Torrent
TECHNOLOGIES, INC

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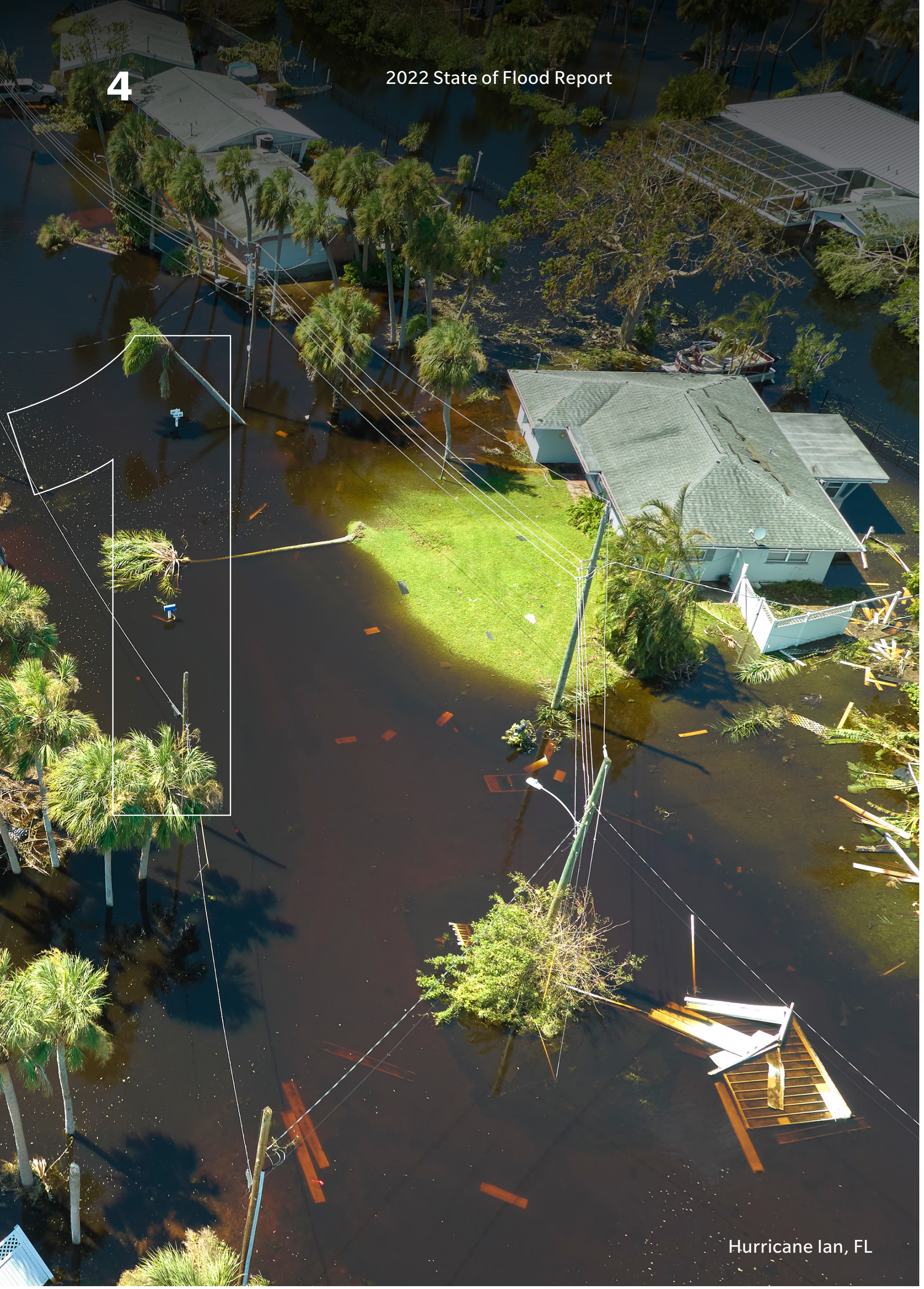
2022 State of Flood Report

Leading the Way to Resilience

Marsh

Contents

“You’ve got to be very careful if you don’t know where you are going, because you might not get there. — Yogi Berra


Hurricane Ian, FL

Hurricane Ian: Urgency for Action

Hurricane Ian made its first US landfall just shy of a Category 5 hurricane on southwest Florida's Gulf Coast, traveling through the state into the Atlantic. It then struck South Carolina as a Category 1 storm. Along this path, Ian dumped massive amounts of rain and caused horrific flooding. However, Ian wasn't done wreaking havoc. As the storm continued up the mid-Atlantic and Northeast, mixing with other systems, Ian caused even more flooding.

- Insured losses that included auto, business interruption, wind, and flood were initially estimated to be more than $60 billion. New data suggests this number could be closer to $50 billion, with flood insurance losses in the minority.
- Total damages were estimated early on to be up to $120 billion.
- In Florida, over 80% of households are estimated to have been uninsured for flood. Lack of flood insurance hinders recoverability, whether underinsured or uninsured.
- Climate change, which is causing hurricanes to rapidly intensify, combined with extensive coastal development from the real estate boom, has contributed to Hurricane Ian's extensive losses.

At the heart of all this are millions of people. Lives have been turned upside down. Businesses and livelihoods have been destroyed by floodwaters. Parts of Fort Myers and other towns are in shambles. Most homeowners do not have flood insurance. Our hearts go out to those who need help and resources to recover. Our families, friends, colleagues, and communities... their health, safety, and peace of mind is what matters.

The time for action is now.

The time for action is now. It's imperative to dramatically shrink the US flood insurance gap. This report outlines our actions to achieve this goal, actions both of Torrent and Marsh McLennan in helping lead the charge, and of the climate resilience commitments of Marsh McLennan.

Leading the Way

Education, product, access, and affordability are keys to managing flood risk

Flood is one of the world's most frequent and costly perils — take a look at the damage estimates for the US alone from Hurricane Fiona that devastated Puerto Rico and Hurricane Ian, which left massive loss in its wake. As the impact of climate change becomes clearer, flood losses are expected to rise. As a result, there is increasing urgency to find solutions that enable individuals, communities, and businesses to mitigate flood risks and achieve resilience.

In 2021, flooding accounted for about $90 billion in losses — of which only $22 billion were insured, according to Munich Re. Catastrophic flooding in Central Europe in July 2021 caused losses of $54 billion, the highest such total in modern times. Continuing a long-term trend, the US in 2021 led the world with the highest value of weather-related losses.

Yet, 2022 flooding damage already have greatly exceeded last year's figure. During the first half of 2022, worldwide catastrophe losses totaled $35 billion. One of the costliest disasters in early 2022 was flooding in Australia, which is again suffering from flooding as we near the end of 2022. In addition to Hurricanes Fiona and Ian, the second half of the year also witnessed one-third of Pakistan being underwater due to flooding from monsoons and snowmelt from glaciers in the northern part of the country. Damages in Pakistan are estimated to be over $30 billion. West Africa is reeling from extreme rains and severe flooding that have plagued the region for months. Hurricane Ian may set another US record for weather-related losses.

Even as the private flood insurance market continues to develop, businesses and individuals need more options to close the protection gap. The NFIP remains an important source of flood coverage for millions of Americans, but it cannot address the magnitude of flood exposures by itself.

Our *2022 State of Flood Report* explores the dynamics of government-sponsored and private insurance, innovations in flood risk management, and steps Torrent is taking to improve risk readiness and make flood insurance more accessible. We hope the State of Flood Report will be a useful resource for policymakers, communities, insurance agents, and other stakeholders to better understand flood risk and facilitate discussions that lead to sustainable solutions.

Continuing leadership is needed at all levels of government and the private sector to forge public–private partnerships that can collaborate on solutions. Torrent and our colleagues at Marsh McLennan are leading the way in managing flood risk and driving greater flood resilience.

Kevin Tobin
President and CEO, Torrent Technologies

Houston, TX

Executive Summary

Flood risk remains high around the world, and the impact of climate change appears to be making floods both more frequent and severe. Standalone flood insurance from public or private sources was historically limited, but private sector companies' interest in underwriting flood risks continues to grow. Improvements in risk analytics are enabling insurers to better understand flood risks and exposures.

As risk technology evolves, Torrent anticipates further development of a private flood insurance market, which can supplement or offer alternatives to government-backed solutions, such as the National Flood Insurance Program (NFIP). The NFIP itself is undergoing evolution, particularly through a new risk rating methodology — Risk Rating 2.0 — that is intended to align flood insurance premiums more closely with the risks related to specific properties.

Recent events in 2022, from Hurricane Ian's ravaging of Florida to historic flooding in eastern Kentucky that hit some of the poorest areas in the United States, highlight the problems of coverage gaps and affordability of flood insurance. As noted above, Munich Re estimated economic losses due to flood exceeded $90 billion worldwide in 2021, of which only 22% was insured — a significant problem that is likely to worsen until we start applying solutions to better encourage homeowners to get flood insurance protection.

Several ways to close the protection gap are available now, including:

- Accelerating the development of private flood insurance
- Community-Based Catastrophe Insurance (CBCI)
- Building Resilience Infrastructure and Communities (BRIC) program
- Simplifying and improving the customer experience for public and private flood insurance
- Options such as private excess flood insurance, parametric insurance, and reinsurance

Collaboration is needed between the public and private sector to achieve sustainable solutions to the flood protection gap. Torrent is ready to lead the way toward facilitating new, broader, and more appealing marked-based solutions and enhancing flood risk resilience.

Hurricane Ian, Florida

Flood Market Overview

Flood risk financing exists in many developed countries, with the predominant model a government-backed program. A private market for flood insurance is relatively small, but growing, particularly in the United States. In many countries, however, standalone flood insurance from either public or private sources is limited.

The National Flood Insurance Program

In the US, the main source of flood insurance is the National Flood Insurance Program (NFIP), created in 1968. The Federal Emergency Management Agency (FEMA) administers the NFIP, which requires congressional reauthorization periodically.

As part of the continuing resolution passed by Congress and signed into law by President Biden in September, the NFIP is temporarily extended through Friday, December 16, 2022. Congress has held hearings to discuss long-term reauthorization, information sharing, and other issues, but so far has been unable to reach consensus. A short-term reauthorization of the NFIP into 2023 is likely as Congress needs to perform a robust analysis of reauthorization proposals to extend the program for another multiyear term.

Distribution of NFIP Policies

Federally backed flood policies are available through the following two channels:

- The Write Your Own (WYO) program, a group of roughly 50 insurance companies, which use their own licensed agents and producers and are authorized by FEMA to act as a fronting insurer to issue and service NFIP-backed flood policies.
- NFIP Direct, which allows agents not appointed by WYO insurer to write flood insurance directly through the NFIP.

Private Flood Insurance

Interest by private sector insurance companies in underwriting flood risks continues to grow. The NFIP was created more than 50 years ago. Prior to that, in 1929, the private flood insurance market disappeared due to the impact of claims.

Recent improvements in risk technology and analytics have enabled private insurers to better understand flood risks and exposures. Types of private flood insurance currently available include:

Primary Residential Flood

This type of insurance can mirror NFIP coverage terms or provide enhanced coverage for residential properties.

Standard NFIP Coverage	Examples of Available Private Primary Residential Flood Coverage
Dwelling limits of $250,000	Dwelling limits up to $2 million+
Contents limits of $100,000	Contents and personal property limits up to $1 million
Contents-only limits for renters up to $100,000	Personal property up to $1 million
30-day waiting period	No waiting period or limited period, e.g., 7 days
No additional living expenses are currently offered via the NFIP	Potential additional living expenses up to $250,000

Some homeowners' insurers also provide coverage for flood insurance via endorsement.

Primary Commercial Flood

This may also replace the NFIP for small businesses.

Standard NFIP Coverage	Examples of Available Private Primary Commercial Flood Coverage
Building limits of $500,000	Building and contents combined limits up to $10 million
Contents limits of $500,000	
30-day waiting period	Often a limited period, e.g., 7 days
Business income coverage is unavailable at this time	Business income coverage is often available

Commercial "all-risk." A broad form of coverage designed for large businesses, all-risk policies can provide protection for different kinds of property risks, including flood and business interruption. The amount of coverage available in these policies are typically much greater than a flood-only policy. However, in recent years, we have seen greater underwriting scrutiny of flood in all-risk programs, and in some instances, a deterioration of coverage for specific locations. This amount of coverage is usually unsuitable for small businesses and is not applicable to homeowners.

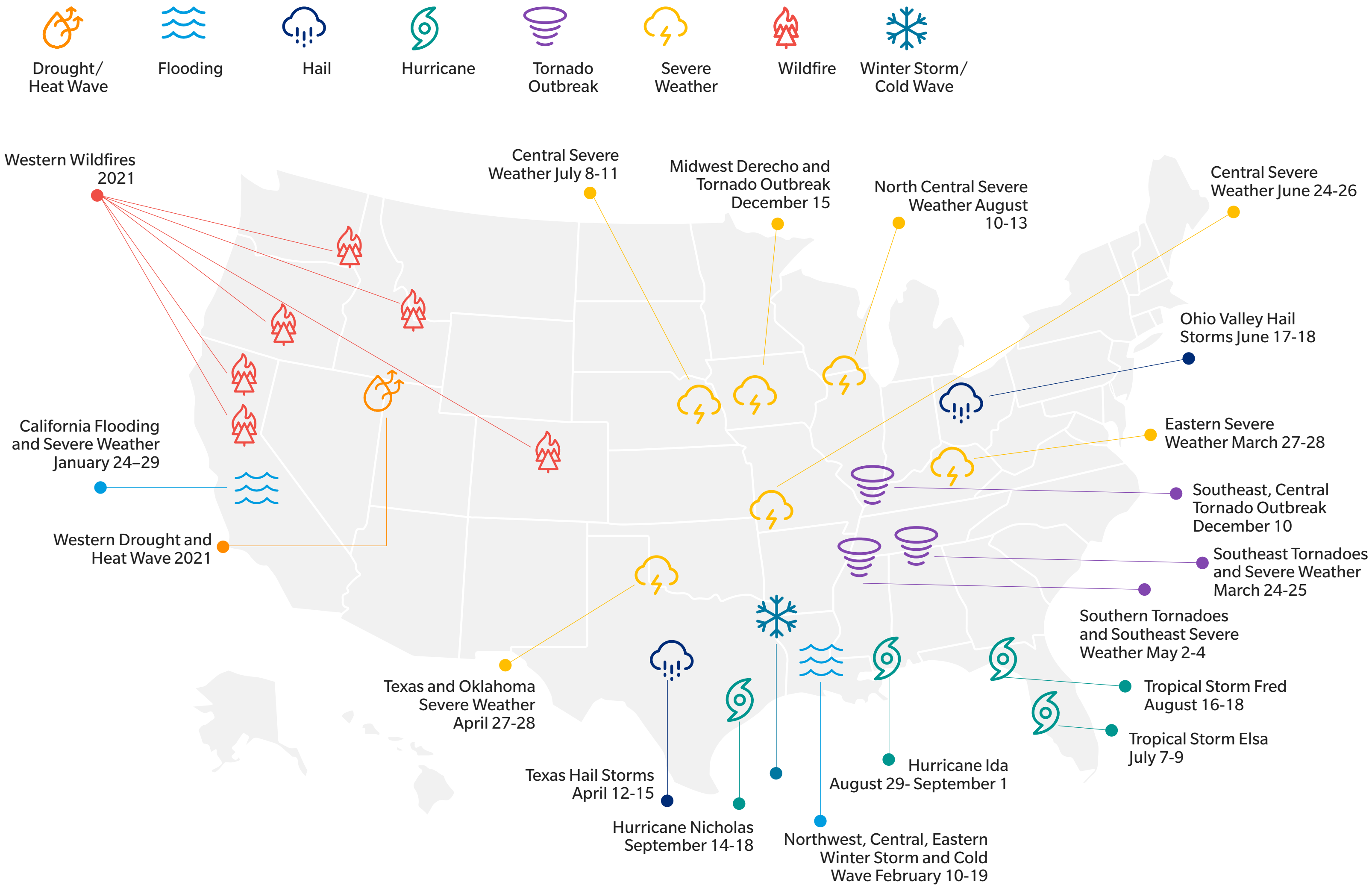
Excess flood. This private form of coverage sits on top of underlying private primary coverage or an NFIP policy. Excess flood insurance is available to individuals and businesses, and it can provide higher limits of protection as well as enhanced coverages such as additional living expenses and business interruption.

Contents-only coverage. Hurricane Ian shed further light on how anywhere it rains, it can flood. The vast majority of people renting homes, apartments, and condos did not have a contents-only flood insurance policy. This highlights an opportunity to help renters with this type of coverage for financial peace of mind.

Hurricane Ian, Florida

Houston, TX

US 2021 Billion–Dollar Weather and Climate Disasters



Source: *National Oceanic and Atmospheric Administration (NOAA),*
This map denotes the approximate location for each of the 20 separate billion-dollar weather and climate disasters that impacted the United States in 2021.

Catastrophes: Recent Events in Review

The impact of climate change is exacerbating flood risk, with greater frequency of extreme rainfall in certain areas.

According to the National Oceanic and Atmospheric Administration (NOAA), 2021 saw 20 US weather events that each caused more than $1 billion in losses. In total, these disasters claimed 688 lives and cost $145 billion — $75 billion of which came from a single event: Hurricane Ida in August 2021. As of March 2022, the NFIP paid out more than 14,500 flood claims from Ida, totaling more than $640 million.

Heavy rains are continuing to cause major floods around the world in 2022. For example, Australia experienced some of its worst-ever flooding, causing nearly $3.5 billion in insured losses, according to Swiss Re. The Australia floods were the costliest insured natural catastrophe in the first half of 2022.

Eastern Kentucky faced some of its most severe flooding in history, with at least 38 dead and many missing people. Few of the flood victims were insured for the loss of their homes and belongings.

INFLATION

After decades of low inflation, the current level of inflation is quickly eroding the value of the fixed limits provided by the NFIP standard policy.

CONCURRENT CAUSATION

In many major events, wind and flood perils are co-mingled, and that complicates the loss recovery process because flood is currently a standalone insurance product.

Late season hurricanes have also caused major flood losses and raised coverage questions. Hurricane Fiona damages in Puerto Rico are currently estimated in to be in the billions. Fiona also unleashed extreme flood events in Canada, while Hurricane Ian damages could reach $120 billion.

It's notable that not all destructive flood events are due to riverine or coastal flooding. Flash floods are occurring in many places, including some far from bodies of water, and causing loss of life and property damage.

Drought and wildfire events also have contributed to the increase in the severity of flooding. Parched soil is less absorptive, and areas where vegetation has burned are unable to block or divert flows of water or mud which increases flash flood risk.

Internationally, flash floods in 2022 have claimed hundreds of lives in Africa, the Middle East, and Asia.

In the US, so far in 2022, flash flood incidents have occurred in Kentucky, Death Valley National Park in California, downtown Las Vegas, Dallas-Fort Worth, and St. Louis.

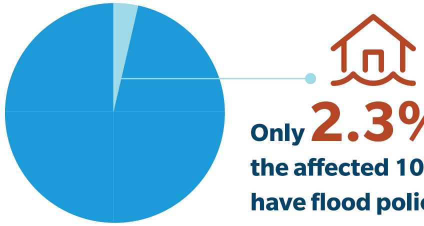
Many of these recent flooding events demonstrate that there is a need for improvement in flood coverage solutions.

Affordability Concerns

One reason for insurance gaps in general, and flood coverage in particular, is the affordability of premiums. Low- and moderate-income individuals and families face disproportionately higher losses from catastrophe events such as floods and recover slower than those with higher incomes, according to the Wharton Risk Management and Decision Processes Center at the University of Pennsylvania. Affordability of coverage is frequently a barrier to purchasing flood coverage, but few pilot programs have launched to address flood premium financing, Wharton researchers note.

Unfortunately, the aforementioned eastern Kentucky floods occurred in some of the poorest counties in the nation, where median annual incomes range from $22,000 to $30,000 — less than half the nationwide median of $65,000 — and coverage is an unaffordable expense.

Estimated number of homeowners insured in Kentucky flooding



Only 2.3% of households in the affected 10 Kentucky counties have flood policies.

The Biden administration, in its package of flood insurance legislative reform proposals, has suggested a targeted assistance program for low- and moderate-income NFIP policyholders and prospective policyholders. The administration expressed a goal of "ensuring more Americans are covered by flood insurance by making insurance more affordable to low-and-moderate income policyholders. Under its current authorities, the NFIP can only make rates 'reasonable' by offering discounts and cross-subsidies, primarily based on a building's age, flood risk map changes at a building's location, or by considering mitigation activities undertaken by the property owner or community. Such discounts and cross-subsidies make risk communication through the price of flood insurance difficult, contributing to policyholder misunderstanding of flood risk."

Impact from Risk Rating 2.0

Part of the challenge is a lack of awareness of flood exposure. In October 2021, the Federal Emergency Management Agency (FEMA) began implementing Risk Rating 2.0, a new pricing methodology intended to deliver actuarially sound rates that are easier to understand and more closely reflect an individual property's flood risk. As of April 2022, all new or renewing NFIP policies are subject to Risk Rating 2.0.

Before the rollout of the new rating program, FEMA estimated nearly one in four policyholders would see immediate NFIP premium decreases. FEMA forecast that 66% of policyholders on average would see monthly premium increases of $0 to $10, and 11% would see premiums rise by more than $10 per month.

Rate changes

Under FEMA's administrative procedures, policyholders see NFIP premium reductions under Risk Rating 2.0 immediately. Those receiving increases will have higher premiums phased in gradually, generally capped at 18% annually, but they are notified of the full-risk rating. When policyholders see a sharply higher rate will apply, they often seek an explanation from their agent. The newness of Risk Rating 2.0 and how it influences rates for individual policyholders is not yet clear.

FEMA's rate explanation guide indicates a flood risk rating takes into account:

- Where a property is built (property address)
- How the property is built (building characteristics)
- What property is built and covered (replacement cost and coverage)

Greater transparency is needed to understand why NFIP premiums for a specific address rise or fall. For some policyholders, dissatisfaction with higher premiums is a reason not to renew their flood coverage. FEMA does offer technical data sources, but these don't apply to all situations.

Torrent has taken the lead in simplifying the quoting process with the rollout of auto-population. This helps create a more accurate quote and makes it easier for insurance agents by automatically filling in many of fields now part of the flood insurance application.

Elimination of the Preferred Risk Policy

Another impact of Risk Rating 2.0 is FEMA's elimination of the Preferred Risk Policy (PRP), an insurance product offered for properties with low to moderate risk of flooding. A PRP is a standard NFIP policy, with the same dwelling and contents limits, for properties in FEMA's B, C and X Zones, which are considered moderate-risk flood hazard areas. Properties with federally backed mortgages in these zones generally are not required to maintain flood insurance, unlike mortgaged properties in the higher-risk flood zones, such as A and V. As a result of the PRP elimination and the lack of lender-required coverage for lower-risk property locations, many of the policyholders who have left the NFIP likely were not required to buy flood insurance.

Since October 2021, it's estimated that nearly 500,000 policyholders have left the NFIP. According to a report obtained by The Associated Press, by the end of this decade about 1 million policies will fall off from the NFIP. However, it is important to note, that FEMA's response to this claim is that the projection was targeted at financial forecasting as opposed to insurance participation and FEMA has not conducted a specific study of flood insurance purchasing trends. It is unclear how many of these policyholders replaced NFIP coverage with private flood insurance. What is becoming clear is the NFIP's insurance portfolio has an increasing concentration of higher-risk properties.

Impact on claims

Because both legacy NFIP policies and those using the new risk rating are currently in force at the same time, the impact of Risk Rating 2.0 will become apparent over the next several years. Even though the NFIP coverage has not changed, the claims process under the Risk Rating 2.0 may result in a somewhat different claim experience for NFIP policyholders. For example, the new risk rating requires some additional information that legacy policies do not — such as first floor height and location of appliances, machinery, and equipment for premium discounts — resulting in additional steps for insurance agents, claims adjusters, and WYO companies. In certain cases, claims under Risk Rating 2.0 may take longer and necessitate premium adjustments that result in a refund or the collection of additional premium before the claim can be paid.

Ready to Close the Protection Gap

As we see repeatedly, and most recently with Hurricane Ian, lack of flood protection is a serious problem, with long-term consequences for individuals, families, businesses, communities, and governments.

A significant protection gap exists as there are far more flood-exposed properties than those that are insured — either through the NFIP or private insurance. Torrent is ready to help close this gap.

We believe there are several ways to improve risk readiness and mitigate the impact of floods. These include:

- **Strengthening the NFIP.** With current debt of more than $20 billion and hundreds of millions of dollars in interest payable annually, the NFIP needs reform and long-term reauthorization to become a sustainable source of flood insurance. Risk Rating 2.0 is a step in the right direction to align premiums with risk, but the program needs to keep attracting, not losing, policyholders. A sound financial framework that spells out roles and accountabilities of the NFIP, along with those of Congress, will help reinforce the program.
- **Deliver reinsurance solutions.** Guy Carpenter, which is also a business of Marsh McLennan, is FEMA's broker, providing reinsurance for the NFIP. Reinsurance is backed by capital market investors and continues efforts to better manage the NFIP's financial risk. For 2022, traditional reinsurance covers all flood and catastrophe (CAT) bonds are on a named storm basis. So, when named storms result in NFIP claims of more than $4 billion and exceed $10 billion, the agency will receive the full $2.3 billion of reinsurance coverage from private markets. Reinsurance provides much needed assurance that claims will be paid. At time of publication, Hurricane Ian claims are over 35,000 and expected to continue to rise, indicating the NFIP's reinsurance could be in play to cover a percentage of losses.
- **Grow the private flood market.** The Biden administration has proposed a package of NFIP reforms in which it recognizes the role of a private flood insurance market in supplementing and supporting the government-backed program. Private flood insurance can offer options that make purchasing flood coverage easier and more attractive. Each property that obtains flood coverage in the private market is a risk the NFIP and US taxpayers do not have to bear. The private market offers possibility for innovation and products to further close the flood insurance gap.

Climate change causing dramatic increase in flooding and flood severity

181% ↑ **increase in global number of flood events in 2010-19 compared to 1980-89**

Source: *Marsh McLennan. (2021). Sunk costs: The socioeconomic impacts of flooding.*

- **Embrace parametric insurance.** A form of alternative risk transfer that is growing in demand as a tool to improve climate resilience, parametric insurance solutions deploy a measurable index with predefined triggers that can pay out once those metrics are reached. Unlike most forms of traditional property insurance, pricing is based primarily on the probability of the loss indexed being triggered rather than the specific risk of damage suffered by the benefits recipients. This is particularly effective where it is either not possible, feasible, or desirable to assess the underlying exposed interests. However, in structuring the coverage it is important to consider the relationship between the index trigger(s) and the benefit recipient's loss potential. There has been considerable progress in the design and sophistication of parametric triggers which reduce basis risk and allow the desired payout weighting to match resiliency goals. Parametric solutions also offer a more expedited contract payout, getting funds into the hands of those who have suffered loss in a matter of days and accelerating recovery. Parametric insurance could apply to flood risks through an index of rainfall during a specified time period, measurement of standing water in the covered locations, or the use of satellite imagery and social media as sources of event verification.

- **Remove barriers to the development of community-based catastrophe insurance.** Community-based catastrophe insurance (CBCI) is a risk-transfer program designed to cover individual properties in a community that is arranged by a local government or quasi-governmental entity, or a community organization. CBCI can enhance financial resilience, provide affordable coverage, increase the availability of disaster protection, and create incentives for risk reduction at the community and individual level. CBCI can support efforts to improve risk reduction and risk transfer. This type of program also is flexible as it can be created to insure a single hazard, such as flood or multiple hazards.

Guy Carpenter and MMC Securities are working with the City of New York and the Center for NYC Neighborhoods to pilot a CBCI program protecting low– to moderate–income households in designated New York neighborhoods. Many of the potential benefit recipients cannot afford flood insurance or are locked out of the traditional insurance market. The program will execute a parametric contract containing a risk index based on approximately 37,000 grid points using satellite imagery as the primary source to validate the flood footprint.

POTENTIAL BENEFITS OF CBCI

Enhance Financial Resilience

- Reduces the community's contingent disaster liabilities
- Enhances the community's credit risk profile
- Speeds the insured individuals and businesses to recovery
- Supports the community's post-disaster economic revitalization

Provide Affordable and Available Coverage

- Reduces premium costs by:
  - Increasing buying power and seuring volume discounts
  - Enhancing data provision for risk analysis
  - Reducing administrative costs
  - Supporting means testing
- Increases insurance availability by:
  - Potentially lowering premium costs
  - Guaranteeing coverage post-loss
  - Increasing confidence in risk assessment and peril modeling
  - Retaining and attracting catastrophe capacity

Incentivize Community-Level and Individual Risk Reduction

- Enables capture of premium discounts for community-scale and household mitigation efforts
- Supports financing of risk reduction activity via premium surcharge
- Enhances decision-making around risk reduction through risk analytics and pricing

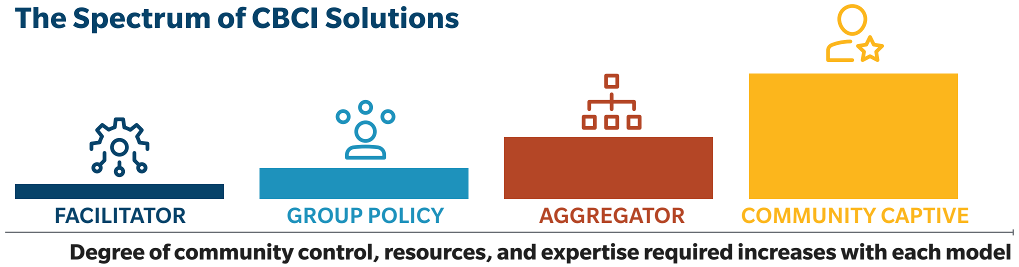
In the US, The Stafford Act disincentivizes communities and individuals from purchasing insurance. For example, when evaluating requests for major disasters and making recommendations to the President, FEMA considers the amount of insurance coverage in force as a factor for a Presidential Disaster Declaration. Thus, communities with high insurance rates will be less likely to receive a declaration. Below are several possible solutions that remove this barrier and would allow communities to take proactive steps in financially protecting themselves from disasters:

a. Remove insurance as a factor for disaster declarations and/or allow for reimbursement of insured losses.

b. Provide mitigation or preparedness grants in the amount of insurance premiums paid.

c. Allow for eligibility of insurance premiums for mitigation and preparedness grants.

The Spectrum of CBCI Solutions



Facilitator model
Community helps to establish a beneficial arrangement with an insurer for community members

Group Policy model
Community arranges a group policy on behalf of its members

Aggregator model
Community buys bulk parametric catastrophe insurance

Community Captive model
Community establishes its own risk-bearing entity (e.g., a captive)

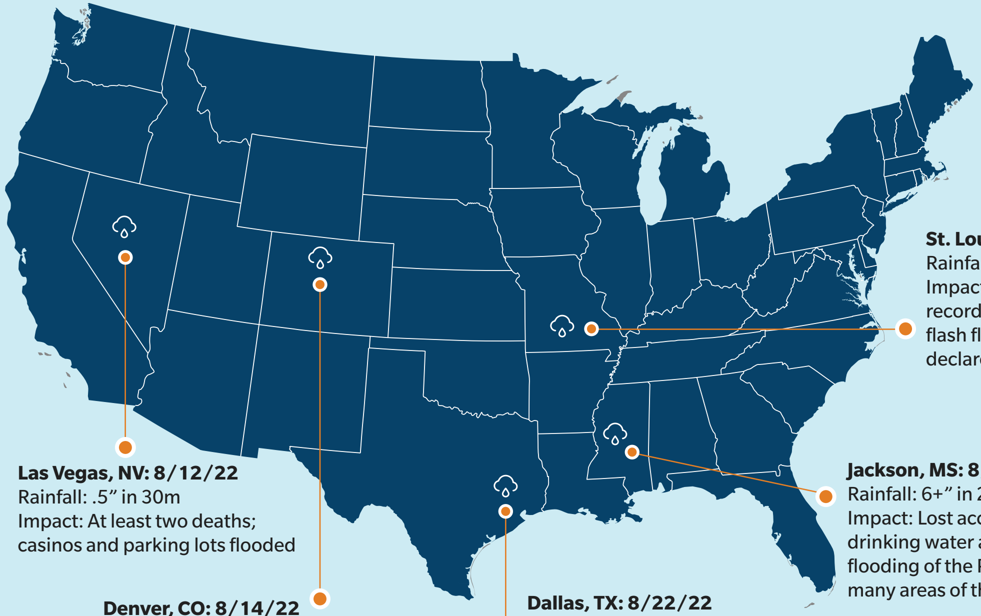
- **Promote excess flood coverage to complement the NFIP.** While the NFIP remains a reliable source of flood insurance, its coverage limits are insufficient for many higher-value properties. Such properties with flood exposure need excess coverage that can supplement the foundational NFIP protection. For example, in the second quarter of 2022, the median price of homes sold in the United States was $440,300, according to Federal Reserve Economic Data; this substantially exceeds the NFIP dwelling limit of $250,000.

Closing the flood protection gap and improving resilience will take collaboration by various stakeholders. No single solution is likely to work for all risk scenarios, there is a multiplicity of solutions available to improve results across each one of them. Therefore, public and private sector leaders should come together to discuss the best ways to enhance flood risk readiness and protection. Through the collaboration process, additional ideas and innovations may surface that advance flood risk management.

Marsh McLennan developed a global Flood Risk Index to help better understand flood risk and resilience. Focused as a macro-based solution for countries, this tool provides a good foundation for commercial/private-public dialogue on the vulnerability of key infrastructure and exposure changes over time.

In Focus: Flood Risks Rising

Urban environments are increasingly at risk of flood events, due to more frequent incidents of excessive rainfall, drought, and wildfire. Urban floods tend to cause more deaths and property damage for several reasons, including concentrated populations and a lack of places for excess water to go. Excessive rainfall, for example, can quickly overwhelm surface drainage and sewer systems.



Source: *CoreLogic, Accuweather, National Weather Service*

In 2022, several urban areas have experienced significant floods as a result of excessive rainfall. These include Dallas, Texas; Denver, Colorado; Las Vegas, Nevada; St. Louis, Missouri, and Jackson, Mississippi, which lost access to safe drinking water as historic flooding of the Pearl River closed many areas of the state capital.

Part of the problem with sudden flooding is extreme weather conditions, with some areas experiencing drought followed by flash floods. Drought dries out soil and makes it less absorptive, so heavy rainfall in drought-stricken locations often leads to flash floods and mudflows.

A recent study suggests changes in atmospheric rivers in the Pacific put California at risk of a future mega flood, similar to the state's Great Flood of 1861-1862. In that historical event, a series of winter storms created a 300-mile-long temporary inland sea in the Sacramento and San Joaquin valleys and inundated much of Los Angeles and Orange counties. In a modeled future risk scenario, scientists estimate cumulative precipitation during a multi–week series of severe winter storms in Northern California could exceed 1,000 millimeters (39 inches) in large areas during a 30-day period.

Such rainfall presents an extreme level of runoff, which would greatly increase the likelihood of flash flooding and debris flows. The recent study follows up on prior modeling in 2010 of intense winter precipitation, which presented a then-worst-case scenario for widespread flooding in California. At the time, the economic impact was estimated to exceed $750 billion — more than $1 trillion in 2022 dollars. In the recent modeled scenario, atmospheric and hydrological conditions would make the precipitation and flood damage even worse.

Excessive rainfall is not the only source of urban flooding. A phenomenon that has quadrupled since 2000 in coastal cities is sunny-day flooding, which occurs on abnormally high tides. According to NOAA, major high tide flooding exposure — defined as presenting a significant threat to life and property — exists from Texas to Maine. For example, Galveston, Texas, had 14 high tide flood days in 2021, and is forecast to have 10-17 such days in 2022. By 2050, NOAA predicts Galveston will experience 170-210 high tide flood days annually. By comparison, in 2000, the city had three high tide flood days. Boston had seven high tide flood days in 2021, with 11-18 forecast for 2022, and 50-70 in 2050. In 2000, Boston had six high tide flood days.

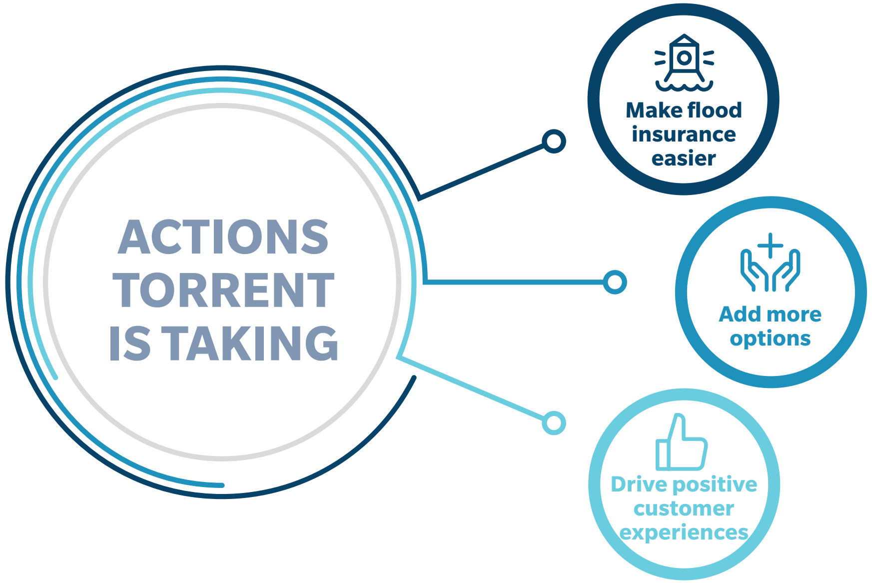
As flood risk grows — from excessive rainfall or rising sea levels amplifying tidal flows — urban communities must improve their readiness to respond.

Yellowstone River

Houston, TX

Closing the Gap

The longer the flood protection gap exists, the impact of climate change – from sea level rise, to more incidents of extreme rainfall, to more intense storms, among other geophysical events – will make losses worse. In turn, the burden on individuals, families, businesses, communities, and governments will increase. For these reasons, there is an urgent need to take action.



TORRENT IS READY RIGHT NOW AND COMMITTED TO MAKING FLOOD INSURANCE MORE ACCESSIBLE.

Make flood insurance easier.

We continue to evolve our technology platform to make it as easy as possible for agents, brokers, and policyholders to use, with features such as automated population of data fields and intuitive compliance that generate more accurate quotes. We are enhancing our service and simplifying the process for obtaining flood insurance and handling claims.

Add more options.

We are increasing the number of private flood insurance products available through our platform. In addition, Torrent works collaboratively with our colleagues at Marsh and the other Marsh McLennan businesses to make a positive difference for our clients through leadership on climate resilience. Torrent and Marsh McLennan are building industry confidence and risk appetite with risk capital providers to make more extensive and affordable private flood insurance a possible reality. Flood risk cannot be eliminated, but it can be managed and mitigated, and we are leading the way.

Drive positive customer experience.

Torrent clients rely on us to provide peace of mind in the moments that matter. The actions listed above help achieve this, but Torrent knows this is not just a technology business, it's a people business. Whether it's providing policyholders with their own portal to monitor their claims status or offering direct-to-consumer options, it's providing solutions to make flood insurance more attainable, while delivering exceptional customer service for an all-around industry-leading experience.

Memphis, TN

Ready for Flood, the Power of Resilience

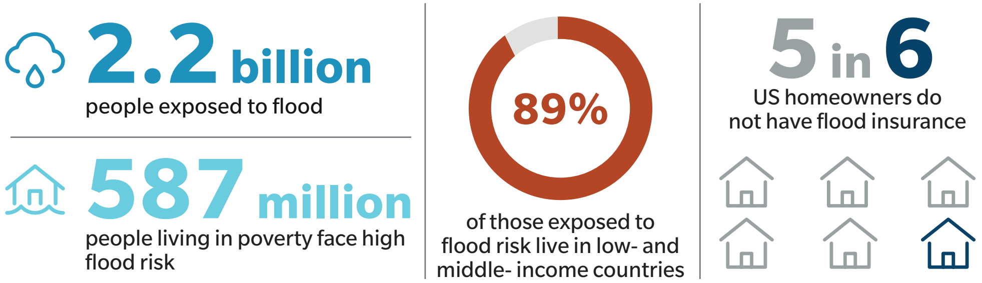
As a leader in addressing the world's complex and increasingly interconnected dynamics around risk, strategy, and people, Marsh McLennan helps clients embed climate change strategies into every aspect of their businesses, from navigating the transition to a resilient, low-carbon economy to managing the physical risks associated with extreme weather events, including flood.

Advocating climate resilience

Through driving climate resilience initiatives with the Marsh McLennan Disaster Resilience Center of Excellence, Marsh McLennan and Torrent are paving the way for proactive engagement within the public and private sectors that is necessary for better US flood resiliency practices.

Our current platform for flood insurance allows easy access to agents and will help grow the public and private flood insurance market to facilitate improved individual, business, and community resilience. Torrent and Guy Carpenter's collaboration with FEMA through the Write Your Own and Direct programs provides an opportunity to help close the flood insurance gap in the US.

Global flood risk in numbers



As part of Marsh McLennan, we apply unified solutions and services to help clients identify and respond to the physical risks from a changing climate. We use our combined expertise in insurance, reinsurance, and risk consulting to help clients build resilience, and develop climate risk management frameworks and investment strategies.

Accelerating Impact

Climate change is exacerbating the flood peril.

Marsh McLennan is advising clients on how to execute the profound transformations required to face climate change, while committing to charting a path to net-zero at Marsh McLennan. Recent initiatives include:

- Signing on to the Task Force on Climate-Related Financial Disclosures (TCFD), which created a set of recommendations to help organizations disclose information on climate-related risks and opportunities in a consistent, comparable, and reliable way.
- Introducing the ESG Risk Rating, a self-assessment that measures an organization's environmental, social, and governance performance.
- Developing the Flood Risk Index to provide a global overview of flood risk and its potential implication on human economic systems.
- Enabling Marsh US clients to pay fees using carbon credits and renewable energy certificates.

With flood risk rapidly rising, we are rethinking strategies for resilience. For business, this means:

Five strategies for a wetter world

1. Take a 360-degree view of flood risk
2. Reimagine operational flood resilience
3. Prepare for changes in access to capital and insurance
4. Harness innovations in data and risk transfer
5. Develop a multi-stakeholder agenda

For homeowners in the US, there is often a misconception that homeowners insurance covers all flood damage. As we've shared, there is a wide gap of homeowners who do not have protection from the growing threat of flood. Insurance is a crucial element for recoverability that helps to provide the funds needed to rebuild after a flood disaster. With rising flood risk, we are committed to help close that gap and help more people recover after the tragedy of losses from flooding.

RESISTANCE + RECOVERABILITY = RESILIENCE

Flood **resilience** is a combination of:

1. **Resistance:** Measures that hold back water.
2. **Recoverability:** Measures that minimize the impact and speed of recovery if water enters a building.

Resilience can be achieved through a combination of:

- Designing, retrofitting/remodeling, and building for resistance to the inevitability to flood waters.
- Quick recovery achieved through the actions outlined in how we close the protection gap.

Flood risks are rising, but we are rising above the waters to face the challenge in the US and globally.

We at Torrent and Marsh are ready to lead the way to flood resilience and deliver peace of mind in the moments that matter.

ABOUT TORRENT TECHNOLOGIES

Torrent Technologies Inc. is a part of Marsh that leverages industry–leading service and technology to improve the underwriting, distribution, and claims service of flood insurance. Since 2017, Torrent has been the National Flood Insurance Program (NFIP) Direct Service Provider. About 75% of Torrent's Write Your Own (WYO) carrier clients utilize its full business process outsourcing capabilities, which include underwriting, claims, accounting, agency support, training, marketing, information technology, and mailing services. Integrated private primary flood and excess flood policies are offered along with the NFIP to provide agents and policyholders with a more seamless experience. A cloud-based, software as a service model enables clients to retain elements of flood insurance servicing. Torrent also offers integrated private primary and excess flood insurance for WYOs, their agents, and clients.

ABOUT MARSH

Marsh is the world's leading insurance broker and risk advisor. With around 45,000 colleagues operating in 130 countries, Marsh serves commercial and individual clients with data-driven risk solutions and advisory services. Marsh is a business of Marsh McLennan (NYSE: MMC), the world's leading professional services firm in the areas of risk, strategy, and people. With annual revenue of over $20 billion, Marsh McLennan helps clients navigate an increasingly dynamic and complex environment through four market-leading businesses: Marsh, Guy Carpenter, Mercer and Oliver Wyman. For more information, visit marsh.com, follow us on LinkedIn and Twitter or subscribe to BRINK.

CUSTOMER FOCUSED. TECHNOLOGY DRIVEN.

Torrent Technologies is a business of Marsh, which along with Guy Carpenter, Mercer, and Oliver Wyman, are the primary businesses of Marsh McLennan.