

The Impact of Climate Change on the URBAN ENVIRONMENTS OF THE NORTHEAST



The expected increase in the severity and duration of heat waves will pose an increasing threat to human health—an impact that will be most evident in cities.

- The number of extremely hot days in northeastern cities is expected to increase dramatically over the next century. In New York City, the annual number of days at or above 90°F is expected to increase by about 50 percent within the next 20 years and then by about 100 percent within the next 40 years.¹
- The urban heat-island effect will exacerbate the impacts of warming in cities. According to the EPA, the annual average air temperature in U.S. cities is 2° to 5°F warmer than their surroundings.²
- Extreme hot weather poses the greatest risk to the elderly and other vulnerable populations by inducing heat strokes and heart attacks and by exacerbating other illnesses.
- Hotter summers will cause an increase in the formation of ground-level ozone—a major component of urban smog that is detrimental to the health of city inhabitants, especially children.³ In Boston, ozone concentration is expected to increase between 2 and 17 percent by the end of the century, depending on emissions.⁴

A GLANCE AT WHAT IS AT RISK

- According to the Center for Disease Control and Prevention, “heat waves are already the most deadly weather-related exposure in the U.S., and account for more deaths annually than hurricanes, tornadoes, floods, and earthquakes combined.” The CDC estimates that by 2050, the number of annual heat related deaths in the U.S. will jump from 700 to as many as 5,000.⁵

Severe flooding and storm damage will occur more frequently as sea level rises and heavy storms become more common.

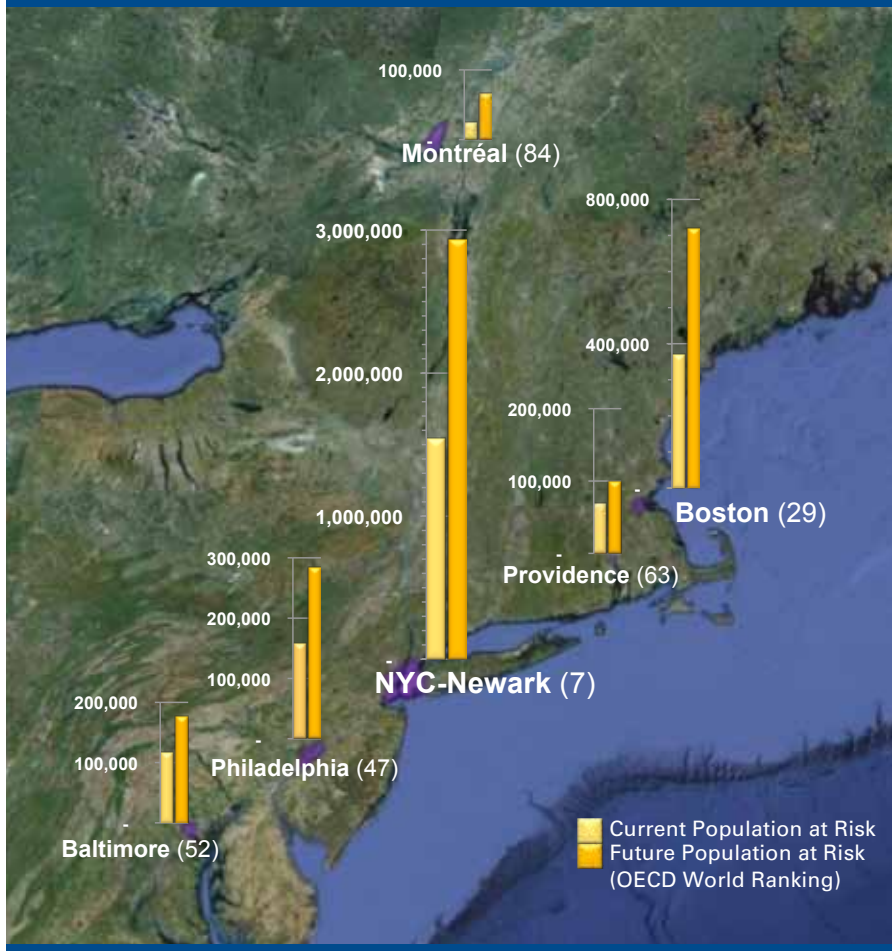
- Over the last century, sea level has risen about 8 inches and satellite data has indicated that this rate of rise has already doubled.⁶ In New York State, it is projected that sea level will rise 1 to 5 inches by the 2020s and 5 to 12 inches by the 2050s.⁷
- Extreme precipitation events are expected to occur more often and it will become more likely that serious storms striking the east coast will travel farther north and hit the Northeast.⁸ This is expected to result in increased storm damage that will jeopardize human safety and impose costs on cities and coastal property owners.
- The 100-year floods of today will occur much more often. In Boston by the middle of the 21st Century, the now 100-year flood is expected to take place every 2 to 3 years.⁹

A GLANCE AT WHAT IS AT RISK

- Many densely populated northeastern cities already have large populations at risk from severe flooding—a concern that will be magnified by changes in sea-level and storm intensities. The figure on page 2 shows the populations at risk in the most vulnerable northeastern cities.¹⁰

Flooding Poses an Increasing Risk to Northeastern Cities

Current and Future Populations at Risk in the OECD's Top-Ranked Vulnerable Cities



City planning must adapt for climate change as key urban infrastructure is put in jeopardy.

- During periods of extreme heat, there will be an increase in peak energy demand paired with a decrease in the efficiency of generators and transmission lines that will pose challenges to reliability. In addition, the increase in severe storms may cause more frequent power outages (see the Pace Energy and Climate Center's fact sheet on Energy Systems of the Northeast for more details).
- Sea-level rise and storm surges will cause roads and transit lines to flood more often.
- More erratic precipitation and warmer weather will bring about increasing uncertainty in city water supplies.
- Extreme weather will also threaten waste water and solid waste treatment facilities.¹¹

Endnotes

1. See New York City, Days Over 90F: http://www.northeastclimatedata.org/data_viewer.php
2. <http://www.epa.gov/hiri/about/index.htm>
3. <http://www.epa.gov/air/ozonepollution/health.html>
4. Union of Concerned Scientists, Confronting Climate Change in the U.S. Northeast. 2007 <http://www.northeastclimateimpacts.org/pdf/confronting-climate-change-in-the-u-s-northeast.pdf>
5. <http://www.cdc.gov/climatechange/effects/heat.htm>
6. Thomas Karl, Jerry Melillo, and Thomas Peterson, Global Climate Change Impacts in the United States. 2009 <http://downloads.globalchange.gov/usimpacts/pdfs/climate-impacts-report.pdf>
7. According to ClimAID Global Climate Model base scenario. See NYSERDA, Responding to Climate Change in New York State. 2011, <http://www.nysersda.ny.gov/Publications/Research-and-Development/Environmental/EMEP-Publications/Response-to-Climate-Change-in-New-York.aspx>
8. Union of Concerned Scientists 2007
9. Union of Concerned Scientists 2007
10. The figure is based on the OECD report: Nicholls, R. J. et al. (2008), Ranking Port Cities with High Exposure and Vulnerability to Climate Extremes: Exposure Estimates, OECD Environment Working Papers. <http://dx.doi.org/10.1787/011766488208>
11. For more information on the threat to urban infrastructure, see the report on Climate Change Adaptation in New York City: <http://www.nyas.org/Publications/Annals/Detail.aspx?cid=ab9d0f9f-1cb1-4f21-b0c8-7607daa5dfcc>



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