Union of Concerned Scientists
ucsusa.org Two Brattle Square, Cambridge, MA 02138-3780 t 617.547.5552 f 617.864.9405
1825 K Street NW, Suite 800, Washington, DC 20006-1232 t 202.223.6133 f 202.223.6162
500 12th Street, Suite 340, Oakland, CA 94607-4087 t 510.843.1872 f 510.843.3785
One North LaSalle Street, Suite 1904, Chicago, IL 60602-4064 t 312.578.1750 f 312.578.1751

April 19, 2021

Dr. Mark A. Calabria
FHFA Director
Federal Housing Finance Agency
Office of the Director
400 7th Street SW, 10th Floor
Washington, D.C. 20219
Submitted electronically via: https://www.fhfa.gov/AboutUs/Contact/Pages/Request-for-Information-Form.aspx

RE: Request for Input on Climate and Natural Disaster Risk Management at the Regulated Entities

Dear Director Calabria,

On behalf of the Union of Concerned Scientists' 500,000 members and supporters, we appreciate the opportunity to submit comments on current and future natural disaster and climate risks to the housing finance system and to the regulated entities—the Enterprises—the Federal Home Loan Mortgage Corporation (Freddie Mac), Federal National Mortgage Association (Fannie Mae) and the Government National Mortgage Association (Ginnie Mae) and the Federal Home Loan Banks (the FHL Banks). Thank you also for the opportunity to provide comments at the FHFA's first Listening Session on Climate and Natural Disaster Risk Management on March 4, 2021.

We welcome the FHFA's efforts to take steps to account for these risks, many of which are worsening due to climate change. These are complex challenges and will require a thoughtful and sustained effort for a long while to come. Our research and a robust body of research of others, shows that climate change poses profound risks to people's homes, the housing market and the broader economy to which it is connected—all of which could cause disproportionate harms to low-income communities, communities of color and Indigenous communities. Our comments focus on the near-and long-term socioeconomic risks of climate change to the regulated entities as well as on some vital, urgent steps the FHFA can take to help limit these risks, as part of a whole-of-government approach to addressing climate change. We also provide recommendations on how FHFA must play a critical role in educating participants in the housing market about risks and encouraging risk mitigation, encouraging more transparent disclosure of risks, incorporating climate-related risks into FHFA's mandates, developing a strategy for integrating these risks in the entities' work, and establishing monitoring and oversight of these recommendations with specific qualitative and quantitative metrics including explicit attention to equitable outcomes.

We also note that the Biden administration is shortly expected to issue an executive order aimed at limiting the risks of climate change to government and the economy. FHFA's efforts to address these

risks to the housing market will therefore be in line with this urgent and necessary whole-of-government approach.

We summarize our overall recommendations to FHFA below and then provide responses to some of the questions posed in the RFI, related to our areas of expertise.

Overall Recommendations for FHFA's Response to Growing Climate Risks

As the FHFA considers how to respond to these growing risks, it will be important to keep some priorities in mind:

- **FHFA and the federal government must play a lead role in researching and communicating a full range of climate risks to the public and incorporating those risks into its own policies and actions**.[1] Federal investments are needed to ensure that robust datasets, modeling and weather prediction initiatives are widely and freely accessible.[2] The private sector is increasingly developing sophisticated proprietary tools to assess climate risks and sharing that information with their clients (e.g. Jupiter Intelligence, Four Twenty Seven, riskQ, among others), however the general public does not yet have a clear appreciation of these risks. Over time, those with resources and information will be better able to insulate themselves from housing market risks, reinforcing existing inequities. The FHFA must play an important role in educating the regulated entities, as well as the broader circle of public and private sector actors at the federal, state and local level.
- **Mandating climate risk disclosure in the marketplace is vital to help individuals and businesses understand the risks to their investments and drive more resilient outcomes, however this must be done in a transparent and careful way**.[3] Financial regulators and market actors must live up to their responsibilities to the public. The FHFA should require more transparent reporting and disclosure of the risks that climate change poses to the mortgage portfolios of the regulated entities today and how those risks will change over time. Better data and tools for assessing and managing market related climate risks are also needed. Without this, business as usual decisions are increasing the exposure to risks, putting more people and property in harms' way and creating a greater potential for mortgage defaults that can have cascading effects.The disclosure of risks itself can trigger sharp—and potentially inequitable—market shifts in highly exposed places, even precipitating a crash in values in some markets. Unlike past housing market crashes, values may not recover in places where the data show the risk is extreme. Thus, it is vital to have other support programs in place *ahead of time*, communicate and engage with community stakeholders, and to consider ways to phase in some changes.
- **The federal government must work together with state and local authorities and the private sector to provide options, and significantly ramped up and well-resourced programs, for risk-mitigation measures for people with homes at risk from climate-related disasters.** This could range from home buyout programs, programs to expand investments in floodproofing of homes,

[1] See H.R.4823 - FEMA Climate Change Preparedness Act, https://www.congress.gov/bill/116th-congress/house-bill/4823

[2] *See* S.4462 - A bill to establish a national integrated flood information system within the National Oceanic and Atmospheric Administration, and for other purposes *and* H.R.2462 - Flood Mapping Modernization and Homeowner Empowerment Pilot Program Act of 2019

[3] *See* H.R.3623 - Climate Risk Disclosure Act of 2019 and S.2075 - Climate Risk Disclosure Act of 2019.

expanded access to affordable insurance and enforcement of insurance purchase requirements in the most at-risk places.

- **Limiting new development in flood and fire-prone areas is also key to reducing the exposure to these risks over time.** FHFA should work with state and local entities, and community stakeholders, to consider how to limit new mortgages being offered in high-risk areas, while ensuring that communities have access to affordable housing options in safer areas. The Groundwork's Climate Safe Neighborhoods project found that historical segregation redlining practices correlated with more vulnerability to extreme heat and flood in these neighborhoods.[4] Additionally, while GSE's provide the benefit of facilitating access to homeownership, they may also encourage lenders to distribute their climate risk and encourage households to locate in flood risk areas while not also accounting for climate change projections over the 30-year fixed rate mortgage.[5]
- Our nation's shameful history of mortgage redlining has led to lasting injustices and inequities in housing and wealth, particularly for African American households.[6] The unfortunate reality is that a type of "modern day" redlining exists when it comes to the success rate of people of color securing loans for purchasing homes.[7] FHFA must work with the Administration and Congress on how not to replicate those harmful patterns—directly or indirectly—by pulling back mortgage financing in some geographies.

Responses to FHFA's Questions in the RFI

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

For the purposes of FHFA's mission, it is important to put the growing risks of certain kinds of disasters that affect the housing market in the context of human-caused climate change.[8] To do so, FHFA should draw on the vast body of scientific literature on climate change.[9] Additional spatially downscaled data and maps should be used to assess risks to homes at the local level including risks from flooding, storms, wildfires and sea level rise. A critical aspect is recognizing that these risks are growing, in some cases at an accelerating pace, as the climate warms. That means the past is no longer a good predictor of the future, so FHFA must incorporate science-based projections into its approaches. Development patterns are also exacerbating these risks in many places—for example, an expansion in impermeable surfaces in developed areas and the draining of wetlands to create space for development increases the risks of

[4] *See* Mapping Project Explores Links Between Historic Redlining And Future Climate, Vulnerability. https://www.wbur.org/earthwhile/2021/03/05/haverill-merrimack-climate-redlining-maps. *Also see* The Effects of Historical Housing Policies on Resident Exposure to Intra-Urban Heat: A Study of 108 US Urban Areas, https://www.mdpi.com/2225-1154/8/1/12/htm

[5] *See* Amine Ouazad & Matthew E. Kahn, 2019. "Mortgage Finance and Climate Change: Securitization Dynamics in the Aftermath of Natural Disasters," NBER Working Papers 26322, National Bureau of Economic Research, Inc.

[6] *See* January 26, 2021 White House Memorandum on Redressing Our Nation's and the Federal Government's History of Discriminatory Housing Practices and Policieshttps://www.whitehouse.gov/briefing-room/presidential-actions/2021/01/26/memorandum-on-redressing-our-nations-and-the-federal-governments-history-of-discriminatory-housing-practices-and-policies/.

[7] *See* Modern-day redlining: How banks block people of color from homeownership. https://www.chicagotribune.com/business/ct-biz-modern-day-redlining-20180215-story.html

[8] Hayhoe, K., D.J. Wuebbles, D.R. Easterling, D.W. Fahey, S. Doherty, J. Kossin, W. Sweet, R. Vose, and M. Wehner, 2018: Our Changing Climate. In *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II* [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, pp. 72–144. doi: 10.7930/NCA4.2018.CH2

[9] https://nca2018.globalchange.gov/

flooding during extreme rainfall events. Climate change is contributing to an increase in extreme rainfall events—thus compounding the risks.

2) What are the climate and natural disaster risks to the regulated entities, including long- and short-term risks, and how might such risks change over time? To what extent, if any, could such risks now or in the future impede the ability of each regulated entity to operate in a safe and sound manner, fulfill its statutory mission, or foster liquid, efficient, competitive, and resilient national housing finance markets?

We address this question in four parts: (i) the latest science on the growing risks of climate change, (ii) UCS research on the threat to coastal real estate from sea level rise, (iii) the growing recognition of the economic risks of climate change, and (iv) the threats to housing markets and housing market finance.

Latest science on the growing risks of climate change

Human-caused climate change is already having a profound impact on people, the economy and natural ecosystems. FHFA's mandate to supervise and regulate the housing mission of Fannie Mae and Freddie Mac creates a unique responsibility to ensure that worsening climate risks—including from floods, wildfires, storms, sea level rise—are carefully and thoroughly integrated into risk assessments for the mortgage portfolio of these entities, with robust actions to limit to those risks.

The US Fourth National Climate Assessment (NCA)—a quadrennial report mandated by Congress since 1990—is an authoritative compendium of the latest climate science for our nation.[10] Drafted by thirteen federal agencies and drawing on the best available science, the report emphasized that climate change is not about some distant future; communities around our nation are already coping with record-breaking heat, flooding, wildfires, storms, heavy rainfall, droughts, and accelerating sea level rise. The report's stark conclusion is that these climate-related impacts will only get worse and their costs will mount dramatically if carbon emissions continue unabated. Under high emissions scenarios with little or no adaptation, annual losses in some sectors are projected to exceed $100 billion by the end of the century and surpass the gross domestic product of many states.

In terms of the FHFA's mandate, it is sobering to note that among the most consequential impacts highlighted in the NCA report is the loss in the value of coastal properties due to accelerating sea level rise. Critical infrastructure—including roads and bridges, water and stormwater, and power—is also at risk, which can also affect the property values and livability of homes in adjacent areas. Growing scientific evidence shows a trend of hurricanes intensifying faster, and becoming wetter, slower and more destructive—which is linked to climate change.[11,12,13,14]The 2020 hurricane season brought a record 30 named storms—several of which experienced rapid intensification, which emerging science

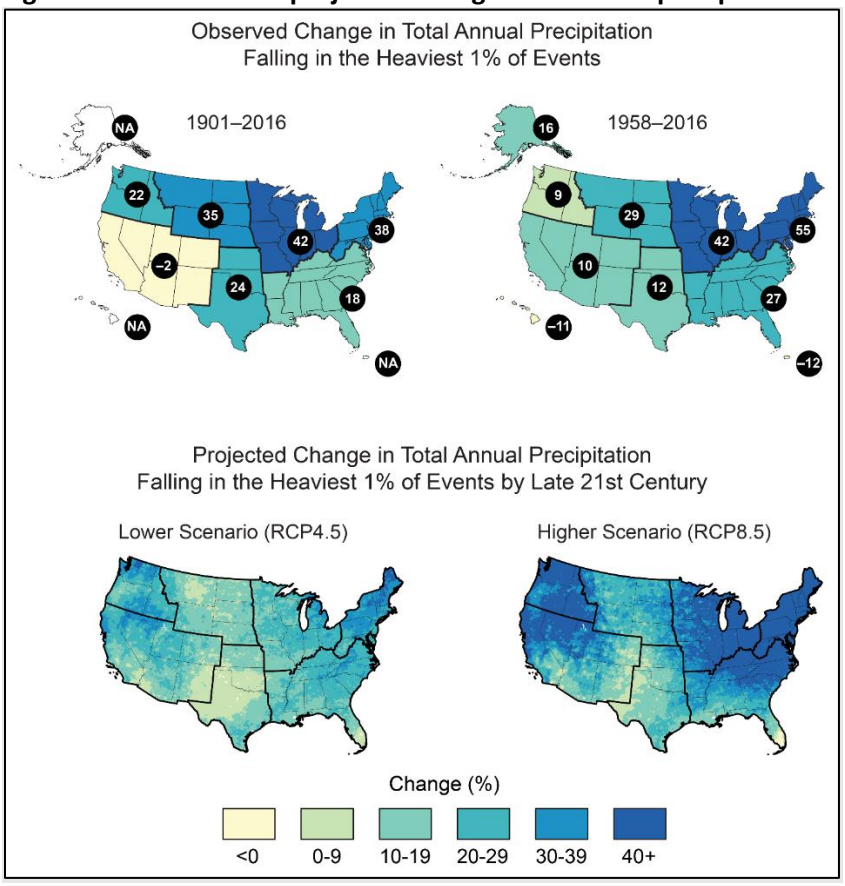
[10] US Global Change Research Program (USGCRP). 2018. Fourth national climate assessment: Impacts, risks, and adaptation in the United States, volume 2. Washington, DC. Online at https:// nca2018.globalchange.gov.
See also: US Global Change Research Program (USGCRP). 2017. Fourth national climate assessment: Climate Science Special Report, volume 1. Washington, DC. Online at https://science2017.globalchange.gov/
[11] Holland, G., Bruyère, C.L. Recent intense hurricane response to global climate change. *Clim Dyn* **42,** 617–627 (2014). https://doi.org/10.1007/s00382-013-1713-0
[12] Patricola, C.M., Wehner, M.F. Anthropogenic influences on major tropical cyclone events. *Nature* **563,** 339–346 (2018). https://doi.org/10.1038/s41586-018-0673-2
[13] Hall, T.M., Kossin, J.P. Hurricane stalling along the North American coast and implications for rainfall. *npj Clim Atmos Sci* **2,** 17 (2019). https://doi.org/10.1038/s41612-019-0074-8
[14] Aslak Grinsted, Peter Ditlevsen, Jens Hesselbjerg Christensen. Normalized US hurricane damage estimates using area of total destruction, 1900−2018.Proceedings of the National Academy of Sciences Nov 2019, 116 (48) 23942-23946; DOI: 10.1073/pnas.1912277116.

shows to be linked to climate change.[15] It was the 6th year in a row that named storms formed before the official start of the season, and the 5th season in a row with at least one category 5 hurricane.

Hotter, drier conditions in the western US are driving longer and more intense wildfire seasons.[16] A history of mismanagement of forests and wildfires, along with growing development in wildfire prone areas, is also raising risks to people, property and ecosystems. In 2020, the nation experienced nearly 59,000 wildfires which burned over 10 million acres, the most area affected in single year.[17] About 40 percent of the burned area was in California.[18] Five of the six largest fires on record that the state has experienced occurred in 2020.[19] At approximately 1 million acres, the largest California wildfire on record—the August Complex fire—was more than double the second largest on record. Climate change is also shifting rainfall patterns, making heavy rain heavier and more frequent in many areas of the country (see figure 9). With human alteration of the land—like the engineering of rivers, the destruction of natural protective systems, increased construction on floodplains, and increased area of impermeable surface—many parts of the United States are at greater risk of experiencing destructive and costly floods.[20]

[15] https://www.nature.com/articles/s41467-019-08471-z.pdf; https://journals.ametsoc.org/view/journals/clim/31/20/jcli-d-17-0898.1.xml
[16] UCS Infographic: Wildfires and Climate Change. https://www.ucsusa.org/resources/infographic-wildfires-and-climate-change
[17] https://www.nifc.gov/fire-information/statistics/wildfires
[18] https://www.fire.ca.gov/stats-events/
[19] CAL FIRE data. https://www.fire.ca.gov/media/11416/top20_acres.pdf
[20] https://www.ucsusa.org/sites/default/files/attach/2018/07/gw-fact-sheet-epif.pdf

Figure 1: Observed and projected changes in extreme precipitation



Heavy precipitation is becoming more intense and more frequent across most of the US, particularly in the Northeast and Midwest, and these trends are projected to continue in the future. ***Source:*** *Fourth National Climate Assessment.*

A growing body of evidence has linked specific extreme rainfall events to human-caused climate change. The record-breaking rainfall during Hurricane Harvey that brought devastating flooding to Houston, for example, was made about three (1.5-5) times more likely and around 15% (8-19%) more intense because of human-caused climate change[21]. Human-caused climate change also made the devastating rains in Louisiana in 2016—in which more than two feet of rain fell in a two-day period—more likely. A study of that particular event concluded that such downpours are expected to occur 40 percent more often and be 10 percent more intense now than they were before the Industrial Revolution.[22] Researchers from the World Weather Attribution partnership found that "the extreme rainfall and flooding caused by Tropical Storm Imelda was made more likely and intense due to global warming" and that "two-day extreme precipitation events along the Gulf Coast as intense as observed on 19–20

[21] van Oldenborgh, G.J., K. van der Wiel, A. Sebastian, R. Singh, J. Arrighi, F. Otto, K. Haustein, S. Li, G. Vecchi, and H. Cullen. 2017a. Attribution of extreme rainfall from Hurricane Harvey, August 2017. Environmental Research Letters 12(12):1–11. doi:10.1088/1748-9326/aa9ef2.

[22] van der Weil, K., S. B. Kapnick, G. J. van Oldenborgh, K. Whan , S. Philip, G. A. Vecchi, R. K. Singh, J. Arrighi , and H. Cullen. 2017. Rapid attribution of the August 2016 flood-inducing extreme precipitation in south Louisiana to climate change. Hydrol. Earth Syst. Sci., 21, 897–921, 2017 www.hydrol-earth-syst-sci.net/21/897/2017/ doi:10.5194/hess-21-897-2017. Online at https://www.hydrol-earth-syst-sci.net/21/897/2017/hess-21-897-2017.pdf

September 2019 or higher have become 1.6 to 2.6 times more likely due to anthropogenic climate change, or 9% to 17% more intense."[23] Projections of future climate suggest that the frequency and intensity of extreme precipitation events will continue to increase across much of the United States in the coming decades[24].

The climate extremes our nation and the world are experiencing are very costly. 2020 brought an unprecedented 22 extreme weather and climate related disasters, each of which cost at least a billion dollars in damages.[25] NOAA data show that 2020 was the sixth consecutive year when the US experienced ten or more billion-dollar weather and climate disasters.[26,27] In 2019, the nation experienced 14 such events including three major inland floods, eight severe storms, two tropical cyclones (Hurricane Dorian and Tropical Storm Imelda), and one wildfire event. Hurricanes Harvey, Irma, Maria and Sandy, all of which occurred in the last decade, are four of the five costliest billion-dollar disasters. The last five years have also brought four of the most destructive and costly wildfire seasons in U.S. history, with California suffering the most harm.

UCS research on the threat to coastal real estate from sea level rise:

UCS research on the impacts of sea level rise to coastal communities shows that long before rising seas permanently submerge properties, millions of Americans living in coastal communities will face more frequent and disruptive high-tide flooding. By the end of the century, under a high sea level rise scenario,[28] approximately 2.5 million US coastal homes and commercial properties currently worth more than $1 trillion would be at risk from chronic flooding—a threshold we defined as flooding that occurs 26 times per year or more.[29] By 2045, within the lifetime of a typical mortgage issued today, about 325,000 coastal properties worth $136 billion will be at risk of chronic flooding (see figures 2 and 3). The properties at risk by 2045 currently house 550,000 people and contribute nearly $1.5 billion toward today's property tax base. Those numbers jump to about 4.7 million people and $12 billion by 2100 (see fig 4).

[23] https://www.worldweatherattribution.org/rapid-attribution-of-the-extreme-rainfall-in-texas-from-tropical-storm-imelda/

[24] Easterling, D.R., K.E. Kunkel, J.R. Arnold, T. Knutson, A.N. LeGrande, L.R. Leung, R.S. Vose, D.E. Waliser, and M.F. Wehner. 2017. Precipitation change in the United States. In Climate science special report: Fourth national climate assessment, volume 1, fourth edition, edited by D.J. Wuebbles, D.W. Fahey, K.A. Hibbard, D.J. Dokken, B.C. Stewart, and T.K. Maycock. Washington, DC: US Global Change Research Program, 207–230. doi:10.7930/J0H993CC.
Intergovernmental Panel on Climate Change (IPCC). 2012. Summary for policymakers. In Managing the risks of extreme events and disasters to advance climate change adaptation: Summary for policymakers, edited by C.B. Field, V. Barros, T.F. Stocker, D. Qin, D.J. Dokken, K.L. Ebi, M.D. Mastrandrea, K.J. Mach, G.-K. Plattner, S.K. Allen, M. Tignor, and P.M. Midgley. Cambridge, UK, 1–19. Online at http://www.ipcc.ch/pdf/special-reports/srex/SREX_FD_SPM_final.pdf

[25] https://www.ncdc.noaa.gov/billions/

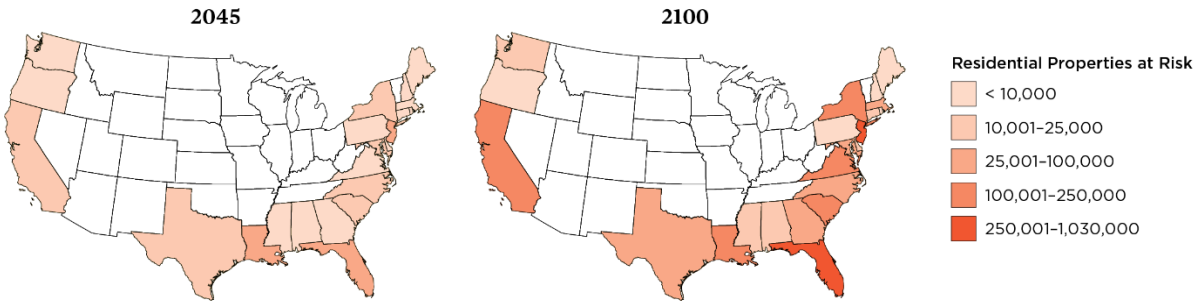
[26] https://www.climate.gov/news-features/blogs/beyond-data/2010-2019-landmark-decade-us-billion-dollar-weather-and-climate

[27] https://www.ncdc.noaa.gov/billions/

[28] The high scenario, which is drawn from the 2014 National Climate Assessment, assumes rapid ice sheet loss and projects a global average sea level rise of 6.6 feet (2.0 m) above 1992 levels by the end of this century. This scenario is considered most applicable in situations with a low tolerance for risk. This makes it most suitable for estimating the scale of risk to residential properties, which typically represent a homeowner's greatest single asset. For more on our data and methodology, please see: https://www.ucsusa.org/sites/default/files/attach/2018/06/underwater-analysis-full-report.pdf and https://www.ucsusa.org/sites/default/files/attach/2018/06/underwater-analysis-technical-backgrounder.pdf

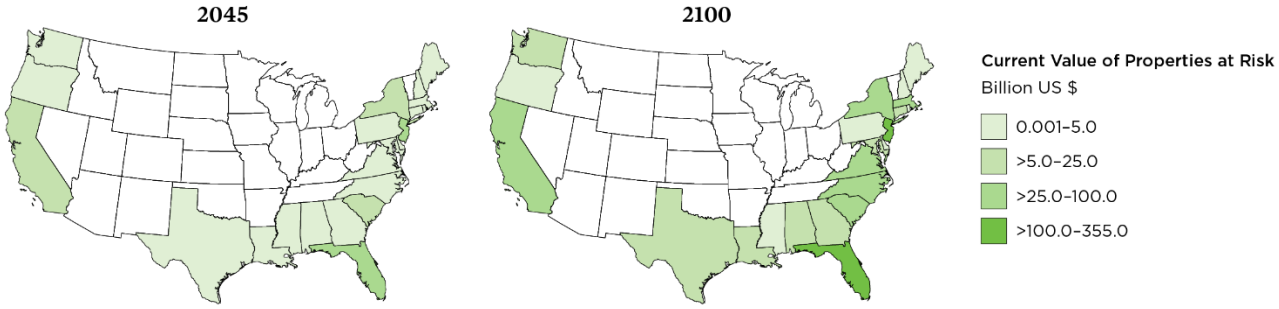
[29] https://www.ucsusa.org/resources/underwater

Figure 2: Homes at risk of chronic inundation



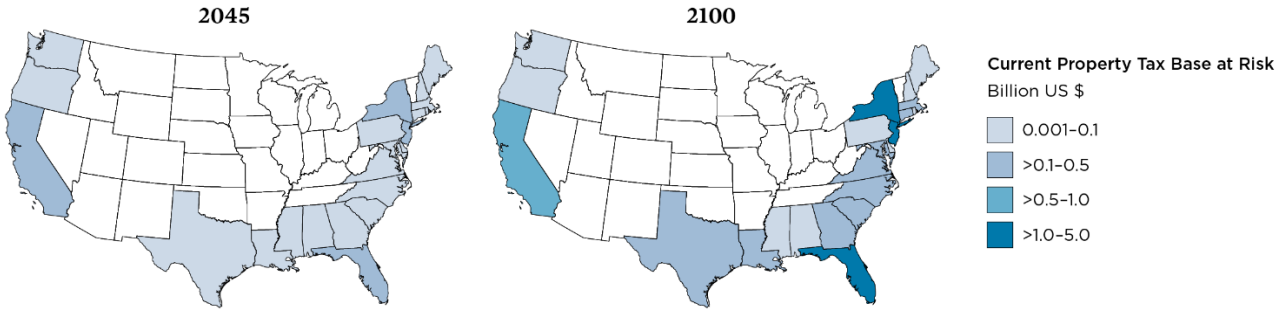
Credit: Union of Concerned Scientists. Data provided by third parties through the Zillow Transaction and Assessment Dataset (ZTRAX).

Figure 3: Value of homes at risk from chronic inundation



Credit: Union of Concerned Scientists. Data provided by third parties through the Zillow Transaction and Assessment Dataset (ZTRAX).

Figure 4: Property tax base at risk from chronic inundation

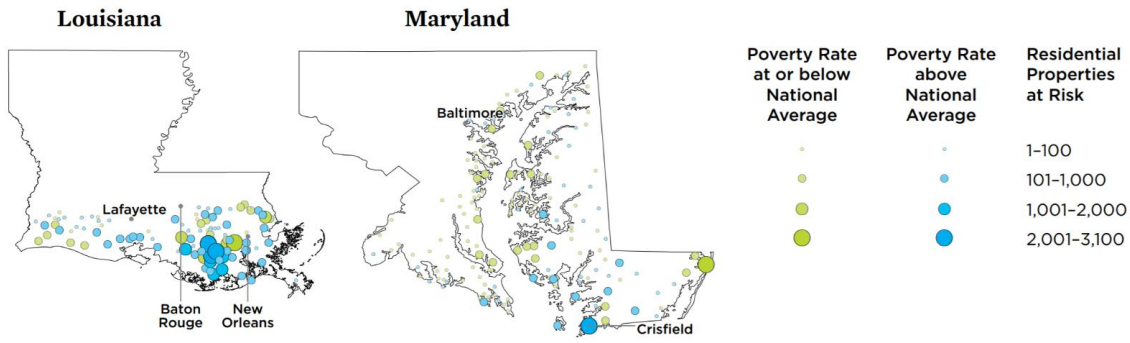


Credit: Union of Concerned Scientists. Data provided by third parties through the Zillow Transaction and Assessment Dataset (ZTRAX).

The declining value of coastal homes will be damaging, even devastating, to individual homeowners. It will also have more widespread consequences, including for affected communities, lenders, investors, and taxpayers. Communities with fewer resources to start with, or that are otherwise disadvantaged,

will likely be most heavily affected by chronic flooding and its accompanying financial losses (see Figure 5).

Figure 5: Communities with high poverty rates at risk of chronic inundation in Louisiana and Maryland



UCS also developed an interactive mapping tool that lets you explore the risk sea level rise poses to homes in your congressional district and provides district-specific fact sheets about those risks.[30] What our maps show is that rising seas will begin to reshape many coastal communities in the coming decades, in some cases quite drastically. Communities need representatives in Congress who will advocate for the research, funding, and policies needed to help them cope with sea level rise and coastal flooding head-on. In some cases, that will include help with relocation to safer ground.

Our research also points to the choices we face: If the global community adheres to the primary goal of the Paris Agreement of capping warming below 2°C, and with limited loss of land-based ice, by the end of the century the United States could avoid losing residential properties that are currently valued at $780 billion, contribute $10 billion annually in property tax revenue, and house 4.1 million people.

Growing Recognition of the economic risks of climate change

Last September, the Commodity Futures Trading Commission (CFTC), released a new report titled "*Managing Climate Risk in the Financial System*."[31] The first-of-its-kind CFTC report sends another clear signal that climate change poses a significant risk to our economy and financial system. If left unaddressed, these risks—which include flooding exacerbated by sea level rise and heavy rainfall, extreme heat, and worsening wildfires—will escalate untenably and harm our prosperity and well-being today and into the future. Markets for agricultural commodities, real estate, insurance and mortgages are among those highly exposed to these risks, as are the supply chains of many companies. The report includes a discussion on real estate which states that:

"As major holders of mortgages and originators of residential mortgage-backed securities, the GSEs are exposed to physical climate risk affecting property, particularly flood risk. Because Fannie Mae and Freddie Mac are limited by rules governing how they underwrite mortgages, they may have limited room to screen for and manage climate risk (Ouazad and Kahn, 2019). In addition, some of this opaque risk could be transferred to other parts of the financial system through the GSEs' sales of Credit Risk Transfer securities. Ensuring that the GSEs are effectively measuring, monitoring, and managing climate risk will be imperative for their continued ability to enhance the stability of the U.S. mortgage market."

[30] https://www.gao.gov/products/gao-21-119sp

[31] See https://www.cftc.gov/PressRoom/PressReleases/8234-20

Major banks including JP Morgan, Goldman Sachs, Bank of America and Citigroup have all made recent regulatory filings noting that climate change poses a material risk to their businesses. JP Morgan's annual report to the SEC[32] states that its worldwide operations could be disrupted by climate impacts such as flooding and wildfires, and that "*climate driven changes could have a material adverse impact on asset values and the financial performance of JPMorgan Chase's businesses, and those of its clients and customers."*

A recent report from McKinsey & Company notes that the physical risks of climate change are increasing, spatial in how they manifest, non-stationary, nonlinear, systemic and regressive.[33] The report notes that climate impacts are already evident around us and that climate change is already having measurable socioeconomic impacts. The range of impacts going forward could include impacts on livability and workability, food systems, physical assets, infrastructure services and natural capital.

Last December the Federal Reserve Bank of San Francisco hosted its first-ever conference on the 'Economics of Climate Change.' Reporting on the meeting, a bulletin from the Bank[34] says:

> *Climate change will have sweeping effects on our economy and financial system (Network for Greening the Financial System 2018, hereafter NGFS; USGCRP 2018). Climate-related shifts in the physical environment can slow economic growth, increase volatility, and depreciate the value of business and household assets and property. Avoiding further climate change will involve a substantial transformation of the economy. Consequently, climate change appears increasingly relevant to central bankers and financial supervisors for achieving their macroeconomic, inflation, and financial stability mandates (NGFS 2018, Rudebusch 2019)*.

The Government Accountability Office's (GAO's) High Risk report series have repeatedly flagged climate change as a key area of fiscal exposure for the federal government, including in its most recent 2021 report.[35] It calls for limiting this exposure by better managing climate risks, including through proactive steps to reduce risks ahead of disasters as part of a comprehensive resilience investment strategy.

The credit rating agencies Moody's and Standard & Poor's have begun to evaluate and communicate how to account for climate risks in their credit ratings. Many US businesses increasingly understand that climate change is an economic threat and that there are significant economic opportunities in the transition to a low-carbon economy. And most forward-thinking companies recognize that addressing climate change will require robust federal action.

Threats to housing markets and housing market finance

By and large, climate risks are still flying under the radar in many housing markets—although that is shifting as some communities are experiencing more, and more severe, climate-caused disasters. There are currently no uniform federal guidelines for disclosure of risks to properties from flooding and wildfires. Current FEMA flood risk maps do not include projections of future conditions, including

[32] https://jpmorganchaseco.gcs-web.com/node/315401/html
[33] https://www.mckinsey.com/business-functions/sustainability/our-insights/climate-risk-and-response-physical-hazards-and-socioeconomic-impacts
[34] https://www.frbsf.org/economic-research/publications/economic-letter/2019/december/economics-climate-change-first-fed-conference/
[35] https://www.gao.gov/products/gao-21-119sp

climate change. Even as FEMA moves away from its antiquated binary view of flood risk--with homes being either in or out of the 100-year floodplain--toward it's Risk Rating 2.0 system that provides parcel-level probabilistic flood risk, the zones in which flood insurance is mandatory are remaining unchanged. This means that homebuyers, mortgage lenders, investors, insurers, and others engaged in the housing market are making decisions without the complete(?) information they need to assess risks.

Zillow and Freddie Mac have both released reports in the last few years examining the impact of future sea level rise on coastal real estate.[36,37] Freddie Mac finds that sea level rise could "destroy billions of dollars in property and displace millions of people," with the resulting social and economic impacts "greater in total than those experienced in the housing crisis and Great Recession."

Research shows that major disasters can shift risk perceptions quickly. For example, Freddie Mac researchers found that homes in the 100-year floodplain in Harris County, TX, sold for less than homes outside the floodplain—and that that price differential increased after Hurricane Harvey hit.[38] In the City of Houston, which was particularly hard hit by flooding from Harvey, prices fell even further.

As climate-related disasters worsen, one challenge is that a geographically diversified portfolio of mortgages may no longer provide the risk limitation it once did. For example, last year, significant swaths of the country were affected by extreme disasters, sometimes even simultaneously. Several coastal communities—such as those along the Gulf coast and the coast of North Carolina—are also facing repeated hits, year-on-year, from intensifying storms accompanied by heavy rainfall. Housing markets in these communities especially those that are smaller and less well resourced, may, over time, lose considerable value.

The growing risks to the housing market from climate change threatens to impose a disproportionate impact on low-and fixed-income households and communities of color. In some cases, this is because communities are located in places more exposed to climate risks such as flooding and may be less likely to be able to afford flood insurance. They might also be more at risk of having their livelihoods disrupted by climate-related disasters and therefore at risk of defaulting on their mortgage or dropping their flood insurance. Homes owned by low- and fixed-income homeowners are likely to be a much greater share of their total assets, thus any loss in value would be devastating.

Finally, some places face risks that are so extreme that communities will need to consider relocating. Homes in these communities are likely to spiral downwards in value, making it difficult for individual homeowners to recoup their investment and also potentially passing on losses to mortgage holders.

[38] http://www.freddiemac.com/research/insight/20200910_unravelling_perceptions_of_flood_risk.page

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?

Current datasets and tools to measure and monitor climate risks to the national housing finance markets are insufficient and/or proprietary, leaving many housing market participants and homeowners unaware or insufficiently aware of the risks. FHFA can play an important role in helping to standardize these methodologies and ensuring that their insights—including measures to help manage these risks—are broadly available to all. Risk assessment must be done in a forward-looking manner that takes into account worsening climate related risks, including those that have bearing within the lifetime of a typical 30-year mortgage issued today. Because many mortgage lenders typically do not hold mortgages for their entire duration, and markets are often shortsightedly focused on the next 3-5 years, material risks to the housing market are still flying under the radar.

Some of the information gaps include:

- A full assessment of the current and projected climate risk in the GSE's federal housing portfolio. This assessment ought to include the full range of climate change-related impacts on the estimated $6.9 trillion in mortgage debt that Fannie Mae, Freddie Mac and Ginnie Mae guarantee.[39]
- Implementation of an Enterprise Risk management (ERM) process and assessment (see Office of Management and Budget (OMB) Circular No. A-123 released in 2016). The ERM directive emphasized the importance of risk management agency-wide to move away from addressing risks in silos.[40]

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?

Industry participants currently use a variety of approaches, including:

- Purchasing insurance and reinsurance
- Selling off mortgages that are deemed to be higher risk
- Charging higher mortgage rates or otherwise increasing the costs of borrowing for loans that are considered higher risk.
- Diversifying their portfolios to mitigate overall risk exposure

There is also reason for concern that a lack of transparency could result in risks being transferred to other parts of the financial system through the GSEs' sales of Credit Risk Transfer securities, a concern highlighted in the 2020 CFTC report.

Market-based approaches alone will not be sufficient to address the growing risks of climate change—and are particularly unlikely to foster equitable and resilient outcomes without additional policies. UCS has developed a framework and a set of principles for science-based equitable adaptation that could be

[39] *See* Amine Ouazad & Matthew E. Kahn, 2019. "Mortgage Finance and Climate Change: Securitization Dynamics in the Aftermath of Natural Disasters," NBER Working Papers 26322, National Bureau of Economic Research, Inc.
[40] https://obamawhitehouse.archives.gov/omb/circulars_a123_rev

instructive in this context.[41] We also recommend the establishment of a federally financed and administered frontline equity redistribution and investment fund to help provide financial resources to those homeowners willing to relocate from areas that are highly exposed to climate risks.[42]

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? 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.

FHFA must incorporate the potential for abrupt repricing of real estate properties exposed to extreme weather and climate change-related disasters. This could be triggered by a range of factors such as a major climate related disaster, policy changes such changes to the provisions of the National Flood Insurance Program, the release of data and maps highlighting risks, changes to risk disclosure through law or regulations, or changes in consumer awareness and preferences related to climate risks. A 2018 UCS research report included a section on expert elicitation from participants in the real estate market and highlights how these experts viewed the impacts of climate change on the value of homes and commercial properties, including the potential for abrupt shifts. [43, 44]

6) How should FHFA evaluate the adequacy of a regulated entity's ability to assess and manage the impacts of climate and natural disaster risk, particularly in light of the significant uncertainties and data limitations?

FHFA should consider establishing an expert interdisciplinary working group to help advise the agency and the entities on a robust climate change risk assessment and a process for establishing metrics and tracking progress on the goals and objectives of the assessment. Areas that FHFA ought to explore include:

- Climate risk disclosure and public outreach on climate change risks and solutions to reduce these risks. FHFA should create standard practices and guidance to ensure that the climate change risk assessment information is developed and made publicly available to all housing market participants including borrowers, lenders, underwriters, securitizers and others.
- The changing nature of financial risks and who specifically is bearing these risks ultimately, including homeowners and taxpayers
- Future scenario planning for extreme weather and climate change related disasters and compounding events affecting the housing market; and
- The potential for risk mitigation tools like reinsurance purchase to reduce the exposure of federal taxpayers.

  We also encourage FHFA to give serious consideration to recommendations on this topic made by Professors Matthew E. Kahn and Amine Ouazad in their written comments from the public listening session on March 4, 2021.[45]

[41] https://www.ucsusa.org/sites/default/files/attach/2016/06/climate-resilience-framework-and-principles.pdf
[42] https://www.zillow.com/research/climate-change-underwater-homes-12890/ and https://www.zillow.com/research/climate-change-underwater-homes-2-16928/
[43] Underwater Rising Seas and the Implications for U.S. Coastal Real Estate www.ucsusa.org/underwater *See* Matrix of Voices: Insights From Market Experts on the Financial Risks of Sea Level Rise
[44] http://www.freddiemac.com/research/insight/20160426_lifes_a_beach.page
[45] *See* https://www.fhfa.gov/Videos/Documents/WrittenRemarks%E2%80%93ProfessorsKhan-and-Ouzad.pdf

7) How should FHFA prioritize the various climate and natural disaster risks to the regulated entities?

With the climate crisis already unfolding around us, FHFA will need to work on multiple fronts. We urge a holistic approach that incorporates a range of climate risks and their compounding effects. That said, research shows that the most acute and widespread risks to the housing market are those caused by coastal and inland flooding related to sea level rise, extreme precipitation and intensifying storms. We also urge FHFA to explicitly look to the intersection of long-standing socioeconomic inequities and these physical risks to identify and prioritize communities who bear a disproportionate burden of disasters.

8) Should FHFA implement a stress testing, scenario analysis, or similar program to assess the regulated entities' climate and natural disaster risk? If so, what factors should FHFA consider in defining the purposes, design, and scenarios of any such programs?

Yes, we strongly agree that FHFA should undertake this type of a program. Scenarios should be created drawing on the latest climate risk information from the National Climate Assessment, other federal government data including the EPA's Climate Change Impacts and Risk Analysis.[46] The range of scenarios should include the potential for abrupt, discontinuous changes. Scenarios should also include demographic and socioeconomic projections, as well as pathways to help reduce climate risks and reduce negative impacts on homeowners and taxpayers.

FHFA should also conduct scenario planning to understand the potential impact of compounding risks and to put contingency plans in place. Events during 2020 demonstrated how climate-related disasters can intersect with non-climate-related events. For example, wildfires in California intersected with the COVID-19 pandemic as well as the state's ongoing affordable housing crisis. Together, these three forces altered long-standing patterns of migration to and from the state as well as regional housing markets.

Stakeholder engagement is critical to ensuring scenarios are developed in a transparent way that is relevant for a variety of purposes. While very useful, FHFA should also be mindful of the limitations of scenario planning and supplement this with additional tools.

9) How might the regulated entities support their housing finance missions while minimizing the impact of climate and natural disaster risk?

The regulated entities' housing finance mission is critically tied to their underlying fiscal health. We urge better incorporation of climate risks into their portfolios and decision making to limit the prospect of a future housing market crisis precipitated by market adjustments to climate realities. We also urge a focus on affordable, climate-resilient housing because increasing access to this type of housing is also a strategy to better protect homeowners and communities from worsening climate impacts and the resulting financial ramifications.

[46] https://www.epa.gov/cira

10) Market discipline could potentially supplement FHFA's supervision and regulation of the regulated entities' climate and natural disaster risk appetite and management. Market discipline depends in part on the information that is available to shareholders, creditors, and other counterparties. Is the existing publicly available information sufficient for shareholders, creditors, CRT and other investors, and other counterparties to understand and exercise market discipline over a regulated entity's appetite for and management of climate and natural disaster risk? If not, what changes are needed? Should each regulated entity be required to disclose additional information, including but not limited to the extent to which its underwriting practices take into account climate and natural disaster risk?

To date, the information companies are voluntarily disclosing is not sufficient to create a full understanding of an entity's exposure to climate risk or its appreciation for these risks. Some of the issues include:

i. Disclosed data is rarely calculated with the same metrics or formula, and is rarely comparable across companies or industries.
ii. Current disclosure requirements do not have sufficient quantitative metrics.

Therefore, each regulated entity should absolutely be required to disclose additional information on its underwriting practices and climate risk, preferably with the inclusion of dollar amounts of properties at risk, leveraged risk, and any at-risk finances that pass through the institution.

In addition, the Security and Exchange Commission (SEC) climate disclosure discussions are including a push for auditors to sign off on corporate climate disclosure as well, which could provide a level of accuracy and certainty here.

11) What, if any, additional periodic or episodic reporting requirements for the regulated entities should FHFA consider to improve the publicly available information on the regulated entities' management of climate and natural disaster risk?

The FHFA's approach should be informed by the SEC's efforts on disclosure requirements and the CFTC report recommendations. As additional steps are taken by the Biden administration to improve climate risk disclosure, FHFA's actions should be informed by the whole-of-government approach.

12) 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?

FHFA should indeed be vigilant about unintended consequences on housing affordability. To mitigate these outcomes, some options that should be prioritized include:

- Increasing access to affordable flood insurance. FHFA must work with Congress, the administration and other federal agencies, in particular FEMA, to ensure that Congress establishes a flood insurance affordability program in the next National Flood Insurance Program reauthorization bill. Such a program must also include resources to help low- and fixed-income households reduce their flood risk.

- FHFA should consider the concept of “Buy, rent, retreat" that was recently put forward in California, to help mitigate financial risk while preserving communities for as long as possible.[47]
- FHFA should undertake a study to examine whether its policies, or the actions of the GSEs, are contributing to ‘climate gentrification” and whether it can implement specific measures to work with communities to limit these kinds of adverse impacts.

13) 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?

FHFA should aim to work with the agencies that comprise the US Global Change Research program (USGCRP). New inter-agency processes may also emerge as a result of the forthcoming Biden administration executive order on climate risk disclosure, including the opportunity to work collaboratively with the US Treasury and specifically with the Financial Stability Oversight Council.

14) What, if any, other enhancements should FHFA consider to its supervision and regulation of each regulated entity’s management of climate and natural disaster risk? Other enhancements could include but need not be limited to:

a. regulatory capital requirements or other loss absorbing capacity requirements that ensure each regulated entity has the capacity to absorb impacts of climate and natural disaster risk
Yes, we encourage FHFA to consider this type of an approach as an interim strategy while methodologies are still under development to accurately price climate risks. Please see recommendations from Public Citizen for increasing capital requirements to better account for unknown or unquantifiable climate risks, for example.[48]

b. disclosure requirements to provide shareholders, creditors, CRT or other investors, and other counterparties with appropriate information about a regulated entity’s climate and natural disaster risk. Yes, we strongly support this approach—and it corresponds to recent statement from the SEC, the CFTC, the Treasury and the Federal Reserve among other market and financial regulators.

c. changes to FHFA’s supervisory program to enhance examination of or reporting on each regulated entity’s infrastructure and processes for identifying, assessing, mitigating, and monitoring the regulated entity’s management of climate and natural disaster risk.
FHFA must be more vigilant in ensuring that the GSE’s are monitoring and tracking the underlying risks in their Credit Risk Transfer instruments and ensuring those risks are transparent. FHFA should also prioritize the incorporation of climate risk into the rules for mortgage insurance and guarantee fees.[49]

[47] *See* https://www.npr.org/2021/03/21/978416929/california-has-a-new-idea-for-homes-at-risk-from-rising-seas-buy-rent-retreat

[48] Public Citizen Provides Regulators Road Map to Address Climate Risks in Financial and Commodity Markets, May 14, 2020. https://www.citizen.org/news/public-citizen-provides-regulators-road-map-to-address-climate-risks-in-financial-and-commodity-markets/

[49] For more on this, see "Soaked” by Dr. Lindsay Owens, https://www.fhfa.gov/Videos/Documents/ClimateandHousingReport%E2%80%93Dr-Lindsay-Owens.pdf

15) To what extent, if any, should FHFA support efforts to develop standards of classification and data reporting on climate and natural disaster risk to the financial performance of companies, such as those by the Sustainability Accounting Standards Board, domestic and foreign government agencies, or others?

FHFA should fully support the development of standards for climate risk data and reporting. The CFTC's 2020 report recommends that such guidance be developed, and that the US should consider the establishment of a Standards Developing Organization (SDO) composed of public and private sector members.

Thank you for the opportunity to provide our submission to FHFA's RFI. We look forward to being a resource as FHFA moves forward on these critical next steps and recommendations.

Sincerely,

Rachel Cleetus
Policy Director, Climate and Energy Program

Shana Udvardy
Climate Resilience Analyst