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GLOBAL WARMING WATCH

NEW JERSEY IS GETTING WARMER

New Jersey's average temperature has risen more than 2 degrees the last 30 years, a pace that outstrips most of the nation, putting thousands of Shore homes at risk of chronic flooding, and forcing fish to find new habitats, according to new data bolstering years of science on climate change. Atlantic City tops the state with a nearly 3-degree rise, the analysis shows.

New Jersey, with an overall 2.19-degrees Fahrenheit increase, saw the third-highest average temperature rise among all states from 1988 through 2017, according to data to be released Monday by the Associated Press and analyzed by the Inquirer. Alaska was tops with a 2.42-degree rise and Vermont was second with a 2.22-degree rise.

In addition to the states, the data also considered smaller sections of the country dubbed climate divisions by the National Oceanic and Atmospheric Administration. The New Jersey coastal climate division experienced a 2.29-degree rise, topping the state as a whole.

In Atlantic City, already suffering from sunny-day flooding, the rise has been even greater, with a 2.9-degree rise.

Beyond the Philadelphia region, rainfall in the Northeast has more than doubled in the 30 years covered by the data analysis. Accordingly, big storms - both tropical storms and hurricanes - are more frequent. The first named storm of the year now forms nearly a month earlier than in 1988, University of Miami hurricane researcher Brian McNoldy told the AP.

Scientists attribute the sea-level rise to the melting of the Greenland ice sheet and Arctic sea ice loss as the climate changes, mostly due to fossil fuel burning. The Arctic has warmed twice as fast as the rest of the world. NASA satellites have shown three inches of sea level rise over the last few decades.

New Jersey's problems only start with rising water. Compounding the flooding, land is slowly sinking, mostly for geological reasons, though groundwater extraction and development also contribute.

Rising seas push saltwater further inland, killing plants that aren't adapted to salinity. One of the most visible results: the ghost forests of Atlantic White Cedar.

The Pinelands have suffered the tree-munching southern pine beetle, an invasive species from the South now able to thrive further north because of warming.

Even the region's highest ground is not spared. The Poconos have experienced a near 2-degree rise over the same span, according to the data. Though this winter was good for Poconos ski tourism, prior years have been tougher on the ski industry.

Agriculture in Southeastern Pennsylvania is threatened, too, with the incursion of the spotted lanternfly, first found in Bucks County in 2014. Recent surveys show the pest - originally from Asia - survived the harsh winter, though treatments by the state have been working. The federal government has awarded

\$17.5 million to Pennsylvania to help fight the insect. Higher temperatures globally are among one of the factors that have allowed invasive pests to spread.

But the impact of temperature change appears most pronounced along the coast. The Union of Concerned Scientists singled out New Jersey and Florida in its peer-reviewed study, also to be released Monday using data from Zillow, the online real estate company. It also released an interactive map with projections indicating that the Garden State and the Sunshine State are the nation's most vulnerable to chronic property flooding by 2045, and continuing through the end of the century. Translation: Higher tides will be reaching what now is entirely dry land.

In New Jersey, scientists project that 251,000 homes, valued at \$107 billion, are at risk of chronic flooding by 2100 as chronic flooding - already happening in some Shore communities - intensifies. Regular flooding, along with Hurricane Sandy, have led to the state razing homes along the Delaware Bayshore as its coast erodes.

Toms River, Cape May and Atlantic City are other communities in danger of chronic flooding, according to the data.

Wildlife is also threatened by rising ocean temperature. A Rutgers study published last week in the journal Science shows that fish are being forced to seek new habitat, causing conflicts among commercial fishing operations governed by an elaborate set of political boundaries.

Malin Pinsky, an assistant professor at Rutgers-New Brunswick, is one of that report's authors. He said New Jersey will see some fish species heading north, but others will move up in the state. For example, he said, shrimp known to prefer a North Carolina habitat are showing up in New Jersey.

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As we enjoy another summer, we should all remember how lucky we are to enjoy our coastline.

- Gary R. Brown, P.E.



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