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FACT SHEET: What Climate Change Means for Michigan and the Midwest



Today, the Obama Administration released the third U.S. National Climate Assessment – the most comprehensive scientific assessment ever generated of climate change and its impacts across every region of America and major sectors of the U.S. economy. The findings in this National Climate Assessment underscore the need for urgent action to combat the threats from climate change, protect American citizens and communities today, and build a sustainable future for our kids and grandkids.

The National Climate Assessment is a key deliverable of President Obama’s Climate Action Plan to cut carbon pollution, prepare America’s communities for climate-change impacts, and lead international efforts to address this global challenge. Importantly, the plan acknowledges that even as we act to reduce the greenhouse-gas pollution that is driving climate change, we must also empower the Nation’s states, communities, businesses, and decision makers with the information they need prepare for climate impacts already underway.

The Obama Administration has already taken a number of steps to deliver on that commitment to states, regions, and communities across America. In the past year alone, these efforts have included: establishing a Task Force of State, Local, and Tribal Leaders on Climate Preparedness and Resilience to advise the Administration on how the Federal Government can respond to the needs of communities nationwide that are dealing with the impacts of climate change; launching a Climate Data Initiative to bring together extensive open government data with strong commitments from the private and philanthropic sectors to develop planning and resilience tools for communities; and establishing seven new “climate hubs” across the country to help farmers and ranchers adapt their operations to a changing climate.

MICHIGAN is part of the U.S. National Climate Assessment U.S. Midwest Region. The regional phenomena identified by the Assessment may not occur in every state that is part of a particular region. According to the third U.S. National Climate Assessment Highlights report:

“The Midwest’s agricultural lands, forests, Great Lakes, industrial activities, and cities are all vulnerable to climate variability and climate change. Climate change will tend to amplify existing risks climate poses to people, ecosystems, and infrastructure. Direct effects will include increased heat stress, flooding, drought, and late spring freezes. Climate change also alters pests and disease prevalence, competition from non-native or opportunistic native species, ecosystem disturbances, land-use change, landscape fragmentation, atmospheric and watershed pollutants, and economic shocks such as crop failures, reduced yields, or toxic blooms of algae due to extreme weather events. These added stresses, together with the direct effects of climate change, are projected to alter ecosystem and socioeconomic patterns and processes in ways that most people in the region would consider detrimental.

Most of the Midwest's population lives in urban environments. Climate change may intensify other stresses on urban dwellers and vegetation, including increased atmospheric pollution, heat island effects, a highly variable water cycle, and frequent exposure to new pests and diseases. Further, many of the cities have aging infrastructure and are particularly vulnerable to climate change related flooding and life-threatening heat waves. The increase in heavy downpours has contributed to the discharge of untreated sewage due to excess water in combined sewage-overflow systems in a number of cities in the Midwest." (NCA Highlights, p.74)

Regional Findings of the Third U.S. National Climate Assessment: MIDWEST

- "In the next few decades, longer growing seasons and rising carbon dioxide levels will increase yields of some crops, though those benefits will be progressively offset by extreme weather events. Though adaptation options can reduce some of the detrimental effects, in the long term, the combined stresses associated with climate change are expected to decrease agricultural productivity.
- The composition of the region's forests is expected to change as rising temperatures drive habitats for many tree species northward. The role of the region's forests as a net absorber of carbon is at risk from disruptions to forest ecosystems, in part due to climate change.
- Increased heat wave intensity and frequency, increased humidity, degraded air quality, and reduced water quality will increase public health risks.
- The Midwest has a highly energy-intensive economy with per capita emissions of greenhouse gases more than 20% higher than the national average. The region also has a large and increasingly utilized potential to reduce emissions that cause climate change.
- Extreme rainfall events and flooding have increased during the last century, and these trends are expected to continue, causing erosion, declining water quality, and negative impacts on transportation, agriculture, human health, and infrastructure.
- Climate change will exacerbate a range of risks to the Great Lakes, including changes in the range and distribution of certain fish species, increased invasive species and harmful blooms of algae, and declining beach health. Ice cover declines will lengthen the commercial navigation season." (NCA, Ch. 18: Midwest)

Selected Findings and Information from the Third U.S. National Climate Assessment Relevant to MICHIGAN

- **Climate:** "The rate of warming in the Midwest has markedly accelerated over the past few decades. Between 1900 and 2010, the average Midwest air temperature increased by more than 1.5°F. Since 1991, the amount of rain falling in very heavy precipitation events has been significantly above average. This increase has been greatest in the Northeast, Midwest, and upper Great Plains – more than 30% above the 1901-1960 average. There has also been an increase in flooding events in the Midwest and Northeast where the largest increases in heavy rain amounts have occurred." (NCA, Ch. 18: Midwest; Ch. 2: Our

Changing Climate)

- **Transportation:** “Effective asset management requires significant data and monitoring of transportation assets. As Michigan DOT has noted, an increase in lake-effect snows means that existing models used for snow and ice removal procedures are no longer reliable, requiring better monitoring and new models, as well as better roadway condition detection systems.” (NCA, Ch. 5: Transportation)
- **Energy:** “The demand for heating in major midwestern cities is typically five to seven times that for cooling, although this is expected to shift as a result of longer summers, more frequent heat waves, and higher humidity, leading to an increase in the number of cooling degree days. This increased demand for cooling by the middle of this century is projected to exceed 10 gigawatts (equivalent to at least five large conventional power plants), requiring more than \$6 billion in infrastructure investments. Further, approximately 95% of the electrical generating infrastructure in the Midwest is susceptible to decreased efficiency due to higher temperatures.” (NCA, Ch. 18: Midwest)
- **Agriculture:** “Future crop yields will be more strongly influenced by anomalous weather events than by changes in average temperature or annual precipitation. Cold injury due to a freeze event after plant budding can decimate fruit crop production, as happened in 2002, and again in 2012, to Michigan’s \$60 million tart cherry crop.” (NCA, Ch. 18: Midwest)
- **Forests:** “Among the varied ecosystems of the region, forest systems are particularly vulnerable to multiple stresses. The habitat ranges of many iconic tree species such as paper birch, quaking aspen, balsam fir, and black spruce are projected to decline substantially across the northern Midwest as they shift northward, while species that are common farther south, including several oaks and pines, expand their ranges northward into the region.” (NCA, Ch. 18: Midwest)
- **Great Lakes:** “The Great Lakes, North America’s largest freshwater feature, have recently recorded higher water temperatures and less ice cover as a result of changes in regional climate. However, current estimates of lake level changes are uncertain, even for continued increases in global greenhouse gas emissions (A2 scenario). The most recent projections suggest a slight decrease or even a small rise in levels. Higher temperatures, increases in precipitation, and lengthened growing seasons favor production of blue-green and toxic algae that can harm fish, water quality, habitats, and aesthetics, and could heighten the impact of invasive species already present.” (NCA, Ch. 18: Midwest)

Examples of Efforts Underway in MICHIGAN to Address Climate Change

In MICHIGAN, many efforts are already underway to mitigate and respond to the impacts of climate change, including:

Preparing Communities for the Consequences of Climate Change:

Many important preparedness, resilience, and adaptation efforts are already being led by local, state, and regional entities across the country. Mechanisms being used by local governments to

prepare for climate change include: land-use planning; provisions to protect infrastructure and ecosystems; regulations related to the design and construction of buildings, road, and bridges; and preparation for emergency response and recovery. These local adaptation planning and actions are unfolding in municipalities of different sizes, and regional agencies and regional aggregations of governments are also taking actions. And States have also become important actors in efforts related to climate change.

- The U.S. Department of Agriculture's Midwest Regional "Climate Hub" is located in Ames, Iowa, with a sub-hub located in Houghton, Michigan. The Hub is designed to deliver science-based knowledge, practical information, and program support for farmers, ranchers, landowners, and resource managers to support informed on-the-ground decision-making related to climate change.
- Mayor George Heartwell (Grand Rapids, MI) serves on the President's State, Local and Tribal Leaders Task Force for Climate Preparedness. Mayor Heartwell has been recognized by the U.S. Conference of Mayors for his leadership on climate change and has commissioned a city climate resiliency and preparedness report, identifying key impacts across community sectors and solution recommendations.

Cutting Carbon Pollution in MICHIGAN:

In 2012, power plants and major industrial facilities in Michigan emitted more than 92 million metric tons of carbon pollution – that is equal to the yearly pollution from more than 19 million cars. Through the Climate Action Plan and state initiatives, there are many efforts already underway to mitigate and respond to the impacts of climate change in Michigan, including:

- ***Investing in Clean Energy:*** Since President Obama took office, the U.S. increased solar-electricity generation by more than ten-fold and tripled electricity production from wind power. In Michigan, renewable energy generation from wind, solar, and geothermal sources increased more than 100 percent. Since 2009, the Administration has supported tens of thousands of renewable energy projects throughout the country, including 202 in Michigan, generating enough energy to power more than 100,000 homes and helping Michigan meet its own goal of generating 10 percent of its electricity from renewable energy sources by 2015.
- ***Improving Efficiency:*** Using less energy to power our homes, businesses and vehicles is critical to building a clean and secure energy future. President Obama has made essential investments in research and development for energy efficiency advances, and set new standards to make the things we use every day – from cars to microwaves – more efficient.
 - President Obama established the toughest fuel economy standards for passenger vehicles in U.S. history. These standards will double the fuel efficiency of our cars and trucks by 2025, saving the average driver more than \$8,000 over the lifetime of a 2025 vehicle and cutting carbon pollution.
 - Since October 2009, the Department of Energy and the Department of Housing and Urban Development have jointly completed energy upgrades nearly two million

homes across the country, saving many families more than \$400 on their heating and cooling bills in the first year alone.

- As part of the President's Better Buildings Challenge, Michigan State University committed to reducing energy intensity 20 percent by 2020 in 20 million square feet of campus buildings. To date, Michigan State University has achieved improved energy performance of 10 percent.

For more information about the third U.S. National Climate Assessment, please visit www.globalchange.gov or contact engagement@usgcrp.gov.