

# The Costs of Climate Change for Michigan

## GREAT LAKES STATE AT RISK



Michigan is home to many unique plants and animals, including some of the most diverse ecosystems in the country like dense forests, sprawling prairies, and island ecosystems which provide habitat for moose, beaver, deer, Common loons, Monarch butterflies, Yellow perch and over 100 species of fish. Michigan also provides shelter and nesting grounds for thousands of migratory birds and waterfowl that pass through the state every year,<sup>1</sup> and grows some of the most diverse agricultural crops in the nation including apples, cherries, and blueberries.<sup>2</sup> A large portion of the Michigan economy is reliant on Michigan's unique environment, with outdoor recreation generating over \$30 billion a year and providing over 230,000 jobs for Michigan residents,<sup>3</sup> and agriculture in Michigan providing over \$70 billion a year to the state economy and more than half a million jobs, approximately 12.5% of all Michigan employment.<sup>4</sup> However, the climate of Michigan is changing—tempera-

tures in Michigan in the 2000s have been the highest in recorded history for the state, with both of Michigan's two peninsulas having warmed by more than two degrees Fahrenheit on average since 1900. Consequently, Michigan is seeing increases in the frequency and magnitude of natural disasters, flooding, and extreme temperatures,<sup>5</sup> which poses serious threats to the businesses and economy that are dependent on Michigan's natural environment.

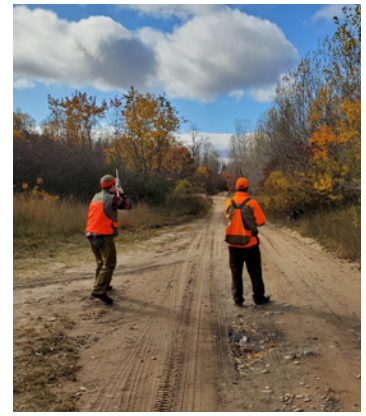
### IMPACTS ON MICHIGAN'S OUTDOOR LIFESTYLE AND RECREATION

Impacts from a warming climate will damage the many recreational opportunities that draw people from all over the world to Michigan and the businesses that depend on them. Outdoor recreation is vital to the Michigan economy and way of life, including businesses that thrive around boating, fishing, hunting, birdwatching, and winter sports.



- **Boating** plays an important role in the Michigan and Great Lakes economy, with boating related activities contributing approximately **\$16 billion** to the Great Lakes economy every year.<sup>6</sup> However, the more than 800 marinas and harbors in Michigan will be affected by shifts in season duration, increased storm frequency and intensity, and changes in lake levels. Fluctuating lake levels require marinas and boat owners to adopt additional protection measures like installing floating docks and potentially dredging the shallower portions of harbors and marinas when lake levels are low.<sup>7</sup> These additional measures require higher costs in upkeep and maintenance of existing coastal and boating infrastructure, and they can have negative impacts on wildlife habitat as well.
- **Recreational fishing** brings in over **\$2 billion** to the Michigan economy through lodging, dining, and retail store purchases.<sup>8</sup> Changes in seasonal temperatures will affect the habitats and availability for freshwater fish in the Great Lakes which will have major implications for existing sport fisheries and fishing-related businesses. As temperatures warm, cool water fish like salmon and trout will be forced to migrate further north potentially outside of their traditional habitats and fishing zones. Fishermen dependent on the walleye, a popular cool water sport fish in the Great Lakes, will likely see a decline in availability and abundance of these fish as they struggle to cope with the warmer waters.<sup>9</sup> Businesses dependent on the attraction of anglers to their area, like bait shops and charter boats, may also begin to see the effects of declining tourism and may ultimately end up booking less trips and selling less gear.

- **Hunting** and wildlife associated recreation is very popular in Michigan, with over 700,000 people participating in hunting every year in Michigan, and wildlife associated recreation bringing in over **\$11 billion** to the state's economy annually, providing over 135,000 jobs in the state.<sup>10</sup> Warmer temperatures are expected to impact the abundance and range of popular animals in Michigan during the winter and summer, including the White-Tailed Deer, as longer summers and more droughts may increase the likelihood of transmission of deadly viruses capable of wiping out thousands of deer at a time.<sup>11</sup>
- **Birdwatching** is one of the fastest growing hobbies in the nation, bringing in more than **\$40 billion** to the U.S. economy through travel and retail, and bringing thousands of tourists to watch birds in Michigan every year.<sup>12</sup> Popular birds like the Common loon and Kirtland warbler may begin to migrate out of Michigan as our climate changes, as will the tourism dollars in lodging, food, and retail that are generated by the tourism centered around these rare birds.<sup>13</sup> By 2080 Michigan will have lost its population of almost 37 different species of birds, primarily from the Upper Peninsula of Michigan where birdwatching is especially popular.<sup>14</sup>



- **Ski and snowboard areas and trails for snowmobiling, cross country skiing, and dog sledding** are another resource that makes Michigan so popular, with winter recreation bringing in more than **\$3 billion** a year to the Michigan economy. With 47 ski areas, Michigan ranks second in the nation for ski resorts, coming second only to New York.<sup>15</sup> As the climate and seasons continue to change, ski resorts may need to spend more money to make more snow for their slopes during the peak seasons in order to allow for skiing and snowboarding. Snowmobile and cross-country skiing seasons may be cut short due to lack of snow cover on the ground.<sup>16</sup> These changes can lead to major losses in revenue through ski retail, lodging, dining, snowmobile registrations and gear, and trail permits.

### IMPACTS ON MICHIGAN AGRICULTURE

Michigan's unique climate allows for a great diversity of agricultural products that grow in Michigan. Agriculture in Michigan adds more than **\$70 billion** a year to the Michigan economy,<sup>17</sup> with Michigan having one of the most diverse agricultural industries in the country second only to California.<sup>18</sup> Michigan is the nation's top producer of cultivated blueberries, producing over 100 million pounds of blueberries and bringing in over \$130 million a year.<sup>19</sup> Cherries also contribute to Michigan's agricultural notoriety, with 74% of all national tart cherries produced in Michigan and the National Cherry Festival in Traverse City which brings in more than 500,000 people to the region, producing over \$19 million a year and supporting over 200 local jobs.<sup>20</sup> Changes in the climate, including precipitation and temperature, can have major impacts on crop yield and diversity. Changes in seasonal temperatures can also lead to devastating effects on crops, as heat waves and frost can both damage and even destroy many of the main agricultural crops in Michigan like corn and wheat, as well as popular fruits like apples, blueberries, and cherries.<sup>21</sup> In 2012, for example, high temperatures in March caused Michigan fruit trees to bloom early and when temperatures subsequently dropped below freezing in April, the fruit trees were all destroyed. This event alone caused more than \$225 million worth of damage and was the worst loss to the state's fruit tree industry since 1945.<sup>22</sup>

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**M**ichigan's unique environment allows for a wide variety of agricultural diversity and provides many different opportunities to explore and recreate outdoors, which together brings in billions of

### APPROXIMATE ECONOMIC IMPACT IN MICHIGAN PER YEAR

- **Recreational Hunting = \$11 Billion**
- **Recreational Fishing = \$2 Billion**
- **Recreational Boating = \$3.9 Billion<sup>23</sup>**
- **Winter Recreation = \$3 Billion**
- **Birdwatching = \$40 Billion (Nationally)**
- **Agriculture = \$70 Billion**



dollars and millions of tourists to Michigan every year. As the climate continues to shift, Michigan's booming agriculture industry and outdoor recreational opportunities will become threatened and Michigan businesses will need to adapt to survive. It is clear that a major portion of the Michigan economy is reliant on the natural environment, and as the climate continues to shift rapidly, so will our economy.

In order to protect the vital natural and economic resources that Michigan provides, action must be taken now to address the impacts of climate change and its adverse effects on the people and businesses of Michigan. Implementing adaptation and mitigation measures may prevent these effects and changes to our environment and economy from being more severe in the short-term, and will help maintain the economic prosperity and natural beauty that Michigan is known for.





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