THE IMPACT OF CLIMATE CHANGE ON AMERICAN HOUSEHOLD FINANCES

U.S. Department of the Treasury

CONTENTS

Introduction

The impacts of climate change are significant and escalating, including through more frequent and severe weather events, rising sea levels, and higher temperatures.[1] Alongside risks to the physical environment and health, climate change already imposes substantial financial costs on communities across the United States. The total cost resulting from major U.S. weather and climate disasters between 2018 to 2022 exceeded $617 billion, a record figure.[2] In 2022 alone, the cost of climate and weather disasters in the United States totaled more than $176 billion – the third most costly year on record, and 13 percent of Americans reported economic hardship from disasters or severe weather events within the past year.[3] The impacts of climate change are projected to worsen in coming years, putting additional communities and households at risk of financial strain.

This report seeks to deepen our understanding of the relationship between climate hazards and household finances. Already, over half of U.S. counties – home to millions of Americans – face heightened future exposure to at least one of the three climate hazards described in this report: flooding, wildfire, or extreme heat. While climate hazards impose financial challenges for households across income and wealth spectrums, financial burdens are not distributed evenly. For vulnerable households, the financial costs and losses associated with climate hazards have the potential to compound existing inequities and cause disproportionate financial strain. As detailed in this report, approximately one-fifth of all U.S. counties face both elevated vulnerability and elevated future exposure to climate hazards. These counties rank in the top 25 percent for both vulnerability and future exposure to at least one of the three climate hazards. This report brings together existing information and research to provide a focused exploration of the various pathways through which climate hazards impact household finances, and to identify people and places that may face heightened impacts.

To begin, this report identifies *what* could happen at the household level by describing several pathways through which climate hazards impact household finances. This analysis is accompanied by an in-depth look at *who* faces the most significant impacts, including a discussion of those households that are particularly vulnerable to climate-related financial strain. Next, this report investigates the locations *where* vulnerable households are concentrated. Finally, this report suggests *how* households and policymakers might mitigate the negative financial consequences of climate hazards for households. The report recommends measures policymakers and communities can implement to promote awareness and build physical and financial resilience. The report also highlights strategies households can adopt to build their own awareness and preparedness along with support from relevant Federal resources. Taken together, the findings in this report are intended to build recognition of the present and future financial challenges that households face from climate change, and opportunities and strategies for promoting social and economic resilience.

In this report, the Department of the Treasury (Treasury) implements the objectives set out in the Executive Orders 14030[4] and 13985,[5] *Climate-Related Financial Risk* and *Advancing Racial Equity and Support for Underserved Communities Through the Federal Government,* and responds to a recommendation in the April 2021 Financial Stability Oversight Council (FSOC) report by evaluating the various impacts of climate change on American household finances, with particular attention to those households and individuals that may be most

1 IPCC, *Climate Change 2022: Impacts, Adaptation, and Vulnerability*, *Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (2022), at https://report.ipcc.ch/ar6/wg2/IPCC_AR6_WGII_FullReport.pdf.

2 NOAA, National Centers for Environmental Information, "Billion-Dollar Weather and Climate Disasters: Overview," at https://www.ncdc.noaa.gov/billions/. Figures represent inflation-adjusted total costs for events resulting in at least $1 billion in damage, and stand as an all-time high for total costs during any five year increment.

3 *See* NOAA, National Centers for Environmental Information, "Billion-Dollar Weather and Climate Disasters: Overview," at https://www.ncdc.noaa.gov/billions/ and Board of Governors of the Federal Reserve System, *Economic Well-Being of U.S. Households in 2022* (May 2023), p.33, at https://www.federalreserve.gov/publications/files/2022-report-economic-well-being-us-households-202305.pdf. Note that survey respondents were asked about experiencing economic hardship from "natural disasters or severe weather events like flooding, hurricanes, wildfires, or extreme temperatures" within the preceding 12 months.

4 Exec. Order No. 14030, 86 Fed. Reg. 27,967 (May 25, 2021).

5 Exec. Order No. 13985, 86 Fed. Reg. 7,009 (Jan. 25, 2021).

adversely affected.[6] The development of this report was significantly enriched by the expert consultation of the Financial Literacy and Education Commission (FLEC) member agencies.[7]

Framework and Key Terminology

This report examines climate change and household finances through the framework of hazards, exposure, and vulnerability. This framework is commonly used by disaster management experts and policymakers to identify and mitigate potential risks and hazards, and inform planning and resource allocation for response and recovery efforts.[8] In this framework, "hazard" refers to an event or condition that has the potential to cause harm or damage. "Exposure" refers to the presence of a community or population in an area that could be affected by hazards. "Vulnerability" refers to the factors that make a community or population more susceptible to the effects of the hazard. The framework suggests that the potential for negative impacts is based on the combination of hazards, exposure, and vulnerability.

The framework and terminology chosen for this report draw from a range of research and other sources relevant to assessing climate change and its impacts, and key terms in this report are consistent with commonly used definitions across a range of public resources.[9] It is important to note that there are different ways to understand and evaluate climate change and its impacts, which can lead to variations in terms across different sources. The terms used in this report are discussed in more detail below.

Climate Hazards

This report investigates the impacts of "climate hazards" on American household finances. Climate hazards are physical events and processes- linked to or caused by climate change- that cause harm or damage to people, property, resources, and the environment. Climate hazards include both "climate events" and "climate conditions." The term "climate events" encompasses specific, acute, climate-related disaster events. Examples of climate events include floods, wildfires, and hurricanes. The term "climate conditions" refers to chronic phenomena and broader conditions such as higher average temperatures or sea-level rise.[10]

This report primarily focuses on exposure to the climate hazards of flooding (including flooding related to extreme weather events and sea level rise), wildfires, and extreme heat. While flooding, wildfires, and extreme heat are not the only hazards American households are exposed to, they are some of the most significant types of hazards associated with climate change in the United States. In addition to affecting broad areas of the country, they represent the top three hazards in terms of total costs of damage.[11]

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6 In April 2021, the Biden Administration's Executive Order 14030, *Climate-Related Financial Risk*, directed the Financial Stability Oversight Council (FSOC) to, among other tasks, "issue a report to the President on any efforts by FSOC member agencies to integrate consideration of climate-related financial risk in their policies and programs." In the resulting report, FSOC recommended "the Treasury Department engage other members of the Financial Literacy and Education Commission (FLEC) to analyze and understand the impact of climate change on the financial well-being of financially vulnerable populations." Executive Order 13985, *Advancing Racial Equity and Support for Underserved Communities Through the Federal Government*, states that the Federal Government should "pursue a comprehensive approach to advancing equity for all, including people of color and others who have been historically underserved, marginalized, and adversely affected by persistent poverty and inequality."

7 A full list of FLEC member agencies is included in Appendix 2.

8 *See* Billie L. Turner et al., "A Framework for Vulnerability Analysis in Sustainability Science," *Proceedings of the National Academy of Sciences of the United States of America*, Vol. 100, no. 14 (Jul. 8, 2003), p.8074-8079, at https://doi.org/10.1073/pnas.1231335100, and Susan L. Cutter et al., "A Place-Based Model for Understanding Community Resilience to Natural Disasters," *Global Environmental Change-Human and Policy Dimensions,* Vol. 18, no. 4 (Oct. 1, 2008), p.598-606, at https://doi.org/10.1016/j.gloenvcha.2008.07.013.

9 *See, e.g.,* U.S. Climate Resilience Toolkit, "Glossary," at https://toolkit.climate.gov/content/glossary, and FEMA, *National Risk Index Technical Documentation* (Mar. 2023), at https://www.fema.gov/sites/default/files/documents/fema_national-risk-index_technical-documentation.pdf.

10 Mikaël J.A. Maes et al., "Monitoring exposure to climate-related hazards: Indicator methodology and key results," *OECD Environment Working Papers*, no. 2 (Oct. 7, 2022), at https://doi.org/10.1787/da074cb6-en.

11 NOAA, National Centers for Environmental Information, "Billion-Dollar Weather and Climate Disasters: Overview," at https://www.ncdc.noaa.gov/billions/.

Exposure

This report utilizes the concept of "exposure" within the context of climate hazards and their impacts on American household finances. Exposure refers to the presence of individuals, communities, and assets in areas where climate hazards could harm or damage them. Across the country, certain climate events, such as floods or wildfires, may be more likely or less likely to occur based on a specific region's geography and environmental features. Different households face varying levels of exposure to climate hazards depending on their location and the particular climate hazards prevalent in their region.

Vulnerability

This report discusses households that are more vulnerable to financial strain due to climate hazards. In this context, "vulnerability" refers to increased susceptibility to the financial burdens that climate hazards create or exacerbate. When exposed to climate hazards, vulnerable households have more limited ability to prevent losses and to adapt to new challenges, making them more likely to experience financial strain, and lasting financial hardship. Household vulnerability is influenced by a variety of social, geographic, and economic factors, including household composition, and the demographic and structural makeup of a household membership.[12] Historical marginalization and racial discrimination have imposed disparities in access to essential resources and opportunities, including education, healthcare, and employment. The resulting uneven distribution of capital and power influence households' vulnerability to the damaging effects of climate hazards.

This report considers vulnerable populations to include individuals with lower incomes and wealth;[13] Black, Indigenous, and People of Color (BIPOC) individuals whose communities have been historically excluded from social and economic opportunities; women; older adults; and individuals with health conditions or disabilities. When exposed to climate hazards, households with these characteristics may experience disproportionate financial harm.

Household Finances

This report analyzes the primary pathways through which climate hazards impact household finances. For this discussion, "household finances" refers to household income, expenses, and certain assets such as checking and savings accounts for transactions as well as residential and other properties.[14]

When climate hazards cause strain on household finances, households' financial well-being may be reduced.[15] Financial well-being, a concept used in assessing household economic status, is typically described as a state of overall financial security and the ability to meet current and future financial obligations and goals. When climate hazards create costs, losses, or other financial burdens, they may cause households to struggle with managing their day-to-day finances, cope with unexpected expenses, and meet longer-term financial goals, thereby imposing financial hardship.

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12 Elena Pirani, "Household Composition," *Encyclopedia of Quality of Life and Well-Being Research* (2014), p.2944-2945, at https://doi.org/10.1007/978-94-007-0753-5_1319.

13 This report considers households with lower incomes to be a primary group that could be vulnerable to financial strain from climate hazards. However, households with higher incomes could also experience financial hardship and strain.

14 This report examines household finances primarily through the lens of a household's budget. Discussion of household income includes both earned income from wage and salary employment, as well as income support from public benefit programs. Impacts to households' expenses are considered across a range of consumer goods and services. This report does not delve into detailed implications of the effects of climate hazards on certain components of households' wealth or net worth such as home equity, stocks and mutual funds, retirement accounts, investment funds, and other financial assets; neither does this report discuss nonfinancial assets such as business equity. For more information on household finances and its constituent elements, see Board of Governors of the Federal Reserve System, "Changes in U.S. Family Finances from 2016 to 2019: Evidence from the Survey of Consumer Finances," *Federal Reserve Bulletin*, Vol. 106, no. 5 (Sep. 2020), at https://www.federalreserve.gov/publications/files/scf20.pdf.

15 While financial well-being is a concept frequently used in the context of research and policy related to household finance, it does not have a single standard use or definition. This report utilizes a concept of financial well-being consistent with commonly used definitions from organizations involved in consumer finance and education. *See* CFPB, *Report on the Financial Well-Being of U.S. Consumers* (Jan. 2015), at https://files.consumerfinance.gov/f/201501_cfpb_report_financial-well-being.pdf.

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WHAT could happen and WHO may face the most significant impacts

This section identifies and describes channels through which climate hazards may strain household finances. Some climate hazards cause widespread physical damage and force interruptions and closures of normal operations of businesses, governments, and other critical services. As a result, households could face significant financial strain from lost employment income due to job loss, reduced working hours, or from interruptions in access to income supports or other public benefits. Adding to these challenges, climate hazards make it more costly and harder for households to access a range of consumer goods and services. While many households are likely to be impacted, some households may be particularly sensitive to these added financial challenges. Discussion throughout this section identifies characteristics of households that may be vulnerable to financial strain and reduced financial well-being.

Households' Income and Expense Challenges

Lost earnings and access to employee benefits

Climate hazards can impact household finances by causing interruptions to employment-related income and benefits.[16] Climate events such as flooding and wildfires can damage businesses, as well as key infrastructure such as power systems, roads, and internet service. Moreover, hazards like wildfires or heat waves have the potential to create unsafe working or operational conditions that necessitate closures of businesses and infrastructure. Workers in areas impacted by these hazards may face income loss due to reduced working hours, job loss, or furlough, or could be forced to spend time away from work due to illness or injury.[17] Further, prolonged exposure to climate hazards such as extreme heat can impair workers' physical and cognitive abilities, which can lower their overall productivity and, consequently, result in a decline in their earnings.[18] Over the longer-term, recurring climate hazards, like wildfires or heatwaves, could prolong financial strain by reducing available jobs in certain sectors, potentially extending unemployment into months or years. Interruptions in employment have been shown to have persistent, negative impacts on workers' long-term earnings.[19] Adding to these challenges, prolonged time away from work may cause workers to lose access to employer-provided health insurance benefits, income replacement or paid leave, and employee assistance programs.[20]

Certain households are at greater risk of experiencing income loss related to climate hazards and the resulting financial strain. Households with workers in climate-exposed industries like agriculture, construction, manufacturing, and tourism may be particularly vulnerable to interruptions in employment income.[21] Outdoor workers, employees required to spend more than two-thirds of their workday outside, could be particularly impacted.[22] Outdoor workers comprise approximately 20 percent of the civilian workforce, and are more likely

16 *See, e.g.,* JiYoung Park, Minsu Son, and ChangKeun Park, "Natural disasters and deterrence of economic innovation: a case of temporary job losses by Hurricane Sandy," *Journal of Open Innovation*, Vol. 3, no. 1 (Mar. 1, 2017), p.20-21, at https://doi.org/10.1186/s40852-017-0055-2.

17 Joshua Graff Zivin and Matthew Neidell, "Temperature and the Allocation of Time: Implications for Climate Change," *Journal of Labor Economics*, Vol. 32, no. 1 (Jan. 1, 2014), p.1-26, at https://doi.org/10.1086/671766.

18 A. P. Behrer, R. J. Park, G. Wagner, et al., "Heat has larger impacts on labor in poorer areas," *Environmental Research Communications*, Vol. 3, no. 095001 (2021), at https://doi.org/10.1088/2515-7620/abffa3.

19 William T. Dickens, Robert K. Triest, and Rachel Sederberg, "The Changing Consequences of Unemployment for Household Finances," *RSF: The Russell Sage Foundation Journal of the Social Sciences*, Vol. 3, no. 3 (May 10, 2017), p.202-221, at https://doi.org/10.7758/rsf.2017.3.3.09 and Lori Kletzer, "Job Displacement," *Journal of Economic Perspectives*, Vol. 12, no. 1 (1998), p.115-136 at https://www.aeaweb.org/articles?id=10.1257/jep.12.1.115.

20 *See, e.g.,* Thomas Remington, "Inequality and Workforce Development in Maine in the Post-COVID-19 Environment," *Maine Policy Review*, Vol. 30, no. 2 (2021), p.116-125, at https://doi.org/10.53558/vhcd4408.

21 *See* U.S. Department of Labor, Occupational Safety and Health Administration, "Overview: Working in Outdoor and Indoor Heat Environments," at www.osha.gov/heat-exposure and Gerard Cachon, Santiago Gallino, and Marcelo Olivares, "Severe Weather and Automobile Assembly Productivity," *Columbia Business School Research Paper*, no. 12/37 (2012), at http://dx.doi.org/10.2139/ssrn.2099798.

22 Michelle Tigchelaar, David S. Battisti, and June T. Spector, "Work Adaptations Insufficient to Address Growing Heat Risk for U.S. Agricultural Workers," *Environmental Research Letters*, Vol. 15, no. 9 (Aug. 25, 2020), at https://doi.org/10.1088/1748-9326/ab86f4.

to be lower- to middle-income and belong to minority groups.[23] Already exposed to extremes in weather and temperature, outdoor workers may face worsening conditions in the years ahead that reduce income through cuts to working hours, job loss, or furlough. One study has suggested that for outdoor workers, future heat conditions could place approximately $55 billion, or about $1,700 per worker, of annual earnings at risk due to reduced working hours.[24] Lower-income households, who rely heavily on employment earnings to meet basic needs and often live "paycheck-to-paycheck" may experience compounding hardship from even short-term disruptions in earnings.[25]

Lost or limited access to public benefits programs

Climate hazards can also strain household finances by causing interrupted access to public benefit programs. Public benefits programs provide financial support to households through programs such as cash assistance, food support, housing assistance, and health insurance.[26] Many households participate in public benefits programs. In 2020, over one-third of people in the U.S. lived in households that received benefits from a means-tested program that based receipt on applicants' financial status. In addition, about 66 million Americans receive regular financial support through Social Security Old Age and Survivors' Insurance, a universal program, or through disability benefits.[27] Disruptions or limited access to public benefits programs can cause financial strain for many households.

Climate hazards may cause interruptions in access to benefits through disruptions to the payment system, including mail disruptions that may delay delivery of paper checks or physical damage that restricts access to banking services to deposit or access funds. For example, a severe weather event could prompt program office closures and thus interrupt access to critical services and the paperwork needed to apply for them. This event means households could have difficulty enrolling or staying enrolled in benefit programs for which specific supporting documentation is required. Many federal and state-administered benefits programs have complex administrative and eligibility requirements that may vary substantially by state or locality, and can be challenging for applicants to navigate under any circumstance.[28] When climate events force participants to relocate, or cause the loss of personal documents, households may be required to navigate new rules and systems in the jurisdictions to which they move, or struggle to successfully apply without a permanent address, exacerbating this complexity.

Property damage and destruction

Climate hazards can lead to significant financial strain by causing damage and destruction to households' property, requiring expenditures on repairs or replacement and potential impacts to property value. American households already face significant property damage costs related to climate change. A recent study found that in 2021, climate hazards affected one in ten homes in the United States and resulted in a total of approximately $56.92 billion in property damage among impacted households.[29] While remediation is often urgent, households may lack the resources needed to make repairs or may be delayed completing them. In some cases, delayed and incomplete repairs may lead to additional long-term property damage, resulting in additional costs or property

23 U.S. Bureau of Labor Statistics, "*Civilian occupations required to spend the most time outdoors in 2020*" (Jun. 25, 2021), at https://www.bls.gov/opub/ted/2021/civilian-occupations-required-to-spend-the-most-time-outdoors-in-2020.htm.

24 Kristina Dahl and Rachel Licker, "Too Hot to Work," *Union of Concerned Scientists* (Aug. 17, 2022), p.2, at https://www.ucsusa.org/resources/too-hot-to-work#read-online-content.

25 Board of Governors of the Federal Reserve System (2023), p.29.

26 U.S. Census Bureau, *Current Population Survey: POV-08 Program Participation Status of Household-Poverty Status of People* (2020), at https://www.census.gov/data/tables/time-series/demo/income-poverty/cps-pov/pov-08.html.

27 U.S. Social Security Administration, "Fact Sheet: Social Security" (2023), at https://www.ssa.gov/news/press/factsheets/basicfact-alt.pdf.

28 Pamela Herd and Donald P. Moynihan, *Administrative Burden: Policymaking by Other Means*, Russell Sage Foundation (2018), at https://hdl.handle.net/1721.1/138134.

29 CoreLogic, *2021 CoreLogic Climate Change Catastrophe* (Feb. 17, 2022), at https://www.corelogic.com/press-releases/corelogic-climate-change-catastrophe-report-estimates-1-in-10-u-s-residential-properties-impacted-by-natural-disasters-in-2021/.

abandonment.[30] For example, Hurricane Katrina damaged about 70 percent of all Louisiana properties, with approximately 17 percent remaining unrepaired and about 8 percent uninhabitable five years later.[31] In addition to repair costs, damage from climate events and conditions can also impact household finances by reducing the value of property. As in New Orleans following Hurricane Katrina, repair costs may cause some households to abandon owned housing due to declining property values or repair expenses surpassing the property's worth. Property abandonment can reduce household assets and impair their ability to build wealth through homeownership.[32] Box 1 discusses some of the dynamics related to the impact of climate hazards on housing and associated financial effects.

When climate hazards lead to damage and destruction of property, lower-income households may be vulnerable to disproportionate impacts. Households with lower incomes are more likely to live in structures that may be more easily damaged, such as manufactured housing, or to lack the funds to make their homes more resilient to climate hazards. Further, these households are also more likely to be in areas that are highly exposed to climate hazards, such as floodplains or areas prone to wildfires, making them even more vulnerable to damage and added expenses.[33]

Renter households, which have significantly less wealth and income in comparison to homeowners, are also vulnerable to financial strain.[34] Renters may have fewer resources or less ability to make structural improvements to their residences to prevent or mitigate damage.[35] Households with renters insurance may experience financial strain if certain climate hazards occur, as renter's insurance policies typically do not cover property damage from flooding.[36] Further, some research also suggests that rental markets may be slow to recover following a climate hazard, potentially limiting future housing availability and increasing cost.[37]

When climate hazards cause property damage and destruction, some households may be required to relocate.[38] For example, floods, wildfires, or hurricanes can make homes in impacted areas uninhabitable or unsafe for occupation. Displaced households could experience significant financial strain from expenses associated with relocation.

30 *See, e.g.,* Yang Zhang and Walter Gillis Peacock, "Planning for Housing Recovery? Lessons Learned From Hurricane Andrew," *Journal of the American Planning Association*, Vol.1, Issue 1 (Nov. 12, 2009), p.7, at https://doi.org/10.1080/01944360903294556 and Pejman Rezakhani, "Empirical study of housing recovery and property abandonment following valley fire in California: insights from neighborhood characteristics and building attributes," *International Journal of Disaster Resilience in the Built Environment* (May 26, 2022), at https://doi.org/10.1108/IJDRBE-01-2022-0004.

31 Jonathan Spader, "How much of the damaged housing stock was rebuilt after Hurricanes Katrina and Rita?," *Joint Center for Housing Studies of Harvard University* (Sep. 3, 2015), at https://www.jchs.harvard.edu/blog/how-much-of-the-damaged-housing-stock-was-rebuilt-after-hurricanes-katrina-and-rita.

32 Elizabeth Fussell, "The Long-Term Recovery of New Orleans' Population After Hurricane Katrina," *American Behavioral Scientist*, Vol. 59, no. 10 (Jun. 17, 2015), p.1231–45, at https://doi.org/10.1177/0002764215591181.

33 U.S. Department of Health and Human Services, SAMHSA, "Greater Impact: How Disasters Affect People of Low Socioeconomic Status," *Disaster Technical Assistance Center Supplemental Research Bulletin* (Jul. 2017), at https://www.samhsa.gov/sites/default/files/dtac/srb-low-ses_2.pdf.

34 *See* Board of Governors of the Federal Reserve System (2020), p.7, 11.

35 Taylor Gauthier, "The Devastating Effects of Climate Change on US Housing Security," *Aspen Institute* (Apr. 2021), at https://www.aspeninstitute.org/blog-posts/the-devastating-effects-of-climate-change-on-us-housing-security/ and U.S. Census Bureau, "The Wealth of Households: 2020," Current Population Reports, by Donald Hays and Briana Sullivan (Aug. 2022), at https://www.census.gov/content/dam/Census/library/publications/2022/demo/p70br-181.pdf.

36 Kris Bertelsen, "Renters and Homeowners Insurance: When the Unexpected Happens," Page One Economics, Federal Reserve Bank of St. Louis (Feb. 2020), at https://research.stlouisfed.org/publications/page1-econ/2020/02/03/renters-and-homeowners-insurance-when-the-unexpected-happens.

37 Sarah Hamideh, Walter Gillis Peacock, and Shannon Van Zandt, "Housing type matters for pace of recovery: Evidence from Hurricane Ike," *International Journal of Disaster Risk Reduction*, Vol. 57 (Apr. 15, 2021), at https://doi.org/10.1016/j.ijdrr.2021.102149.

38 Jake Bittle, *The Great Displacement: Climate Change and the Next American Migration*, Simon & Schuster (2023).

Box 1. Housing

In household finances, housing plays a complex role as both a major category of consumer expenditure and a tool for potential wealth accumulation. Housing can be a significant financial burden for rent-burdened households and those struggling with high housing costs but may also present an opportunity for greater financial security and stability for some who are able to build equity through homeownership. A reduction in home value can have negative implications for a homeowner's net worth, as home equity is often a significant component of household wealth. Further, a reduction in home value can make it more difficult for a homeowner to sell or obtain a loan against their property.

Damage from specific climate events can affect property values, as well as the projected level and frequency of potential exposure to future climate hazards. Research has found that property values in areas more prone to climate hazards are generally lower versus comparable properties in areas at lower risk for damage.[39] However, the extent to which property values and broader housing market dynamics reflect future exposure to climate hazards remains uncertain.[40] Some studies also suggest that approximately 40 percent of rental units in the United States are located in areas at risk of substantial annual economic losses from climate hazards, which could lead to reduced rental stock and lower housing affordability.[41] A significant vector for the impact of climate hazards on housing is likely to be the availability and cost of home insurance.[42] Some evidence shows that states with exposure to climate hazards are already experiencing higher insurance costs, and the availability of insurance could have differential impacts for mortgage availability. Further research is needed to better understand the full extent of the effects of climate hazards on housing and ramifications for household finances.

Higher prices for consumer products

Climate hazards can also strain household finances by increasing the costs of consumer goods through interruptions to production or distribution, including through impacts on established supply chains. For example, climate hazards such as droughts, floods, and extreme temperatures can reduce crop yields, creating shortages and higher food prices.[43] Further, when climate hazards occur, they can disrupt supply chains by interfering with transportation and logistics.[44] Delays and increased costs for shipping and storing goods can increase consumer prices. Because the U.S. imports a substantial amount of consumer goods from abroad, American households are exposed to price increases from both foreign and domestic climate hazards.[45]

Lower-income households may experience disproportionate financial strain from higher prices of consumer goods. Food is a spending category of particular concern. When climate hazards increase food prices, this may cause additional households to experience food insecurity, defined as limited or uncertain access to adequate food.[46] Food insecurity disproportionately impacts lower-income households, families led by single mothers,

39 Tim Ellis, "In Areas at High Risk for Wildfires, Relative Affordability Lures Homebuyers," *Redfin News* (Oct. 16, 2020), at https://www.redfin.com/news/home-prices-rise-slower-wildfire-risk/.

40 Miyuki Hino and Marshall Burke, "The effect of information about climate risk on property values," *Proceedings of the National Academy of Sciences*, Vol. 118, no. 17 (Apr. 27, 2021), at https://doi.org/10.1073/pnas.2003374118.

41 Joint Center for Housing Studies of Harvard University, *America's Rental Housing 2022*, Harvard University (2022), at https://www.jchs.harvard.edu/sites/default/files/reports/files/Harvard_JCHS_Americas_Rental_Housing_2022.pdf.

42 Renee Cho, "With Climate Impacts Growing, Insurance Companies Face Big Challenges," *Columbia Climate School* (Nov. 3, 2022), at https://news.climate.columbia.edu/2022/11/03/with-climate-impacts-growing-insurance-companies-face-big-challenges/.

43 U.S. Environmental Protection Agency, "Climate Change Impacts on Agriculture and Food Supply," at https://www.epa.gov/climateimpacts/climate-change-impacts-agriculture-and-food-supply.

44 Sandor Boyson et al., "How Exposed Is Your Supply Chain to Climate Risks?," *Harvard Business Review* (May 2, 2022), at https://hbr.org/2022/05/how-exposed-is-your-supply-chain-to-climate-risks.

45 *See* Galina Hale et al. "How Much Do We Spend on Imports?," Economic Letter, Federal Reserve Board of San Francisco (2019) and U.S. Census Bureau, Bureau of Economic Analysis, "U.S. International Trade in Goods and Services," (Aug. 2023), p. 21-23 at https://www.bea.gov/sites/default/files/2023-08/trad0623.pdf.

46 U.S. Department of Agriculture, Economic Research Service, "Definitions of Food Security," at https://www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-u-s/definitions-of-food-security/.

families with children, and households in Southern states.[47] The effects of climate-related food price increases may further exacerbate food insecurity among these households.

Increased spending on energy

As climate events and conditions continue to grow in frequency and intensity, additional spending on utilities may present a source of financial strain. Households could face higher energy prices if climate events cause interruptions to energy generation, disruptions to fuel production and distribution systems, and damage to energy resources and infrastructure.[48] In addition, climate conditions could require households to increase the amount of energy they use. For example, households exposed to heat waves and higher average temperatures are more likely to need and use air-conditioning, which could further increase energy costs and add to households' total utilities spending.[49] The potential increase in energy prices is a concern especially for lower-income households that already spend a larger share of their budget on utilities than higher-income households.[50]

Disruptions to dependent care

Climate events and conditions may lead to interruptions or cessations of childcare, senior care, and other care services, which could cause difficulty and financial strain for households that rely on these services. Extreme heat is causing an increasing number of school closures. Over the past decade, U.S. school districts have almost doubled the average number of heat-related school closings from three to four days to six to seven days annually.[51] In addition to extreme heat, flooding and other climate-related disasters can interrupt access to care by limiting the ability of businesses to remain open or impacting the availability of transportation.

These stresses exacerbate the existing crisis in the cost of childcare. If climate hazards force the closure of a family's regular childcare provider, temporarily or permanently, they may need to rely on informal networks or seek dependent care from more costly providers. Should alternative dependent care services be inaccessible, as is the case in many "childcare deserts" across the country, households may need to forego working hours to care for dependents, losing out on employment income.[52] Further, these dynamics may also impact current and future income and labor force participation, particularly for women who disproportionately shoulder care responsibilities.

Increased transportation cost and reduced availability

Climate hazards may increase households' spending on transportation. Households' expenditures on transportation vary depending on the mode and frequency of transportation, access to public transportation, and proximity to frequently visited places. Climate events can increase gasoline prices by causing shortages or increased demand.[53] For example, hurricanes that hit the Gulf Coast have disrupted oil production and resulted in price hikes at gas stations across the country.[54] Households that rely on personal gas-powered vehicles for

47 U.S. Department of Agriculture, Economic Research Service, "Food Security and Nutrition Assistance," at https://www.ers.usda.gov/data-products/ag-and-food-statistics-charting-the-essentials/food-security-and-nutrition-assistance/#:~:text=Food%20insecurity%20rates%20are%20highest,poverty%20line%20were%20food%20insecure.

48 D.W. Wanik, E.N. Anagnostou, M. Astitha, et al., "A Case Study on Power Outage Impacts from Future Hurricane Sandy Scenarios," *Journal of Applied Meteorology and Climatology* (Jan. 2018), at https://doi.org/10.1175/JAMC-D-16-0408.1.

49 U.S. Environmental Protection Agency, "Climate Change Indicators: Residential Energy Use," at https://www.epa.gov/climate-indicators/climate-change-indicators-residential-energy-use.

50 Marilyn A. Brown et al., "High energy burden and low-income energy affordability: conclusions from a literature review," *Progress in Energy* (Oct. 2020), at https://doi.org/10.1088/2516-1083/abb954.

51 Sverre LeRoy et al., *Hotter Days, Higher Costs The Cooling Crisis in America's Classrooms*, Center for Climate Integrity (Sep. 2021), at https://coolingcrisis.org/uploads/media/HotterDaysHigherCosts-CCI-September2021.pdf.

52 Child care deserts" refer to areas or communities with limited or no access to quality child care. *See* U.S. Department of the Treasury, *The Economics of Childcare Supply: A Review of the Literature* (Sep. 2021), p. 16, at https://home.treasury.gov/system/files/136/The-Economics-of-Childcare-Supply-09-14-final.pdf.

53 Jun Wen, Xin-Xin Zhao, and Chun-Ping Chang, "The impact of extreme events on energy price risk," *Energy Economics*, Vol. 99 (Jul. 2021), at https://doi.org/10.1016/j.eneco.2021.105308.

54 Ethan Brown, "Climate and Gas Prices: A Surprising Connection," Peril & Promise, PBS (Mar. 24, 2022), at https://www.pbs.org/wnet/peril-and-promise/2022/03/climate-and-gas-prices-a-surprising-connection/.

transportation face greater financial strain from higher fuel prices. In addition, climate events can also damage roads and transportation infrastructure, and may disrupt service or limit access to public transportation. Households relying on public transit could be forced to shift to costlier alternatives. Difficulties with transportation access and costs could create challenges for certain households' ability to access employment. In particular, hourly workers are more likely to have inflexible schedules and rely on public transportation to and from work.[55] Moreover, lower-income workers are less likely to have the option of working from home, as their jobs are more likely to be in industries that require physical presence, such as retail or manufacturing.[56]

Challenges with healthcare access and expenses

Climate events and conditions can result in physical injuries, including those requiring medical care. For impacted households, climate-related hospitalization or care services could lead to an overall increase in healthcare expenditures. The total cost of these expenses can be staggering. An analysis of 10 climate events in 2012 concluded that they created a total of $10 billion in health-related costs. Hurricane Sandy alone was estimated to have caused $3.1 billion (2018 dollars) in health-related expenses.[57] Climate hazards can also have far-reaching impacts on vast portions of the population, negatively affecting public health. For example, the 2023 wildfires in Canada led to poor air quality across the U.S., far from the fires themselves.[58] In addition, climate events can create financial challenges by reducing the availability of regular healthcare services. Events like flooding or hurricanes could cause damage forcing hospitals or emergency services to close. If individuals are unable to access routine medical care, chronic health conditions could worsen, requiring more expensive treatment or increased time away from work.[59]

Specific demographic groups may be more vulnerable to financial strain from healthcare costs, and more likely to experience additional healthcare needs due to climate hazards. Households with lower incomes are often less likely to have health insurance, reducing their ability to absorb added healthcare costs.[60] Further, households with older adults or with individuals with pre-existing health conditions may be more susceptible to additional negative health consequences when exposed to climate hazards. Climate hazards can exacerbate existing health inequities for households that are underserved by healthcare resources. In particular, households in rural or lower-income areas already have limited healthcare services. When climate hazards further reduce access in these areas, households may experience delayed treatment or management of healthcare conditions, which could lead to adverse health outcomes and increased healthcare costs over the longer-term.[61]

Climate Hazards and Financial Vulnerabilities

Climate hazards pose broad challenges to households' financial well-being. As described in the previous section, climate hazards can cause households to face income disruptions and unexpected increases in expenses. Concerningly, many households say they are unprepared to respond to unexpected expense or income challenges. In 2022, a Federal Reserve Board (FRB) survey found that roughly 63 percent of Americans reported they could not cover a $400 emergency expense using cash or its equivalent.[62] In the same survey, Black and Hispanic adults were the most likely to report difficulty paying monthly bills. Beyond unexpected expenses,

55 Sara McLafferty and Valerie Preston, "Who Has Long Commutes to Low-Wage Jobs? Gender, Race, and Access to Work in the New York Region," *Urban Geography*, Vol. 40, no. 9 (Oct. 21, 2019), at https://doi.org/10.1080/02723638.2019.1577091.

56 U.S. Bureau of Labor Statistics, *May 2022 National Occupational Employment and Wage Estimates* (Apr. 25, 2023), at https://www.bls.gov/oes/current/oes_nat.htm.

57 Vijay S. Limaye et al., "Estimating the Health-Related Costs of 10 Climate-Sensitive U.S. Events During 2012," *GeoHealth* (Sep. 17, 2019), at https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2019GH000202.

58 NOAA, "Smoke From Canadian Wildfires Blankets U.S." (Jun. 8, 2023), at https://www.nesdis.noaa.gov/news/smoke-canadian-wildfires-blankets-us.

59 Joel S. Weissman, "Delayed Access to Health Care: Risk Factors, Reasons, and Consequences," *Annals of Internal Medicine*, Vol. 114, no. 4 (Feb. 15, 1991), p.325, at https://doi.org/10.7326/0003-4819-114-4-325.

60 Alex Montero et al., "Americans' Challenges with Healthcare Costs," *Kaiser Family Foundation* (Jul. 14, 2022), at https://www.kff.org/health-costs/issue-brief/americans-challenges-with-health-care-costs/.

61 Jie Chen et al., "The Health Effects of Cost-Related Treatment Delays," *American Journal of Medical Quality* (Apr. 8, 2011), at https://journals.sagepub.com/doi/abs/10.1177/1062860610390352?journalCode=ajmb.

62 Board of Governors of the Federal Reserve System (2023), p.31.

the Consumer Financial Protection Bureau found in a 2021 survey that over one-third of households reported they would be unable to cover their regular expenses for more than a month if they lost their main source of income.[63] These findings indicate that certain households could experience severe financial strain from even brief interruptions in income if climate hazards result in injury or unemployment. To cope with these challenges, households may turn to savings accounts, credit, and insurance. Yet, certain households may encounter difficulties accessing or using these financial services. Households unable to utilize certain financial products and services, or conduct essential financial activities like making purchases, may be particularly vulnerable to lasting negative financial outcomes.

Challenges accessing funds

Households could experience financial strain if climate hazards interrupt access to their funds. Immediately following a climate event affecting electrical power and cell service, physical cash may be needed to conduct transactions.[64] This interruption creates challenges for the growing proportion of households that rely primarily on online or mobile banking services and may not have cash on hand. At the same time, households that rely more heavily on in-person banking services may also have difficulty managing expenses or conducting regular financial activities, as climate events could cause these facilities to be damaged, inaccessible, or destroyed.[65] Though mobile banking adoption rose significantly during the COVID pandemic, in-person banking services are still widely used by a significant minority of the population, particularly among certain demographic groups. A 2021 Federal Deposit Insurance Corporation (FDIC) survey found that in-person banking remains prevalent among lower-income households, households with lower levels of educational attainment, older households, and households that do not live in a metropolitan area.[66] These households could be particularly vulnerable to financial strain from interrupted access to bank branches.

Insurance gaps

Households commonly use home and property insurance to mitigate financial losses by providing coverage for potential damages. Insured households tend to recover better from disaster events than uninsured households, lessening the financial burden on policyholders as well as enhancing community recovery and disaster mitigation efforts.[67] Insurance providers are increasingly facing greater uncertainty surrounding climate hazards and growing numbers of claims, making it more difficult for insurers to predict losses, set premiums, and underwrite policies. As a result of these pressures, insurers could increase households' premiums, reduce coverage, or choose not to renew coverage for households in certain areas.[68] Reduced availability of insurance can negatively affect household finances by increasing risk exposure, limiting asset protection, and hampering the ability to make financial plans for the future.

These dynamics could cause significant financial strain for certain households by contributing to the "protection gap." The protection gap refers to the portion of economic losses not covered by insurance, which households must absorb.[69] Already, certain households, such as lower-income households may struggle to afford insurance premiums, which could constrain their ability to obtain adequate coverage. Higher premiums, reduced coverage, and reduced availability could further impede some households' ability to use insurance to protect

63 CFPB, *Making Ends Meet in 2022*, Office of Research Publication No. 2022-9 (Dec. 2022), at https://s3.amazonaws.com/files.consumerfinance.gov/f/documents/cfpb_making-ends-meet-in-2022_report_2022-12.pdf.

64 Federal Reserve Bank of New York, "Statement Regarding Cash Operations in Puerto Rico," (Sep. 27, 2017), at https://www.newyorkfed.org/newsevents/statements/2017/0927-2017.

65 FDIC, "An Assessment of the Effects of Hurricanes on FDIC-Insured Institutions," *FDIC Outlook* (2006), at https://www.fdic.gov/news/disaster/.

66 FDIC, *2021 FDIC National Survey of Unbanked and Underbanked Households* (Oct. 2021), at https://www.fdic.gov/analysis/household-survey/index.html.

67 Carolyn Koucky, "The Role of Natural Disaster Insurance in Recovery and Risk Reduction," *Annual Review of Resource Economics*, Vol. 11 (Oct. 2019), p.399-418, at https://doi.org/10.1146/annurev-resource-100518-094028.

68 State Farm General Insurance Company, "California New Business Update," news release (May 26, 2023), at https://newsroom.statefarm.com/state-farm-general-insurance-company-california-new-business-update//.

69 The Geneva Association, *The Global Insurance Protection Gap: Assessment and Recommendations* (2014), at https://www.genevaassociation.org/sites/default/files/research-topics-document-type/pdf_public/ga2014-the_global_insurance_protection_gap_1.pdf.

against financial strain.[70]

Reduced availability and increased cost of credit

Households may turn to credit to manage expenses related to climate hazards, particularly if they have limited savings or if there are delays in receiving insurance claim payments or disaster relief.[71] The U.S. Census Bureau's Household Pulse Survey found in a 2023 survey that over one-third of Americans impacted by a disaster within the past year reported that they turned to loans or credit cards to meet spending needs.[72] Further, households under financial strain are more likely to skip payments or pay less than is owed toward various financial obligations, including credit.[73] Delinquencies, forbearances, and other modifications to regular payments can lead to a range of negative consequences, including lower credit scores, which can raise household borrowing costs and reduce households' ability to obtain credit in the future.[74] These effects may be more pronounced for younger borrowers with thin credit files, and may also be more likely to occur following disasters that do not trigger special appropriations for disaster assistance beyond typical assistance allocations.[75]

While credit can provide an affordable short-term solution for those households able to access it, climate hazards may cause credit to become generally costlier or less accessible. Some research has demonstrated that financial shocks from natural disasters can harm household credit access for years following a disaster.[76] As households struggle to repay debt, financial institutions may reduce new credit offerings in areas struck by climate events as a de-risking measure, with significant consequences for community access to credit in the medium and longer-term.[77]

Some households that already lack access to commonly used consumer credit products may struggle to manage expenses related to climate hazards. For example, a 2021 FDIC survey found that unbanked and underbanked households were less likely to own a credit card and more likely to use costly alternative credit products such as payday and pawn shop loans.[78] Further, credit needs related to climate hazards may exacerbate longstanding issues that certain populations face in accessing credit. Historically, racial and ethnic minorities have been inadequately served by traditional credit models, and are less likely to have high-quality credit.[79] Research has shown that credit scores are less accurate, and often lower, for lower-income and minority borrowers.[80] Frequently, this is due to these consumers having no credit history or thin credit files, which can result from several disadvantages that have compounded in the credit system.[81] The combination of these factors suggest that for minority households with lower incomes, building or accessing credit post-disaster could be a more considerable challenge than for other households.[82]

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70 *Id*, at p.33-37.

71 Daniel Teles and Carlos Martin, "Why Does Disaster Recovery Take So Long? Five Facts about Federal Housing Aid after Disasters," The Urban Institute (Jan. 25, 2021), at https://www.urban.org/urban-wire/why-does-disaster-recovery-take-so-long-five-facts-about-federal-housing-aid-after-disasters.

72 U.S. Census Bureau, *Week 53 Household Pulse Survey: January 4 - January 16 Spending Table 2. Methods Used to Meet Spending Needs in the Last 7 Days* (2023), at https://www.census.gov/data/tables/2023/demo/hhp/hhp53.html. Note that figure is calculated as the percentage of respondents for demographic question "Used in the last 7 days to meet spending needs".

73 *See* CFPB (2022), p.27.

74 *See* CFPB (2022), p.29.

75 Caroline Ratcliffe et al., " Insult to Injury: Natural Disasters and Residents' Financial Health," The Urban Institute (2019), at https://www.urban.org/sites/default/files/publication/100079/insult_to_injury_natural_disasters_2.pdf.

76 *Id*, at p.18.

77 Basel Committee on Banking Supervision, *Climate-Related Risk Drivers and Their Transmission Channels* (2021), at https://www.bis.org/bcbs/publ/d517.pdf.

78 *See* FDIC (2021), p.66.

79 Lisa Rice and Deidre Swesnik, "Discriminatory Effects of Credit Scoring on Communities of Color," *Suffolk University Law Review* (2013), p.940, at https://bpb-us-e1.wpmucdn.com/sites.suffolk.edu/dist/3/1172/files/2014/01/Rice-Swesnik_Lead.pdf.

80 Robert Fairlie, Alicia Robb, and David T. Robinson, "Black and White: Access to Capital Among Minority-Owned Start-ups," *Management Science*, Vol. 68, Issue 4 (Apr. 2022), at https://doi.org/10.1287/mnsc.2021.3998.

81 Rocio Sanchez-Moyano and Bina Patel Shrimali, "The Racialized Roots of Financial Exclusion," Community Development Innovation Review, Federal Reserve Bank of San Francisco (2021), at https://www.frbsf.org/community-development/publications/community-development-investment-review/2021/august/the-racialized-roots-of-financial-exclusion/.

82 *See* Caroline Ratcliffe et al., (2019).

WHERE impacts may be felt

This section presents several maps illustrating locations where American households may be particularly exposed to future climate hazards and vulnerable to financial strain. The maps show projections of future exposure to wildfire, flooding, and extreme heat conditions across different U.S. locations. They also highlight the locations of households with characteristics that increase their vulnerability to financial strain, as discussed in the previous section. Three regions are profiled to illustrate some of the areas with high exposure to major hazards and high vulnerability: Appalachia, with high flood exposure; border regions between the U.S. and Mexico, with high exposure to wildfire; and the Mississippi Delta, with high exposure to extreme heat conditions.[83] Though these regions are not the only parts of the country where households may face challenges from climate hazards, exploring unique aspects of these regions' combination of vulnerabilities and climate hazard exposures demonstrates some of the varying ways that households may experience financial strain related to climate change.

Data and methods

The maps in this report were created using county-level data from two primary sources: the Centers for Disease Control and Prevention's (CDC) Social Vulnerability Index (SVI), and the U.S. Global Change Research Program's (USCGRP) Localized Constructed Analog (LOCA) climate scenarios.

The CDC's 2020 SVI is used to measure differences in household vulnerability across counties.[84] The SVI is designed to assess the vulnerability of communities in the U.S. to disasters and other emergencies by considering 16 different factors, including poverty, health conditions, and minority status, among others. The SVI ranks counties based on their combined scores across these factors, portraying the complex social and economic challenges vulnerable communities face.

Differences in counties' future exposure to climate hazards are measured using LOCA climate scenario data published by the USCGRP for the 4th National Climate Assessment.[85] These data represent county-level projections for climate conditions between 2016 through 2045, based on varying assumptions about emission levels and other factors.[86] Additional details on the data used for the maps in this report can be found in the Appendix.

The maps in this report demonstrate regions with heightened household vulnerability and future exposure to climate hazards. The maps presented in this section were generated by assessing each U.S. county's level of vulnerability and projected future exposure to climate hazards of flooding, wildfire, and heat, and sorting counties based on their percentile ranking.[87] The national maps presented in figures 1 and 2 depict counties that fall within the top 25 percent for future exposure to flooding, wildfire, and heat, and vulnerability, respectively. Regional maps presented in figures 2, 3, and 4 profile counties that fall within the top 25 percent for both future climate hazard exposure and vulnerability-- highlighting counties that stand at the intersection of both factors. The analysis in this report is at the county-level, enabling comparisons across counties in regarding their respective challenges. Within counties, specific areas may exhibit varying levels of vulnerability and exposure which cannot be captured in county-level maps. Additionally, counties ranking below the top 25 percent may still have significant concerns regarding vulnerability and exposure, although they are not depicted in the maps in this report.

83 The maps are presented in this section to facilitate and enable further exploration and identification of areas where populations may be particularly vulnerable to the negative financial impacts of climate hazards. These maps should not be interpreted as definitive predictions of future impacts at specific locations. Rather, they aim to highlight areas that may merit additional focus from policymakers, researchers, and other stakeholders.

84 CDC, *CDC/ATSDR Social Vulnerability Index (CDC/ATSDR SVI)*, ATSDR's Geospatial Research, Analysis & Services Program (2022), at https://www.atsdr.cdc.gov/placeandhealth/svi/fact_sheet/pdf/GRASP-Social-Vulnerability-Index-v10262022.pdf.

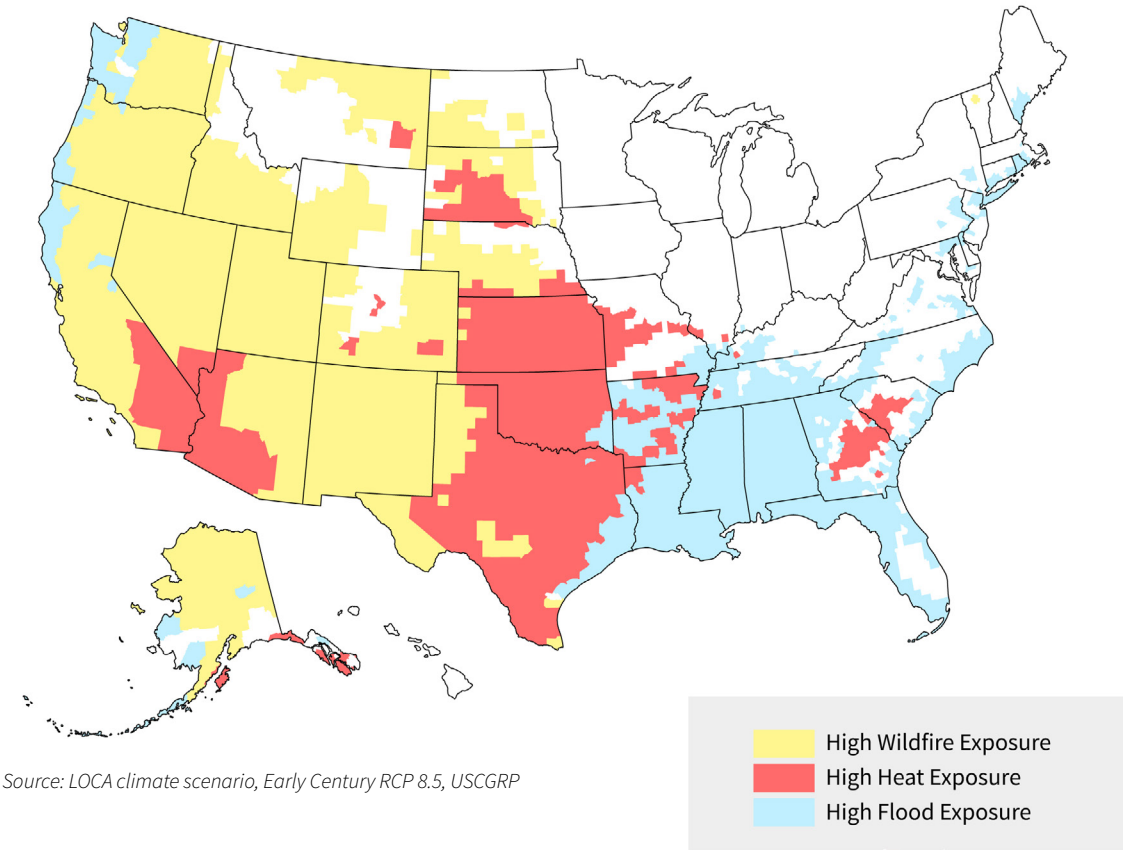
85 USGCRP, *U.S. Climate Thresholds – LOCA RCP 8.5 Early Century*, 4th National Climate Assessment (2018), at https://resilience.climate.gov/maps/nationalclimate::u-s-climate-thresholds-loca-rcp-8-5-early-century/about. Detailed technical documentation is available at https://scenarios.globalchange.gov/loca-viewer/.

86 The emissions assumptions in climate modeling are called a "Representative Concentrated Pathway," or "RCP". The data used to create the maps in this report rely on RCP 8.5, which represents a "business as usual" scenario. *See,* Christopher Schwalm et al., "RCO8.5 tracks cumulative CO2 emissions," Environmental Sciences (Aug. 2020), at https://doi.org/10.1073/pnas.2007117117 for more information on this scenario and its assumptions.

87 These variables are represented by the average number of days per year with precipitation in the 99th percentile, the average maximum number of consecutive days per year with no precipitation, and the average number of days per year with temperatures expected to reach at least 100F, respectively.

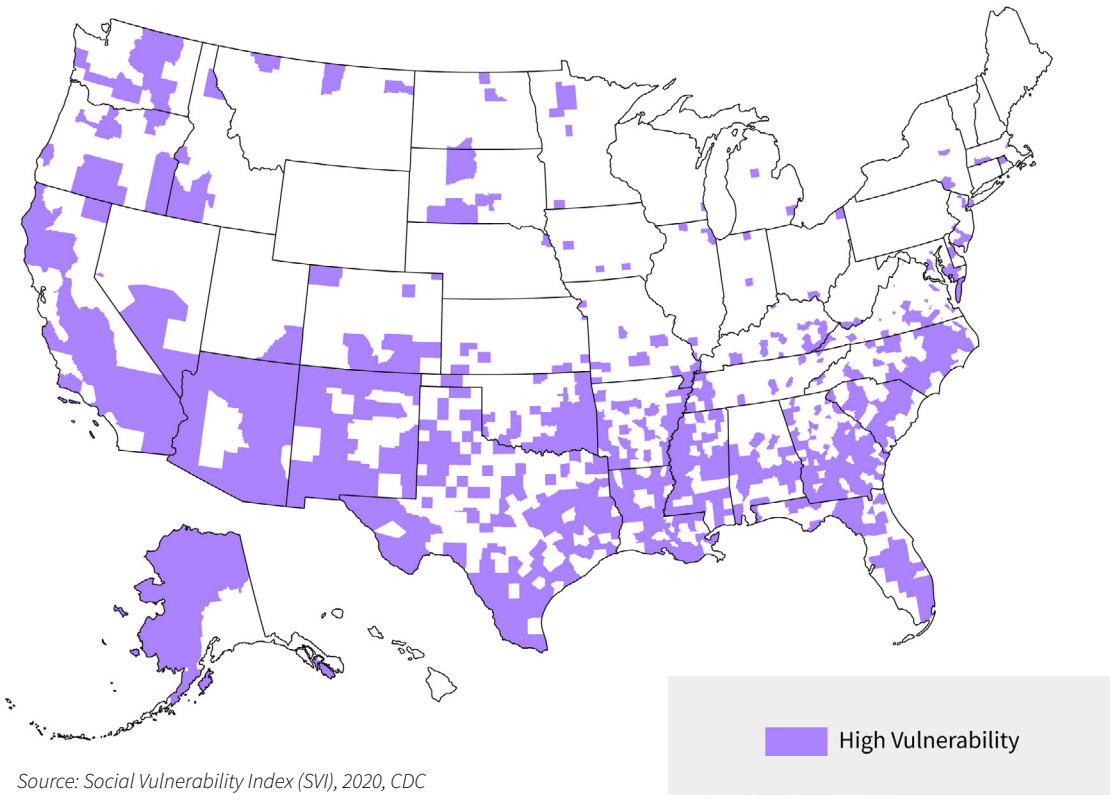
Mapping climate hazards across the U.S.

Figure 1. Predominant Category of Future Climate Hazard Conditions by County



Source: LOCA climate scenario, Early Century RCP 8.5, USCGRP

Figure 2. Social Vulnerability by County, Top 25 Percent



Source: Social Vulnerability Index (SVI), 2020, CDC

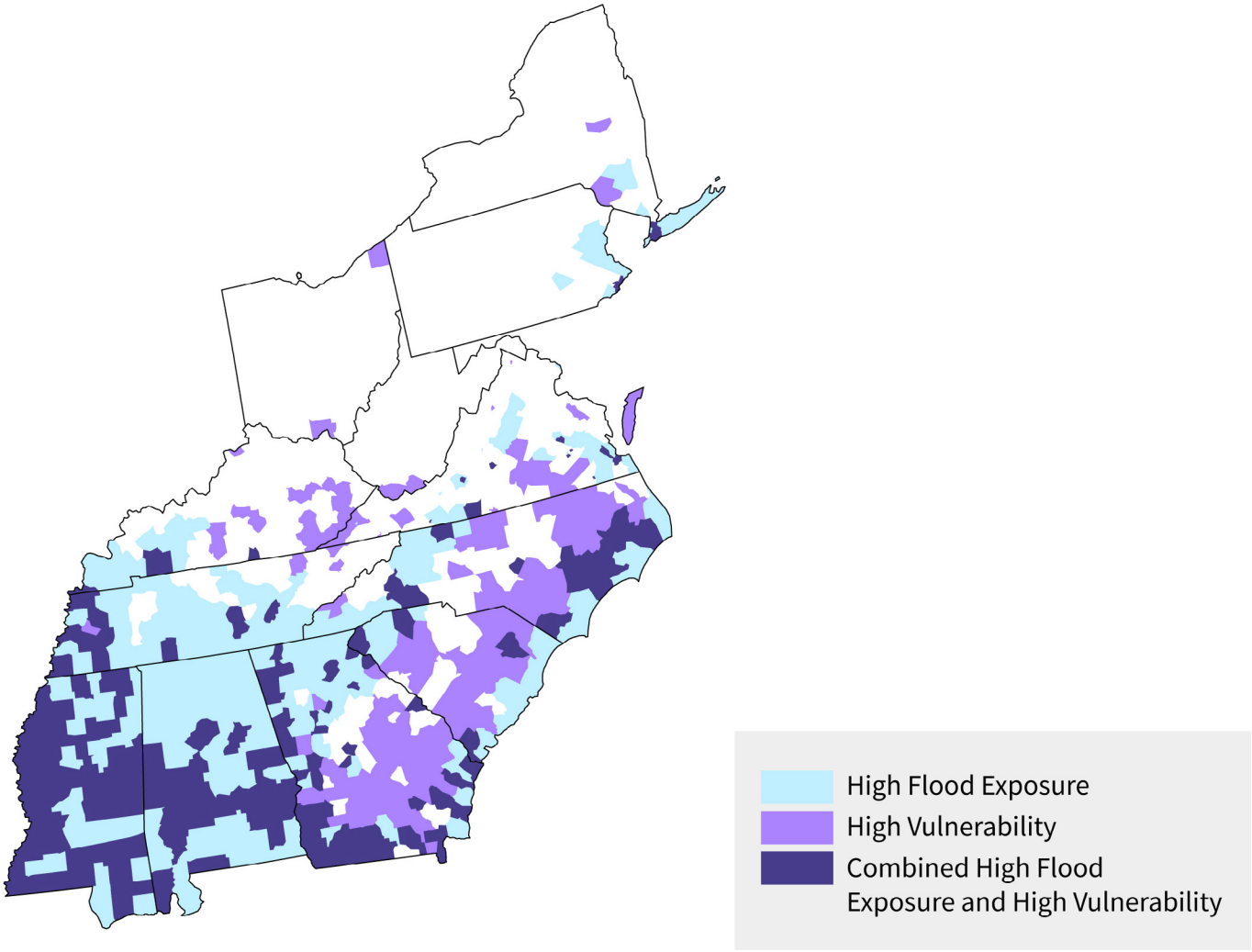
Figure 1 depicts U.S. counties with elevated future exposure to the climate hazards of flooding, wildfires, and heat, representing approximately 53 percent of all U.S. counties. While every county has some level of exposure to future climate hazards, this map specifically highlights those ranking in the top 25 percent levels for future exposure to either flooding, wildfire, or extreme heat, and depicts the predominant type of climate hazard exposure for each county. It is important to note that households across different regions may also be exposed to other kinds of climate hazards, such as sea-level rise or hurricanes, and that regions not indicated in Figure 1 may still have significant exposures to climate hazards below the county level, including in areas that may be densely populated. Further, it is important to note that counties in much of the U.S. are exposed to multiple types of climate hazards simultaneously – for example, both flood and wildfire, or wildfire and extreme heat. The presence of compounding climate hazards may amplify potential impacts, which is discussed in greater detail in the three regional examples below. Figure 2 charts areas with higher vulnerability by depicting U.S. counties ranking in the top 25 percent on vulnerability. This map highlights areas where the underlying population, as assessed at the county level, is most vulnerable to negative financial impacts from climate hazards.

Taken together, these two maps show that across the U.S., the location of households with higher vulnerability overlaps significantly with many areas that are more highly exposed to future climate hazards. While approximately 53 percent of counties face elevated exposure to at least one climate hazard, nearly one-fifth of all U.S. counties face both elevated vulnerability and elevated exposure to future climate hazards. These counties rank in the top 25 percent for both vulnerability and future exposure to at least one of the three climate hazards. While this analysis focuses on the impacts of climate hazards at a geographical level, other research has proposed that nearly a third of the U.S. population may experience one or more extreme weather events by 2050.[88] The below discussion on Appalachia, border areas between the U.S. and Mexico, and the Mississippi Delta discusses regional differences underlying these national-level statistics. These regions together account for the majority of counties at the intersection of high vulnerability and high exposure to the climate hazards highlighted in this report, and these cases illustrate many of the pathways through which climate hazards can cause financial strain for vulnerable populations at the household level.

88 Fulden Batibeniz et al., "Doubling of U.S. Population Exposure to Climate Extremes by 2050," *Earth's Future* (Mar. 23, 2020), at https://doi.org/10.1029/2019EF001421.

Flood Exposure in Appalachia

Figure 3. Projected Flooding and Vulnerability by County, Top 25 Percent Highest Exposure and Vulnerability



Source: LOCA climate scenario, Early Century RCP 8.5, USCGRP and Social Vulnerability Index (SVI), 2020, CDC

For projected future flood exposures, households in the Appalachian region are particularly vulnerable (Figure 3). Appalachia stretches throughout the Appalachian Mountain range, covering parts of Alabama, Georgia, Kentucky, Maryland, Mississippi, New York, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, Virginia, and all of West Virginia. As depicted in Figure 3, select counties across the region have elevated exposure to future floods. In addition, the region is also projected to experience extreme precipitation and prolonged periods of hot, dry conditions.[89] Heavy rainfall, following a drought, can heighten the risk of flash flooding. The combination of dry conditions and heavy rainfall can result in the rapid accumulation of water, overwhelming the capacity of rivers, creeks, and drainage systems, leading to sudden and destructive flash floods. Appalachia's mountainous terrain can exacerbate the impact of these extreme precipitation events. Recent events, like the devastating 2020 floods across central Appalachia, highlight the tangible challenges posed by climate hazards in this region.[90] In addition to disrupting normal business operations, supply chains, and essential services, floods can cause severe damage to property, infrastructure, and community resources, posing long-term economic repercussions. Moreover, flooding not only damages physical structures but also introduces health risks by contaminating water sources.[91]

When exposed to climate hazards, households in Appalachia may be particularly vulnerable to financial strain due to a combination of regional economic, demographic, and health factors. Historically, households in Appalachia have experienced both more limited employment opportunities and more limited access to education. While Appalachia has seen improvements in income and poverty in recent years, median household income in the region remains nearly 20 percent below the national .[92] In part due to these income constraints, households in this region may struggle to manage expenses if flooding events result in reduced working hours, or damage or destruction of household property. In comparison to other parts of the country, households in Appalachia are more likely to have reduced access to healthcare services and are more likely to experience poor health outcomes.[93] Further, the underlying population has a higher percentage of older adults, and people with disabilities and pre-existing health conditions.[94] If flooding results in illness, injury, or additional healthcare expenditures, households in Appalachia may experience significant financial strain.

89 Patricia R. Butler et al., *Central Appalachians Forest Ecosystem Vulnerability Assessment*, U.S. Department of Agriculture, Forest Service, Northern Research Station (2015), at https://www.fs.usda.gov/research/treesearch/47885.

90 The Center for Disaster Philanthropy, "2022 Central Appalachia Floods," (Nov. 11, 2022), at https://disasterphilanthropy.org/disasters/2022-central-appalachia-floods/.

91 CDC, National Center for Environmental Health (NCEH), Agency for Toxic Substances and Disease Registry (ATSDR), National Center for Injury Prevention and Control (NCIPC), "Floodwater After a Disaster or Emergency," at https://www.cdc.gov/disasters/floods/floodsafety.html.

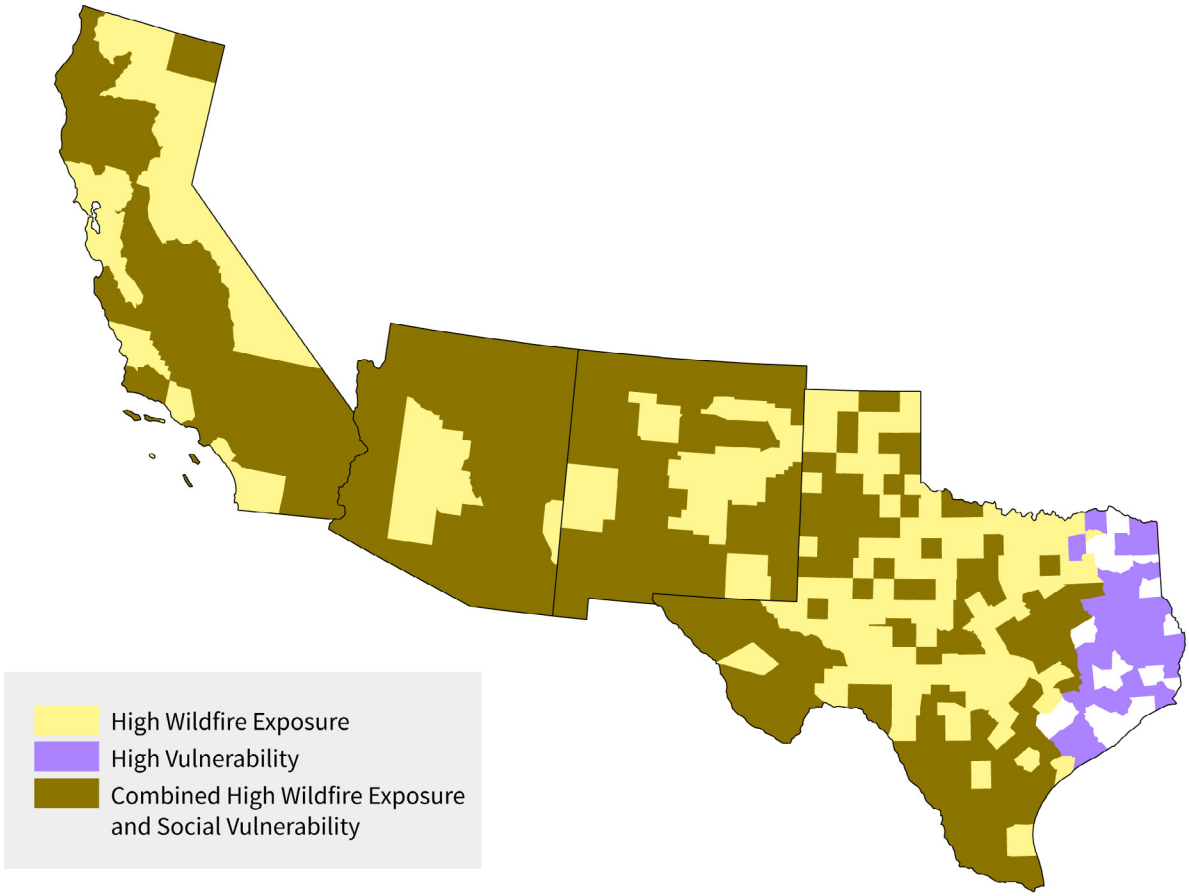
92 Appalachian Regional Commission, "Income and Poverty in Appalachia," at https://www.arc.gov/income-and-poverty-in-appalachia/.

93 Julie L. Marshall et al., *Health Disparities in Appalachia*, PDA Inc., Cecil G. Sheps Center for Health Services Research, Appalachia Regional Commission (Aug. 24, 2017), at https://www.arc.gov/report/health-disparities-in-appalachia/.

94 Evan Smith, "Socioeconomic and health disparities in Appalachia," *The University of Alabama Birmingham Institute for Human Rights Blog* (Jan. 6, 2021), at https://sites.uab.edu/humanrights/2021/01/06/human-rights-in-appalachia-socioeconomic-and-health-disparities-in-appalachia/.

Wildfire Exposure in Border areas in California, Arizona, New Mexico, and Texas

Figure 4. Projected Wildfire and Vulnerability by County, Top 25 Percent Highest Exposure and Vulnerability



Source: LOCA climate scenario, Early Century RCP 8.5, USCGRP and Social Vulnerability Index (SVI), 2020, CDC

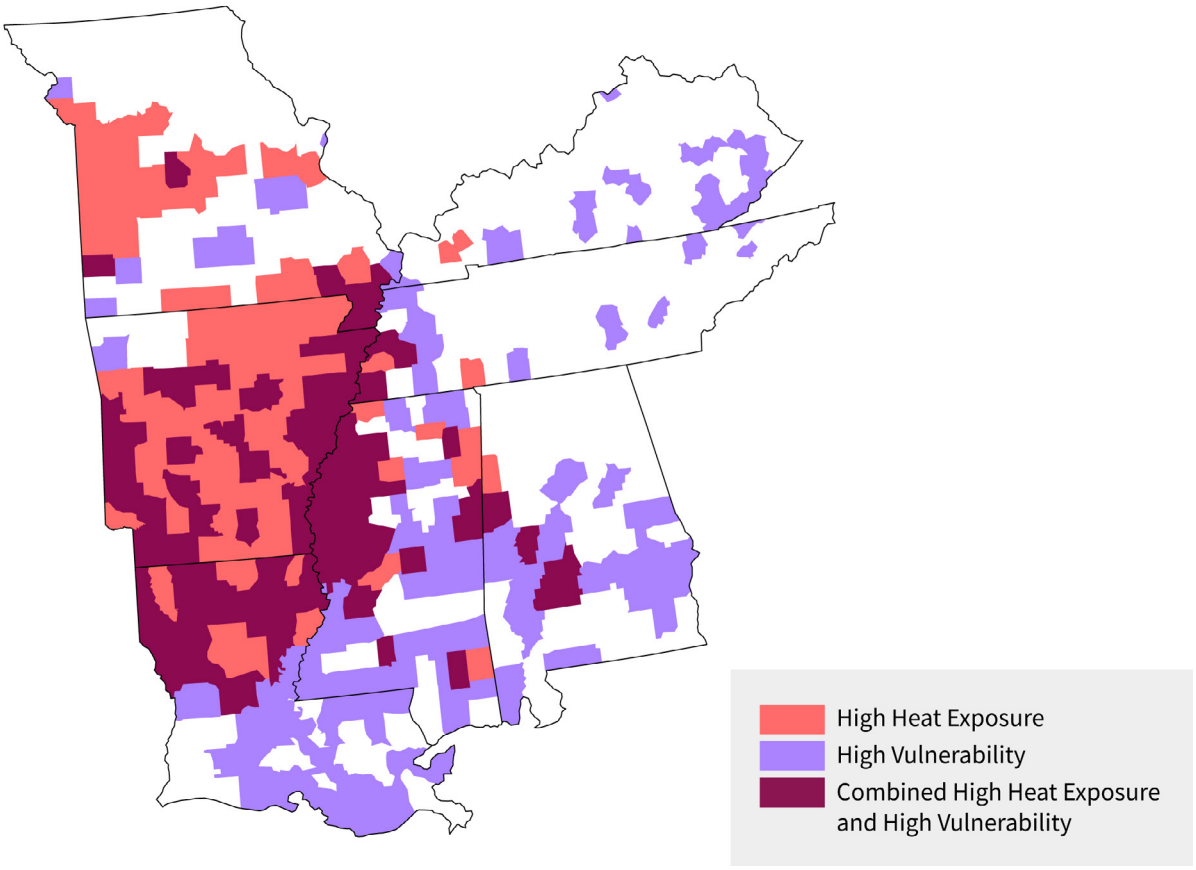
For projected future wildfire exposures, households in portions of the West Coast and border regions between the U.S. and Mexico are particularly vulnerable. The map in Figure 4 demonstrates that large areas across California, Arizona, New Mexico, and Texas have elevated exposure to future wildfires. The region is predicted to face exposures to multiple climate hazards, including rising temperatures and prolonged periods of hot, dry conditions. The combination of these factors amplifies the risk of wildfires. Wildfires can quickly spread across a large area, causing widespread damage to property, infrastructure, and essential services. The smoke and air pollution generated by wildfires can also create unsafe conditions for workers and exacerbate health concerns.[95] Wildfires can cause significant disruption to normal business operations, particularly for agriculture, which is a dominant sector in border regions.

The impacts of wildfires on vulnerable households in the U.S.-Mexico border region could be compounded by particular challenges facing these communities. As illustrated by Figure 4, the population in this area has higher levels of vulnerability. Households in the region are more likely to have lower incomes and might struggle to overcome the economic hardship of property destruction and displacement. In addition to these costs, households in the border region could be particularly vulnerable to financial strain from income loss. Many workers in the region are employed as outdoor workers in sectors such as agricultural production, which are particularly exposed to disruptions from wildfires. While wildfires can cause quick and dramatic environmental and physical damage, they can also persist for extended periods, meaning that households with outdoor workers in these areas could experience long-lasting income loss and financial strain. Adding to these challenges, households in the border region are often comprised of immigrant groups and Tribal communities and may experience barriers to accessing information and resources about climate hazards or emergency resources in appropriate languages.

95 U.S. Environmental Protection Agency, "Health Effects Attributed to Wildfire Smoke," at https://www.epa.gov/wildfire-smoke-course/health-effects-attributed-wildfire-smoke.

Heat Exposure in the Mississippi Delta

Figure 5. Projected Heat and Vulnerability by County, Top 25 Percent Highest Exposure and Vulnerability



Source: LOCA climate scenario, Early Century RCP 8.5, USCGRP and Social Vulnerability Index (SVI), 2020, CDC

The Mississippi Delta region has high levels of exposure to projected future extreme heat, as well as high levels of vulnerability. The Mississippi Delta region covers agricultural areas in Alabama, Mississippi, Louisiana, Missouri, and Arkansas. Due to its location, the region experiences comparatively high temperatures and humidity levels throughout the year. Recent research examining the impacts of future heat conditions has suggested that heat-related economic losses, adverse impacts on worker health, and mortality may be concentrated in counties across the Mississippi Delta region.[96] As global temperatures continue to rise, the Mississippi Delta is projected to have high exposure to more frequent and intense heat waves. High temperatures and humidity can have significant, negative impacts on public health by putting populations at risk of heat exhaustion, heat stroke, and other heat-related illnesses.[97] High temperatures and humidity not only impact public health, with the heightened risk of heat-related illnesses, but may also have a profound negative impact on agricultural productivity, the dominant sector in the region. In addition to extreme heat conditions, the region also has higher levels of exposure to flooding, hurricanes, tornadoes, and rising sea levels.[98] These hazards can also cause significant property damage and financial losses for impacted households.

In addition to future exposure to extreme heat, households in the Mississippi Delta also face higher levels of social vulnerability. Households in the region are more likely to have lower incomes, lower levels of educational attainment, and more limited access to healthcare services. The poverty rate in the Mississippi Delta region is around 25 percent, compared to the 10.5 percent national average.[99] Lower-income households often lack access to air conditioning, which may make them more susceptible to heat-related illnesses.[100] Additionally, households in the Mississippi Delta are more likely to include older adults and individuals with pre-existing health conditions. These households may experience financial strain from added healthcare and utility costs. Extreme temperatures in the region also may require outdoor workers to forego working hours and remain indoors. The population in the Mississippi Delta region is predominantly Black, and historical discrimination and segregation have contributed to systemic social and economic inequalities that may heighten vulnerability. Future climate hazards could compound existing social and economic disparities and may cause increased financial strain for vulnerable households in the region.

96 Atlantic Council, Adrienne Arsht Rockefeller Foundation Resilience Center, *Extreme Heat: The Economic and Social Consequences for the United States*, Vivid Economics (Aug. 2021), at https://www.atlanticcouncil.org/wp-content/uploads/2021/08/Extreme-Heat-Report-2021.pdf.

97 Diane Gubernot, G. Brooke Anderson, and Katherine L. Hunting, "The epidemiology of occupational heat exposure in the United States: a review of the literature and assessment of research needs in a changing climate," *International Journal of Biometeorology*, Vol. 58 (2014), p.1779-1788, at https://doi.org/10.1007/s00484-013-0752-x.

98 Carl C. Anderson et al., "Assessing Multi-Hazard Vulnerability and Dynamic Coastal Flood Risk in the Mississippi Delta: The Global Delta Risk Index as a Social-Ecological Systems Approach," *Water*, Vol. 13, no. 4 (2021), at https://www.mdpi.com/2073-4441/13/4/577.

99 U.S. Department of Agriculture, Economic Research Service, "Rural Child Poverty Was Most Concentrated in the Mississippi Delta," at http://www.ers.usda.gov/data-products/chart-gallery/gallery/chart-detail/?chartId=88503.

100 Rebecca Mann and Jenny Schuetz, "As extreme heat grips the globe, access to air conditioning is an urgent public health issue," The Brookings Institution (Jul. 25, 2022), at https://www.brookings.edu/articles/as-extreme-heat-grips-the-globe-access-to-air-conditioning-is-an-urgent-public-health-issue/.

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HOW to prepare and respond

American households are increasingly exposed to climate hazards, with cascading impacts on household finance. Without significant intervention, climate hazards are likely to cause compounding financial burdens for vulnerable households with fewer resources and limited ability to prepare for and recover from shocks. Though challenges are significant and require urgent action, policymakers, communities, and households have opportunities to prepare for and adapt to climate change, including through strategies to increase household financial resilience. The federal government plays a key role in aligning efforts aimed at fostering community resilience, building a sustainable future, and supporting household financial well-being.

Policymakers and communities should take action toward three key priorities: 1) promoting awareness of climate hazards and their financial consequences, and 2) building physical resilience and 3) financial resilience at the community and household level. These initiatives will require collaboration between government actors at all levels, including financial regulators, as well as market participants and communities.

With guidance and support from policymakers, community groups, and other stakeholders, households should similarly prioritize 1) building their understanding of specific climate hazards with the potential to impact them, 2) building physical resilience to protect physical and financial assets and manage current and future expenditures, and 3) building financial resilience to insulate their finances from negative impact as a result of climate hazards.

This section discusses the strategies and specific steps that communities and policymakers should take towards these recommendations and provides guidance to households on ways to prepare and build resilience against financial impact. While not exhaustive, these recommendations will help households adapt and may mitigate negative financial impacts from of climate change. Alongside these measures supporting household financial wellbeing, further work must be done to better define and assess the challenges that climate conditions and events pose to household finances and identify solutions.

Policymakers at all levels should plan and implement responses to climate change that recognize the diversity of local communities, and unique sources of vulnerability that may lead to differential impacts and require targeted intervention. Policy responses, especially consumer-facing programs or initiatives, should be designed to be culturally conscious and relevant to community needs. Further, policymakers should attend to legal or political context that may require targeted approaches, such as nation-to-nation diplomacy in Tribal and Native communities.

Opportunities for Communities and Policymakers

Promote awareness

Communities and policymakers play a critical role in supporting the financial well-being of households vulnerable to the challenges of climate hazards. Policymakers should disseminate information about climate hazards and their potential impacts, which serves as a critical initial step in preparing for and adapting to future climate hazards. By developing and promoting information about current and future climate hazard risks, governments can help support effective planning and decision-making by households, community-based organizations, and other actors on how to prepare, adapt to, and respond to hazards. Policymakers should also work to improve the effectiveness of efforts to educate the public by evaluating their channels of communication with the populations they serve, developing and strengthening communication channels where appropriate, and collaborating with trusted community-based organizations to disseminate information.

Examples of available tools and resources include the Climate and Economic Justice Screening Tool developed by the Council on Environmental Quality, and Climate Mapping for Resilience and Adaptation (CMRA) developed with support from the USCGRP.[101] These resources which may be useful for households, communities, and other government actors for identifying and assessing exposure and vulnerability to climate hazards across different

101 *See* U.S. Environmental Protection Agency, "EJScreen: Environmental Justice Screening and Mapping Tool," at https://www.epa.gov/ejscreen, and USCGRP, "Climate Mapping for Resilience and Adaptation" at https://resilience.climate.gov/.

regions.[102] Treasury, in coordination with the FLEC, is committed to ensuring that households have access to educational materials that explain how they may experience financial harm, how to build financial resilience ahead of climate hazards and natural disasters, and how to best manage financial challenges in the face of these hazards and disasters.

Build physical resilience

Communities and policymakers have opportunities to mitigate the negative effects of climate hazards by identifying and implementing adaptation measures that build physical resilience. Adaptation measures, including investments in physical infrastructure such as stormwater management systems, sea walls, protected energy infrastructure, or shade creation, may reduce the severity of climate hazards' physical impacts. Building physical resilience requires comprehensive and coordinated planning among federal agencies, states, localities, and Tribal partners. For example, current intergovernmental efforts to combat wildfire and heatwaves combine immediate mitigation measures, including clean air shelters and cooling centers, and longer-term adaptation measures, such as forest management and shade creation.[103] At the federal level, the Biden Administration in 2023 announced plans to adopt a National Climate Resilience Framework designed to advance federal government actions. This framework will work in conjunction with state, local, and Tribal government action towards building a climate-resilient nation.[104] State, local, and Tribal government leaders can also develop plans to reduce their communities' exposure to hazards, as well as climate action plans to work towards overall climate goals. State, local, and Tribal governments should utilize targeted engagement with constituents and detailed knowledge of their communities to develop adaptation strategies tailored to their unique combination of exposure and vulnerability to climate hazards.

Proactive hazard mitigation planning offers one approach for state, local, and Tribal governments to plan for climate adaptation. Proactive hazard mitigation planning helps to build physical resilience by minimizing the impact of disasters to reduce loss of life and property.[105] In the hazard mitigation planning process, state, local, and tribal governments first identify the natural hazards to which they are exposed and then develop and document long-term strategies for protecting people and property from those hazards. Having an approved hazard mitigation plan is also a requirement for state, local, and Tribal governments to access certain disaster assistance programs and mitigation programs and grants from the Federal Emergency Management Agency (FEMA).[106]

There are a range of specific strategies that state, local, and Tribal governments should consider as they plan and implement climate adaptation measures. One key measure is the adoption and enforcement of modern building codes, which is among the most cost-effective ways to safeguard communities against natural disasters, reducing casualties, property damage, and the cost of rebuilding.[107] Building codes can also help communities recover and rebuild faster by minimizing indirect costs such as business interruptions and

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102 The White House, "FACT SHEET: Biden Administration Makes Climate Information and Decision Tools More Accessible" (Oct. 12, 2021), at https://www.whitehouse.gov/briefing-room/statements-releases/2021/10/12/fact-sheet-biden-administration-makes-climate-information-and-decision-tools-more-accessible/.

103 The White House, "FACT SHEET: The Biden-Harris Administration Continues Efforts to Address Growing Wildfire Threat" (Jul. 28, 2023), at https://www.whitehouse.gov/briefing-room/statements-releases/2022/07/28/fact-sheet-the-biden-harris-administration-continues-efforts-to-address-growing-wildfire-threat/, and The White House, "FACT SHEET: 10 Ways the Biden-Harris Administration Is Responding to Extreme Heat" (Jul. 26, 2022), at https://www.whitehouse.gov/briefing-room/statements-releases/2022/07/26/fact-sheet-10-ways-the-biden-harris-administration-is-responding-to-extreme-heat/.

104 The White House, "FACT SHEET: Biden-Harris Administration Makes Historic Investments to Build Community Climate Resilience" (Jun. 19, 2023), at https://www.whitehouse.gov/briefing-room/statements-releases/2023/06/19/fact-sheet-biden-harris-administration-makes-historic-investments-to-build-community-climate-resilience/.

105 FEMA, "Hazard Mitigation Planning," at https://www.fema.gov/emergency-managers/risk-management/hazard-mitigation-planning.

106 Select FEMA programs requiring a hazard mitigation plan include Public Assistance grants, Fire Management Assistance Grants, Hazard Mitigation Grant Program, Building Resilient Infrastructure and Communities grant program, Safeguarding Tomorrow Revolving Loan Fund, and Flood Mitigation Assistance grant program. *See* https://www.fema.gov/grants for information.

107 FEMA, *Building Codes Save: A Nationwide Study of Loss Prevention* (Nov. 2020), at https://www.fema.gov/sites/default/files/2020-11/fema_building-codes-save_study.pdf.

lost income due to property damage. Moreover, modernized building codes may also help to reduce energy consumption and produce cost-savings for households over the longer term.[108]

Another important adaptation measure communities should consider is active floodplain management. Floodplain management is a community-based effort to prevent or reduce the risk of flooding. State and federal agencies, local communities, and property owners all have a role in reducing flood risk and building community resilience. The National Flood Insurance Program (NFIP) provides flood insurance to property owners, renters, and businesses, and having this coverage helps communities recover from flooding events. Participation in the NFIP is voluntary and requires that communities adopt minimum floodplain management standards. However, FEMA encourages adopting higher-than-minimum standards to foster safer, stronger, and more resilient communities.[109] To that end, FEMA also oversees the Community Rating System. This voluntary incentive program recognizes and encourages community floodplain management practices that exceed the NFIP minimum requirements through discounts on flood insurance premiums.[110] FEMA also provides tools and resources to help governments, individuals, and communities navigate NFIP requirements and implement higher standards of floodplain management.[111]

In addition to building physical resilience through implementing adaptation measures, governments should also take steps to improve households' access to and participation in programs related to climate adaptation. Research has shown that lower-income and minority households face barriers to adopting climate resilience measures such as energy-efficient home improvements, notwithstanding federal assistance programs.[112] A targeted approach, including actions such as additional outreach, education, and financial assistance, can improve household access to the benefits of climate resilience programs. Moreover, federal and state governments should consider establishing programs that promote long-term resilience and sustainability, which may include relocation assistance to households in highly exposed locations. For example, FEMA offers grants for property acquisition and structure relocation which support property owners to physically relocate existing structures outside a hazard-prone area.[113]

To finance climate adaptation measures, state, local, and Tribal governments should consider leveraging available Federal support, including targeted funding in the Inflation Reduction Act and Bipartisan Infrastructure Law.[114] Both the Inflation Reduction Act and Bipartisan Infrastructure Law provide historic levels of funding for communities to enhance their resilience to climate change. Specific climate-related provisions allow for investments in mitigation and adaptation strategies such as building or upgrading infrastructure to withstand extreme weather events, promoting sustainable transportation systems, improving emergency response capabilities, and implementing energy efficiency programs.[115] State, local, and Tribal governments should also explore additional financing for investments in adaptation measures through sources such as

108 The White House, "FACT SHEET: Biden-Harris Administration Launches Initiative to Modernize Building Codes, Improve Climate Resilience, and Reduce Energy Costs," (Jun. 1, 2022), at https://www.whitehouse.gov/briefing-room/statements-releases/2022/06/01/fact-sheet-biden-harris-administration-launches-initiative-to-modernize-building-codes-improve-climate-resilience-and-reduce-energy-costs/.

109 FEMA, "Floodplain Management," at https://www.fema.gov/floodplain-management.

110 FEMA, "Community Rating System," at https://www.fema.gov/floodplain-management/community-rating-system.

111 *Id*, 114.

112 Boris R. Lukanov and Elena M. Krieger, "Distributed solar and environmental justice: Exploring the demographic and socio-economic trends of residential PV adoption in California," *Energy Policy*, Vol. 134 (Nov. 2019), at https://doi.org/10.1016/j.enpol.2019.110935.

113 Federal Emergency Management Agency, "Property Acquisition and Structure Relocation," at https://www.fema.gov/hmgp-appeal-categories/property-acquisition-and-structure-relocation#.

114 The White House, *Building a Clean Energy Economy: A Guidebook to the Inflation Reduction Act's Investments in Clean Energy and Climate Action* (Jan. 2023), at https://www.whitehouse.gov/cleanenergy/inflation-reduction-act-guidebook/ and The White House, *A Guidebook to the Bipartisan Infrastructure Law for State, Local, Tribal, and Territorial Governments, and Other Partners* (May 2022), at https://www.whitehouse.gov/wp-content/uploads/2022/05/BUILDING-A-BETTER-AMERICA-V2.pdf.

115 United States of America, *2022 U.S. Climate Ambition Report*, Eighth National Communication and Fifth Biennial Report of the United States to the UN Framework Convention on Climate Change (Dec. 29, 2022), p. 94, at https://unfccc.int/documents/624756.

municipal bonds, public-private partnerships, and other existing state and federal grants.[116]

State, local, and Tribal governments may need additional resources to implement necessary adaptation measures. Programs like those established through the American Rescue Plan could serve as a template for future funding. For example, programs such as Treasury's Capital Projects Fund, which facilitates investments that meet communities' critical needs, may help state and local governments implement resilience and adaptation measures such as improving broadband access.[117] These investments may help bolster income resilience by reducing interruptions in employment for some workers and protecting communication channels between impacted communities and government leaders.

Build financial resilience

Alongside implementing physical adaptation measures, governments should support household financial well-being by building financial resilience. An important element of this involves governments providing targeted financial support for households impacted by climate hazards, which can help to reduce financial strain. The federal government currently has a range of household-level programs, including FEMA aid to households affected by events like hurricanes, floods, and wildfires.[118] Other emergency assistance programs such as those offered by the U.S. Small Business Administration (SBA) and the U.S. Department of Agriculture (USDA) can help impacted households access low-interest loans for businesses and homeowners.[119] Many state and local governments also provide disaster-related grants, loans, and services.

As climate hazards escalate, and particularly where they impact vulnerable communities, policymakers should continue to review the adequacy of existing sources of aid and identify and mitigate potential gaps. Research has shown that lower-income and minority households often receive less federal funding and assistance after a disaster due in part to federal policies and program design.[120] Research has highlighted barriers, including a lack of knowledge of the systems through which disaster survivors receive aid; discomfort with these systems; and challenges in getting to and from disaster assistance centers, such as limited transportation, childcare needs, and work schedules.[121] Careful evaluation of existing programs could shed light on opportunities to streamline or enhance access to existing programs and identify potential areas of additional need. For example, increasing the portability of public benefits across jurisdictions, or standardizing eligibility requirements, could help reduce administrative burden and provide additional stability for households who may need to relocate in the aftermath of a climate event. As climate hazards become more frequent and severe, existing, non-climate-focused assistance programs may also see additional uptake and could benefit from a similar review.

Governments should also work to support household financial well-being through collaboration with financial institutions, which themselves play an important role in helping households navigate new challenges from climate hazards. For example, financial institutions, including mission-driven institutions such as Community Development Financial Institutions (CDFIs), provide access to affordable loans, technical assistance, and financial counseling.[122] As these institutions serve as a bridge between financial services and underserved communities, they may be well-positioned to help households particularly vulnerable to financial strain.

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116 U.S. Environmental Protection Agency, "Federal Funding and Technical Assistance for Climate Adaptation," at https://www.epa.gov/arc-x/federal-funding-and-technical-assistance-climate-adaptation.

117 U.S. Department of the Treasury, "Capital Projects Fund," at https://home.treasury.gov/policy-issues/coronavirus/assistance-for-state-local-and-tribal-governments/capital-projects-fund.

118 FEMA, "Individual Assistance," at https://www.fema.gov/assistance/individual.

119 U.S. Small Business Administration, "Disaster Assistance," at https://www.sba.gov/funding-programs/disaster-assistance, and U.S. Department of Agriculture, Farm Service Agency, "Disaster Assistance Programs," at https://www.fsa.usda.gov/programs-and-services/disaster-assistance-program/index.

120 FEMA, *National Advisory Council November 2020 Report to the Administrator* (Nov. 30, 2022), at https://www.fema.gov/sites/default/files/documents/fema_nac-report_11-2020.pdf.

121 U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration, *Greater Impact: How Disasters Affect People of Low Socioeconomic Status*, Disaster Technical Assistance Center Supplemental Research Bulletin (Jul. 2017), at https://www.samhsa.gov/sites/default/files/dtac/srb-low-ses_2.pdf.

122 U.S. Department of the Treasury, Community Development Financial Institutions Fund, "About Us," at https://www.cdfifund.gov/about.

CDFIs and other financial institutions can help households impacted by climate hazards manage their finances and navigate the rebuilding and repair process. In addition, financial institutions can contribute to long-term community resilience by enabling and facilitating investments in adaptation measures that may mitigate the impact of climate hazards.

Financial regulators should, where appropriate, continue to support connections between financial institutions and communities by encouraging community reinvestment, facilitating partnerships, providing guidance, and supporting financial education and counseling. Through their Community Reinvestment Act (CRA) regulations, the federal banking regulatory agencies encourage banks to help meet credit needs in their communities, including engaging in certain disaster recovery activities that assist in stabilizing and revitalizing communities designated by the federal government as major disaster areas.[123] The agencies have proposed updating the CRA regulations to expand CRA-eligible activities to include certain disaster preparedness and climate resilience activities.[124] Examples of these activities include developing financial products and services that help residents, small businesses, and small farms in targeted geographies prepare for and withstand the impact of future disasters; supporting the establishment of flood control systems in a flood-prone low- or moderate-income or underserved or distressed nonmetropolitan middle-income census tract; and retrofitting affordable housing to withstand future disasters or climate-related events.

The regulatory agencies also have issued guidance encouraging banks to engage in practices that help customers and communities recover from disasters.[125] For example, the Office of the Comptroller of the Currency (OCC) encourages banks to consider variety of actions when disasters occur, such as: 1) waiving or reducing ATM fees, 2) temporarily waiving late payment fees or penalties for early withdrawal of savings for affected customers, 3) working with borrowers who have been affected by the event by restructuring borrowers' debt obligations, when appropriate, by altering or adjusting payment terms, 4) expediting lending decisions when possible, consistent with safety and soundness principles, and 5) reassessing the current credit needs of the community and helping meet those needs by originating or participating in sound loans to rebuild damaged property.[126] In 2022, the OCC published additional information detailing how banks can collaborate with CDFIs and other community-based organizations to help rebuild communities affected by disasters.[127] Financial regulators should continue engaging with and encouraging financial institutions to strengthen their role in mitigating the impacts of climate hazards on households.

Financial institutions should also take opportunities to evaluate existing products and services, including credit products, payment methods, and financial counseling, for their adequacy in meeting consumer financial needs in the context of climate hazards, and identify opportunities to improve product design and delivery. Financial institutions should continue evaluating ways that risk management procedures and methods of assessing creditworthiness may impact communities and areas with high vulnerability to climate hazards, including over the longer term.

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123 *See* OCC, "Designated Disaster Areas and Consideration Under the Community Reinvestment Act," Community Developments Fact Sheet (Aug. 2018), at https://www.occ.gov/publications-and-resources/publications/community-affairs/community-developments-fact-sheets/ca-fact-sheet-designated-disaster-areas-dec-2015.html, and Federal Deposit Insurance Corporation, "Supervisory Practices Regarding Depository Institutions and Borrowers Affected by Hurricane Ian in South Carolina," Financial Institution Letter 51-2022 (Dec. 2022), at https://www.fdic.gov/news/financial-institution-letters/2022/fil22051.html#guidance.

124 OCC, Federal Reserve System, FDIC, Community Reinvestment Act, 87 FR 33,884 (Aug. 2022).

125 *See* Board of Governors of the Federal Reserve System, "Supervisory Practices Regarding Banking Organizations and their Borrowers and Other Customers Affected by a Major Disaster or Emergency," Supervisory and Regulation Letter 13-6 (Mar. 2013), at https://www.federalreserve.gov/supervisionreg/srletters/sr1306.htm and FDIC, "Guidance to Help Financial Institutions and Facilitate Recovery in Areas of Louisiana Affected by Hurricane Ida," Financial Institution Letter 61-2021 (Sep. 2021), at https://www.fdic.gov/news/financial-institution-letters/2021/fil21061.html.

126 OCC, "Responding to a Declaration of a Legal Holiday or a Natural Disaster: Supervisory Guidance on Natural Disasters and Other Emergency Conditions," Bulletin 2012-28 (Sep. 2012), at https://www.occ.gov/news-issuances/bulletins/2012/bulletin-2012-28.html.

127 OCC, *Community Developments Investments: Partners in Recovery, Community Reinvestment and Resilience* (Apr. 2022), at https://www.occ.treas.gov/publications-and-resources/publications/community-affairs/community-developments-investments/apr-2022/pub-cdi-apr-2022.pdf.

Opportunities for Households

Build awareness

Understanding and preparing for climate change can help households mitigate negative financial impacts of climate hazards when they occur. Table 1 in the Appendix outlines specific steps households can take to prepare and adapt to climate hazards, along with accompanying resources. As an initial step towards preparation, households should seek a comprehensive understanding of climate hazards that could occur in their local area. Households can use publicly available data, research, and resources from reliable sources such as Climate Mapping for Resilience and Adaptation (CMRA), the U.S. Climate Resilience Toolkit, or FEMA's National Risk Index.[128] These resources offer information on a broad range of potential climate hazards and may be useful for households in evaluating their potential exposure. Households can also utilize the tools available at Ready.gov to plan for disasters. Federal products such as the FEMA mobile phone app provide real-time notifications about weather and other disaster alerts, as well as tips and resources for preparedness and recovery.[129]

Impacted households should be aware that they may be eligible for a range of federal, state, and local resources and benefits to assist their recovery from a climate event or to cope with climate conditions, including programs such as those from FEMA and SBA, among other sources. Households should also maintain vigilance against financial fraud and scams, and be aware that in the aftermath of a disaster, there is commonly an uptick in reported fraud, scams, and exploitation.[130] The scams that immediately follow a climate event typically take a few forms: fake charities, impersonations of disaster recovery support (e.g., impersonating FEMA representatives or banks), mortgage repayment or modification scams, robocall cash flow opportunities, and fraudulent job opportunities, among others.[131]

Improve preparedness

Households should look for opportunities to lower financial burdens caused by climate hazards by adapting their financial management strategies and assets (including homes and other property) for climate change. For example, reviewing property, auto, flood, fire, and other insurance can help households to ensure that coverages are appropriate and adequate for current and future risks. Households should seek unbiased consumer education materials to better understand potential issues and financial management strategies. For example, in September 2022, the National Credit Union Administration (NCUA) partnered with FEMA to host a webinar focused on how credit unions and their members can prepare for, and remain resilient in the face of, climate-related disasters, and published a consumer tip video highlighting key takeaways.[132] Another example is the FDIC's Money Smart financial education program, which addresses financial preparedness and recovery.[133] The program includes tools for preparing financially for disasters, reviewing insurance coverage, avoiding scams and receiving assistance to financially recover after a disaster. Consumers can access Money Smart materials directly or through intermediaries such as banks, universities, schools, non-profits, and other community-based organizations. The banking regulatory agencies also hold events to foster greater collaboration to support disaster recovery.[134]

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128 USGCRP, *Climate Mapping for Resilience and Adaption*, at https://resilience.climate.gov/ *and* U.S. Climate Resilience Toolkit, *Meet the Challenges of a Changing Climate*, at https://toolkit.climate.gov/; and FEMA, *National Risk Index for Natural Hazards*, at https://hazards.fema.gov/nri/.

129 FEMA, "FEMA Mobile Products," at https://www.fema.gov/about/news-multimedia/mobile-products.

130 B. E. Aguirre and David Lane, "Fraud in Disaster: Rethinking the Phases," *International Journal of Disaster Risk Reduction*, Vol. 39 (Oct. 2019), at https://doi.org/10.1016/j.ijdrr.2019.101232; U.S. Department of Health and Human Services, Administration for Children and Families, Office on Trafficking in Persons, and National Human Trafficking Training and Technical Assistance Center, *Trafficking Prevention and Disaster Response* (Feb. 2018), at https://nhttac.acf.hhs.gov/sites/default/files/2020-02/Trafficking%20Prevention%20and%20Disaster%20Response%20Literature%20Review.pdf; and FEMA, "Disaster Fraud," at https://www.fema.gov/about/offices/security/disaster-fraud.

131 *See* CFPB, "How Do I Avoid Scams and Fraud after a Disaster?," at https://www.consumerfinance.gov/ask-cfpb/how-do-i-recognize-and-prevent-against-fraud-after-a-natural-disaster-en-1529/ and Federal Trade Commission, "Dealing with Weather Emergencies," at https://consumer.ftc.gov/features/dealing-weather-emergencies#stayingalert.

132 *See* NCUA, "Register Now for Webinar on Climate-Related Preparedness" (Sep. 15, 2022) at https://ncua.gov/news/events/2022/register-now-webinar-climate-related-preparedness and NCUA, "Planning for the Unexpected," at https://mycreditunion.gov/life-events/planning-unexpected.

133 FDIC, "How Money Smart Are You? Resources," at https://playmoneysmart.fdic.gov/resources?tab=Tools.

134 *See* FDIC, "The FDIC, OCC, and FRB of San Francisco Promote the Equitable Distribution of Aid for LMI Communities Affected by Wildfires in Northern California," Community Affairs Events (Nov. 2022), at https://www.fdic.gov/resources/consumers/events/2022-12-15-equitable-distribution-aid.html.

Households should also consider government incentives to make climate-resilient property modifications, such as tax credits and home energy rebates for energy-efficient home improvements.[135] Such improvements could help ease the financial burden of climate events and conditions, including rising temperatures. For example, installing solar panels or upgrading heating and cooling systems may reduce the energy needed to heat and cool a home, saving households money on their utility bills. Some of the incentives available to households from the Inflation Reduction Act are described below in Box 2. Furthermore, the Low Income Home Energy Assistance Program (LIHEAP) program's flexibility may allow eligible households to make energy-related home upgrades or purchases such as air-conditioning units, and provide households assistance with utility bills.[136]

In addition to preparing their homes and property, households should prepare themselves for climate hazards by examining their finances and adapting their financial management strategies. Reviewing bills and payment dates can help households understand their cash flows, prioritize among payments, and avoid or reduce fees or penalties should a climate hazard occur and impose financial strain. Households may benefit from bolstering emergency savings if they are able. Households also may consider plans for meeting unexpected future expenses, including identifying assistance programs for which they may be eligible, or other low-cost or free resources in their area.

Additionally, households should take action to ensure that their income and savings remain accessible in the event of a climate event. Shifting to electronic payment of income and expenses can help to ensure that access to funds is not subject to interruption by a climate event or resulting relocation. Households should consider utilizing direct deposit to receive paychecks and switching to electronic payment of government benefits like Social Security and other programs through direct deposit or Direct Express prepaid debit cards. Other preparedness steps include gathering and protecting key documents such as deeds to property, insurance coverage, and medical information for each household member.

Box 2. The Inflation Reduction Act

The Inflation Reduction Act of 2022 is the largest investment to date in addressing climate change and building a clean energy economy in the United States. The Act includes grants, loans, rebates, incentives, and other investments designed to work towards the United States' 2030 emissions-reduction targets. The Act is intended to lower energy costs for American households and create new jobs, with specific provisions around worker pay, apprenticeship pathways, and investments in underserved communities.

The bulk of the Act's investments are designed to reduce greenhouse gas emissions from the power, transportation, and industrial sectors through upgrades to energy infrastructure and incentives for private investments in energy and climate funding. The Act also includes a range of provisions designed to strengthen and diversify America's clean energy supply chains.

The Act includes a broad range of benefits for households. For example, the Act provides tax credits for electric vehicles, energy-efficient home improvements, and clean energy credits. These tax credits can help reduce the initial cost of upgrades and may generate cost-savings over time as households save on fuel costs or expenditures on home energy use. In addition to these benefits, the Act also includes specific provisions for projects in disadvantaged communities, including additional credit amounts for solar and wind projects in lower-income communities and Tribal lands, and for renewable energy projects in historic energy communities (locations that have been heavily dependent on fossil fuels as a driver of economic activity).[137]

135 U.S. Department of Energy, Office of State and Community Energy Programs, "Home Energy Rebate Program," at https://www.energy.gov/scep/home-energy-rebate-programs.

136 U.S. Department of Health and Human Services, Administration for Children & Families, Office of Community Services, "About LIHEAP," at https://www.acf.hhs.gov/ocs/programs/liheap/about and The White House, "FACT SHEET: Biden Administration Mobilizes to Protect Workers and Communities from Extreme Heat" (Sep. 20, 2021), at https://www.whitehouse.gov/briefing-room/statements-releases/2021/09/20/fact-sheet-biden-administration-mobilizes-to-protect-workers-and-communities-from-extreme-heat/.

137 Interagency Working Group on Coal & Power Plant Communities & Economic Revitalization, "Background," at https://energycommunities.gov/background/.

Areas for further study

Government, researchers, and other stakeholders should engage in further work to understand the risks of climate change and its potential impacts on households' financial well-being. As climate events and conditions become more frequent and severe, so may the burdens they place on household finances. Much is still unknown about the extent and distribution of these financial burdens, as well as the effectiveness of potential mitigation strategies. For example, while climate change immediately impact household financial well-being, these burdens can potentially affect household finances for years to come. Further research is needed to better understand the long-term impacts of climate change on households' financial well-being, including how climate hazards can alter the trajectory of households' long-term financial and economic outcomes. Building knowledge about the financial impacts of climate hazards can inform the development of policies that mitigate negative effects and may help households to become more resilient and better prepared to weather the challenges of a changing climate. Beyond the physical impacts of climate hazards, climate transition, the shift away from a carbon-intensive economic system, may also have financial implications for households. Some dynamics related to climate transition and household financial well-being are discussed in Box 3.

Climate hazards can disrupt local economies, destroy homes and infrastructure, and force businesses to close. Further research could quantify how these effects translate to changes in household income and wealth, and how these impacts vary across different types of households. Additional research also may deepen our understanding of climate hazard impacts in specific areas of household finance, especially housing. Housing is the largest consumer expenditure in many households' budgets, while in many cases also serving as a core financial asset. In addition to causing expensive physical damage, climate change may reduce housing availability; increase the cost to rent, buy or maintain housing (including through consequences for mortgage availability); and affect property values and home insurance coverage. These impacts have serious consequences for household financial well-being and deserve additional dedicated attention from researchers.

Other work can be done to further investigate the experiences of specific populations that may face differential or disproportionate impacts. The unique challenges faced by populations such as small business owners, or different classifications of workers, could be better defined. Additional investigation of varied impacts could be coupled with review of existing benefits programs and their ability to fill gaps and mitigate negative outcomes for impacted workers, business owners, or other lower-income or vulnerable groups. Similarly, existing financial products and services should be evaluated for their adequacy in meeting consumer and household financial needs. Financial institutions have an important role to play in helping households build resilience to climate hazards. Research could investigate the availability and effectiveness of financial services and products such as insurance, savings accounts, and emergency loans for households impacted by climate hazards. The impact of climate hazards on insurance practices and availability is a particularly important area of inquiry, and some of this work is underway. In April 2023, the NCUA released a Federal Register Request for Information and Comment on Climate-related Financial Risk (RFI).[138] The RFI includes information and questions on the risks that impact vulnerable communities. The NCUA's Office of the Chief Economist produced a research note that analyzed credit union system exposure to negative effects of natural hazards to include the exposure of MDIs and low-income designated credit unions, which serve vulnerable communities.[139]

In order to identify the implications of climate hazards on the pricing and availability of insurance, Treasury's Federal Insurance Office (FIO) issued a request for comment in October 2022 on a proposed collection of nationwide data from certain Property and Casualty insurers regarding current and historical homeowners

138 NCUA, Climate-Related Financial Risk, 88 Fed. Reg. 25,028 (Apr. 25, 2023), at https://www.federalregister.gov/documents/2023/04/25/2023-08715/climate-related-financial-risk.

139 NCUA, "Estimating Credit Union Exposure to Climate-Related Physical Risks," (Apr. 2023), at https://ncua.gov/news/publication-search/climate-financial-risk/estimating-credit-union-exposure-climate-related-physical-risks.

insurance underwriting.[140] The proposed data collection would provide a better understanding of how climate-related risks impact insurance coverage for families and individuals across the United States, including evaluating the potential for major disruptions of private insurance coverage in regions of the country particularly vulnerable to climate change impacts. FIO is also working with other federal agencies to assess how other publicly available information, such as that obtainable through the NFIP's flood insurance data and analytics portal and hazard maps, could complement its analysis.[141] Additionally, in June 2023, FIO issued a report on insurance supervision and regulation of climate-related risks in response to President Biden's Executive Order on Climate-related financial risk.[142] The report, which is one of several steps that FIO is taking to assess climate-related financial risk, contains 20 recommendations for the National Association of Insurance Commissioners (NAIC) and state insurance regulators on how integrate climate-related risk into insurance regulation more fully. In the report, FIO recommends that the NAIC, state insurance regulators, the insurance industry, FIO, the FLEC, and other partners work together to increase consumer education and outreach regarding what climate-related risks are (and are not) commonly covered under personal lines of insurance and take steps to raise public awareness of the nature and magnitude of climate-related risks. FIO further recommended continuing to encourage consumers to take advantage of educational and outreach programs in markets vulnerable to climate change, including programs relating to the value of, and opportunities for, pre-disaster mitigation investments in property resilience. Public-private partnerships with the insurance industry can aid this educational effort.

In addition to these concerns, research could investigate household impacts that may be more difficult to quantify. For example, climate hazards can have significant psychological impacts on households, including stress, trauma, and anxiety. Research investigating the relationship between climate hazards, mental health, and financial decision-making may help identify strategies to support households' financial well-being in the aftermath of a climate event. Other research could focus on the role of social and community support networks in climate hazard resilience. These networks, which can include organizations such as community groups or community-based nonprofits, can provide a range of support services to those affected by a climate event. Research could investigate the role of these support systems in mitigating negative financial impacts and could lead to the identification of partnership opportunities between government, community, and nonprofit organizations.

140 FIO, Agency Information Collection Activities; Proposed Collection; Comment Request; Federal Insurance Office Climate-Related Financial Risk Data Collection, 87 Fed. Reg. 64,134 (Oct. 21, 2022). This notice links to additional instructions and an example template for insurers to complete. *See* FIO, *Climate-Related Financial Risk Proposed Data Collection: Instructions* (Oct. 18, 2022), at https://home.treasury.gov/system/files/311/FIO-Proposed-Climate-Data-Call-Instructions.pdf and FIO, *Climate-Related Financial Risk Proposed Data Collection: Template* (Oct. 18, 2022), at https://home.treasury.gov/system/files/311/FIO-Proposed-Climate-Data-Call-Template.xlsx.

141 FIO, U.S. Department of the Treasury, *Insurance Supervision and Regulation of Climate-Related Financial Risks* (Jun. 27, 2023), at https://home.treasury.gov/system/files/136/FIO-June-2023-Insurance-Supervision-and-Regulation-of-Climate-Related-Risks.pdf.

142 *See* FIO (June 27, 2023), p.5.

Box 3. Climate Transition and Building a Clean Energy Economy

Climate change poses numerous challenges to American communities and households. This report focuses on the physical impacts of climate hazards on household finances. The transition from a carbon-intensive economy to a low-carbon or carbon-neutral economy, while likely to pose new economic opportunities, could also lead to significant changes in household finances.[143] Shifting towards renewable energy and other sustainable practices will require wide-ranging changes in energy sources, land use, infrastructure, production, and consumption.[144]

The impacts of economic shifts are likely to have disproportionate impacts on certain populations. As the economy moves away from carbon-intensive industries, businesses that produce or rely on fossil fuels may need to adapt. Job losses and decreased economic activity in certain regions or sectors could create economic hardship for workers and communities that depend on these industries.[145] Workers and job seekers may need additional funds for education, re-skilling, or relocation. In addition to potential impacts on household income, climate transition, alongside the escalating impacts of climate change, may make it necessary for households to make up-front investments in adaptation measures. While these investments may benefit households over time, major expenditures could be challenging for households with limited financial resources, or out of reach without additional assistance.[146] Further, climate transition can have implications for household wealth and investments as a result of asset rebalancing.[147]

There is also potential for widespread economic benefit in building a future clean energy economy. Building a clean energy economy could generate economic growth and create new jobs through developing and expanding new industries and additional economic activity in sectors such as energy, transportation, or manufacturing. The public and private investments associated with these new industries could also stimulate economic activity in areas that have previously experienced decline or economic stagnation, potentially providing new employment opportunities and improving economic conditions for many households and communities.

Additionally, moving towards a clean energy economy could produce significant benefits and cost-savings for households, including advancements in technologies and industries that allow households to take advantage of improved or innovative goods and services. New energy production and infrastructure investments could improve efficiency and reduce household utility and transportation costs. Investing in a carbon-neutral clean energy future has the potential to generate widespread societal and economic benefits through improvements to the physical environment that benefit overall public health. These changes could help raise living standards and increase the safety of vulnerable populations disproportionately affected by the physical impacts of climate change.

The Federal government plays a key role in managing the risks and seizing the opportunities of climate transition. Strategies for mitigating negative outcomes and taking advantage of opportunities will involve balancing economic, social, and environmental needs. Through careful planning, collaboration, and the development and implementation of appropriate policy responses, federal, state, and local government

143 The White House, Council of Economic Advisers, *New Tools Needed to Assess Climate-Related Financial Risk*, by Heather Boushey, Noah Kaufman, and Jeffrey Zhang (Mar. 23, 2022), at https://www.whitehouse.gov/cea/written-materials/2021/11/03/new-tools-needed-to-assess-climate-related-financial-risk-2.

144 Governor Lael Brainard, "Building Climate Scenario Analysis on the Foundations of Economic Research," Speech presented at the 2021 Federal Reserve Stress Testing Research Conference, Federal Reserve Bank of Boston (Oct. 7, 2021), at https://www.federalreserve.gov/newsevents/speech/brainard20211007a.htm.

145 Council of Economic Advisers and Office of Management and Budget, *Methodologies and Considerations for Integrating the Physical and Transition Risks of Climate Change into Macroeconomic Forecasting for the President's Budget* (Mar. 13, 2023), p. 25, at https://www.whitehouse.gov/wp-content/uploads/2023/03/CEA-OMB-White-Paper.pdf.

146 Council of Economic Advisors, *Economic Report of the President* (Mar. 2023), p.295, at https://www.whitehouse.gov/wp-content/uploads/2023/03/ERP-2023.pdf.

147 *See, e.g.,* Francesca Diluiso et al., "Climate Actions and Stranded Assets: The Role of Financial Regulation and Monetary Policy," *CEIS Working Paper No. 501* (Jul. 22, 2020), at https://doi.org/10.2139/ssrn.3658126 and Ceres, "Responsible Retirement Investing," at https://www.ceres.org/accelerator/responsible-retirement.

actors can support vulnerable populations and ensure that the benefits of the evolving economic system are fair and inclusive. The Biden Administration's Investing in America agenda – including the Bipartisan Infrastructure Law and the Inflation Reduction Act – aims to mobilize historic levels of funding so that all Americans can benefit from the growth of the clean energy economy. These investments, and other federal, state and local resources, will be key to building an equitable clean energy economy.[148]

Conclusion

Climate hazards can cause income loss, increase expenses, and place additional burdens on American households' savings, credit, and insurance coverage. These effects could have severe and lasting negative implications for the financial well-being of American households, particularly lower-income households, and other vulnerable groups. Many of these effects have already been felt by households who have experienced climate-related extreme weather events.

The federal government response to climate change is coordinated at the national level, but climate hazards and their consequences are highly localized. This report has identified and explored geographical locations at the intersection of exposure to climate hazards and vulnerability to negative financial impacts and has illustrated the specific channels through which households may experience financial impacts.

In addition, this report reviewed opportunities to mitigate climate hazards' negative effects. Federal, state, and local governments play a crucial role in sharing information, providing public resources and benefits, and managing strategies for climate adaptation. Similarly, households may have opportunities to mitigate the risk of financial strain by learning about potential exposures and, where feasible, taking steps to prepare and adapt.

As climate change hazards continue to evolve, new research will be essential to understanding potential impacts on households. This report recommends further research into the effects of climate change and climate hazards on housing and small businesses, the effects of local fiscal constraints, and the role of and potential impacts on insurance.

148 The White House, *Building a Clean Energy Economy: A Guidebook to the Inflation Reduction Act's Investments in Clean Energy and Climate Action* (Jan. 2023), at https://www.whitehouse.gov/cleanenergy/inflation-reduction-act-guidebook/ and The White House, *A Guidebook to the Bipartisan Infrastructure Law for State, Local, Tribal, and Territorial Governments, and Other Partners* (May 2022), at https://www.whitehouse.gov/wp-content/uploads/2022/05/BUILDING-A-BETTER-AMERICA-V2.pdf.

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Appendix 1. Resources for Households

Learn about exposure to climate hazards

Climate Mapping for Resilience and Adaptation (CMRA)
You can use this mapping tool to learn about which climate-related hazards are occurring today, and check how your exposure to five common climate-related hazards is projected to change over time.

The U.S. Climate Resilience Toolkit
You can use the resources at this site to better understand and manage climate-related risks and opportunities, and learn about how to make your community more resilient to extreme events.

FEMA National Risk Index (NRI)
You can use this interactive online tool to learn about which natural hazards pose risk to your community.

FEMA Flood Map Service Center
You can use this site to find your official flood map, access a range of other flood hazard products, and take advantage of tools to help you better understand flood risk.

HHS LIHEAP and Extreme Heat Map
You can use the resources at this site to learn about your area's exposure to extreme heat, and access resources related to the Low Income Home Energy Assistance Program (LIHEAP).

CFPB Resources for Housing Decisions
Homebuyers, homeowners, renters, and real estate professionals can use linked resources to explore and understand their climate risk.

CDC National Environmental Public Health Tracking Network
You can use the data, maps, and tools at this site to explore information related to air quality, water quality, chemical exposures, and other environmental factors that can impact public health.

Develop a plan of what to do if a climate hazard occurs

Ready.gov
This site provides information and resources to help you prepare for and respond to emergencies by taking steps like creating emergency plans, building emergency supply kits, and learning how to stay informed during emergencies.

FEMA App
You can use this app to receive real-time weather alerts, locate emergency shelters in your area, prepare for common hazards, and more.

FEMA Protective Actions Research Home Page
You can access this site to learn about protective actions to help you prepare for, keep safe during, and recover from a disaster. From natural disaster warnings to common emergency protective actions, you can find over 380 protective actions based on more than 275 research studies and articles by dozens of subject matter experts.

FEMA Emergency Financial First Aid Kit
You can access a the Emergency Financial First Aid Kit (EFFAK) toolkit at this website that offers practical guidance, checklists, and resources to help you organize important financial information, assess your insurance coverage, create a budget, and develop a plan for your financial recovery.

CFPB Dealing with Disasters Guide
You can use resources at this site to learn about how to handle your money as you prepare for, recover from, or rebuild after a hurricane, tornado, wildfire, or other emergency.

CFPB Your Disaster Checklist
Resources at this site can help you with collecting, copying, and storing your financial information, which could help you avoid problems and recover faster after a disaster. These resources are available in multiple languages.

NCUA Webinar on Climate-Related Preparedness
You can watch a webinar at this site, hosted by the National Credit Union Administration in partnership with FEMA, that provides information on how credit unions and their members can prepare for and remain resilient in the face of climate-related disasters.

FDIC Money Smart Module on Disasters
You can use resources at this site to learn why preparing for disasters is part of managing your financial health, as well as how to financially prepare for and recover from disasters.

Know that resources and support are available

You may be eligible for Federal programs such as:

FEMA Programs to Support Disaster Survivors
FEMA has several Individual Assistance programs designed to support disaster survivors. You can apply for assistance at DisasterAssistance.gov and review different types of assistance to determine what best suits your needs.

SBA Disaster Assistance
The SBA offers disaster assistance in the form of low interest loans to businesses, nonprofit organizations, homeowners, and renters located in regions affected by declared disasters. SBA also provides eligible small businesses and nonprofit organizations with working capital to help overcome the economic injury of a declared disaster. You can apply for assistance at DisasterLoanAssistance.sba.gov.

USDA FNS Disaster Nutrition Assistance Programs
The USDA's Food and Nutrition Service provides temporary nutrition assistance to eligible individuals and households affected by a disaster or emergency. You can contact your local or state office about Disaster Supplemental Nutrition Program (D-SNAP) at State SNAP Resources.

USDA Disaster Assistance Programs
USDA provides a variety of programs to help farmers, ranchers, communities, and businesses that have been hard hit by natural disaster events.

Remain vigilant of fraud and scams if climate hazards occur

FTC Dealing with Weather Emergencies
You can use the resources and information at this site to learn about dealing with weather emergencies. The section Staying Alert to Disaster-related Scams offers advice on how to how to recognize and avoid common scams that can help you protect your finances and personal information.

CFPB Fraud and Scams
You can access resources at this site to learn about how to avoid fraud and scams after a disaster event.

HelpWithMyBank.gov
You can access the resources at this site, which provides information and assistance for customers of national banks and federal savings associations on topics including accessing bank branch services and frauds and scams.

Preparedness

Review insurance coverage

You can review coverages with your personal insurance provider.

Ask CFPB: Answers to common questions about insurance
You can find answers to questions about your home and auto insurance at this site.

FEMA NFIP FloodSmart.gov
You can access resources related to FEMA's National Flood Insurance Program (NFIP) at this site. You can also learn about the importance of flood insurance, as well as proactive steps you can take to safeguard your home and belongings.

Make modifications to home and property

IRS Credits and Deductions Under the IRA of 2022
You can access information at this site related to tax credits and deductions from the Inflation Reduction Act. The specifics of Inflation Reduction Act incentives may vary by location. You can consult with government agencies, utility companies, and insurance providers to determine which incentives may be available to you.

IRA Guidebook
You can learn about learn about provisions in the Inflation Reduction Act at this site.

Department of Energy Energy Savings Hub
You can access resources at this site to learn about incentives like tax credits and rebates that you can use to make energy- efficient improvements to your home and property. Resources are available for homeowners, renters, and vehicle owners.

Examine finances and payments including bills, payment dates, avenues for using savings

Federal Direct Express
You can sign up for the Direct Express Debit Mastercard to receive federal benefits at this site. The FAQ page outlines which type of federal payments you may be eligible to receive on a Direct Express card account.

MyMoney.gov
You can use the resources and tools at this site to learn about budgeting, saving, investing, taxes, and protecting against fraud.

FDIC Get Banked
You can learn how to set up a bank account at an FDIC-insured bank at this site.

Appendix 2. Members of the Financial Literacy and Education Commission

Consultative expertise from FLEC member agencies was instrumental in supporting Treasury's efforts during the development of this report.

- Department of the Treasury (Treasury), Chair
- Consumer Financial Protection Bureau (CFPB), Vice Chair
- Department of Agriculture (USDA)
- Department of Education (ED)
- Department of Defense (DoD)
- Department of Health and Human Services (HHS)
- Department of Housing and Urban Development (HUD)
- Department of the Interior (DOI)
- Department of Labor (DOL)
- Department of Veterans Affairs (VA)
- Board of Governors of the Federal Reserve System (FRB)
- Commodity Futures Trading Commission (CFTC)
- Federal Deposit Insurance Corporation (FDIC)
- Federal Emergency Management Agency (FEMA)
- Federal Housing Finance Agency (FHFA)
- Federal Trade Commission (FTC)
- General Services Administration (GSA)
- National Credit Union Administration (NCUA)
- Office of the Comptroller of the Currency (OCC)
- Office of Personnel Management (OPM)
- Securities and Exchange Commission (SEC)
- Small Business Administration (SBA)
- Social Security Administration (SSA)
- White House Domestic Policy Council (DPC)

Appendix 3. Data Notes

CDC's Social Vulnerability Index

The Centers for Disease Control Agency for Toxic Substance and Disease Registry's Social Vulnerability Index was used to map variation in county vulnerability.[149] The data underlying the CDC's SVI are sourced from the Census Bureau's American Community Survey. The SVI uses 15 social factors to measure a community's vulnerability to health risks and disasters, which are grouped into four themes: socioeconomic status, household composition and disability, minority status and language, and housing and transportation. The 15 variables that make up the CDC SVI are: socioeconomic status, household composition and disability, race/ethnicity/language, housing and transportation, minority status and language, household composition and disability status, education, poverty, age, employment, disability status, single-parent households, minority status, language, and housing. Each census tract in the United States is assigned a score from zero to 1 for each of the 15 social factors based on how that tract compares to other tracts within the same state. These scores are then combined to create an overall SVI score for each census tract, which ranges from zero to 1, with higher scores indicating greater social vulnerability. The SVI is updated with new data every two years, and the latest version is based on data from the 2015-2020 American Community Survey. Additional information on the SVI can be found at https://www.atsdr.cdc.gov/placeandhealth/svi/at-a-glance_svi.html.

The SVI was created to facilitate measuring and comparing different localities' vulnerability to disasters and other hazardous events. As the SVI is a composite score made up of multiple underlying social factors, it can capture a relatively comprehensive picture of a community's vulnerability to risks and disasters. This can be particularly important when trying to understand disparities and inequities across locations, as vulnerable communities may face multiple social and economic challenges that are not captured by a single variable such as median family income.

Researchers have employed the SVI to investigate the impact of social, economic, and environmental factors on communities' ability to prepare for, respond to, and recover from various public health crises, such as natural disasters and disease outbreaks. The SVI has also been used to examine how climate hazards may exacerbate existing social and health inequalities. A selection of studies relevant to this report have used the SVI to examine the impacts of events and conditions like heat exposure, flooding, and wildfire on vulnerable populations.[150]

USGCRP LOCA Climate Scenario Data

The Localized Constructed Analogs (LOCA) climate scenario data used to map future exposure to climate hazards were published by the U.S. Global Change Research Program (USGCRP), a federal interagency program established in 1989 by the Global Change Research Act of 1990. The USGCRP produces a range of reports, assessments, and other products, including the National Climate Assessment, which serves as a comprehensive overview of climate change impacts on the United States. The program operates several online platforms such as the Climate Change Resilience Toolkit and the Global Change Information System to provide access to data, tools, and other resources that aim to support decision-making and planning for climate adaptation and resilience.

LOCA climate scenario data were created using statistical techniques to downscale the low-resolution output of global climate change models to a finer, regional scale, providing more detailed information on climate change conditions at a local level. The LOCA downscaled projections are based on the outputs of the fifth phase of the Coupled Model Intercomparison Project (CMIP5), which includes simulations from several leading climate models.

149 CDC, *CDC/ATSDR Social Vulnerability Index (CDC/ATSDR SVI)*, ATSDR's Geospatial Research, Analysis & Services Program (2022), at https://www.atsdr.cdc.gov/placeandhealth/svi/fact_sheet/pdf/GRASP-Social-Vulnerability-Index-v10262022.pdf.

150 *See* Lehnert et al., "Spatial exploration of the CDC's Social Vulnerability Index and heat-related health outcomes in Georgia," *International Journal of Disaster Risk Reduction*, Vol. 46, no. 101517 (June 2020), at https://www.sciencedirect.com/science/article/pii/S2212420919310611, Vargo et al. "Social Vulnerability in US Communities Affected by Wildfire Smoke, 2011 to 2021," *American Journal of Public Health*, Vol. 113, no. 7 (July 1, 2023), p. 759-767, at https://doi.org/10.2105/AJPH.2023.307286, and Ramesh et al., "Flooding and emergency department visits: Effect modification by the CDC/ATSDR Social Vulnerability Index," *International Journal of Disaster Risk Reduction*, Vol 76, no. 102986 (June 2022), at https://doi.org/10.1016/j.ijdrr.2022.102986.

In the full dataset, a variety of climate projections are available under different Representative Concentration Pathway (RCP) scenarios, which represent different levels of greenhouse gas emissions. The full dataset also covers three different time periods: early century (2016-2030), mid-century (2030-2065), and late century (2070-2099). More information on the LOCA data used in this report can be found at https://loca.ucsd.edu/.

Localized Constructed Analog climate scenario data are useful for examining the spatial variation in future exposure to climate hazards. LOCA data are available to the public through online platforms from the federal government such as the U.S. Climate Resilience Toolkit and Heat.gov.[151]

Note that due to data availability, the Chugach Census Area and Copper River Census Area in Alaska are not included in the analysis in this report.

151 *See* Climate Mapping for Resilience and Adaptation, "Assessment Tool," at https://resilience.climate.gov/, and Heat.gov, National Integrated Heat Health Information System, "Tools & Information," at https://www.heat.gov/pages/tools-information.


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