CoreLogic®

2020 Climate Change Catastrophe Report

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Introduction

2020, without a doubt, was a year of record-breaking and unexpected catastrophic events. In addition to reeling from the health and economic shock of a global pandemic, the U.S. was hit with one natural disaster after the next, marking the sixth straight year with more than 10 weather and climate events surpassing $1 billion in economic losses[1]. Our front-line workers, critical infrastructure and first responders were put to the test by hurricanes, flooding, tornadoes and wildfires as the world was simultaneously urged to stay home and prevent the spread of the coronavirus.

What does 2020 look like when we put it all together?

[1] *https://www.noaa.gov/news/us-hit-by-16-billion-dollar-disasters-year-so-far*

PART I

What Happened in 2020?

JAN

NATURAL HAZARDS

In January, we began the year with a dramatic set of over 80 tornadoes and severe storms that damaged many states in the Southeast. This was paired with storms and severe flooding in northern states such as Michigan, Wisconsin and New York.

HOUSING

Despite the natural hazards, the housing market started the year on a solid footing with home prices steadily increasing at about 4% and 30+ days delinquent loan share at 3.5%, reaching the lowest rate since data recording started in 1999.

ECONOMIC

The economy was also performing solidly, with a record 112 consecutive months of nonfarm payroll employment growth. Nevertheless, news of the novel coronavirus spreading across Asia led to concerns, and the World Health Organization (W.H.O.) declared a global health emergency.

FEB

NATURAL HAZARDS

Severe weather continued in February with the South, East and Northeast being hit hardest. There were over 20 tornadoes across central Mississippi and Tennessee and hundreds of high-wind damage reports across the East Coast. North Carolina, South Carolina and Florida were hit with the costliest damages from this series of severe storms.

HOUSING

The housing market continued to hum along nicely with home sales and mortgage applications outperforming last year's levels and continually declining mortgage rates providing an incentive for home purchases and refinances. Home price growth started picking up the pace again to over 4% after a lull in 2019 when home price growth remained below 4%.

JANUARY

Natural Hazards
80+ tornadoes

Housing
4% home price increase

Economic
112 months of growth

FEBRUARY

Natural Hazards
20 tornadoes

Housing
Below 4% home price growth

ECONOMIC

Unemployment rates reached a 50-year low at 3.5%. The news of virus-related shutdowns in China started to raise concerns across the world economies. Later in the year, the Business Cycle Dating Committee of the National Bureau of Economic Research would determine that February 2020 marked the peak in monthly U.S. economic activity and the beginning of a recession. The economic expansion lasted 128 months, the longest in the history of U.S. dating back to 1854.

MAR

NATURAL HAZARDS

In March, tornadoes and severe weather caused significant damage in Tennessee. Many homes and businesses were damaged by EF-3 and EF-4 tornadoes that wreaked havoc east of Nashville. Surrounding states were also impacted by hail and wind damage. Many of those spared by the severe weather faced flooding across the Missouri basin.

HOUSING

The housing market showed signs of a promising spring home-buying season ahead, but with declaration of the COVID-19 National Emergency on March 13, 2020, housing market activity, including home purchase signings and availability of newly listed properties, precipitously declined.

ECONOMIC

With the W.H.O. declaring COVID-19 a pandemic on March 11, and the U.S. declaring a national emergency on March 13, the U.S. economy started shutting down. Weekly unemployment insurance claims surged to over 3.2 million, a tenfold increase from the week prior and the highest level of initial claims in the history of the series (since 1967). Nearly every state providing comments cited the impact of the COVID-19 virus. On March 27, President Trump signed the Coronavirus Aid, Relief, and Economic Security Act (CARES Act) into law, the largest single spending bill in the history of the U.S. Among other actions, the law provided nearly $2 trillion in tax relief, spending, grants and capital to offset the economic effects of the COVID-19 pandemic.

Economic

3.5% unemployment rate

COVID-19

W.H.O. declaring COVID-19 a pandemic

MARCH

Natural Hazards

EF-3 and EF-4 tornadoes

Housing

Housing activity precipitously declined

Economic

Unemployment insurance surge of over 3.2M

APR

NATURAL HAZARDS

In April, tornadoes, high winds and hail were rampant. North Central and Ohio Valley states were hit with numerous hailstorms and over 20 tornadoes. Later in the month, there was an outbreak of over 140 tornadoes from Texas to Maryland. CoreLogic estimates indicate that over 40,000 structures were affected with a reconstruction cost of over $5 billion. High winds, hail and tornadoes also caused significant damage in Oklahoma and Louisiana.

HOUSING

With stay-at-home orders taking place across many states, housing market activity slowed to a crawl and the signing of home purchase contracts fell by over 50% compared to 2019. Early mortgage defaults (those 30 days past due) doubled from 1.9% in March to 4.2% in April — the largest one-month jump in the history of the series. At the same time, federal and state financial institution regulators urged mortgage servicers to work with consumers affected by COVID-19. Under the CARES Act, borrowers with a federally backed mortgage loan experiencing a financial hardship due to the COVID-19 pandemic were able to request forbearance from their mortgage servicer; servicers were required to provide a CARES Act forbearance for up to 180 days with another 180 days extension.

ECONOMIC

Total nonfarm payroll employment fell by 20.5 million in April, and the unemployment rate jumped to 14.7 percent. This was the largest one-month decline in employment and the highest monthly unemployment rate in the history of the series (seasonally adjusted data are available back to 1948).

MAY

NATURAL HAZARDS

May continued to bring high winds, thunderstorms, tornadoes and hail to Central, Eastern and Southern states. Earlier in the month, high winds and hail damage caused significant damage across southern Missouri and Tennessee. Then, thunderstorms, high winds, hail and tornadoes caused significant damage in Texas, Illinois and North Carolina. This was followed by dramatic hailstorms in south Texas, where golf ball-sized hail caused damage to many homes and businesses. Hail damage was concentrated in north San Antonio. Flooding persisted and spread across the Mississippi basin.

APRIL

Natural Hazards

Over $5b in reconstruction cost from tornadoes

Housing

4.2% early mortgage defaults

Economic

14.7% unemployment rate

Unemployment rates

Largest one-month decline and highest monthly unemployment rate in the history

MAY

Natural Hazards

High winds, thunderstorms, tornadoes and hail

HOUSING

As shelter-in-place orders started lifting, home purchasing picked up pace, but with uncertainty around economic outcomes, home price growth slowed compared to prior months. Mortgage transitions into delinquency slowed notably from April's jump but remained twice the pre-pandemic rate as those affected by COVID-19 started receiving CARES Act benefits.

ECONOMIC

Unemployment rates fell slightly to 13.3% in May but remained at historic highs.

Housing

Home price growth slows

Economic

13.3% unemployment rate

JUN

NATURAL HAZARDS

As summer began to approach in June, drought and record heat began to cause issues in the Western and Central regions. Death Valley in California reached 130°F, the highest temperature measured globally in many decades. The drought played a significant role in drying out vegetation, increasing the potential and severity of wildfire in the region. Tropical Depression Cristobal marked the first ever tropical cyclone to make its way into Wisconsin.

HOUSING

With home purchase applications and contract signings exceeding 2019's levels, the housing market showed signs of a strong rebound. Home price growth similarly accelerated again, suggesting that the negative impact of COVID-19 on the housing purchase market was short lived. New mortgage defaults — those transitioning from current to-30-days past due — also slowed to pre-COVID-19 rates.

ECONOMIC

Unemployment rates fell to 11.1% but still remained above the Great Recession peak of 10%. Nevertheless, the Bureau of Economic Analysis estimated that the second quarter gross domestic product contracted by a record 31.4% annual rate as a result of the pandemic.

JUNE

Natural Hazards

Death Valley in California reached 130°F

Housing

Home purchase applications and contract signings exceed

Economic

11.1% unemployment rate

JUL

NATURAL HAZARDS

At the end of July, Colorado was hit with the Pine Gulch Fire, resulting in local evacuations and the closure of highways in the region. The fire, with over 139,000 acres burned, was, at the time, the largest wildfire recorded in Colorado history.

HOUSING

With mortgage rates falling to historical lows and forgone spring home-buying season taking hold, home purchase signings were tracking around 20% above 2019 leading to home price growth accelerating to above 5% year-over-year increase. However, the pipeline of borrowers who were late on their mortgage payments led to serious delinquencies increasing four-fold compared to pre-pandemic.

ECONOMIC

Unemployment rates fell further to 10.2%. On July 31, the Federal Pandemic Unemployment Compensation (FPUC) program, which provided an additional $600 per week to individuals who were collecting regular unemployment benefits, expired.

AUG

NATURAL HAZARDS

In early August, Hurricane Isaias made landfall in North Carolina with 150 mph winds spawning at least 21 tornados in its path, and later in August, Hurricane Laura made landfall in southwestern Louisiana with 150 mph winds. CoreLogic estimated $8 billion to $12 billion in insured losses from Hurricane Laura's wind and storm surge. By mid-month, a large derecho focused its damaging winds in Iowa, Illinois, Minnesota, Indiana and Ohio. On the West Coast, a dry lightning storm was responsible for 650 wildfire ignitions in California — including the August Complex Fire which grew from 37 different wildfires to become the largest wildfire in California state history. The Cameron Peak Fire began in Colorado, eventually growing to be the largest wildfire in Colorado state history.

JULY

Natural Hazards

139,000 acres burned

Housing

Home purchase signings are tracking 20%

Economic

10.2% unemployment rate

Hurricane Laura

$8B - $12B in insured losses

AUGUST

Natural Hazards

August Complex Fire largest wildfire in California state history

HOUSING

While early defaults spiked in April and retrieved in the following months, serious delinquencies (90+ days past due) peaked in August at 4.3%. Foreclosures, on the other hand, remained at the series low of 0.3% due to foreclosure moratoria put in place at the onset of the pandemic. Mortgage interest rates continued to slide lower, incentivizing home buyers and driving sales higher. Home price appreciation accelerated further.

ECONOMIC

The unemployment rate fell to 8.4%.

SEPT

NATURAL HAZARDS

The end of August was followed by another month of hurricanes in September with six active areas of interest on the peak day of the season. Hurricane Sally strengthened to a powerful Category 2 storm and made landfall in Gulf Shores, Alabama, with winds of 105 mph. The storm brought strong storm surge to Alabama and the western end of the Florida Panhandle, with approximately five feet of flooding in Pensacola, Florida.

HOUSING

Following a disastrous August, September delinquency rates started to reflect impacts from Hurricane Laura in Louisiana. Thirty-day delinquencies in Lake Charles jump about three-fold, from 2.85% in August to 8.41% in September. Danville, Illinois, experienced a similar notable jump in early delinquencies as the city was on the derecho path that swept through the month before. Nationally, serious delinquencies moved lower from the 4.3% peak in August to 4.2% in September. Home price growth, however, led to average equity per homeowner increasing to a record level of almost $200,000 in the second quarter of 2020. At the same time, the share to homes in negative equity fell to a series low of 3%.

ECONOMIC

Unemployment rates declined to 7.9%. Consumer confidence showed signs of revival after falling 30 points between February and April. Third quarter gross domestic product also bounced back from a devastating second quarter to an increase of 33.4% annualized rate.

AUGUST

Housing

Delinquencies at 4.3%

Economic

8.4%. unemployment rate

SEPTEMBER

Natural Hazards

Hurricane Sally: Category 2

Housing

Delinquencies at 4.2%

Economic

7.9%. unemployment rate

Avg. equity per homeowner

Record level of almost $200,000

OCT

NATURAL HAZARDS

In early October, Hurricane Delta, a Mid-Category 2 storm with winds up to 100 mph, made landfall in Louisiana. Fortunately, the storm was weakened before it made landfall, but there were still significant damages. CoreLogic estimated $0.7 billion to $1.2 billion in insured losses from the hurricane's wind and storm surge. In the West, California wildfire season continued to rage on with many events occurring across northern and southern California. Hurricane Zeta, a strong Category 2 storm, was the fifth named storm to strike Louisiana this season. CoreLogic estimated between $2.5 billion to $4 billion insured losses from the hurricane's wind and storm surge.

HOUSING

While up to 90-day delinquency rates fell back to pre-pandemic rates and the 90 to 119 days delinquencies started decreasing, the very late delinquencies of 180 days or more increased to 2.1%, up from 0.3% pre-pandemic. Despite the high share of late-stage delinquencies, foreclosure rates remained low due to moratoria. Lake Charles, Louisiana, affected by the two hurricanes that swept through in October, continued to have the highest overall delinquency rate and also the biggest increase from a year ago.

ECONOMIC

Unemployment rates slid to 6.9%.

NOV

NATURAL HAZARDS

November started with Hurricane Eta, a Category 4 hurricane that originated in the eastern Caribbean Sea. The storm weakened after making landfall in Nicaragua before it reached the Florida Keys where it continued across the Southeastern U.S. A week later, a significant cold front brought thunderstorms and wind damage to the Midwest. Lower Michigan was significantly impacted as 370,000 customers lost their electricity. A few days later, the Mountain View Fire in Mono County, California, and Douglas County, Nevada, burned over 20,000 acres and destroyed 80 structures.

OCTOBER

Natural Hazards

Hurricane Delta: Category 2

Housing

Late delinquencies of 180 days or more have increased to 2.1%

Economic

6.9%. unemployment rate

Mountain View Fire

20,000 acres burned

NOVEMBER

Natural Hazards

Hurricane Eta: Category 4

HOUSING

Despite the usual seasonal slowdown, the housing market continued to outperform 2019's levels, resulting in the total 2020 home sales exceeding 2019 levels. Mortgage interest rates continued to reach historic lows, prompting many buyers to enter the market. Home price growth accelerated to 8.2% in November — marking the largest annual appreciation since March 2014.

ECONOMIC

While unemployment rates continued to decline to 6.7% in November, hiring showed signs of slowing, and new unemployment claims picked up again. Hiring in the service sector slowed and continued to suffer from pandemic impacts. A decline in labor force participation was the primary driver behind falling unemployment rate.

Housing

8.2% home price growth

Economic

6.7%. unemployment rate

DEC

NATURAL HAZARDS

Wildfire season continued into December with four wildfires starting across Southern California. The two largest were the Bond Fire in Orange County that burned over 6,600 acres and the Creek Fire in San Diego that burned over 4,200 acres. The Northeast was also hit with Winter Storm Gail with gusts up to 63 mph and over a foot of snow in much of the region.

HOUSING

Housing market indicators ended the year on a high note with home sales and home prices well above expectations. The loan performance data report also suggested the share of serious delinquencies began declining from August's peak.

ECONOMIC

Unemployment rates remained unchanged in December as total nonfarm unemployment declined by 140,000, reflecting the increase in COVID-19 cases and significant job losses in leisure and hospitality from efforts made to contain the pandemic. The U.S. ended the year with nearly 350,000 deaths and about 20 million total cases of COVID-19 infections.

DECEMBER

Natural Hazards

4 major wildfires

Housing

Delinquencies at a decline

Economic

Nonfarm unemployment declined by 140,000

COVID-19

350,000 deaths and about 20 million cases

PART II

Quantifying Multi-Peril Property Risk in the U.S.

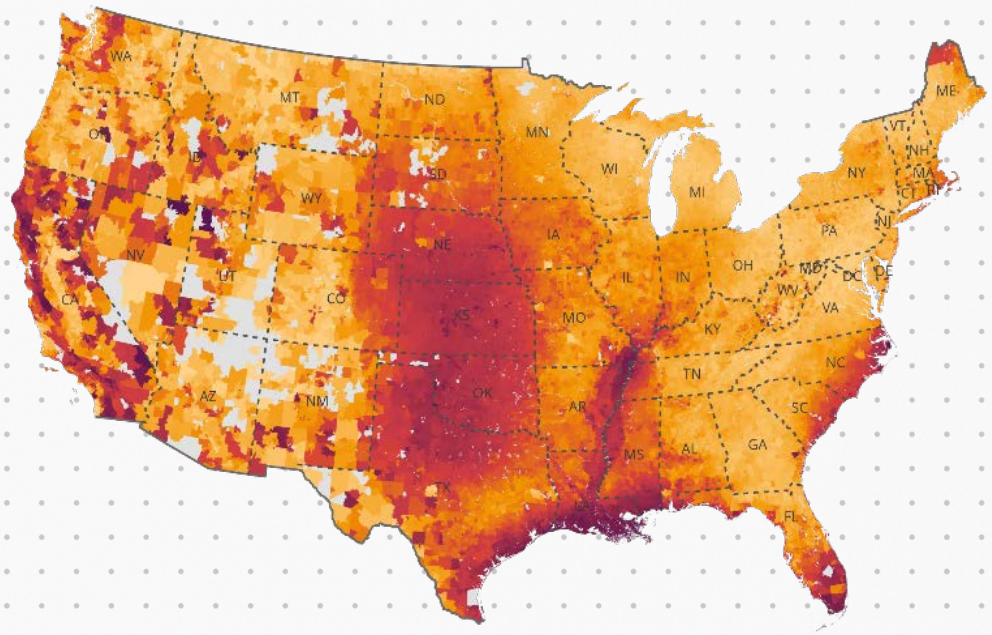
U.S. HOUSING: MOST PROPERTIES HAVE SOME RISK

The U.S. is exposed to many natural hazards: Hurricanes bring devastating winds, storm surge and inland flooding to coastal locations. Severe convective storms bring damaging tornadoes, hailstorms and derechos to a great portion of the country. Earthquakes, wildfires and seasonal flooding combine to produce risks that persist throughout the U.S. Properties also have varying degrees of non-weather risk, from appliance flooding and house fires to crime-related loss, depending on location of the property.

Utilizing risk modeling, CoreLogic combined the severity and frequency of damage into a composite risk score. The composite risk score represents the sum of the average Annual Loss (AAL) for seven individual hazards (earthquake, wildfire, inland flood, severe convective storm, winter storm, hurricane/tropical storm coastal surge, hurricane/tropical storm wind) for approximately 105 million residential structures across the U.S. The value of this composite AAL, relative to the calculated Reconstruction Cost Value (RCV), is used to rank all structures with a 1-100 score, where the higher scores equates to higher risk.

These values can be used in insurance markets, the housing finance ecosystem (primary and secondary), investors in credit risk transfers and asset-backed securities, financial services prudential regulators for supervisory stress testing and oversight, as well as by publicly traded companies preparing materiality disclosures in SEC filings when it's necessary to understand the relative risk for any structure across the US.

These composite scores can be mapped in a composite risk map to identify the areas with the highest risk homes. Figure 1 illustrates that the highest risk homes are in California (dominated by earthquake and wildfire), Texas, Oklahoma, Kansas, Nebraska (dominated by tornado/hail), along the Mississippi River (dominated by river flooding and earthquake risk) and large Gulf and Atlantic coastal stretches (dominated by hurricane winds and storm surge/riverine flooding).



RISK SCORE

1 — 100

NO DATA

PART III

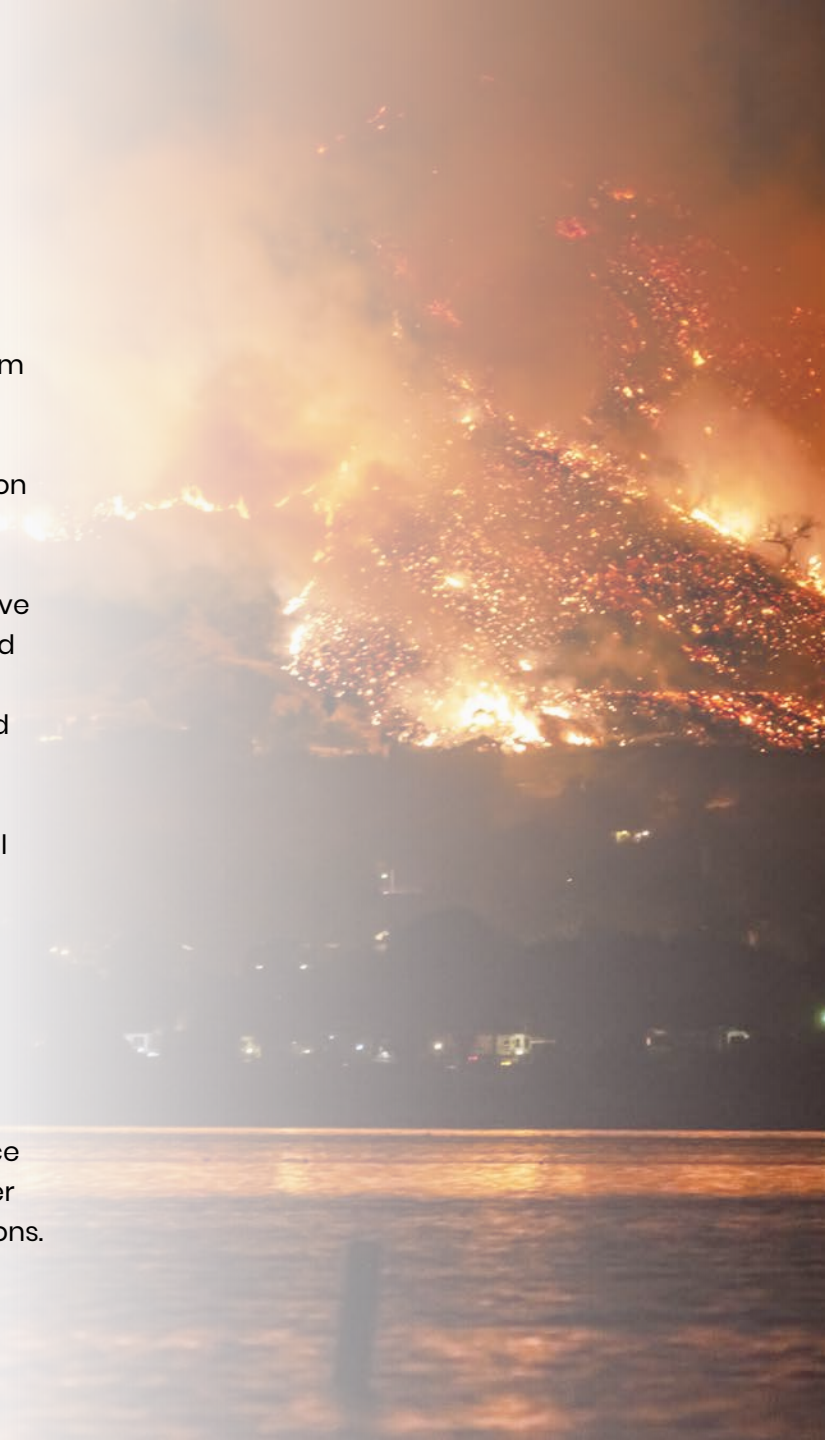
New Technology Introduces New Insurance and Financial Services Market Solutions

Insurance, the housing finance ecosystem, investors in credit risk transfers and asset-backed securities, financial services prudential regulators, and financial services are facing an increasingly volatile catastrophe risk environment. This is shrinking profit margins and prompting deep losses where intense, large-spread catastrophes like wildfire, hurricanes and unemployment concentrate in certain areas. Improved data and geographic accuracy have enabled the development of better information of the risk of damage to a single location. The computational power brought from cloud-computing has enabled probabilistic risk models that help us anticipate the severity of a potential disaster. Weather monitoring technology has evolved to rapidly to deliver an accurate understanding to insurers and lenders of what happened after an event. All of these elements are supporting us on the path toward rapid recovery post-incident and more resilient homes, businesses and communities.

INSURANCE

Disaster resilience is the ability of individuals, communities and states to adapt to and recover from hazards, shocks or stresses without compromising long-term prospects. Strengthening new homes is important and has played a large role in the reduction of losses from fires and natural disasters. While strengthening buildings is one part of resilience, another part is our ability to recover in a cost-effective manner. The best way to recover cost-effectively and fast is to better predict what damages might occur should the worst happen. Catastrophe modeling and property risk analysis are paramount to accurately predicting the damages that could occur down to a parcel level. Insurers can model large-scale financial needs using aggregate risk scores, or composite scores, for a certain portfolio or area to understand their AAL.

With access to catastrophe modeling and property data, insurance businesses have an important opportunity to change the way they protect homeownership and property, offering new insurance options and transformational experiences that better suit today's reality of risk and policyholder expectations.



Parametric Insurance

New weather verification technology has created the opportunity to introduce new types of insurance, specifically parametric insurance. The National Association of Insurance Commissioners (NAIC) defines **parametric insurance** as:

> *a type of **insurance** contract that insures a policyholder against the occurrence of a specific event by paying a set amount based on the magnitude of the event, as opposed to the magnitude of the losses in a traditional **indemnity** policy.*[2]

Real-time risk assessment is helping with the development of new financial offerings — such as parametric insurance as an alternative to indemnity insurance. CoreLogic's weather verification technology for hail has reduced the uncertainty in the size of hail stones affecting a location, enabling the efficient transfer of risk without requiring the time and cost of traditional indemnity claims adjustment. This technology is now used to support insurance written in the U.S.

While not likely to replace indemnity insurance, parametric insurance brings the potential to broaden insurance coverage in the U.S. and improve a homeowner's ability to recover from the effects of natural catastrophes through quicker claims processing and faster payouts.

Private Flood Insurance

For most homes in the U.S., rising waters from floods represents the greatest damage potential. For the last 50 years, the foundation of the residential flood insurance market in the U.S. has been the U.S. Federal Emergency Management Agency (FEMA) National Flood Insurance Program (NFIP). While the NFIP is expected to remain a foundation of the residential flood insurance market, recent legislation has enabled some private insurance to satisfy the mandatory insurance purchase provisions imposed upon mortgage lenders, adding more diversity to the insurance offerings to consumers. Additionally, improved catastrophe risk modeling and property risk characteristic data availability have enabled the development of flood risk pricing for homes outside of the designated Special Flood Hazard Areas (SFHAs). Historical experience shows many homes outside of the SFHA are at risk of flooding but are not required to purchase insurance.

The availability of models to price the risk of this previously neglected market niche is producing new opportunities to provide value and security to homeowners and improve community resilience to the effects of flooding. Globally, flooding is anticipated to affect twice as many people by 2030 — further exacerbating the strain on federal programs and highlighting the fact that now is the time to ramp up efforts to protect this underserved market.

Flood and Wildfire Reinsurance

Natural catastrophes by their nature impose sudden and severe financial burdens on the homes and businesses in the affected region. For the large-scale perils of hurricanes and earthquakes, reinsurance markets have provided the reservoirs of rebuilding and reconstruction capital to insurers and commercial enterprises. This has proven to be an efficient means to support communities.

The NFIP has purchased private reinsurance (leveraging the Insurance-Linked Securities, or ILS, market) on its insured flood exposure for three years in a row, and experience has demonstrated that the latest version of analytical flood risk modeling can be used to support and grow a wholesale flood insurance risk market.

In California, two sequential years of wildfire ILS issuances based on computer-risk modeling have begun the same acceptability process. The importance of these initiatives is elevated in the face of climate change — a changing climate negates the value of experience rating and highlights the need for reliable computer risk modeling that can account for changed environmental conditions.

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[2] *https://content.naic.org/cipr_topics/topic_parametric_disaster_insurance.htm*

MORTGAGE AND FINANCIAL SERVICES

Natural hazards affect all areas of the housing economy and property ecosystem. When disaster strikes, homes and businesses can be damaged or destroyed, leaving a trail of devastation in its wake. This results in a drop in vacancy rates, an increase in delinquencies, a local economic recovery and increased demand for resources — all during a recovery period involving aid and reconstruction of at least several months.

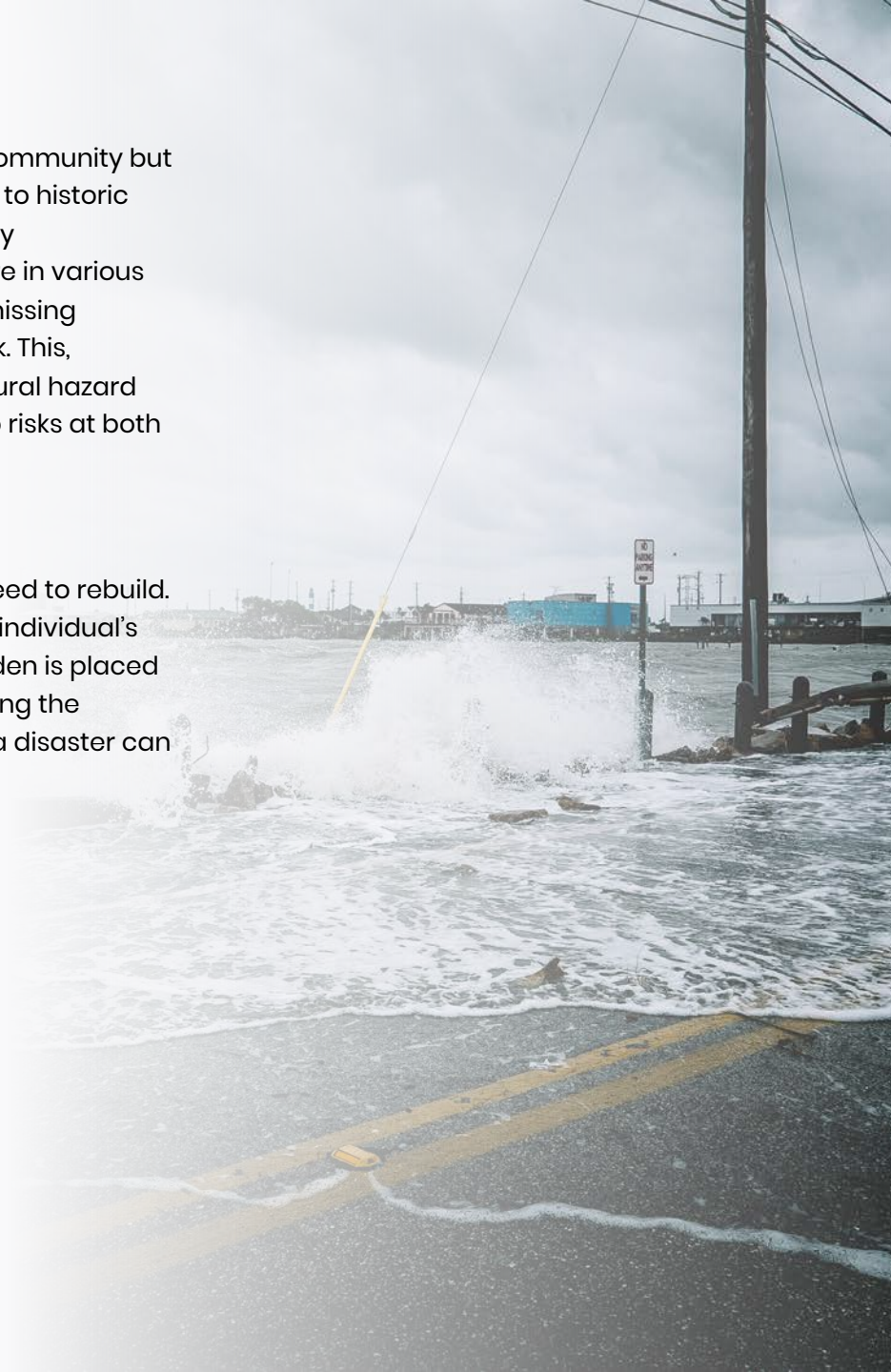
The increased severity and frequency of natural hazards underscores the importance of scientifically-based catastrophe modeling to protect homeownership and brace the economy for disasters. This modeling can estimate the impact of natural disasters with greater certainty to better address risk mitigation. By leveraging this technology, mortgage lenders and financial services alike can accelerate local economic recovery and protect homeowners once a natural hazard hits

Portfolio Risk Management

A natural hazard can not only devastate a community but also increase its mortgage delinquency rate to historic levels and put strain on the local economy. By determining the probability of homes that are in various stages of delinquency, default or at risk for missing payments, lenders can minimize portfolio risk. This, combined with actionable property and natural hazard exposure insights, can help pinpoint portfolio risks at both the macro and micro levels.

Comprehensive Mortgage Relief

With the post-disaster timeline comes the need to rebuild. As each individual is different, so too is each individual's unique financial needs. As an economic burden is placed on both individuals and communities, revisiting the payment structure or modifying loans after a disaster can help homeowners recover more quickly.



> *The increased severity and frequency of natural hazards leads to the importance of scientifically-based catastrophe modeling to protect homeownership and brace the economy for disasters.*

Conclusion

2020 has been quite a year. The nation has seen record-breaking wildfires, hurricanes, floods and tornadoes, prompting governments, insurers and property owners to think of new ways to mitigate risk and make our neighborhoods more resilient.

As the world continues to adapt to a global pandemic and ever-changing climate, being equipped with the latest catastrophe modeling tools can help us make sense of the disasters that damage our communities. By understanding the risk these events pose to property, we can better plan for a catastrophic tomorrow and build a resilient future.

CoreLogic®