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Insurance Business America**

Special Report: Natural Catastrophes

Expert advice on preparing your clients for wildfires, hurricanes, and floods

NOT IF, BUT HOW

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SPECIAL REPORT

NATURAL CATASTROPHES

Expert advice on preparing your clients for wildfires, hurricanes and floods

Natural catastrophes are increasing in frequency and destructive impact. Munich Re has been on the forefront of climate risk research, education, and innovation, helping to develop solutions that mitigate this growing risk. Our respected flood experts were among industry leaders who shared their knowledge in an Insurance Business America Special Report on Natural Catastrophes.

For more information about our commercial and inland flood solutions, visit munichre.com

FLOOD

THE EXPERTS



Dr. Raghuveer Vinukollu

Natural catastrophe solutions lead
Munich Re US

Dr. Raghuveer Vinukollu is a member of the strategic products team at Munich Re US and leads the Nat Cat Solutions group, which focuses on the development of innovative products to cover various natural catastrophe exposures, either through traditional reinsurance structures or private-label approaches.



Sanjay Mehrotra

Senior vice president and strategic products natural catastrophe solutions manager
Munich Re US

Sanjay Mehrotra leads the flood strategy at Munich Re US. In 2015, Mehrotra and the strategic products team developed and launched an inland flood endorsement for US homeowners in low- to moderate-risk areas.



Serena Garrahan

Vice president and inland flood product manager
Munich Re US

As VP and inland flood product manager at Munich Re US, Serena Garrahan works closely with partner carriers to implement the inland flood endorsement, providing support for filing, marketing and training.

● For a long time, the US flood insurance market was dominated by FEMA and the NFIP. How has the market evolved in the past few years?

In 2018, net premiums written for private flood insurance totaled \$541 million, up 11.5% from \$471 million in 2017, according to S&P Global Market Intelligence. According to the National Association of Insurance Commissioners, there were 120 private companies writing flood insurance in 2018, compared to about 90 in 2017 and 50 in 2016. The increase in private carriers improves competition and helps spread the economic risk that comes from flooding. Private carriers can offer higher coverage than FEMA's National Flood Insurance Program policies, currently capped at \$250,000 for residential buildings and \$500,000 for nonresidential buildings. Some of the larger writers of private flood include FM Global, Assurant and Zurich Insurance.

There has also been growth in the non-admitted flood market through MGAs like Poulton & Associates and Neptune Flood. MGAs use both admitted and non-admitted carriers to cover the flood peril, with reinsurers sometimes taking up to 100% of the underlying flood risk. Non-admitted carriers, or surplus lines carriers, though approved by the state, have no requirements on their rates and forms and are not backed by state guaranty funds, but they may have higher minimum solvency requirements than admitted carriers. Rate and form freedom allow them to specialize in potentially volatile markets – nonstandard, unique, complex or catastrophic risks.

While broader coverage options are now available to homeowners and small business owners through the private flood market, the NFIP still has the most significant share of the current flood market.

● The flood insurance gap in the US remains sizable, even though flooding is the number-one natural peril. What's preventing further uptake?

There is a large flood insurance gap in the

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United States, where many people who are exposed to flood risk are not covered by flood insurance. According to Milliman, only 5% of single-family homeowners in the US have flood insurance. The NFIP is the primary source of residential flood insurance. More than 22,000 communities participate in the NFIP, with nearly 5.1 million policies providing more than \$1.3 trillion in coverage.

Recent floods like Hurricane Harvey highlight the issue of high uninsured losses. As of August 2016, just 15% of the 1.6 million homes in Harris County, Texas, had flood insurance, according to data from the Insurance Information Institute, and only 28% of the homes are located in high-risk areas for flooding. Many Houston homeowners outside the 100-year flood plain have been flooded several times in just the last few years, and most city homeowners don't have flood insurance now. More than 50% of Houston's homes in high and moderate flood risk areas are not in designated flood zones, according to CoreLogic.

The NFIP identifies areas at high risk of flooding as Special Flood Hazard Areas [SFHAs]. Property owners are required to purchase flood insurance only if their properties are in SFHAs, their communities participate in the NFIP and they have federally backed mortgages. Because the SFHA boundary is central to NFIP mapping, it may create a false belief that flood risk changes abruptly at the boundary and that properties outside the SFHA are safe and do not need flood insurance. However, about 20% of NFIP claims are for properties outside SFHAs, and all 50 states have experienced floods in the last five years.

A new report from the First Street Foundation provides a comprehensive analysis of the state of flood risk in the continental US. At the national level, the First Street Foundation flood model identifies about 1.7 times the number of properties as having substantial risk compared to the FEMA 1-in-100 SFHA designation. This equates to a total of 14.6 million properties across the country at substantial risk, of which 5.9 million properties and property owners are currently unaware of or underestimating the risk they face because they are not identified as being



within the SFHA zone. This report further highlights the flood protection gap because the number of high-risk homes is actually much higher than what FEMA designates.

While studies such as the one by the First Street Foundation are a move in the right direction, there is currently no industry standard for an accurate – or even adequate – view of flood risk. The current binary view of flood risk from FEMA – 58% of which is outdated, according to the September 2017 Department of Homeland Security Office of Inspector General report – serves as a major roadblock for a higher take-up rate. FEMA only requires that homes within the SFHA areas purchase flood insurance.

Unfortunately, in some cases, this leads to miscommunication that homes outside the SFHA do not have flood risk or are a low flood risk. Examples include hurricanes

Harvey, Florence and Michael, where people were caught off guard in terms of their real flood risk. In addition, note that flood risk is constantly changing in a warming climate scenario. Unfortunately, homeowners and business owners are not aware of their current view of risk, let alone what might occur in a future climate.

● How can the insurance industry work with other stakeholders to build more flood-resilient communities?

For the peril of flood, not only does the protection gap exist at the homeowner level, the gap is also significant at the public entity level with regards to insuring public buildings and infrastructure. One of the key factors for the resilience of a community is dependent on the take-up rate of insurance by property owners. With the single-digit



number for insurance take-up for flood, there exists not only a need but also a potential opportunity for the insurance industry to play a vital role in the recovery of a community after an event.

While the private-market options clearly outweigh the NFIP ones in terms of the benefits – policy coverage options, etc. – the industry and local stakeholders should work together to communicate to communities the growing flood risk, to mitigate and adapt to the warming climate, and to work collectively on risk transfer options that fit the specific needs of the community. Risk transfer needs for Florida are much different than the solutions required for communities in a state like Vermont. Furthermore, insurance solutions not only exist for individual property owners, but also collectively for a community – e.g. community insurance.

It's not just important to focus on building resilient communities to help protect them from natural catastrophes; it's now becoming a crucial requirement for cities and states. Standard & Poor's has emphasized the importance of disaster insurance arrangements on sovereign financial resilience. In their September 2015 Rating Report, they indicated the potential negative impact of insufficient or no insurance coverage at all on sovereign ratings. In November 2017, Moody's reported the incorporation of climate change into its credit ratings for state and local bonds. This means that communities, cities and states may get downgraded unless they show sufficient adaptation and loss mitigation strategies.







Public-private partnerships can play a crucial role in building a backstop against catastrophic losses that neither entity could provide on its own. Insurers and legislative bodies can work together to not only make communities resilient, but also help in maintaining the credit ratings for state and local bonds. While insurers can bring their financial strength, rich data and risk expertise to bear, public entities can help to increase the take-up rate of coverage by encouraging communities to adopt risk mitigation regulations and educating consumers.

The 2019 Mississippi floods and the 2017–2019 hurricanes highlight the importance of creating communities resilient to natural disasters – specifically floods – both from a risk transfer and a risk mitigation standpoint. Within disaster risk management, investment in risk-reducing measures is considered wholly separate from investment in risk transfer measures. But the two can actually be combined to create more efficient solutions.

Recently, Munich Re has been actively pursuing a potential proof of concept for testing a potential solution, Resilience Risk Transfer [RRT], that would look at the risk reduction impact of a specific risk mitigation measure on a property exposed to extreme flooding. The focus of the risk mitigation measures is on natural infrastructure: wetlands, mangroves, etc. The RRT solution has the potential to restore the natural infrastructure that provides one of the most important protections from flood disasters

PRIVATE FLOOD INSURANCE: THINGS TO CONSIDER

When switching from the NFIP to private flood insurance, the experts at Munich Re US recommend taking some time to consider the following aspects.

-  Coverage might not be as broad as that offered by the NFIP-supported policy and therefore might not be accepted by a lending institution. Most private flood insurance policies do state that their coverage is at least as broad as the NFIP.
-  An NFIP policy offers a guarantee of renewal; private flood insurance does not offer this, even if the premium is paid. This is especially true for E&S flood policies.
-  Rates could increase drastically, especially with an E&S or surplus lines insurer.
-  The insurer might be weakly capitalized or new to writing flood coverage.
-  There is the potential to lose a subsidized rate and/or grandfathering, especially for pre-FIRM risks.
-  As these policies are new, policy language is not standardized and has not been tested in court.

while also providing insurance coverage, thus narrowing the protection gap.

Finally, the resilience of communities to flood also relies on mitigating physical damage to property by building stronger structures. Strong building codes have clearly demonstrated their benefits to cities and towns across the world in better withstanding natural catastrophes. Building property a few feet above the base flood elevation/predicted flood levels and/or using flood-resistant

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materials for construction can prevent thousands of dollars in damage to a single property. While implementing building codes needs to be addressed by legislative bodies, insurers can offer incentives to property owners for building stronger.

● What advances have been made recently in flood modeling, risk prevention and claims technology?

Flood is a high-gradient peril and probably one of the least understood perils within the industry. Part of the complication is that a country as vast as the United States is exposed to different forms of flooding: storm surge from hurricanes, tropical depressions, spring flooding, flooding from atmospheric rivers, etc. However, flood models have significantly developed over the past few years. It may be fair to say that the flood models are at the same stage as the hurricane models were in the early 2000s. This is a significant development and can be attributed to the increased computational power that exists.

Flood modeling is also beginning to take into account the changing climate. There are companies that are not only looking at a historical view, but also looking into what flooding might look like in a warming climate scenario. Examples include what the storm surge inundation would look like in an increased sea level rise scenario, the impact of Hurricane Harvey-like scenarios in other regions of the country, etc.

In flood modeling, the topography, location accuracy and building characteristics are as important, if not more, as the science identifying the floods over a region. Technology has come a long way in capturing some of these important parameters for flood underwriting. Geocoding and location accuracy have improved substantially with machine learning [ML] and artificial intelligence [AI]. If the model geocodes the address to the wrong location, then there is a significant chance that the loss cost and the premium calculations are wrong.

Similarly, local elevation and building characteristics are extremely important. LiDAR technology, which is based on laser measurements, is now available to obtain high-resolution digital elevation data. AI and

ML have also enabled the capture of the lowest and/or first flood elevation, which has further improved the flood underwriting process, thus helping insurers to find the competitive edge for flood insurance pricing.

Experiencing a flood can be a frustrating process for a property owner. With the increasing frequency and severity of flood events, insurers have to be prepared for a large influx of claims and, in some instances, claims from multiple events – hurricanes Harvey and Irma made landfall within two weeks of one another. High-resolution imagery – i.e. remote sensing – combined with AI and ML has provided a major breakthrough in the claims management process by speeding up the recovery process, especially for a homeowner who has experienced flooding on their property.














● In 2020, the Atlantic hurricane season is coming right in the middle of a pandemic. What unique challenges does this present?

The global pandemic has, in many ways, caught communities, states and countries off guard and once again forced us to question and find ways to be prepared and mitigate for future catastrophes.

As has been already noticed, some cities and towns recovering from the 2019 Mississippi flooding are facing huge economic challenges from the coronavirus pandemic. Earlier in the year, some regions that experienced spring flooding also faced a shortage of PPE, which further impacted the emergency and recovery efforts. Most of these communities did not have sufficient insurance coverage for the flood, let alone being insured for the pandemic. Based on the NFIP policy statistics, in some of the Midwestern states, the insurance take-up rate for flood is as low as 1% to 2%.

The take-up rate for flood is not significantly higher in the coastal regions and states. Events like hurricanes Florence and Harvey and Superstorm Sandy exposed that as many as 80% of homeowners were not insured for flood. This huge protection gap can be a major challenge as we enter the main season for the Atlantic hurricanes. Recent years have clearly experienced both frequency and severity of

POTENTIAL ADVANTAGES OF A PRIVATE FLOOD INSURANCE POLICY

-  Broader definition of flood versus the NFIP
-  Higher limits of coverage than those offered by the NFIP, both primary and excess
-  Replacement cost loss settlement versus actual cash value on all building and personal property losses
-  Coverage for personal property in basements
-  Full-limit ordinance and law coverage
-  Broader coverage for other structures besides a detached garage
-  Additional living expense on a policy covering homes
-  Business income and extra expense coverage on commercial policies
-  More deductible options
-  Fewer 'property not covered' and exclusions than the NFIP
-  No elevation certificate requirement
-  No HIFAA surcharge of \$25 or \$250
-  Potentially lower rates

Source: Munich Re US

events, with more hurricanes impacting communities with extreme flooding. There is also strong evidence that climate change has already had a significant influence on these extreme events. **13**