Housing Finance & Regulatory Affairs
Jessica R. Lynch
Vice President, Housing Finance
jlynch@nahb.org

April 19, 2021

Federal Housing Finance Agency
Office of the Director
8th Floor
400 7th Street, SW
Washington, DC 20219

RE: Request for Input
Climate and Natural Disaster Risk Management

Submitted by Electronic Delivery to: Federal Housing Finance Agency

Dear Director Calabria:

On behalf of the more than 140,000 members of the National Association of Home Builders (NAHB), I appreciate the opportunity to respond to the Federal Housing Finance Agency's (FHFA) Request for Input (RFI) on the current and future climate and natural disaster risk to the housing finance system and to the regulated entities: Fannie Mae and Freddie Mac (the Enterprises) and the Federal Home Loan Banks (the FHLBanks). Increased instances of climate-related natural disasters in recent years have impacted the financial services industry and the economy broadly. As banks, insurance companies and other financial industry participants plan for how to address the potential of climate-related natural disasters, it is appropriate that FHFA consider how the regulated entities also should manage the risk that natural disasters and climate change pose to their safety and soundness. The regulated entities must plan to protect their ability to fulfill their statutory missions and foster the liquidity, efficiency, competitiveness, and resiliency of the national housing finance market.

NAHB is a Washington DC-based trade association representing, among others, companies involved in the development and construction of for-sale single-family homes, including homes for first-time and low- and moderate-income homebuyers as well as the production and management of affordable multifamily rental housing. The ability of the home building industry to meet the demand for housing, including addressing affordable housing needs, and contribute significantly to the nation's economic growth is dependent on a sound and efficiently operating housing finance system.

NAHB and its members have a long history of supporting, developing and participating in many state and local initiatives, as well as various federal activities aimed at reducing disaster losses and improving resiliency of homes. We have repeatedly demonstrated our commitment to working with all levels of government to promote and implement sound disaster and floodplain management policies and improve the resiliency of the homes we build and the communities we serve. We are helping to develop cost-effective, market-driven solutions that maintain housing affordability while balancing the needs of growing communities with the need for reasonable protection of life and property.

General Principles

NAHB appreciates that FHFA is considering how to assess and mitigate the risks to the Enterprises and the FHLBanks associated with climate change and the increased frequency, severity and unpredictability of natural

disasters. Since these regulated entities are government-sponsored, taxpayer-backed enterprises, NAHB does not believe they can simply avoid activities related to homes located in floodplains or other places vulnerable to natural disasters. Importantly,

FHFA must balance its duty as regulator of the Enterprises to keep them safe and sound while ensuring they continue to serve the entirety of the national housing finance market. To this end, we caution FHFA to consider that any changes to risk-management policies for its regulated entities – even if well-intended – could have consequences that impact the housing market and ripple through the entire economy. For this reason, housing affordability and ensuring broad access to credit must be central to the Agency's deliberations.

In addition to maintaining nationwide affordability and access to mortgage credit, FHFA should be mindful of the following principles when developing its approach to establishing climate and disaster risk management policies:

- The financial costs of climate change should not fall disproportionately on low-income communities or communities of color.

- Many people cannot afford to purchase a newly constructed home that is built to more stringent codes, or install energy efficient or resilient features in an existing home - even before the Enterprises have considered new, potentially restrictive and/or costly policies aimed at addressing climate change.

- New housing has proven to be more resilient to natural disasters than the existing housing stock. Modernizing the older homes to reduce their risks must play a key role in preparing for the future. Encouraging and recognizing above-code construction can mitigate the costs associated with climate and natural disaster risks.

- The cost to develop affordable rental properties is significant and these properties already are subject to a myriad of state and local environmental and code regulations. Increasing construction requirements or financing costs likely will price-out many of these projects while doing little to reduce their climate and natural disaster risks.

- Location-based risk pricing for single-family and multifamily mortgage loans that are believed to be at heightened climate and natural disaster risk would result in discriminatory pricing.

- Mitigating defaults and foreclosures on mortgages should be a priority of the Enterprises. Property owners negatively impacted by a natural disaster or climate event should be encouraged and incented to keep their homes through flexible and affordable refinance and forbearance options and loans and grants that help them rehabilitate or rebuild.

- Policies should be considered in coordination with those of related financial industries to prevent inconsistencies and the "piling on" of regulations and/or fees for homeowners and home buyers seeking mortgage loans eligible for purchase by Fannie Mae and Freddie Mac. For example, the Enterprises already require risk mitigation on purchased loans such as flood insurance, homeowner's insurance, liability insurance and mortgage insurance.

- Local, state and federal governments all are looking for approaches to mitigate the effects of potential climate and natural disaster risk events. FHFA should be aware of such initiatives and develop policies that support, not conflict, with these efforts.

- Enhanced appraisal reports that include data that identifies high performance, high efficiency homes and homes built to construction codes that mitigate damage from climate change and natural disasters would improve the Enterprises' ability to monitor the climate and natural disaster risk of individual properties. Climate and natural disaster risks will vary based on the age of the structure and the building code to which it was built. This information should added to the Enterprises appraisal systems as soon as possible.

- Accurate data and consistent use of that data is critical to establishing policy. The current array of risk data, climate models, hazard maps, mortgage default rates, damage assessments, etc. may seem to cover every possible scenario, yet much of that data is incomplete, inaccurate, dated, not available, or not of the quality needed to make policy decisions. The ability to accurately measure climate-related risk is severely impaired by these data limitations.

- Opportunities to implement innovative "green" initiatives such as Fannie Mae's Single Family Mortgage Green Mortgage-backed Security program may, over time, mitigate future increases in climate change and related natural disasters.

NAHB Responses to Specific Questions

1. How should FHFA define climate and natural disaster risk?

FHFA raises a good question and one that must be defined before any action is taken. Addressing the issues around climate change, climate risk, and natural disaster risk has been identified by the Biden Administration as a priority. Many federal agencies and policy makers are focusing on how these risks might impact different market segments across the economy, yet in doing so, we are not aware of any effort to standardize definitions. NAHB believes FHFA should work with the federal banking agencies, regulators of the broader U.S. financial system and the mortgage finance system, as well as those agencies responsible for insuring and guaranteeing mortgage loans, to establish a definition of climate and natural disaster risk that is consistent.

Given the whole-of-government approach that is being taken on this issue, FHFA must also be cognizant of the parallel efforts that are underway within the other agencies and branches to ensure all definitions, if not the same, can work in concert with one another. Likewise, while uncertainty is inherent within the definition of risk, any definitions related to climate change and natural disasters should be based on real, expected, and common outcomes that are documented to be related to climate change, not potentialities or statistical anomalies that, while they may occur, are expected to be rare or occur as a result of other non-related events. Similarly, any definition must recognize that some level of risk will remain and treat that risk as acceptable.

3. What methodologies, datasets, variables, assumptions, future climate scenarios, and measurement tools are used to measure and monitor climate risk to the national housing finance markets? Describe any gaps in available data that limit the ability to measure such risks. How could such data gaps be resolved?

A major gap that limits the Enterprises' ability to measure climate and natural disaster risk to the housing finance market is data that could and should be collected on home appraisals. Having better information on a home's attributes, construction methodology and resiliency or mitigation features would allow the Enterprises to better assess the resiliency of its portfolio.

NAHB has been a part of Fannie Mae's and Freddie Mac's joint working group on the Uniform Appraisal Dataset and Forms Redesign initiative. The group is making great strides toward the collection of robust data. Housing industry stakeholders and policy makers would benefit from widely available information on energy efficiency, water conservation, building codes, and green building standards. This information would be useful in assessing efforts to mitigate climate change over the long term. As noted earlier, NAHB recommends Fannie Mae and Freddie Mac collect more comprehensive information on homes as part of the appraisal process and allow other industry participants to access the data (at least in aggregate).

4. What risk management strategies or approaches—including but not limited to those related to pricing, insurance, credit risk transfers (CRT), loss mitigation, and disaster response—do industry participants use to address climate and natural disaster risk?

Building Codes

Home builders are addressing climate and natural disaster risk by building new homes to codes that reduce damage from natural disasters and improving the resiliency and performance of existing homes through upgrades and retrofits. Because most older homes, structures and infrastructure are less resilient to natural disasters because they were built when there were no national model codes in existence or constructed following codes that are now outdated, it is imperative that the Enterprises consider the overall condition of the homes within their portfolios and assume newer homes (post-2000) as generally posing less of a risk. This is because homes designed and constructed to the national model building codes are built to withstand major damage from disasters and provide substantial resiliency for many high seismic, high wind, heavy snow, wildfire and flooding events. Evidence from FEMA and others demonstrate the International Residential Code (IRC), throughout its history, has been very effective in preventing the destruction of homes due to various storms and earthquakes and significantly reducing damage to wall and roof coverings. [1]

Flood Insurance

The National Flood Insurance Program (NFIP) requires lenders who originate mortgage loans for sale to the Enterprises to require flood insurance for homes that are located within federally-designated special flood hazard zones (SFHZ) classified by the Federal Emergency Management Agency (FEMA) as the 100-year floodplain. Historically, however, this requirement has not been well-enforced and many of the federal flood maps that identify the extent of the 100-year flood zone are out of date, so do not accurately depict flood risks. These failings create a risk for the Enterprises because they allow many homes that may be vulnerable to flooding to avoid the required insurance coverage, thereby endangering the Enterprises in the event of a severe flooding event. Research has shown that census tracts with high rates of federally backed mortgages exist in many areas considered outside the current floodplain, but since they are adjacent to the floodplain and the maps are old, many are worried that a combination of old flood maps and new climate-fueled risk could leave people and federally backed mortgages at risk. [2]

[1] For example, FEMA's Summary Report on Building Performance - 2004 Hurricane Season (FEMA 490, March 2005) indicated that "no structural failures were observed to structures designed and constructed to the wind design requirements of…the 2000 IBC/IRC", and FEMA's Summary Report on Building Performance from Hurricane Katrina (FEMA 548, April 2006) stated "most structural failures observed…appeared to be the result of inadequate design and construction methods commonly used before IBC 2000 and IRC 2000 were adopted and enforced."

[2] Special Report: "How climate change could spark the next home mortgage disaster," Zack Colman, November 30, 2020, *Politico.*

Home building and mortgage originations for properties within the floodplain have risen steadily over the years – even as the number of flood insurance policies has fallen, according to data provided to POLITICO by First Street Foundation. Between 2006 and 2018, nearly 600,000 houses were built in 100-year floodplains, bringing the total to 4.1 million homes. In that same time period, 300,000 mortgages were added to homes in floodplains, bringing the total number of loans to 7 million. As residential construction and lending have risen in tandem, they have outpaced insurance. The number of taxpayer-backed flood insurance policies in effect nationwide peaked in 2006 at 5.5 million after Hurricane Katrina. But by 2018, there were only 5.2 million policies in effect. Where the risk of flooding is highest, the number of policies held has shrunk even faster, according to FEMA. In 2008, there were 2.5 million residential structures in floodplains insured by the NFIP. By the end of 2019, that number had fallen to fewer than 1.8 million.[3]

However, statistics alone do not tell the whole story. The number of flood insurance policies may have decreased, as above, due to dropped policies, but could also decrease due to an increase in homes within floodplains that do not have mortgages, map changes that take homes out of the floodplain, or reduced coverage due to mitigation and renovation activities that may reduce flooding risks and damage levels. Further, given the price of flood insurance, many borrowers are unable to pay the premiums, resulting in a significant number of uninsured or underinsured homes.

FEMA's new Risk Rating 2.0 initiative, which has been in the works for a number of years, is designed to help bridge this gap, as it changes the way FEMA rates a property's flood risk and prices flood insurance. While it will still rely on the Flood Insurance Rate Maps to determine if a property has a mandatory flood insurance purchase requirement, the calculation of the insurance rate will be based on structure-specific factors and risks, such as distance to flooding source, building elevation and the cost to rebuild the home. While FEMA had originally intended to implement the program by Oct. 1, 2020, the implementation was pushed back one year to Oct. 1, 2021. In the end, FEMA hopes that Risk Rating 2.0 will deliver rates that are easier to understand and more equitable and actuarily sound, which it hopes will translate into better understanding of flooding risks and the purchase and retention of more flood insurance policies per the NFIP.

Home Insurance

Lenders require homeowners to have insurance on all properties that are collateral for loans. Insurance coverage protects the Enterprises by providing financial assistance to homeowners to repair damage to the home caused by unpredicted events. Insurance policies also may help limit future damage by encouraging certain home improvements. In some states, homeowner insurance companies are incenting positive behavior, such as providing insurance discounts to homeowners who conduct specific activities to reduce damage. For example, in Texas, the state's hurricane insurance pool, the Texas Windstorm Insurance Association, offers premium discounts of 19 percent to 33 percent for building code compliance; in Rhode Island, insurers are required to waive the hurricane deductible for insured homeowners who voluntarily implement mitigation measures that are specified in the insurance regulation; and, in Alabama, tax credits of up to $3,000 are available for retrofitting a taxpayer's legal residence to make it more resistant to hurricanes, tornadoes, other catastrophic windstorm events, or rising floodwater. These state programs have proven to be popular, as they provide value through loss reduction, and encourage and facilitate broader participation through reduced costs. The recognition and expansion of programs like these is one way to minimize risks to the Enterprises and engage participation by offsetting the hefty costs associated with home upgrades.

[3] "Borrowed time: Climate change threatens U.S. mortgage market," Zack Colman and Katy O'Donnell, June 8, 2020, *Politico.*

5. How, if at all, should FHFA incorporate into its assessment of the regulated entities' climate and natural disaster risk the potential for abrupt repricing of real estate properties exposed to acute natural hazards?

NAHB does not believe FHFA should try to predict the impact of acute natural hazards on the value of real estate in the regulated entities' portfolios. An acute natural disaster happens quickly with little to no warning. While some areas may be more likely to be impacted by acute natural disasters such as hurricanes, tornados, earthquakes, and forest fires, such events are unpredictable and could happen anywhere and at any time with unknowable impacts that would vary by location, duration, severity, etc. NAHB believes trying to predict and assess the potential effect of such an event on real estate values of properties in the Enterprises' portfolio inevitably would lead to disparate pricing on mortgage loans in areas determined to have heightened exposure to these potential hazards. This could have the effect of a self-fulling prophecy causing home values in these areas to actually decline in the absence of a natural disaster. The Enterprises hold a large nationwide portfolio of mortgage loans. Acute natural disasters impact a specific region or area so the national portfolio of loans should provide enough cushion to absorb the impact of losses to real estate values in a specific area.

6. With respect to the foregoing questions, FHFA invites interested parties to submit any studies, research, data, or other qualitative or quantitative information that supports a commenter's response or is otherwise relevant to the regulated entities' climate and natural disaster risk.

Following Hurricanes Harvey and Irma in 2017, NAHB commissioned a study by the Zachry Department of Civil Engineering at Texas A&M to determine how building code year impacted the amount of damage sustained by homes in Texas and Florida during these two weather events. The study found that homes built to the International Residential Code (IRC) after 2003 performed much better during both hurricanes than older homes. Building to the IRC was determined to be very effective in preventing the destruction of homes due to wind and resulted in significantly less damage to wall and roof coverings and loss of those components while also minimizing window breakage. Please find attached *Damage Assessment from Hurricanes Harvey and Irma*.

18. Policies to manage climate and natural disaster risk could increase the cost of housing, making it more difficult for lower income households in some areas to obtain affordable housing. Are there policies the regulated entities could pursue to mitigate such adverse effects for lower income households in vulnerable areas without undermining efforts to manage climate and natural disaster risk?

Encourage and Facilitate Upgrades to Existing Homes

All policymakers seeking to mitigate the effects of future natural disasters, including FHFA, need to create an array of opportunities to facilitate upgrades and improvements to the existing housing stock. Not only are these older homes, structures and infrastructure less resilient to natural disasters because they were built when there were no national model codes in existence or constructed using codes that are now outdated, they house the majority of the nation's population, including those at the lower end of the income spectrum. NAHB's analysis of the 2019 American Community Survey finds that the median age of owner-occupied homes in the United States is 39 years, but this figure varies dramatically when broken down state-by-state. On the farthest ends of the spectrum, New York has the oldest owner-occupied homes with a median age of 60 years while Nevada leads the newer owner-occupied housing stock at only 23 years.[4]

[4] Eye on Housing

Modernizing existing structures and properties to improve their resiliency can take many forms – ranging from better sealing roof penetrations or installing hurricane shutters to elevating the structure or improving the site's stormwater management. Clearly, mitigation will be largely dependent on property location and condition, type of hazard and level of risk, geographic conditions, economic levels, community and individual resources and other factors. Like most efforts, however, there is no one solution that can address the full range of issues and needs associated with improving resiliency. Therefore, flexibility in program design, application and implementation is vital. Any federal assistance must also be broadly applicable over geographic and economic spectrums at both the community and individual levels. While some will need financial assistance, others may benefit from technical expertise or innovation.

At the individual home level, recognizing many households do not have the interest or means to conduct larger scale renovation projects, NAHB, in concert with the Federal Emergency Management Agency, the, International Code Council, and the Insurance Institute for Business & Home Safety, is developing a series of Tech Notes that describe different types of retrofit techniques that can be used to increase the resiliency of existing buildings. Importantly, these how-to fact sheets focus on strategies that require minimal costs (typically less than $1,000 for a typical home), but have a significant impact on reducing damage. It is hoped that these new resources will help homeowners understand their options, recognize that certain mitigation options can be cost-effective, and compel them to take action.

Enterprise Financing Programs

The Enterprises should seek to increase usage of their financing programs that allow the costs of retrofits to be added to a mortgage. Fannie Mae's HomeStyle® Energy mortgage and Freddie Mac's GreenCHOICE Mortgage® allow borrowers to finance energy efficiency home improvements and finance new energy upgrades when purchasing or refinancing a home. Both Enterprises allow the mortgage loans to be used with their mortgage programs targeted to low-income borrowers.

Green Mortgage-backed Securities

NAHB is encouraged that Fannie Mae has issued $100 million in Single-family Green Mortgage-backed Securities for newly constructed single-family homes with ENERGY STAR® certifications that meet or exceed the national program requirements for ENERGY STAR 3.0 Certified Homes. We are hopeful this program can lead to economic benefits for buyers of high energy efficiency homes, such as through lower mortgage interest rates or other financial incentives. We believe this is the kind of solution that should be expanded to create further opportunities for homeownership, while at the same time, reducing the long-term risks of climate change.

Enterprise Pricing

The Enterprises must maintain credit accessibility and affordability throughout the country, even in areas that have demonstrated high risk factors such as those prone to hurricanes, flooding, wildfires, etc. The Enterprises should continue to cross-subsidize their mortgage pricing and must not charge higher prices or premiums for mortgage loans purchased in areas that have experienced a higher incidence of natural disaster events. Home buyers and homeowners should not be subject to location-based pricing.

21. What specific issues or topics should FHFA consider for future research on climate and natural disaster risk to the regulated entities and the national housing finance markets?

NAHB suggests that FHFA work with stakeholders to collect information on the type, incidence and actual costs of repairing damages to homes caused by disasters at a level of detail that can be used to identify appropriate mitigation options. This information is not publicly available, yet could be very useful in determining patterns of damage and retrofit options that can be employed to reduce the risks faced by homeowners and the Enterprises.

22. What data or housing market information would be beneficial for FHFA to make available, to the extent permitted by privacy considerations, to researchers and other interested parties to support the assessment of climate and natural disaster risk to the regulated entities or the national housing finance markets?

NAHB would find the following data beneficial to future research on the assessment of climate and natural disaster risk to the national housing market.

- Delinquency, default and foreclosure status of home loans including:
    - The year the structure was built;
    - The code to which the structure was built;
    - What third party certifications (EnergyStar, National Green Building Standard, LEED, etc.) the home has earned;

- Microdata: in which case each record contains as much information as possible about the loan (loan-to-value, interest rate, etc.) and area in which the structure is located (climate zone, flood plain, susceptibility to various natural disasters): Or,

- If privacy considerations preclude public release of microdata, the next best alternative would be delinquency, default and foreclosure rates by year built and building code, cross-tabulated with as much detail on loan and area characteristics as is practical.

23. What factors should FHFA consider in determining whether to formally participate in or informally partner with organizations or groups focused on climate and natural disaster risk management?

NAHB encourages FHFA to engage with credible organizations with specific areas of expertise. Partnerships with organizations gathering, assessing, and modeling quality data to inform decisions on future policies should take priority. Partnerships should be transparent and policies should go through a notice and comment period with data that has been used to propose new policies made available to the industry.

24. Are there existing or potential government agencies or programs that FHFA could partner with to enhance the Agency's supervision and regulation of climate and natural disaster risk to the regulated entities?

Climate and natural disaster risk is top-of-mind for the Biden administration, its agencies, and all financial regulators. FHFA should be an active part of working groups and discussions taking place on this issue that include the U.S. Department of the Treasury, the Financial Stability Oversight Council (FSOC), the Office of Financial Research (OFR) the Board of Governors of the Federal Reserve System (the Federal Reserve), the Office of the Comptroller of the Currency (OCC), the Federal Deposit Insurance Corporation (FDIC), the National Credit Union Administration (NCUA), the Securities and Exchange Commission (SEC) and the Commodity Futures

Trading Commission (CFTC). In addition, FHFA should be mindful of the climate change conversations being held across the administration and seek to participate.

Conclusion

NAHB applauds the FHFA's efforts to be a world class regulator and consider the increasing threat that climate and natural disaster risk poses to the Enterprises and the FHLBanks. Efforts to address these risks are happening throughout the country at all levels of government and in all industries. NAHB cautions that the nation's housing finance system is not the appropriate forum to drive these initiatives. FHFA must consider the cumulative impact that regulations to address climate and natural disaster risk will have on the individual homeowner and home buyer, multifamily properties and the mortgage and financial markets. FHFA should keep an utmost focus on ensuring access to credit, particularly for low-to moderate-income home buyers and renters.

Thank you for considering our comments. Please contact Becky Froass, Director, Financial Institutions and Capital Markets, at rfroass@nahb.org or 202-266-8259 with any questions.

Sincerely,

Jessica R. Lynch
Vice President, Housing Finance

SUMMARY REPORT

Damage Assessment from Hurricanes Harvey and Irma

NAHB®
National Association of Home Builders

Damage Assessment from Hurricanes Harvey and Irma

SUMMARY REPORT

INTRODUCTION

In 2017, regions of Texas and Florida were significantly impacted by Hurricanes Harvey and Irma, respectively. A recent Texas A&M study, commissioned by NAHB, sought to determine how building code year impacted the amount of damage homes sustained during these weather events. The study found that, in Texas, homes built to the International Residential Code (IRC) after 2003 performed much better during the severe weather events than older homes. The study also found that Florida homes built after 1994 and to the Florida-specific building code based on the IRC were more resilient to wind damage.

The study, conducted by the Zachry Department of Civil Engineering at Texas A&M University and finalized in March 2019, found that building to the IRC was very effective in preventing the destruction of homes due to wind during Hurricanes Harvey and Irma and resulted in significantly less damage to wall and roof coverings and loss of those components while also minimizing window breakage.

Prior to this study, anecdotal reports, including statements in the Federal Emergency Management Agency's damage assessments and media coverage, suggested that homes built to the IRC performed well in both states. However, there was little empirical evidence to support those claims.

To better understand building performance, NAHB contracted with Texas A&M University to conduct a statistical analysis of wind damage to residential buildings affected by Hurricanes Harvey and Irma using publicly-available damage assessments collected by teams funded by National Science Foundation rapid-response grants. Almost 2,000 assessments collected in Texas and 1,100 assessments collected in Florida[1] formed the basis of the study.

RESULTS

TEXAS

Building Codes

Most cities in Texas near Harvey's landfall (Corpus Christi, Port Aransas, Ingleside, Rockport, Portland) build to the 2012 or 2015 IRC. Although several small- to mid-size cities and many counties in Texas do not enforce a building code, the Texas Windstorm Insurance Association requires construction to the 2006 IRC for buildings within the first tier of coastal counties.[2] It also requires compliance inspections.

Damage Assessment Results

Of the 1,983 homes evaluated in Texas, a relatively small number suffered complete loss of roof framing, wall framing, wall sheathing or windows due to hurricane winds. The statistical analysis identified damage to roof coverings, wall coverings, and windows as the most important contributors to the overall wind damage level.

Based on that analysis, damage levels for each of those components were charted by the year of construction; Houses constructed after 2003 showed significantly lower levels of damage to wall and roof coverings and windows.

On average, homes constructed before 2003 suffered minor to moderate damage to roof coverings. The average home constructed after 2003 typically had no damage or minor roof damage.

Homes included in the study generally had either no wall damage or minor wall damage; however, homes constructed before 2003 performed the worst. Homes built between 2003 and 2009 were more likely to have no damage. *(See Figures 1-2)*

[1] Available at https://web.fulcrumapp.com/communities/nsf-rapid/

[2] Cameron, Willacy, Kenedy, Kleberg, Nueces, San Patricio, Refugio, Aransas, Calhoun, Matagorda, Brazoria, Galveston, Chambers and Jefferson counties.

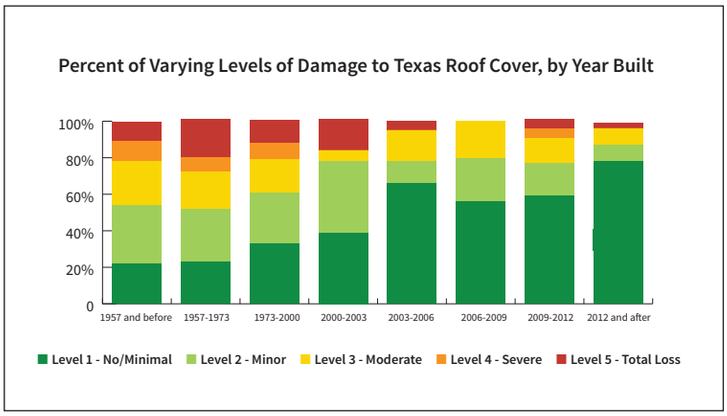

FIGURE 1

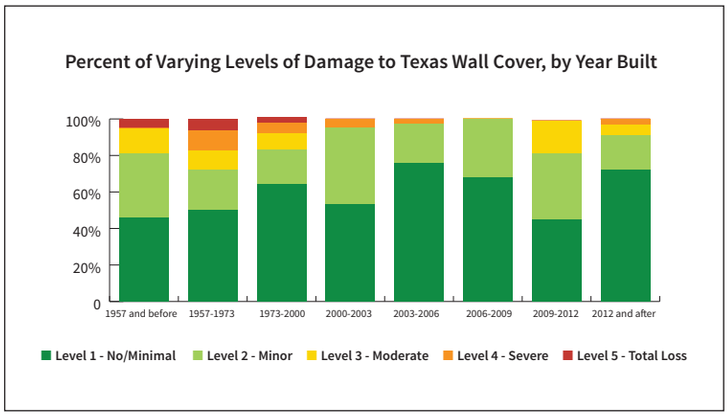

FIGURE 2

FLORIDA

Building Codes

Following Hurricane Andrew in 1992, building codes in Florida were updated and made more stringent. The first post-Andrew code, the South Florida Building Code, was enacted in 1994. In 2002, the Florida Building Code or FBC, which is based on the 2000 IBC and IRC, was adopted statewide. The FBC includes special provisions for a High-Velocity Hurricane Zone that apply to Broward County, Miami-Dade County, and the Florida Keys. The current edition of the FBC was adopted in 2017 and is based on the 2015 IBC and IRC.

Damage Assessment Results

A relatively small percentage of the 1,100 Florida homes included in the analysis suffered a complete loss of roof framing, wall framing, wall sheathing or windows. Roof and wall coverings sustained the most damage; the level of damage to those components was charted based on the year the homes were built.

The analysis found that homes in Florida constructed after 1994 had significantly lower levels of damage to roof and wall coverings than homes built earlier.

On average, the roof covering damage in the Florida homes ranged from no/minimal damage to minor damage. The average degree of damage generally decreased for homes constructed after 1994. *(See Figure 3)*

On average, the wall covering damage in the Florida homes ranged from no damage to minor damage. Homes built before 1994 performed worst, yet more than 80 percent of these homes had no/minimal damage. No homes constructed after 1994 had wall damage classified as total or complete and no homes constructed after 1999 had wall damage classified as either severe or total. Almost 95 percent of the homes constructed after 2008 sustained little or no damage, and a few percent had minor damage. *(See Figure 4)*

Window damage was not a significant component of overall damage to homes in Florida. This may be a result of the greater use of windows rated for design wind pressures that are consistent with hurricanes or the installation of impact-resistant windows or hurricane shutters.

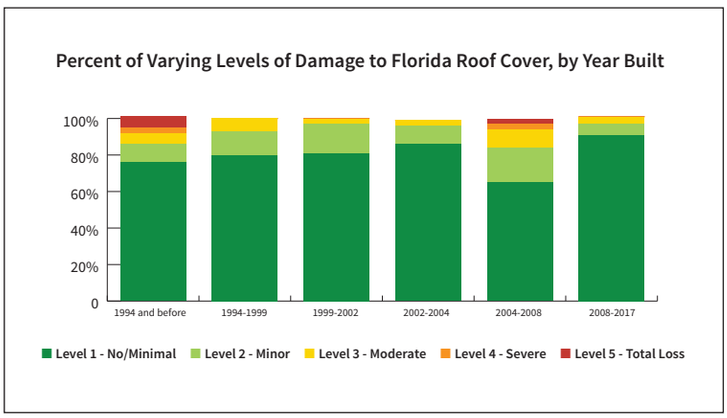

FIGURE 3

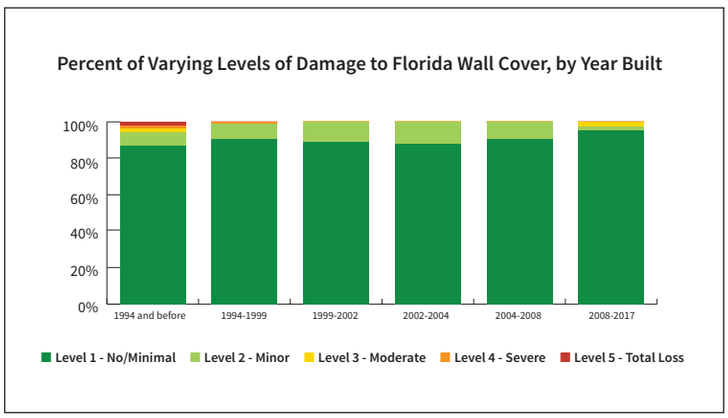

FIGURE 4

NAHB SUMMARY AND CONCLUSIONS[3]

In general, the analysis shows that few homes in Texas and Florida experienced more than moderate damage to structural roof or wall components, but the majority of the wind damage from Hurricanes Harvey and Irma was to the roof and wall coverings. In Texas, there were significantly lower levels of damage to wall and roof coverings among houses constructed after 2003. Based on these findings, it can be inferred that very few homes constructed in Texas after 2003 suffered severe damage to roof sheathing, wall sheathing and framing or total loss and collapse of those components.

Similar damage levels were observed among the houses in Florida. Only small percentages of homes constructed after 1994 were classified as having severe damage to/total loss of wall and roof coverings or total loss of those components.. No homes constructed after 2008 were classified as having severe damage to wall and roof coverings or total loss of those components. Consequently, it can be inferred that very few homes constructed in Florida after 2008 suffered severe damage to roof sheathing, wall sheathing and framing or total loss and collapse of those components.

Homes built before 2003 in Texas and before 2008 in Florida, and therefore built to older codes, sustained more damage than newer homes built to newer codes. These observations demonstrate that the IRC, since its inception, has been very effective in preventing the destruction of homes due to hurricane winds. The structural provisions ensure that the integrity of the roof framing and sheathing is maintained, and that wall structure and sheathing damage is minimized. Other required building practices have also resulted in less damage to wall and roof coverings and the loss of those components while also minimizing window breakage.

[3] The findings and conclusions in this section are based on NAHB staff analysis of the Texas A&M study, and are not included in the formal report.

For more information, contact:
Craig Drumheller (x8565) or Gary Ehrlich (x8545)

To download the full report, visit:
www.nahb.org/nahb-priorities/construction-codes-and-standards/hurricane-damage-report.aspx

NAHB National Association of Home Builders

Zachry Department of CIVIL ENGINEERING TEXAS A&M UNIVERSITY