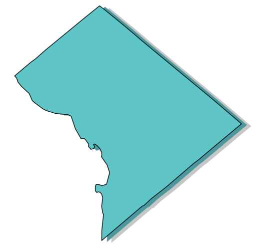
Washington, DC

District residents will face increasingly severe weather-related hazards, such as heat waves, flooding, and storm surge.



As the frequency and intensity of local hazards change, it is important for all of us to protect communities and local habitats. Using the best data, scientists can project how long-term averages in daily weather will change in the future, and the effects this will have on localities.

Information on extreme weather and hazards can empower citizens, decision-makers, and other stakeholders to make infored risk-reduction decisions. With planning and preparation, the District can reduce risks for all residents.

Changing Temperature Patterns

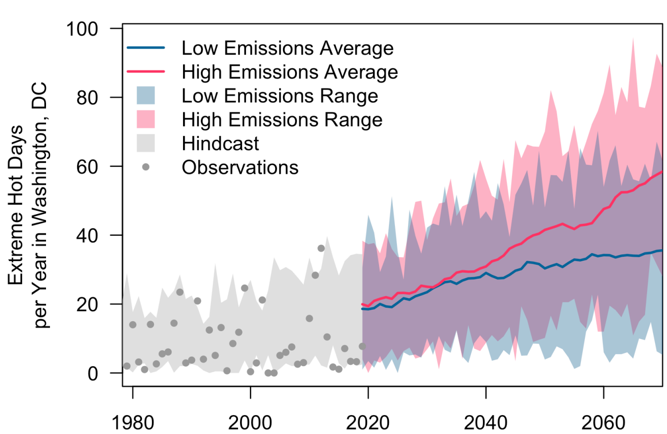
Human health and infrastructure are threatened by higher temperatures. At 95°F, it is hard to keep indoor areas and our bodies cool. The District's summers are getting hotter and this is intensified by the Heat Island effect[1]. On average, the District sees 9 days per year with temperatures above 95°F (1990-2019 average). Within the next 50 years (by 2070), the abbreviation-name can expect a yearly average of 36 to 58 days above 95°F, with associated increases in cooling costs, reduced air quality, and heat-related illnesses.

HEAT-RELATED ILLNESSES

Heatwaves can kill people and pets. Individuals at higher risk include children, pregnant women, older adults, outdoor workers, and lower-income residents.

ENERGY USE

Heat islands increase the demand for air conditioning. In the US, electricity demand for cooling will increase by 5-20% for every added degree C. During heatwaves, increased demand can overload systems causing power companies to conduct rolling brownouts or blackouts to avoid system failure.



The graph shows the number of days in a year with temperatures above or equal to 95°F. Dots represent observed annual days of extreme temperatures and the gray shading shows the hindcast[2]. Two scenarios of the future are shown as a high-emissions scenario (RCP 8.5) in red and a low-emissions scenario (RCP 4.5) in blue.

Data:

- Future scenarios: Multivariate Adaptive Constructed Analogs (MACA)
- Observed data: Gridded Surface Meteorological Dataset (gridMET)

[1] Heat islands are urban areas where temperatures are higher than the surrounding areas due to high concentrations of infrastructure and limited green space.

[2] Hindcasts are model results for a historical period. Hindcasts are useful for comparing observations with model estimates.

Changing Rainfall Patterns

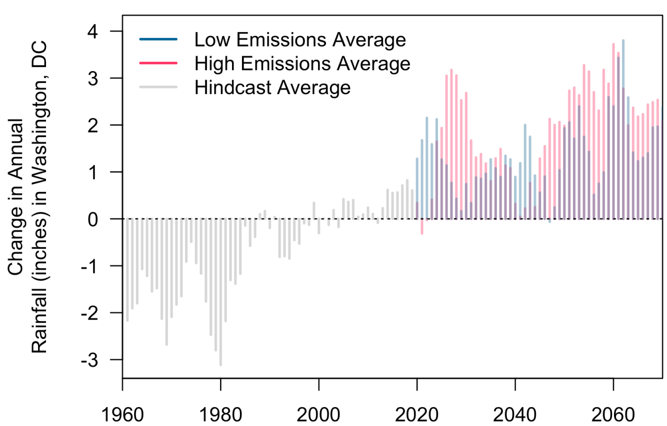
Heavy rainfall in the District is increasing in frequency and intensity, causing property damage, flooding basements, disrupting transportation, mold and indoor air quality issues, and overwhelming storm sewer systems. Annual rainfall in the District will likely increase by an average of 2 to 3 inches (2050-2079 average compared to the 1990-2019 average).

FLOODING

Heavy rain overwhelms infrastructure and drainage systems, causing property damage and increasing the risk of contaminated water and the spread of mold and illness.

DISRUPTED TRANSPORTATION

Heavy rain can quickly cover streets causing traffic to slow and become deadly to drivers. Service can also be disrupted along the Metrorail in which some stations can partially flood during heavy rainstorms.



The graph shows the change in annual rainfall compared to the average between 1990 and 2019. The gray lines show the hindcast. Two scenarios of the future are shown as a high-emissions scenario (RCP 8.5) in red and a low-emissions scenario (RCP 4.5) in blue. Data for the future scenarios are retrieved from MACA.

Data:

- Future scenarios: Multivariate Adaptive Constructed Analogs (MACA)

Sea Level Rise

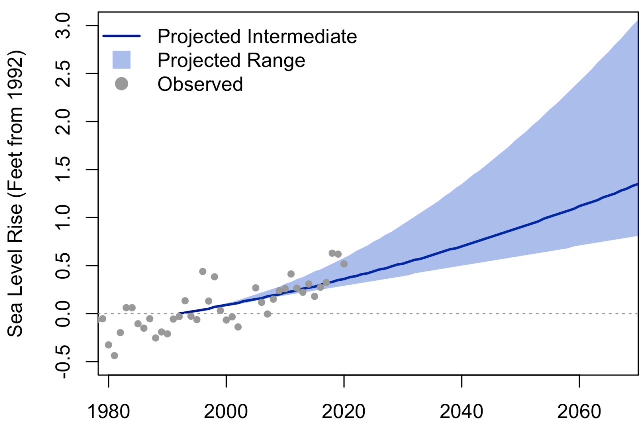
As temperatures warm, land ice melts and seawater expands causing sea levels to rise around the world and water levels to rise in the tidal Potomac and Anacostia Rivers. Between 1960 and 2019, sea levels in the District rose roughly 0.8 feet leading to more frequent and severe coastal flooding, and property damage. Sea levels will rise an additional 0.4 to 2.7 feet in the next 50 years (by 2070).

TIDAL FLOODING

Rising sea levels allow tides to push further inland causing more frequent high tide flooding, putting low-lying housing and commercial property, infrastructure, and the National Mall at risk. Saltwater from repeated tidal flooding damages and kills the cherry trees along the Tidal Basin.

STORM SURGE

Rising sea levels increase the impacts of storm surge allowing waves and severe flooding to reach further upriver and inland. Storm surge can cause serious injury or death and damage properties and tidal marshes.



The graph shows the projected change of sea level in feet above mean sea level compared to the 1983-2001 average. The blue line shows the intermediate scenario and the blue shading shows the range between the low and high scenarios of sea level rise used for official planning purposes in Washington, DC. Dots show the observed changes in sea level at the Washington, DC tide station.

Data:

- Future scenarios: US Army Corps of Engineers (USACE)
- Observed data: Permanent Service for Mean Sea Level (PSMSL)

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