

Protecting Michigan's Communities, Economy and Environment from Global Warming

Global warming is already affecting Michigan, and will continue to do so for decades to come. Investing 5% of total allowance value generated from an energy and climate bill will protect communities and local economies across America by creating jobs that protect wildlife and natural resources from the effects of global warming.

Critical Issues for Michigan:

- Declining Great Lakes water levels and ice cover
- Damage to local economy
- Increasing temperatures
- Changing precipitation patterns

Is Global Warming Affecting Natural Resources in Michigan?

Yes, and Michigan is warming. Since mid-century, **temperatures across the state have risen over 1.25°F, and are expected to rise up to an additional 5°F by 2060.**¹ Based on these projected increases, summers in Michigan will begin to **resemble those of Ohio by as early as 2030**, and will eventually resemble northern Arkansas by the end of the century.² Along the shores of the Great Lakes, projections show a decrease of up to eight inches in annual rainfall by 2060.³ These changes are significant, and the impacts are already being felt.

Across the U.S., more than 80% of plant and animal species studied are shifting their ranges in reaction to less than 1° F of warming in the last century.⁴ The Intergovernmental Panel on Climate Change predicts further warming could result in **up to 30% of known species becoming extinct**, and the disappearance of more than one-fifth of the world's ecosystems.⁵

The Great Lakes are seeing a decline in ice cover, resulting in lower water levels the rest of the year. **Total ice cover decreased by approximately 40% between 1972 and 2005, and water levels across the Lakes could drop 8 feet by the end of the century.**⁶ As of March 2009, Lake Michigan was nine inches below the lake's historic average, and is expected to remain at similar levels for the next six months.⁷

The time to act is now. Tackling global warming means reducing carbon pollution and protecting our communities, natural resources and economy from climate change impacts. A renewed dedication to protecting America's natural resources will create tens of thousands of new jobs and secure clean air and water for us all.



Land management agencies need additional resources to protect ecosystems like those on Michigan's expansive shoreline from the effects of global warming.

What's at Stake?

Changes brought on by global warming are disrupting the careful balance of natural resources and having significant impacts on communities and businesses across the state.

- **Clean Water and Hydroelectricity:** Decreasing ice coverage and resulting water levels will likely place a strain on water availability throughout the state. The Great Lakes provide more than 75% of Michigan's water, and for the five largest counties in the state, the Lakes supply more than 90%.⁸ In both 2007 and 2008, when water levels were especially low, hydroelectric power plant capacity was reduced by 50% along Lake Superior, resulting in a spike in electricity rates.⁹
- **Agriculture:** The effects of global warming have been shown to increase soil erosion, which will impact Michigan's \$64 billion agricultural industry and the one million jobs it provides across the state. By 2059, two areas of the state will see significant losses in topsoil: the Thumb area is expected to decline by 105%, and Southeastern Michigan can expect to see a more than 270% loss. Loss of topsoil, combined with increases in runoff, could cause between \$11.5 and \$20.7 billion in annual losses to the agricultural industry.¹⁰
- **The Shipping Industry:** Likely to be one of the most direct impacts to Michigan's economy, the Great Lakes' declining water levels will necessitate significant investment in order to maintain the current level of productivity at the state's ports. As early as 2030, the dredging required to maintain open shipping lanes may cost between \$92 million and \$154 million annually and under this scenario, Detroit, Muskegon, and Port Huron could see almost \$1.5 billion in annual economic losses.¹¹
- **Local Businesses:** Michigan's outdoor recreation industry is dependent upon healthy ecosystems. Businesses that support Michigan's \$5.1 billion wildlife-related recreation economy are threatened by the effects of global warming. For example, trout fishing alone contributes over \$75 million annually to Michigan's economy.¹² However, water temperature and stream flows are crucial for sustaining healthy trout populations—and rising temperatures and decreasing ice cover and water levels in the Great Lakes are threatening both native species and local businesses.

Economy at Risk:
\$20.7 Billion
Anticipated annual losses in the agricultural sector due to changing climates



Dedicated funding for natural resource adaptation will help protect species like the white-tailed deer from the effects of global warming.

Protecting Natural Resources, Creating Jobs

Restoring ecosystem health helps ensure species have the best possible chance to adapt to the effects of global warming. Ecosystem adaptation projects, such as establishing wildlife corridors for animals migrating in search of needed habitat, are critical to the survival of many species. **Investing now in natural resources is the most cost-effective way to protect our treasured landscapes and the clean water, clean air and jobs they provide.**

Of the total allowance value generated from an energy and climate bill, 5% should be invested in protecting communities and local economies across America by protecting natural resources from the effects of global warming. This funding will allow Michigan's wildlife and land management agencies, as well as the Land and Water Conservation Fund and the Forest Legacy Program, to ramp up important conservation projects.

This dedicated funding will allow scientists, engineers, construction crews, and others to be employed across Michigan:

- Acquiring land and establishing migration corridors to increase species' survival as climates change.
- Monitoring wildlife, their habitat and local climate and developing appropriate adaptation responses.
- Restoring native landscapes to increase resiliency in a warming world by removing unnecessary roads and barriers, constructing riparian buffer strips, and removing invasive species.
- Repairing damaged watersheds to ensure clean water for communities through removing impediments and deteriorating coastal structures, restoring eroding river banks, and repairing in-stream habitat.



Restoring river habitats protects ecosystems, jobs, and drinking water

This work will protect and create American jobs – providing new skills and income to workers and their families across the state.

Investing in Solutions for Families, Businesses and the Planet

The risks to Michigan and the nation from global warming are significant—and require an extensive and sustained commitment to reducing heat-trapping pollution, protecting our natural resources, and the communities that rely on them. A cap-and-invest system that reduces pollution and auctions emission allowances will provide billions of dollars for combating the climate crisis.

Revenues from a cap-and-invest system must be directed to three primary solutions:

- **Invest 5% of the total allowance value generated in annual dedicated funding for natural resource protection** in order to create jobs while increasing resiliency across landscapes, protecting important ecosystem services and safeguarding communities.
- **Offset increased energy costs for at-risk consumers** by allocating roughly 14% of allowance auction revenues to consumers through existing mechanisms such as the Earned Income Tax Credit and the Low Income Home Energy Assistance Program.¹³
- **Invest in areas such as clean energy choices, job training, and business assistance**, which will aid businesses and communities in transitioning to a clean energy economy, while creating jobs and reducing heat-trapping pollution.

Michigan and the country need your support for reducing carbon pollution and protecting communities by safeguarding our natural resources.

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Text Box: Center for Integrative Environmental Research. 2008. "Michigan Economic Impacts of Climate Change Full Report." University of Maryland. Available from:

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¹ NOAA National Climatic Data Center. 2009. "U.S. Climate at a Glance – Statewide." Available from:

<http://www.ncdc.noaa.gov/oa/climate/research/cag3/state.html>; The University of Washington and The Nature Conservancy. 2009. Climate Wizard. Available from: <http://www.climatewizard.org/index.html>

² Center for Integrative Environmental Research. 2008. "Michigan Economic Impacts of Climate Change Full Report." University of Maryland. Available from: <http://www.cier.umd.edu/climateadaptation/Michigan%20Economic%20Impacts%20of%20Climate%20Change.pdf>

³ The University of Washington and The Nature Conservancy. 2009.

⁴ Sagarin, Raphael. 2002. "Historical Studies of Species' Responses to Climate Change." In: *Wildlife Responses to Climate Change: North American Case Studies*. Ed: Terry L. Root and Stephen H. Schneider. Island Press. Washington, DC.

⁵ Intergovernmental Panel on Climate Change. 2007. "Summary for Policy Makers." In: *Climate Change 2007: Impacts, Adaptation and Vulnerability: Working Group II Contribution to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Pg 792.

⁶ Congressman Mark Steven Kirk and NOAA. 2009. "Kirk: Climate Change and Regional Growth Threaten to Lower Lake Michigan Level." Available from: http://www.house.gov/list/press/il10_kirk/Climate_Change_threatens_lake.html; National Conference of State Legislatures. 2008.

⁷ US Army Corps of Engineers. 2009. "March 2009 Great Lakes Water Level Summary." Available from:

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⁸ The Center for Integrative Environmental Research. 2008.

⁹ Congressman Mark Steven Kirk. 2009.

¹⁰ The Center for Integrative Environmental Research. 2008.

¹¹ The Center for Integrative Environmental Research. 2008

¹² The Center for Integrative Environmental Research. 2008. ; U.S. Fish and Wildlife Service. 2006. "National Survey of Fishing, Hunting, and Wildlife-Associated Recreation." http://library.fws.gov/nat_survey2006_michigan.pdf.

¹³ Stone, Chad and Hannah Shaw. 2009. "Extending "Climate Rebates" to Include Middle-Income Consumers." *Center on Budget and Policy Priorities*.