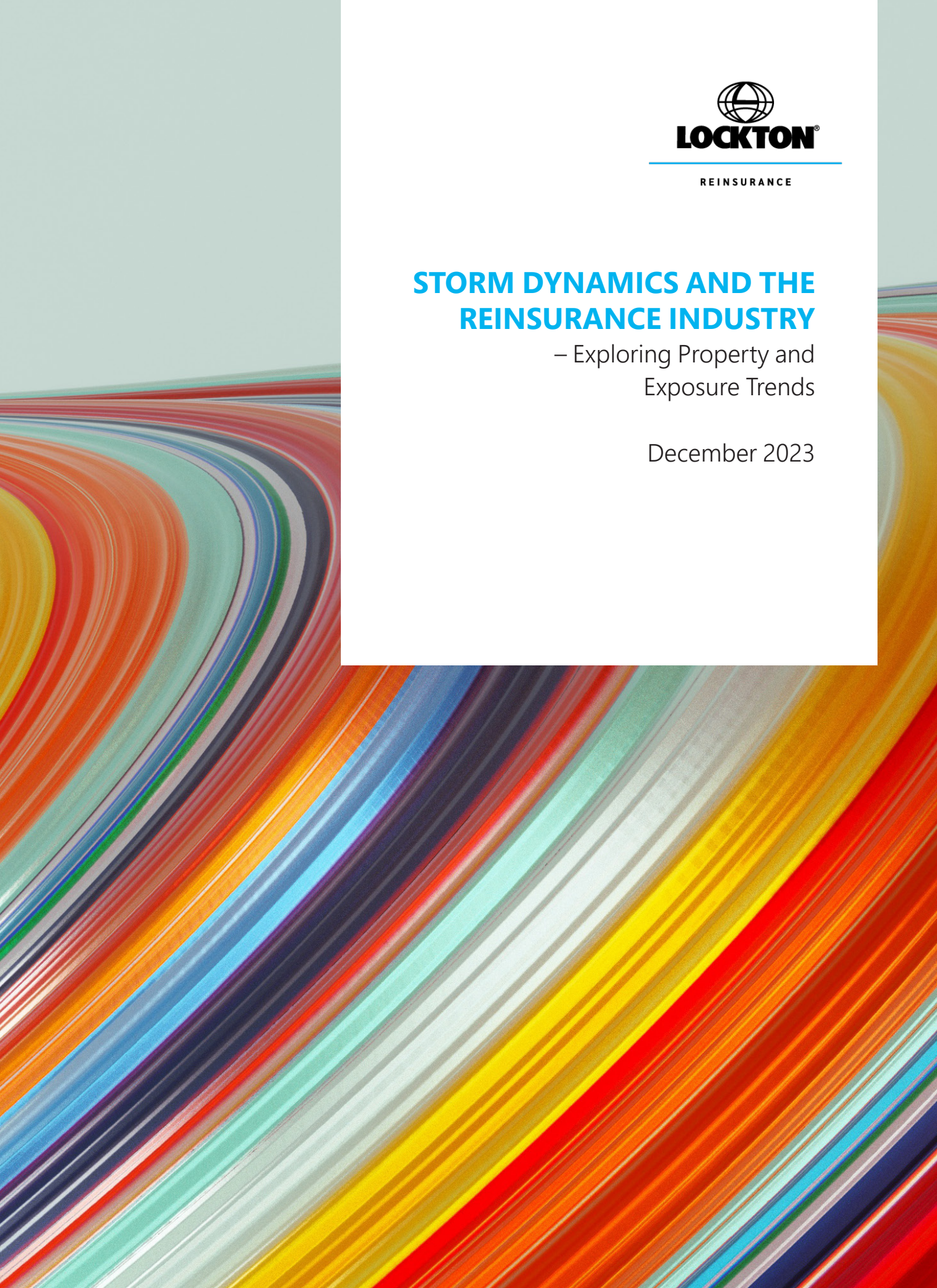
LOCKTON®

REINSURANCE

STORM DYNAMICS AND THE REINSURANCE INDUSTRY

– Exploring Property and Exposure Trends

December 2023

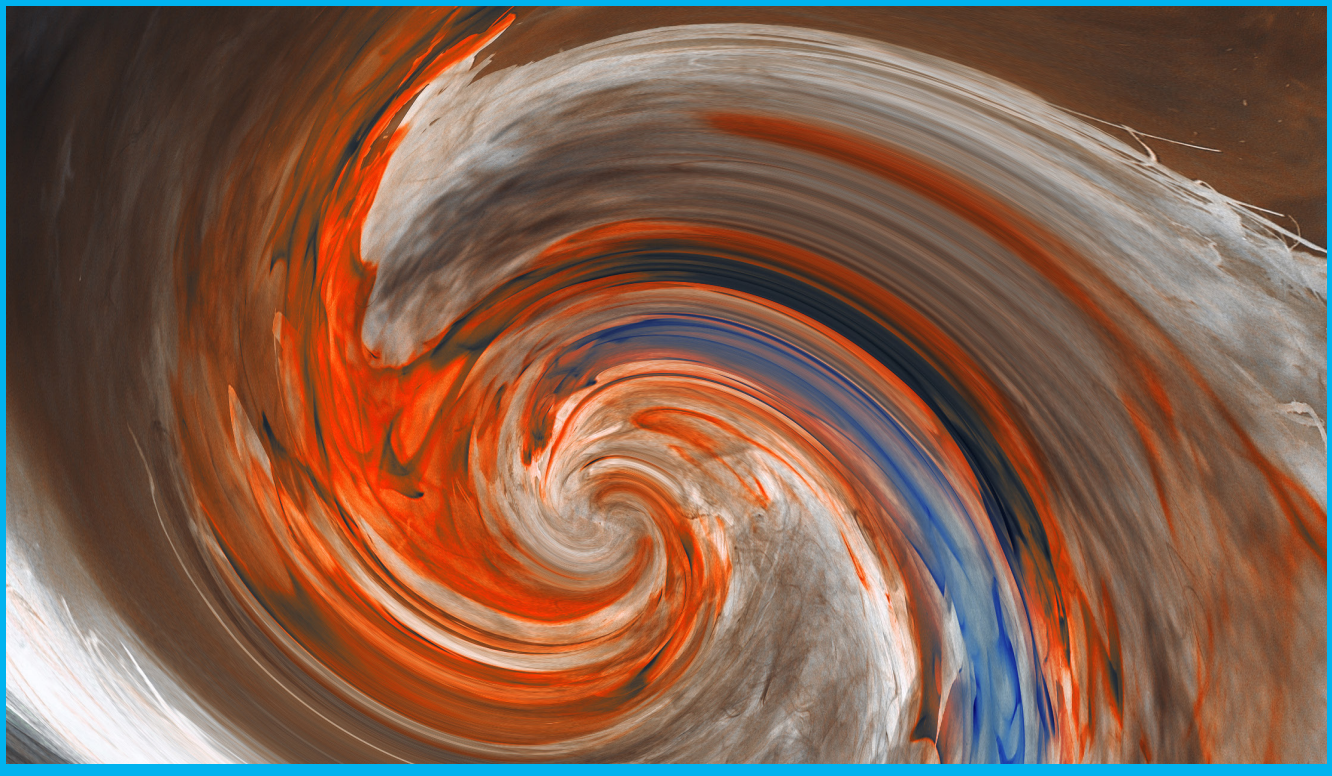


HELPING BUSINESSES UNDERSTAND, MITIGATE AND CAPITALIZE ON RISK

Executive Summary

Lockton Re's view of risk comprises of four components that underpin the (re)insurance industry: perils, exposure (to those perils), risk transfer, and placement (of the risk transfer structure). This publication, the second in our four-part property and natural catastrophe focused Storm Dynamics series, will explore how property exposure dynamics are impacting the industry, with in-depth analysis on hurricanes and the fast-changing nature of home and building structures and their ability to withstand storms.

In our follow-up publications in this series, we will take a unique view of comprehensive risk transfer option creation and close out the series focusing on how placement techniques are trending and improving within the property (re)insurance market.



• Peril • **Exposure** • Risk Transfer • Placement

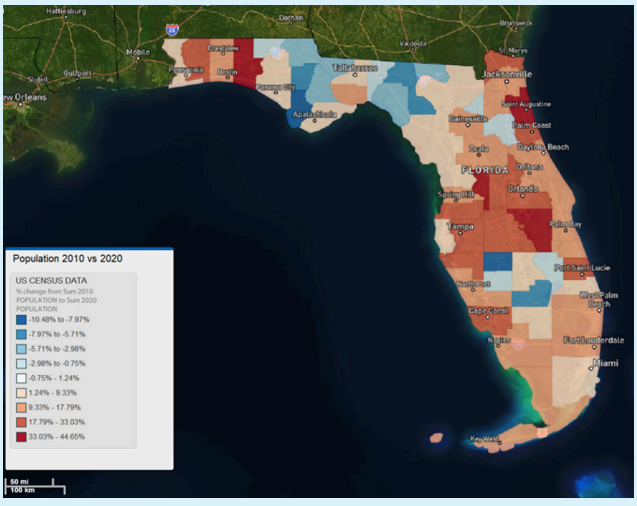
Activity vs. Exposure vs. Loss

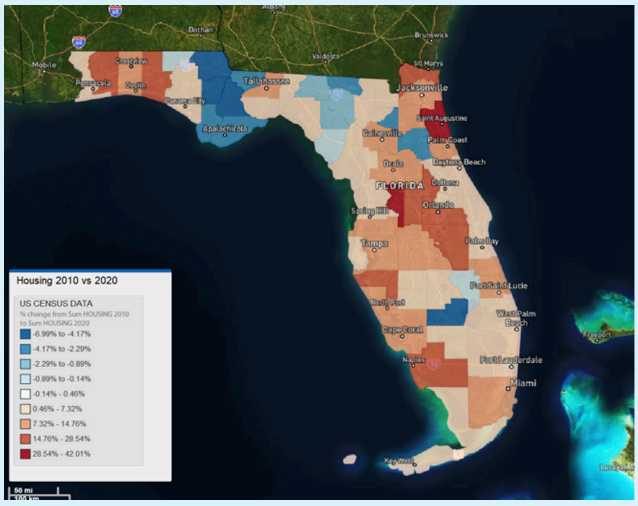
In 1992, Hurricane Andrew cost the insurance industry $15bn (roughly $33bn in 2023 inflation adjusted dollars). At the time, this was the costliest insured loss from a natural catastrophe in US history and sent shockwaves through the industry, resulting in multiple insolvencies and a significant shift in how (re)insurers approached risk management. While these changes helped create a more sophisticated and robust (re)insurance industry, exposure to hurricane risk has also changed significantly. Since 1992, seven hurricanes have broken Andrew's inflation-adjusted record. Six of these have made landfall in the past seven years as changes in population, exposures, climate, inflation, and social factors have drastically increased losses. If an Andrew-like event were to happen today, insured losses could realistically reach over $100bn given current changes to exposures.

Last year's Hurricane Ian made landfall in western Florida as a Category 4 storm, and hit areas that have seen rapid population growth, expansion of densely populated areas and an accumulation of physical assets. Since 1970, the population where the storm made landfall has increased by 620%.

Just in the last decade, the population of the impacted area from Ian's landfall has increased by 33%, as shown in the first graphic below. The second graphic shows new housing development has increased 28% in that same impacted area.

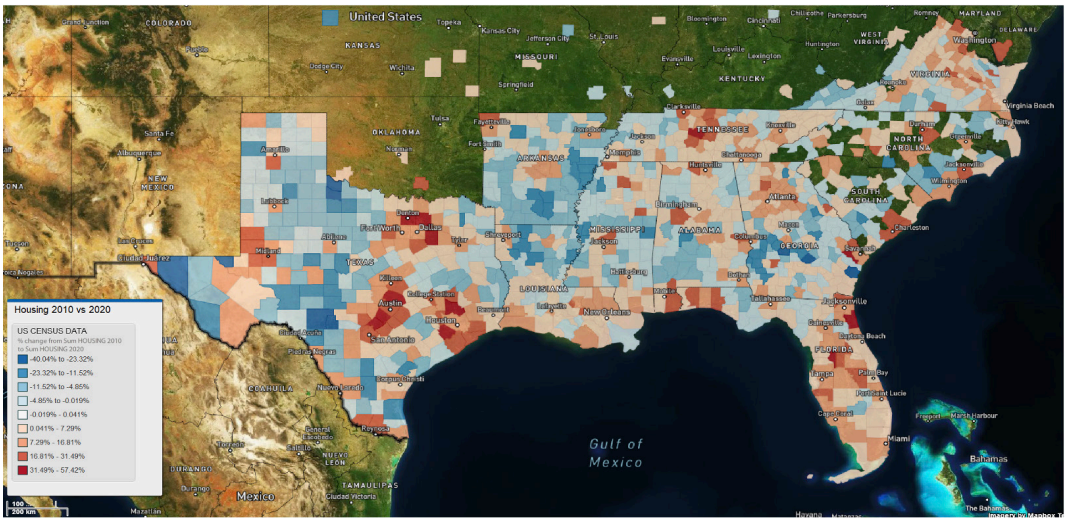
> "Hurricane Ian demonstrates that landfall location, not necessarily number of storms, can be the driver of heavy industry loss burdens."



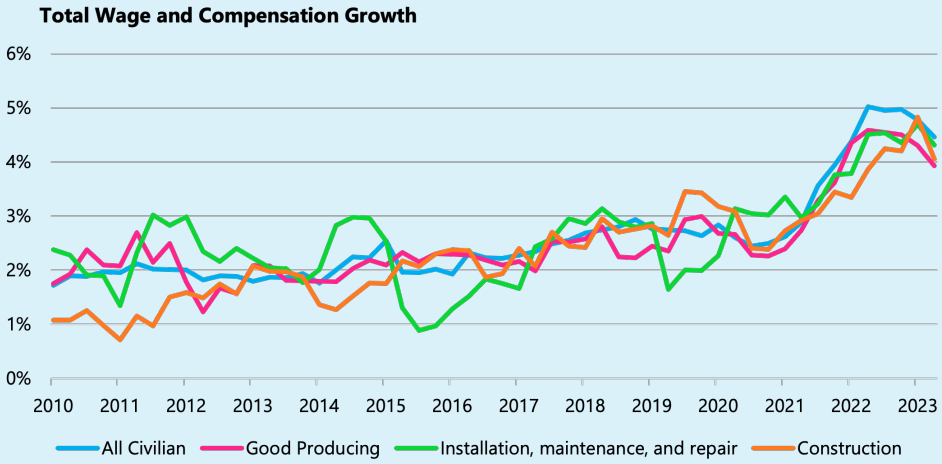


Source: https://www.census.gov

If we broaden our view to the Gulf and Southeastern states below, we see the same story - housing development has increased significantly in many popular coastal counties, with some counties seeing as much as 20-30% in housing growth. Once again, this highlights the potential for additional loss before accounting for the change in hurricane frequency and severity due to climate change.



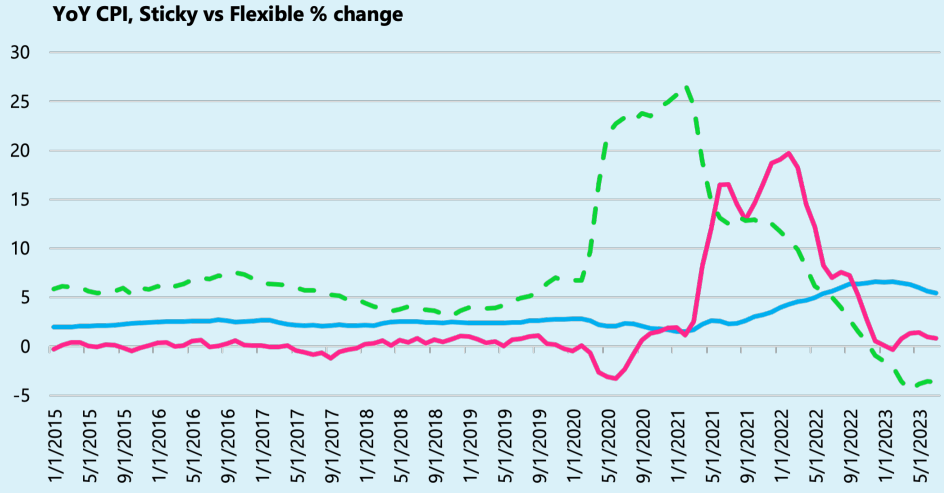
Source: https://www.census.gov



Source: U.S. Bureau of Labor Statistics

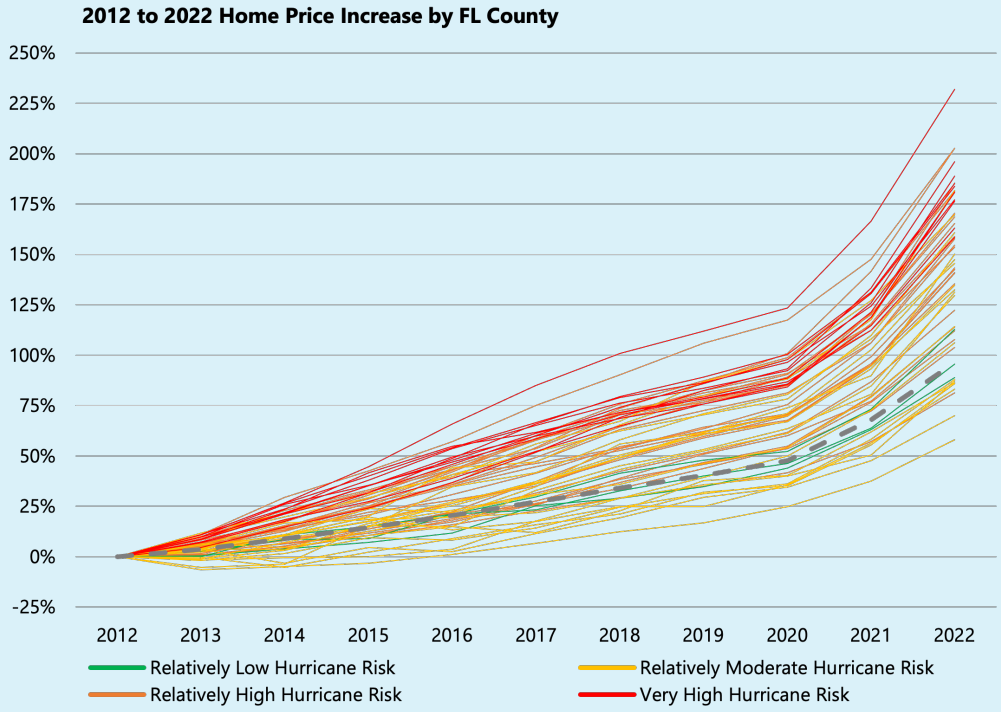
While population density has been increasing, other factors have also been influencing property value and potential repair costs: inflation, supply chain constraints, and wage growth have had a cumulative impact on the value of exposed property.

Even as macroeconomic factors normalize and general inflation is lower than a year ago, sticky inflation persists and is still at its highest level since the early 1990s. Inventory purchased during shortages will need to work its way through the supply chain while longer-term costs and contracts will factor in uncertainty and fear of a resurgence of higher costs.



Sources: Federal Reserve Bank of Atlanta, Board of Governors of the Federal Reserve System

Florida has also seen an increasing number of lawsuits against insurers over the past few years. Legislative changes and reform will improve this over time, but for the many insurers who have either closed their doors or exited the state due to unsustainable losses it is too little too late. This puts pressure on the remaining writers and policyholders. Even if losses stabilize it will take time for new capital to enter the market.



Source: U.S. Federal Housing Finance Agency, Federal Emergency Management Agency

Florida is the most expensive state in the country to purchase property insurance, but this has not deterred people seeking to live in coastal counties. Areas such as St. Lucie, Hernando, Pasco, and Sarasota are experiencing significantly above average home price growth. This forms a concentration of increasing property values and population growth in high hurricane risk counties, making the cost of exposed risk significantly higher than one would expect looking only at state or national macroeconomic trends. This, combined with demand surge and supply chain difficulties, will make recovery after a catastrophic event increasingly expensive.

> As society continues to expand in these hurricane-prone areas, the importance of building codes that are adhered to becomes more critical.

The state of Florida has some of the strictest building codes in the United States when it comes to Hurricane vulnerability. After Hurricane Andrew, the state examined minimum building codes first introduced in 1974. After years of scrutiny, legislation in 2000 authorized the implementation of the Florida Building Code (FBC) that went into effect as of March 1, 2002. This created a standard of codes that needed to be followed throughout the state, not just at each county's discretion, and put a much-needed emphasis on adoption of these codes. Furthermore, the FBC must be updated every 3 years, with the current version of 2020 being the 7th edition with the 8th edition tentatively scheduled to go into effect on 12/31/2023.

The goal of the FBC is to increase the likelihood that a building is able to withstand certain windspeed thresholds, with more stringent requirements placed on risks closer to the coast. For example, Miami-Dade County's standards are particularly high given its exposure to hurricanes and high wind events. Roof trusses and rafters must be securely connected to the supporting structure using hurricane clips or straps, which are designed to resist both uplift and lateral forces during high winds. Additionally, homes should have proper edge protection like hurricane-rated roof edge details, which are essential in preventing wind-driven rain and debris from entering the roof system at the eaves and gable ends of the roof. However, the FBC only works through compliance to its standards. To help compliance, the FBC is enforced through the permitting and inspection process. Officials review plans and conduct inspections at various stages of construction to verify that the building complies with the code.

Much of today's Florida building inventory includes homes that adhere to these codes. Hurricane Irma, which made landfall in the state in 2017, was one of the first events that tested how these improved codes would influence structural damage. FEMA's mitigation assessment team's report on Irma in Florida concluded that newer construction generally sustained much less damage than older construction, so the requirements incorporated in the FBC appear to be working as intended. Additionally, structural damage observations were almost exclusively limited to pre-FBC residential buildings[1].

Hurricane Ian in 2022 was another test of the impact of FBC. Ian's area of landfall was not only in an area that had seen rapid population growth, but additionally had been hit by Hurricane Charley in 2004. Residents of the area described Charley as a "spring cleaning" event of sorts, as it brought down many older homes that would be rebuilt to the more stringent building codes that were in effect at the time of Ian's landfall. In Punta Gorda, almost every structure built to the 2007 code or better was relatively fine compared to older homes. FEMA's landmark study, "Building Codes Save: A Nationwide Study", shows that modern building codes have lead to major reduction in property losses from natural disasters. When looking specifically at the peril of Hurricane, there is an initial savings in losses avoided of 15-20% at the beginning of the 2000s. This savings continuously increases to almost 40% for homes built in 2016 and is expected to further increase as building codes continue to be updated[2].

For the rest of the hurricane prone states, with the changing climate and evolving coastal population, adoption of modern building codes will be key. FEMA's BCAT, or Building Code Adoption Tracking, estimates that 31% of natural hazard-prone jurisdictions have adopted current hazard resistant building codes. When it comes to the peril of Hurricane Wind, that number actually jumps up to 62% change for Q3 2023, which is a 10% increase from this time last year. One reason this number isn't higher is that the stronger codes typically lead to more expensive buildings, which can sometimes price people out of owning – especially if they are rebuilding an older home to meet the newer standards[3].

We can also see the impacts of the Florida Building Codes using catastrophe models when doing Year Built sensitivity tests.

> "Lockton Re tested a notional Florida portfolio, with losses decreasing significantly just from building code changes between 1990 and 2000."

For more recent years, loss estimates continued to drop as building codes improved. The results in the table below are specific to the portfolio that was considered, and depending on portfolio characteristics results will be different, although losses will generally decrease. It should be noted that differences in vulnerabilities between old and new properties are not only due to building codes but also due to wear and tear, aging and deterioration, etc. An old building with new roof cover still performs better compared to an old building with older roof cover. Below is a table of changes to the portfolio's estimated loss amount for a given hurricane and year-built:

Event	1990	2000	2005	2022
Andrew	Baseline	-58.8%	-76.9%	-85.9%
Irma	Baseline	-38.9%	-59.6%	-74.0%
Opal	Baseline	-36.2%	-58.1%	-74.9%
Wilma	Baseline	-51.1%	-68.2%	-83.6%

Source: Verisk Touchstone

But not all homeowners who deviate from the building codes are putting themselves at further risk to damage from hurricanes. In fact, we have started to see evidence of homeowners and developers building houses to withstand all that a hurricane may throw its way. Hurricane Michael, which made landfall in the Mexico Beach area of Florida in 2018, leveled much of the beach front properties in its path apart from one property dubbed the Sand Palace. This design, built to withstand wind speeds of 250 mph, went far above the requirements for homes built in Mexico Beach. There is also the case of Babcock Ranch, a development just north of Fort Myers, Florida. Founded by former professional football player Syd Kitson, it was created to withstand the worst that Florida weather could bring. It is located 30 miles inland to avoid coastal storm surges, power lines are all underground to be shielded from high winds, and giant retaining ponds surround the development to protect houses from flooding. And while the community took a direct hit from Hurricane Ian, the lack of damage was profound - a traffic light at the main entrance gone, a couple of street signs lying on the ground, and some palm trees knocked over were the only items damaged.

Conclusion

While the attraction of coastal areas increases population density in hurricane prone areas, building codes are working as expected to lower property damageability. Homes built to recent specifications will see as much as 90% less damage over their "out of spec" counterparts. Further experimentation into more cost-effective means to completely remove the danger of material building damage continues. From a (re) insurance perspective, the composition of a portfolio of buildings and homes is critical to understand its risk profile. Data and analytics methods differ in their ability to identify risk and create options for structuring. In our next article, we will explore risk transfer approaches.

About Lockton Re (locktonre.com)

Lockton Re, the global reinsurance business of Lockton Companies, helps businesses understand, mitigate, and capitalize on risk. With over 300 colleagues in 16 locations globally, the business is continuing to grow, pushing the reinsurance industry forward with smarter solutions that leverage new technologies—delivered by people empowered to do what's right for clients.

Lockton Re Insights

Lockton Re's reports, market commentary and insights focus on key topics, occurrences or changes in the (re) insurance and broking market place which impact our clients and partners. In order to help guide relevance for the reader we categorize this content in four areas – Perils, Exposures, Risk Transfer and Placement.

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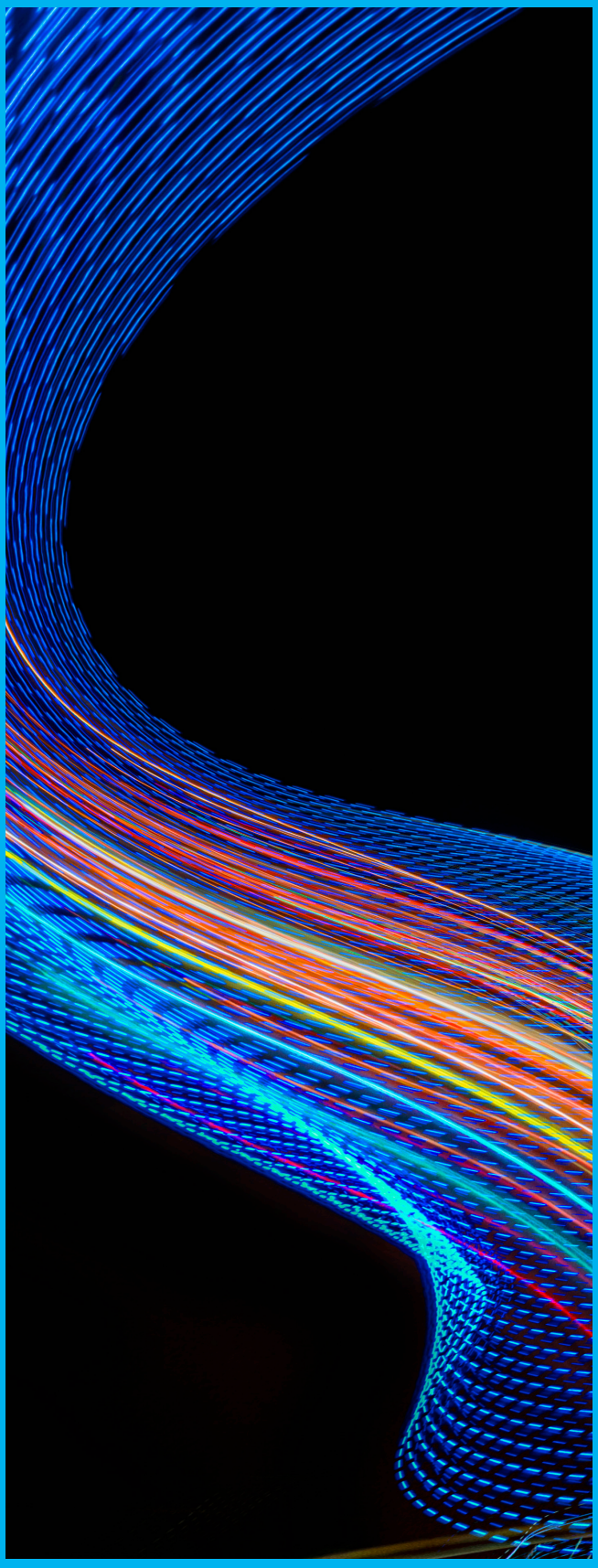

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[1] FEMA. (2018, December). Mitigation Assessment Team Report: Hurricane Irma in Florida. FEMA.gov. Retrieved December 6, 2023, from https://www.fema.gov/sites/default/files/2020-07/mat-report_hurricane-irma_florida.pdf

[2] Building Codes Save: A Nationwide Study of Loss Prevention. (2022, June 3). FEMA.gov. https://www.fema.gov/emergency-managers/risk-management/building-science/building-codes-save-study

[3] Building Code Adoption tracking. (2023, October 30). FEMA.gov. https://www.fema.gov/emergency-managers/risk-management/building-science/bcat

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