



CLIMATE CORNER

April 2021

By Frances Ferrari for Brodhead Watershed Association

Climate change's effects on PA water resources

Editor's note: This is part of a 2021 series of articles on the impacts of climate change on our water resources and municipal government's role in working toward a solution.

In the 2015 **Pennsylvania Climate Impact Assessment Update**, a team of Penn State researchers assessed the effects of changing weather conditions. According to the report, Pennsylvania has undergone a long-term warming of more than 1°C over the past 110 years and will continue to warm. It will also continue to become wetter. Annual precipitation will very likely be up to 16% higher by mid-century than it was in the late 20th century. Winter precipitation will increase by 10% to 20%. Summer heat waves will become more frequent and intense, and the number of days with heavy rainfall is likely to continue to increase.

In 2008, the Union of Concerned Scientists, in its **Climate Change & Natural Resources in Pennsylvania** report, stated that “precipitation is expected to increase statewide by more than 5%; however, while there will be an increase in the frequency of extreme events such as heavy rainstorms, the state may grow drier overall and experience more drought because rainfall will not compensate for the drying effects of a warmer climate. Precipitation will also change seasonally, with less precipitation in the summer and more in the winter.”

Andrew Freedman and Jason Samenow of the **Capital Weather Gang**, in the Feb. 5, 2021, *Washington Post*, wrote that “blockbuster” winter storms may increase in a warming world. While this seems to be counterintuitive, studies show that precipitation in heavier bursts happen as the climate warms, which is a result of the ability of milder air to hold more water vapor. They used information from studies by Ken Kunkel, a senior scientist with NC Institute for Climate Studies. Kunkel stated that “the oceans have been warming overall. These storms are deriving their moisture from the Atlantic, and more moisture is being brought into these storms.” Freedman and Samenow also highlight information from the research and media group Climate Central, which found that snowfall is increasing in the Northeast but mainly in the winter months, while snow totals have not increased in the “shoulder seasons” of the fall and early spring.

Changes in precipitation, according to the PSU webinar **Watercooler Talks: Climate Change and PA Water Resources**, are showing less predictability at both the wet and dry ends of the spectrum and greater intensity, with a prediction of 100% more rainfall days of over 3 inches, with resulting flash flooding and river flooding. These changes in precipitation will affect many electrical substations which often are near rivers, overwhelming storm management and flooding of transportation infrastructure. New, less predictable rainfall patterns will cause changes in watershed management and coupled with increased runoff will become more problematic, straining existing municipal and state infrastructure built to standards based upon weather patterns of the past.

According to Xiaoxin Shi and Penn State researchers in the 2015 **Pennsylvania Climate Impact Assessment Update**, protecting water quality remains a big challenge for Pennsylvania. With more storms and floods, bank erosion and water channel degradation are expected to increase. Although most wetlands in the state would have stable or wetter hydrologic conditions on an annual basis, the seasonable swings in their hydrologic conditions would be more severe and affect the ability of wetlands to improve water quality. Protection of such wetlands is critical to “buffer” the water system from predicted impacts. In southeastern Pennsylvania, the quality of the tidal waters may deteriorate due to saltwater intrusion as sea levels rise. Fish and shellfish in these waters would be negatively affected because warming is likely to counteract the improvements in dissolved oxygen levels made under the Clean Water Act.

Frances Ferrari is a member of Brodhead Watershed Association's Climate Action Committee.