

Regional Highlight: Maryland

The US Economic Impacts of Climate Change and the Costs of Inaction

A Review and Assessment by the Center for Integrative Environmental Research (CIER) at the University of Maryland

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Background

As science continues to bring clarity to present and future global climate change, policymakers are beginning to respond and propose policies that aim to curb greenhouse gas emissions. Although these policies are gaining momentum, their importance is not fully understood by many. All too frequently, inaction is motivated by the perceived high cost of reducing greenhouse gas emissions. The costs of not taking on the challenge posed by climate change are frequently neglected and typically not calculated. Throughout the United States, individuals and communities depend on sectors and systems that are expected to be greatly affected by the impacts of continued climate change.

- The **agricultural sector** is likely to experience uneven impacts throughout the country. Initial economic gains from altered growing conditions will likely be lost as temperatures continue to rise. Regional droughts, water shortages, as well as excess precipitation, and spread of pest and diseases will negatively impact agriculture in most regions.
- Storms and sea level rise threaten extensive **coastal infrastructure** – including transportation networks, coastal developments, and water and energy supply systems.
- Current **energy** supply and demand equilibria will be disrupted as electricity consumption climbs when demand grows in peak summer months. At the same time, delivering adequate supply of electricity may become more expensive because of extreme weather events.
- Increased incidence of asthma, heat-related diseases, and other respiratory ailments may result from climate change, affecting **human health** and well-being.
- More frequent and severe **forest fires** are expected, putting ecosystems and human settlements at peril.

- The reliability of **water supply networks** may be compromised, influencing agricultural production, as well as availability of water for household and industrial uses.

Maryland

The state's extensive coastal infrastructure – including transportation and energy supply networks and coastal developments – will likely endure the greatest portion of total economic impacts of climate change in the region. Although the picture is incomplete because of data limitations, a valuable glimpse of the extent to which climate change will affect these economic sectors can be gleaned from the summary below.

Overview and Summary of Expected Impacts

Along with Virginia, Maryland is expected to undergo the greatest percent coastal population change in the country. The value of Maryland's insured coastal property is one of the highest in the country. The State's coastline is also ranked as the third most vulnerable to sea level rise, whose impacts include more severe coastal flood events and increased shore erosion. Shore erosion is already in progress for 31% of Maryland's coastline, and around 580 acres of land are lost annually as a result.

Regional land subsidence is expected to exacerbate the projected global sea levels rise of 7 to 23 inches by 2099. Maryland is projected to face an additional 5 or more inches of sea level rise beyond the level experienced elsewhere. More recent estimates forecast as much as 2 or 3 feet in sea level rise by the end of this century.

Coastal Infrastructure

- In Maryland in 2004, the total value of insured properties vulnerable to hurricanes was over \$12.1 trillion.
- A Category 4 hurricane touching down in a major metropolitan area – such as Washington DC or Baltimore – would cost \$50–66 billion in insurance losses alone.

- Transportation infrastructure in the region is especially vulnerable to storm surges. Repairs to transportation systems can be very expensive. Approximately 748 miles of urban roads are potentially at risk in Maryland. Constructing sea wall and bulkhead protection for the 31 miles of the region's coastline would cost anywhere from \$37 million to just under \$1 billion. Building dikes or levees to protect against a one-meter rise in sea level would run from \$37 million to just under \$200 million for the coastline.
- Evacuation effort estimates for Maryland's coastal counties range from nearly \$500 million to over \$1.6 billion.

Other Impacts

- Changes in water quality and water temperature on the coast may negatively affect the **ocean economy sector**, which employs over 50,000 people, contributes around \$1.7 million in wages to the economy and nearly \$2.5 billion to Maryland's Gross State Product.
- Similarly, the **coastal economy sector**, which employs nearly 2.5 million people and generates roughly \$250 billion for the State, will likely be threatened as a result of impacts from global climate change.
- The **forest industry** and **agricultural crops** will likely face declines in productivity, as more severe weather events add unpredictability and risk to the sectors.

Nationwide

An assessment of the possible impacts of inaction is presented in the University of Maryland report, *The Economic Impacts of Climate Change and the Cost of Inaction*. The range of climate changes anticipated in the United States will have real impacts on the natural environment as well as human-made infrastructure and its ability to contribute to economic activity and quality of life. The assessment suggests a need for immediate national policy to cut emissions, and a federally-funded set of region- and sector-specific studies to guide climate policy and investment.

Five key lessons from the complete report:

1. Economic impacts of climate change will occur throughout the country.
2. Economic impacts will be unevenly distributed across regions and within the economy and society.
3. Negative climate impacts will outweigh benefits for most sectors that provide essential goods and services to society.
4. Climate change impacts will place immense strains on public sector budgets.
5. Secondary effects of climate impacts can include higher prices, reduced income and job loss.

SOURCES

Data sources for Maryland analysis include:

Barron, E. 2001. Potential Consequences of Climate Variability and Change for the Northeastern United States. *Climate Change Impacts on the United States: The Potential Consequences of Climate Variability and Change*. Ch 4, p 109-134. Report for the US Global Change Research Program. Cambridge University Press, Cambridge, UK. Available online at <http://www.usgcrp.gov/usgcrp/nacc/northeast.htm>.

Bureau of Economic Analysis (BEA). 2005. Available online at <http://www.bea.gov/national/index.htm#gdp>

Frumhoff, P.C. et al. 2007. *Confronting Climate Change in the U.S. Northeast: Science, Impacts, and Solutions*. Union of Concerned Scientists. Available online at http://www.climatechoices.org/ne/resources_ne/nereport.html.

Insurance Information Institute (III). 2007. *Facts and Statistics: Catastrophes*. Available online at <http://www.iii.org/media/facts/statsbyissue/catastrophes/>

Maryland Department of Natural Resources. 2007. DNR Answers Questions about Sea Level Rise in Response to IPCC Report. Available online at http://www.dnr.state.md.us/dnrnews/infocus/sealevel_rise.asp

National Oceanic and Atmospheric Administration (NOAA). 2004. *Population Trends Along the Coastal United States: 1980-2008*. Available online at http://www.oceanservice.noaa.gov/programs/mb/pdfs/coastal_pop_trends_complete.pdf.

National Ocean Economics Program (NOEP). 2004. *Ocean Economy Data*. Available online at <http://noep.mbari.org/Market/ocean/oceanEcon.asp>

Neumann, J.E., G.Yohe, R. Nicholls and M. Manion. 2000. *Sea level rise and global climate change: a review of impacts to US coasts*. Prepared for the Pew Center on Global Climate Change. February 2000.

US Department of Transportation (US DOT). 2005. *National Highway System Road Length- 2005*. Available online at <http://www.fhwa.dot.gov/policy/ohim/hs05/hm/hm40.htm>.

Whitehead, J.C. 2000. *One Million Dollars A Mile? The Opportunity Costs of Hurricane Evacuation*. Available online at <http://www.ecu.edu/econ/wp/00/ecu0005.pdf>.

Zimmerman, R. 2002. *Global Climate Change and Transportation Infrastructure: Lessons from the New York Area*. Available online at <http://climate.volpe.dot.gov/workshop1002/zimmermanrch.pdf>.

For the complete report, *The US Economic Impacts of Climate Change and the Cost of Inaction*, see: <http://www.cier.umd.edu/climateadaptation>. We thank Environmental Defense for support of this research.

