Temperatures in state projected to increase 6 degrees

Warming trend could affect farming, tourism

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Wisconsin's temperatures are expected to increase by an annual average of 6 to 7 degrees Fahrenheit by midcentury - a warming trend that will be highly variable and affect everything from our farming practices to the way we fish.

The study by University of Wisconsin-Madison scientists and others in state government shows that a rise in temperature produces a jumble of different outcomes.

Northern Wisconsin, for example, is expected to warm the most. Meanwhile, warming would be less dramatic near Lake Michigan.

Also, state climate models show that the biggest increases in warming will occur in the winter - not the summer. The biggest changes are expected to take place in northwestern Wisconsin.

Without delving into policy recommendations, the study is the latest effort by Wisconsin scientists and other experts to examine possible outcomes of a changing climate.

"Our core mission is to help Wisconsin decision-makers make plans to help the state adapt to changes in the natural environment," said Lewis Gilbert, associate director of the Nelson Institute for

Environmental Studies at UW-Madison.

The state has already become warmer and wetter over the past 60 years, and the warming trend is projected to "continue and increase considerably in the decades ahead," the study says.

As temperatures increase, plant hardiness will shift so northern species such as black spruce, balsam fir and paper birch will have difficulty growing by the end of the century.

Also, the American marten, spruce grouse and snowshoe hare may disappear from the state.

But a warming climate will benefit other species: gray squirrels, white-tailed deer, European starlings and Canada geese.

Greater warming is expected to spur evaporation. That's likely to push down lake levels on the Great Lakes. Lake Michigan could drop 1 foot by the end of the century, increasing shoreline erosion. Water levels of northern lakes and wetlands could drop more during droughts.

But, paradoxically, warming will spur more heavy rain events, raising the likelihood of algae blooms when sediment and organic material such as manure and fertilizer wash into waterways.

As for Wisconsin agriculture - which accounts for more than 350,000 jobs - the growing season is expected to lengthen, with longer springs and falls. That should boost crop production, but it could be diminished by an increase in soil erosion.

If farmers don't adapt, key crops such as corn and soybeans could be harmed. Every increase of 2 degrees could cut corn yields by 13% and soybeans by 16%, studies have shown, the report says.

The report also says the state could see an impact on another sector of its economy - tourism.

"Increased water temperatures and runoff from intense storms may create an environment that deposits and supports pathogens on beaches," the study says. "More pathogens on beaches will most likely lead to more frequent beach closures."

In a statement, Ned Zuelsdorff, director of the American Birkebeiner Ski Foundation, said the study "confirms our suspicions about the conditions we've been working with several years."

The annual ski marathon between Cable and Hayward will be held on Feb. 26. In the past 15 years, Zuelsdorff said, there have been more instances where the race had to be shortened or modified than in the previous 15 years.

Average winter temperature increases could vary from 5 degrees to 11 degrees, depending on the model, the study found.

By contrast, the models showed that global warming is weakest during the summer, with increases ranging from 3 degrees to 8 degrees.

Among other changes: more 90-degree days per year across much of the state, along with more frequent intense precipitation events like the flooding Milwaukee experienced last summer.

Typically, daily high temperatures now exceed 90 degrees about 12 times a year in the south and five

times per year in the north. The number of days when the mercury hits 90 may double to 25 times a year in the south, and more than double to about 12 times in the north.

Localized models

The temperature estimates are the work of UW climatologists, who used the same models as teams of international scientists working on climate change.

Then, working groups in various disciplines looked at the data and predicted outcomes and ways the state might need to adapt.

The estimate of 6 to 7 degrees is an average over 14 different computer models used by international scientists. Individual models predict a range of 4 degrees to 9 degrees, depending on the assumptions used.

Wisconsin's report generally mirrors the outcomes of the 2007 Intergovernmental Panel on Climate Change, which forecast global changes of 3.2 degrees to 7.1 degrees by the end of the century.

The UW climatologists fine-tuned the climate panel's work by localizing temperature data between 1950 and 2006 from spots across the state.

The localized work reflects the thinking among many climate scientists that inland continental temperatures in the Northern Hemisphere are likely to warm relatively more and exhibit greater extremes.

The Intergovernmental Panel on Climate Change is generally seen as the most authoritative source for calculating the relationship between rising levels of carbon dioxide and its climate effect.

But the IPCC is not without its detractors. Critics pointed to several errors in the 2007 report, including a projection that "most Himalayan glaciers would melt by 2035."

The criticism prompted several independent reviews, one of which found that there was no reason to doubt the panel's key findings. Another review recommended procedural changes aimed at improving the organization's transparency. The IPCC has agreed to the changes as it prepares its next assessment, due out in two years.

In a report last month, the National Oceanic and Atmospheric Administration said 2010 tied with 2005 as the warmest year on record, based on global surface temperature. It was the warmest year in the Northern Hemisphere. It was also the wettest year on record worldwide, and among the busiest years for both hurricanes and tornadoes, according to NOAA.

Steers clear of policy

The 226-page Wisconsin study was produced by the Wisconsin Initiative on Climate Change Impacts, a project of the Nelson Institute and the state Department of Natural Resources.

Unlike former Gov. Jim Doyle's climate change task force, which last year unsuccessfully sought ways to cut carbon emissions, the authors generally sought to steer clear of dictating policy.

Jack Sullivan, director of the DNR's Bureau of Integrated Science Services, said the study is designed to

"open the agency's eyes, so we know what may need to change."

For example, "forestry decisions are 100-year decisions," Sullivan said.

He noted the study was not good news for brook trout, which need cold streams and currently live in the southern edge of their range.

Thus, one possible strategy for brook trout is to stock them for a single season, knowing the fish will not survive.

The habitat for brook trout could be lost altogether, brown trout could lose 88% of their habitat and northern pike could lose 72%, the study showed.

But the habitat for large mouth bass could increase by 34% and for channel catfish by 32%.