



# How Banks Can Quantify Physical Climate Risk

By Wolcott Wheeler

CLIMATE CHANGE IS getting expensive. According to Aon, 421 notable disaster events last year generated \$313 billion in economic loss, of which only \$132 billion (42%) was insured loss.

“Hurricane Ian was the second-costliest insured event on record globally, just behind Katrina, and we saw additional deadly flooding in Missouri and Kentucky in July,” said Dan Raizman, Senior Director, Climate Risk Advisory at Aon, at a recent RMA conference.

As a result, it has never been more important to understand the risk that

a changing climate poses today and in the future. With only 42% of losses covered by insurance last year, the remaining 58% of uninsured losses demonstrate the scale of the protection gap—the difference between economic losses and what’s covered by insurance. While staggering, this was the smallest protection gap on record. The scale of the gap is both concerning and presents opportunity for the banking and insurance industries. Each can play a critical role in providing additional protection.

How serious is the situation? Earlier this year, two of America’s largest insurers, State Farm and Allstate, stopped

issuing new homeowners policies in California owing to climate risk. State Farm cited “rapidly growing catastrophe exposure”—wildfires, specifically.

The Federal Reserve is conducting a pilot Climate Scenario Analysis (CSA) exercise for six major banks to learn about their climate risk management practices. Banks must estimate the effects of climatic changes—both physical and transitional—out to 2050 on residential and commercial loan portfolios under two scenarios: a Northeast hurricane and an idiosyncratic peril selected by the bank. Banks were expected to provide responses by

July 31 of this year, and the Fed intends to release high-level findings by the end of 2023.

In many ways, panelists at an RMA Governance, Compliance, and Operational Resiliency (GCOR) session said, many banks are still in discovery mode when it comes to identifying climate risk. But they're moving fast to catch up.

"First-line business teams in residential and commercial real estate lending are analyzing the impact on credit quality," said Derrick Oracki, head of Financial Institutions Risk Consulting at Aon. "Credit risk modeling teams are estimating the impact on probabilities of default and loss given default. Operational risk management teams are studying operational resiliency and business resumption strategies. Operations teams are identifying the adaptations or structural engineering they'll be required to put in place in their branches and offices. In addition, sustainability and ESG teams are very interested in Net Zero planning and disclosure expectations from regulators and external stakeholders."

How can banks quantify physical climate risk? "We see a growing suite of tools available," said Raizman. "We can broadly divide these into two categories: catastrophe models and climate models. Catastrophe models are the primary tools the insurance industry

has leveraged to price and manage risk over the past 35 years. They're designed to tackle a small data problem characterized by low-frequency but high-severity events that pose material threats to solvency."

Climate modeling typically starts with downscaling global climate models. Such modeling is best at understanding the effect that chronic impacts such as droughts, extreme precipitation, wildfire weather, extreme heat, and extreme freeze risk will have on future time horizons and under climate scenario trajectories.

"We have seen that the most benefit comes from combining the methods and insights of the two approaches when forecasting acute perils and how the climate could impact extreme event activity, such as tropical cyclones, wildfires, and floods," Raizman said. "Some banks opt to develop their own solutions internally, but primarily they're relying on vendors."

For bank analysts, one task at hand is to take the climate models and translate them into how future events could play out in terms of credit losses or operational risk events. For example, it's anticipated that the financial strain of hurricane and wildfire damage will cause some property owners to default on their mortgages.

Another is to factor the potential of future climate-related losses into ap-

praisals and credit rating calculations. To wit: According to a recent paper in the journal *Nature Climate Change*, the U.S. housing market is [overvalued](#) by between \$121 billion and \$237 billion due to underinsured flood risks, across nearly 7 million homes.

Banks also need to model potential insurance recoveries, or lack thereof: It's crucial to have reliable data concerning the borrower's insurance. Are hurricanes, wind, tornadoes, and flooding covered? What are the terms of the insurance? What are the deductibles and the limits that apply? More accurate data will yield more accurate insurance recovery models.

"Unprecedented physical events pose a notable risk to bank portfolios," Raizman said. "It's important for banks to commit time to understand risk quantification and establish a process for that understanding."

"Don't wait to start collecting the data that you need," advised Oracki. "Because you're required to understand the physical risk to borrowers, you need to start working with them to understand where their locations are and the physical risks to their operations. Then also look at the resilience of the communities where you operate and how they're responding. Map out your bank's roles and responsibilities across credit, operational resilience, treasury, and frontline businesses. They are all going to be involved."

He added: "You're going to need the right people in-house who can understand the vendor data and build it into your risk models. Keep an open mind on what you'll find when you start analyzing the climate and catastrophe risk in your bank today and into the future, because I'm sure there will be some surprises for you, with some pockets of underinsured risk in your portfolios that you didn't think about or didn't know were there. Your offices, branches, or data centers may be exposed to severe events you just hadn't even thought about, or you haven't experienced before." 

