



# SOCIAL VULNERABILITY AND CLIMATE HAZARDS

## WHAT DOES IT MEAN TO BE SOCIALLY VULNERABLE TO CLIMATE HAZARDS?

When a climate disaster strikes, it hammers a community: water floods in; high winds topple power lines, trees, and structures; drought dries up crops. As our global climate has changed, these hazards have increased.

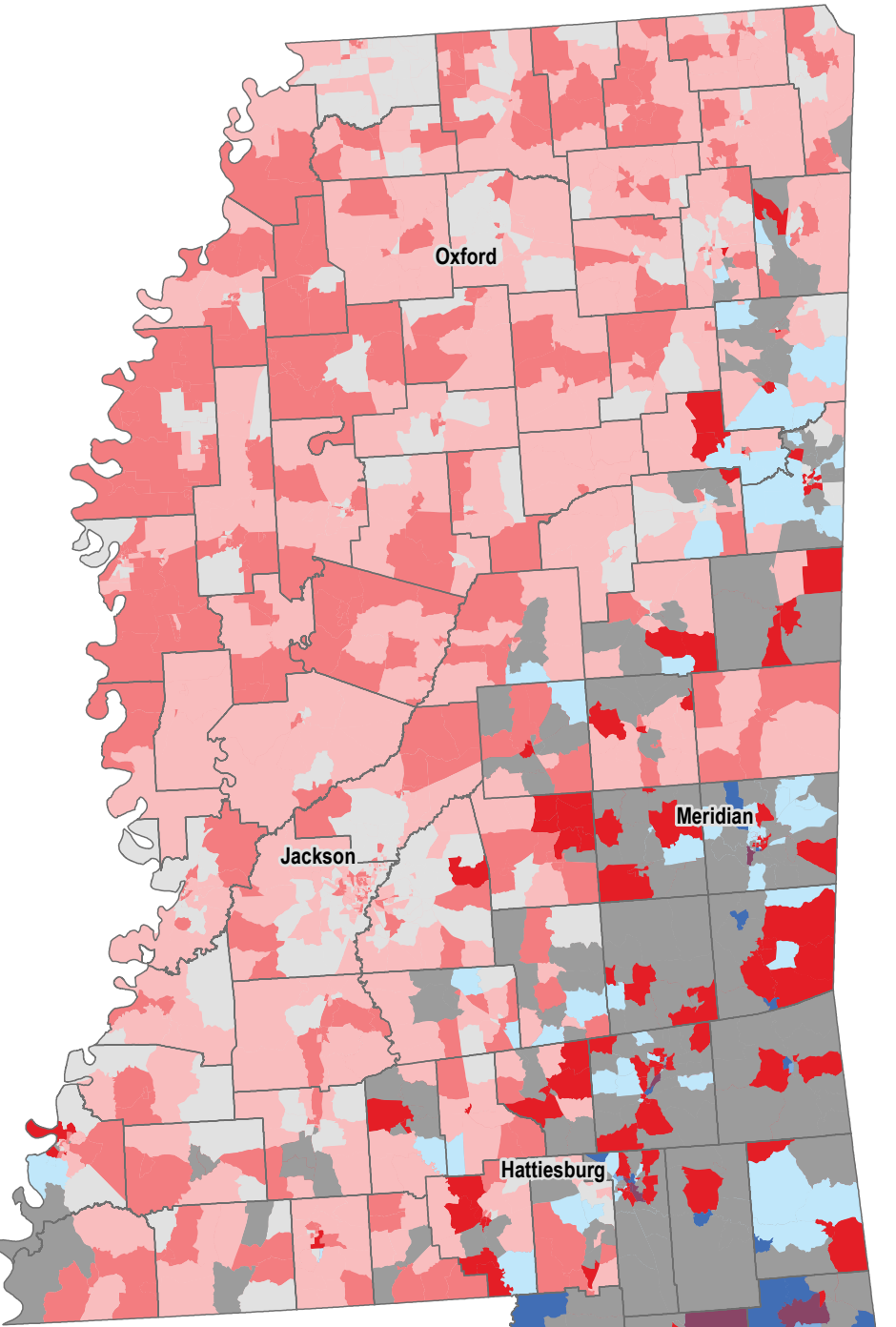
If a community is strong and resilient, it will be better able to prepare for, recover from, and adapt to environmental change and disaster. If a community is vulnerable, it will have a harder time coping with the blows from a disaster.

Those who are most vulnerable – due to such factors as poverty or advanced age – are the ones most exposed and likely to suffer harm.

## CHANGES IN GLOBAL CLIMATE INCREASE RISKS TO HUMAN POPULATIONS

- Warming of the Earth’s climate is evident in increased air and ocean temperatures, melting of snow and ice, and rising global sea level. It is very likely that temperature extremes, heat waves, and heavy precipitation events will become more frequent.<sup>1</sup>
- The northern Gulf of Mexico has some of the highest rates of relative sea-level rise in the nation; Mississippi will see roughly .12” per year. Rising sea level increases vulnerability to storm surges and flooding, and threatens to inundate some areas.<sup>2</sup>
- Summer high temperatures along the Gulf Coast are projected to rise between 3°F and 7°F by 2100, and winter low temperatures to warm by as much as 5°F to the east and 10°F to the west.<sup>3</sup>
- Regional climate projections for the Gulf Coast include increases in both extreme precipitation events and in the frequency of dry days, suggesting that climate change could result in simultaneous enhancement of both wet and dry conditions.<sup>4</sup>

# SOCIAL VULNERABILITY TO MULTIPLE HAZARDS IN MISSISSIPPI



## MISSISSIPPI HAS UNIQUELY VULNERABLE POPULATIONS AS WELL AS ELEVATED RISKS TO CLIMATE HAZARDS

Mississippi faces risks from all four climate hazards; and has some of the highest poverty rates in the country. These two trends combine to expose vulnerable populations to extreme risks.

- The counties that have the most social vulnerability to hurricane winds are located inland (Wilkinson and Pike Counties), and along the Alabama border in Lauderdale, Kemper, Noxubee, and Lowndes Counties.
- While the coastal counties have high vulnerability to wind, they have moderate social vulnerability, giving them a lower ranking on the Social Vulnerability Index than some of the inland counties.
- Though coastal counties face an elevated risk for flooding, moderate social vulnerability means that these counties rank lower on the Social Vulnerability Index than the flood-prone counties along the state’s western border.
- One third of the land area in Adams, Clay, and Lowndes Counties is in the 100-year flood plain. Social vulnerability scores in these counties are among the highest in the country.

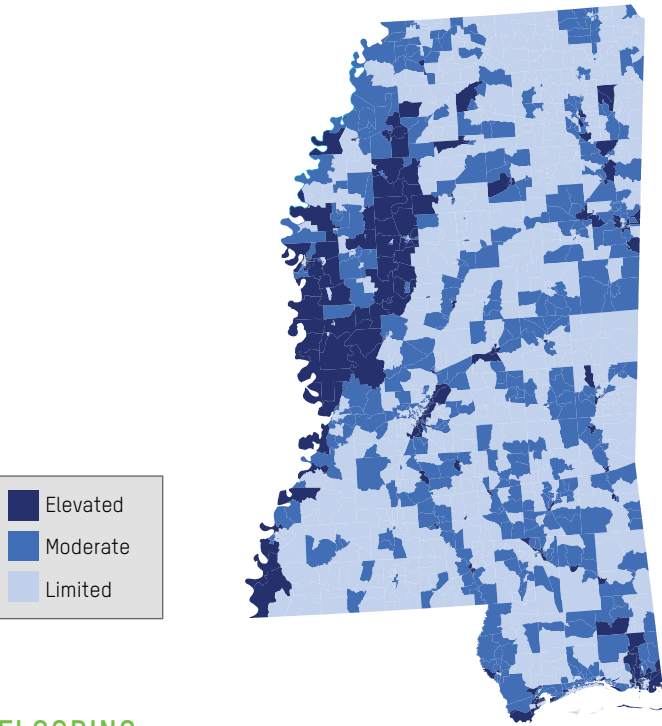
This map measures and illustrates the convergence of social vulnerability factors and four environmental hazards.

The hazards that are mapped:

- Flooding
- Hurricane force winds
- Sea-level rise
- Drought

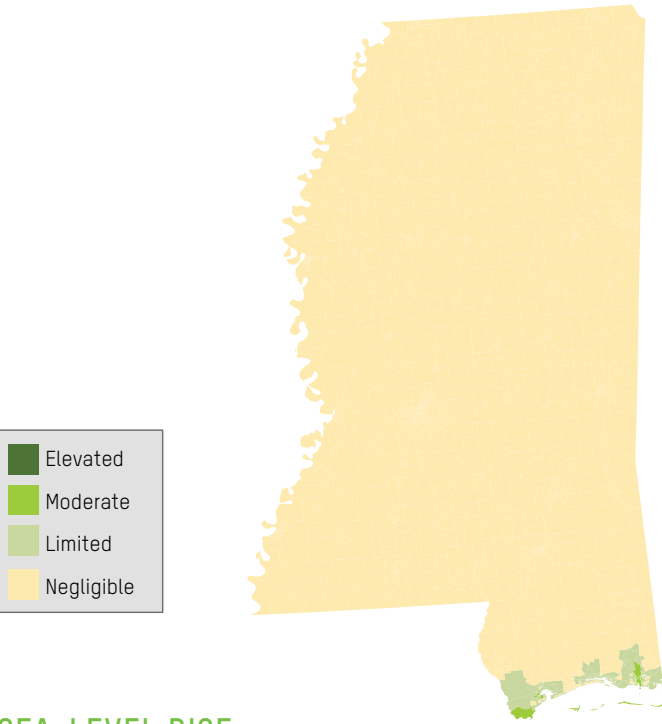
The legend indicates Limited, Moderate, Elevated.

# THE FOUR CLIMATE HAZARDS POSE RISKS TO DIFFERENT AREAS



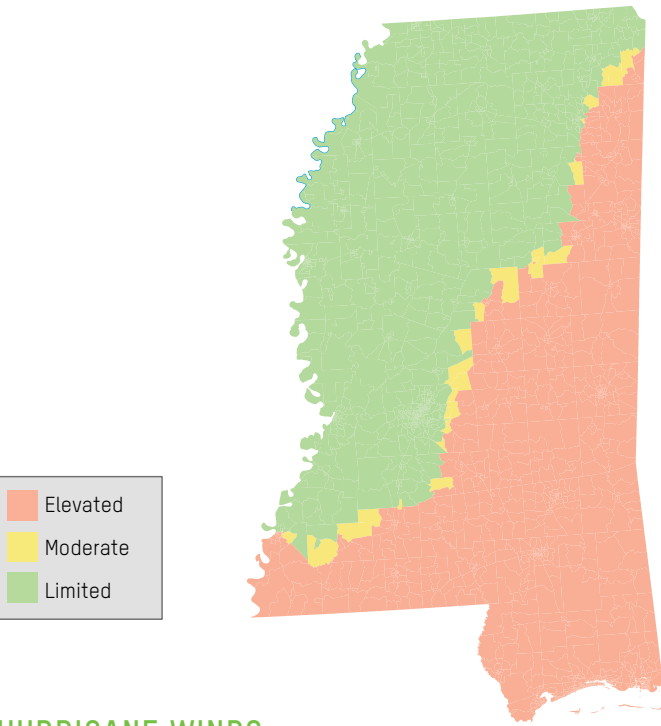
## FLOODING

The Mississippi Valley and the Delta region, as well as floodplain areas associated with the Black River and the Pearl River, have elevated flood hazard risk. Coastal communities face moderate to elevated risk of flooding.



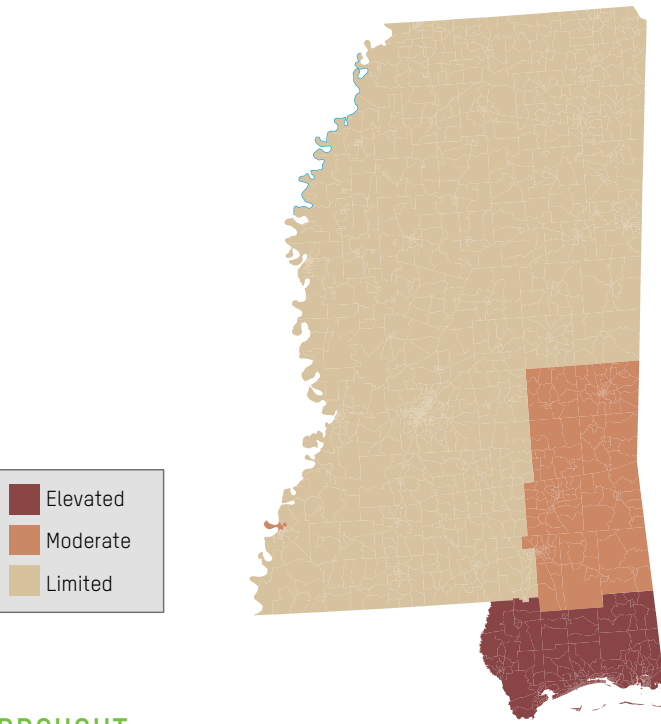
## SEA-LEVEL RISE

Mississippi has a 360-mile shoreline along the Gulf of Mexico, which is threatened by sea levels expected to rise 15” by the year 2100. Hancock County has the largest percentage of land area in the sea-level rise hazard zone (11 percent), followed by Jackson (8 percent) because of the Pascagoula Delta.



## HURRICANE WINDS

Nearly half of Mississippi’s land area falls within the designated hurricane wind hazard zone.



## DROUGHT

Drought refers to a lack of precipitation that influences water reserves and soil and crop moisture. Southern Mississippi is at elevated risk for extended drought, which threatens farm-related businesses that rely on adequate water supplies.

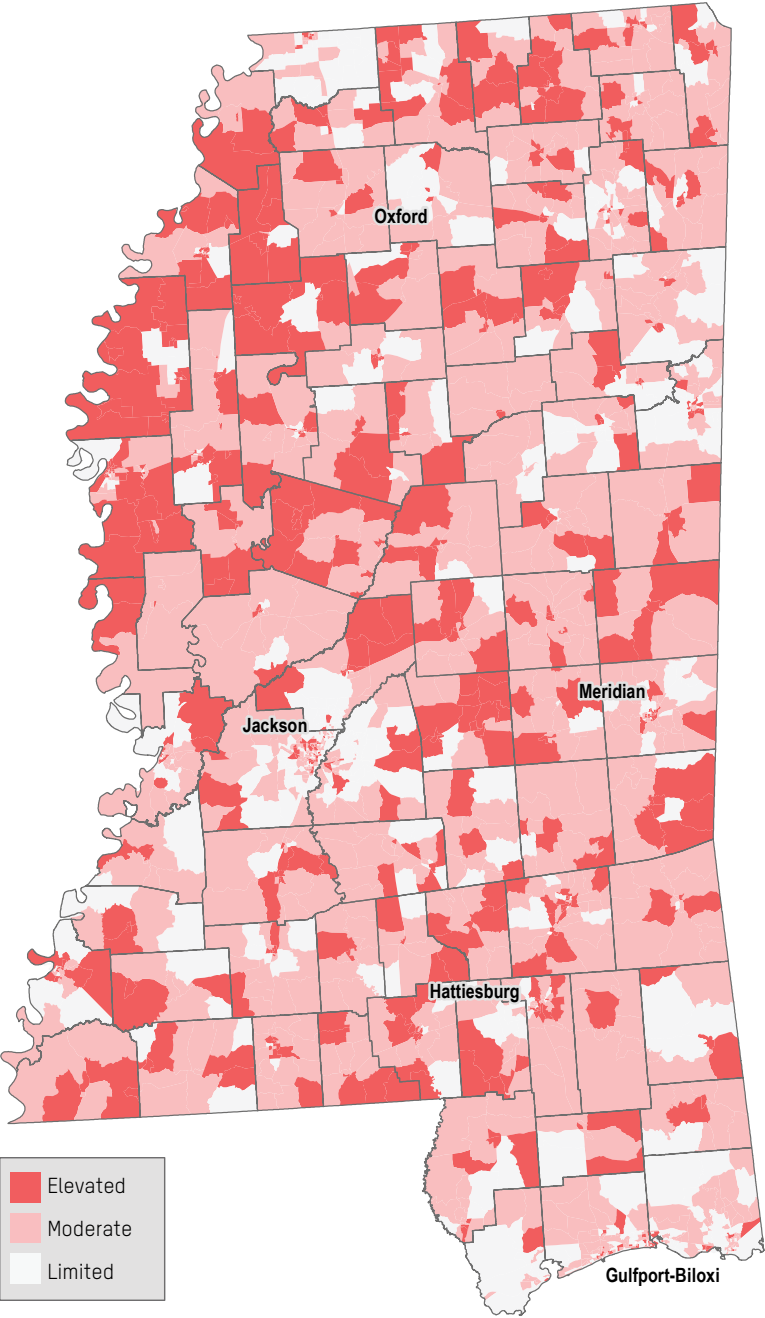


# WHAT MAKES A COMMUNITY VULNERABLE?

Social vulnerability indicates how well a population can prepare for, recover from, and adapt to environmental change and disaster. Some characteristics calculated into the Social Vulnerability Index:

- **Economic standing** is the number one factor in determining a community’s vulnerability to disaster. Poorer communities have fewer resources to endure disasters and to withstand losses.
- **Age extremes** (elderly or young) mean people are less mobile and more dependent on care, and are less able to get out of harm’s way.
- **Rural and urban communities** each face special challenges when disaster strikes, and have a harder time recovering.
- **Special needs populations** are less able to cope with physical and social challenges.
- **Other factors:** race and ethnicity, gender, education and employment rates, home ownership statistics.

## SOCIAL VULNERABILITY IN MISSISSIPPI



### MISSISSIPPI

Elevated levels of social vulnerability exist throughout western Mississippi in the traditional Delta region of the state. Driven by the combination of extreme poverty, race, gender, age, and rural populations, these counties contain some of the most socially vulnerable populations in the country.

Sharkey County is the most socially vulnerable in the state based on poverty, age (children), race, gender, and rural geography.

Mississippi has some of the most vulnerable block groups in the country. Three are in Neshoba County and one in neighboring Newton County.



### ABOUT SOCIAL VULNERABILITY MAPPING

Risks and hazards are unevenly distributed across the landscape. Some places, such as coastal areas, are more exposed to risk; and feel the effects of climate change more acutely.

As people populate a landscape, they are exposed to risk both by nature of place and by nature of their characteristics. The interaction of natural hazards and how people live on the land produces the “hazards of place.”

The Social Vulnerability Index (SoVI) is a quantitative measure of social vulnerability to environmental hazards. Based on extensive research focused on post-disaster response and recovery that spans nearly half a century,<sup>5</sup> SoVI includes population characteristics known to influence the ability of communities to prepare for, respond to, and recover from disasters.<sup>6</sup>

For example, socioeconomic status (wealth or poverty) informs the ability of a community to withstand the impact of losses (through access to savings, insurance, transportation, and so on). The two extremes of age – the very young and the elderly – need special care, and may need help in getting out of harm’s way and repairing damage. Special needs populations are more susceptible to harm, and often need assistance.

Oxfam America has commissioned two reports on social vulnerability in the US Southeast from the Hazards and Vulnerability Research Institute at the University of South Carolina.

You can find both reports and a full interactive version of the social vulnerability maps of Louisiana and Mississippi online.

[www.oxfamamerica.org/svm](http://www.oxfamamerica.org/svm)

Unless noted otherwise, statistics cited are from “Integrating Social Vulnerability into Climate Change Planning and Preparedness at the Local Level for Mississippi and Louisiana.” Susan L. Cutter and Christopher T. Emrich. Hazards and Vulnerability Research Institute, University of South Carolina. 2011.

<sup>1</sup> Loehman, R., and G. Anderson. “Understanding the science of climate change: Talking points – Impacts to the Gulf Coast.” Natural Resource Report NPS/NRPC/NRR – 2010/210. National Park Service, Fort Collins, Colorado. 2010.

<sup>2</sup> “Gulf Coast Network: Climate Change Resource Brief,” Southeast Region Inventory & Monitoring. National Park Service, US Department of the Interior.

<sup>3</sup> Twilley, R. R., E. Barron, H. L. Gholz, M. A. Harwell, R. L. Miller, D. J. Reed, J. B. Rose, E. Siemann, R. G. Wetzel, and R. J. Zimmerman. “Confronting climate change in the Gulf Coast Region: Prospects for sustaining our ecological heritage.” A report of the Union of Concerned Scientists and the Ecological Society of America. UCS Publications, Cambridge, MA. 2001.

<sup>4</sup> Diffenbaugh, N. S., J. S. Pal, R. J. Trapp, and F. Giorgi. “Fine-scale processes regulate the response of extreme events to global climate change.” Proceedings of the National Academy of Sciences 102:15774–15778. 2005.

<sup>5</sup> “Facing Hazards and Disasters: Understanding Human Dimensions,” National Research Council, Washington, DC: The National Academies Press. 2006.

<sup>6</sup> Cutter, Susan L., and Christopher T. Emrich. “Social Vulnerability Mapping for the Southeast US.” Hazards and Vulnerability Research Institute, University of South Carolina. 2009.

#### PHOTO CREDITS

Cover: Jesus Diaz looks over the concrete slab that used to be his apartment in Biloxi, MS shortly after Hurricane Katrina struck land. (Barry Williams/Getty Images)

Inside left: Residents look at the remains of their house on the beach in Biloxi, MS shortly after it was destroyed by Hurricane Katrina. (ROBERT SULLIVAN/AFP/Getty Images)

Back: *left:* Former fishermen now employed as welders in Mississippi. (Mary Babic/Oxfam America)

Back: *center:* Family in Louisiana that farms the land behind their house. Grandmother rode the top of their house several miles as it floated away during Hurricane Katrina. (Audra Melton/Oxfam America)

Back: *right:* Michael Roberts, fisherman who has endured declines in catches with deterioration of coastline ecosystems. (Mary Babic/Oxfam America)



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## SOCIAL VULNERABILITY AND CLIMATE CHANGE IN THE GULF COAST: MAPPING MISSISSIPPI



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