

18-2188

UNITED STATES COURT OF APPEALS
FOR THE SECOND CIRCUIT

CITY OF NEW YORK,

Plaintiff-Appellant,

against

BP P.L.C., CHEVRON CORPORATION, CONOCOPHILLIPS, EXXON
MOBIL CORPORATION, and ROYAL DUTCH SHELL P.L.C.

Defendants-Appellees.

On Appeal from the United States District
Court for the Southern District of New York

**BRIEF OF *AMICI CURIAE* NATURAL RESOURCES DEFENSE
COUNCIL, NEW YORK CITY ENVIRONMENTAL JUSTICE
ALLIANCE, THE POINT, AND UPROSE IN SUPPORT OF
PLAINTIFF-APPELLANT**

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CORPORATE DISCLOSURE STATEMENT

Pursuant to Federal Rule of Appellate Procedure 26.1, amici curiae New York City Environmental Justice Alliance, THE POINT Community Development Corporation, and UPROSE submit that they have no parent corporations and no publicly issued stock shares or securities. No publicly held corporation holds stock in any of the amici curiae.

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INTEREST OF AMICI CURIAE¹

The New York City Environmental Justice Alliance (“NYC-EJA”) is a not-for-profit, membership network of ten grassroots organizations from low-income neighborhoods and communities of color located throughout New York City’s five boroughs. NYC-EJA empowers its member organizations to advocate for improved environmental conditions and against inequitable environmental burdens across New York State.

THE POINT Community Development Corporation (“THE POINT CDC”) is a not-for-profit advocacy organization that works toward the cultural and economic revitalization of Hunts Point, a neighborhood located in the South Bronx in New York City. THE POINT CDC uses the lens of environmental justice, youth development, and arts and culture to engage local residents in campaigns to create a more livable community and generate economic opportunity, which include efforts to establish public greenspace and convert brownfields in Hunts Point.

¹ No party’s counsel authored any part of this brief, nor have any parties or their counsel contributed money that was intended to fund the preparation or submission of this brief. No person other than Amici, their members, and their counsel contributed any money that was intended to fund the preparation or submission of this brief.

UPROSE is an intergenerational, multi-racial, nationally recognized not-for-profit, and Brooklyn's oldest Latino community-based organization. UPROSE promotes sustainability and resiliency in Brooklyn's Sunset Park neighborhood through community organizing, education, indigenous and youth leadership development, and cultural and artistic expression. Central to UPROSE's advocacy is ensuring meaningful community engagement, participatory community planning practices, and sustainable development with governmental accountability. As advocates of climate justice, UPROSE views just urban policy—ranging from transportation to open space—as the heart of climate adaptation and community resilience.

INTRODUCTION

Since the dawn of English common law, injured parties have relied on tort claims to redress legal activity that has caused them harm. In line with this long tradition, this case is about ensuring that the world's largest producers of fossil fuels are held responsible for the harmful effects of the products they produce, promote, and sell. Fossil fuels are responsible for a plethora of harms associated with climate change, including hotter temperatures, longer and more severe heat waves, extreme precipitation events, and rising sea levels. These effects have and will continue to cost New York City billions of dollars in public health services as well as climate resilience and adaptation measures.

This brief is submitted by amici NYC-EJA, THE POINT CDC, and UPROSE in support of the City of New York (the "City"). Amici, a collection of environmental justice groups based in New York City, seek to aid the Court in its decision by demonstrating that climate change, while experienced globally, is a problem with very local effects, especially on the City's low-income communities and communities of color. These effects are both unique and perilous to the City, as the nation's most densely populated city with 520 miles of almost entirely

developed coastline and major pockets of poverty. With consent from all parties, we write as amici to provide the court with relevant facts about how climate change has affected New York City and its most vulnerable residents.

On January 9, 2018, the City filed this lawsuit against Defendants in the Southern District of New York, claiming that Defendants' production, promotion, and sale of massive quantities of fossil fuels amount to state common law claims of public nuisance, private nuisance, and trespass. On April 25 and May 4, 2018, Defendants moved to dismiss these claims, and on July 19, 2018, the court dismissed the City's complaint for failure to state a claim, finding, among other things, that New York's claims were governed by federal, not state, common law, and that those federal common law claims were displaced by the federal Clean Air Act, under which there is no remedy for Defendant's activity. On July 26, 2018, the City appealed this decision to this court.

The City of New York ably explains in its papers that their claims were properly brought under New York State common law. Our brief will refrain from weighing in directly on the legal merits of the case.

Instead, our brief will show that climate change has extremely local impacts in which there is no unique federal interest. New York City and its residents, not fossil fuel producers, have shouldered the cost of climate change, and New Yorkers earning low incomes and people of color have borne that cost disproportionately. We believe this brief will provide an important perspective that is not being covered by any other party or amicus in this case.

I. Climate Change Is Happening, and It Is Happening Because of the Production and Subsequent Burning of Fossil Fuels.

The chain of causation from fossil fuel emissions to extreme heat, sea level rise, and more severe storms is well-documented:

First, it is indisputable that our planet is warming. For thousands of years, the world's climate was relatively stable, with a nearly constant level of carbon dioxide in the atmosphere. Howard Frumkin, et al., *Climate Change: The Public Health Response*, 98 AM. J. OF PUB. HEALTH 435 (2008). This changed at the dawn of the 20th Century. Since 1901, the planet's surface has warmed about 1.5°F, INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2014: SYNTHESIS REPORT 2 (2014) (hereinafter "IPCC"), and the rate of

warming has more than doubled since 1983. New York City Panel on Climate Change, *2015 Report Chapter 1*, 1336 ANN. N.Y. ACAD. SCI. 18, 19 (2015).

Second, it can also no longer be rationally disputed that human activities—mainly the burning of fossil fuels—are responsible for this warming. NPCC ch. 1, 18. There is clear consensus amongst climate scientists that climate change is real and that humans are the dominant cause of it. John Cook, et al., *Quantifying the Consensus on Anthropogenic Global Warming in the Scientific Literature*, 8 ENVIRON. RES. LETT. 1 (2013). The Intergovernmental Panel on Climate Change (“IPCC”), the world’s leading scientific body on the subject of climate change, agrees. According to the IPCC, it is “extremely likely” that the majority of the global temperature increase between 1951 and 2000 is a result of human-caused increases in greenhouse gases in the atmosphere. IPCC, at 4.

Significantly, it is well understood that the burning of fossil fuels is primarily responsible for the increase of greenhouse gas levels in the atmosphere. NPCC ES 9. In the United States, the burning of fossil fuels, particularly for the power and transportation sectors, accounts for

about three-quarters of all carbon emissions. EPA, INVENTORY OF U.S. GREENHOUSE GAS EMISSIONS AND SINKS: 1990–2016, ES-8 (2018).

According to the U.S. Environmental Protection Agency’s (“EPA”) most recent inventory of greenhouse gas emissions from 1990 to 2016, carbon dioxide generated from the burning of fossil fuels has accounted for approximately 77 percent of all greenhouse gas emissions since 1990.² *Id.* Also according to EPA, changes in emissions from fossil fuel combustion have historically been the dominant factor affecting trends in greenhouse gas emissions in the United States. *Id.* at ES-10.

Third, as explained below, it is well-established that this warming has led to an increase in extreme weather events. See NPCC ch. 1, 25. These extreme weather events have caused illness, injury, and the loss of life across New York City, particularly amongst low-income communities and communities of color.

The fact that other communities across the globe are also harmed by climate change does not absolve fossil fuel companies of

² Emissions from different greenhouse gases are weighted for “global warming potential,” “a quantified measure of the globally averaged relative radiative forcing impacts of a particular greenhouse gas.” *Id.*

responsibility for the hardship New York City has and will continue to endure as a consequence of their actions—the existence of many different local interests does not convert the interest to a uniquely federal one. As New York City must struggle daily with the local effects of climate change and plan for an uncertain future as temperatures continue to rise, it must be permitted to seek redress for these issues through state common law.

II. Because of Fossil Fuel Production and Use, New York City has and Will Continue to be Harmed by Climate Change.

New York City is getting hotter, and human activities, particularly the burning of fossil fuels, are responsible. NPCC ch. 1, at 18. Climate disasters, such as record-breaking heat waves, intensified hurricanes, and unprecedented flooding, have harmed millions of people in New York City. NEW YORK CITY, PLAN NYC - A STRONGER, MORE RESILIENT NEW YORK 11 (2013)(hereinafter “PLAN NYC”). Markedly, this devastation has resulted from only 3.4°F of warming from pre-industrial levels to date. New York City Panel on Climate Change, *2015 Report Executive Summary*, 1336 ANN. N.Y. ACAD. SCI. 9, 9 (2015) (hereinafter “NPCC ES”). In the coming century, the City is expected to warm as much as 12.1°F. NPCC ch. 1, 30 tbl.1.1.

As the planet warms, New York City, the most populous city in the United States, could be particularly affected. The City is situated on one of the world's largest natural harbors, FEDERAL WRITERS' PROJECT, *NEW YORK PANORAMA: ESSAYS FROM THE 1930S*, 326 (2018), and consists of many low-lying communities, Frank G. Runyeon, *Is New York City Ready for the Next Superstorm Sandy?*, CITY & STATE NEW YORK, Oct. 13, 2017, <https://www.cityandstateny.com/articles/policy/energy-and-environment/superstorm-sandy-fifth-anniversary-could-it-happen-again.html>.

As such, it suffers certain climate change impacts—like hotter temperatures and flooding—differently and often worse than its neighboring municipalities. Annual temperatures in the City are hotter than in surrounding suburban and rural areas, CYNTHIA ROSENZWEIG, ET AL., 86TH AMS ANNUAL MEETING, *MITIGATING NEW YORK CITY'S HEAT ISLAND WITH URBAN FORESTRY, LIVING ROOFS, AND LIGHT SURFACES* 1 (2006), the sea has risen and is continuing to rise at twice the global rate, NPCC ES, at 11, and due to its unique urban character, severe storms are more disruptive, upending all measures of life, KIM KNOWLTON AND MIRIAM ROTKIN-ELLMAN, NRDC, *PREPARING FOR*

CLIMATE CHANGE: LESSONS FOR COASTAL CITIES FROM HURRICANE SANDY (2014) (hereinafter “NRDC SANDY”).

For example, Superstorm Sandy caused forced evacuations, loss of electricity, and ground the City to a standstill for several weeks, depriving many New Yorkers of heat, health, services, and public transportation. *See generally* PlaNYC, at ch. 1. The effects of that storm permanently altered the City’s ecosystem and economy, and it is still recovering more than six years later.

A. New York City Has and Will Continue to Suffer from Extreme Heat

Because of fossil fuel production and use, New York City average temperatures have risen, leading to longer and more frequent heat waves (i.e., periods of at least three consecutive days with temperatures that reach at least 90°F). While New York City has already spent millions of dollars mitigating the harm from extreme heat, NEW YORK CITY, COOL NEIGHBORHOODS NYC (2017), climate scientists project that temperatures will continue to rise in the coming years, requiring the City to undertake additional measures to safeguard its residents in the future.

1. *New York City is Getting Hotter, and It Is Only Projected to Get Worse*

New York City is already experiencing unprecedented hotter temperatures—New York State temperatures have been higher in the 2000s than in any other historical period. NOAA NATIONAL CENTERS FOR ENVIRONMENTAL INFORMATION, STATE CLIMATE SUMMARIES: NEW YORK 3 (2017), <https://statesummaries.ncics.org/ny> (hereinafter “NOAA”), and in the City, average temperatures have warmed an average of 3.4°F from 1900 to 2013, NPCC ES, at 9—approximately double the global average, NPCC ch. 1, at 20. The IPCC states that there is a greater than 95 percent chance that these hotter temperatures are a result of fossil fuel use. IPCC, at 5.

And New York City is projected to get even hotter. According to the New York City Panel on Climate Change (“NPCC”), a consortium of world-class scientists that makes climate projections for New York City, by the 2080s, the City’s summers will be sweltering, with the number of heat waves projected to more than quadruple and to last twice as long. NPCC ch. 1, 35 t.1.3. Under this scenario, nearly every day of summer could reach over 90°F, *id.*, and over the course of the year, the average

temperature could be as much as 12°F hotter than it is now. *Id.* at 30 t.

1.1.

New York City’s hotter temperatures are in part due to a phenomenon known as the Urban Heat Island effect, in which denser more urban areas experience higher daytime temperatures and less nighttime cooling than surrounding non-urban areas due to the greater prevalence of heat concentration materials and structures like asphalt and buildings, respectively, and lower prevalence of cooling natural features, like trees and soil. *See Zoé Hamstead, WEACTION, How We Can Use Climate Action Planning to Beat the Heat*, Sept. 2016, <https://www.weaction.org/2016/09/climate-action-beat-heat/> (hereinafter “WEACTION, *Beat Heat*”). As a result of the Urban Heat Island effect, during the summer months, the daily minimum temperature in New York City is on average 7.2°F warmer than in surrounding areas.

ROSENZWEIG, ET AL., at 1.

2. *Extreme Heat Kills*

Heat is the leading weather-related killer in the United States, WEACTION, *Beat Heat*, responsible for one in five natural hazard deaths.

Bill Jesdale, et al., *The Racial/Ethnic Distribution of Heat Risk-Related*

Land Cover in Relation to Residential Segregation, 121 ENVIRON. HEALTH PERSPECT. 811, 811 (2013). Setting aside the devastating effects of rising temperatures on our natural environment, this change in temperature could have serious effects on the health of New Yorkers.

The health effects of warming are surprisingly far-reaching. Heat-related illnesses include heat rash, heat-caused swelling (edema), heat stroke, heat cramps, heat stress, and dehydration, as well as death. NEW YORK STATE DEPARTMENT OF HEALTH, BUILDING RESILIENCE AGAINST CLIMATE EFFECTS (BRACE) IN NEW YORK STATE 21 (2015) (hereinafter “NYS DOH”). Heat can also aggravate existing health conditions, such as renal, lung, and cardiovascular disease, particularly among children and the elderly, and lead to an increase in preterm births. *Id.* at 21, 50.

The secondary effects of extreme heat are just as dangerous for New Yorkers. Extreme heat can induce respiratory problems in New Yorkers in two ways. First, extreme heat further compounds respiratory risks for New Yorkers by hastening the formation of harmful air pollution like smog, also known as ground-level ozone. JOYCE ROSENTHAL, ET AL., SUSTAINABLE SOUTH BRONX, URBAN HEAT

ISLAND MITIGATION CAN IMPROVE NEW YORK CITY’S ENVIRONMENT:
RESEARCH ON THE IMPACTS OF MITIGATION STRATEGIES ON THE URBAN
ENVIRONMENT 4 (2008) (hereinafter “SSBx”). This harms lung tissue,
reduces lung function, and sensitizes the lungs to other irritants, *id.* at
6, which can lead to hospitalization and even death for people with pre-
existing respiratory issues, like asthma and chronic pulmonary disease.
NYS DOH 22–23. And ozone does not just induce asthma attacks, but
may even lead to the development of asthma. EPA, *Health Effects of
Ozone Pollution*, [https://www.epa.gov/ground-level-ozone-
pollution/health-effects-ozone-pollution](https://www.epa.gov/ground-level-ozone-pollution/health-effects-ozone-pollution) (Oct. 10, 2018).

Unsurprisingly, EPA expects heat to increase summertime ozone
levels in the Northeastern United States. EPA, ASSESSMENT OF THE
IMPACTS OF GLOBAL CHANGE ON REGIONAL US AIR QUALITY: A SYNTHESIS
OF CLIMATE CHANGE IMPACTS ON GROUND-LEVEL OZONE 3-21 (2009).
And this will result in tangible injury—by the 2050s, it is estimated
that increased ozone concentrations resulting from climate change will
lead to a 4.5 percent increase in ozone-related mortality. SSBx 6 – 7.

Second, higher temperatures escalate the demand for electricity to
cool the City’s residential and commercial buildings, increasing power

plant emissions. This results in the release of additional levels of particulate matter, carbon monoxide, sulfur dioxide, and nitrogen oxide, which are associated with respiratory conditions and lung disease.

Kristie L. Ebi and Glenn McGregor, *Climate Change, Tropospheric Ozone and Particulate Matter, and Health Impacts*, 116 ENVIRON. HEALTH PERSPECT. 1449, 1449 (2008).

Warmer weather also aids the spread of tropical diseases and infectious diseases that thrive in hot, humid conditions, such as malaria and dengue fever. Howard Frumkin, et al., *Climate Change: The Public Health Response*, 98 AM. J. OF PUB. HEALTH 435, 435 (2008); NYS DOH 23. Mosquitoes, ticks, and other disease-carrying insects thrive in warmer and wetter weather, promoting the spread of disease. New York City currently harbors at least one of the mosquito species that can carry Zika virus and Dengue fever, KIM KNOWLTON, ET AL., NRDC, *FEVER PITCH: MOSQUITO-BORNE DENGUE FEVER THREAT SPREADING IN THE AMERICAS* (2009), as well as ticks that carry diseases like Lyme, anaplasmosis, and babesiosis. Centers for Disease Control and Prevention, *Tickborne Diseases of the United States* (2017), <https://www.cdc.gov/ticks/diseases/index.html>.

Without millions of dollars of investment by the City to mitigate and protect its residents, more New Yorkers will suffer and even die from extreme heat. Hotter temperatures means higher mortality— From 2000 to 2011, an average of 447 New Yorkers went to the emergency room, an additional 152 were hospitalized, and an additional 13 people died each year from heat illness. Centers for Disease Control and Prevention, *Heat Illness and Deaths — New York City, 2000–2011*, 62 MORBIDITY AND MORTALITY WEEKLY REPORT 608 (2013).

These already high numbers very likely underestimate heat-related deaths, as they do not count individuals who died from existing medical conditions that were prompted or abetted by heat. NYC-EJA, NYC CLIMATE JUSTICE AGENDA 9 (2018) (hereinafter “NYC-EJA AGENDA”). On average, there are 4 percent more deaths each day the Heat Index is equal to or above 100°F in New York. Joyce Klein Rosenthal, et al., *Intra-Urban Vulnerability to Heat-Related Mortality in New York City, 1997–2006*, 30 HEALTH & PLACE 45, 50 (2014) (hereinafter “Rosenthal (2014)”).

And the risk of heat related illness and death will only grow as temperatures in the City rise. By 2080, as many as 3,330 New Yorkers

could die each year from the increasingly intense heat. Elisaveta P. Petkova, et al., *Towards More Comprehensive Projections of Urban Heat-Related Mortality: Estimates for New York City under Multiple Population, Adaptation, and Climate Scenarios*, 125 ENVTL. HEALTH PERSPECT. 47 (2017).

New York City has taken steps to try to mitigate the harms of extreme heat in the City, including launching Cool Neighborhoods NYC: a \$106 million program designed to help keep “New Yorkers safe during hot weather, mitigate urban heat island effect drivers and protect against the worst impacts of rising temperatures from climate change.” NEW YORK CITY, COOL NEIGHBORHOODS NYC (2017). As extreme heat is projected to intensify, additional measures will be necessary to prevent the worst of heat’s effects. The City cannot and should not be expected to shoulder the burden for extreme heat while those most responsible for the production of fossil fuels continue to profit from their use.

B. New York City Has and Will Continue to Suffer from Extreme Storms and Flooding

Because of fossil fuel production and use, sea levels have risen, and the frequency, duration, and severity of storms has increased, leading to more frequent and severe flooding of the City, especially during extreme storm events. NRDC SANDY, at 13.

Because of climate change, sea level is rising in New York City at an alarming rate. The sea has risen around the City by more than one foot in the last 100 years—nearly twice the global average.³ NPCC ES, at 11. The IPCC has found that it is “very likely” that fossil fuel combustion has made a substantial contribution to this phenomenon. IPCC, at 5. And sea levels will continue to rise, as high as six feet by 2100. NPCC ES, at 11.

Increased temperatures can also lead to an increase in precipitation. According to the NPCC, from 1958 to 2011, extreme precipitation events have increased by about 70 percent in the Northeastern United States, NPCC ch.1, at 25 – 26, a rate higher than

³ Approximately 60 percent of this is driven by climate change, while the rest is due to land subsidence. New York City Panel on Climate Change, *2015 Report Chapter 2*, 1336 ANN. N.Y. ACAD. SCI. 36, 37 (2015).

anywhere else in the country. JOHN WALSH ET AL., U.S. GLOBAL CHANGE RESEARCH PROGRAM, CLIMATE CHANGE IMPACTS IN THE UNITED STATES: THE THIRD NATIONAL CLIMATE ASSESSMENT, CH. 2: OUR CHANGING CLIMATE 37, fig. 2.18 (2014). In New York City, from 1900 to 2013, mean annual precipitation increased eight inches. NPCC ES, at 9. This trend is projected to continue—precipitation is expected to increase in New York State by as much as 25 percent by 2100. NPCC ch. 1, at 30, t.1.1. Downpours are “very likely” to increase infrequency and intensity, *id.* at 32, with about one and a half times more extreme precipitation events by the 2080s as compared to now, NPCC ES, at 10.

A higher sea level is very problematic for the future of the City, especially when combined with increases in the frequency, duration, and severity of storms. Sea level rise on its own can lead to permanent inundation of low-lying land where sea level simply exceeds the land elevation. And when combined with precipitation, flooding from sea level rise intensifies because more water adds to the sea’s volume. Most significantly, storm surge—the rise of water generated when the storm’s winds push ocean water toward the shore—can even further amplify flooding when combined with sea level rise and precipitation.

In fact, flooding due to storm surge is the greatest risk to coastal areas in New York City. PLANYC, at 44.

According to New York State, severe flooding is projected to increase. By the end of century, coastal flood levels that only occur once per decade now may occur once every one to three years, and flooding that only happens once per century now may occur 19 times as often.

RADLEY M. HORTON, NEW YORK STATE ENERGY RESEARCH AND DEVELOPMENT AUTHORITY (NYSERDA), CLIMATE CHANGE IN NEW YORK STATE: UPDATING THE 2011 CLIMAID CLIMATE RISK INFORMATION (2014).

The map included below, prepared by NPCC, highlights the areas that could be hit by a 100-year flood in the 2020s, 2050s, 2080s, and 2100s:

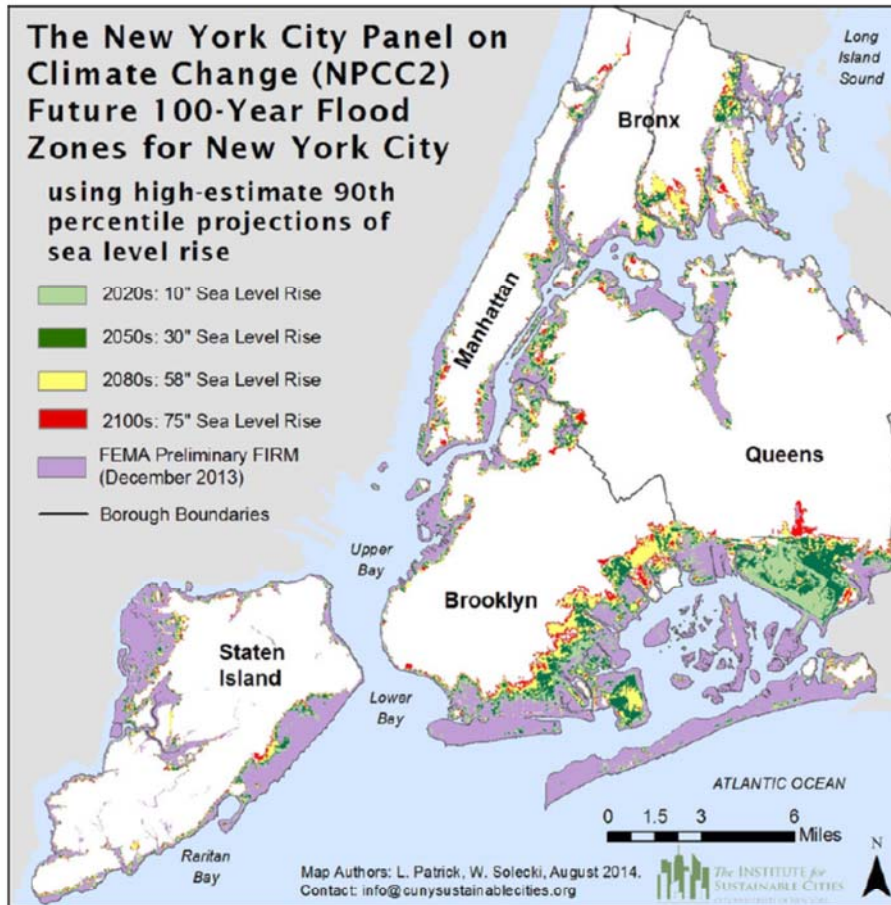


Figure ES.3. Potential areas that could be impacted by the 100-year flood in the 2020s, 2050s, 2080s, and 2100 based on projections of the high-estimate 90th percentile NPCC2 sea level rise scenario. Map developed using the static approach. **NOTE:** This map is subject to limitations in accuracy as a result of the quantitative models, data sets, and methodology used in its development. The map and data should not be used to assess actual coastal hazards, insurance requirements, or property values or be used in lieu of FIRMS issued by FEMA. The flood areas delineated in no way represent precise flood boundaries but rather illustrate three distinct areas of interest: (1) areas currently subject to the 100-year flood that will continue to be subject to flooding in the future; (2) areas that do not currently flood but are expected to potentially experience the 100-year flood in the future; and (3) areas that do not currently flood and are unlikely to do so in the timeline of the climate scenarios used in this research (end of the current century).

As this map demonstrates, without mitigation by the City, flooding will uniquely harm the City. Because its extensive coastline, longer than the coastlines of Miami, Boston, Los Angeles, and San Francisco combined, PLANYC, at 40, is so densely populated, flooding could severely disrupt the lives of millions of people.

Without intervention, the City faces a bleak future—many neighborhoods could be regularly flooded, and during severe storms, hospitals could be evacuated, heat and electricity could be shut off, public transportation could be shut down, and, consequently, more New Yorkers could die. New York City has already launched an over \$20 billion resiliency program to minimize flood-related harm, including the adoption of interim flood protection measures, the elevation of hundreds of homes, and other programs. CITY OF NEW YORK, PROGRESS REPORT: ONENYC, 9 (2018). Initiatives like these will have to expand in future years to account for additional flood-related harms.

1. Sandy’s Devastating Effects on New York City Are a Window into Regular New York City Storms and Flooding in 2100

On October 29, 2012, Superstorm Sandy made landfall and wreaked havoc across the northeastern United States. The damage Sandy imposed upon New York City is a glimpse of what will likely betide the City as climate change fuels rising seas and more powerful weather events—over one-fifth of the land in New York City could be flooded, leading to loss of life, homes, and to the temporary cessation of electricity, transportation, and necessary medical services, causing

injury and illness among all New Yorkers, and especially among those who earn low incomes and people of color.

As a City report on Sandy observed, “By any measure, Sandy was an unprecedented event for New York City. Never in its recorded history had the city experienced a storm of this size. Never had a storm caused so much damage. Never had a storm affected so many lives.”

PLAN NYC, at 11. Yet by 2100, the flooding of communities on the level of Superstorm Sandy may become the norm. Under NPCC’s sea level rise projection of six feet by 2100, a level of coastal flooding similar to Superstorm Sandy’s could happen every year or two. NRDC SANDY, at 13. Indeed, coastal communities along the mid-Atlantic are facing a “looming [sea level rise] crisis, one that will manifest itself as increased frequency of Sandy-like inundation disasters.” Thomas C. Peterson, et al., *Explaining Extreme Events Of 2012 from A Climate Perspective*, 94 BULL. AM. METEOROLOGICAL SOC’Y (SPECIAL SUPPLEMENT) S1, S20 (2013). A recounting of the ways in which Superstorm Sandy affected the City provides a window into what New York City may face regularly in less than a century. As demonstrated by the days and weeks and years following Superstorm Sandy, just one big storm can cripple the

City and leave communities displaced and without basic necessities, leading to injury and loss of life.

Sandy is the second-largest Atlantic storm on record, battering New York City with heavy rains, strong winds, and record storm surges. FEMA, HURRICANE SANDY FEMA AFTER-ACTION REPORT, iii (2013). In all, Sandy's storm surge flooded 16.6 percent of all of the land in New York City. NYU FURMAN CENTER FOR REAL ESTATE & URBAN POLICY, FACT BRIEF: SANDY'S EFFECTS ON HOUSING IN NEW YORK CITY 3 (2013) (hereinafter "FURMAN CENTER"). Its surge and waves rose up over beaches, boardwalks, and bulkheads on the city's coastline along the Atlantic Ocean and Lower New York Bay, hitting the neighborhoods across South Queens, Southern Brooklyn, and the East and South Shores of Staten Island especially hard. It was not just the ocean that was overflowing—the ocean flowed into bays, which fed into rivers, which fed into inlets and creeks, elevating water levels in Jamaica, Sheepshead, Gravesend, and Gowanus Bays, as well as in Upper New York Harbor and the East and Hudson Rivers. PLANYC 13. Water heights reached several feet above ground level in many coastal areas. *Id.* Near Sea Gate, a community at the tip of the Coney Island

peninsula in Brooklyn, the water rose to eleven feet above ground level, and in Tottenville in Staten Island, the water rose to fourteen feet. *Id.*

Superstorm Sandy had a wide range of effects on New York City, some of which we still have not recovered from. And the magnificent density of the City, unmatched by any other American city, amplified the effect of the flooding, leading to a cascading series of events, which in turn led to damage, injury, and death. *Id.* In all, Sandy killed 52 people in New York City, Kacie Seil, et al., *Injury Deaths Related to Hurricane Sandy, New York City, 2012*, 10 DISASTER MEDICINE AND PUB. HEALTH PREPAREDNESS 378, 378 (2016), the vast majority of whom died from drowning in areas that were rapidly hit by storm surge. PLANYC 13. More than 443,000 New Yorkers were living in the areas that Sandy flooded when the storm struck. *Id.*

Critical facilities and services that New Yorkers rely on, such as hospitals, public infrastructure, public transportation, and electricity, fully or partially shut down for the duration of the storm, and some were not restored for long periods afterwards. *Id.* at 14.

Hospitals and Care Facilities. Sandy placed an unprecedented strain on the city's healthcare system—six hospitals were forced to

close, requiring the evacuation of nearly 2,000 patients, and hospitals that remained open struggled to shoulder the burden of the new influx of patients. *Id.* at 16. Twenty-six nursing homes and adult care facilities closed, and five partially closed, requiring the evacuation of 4,500 people who could not care for themselves. *Id.*

Transportation. Highways, roads, railroads, subway tunnels and airports also flooded, stranding over five million New Yorkers. *Id.* at 17. Finally, Sandy damaged infrastructure along the New York City waterfront, causing severe breakdowns in the supply chain, leaving gas stations with no gas to pump, so even car travel was impeded. *Id.* at 15 – 16.

Electrical Infrastructure. Sandy's tropical-storm-force winds knocked down overhead lines and flooded substations, knocking out electricity for close to 2 million people in New York City at some point during the storm. *Id.* at 15. The loss of power completely crippled the City, shutting down heating systems and interrupting life-support and other crucial systems. John Manuel, *The Long Road to Recovery: Environmental Health Impacts of Hurricane Sandy*, 121 ENVTL. HEALTH PERSPECT. A152, A154 (2013). Loss of electricity in high rise apartment

buildings was particularly devastating, knocking out elevator service, *id.* at A155, and pumping systems, leaving residents on upper floors stranded at the top without lights, running water, PLANYC, at 17, and medical care for days and sometimes weeks. NRDC SANDY, at 5.

Moreover, loss of electricity and flooding caused outages across phone, wireless, cable, and Internet services, which were critical to communicate with responders, family members, and medical professionals during the storm. PLANYC, at 16.

Besides its immediate effects, Sandy led to terrible health problems among many of its victims. Moisture and mold damage to water-logged homes and schools created indoor air quality problems, exacerbating respiratory ailments such as asthma, chronic obstructive pulmonary disorder, bronchitis, and other respiratory infections.

Michael Schmeltz, et al., *Lessons from Hurricane Sandy: a Community Response in Brooklyn, New York*, J. OF URBAN HEALTH: BULL. OF THE N.Y. ACAD. OF MED. 799, 804 (2013). After Sandy, respiratory complaints soared, for both affected residents and relief workers exposed to debris dust and other particulates. NRDC SANDY, at 5.

Those who had to stay in temporary shelters risked contracting

respiratory and other infections in close quarters. *Id.* And increased contact with sewage- and chemical-contaminated floodwaters on city streets and beachfronts increased the risk of exposure to waterborne illnesses. *Id.*

The experience of living through Hurricane Sandy's flooding, displacement, and cleanup also increased the number of people who needed counseling for stress as well as longer-term psychosocial impacts. *Id.* In one study of the effects of Hurricane Sandy on residents living in the Rockaways, two-thirds of respondents reported experiencing anxiety and sleep disturbances following Hurricane Sandy, and half of respondents reported experiencing significant emotional concerns. Saleena Subaiya, *A Rapid Needs Assessment of the Rockaway Peninsula in New York City After Hurricane Sandy and the Relationship of Socioeconomic Status to Recovery*, 104 AM. J. OF PUB. HEALTH 634 (2014).

Sandy highlights the need for localities to be proactive in adaptation and protection efforts. While the City played a vital role in Sandy recovery, working hard to restore power, PLANYC, at 15, rebuild and repair homes, *id.* at 5, and clean up the immense volume of debris

that Sandy generated, *id.* at 18, among other things, it is irresponsible—and too costly—to wait idly for the next storm to hit, especially for New York City, the largest, densest, and most complex of all American cities. Sandy demonstrated the uniqueness of New York’s position and its need to fight climate change on a local level with all available resources and tools.

III. Low-Income Communities and Communities of Color in New York City Are Especially Harmed by the Effects of Climate Change.

Within New York City, people earning low incomes and people of color are the most vulnerable to the worst of climate change’s effects, such as extreme heat, extreme storms, and flooding.

These populations are most vulnerable in several ways: First, they frequently reside in areas that, due to their physical location within the City, tend to be more exposed to climate hazards. *See, e.g.,* Bruce C. Mitchell and Jayajit Chakraborty, *Landscapes of Thermal Inequity: Disproportionate Exposure to Urban Heat in the Three Largest US Cities*, 10 ENVIRON. RES. LETT. 1, 7 (2015); SUBSTANCE ABUSE AND MENTAL HEALTH SERVICES ADMINISTRATION, U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, GREATER IMPACT: HOW DISASTERS AFFECT

PEOPLE OF LOW SOCIOECONOMIC STATUS, DISASTER TECHNICAL ASSISTANCE CENTER SUPPLEMENTAL RESEARCH BULLETIN 8 (2017) (hereinafter “SAMHSA”).

Second, due to their low socio-economic status, they tend to have fewer resources to both prepare for and recover from climate hazards once they are exposed. CATHLEEN KELLY AND TRACEY ROSS, CENTER FOR AMERICAN PROGRESS, ONE STORM SHY OF DESPAIR 4 (2014).

Third, when combined with the fact that low-income communities and communities of color tend to already endure an accumulation of harmful environmental, health, economic, or social conditions, all of these factors combined can further inflame chronic environmental health problems. Rachel Morello-Frosch, et al., *Understanding the Cumulative Impacts of Inequalities in Environmental Health: Implications for Policy*, 30 HEALTH AFFAIRS 879, 879 (2011).

And when low-income communities suffer from climate impacts, New York City is a primary provider of health services, like emergency room care, in those communities. *See generally* CITY OF NEW YORK, ONE NEW YORK – HEALTH CARE FOR OUR NEIGHBORHOODS (2016) (hereinafter “ONE NEW YORK”).

A. Low-income communities and communities of color in New York City are more vulnerable to hotter temperatures.

Inside New York City, the Urban Heat Island effect does not treat all neighborhoods—or residents—equally. Within the City, there are micro-urban heat islands—neighborhoods with more heat-trapping impervious surfaces and denser, taller buildings with less natural cover. These micro-urban heat islands tend to be disproportionately populated by black, Latino, and Asian residents, along with people with lower incomes, lower rates of home ownership, and lower rates of high school graduation. Mitchell Chakraborty, at 7. Micro-heat islands, like Harlem in Manhattan and Bedford Stuyvesant in Brooklyn, tend to be hotter than less dense neighborhoods with more trees and plants, like Park Slope in Brooklyn and Forest Hills in Queens. WEACTION, *Beat Heat*.

When outdoor temperatures get hot, without air conditioning, indoor temperatures can get even hotter. According to field data gathered by the Harlem Heat Project reporting initiative in July and August 2016, while the outdoor temperature in New York City was

83°F, average indoor temperatures was over 90°F. Sarah Holder, *Harlem Sensor Data Reveals Dangerous Indoor Heat Risk*, ADAPTNYP, Oct. 25, 2016, <http://www.adaptny.org/2016/10/25/harlem-sensor-data-reveals-dangerous-indoor-heat-risk/#more-1790> (hereinafter “ADAPTNYP”).

The absence of a functioning air conditioner is often a key factor in heat-related mortality. According to the New York City Office of Emergency Management, 80 percent of people who die from heat stroke were exposed to heat in homes without air conditioning. *Extreme Heat and Your Health*, NEW YORK CITY DEPARTMENT OF HEALTH AND MENTAL HYGIENE, <https://www1.nyc.gov/site/doh/health/emergency-preparedness/emergencies-extreme-weather-heat.page> (last visited Nov. 9, 2018). In studies of heat illness and deaths in New York City from 2000 to 2011, none of those who died from heat-related illnesses had used a working air conditioner prior to falling ill. Rosenthal (2014), at 46; Centers for Disease Control and Prevention, *Heat Illness and Deaths — New York City, 2000–2011*, 62 MORBIDITY AND MORTALITY WEEKLY REPORT 608, 619 (2013). One in five low-income households do not have air conditioners, and even those that do may not be able to

afford the electricity to use them regularly. KELLY AND ROSS, at 6. Not coincidentally, Harlem has the highest rate of heat stress-related emergency room visits in the city and also has the fewest air conditioning units. ADAPTN.Y.

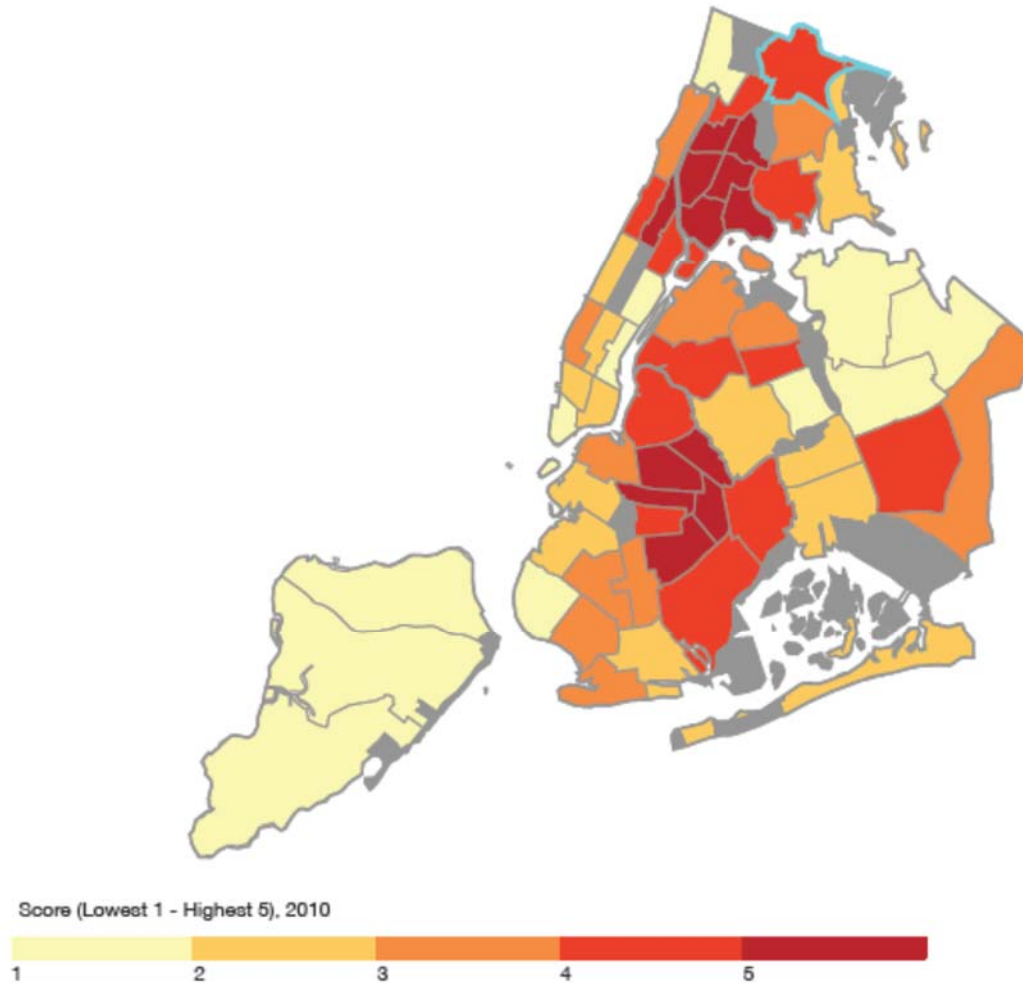
Compounding this problem, low-income communities and communities of color are also more likely to have pre-existing respiratory conditions like asthma, *Most Recent Asthma Data*, CENTERS FOR DISEASE CONTROL AND PREVENTION, https://www.cdc.gov/asthma/most_recent_data.htm (May 2018), that make them more likely to falling ill during heat waves.

Data about heat-related deaths underscore these observations—Several studies have found that New York City census tracts with high proportions of people who are black and earn low incomes or who receive public assistance have higher rates of heat-related deaths. *See, e.g., Jaime Madrigano, A Case-Only Study of Vulnerability to Heat Wave-Related Mortality in New York City (2000–2011)*, 123 ENVTL. HEALTH PERSP. 672 (2015); Rosenthal (2014). In particular, parts of the Southwestern Bronx, Northern Manhattan, Central Brooklyn, and the Eastern side of Midtown Manhattan are all amongst the lowest-income

areas in New York City. Rosenthal (2014), at 50–51. They also have higher rates of heat-related deaths. *Id.*

Based on the strong associations between certain neighborhood characteristics (i.e., average temperature, amount of green space, poverty, and race) and heat-related illness and death, New York City has developed a Heat Vulnerability Index for all neighborhoods in the City, which seeks to measure how at-risk a neighborhood is during extreme heat compared to other neighborhoods. The City found the neighborhoods colored red in the map below to be the most heat vulnerable:

Heat Vulnerability Index - Score (Lowest 1 - Highest 5), 2010, CD



Source: *Environment & Health Data Portal: Heat Vulnerability Index*, New York City Department of Health and Mental Hygiene, <http://a816-dohbsp.nyc.gov/IndicatorPublic/VisualizationData.aspx?id=2191,4466a0,100,Summarize> (last visited Nov. 9, 2018).

Information about the neighborhoods with the highest heat vulnerability rating (5) are set forth in the chart below:

Demographics of NYC’s Most Heat-Vulnerable Communities

Neighborhoods (Community Districts)	Percentage POC ⁴ (citywide: 68.2%) ⁵	Median Household Income (citywide: \$60,010) ⁶	Residents with Incomes Below Poverty Level (citywide: 18.9%) ⁷
Bedford-Stuyvesant, Stuyvesant Heights, Tompkins Park North (BK-CD3)	88%	\$52,440	26.7%
Bushwick (BK-CD4)	91%	\$49,380	28.7%
Broadway Junction, Brownsville, Ocean Hill (BK-CD16)	99%	\$30,800	33.2%
Crown Heights, Prospect Heights, Weeksville (BK-CD8)	82%	\$52,900	22.7%

⁴ *New York City Community Health Profiles*, NEW YORK CITY DEPARTMENT OF HEALTH AND MENTAL HYGIENE, <https://www1.nyc.gov/site/doh/data/data-publications/profiles.page> (last visited Nov. 10, 2018).

⁵ *New York: Diversity*, DATA USA, <https://datausa.io/profile/geo/new-york-ny/#demographics> (last visited Nov. 10, 2018).

⁶ NYU FURMAN CENTER FOR REAL ESTATE & URBAN POLICY, STATE OF NEW YORK CITY’S HOUSING AND NEIGHBORHOODS IN 2017 (2018), available at http://furmancenter.org/files/sotc/SOC_2017_Full_2018-08-01.pdf.

⁷ *Id.*

East Flatbush, Farragut, Flatbush, Northeast Flatbush (BK-CD17)	99%	\$52,260	14.9%
Bathgate, Belmont, Bronx Park South, East Tremont, West Farms (BX-CD6)	93%	\$26,320	36.3%
Claremont, Crotona Park East, Melrose, Morrisania (BX-CD3)	99%	\$26,320	36.3%
Concourse, Concourse Village, East Concourse, Highbridge, Mount Eden (BX-CD4)	99%	\$32,120	34.9%
Fordham, Morris Heights, Mount Hope, University Heights (BX-CD5)	99%	\$27,140	41.1%
Hunts Point, Longwood (BX-CD2)	99%	\$27,850	36.9%
Melrose, Mott Haven, Port Morris (BX-CD1)	98%	\$27,850	36.9%
Central Harlem (M-CD10)	90%	\$60,560	14.7%

New York City’s Heat Vulnerability Index underscores the incredibly strong links between heat, race, poverty, and vulnerability.

And when low-income patients get sick, New York City treats a disproportionate number of them in its clinics and hospitals. ONE NEW YORK, at 23 – 24.

B. Extreme storms disproportionately harm people earning low incomes and people of color.

While some have described extreme weather events as “social equalizers” that do not differentiate based on ethnicity, race, or class, the truth is that these events usually hit low-income communities the hardest. People earning low-incomes and people of color are generally much more climate vulnerable than other populations. NRDC SANDY, at 13. And once hit, it is much harder for low-income households to recover from the devastation. Where assistance is needed for recovery, it is often the City that is best positioned to assist in recovery. *See generally* PLANYC, at ch. 1.

Hurricane Sandy demonstrated that natural disasters do not harm all people equally—populations living in coastal and low-lying areas, the elderly and very young, and low-income families are disproportionately vulnerable. NPCC ES, at 9. According to researchers at Stony Brook University, census blocks with lower median income experienced greater damage from Superstorm Sandy

than wealthier census blocks. Chris Sellers et al., *Median Income versus Damaged Housing*, CENTER FOR THE STUDY OF INEQUALITY, SOCIAL JUSTICE AND POLICY, STONY BROOK UNIVERSITY (2017). Viewed another way, the poverty rate was higher in flooded areas than in areas that remained dry—nearly one of every three flooded census tracts had a poverty rate of 20 percent or higher. SAMHSA, at 8. And whites, blacks, and Latinos who lived in flooded areas tended to earn lower incomes than whites, blacks, and Latinos in areas that stayed dry. *Id.* Of the 443,000 New Yorkers who lived in homes that Sandy damaged, PLANYC, at 13, 121,000 people lived in public housing, owned by the New York City Housing Authority (NYCHA), NRDC SANDY, at 4. On top of that, about 24,500 flooded homes were privately-owned affordable rental housing that received some form of federal government assistance. FURMAN CENTER, at 5. Most of the subsidized housing was located in Coney Island, the Rockaways, Harlem, and the Lower East Side. *Id.*

Sandy's effects were also unequally distributed by race. Black New Yorkers were more likely to live in flooded areas than white New Yorkers. Jacob William Faber, *Superstorm Sandy and the*

Demographics of Flood Risk in New York City, 43 HUM. ECOL. 363, 373 (2015). And just as a disproportionate number of NYCHA homes were located in Sandy's flood zone, nearly all NYCHA residents, an incredible 95.6 percent, are people of color. NYCHA, RESIDENT DATA SUMMARY (2015), https://www1.nyc.gov/assets/nycha/downloads/pdf/res_data.pdf.

Furthermore, people earning low incomes tend to have more difficulty recovering from natural disasters, as natural disasters tend to amplify the health, safety, financial, and other socioeconomic problems that low-income communities are already suffering through. KELLY AND ROSS, at 4. Because people earning lower incomes have fewer assets, losses comprise a larger proportion of their total assets. SAMHSA, at 12. Difficulties associated with recovery also appear to have emotional and behavioral health consequences. *Id.* at 12 – 13.

CONCLUSION

Fossil fuels have already had a devastating effect on the well-being of New York City. And these effects—Harlem residents hospitalized for heat-related illnesses, homes in Staten Island permanently damaged by flooding—are not abstract or speculative—they are concrete and measurable. Moreover, they are unique to New York City, which is experiencing heat, sea level rise, and flooding in an unprecedented and very serious way as a consequence of fossil fuel combustion. As competently explained by the City of New York, these harms can be straightforwardly remedied under New York State common law. For the reasons set forth above and in the City of New York’s brief, the Court should grant the City’s request.

Dated: November 15, 2018

Respectfully submitted,

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CERTIFICATE OF COMPLIANCE

1. This brief complies with the type-volume limit of Fed. R. App. P. 29(a)(5) and Local Rule 29.1(c) because, excluding the parts of the brief exempted by Fed. R. App. P. 32(f), this brief contains 6,913 words.

2. This brief complies with the typeface requirements of Fed. R. App. P. 32(a)(5) and the type-style requirements of Fed. R. App. P. 32(a)(6) because this brief has been prepared in a proportionally spaced typeface using Microsoft Word 2010 in 14-point Century Schoolbook.

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CERTIFICATE OF SERVICE

I hereby certify that on this 15th day of November, I filed the foregoing brief and served the foregoing brief on all registered counsel through the Court's CM/ECF system.

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