2014 SCIENCE AND TECHNICAL ADVISORY PANEL REPORT SUMMARY

Sea-level Rise, Storm Surges, and Extreme Precipitation in Coastal New Hampshire: Analysis of Past and Projected Future Trends

Climate change is expected to have significant impacts on critical infrastructure and natural and cultural resources in coastal New Hampshire over the next century and beyond.

This report is intended to help municipal and state decision-makers prepare for projected sea-level rise and other coastal hazards and minimize the risks those hazards pose to municipalities and state assets.

**SEA-LEVEL RISE**

Global sea levels have been rising and are expected to continue rising well beyond the end of the 21st century. Rising seas pose significant risks to our communities and ecosystems, cultural resources and other coastal property and infrastructure.

**PROJECTIONS**

Forecasting rates of global greenhouse gas emissions is challenging, but research shows that current greenhouse gas concentrations and current or accelerated emissions will continue to influence sea levels in the future.

**PRECIPITATION**

Mean annual precipitation in the northeastern United States increased by approximately 5 inches (more than 10%) between 1895 and 2011.

**PROJECTIONS**

Annual precipitation is expected to increase by as much as 20% between 2071 and 2099 compared to the late 20th century. Most of the precipitation increases will be in winter and spring in the form of rain or snow. Fall and summer will experience less of an increase.

**EXTREME PRECIPITATION**

The Northeast experienced a 50% increase in total annual precipitation from storms classified as extreme events between 1901 and 2012. Here, “extreme” is defined as the number of times each year that the 24-hour rainfall amount exceeds the largest 1% of precipitation events in that year.

**PROJECTIONS**

Extreme precipitation events are projected to increase in frequency and in the amount of precipitation produced. In particular, the rainfall amount produced by hurricanes is projected to increase. However, current climate models and analyses are not as good at projecting future changes in the frequency or magnitude of extreme precipitation events.

**STORM SURGE**

The New Hampshire coast is significantly impacted by both Nor’easters and hurricanes. Winds from these storms drive ocean water towards the land, resulting in the short-term rise in water levels called storm surge. The actual height of a flood is determined by factors such as storm intensity, forward speed, storm area size, coastline characteristics, and angle of approach to the coast, in addition to tide height. Nor’easters can impact the region for several days and produce a storm surge with or without the addition of inland runoff from heavy precipitation. Over the past ten years the largest storm surges observed in New Hampshire occurred during Nor’easters.

**PROJECTIONS**

Considering changes in water levels due to sea-level rise alone, today’s extreme storm surge events (i.e. 100-year flood) will have a greater inundation extent and occur more frequently over time. Due to increased coastal development, there has been a significant increase in impacts from hurricanes nationwide over the 20th century. However, there is some uncertainty in the projection of trends in hurricane frequency and intensity in any given region, and no research consistently finds a trend in the frequency and intensity of Nor’easters.
The New Hampshire Coastal Risks and Hazards Commission was established by the New Hampshire Legislature on July 2, 2013 by RSA 483E. The Commission is required to consider key scientific research on current and future coastal risks and hazards and is charged with recommending legislation, rules and other actions.

The Commission created a Science and Technical Advisory Panel to review available scientific information about coastal hazards and flood risks in New Hampshire.

The Panel analyzed the latest published data on historic trends and projections for the years 2050 and 2100 for sea-level rise, coastal storms, and extreme precipitation.

These findings were summarized in a peer-reviewed report, which the Commission will use to develop recommendations in 2015 and 2016. The Panel suggests this assessment and report be updated at least every two years as new research and data become available.

To learn more about the New Hampshire Coastal Risks and Hazards Commission, go to nhcrhc.stormsmart.org. Commission meetings are open to the public and posted on the website.

For information or questions about the Commission, contact Cliff Sinnott, Commission Chair at 603-778-0885 or csinnott@rpc-nh.org.