Lake Michigan's November surface temperature—hovering around 50 degrees—'really warm for this time of year'

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Weeks before the official start of the winter season, Great Lakes surface temperatures are still trending above average, following summer and fall evenings that didn't cool down—a feature of climate change in Illinois.

"What was kind of jarring was the consistency of the warmer-than-normal conditions," said state climatologist Trent Ford. "And the lack of cool nights."

Above-average temperatures warmed the Great Lakes basin through summer. Minnesota and Wisconsin recorded their third-hottest June on record; parts of New York, including Syracuse, experienced one of their hottest summers on record. Lake Huron warmed to nearly 74 degrees in late August—another record-breaker.

Illinois saw an extended period of high minimum temperatures across the state in summer and fall. The average minimum temperature for July through October was the second highest on record statewide, below only 2016, according to National Oceanic and Atmospheric Administration records going back to 1895. The October average minimum temperature is the highest on record for the state—about 8 degrees higher than the average.

That lack of cooling extended to neighboring states, which also saw high minimum temperatures in October, including Indiana, Michigan and Ohio. From June to October, Michigan and Ohio also saw their highest average minimum temperature on record for that period.

"Getting a record number of 60-degree-or-higher nights in October is not like getting a record number of 100-degree days in July," Ford said. "But certainly there are impacts from that, even though they may be a bit more subtle."

A hard freeze didn't chill much of the state until the last week of October, Ford said. Allergy season might have felt longer than usual. Ticks and mosquitoes had longer to bite. Some areas saw a delay in leaf color. Ford noticed it in his own backyard; he was picking tomatoes close to Halloween.

Increasing minimum temperatures are a sign of the warmer and wetter conditions expected for Illinois, as human actions—the burning of fossil fuels and resulting emissions—continue to fuel rapid climate shifts.

The most pronounced warming in Illinois has occurred in the winter season, and a continued decrease in extreme cold is projected for the state. In some parts of Illinois, minimum winter temperatures have already warmed by more than 3 degrees.

Last November in Chicago, in what the National Weather Service called a "remarkable stretch of warmth," a record-breaking week of 70s warmed the city, with two consecutive days hitting 76 degrees. The month ended up as the fourth-warmest November recorded in Chicago. Globally, it was the hottest November on record.

Heading into winter with warmer air temperatures can delay the cooling of lake temperatures. And warmer water stretching into winter can increase the potential for lake effect snow, Ford said, as the difference between temperature gradients feeds winter storms. Lake effect snow tends to diminish with the arrival of ice coverage, but warmer waters may delay that as well.

Ice cover, which reaches its peak between February and March in the Great Lakes, plays a key role in determining summer and fall conditions; last season's maximum ice cover was below average. There's annual variability, but ice cover has decreased in recent decades as some lake temperatures warm faster than air temperatures.

Projected low ice cover in 2022 may set the Great Lakes up for another summer and fall of above-average temperatures.

Because of changes in the strength of complex global sea-level pressure patterns, including a strong La Nina, the Great Lakes may see warm weather continue into the winter season, said Jia Wang, an ice climatologist with NOAA's Great Lakes Environmental Research Lab.

Above-average surface water temperatures and below-average ice cover

are projected across the Great Lakes, Wang said.

Ice can diminish the effects of coastal erosion, still an ongoing concern of Great Lakes communities even as lake levels have lowered from exceptional highs. And warming waters—even the deep waters of Lake Michigan are warming in winter—offer their own ecological challenges, welcoming some invasive species, potentially fueling harmful algae blooms and transforming ecosystems.

Lake Michigan's surface temperature is still trending a few degrees warmer than average, according to National Oceanic and Atmospheric Administration CoastWatch data going back to 1995. Throughout the fall, Lake Michigan saw above-average temperatures, with late November temperatures hovering around 50 degrees.

"Which is really warm for this time of year," said Andrea Vander Woude, a research physical scientist with NOAA's Great Lakes Environmental Research Laboratory.

Lake Michigan isn't an anomaly; the Great Lakes overall are warmer than average.

All of the lakes saw record highs in early October, Vander Woude said. But especially notable is the prolonged period of high temperatures.

"Study after study shows that the impacts of climate change that we feel here in Illinois, or Chicago specifically, is proportionate to the amount of global warming," Ford said. "How much climate change we see here in the state and the city is directly related to what's going on at the global level."

Globally, even fractions of a degree can make a difference in keeping the worst climate consequences at bay. But after the major climate

conference this month in Glasgow, Scotland, some experts left with little hope of staying within 1.5 degrees Celsius of warming—the threshold scientists warn against passing to avoid severe impacts.

In Illinois, scientists expect to see extremes, including exceptionally warm days, more intense rains and longer dry spells, become more common. The average daily temperature has already increased by as much as 2 degrees in much of the state, and an Illinois climate assessment found that warming of 4 degrees or more is possible by the end of the century, depending on different emissions scenarios.