

Regional Highlight: Northeast and Mid-Atlantic

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

October 2007

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.

Northeast and Mid-Atlantic

The Northeast and Mid-Atlantic'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.

Coastal Infrastructure

- The total value of insured properties vulnerable to hurricanes was nearly \$4 trillion in 2004. A Category 4 hurricane touching down in a major metropolitan area would cost \$50-66 billion in insurance losses alone.
- Sea-level rise of 20 inches (which is expected to happen by 2100) would cause damages from \$8-\$58 billion.
- Transportation infrastructure in the region is especially vulnerable to storm surges. In the New York metropolitan area alone, there are 48 major transit facilities at 10 feet or less above sea level – including all the city's airports. Damage to this transit infrastructure caused by the September 11th attacks amounted to over \$7 billion. Similarly, flooding of the Boston subway system in 1996 inflicted over \$92 million in damages. Approximately 7,439 miles of urban roads are potentially at risk.

Constructing sea wall and bulkhead protection for just 25% of the length of the region's coastline would cost from roughly \$300 million to just under \$8 billion. Constructing dikes or levees to protect against a one-meter rise in sea level would run from \$300 million to just over \$1.5 billion for a quarter of the coastline.

- Evacuation effort estimates for the Northeastern coastal region ranges from nearly \$2 billion to over \$6.5 billion.

Other impacts

- Changes in water quality and water temperature on the coasts may negatively affect the \$63 billion **ocean**

economy sector, which employs 1.1 million people.

- A decrease of 10–20% in skiing days will result in a loss of \$405–\$810 million per year. Other **tourism industries**, such as snowmobiling and beach-related sectors, which are primarily located in the vulnerable coastal communities, are likely to experience declines, as well.
- The **forest industry** will likely face declines in productivity as high as 17%. Maple syrup production may also suffer: sap flow is predicted to fall by 17–39%, inflicting a loss of \$5.3–\$12.1 million in annual revenue to this \$31 million industry.
- Effects on **agricultural crops** are expected to be mixed – at least for the short- to medium term – causing losses for some crops and gains for others. Losses are expected to be significant; New York’s agricultural yield may be reduced by as much as 40%, causing \$1.2 billion in annual damages. Threat of drought is expected to rise, affecting the agricultural sector. For example, a 1999 nation-wide drought cost the Northeast region around \$973 million in net farm-income losses

Nationwide

An assessment of the possible impacts of inaction is presented in the University of Maryland report, *The US 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.

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.

SOURCES

As documented in the full report, data sources for the Northeast and Mid-Atlantic region 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>

Congressional Research Service (CRS). 2006. *U.S. International Borders: Brief Facts*. Available online at <http://www.fas.org/sgp/crs/misc/RS21729.pdf>

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.

Jacob, K., N. Edelblum and J. Arnold. 2000. *Climate Change and a Global City: An Assessment of the Metropolitan East Coast Region*. Available online at http://metroeast_climate.ciesin.columbia.edu/reports/infrastructure.pdf

Kinney et al. 2006. *Assessing Potential Public Health Impacts of Changing Climate and Land Uses: The New York Climate and Health Project*. Regional Climate Change and Variability: Impacts and Responses. Ch. 6. p. 161-191. Northampton: Edward Elgar Publishing, Inc.

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

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.

New Hampshire Dept of Environmental Services. 2005. *Global Climate Change and Its Impact on New Hampshire*. Concord, NH. Available online at <http://www.des.state.nh.us/factsheets/ard/ard-23.htm>

US Census Bureau 2002. American FactFinder. Available online at <http://factfinder.census.gov>.

US Census Bureau. 2006. American FactFinder. Available online at <http://factfinder.census.gov>.

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