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NEW JERSEY-SPECIFIC STUDIES CONFIRM RAINFALL IS INTENSIFYING BECAUSE OF CLIMATE CHANGE

(21/P038) TRENTON – The New Jersey Department of Environmental Protection has released two studies by the Northeast Regional Climate Center, a National Oceanic and Atmospheric Administration (NOAA) partner, confirming increases in precipitation across New Jersey over the last 20 years, and projecting further increases in precipitation intensity through the end of this century due to climate change, Environmental Protection Commissioner Shawn M. LaTourette announced today.



The studies by Dr. Arthur DeGaetano, director of the Northeast Regional Climate Center and professor of Earth and Atmospheric Sciences at Cornell University, and peer-reviewed by DEP's Science Advisory Board, provide a range of rainfall projections dependent on warming scenario. These reports, which fill in 20 years of climate data gaps, will aid governments, communities and businesses in their work to build greater climate resilience.

"While New Jersey is ground zero for some of the worst impacts of climate change, this science provides us another opportunity to ensure that our communities become more resilient," said Commissioner LaTourette.

"As we saw late this summer with the remnants of Tropical Storms Henri and Ida, more frequent and intense storms are our reality today, and we can expect these extreme precipitation events to continue, even worsen, in the years ahead," Commissioner LaTourette continued. "By building upon our scientific understanding, we can take the wise steps that the science demands: from planning more resilient development, to enhancing our stormwater and flood control infrastructure and beyond. We all have the power to ensure that what we build today will stand the test of time and a changing climate."

The studies show:

- **Precipitation is already 2.5% to 10% higher.** The precipitation expectations that presently guide state policy, planning and development criteria, and which rely upon data obtained through 1999, do not accurately reflect current precipitation intensity conditions. Extreme precipitation amounts are 2.5% higher now than the 1999 data suggests, and some parts of the state have seen a 10% increase above the outdated data.
- **Precipitation is likely to increase by more than 20% from the 1999 baseline by 2100,** and projected changes will be greater in the northern part of the state than in the southern and coastal areas, with projections for some northwestern counties seeing the greatest increase, some by as much as 50%.

"As we move into a warmer and wetter world, it is crucial that the most recent rainfall observations and state-of-the-art climate model simulations of future rainfall be incorporated into decisions regarding flood potential, infrastructure design and resiliency planning," Dr. DeGaetano said.

These two reports went through a peer review by the DEP Science Advisory Board's standing committee for Climate and Atmospheric Sciences, led by Dr. Anthony Broccoli, Co-Director of the Rutgers Climate Institute and faculty member in the Department of Environmental Sciences.

"One of the consequences of climate change is that we can no longer assume that what has happened in the past is a guide to the future," Dr. Broccoli said. "These studies will provide better guidance for estimating and managing future risks to human life, property, and infrastructure."

Notably, the studies will provide the scientific basis for the ongoing development and modification of rules to be introduced under the state's [NJPACT](#) (Protecting Against Climate Threats) and [NJREAL](#) (Resilient Environments and Landscapes) initiatives as directed by Governor Murphy's [Executive Order 100](#).

The studies build from data currently published in the NOAA Atlas 14, a federal resource of precipitation totals used to aid in engineering and design planning and the standard resource for rain depth associated with precipitation events. NOAA Atlas 14 is an ongoing study used to analyze historical rainfall data to update statistical rainfall events.

In New Jersey, Atlas 14 is often used to analyze flood potential in waterways and in the design of stormwater infrastructure. The current Atlas 14 volume available for New Jersey was last updated in 2006 and includes data only through 1999. This new data fills a data gap of some two decades allowing the state to plan and design projects based on current data.

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“The recent excessive rainfall totals and accompanying tragic flash flooding associated with Henri and Ida suggest that an update of the Atlas 14 report was prudent,” said State Climatologist Dr. David A. Robinson. “New Jersey must be better prepared to deal more frequently with such events now and in upcoming years.”

Among other storm types studied, what is often referred to as the 100-year, 24-hour storm is included. A 100-year storm is one that has a 1 percent chance of occurring based on past historical records and represents the total amount of rainfall likely to fall within a 24-hour period.

It is important to note that despite the name, it is a mistake to assume such a rainfall occurs once every 100 years. Rather, it means that there is a 1 percent chance in any given year that this type of storm will hit any given area. In fact, the remnants of Tropical Storms Henri and Ida, though considered 100-year-storms, hit the same areas less than two week apart this past summer.

The long-term projections were developed from a combination of 47 climate models under moderate and high future emissions scenarios. The modeled storms included those with a 50% chance of occurring each year (also known as a 2-year storm), a 20% chance of occurring each year (5-year storm), a 10% chance of occurring each year (10-year storm), a 4% chance of occurring each year (25-year storm), a 2% chance of occurring each year (50-year storm), and a 1% chance of occurring each year (100-year storm).

The accompanying map shows, by county, the upper range of how much additional rainfall may occur during a 24-hour period of a 100-year storm under a moderate warming scenario.

The first study, *Changes in Hourly and Daily Extreme Rainfall Amounts in NJ since the Publication of NOAA Atlas 14 Volume*, closes climate data gaps and addresses how measures of storm intensity change by incorporating the past two decades of data into the current analyses.

The data show that the current version of NOAA Atlas 14, published in 2006 with data through 1999, does not accurately reflect current precipitation intensity conditions particularly for 24-hour and 48-hour storm event. The study found that at more than half of the stations reviewed, extreme precipitation amounts are 2.5% higher now than those published in 2000. In some places, the additional 20 years of data reflects a more than 10% increase above the outdated data.

The second report, *Projected Changes in Extreme Rainfall in New Jersey based on an Ensemble of Downscaled Climate Model Projections*, addresses changes to precipitation intensity that can be expected by the middle and latter part of the century.

The data from this study clearly indicate that there is a high likelihood that precipitation intensity will increase throughout the century in all parts of the state, but the projected changes will be greater in the northern part of the state than in the southern and coastal areas. The report provides mid and late-century projections for each county. Key findings:

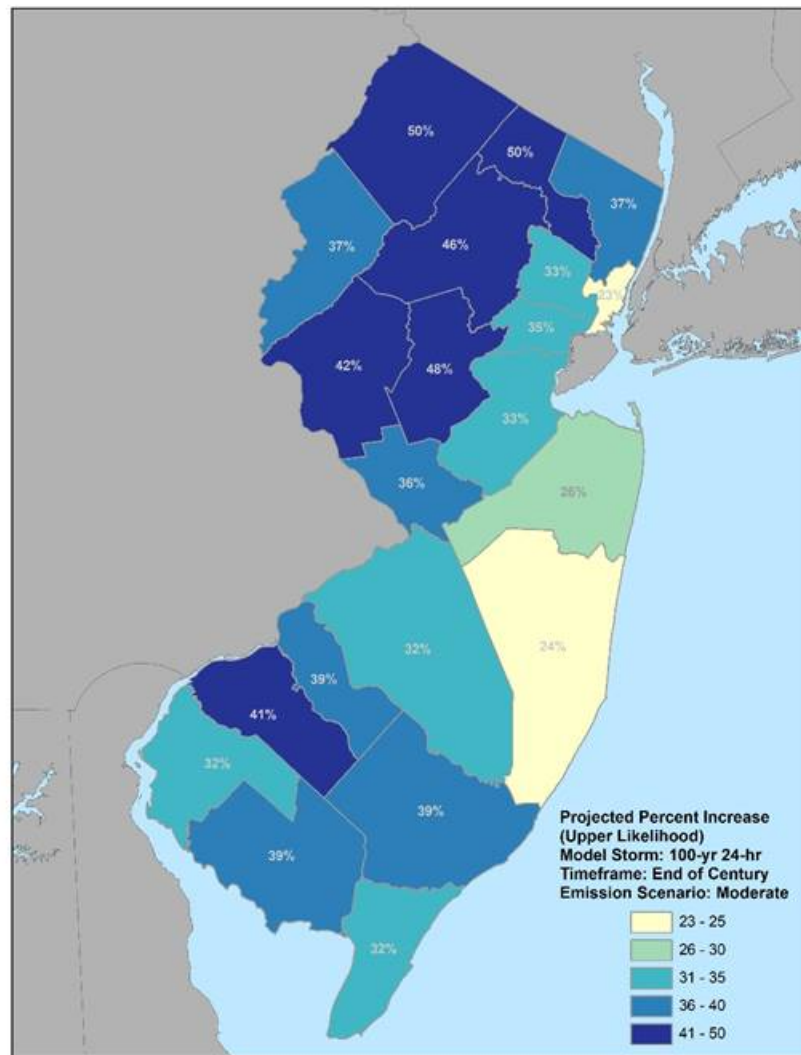
- Under a scenario of moderate increases in atmospheric warming of about 3.2°F (1.8°C), projections suggest that the amount of precipitation associated with the 100-year, 24-hour storm will increase by 20% to 25% in northern counties, on average.
- For the 100-year, 24-hour storm, the models suggest that there is a 17% chance that precipitation associated with this this type of storm will increase by as much as 45% to 50% in some counties.
- More frequent storms, such as the 2-year and 10-year, 24-hour storms are expected to see increases in precipitation intensity of 5% to 15% on average across the state by the end of the century.

These studies further New Jersey’s commitment to providing the best available science as a basis for decision-making as evidenced by the Scientific Report on Climate Change (<https://www.nj.gov/dep/climatechange/data.html>) and consistent with the Statewide Climate Change Resilience Strategy (<https://www.nj.gov/dep/climatechange/resilience-strategy.html>).

The studies and a research summary are available at <https://nj.gov/dep/dsr/>

The Science Advisory and Board review and responses are available at <https://www.nj.gov/dep/sab/>

DEP PHOTO/Rahway River area flooding from Tropical Storm Ida



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