

# Climate Change Information Resources

## New York Metropolitan Region

(CCIR-NYC)



1

## What major climate change impacts are projected for the coming decades?

### Key Points

The climate change impacts projected for the New York metropolitan region will affect infrastructure, wetlands, water supply, health, and energy demand. These impacts interact in complex and dynamic ways because of the high population density, heterogeneous ecosystems, and extensive built infrastructure in the region. Impacts on the coastal environment and coastal communities and on transportation infrastructure in the metropolitan area are discussed in greater detail in subsequent articles.

### Infrastructure

Most of the region's low-elevation infrastructure, including buildings and transportation networks, will be at increased risk of flooding in coming decades. Figure 1 illustrates the height to which water may rise during Category 2 hurricanes, which are projected to occur more frequently. See "How will climate change affect the region's transportation system?"

### Wetlands

Some scenarios suggest that salt marshes in the region are at risk of increased inundation (Figure 2). Coastal wetland losses disrupt current habitats of birds, fish, and other wildlife. For example, the salt marshes of Jamaica Bay have experienced dramatic loss of marshland during the twentieth century. This is probably related to sea level rise already occurring in the region, as well as to changes in land use, sedimentation, and pollution. See "How might climate change affect the coastal environment and coastal communities?"

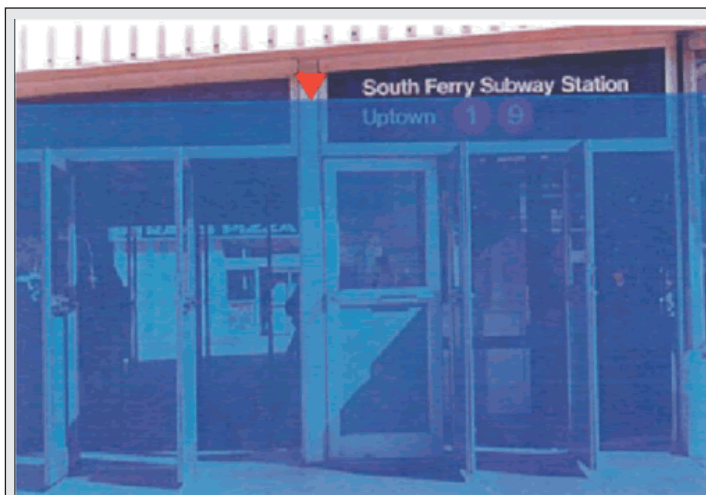


Figure 1. Shaded area represents the potential height of floods from a Category 2 hurricane at South Ferry (Battery) subway station. Source: NYC Office of Emergency Management.

### Water Supply

Greater climate variability is projected to lead to increases in the frequency of droughts and floods which will affect regional water supply and demand. New York City's water supply systems should be able to cope with climate variability and change over the next several decades, but there are likely to be significant challenges during the latter part of the century. See "How might climate change affect the coastal environment and coastal communities?"

### Public Health

Higher summer-season temperatures and increasing frequency and duration of heat waves are projected to lead to an increase in summer-season heat stress morbidity, particularly among the elderly poor. Summer heat-related mortality could increase 55% by the 2020s, more than double by the 2050s and more than triple by the 2080s.



Figure 2. Rising sea level is contributing to the erosion of wetlands. Source: Hartig et al, Wetlands, in *Climate Change and a Global City*, 2001.

Climate change could also contribute indirectly to at least three classes of health problems: incidence of certain vector-borne diseases such as West Nile Virus, lyme disease, and malaria may rise; water-borne disease organisms may become more prevalent; and photochemical air pollution may increase. Over the next several decades, impacts of climate

change on ground-level ozone concentrations are not likely to be a major public health concern, but by the year 2100, asthma-related hospital admissions are expected to increase slightly.

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## Energy Demand

A warming climate will raise the overall use of electricity because the increase in demand to power summer cooling will outweigh the decrease in power demand for winter warming needs. The electric system will be increasingly stressed during summer heat waves. Peak loads could increase by 7 – 12% in the 2020s, 8 – 15% in the 2050s, and 11 – 17% in the 2080s (Figure 3).

The urban heat island effect already causes cities to be warmer than the surrounding countryside due to the absorption of heat by buildings during the day and reradiation at night. Under a warming climate, the urban heat island effect will increasingly become an issue of regional concern in regard to energy demand.

Hill, D. and R. Goldberg (2001) Energy Demand. In Rosenzweig, C. and W.D. Solecki, (eds.), "Climate Change and a Global City: An Assessment of the Metropolitan East Coast Region" (pp. 121 – 147) Columbia Earth Institute, New York, 210 pp.

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Jacob, K.H., N. Edelblum, and J. Arnold (2001) Infrastructure. In Rosenzweig, C. and W.D. Solecki, (eds.), "Climate Change and a Global City: An Assessment of the Metropolitan East Coast Region" (pp. 21 – 46) Columbia Earth Institute, New York, 210 pp.

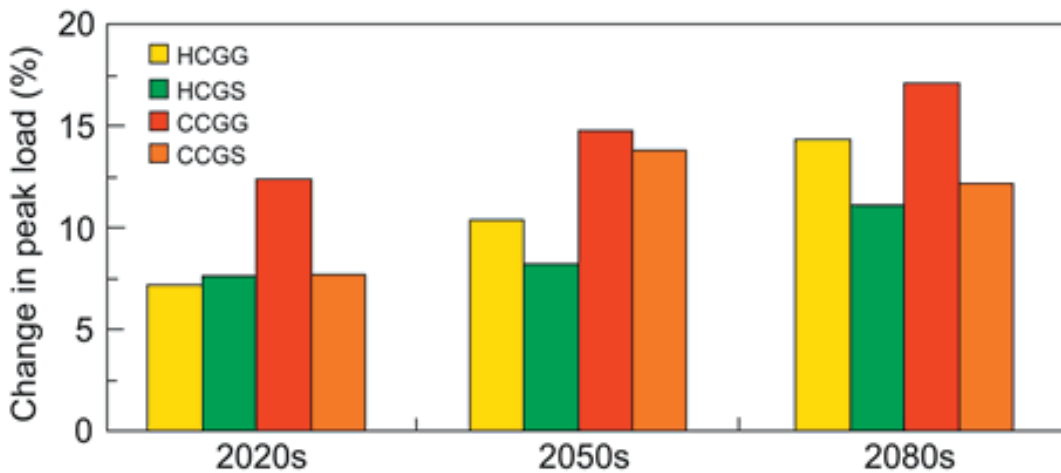


Figure 3. Projected changes in peak energy load for the New York metropolitan region. As the climate changes the amount of energy humans require will increase. The four bars for each decade represent different scenarios. The yellow and green bars (HCGG and HCGS) are projections based on United Kingdom Hadley Centre scenarios and the red and orange bars are projections based on the Canadian Centre for Climate Modeling and Analysis. Source: Hill and Goldberg, Energy Demand, in *Climate Change and a Global City*, 2001.

Rosenthal, J., P. Kinney, K. Knowlton, and J. Freeman (Eds.). 2004. "Assessing Potential Public Health and Air Quality Impacts of Changing Climate and Land Use in Metropolitan New York." A study by the New York Climate and Health Project.

Rosenzweig, C. and W.D. Solecki (Eds.). 2001. "Climate Change and a Global City: The Potential Consequences of Climate Variability and Change – Metro East Coast (MEC)." Report for the U.S. Global Change Research Program, National Assessment of the Potential Consequences of Climate Variability and

Change for the United States, Columbia Earth Institute, New York. 224 pp.

## References

Hartig, E., A. Kolker, D. Fallon, and F. Mushacke. (2001) Wetlands. In Rosenzweig, C. and W.D. Solecki, (eds.), "Climate Change and a Global City: An Assessment of the Metropolitan East Coast Region" (pp. 67 – 86) Columbia Earth Institute, New York, 210 pp.

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