SOA Research INSTITUTE

Beyond the Headlines
The 2025 Disaster Reshaping Risk

Catastrophe and Climate

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Introduction

This is the inaugural "Beyond the Headlines: The Disaster Reshaping Risk" annual research project produced by the Society of Actuaries Research Institute Catastrophe and Climate Research Program. The project research committee examined significant weather events and other crises, including cyber incidents and humanitarian emergencies. Many events in 2025 merited serious attention. In selecting this year's event, the committee focused on those with substantial impacts—financial and otherwise—broad geographic reach, or implications that foreshadow more severe episodes to come.

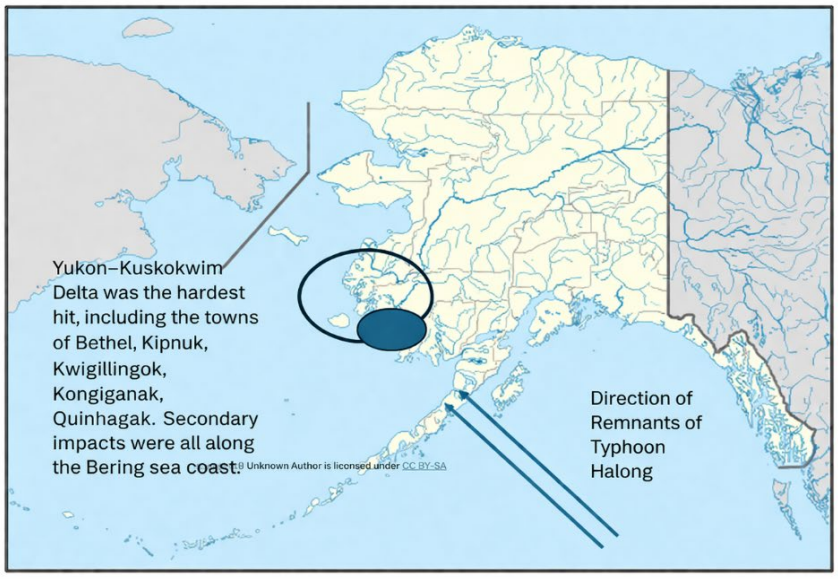
The committee selected an event that received far less public attention than many climate catastrophes yet carries ominous implications for the future. Reasonable observers, applying different criteria or interpretations, might have chosen a different event—and indeed, a different list.

Candidates for "Beyond the Headlines: The 2025 Disaster Reshaping Risk:"

1. California wildfires
2. Summer flooding in the Central United States
3. Flooding in Pakistan
4. Welter of climate events in Europe
5. Alaska Floods

The first four events were truly catastrophic and have been extensively examined elsewhere. We selected the Alaska floods because they were largely overlooked, despite representing the latest manifestation of a growing and troubling pattern: low-lying coastal communities facing the combined threats of rising sea levels and more frequent, more severe storms—even in regions outside traditional hurricane zones.

Location of the Alaska Flooding Caused by the Remnants of Typhoon Halong



Alaska Map courtesy of Creative Commons. Text and graphics by author Rebecca Owen.

When the 2025 West Coast Storm and remnants of Typhoon Halong struck western Alaska, hurricane-force winds and flooding devastated remote Alaska Native villages. As winter approached, survivors faced a growing humanitarian crisis.

The October 2025 Alaska floods were caused by the remnants of Typhoon Halong, which brought hurricane-force winds, record-breaking storm surges, and flooding to eastern Alaska's Yukon-Kuskokwim Delta. Beginning on October 12, 2025, the storm devastated communities like Kipnuk and Kwigillingok, displacing over 1,600 people, destroying homes, and straining already limited local resources. Recovery efforts were hampered by the remoteness of the affected villages, which lack the infrastructure found in other parts of the United States.[1]

While the direct cause was Typhoon Halong, the unusual strength of the storm was fueled by the near-record warm surface temperatures in the Pacific. But, even as Typhoon Halong moved northward into cooler water, it began to transition into an extratropical storm. As the name implies, extratropical transitioning is a process whereby tropical storms become extratropical – changing their primary energy source from the warm underlying ocean water to the strong atmospheric temperature gradients (so-called baroclinic zone) that become more significant starting in late summer and early fall. Extratropical storms are the storms that typically affect the mid-latitudes, especially in winter. While transitioned storms are typically weaker than their tropical counterparts, they are much larger. The size difference means that much larger areas can be affected by still-strong winds and still-heavy rainfall. Additionally, as these storms approach a coastline, they can push much larger volumes of water into bays and inlets to cause significant flooding, even far inland as rivers get backed up. Such was the case with Superstorm Sandy in 2012 as it wreaked havoc in Manhattan, New York City. And such was the case with Halong. The Alaska flooding was the result of an extreme transition, but extratropical transitioning can and does happen in most ocean basins, and climate change is expected to exacerbate the effects as warmer ocean water will allow hurricanes and typhoons to remain stronger as they move farther north into strong baroclinic zones later in the year.

Recovery and Rescue

- **Rescue operations:** The Coast Guard rescued dozens of people, some from their homes as the buildings floated away.[2]
- **Challenges:** The remote nature of the affected villages made recovery extremely difficult, as residents could not simply go to a store for supplies or find a hotel if their home was destroyed.

[1] Rosen, Yereth. "Western Alaska Residents Evacuated During Ex-Typhoon Halong Plan for New Homes," *Anchorage Daily News*, March 29, 2026, https://www.adn.com/alaska-news/rural-alaska/2026/03/29/western-alaska-residents-evacuated-during-ex-typhoon-halong-plan-for-new-homes/.
[2] U.S. Department of Homeland Security, "ICYMI: Coast Guard Saves Dozens of Lives During Catastrophic Floods in Alaska," October 16, 2025, https://www.dhs.gov/news/2025/10/16/icymi-coast-guard-saves-dozens-lives-during-catastrophic-floods-alaska.

Impact on Communities

- **Housing Destruction:** Numerous homes were inundated, and some were swept away or lifted off their foundations by the floodwaters.
- **Infrastructure damage:** Boardwalks, roads, and critical infrastructure—including the runway at Bethel Airport—were damaged or obstructed by debris.
- **Loss of essential services:** Communities lost access to clean drinking water and electrical power.
- **Humanitarian crisis:** With winter approaching, survivors faced extreme hardship, limited supplies, and minimal access to external support—conditions exacerbated by the remoteness of the villages.

Coastal Flooding — the Current Status

Coastal Flooding — the Predictions:

- **In the United States, 2.5 million people** in **1.4 million homes** are projected to be at risk from a severe coastal flood by 2050, **assuming global commitments to reduce carbon pollution are met.**[3]
- Florida, New York, and New Jersey have the highest numbers of people and homes in these high-risk areas.[4]
- By 2050, coastal flooding in the U.S. is projected to occur **ten times more frequently than as of 2025**.[5]

Why Actuaries Should Pay attention

Events such as the 2025 Alaska floods highlight how climate risk is evolving beyond traditional hazard zones, challenging assumptions embedded in historical loss data and catastrophe models. While this was geographically confined and did not garner the kind of media attention that other crises did, this event presages a future risk landscape that actuaries will need to consider now. For actuaries, this shift raises critical questions about the adequacy of pricing, reserving, and capital frameworks when exposure is expanding into both regions with limited experience, sparse data, and fragile infrastructure, as well as dense urban areas with substantially higher financial and humanitarian stakes.

Ignoring these signals risks embedding structural blind spots into actuarial assumptions at precisely the moment when forward-looking judgment is most critical.

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[3] Climate Central, "New U.S. Coastal Risk Map and Analysis," *Climate Matters*, April 2. 2025, https://www.climatecentral.org/climate-matters/new-us-coastal-risk-map-and-analysis.
[4] Climate Central, "New U.S. Coastal Risk Map and Analysis," *Climate Matters*, April 2. 2025, https://www.climatecentral.org/climate-matters/new-us-coastal-risk-map-and-analysis.
[5] Climate Central, "New U.S. Coastal Risk Map and Analysis," *Climate Matters*, April 2. 2025, https://www.climatecentral.org/climate-matters/new-us-coastal-risk-map-and-analysis.

The Other Nominees

The other four event nominees were significant events and warrant study. A brief reminder of these catastrophes follows:

1) California wildfires

The 2025 California wildfire season, particularly in Southern California (a high fire hazard zone) was among the most devastating in recent history. The Eaton and Palisades fires burned for more than 24 days in January alone, forcing over 200,000 people to evacuate and destroying approximately 12,000 homes and structures in Los Angeles County.[6] This widespread destruction caused loss of life, significant displacement, communication gaps, trauma, and economic disruption, with losses in the Los Angeles area estimated as high as $275 billion.[7]

The fires also severely impacted air quality, posing health risks, and caused long-term environmental damage including soil erosion and water contamination. Long-term psychological trauma is still unfolding, and displaced families are still struggling with housing.

The wildfire crisis intensified California's home insurance challenges, with many insurers reducing coverage or exiting high-risk areas. The California FAIR (Fair Access to Insurance Requirements) Plan serves as a last-resort insurer but has limitations and is financially strained. Insurance premiums and deductibles rose sharply, prompting new regulations encouraging wildfire mitigation efforts and home hardening to improve insurance availability and terms.

This wildfire season was classified as an extreme weather event due to a combination of factors: prolonged drought conditions had left vegetation extremely dry and highly flammable; record-breaking high temperatures and strong, dry Santa Ana winds rapidly spread the fires across vast areas; and climate change has increased the frequency and intensity of such conditions in California. These factors combined to create an unprecedented fire environment that overwhelmed firefighting resources and led to rapid, large-scale destruction.

2) Summer flooding in the Central US

Widespread flash flooding affected large portions of United States in 2025. Although they occurred in different regions, the events shared a common atmospheric setup: unusually

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[6] "California Wildfires: Evacuation Orders Expand," *The Guardian*, January 11, 2025, https://www.theguardian.com/us-news/2025/jan/11/california-wildfires-evacuation-orders-expand.
[7] AccuWeather, "AccuWeather Estimates More Than $250 Billion in Damages and Economic Loss from L.A. Wildfires," January 2025, https://www.accuweather.com/en/weather-news/accuweather-estimates-more-than-250-billion-in-damages-and-economic-loss-from-la-wildfires/1733821.

moist tropical air, a weakened and southward-shifted jet stream, and slow-moving storm systems that repeatedly drenched the same areas.

From April through July, many regions received 50% to 200% of normal seasonal precipitation. By late July, the National Weather Service issued more than 3,600 flash-flood warnings, nearly the typical total for an entire year. Deadly flooding occurred in Texas, New Mexico, West Virginia, New Jersey, and multiple Midwest states. Although each flood had its own local triggers, the underlying process was remarkably consistent: excessive water vapor fueled extreme rainfall and storms stalled because of a weakened jet stream, where intense rainfall overwhelmed saturated soils, steep terrain, and urban drainage systems. Runoff rapidly exceeded the land's ability to absorb or channel water—leading to fast-rising, destructive floods across diverse geographies.[8, 9, 10]

3) Floods in Pakistan

At least 1,000 deaths from multiple floods, caused by extra heavy monsoons and glacial floods from the Himalayas. About a third of the country was submerged, resulting in 2.5 million acres of agricultural loss, possibly exceeding $3.5 billion in damages. This led to food shortages, an inflation spike, and a widened trade deficit. It followed a terrible flood season in 2022.[11]

Flooding will periodically recur, with people of low income being the most severely affected, having nowhere else to go. Because of the continued climate-related risks, further effort to build resilience is warranted.

4) Welter of climate events in Europe in 2025

In 2025, Europe experienced a continuation of increasingly intense climate extremes linked to global warming. The evolving situation has had an impact on individuals, municipalities and agriculture. These included record-breaking heatwaves during the summer. Southern Europe experienced prolonged heat events with temperatures exceeding 100 degrees Fahrenheit, leading to not only increased deaths and health impacts, but also spawning major wildfires in many countries. [12, 13]

Europe also endured multiple windstorms and heavy rainfall events, resulting in infrastructure damage, power outages, and agricultural losses. Reduced snow cover disrupted winter

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[8] Basara, Jeffrey. "Flash Floods in the U.S. were Extreme in 2025," *EarthSky*, August 10, 2025, https://earthsky.org/earth/flash-floods-us-extreme-2025/.
[9] "Why 2025 Became the Summer of Flash Flooding in America," *The Conversation*, 2025, https://theconversation.com/why-2025-became-the-summer-of-flash-flooding-in-america-261650.
[10] Wu, Shuang-Ye. "How the Jet Stream Helped Drive Extreme Weather in 2025," *The Weather Channel*, December 29, 2025, https://weather.com/news/news/2025-12-29-2025-extreme-weather-jet-stream.
[11] Shahid, Ariba and Asif Shahzad. "Pakistan Floods Batter Fields, Factories, Fiscal Plans," *Reuters*, September 23, 2025, https://www.reuters.com/sustainability/climate-energy/pakistan-floods-batter-fields-factories-fiscal-plans-2025-09-23/.
[12] Jordan, Dearbail. "Southern Europe swelters as heatwave spreads," *BBC News*, June 28, 2025, https://www.bbc.com/news/articles/c5y74nv1zqpo.
[13] Paddison, Laura and Luke Snyder. "'We're Being Cooked Alive': Europe Burns as Heatwave and Drought Fuel Wildfires," *CNN*, August 12, 2025, https://www.cnn.com/2025/08/12/climate/europe-wildfires-heatwave-drought.

tourism and destabilized glaciers, increasing landslide risk. Both crops and livestock suffered short- and long-term impacts.[14]

Readers are directed to the European Environment Agency's report, *Europe's Environment 2025: Knowledge for Resilience, Prosperity, and Sustainability*, for additional details.[15]

Concluding Comments

The 2025 Alaska floods underscore a critical shift in climate risk that is highly relevant to actuaries: extreme events are no longer confined to familiar geographies, seasons, or hazard categories. Coastal communities, long considered peripheral to major catastrophe models, are increasingly exposed to compound risks driven by warming oceans, rising sea levels, and evolving storm dynamics. Events like the extratropical transition of Typhoon Halong challenge traditional assumptions about frequency, severity, and spatial extent of loss.

From an actuarial perspective, this event illustrates the growing gap between historical experience and emerging risk. Losses in Alaska were amplified not only by physical hazards, but by limited infrastructure, logistical constraints, and the absence of diversification options for affected communities. These factors complicate recovery, increase tail risk, and heighten the potential for correlated humanitarian, economic, and insurance impacts—particularly in regions with thin markets or limited insurance penetration.

The Alaska floods also highlight the importance of viewing climate risk through a systemic lens. Coastal flooding is no longer a problem limited to major metropolitan areas or hurricane-prone states. As extratropical storms intensify and reach farther north, it would be helpful for actuarial models to account for nontraditional pathways to catastrophe, including storm surges in mid- and high-latitude regions and cascading impacts on transportation, supply chains, and public services.

Finally, this event reinforces the actuarial profession's role in translating complex climate dynamics into actionable insight. Actuaries are uniquely positioned to assess emerging risks, inform adaptation strategies, and support resilient financial systems through pricing, reserving, capital modeling, and public policy engagement. The Alaska floods may not have captured global headlines, but they offer a clear warning: tomorrow's critical events may look unfamiliar, unfold in unexpected places, and test the boundaries of existing risk frameworks. Recognizing and responding to these signals is important in an era of accelerating climate change.

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[14] Milliman, "Extreme Weather Events in Europe 2025," 2025, https://www.milliman.com/en/insight/extreme-weather-events-in-europe-2025.
[15] Dieumegard, Pierre. "Europe's environment and climate: knowledge for resilience, prosperity and sustainability," European Environment Agency, 2025, https://europokune.eu/dok/2025/RapEurEnvKlim2025/RapEurEnvClim2025_MiniTotal.pdf.

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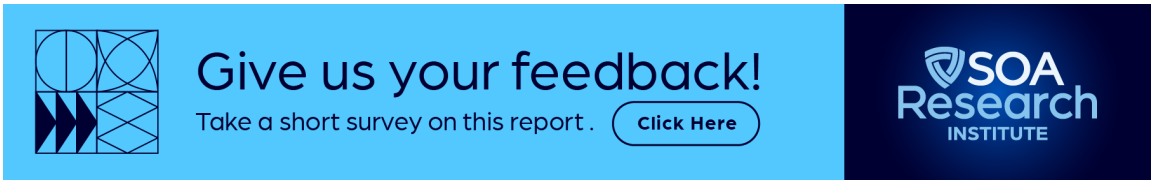

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