



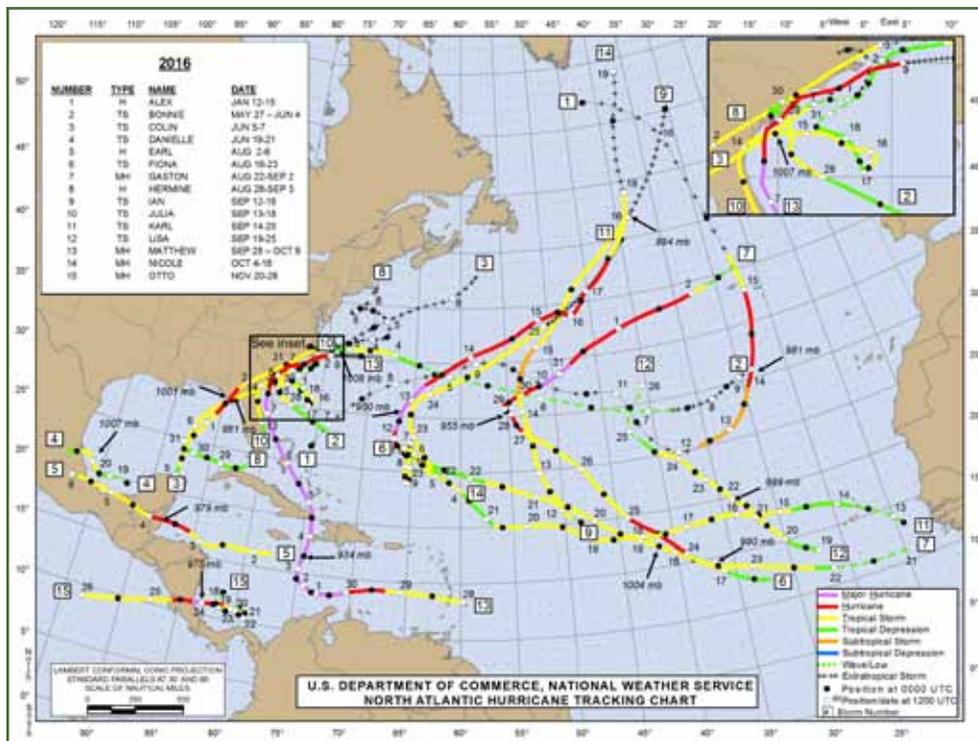
Climate Change Today

Climate change is here; it's already impacting the daily lives of people around the globe. But let's consider what it is doing to our home in and around Narragansett Bay.

Narragansett Bay is facing many of the same threats as other areas: intense summer heat, warming waters, shifting seasonal patterns, northward movement of plants and animals, loss of native species, increasing air and water temperatures, rising seas, periods of drought and intense rainfall, stronger coastal storms, and overall threats to human health.

While there are many climate change impacts, three—warming waters, accelerating rate of sea level rise, and intensifying coastal storms—are of particular concern to Narragansett Bay's thriving and growing shellfish industry, its species rich but declining salt marshes, and its sense of place along heavily populated shores. For a deeper understanding of these issues, check out the Watershed Counts topic booklets. But, for now, let's consider some science.

Increased frequency of strong storms



The relationship between climate change and tropical storms is complex, but we know that warmer waters fuel stronger storms. On average, tropical cyclones in the Atlantic Basin will become about 4% more intense per 1.8 °F (1 °C) warming of the underlying Atlantic Ocean (this is not the same as the warming we see in Narragansett Bay). As counterintuitive as it sounds, however, we will likely see fewer storms, but the storms we do see will be more intense. And, more intense storms will feature a 12% increase in precipi-

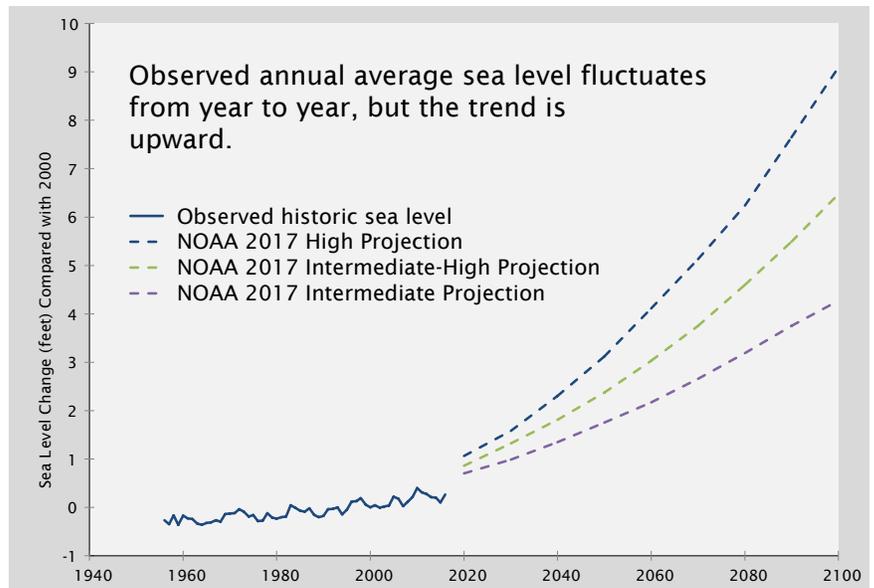
tation per each 1.8 °F (1 °C) that the Atlantic warms. Moreover, these intensified storms will sit on higher seas, further amplifying their impact.

Not every storm that develops in the Atlantic makes landfall, but when a more intense storm does, the damage will likely be significant. Just recall the destruction caused by the 1938 Hurricane and consider the additional factors of population growth, urban and suburban development, and infrastructure expansion.

Sea Level Rise

The rate of sea level rise in Narragansett Bay—as measured by the Newport tide gauge—has been about 0.1 inch (2.72 mm) per year since 1931, or more than 10 inches over the last century. Sea level rise is not uniform around the globe, and sea level along the Northeast coast has risen more than the global average of about 8 inches since 1880. While sea levels have been rising for the past century, the rate of rise is accelerating, which means we will experience higher seas decade by decade.

The exact amount of future sea level rise depends upon several factors including the reduction (or not) of greenhouse gas emissions, but projections range from a little over 4 feet (intermediate scenario) to just over 9 feet (high scenario) by the end of this century. Since we have already seen more rise than was projected, the State of Rhode Island is preparing for NOAA's high scenario— 9 feet of sea level rise by 2100.

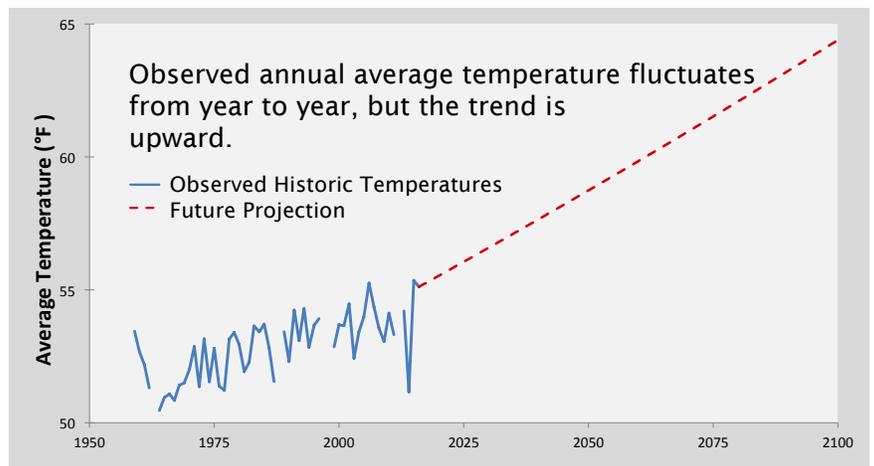


The National Oceanic and Atmospheric Administration (NOAA) 2017 sea level rise projections based on the Newport, RI, tide gauge and calculated with the U.S. Army Corps of Engineers Sea-Level Change Curve Calculator.

Warming water temperatures

We know precisely how much the annual average surface water temperature of Narragansett Bay has increased over the past 50 years: 2.5 to 2.9 °F (1.4 to 1.6 °C). But, like many aspects of nature, the change is not uniform throughout the year, and winter water temperatures are rising more quickly than that of other seasons: 2.9 to 3.6 °F (1.6 to 2.0 °C).

Scientists project that annual water temperatures of the bay will increase by 5 to 6 °F (2.7 to 3.2 °C) by 2100. And winter temperatures will increase by more: 5.7 to 7.2 °F (3.2 to 4.0 °C). Scientists are generally conservative when creating projections; however, they caution that waters may warm even more if we do not reduce global greenhouse gas emissions.



Data provided by The Phytoplankton of Narragansett Bay Laboratory, Graduate School of Oceanography at the University of Rhode Island. <http://www.gso.uri.edu/phytoplankton/#Home>

Learn more about climate change impacts in our area
www.riclimatchange.org

Watershed Counts is facilitated and supported by the Coastal Institute at URI and the Narragansett Bay Estuary Program with additional support from the U.S. Environmental Protection Agency.

www.watershedcounts.org



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