

(Information from the Detroit Free Press)

## It is only going to get worse in metro Detroit, they say **Keith Matheny**

The steady, sometimes heavy rains that once again caused flooding and chaos in metro Detroit last week - only a few weeks after doing the same in late June - show signs of being related to human-caused climate change, scientists say.

And the researchers warn that unless and until greenhouse gases are controlled, expect more of the same, only worse, in the years ahead.

As summers get hotter, the atmosphere over the Great Lakes region holds more and more moisture - a phenomenon climate change is expected to increase. A weather system parked over southern Michigan last week, then funneled moisture from the southeastern U.S. to our already saturated skies. The result was rain, and a lot of it again.

Historic temperature and precipitation data shows the Great Lakes region is warming faster than the rest of the contiguous United States. U.S. annual precipitation increased 4% between 1901 and 2015, but the Great Lakes region saw an almost 10% increase over that interval.

Heavy rains are getting heavier as well. Researchers looked at the top 1% of rainfall events, based on the amount of rain that fell within a 24-hour period, and found that the amount of rain falling in those heavy events has increased 42% in the Midwest since the 1950s. Only the northeastern U.S. had a more pronounced increase, at 55%. Scientific modeling projects rain and snowfall in the region could increase by up to 30% by century's end.

But here's the paradox: Most of that increased rain and snow, and more intense storms, is happening in winters and springs. Summers in the Great Lakes region, scientists predict, will get drier over time, with increased drought-like conditions. So how does climate change contribute to deluges and flooding in late June and mid-July?

The key is in what's contributing to those typically more-dry summers, said Jonathan Overpeck, a climate scientist and dean of the University of Michigan's School for Environment and Sustainability.

As the atmosphere warms, it holds more moisture, he said. It's taking that moisture from all available sources - evaporating lakes, the soil, and from plants in a process known as evapotranspiration.

“This is what causes plants to wilt when they don't have enough water,” he said. As temperatures increase, and particularly in the summer, the atmosphere is demanding more moisture, and holding it there.

“Unless the conditions are right for rain, you're going to get drier weather,” he said. “But if the conditions are right for rain, it's going to come down harder.”

And those conditions got very right for rain last week. Rainfall was below average for July in southeast Michigan, until an area of high pressure parked over the region last week had no atmospheric low-pressure centers to move it along, and it funneled moisture from the Gulf of Mexico up to the already-saturated Great Lakes air over several days.

On Friday, Metro Airport saw 2.2 inches of rain, almost doubling its daily record for July 16 rainfall, set last year. As of Monday, the airport had already exceeded average rainfall for all of July, with 12 days to go.

Other areas of southeast Michigan were hit even harder. Grosse Pointe Farms received almost 4 inches of rain on Saturday, with Dexter and Milan in Washtenaw County over 3.75 inches and areas of southeast Detroit at 3.64 inches.

It comes on the heels of heavy rains June 25 and 26 - topping 6.5 inches in Garden City and Grosse Pointe - that caused flood-closed freeways, abandoned cars and scores of flooded homes and basements.

“Climate change is increasing the odds of these really heavy rainfalls, and therefore increasing the odds of flooding - particularly where the infrastructure isn't designed for the kinds of rainfall we are now getting,” Overpeck said. “That's a big issue in Detroit. It was a big issue up in Midland last year, when we lost two dams.”

Though scientists think summers will become drier in the years to come, as this summer is proving, other factors can change that - at times dramatically.

“Climate models project an increase in mean cold season precipitation and an increase in the frequency of heavy precipitation events, but they are less certain what will happen with summer mean precipitation,” said Michael Notaro, associate director of the Nelson Institute Center for Climatic Research at the University of Wisconsin.

As long as humans contribute to climate change through carbon emissions that hold heat in the atmosphere, the frequency of intense storms and flooding will only get worse, Overpeck said.

“We have to literally halt the addition of greenhouse gases to the atmosphere,” he said. “If we don't stop climate change, all we are doing is controlling how fast it gets worse.”

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