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Study:Great Lakes face drastic decline

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Global warming could drop Lake Michigan water levels to unprecedented lows over the next century, devastating commercial shipping and dramatically altering the Great Lakes ecosystem, a new study says.

The Lake Michigan water level is already within one foot of the lowest level recorded since 1865. A landmark study of how global climate change could affect the United States says warming could lower all Great Lakes water levels five feet by 2100.

The chief threat: Evaporation.

"The implications of climate change are quite large for the Great Lakes. We could see major changes within 30 years," said Frank Quinn, a senior research hydrologist at the National Oceanic and Atmospheric Administration's Great Lakes laboratory in Ann Arbor.

The report by the National Assessment Synthesis Team a government-sponsored group of scientists representing government, academia, industry and environmental groups suggests average temperatures in the U.S. will increase by 5 to 9 degrees Fahrenheit over the next century. Average temperatures in the U.S. rose 1 degree over the past century.

"All climate models suggest that the climate is going to get warmer and the heat index is going to rise,"

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according to the study.

At the same time, "precipitation is more likely to come in heavy and extreme events," according to the study, conducted as part of the U.S. Global Change Research Program.

The effects of increased global warming in the 21st century will intensify but vary widely in different regions of the United States. Some regions could benefit from rising temperatures, according to the report.

Agriculture and forestry would benefit from longer growing seasons and excess carbon dioxide in the atmosphere. Carbon dioxide is one of the main causes of global warming, but it also increases the growth of vegetation.

The flip side is that soaring temperatures would cause "substantial disruptions" in natural ecosystems and cause more extreme weather floods and droughts in much of the nation, the study said.

Warmer temperatures also would mean milder winters in the Midwest, which translates to less snow and less ice cover on the Great Lakes. The result: Increased evaporation and a lowering of the Great Lakes "to levels we have never seen before," Quinn said.

Commercial shipping in the Great Lakes "would cease to exist" if water levels dropped five feet, said Glen Nekvasil, spokesman for the Cleveland-based Lake Carriers Association.

Lower water levels also would disrupt commercial boating, a cornerstone of Michigan's tourism economy, and curtail hydropower production on the St. Marys, St. Lawrence and Niagara rivers.

Temperature increases of the magnitude projected in the study would mean dramatically lower water levels in most surface waters in the upper Midwest; that would warm water temperatures and concentrate pollutants that wash into surface waters from cities, farm fields and sewage treatment plants, Quinn said.

"I think you will see dramatic effects in the tributaries to the Great Lakes, in rivers like the

Muskegon and the Grand, where there will be less flow and the water is warmer," Quinn said.

Scientists have said even a slight increase in water temperatures in the Muskegon River could wipe out a nationally recognized trout fishery near Newaygo.

Nekvasil said the latest global warming study should concern Great Lakes shipping interests. But he warned against overreacting, saying predictions of future environmental conditions are sometimes wrong.

"What are things going to look like in 100 years? Who knows?," Nekvasil said. "Nobody's crystal ball is that good."

More than an educated guess

Quinn, who worked on the global warming study, said it should be interpreted as a series of "plausible scenarios" and not a 100-year weather forecast.

Although the results of climate change would be mixed for the U.S., the study suggests global warming will do far more harm than good to the nation's natural resources.

Warmer temperatures would increase precipitation in the Great Lakes basin by as much as 30 percent, causing more floods, according to the study. But the added rain and snowfall would not offset dramatic increases in evaporation of Great Lakes water caused by warmer temperatures; the result would be a net reduction in water levels and warmer lake temperatures, Quinn said.

When informed of the study's conclusions, coastal property owners, environmentalists and industry representatives contacted by The Chronicle expressed shock and disbelief.

"A five-foot drop in the lake levels could be an absolute disaster," said Paul Parks, a retired engineer who has lived on the Lake Michigan coast in Grand Haven for 75 years.

"Lower lake levels wouldn't put us out of business, but it sure would create a hardship," said Gordon Torresen, owner of Torresen Marine Inc. in

Muskegon.

Torresen said the existing low water levels in Lake Michigan forced him to spend \$100,000 on dredging so sailboats can get in and out of his marina on Muskegon Lake. "If we can't get boats in the slips, we have no income."

Most scientists agree that dramatic reductions in Great Lakes water levels would disrupt the economy and the ecosystem. But they often disagree on the question of whether such changes are imminent.

Roger Gauthier, a supervisory hydrologist for the U.S. Army Corps of Engineers, said he does not believe lake levels would plummet if regional precipitation increases by 30 percent, as the study suggests.

"I think the predictions about temperature increases are plausible, but the predictions about future precipitation and evaporation are debatable," said Gauthier, who studies Great Lakes water levels. "I'm not inclined to believe lake levels are going to decline in the next 50 years."

Gauthier said studies by Corps scientists suggest Great Lakes water levels fluctuate over a period of about 160 years. Some Corps scientists believe lake levels will rise within the next 50 years.

The case for global warming

After years of fierce debate, most scientists agree that global warming has increased over the past century.

The culprit: An intensifying of the "greenhouse effect," a natural phenomenon that warms Earth and makes it suitable for human habitation.

Carbon-based gases and other airborne compounds in the Earth's atmosphere trap heat from the sun, warming the planet the same way a nursery greenhouse traps heat for plants.

Scientists say excessive amounts of carbon dioxide and other pollutants generated by the burning of coal, oil and gas have accumulated in the atmosphere. That intensifies the greenhouse effect, driving up temperatures.

"We're already seeing indisputable evidence that the climate is changing," said Peter Gleick, a scientist at the Pacific Institute for Studies in Development who worked on the global warming study. Among the indications he and other scientists cite:

n The U.S. has recorded two consecutive years of record high average temperatures.

n Polar ice caps are melting at unprecedented rates.

n Great Lakes water temperatures have hit record highs in recent years and the lakes are staying warmer longer.

n Temperatures in the upper Midwest increased by 4 degrees over the past century.

Global warming will mean warmer nights and winters in much of the U.S., according to the study.

No fast solutions

Despite evidence that global warming is changing the environment, the U.S. and other nations have been unable to reach agreement on reducing emissions of greenhouse gases. Global warming talks collapsed in the Netherlands earlier this month when negotiators from more than 180 countries failed to agree on rules for reducing greenhouse gas emissions.

It is already too late to curb global warming for the next two generations of people occupying the planet, according to the report. Immediate reductions in greenhouse gas emissions would not stabilize global temperatures for at least a century because the pollutants already in the air will remain there for decades, according to the report.

However, the report noted that the rate of global warming could be slowed, and the effects minimized, by reducing greenhouse gas emissions.

"No matter how aggressively emissions are reduced, the world will still experience at least a century of climate change," the report said. "Consequently, even if the world takes mitigation measures, we must still adapt to a changing climate."

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