



## Understanding Virginia’s Vulnerability to Climate Change



Communities across Virginia are increasingly vulnerable to severe weather influenced by changes in our climate. Population centers near the coast and tidal rivers are experiencing more flooding, farmers are increasingly contending with drought risks, and health problems are likely to be exacerbated by extreme heat and polluted air. Solutions to manage these risks exist, and implementing them will make our communities more resilient to the new conditions and challenges of our changing climate.

### Threats from Rising Seas, Flooding, and Extreme Storms

- Virginia’s vulnerability to sea-level rise and its impacts can no longer be denied or ignored. Scientists have determined that sea levels along the Virginia coastline are rising faster today than in the past.<sup>9</sup> Virginia’s Recurrent Flooding Sub-Panel states: “Sea-level rise is real. It is as real a threat as all other threats for which Virginia plans.”<sup>10</sup>
- Population centers near Virginia’s coast face increasing flood risks from rising sea levels and destructive storm surges intensified by climate change. More than 400,000 homes in Virginia are at risk for storm surge damage with projected reconstruction costs of \$92 billion. Most of these homes are in Hampton Roads.<sup>11</sup>
- More than 100,000 people in Virginia live in homes less than five feet above the high tide line, putting them at particular risk to flooding as rising seas contribute to rising water levels. Virginia’s vulnerable communities are likely to experience floods exceeding historic records within the next 20 to 30 years as seas continue to rise at accelerating levels.<sup>12</sup>
- Heavy precipitation, high tides, and storm surge are all projected to get worse, resulting in larger and more frequent floods.<sup>13</sup> In the last 60 years, Virginia has experienced a 33 percent increase in heavy rainstorms and snowstorms and an 11 percent increase in precipitation from the largest storms.<sup>14</sup>

### Vulnerable VA by the Numbers:

- Scientists project Virginia will experience at least 1.5 feet of sea-level rise during the next 20 to 50 years, putting coastal communities increasingly at risk.<sup>1</sup>
- Home to 1.7 million people, Hampton Roads is the second-most vulnerable area in the country to rising seas behind New Orleans.<sup>2</sup>
- Asthma affects an estimated 163,000 children and 554,000 adults in Virginia.<sup>3</sup> Hotter temperatures that contribute to poor air quality threaten to exacerbate such health concerns.<sup>4,5</sup>
- 85% of Virginians believe climate change is happening, and 67% say human activity is a factor.<sup>6</sup>
- 97% of climate scientists have concluded that human-caused climate change is happening.<sup>7</sup> Although 85% of Virginians trust scientists about climate change, only 43% think scientists agree that it’s human caused.<sup>8</sup>

- Cities along coasts and tidal rivers like Alexandria, Norfolk, and Virginia Beach face some of the highest costs from flooding damage because they are densely populated and have higher replacement costs for land, homes and buildings, roads, and other infrastructure.<sup>15</sup> Risks from extreme weather to the economy, electric grid infrastructure, and transportation networks in these cities demonstrate the need to better prepare for changing conditions.
- Rising sea levels mean that in low-lying communities, floods that in the past were only caused by unusually strong storms now occur more frequently when waters rise only slightly above high tide. For instance, street flooding in the historic Hague section of Norfolk has dramatically increased in recent years, with over 200 hours of street flooding each year from 2009-2012.<sup>16</sup>

### Threats from Extreme Heat

- More hot days are coming to Virginia. The first decade of this century was the warmest on record,<sup>17</sup> and an increasing number of summer days are expected to exceed 95°F.<sup>18</sup>
- The Virginia Department of Agriculture and Consumer Services calls agriculture “the state’s largest industry by far.”<sup>19</sup> Agricultural production and processing alone provide 122,000 jobs and \$27 billion in economic activity.<sup>20</sup> But the industry faces growing risks to production from harmful effects of extreme heat on livestock, drought affecting water supplies and crops, and invasive weeds and pests that thrive in a warmer climate.<sup>21</sup>
- Half of Virginia’s counties face higher risks of water shortages by mid-century under hotter, drier conditions. These same at-risk counties produce \$472 million in crops.<sup>22,23</sup> Virginia farmers’ livelihoods and the food supplies grown in these at-risk counties face greater threats from a changing climate.
- A warming climate exacerbates public health threats like infectious diseases and air pollution in Virginia.<sup>24</sup> West Nile virus and Lyme disease, once extremely rare, now present increased health risks across the state.<sup>25,26,27</sup>
- Heat waves are a leading cause of weather-related deaths and present health risks such as heat stroke and dehydration. Twelve people in Virginia died from excessive heat exposure over a two-week period in summer 2012 when temperatures regularly exceeded 100°F.<sup>28</sup> Extreme heat also increases smog, especially in urban areas, putting the health of seniors, children, adults who work outdoors, and people with lung and heart conditions at greater risk.<sup>29</sup>
- Increasing temperatures and salinity threaten water quality and marine living conditions in the Chesapeake Bay. The Bay’s iconic blue crabs and oysters, which generate a combined \$80 million in economic impacts in Virginia,<sup>30</sup> could decline or disappear as these conditions grow worse and weather patterns continue to fluctuate from year to year.<sup>31</sup>



“Our increasing vulnerability to rising sea levels, frequent flooding, and powerful storms poses hard questions for many Virginians. Some communities are already taking steps to prepare, and progress toward lasting solutions must expand to meet the challenges of our changing climate.”

— Larry Atkinson,  
Professor and Eminent Scholar,  
Mitigation & Adaptation Research Institute,  
Old Dominion University

## Resources to Prepare Virginia's Vulnerable Communities

Experts and scientists have already started to develop tools and recommendations to help our communities prepare for climate change and extreme weather.

- [Governor's Climate Change and Resiliency Update Commission](#) is a bipartisan group tasked with updating the state's 2008 Climate Change Action Plan.
- [General Assembly Joint Subcommittee on Recurrent Flooding](#) is tasked with developing recommendations for a comprehensive plan to address Virginia's vulnerability to regular flooding.
- [The Recurrent Flooding Sub-Panel](#) of the Secure Commonwealth Panel developed recommendations for tackling sea-level rise and recurrent flooding in coastal Virginia.
- [Virginia Institute of Marine Science](#) (VIMS) provides recommendations concerning effective responses to sea-level rise and other climate change impacts, including:
  - [Recurrent Flooding Study for Tidewater Virginia](#); and
  - [Comprehensive Coastal Resource Management Portal](#).
- [Georgetown Climate Center](#) at Georgetown Law works with state and local governments to prepare for climate change impacts. Its resources include:
  - [Adaptation Clearinghouse](#), a one-stop shop for state & local adaptation resources;
  - [State Adaptation Progress Tracker](#); and
  - Adaptation tool kits and analysis to help local governments prepare for [rising seas and flooding](#) and reduce threats from [urban heat](#) and its impacts.
- [Mitigation and Adaptation Research Institute](#) (MARI) at Old Dominion University focuses on solutions to mitigate and adapt to climate change and sea-level rise. MARI's work includes leading the first [statewide assessment](#) focused on practice-relevant knowledge that stakeholders in Virginia need to prepare and protect communities, and it supports the [Hampton Roads Pilot Project](#) to advance intergovernmental sea-level rise preparedness and resilience planning.
- [Virginia Coastal Policy Clinic](#) at William & Mary Law School provides state and local decision makers with science-based legal and policy analysis of environmental and land-use issues affecting Virginia's coastal resources.
- [Resilient Virginia](#) involves leaders from government, the private sector, academia, and Virginia Sustainable Building Network to accelerate resiliency planning in communities.
- [Center for Climate Change Communication](#) at George Mason University identifies ways of effectively engaging the public and policy makers about climate change.
- [Climate Central's](#) Surging Seas map tool helps identify communities' flood risks.

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“The vulnerability of Virginia to rising seas, floods, and escalating temperatures is no longer a problem for the distant future. It is affecting us in the here and now, and it is up to all of us to prepare for the changes taking place.”

— Vicki Arroyo,  
Executive Director of the  
Georgetown Climate Center and  
Director of Georgetown Law's  
Environmental Law Program

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