

# MARYLAND: CLIMATE CHANGE IS HERE AND NOW



The earth is warming and this is largely the result of human-caused emissions. The *National Climate Assessment* (NCA) found that U.S. average temperature has increased by about 1.5 F since 1895 with 80 percent of this increase occurring since 1980. Similarly, the Intergovernmental Panel on Climate Change Fifth Assessment Working Group 1 report (IPCC AR5 WG1), *Climate Change 2013: The Physical Science Basis* came to many of the same conclusions as the NCA, but with a global focus.

The amount of warming that will occur by the end of this century depends on our choices now. If we don't make much progress in curbing emissions, temperatures for the planet could rise between 4.7 to 8.6 degrees Fahrenheit (F)—2.6 to 4.8 degrees Celsius (C)—by the end of this century, compared to the average temperature around the end of the 20<sup>th</sup> century (1986–2005).<sup>1</sup> Warming in the United States is expected to be higher than the global average. Warming averaged across the country could be between 5 F to 10 F, assuming emissions rates continue. Average summer temperatures in Maryland could increase around 9 F by the end of the century, if little is done to reduce emissions.<sup>2</sup>

Although we have the opportunity to avoid some of this warming, we are still likely to face a number of impacts arising from climate change in the coming decades. In fact, we are already observing some of these impacts now.

- **Sea level rise** – Sea level has risen about 8 inches in the last 100 years, making coastal storms more damaging and accelerating erosion. Globally, future sea level rise is likely to range from 1 to 4 feet, and could be even higher if glaciers in Greenland or Antarctica melt especially quickly.
  - **Polar ice** – Arctic sea ice during the summer has been shrinking, and sometime in the 21<sup>st</sup> century, perhaps within the next few decades, the Arctic will likely be ice-free in the summer. The ice sheets in Greenland and Antarctica have also been melting more rapidly in recent years, which could increase the rate of global sea level rise.
  - **More heavy downpours** – More rain is coming in heavy precipitation events in many parts of the world, including the United States. This may contribute to stronger or more frequent floods.
  - **More heat waves** – Heat waves have become more frequent and intense, threatening human health, stressing water resources, and increasing energy demands.
  - **Threats to ecosystems** – Many plants and animals will be forced to shift their habitats to higher elevations or higher latitudes as warming makes it more difficult to thrive in their current locations.
  - **Increased agricultural pests** – With milder winters, many pests and pathogens that affect plants and livestock have been able to migrate to new areas, posing problems to farmers and ranchers.
  - **Ocean acidification** – Increased carbon dioxide in the atmosphere has caused the oceans to become more acidic. Further acidification could dissolve the shells of many organisms at the bottom of the food chain, threatening to disrupt the ocean ecosystem.
- These impacts pose challenges to infrastructure, businesses, and communities, particularly in countries already struggling to meet the basic food, water, shelter, and security needs of their citizens.

The state of Maryland is presently experiencing some of these types of impacts, which are expected to become more intense and occur more frequently as a result of climate change. No one individual weather event can be attributed directly to climate change; climate is a pattern of events over time. However, it is clear that the costs to property, crops, public health and human life from impacts consistent with climate change are significant (Table 1).<sup>3</sup>

Specifically, over the past three years, floods, heavy rains, heat, and strong winds have led to millions of dollars in property losses and the loss of human life. On August 12, 2014, flash floods from heavy rains resulted in more than \$4.8 million in property damage in Prince George’s and Anne Arundel counties. Heat waves in July 2012 and 2013 were responsible for eight fatalities in Baltimore and Howard counties. And, a glancing blow from Hurricane Sandy in late October 2012 caused more than

**TABLE 1: Maryland Impacts from Weather-Related Events, 2012—2014**

DATE	EVENT(S)	DAMAGE(S)	JURISDICTION(S)	COMMENT
Aug. 12, 2014	Flash floods from heavy rains	\$4.835M in property damage	Prince George’s, Anne Arundel	
June–Sept. 2014	Rip currents	5 fatalities	Maryland beaches	
July 8, 2014	Thunderstorm winds	1 fatality, minor crop damage	Carroll	Tree branches fell at youth campsite
July 18, 2013	Heat	4 fatalities	Southern Baltimore, Howard	Heat indices above 105 F, Dew points in the mid-70s
Jan. 31, 2013	Flash floods from heavy rains	1 fatality	Anne Arundel	
2013	Flash flood, High Wind, Tornado, Thunderstorm wind, Winter storm, Lightning, Strong wind	\$358.5K in property damage	Statewide	19 counties
July 5, 2012	Excessive heat	3 fatalities	Southern Baltimore	Heat indices as high as 112 F
July 8, 2012	Heat	1 fatality	Southern Baltimore	Heat indices above 105 F
Oct. 28–30, 2012	Coastal flood, flood, Strong wind, High wind	\$15.55M in property damage	Caroline, Cecil, Dorchester, Kent, Maryland Beaches, Somerset, Queen Anne’s, Talbot, Wicomico, Worcester	Hurricane Sandy
June 29, 2012	Thunderstorm wind, Hail	\$1.79M in property damage	Statewide	Derecho
2012	Thunderstorm wind, Tornado (EF1, EF0), Coastal flood, Flash flood, Lightning, Strong wind	\$3.504M in property damage	Statewide	Exclusive of Sandy and Derecho

Source: National Climatic Data Center Storm Events Database

\$15.5 million in property damage, primarily on Maryland's Eastern Shore.

These climate impacts are also affecting agriculture in the state. In 2012 (a year with several extreme weather events), crop insurance payouts across Maryland due to weather-related events, including drought, heat, excessive rain, and high winds, were just over \$28.7 million, primarily driven by drought conditions. In 2014, insurance payouts totaled nearly \$7 million.<sup>4</sup>

A White House fact sheet provides a snapshot of the impacts on public health and costs due to extreme weather in recent years for the state of Maryland:<sup>5</sup>

- Hurricane Sandy affected 477 Maryland residences and required more than \$34 million in federal assistance in 23 counties and the City of Baltimore.
- The cumulative cost of severe weather events in 2011 and 2012 was more than \$70 million.
- In Maryland, there were more than 9,100 hospital admissions for asthma in 2011, with an average charge of close to \$8,000 for each stay.<sup>6</sup>
- Changing temperature and precipitation patterns can affect the life cycle and distribution of insects, many of which transmit diseases that already pose problems in Maryland. In 2010, there were 1163 cases of Lyme disease in the state.

- In 2009, there were 407 emergency room visits in Maryland due to heat stress.

Additionally, The White House released, in conjunction with the National Climate Assessment, a mostly qualitative brief on what climate change means for Maryland and the Northeast—highlighting heat waves, health and coastal impacts.<sup>7</sup>

The costs from these recent weather-related events and the scientific assessments remind us of the urgent need to take action to reduce emissions and prepare for the future impacts of climate change.

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### Other C2ES Resources:

*Climate Change: Cost of Inaction for Maryland's Economy, November 2015.*

*A Summary of American Climate Prospectus Data: Impacts for Maryland, November 2015.*

*Recommendations for Maryland's Greenhouse Gas Reduction Plan, November 2015.*

## ENDNOTES

- 1 Intergovernmental Panel on Climate Change, “Climate Change 2013: The Physical Science Basis.” Accessed July 15, 2015. Available at: <http://www.ipcc.ch/report/ar5/wg1>.
- 2 Houser, Trevor et al., “American Climate Prospectus: Economic Risks in the United States.” Rhodium Group. June 24, 2014. Available at: <http://rhg.com/reports/climate-prospectus>.
- 3 National Climatic Data Center, “Storm Events Database.” March 2015. Available at: <http://www.ncdc.noaa.gov/stormevents>.
- 4 U.S. Department of Agriculture Risk Management Agency, “Cause of Loss Historical Data Files.” Accessed July 15, 2015. Available at: <http://www.rma.usda.gov/data/cause.html>.
- 5 Note that The White House does not provide any sources for the data and events that appear in their fact sheet. The White House, “The Threat of Carbon Pollution: Maryland.” Accessed July 15, 2015. Available at: <https://www.whitehouse.gov/sites/default/files/docs/state-reports/climate/Maryland%20Fact%20Sheet.pdf>.
- 6 Note that climate change is expected to impact asthma, respiratory allergies and airway diseases through changes in air quality. The extent to which it effects vulnerable populations is an active area of study. National Institute of Health, “Asthma, Respiratory Allergies and Airway Diseases, and Climate Change.” March 2013. Available at: [http://www.niehs.nih.gov/research/programs/geh/climatechange/health\\_impacts/asthma/index.cfm](http://www.niehs.nih.gov/research/programs/geh/climatechange/health_impacts/asthma/index.cfm).
- 7 The White House, “Fact Sheet: What Climate Change Means for Maryland and the Northeast.” May 6, 2014. Available at: [https://www.whitehouse.gov/sites/default/files/docs/state-reports/MARYLAND\\_NCA\\_2014.pdf](https://www.whitehouse.gov/sites/default/files/docs/state-reports/MARYLAND_NCA_2014.pdf).



The Center for Climate and Energy Solutions (C2ES) is an independent nonprofit organization working to promote practical, effective policies and actions to address the twin challenges of energy and climate change.