

Labor Day floods offer a glimpse into our climate future

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Torrential downpours in New England on Labor Day turned roads into rivers and caused a building to collapse. And it's not over yet: a flood watch remains in effect for parts of Rhode Island, Massachusetts, and northern Connecticut until 5 p.m. on Tuesday.

The rain comes as the U.S. Drought Monitor warns that much of New England is in an extreme drought. It's a stark reminder of the ways climate change is reshaping local weather patterns, and a glimpse of the region's climate future.

Greenhouse gas pollution, chiefly from the burning of fossil fuels, is changing the atmospheric patterns that shape weather systems. In New England, that's resulted in a wetter climate overall, and has also changed the way rain falls, said Ellen L. Mecray, regional climate services director for the Eastern region at the National Oceanic and Atmospheric Administration.

"It's not raining like it used to," she said.

While precipitation used to fall steadily over the course of a few weeks, it's now common for a lot of rain to fall at once, experts say.

In fact, Michael Rawlins, associate director of the Climate System Research Center at the University of Massachusetts Amherst, said that since the 1950s, there's been a 70 percent increase in the number of days that New England sees extreme levels of precipitation.

"That's that's a clear fingerprint of a warming world," he said.

Why are dry periods followed by heavy rains a clear hallmark of climate change? Well, research shows that New England is warming at a faster rate than the global average, due to both altered atmospheric conditions and rising temperatures in coastal waters like the Gulf of Maine, which is among the fastest-warming bodies of water on the planet.

When the air heats up, more water evaporates from the ground, lakes, and greenery. Warmer air has an increased capacity to hold water, so it can hold onto it for longer.

"A warmer atmosphere is more thirsty," said Rawlins. "So we see greater drying of the land surface, hence more dry periods."

When the air finally reaches its capacity to hold water, it has more of it to drop, leading to heavier precipitation.

"That contributes to more intense periods of rain and subsequent flooding," said Adam Schlosser, senior research scientist at the Massachusetts Institute of Technology's Center for Global Change Science.

In addition to short term oscillation between droughts and deluges, there's been more year-to-year variability in precipitation, said Rawlins.

“We're bouncing back and forth more between wet summers and dry summers in the past 20 to 30 years or so,” he said.

Scientists are still researching how much more pronounced both long- and short-term variability of rainfall will become as the region continues to warm, he said.

For now, the downpour could be dangerous, especially in areas laden with impervious surfaces like pavement which are more prone to flooding. Areas where the soil has been dried by weeks of drought are also under threat, because when water falls onto parched ground, water tends to pool on the surface rather than soak in.

But Glenn Field, warning coordination meteorologist at National Weather Service, said there's a silver lining: He expects the rains will help rejuvenate those dry soils, alleviating some of the worst effects of drought.

“The situation has eased up considerably in many areas now,” he said.