based on historical patterns ignores trend and does not appropriately address flood potential from non-coastal exposures.



Model



*The map above is the result of Demex's climate assessment where -100 (dark blue) is getting much drier and 100 (dark green) is getting much wetter.*



Assess

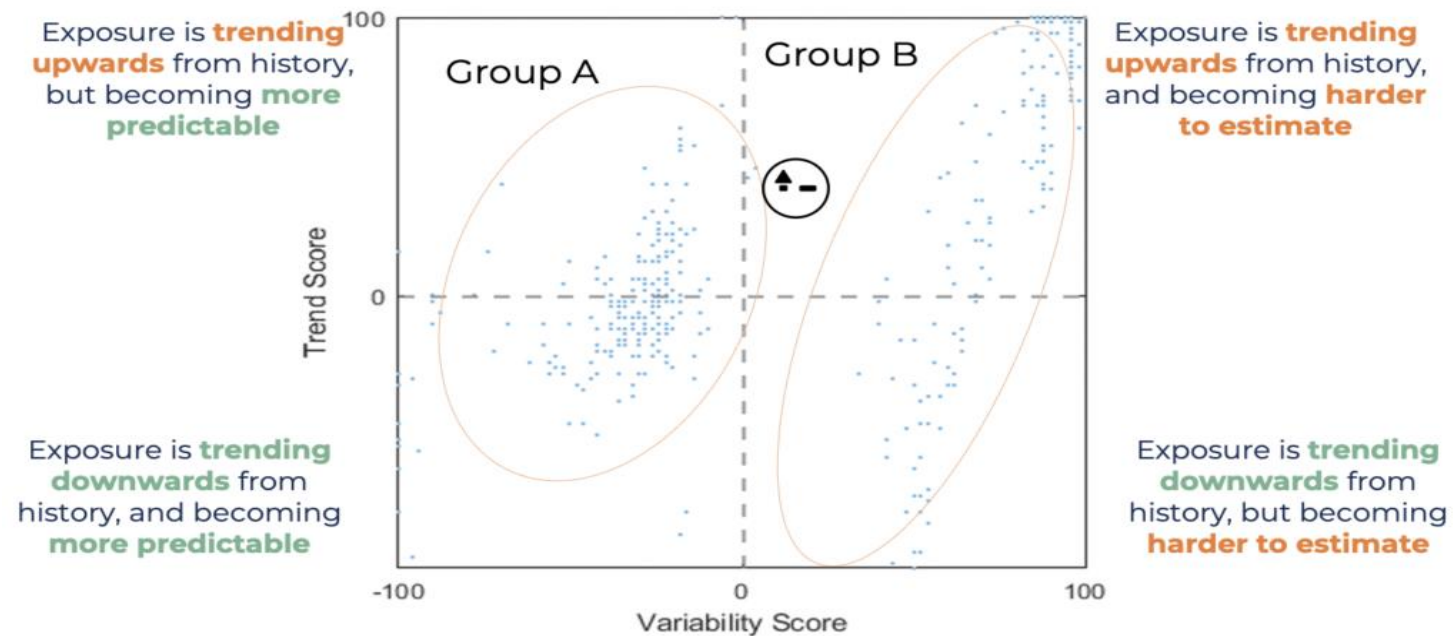
Demex quantified rainfall trends in the region, then used customers total insured values by zip code to assess exposure.

# Climate Appraisal Case Study...part 2

After assigning scores for trends in rainfall and variability, our customer's properties cluster into two groups that are impacted differently.



## Demex Exposure Assessment



Each blue dot represents a single portfolio element

Group A experienced decreased variability year-to-year; rainfall patterns are becoming more reliable and easier to estimate. Group B experienced increased variability year-to-year; rainfall trends are becoming unreliable and harder to estimate.

Then, we calibrated further using financial data to appraise risk at each location, to identify segments of underwriting portfolio most subject to impact from weather trend and variability.



# Parametric Insurance

## *What is a parameter?*

- A parameter or index is an objective measure that is linked to a specific risk that may or may not lead to a financial loss for the protection buyer.
- The selected parameter or index must be:
  - derived from a mathematical model or obtained from a 3<sup>rd</sup>-party provider that tracks relevant events
  - independently verifiable, and consistently measured and reported
  - transparent...neither the carrier nor insured can influence the occurrence of the event or its reporting
- Examples include:
  - snowfall/ice removal expenses for a municipality tied to snowfall at nearby weather stations
  - rainfall related construction delays tied to rainfall at nearby weather stations



Manage



# ***Parametric covers complement traditional insurance***

## ***How does it differ from traditional insurance?***

- 1. Customized Payment Trigger**
  - Payment triggered by event / parametric threshold vs requiring actual damage or loss to property
  - For example, snowfall exceeding 40" at a prescribed weather station.
- 2. Efficient Recovery**
  - Pre-agreed payment and recovery mechanism based on event parameter or index value vs indemnification after a reported loss
  - Payment is guaranteed when policy is triggered
  - For example, increasing pay-out amounts with increasing rainfall
- 3. Correlation Risk**
  - The risk that the trigger index does not perfectly match the exposure at the insured location
  - For example, snowfall at the selected weather station differs from snowfall at the insured location
- 4. Claims Process and loss payment**
  - Payment is efficient after trigger occurs vs complicated and time-consuming adjustment process
- 5. Policy Term**
  - Seasonal, annual or multi-year vs typically annual
- 6. Coverage flexibility and structure**
  - Broad coverage customized for each buyer vs generally standard policy language (minimal customization)
  - Few restrictions and exclusions

**Parametric covers are intended to complement traditional insurance and to speed up recovery** – not to be purchased in place of traditional insurance.

# Parametric Insurance



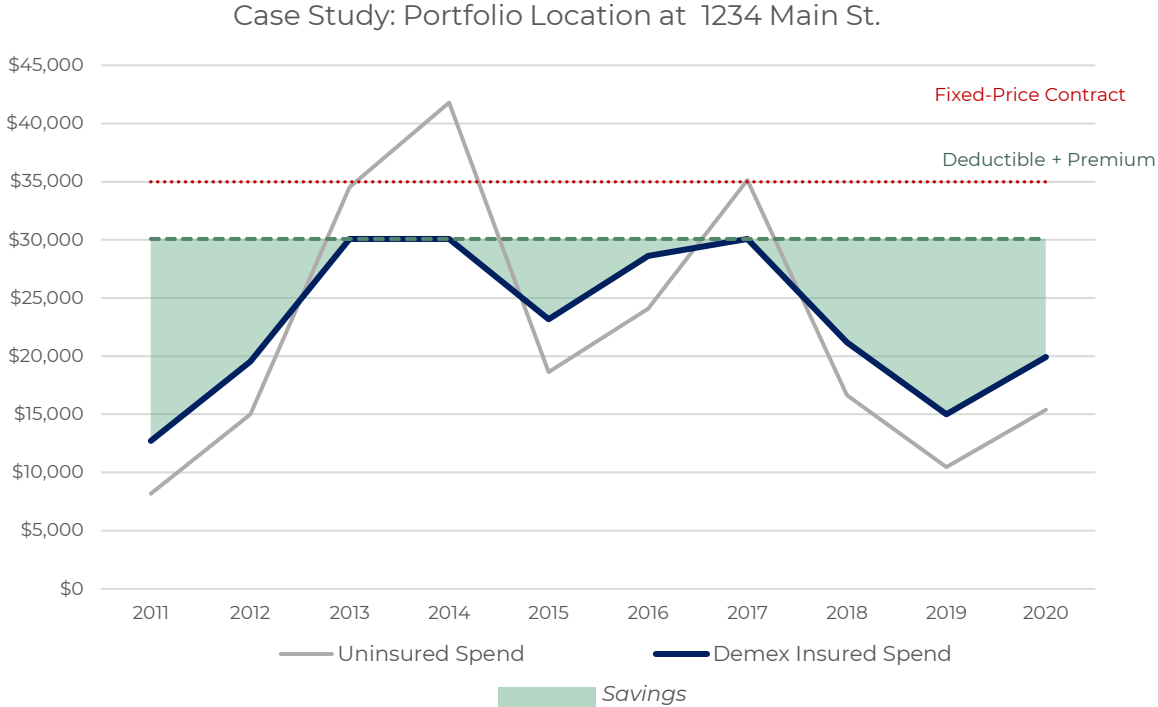
Manage



## CASE STUDY – Snow Removal Ins for Schools, Municipalities and Property Owners

### Shifting Risk

- **Seasonal fixed price contracts exceed per event pricing in most years because they overweight the probability of extreme winters.** Snow/ice removal contractors typically set the fixed price by using extreme snow events that occur approximately once every ten years as a benchmark to hedge their own risk.
- Per event contracts often appear less costly than fixed-price because they accumulate charges as winter unfolds. Not surprisingly, low-snow winters lead to lower accumulated charges. Extreme winters, however, can generate snow removal costs with totals significantly higher than that of a fixed price contract.
- Over time, per event (or “variable”) contract pricing is less costly than the fixed price alternative, but this leaves customers exposed to serious budget overages in extreme winter years.
- A variable-priced snow removal contract plus a Demex policy results in claim payments in 2013, 2014, and 2017. Including premium, the client spent less in these years than they would have if they had purchased either a fixed-price or a stand-alone (uninsured) variable price contract.
- Demex saves the client \$120,000 over ten years at this single location. Savings will scale across all locations in a portfolio.



\*Uninsured Spend Using Per-Event Contract

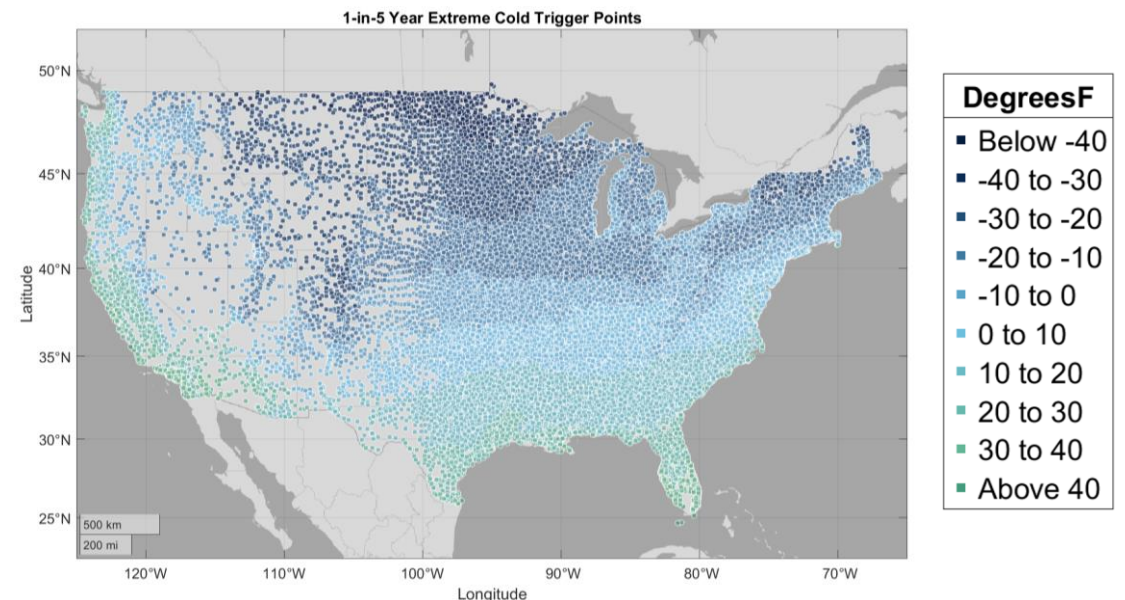
By purchasing a Demex snow removal policy in combination with a variable-priced contract, clients achieve the risk-transfer benefits of a fixed-price contract at a significantly reduced cost...the best of both worlds!

# Bundled Parametric Climate Protection

## Extreme Cold Protection at every Zip Code

The first-ever parametric coverage bundled within an indemnity policy

- A UK-based carrier partnered with Demex to deliver Extreme Cold Protection within their Business Owners Policy – **the first of its kind**
- When temperature reaches a predefined temperature trigger by zip code , e.g., below 20°F in 29710, the payout for policyholders in that zip code is initiated
- The Demex API returns a quote at any one of 42,000 US Zip Codes to agents in **< 1 sec**
- Demex monitors all zip codes throughout the coverage window to identify claims locations



Model



Assess



Manage

# Bundled Parametric Climate Protection

## A simple and transparent pricing strategy

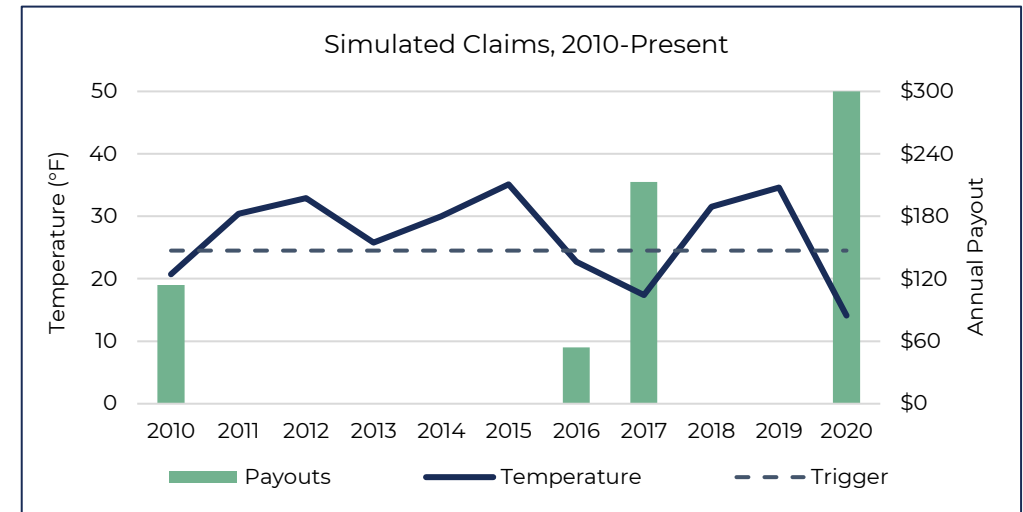
For only a minimal increase in policy premium, our coverage responds when the temperature in any US zip code dips below a 1-in-5-year extreme low that is predetermined at the time the policy is issued.

### Example Coverage – Houston, TX 77072

Coverage Window: Annual 2022  
 Trigger: Temperature below 24°F

#### Customer Economics

Payout: \$30 per degree below 24°F  
 Maximum Payout: \$300  
 \$300 coverage is provided to all policyholders with optional \$600 and \$1500 coverage amounts available. Our fees are based on product success.

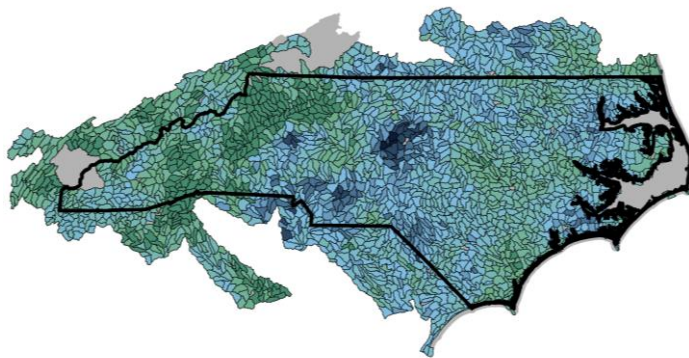


# The Potential For Scale is Great

## Climate resilience on scale is an immediate need

### Rainfall Solutions

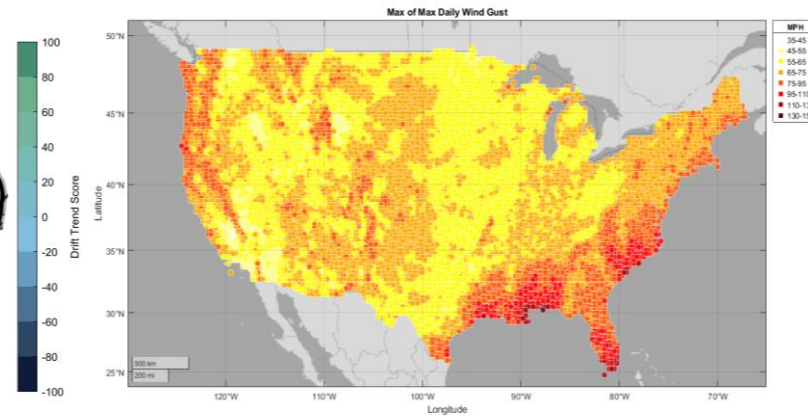
Extreme precipitation can damage property without a flooding event



Rainfall trends are stronger in the western mountains than coastal regions

### Wind Solutions

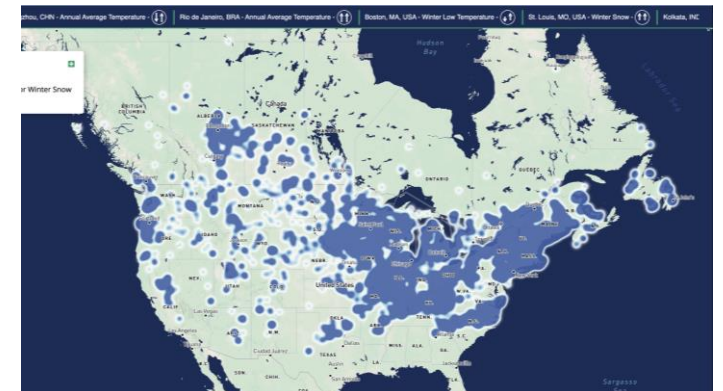
Parametric wind policies can replace traditional deductible buy-down products



US extreme wind risk extends beyond traditional hurricane locations

### Snow Solutions

Snow removal is a significant winter expense for many businesses and municipalities



As climate warms, North American cities experience increasing snowfall risks

# Insurance Leaders are Key to Climate Resilience



**What questions can we answer and how can we work together?**





Climate Resiliency,  
Delivered.



[contact@thedemexgroup.com](mailto:contact@thedemexgroup.com)

[www.thedemexgroup.com](http://www.thedemexgroup.com)





# Demex Operations Appendix

- Demex has a signed Program Administration Agreement with a major national carrier (AM Best A, XV)
- We offer weather-related surplus lines parametric insurance products through wholesalers and brokers
- We're currently licensed in 21 jurisdictions:

AL, CT, DC, DE, IL, MA, ME, MI, MN, NC, ND, NH, NJ, NY, OH, PA, RI, SC, VT, WI, WY