

Regional Highlight: Midwest

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.

Midwest

A big concern in the region is drought-like conditions resulting from rising temperatures, which increase evaporation and contribute to decreases in soil moisture and reductions in lake and river levels. 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.

Manufacturing and Shipping

- Approximately \$3.4 billion and 60,000 jobs rely on the movement of goods within the Great Lakes-St. Lawrence shipping route annually. Water levels are expected to drop significantly, necessitating dredging. An estimated 7.5–12.5 million cubic yards of sediment will need to be dredged annually at a cost of \$85–\$142 million
- System connectivity is predicted to become 25% impaired, causing a loss of \$850 million annually. Increased incidences of drought will likely place an additional stress on the water conveyance system. For example, a 1988 Midwest drought cost the region over \$49 billion, in part because riverine commercial shipping had to be replaced by more expensive railroad transport due to reduced water levels in the Mississippi River.

Other impacts

- **Forestry** is an integral part of the economic structure in the Midwest. Over 90% of forestland is used for commercial forestry, resulting in economic activity valued at \$41.6 billion. The sector employs 200,000 people and produces \$27 billion in forest products. Many of the economically valuable timber species – aspen, jack pine, red pine, and white pine – may be lost

due to warming of the climate. The virgin pulping/ wood fiber industry may be eliminated entirely as the forest cover landscape shifts toward oak and hickory species.

- Potentially negative impacts are expected to the \$5.7 billion **dairy industry**, since milk production is temperature-sensitive and is reduced once temperatures advance beyond a certain threshold.
- The **agriculture** sector also may experience losses similar to the 1988 drought, which cut production of grain by 31% and production of corn by 45%.
- **Outdoor recreation** will likely suffer as forest cover matrices shift. In Michigan, Minnesota and Wisconsin alone, \$4.7 billion was spent in 1996 on hunting, and bird-watching generates \$668 million in retail sales and supports 18,000 jobs.
- **Skating** is likely to be affected as well. Lighter than usual snowfall during the 1997-1998 season resulted in business losses of \$144 million.
- **Boating** is another favorite pastime – 4 billion boats are owned in the region. Reduced water levels may require dredging to ensure access to the 1,883 marinas, at a total annual cost of \$68 million.

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.

SOURCES

As documented in the full report, data sources for the Midwest region include:

Donaghy, K., W.Ehreat, E.Herricks and B.Orland.2006.An integrated Assessment of Impacts of Predicted Climate Change on the Mackinaw River Basin, In M.Ruth, K.Donaghy and P.Kirshen (eds.) *Regional Climate Change and Variability*, Edward Elgar Publishing, Cheltenham, UK, pp.79 – 127.

Easterling, D.R. and Karl T. R. 2001. Potential Consequences of Climate Variability and Change for the Midwestern United States. *Climate Change Impacts on the United States: The Potential Consequences of Climate Variability and Change*. Ch. 6, pp 167-188. Report for the US Global Change Research Program. Cambridge University Press, Cambridge, UK. Available online at <http://www.usgcrp.gov/usgcrp/nacc/midwest.htm>.

Great Lakes Regional Assessment Group.2000.*Preparing for a Changing Climate: The Potential Consequences of Climate Variability and Change*. Available online at http://www.geo.msu.edu/glra/PDF_files/GLRA_report.pdf

United States Army Corps of Engineers (US ACOE). 2004. *Water Bourne Commerce of the United States: Waterways and Harbors Great Lakes*. Available online at <http://www.iwr.usace.army.mil/ndc/wcsc/pdf/wcusgl04.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.

