SWELTERING IN PLACE: COVID–19, EXTREME HEAT, AND ENVIRONMENTAL JUSTICE

HEARING

BEFORE THE

COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY HOUSE OF REPRESENTATIVES

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C O N T E N T S

July 14, 2020

SWELTERING IN PLACE: COVID–19, EXTREME HEAT, AND ENVIRONMENTAL JUSTICE

TUESDAY, JULY 14, 2020

HOUSE OF REPRESENTATIVES,
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY,
Washington, D.C.

The Committee met, pursuant to notice, at 2:08 p.m., via Webex, Hon. Eddie Bernice Johnson [Chairwoman of the Committee] presiding.

COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY
U.S. HOUSE OF REPRESENTATIVES

HEARING CHARTER

Sweltering in Place[1]: COVID-19, Extreme Heat, and Environmental Justice

Tuesday, July 14, 2020
2:00 p.m. ET
Cisco WebEx

PURPOSE

This hearing will explore the disproportionate impacts of extreme heat and COVID-19 on communities of color and low-income communities, and to understand the impacts of the Environmental Protection Agency (EPA)'s deregulatory actions and relaxed enforcement of pollution regulations on these communities. This hearing will provide an opportunity to discuss the near-term concerns for environmental justice (EJ) communities who are likely to be dealing with a summer of excessive heat, coupled with the impacts of toxic environmental exposures, vulnerabilities to COVID-19, and the compounding effects of recent EPA regulatory rollbacks and relaxed enforcement of pollution regulation. It will also be an opportunity to discuss the gaps in heat monitoring research to understand the disparate impacts of extreme heat on vulnerable communities, and what Federal investments are needed to address these gaps to develop equitable and just Federal policies.

WITNESSES

- **Ms. Heather McTeer Toney,** National Field Director, Moms Clean Air Force
- **Dr. Mustafa Santiago Ali,** Vice President of Environmental Justice, Climate, and Community Revitalization, National Wildlife Federation
- **Mr. Cecil Corbin-Mark,** Deputy Director, WE ACT for Environmental Justice
- **Mr. Hilton Kelley,** Founder/Director of the Community In-Power & Development Association Inc.

OVERARCHING QUESTIONS

- How has COVID-19 disproportionately impacted communities of color and low-income communities?
- What are the root causes of the disproportionate outcomes of COVID-19 for low-income communities and people of color?
- How will a summer of extreme heat compound the effects of COVID-19 on low-income communities and people of color?
- How will the rollbacks of EPA pollution standards and relaxed enforcement of environmental laws exacerbate the impacts of COVID-19 on these communities, especially as we move into the summer months and as the economy restarts?
- What actions should the EPA take to improve air quality and curb exposure to toxics to protect these already vulnerable communities?

[1] https://www.hsph.harvard.edu/c-change/subtopics/coronavirus-and-heatwaves/

- What role has climate change played in creating the perfect storm for vulnerable communities already grappling with the devastating effects of COVID-19 and historic environmental disparities?
- How are stay-at-home orders and the economic slowdown due to COVID-19 further disadvantaging environmental justice communities?
- How can social and behavioral sciences inform public warnings and other communications about vulnerable communities' risks to extreme heat, particularly during the COVID-19 pandemic?

BACKGROUND

COVID-19 Disparities and Environmental Justice

Communities of color in America have been disproportionately impacted by COVID-19. In Louisiana, Black people account for 33% of the population, but make up 70% of COVID-19 deaths in the state. In Wisconsin, they make up 26% of the population, but 75% of COVID-19 deaths.[2] An analysis by the Washington Post found that majority-Black counties have six times the rate of death of majority-white counties.[3] In New York City, the death rate for Black people was more than double that of white people.[4]

This disparity results in part from the fact that people of color have been disproportionately exposed to environmental harms that have made them more vulnerable to COVID-19. Black people are more likely than white people to live near pollution sources such as landfills, coal plants, highways, and refineries.[5] Similarly, communities of color are much more likely to face the devastating environmental, health, and economic impacts of climate change.[6] For example, in the South, Black coastal communities face the highest risks from sea level rise.[7] In cities across the country, Black neighborhoods are experiencing increasingly frequent episodes of extreme heat.[8]

The disparities between Black and white communities with respect to COVID-19 mortality rates, as well as exposure to environmental harms, are not purely coincidental: Black communities face the worst impacts of both COVID-19 and climate change as a consequence of historic redlining, or the denial of mortgage lending based on race.[9] The National Housing Act of 1934 made it legal to systematically deny Black Americans equal access to government-backed mortgages and loans, effectively enabling segregated neighborhoods and withholding investment and resources from communities of color.[10] Although redlining is no longer legal, its legacy and impacts on communities of color persist to this day. A recent study found that in 94% of cities the study looked at, historically redlined neighborhoods were on average 5°F warmer than non-redlined

[2] https://www.ewg.org/news-and-analysis/2020/04/harvard-study-places-dirty-air-covid-19-patients-greater-risk-death
[3] https://www.washingtonpost.com/nation/2020/04/07/coronavirus-is-infecting-killing-black-americans-an-alarmingly-high-rate-post-analysis-shows/?arc404=true
[4] https://www.eenews.net/eedaily/2020/06/04/stories/1063313133?utm_medium=email&utm_source=eenews%3Aeedaily&utm_campaign=edition%2BiZ%2B%2FfUV%2B2LxUfI1tN5bxJQ%3D%3D
[5] https://ajph.aphapublications.org/doi/10.2105/AJPH.2017.304297
[6] https://science.sciencemag.org/content/356/6345/1362/tab-figures-data
[7] https://www.sciencedirect.com/science/article/pii/S0016718517302944
[8] https://www.tandfonline.com/doi/full/10.1080/01944363.2020.1759127
[9] https://tcf.org/content/report/attacking-black-white-opportunity-gap-comes-residential-segregation/
[10] https://www.thoughtco.com/redlining-definition-4157858

neighborhoods in the same city.[11] Within some cities, the temperature differential reached as high as 12°F.

The practice of redlining also led to toxic industries being disproportionately located in communities of color, which consequently increased their exposure to pollutants that cause asthma, hypertension, diabetes, and other underlying health conditions that put people in high-risk categories for COVID-19. A pre-print Harvard study found that coronavirus patients in areas with high levels of air pollution were 8% more likely to die than coronavirus patients in parts of the country with cleaner air.[12] The study established a statistical link between long-term exposure to air pollution and severe COVID-19 outcomes. A separate, preliminary study out of Northern Italy found that COVID-19 attaches itself to tiny particles of air pollution.[13] These tiny particles, known as particulate matter or PM, can get deep into human lungs. They are produced by car emissions, power plants, and burning materials – all toxic sources that communities of color are far more likely to be exposed to than white communities.

Extreme Heat and Environmental Justice

The legacy of redlining and institutionalized racism has led to the disparate impacts that climate change has on people of color and low-income communities. The 2018 National Climate Assessment found that risks are "often highest for those that are already vulnerable, including low-income communities, some communities of color, children, and the elderly."[14] One such risk is rising temperatures and extreme heat, which disproportionately affects low-income urban residents. The EPA found that the "annual mean air temperature of a city with one million or more people can be 1.8 to 5.4°F…warmer than its surroundings, and… [at night] this temperature difference can be as much as 22°F," leading to the formation of urban heat islands.[15] These heat islands primarily impact neighborhoods of color and low-income areas, which often have "fewer trees, more concrete and [can be] closer to highways and factories."[16] In addition, low-income communities in urban areas have less financial stability, making it a challenge to pay inflated summertime air conditioning bills or finance the activities that keep children out of the heat.[17]

In the time of COVID-19, these impacts are exacerbated by stay-at-home orders and the closure of cooling centers, public pools, splash pads, and playgrounds. Extreme heat is especially dangerous for those who are already vulnerable, as heat is the leading cause of summertime morbidity and has severe impacts to those with pre-existing health conditions.[18] In major cities, including New York, it is estimated that as many as half of public housing units do not have adequate cooling.[19] Many people in these neighborhoods will have to choose between staying indoors and safe from the coronavirus but risking death or illness from extreme heat, against going outdoors for relief from indoor heat but potentially exposing themselves to the virus from

[11] https://www.mdpi.com/2225-1154/8/1/12/htm
[12] https://projects.iq.harvard.edu/covid-pm
[13] https://www.medrxiv.org/content/10.1101/2020.04.15.20065995v2
[14] https://nca2018.globalchange.gov/chapter/1/
[15] https://www.epa.gov/sites/production/files/2017-05/documents/reducing_urban_heat_islands_ch_1.pdf
[16] https://www.npr.org/2019/09/03/754044732/as-rising-heat-bakes-u-s-cities-the-poor-often-feel-it-most
[17] Ibid.
[18] https://www.mdpi.com/2225-1154/8/1/12/htm
[19] https://www.washingtonpost.com/national/will-summer-kill-coronavirus/2020/04/27/5ec70fd8-8670-11ea-a3eb-e9fc93160703_story.html

which they are more likely to die.

Access to, and the cost of, indoor cooling is also unequal among races: Black families with air conditioning units face higher energy prices than white families. A June 2020 study from UC Berkeley found that Black households in the U.S. pay more for residential energy than white households.[20] This gap holds regardless of income, household size, homeowner status, and city of residence. As climate change causes extreme heat across more areas of the country, and the urban heat island effect intensifies, families who have air conditioning might not even have the option to turn it on due to the overwhelming cost of energy. Many cities are looking towards solutions for keeping their residents cool, especially during the COVID-19 pandemic with many cooling centers closed. Some cities have proposed delivering free air conditioners to residents who need them; however, these plans are shortsighted because many of those residents will not be able to shoulder the disproportionate energy burden they will have to pay once they plug those air conditioners in.

Inequality Exposed by the Pandemic

The COVID-19 pandemic has exposed the systemic inequities that result in disproportionate impacts to communities of color and low-income communities. These inequities are the same for all disasters and diseases: communities of color are more vulnerable to harm than their white counterparts due to historic and modern-day redlining, housing discrimination, lack of equal access to adequate healthcare and nutrition, and so on. These same factors make people of color more vulnerable to COVID-19, extreme heat, climate change, and many other environmental and health risks.

In addition to higher rates of COVID-19 illness and death amongst low-income communities and people of color, the reopening and recovery process also disproportionately harms these communities. People of color comprise a large portion of the essential workforce in many cities and states, and consequently, are disproportionally exposed to toxics at work as well as at home. Government decisions to reopen disproportionately impact these people. On top of that, people of color are more likely than white people to live in proximity to toxic sites such as landfills and highways. This constant toxic exposure at home and at work makes them more vulnerable to COVID-19 and its deleterious impacts.

EPA Rollbacks and Relaxed Pollution Enforcement

Over 100 rules and regulations relating to climate and environmental policies have been rolled back since January 2017, with the majority of these roll backs occurring at EPA.[21] These deregulatory actions range in progress from the first notice of planned action in the Regulatory Agenda, to a formal Notice of Proposed Rulemaking, to a finalized rule.[22] The regulations that have been, or are in the process of being, rolled back include dozens of rules meant to regulate air emissions, reduce toxic pollution, limit the use of harmful pesticides and chemicals, and improve air quality.[23] Amid a global pandemic, EPA has eased enforcement of pollution standards, relaxing penalties for companies that do not comply with air and water pollution

[20] https://haas.berkeley.edu/wp-content/uploads/WP306.pdf
[21] https://www.nytimes.com/interactive/2020/climate/trump-environment-rollbacks.html
[22] U.S. EPA. "EPA Deregulatory Actions." Accessed here: https://www.epa.gov/laws-regulations/epa-deregulatory-actions
[23] https://eelp.law.harvard.edu/regulatory-rollback-tracker/

monitoring and reporting requirements.[24] They have also weakened fuel-efficiency standards and mercury emission rules.[25] Loosening emissions standards is likely to lead to increased emissions, which EPA's own research has shown causes asthma, lung irritation, heart issues, and other underlying conditions that make people more vulnerable to contracting severe COVID-19.[26] In addition to regulatory rollbacks, EPA has limited comment periods and has been accused of using the COVID-19 pandemic to push through controversial rulemaking, including the Strengthening Transparency in Regulatory Science rule.[27]

Communicating Environmental and Public Health Risks to Environmental Justice Communities

For extreme heat and COVID-19 as well as other diseases and disasters, public outreach and warning systems are essential in preparing people and helping them understand their risks. This is especially crucial for vulnerable populations, who are facing the most devastating impacts from both extreme heat and COVID-19. Research has demonstrated that Federal, state, and local governments failed to both understand and communicate the risks from COVID-19 to communities of color, who have been disproportionately harmed by the pandemic. Likewise, various factors determine the effectiveness of heat warnings for vulnerable people, and communicating these events is an ongoing issue for local, state, and Federal officials. More social and behavioral science research is needed to understand how people interpret and respond to weather forecasts and disease information.[28]

Impacts of extreme heat and other extreme events are strongly dependent on behavioral responses to forecasts; thus, increased investment in social science is needed to understand how social factors affect how the public prepares for and responds to extreme weather events.[29] Given that people of color and other at-risk groups are more likely to experience negative impacts of extreme heat and COVID-19, there is an urgent need to improve understanding of the role of public communication and outreach in order to prepare and protect them from these compounding risks.

Federal Heat Research and Monitoring

In June 2015, the National Oceanic and Atmospheric Administration (NOAA) and the Centers for Disease Control (CDC) launched the National Integrated Heat Health Information System (NIHHIS). NIHHIS monitors and collects data on heat across timescales and regions, and provides advanced heat warnings and decision support services to help the public prepare for and respond to extreme heat.[30] The program has expanded to include other relevant agencies, forming an interagency working group that includes NOAA, CDC, US Department of Agriculture (USDA), Federal Emergency Management Agency (FEMA), Occupational Safety and Health Administration (OSHA), and EPA.[31]

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[24] https://www.nytimes.com/2020/03/26/climate/epa-coronavirus-pollution-rules.html
[25] https://www.washingtonpost.com/health/2020/03/30/trump-mileage-standards-environment/
[26] https://www.epa.gov/pm-pollution/health-and-environmental-effects-particulate-matter-pm#:~:text=Health%20Effects&text=Exposure%20to%20such%20particles%20can,nonfatal%20heart%20attacks
[27] https://www.newsweek.com/epa-push-censored-science-rule-pandemic-1512590
[28] National Academies of Sciences, Engineering, and Medicine. 2018. Integrating Social and Behavioral Sciences Within the Weather Enterprise. Washington, DC: The National Academies Press. https://doi.org/10.17226/24865
[29] Ibid.
[30] https://cpo.noaa.gov/Serving-Society/NIHHIS/About-NIHHIS
[31] https://www.nationalacademies.org/event/05-13-2020/webinar-on-environmental-extreme-events-and-covid-19-in-2020?utm_source=All+DBASSE+Newsletters&utm_campaign=a9c23748f1-BECS-webinar-may-13-2020&utm_medium=email&utm_term=0_e16023964e-a9c23748f1-206337753

NOAA, through the International Research and Applications (IRAP) program, funds projects that seek to understand how international climate and weather events, such as extreme heat, affect U.S. interests in health and national security. One such ongoing project is working "to assess historical heat extremes and their predictability at seasonal-subseasonal scales to inform geographically and socioculturally specific recommendations for improving the efficacy of heat advisory and mitigative messaging to vulnerable populations."[32]

In August 2018, EPA released a report titled *Mapping the Vulnerability of Human Health to Extreme Heat in the United States*, through which EPA began to identify and define methodologies for developing maps and mapping tools to understand the effects of extreme heat on vulnerable populations.[33]

The Department of Energy (DOE) works with universities, businesses, and its National Labs to develop innovative energy-efficiency technologies, including for home energy saving.[34] DOE's research and development into energy efficiency help to mitigate extreme heat by limiting power outages during heat waves, reducing spikes in energy prices, and curbing heat-trapping emissions through energy-efficient appliances.[35]

Research on COVID-19 in the Environment

EPA's Office of Research and Development (ORD) has the capability to conduct robust research on the human and environmental health factors that affect COVID-19 transmission and severity. In EPA's April 2020 "Charge for Review of COVID-19 Pandemic Scientific and Technical Issues to Inform EPA's Research Activities" to its Science Advisory Board (SAB), they outlined research questions including whether exposure to air pollutants increases susceptibility to respiratory viruses or exacerbates COVID-19 infections, as well as whether there are particular factors such as race, socioeconomic status, gender, and built environment, that affect transmission and severity of COVID-19.[36] The SAB, charged with rapidly reviewing these research questions and providing feedback to EPA, recommended that ORD utilize existing monitoring networks, partnerships, models, and national databases to carry out these analyses.[37] It also recommended EPA expand the scope of these questions to deepen understanding of how exposure factors related to living and working near pollution sites affect the likelihood of contracting COVID-19 or having a severe case of it, as well as the impact of human health risk factors related to socio-economic status on virus transmission and risk.[38]

Environmental Justice Research Gaps

The pandemic has brought to the forefront the social, health, environmental, and economic disparities that persist in the United States, and the ongoing movement for racial justice has

[32] https://cpo.noaa.gov/Meet-the-Divisions/Climate-and-Societal-Interactions/IRAP/Funded-Projects
[33] U.S. EPA. Mapping the Vulnerability of Human Health to Extreme Heat in the United States (Final Report). U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-18/212F, 2018.
[34] https://www.energy.gov/science-innovation/energy-efficiency
[35] https://www.ucsusa.org/resources/killer-heat-united-states-0
[36] https://yosemite.epa.gov/sab/sabproduct.nsf/0/2996BA363B41C2598525854C0048EA69/$File/PDF%20for%20COVID-19%20Meeting%20Materials%20and%20Charge_04-21-20.pdf
[37] https://yosemite.epa.gov/sab/sabproduct.nsf/0/F29062728B4BC9148525857B00731EAA/$File/EPA-SAB-20-006.pdf
[38] Ibid.

heightened the need to better understand these inequities. Much of the EJ research to date has focused on anthropogenic pollution and its disproportionate impacts on communities of color.[39] There is a need to broaden the research priorities and develop an EJ research framework that extends to existing and emerging topics. This includes better understanding environmental injustices stemming from extreme weather events including heat, flooding, energy production and access, food production and access, animal feeding operations, drinking water systems, and how these and other issues lead to inequitable environmental burdens and disproportionate health impacts for people of color.[40]

In addition to expanding EJ research topics, there is a need to better document and understand links between unjust environmental exposures and health effects and incorporate EJ metrics into Federal research and development efforts.[41] EPA ORD published an Environmental Justice Research Roadmap draft, which laid out plans for research to fill gaps in scientific understanding of how environmental stressors interact with societal and economic stressors, and to address climate justice, or the "growing recognition that America's poorest communities are also those that are…least prepared for potential impacts related to our changing climate such as extreme weather emergencies, drought, heat stress, flooding, and changes in sea level."[42]

LEGISLATION

There have been several pieces of legislation introduced this Congress addressing issues related to Environmental Justice, including H.R. 5986, the Environmental Justice for All Act,[43] H.R. 5842, Voices for Environmental Justice Act,[44] and H.R. 3924, the Environmental Justice Act of 2019.[45]

ADDITIONAL READING

Killer Heat in the United States: Climate Choices and the Future of Dangerously Hot Days, Union of Concerned Scientists. July 2019
https://www.ucsusa.org/resources/killer-heat-united-states-0

The National Black Environmental Justice Network's COVID-19 Statement
https://www.nbejn.com/nbejn-covid-19-statement

GAO Report: Environmental Justice: Federal Efforts Need Better Planning, Coordination, and Methods to Assess Programs. September 2019
https://www.gao.gov/products/gao-19-543?mobile_opt_out=1

[39] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5129282/
[40] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5129282/
[41] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5129282/
[42] https://www.epa.gov/sites/production/files/2015-12/documents/environmental_justice_research_roadmap_partner_review.pdf
[43] https://www.congress.gov/bill/116th-congress/house-bill/5986?q=%7B%22search%22%3A%5B%22environmental+justice+for+all+act%22%5D%7D&s=1&r=1
[44] https://www.congress.gov/bill/116th-congress/house-bill/5842?q=%7B%22search%22%3A%22environmental+justice%22%7D&s=1&r=4
[45] https://www.congress.gov/bill/116th-congress/house-bill/3923

Chairwoman JOHNSON. Well, the hearing will come to order. And without objection, the Chair is authorized to declare recess at any time.

Before I deliver my opening remarks, I want to announce a couple of reminders to the Members about the conduct of the hearing. First, Members should keep their video feed on as long as they are present in the hearing, and Members are responsible for their own microphones. So please also keep your microphones muted until you are speaking.

And finally, if Members have documents they wish to submit to the record, please email them to the Committee Clerk, whose email address was circulated prior to this hearing.

And one additional thing before I begin my opening remarks, several of the written witness testimonies for today's hearing were received after the Committee's 48-hour deadline submission. This is really unfortunate. As I know my colleagues and their staff rely upon this testimony to adequately prepare for our hearings, this is not something that I or my staff support or will encourage in the future. It is my hope that this will not become a common occurrence on this Committee. And I want to let all of my colleagues know that I and my staff will work to ensure all future witness testimony is received and distributed in a timely manner.

I look forward to continuing to work with the Ranking Member Lucas and his staff to invite expert witnesses like those on today's panel and to support the work of the Committee.

Good afternoon. I'd like to welcome everyone to this virtual hearing to discuss the intersection of COVID–19, extreme heat, and environmental justice (EJ). I would also like to thank our esteemed witnesses for participating in this very important hearing. I know your time is in high demand during this period of intersecting crises, and we appreciate you being here. There is no better time to discuss these important and intersecting issues than right now.

The COVID–19 pandemic has not treated everyone the same. The death rate for African-American, Hispanic, and Native American people is much higher than for white people of all age categories. A *Washington Post* analysis found that majority-African-American counties have six times the death rate of majority-white counties. The trends for exposure to extreme heat and other environmental harms mirror those of COVID–19.

Extreme heat is especially problematic in cities, where urban heat islands form, making some neighborhoods much hotter than others. Urban heat islands occur primarily in neighborhoods of color and low-income areas, where there are often less trees, more concrete, less access to air conditioning, and are located closer to highways and factories.

These disparities hold true for many other issues. People of color and low-income communities are hit first, worst, and hardest by many disasters and diseases. Disparities between African Americans and whites in COVID–19 mortality rates, as well as exposure to environmental harms, are the result of the legacy of historic redlining and discriminatory housing practices. African Americans were systematically denied equal access to housing, and to this day, the historically redlined neighborhoods are on average 5 degrees Fahrenheit warmer than non-redlined neighborhoods in the

same cities. Sometimes this temperature difference can be as high as 12 degrees.

And my home State of Texas is no stranger to extreme heat, nor other severe weather or environmental threats. In recent years, Texans have dealt with toxic emissions from refineries in Port Arthur, devastating hurricanes and associated flooding in Houston, and destructive tornadoes in Dallas. Now COVID–19 is devastating our great State. Communities of color and low-income communities are on the frontlines, fighting for their lives against environmental hazards, disease, and social injustice as well.

So, this week, nearly 2/3 of the country is facing warmer-than-normal temperatures, with 40 percent of the lower 48 States having a moderate risk of extreme and dangerous heat. According to NOAA's (National Oceanic and Atmospheric Administration's) Climate Prediction Center, the Texas panhandle will experience some of the worst prolonged heat, with temperatures around 110 degrees.

While it is important that agencies like NOAA and EPA (Environmental Protection Agency) collect data and conduct research on extreme weather and environmental pollution, it is not enough. The scope of ongoing Federal research on issues such as extreme heat and environmental justice must expand to better understand the impacts of environmental and public health risk on vulnerable communities.

That is why we are very fortunate to have the opportunity to speak with such an esteemed panel today. I look forward to hearing from our expert witnesses on how the impacts of social injustice, COVID–19, and the climate crisis on vulnerable communities are interconnected, and the role that science and research can play in closing the gaps in environmental and health disparities for these communities.

[The prepared statement of Chairwoman Johnson follows:]

Good afternoon. I'd like to welcome everyone to this virtual hearing to discuss the intersection of COVID-19, extreme heat, and environmental justice. I would also like to thank our esteemed witnesses for participating in this very important hearing - I know your time is in high demand during this period of intersecting crises, and we appreciate you being here. There is no better time to discuss these important and intersecting issues than right now. The COVID-19 pandemic has not treated everyone the same: the death rate for African American, Hispanic, and Native American people is much higher than for white people in all age categories. A Washington Post analysis found that majority-African American counties have six times the death rate of majority-white counties.

The trends for exposure to extreme heat and other environmental harms mirror those of COVID19. Extreme heat is especially problematic in cities, where urban heat islands form, making some neighborhoods much hotter than others. Urban heat islands occur primarily in neighborhoods of color and low-income areas, where there are often less trees, more concrete, less access to air conditioning, and are located closer to highways and factories.

These disparities hold true for many other issues. People of color and low-income communities are hit first, worst, and hardest by many disasters and diseases. Disparities between African Americans and whites in COVID-19 mortality rates, as well as exposure to environmental harms, are the result of the legacy of historic redlining and discriminatory housing practices. African Americans were systematically denied equal access to housing. To this day, historically redlined neighborhoods are on average 5 degrees Fahrenheit warmer than non-redlined neighborhoods in the same city - sometimes this temperature difference can be as high as 12 degrees.

My home State of Texas is no stranger to extreme heat nor other severe weather or environmental threats. In recent years, Texans have dealt with toxic emissions

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This week, nearly two-thirds of the country is facing warmer than normal temperatures, with 40% of the lower 48 States having a moderate risk of extreme and dangerous heat. According to NOAA's Climate Prediction Center, the Texas panhandle will experience some of the worst prolonged heat, with temperatures around 110 degrees.

While it is important that agencies like NOAA and EPA collect data and conduct research on extreme weather and environmental pollution, it is not enough. The scope of ongoing Federal research on issues such as extreme heat and environmental justice must expand to better understand the impacts of environmental and public health risk on vulnerable communities.

That is why we are very fortunate to have the opportunity to speak with such an esteemed panel today. I look forward to hearing from our expert witnesses about how the impacts of social injustice, COVID-19, and the climate crisis on vulnerable communities are interconnected, and the role that science and research can play in closing the gaps in environmental and health disparities for these communities.

Chairwoman JOHNSON. At this time I'd like to enter into the record a letter from the American Psychological Association expressing their support for this hearing and the importance of mitigating disproportionate impacts of heat and COVID–19 on communities of color. The APA recognizes that COVID–19 is exacerbating mental health disparities among African Americans, Latinos, American Indians, Alaska Natives, and Asian Americans. They highlight that quality and affordable health care and treatment must be made available to those hard-hit low-income and minority communities to close the gap in mental health care and treatment.

I'd also like to enter into the record a letter from WE ACT for Environmental Justice, which is an organization that works to implement community-driven political change to address environmental racism. I'm entering into the record WE ACT's 2020 Extreme Heat Policy Agenda Report, which is a long-term action plan outlining Federal policy solutions to mitigate extreme heat and its impact on vulnerable communities. We will also hear from the Deputy Director of WE ACT on today's panel.

And so now I will recognize our Ranking Member Mr. Lucas for his opening statement.

Mr. LUCAS. Thank you, Madam Chairman. And before I begin my opening statement, I would note that we have a couple of new Republicans on the Science Committee. And at perhaps the next meeting I will take a little more time to give them the appropriate introduction that they deserve, but it's good to add to this Committee.

With that, as we continue to fight COVID–19, I appreciate that we're focusing our hearing time on this pandemic. Environmental justice, public health, and extreme weather are very serious topics that deserve our attention. It's well-documented that low-income and minority communities are adversely affected by these issues. And while I appreciate the effort to better understand why and how that is, I think the structure and scope of today's hearing doesn't give us the chance to focus on potential solutions.

Sadly, we know that extreme weather, environmental quality, and public health all have a disproportionate effect on low-income and vulnerable populations. I've seen it firsthand with rural communities and tribal lands in my Oklahoma district. It's important

we recognize that and have an upfront discussion on it. But in addition to having that discussion, we have a responsibility to try and solve the challenges we face. One of the reasons I love the Science Committee is our focus on solutions. We are the most forward-thinking Committee. We have the ability to support and shape our country's path forward.

That's why I would have liked to have seen a witness from the EPA's Office of Environmental Justice at this hearing. If we're talking about environmental justice and the disparities of environmental effects, we need to know what's being done and how we can improve on it. No one outside of that office can adequately walk through their $9.5 million budget, one that my Democratic friends have just proposed increasing by almost 50 percent, I might add.

Like all things in government, EPA's Office of Environmental Justice is not perfect and there are certainly things that could be improved, but this is the office that facilitates nationwide environmental justice solutions. They should be here today to discuss that. EPA has funded over $33 million in environmental justice grants to more than 1,400 vulnerable communities. It's giving $1 million in grant funding to States, local governments, tribes, and U.S. territories to help local environmental justice communities address COVID–19 concerns. And EPA has also requested $18 million as a set-aside within the Brownfields Projects program to support Opportunity Zone development. Opportunity Zones are a new community investment tool to encourage long-term investments in low-income urban and rural communities nationwide.

It's easy to just talk facts and figures on the economic hardship communities have faced during this pandemic and the long-term health effects they have historically battled, but it's much more difficult to discuss concrete solutions. For instance, we have to be careful of trying to address extreme weather by implementing emissions standards that will inevitably raise energy prices. Low-income families spend a disproportionate amount on energy costs, and any increase can affect their entire budget, not to mention their ability to heat or cool their homes.

So while solutions require careful discussions, I think we can all agree that investment and development is the best starting point. That is exactly what Opportunity Zones are designed to do. Over $10 billion has been raised by investment as of April 30, and Secretary of the Treasury Mnuchin estimates Opportunity Zones could drive as much as $100 billion into struggling communities over the coming decade. If you take this initiative and connect it to our Committee, you'll see there is the potential for universities and scientific institutions to commercialize research, support technology transfer, incubate student startups, and expand student housing near Opportunity Zones.

Those are just two of many areas that have the potential to offer solutions to today's hearing. And before any of our friends on the other side point out the witness process, I want to say that the minority elected not to invite a witness out of respect to whoever it might have been. If we chose an Opportunity Zone expert, they would not be able to discuss public health or COVID. If we chose a university representative, they would not be able to discuss environmental justice or heat waves.

The minority is given the opportunity to invite a witness to our hearings to allow the Committee to hear differing perspectives on the issues in front of us, but being in the minority means we can only choose a single witness. We take that responsibility seriously and try to invite experts who can speak comprehensively. Today's hearing topic was simply not practical for us to identify one expert.

We also do our best to encourage each witness to be able to comply with established Committee rules, which includes providing testimony at least 48 hours in advance of the hearing. Yesterday, within 24 hours from the start of the hearing, staff had received just one testimony, and Chairwoman Johnson addressed that issue thoughtfully and fairly a few minutes ago.

With that being said, I have full faith that the four witnesses with us today are experts in their fields and will do an excellent job in discussing the significant issues low-income and minority communities are facing. I hope we can hold future hearings with EPA to focus on forward-looking solutions to these problems. I look forward to the discussion today, and I yield back, Madam Chair.

[The prepared statement of Mr. Lucas follows:]

Thank you, Chairwoman Johnson. As we continue to fight COVID-19, I appreciate that we're focusing our hearing time on this pandemic.

Environmental justice, public health, and extreme weather are very serious topics that deserve our attention. It's well documented that low-income and minority communities are adversely affected by these issues. And while I appreciate the effort to better understand why and how that is, I think the structure and scope of today's hearing doesn't give us the chance to focus on potential solutions.

Sadly, we know that extreme weather, environmental quality, and public health all have a disproportionate effect on low-income and vulnerable populations. I've seen it firsthand with rural communities and tribal lands in my Oklahoma district. It's important we recognize that and have an upfront discussion on it. But in addition to having that discussion, we have a responsibility to try to solve the challenges we face. One of the reasons I love the Science Committee is our focus on solutions. We are the most forward-thinking Committee, and we have the ability to support and shape our country's path forward.

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Chairwoman JOHNSON. Thank you very much, Mr. Lucas.

If there are Members who wish to submit additional opening statements, your statements will be added to the record at this point.

At this time, I'd like to introduce our witnesses. Our first distinguished witness is Ms. Heather McTeer Toney, the National Field Director for Moms Clean Air Force, an organization that works to protect children from the devastating health impacts of air and climate pollution. Ms. Toney previously served as the EPA's Regional Administrator for region 4 under President Obama and before that was elected as the first African-American female and the youngest Mayor of Greenville, Mississippi. She is an expert on environmental and climate justice. She has spent years working on the ground with rural communities and communities of color on environmental justice issues in her home State of Mississippi. Ms. Toney received her juris doctor from Tulane University School of Law.

Our second witness is Mr. Mustafa Santiago Ali, Vice President of Environmental Justice, Climate, and Community Revitalization for the National Wildlife Federation. Dr. Ali has long been committed to the fight for environmental justice and economic equity. He worked for 24 years at EPA where he helped to found the Office of Environmental Justice and held the role of Assistant Associate Administrator for Environmental Justice and Senior Advisor for Environmental Justice and Community Revitalization. While at EPA, he led the Interagency Working Group on Environmental Justice coordinating across 17 Federal agencies to address the issues facing vulnerable communities. Dr. Ali earned his master's degree from West Virginia University and holds honorary doctorate degrees from Green Mountain College, along with an honorary juris doctor degree from Vermont Law school.

Our third witness is Mr. Cecil Corbin-Mark, Deputy Director of WE ACT for Environmental Justice, an organization that works to

implement community-driven political change to address environmental racism. WE ACT works to ensure that people of color and low-income residents participate meaningfully in the creation of environmental health policy and practices. Mr. Corbin-Mark previously worked for the Bronx County District Attorney and the Justice Honorable W.T. Martin, the Mellon Minority Scholars Program. As a longtime advocate of environmental justice in New York City, Mr. Corbin-Mark has strongly pushed to reduce vehicle exhaust to improve air quality starting with neighborhoods with the worst air quality. Mr. Corbin-Mark earned his master's of philosophy in international relations from Oxford University in England.

And our final witnesses is Mr. Hilton Kelley, Founder and Director of Community In-Power and Development Association, or CIDA Incorporated, a nonprofit dedicated to empowering residents in low-income communities in Mr. Kelley's home of Port Arthur, Texas. Mr. Kelley is a community leader and environmental justice activist, pushing for cleaner, safer communities for the vulnerable in his hometown, notoriously one of the most polluted in America due to its disproportionate exposure to toxic chemicals. Mr. Kelley's advocacy and leadership led to Port Arthur being selected by the EPA as an environmental justice showcase community and receiving $100,000 to improve the community's health challenges. Mr. Kelley is a Clean Air Ambassador for Earthjustice and a recipient of the Goldman Environmental Prize.

Let me say to our witnesses, you should each have 5 minutes for your spoken testimony, and your written testimony will be included in the record for the hearing. When you all have completed your spoken testimony, we will begin with questions. Each Member will have 5 minutes to question the panel.

So we will begin now with Ms. Toney.

TESTIMONY OF MS. HEATHER MCTEER TONEY, NATIONAL FIELD DIRECTOR, MOMS CLEAN AIR FORCE

Ms. TONEY. Thank you, Chairwoman Johnson, Ranking Member Lucas, and Members of the Committee. Thank you for the opportunity to testify today about the very real and very devastating combination of coronavirus, extreme heat, and environmental justice existing in our country today.

I'm Heather McTeer Toney, and I do serve as National Field Director for Moms Clean Air Force. We are a community of over 1 million moms, dads, and caretakers that are united against air pollution and climate change for the sake of our children's health. And yes, I previously served as Regional Administrator for the southeast part of the United States, and my region covered eight States, six tribes, and over 1/4 of the Nation's population. In my job I not only assisted communities and businesses but also really explained the importance of protective measures, especially in vulnerable populations and communities of color.

And aside from being a former Mayor, I am a wife and a mother of three children ages 25, 14, and 3 years old.

Today that we're—the work that we're doing is compounded with the onset of coronavirus and the looming threats of climate change. Not only are our moms fighting a pandemic in the midst of a climate emergency, we're having to do it within a system of structural

racism and inequity. There's no question that the coronavirus pandemic is impacting black and brown communities worse than any other demographic in the Nation. A study from Yale found that black Americans are three and a half times more likely to die of coronavirus than white Americans. And while this should not have been a surprise to any of us, it was certainly acknowledged within minority communities very early.

The COVID–19 disparities are stemming from multiple interrelated factors that are all driven by long-standing structural racism and inequity. People of color and lower-income people are more likely to serve as frontline and essential workers, have more essential—more financial pressure to work, and lower access to paid sick leave.

And due to long-standing environmental and social disparities, minority communities also have a higher rate of chronic conditions that put us at risk for more severe illnesses. As an example, we know that black and brown people, as well as lower-income people, tend to have higher average exposure to air pollution. We also know that air pollution exposure causes many of the same chronic diseases that make COVID more deadly.

Now, add to this fact that there's ample evidence that racism within the healthcare setting often results in a lower standard of care and the fact that some black folks just plain don't trust the system because of delay or avoid seeking these—COVID care because of past negative experiences or distress that stem from a legacy of racism and unethical medical research and experimentation.

Now, while we may not know exactly the details of how extreme heat compounds the effects of COVID on low-income communities and people of color, what we do know and we can see is that the relationship definitely exists and is exasperated by oppressive systems of racial inequity.

Just this past weekend Dr. Linda Rae Murray of Chicago, Illinois, outlined a stunningly familiar relationship between the death rate of COVID and the Chicago heat wave in 1995, which was one of the most deadly in its history. We had over 700 people die in Chicago's housing projects in what can only be explained as death by virtue of being poor.

And one of our organizers in Phoenix, Arizona, Columba Sainz, she's a wife and a mother of three, she explained it best. She said energy poverty is real. People in the lowest income groups spend the most on energy. The hotter it gets, the more it costs and the more we need. And who can afford to pay over half their paycheck on air conditioning in the middle of a pandemic in a heatwave? Communities of color are energy-poor, and here we are 25 years later and we see the exact same dynamic played out on the exact same people in the exact same way. We haven't legislated to lessen the impacts of structural racism but instead we place a higher burden and a lower value of lives on the lives of black and brown people. And we see this through policies that the EPA is doing like the hundred rollbacks that they have instituted within the past 3 1/2 years.

Now, with economic resources stretched thin by COVID–19, thoughtful spending and prioritizing projects that produce the most immediate benefit are needed. I agree, Representative Lucas, that

we should talk solutions. And one of the solutions includes having better information regarding mapping of heat islands and better understanding of the risks associated with low-income and minority communities to better understand the disproportionate impact of extreme weather on communities of color. We need to deploy many existing tools, as well as developing some new ones with the specific goal of understanding the complex web of interactions that result in heightened weather-related risk to such communities. We absolutely must demand a halt to EPA reversing lifesaving protections and that they revisit their mission of protecting human health and the environment.

This is our call to action at Moms Clean Air Force. We're demanding justice in every breath of every policy impacting the health and well-being of our children.

I look forward to answering your questions later in the hearing, and thank you.

[The statement of Ms. Toney follows:]

Before the United States House of Representatives
Full Committee on Science, Space and Technology

"Sweltering in Place: COVID-19, Extreme Heat, and Environmental Justice"

Oral Testimony of Heather Toney
National Field Director
Moms Clean Air Force
July 14, 2020

Chairwoman Johnson, Ranking Member Lucus, and members of the committee, thank you for the opportunity to testify about the very real and devastating combination of Coronavirus, extreme heat and environmental justice existing in our country today.

My name is Heather McTeer Toney and I serve as National Field Director of Moms Clean Air Force. We are a community of over one million moms and dads united against air pollution and climate change for the sake of our children's health. I previously served as Regional Administrator for the Environmental Protection Agency's Southeast Region. My region covered 8 states, 6 tribes and over a quarter of the nation's population. My job was to not only assist communities and businesses but to also explain the importance of protective measures, especially in vulnerable communities and communities of color. I am also a former mayor, having served my hometown of Greenville, Mississippi, for two terms. I am the mother of 3; children ages 25, 14, and 3.

Today, this work is compounded with the onset of Coronavirus and the looming threats of climate change. Not only are our moms fighting a pandemic in the midst

of a climate emergency, we're having to do it within a system of structural racism and inequity.

There is no question that the Coronavirus pandemic is impacting black and brown communities worse than any other demographic in the nation. A study from Yale found that Black Americans are 3.5 times more likely to die of Coronavirus than white Americans.[1] While this should not have been a surprise to any of us, it was certainly acknowledged within minority communities early. These COVID-19 disparities stem from multiple interrelated factors, all driven by longstanding structural racism and inequity.

People of color and lower income people are more likely to serve as frontline and essential workers, have more financial pressure to work and lower access to paid sick leave. This leads to higher coronavirus exposure, and a higher infection rate. Due to longstanding environmental and social disparities, minority communities also have higher rates of chronic conditions that put us at risk for more severe illness. As an example, we know that black and brown people as well as lower income people tend to have higher average exposure to air pollution. We also know that air pollution exposure causes many of the same chronic diseases that make COVID more deadly, including heart disease, diabetes, and asthma. Inequity in healthcare access and quality of care may then further contribute to worse outcomes, including higher mortality. Add to this the fact there is ample evidence that racism in healthcare settings often results in people of color receiving a lower standard of care, and that black folks just plain don't trust these systems and may delay or avoid seeking care for COVID symptoms because of past negative experiences or distrust stemming from the legacy of racist and unethical medical research and experimentation on people of color. Finally, lower healthcare access

[1] https://www.medrxiv.org/content/10.1101/2020.05.07.20094250v1.full.pdf

and quality may also worsen chronic health conditions, and influence access to COVID testing and diagnosis, which in turn impacts infection rates if people are more likely to be living and working with undiagnosed illness.

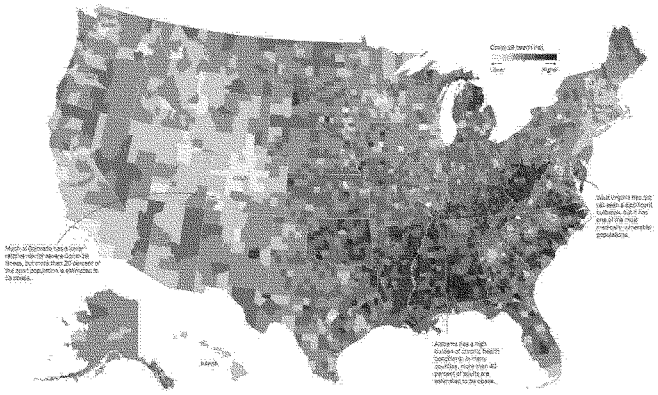
While we don't yet know exactly how extreme heat compounds the effects of COVID-19 on low income communities and people of color, we can see that a relationship exist and it is exasperated by oppressive systems of racial inequity. Just last week, Dr. Linda Ray Murray of Chicago, IL outlined a stunningly familiar relationship between the death rate of COVID and the Chicago Heat Wave of 1995, the deadliest in the city's history.[2] Over 700 people died in Chicago's housing projects in what can be explained as death by virtue of being poor. Moms Clean Air Force Organizer Columba Sainz, wife and mother of 3 in Phoenix, Arizona, explained it best. "Energy poverty is real; people in the lowest income groups spend the most on energy. The hotter it gets, the more it cost and the more we need. Who can afford to pay over half of their paycheck on air conditioning in the middle of a pandemic and a heat wave? Communities of color are energy poor and 25 years later, we see the exact same dynamics played out on the exact same people in the exact same way: we have not legislated to lessen the impacts of structural racism but instead, have placed a higher burden and lower value on the lives of black and brown people through racist policies like the 100 rollbacks of EPA. Systems that are meant to protect the health of the most vulnerable among us are being cast aside for profit and Coronavirus has revealed just how deadly inaction can be.

With economic resources stretched thin by COVID-19, thoughtful spending and prioritizing projects that produce the most immediate benefit are needed – this includes having better information regarding mapping of heat islands and a better

[2] https://chicago.suntimes.com/2020/6/28/21302962/25th-anniversary-heat-wave-racism-covid-19-chicago-linda-murray

understanding of the risks associated with low income and minority communities. To better understand the disproportionate impacts of extreme weather on communities of color, we need to deploy many existing tools – and develop some new ones – with the specific goal of understanding the complex web of interactions that result in heightened weather-related risk to such communities. We absolutely must demand a halt to EPA reversing lifesaving protections and that they revisit their mission of protecting human health and the environment. This is our call to action at Moms, demanding "Justice in Every Breathe" of every policy impacting the health and well-being of children.

The New York Times recently published a map (Figure 1) which displays the proportion of adults in each county who have one or more of the conditions known to worsen COVID illness: diabetes, high blood pressure, obesity, heart disease, and chronic lung disease; southern states have a larger proportion of their populations who have these underlying conditions. With extreme heat projected in many of



these states over the summer, we expect these conditions may worsen, especially with increases in ozone concentrations that are seen in the warmer months.

Figure 1: NY Times, May 18

We also know that there are clear disparities by race and income in the prevalence of chronic diseases that put people at higher risk of severe COVID illness. 69% of American Indian seniors and 61% of black seniors have chronic diseases putting them at elevated risk of severe COVID illness, versus 54% of white seniors. 40% of low income people under 65 are at higher risk, versus 24% of those with higher income. COVID-19 death rates in the U.S. also vary dramatically by race. Based on mortality data through June 24, 2020, the mortality rate for black Americans (65.8 deaths per 100,000 people, or 1 in 1,500) is more than twice as high as the rate for whites. Black Americans represent 12.4% of the population in the US, but have suffered 23.8% of deaths as of June 24.

An inter-disciplinary approach is needed, one that begins with better understanding the localized impacts of climate change-fueled heatwaves and other extreme weather events. Research is needed to quantify how much more communities of color may be impacted during an extreme event and the historical reasons for such disproportionate impacts. For example, are communities of color living in a more vulnerable area such as an urban heat island lacking green space? Are residents living in low-lying neighborhoods without sufficient flood control? These data must be incorporated into a larger framework that can evaluate community-level risks with the knowledge of pollution exposure, housing stock, health characteristics, age distribution, indoor air quality, and other household risks such as overcrowding and the prevalence of lead in water and paint.

More information is needed about the public health risks of expanding petrochemical operations in areas susceptible to climate change-induced storms, flooding, and sea level rise. Studies in the area of St. James Parish in Louisiana, part of Cancer Alley have already shown a correlation between the rampant air

pollution in the area and Coronavirus deaths.[3] It's case study of why we must collect this information now to protect people in the future. Local governments need resources to support sustainability planning efforts such as development of climate action and mitigation plans and renewable energy portfolios.

A comprehensive understanding of current conditions will also help project future extreme weather-related risks to communities of color as the climate continues to warm.

We are fortunate to work alongside the Environmental Defense Fund as they are preparing to build a Climate Vulnerability Index (CVI) tool that aggregates and translates climate change-associated vulnerability data on a county-level scale. The goal of the initiative is to build a toolkit that can help inform decision-making at the local level. For example, CVI will be able to educate investors about the public health risks of expanding petrochemical operations in areas increasingly prone to climate change-induced storms, flooding, and sea level rise, at a time when more and more investors demand that companies evaluate shareholder concerns about the financial risks and investment opportunities posed by climate change. EDF also plans to use the tool to work with local community groups and lawmakers to support sustainability planning efforts and decision-making, such as development of climate action plans and renewable energy portfolios. While there is considerable environmental and health data publicly available right now, the CVI tool will synthesize the data to make it accessible, visual, and actionable at a granular scale. This is the information our members need and will help advocate for just policies that protect the most vulnerable in our communities.

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[3] https://earther.gizmodo.com/im-scared-study-links-cancer-alley-air-pollution-to-hi-1843484042

Another aspect of this challenge is to improve the quality and extent of mapping, modeling and simulations examining the performance of community infrastructure, in order to improve local understanding of exactly how our communities will be affected by severe weather events. It is especially important that we have the right tools to collect real-time data during these severe weather episodes. For example, when Category 4 Hurricane Harvey struck Houston in 2017, the state's air quality monitoring network was suspended. When a subsequent chemical fire at the Arkema plant released toxic gases into the air, first responders and the community were left in the dark about potential exposures. Even the Chemical Safety Board panel that investigated the incident found there was a lack of planning for how severe weather events like the unprecedented rain during Hurricane Harvey could affect facilities that store chemicals and that even though Arkema had emergency generators and other backup systems, "all of these layers of protection failed due to flooding." It quickly became obvious that assumptions about flooding patterns and impacts were outdated and inadequate. We have to do better.

If we are to understand and mitigate the public health challenges associated with the intersection of climate change, extreme weather, and communities at risk, we need to invest now in scientific research, analytical capacity, resilient infrastructure, adaptive measures, and emergency response planning.

Whether those crises come in the form of a health pandemic or severe weather events, we already know they will disproportionately affect the citizens and economies of communities of color. For that reason, justice and equity require a new focus on funding the scientific infrastructure necessary to respond in a manner that demonstrates a societal commitment to righting that imbalance. It is the very definition of "Justice in every breathe".

Elected at age 27, Heather McTeer Toney Knows what it means to be a public servant. She was the first African-American, first female and the youngest to serve as Mayor of Greenville, Mississippi from 2004-2012.

In 2014, she was appointed by President Barack Obama as Regional Administrator for Environmental Protection Agency's (EPA) Southeast Region. Known for her energetic and genuine commitment to people, her work has made her a national figure in the area of public service, environmental justice and community engagement. She currently serves as the National Field Director for Moms Clean Air Force, an organization of over 1 million moms and dads committed to fighting climate change and protecting children from the dangers of air pollution. Heather is also a sought-after speaker and writer.

The daughter of a civil rights attorney and public school teacher, Heather was born and raised in Greenville, Mississippi. In 2003, she was elected Mayor of the City of Greenville and re-elected for a second term in 2007. Under her leadership, the city thrived, emerged from significant debt, and received millions of dollars in grants and federal assistance. At EPA, Mrs. Toney was responsible for protecting public health and the environment in eight southeastern states, as well as six federally recognized tribes; making Region 4 the most populated and diverse of ten regions. In addition, she led efforts to maintain and enhance the quality of work life for Region 4's approximately 1,000 employees while effectively managing a budget of more than $500 million.

Heather has served in several roles throughout her career including one of the National Spokeswomen for *She Should Run!*, a National Organization that encourages women to run for office. She is an expert on environmental and climate justice with SheSource, a publication of the Women's Media Center and has worked around the world. She is known for advocating and training diverse officials on leadership and climate in over 15 countries including Kenya, France, Portugal, Nigeria and Senegal. She has appeared on news outlets such as CNN, MSNBC, Fox News, and Democracy Now! She has written for and been featured in numerous papers including the New York Times and the Washington Post. McTeer Toney was featured in the May 2005 issue of Essence Magazine as one of the "50 Most Remarkable Women in the World. She is also one of the winners of Marie Claire Magazine's "Women on Top" awards and the inaugural Rachel's Network "Catalyst Awards" recognizing women of color that work on climate issues. Heather is often a guest on various Sirux/XM radio shows and was included in the PBS/AOL documentary entitled "MAKERS", where she appears alongside noted women such as Hilary Clinton and Condoleezza Rice.

Mrs. Toney earned a bachelor's degree in Sociology from Spelman College in Atlanta. She earned her law degree from the Tulane University School of Law. Heather is a member of numerous organizations, is an avid athlete that loves triathlons. She is a member of Alpha Kappa Alpha Sorority, Inc., and an active member of Oxford University United Methodist Church. She is married to Dexter Toney and they have three children.

Chairwoman JOHNSON. Thank you very much. Dr. Ali.

TESTIMONY OF DR. MUSTAFA SANTIAGO ALI, VICE PRESIDENT OF ENVIRONMENTAL JUSTICE, CLIMATE, AND COMMUNITY REVITALIZATION, NATIONAL WILDLIFE FEDERATION

Dr. ALI. Thank you. Chairwoman Johnson, Ranking Member Lucas, and Members of the Committee, on behalf of the National Wildlife Federation, our 52 State and territorial affiliates, and more than 6 million members in environmental justice communities and advocates around the country, thank you for the honor of being able to testify and join you today.

Today's hearing is taking place during a very pivotal moment for our society. People from all across—from all ages, racial backgrounds, economic statuses, abilities, and more are coming together to stand up against injustice that are so deeply embedded in our democracy. Whether we're talking about the elevated exposures and health-related discrepancies from pollution, climate change, COVID–19, or police brutality, people are connecting the dots and becoming aware of the disproportionate impacts on people of color, low-income communities, and indigenous populations.

Our country is built upon the historical foundation of separate and unequal. I'll say that again, separate and unequal, and it continues today in the form of sacrifice zones in both the urban and rural context. Plessy v. Ferguson, Brown v. the Board of Education, a number of other actions have attempted to move us forward toward equity and justice, but we continue to fall short. Wealthier white communities have benefited from protection and resources that have allowed them and many of their communities to thrive. Communities of color, lower-wealth communities, and indigenous people have had to deal with the disinvestment and lack of protections that have often left us in a survival mode.

We now find ourselves on the precipice of change, and millions are demanding change. This awakening is correlated with the evolving understanding of the institutional and systemic racism that has played a critical role in the social structures prevalent today. Racial segregation and redlining practices that were backed by government entities have had a long-lasting impact on the concentration of black and brown people. Communities of color were historically disinvested in, which has made them susceptible to the placement of toxic industries that have polluted air, land, and water.

According to published annual estimates on behalf of the EPA's EJSCREEN, African Americans and Latinx communities face significantly higher environmental hazard exposures when compared to the majority of white communities. As a result, these frontline communities suffer from chronic medical conditions, heart, liver, kidney, and lung diseases, as well as cancer. Further, these chronic medical conditions make people more susceptible to the coronavirus and health-related illnesses, including heat exhaustion and stroke.

So let me be clear. We have over 100,000 people who are dying disproportionately from air pollution in our country. We have 24 million people who are suffering from asthma and 7 million kids. And disproportionately, it is African-American and Latinx folks

who are going to the emergency rooms and the ones who are dying prematurely from asthma.

We also know that there is a direct connection, as Ms. Toney shared with folks, between the pollution that people are dealing with in these chronic medical conditions and then being more susceptible to the COVID–19 infections and unfortunately to the loss of life.

We've already discussed the urban heat effects that are going on and understanding that the temperatures inside of these communities are greater. We also need to call out the fact that we have over 500,000 people in our country who are housing-insecure. So whether we are talking about the impacts from extreme heat or their lack of ability to protect themselves from the COVID–19 virus, then we've got work to do.

We also know, as was shared earlier, that there are mental health impacts that are also associated with extreme heat, and those challenges may make it more difficult for people to make the decisions that they might normally make in making choices about navigating these impacts that are happening from COVID–19.

I just want to also highlight for folks that many folks are also being—facing these situations where they are insecure. They are water-insecure, as well as some of these other insecurities that we'll talk about. And that gets to our ability to actually help these people to be in a better place. If we know that folks' water is being turned off but we've sent the message across the country that you need to be able to wash your hands to protect yourself from the COVID–19, then there's something wrong with our process if we're still allowing these types of things to go on and if we don't move past just the moratorium but making sure that people have the security that's necessary. If we know that, we need to make sure that people in an extreme heat event have access to air conditioning. That's the first step in making sure that they can deal with these escalating bills that are going on, but then we have to ask the question about what types of air conditioning are proper to make sure that the right types of ventilation is going on.

That ties also to our schools. Everybody is focused on trying to move our students back to school so that they can get a quality education. We have to address this crumbling infrastructure that is happening in black and brown schools and on indigenous land. And if we're not doing that, then we're creating these additional sacrifice zones. We're continuing to allow this to be the dumping grounds where we put bad policy in place, where we disinvest in communities, and we don't make real change happen.

And I'll just close out with this because I'm so thankful for this bipartisan Committee that is focused on making real change happen. We have opportunities around a just transition and utilizing cleaner forms of energy to lower these emissions that we know are going on in these communities. That's one.

The second one is that we have opportunities around natural infrastructure, whether it is in our tree planting or helping to rebuild our marshes and wetlands and all these other opportunities to create these carbon capture situations.

And then finally, you know, we've had lessons from Roosevelt and others about the CCC (Civilian Conservation Corps). And I

know there's lots of really great conversations that are happening now on the Hill about how do we put these cores back to work to help to rebuild our country but at the same time make sure that equity is really a part of that process so that no one is getting left behind.

So I want to thank you all for taking a bipartisan approach, thinking critically about the actions that are necessary, but also the investments that are going to be critical if we're going to help our most vulnerable communities move from surviving to thriving.

[The statement of Dr. Ali follows:]

Testimony of Mustafa Santiago Ali
Vice President of Environmental Justice, Climate, and Community Revitalization,
the National Wildlife Federation

Before the House Committee on Science, Space, and Technology
Hearing: "*Sweltering in Place: COVID-19, Extreme Heat, and Environmental Justice*"

Tuesday, July 14, 2020

Chairwoman Johnson, Ranking Member Lucas and Members of the Committee, on behalf of the National Wildlife Federation, our 52 state and territorial affiliates, more than 6 million members, and environmental justice communities and advocates around the country, thank you for the honor of testifying before you today.

Today's hearing is taking place during a pivotal moment for our society. People from across all ages, racial backgrounds, economic statuses, abilities, and more, are coming together to stand up against injustices that are so deeply embedded in our democracy. Whether we're talking about the elevated exposure and health-related discrepancies from pollution, climate change, COVID-19, or police brutality—people are connecting the dots and becoming aware of the disproportionate impact on people of color and low-income communities.

Our country is built upon a historical foundation of, "Separate and Unequal" and it continues today in the form of sacrifice zones in both the urban and rural context. *Plessy v. Ferguson* and *Brown v. Board of Education* attempted to move us forward toward equity and justice but we continue to fall short. Wealthier white communities have benefitted from protections and resources that have allowed many of their communities to thrive. Communities of color, lower wealth communities and Indigenous peoples have had to deal with the disinvestment and lack or protections that have often left them in survival mode. We now find ourselves on the precipice of change where millions are demanding change.

This awakening is correlated with the evolving understanding of institutional and systematic racism that has played a critical role in the social structures prevalent today. Racial segregation and redlining practices that were backed by government entities have had a long-lasting impact on the concentration of Black and Brown people. Communities of color were historically disinvested, which made them susceptible to the placement of toxic industries that have polluted air, land, and water. According to published annual estimates on behalf of the EPA's EJSCREEN, African-American and Latinx communities face a significantly higher environmental hazard exposure when compared to majority-White communities.[i]

As a result, these frontline communities suffer from chronic medical conditions: heart, liver, kidney and lung disease, as well as cancers. Further, these chronic medical conditions make

people more susceptible to the coronavirus and heat-related illnesses (including heat exhaustion and strokes).[ii]

Almost 3 million Americans have been infected with the coronavirus and approximately 130,000 have died.[iii] We see these elevated rates of infections and deaths in places that have a long history of serving as pollution dumping grounds, like Trenton, New Jersey, Cancer Alley in Louisiana, and Chicago's south side. African-Americans make up only 13% of the country's population, but they make up almost a third of COVID-19 related deaths. And these numbers continue to rise.

Communities of color across our nation are overburdened by the burning of fossil fuels, which is a significant driver in the climate crisis. That has resulted in a 2 degree (F) increase in global average surface temperatures since the pre-industrial era.[iv] The majority of these fossil fuel facilities are located in lower wealth, communities of color, and on Indigenous lands. Every year we continue to surpass the number of days of record-breaking hot temperatures and as heat waves intensify and increase in frequency, the air in frontline communities becomes stagnant and can better trap emitted pollutants, resulting in an increase of air pollution exposure.[v]

The Urban Heat Island (UHI) effect also exacerbates rising temperatures. On average, temperatures in an urban center can vary between 1.8 – 5.4 degrees (F) warmer than rural areas.[vi] And as our technology continues to evolve to underscore the impact of UHIs, we have significant gaps in monitoring exact temperatures and understanding ways to better mitigate its effects.

Urban areas can present unique challenges with extreme heat, but often the solutions are the same as those in other areas, such as tree cover. For example, Chicago is home to a longstanding urban forestry program that has documented impacts on reducing air pollution and reducing energy bills.[vii] In Fact, the U.S. Forest Service estimates that trees in the Chicago region remove about 18,080 tons of air pollution per year ($137 million/year) and help reduce annual residential energy costs by $44.0 million/year.[viii]

We've seen the detrimental impacts of environmental and climate injustices play out in 1995 when Chicago experienced an intense heat wave over a span of 3 days that killed more than 700 people.[ix] Most of the deaths were among majority-Black and low-income neighborhoods such as Englewood, Fuller Park, and Roseland.

It was also in Chicago where one of the first environmental justice heroes arose—Mrs. Hazel M. Johnson. Mrs. Johnson dedicated her life to uncovering the connection between high cancer rates in Chicago's south side and exposure to toxic pollution sites. She, along with several environmental justice leaders, were instrumental in urging President Clinton to sign the Environmental Justice Executive Order, a foundational directive that made federal agencies responsible for addressing environmental injustices among minority and low-income populations.

COVID-19 will prove to be an obstacle for countless communities that have invested time and resources to develop health action plans to reach and protect vulnerable residents from extreme heat.[x] These plans often include surveillance systems and outreach methods to ensure that

populations that are more susceptible to heat-related health issues are provided with adequate information and resources to ensure their well-being. These systems have shifted to monitor and address COVID-19, which has created a significant gap in the ability of communities to simultaneously address extreme heat. Physical distancing requirements also creates further difficulties when considering health action plans that involve the use of cooling centers. And in most rural communities, these plans and access to cooling centers are largely absent.

To make matters worse, several low-income communities are undergoing energy injustices and don't have the financial means or employment security to keep their utilities on. We've heard from countless community leaders and government officials about utility shutoffs in our virtual Environmental Justice Roundtables that the National Wildlife Federation and other national partners have hosted. Time and again, this energy burden are mainly attributed to the lack of adequate and energy efficient housing.

During my time at the Environmental Protection Agency, we had an active interagency working group that facilitated collaboration and the development of holistic solutions to support frontline communities. Together, we were able to craft forward-thinking policies, which included the implementation of the Emergency Efficiency and Conservation Block Grant Program at the Department of Energy. The program provided $3.2 billion to local governments, Indigenous tribes, and territories to improve energy efficiency, which lowered energy bills and simultaneously reduced carbon emissions.[xi] If reinstated and fully funded, this program could result in an average of 35,000 jobs over the next five years.

Unfortunately, instead of building off the existing programs and working groups, the Trump Administration is taking drastic steps backwards. Even amid the coronavirus pandemic, the Trump administration has diligently weakened U.S. environmental protections, which have significant impacts on climate change and public health. Rollbacks include the Clean Car Rule and standards on mercury and air toxics. Overall, the current administration has rolled back more than 60 environmental regulations and it's instituting an Executive Order to weaken the National Environmental Policy Act.[xii] Each of these current actions overburden vulnerable communities and make them more susceptible to health-related conditions that can be lethal.

These rollbacks play out in neighborhoods like Southwest Detroit where 1.6 million pounds of hazardous pollution is released each year from billowing smokestacks above schoolyards and day care centers, as they live in the shadow of the Marathon refinery. Exposure to these emissions places the residents at a greater risk for the coronavirus and future pandemics. We know this from the recently released Harvard study which highlighted the fact that a small increase in long-term exposure to $PM_{2.5}$ leads to an 8 percent increase in the COVID-19 death rates.

These considerations must factor into the federal government's response to coronavirus and extreme heat, especially as we're now seeing a debate about reopening schools under these alarming circumstances.

When we address climate change and its impacts, such as extreme heat, we have the ability to simultaneously address environmental injustices. If we invest strategically to improve our air,

water, toxic waste cleanup, affordable housing and energy assistance, we could simultaneously create a cleaner and healthier environment for all and help realize the creation of more than 300,000 jobs annually over the next 5 years.[xiii] We can do this through several avenues.

First, we must move forward with a just and equitable transition from fossil fuels and ensure that no one is left behind. By centering communities of color, rural communities, and our most vulnerable in that transition, we will be able to mitigate climate change impacts and ensure fossil-fuel dependent communities have a path forward with sustainable, good-paying jobs. Building new renewable energy is cheaper than running existing coal plants as prices become more affordable every year. By 2025, almost every existing coal plant in the United States will cost more to operate than building replacement wind and solar.

Nearly 335,000 people work in the solar industry and more than 111,000 work in the wind industry, compared to 211,000 working in coal mining or other fossil fuel extraction. Clean energy employment grew 3.6% in 2018, adding 110,000 net new jobs, which accounted for 4.2% of all jobs added nationally in 2018.[xiv]

With the development of this new economy we must ensure that our most vulnerable communities whom have been impacted by fossil fuel pollution, the devastating effects of COVID-19 and climate change, can fully benefit from new job opportunities. When we advance clean energy tax credits and energy efficiency grants, we should be sure to prioritize investment in fossil-fuel dependent communities. Not only would that get the most carbon abatement per federal dollar spent, it would also speed investment to areas needing well-paying jobs and help reverse a toxic pollution legacy.

Second, projects that restore natural systems also create jobs. Restore America's Estuaries reports that coastal restoration "can create more than 30 jobs for each million dollars invested" which is "more than twice as many jobs as the oil and gas and road construction industries combined."

In Louisiana, a proposed $72 million project to restore a 30,000-acre expanse of degraded marsh near downtown New Orleans known as the Central Wetlands Unit would create 689 jobs (280 direct jobs and 400 indirect and induced jobs) over the project's life. Implementation of the entire $25 billion of restoration in Louisiana's Master Plan over the next fifty years would multiply those jobs hundreds of times over. In Florida, restoration of the Everglades will produce more than 442,000 jobs over the next 50 years and almost 23,000 short- to mid-term jobs for the actual restoration work. Restoring the Everglades is also predicted to produce a return of four dollars for each dollar invested.

Restoring our natural resources and expanding outdoor recreation would also help us address the impacts of extreme heat and climate change on vulnerable communities and wildlife. Many wildlife species, including brook trout in the East and various trout (brown, rainbow and native cutthroat and bull trout) and whitefish in West are very susceptible to temperature spikes. Temperature spikes also can cause disease and parasite outbreaks. Four years ago, the Yellowstone River had to be shutdown to fishing because the river warmed resulting in fish die offs. These events are happening more and more frequently, and have a devastating impact on

local businesses and the nearly $800 billion outdoor economy. Beyond just short-term extreme heat events, when we consider the cumulative of impacts of increased air and water temperatures, as well as drought frequency and duration, we're facing the reshuffling of entire communities and wildlife populations.[xv]

Lastly, we must work diligently to reinstate a 21st-century version of the Civilian Conservation Corps.[xvi] The Corps could be an instrumental path forward to both creating jobs and transforming our environment for the benefit of wildlife and people, and it should prioritize inclusion of disadvantaged youth who can be inspired to begin careers in conservation. First institutionalized under President Roosevelt during a time of similar economic insecurity, the Corps was instrumental in planting more than 3 billion trees, building hundreds of parks and wildlife refuges, and completing thousands of miles of trails and roads.[xvii] Today, more than 12,000 species, including wildlife, fish, and plants need conservation. Our forests, parks, and refuges face billions in maintenance backlogs. Strategic investments in natural solutions can mitigate the severity of extreme weather events provoked by climate change. And a recent study found that restoration jobs support 33 jobs per $1 million of investment, which can stimulate our economy and create work force development opportunities.

These are just a few examples of how change can happen when we support community driven solutions that help our people, our planet, and our economies.

The National Wildlife Federation has recently released several helpful resources, including reports on the Protective Value of Nature, Extreme Heat, and our Natural Climate Solutions policy platform, all of which are attached to this testimony.

I look forward to answering your questions, continuing this important conversation, and working with you to develop legislative solutions. Thank you.

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[i] https://rhg.com/research/a-just-green-recovery/

[ii] https://www.cdc.gov/disasters/extremeheat/medical.html#:~:text=They%20may%20be%20taking%20medications,to%20retain%20more%20body%20heat.

[iii] https://www.cdc.gov/coronavirus/2019-ncov/cases-updates/cases-in-us.html

[iv] https://www.cdc.gov/coronavirus/2019-ncov/cases-updates/cases-in-us.html

[v] https://www.ncdc.noaa.gov/news/impact-weather-and-climate-extremes-air-and-water-quality#:~:text=According%20to%20the%20scientists%2C%20heat,in%20increases%20in%20surface%20ozone.&text=One%20type%20of%20cold%20wave%20also%20allows%20air%20pollution%20to%20accumulate.

[vi] https://www.epa.gov/heatislands

[vii] https://www.chicago.gov/city/en/depts/streets/provdrs/forestry/news/2019/april/city-of-chicago-announces-plan-to-plant-nearly-4-500-new-trees-t.html

[viii] https://www.itreetools.org/documents/312/Chicago_Region_rb_nrs84.pdf

[ix] https://www.chicagomag.com/Chicago-Magazine/July-2015/1995-Chicago-heat-wave/

[x] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7255271/

[xi] https://www.americanprogress.org/issues/green/news/2020/06/29/486959/extreme-heat-covid-19-pandemic-amplifies-racial-economic-inequities/

[xii] https://www.nytimes.com/interactive/2020/climate/trump-environment-rollbacks.html?mtrref=undefined&gwh=2A1B0CE283244FDAD1B96D9817E8B0A0&gwt=pay&assetType=REGIWALL

[xiii] https://rhg.com/research/a-just-green-recovery/

[xiv] https://www.forbes.com/sites/energyinnovation/2019/04/22/renewable-energy-job-boom-creating-economic-opportunity-as-coal-industry-slumps/#2ec7c7c43665

[xv] https://e360.yale.edu/features/with-temperatures-rising-can-animals-survive-the-heat-stress#:~:text=A%20growing%20number%20of%20studies,major%20factor%20in%20future%20extinctions.
[xvi] https://www.nytimes.com/2020/05/18/opinion/coronavirus-unemployment-youth.html
[xvii] https://www.nytimes.com/2020/05/18/opinion/coronavirus-unemployment-youth.html

Mustafa Santiago Ali

Vice President of Environmental Justice, Climate, and Community Revitalization

National Advocacy Center // Washington, D.C.

A renowned thought leader, international speaker, policy maker, community liaison, trainer, and facilitator, Dr. Mustafa Santiago Ali serves as the Vice President of Environmental Justice, Climate, and Community Revitalization for the National Wildlife Federation. He is also the founder of Revitalization Strategies, a business focused on moving our most vulnerable communities from "surviving to thriving."

Before joining the National Wildlife Federation, Mustafa was the senior vice president for the Hip Hop Caucus, a national non-profit and non-partisan organization that connects the hip-hop community to the civic process to build power and create positive change. In his role, he led the strategic direction, expansion, and operation of the Hip Hop Caucus' portfolio on climate, environmental justice, and community revitalization.

Prior to joining the Hip Hop Caucus, Mustafa worked for 24 years at the U.S. Environmental Protection Agency (EPA). He began working on social justice issues at the age of 16 and joined the EPA as a student, becoming a founding member of the EPA's Office of Environmental Justice (OEJ). He most recently served as senior advisor for environmental justice and community revitalization and assistant associate administrator, working to elevate environmental justice issues and strengthening environmental justice policies, programs, and initiatives. Mustafa worked for EPA administrators beginning with William Riley and ending with Scott Pruitt.

Mustafa uses a holistic approach to revitalizing vulnerable communities, and has worked with more than 500 domestic and international communities to secure environmental, health, and economic justice. Throughout his career, Mustafa has conducted more than 1,000 presentations across the country, including speeches, training, and guest lectures at over 100 colleges and universities. He is a former instructor at West Virginia University and Stanford University.

Mustafa currently serves as a board member for Robert Wood Johnson Foundation, Union of Concerned Scientists, Rodenberry Foundation, TREE, and Climate Hawks Vote. He is frequently seen on television, including appearances on MSNBC, CNN, VICE, BET, *Full Frontal with Samantha Bee,* and *Democracy NOW!* Mustafa is also a regular guest on WURD radio, *Roland Martin Unfiltered*, *The Dean Obeidallah Show,* and many others, and is the former co-host of the live radio show and podcast *Think 100%: The Coolest Show on Climate Change* with Grammy-nominated singer and actress Antonique Smith and civil rights icon Rev Lennox Yearwood.

Chairwoman JOHNSON. Thank you very much, Dr. Ali. Mr. Corbin-Mark? You're muted.

TESTIMONY OF CECIL CORBIN-MARK,
DEPUTY DIRECTOR, WE ACT FOR ENVIRONMENTAL JUSTICE

Mr. CORBIN-MARK. Sorry. Sorry very much. Sorry. I'll start over.

Good afternoon, and thank you, Chairwoman Johnson and Ranking Member Lucas and all of the Members of the Committee, for the invitation to testify before you. My name is Cecil Corbin-Mark, and I'm the Deputy Director of WE ACT for Environmental Justice. We are a 32-year-old environmental justice organization with 1,000 dues-paying members primarily located in the 15th Congressional District. We have offices in Harlem and in Washington, DC, where we anchor a nationwide environmental justice coalition called the Environmental Justice Forum that focuses on climate policy, energy policy, and other matters of concern to the EJ movement.

WE ACT's mission is to build healthy communities by ensuring that people of color and communities of low-income residents participate meaningfully in the creation of sound and fair environmental health and protection policies and practices. And WE ACT envisions a community that has informed and engaged residents who participate fully in decisionmaking on key issues that impact their health and community, strong and equal environmental protections, and increased environmental health through community-based participatory research and evidence-based campaigns.

Let me start off by saying that climate change is here today. It is threatening our health now, and if felt—and if left unchecked will lead to increases in both illnesses and deaths. Immediate action can and must be taken to both mitigate the effects of climate change over time and adapt our communities in ways that reduce the health impacts now so that our communities can be further protected.

WE ACT for Environmental Justice strongly supports measures to reduce carbon pollution and other greenhouse gas emissions from all sectors, including energy production, transportation, health care, forestry, agriculture, and the like.

In addition to mitigating efforts [inaudible] WE ACT believes it's critical for the Federal Government to provide technical assistance, tools, and resources to help States, cities, and rural communities, territories, and tribes prepare for and protect their communities from the health impacts of climate change.

We've seen through the Fourth National Climate Assessment completed in 2018 that details the health impacts of climate change in the United States and says the health and well-being of Americans are already affected by climate change with adverse health consequences projected only to worsen with additional climate change. Climate change affects human health by altering exposures to heat waves, for example, one of the key subjects of this Committee's hearing today, as well as air pollution, a critical issue that WE ACT has focused on for at least three decades.

I want to just focus and move to extreme heat. Exposure to extreme heat kills more people in the United States and particularly black and brown people in the United States at higher rates than any other weather-related threat, and extreme heat events are on

the rise. By 2050, one estimate predicts approximately 3,400 more premature deaths each year in the United States due to extreme heat, and the burden of heat-related illness and the death—and disproportionate death—sorry, and disproportionate death affects climate-sensitive populations like pregnant women, the young, and the old, and the chronically ill, as well as people of color and low-income families and outdoor workers.

Just one heatwave event can cost $179 million in hospitalizations, emergency department encounters, and outpatient visits. Extreme heat events can trigger a variety of other heat-related conditions and severe dehydration to heatstroke. High-heat conditions can also exacerbate cardiovascular and respiratory disorders, resulting in hospitalization and even premature death. Also, extreme heat is linked to increased aggression and more suicides in some studies.

The built environment plays a critical role in the severity of heat-related events because of the urban heat island effect. Climate change can worsen heat effects due to less reflective impervious surfaces, which make urban settings more deadly than vegetative rural communities. This issue of land use needs to be more actively addressed as the climate warms, and adaptation also requires considerable emergency planning and risk communications to inform the public, identify people most at risk, and respond with proactive measures to get people out of the heat.

This requires a range of community tools such as cooling centers, water distribution, fan, wind, air conditioning unit distribution, and even relocation in some instances. Battling heat-related health threats requires considerable amounts of resources. As extreme heat events become more frequent and intense, key health effects will worsen and health costs will rise to us, and we will lose more lives.

However, some interventions are really worth it, and I urge the Committee to really in a bipartisan way advance on key issues in supporting things like the expansion of the HEAP program, the Home Energy Assistance Program, as well as creating more program for WAP, the Weather Assistance—Weatherization Assistance Program. These—in particular, the last program has real opportunity to move beyond some of the structural impediments that have traditionally allowed communities in our EJ areas to be left behind in terms of the advancement of both energy and reduce the energy burden that those communities currently exist with.

Energy insecurity is a significantly serious issue for many of our communities, and it really is the focus—its focus—sorry [inaudible] is about really looking at the interplay between physical conditions, housing, household energy expenditures, energy-related coping—and energy-related coping strategies. The—there are a lot of studies that have been done to really show that if we deal with energy insecurity, we can help lift certain communities out of the energy poverty and insecurity that they are experiencing.

One of the things that we at WE ACT really try to advance and support is the idea that, as we move forth with dealing with just how we respond in terms of mitigation to heat-related events, that we really need to tackle the structural underpinnings that have really created some of the challenges for our communities not to be

able to fend for themselves, and energy insecurity is certainly at the heart of that. Dealing with how we weatherize our households is critical so that the legacy of redlining, the legacy of disinvestment in particular communities that has so adversely affected particularly African Americans but also other people of color, as well as indigenous peoples, is a significant—is a critical effort that must be undertaken as quickly as possible.

I will, with that, just yield my time and say that the expansion of the HEAP program so that it can allow for the payment of air conditioner utility bills is critical to be able to help provide comfort and aid to some of our communities. And this is not just a luxury issue of having an air conditioner at this particular point in time. This is literally an issue of life and death. As extreme heat continues to be a problem for communities of color across this country, this is not a luxury. This is really about public health and making sure that people aren't dying.

But beyond the issue of dealing with just providing air conditioners in the short term, one of the things that we have to do is address the structural issues with housing that have led to the inefficiency of those homes, creating a higher level of energy burden for communities of color as they spend more and more of their income to pay their utility bills.

And so doing the issue—advancing the issue of further funding the Weatherization Assistance Program is a critical necessity for these communities to help them move beyond the challenges that they are experiencing at this particular point in time and to really address the structurally racist way in which housing has sort of moved forth in this country over time.

I'll stop there and say thank you for your time. I've submitted my testimony, which is long.

[The statement of Mr. Corbin-Mark follows:]

Testimony of Cecil D. Corbin-Mark Deputy Director of WE ACT for Environmental Justice Before Subcommittee on Environment of the House Science, Space, and Technology Committee

Tuesday, July 14, 2020

Good afternoon and thank you for the invitation to testify before this committee. My name is Cecil Corbin-Mark and I am the Deputy Director of WE ACT for Environmental Justice (WE ACT). We are a 32-year old environmental justice organization with 1000 dues paying members primarily located in the 15th Congressional District. We have offices in Harlem and Washington, DC. WE ACT's mission is to build healthy communities by ensuring that people of color and/or low-income residents participate meaningfully in the creation of sound and fair environmental health and protection policies and practices. WE ACT envisions a community that has:

informed and engaged residents who participate fully in decision-making on key issues that impact their health and community.

strong and equal environmental protections.

increased environmental health through community-based participatory research and evidence-based campaigns.

Climate change poses risks to human health

Climate change is here today, it is threatening our health now, and, if left unchecked, will lead to increases in both illnesses and deaths. Immediate action can and must be taken to both mitigate the effects of climate change over time and adapt our communities in ways that reduce the health impacts now to protect our health. WE ACT for Environmental Justice strongly supports measures to reduce carbon pollution and other greenhouse gas emissions from all sectors, including energy production, transportation, health care, forestry, and agriculture.1 In addition to mitigation efforts, WE ACT believes it is critical that the federal government provide technical assistance, tools and resources to help states, cities and rural communities, territories, and tribes prepare for and protect their communities from the health impacts of climate change.

The fourth National Climate Assessment, which was completed in 2018, details the health impacts of climate change in the United States and says "The health and well-being of Americans are already affected by climate change, with the adverse health consequences projected to worsen with additional climate change. Climate change affects human health by altering exposures to heat waves, floods, droughts, and other extreme events; vector-borne, food-borne and water-borne infectious diseases; changes in the quality and safety of air, food, and water; and stresses to mental health and well-being." In October 2018, the United Nations Intergovernmental Panel on Climate Change released their latest conclusions, underlining the impact of climate change on the world now and in the future.2 The report confirms that actions underway now will not be enough to protect against the ongoing and growing risk to public health: more, stronger, faster steps must be taken to further limit warming to below 1.5o C. The Intergovernmental Panel on Climate Change provided strong recommendations of more aggressive actions needed to reduce greenhouse gas emissions and increase the use of clean, renewable energy sources. According to the fifth assessment report from the IPCC, warming of the earth over the past century is "unequivocal" and is "unprecedented over decades to millennia.

The most recent National Climate Assessment conducted by the U.S. Global Change Research Program highlights the fact that recent years have seen "record-breaking, climate-related weather extremes, and the last three years have been the warmest years on record for the globe. These trends are expected to continue..." 4 The long-term threat of climate change to health is both serious and urgent, and the IPCC special report, the IPCC fifth assessment, the fourth National Climate Assessment, and other scientific documents demonstrate convincingly that greenhouse gas emissions, due to human activity, are primarily responsible for this threat

Climate change poses many risks to human health. Some health impacts of climate change are already being felt in the United States, including those linked to:

Extreme Heat

Exposure to extreme heat kills more people in the U.S. than any other weather-related threat, and extreme heat events are on the rise. By 2050, one estimate predicts approximately 3,400 more premature deaths each year in the U.S. due to extreme heat.9 The burden of heat-related illness and death disproportionately affects climate-sensitive populations like pregnant women, the young and old, the chronically ill, people of color, low-income families, and outdoor workers.8 Just one heat wave event can cost $179 million in hospitalizations, emergency department encounters, and outpatient visits. Extreme heat events can trigger a variety of other heat-related conditions, from severe dehydration, to heat stroke. High heat conditions can also exacerbate cardiovascular and respiratory disorders, resulting in hospitalization and even premature death. Also, extreme heat is linked to increased aggression, raising the number of assaults, murders, and suicides. The built environment plays a role in the severity of heat-related events because of the urban heat island effect. Climate change can worsen heat effects due to less-reflective, impervious surfaces, which make urban settings more deadly than vegetative, rural communities.13 This issue of land use needs to be more actively addressed as the planet warms. Adaptation also requires considerable emergency planning and risk communications to inform the public, identify people most at risk, and respond with proactive measures to get people out of the heat. This requires a range of community tools such as cooling centers, water distribution, fan and air-conditioning unit distribution, and even relocation of at-risk people. Battling heat-related health threats requires considerable amounts of funding. As extreme heat events become more frequent and intense, health effects will worsen, and health care costs will rise. However, some public health interventions are well worth the investment because they are so cost-effective. For example, Ebi et al. reported that the cost of running a heat–health warning system for Philadelphia was relatively small ($210,000) compared with the benefits of saving 117 lives ($468 million) over the three-year period of 1995–1998.

Air Quality

Air quality is another key issue that WE ACT has worked on for the past three decades because of its impact on environmental justice communities. Climate change affects human health by increasing ground-level ozone and particulate matter air pollution. Ground-level ozone, a key component of smog, is associated with many health problems, including reduced lung function. Air pollution increases the risk of health complications from cardiovascular disease and respiratory conditions like asthma and chronic obstructive pulmonary disease.

Increased carbon dioxide also causes increased pollen potency, leading to a longer and more intense allergy season. Asthma attacks are a major cause of school absenteeism, and, therefore, climate change

has an indirect impact on children's education. This is especially troubling considering the fact that educational attainment is strongly link to improved health.

The cheapest way to reduce the health impact from air pollution is to address the factors that cause it. Major causes of air pollution include the burning of fossil fuels, power plant emissions, and automobile exhausts. Minimizing damage from air pollution is an important step to reduce health impacts and health care costs. It is critical to engage with federal, state, and local officials, planners, and local organizations to better educate residents on air quality and develop community design solutions to improve air quality.

Given the challenge we have a number of suggested policy reforms that can be found in our Heat Health and Equity Policy Platform which can be found here.

Thank you for your time and attention and I am happy to answer any questions.

Cecil Corbin-Mark is WE ACT for Environmental Justice's (WE ACT) Deputy Director and Director of Policy Initiatives. He holds a BA from Hunter College in Political Science and a M. Phil. in International Relations from Oxford University in England. Prior to joining WE ACT, Cecil worked for the following: the Bronx County District Attorney, NYS Justice Hon. W. T. Martin, the Mellon Minority Scholars Program and the NY Public Library.

He currently serves on the following boards: Center for Environmental Health, Clean and Healthy New York, the Louis E. Burnham Fund, the West Harlem Development Corporation, and Friends of the Earth USA. He was the recipient of the 2010 Earth Day New York Award and the 2018 Marshall England Memorial Public Health Award.

Cecil is a father, a pilot and lives in the Hamilton Heights section of West Harlem in NYC, his family's home for almost 90 years. He comes from a family that was actively engaged in the Civil Rights movement. His great uncle and aunt Louis E., and Dorothy Burnham moved from Harlem to Birmingham, AL to launch the Southern Negro Youth Congress and his cousin represented professor and Civil Rights activist, Angela Y. Davis, in her trial for kidnapping, murder and conspiracy.

Chairwoman JOHNSON. Thank you, Mr. Corbin-Mark.
We will have our final witness now, Mr. Kelley.

TESTIMONY OF HILTON KELLEY,
FOUNDER AND DIRECTOR OF THE COMMUNITY IN-POWER AND DEVELOPMENT ASSOCIATION INC.

Mr. KELLEY. Good afternoon, Chairwoman Johnson, Ranking Member Lucas, and Members of the House Committee on Science, Space, and Technology. My name is Hilton Kelley, Founder and Director of the Community In-Power and Development Association located here in Port Arthur, Texas, also known as CIDA Inc. I'm also a member of the Environmental Justice Leadership Forum. The EJ Forum is a national coalition of nearly 60 environmental justice advocacy experts working to eliminate environmental injustice through technical assistance, capacity-building, and policy solutions.

I would like to start by saying I sincerely appreciate this opportunity to speak before you and this body today, and I hope that in some way I can shed some light on the social and environmental impact issues which millions of Americans are dealing with on a daily basis, which position them to be more susceptible to the coronavirus and other issues which come with chronic flooding and climate change and the disproportionate exposures to pollution.

As stated, my name is Hilton Kelley. I live in the city of Port Arthur, Texas, on the Gulf Coast. Port Arthur, Texas, is also home to a large number of refineries, chemical plants, and other petrochemical industries like Veolia, a chemical incineration facility; Oxbow Calcining petrochemical coke facility which dumped tons of sulfur dioxide into the air every day.

It would be fair to say that out of all four of the oil refineries with Motiva being the largest, producing 633,000 barrels of oil per day and the five chemical plants, Oxbow Calcining dumps more sulfur dioxide than all of them combined. Oxbow Calcining pumps out 98 percent of the SO_2 which is emitted into our air, and they refuse to put in the necessary scrubbers to help protect human health and/or the environment. Only 2 percent of the sulfur dioxide is emitted from the four oil refineries and five chemical plants combined.

When we speak of emissions issues, refineries and chemical plants many times is due to the power failure, malfunction, fugitive emissions, and startup and shutdown procedures with the processing units that they dump out the most pollution, which engulf our communities with strong, pungent chemical odors, soot, and smoke. And on occasions there has been fuel tank explosions and process unit explosions like the one in Nederland, Texas, in November 2019, a day before Thanksgiving. Many homes were damaged, and hundreds were evacuated to safer areas.

After the explosion, it was discovered the large amounts of 1,3-butadiene, which is a known carcinogen, was being released into the air unchecked due to the fact the processing unit was no longer there. Because of the large explosion, this issue is still ongoing, and yes, to be—has yet to be settled almost a year or so later.

In 2017, shortly after Hurricane Harvey hit the Port Arthur area, Houston and Beaumont, Texas, area, and all areas in be-

tween, many of the refineries and chemical plants had to go into shutdown mode and was unable to operate due to flooding on their grounds. And then the shutdown procedure is in effect. There's a lot of flaring which takes place because of the material in the pipelines that must be burned, thus creating more pollution. And oftentimes, things happen during the flood, which is out of the facility's control like the tank explosion at the Valero oil refinery, which took a few days to burn itself out. But in either case, the workers at the plant, the community, and the environment suffer.

Historically, African-American people of color have been forced to live in heavily industrialized low-lying areas due to housing discrimination on a Federal, State, and local level. And it is because of this historic fact that we are plagued with pre-existing conditions like hypertension, liver and kidney disease, acute asthma, bronchitis, COPD (chronic obstructive pulmonary disease), et cetera. It's been discovered by our medical and healthcare experts that in the wake of COVID–19, those who suffer from the pre-existing conditions mentioned earlier are more susceptible to being infected with COVID–19 than others. And it has been proven so.

Due to the disproportionate of large number of African-Americans' death with pre-existing conditions which have taken place across our country as we move forward and further into the 2020 summer, it is also understood by our weather experts that we are going to experience high heat temperatures ranging from 98 to 104 degrees. These high temperatures will further exacerbate the health conditions of those with pre-existing conditions, rendering them more susceptible to the known virus, COVID–19.

As we get further into the summer of 2020 and closer to the peak of hurricane season, hurricanes are expected due to the patterns which have been created within the last 15 years. Hurricane Katrina, Hurricane Rita in 2005, Hurricane Gustav and Ike in 2008, Hurricane Sandy in 2012, Hurricane Gonzalez in 2014, and, fast-forward, Hurricane Harvey in 2017, which brought in record-breaking flooding throughout southeast Texas, leaving 80 percent of the Port Arthur, Texas, area inundated with water.

Also due to the shutdown procedures of the petrochemical facilities, we saw a 15,000 percent spike in the release of known carcinogens. On a personal level, my home was also flooded with 3 feet of water throughout the whole interior, and because of the heat, mold, and destruction of my home, it was deemed uninhabitable and required major construction repairs. And we had no choice but to live with relatives until we were able to obtain a FEMA (Federal Emergency Management Agency) mobile home, which we were successful in doing. And we stayed there for a year while our home was being repaired.

Many people were not as fortunate as myself. Many of the elderly and poor had to live in their damaged homes due to the fact that they did not qualify for FEMA assistance, and to live inside of a moldy, humid structure means certain respiratory illnesses for the inhabitants.

High floodwaters on the Gulf Coast has become a chronic problem over the years, so much so that many are elevating their homes in the neighborhoods where once considered a high ground area, no flood zone, which are now flooding. I have taken it upon

myself and my organization to do what we can to assist my community and others with learning to fight climate change and chronic flooding to help sustain our communities, neighborhoods, and culture by joining up with the Anthropocene Alliance/higher ground national network, which helped chronic flooding communities find experts and resources to help keep their communities strong and find new ways to coexist with our forever-changing climate. And we are growing in numbers as more and more further inland communities begin to flood. We flood and we vote is to be noted.

I would like to end my testimony by asking our—by a few asks. I would like to ask for our low-income people of color, disenfranchised communities, are in need of strong Federal science and the study of cumulative impacts of various chemicals emitted by large polluting refineries and chemical plants and other large polluting industries in the Port Arthur, Texas, Jefferson County area and Hardin County area. We are also in the need of strong Federal study on emitted chemicals when they impact our health on the human body and strong Federal studies on regulation and the possible impacts of deregulation of polluting industries in vulnerable people of color communities.

On the last page of my testimony you will find a list of chemicals emitted into our air in large quantities over the last 5 years, and some of those chemicals are known carcinogens. The measure of those chemicals is in pounds and tons per year. The source of this information is also noted.

I would like to give my sincere thanks and appreciation for your attention and time. And with all due respect, I welcome any questions at this point.

[The statement of Mr. Kelley follows:]

Congress of the United States
House of Representatives
Committee on Science, Space and Technology
Hearing Testimony July 14th 2020

Testimony by: "Hilton Kelley"
Founder & Director of the
Community In-power & Development Association Inc.

Good afternoon Chairwomen Johnson, Ranking member Lucas and members of the House Committee on Science, Space and Technology

My name is Hilton Kelley Founder and Director of the Community In-power & Development Association Inc, also known as C.I.D.A Inc. I am also members of the "Environmental Justice Leadership Forum. The EJ forum is a national coalition of nearly 6o environmental justice advocates and experts working to eliminate environmental injustice through technical assistance, capacity building and policy solutions.

I would like to start by saying, I sincerely appreciate this opportunity to speak before this body today and I hope that in some way I can shed some light on the Social and environmental impact issues which millions of Americans are dealing with on a daily base, which position them to be more susceptible to the Coronavirus and other issues which come with chronic flooding and climate change and the disproportionate exposure to pollution.

As stated, my name is "Hilton Kelley", I live in the city of Port Arthur Texas on the Gulf coast, Port Arthur Texas is also home to a large number of Refineries, Chemical plants and other petrochemical industries like Veolia chemical incineration facilities and Oxbow Calcining petroleum coke facility which dumps tons of Sulfur dioxide into the air ever day. It would be fair to say that out of all four of the oil refineries with Motiva being the largest producing 633,000 barrels of oil per day and the five chemical plants, Oxbow Calcining dumps more SO2 than all of them combined, Oxbow Calcining pumps out 98% of the SO2 which is emitted into our air everyday and they refuse to put in the necessary scrubbers to help protect human health and or the environment. Only 2% of the Sulfur Dioxide is emitted from the four oil refineries and five chemical plants combined.

When we speak of emission issues from refineries and Chemical plants many time it's due to power failures, Malfunctions, fugitive emission or start up and shut downs of they're processing united and during these time our communities are engulfed with strong pungent chemical odors, soot and smoke and on occasion there has been fuel tank explosions and process unit explosions like the one in Nederland Texas in November 2019 a day before Thanks Giving, many homes were damage and hundreds were evacuated to safer areas. After the explosion it was discovered that large amounts of 1-3 butadiene which is a known carcinogen was being released into the air unchecked due to the fact the processing unit was no longer there,

because of the large explosion this issue is still on going and has yet to be settled almost a year later.

In 2017 shortly after hurricane Harvey hit the Port Arthur Texas, Houston Texas, Beaumont Texas and all areas in between, many of the refineries and Chemical plants had to go into shutdown mode and was unable to operate due to flooding on they're grounds and when the shutdown procedure is in effect there's a lot of flaring which takes place because the material in the pipeline must be burned thus creating more pollution and often time things happen during a flood which is out of the facilities control like the tank explosion at the Valero oil refinery which took a few days to burn itself out, but in either case the workers at the plant, the community and the environment suffers.

Historically African Americans, People of color have been forced the live in heavily industrialized and lowland areas due to housing discrimination on a federal, state and local level and it is because of this historic fact that we are pledge with preexisting condition like Hyper tension, liver and kidney disease, acute asthma, bronchitis, COPD etc.

It has been discovered by our medical and healthcare experts that in the wake of COVID-19 those who suffer from the preexisting conditions mentioned earlier are more susceptible to being infected with COVID-19 than others and it has been proven so, due to the disproportionate large number of African American deaths with preexisting conditions which have taken place across our country. As we move further into the 2020 summer it is also understood by our weather experts that we're going to experience high heat temperature ranging from 98 to 104 degrees these high temperatures will further exacerbate the health conditions of those with preexisting condition rendering them more susceptible to the known Virus COVID-19.

As we get further into the summer of 2020 and closer to the peak of hurricane season hurricanes are expected due to the pattern which have been created within the last 15 years Hurricane Katrina and Rita in 2005, hurricane Gustav and Ike in 2008, Hurricane Sandy in 2012, Hurricane Gonzalo 2014 and fast forward Hurricane Harvey in 2017 which brought with-it record-breaking flooding throughout Southeast Texas leaving 80% of the Port Arthur Texas area inundated with water also due to the shutdown procedures of the petrochemical facilities we saw a 15,000 % spike in the release of known carcinogens. by On a personal level my home was flooded with three feet of water throughout the interior and because of the heat, mold and destruction to our home it was deemed uninhabitable and required major construction repairs and we had no choice but to live with relatives until we were able to obtain a FEMA mobile home which we were successful in doing and we stayed there for a year while we repaired our home.

Many people were not as fortunate as myself, many of the elderly and poor had to live in they're damage homes due to the fact they did not qualify for FEMA assistance and to live inside and moldy humid structure means certain Respiratory illness for the inhabitant.

High Flood waters on the Gulf coast has become a chronic problem over the years, so much so that many are elevating they're homes in neighborhood where once considered a high ground area no flood zone which are now flooding.

I have taken it upon myself to do what I can to assist my community and others with learning to fight climate change and chronic flooding to help sustain our communities, neighborhood and culture by joining up with Anthropocene Alliance / higher ground national network which help chronic flooding communities find experts and resource to help keep they're community strong and find new ways to co-exist with our forever changing climate and we are growing in number as more and more communities further inland began to flood. We Flood and we Vote is to be noted.

I would like to end my testimony with an ask: our low income people of color disenfranchised communities are in need of strong federal science in the study of cumulative impacts of various chemicals emitted by large polluting refineries and chemical plants and other large polluting industries in the Port Arthur Texas Jefferson county area and Hardin county areas in Texas and other states.
We are also in need of a strong federal study on emitted chemicals health impacts on the human body and a strong federal study on regulation and the possible impacts of deregulation of polluting industries in vulnerable people of color communities.

On the last page of my testimony you will find a list of chemicals emitted into our air in large quantities over the last five years and some of those chemicals are known carcinogens, the measure of those chemicals is in pounds and tons per year. The source of the information is also noted.

I would like to give my sincere thanks and appreciation for your attention and time and with all due respect I welcome any questions at this time.

Toxic Release Inventory – TRI – Report 2014-2018

Jefferson Co.	Total CARCINOGENIC Air Releases in LBS per year					
Row Labels	**2014**	**2015**	**2016**	**2017**	**2018**	**Grand Total**
TOTAL CARCINOGENIC RELEASES	**10,595**	**35,277**	**39,914**	**58,491**	**28,058**	**172,335**
1 3-BUTADIENE	14	22	495	3,575	3	**4,109**
BENZENE	10,276	34,562	37,598	54,406	13,630	**150,472**
BENZO(G H I)PERYLENE	-	-	2	3		**6**
COBALT COMPOUNDS	-	-	990			**990**
CUMENE					1,022	**1,022**
DIOXIN AND DIOXIN-LIKE COMPOUNDS					0	**0**
ETHYLBENZENE					11,806	**11,806**
NAPHTHALENE					1,425	**1,425**
NICKEL COMPOUNDS					55	**55**
POLYCYCLIC AROMATIC COMPOUNDS	41	66	102	100	3	**312**
STYRENE	264	627	726	407	114	**2,138**
TETRACHLOROETHYLENE	-	-	-	-		**-**
Total releases (including non-carcinogenic)	**776,153**	**2,067,747**	**1,770,778**	**4,769,674**	**669,615**	**10,053,967**

Port Arthur	Total CARCINOGENIC Air Releases in LBS per year					
Row Labels	**2014**	**2015**	**2016**	**2017**	**2018**	**Grand Total**
TOTAL CARCINOGENIC RELEASES	**10,595**	**33,407**	**33,796**	**52,759**	**27,863**	**158,421**
1 3-BUTADIENE	14	22	495	3,575	3	**4,109**
BENZENE	10,276	32,692	31,482	48,675	13,482	**136,607**
BENZO(G H I)PERYLENE	-	-	2	3		**6**
COBALT COMPOUNDS	-	-	990			**990**
CUMENE					1,022	**1,022**
DIOXIN AND DIOXIN-LIKE COMPOUNDS					0	**0**
ETHYLBENZENE					11,760	**11,760**
NAPHTHALENE					1,425	**1,425**
NICKEL COMPOUNDS					55	**55**
POLYCYCLIC AROMATIC COMPOUNDS	41	66	101	99	2	**310**
STYRENE	264	627	726	407	114	**2,138**
TETRACHLOROETHYLENE	-	-	-	-		**-**
Total releases (including non-carcinogenic)	**776,153**	**2,058,760**	**1,741,660**	**4,730,986**	**666,783**	**9,974,341**

National Ambient Air Quality Standards – NAAQS – TCEQ: Report 2014-2018

Jefferson Co.	Total Releases in Tons per Year					
Values	**2014**	**2015**	**2016**	**2017**	**2018**	**Grand Total**
Sulfur Dioxide - *SO2*	13,291.56	12,054.62	13,467.74	13,848.71	13,951.41	**66,614.04**
Lead – *Pb*	0.40	0.37	0.54	0.47	0.47	**2.24**
Particulate Matter - *PM10*	2,384.07	2,405.45	2,494.11	2,491.09	2,611.34	**12,386.06**
Particulate Matter - *PM2.5*	1,996.87	2,058.79	2,129.68	2,124.84	2,215.10	**10,525.28**
Carbon Monoxide - *CO*	5,045.33	5,204.94	6,314.96	6,520.74	6,746.72	**29,832.69**
Nitrogen Oxides - *NOX*	10,690.96	10,125.96	10,395.75	10,100.58	10,087.03	**51,400.27**
Volatile Organic Compound - *VOC*	7,736.72	7,829.21	7,840.57	7,448.87	7,464.94	**38,320.31**

Port Arthur	Total Releases in Tons per Year					
Values	**2014**	**2015**	**2016**	**2017**	**2018**	**Grand Total**
Sulfur Dioxide - *SO2*	12,220.98	10,935.14	12,266.46	12,599.31	12,723.35	**60,745.24**
Lead – *Pb*	0.30	0.26	0.43	0.36	0.36	**1.69**
Particulate Matter - *PM10*	1,425.83	1,424.31	1,473.49	1,462.45	1,598.86	**7,384.95**
Particulate Matter - *PM2.5*	1,243.09	1,273.90	1,307.23	1,279.65	1,362.58	**6,466.46**
Carbon Monoxide - *CO*	2,179.36	2,549.40	2,869.83	2,950.21	2,982.56	**13,531.36**
Nitrogen Oxides - *NOX*	6,021.75	5,944.74	6,176.14	6,070.63	6,113.58	**30,326.84**
Volatile Organic Compound - *VOC*	2,948.15	3,147.59	3,332.19	3,535.14	3,539.86	**16,502.93**

Cancer, Respiratory and other Health Disparities

A 2017 report from the NAACP pointed to Texas Cancer Registry data showing that **Black** people in Jefferson County, which includes Port Arthur, had **cancer rates 15 % higher** than average **Texans**; the **cancer mortality rate** for these Black residents was **nearly 40 percent higher** than the state average.[1]

- One 2010 study[2] found that **Port Arthur residents** were **more than 4 times more likely to suffer from heart problems, respiratory issues, skin and nervous system disorders**, head- and muscle aches and ear nose and throat problems.
- A 2001 study discovered that **more than 80 %** of residents of Port Arthur's predominantly **Black West Side suffered heart and lung ailments.**

Hurricane Harvey Accelerated Carcinogenic Emissions Rate

Below the data for the carcinogenic emissions related to Hurricane Harvey. The figures below are for the Golden Triangle in the period from Aug 27 – Sept 19 for both years. This period reflects the emissions from incidents, facility shut-downs and start-ups, related to Hurricane Harvey.

In 2017, the 24 days during and immediately after Harvey the **carcinogenic emissions** were 157 times higher than the same period the year prior. During this 24-day period, the **TCEQ reports emissions every single day** in 2017. If you were to **spread** the emissions **out evenly** over those 24 days, **we were exposed to over 400 LBS of carcinogens daily**.

	Golden Triangle CARCINOGENIC RELEASE IN LBS AUG 27 – Sept 19, 2017		
Year	**1,3-BUTADIENE**	**Benzene**	**Grand Total**
2016	9.05	52.67	61.72
2017	9,329.25	357.28	9,686.53

Source: TCEQ Air Emission Events Report
http://www2.tceq.texas.gov/oce/eer/

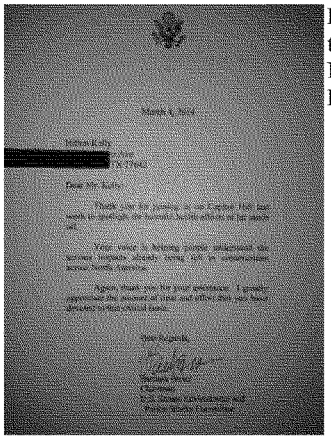
[1] https://www.vice.com/en_us/article/3a8nk3/sentenced-to-death-what-its-like-living-in-a-cancer-plagued-oil-town
[2] https://www.ncbi.nlm.nih.gov/pubmed/16121907

Hilton Kelley's Bio 2015 update

Hilton Kelley, *Founder and CEO, Community In-power & Development Association Inc. (CIDA)*

Hilton Kelley is a leading figure in the battle for environmental justice on the Texas Gulf Coast, as he fights for communities living in the shadow of polluting industries. Mr. Kelley is originally from and currently lives in the refinery and chemical manufacturing town of Port Arthur, Texas. In addition to being a community organizer, Mr. Kelley is an electrician and former second class petty officer in the U.S. Navy. After the Navy, Mr. Kelley remained in California where he worked as a youth activist and was recognized for his youth anti-gang violence efforts and acting ability. He was admitted to the Screen Actors Guild in 1991. Mr. Kelley moved back to Port Arthur in order to help rebuild and save the community from which he came. Pollution, neglect, and deep despair had taken a heavy toll on Port Arthur. In response, Mr. Kelley organized CIDA and began to challenge the regulatory agencies and their policies, and the environmental violations of the plants that loom over the community. CIDA collects scientific data about the sources, types, and amounts of pollution emitted by polluting neighbors and educates residents of Port Arthur (who are overwhelmingly low-income individuals and people of color) about the toxic burden they shoulder.

Mr. Kelley has testified before the Texas legislature and the U.S. Senate, addressed UNESCO in Paris, as recent as March 2014 Mr. Kelley was invited by Senator Barbara Boxer to capital hill to help shine a spotlight on the harmful nature of tar sands crude oil on vulnerable communities at a national press conference, he was also invited to the White House to meet with President Obama to share his views on the environmental state of the U.S. He received the 2003 Environmental Justice Award from the Sierra Club Lone Star Chapter, the 2004 Ben & Jerry Award for Environmental Activism, and the North America 2011 Goldman Environmental Prize winner. Mr. Kelley served on the National Environmental Justice Advisory Council (NEJAC) to EPA from 2009-2011 he also served as vice chairmen of the "Regional Health Equity Council" from 2011-2013 Mr. Kelley is presently serving as a Regional Health Equity Council member still, Locally in his home town he is a member of the Pipeline committee and a National Partnership for Action (NPA) member. Mr. Kelley's work in his community continues.



Chairwoman JOHNSON. Thank you very much. That concludes the witnesses' testimony, so at this point we will begin our first round of questions, and I will recognize myself for 5 minutes. And I think that I will pose this question to each of the witnesses.

The COVID–19 pandemic has exposed major vulnerabilities in our government's ability to predict and respond to public health crises. My colleagues and I on this Committee are working to understand what Federal investments in science and research are needed to respond to COVID–19 and mitigate long-standing and future public health crises.

So to each witness, what science gaps remain in understanding the converging environmental and health effects of extreme heat, toxic air pollution, and COVID–19 that disproportionately impacts environmental justice communities? And we can start with any of the witnesses.

Mr. KELLEY. This is Hilton Kelley. I would like to state that I believe that there are certain barriers to health care that make us more vulnerable in the African-American communities and people-of-color communities. Those barriers are critical because many times it's because of transportation or it's because of finances that many people cannot afford to go to the doctor when they are stricken with heat strokes or when they are dealing with some kind of adverse physical condition or mental condition.

And so, with that being said, I think it would be—behoove our government to look at ways in which they can possibly help provide quality health care to all of our citizens. I mean, I know that we have money to do various things to help protect our country, but yet how important is it to help protect the country and the people that live in this country who help keep it great? I think it would be very, very important for our local government, Federal Government to look at ways in which we can provide health care to keep all of our people healthy at all times.

Chairwoman JOHNSON. Thank you. Dr. Ali?

Dr. ALI. Well, one of the things that we should be focused on is making sure that we're understanding these cumulative impacts that are happening in our most vulnerable communities from both pollution and COVID–19. So we could make sure that the Office of Research and Development at the Environmental Protection Agency has the resources that it needs to also partner with HHS (Department of Health and Human Services) and CDC (Centers for Disease Control and Prevention) to answer that question. And then we need to have a better understanding also of these viruses and how they travel. So we continue to have an evolving set of conversations as people learn more about COVID–19 to really understand PM2.5, PM10, ultrafines, and other possible vehicles that may spread the virus.

So we need to anchor it in the facts, we need to anchor it in the science, and that means that we have to make sure that, one, the resources are there, and two, the mandate to make sure that people are understanding how these cumulative impacts may be causing additional challenges inside of communities of color, lower-wealth communities, and on indigenous land.

Chairwoman JOHNSON. Ms. Toney?

Ms. TONEY. Thank you, Congresswoman. I think absolutely we have to do as Dr. Ali just stated and really hold EPA's feet to the fire. Right now, we're in the appropriations process in the House, and there's consideration to even veto what their existing budget is, which would include funding to do these types of research projects. Unfortunately, right now, EPA is not holding this as a high priority, so there should be some accountability there to ensure that they are researching and using and developing this data so that we can use it in the future. It's going to be critical to making these determinations.

I'll say that at Moms Clean Air Force we are very fortunate that we get to work alongside our friends and partners at the Environmental Defense Fund. And, right now, EDF is working on building something called a CVI, climate vulnerability index, that will help to gather data that comes from a myriad of sources that really aggregates and translates the climate change data down to accounting-level scale.

And this information, when you are able to work together and collect it in your community, is what helps local elected officials and decisionmakers make these sound decisions that are sustainable and are resilient for that community. It's also what helps us as moms advocate for this and understand what things need to be made a decision need to be made in our own communities. So, again, data collection is important, research is important, but investing in it, you have to do it at the outset.

Chairwoman JOHNSON. Thank you very much. I have just a few seconds, Mr. Corbin-Mark, if you want to make a comment.

Mr. CORBIN-MARK. Chairwoman Johnson, thank you. I would just say that it's really—it's impossible I think at this point to really try to untangle certainly the African-American communities but other communities of color current risk from our not only are historically racist practices but the COVID–19 crisis that we are experiencing as well.

In terms of where and how we move forward, I do think that, yes, collecting data is critical and important. I do think that using that data to fuel effective programming and supporting local, county, and city and State health departments and answering the questions of addressing sort of the interrelationship between pollution, the legacy of pollution that EJ communities experience, and the public health crises many of our communities already know and understand that we are facing, this is not new to us.

But I also think that it's important for us to deal with the historical legacy of racism and to really understand that racism has a public health sort of output and component to it that is often overlooked.

And I found it interesting the other day to note that the CDC, some officials within the—inside the CDC were calling on the CDC, the Centers for Disease Control, to actually acknowledge the health impact of racism and to sort of move forth in helping us deal with that as well, and that still—even though the Director of the CDC has responded to that by the employees, there's still no movement in terms of concrete policy and resources being expended toward addressing this issue of racism and its public health impacts.

So I agree with my other colleagues that it's important for us to focus on the health impacts of COVID–19, the disproportionate health impacts of COVID–19, but I think it's also critical for us to be focused on some of the root causes of how we got here, and part of that is recognizing that racism is a public health issue, and the data to be collected about that and move forward as we continue to deal with the pandemic of COVID–19 but also focus on the pandemic of racism.

Chairwoman JOHNSON. Thank you very much. Mr. Lucas.

Mr. LUCAS. Thank you, Madam Chair. And I address my question to whichever or if any of the witnesses would care to respond.

The Department of Energy reports that low-income families nationwide spend about three times more of their gross household income on energy costs then non-low-income households. As I said earlier, Oklahoma has rural communities, tribal lands. We're subject to extreme weather, especially heat in the summertime. Can you all talk about the balance of implementing emissions standards while ensuring these low-income communities with less expendable income are not subject to higher energy costs? And while you're thinking about that, how does access to energy efficiency programs help in this context, too? Just whoever would care to touch that subject matter.

Mr. CORBIN-MARK. Ranking Member Lucas, thank you so much for your question. I would definitely say that the energy insecurity experienced by the communities in Oklahoma, as well as those in Harlem, is something that does need to be focused on. I believe that the Congress should afford more resources to the Weatherization Assistance Programs. If you look at the housing quality and housing stock that are inhabited by many people of color, those are the very same housing stock that have been disinvested over a long history of racist practices in our country. These are the very same housing stock that are energy-inefficient, leak in ways that create a fueling rise—and fuel the rise, sorry, of the energy expenditures that these households have to expend.

We also have in certain portions of the country Weatherization Assistance Programs that are struggling to really be able to continue to do the work of fixing those homes because of the lack of resources. I think this is a perfect place for the Federal Government to step in and really provide resources so that locally, whether they're administered through the States or in localities, that we can actually create a real goal for weatherizing low-income homes across this country.

To me, this is not something our country should be unable to do. In fact, it is a travesty that we haven't been able to set a goal and be able to complete the fact that a certain finite number of houses within this country need the resources to be able to weatherize, and this would be something that structurally challenges the racist past of redlining and disinvestment in those particular localities.

Mr. KELLEY. Yes, this is Hilton Kelley of Port Arthur, Texas. In Port Arthur, Texas, what we're seeing on the ground and have been seeing for quite a few years is a large number of residents fighting to pay their electric bill because [inaudible]. They are making choices whether or not they can [inaudible] or pay the light, gas, or water bill. There's a disproportionate number of African

Americans in the [inaudible] black communities that are basically with low employment or no employment.

I mean, at this particular time because of COVID–19 many folks in this area have been laid off from their three or four jobs, they have nothing coming in and at this particular time, and now they're getting ready to deal with this heatwave that's going to be going through the country. [inaudible] really bewildered on how people are going to afford it [inaudible] trying to keep the lights on, pay for medicine, or now even paying their rent.

So we are in a situation here but also [inaudible] the Environmental Protection Agency could do a great service by pushing industries to reduce toxic emission that they're dumping the amount of tons every year [inaudible] disproportionate amount of [inaudible] being dumped [inaudible] on what they're allowed to [inaudible] when it comes to sulfur dioxide of course impacts climate change. From my understanding [inaudible] they're fighting to roll back so many environmental justice laws that sort of help prevent pollution from being just openly dumped into the environment, so rolling back the laws [inaudible] you can dump at will [inaudible] that is not a healthy situation [inaudible] or the health of the people that live literally on the fence line. So we have a lot of work to do right there within the Environmental Protection Agency that could be done to help eliminate some of these problems.

Ms. TONEY. Representative Lucas—I'm sorry, Congressman Lucas, if I can just add really quickly, you know, it's an important point to understand that this—the [inaudible] corporations and businesses because when we're talking about emissions standards versus high energy costs, what we're saying to people is you can either have good health or you can have cheap energy. We're not telling them that both are—there's an opportunity for both. We're making people make a choice, which we shouldn't have to because energy companies and coal companies are telling people, poor people who live in places like yours and mine in Mississippi and Oklahoma that they have to do one or the other. In reality, these businesses and corporations can reduce their cost while at the same time ensuring that people can live in healthy spaces by reducing their own emissions.

We should also look at the fact that this is part an investment that people—and we can help people to take in terms of reducing their energy costs. A lot of low-income communities aren't able to afford to front an investment that oftentimes are—is told to them that they have to make in order to have renewable energy, in order to have low emission energy sources, so there are things that we can certainly do within the system that will make it effective so that we can live healthy and have reasonable energy cost.

Mr. LUCAS. As I yield back, Madam Chair, I would just note the witnesses provide tremendous insights. We always have to be honest with the constituents about the balancing act. There is a cost to everything for every good, and that is part of our responsibility is to sort our way through all that.

With that, Madam Chair, I yield back.

Chairwoman JOHNSON. Thank you very much. Ms. Lofgren?

Ms. LOFGREN. Thank you very much, Madam Chairman and Ranking Member Lucas. This has been a fabulous hearing, and it's

been an honor to listen to these witnesses, the insight that they have to share with us. And I want to honor and appreciate each and every one of them for that.

You know, the COVID pandemic has revealed divisions and systematic racism within our society. It didn't create it, but it revealed divisions, and we have an opportunity now to examine that broad scope of that and to come up with a path forward for change.

You've touched on so many issues, and we are going to have a very broad need to move forward, so I'm just going to focus on one specific thing as a Californian, and maybe you can talk about that.

Last September, the EPA moved to revoke California's waiver to set its own tougher air pollution standards despite—and we're in court—but despite decades of acknowledging that California had the right to do that. And in fact California moved before the national government ever moved on air pollution because of the tremendous smog problem in this State. Just recently, Nevada, Minnesota, and New Mexico announced that they want to adopt the California plan to reduce pollution, so that would be 16 States and the District of Columbia.

I'm wondering, you know, when you think about low-income communities that tend to be built near freeways or I think about the Central Valley where the highest asthma rate for children in the United States is in the Central Valley of California and I–5 runs right down that whole valley spewing emissions. What impact does the EPA action have, do you think, on the potential risk for COVID for low-income communities? That is—I don't know if Dr. Ali can mention that or anyone else.

Dr. ALI. Well, we know historically that there has been systemic racism in our transportation policies. It is well-documented that in many instances our roads and highways have been designed to bring wealth into certain communities and to dump all pollution unfortunately in other communities.

We also know that when we placed these communities in locations that are close to our transportation infrastructure, that these chronic medical conditions that have been mentioned before are exacerbated. And through that, it makes folks more vulnerable to COVID–19.

So when California was trying to strengthen their standards, what they were trying to do is protect more people's lives. And when we don't do that, unfortunately, we are, you know, putting more people's lives in jeopardy and also making folks more vulnerable to COVID–19 because we know that the pollution that is coming out of tailpipes, you know, plays a significant role in ozone, which most people label as smog. So we have a right to make sure that we are doing the right thing and actually strengthening the respective statutes or laws that are meant to protect folks.

Mr. KELLEY. And this——

Ms. LOFGREN. Thank—yes, go ahead.

Mr. KELLEY. I'd just like to add to what Mr. Ali was saying. Here in Port Arthur, Texas, we were in a 3-year battle with the Valero oil refinery and the Motiva oil refinery, which is the largest oil refinery in the northern hemisphere. Motiva puts out 633,000 barrels of oil per day. Now, I lived in Oakland, California, in the bay area. I'm very familiar with Interstate 5 going to Los Angeles from the

north. But yet with that being said, I'm familiar with the issues [inaudible]. That's how a lot of the pollution not only from the vehicles but from surrounding industries started to travel through our air and it sort of alights in the valley, and therefore you have more acute asthma in that—in those kind of communities.

But what we found in our fight with these industries to reduce their pollution when Gina McCarthy was head of the Environmental Protection Agency, we found that these industries, when they put in scrubbers, when they put in sulfur recovery units, when they put in flare gas recovery units, instead of just dumping all this stuff in the air and finding creative ways in which to mitigate it and to contain it and get rid of it properly, you have a huge reduction in sulfur dioxide carcinogens like benzene and 1,3-butadiene. It has been proven.

After our battle with the Valero oil refinery and within our battle we kind of like pushed them to put in flare gas recovery and sulfur recovery units, and they came back to us and they said, you know what, by us updating our units, by us buckling down and getting rid of some of the leaks and some of the fugitive emissions that were taking place, we have saved a lot of energy. We have saved a lot of money due to fines. We've saved a lot of money due to the chronic explosions they were having.

So many times—people don't change all because the owners of those facilities just choose not to spend the extra buck. It's all about the extra buck. But if they think about it and they repaired those units or they changed out many of those antiquated units and they make sure that their pipes aren't leaking, they make sure that the tank—their storage tanks aren't leaking, then they will find that they will save money, and they will also help to keep the environment cleaner and thus save a ton of money on fines as well. So it would behoove them to look at ways in which they can upgrade and spend the money now so they don't have to spend double that amount on the backend.

Ms. LOFGREN. Thank you very much.

Madam Chair, I see my time is expired. Thank you very much, and I yield back.

Chairwoman JOHNSON. Thank you very much. Mr. Weber.

Mr. WEBER. Madam Chair, pass me by for the time being.

Chairwoman JOHNSON. Oh, OK. Ms. Bonamici?

Ms. BONAMICI. Well, thank you, Chair Johnson and Ranking Member Lucas, but really thank you to the witnesses for your very insightful testimony and really for highlighting how much our vulnerable communities, low-income communities, black, indigenous, and communities of color have been hardest hit not only by the COVID–19 pandemic but also disproportionately affected by the climate crisis.

I am honored to serve on the Select Committee on the Climate Crisis, and we recently released our bold, comprehensive, science-based climate action plan that sets our Nation on a path to reach net-zero emissions no later than midcentury and net-negative thereafter. And our plan is centered on the principles of justice and equity, and we really looked at it as everyone needs and deserves access to clean air, clean water, and a planet free from toxic pollution.

Some of the plan steps to repair the legacy of environmental racism that has really burdened our low-income and communities of color, include enforcing the bedrock environmental laws, doubling the EPA's enforcement budget, amending the *Civil Rights Act* to define discrimination based on disparate impact, strengthening public consultation for environmental justice communities under the *National Environmental Policy Act*, and getting rid of exclusionary provisions in Federal funding for tribes. Those are just some examples.

And I wanted to point out—I'm here in northwest Oregon. A study recently from Portland State University demonstrated how historically racist redlining housing policies, which of course have been discussed in this testimony, in northeast Portland have exacerbated the effects of warming temperatures and poor air quality for black people and people of color. Extreme heat events are expected to increase in frequency and intensity because of the climate crisis and, as a result, the same historically underserved neighborhoods will face the health risks of increasing temperatures, higher energy bills, and often inequitable access to green spaces.

And I do want to note because I heard Mr. Lucas's concerns about high energy bills—strong supporter of the LIHEAP program, the Low-Income Home Energy Assistance Program, but we also cannot look at those bills in isolation. We need to look at the cost of additional health problems that are caused by heat and pollution.

So, Dr. Ali, thank you for your testimony about natural solutions. And, as you noted, one of the ways to address urban heat islands is investing in restoration of natural resources in urban forestry programs. So how can Federal agencies better coordinate to, for example, increase urban tree canopy, create good-paying restoration jobs, and address urban heat islands?

Dr. ALI. Well, you know, the first thing that we have to do is continue to get out of [inaudible]. Over the years, people began to evolve a bit and working in that direction. You heard people mention the Interagency Working Group for Environmental Justice, which came out of Executive Order 12898 that President Clinton signed in 1994 that was bringing folks together. There are other opportunities that exist there. And what we have to do is to leverage the resources on the Federal side but also then also look at some public-private partnerships to help make change happen.

You know, we have the opportunity now to actually address many of these impacts that are happening in vulnerable communities, one, from the fossil fuel pollution side. We have to have a just transition there. We can also use natural infrastructure where we can create a number of jobs to be able to, you know, rebuild wetlands, as I said, our forest, which can lower some of the heat issues that we're referencing today but also, as I've heard other Members say, they're very interested in creating economic opportunities.

So we have the opportunity to do that, but that means we've got to get these Federal entities together. We've got to have a comprehensive strategy to be able to address these communities. And, as was mentioned earlier, we need to identify—so where are the 100 locations or whatever the number is that folks decide on that

we are going to actually build a strong foundation under communities and something we need to discuss today, build power and wealth inside of those communities so that real long-standing, transformative change can happen.

Ms. BONAMICI. I appreciate that. And a lot of those issues—most of those issues if not all of those issues are addressed in the climate action plan.

Ms. Toney, thank you for your testimony. A recent study found that black women in particular are exposed to high temperatures or air pollution, they are more likely then to have premature, underweight, or stillborn babies. And I wondered if you could talk about how the Trump Administration of course is taking steps to reduce enforcement of environmental laws, and how will these regulatory decisions affect the health and well-being of children and parents throughout their lives, especially with a focus on children because you're the mom here. Thanks.

Ms. TONEY. Well, yes, Congresswoman, and thank you for that question. I certainly think of my children every time I consider this, as well as the millions of children across this country that are unfortunately disproportionately impacted by these rollbacks at the EPA.

Just to make it quick and short, there has to be accountability. Unfortunately, EPA has forgotten the beginning of their mission, which is to protect human health and the environment, human health being first. And so when you look at each of these rollbacks, what we see is that there is not only a disproportionate impact on people of color but also the vulnerability to mothers, pregnant mothers, women of childbearing age are not taking it seriously.

And I will just say personally when I ended my time with EPA at the end of 2016, 2017, I was pregnant with my son Devon, who is now 3 years old. At that time I found personally there were places that just impacted due to climate, due to pandemics like Zika virus. At the time I was pregnant. I couldn't travel because of Zika. When I was coming face-to-face with women who were farmworkers who were talking about the toxins that were a part of the—their work clothes every day, the fact that they could not embrace their children, I felt that personally. I felt it personally when we talked about and were experiencing what was happening in Flint, Michigan, because I was a breast-feeding mother. And so to know that there were people who could not drink water and their children who could not drink water and have it pass through, these are very real issues that are made worse when you have an EPA that does not take into consideration the vulnerability of mothers of children and certainly of women of color. And being in that group, I certainly understand why it is important for us to not only hold them accountable but to keep reiterating how critical it is for us to understand and then respond to the most vulnerable among us.

Ms. BONAMICI. Absolutely. Thank you for your passion and your advocacy, and I yield back the balance of my time.

Chairwoman JOHNSON. Thank you very much. Mr. Biggs.

Mr. BIGGS. Thank you, Madam Chair and Ranking Member Lucas. And I thank the witnesses for being here today. This has

been very interesting testimony and questions and dialog back and forth, and I appreciate that.

However, I do have to express a modicum of disappointment that, as of 24 hours before this hearing began, I had received testimonies from actually only one of the four witnesses on this panel, just one, and that's unacceptable as I wanted to prepare for this hearing. And it actually is a breach of this body's rules.

And as we get to this subject matter, this has been interesting because we've covered a very broad array of topics, but that's just perhaps one of my concerns with this hearing is that the topic today is actually all over the map, which makes it disappointing because I think it distracts from what I think is probably the most urgent and undeniably terrible statistic and that is that black Americans and other individuals of color are being hospitalized for COVID and in certain cases dying from COVID at a disproportionately higher rate than other demographic groups of Americans in many parts of this country.

And I think my colleagues on the other side, and obviously everyone can speak for themselves, but I would assume that all of us would agree that the cumulative burdens faced by our Nation's poorest communities, many of which are communities of color, make it more difficult for them to confront COVID or, for that matter, any other serious private or public health threat.

But for all the separate strands that we're engaging with today ranging from residential patterns to climate change to social justice to environmental regulation and more, these are subjects that probably warrant a far more in-depth discussion and in many cases actually some considerable debate and as a former trial lawyer, I can just tell you that's one of the ways we try to get at truth is the back-and-forth and exchange to try to find an answer. We simply can't get there in today's hearing because we're not focused. And I assume that at some point the Chair might bring back for a more refined or granular discussion on these issues.

But I want to just take one example. If you look at one strand today, EPA regulation, there are some here who believe that whenever the Trump Administration changes a rule for any reason that it is unconscionably compromising the safety of the planet, but that's simply not true in my opinion and other scientists and in some scientists' opinion as well. I had the privilege of serving as the Chairman of this body's Environment Subcommittee in the last Congress, and we reviewed many of these types of things, and I think I can speak with some modest amount of authority on the issue.

And every one of us wants clean air, clean water, and some areas of the country unfortunately lag behind others in these metrics. But often State-and municipal-level environmental agencies are much better positioned to make improvements than Federal bureaucrats hundreds or thousands of miles away.

I can just tell you in the Phoenix metro area, even today, our number-one problem with our air quality is dust. And we had one leg of the EPA telling us that we needed to take care of that by putting water on these dusty areas and in an area that has 4.8 million people in it and bigger than several States, and on the other side the EPA telling us that we were mismanaging our water re-

sources. If we could have handled that on the local level, we would have seen far more efficient way to resolve that issue and make strides in that.

And I would say that some EPA rules probably end up offering more harm to disadvantaged Americans than benefit. For example, you can look at the overly stringent CAFE (Corporate Average Fuel Economy) standards, which have been mentioned today and that Dr. Ali mentioned in his written testimony, which the Trump Administration has recently eased, and I emphasize the word eased, not eliminated, when making new vehicles. And those standards were making new vehicles increasingly expensive, thereby forcing some Americans to keep driving older, more dangerous, and less environmentally friendly vehicles because that's the vehicles they could afford.

I introduced a legislative fix for some of the problems at the EPA, but I probably shouldn't introduce that. That'd be just another tangent because, again, the immediate problem we're facing today is that persons of color throughout the United States continue to be hospitalized, in some cases dying from COVID, and I think we could create perfect air, perfect weather right now with the flip of a switch if we could. We'd still be left with this grim problem when we wake up tomorrow morning.

And I'm hoping that we can refocus some of this hearing on immediate resolutions for this very serious problem, which I do think is very serious and needs to be addressed.

And with that, Madam Chair, I'll yield back the balance of my time. Thank you.

Chairwoman JOHNSON. Thank you very much. Ms. Fletcher.

Ms. FLETCHER. Thank you so much, Chairwoman Johnson, and thank you, Ranking Member Lucas, for holding this hearing. It is timely; it is important. I appreciate the insights of all of our panelists and certainly agree that there are so many topics that we are addressing as we're gathered here together today that I hope we'll continue to have additional hearings on these topics because they are of critical importance.

I at least want to start with a focus in my questions on one aspect of the Federal response. This is largely directed first to Ms. Toney and Dr. Ali because you're both former employees of the EPA. Of course, as we've heard, as the former EPA Regional Administrator for region 5 under the Obama Administration, Ms. Toney, as you said, covers the southeastern United States, and then, Dr. Ali, as a member of the Office of Environmental Justice serving in multiple administrations.

I would be interested to hear from you what mechanisms were in place when you worked at the EPA that ensured environmental justice considerations were integrated into the research and rulemaking process and whether to your knowledge these mechanisms are still in place. And then I'll just go ahead and ask kind of the second part of my question, which is if also you have policy recommendations for ensuring that environmental justice communities are placed in the EPA research and development regulatory actions as we move forward. So both what was there? Do you know whether it's still there? And what recommendations do you have? And then after you two address it, if anybody else [inaudible]. Do

you want to start maybe—maybe we'll start with Ms. Toney and then go to Dr. Ali.

Ms. TONEY. Thank you, Congresswoman. I can speak to what happened in the region. I certainly worked very closely with Dr. Ali as he was in the EJ office in Washington, DC. When I think about what things we did and what things have been successful and where we should continue to move forward, it's certainly in investing and leveraging not only our data and research but also in environmental justice communities that are already doing the work. And I can think of no better example than Spartanburg, South Carolina, where they were able to utilize and turn a $300,000 EPA workforce development grant into what is now over $30 million in investment.

And they were able to work together with EPA because there was a program in existence that used—it was sustainable communities that brought together the Department of Transportation, Housing and Urban Development, and EPA to leverage funds so that the environmental justice communities could not just grow in one space but have a 360 view of how they were growing and developing and investing in those communities. And so people were actually not only learning a skill but they were investing in their own resiliency and their own sustainability in their housing and in their transportation, and it was a beautiful—it was not only a leverage point but also collection of community, business, industry coming together for the betterment of the community.

I also served as the Chairwoman of the Local Government Advisory Committee for EPA before I was Regional Administrator, so I did this in my capacity as Mayor. And it was—I was appointed by then-Administrator Lisa Jackson, and what was interesting is I was appointed about 2 weeks before the BP oil spill happened, so truly thrown into the fire. But one of the things that was important during that time period was understanding and listening to local officials, which is what I did.

I was in charge of collecting the information from over 30 elected officials who sat on that Committee across the country to talk to other local elected officials about what works. And if there's anything that I know and have certainly seen, it is that Mayors, City Councilmembers, County Supervisors, and Governors who are on the frontline and are determined to fight climate even when our Federal Government is reversing things, they're the ones that know, and they're the ones that are giving us the information of how to really activate and utilize these resources. And so I think that's what—a place we should go—not only go back to but really learn some lessons from.

Ms. FLETCHER. Thank you so much, Ms. Toney. I'm running close on my time, but, Dr. Ali, if you could touch on anything else that you think would be additionally helpful, I appreciate that.

Dr. ALI. Yes, well, one, we should always be honoring communities and their innovation and suggestions on how to do this better. One of those tools was actually created in collaboration with a number of folks, the States, local governments, Mayors, frontline communities, and others. There's Plan EJ 2014, which actually has an ADP process, the action development process, which gets to rulemaking and helping those other parts of the agency to better

understand how and where environmental justice should be integrated. And a part of that was actually taking out rule writers and getting them outside of their desk and actually training them on environmental justice, taking them to communities so they could see how the impacts were actually playing out so that they would have a better understanding when they're going through that process. So that's one part.

And I'll just close real quickly because I know we're short on time. Another tool that came out of suggestions from communities is the National Environmental Justice Advisory Council, which allows folks to provide advice and recommendations to the Administrator and hopefully those—that advice and recommendations also permeates to the White House and to others about what the real needs are. So communities play a strong role in that, along with business and industry, States, tribal representation, and so many others.

Mrs. FLETCHER. Thank you so much for that answer, and thank you to all of our witnesses for your testimony here today. I exceeded my time, so, Madam Chair, I yield back.

Chairwoman JOHNSON. Thank you very much. Mr. Garcia.

Mr. GARCIA. Thank you, Madam Chair, Ranking Member Lucas, and to our witnesses, very intriguing testimony, very important issues here.

I echo Representative Biggs' sentiment that I hope in future engagements we can narrow down the content here a little bit so we can focus on specific asks and needs as we move forward and truly bring solutions forward.

I will say as a Californian I'm in the heart of northern LA, 38 percent Latino population, and I grew up in this area seeing the terrible air quality. I saw the regulations flow downhill to where we are today. And I will say simply that Ranking Member Lucas's comments that these regulations don't come for free, they do impart a cost on all Members and voters and citizens of this country and specifically in California.

And to that point, while we have some of the highest regulations in California, we are also seeing some of the highest energy prices, and that does dramatically impact the minority populations, the low-income populations, just as everything you've outlined before. So these costs are real. They are direct, and they do hit the pocketbooks of citizens that we're trying to help by definition.

I guess my question is, and I have no specific witness that I direct this to, but if anyone has seen the data, to hear about it, the COVID crisis here has actually given us in some ways a unique insight into the direct cause and effects of human beings on the environment. Over the last four months we've seen things shut down. I've seen in LA freeways in the middle of rush hour that are populated with maybe 10 percent of the cars that they were historically. Have you seen any data that shows us what the ramifications of this shutdown have had to the environment in all neighborhoods I'd say but especially in urban environments, low-income populated neighborhoods? Are we seeing dramatic decreases in health cases as a result of air quality? Are we seeing massively improved air quality as a result of the shutdown?

Ms. TONEY. Congressman, I can start out——

Mr. CORBIN-MARK. Congressman——
Ms. TONEY. Oh, Cecil——
Mr. CORBIN-MARK. Go ahead. I'm sorry.

Ms. TONEY. I'll start and take a quick stab at that, and I will have to supplement the testimony with the actual articles and data. But to the best of my knowledge certainly we have seen in communities where it has not gotten better, particularly in communities of color. There is this belief that because there are fewer vehicles on the roads that that reduces emissions and reduces air pollution. What it does not take into account is that air pollution that is around fence line communities, black and brown communities that are literally right next door to polluting industries, so places like Houston, Texas; St. James Parish, Louisiana, these are places that, regardless of what happens with transportation, they are still going to be experiencing high levels of air pollution.

And if we add to that the fact that these are essential workers, so these are folks that are not only on the frontlines when they're going to their jobs, be they nurses or doctors, janitors, hotel workers, but they're also people who are having to shelter in place in the pollution in the places where they live, so that has resulted in seeing actual higher levels of instances of health impacts that are devastating to black and brown communities.

I'll just close by saying one of the things we don't want to put out there is that in order to clean the environment, people have to get sick because that's not true, and that's certainly not what we want to have happen. It should be the opposite, that this is sort of a wake-up call to us that just because we see clear sky in one place does not mean that it's clean.

Mr. CORBIN-MARK. And, Representative Garcia, just to add to what my colleague Heather has said and to say that, you know, there's an MIT (Massachusetts Institute of Technology) study that has documented the fact that while we've seen, even prior to COVID, record sort of decreases in terms of air pollutions from—air pollution from other sectors like the transportation sector because of some of the initiatives like the CAFE standards and other things that have been put in place by the EPA under previous administrations, one of the things that still remains stubbornly problematic in terms of air pollution is the emissions from buildings.

And again, I point to the fact, as I discussed in my testimony, that one of the things that needs to happen here is that we really need to have greater resources for Weatherization Assistance Programs and to really take the public housing stock across this country and treat it as though it is a finite resource, which it is, and then invest in making sure that the air quality inside of those homes is better by reducing the emissions from oil—dirty oil-burning furnaces, for example.

The fact is that part of what we're saying to folks for COVID–19 is that our biggest public health tool is for you to shelter in your homes. Well, that is only exacerbating the problem when we deal with the consequence of both extreme heat and the fact that we have not dealt with air pollution coming from those buildings in terms of the boiling of fossil fuel infrastructure—the burning of fossil fuel infrastructure like the heating and [inaudible] systems, et cetera.

So I would just—and that—as I said, there's an MIT study that points that out and really documents that, and we'd be happy to forward that to you. But I'd urge the Committee to really look at the issue really providing—telling or encouraging your other colleagues in Congress to provide greater funding for Weatherization Assistance Programs. That's a way in which we can decrease the emissions that are coming from buildings and make those homes really truly the better public health option while we wait for a virus—a vaccine, sorry, for the COVID–19 virus.

Chairwoman JOHNSON. Thank you very much, Mr. Garcia.

Mr. GARCIA. Thank you, Madam Chair.

Chairwoman JOHNSON. Ms. Stevens. You're muted. Unmute. Now, can you proceed? She looks like she's unmuted here, but—well, we'll come back to you when we get that straightened out.

Mr. Tiffany.

Mr. TIFFANY. Madam Chair, can you hear me OK?

Chairwoman JOHNSON. Yes.

Mr. TIFFANY. OK. Thank you very much. It's a great pleasure to be on your Committee and join Ranking Member Lucas. Thank you very much for the time today.

I just have a real simple question. I don't know if there's a simple answer to any of the panelists. How much money are you looking for? How much money are you looking for from the taxpayers of the United States for various projects that you're talking about and that you're so passionate about? And I'll listen to your answers.

Dr. ALI. Well, let me respond to that because I've heard that question asked for decades now. And I don't think that there is a specific number that folks are looking for. What folks are looking for is transformation. What folks are looking for is justice. And what folks are looking for is that when we move forward on the development of policy, programs, or activities, that there's a real environmental justice analysis to address the impacts that are happening. And to also understand that there have been choices that have been made in the past that have gotten us to the place that we find ourselves in now.

So once we put together a comprehensive strategy and make sure that we've got that analysis, then we can begin to unpack all the things that need to be fixed at the Department of Transportation and our transportation issues, around housing, around job creation and making sure there's true equity there, on the environmental side, and our public health side, so I'm not sure how you quantify that.

But what you can do is that you can begin to be very serious about the changes that have to happen to help these communities to be made full and made whole again. So for me that is the best way to respond instead of there being a specific number that we're actually truly focused on putting the mechanisms in place to help people to move from surviving to thriving.

Mr. KELLEY. And this is Hilton——

Mr. CORBIN-MARK. I would just follow up what—hello?

Mr. KELLEY. Yes, I would just like to second what Ali Mustafa has stated. I believe that, you know, the counselor is definitely on point with what we are thinking as well. I mean, it's not about the

amount of money that we need, but it's about the work that needs to be done and putting together a comprehensive plan to get it done when it comes to reducing pollution, when it comes to adequate housing, and when it comes to health care for Americans across the board, so I second that statement which Ali Mustafa made.

Mr. CORBIN-MARK. I—this is Cecil, and I would just say to you, Congressman Tiffany, the—there—I support what both of my colleagues have said, but there are ways in which to come up with a number. So if we're talking about the Weatherization Assistance Program, there is a finite number of public and affordable housing in this country. It can be counted. The Department of Housing and Urban Development has that number. They can come up with a number for what it would cost for us as a nation to weatherize every single public housing or affordable housing unit in this country.

I do not think that that is something that is out of reach of the taxpayers of this country. And furthermore, what I said in my earlier statements was that that would redress some of the historical injustices with regards to redlining and the disinvestment within those type of housing units.

It would reduce the energy burden on those representatives—sorry, those constituents of yours that fall into those particular categories, and it is a very definitive and achievable task that can be quantified. And, to be quite honest, I think that if we came up with a number, it would not be something that would break the bank. I just don't see that happening.

Far too often what we do is we pass on those programs for other kinds of band-aid types of efforts, which are important and critical. So, for example, we may say, well, let's give out a few air conditioners here or there. But if you give out air conditioners in a situation where extreme heat is continuing to rise, what you're doing is putting a band-aid on a problem because that house is going to take more electrical cost to keep it cool than if you had insulated and weatherized the house properly in the first place. This is a fairly sound scientific and engineering approach. It has a finite cost, there is a finite number, and it can be done.

Ms. TONEY. This is Heather Toney. Just very quickly, I agree with all of my colleagues. I think that we should also look at what the return on investment is because we don't count that often enough. And so as we look at what the investment in the dollar amount, whatever that may be, I agree that we have to look at transformative efforts but also rely on the career EPA staff and scientists. Unfortunately, this Administration has greatly reduced that institutional knowledge. But you did have career and will in the future hopefully 1 day have career staff that know these numbers, have the relationships with local mayors and officials that are leveraging these dollars, and we're also looking at what the return on that investment is. So when you utilize these funds to not only create more resiliency within a community that sustains extreme weather, you're actually reducing the amount of money that you have to put into programs like FEMA and emergency response. So there is a balancing act that's done there. It just takes a little bit

of time, thought, and transformative action to correct some of the past injustices.

Mr. TIFFANY. Madam Chair, I really want to thank the panelists for their answers, especially Mr. Corbin-Mark. He seems to have a strong idea that this is quantifiable.

I would just follow up with one thing with Mr. Ali. He said there would be an analysis that would need to be done. What has that analysis been done or is there a way for us to see what the assumptions are that are going into the analysis for those costs so we would have an idea with finite resources in the Federal Government for how much money that it would cost with that analysis?

Dr. ALI. There are steps that have been put in place that have been developed with lots of different folks around environmental justice analysis, so as was stated at the beginning of this, you should most definitely invite someone from the Environmental Protection Agency who's still there to walk you through the various steps that are a part of that and to think then about how that needs to be expanded and to be able to utilize that in a number of the decisionmaking that happens.

One of the things that would be really helpful is that, as we're moving forward on the creation of laws, is that there is an environmental justice analysis component that's a part of that to help you to be able to make the best decisionmaking possible. And of course that should be done in coordination with frontline communities and others who have expertise in many of the areas that folks are making decisions on.

Chairwoman JOHNSON. Thank you, Mr. Tiffany. Ms. Stevens.

Ms. STEVENS. Can you hear me now, Madam Chair?

Chairwoman JOHNSON. Yes.

Ms. STEVENS. Fabulous. Well, what I was saying earlier was thank you for having this very informative and insightful hearing. I've learned a lot from our witnesses in particular, and I want to thank them for their expertise and their time today as well, just such incredible work in organizations and efforts that each one of them represents.

And to kind of go back to where we circled on a few times but just to get slightly more specific, how can we invest in science infrastructure to help bolster our understanding of the disproportionate impacts of extreme weather on our communities of color based on places where we might be overlooking or things that might be making improvements? We obviously hear a lot about tree canopies. There were certainly some great examples that Mr. Kelley provided—and maybe with that, Mr. Kelley, maybe I could—I'll call on you to begin to answer the questions.

Mr. KELLEY. Well, yes. We've been working with quite a few groups when it comes to helping to reduce the climate change impact within the city of Port Arthur and southeast Texas area. We work very closely with the Union for Concerned Scientists. We're working very closely with Anthropocene Alliance, which provides scientists various resources and information to help us sort of rebuild and reconfigure our community when it comes to housing, when it comes to protecting ourselves against sea-level rise.

And I think by investing in Union of Concerned Scientists, the Sierra Club, and various other organizations that have the science,

that have the wherewithal and the staff to sort of help put together programs to assist with some of these operations to help us, No. 1, keep our cities cooler, by doing various planning procedures like gardening, we got our wetland restoration projects that need to happen. Also we are dealing with sea-level rise, so how do we mitigate our housing? So on the coastal areas we have to look at a new way of living.

We have to look at a new way of building, and that means many people here—as a matter of fact, in Port Arthur after Hurricane Harvey, any house that's being built in the city of Port Arthur must have an elevation plan, so therefore, homes must be elevated at least 6 feet above the norm at this particular point, but yet if you still live in a low-lying area, then the city of Port Arthur and the State will not fund your elevation project. They are trying to get people out of those low-lying areas because many of them are—at this particular point they're not sustainable, and it's time to move a little bit closer inland. But yet, there are many ideas, and there are many programs by various organizations such as Union of Concerned Scientists, the Sierra Club that can help to put together programs and ideas to help us move forward with this new norm called climate change.

Ms. STEVENS. Right. Well, and I'll tell you, you know, there's some—I guess it's still a debate, but I'm here for the infrastructure guarantee. You know, certainly those safe and maintained roadways and bridges, the guarantee that everyone can drink clean water, fresh water, and that everyone can breathe fresh air. And that's just our baseline. But then we can continue from there to innovate and create jobs. But, you know, these are real issues. There's a reason why we're having this conversation. And certainly the data is so, so critical.

And I'm curious to ask our witnesses what data the EPA could be collecting right now about the link between environmental disparities and the impacts of COVID–19 and other data that other agencies could be collecting. And I'll tell you, Mayor Toney, I'm a huge fan. I've just gotten to know you through this hearing, but reading about your bio, I was delighted to see you on. And I just have a few more seconds here, but maybe we could get you in before we have to pass it over.

Ms. TONEY. Well, thank you very much. And I absolutely agree that the EPA should be doing as much data collection as humanly possible. There are a number of research facilities and everything from data including race, sex, age, where the populations are most impacted, relating that to climate impacts, so layering it on top of places that have been devastated by flood, fire, and just a number of the different dynamics we see, in addition to things like air pollution, as well as what communities are doing in response.

And then, again, I want to go back to one of the things that we are working on because we work alongside the Environmental Defense Fund that has really come up with a great research tool, the climate vulnerability index, because it's actually a toolkit that helps decisionmakers. It helps mayors and community organizers to understand where they should put the emphasis of their dollars and their focus when they're doing what they're doing right now,

which is developing climate action plans and looking at renewable energy portfolios.

The way the Federal Government can assist is because it's—by some of these communities and mayors come to the Federal Government, come to EPA for things like Federal assistance and technical assistance grants. These things are partnerships together that allow communities to do the work they need to do to research and understand where is the best place to put their dollars, how they make the most of their investment, and how they protect their most vulnerable populations. So these tools are being put together now, and I think it's important for the Federal Government to recognize where there's an opportunity to make some real difference, so thank you for that, Congresswoman.

Ms. STEVENS. Thank you. And thank you again——

Mr. CORBIN-MARK. Congresswoman, I just want to add your—and part of your question was——

Ms. STEVENS. Yes.

Mr. CORBIN-MARK [continuing]. Focusing on where can we make investments for the science infrastructure. I want to point out that under the National Institutes of Health, there is a National Institute of Minority Health and Health Disparities, and it is one of the least-funded entities under the NIH system. I think that that is one of the places that you could begin to look to make other types of investments to really call upon, for example, the CDC to focus on racial disparities, to focus on the issue of racism as a public health issue, as it has been documented scientifically by a number of studies. And I think that those are ways in which you can begin to strengthen the infrastructure. I think it is a travesty that in the midst of this pandemic we have to claw out of the Federal agencies information about health disparities, about the way in which COVID–19 was racially disparate in terms of our communities, and that should never be able—allowed to be happening again.

And then the last thing I'll say—and I think this transcends all—many of the questions that we've talked about, Congress has the power of the purse, and with that power comes particular requirements that you can institute in the legislative language [inaudible], and you all should be doing that. I think the other thing is that you also have the power of oversight. The more you put agencies—Federal agencies under whatever administration they are—under scrutiny and force them to bring out into the daylight data gaps, the issue of not looking at these things in terms of their racially disparate outcomes, the more you do that, then the more pressure is applied to those agencies I think to come up with answers. You can certainly put the public on notice, and we will certainly—I think those of us inclined to do so try to create greater accountability around the time of the elections.

Ms. STEVENS. Thank you. Thank you so much, Mr. Corbin-Mark. Thank you for your expertise, phenomenal.

Chairwoman JOHNSON. Thank you very much. Mr. McNerney.

Mr. MCNERNEY. Well, I thank the Chairwoman. Can you hear me now?

Chairwoman JOHNSON. Yes.

Mr. MCNERNEY. I thank the Chairwoman for holding the hearing. And I want to thank the witnesses. Your testimony is stark and very informative, so I appreciate that.

The city of Stockton, California, which is located in my district, has one of the largest environmental justice communities in the State of California. It's historically borne a disproportionate share of pollution as a result of redlining, which has been discussed, illegal dumping, air pollution near schools, and other discriminatory policies.

Mr. Kelley, your organization is deeply involved in the fight for the fundamental right to breathe clean, unpolluted air. Can you describe the impacts that extreme heat has on chronic cardiovascular respiratory diseases, which are exacerbated by airborne pollutants?

Mr. KELLEY. Yes. Well, you know, when we're dealing with pollution, we know for a fact that sulfur dioxide, it impacts the respiratory system, and it impacts the nervous system. Now, there are other gases that come along with, you know, illegal dumping, for instance, when you have garbage and trash, and with that heat, you never know exactly what type of toxins are being dumped in various [inaudible] when you have illegal dumping. This is why we have segregated trash for various areas. You have hard trash, you have industrial liquid trash, and we have various departments which they are to go in for safety purposes. But when you have illegal dumping, there are a number of products that are dumped in illegal dump sites. You have toxins like paints, you have solvents, you have some fuel material, you have a lot of petroleum material, rubber, plastics, all sorts of things.

And then as this—you know, as these areas start to grow in size and you have a large pocket of people living in that concentrated area, then, as the heat starts to buildup over time, what you'll find is that there are gases that will emit from that large pile of trash that's not being treated properly.

So, with that being said, illegal dumping, that's a different animal than when you're talking about environmental pollution from large industries that may also be plaguing that community. And we are having a difficult time dealing with the large number of people in our community. One out of every five households in the city of Port Arthur has a child or someone that has to use a nebulizer before they go to school or take breathing treatments before they go to bed because of the toxins that they're breathing like sulfur dioxide, particulate matter, and other toxic chemicals that come from the oil and gas industries and also the chemical incineration facility called Veolia.

So there are a pocket of communities that are around our country that are dealing with this, and what we have a tendency to do is try to go and work closely with our State to try to find some type—kind of reprieve from the dumping of these toxic chemicals and illegal dump sites. I know in south Dallas there was a major problem with an illegal dump site, but yet they ended up turning it into a legal dumpsite, but yet the citizens got very involved and they ended up having a lot of say-so in how that dumpsite was to be processed and then also employed the people in that community.

So they incorporated the science, they incorporated the citizens, thus creating jobs and thus creating a clean way in which to get

rid of the trash that was dumped in that area and that was the way they sort of worked together to get that done. So I hope I answered some of your questions.

Mr. MCNERNEY. You answered more than my question. I appreciate that was a good answer.

Dr. Ali, as States and local government—I've seen you before in front of the Energy and Commerce Committee. You're a great witness.

As States and local governments across the country seek to address the economic fallout of COVID–19, I'm concerned that things like air quality monitoring and environmental justice priorities are not going to be given their due consideration. What steps might we take in Congress to elevate this issue so that they aren't left behind?

Dr. ALI. Well, you know, it also ties to a previous question that we need to make sure that we are properly funding community-based participatory research. We need to make sure that our historically black colleges and universities, our Hispanic-serving institutions, our tribal colleges have the resources that are necessary to partner with frontline communities on these issues. We need to make sure that the communities also have the resources so that they can do their own air monitoring.

We have an expert on the line with us today in brother Cecil Corbin-Mark—excuse me, Cecil. I'm talking too fast—that they've done incredible work and making sure that folks have the education and the training that's necessary for communities to understand what these impacts are and then working in conjunction with State and Federal folks. There is a true honest relationship there.

So I'll yield back some of my time because I believe Cecil may want to also add something to this.

Mr. MCNERNEY. Well, my time is already expired, so I'm going to have to yield back, so, thank you.

Chairwoman JOHNSON. Thank you very much. Mr. Weber.

Mr. WEBER. Thank you, Madam Chair. I appreciate that. I have been watching and listening for a while, and I want to extend my welcome to Mr. Garcia and Mr. Tiffany for joining our Committee, get that out of the way.

For each of the witnesses, if you don't know my background, I owned and operated my own air conditioning company for 35 years. And, Mr. Kelley, let me quickly say for you that my bride of almost 44 years grew up in a little town called Nederland, Texas, which is right up the road from Port Arthur.

Mr. KELLEY. That's right.

Mr. WEBER. So we know that area quite well, and it's in our district of course.

Mr. KELLEY. Last year, right before Thanksgiving, we had a major event out there with the TPC plant exploding, so I hope every one of your family members was safe.

Mr. WEBER. They were, and I was there on the ground with County Judge Jeff there probably [inaudible] after it happened I think, so we got to go check that out in person. And you know that County Judge Jeff Branick, by the way, sustained damage at his own house.

Mr. KELLEY. Wow. I did not know that. I'm sorry to hear that.

Mr. WEBER. You bet you. He did.

But to all of the witnesses, really have any of you all ever run an air conditioning or an energy company? And I'm assuming the answer to that is probably categorically no unless there's something in the background I missed. What I'd like to say, and with all due respect to our great Chairwoman, she's such [inaudible] to work with, and I got to go overseas with her and her son Kirk—somebody was going to say something? No.

Mr. CORBIN-MARK. Yes, just to be clear, no, I have not run an energy company, though I have participated in launching an energy company with a bunch of my colleagues.

Mr. WEBER. Well, that's good to hear, Mr. Corbin-Mark, because you seem like a high-energy guy. I'm just saying. But anyway, I got to go over with Eddie Bernice and Kirk, and we had a delightful time. But I think we're a little too broad on this particular hearing with everything that we've got tied to it whether it's heat and cold, energy efficiency, whether it's climate change, social justice, whether it's racism. I mean, let me just tell you, from an air conditioning and heating contractor's point of view, heat, cold, and energy efficiency is pocket book blind, race blind, sex blind. It gets everybody the same way.

I was on the Environmental Reg Committee in the Texas legislature. [inaudible] tell you that the TCEQ, Texas Commission on Environmental Quality, has more air monitoring than probably any other area in the United States. That's just a fact. I think they do a pretty good job. We all live and work there. As I told Mr. Kelley, my wife grew up there. I lived in south of the Houston area. I was born and raised there. We all want clean air, clean water. We all want a good environment. We really do.

And so, you know, if you want to talk about air conditioning, if you want to talk about high-efficiency, the cost of energy, I'm your guy. That's my background. That's what I do. Environmental quality, TCEQ is the second largest environmental regulatory agency in the world, second only to EPA. And again, TCEQ's employees live and work in that community. They want clean air. They want clean water. They monitor that situation.

So I've got a little bit of a different twist here. I want the House to come back to D.C. We can do this safely. We can do this efficiently. We want to come back and get in this room where I can see everybody. I'm the only Member of Congress in this room—where we can see everybody and talk face-to-face, shake your hand, get to know you a little bit before the meeting and hearing, after the hearing. We can observe social distancing.

And I'll just get really politically incorrect and say we need to get our school kids back in school. We can do it safely, get our economy going again. We can observe social distancing. We can use all the precautions. We can get this economy back up rocking and rolling, people back to work. And I will tell you that if parents listening to this who are going to be saying, yes, if we can do it safely and keep everybody safe, I want my children back in school.

Here we have Ms. Toney, who is a mother of three. Judging by the way she looks, her age they're probably one, three, and five, so I'm just saying we can get them back in there.

And we need to get back up rocking and rolling. JFK said a rising tide raises all ships. We need to be doing that. I appreciate you all being here. I appreciate the Chairwoman calling this. And with that, I yield back. Thank you very much.

Chairwoman JOHNSON. Thank you very much. Mr. Tonko.

Mr. TONKO. Yes, Madam Chair, can you hear me?

Chairwoman JOHNSON. Yes.

Mr. TONKO. Oh, great. Thank you. And thank you, Madam Chair and Ranking Member Lucas, for this great hearing, and a special thanks to our witnesses for bringing their expertise and insight to the panel.

This is such a crucially timely topic for my home district. We just experienced a June in upstate New York where the daily high temperature exceeded the historical average 21 times over. Half the days in June were warmer than 85 degrees, which exceeds our average high not only in June but in July as well. So my constituents have been forced to endure this heat in homes that for the most part don't have air conditioning because our summers have not been this warm.

However, COVID's stay-at-home orders, combined with warmer summers—a warmer summer is making for, at minimum, an uncomfortable and, at worst, a potentially deadly summer in Albany and the surrounding area. Heat is the primary driver of summertime morbidity for persons with pre-existing medical conditions, and minority communities have disproportionately more pre-existing conditions. So our societal half-century of negligence has driven both issues. It is therefore up to us to resolve them.

So, with that being said, Dr. Ali, it's great to see you again. I always appreciate your input. I see this as similar to some of the more broad community-related environmental justice issues that you described in your testimony. To that end, what kinds of tools do you think the Federal Government can employ to help rectify this environmental justice problem?

Dr. ALI. Well, there are a number. At the Department of Energy, we have the Energy Efficiency And Conservation Block Grant program that provided about $3.2 billion to tribal—or to tribal brothers and sisters, to low-income communities, to a number of others that is now no longer in place.

We also, as was stated before, need to look at our interagency sets of opportunities to leverage resources to help people to have the information but then also to have the planning in place to be able to move forward.

We also need to look at our banking industry also and the investments in certain communities that they're willing to make and in others that they aren't. Redlining is still real. There is a report that just came out recently with the OCO and certain banks, the enforcement not happening there and the redlining and pushing people and not investing in certain communities. And we know the *Community Reinvestment Act* is a part of their privy.

There are number of things that folks on the Hill can do to make sure that the resources are either going to our Federal entities, making sure that enforcement is happening properly, and then looking at how do we help to strengthen our existing infrastructure

under the organizations who have always been focused on the impacts that are happening but also the set of opportunities?

Mr. TONKO. Thank you. Thank you. And, Ms. Toney, given your many years and working on the ground with community members, what do you believe the Federal Government must do to be a constructive partner in the retrofitting of homes that are suitable for a future warmer climate?

Ms. TONEY. Thank you, Representative Tonko. I think we should absolutely be listening to our local elected officials. They are on the frontlines. But we also have a tool right in front of us. The Select Committee on Climate was mentioned earlier, and I think it's important to know that there are some significant opportunities there within their 12 pillars that do focus on environmental justice but also rely upon working within communities and community organizations to make sure that the infrastructure dollars are put into the right place.

So the House actually has this report in front of them right now, and at Moms Clean Air Force, we're encouraging all of our members to reach out to their Members of Congress, ask the question have you taken a look at this report. This is some active action items that we can get behind right now that will help make a difference in not just responding to coronavirus in upcoming bills but also looking at the appropriations process today, as well as what we can plan for in the future.

Mr. TONKO. Thank you. And keep that advocacy going. What kind of improvements do you believe that current programs such as LIHEAP could benefit from to ensure our most vulnerable neighbors are able to afford their energy bills, including for lifesaving cooling services?

Ms. TONEY. We need to take an assessment and make sure that they are being applied correctly, implemented correctly, and they are having an impact in the communities that need them the most. I think as you look at that, it's important for us to take assessment and understand where the dollars are going and then how they're being utilized and if they're being utilized to the best of their ability right now.

I stress this appropriations process at the moment because it's ongoing. I have never before seen a process—or an EPA that is going through the appropriations process and talking about vetoing their own budget, but here we are. So looking at internally assessing and seeing where these dollars are being spent, how they're impacting the communities where they are, and if there needs to be some revisiting, I think now is the time to do that.

Mr. TONKO. Well, thank you so much. I have exhausted my time, but I appreciate your insights and would suggest that beyond addressing the American homes through these health and security measures, we're also providing for job creation, so thank you. Thank you, Madam Chair. I yield back.

Chairwoman JOHNSON. Thank you very much. Mr. Foster.

Mr. FOSTER. Thank you. And can everyone hear me? Yes?

Chairwoman JOHNSON. Yes.

Mr. FOSTER. OK, great. Well, first off, I just want to say that environmental justice is an issue that hits very close to home with me. I have in my district the second, third, and fourth largest cities

in Illinois in the form of Aurora, Joliet, and Naperville, three cities with very distinct histories.

And I also appreciate the comments on redlining. You know, I—when the University of Richmond put online the redlining maps of Joliet and Aurora, two cities I represent, I spent probably 2 hours looking at those maps just almost trembling in rage at the fact that we could see, you know, maybe almost a century later the fingerprints of the redlining, and you can see on those maps—you can see the incredibly racist and anti-ethnic comments made by Federal employees in the 1930s that determined the fate of those neighborhoods and the wealth of those who live there.

You know, I don't believe it is an accident that the last two coal plants to be shut down in the region were immediately upwind of the African-American areas of south Joliet, the same place that contains many un-remediated chemical waste sites.

So I—what I'd like to focus on my questioning is the effect of urban planning and zoning. You know, the first line of defense is always to reduce industrial pollution, but the second line of defense is to plan things to avoid forcing people to live right near places that—you know, that are near these often unavoidable sources of pollution. You know, Mr. Kelley, you're from Port Arthur. You know, I remember driving through when I was in college, like 45 years ago, Port Arthur and saying, wow, why do people live, you know—have to live near some of these chemical plants?

And Texas is famous for its lack of zoning. You know, industrial sites, you know, they—you know, it's often probably pointed to as a competitive advantage of Texas that anyone can build—you know, it's my land; I can do whatever I want with it, which ignores externalities that you place on your neighbors.

And in Illinois we have been going through for decades the very painful and slow process of separating industrial sites from places that people live. And just recently in my district after a painful discussion we eliminated an ethylene oxide-using site that had a tremendously potent carcinogen pumped right in the middle of a suburban area.

So maybe I'll start with Mr. Ali. You know, you mentioned how to pick 100 communities to show how well we could remediate this, but that means you're picking 10,000 losers. How do we decide, you know, where we spend our money to do the most to benefit for minority public health?

Dr. ALI. Well, no matter what the number is, that does not mean that—let's say if you identified 100, 500, 1,000, whatever that number is, that doesn't mean that the work doesn't stop in other communities that are, you know, being driven by our statutes and our laws, so that work continues. But when I say that, I hope people understand that if we do not make communities whole, that if we don't build a strong foundation underneath of them, they will always be attractive to negative entities, so that's why I say we've got to get together and actually make real change actually happen.

And then at the same time we can continue to make sure the people are following the laws, you know, that there's enforcement and accountability and compliance, and all the various things that all of the Federal agencies and departments do. And if we're not

willing to do that, then, you know, we're doing folks a huge injustice. So that's the reason that I state it the way that I do.

Mr. FOSTER. Yes, but isn't there an important role in comprehensive planning? You know, Mr. Kelley showed pictures of flood. His area is not only subject to, you know, huge chemical pollution, it's also evidently a flooding area. This happens in Illinois as well, and over time what we do is we have paid money to the communities to relocate themselves away from flood areas, as has been done all over the country. And it's a terribly—it's a very fraught discussion, but I think it's really important to mitigate this, to actually, you know, have long-term plans to mitigate things and—you know, and then execute them.

Dr. ALI. Well, of course. That's why, you know, many of us who work in the field that we do, we focus on equitable development and making sure that we are also addressing, you know, the egregious behaviors of zoning, you know, where people would zone something like light industrial and other categories that they would use to be able to justify being able to place things in black and brown communities, so of course long-term planning.

And that's where making sure that there is transparency in the process, making sure that the voice of communities is a driver in that process helps us to make sure that we're not, you know—not doing the sins of the past. I don't know how else to say it but that because there was intentionality in the decisionmaking that was done and placing certain things in certain communities and building low-income housing in floodplains and doing a number of things that we now—you know, it's all coming together now of why people are being not only disproportionately impacted but why they are literally having crosshairs placed on their communities. So there are ways for us to address that by making sure that communities are a part of the planning process and that they are helping to drive that planning process.

Mr. FOSTER. Well, thank you. And thank you, Madam Chair, for this.

Mr. CORBIN-MARK. Congressman Foster, if I may, Representative Foster, I would also—I support your notion that community planning is a critical thing but also making sure that there are resources for community-based planning and community-driven planning is also really critical. I think that technical assistance to help communities engage in the process is really important. They bring a level of expertise that is often devalued by professional planners, not all, but some, and so I think it's really critical and important to recognize that technical assistance needs to contribute their expertise of knowing the communities and understanding their communities from living there over long periods of time is really critical as well.

Mr. FOSTER. Thank you. And, Madam Chair, I yield back.

Chairwoman JOHNSON. Thank you very much. Mr. McAdams.

Mr. MCADAMS. Thank you, Madam Chair. And this time—this hearing is timely for my district as Utah is grappling with both rising COVID case counts and summertime heat. In fact, Utah hit 100-degree temperatures on a record early date this year, on June 5, and we're likely to hit the 100-degree mark again this week.

So Utah's population has a smaller share of people of color than the national average, but my State has seen a similar trend to national statistics where communities of color are hit the hardest by COVID–19. So data from last May show that though Utah is about 14 percent Hispanic, Hispanic Utahans make up more than 38 percent of my State's COVID cases. Hispanic, native Hawaiian, and Pacific Islander, native and black communities all face disproportionately high shares of COVID cases relative to their share of Utah's population.

In addition to the novel virus and summertime heat, the season also brings worsened air quality to Utah with high levels of ground ozone. So I introduced legislation that would direct the EPA and National Academies to examine the issue of background ozone and its impact on human health, but we need to do a lot more to examine both the health effect of each of these factors, as well as the risks from their interaction.

Even in normal times worsened air quality has a notable impact on our health, particularly for vulnerable populations like those with asthma and the elderly. And now on top of that we're grappling with a virus with greater risk for people with respiratory issues.

So my question for the panelists would be in addition to the negative effects of pollution on physical health, I think we need to examine the impact of higher exposure of pollution on a community's mental health. And so, anyone on the panel, what are some of the documented effects of heightened exposure to pollution and excess heat on people's mental health, particularly for children and their brain and behavioral development, and how does that combine to affect our minority communities?

Ms. TONEY. Thank you, Congressman, for that question. I think it's something that is on the mind of a lot of mothers. And while I can't point to a specific study, I can tell you certainly we've heard from a number of our members that are balancing children who are at home, being on the frontline, but also, you know, seeing the higher rates of things like domestic violence that are taking place unfortunately in communities that are grappling with coronavirus, health impacts, air pollution, and all of these burdens. And we're seeing those instances take place in higher rates in communities of color.

Now, I don't want [inaudible], you know, anyone to think that people are—or certainly that we are making—asking people to make certain decisions. People have to make these decisions for themselves whether they keep their kids home, whether they send them to school. You know, they are making these decisions based upon what is the best for their families. But what we do know, what we are seeing is that it is a drain on—when people who are disproportionately in a space where they cannot escape. They cannot leave their place of residence because they are living in a polluted area, so they don't have the means to just go somewhere else, visit a family member. That's where they are, and they're burdened on all sides by that. I hope and look forward to studies on that, and that's something that EPA should be looking at and researching.

Mr. KELLEY. This is Hilton Kelley, Port Arthur, Texas. You know, what we're seeing here on the ground in the southeast Texas

area is a large number of families that are being broken up due to the stress level of unemployment, due to the stress levels of the unhealthy conditions in which they live, and now we have the threat of COVID–19, which is starting to really plague the Jefferson County area in high numbers. We have a long way to go before everyone can even think about getting tested, and now we have people that are suffering from cancer.

I was just watching a news report this morning where many cancer patients cannot even go to the doctor to have their mammogram test. They cannot get their chemo on schedule because so many hospitals are dedicated to COVID–19. And of course that creates a large amount of stress upon that particular person and the family as a whole. But yet when you think about your family's survival and you're looking at, you know, your bills that are piling up and you're looking at all the issues you have to deal with when it comes to the high heat and energy costs and not to mention COVID–19 having an impact on low-income communities and people of color, well, it's a major stress factor.

And people are really, really dealing with it as best they can, but yet it's doing a lot of damage in many low-income, people-of-color communities. And I'm seeing it here in the city of Port Arthur and Beaumont. I know at least three families that have basically broken up due to the stress level of unemployment and illnesses within the family that just financially they can no longer deal with.

Dr. ALI. This is Mustafa. Just let me say something very quickly as we're closing out here. Both pollution and extreme heat increases violence. It increases violence on the interpersonal level and on group effects. There are a number of studies that reference that. It also exacerbates existing mental health conditions. There are studies that have shown that as well. And it also, as was shared at the onset of this hearing, that it also exacerbates suicides, so there is a direct correlation between increased heat and suicides or attempted suicides.

And, I'm sorry, if I could just say this last part because I feel like we keep getting away from why we are dealing with extreme heat situations. If we continue to burn fossil fuels, we will continue to increase the heat in our atmosphere, in our oceans. So that is one of the places we have to be focused on if we're looking at long-term solutions to address some of the things we've been discussing.

Mr. MCADAMS. Thank you. I see we're out of time. Thank you for those—that information, and I yield back.

Chairwoman JOHNSON. Thank you very much. Before we bring this hearing to a close, I want to thank our witnesses, but I also want to welcome our new Committee Members, Mr. Garcia and Mr. Tiffany, and to say to Mr. Lucas and Mr. Biggs that we look forward to having your input for any continuing plan for this subject matter in hearings. We want to be sure that we are open to all testimony and as bipartisan as we can be. What we are looking for is solutions.

And so I want to say that the record will remain open for 2 weeks. I want to thank our witnesses for being here. You were phenomenal. And if you have any additional questions for the Committee or any additional testimony, it can be submitted. Our witnesses are now excused, and our hearing is adjourned. Thank you.

[Whereupon, at 4:31 p.m., the Committee was adjourned.]

Appendix I

Answers to Post-Hearing Questions

ANSWERS TO POST-HEARING QUESTIONS

Responses by Ms. Heather McTeer Toney

US HOUSE OF REPRESENTATEIVES
COMMITTEE ON SCIENCE, SPACE AND TECHNOLOGY

"Sweltering in Place: COVID-19, Extreme Heat, and Environmental Justice"

Responses to Questions
Submitted by
Chairwoman Eddie Bernice Johnson
And
Representative Mikie Sherrill

From
Heather McTeer Toney
Senior Director
Moms Clean Air Force

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1. Consistent public health and environmental data collection by EPA, the agency tasked with protecting human and environmental health, is critical to the agency being able to make informed policy and regulatory decisions now and in the future.
    a. What data should EPA be collecting right now about the link between environmental disparities and the impacts of COVID-19?
    b. How vital is EPA's collection of this data to providing communities information on their COVID-19 risks?
    c. How vital is the data to future decision-making?

EPA is responsible for collecting information to improve public health and the environment thus when there are intersections between the two, the agency should be at the forefront of not only data collection, but also the establishment of query guides for other federal agencies to follow. In addition, EPA's guidance is also, at a minimum, the foundation that states and cities should follow—no state should do any less than EPA in determining what data should be collected to inform state environmental decision making. There are also disturbing links between systemic environmental racism and disparities of COVID mortality rates. Unfortunately the current EPA administration under President Trump has successfully rolled back almost 100 regulations that impact not only the how and why data is collected, but also the outcome of the information if collected under these new standards. Missing this opportunity to use sound science and collect data in the midst of both pandemic and pollution is tantamount to taking away the map key to the future diagram of our cities and towns.

Moving forward, Mayors, Governors and state environmental agencies will need this information to guide not only pandemic response, but also crucial generation impacting decisions such as site selection for industries and the building permit and renewal process. If possible, the following are a few examples of data help to future decision making.

1. *Alongside the information collected about facilities, permits and pollution, EPA should collect and cross reference data with CDC to understand the relationship between permitted polluting sites and COVID.*
2. *Air quality in environmental justice communities, and/or high COVID areas as defined by the CDC.*

3. *TRI (Toxic Release Inventory) and RSEI (Risk Screening Environmental Indicators) increases and analysis in high COVID areas.*
4. *Tracking of COVID through Waste Water in particularly in Environmental Justice communities.*
5. *Maternal Health and infant mortality rates in high COVID/power plant polluted areas*

2. As climate change continues to cause rising temperatures and extreme heat waves in cities across the U.S., there is an urgent need to provide people with location specific heat information in order for people to understand the risk in their neighborhoods and on their block. The urban heat island effect tells us that neighborhoods within the same city can experience temperature differentials as great as 12° F.
    a. What heat impacts have you experienced in your area in Mississippi? Is there a robust mechanism for monitoring heat disparities throughout your area?

Heat impacts in Mississippi are much different than urban communities due to the rural and agrarian nature of our communities. There is a measured difference between sitting in the car and standing under the shade of an old oak tree. Thankfully, trees, grass and bushes are common in most parts of our state. Still, we know when it's hot—through the response of plants, animals and as the old folks say, "The good common sense to go in the house". At certain temperature points (100° or higher) we hear "heat advisory" through the news and radio along with warnings not to spend more than 2-3 hours outside. Combined with humidity, it becomes very difficult for any profession to conduct work or play outside. Farmers are usually seen with headlights on their equipment due to the early morning or late nights they must work in order to avoid the heat. The sounds of mowers and weed eaters before dawn is no different than the sound of dogs barking at passing cars. Children are used to getting up early not because of alarms, but because most sports practices begin no later than 7:00AM. Growing up in Mississippi reminds me of time I've spent in Latino countries where midday "siestas" are a way of life. Ours have simply become more mandatory and more frequent as temperatures have risen over time.

1. Conversations about environmental justice often center around physical health impacts, but I'd like to focus on the impacts to mental health as well.

   We know that the stresses of systemic racism to low income and communities of color have disparate impacts on health. And today Black and brown communities are faced with a number of compounding stressors; we have a global pandemic which is ravaging communities of color, and pollution and climate change and taking an increasing toll on health.

   a. What are the impacts of pollution, pandemics, climate change, as well as systemic racism on mental health?
   b. How do mental health impacts interact with other challenges faced by members of these communities?
   c. What kind of policies can Congress pursue to ameliorate these impacts?

My expertise on this question is derived not from degrees in mental health, but as a black mother living and working in a global pandemic, in a region currently experiencing its 5th hurricane of a yet unfinished season and working on environmental justice and systemic racism issues in southern communities for my entire career. Pollution combined with a pandemic, climate change and racism causes trauma and trauma creates a direct link to a deficiency of mental health. A 2020 article entitled, "The Impact of Air Pollution on Mental Health" gave evidence of the connection between increased exposure to PM (Particulate Matter) levels and an increased risk of developing depression, anxiety, bi-polar disorders and other problems associated with mental health. The NAACP study, "Fumes Across the Fenceline" highlighted the fact that over 1 million African Americans not only live within a mile of a PM emitting facility (Oil and Gas) but that black people face an increased risk of chronic health disparities as a result. It would be no surprise that mental illness would follow suit. Sadly, we need look no further than the recent death of Walter Wallace Jr., a man clearly suffering from mental illness yet shot by the police in front of his mother and sister in west Philadelphia. Black communities are experiencing trauma daily. Communities fraught with air, climate and transportation pollution, rely on Congress to hold EPA accountable to not only following the science but also insuring the equitable application of regulations such that they decrease the pollution impacting those hardest hit. In a study[i] and presentation conducted by Dr. Francesa Dominici, she showed how between 2010 and 2016, EPA regulations were enforced and attained in the areas where the white people lived while black people maintained the same levels under the same regulation[ii]. It showed a clear disparity to air pollution exposure between White and Black populations. Congress must hold EPA accountable to equity in application while funding and granting the resources necessary to correct these injustices.

In an essay I wrote for DAME magazine,(link embedded) the answer is summed best.

"We're supposed to shelter in place, but the places we live are overwhelmed with air pollution, making our lands and water toxic. We're supposed to keep our kids home and provide education but we are the essential workers that must report to duty, and live with failing infrastructure that can't sustain broadband. We're supposed to wear gloves and masks, but we suffer from racial profiling—even during a global pandemic—and are asked to leave the premises when doing the very things that are proposed to save lives.... We are not just fighting for our lives in this pandemic. We are COVIDing while Black.

2. The racial and socioeconomic disparities in COVID-10 mortality rates as well as exposure to environmental harms are not coincidental, instead they are a product of systemic racism.

   Let me be more specific here, Black and brown communities face the worst impacts of both COVID-19 and climate change as a direct consequence of policies like redlining, or the denial of mortgage lending based on race. A recent study found that in 94% of the cities it observed, historically redlined neighborhoods were on average 5 degrees warmer than non-redlined neighborhoods in the same city.

   The practice of redlining also led to toxic industries being disproportionately located in communities of color, which consequently increased their exposure to pollutants that cause asthma, hypertension, diabetes, and other underlying health conditions that put people in high-risk categories for COVID-19. How can we ensure that our COVID-19 response policies are consciously and deliberately anti-racist as well as executed through an environmental justice lens?
      a. How can we ensure that our COVID-19 response policies are consciously and deliberately anti-racist as well as executed through an environmental justice lens?

1. *Immediately demand the reversal of the Trump Administration executive order banning racial sensitivity training.*
2. *Provide resources for anti-racist training in every federal agency. Provide incentives to contractors that participate as well.*
3. *Provide home energy assistance and increased weatherization funding specifically to environmental justice communities impacted by COVID and extreme weather. Fund the upgrades to residential buildings for energy efficiency and healthy homes and increase the energy efficiency of low and moderate income homes to ensure sustainable, healthy housing.*
4. *Support the integration of public housing units into modern energy grid infrastructure*
5. *Provide incentives for infrastructure investments in frontline (environmental justice areas located in areas of highly concentrated air and transportation pollution) communities, (based on standard modelled after NJ S232), and commit to 40% federal infrastructure projects to those communities.*
6. *Support the creation of a low income water bill and sewer assistance program.*
7. *Pass EJ for All legislation currently proposed by Senators Booker, Duckworth and Harris, restore staff and budgets to federal environmental civil rights, and work with states to promote same.*
8. *Require that federal agencies, like EPA, ensure that recipients of federal funds do not administer programs or policies that result in discrimination.*
9. *Increase funding to NIEHS/EPA children and environmental health research on children of color*
10. *Institutionalize an all-of-government approach to environmental justice enforcement.*

[i] Currently under peer review. **Inequalities in air pollution exposure are Increasing in the United States**
Abdulrahman Jbailya , Xiaodan Zhoub , Jie Liub , Ting-Hwan Leeb , Stephane Verguet ´ a , Francesca Dominicic,* aDepartment of Global Health and Population, Harvard T.H. Chan School of Public Health, Boston, MA, USA bEnvironmental Systems Research Institute, Redlands, CA, USA Department of Biostatistics, Harvard T.H. Chan School of Public Health, Boston

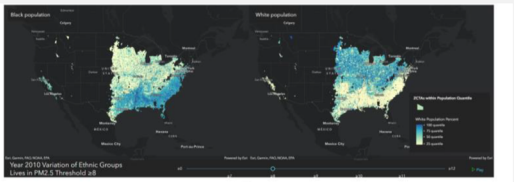
Abstract

Exposure to ambient air pollution contributes substantially to the global burden of disease, and in 2015, ambient exposure to PM2.5 (fine particles with a mass median aerodynamic diameter of less than 2.5 μm) was the fifth-ranking risk factor of mortality globally. We analyzed data from the US zip code tabulation areas (N=32047) for 2000-2016 and found strong evidence of inequalities in exposure to PM2.5 among both racial/ethnic and income groups. Most alarming, we found that these inequalities have been increasing over time. From 2010 to 2016 inequalities in the exposure to PM2.5 levels above 8 μg/m 3 across racial/ethnic, and income groups increased by factors of 1.6 and 4.0 respectively. As shown in our powerful map visualizations, these results indicate that air pollution regulations must not only decrease PM2.5 concentration levels nationwide but also prioritize reducing environmental injustice across the US.

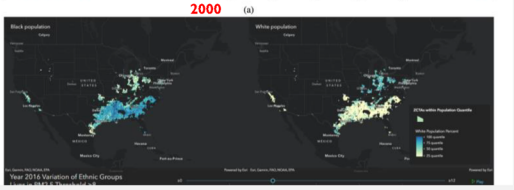
[ii] Slide created by and shared with permission of Dr. Dominic for presentation on Environmental Justice and regulatory disparities.

Blue dots indicate areas with highest ratio of **Black** population to total population – only zip codes with PM>8 are shown

Blue dots indicates areas with highest ratio of **White** population to total population - only zip codes with PM>8 are shown



2000 (a)



2016

EPA regulations between 2010 and 2016 were enforced and attained in the areas where the White live. The Black population is still living with high PM2.5levels

This clearly indicates an increase in disparities to air pollution exposure among the White and Black populations

Responses by Dr. Mustafa Santiago Ali

U.S. HOUSE OF REPRESENTATIVES
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY

"Sweltering in Place: COVID-19, Extreme Heat, and Environmental Justice"

Questions for the Record to:
Dr. Mustafa Santiago Ali
Vice President of Environmental Justice, Climate, and Community Revitalization
National Wildlife Federation

Submitted by Chairwoman Eddie Bernice Johnson

1. Consistent public health and environmental data collection by EPA, the agency tasked with protecting human and environmental health, is critical to the agency being able to make informed policy and regulatory decisions now and in the future.
   a. What data should EPA be collecting right now about the link between environmental disparities and the impacts of COVID-19?

The EPA should create an assessment on the communities most impacted by COVID-19 (i.e., high infection and death rates) to obtain a better understanding of the existing environmental conditions that may have contributed to health outcomes. Factors such as exposure to air pollution from point sources, such as highways and industrial sites, have been linked to underlying health conditions that have factored into the ability for individuals to survive the coronavirus. Data on tree canopy coverage, access to natural spaces and parks, and access to clean and affordable water may also be key indicators that inform a link between environmental disparities and COVID-19 related impacts.

In order to create a comprehensive assessment, the EPA should also commit to collecting data on social factors that provide a clearer depiction of the disparities faced by communities most impacted by COVID-19. In addition to using the EJSCREEN to assess demographic factors, the EPA should also collect data on the location of testing facilities, access to broadband, and access to a vehicle or public transportation on behalf of households. Lastly, the EPA should collect data on the distribution of COVID-19-related relief funds and services to ensure that resources were properly distributed to protect vulnerable people and communities hit the hardest by the virus.

   b. How vital is EPA's collection of this data to providing communities information on their COVID-19 risks?

The data collected on behalf of the EPA would be imperative in informing best practices associated with information distribution and community outreach. First, by understanding the environmental factors, such as inadequate tree canopy coverage or poor water quality, that are linked to COVID-19 health complications, the EPA could work collaboratively with other agencies to warn communities on increased risks. Second, by understanding the social factors associated with preferred language, access to transportation, access to broadband, among others, the EPA could be instrumental in ensuring that information

distributed and community outreach is conducted in an efficient manner.

c. How vital is this data to future decision-making?

The data collected on behalf of the EPA would be extremely valuable in informing future decision-making. For example, by collecting evidence that links air pollution exposure to increased COVID-19 infection and death rates, the EPA could leverage this data to inform future policies associated with air quality. These policies could include increased accountability measures on behalf of industries to ensure that frontline communities are provided with the resources necessary to combat future health crises. Without proper mapping of at-risk communities and the creation of evidence based multidisciplinary policies, we cannot expect future decision-making to be fully comprehensive.

2. As climate change continues to cause rising temperatures and extreme heat waves in cities across the U.S., there is an urgent need to provide people with location-specific heat information in order for people to understand the risks in their neighborhoods and on their block. The urban heat island effect tells us that neighborhoods within the same city can experience temperature differentials as great as 12° F.
   a. What heat impacts have you experienced in your hometown? Is there a robust mechanism for monitoring heat disparities throughout your area?

   My hometown in West Virginia has experienced increased heat wave days at an alarming rate. Several residents suffer from underlying health conditions from exposure to polluting industries, including chemical and coal-mining, that are exacerbated by extreme heat. Unfortunately, my hometown, like many municipalities across the state and Appalachia, don't have the financial means to create robust mechanisms to monitor heat disparities. As a result, we rely on federal regulatory oversight and resources that could help address these issues.

3. What community-led efforts are being undertaken by frontline communities to drive revitalization and mitigate extreme heat and other climate change impacts? What lessons can be learned by the Federal government from these efforts?

   Frontline communities have led several local and regional efforts to both revitalize and mitigate climate change impacts, such as extreme heat. On a local level, communities have organized action plans to ensure that vulnerable individuals are receiving the information and resources that they need on a block-to-block basis. In collaboration with academic institutions, such as historically black colleges and universities (HBCUs) and other minority-serving institutions, communities have also engaged in community-based participatory research and have developed health action plans that center traditional, local knowledge that guides effective local and state policies.

   The federal government can benefit from learning about best practices and supporting ongoing efforts. In order to build trust and collaboration, community leaders must be engaged in both outlining the problems at-hand and developing the steps necessary to create solutions that meet the needs of their community. This level engagement is vital. Frontline leaders understand the challenges and opportunities in their communities and they can inform efficient strategies. The federal government should also provide access to data, technical assistance, and funding to empower existing community efforts and to jumpstart other locally-driven initiatives.

Submitted by Representative Mikie Sherrill

1. I've been extremely concerned with the EPA's practice of rolling back and relaxing pollution enforcement. Since January 2017, over 100 rules and regulations relating to climate and environmental policies have been rolled back -- with a majority of these occurring at the EPA. The regulations that have been, or are in the process of being, rolled back include dozens of rules meant to regulate air emissions, reduce toxic pollution, limit the use of harmful pesticides and chemicals, and improve air quality. Even further, amid a global pandemic, the EPA has eased enforcement of pollution standards, relaxing penalties for companies that do not comply with air and water pollution monitoring and reporting requirements.
   That's why I sent a letter to the EPA and DOT in April objecting to the rollback of the existing car and light truck fuel economy and greenhouse gas emissions standards.

   a. As someone who spent 24 years working at the EPA, can you please share how the most recent rollbacks of regulations on vehicle emissions and factory pollution have changed public health risks in light of the COVID-19 pandemic and a summer of extreme heat?
      The rollbacks associated with vehicle emissions and factory pollution are extremely harmful for frontline communities that are at a higher risk of suffering from chronic health conditions that increase health complications when exposed to the coronavirus. These chronic medical conditions include heart, liver, kidney and lung diseases, as well as cancers, which are linked to elevated exposure to air pollutants, such as PM2.5. Increased level of exposure to air pollutants further hinders individuals with underlying health conditions and several studies have shown that extreme heat leads to stagnant air that can better trap emitted pollutants, resulting in surface ozone. All of these factors further inhibit the ability of vulnerable communities to survive the coronavirus, provoking an even more detrimental public health crisis.

2. Conversations about environmental justice often center around physical health impacts, but I'd like to focus on the impacts to mental health as well.

   We know that the stresses of systemic racism to low income and communities of color have disparate impacts on health. And today Black and brown communities are faced with a number of compounding stressors; we have a global pandemic which is ravaging communities of color, and pollution and climate change are taking an increasing toll on health.
   a. What are the impacts of pollution, pandemics, climate change, as well as systemic racism on mental health?
      Through the National Wildlife Federation's Environmental Justice Roundtables, I was able to hear about the mental health challenges that Black, Indigenous, and People of Color (BIPOC) communities are currently facing. In addition to struggling to keep a roof over their head and the utilities on, frontline communities are now facing an enormous sense of hopelessness as the pandemic and climate change creates a deep sense of uncertainty and fear. Community leaders have voiced concerns surrounding increased cases of domestic violence, suicide, and gun violence. Entire communities are mourning the death of loved ones. And although systemic racism has always been an issue and point of frustration among BIPOC, it's been devastating to see the lack of support and leadership from all levels of government. This lack of support has created an even deeper sense of mistrust among BIPOC and government agencies.

As we find ways to provide BIPOC with the resources needed to overcome pollution, pandemics, climate change, and systematic racism, we must place a larger emphasis on mental health and coping mechanisms to ensure communities are able to address this deep-rooted trauma.

b. How do mental health impacts interact with other challenges faced by members of these communities?

Mental health issues create an additional burden among BIPOC. Without adequate access to health services, communities are forced to cope with ongoing challenges, such as financial issues and housing insecurity, through avenues that may not necessarily be constructive or healthy. Additional stress factors over extended periods of time can also debilitate an individual's health. According to the National Institute of Mental Health, long-term stress can lead to heart disease, high blood pressure, diabetes, and mental disorders, such as depression and anxiety. All of these conditions further impede the ability of community members to survive COVID-19-related health complications.

c. What kind of policies can Congress pursue to ameliorate these impacts?

Through our Environmental Justice Roundtables, frontline leaders have voiced the need for additional resources that address mental health. First, policies are needed to provide BIPOC with resources to cope with stress, build healthy relationships, and establish grief support. Second, community leaders voiced the need for policies that establish community health specialists that could provide community members with the guidance needed to obtain resources that are currently available. Lastly, and most importantly, community leaders voiced the need for free healthcare services for all.

3. The racial and socioeconomic disparities in COVID-19 mortality rates as well as exposure to environmental harms are not coincidental, instead they are a product of systemic racism.

Let me be more specific here, Black and brown communities face the worst impacts of both COVID-19 and climate change as a direct consequence of policies like redlining, or the denial of mortgage lending based on race. A recent study found that in 94% of the cities it observed, historically redlined neighborhoods were on average 5 degrees warmer than non-redlined neighborhoods in the *same city*.

The practice of redlining also led to toxic industries being disproportionately located in communities of color, which consequently increased their exposure to pollutants that cause asthma, hypertension, diabetes, and other underlying health conditions that put people in high-risk categories for COVID-19. How can we ensure that our COVID-19 response policies are consciously and deliberately anti-racist as well as executed through an environmental justice lens?

a. How can we ensure that our COVID-19 response policies are consciously and deliberately anti-racist as well as executed through an environmental justice lens?

We have an opportunity to address systematic racism by ensuring that historically marginalized communities are engaged and have access to testing centers and vaccines. Government agencies should be working closely with community organizations and leaders that have trusted, established relationships with community members to ensure information surrounding COVID-19 are distributed through platforms and languages that are best suited for a community. In addition to testing centers, policies should also address the ability for communities to access these centers by providing resources or reaching people whether they're at through innovative solutions (i.e., mobile testing centers). As we get closer to developing a vaccine, we must also ensure that frontline communities and essential workers are able to access these vaccines. We can't rely on existing health systems and policies to ensure that people who need the vaccine or herd immunity

are able to afford vaccination. Lastly and most importantly, healthcare provides should be provided with the necessary training to prevent implicit biases and misdiagnosis that are more than likely to occur among BIPOC.

Responses by Mr. Hilton Kelley

Answers to the questions for the record.
August 12th 2020
Hilton Kelley

U.S. House of representatives
Committee of Science Space & Technology
Sweltering in place COVID-19 extreme heat

The Data which the EPA should be collecting is:

1. Types of Chemicals being releases from petroleum refineries, Chemical plants, Chemical incineration facilities and petroleum coke processing facilities and other big polluters.
2. Information on the impact of emitted chemicals on public health

Information pertaining to the type of chemicals released into the air is critical information:

1. Having knowledge of what you're breathing in can reduce your risk to COVID-19 Many chemicals we breathe in destroy the respiratory system leaving us vulnerable.

Rising temperatures and extreme heat and heat variations:

1. In smaller cities like Port Arthur TX the temperature basically stay the same from community to community but over all we have seen a rise in temperature by at least 5 degrees during our summer and winter months and when it comes to keeping an eye on the rising temperatures, we rely heavily on the weather report on the news only, our state has no special reporting program.

Cumulative impacts on communities of color during COVID-!9 pandemic :
The disproportionate number of stressors upon the African American communities is having a devastating impact on the Black family for many reasons one being: Economics, preexisting illnesses, lack of youth activity, uncertainty of the future.
Long before COVID-19 African American / Black communities has been marginalized and discriminated against we have suffered in underserved polluted communities we have survived in lowland areas and now we must deal with a virus which could potentially kill us due to the preexisting conditions we suffer with large and in part because of the illnesses we suffer with due to the pollution from the dirty polluting facilities which we had to live next to due to discrimination and unfair housing practices, mentally you start to feel trapped you feel as if no one cares and then you start to feel as if you need to do something to escape your present situation and help your family members who are in desperate need in so many ways. This type of isolation and sense of abandonment eventually will drive anyone to a desperate state of mind particularly when you know you've done everything right, you played by the rules and yet due to systemic racism you still can't get a fair shake I life. This situation could also lead to a weaken immune system and possibly suicidal thoughts.

Creating Policies which are anti-racist:

Historically people of color have been marginalized when it comes to fair housing, access to good health care facilities, job opportunities which have always been afforded to whites, a fair justice system, the police force was designed to protect the elite and white upper class, so on the streets we're disproportionately victimized, we have taxation without representation, police brutality is running ramped. If we really want to ensure that our policies fairly address the issues which black and brown people face disproportionate, start at the top of our governmental system with ending racism. Racism exist across this country because it has been allowed to exist and flourish in many states and communities across our country because of politics, just like within the EPA the strength of the EPA is contingent upon what political party is in office and so does our discriminatory laws and the enforcement of those laws.

Appendix II

Additional Material for the Record

DOCUMENTS SUBMITTED BY REPRESENTATIVE EDDIE BERNICE JOHNSON

AMERICAN PSYCHOLOGICAL ASSOCIATION Services, Inc.

July 10, 2020

The Honorable Eddie Bernice Johnson
Chair
House Committee on Science, Space, and Technology
2306 Rayburn House Office Building
Washington, DC 20515

The Honorable Frank Lucas
Ranking Member
House Committee on Science, Space, and Technology
2405 Rayburn House Office Building
Washington, DC 20515

Dear Chairwoman Johnson and Ranking Member Lucas:

The American Psychological Association (APA) thanks you and the Committee on Science, Space, and Technology for holding this hearing on July 14th, 2020, on "Sweltering in Place, COVID-19, Extreme Heat, and Environmental Justice." We appreciate the Committee providing a forum to explore the disproportionate impacts of extreme heat and COVID-19 on communities of color and low-income communities, and to understand the role of the Environmental Protection Agency (EPA) in mitigating these health disparities. This hearing brings to light a number of issues of broad concern to psychological scientists and practitioners, including the vulnerabilities of low socio-economic status and minority communities, which are more likely to be located in urban areas which create "heat islands" with poor air quality, greater water pollution, and sparse healthcare coverage. The APA agrees that there are disproportionate harmful environmental exposures for these communities due to climate change, which in turn have increased health disparities and exacerbated the effects of the COVID-19 pandemic.

Social and economic inequality, discrimination, stigma, and marginalization are at the root of the differences we see among racial and ethnic minorities. Research documents that even when stigmatized groups can access care, a variety of factors – including providers' implicit biases and the inequitable distribution of health care resources – contribute to a lower overall quality of care and poorer outcomes for these groups relative to white patients.[1,2] These factors, combined with higher risks for chronic health conditions, make many Blacks and similarly situated groups more vulnerable to COVID-19. For example, jurisdictions have reported higher rates of infections and deaths among racial and ethnic minorities. In Louisiana, the Department of Health reports that Blacks make up 32 percent of the population, but 70 percent of its COVID-19 related deaths.[3] And the Department of Public Health has reported that in Chicago, Blacks account for 68 percent of the city's 118 deaths and 52 percent of the roughly 5,000 confirmed coronavirus cases, despite

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making up just 30 percent of the city's population.[4] CDC found disparities among patients hospitalized due to COVID 19, reporting on hospitalizations in a catchment area where approximately 59% of residents are white and 18% are black; yet, among 580 hospitalized COVID-19 patients approximately 45% were white and 33% were black.[5]

Americans are experiencing trauma on a mass scale as the Coronavirus pandemic unfolds. From the harrowing experiences of frontline and essential workers, to families losing loved ones without a chance to say goodbye or to gather to grieve, we know that these experiences, and others during this crisis, will be traumatic and can have serious long-term health implications, especially as the country begins to reopen and people return to work. In addition, COVID-19 is exacerbating existing mental health disparities among Blacks, Latinos, American Indians/Alaska Natives and Asian Americans. Yet mental health is frequently an unaddressed matter in racial and ethnic minority communities due in part to stigma, lack of access to a qualified mental health practitioner, or provider discrimination. As our nation recovers, equitable access to mental health services will be more essential than ever. Congress must ensure quality and affordable mental health diagnosis and treatment is available in hard hit low-income and minority communities, who also tend to be low-wage essential workers, where existing disparities in mental health care and treatment are already being exacerbated due to COVID-19.

Clearly, considerations for mental health are particularly vital to environmental justice communities at this moment. While Americans are beginning to gain a better understanding of climate change and its health impacts: heat-related stress; vector-borne, foodborne, and waterborne diseases; worsening asthma and allergies; and illness and injury related to storms, floods, and droughts, the connections with mental health are rarely part of the discussion.

The tolls of climate change on our mental health are far reaching. They include stress, depression, and anxiety; strained social and community relationships; and increases in aggression and violence. Moreover, the psychological responses to climate change – such as conflict avoidance, fatalism, fear, and helplessness – keep us, and our nation, from addressing the core causes of and solutions for climate change, and from building psychological and community resilience in the face of climate change and related pandemics and natural disasters.

The APA remains highly engaged in efforts to address climate change and its consequences. With ecoAmerica, APA produced a report on Mental Health and Our Changing Climate: Impacts, Implications, and Guidance that reviews the evidence in this area (including effects of heat) and offers solutions to be implemented by health and medical professionals, community and elected leaders, and the public. This article in APA's Monitor on Psychology describes the varied roles that psychologists are playing to combat climate change at the local, national, and international levels.

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Also, APA recently conducted a survey that showed that more than half of U.S. adults say that climate change is the most important issue facing society today and that they have begun to make changes, or are willing to make changes, in their personal behaviors to reduce climate change. This implies a significant opportunity to implement meaningful changes in public policies related to climate change.

To chart the next stage of work on the psychological, behavioral, and mental health dimensions of climate change, APA is establishing a task force of experts that will begin its work this fall. We look forward to keeping you informed of the task force's activities and recommendations.

The APA is the largest scientific and professional organization representing psychology in the United States, and works to promote the advancement, communication, and application of psychological science and knowledge to benefit society and improve lives. Our membership includes more than 121,000 researchers, educators, clinicians, consultants, and students.

Again, we thank you for holding this hearing to explore the disproportionate impacts of extreme heat and COVID-19 on communities of color and low-income communities, and for considering the mental health and psychological aspects of climate change. If you have any questions or would like additional information, please contact Joseph Keller, PhD, of APA's Science Directorate. Dr. Keller can be reached by phone at 443-841-9900 or by email at jkeller@apa.org.

Sincerely,

Jaime L. Diaz-Granados, PhD
Deputy Chief Executive Officer, and
Acting Chief Science Officer

References:

1 Williams, D. R., & Mohammed, S. A. (2013). Racism and health I: Pathways and scientific evidence. American Behavioral Scientist, 57, 1152-1173.
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3 The Louisiana Department of Health. (2020). Coronavirus (COVID-19). Retrieved from http://ldh.la.gov/Coronavirus/
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5 United States Department of Health and Human Services, Centers for Disease Control and Prevention. (2020). Morbidity and Mortality Weekly Report: Hospitalization rates and characteristics of patients hospitalized with laboratory-confirmed coronavirus disease 2019 – COVID-NET, 14 States, March 1-30, 2020.

July 14, 2020

The Honorable Eddie Bernice Johnson
U.S. House of Representatives
Chairwoman
Committee on Science, Space, and Technology

The Honorable Frank Lucas
U.S. House of Representatives
Ranking Member
Committee on Science, Space, and Technology

To the Members of the House Committee on Science, Space, and Technology:

Thank you for holding today's hearing on COVID-19, extreme heat, and environmental justice.

WE ACT for Environmental Justice was founded in 1988 in response to rampant environmental racism in West Harlem. Our founders demanded community-driven, political change. Since then, WE ACT has grown to over 16 staff members and 2 locations in New York City and Washington, D.C. Our mission is to build healthy communities by ensuring that people of color and/or low-income residents participate meaningfully in the creation of environmental health policies and practices.

COVID-19 has devastated Northern Manhattan and the Bronx. A history of environmental injustice, combined with a poorly managed respiratory pandemic, has led to high rates of COVID-19 infections and deaths in New York City's communities of color.[1] As this pandemic persists, we are incredibly worried about the ways in which extreme heat will exacerbate the deadly impacts of this disease.

In general, extreme heat events lead to many negative health impacts, including dehydration, heat stress, fainting, heatstroke, and mortality. Due to systemic racism and pervasive inequalities, Black/African American and Latinx communities, low-income households, and elderly people are disproportionately affected by these heat-related health outcomes. This summer, the pandemic poses new challenges to communities susceptible to heat-related deaths, due to cooling

[1] The New York Times. "New York City Coronavirus Map and Case Count." The New York Times, The New York Times, 9 May 2020, www.nytimes.com/interactive/2020/nyregion/new-york-city-coronavirus-cases.html?action=click&module=RelatedLinks&pgtype=Article.

center closures and individuals avoiding medical care out of fear of contracting COVID-19. If action is not taken, we are concerned that vulnerable communities will see increased fatality rates.[2]

To address this crisis, WE ACT started the Heat, Health, and Equity Initiative (HHEI), aimed to protect New York City's vulnerable populations from extreme heat. In the short term, our community organizers are working to inform residents of the negative impact of extreme heat as well as how to access and benefit from available programs. In the era of COVID-19, this outreach includes informing our membership of the 74,000 free air conditioning units that New York City will be distributing to low-income seniors.[3]

For our long-term action plan, we have attached our 2020 Extreme Heat Policy Agenda. While the report focuses on New York City, there are several federal policy suggestions, including:

- Increasing federal funding to the Low Income Home Energy Assistance Program (LIHEAP). Additionally, creating a more accessible LIHEAP enrollment process.
- Expanding LIHEAP capabilities. This includes infrastructure upgrades that address ventilation, filtration, and energy efficiency.
- Providing federal funding to Public Housing Authorities to specifically protect tenants during extreme heat events. Examples include installing high-performance windows and air sealing to reduce the outdoor/indoor temperature; adding indoor or outdoor shading; installing generator backed-up for air conditioning systems with 100% capability; and building-wide energy efficiency upgrades.
- Supporting federal R&D on green technologies, green design, and renewable energy.

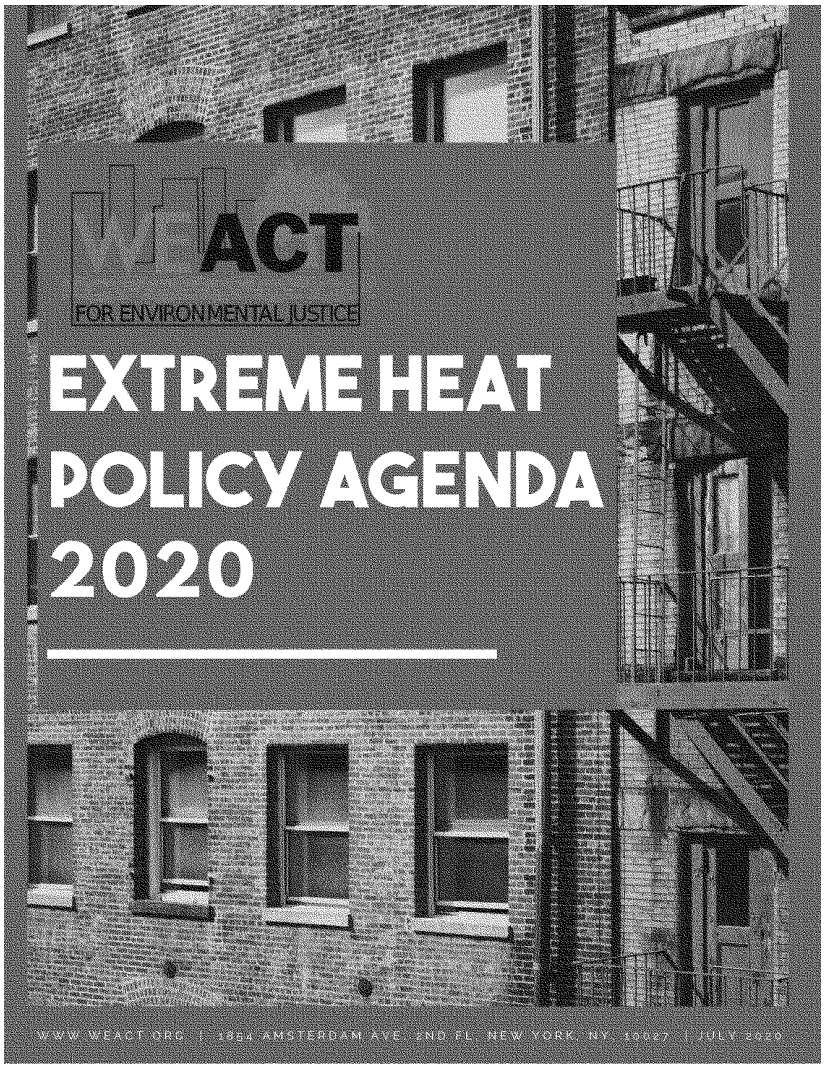
Thank you for the opportunity to submit this letter for the record. We look forward to working with each member of the House Science, Space, and Technology Committee on this issue.

Sincerely,

Kerene N. Tayloe, Esq.
Director of Federal Legislative Affairs
WE ACT for Environmental Justice

Caitlin Buchanan
Federal Policy Associate
WE ACT for Environmental Justice

[2] WE ACT for Environmental Justice. "Extreme Heat Policy Agenda 2020." WE ACT for Environmental Justice, 2020, www.weact.org/wp-content/uploads/2020/07/WE-ACT-Extreme-Heat-Policy-Agenda-2020-Online-Version.pdf.
[3] Mercado, Angely. "It's Getting Hot in Here: Can NYC Keep Seniors Cool during COVID?" Grist, Grist, 6 July 2020, grist.org/justice/its-getting-hot-in-here-can-nyc-keep-seniors-cool-during-covid/.


WE ACT
FOR ENVIRONMENTAL JUSTICE
EXTREME HEAT
POLICY AGENDA
2020
WWW.WEACT.ORG | 1854 AMSTERDAM AVE, 2ND FL, NEW YORK, NY 10027 | JULY 2020

WE ACT FOR ENVIRONMENTAL JUSTICE

EMPOWERING COMMUNITIES TO POWER CHANGE

WE ACT was started in 1988 when three fearless community leaders saw that environmental racism was rampant in their West Harlem neighborhood, and they demanded community-driven, political change. Today, the organization is considered an active and respected participant in the national Environmental Justice Movement.

WE ACT's mission is to build healthy communities by ensuring that people of color and/or low income residents participate meaningfully in the creation of sound and fair environmental health and protection policies and practices.

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INTRODUCTION

Climate change is causing average global temperatures to increase. Extreme heat events lead to many negative health impacts including dehydration, heat stress, fainting, heat stroke, and mortality. Due to systemic racism and pervasive inequalities, Black/African American and Latinx communities, low-income households, and elderly people are disproportionately affected by these heat-related health outcomes. WE ACT for Environmental Justice's is soon launching the Heat, Health, and Equity Initiative (HHEI), aimed to protect New York City's vulnerable populations from extreme heat. Due to COVID-19 pandemic, HHEI is releasing pre-launch objectives that are vital for supporting populations now, as detailed in this report.

Swift and robust government action is needed to proactively prepare New York City (NYC) for rising temperatures and mitigate the corresponding health risks. A variety of strategies should be implemented to promote a comprehensive portfolio of approaches that emphasizes equity, prioritizes community participation, and heeds COVID-19 safety precautions.

CONTEXT

New York City is particularly susceptible to rising temperatures because its physical design characteristics amplify the urban heat island effect. Climate modeling projects that up to 75 days of the year could reach 90 degrees Fahrenheit in New York City by the 2080s (1). On average, there are over 100 heat-related deaths and approximately 450 hospitalizations or ER visits due to extreme heat exposure per year in NYC (2). A 2016 Columbia University study projected that heat mortality rates in New York City will continue to rise significantly, resulting in up to 3,300 deaths annually by 2080 (3).

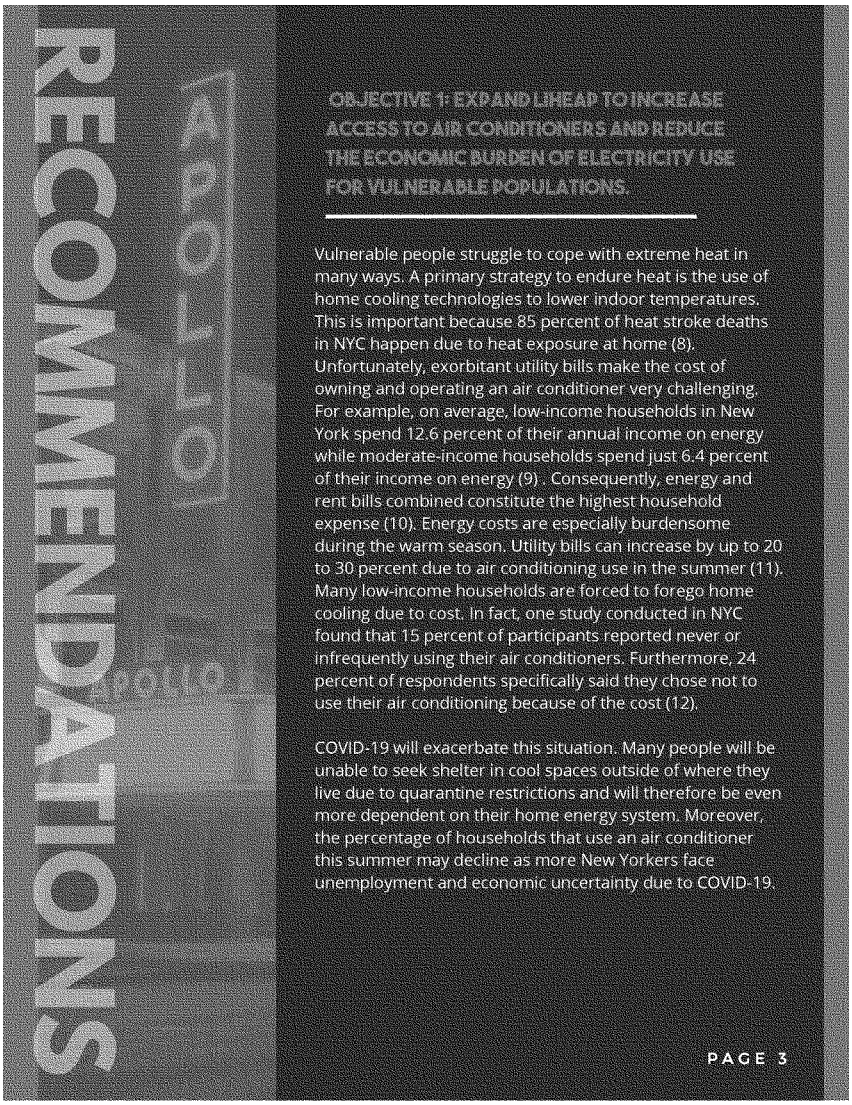
New York City's struggle with inequality causes extreme heat events to disproportionately affect certain populations and neighborhoods (Table 1). For example, neighborhoods in East Harlem, Central Harlem, and the South Bronx have a high heat vulnerability index, a measurement of risk to heat-related illness or death (4). These neighborhoods also have large Black/African American and Latinx populations. Additionally, low income and elderly people are more susceptible to adverse health impacts related to extreme heat. Much of this inequity comes from structural and historical racism, forcing low-income and people of color in NYC to:

- Live in older, poorly maintained apartment buildings
- Live in crowded apartments with intergenerational living
- Live in neighborhoods with less green space
- Live in neighborhoods with more air pollution from buildings and industrial sites
- Stretch their resilience and their means across many hardships, such as food, rent, chronic illness, and immigration status (5).

New York City has developed a variety of programs to reduce negative health impacts during extreme heat events but COVID-19 poses new challenges. Many of the neighborhoods in NYC that are reporting the greatest number of COVID-19 cases are also categorized as areas of high heat vulnerability (4,6). Thus, COVID-19 is compounding existing vulnerabilities and exacerbating inequalities. Approximately 34 percent of reported COVID-19 cases are Black/African American, even though they make up only 25 percent of the population (6). Health experts are concerned that the number of fatalities could increase this summer because people may avoid going to the hospital due to their fear of contracting the virus or overburdening health facilities.

Table 1. Heat-related health complications are exacerbated by other health conditions and socioeconomic indicators of vulnerability, including age, race, income, and employment. These characteristics can overlap to create cumulative impacts that compound health risks.

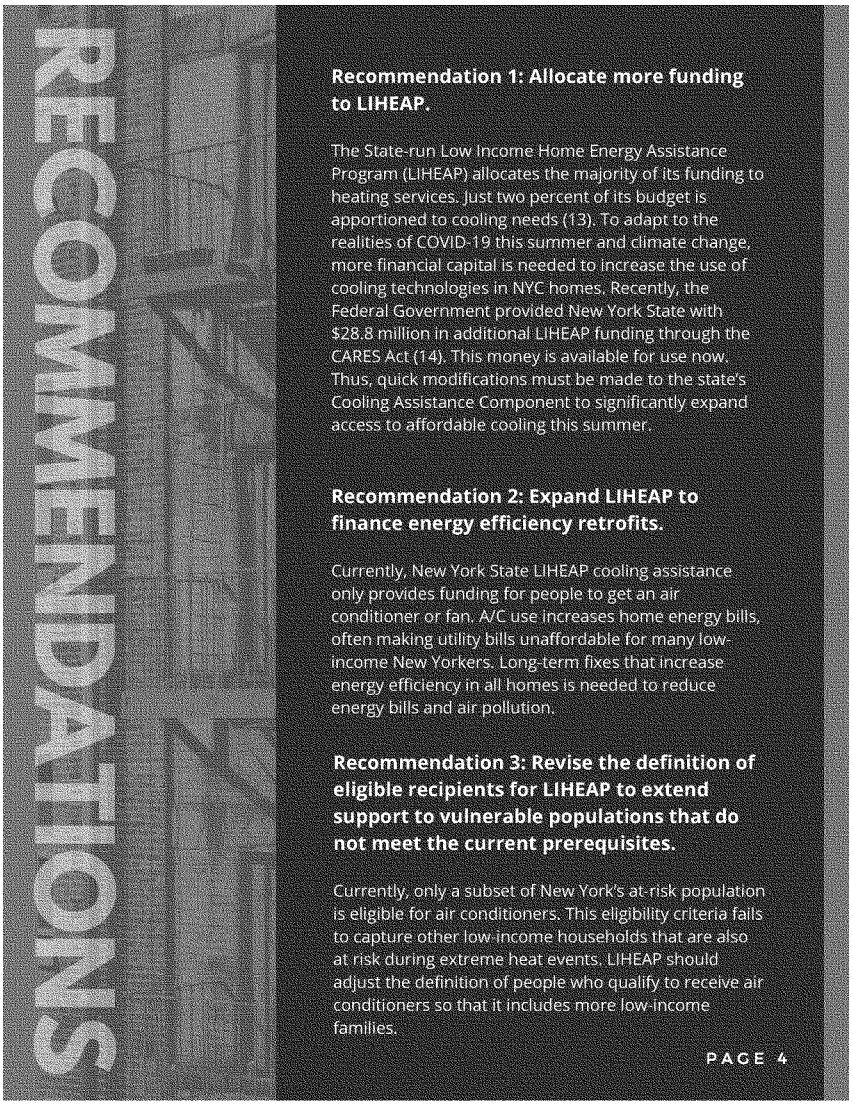
HEALTH	• People with chronic illnesses, such as cardiovascular and respiratory diseases, are more susceptible to heat stress and health complications on hot days (5).
AGE	• Elderly people are more prone to heat illness due to increased isolation and pre-existing health challenges (5). • Children with pre-existing health conditions, such as asthma, are also at risk during heat events. Like the elderly, children may spend more time indoors, heightening exposure (5).
RACE	• People of color are more likely to experience energy insecurity. For example, in Washington Heights, energy insecure households are predominately Black/African American and Latinx (5). • 50 percent of heat-related deaths in New York City over ten years were Black/African American people (2).
INCOME	• Low-income families are more likely to be burdened by energy insecurity (5). • People experiencing homelessness have increased exposure to hot temperatures, struggle to access healthcare, and are often stigmatized making it difficult to gain admission to cooling centers (7).
EMPLOYMENT	• Certain jobs require work to be done in extreme temperature conditions that expose employees to environmental hazards that increase risk (5). This is especially true for essential workers during the COVID-19 pandemic.

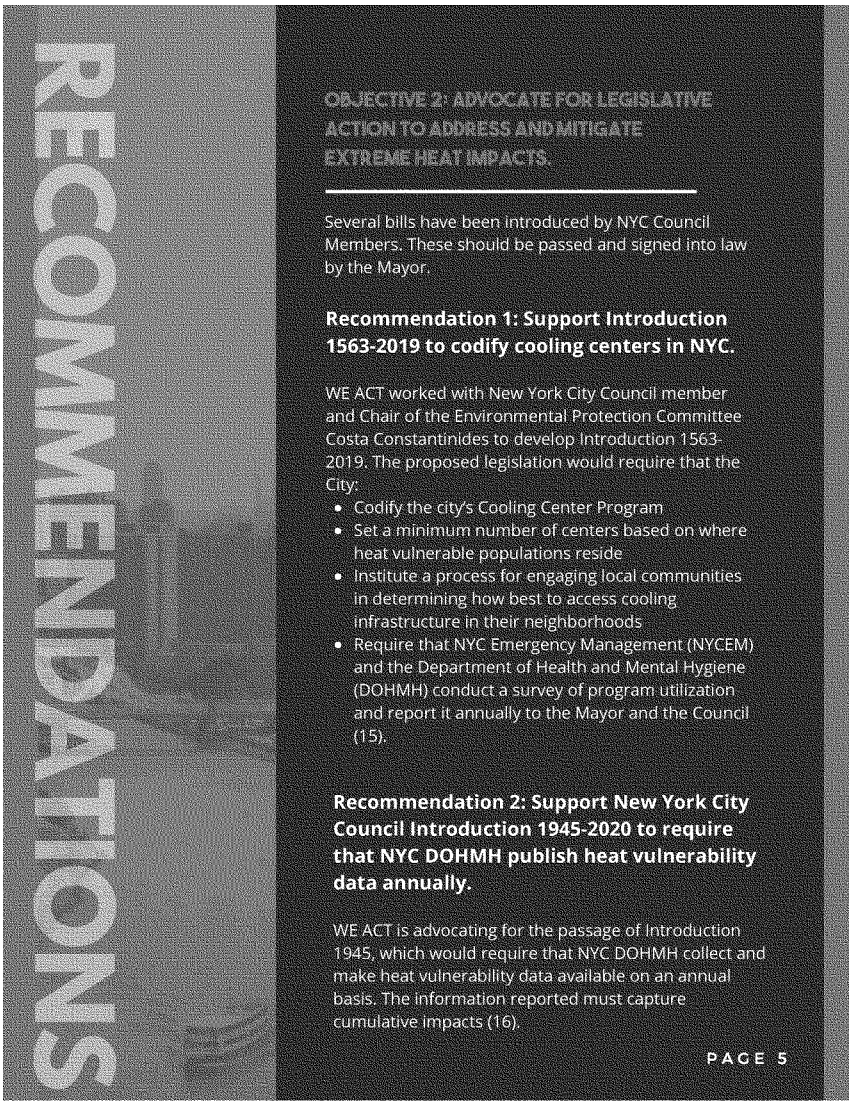


OBJECTIVE 1: EXPAND LIHEAP TO INCREASE ACCESS TO AIR CONDITIONERS AND REDUCE THE ECONOMIC BURDEN OF ELECTRICITY USE FOR VULNERABLE POPULATIONS.

Vulnerable people struggle to cope with extreme heat in many ways. A primary strategy to endure heat is the use of home cooling technologies to lower indoor temperatures. This is important because 85 percent of heat stroke deaths in NYC happen due to heat exposure at home (8). Unfortunately, exorbitant utility bills make the cost of owning and operating an air conditioner very challenging. For example, on average, low-income households in New York spend 12.6 percent of their annual income on energy while moderate-income households spend just 6.4 percent of their income on energy (9) . Consequently, energy and rent bills combined constitute the highest household expense (10). Energy costs are especially burdensome during the warm season. Utility bills can increase by up to 20 to 30 percent due to air conditioning use in the summer (11). Many low-income households are forced to forego home cooling due to cost. In fact, one study conducted in NYC found that 15 percent of participants reported never or infrequently using their air conditioners. Furthermore, 24 percent of respondents specifically said they chose not to use their air conditioning because of the cost (12).

COVID-19 will exacerbate this situation. Many people will be unable to seek shelter in cool spaces outside of where they live due to quarantine restrictions and will therefore be even more dependent on their home energy system. Moreover, the percentage of households that use an air conditioner this summer may decline as more New Yorkers face unemployment and economic uncertainty due to COVID-19.


RECOMMENDATIONS
Recommendation 1: Allocate more funding to LIHEAP.
The State-run Low Income Home Energy Assistance Program (LIHEAP) allocates the majority of its funding to heating services. Just two percent of its budget is apportioned to cooling needs (13). To adapt to the realities of COVID-19 this summer and climate change, more financial capital is needed to increase the use of cooling technologies in NYC homes. Recently, the Federal Government provided New York State with $28.8 million in additional LIHEAP funding through the CARES Act (14). This money is available for use now. Thus, quick modifications must be made to the state's Cooling Assistance Component to significantly expand access to affordable cooling this summer.
Recommendation 2: Expand LIHEAP to finance energy efficiency retrofits.
Currently, New York State LIHEAP cooling assistance only provides funding for people to get an air conditioner or fan. A/C use increases home energy bills, often making utility bills unaffordable for many low-income New Yorkers. Long-term fixes that increase energy efficiency in all homes is needed to reduce energy bills and air pollution.
Recommendation 3: Revise the definition of eligible recipients for LIHEAP to extend support to vulnerable populations that do not meet the current prerequisites.
Currently, only a subset of New York's at-risk population is eligible for air conditioners. This eligibility criteria fails to capture other low-income households that are also at risk during extreme heat events. LIHEAP should adjust the definition of people who qualify to receive air conditioners so that it includes more low-income families.
PAGE 4



OBJECTIVE 2: ADVOCATE FOR LEGISLATIVE ACTION TO ADDRESS AND MITIGATE EXTREME HEAT IMPACTS.

Several bills have been introduced by NYC Council Members. These should be passed and signed into law by the Mayor.

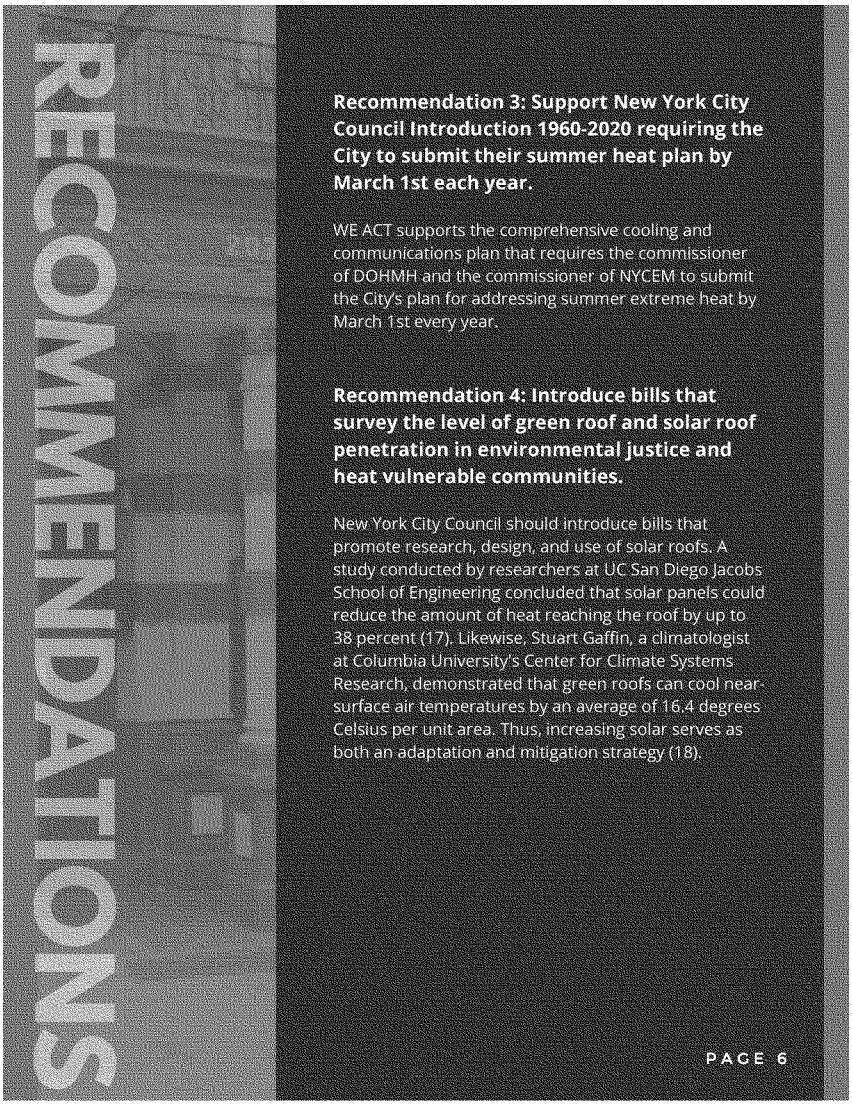
Recommendation 1: Support Introduction 1563-2019 to codify cooling centers in NYC.

WE ACT worked with New York City Council member and Chair of the Environmental Protection Committee Costa Constantinides to develop Introduction 1563-2019. The proposed legislation would require that the City:

- Codify the city's Cooling Center Program
- Set a minimum number of centers based on where heat vulnerable populations reside
- Institute a process for engaging local communities in determining how best to access cooling infrastructure in their neighborhoods
- Require that NYC Emergency Management (NYCEM) and the Department of Health and Mental Hygiene (DOHMH) conduct a survey of program utilization and report it annually to the Mayor and the Council (15).

Recommendation 2: Support New York City Council Introduction 1945-2020 to require that NYC DOHMH publish heat vulnerability data annually.

WE ACT is advocating for the passage of Introduction 1945, which would require that NYC DOHMH collect and make heat vulnerability data available on an annual basis. The information reported must capture cumulative impacts (16).



Recommendation 3: Support New York City Council Introduction 1960-2020 requiring the City to submit their summer heat plan by March 1st each year.

WE ACT supports the comprehensive cooling and communications plan that requires the commissioner of DOHMH and the commissioner of NYCEM to submit the City's plan for addressing summer extreme heat by March 1st every year.

Recommendation 4: Introduce bills that survey the level of green roof and solar roof penetration in environmental justice and heat vulnerable communities.

New York City Council should introduce bills that promote research, design, and use of solar roofs. A study conducted by researchers at UC San Diego Jacobs School of Engineering concluded that solar panels could reduce the amount of heat reaching the roof by up to 38 percent (17). Likewise, Stuart Gaffin, a climatologist at Columbia University's Center for Climate Systems Research, demonstrated that green roofs can cool near-surface air temperatures by an average of 16.4 degrees Celsius per unit area. Thus, increasing solar serves as both an adaptation and mitigation strategy (18).

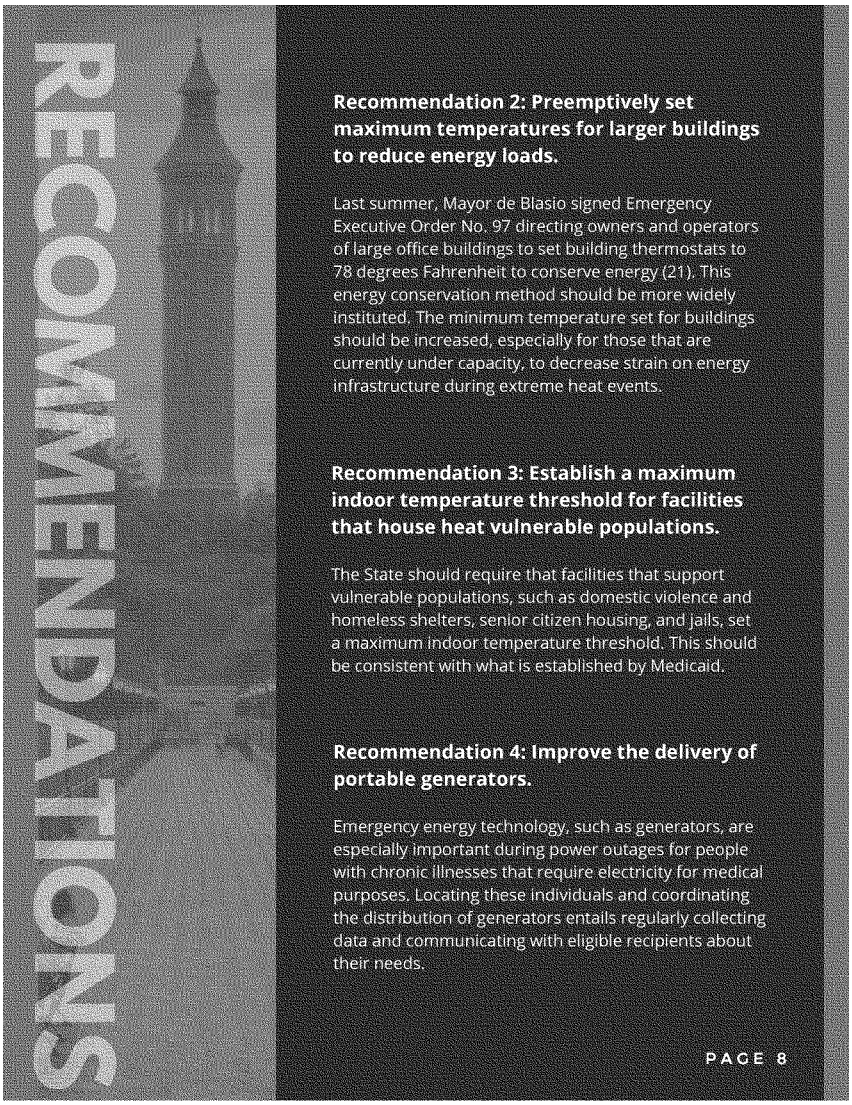
RECOMMENDATIONS

OBJECTIVE 3: COORDINATE EMERGENCY PLANNING STRATEGIES DURING EXTREME HEAT EVENTS TO PREVENT POWER OUTAGES AND PROMOTE SAFETY.

Increased energy demand during extreme heat events can result in power outages. During the summer, indoor temperatures can surpass outdoor temperatures, especially for households without air conditioners and during blackout and brownout periods. This increases the risk of heat illness and poses an additional challenge to individuals that rely on electronic medical devices (7). Low-income neighborhoods are disproportionately impacted by power outages. When Con-Ed shut off service to 33,000 customers in the summer of 2019 to protect the company's equipment, two of the neighborhoods chosen were Canarsie and Flatlands. Both are majority Black/African American (approximately 59 percent) and rank 4 out of 5 on the City's heat vulnerability index (19).

Recommendation 1: Complete the installation of all 74,000 A/C units provided by the GetCool program by July 1st.

New York City's GetCool Air Conditioner Program is providing $55 million to install 74,000 air conditioners in the homes of low-income seniors this summer, 22,000 of whom are NYCHA residents (20). The City must ensure that they meet their pledged timeline and complete all installations by July 1st. When choosing contractors, priority should be given to Minority and Women-Owned Business Enterprises (MWBEs).



Recommendation 2: Preemptively set maximum temperatures for larger buildings to reduce energy loads.

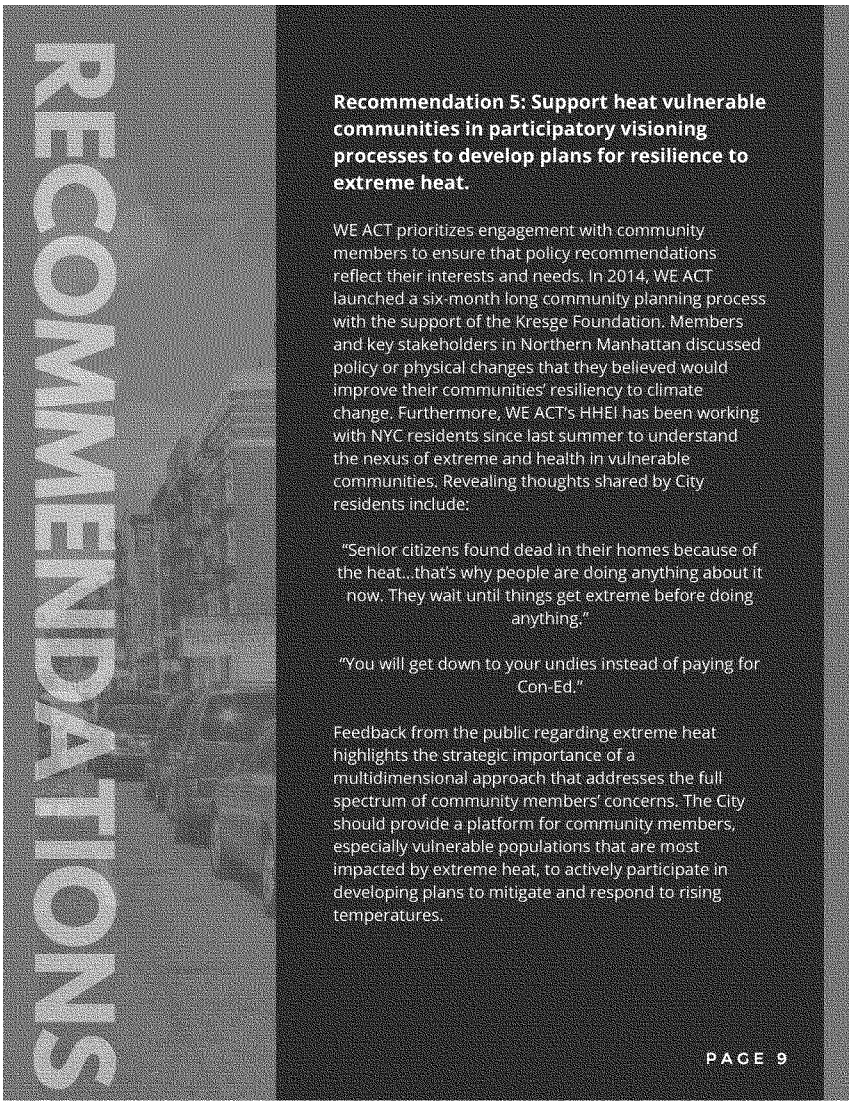
Last summer, Mayor de Blasio signed Emergency Executive Order No. 97 directing owners and operators of large office buildings to set building thermostats to 78 degrees Fahrenheit to conserve energy (21). This energy conservation method should be more widely instituted. The minimum temperature set for buildings should be increased, especially for those that are currently under capacity, to decrease strain on energy infrastructure during extreme heat events.

Recommendation 3: Establish a maximum indoor temperature threshold for facilities that house heat vulnerable populations.

The State should require that facilities that support vulnerable populations, such as domestic violence and homeless shelters, senior citizen housing, and jails, set a maximum indoor temperature threshold. This should be consistent with what is established by Medicaid.

Recommendation 4: Improve the delivery of portable generators.

Emergency energy technology, such as generators, are especially important during power outages for people with chronic illnesses that require electricity for medical purposes. Locating these individuals and coordinating the distribution of generators entails regularly collecting data and communicating with eligible recipients about their needs.



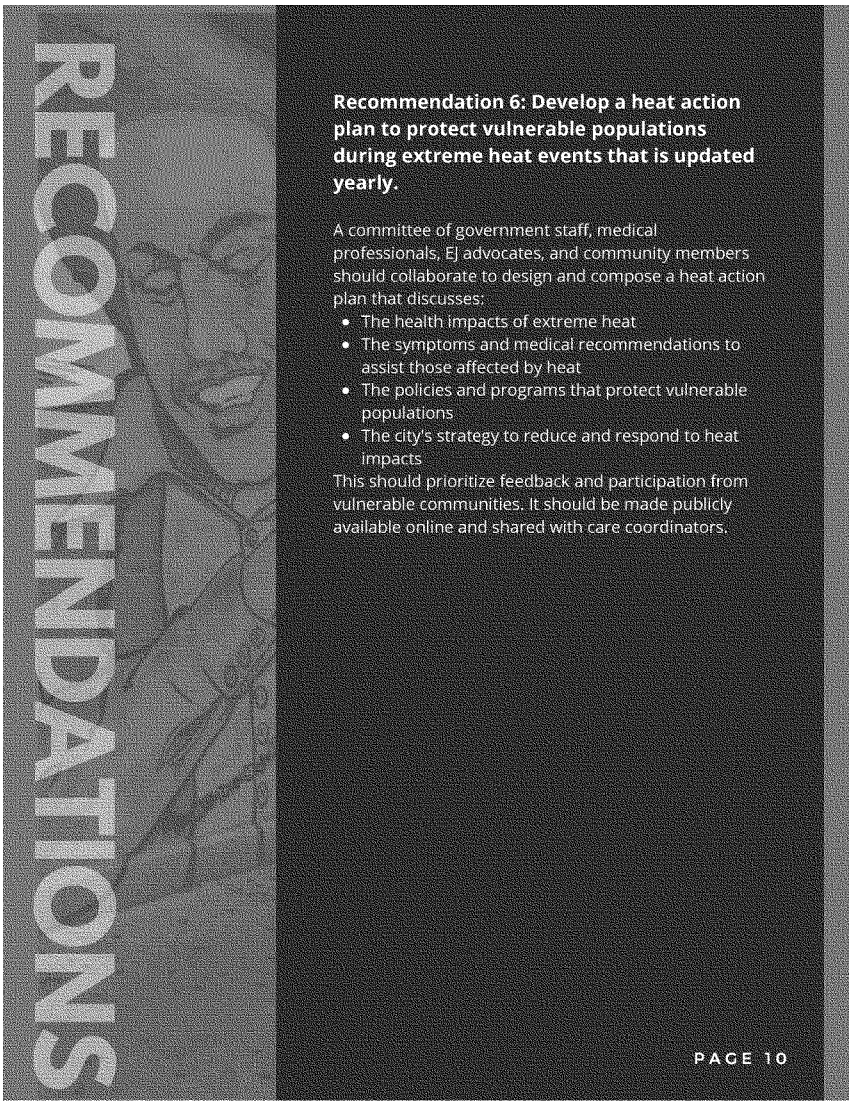
Recommendation 5: Support heat vulnerable communities in participatory visioning processes to develop plans for resilience to extreme heat.

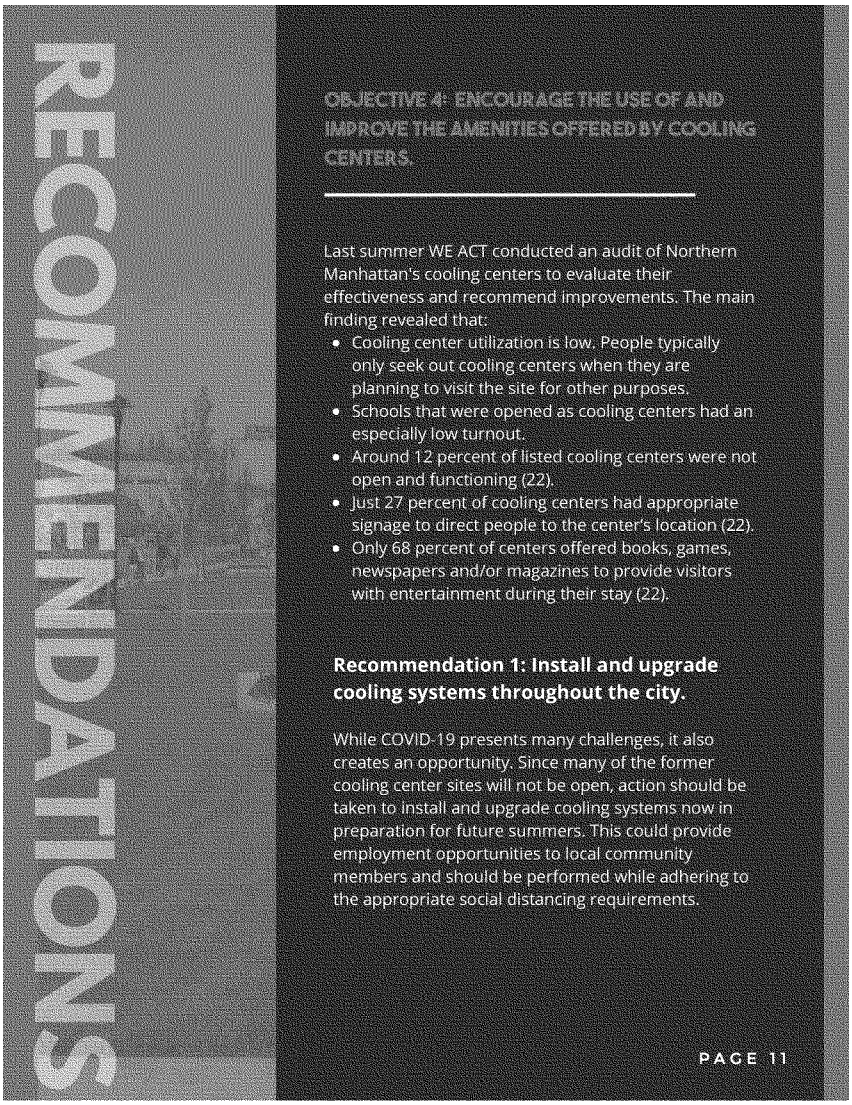
WE ACT prioritizes engagement with community members to ensure that policy recommendations reflect their interests and needs. In 2014, WE ACT launched a six-month long community planning process with the support of the Kresge Foundation. Members and key stakeholders in Northern Manhattan discussed policy or physical changes that they believed would improve their communities' resiliency to climate change. Furthermore, WE ACT's HHEI has been working with NYC residents since last summer to understand the nexus of extreme and health in vulnerable communities. Revealing thoughts shared by City residents include:

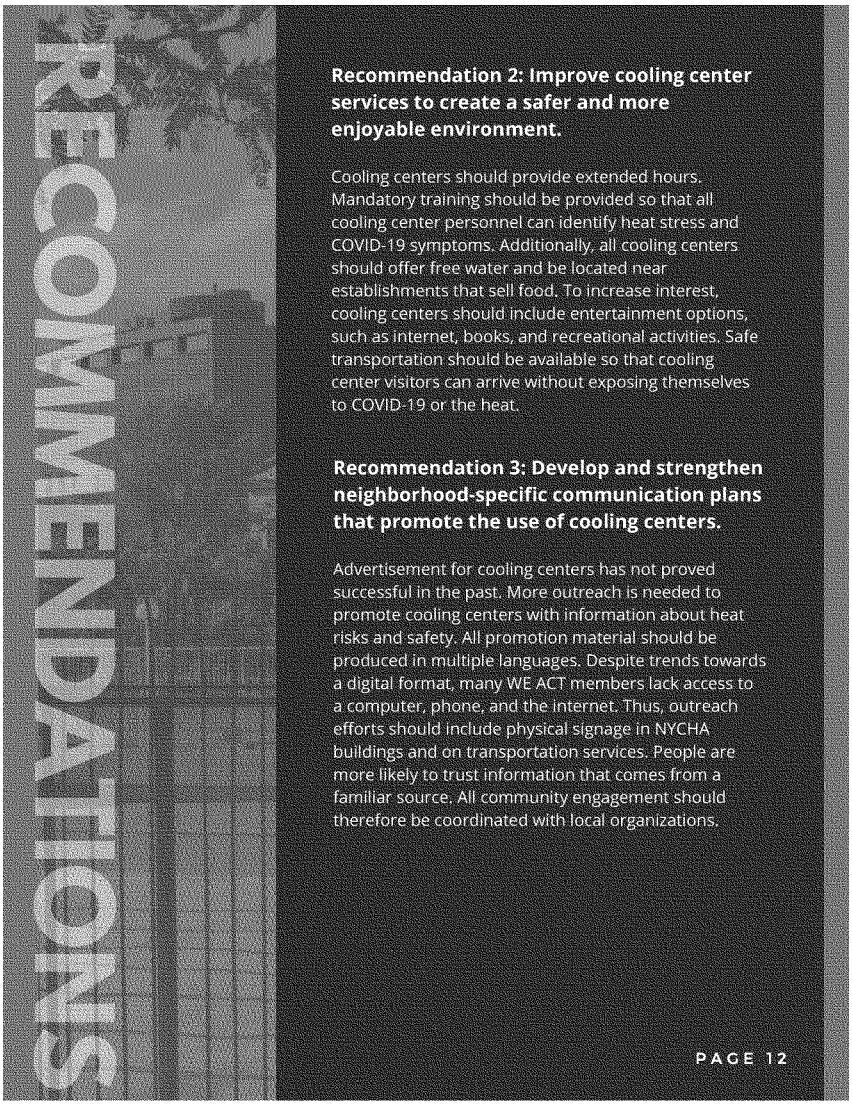
"Senior citizens found dead in their homes because of the heat...that's why people are doing anything about it now. They wait until things get extreme before doing anything."

"You will get down to your undies instead of paying for Con-Ed."

Feedback from the public regarding extreme heat highlights the strategic importance of a multidimensional approach that addresses the full spectrum of community members' concerns. The City should provide a platform for community members, especially vulnerable populations that are most impacted by extreme heat, to actively participate in developing plans to mitigate and respond to rising temperatures.


RECOMMENDATIONS
Recommendation 6: Develop a heat action plan to protect vulnerable populations during extreme heat events that is updated yearly.
A committee of government staff, medical professionals, EJ advocates, and community members should collaborate to design and compose a heat action plan that discusses:
The health impacts of extreme heat
The symptoms and medical recommendations to assist those affected by heat
The policies and programs that protect vulnerable populations
The city's strategy to reduce and respond to heat impacts
This should prioritize feedback and participation from vulnerable communities. It should be made publicly available online and shared with care coordinators.
PAGE 10


RECOMMENDATIONS
OBJECTIVE 4: ENCOURAGE THE USE OF AND IMPROVE THE AMENITIES OFFERED BY COOLING CENTERS.
Last summer WE ACT conducted an audit of Northern Manhattan's cooling centers to evaluate their effectiveness and recommend improvements. The main finding revealed that:
• Cooling center utilization is low. People typically only seek out cooling centers when they are planning to visit the site for other purposes.
• Schools that were opened as cooling centers had an especially low turnout.
• Around 12 percent of listed cooling centers were not open and functioning (22).
• Just 27 percent of cooling centers had appropriate signage to direct people to the center's location (22).
• Only 68 percent of centers offered books, games, newspapers and/or magazines to provide visitors with entertainment during their stay (22).
Recommendation 1: Install and upgrade cooling systems throughout the city.
While COVID-19 presents many challenges, it also creates an opportunity. Since many of the former cooling center sites will not be open, action should be taken to install and upgrade cooling systems now in preparation for future summers. This could provide employment opportunities to local community members and should be performed while adhering to the appropriate social distancing requirements.
PAGE 11

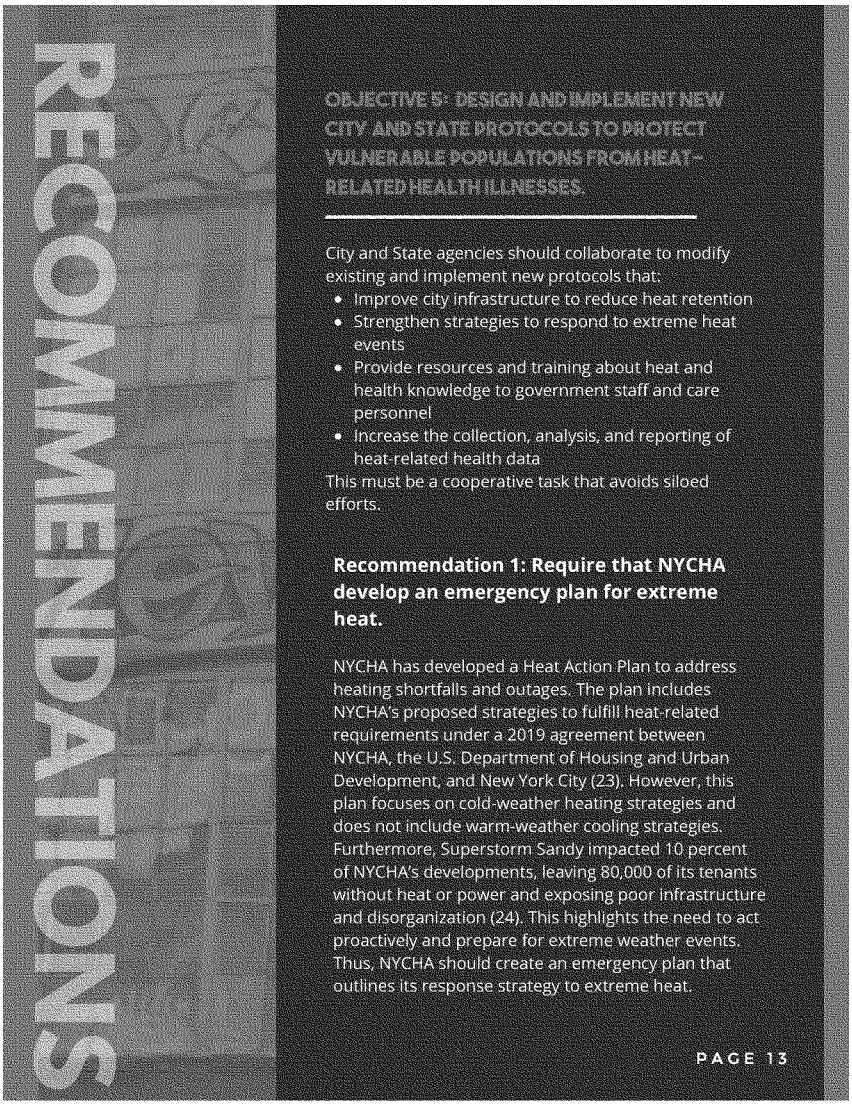


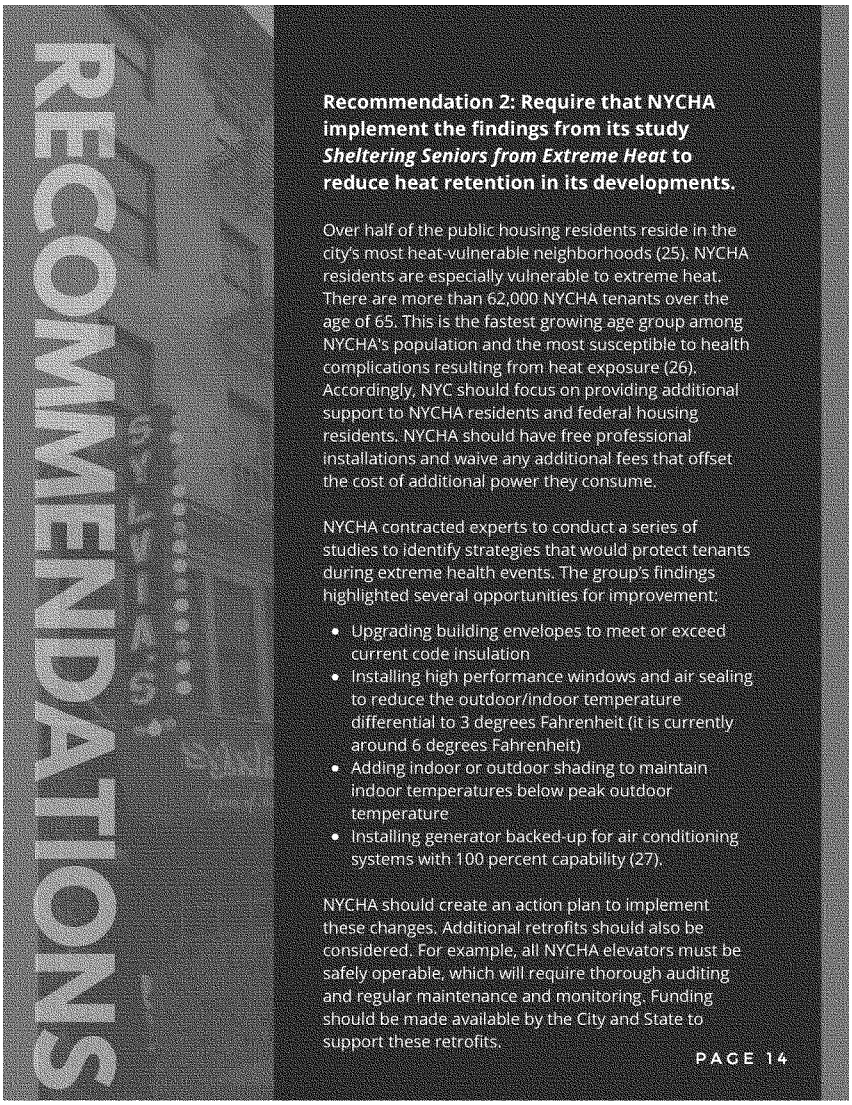
Recommendation 2: Improve cooling center services to create a safer and more enjoyable environment.

Cooling centers should provide extended hours. Mandatory training should be provided so that all cooling center personnel can identify heat stress and COVID-19 symptoms. Additionally, all cooling centers should offer free water and be located near establishments that sell food. To increase interest, cooling centers should include entertainment options, such as internet, books, and recreational activities. Safe transportation should be available so that cooling center visitors can arrive without exposing themselves to COVID-19 or the heat.

Recommendation 3: Develop and strengthen neighborhood-specific communication plans that promote the use of cooling centers.

Advertisement for cooling centers has not proved successful in the past. More outreach is needed to promote cooling centers with information about heat risks and safety. All promotion material should be produced in multiple languages. Despite trends towards a digital format, many WE ACT members lack access to a computer, phone, and the internet. Thus, outreach efforts should include physical signage in NYCHA buildings and on transportation services. People are more likely to trust information that comes from a familiar source. All community engagement should therefore be coordinated with local organizations.


RECOMMENDATIONS
OBJECTIVE 5: DESIGN AND IMPLEMENT NEW CITY AND STATE PROTOCOLS TO PROTECT VULNERABLE POPULATIONS FROM HEAT-RELATED HEALTH ILLNESSES.
City and State agencies should collaborate to modify existing and implement new protocols that:
• Improve city infrastructure to reduce heat retention
• Strengthen strategies to respond to extreme heat events
• Provide resources and training about heat and health knowledge to government staff and care personnel
• Increase the collection, analysis, and reporting of heat-related health data
This must be a cooperative task that avoids siloed efforts.
Recommendation 1: Require that NYCHA develop an emergency plan for extreme heat.
NYCHA has developed a Heat Action Plan to address heating shortfalls and outages. The plan includes NYCHA's proposed strategies to fulfill heat-related requirements under a 2019 agreement between NYCHA, the U.S. Department of Housing and Urban Development, and New York City (23). However, this plan focuses on cold-weather heating strategies and does not include warm-weather cooling strategies. Furthermore, Superstorm Sandy impacted 10 percent of NYCHA's developments, leaving 80,000 of its tenants without heat or power and exposing poor infrastructure and disorganization (24). This highlights the need to act proactively and prepare for extreme weather events. Thus, NYCHA should create an emergency plan that outlines its response strategy to extreme heat.
PAGE 13



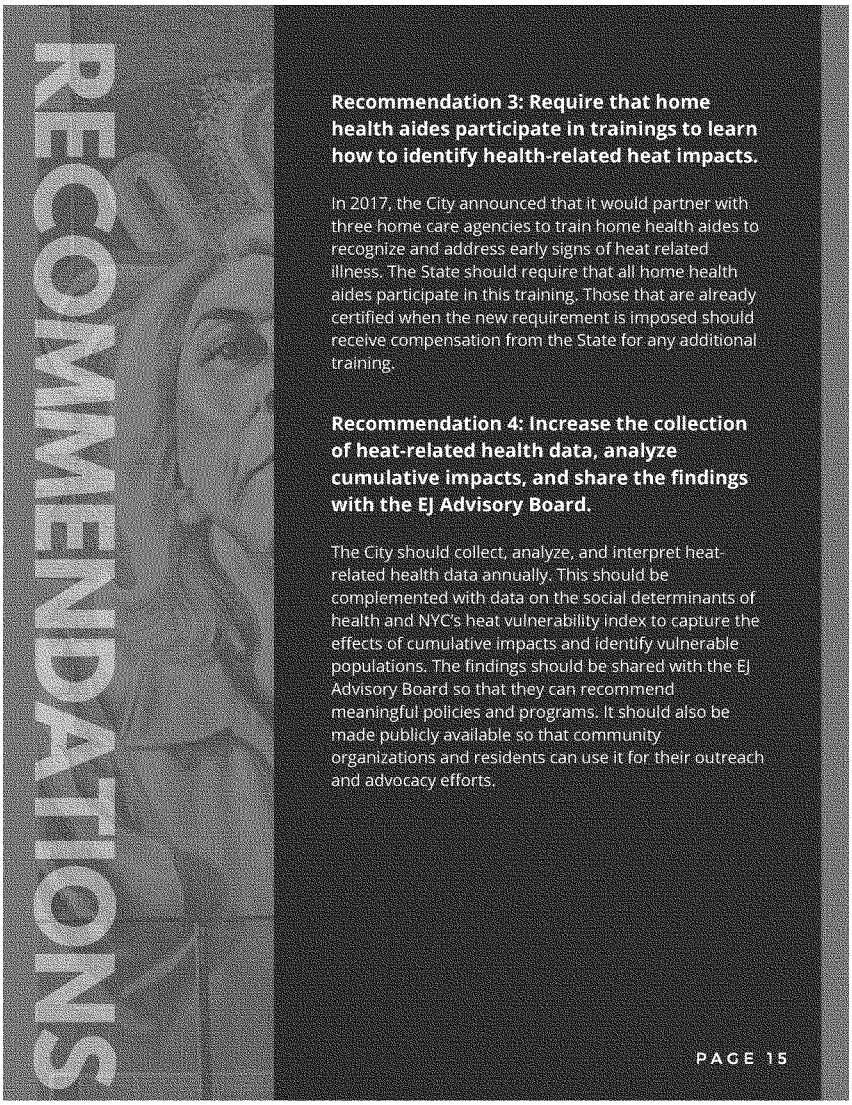
Recommendation 2: Require that NYCHA implement the findings from its study *Sheltering Seniors from Extreme Heat* to reduce heat retention in its developments.

Over half of the public housing residents reside in the city's most heat-vulnerable neighborhoods (25). NYCHA residents are especially vulnerable to extreme heat. There are more than 62,000 NYCHA tenants over the age of 65. This is the fastest growing age group among NYCHA's population and the most susceptible to health complications resulting from heat exposure (26). Accordingly, NYC should focus on providing additional support to NYCHA residents and federal housing residents. NYCHA should have free professional installations and waive any additional fees that offset the cost of additional power they consume.

NYCHA contracted experts to conduct a series of studies to identify strategies that would protect tenants during extreme health events. The group's findings highlighted several opportunities for improvement:

- Upgrading building envelopes to meet or exceed current code insulation
- Installing high performance windows and air sealing to reduce the outdoor/indoor temperature differential to 3 degrees Fahrenheit (it is currently around 6 degrees Fahrenheit)
- Adding indoor or outdoor shading to maintain indoor temperatures below peak outdoor temperature
- Installing generator backed-up for air conditioning systems with 100 percent capability (27).

NYCHA should create an action plan to implement these changes. Additional retrofits should also be considered. For example, all NYCHA elevators must be safely operable, which will require thorough auditing and regular maintenance and monitoring. Funding should be made available by the City and State to support these retrofits.

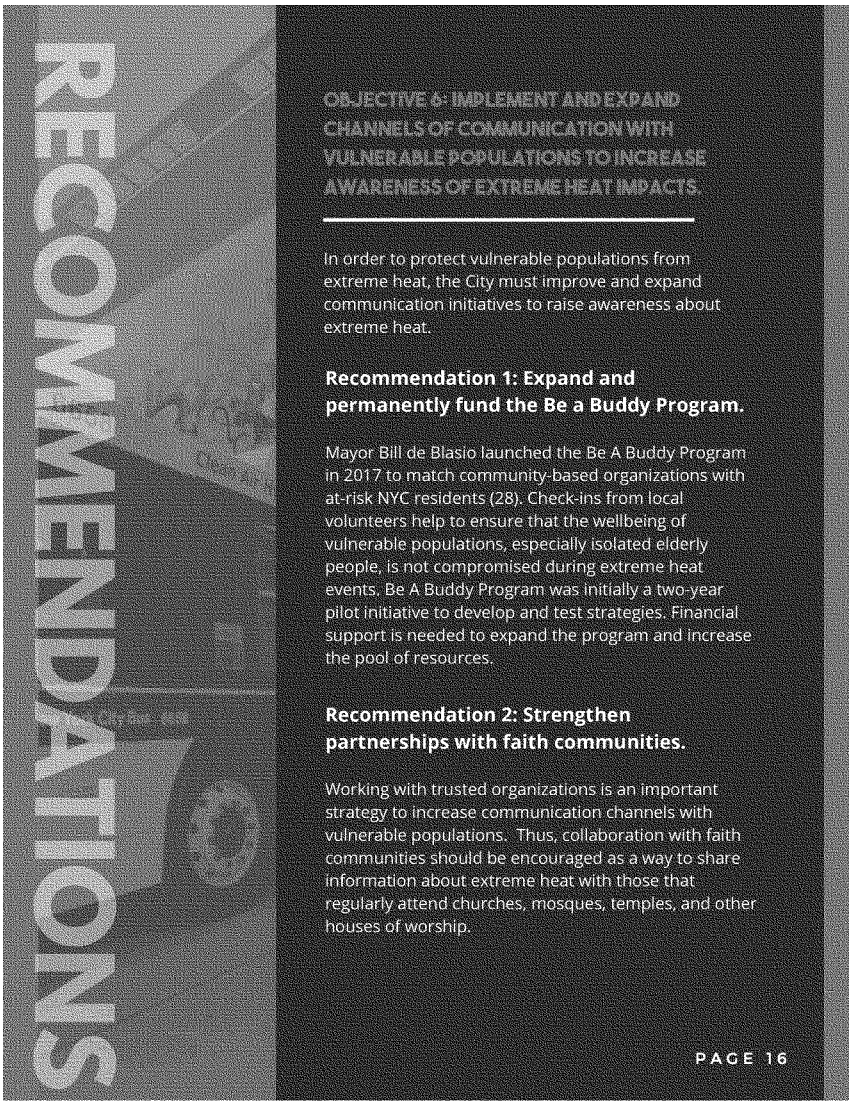


Recommendation 3: Require that home health aides participate in trainings to learn how to identify health-related heat impacts.

In 2017, the City announced that it would partner with three home care agencies to train home health aides to recognize and address early signs of heat related illness. The State should require that all home health aides participate in this training. Those that are already certified when the new requirement is imposed should receive compensation from the State for any additional training.

Recommendation 4: Increase the collection of heat-related health data, analyze cumulative impacts, and share the findings with the EJ Advisory Board.

The City should collect, analyze, and interpret heat-related health data annually. This should be complemented with data on the social determinants of health and NYC's heat vulnerability index to capture the effects of cumulative impacts and identify vulnerable populations. The findings should be shared with the EJ Advisory Board so that they can recommend meaningful policies and programs. It should also be made publicly available so that community organizations and residents can use it for their outreach and advocacy efforts.



OBJECTIVE 6: IMPLEMENT AND EXPAND CHANNELS OF COMMUNICATION WITH VULNERABLE POPULATIONS TO INCREASE AWARENESS OF EXTREME HEAT IMPACTS.

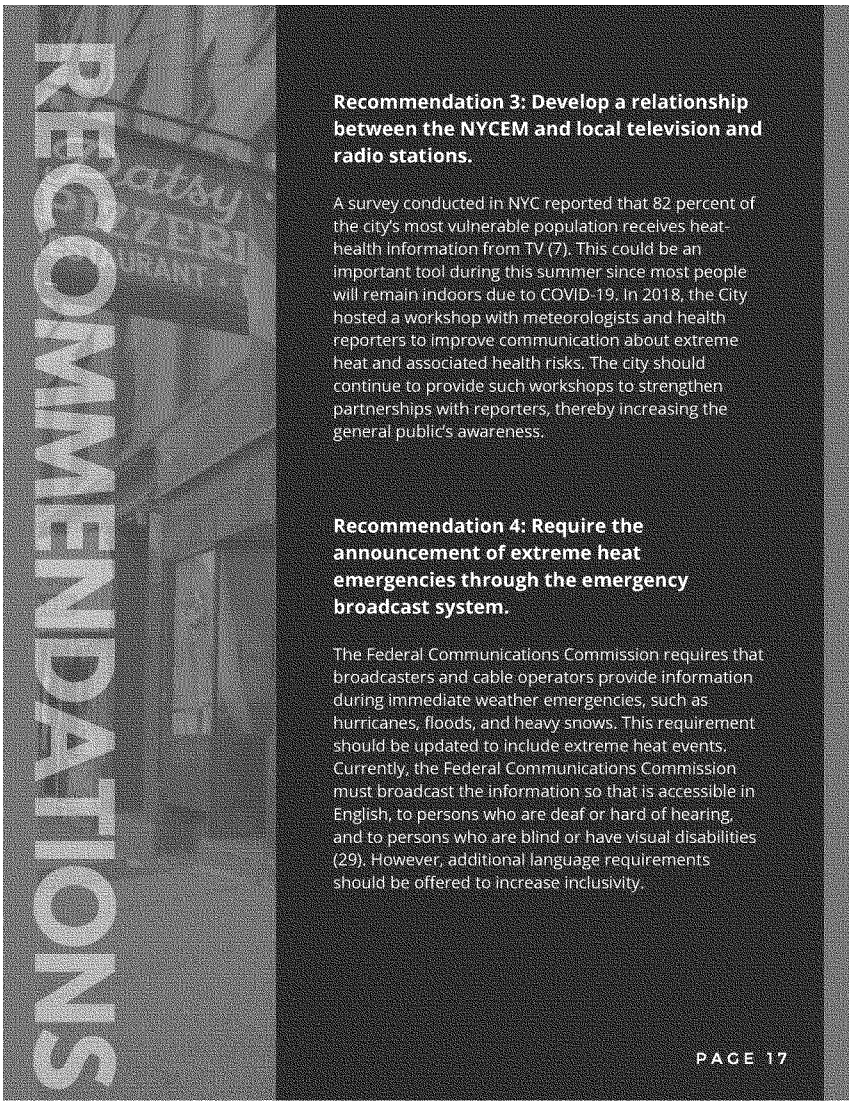
In order to protect vulnerable populations from extreme heat, the City must improve and expand communication initiatives to raise awareness about extreme heat.

Recommendation 1: Expand and permanently fund the Be a Buddy Program.

Mayor Bill de Blasio launched the Be A Buddy Program in 2017 to match community-based organizations with at-risk NYC residents (28). Check-ins from local volunteers help to ensure that the wellbeing of vulnerable populations, especially isolated elderly people, is not compromised during extreme heat events. Be A Buddy Program was initially a two-year pilot initiative to develop and test strategies. Financial support is needed to expand the program and increase the pool of resources.

Recommendation 2: Strengthen partnerships with faith communities.

Working with trusted organizations is an important strategy to increase communication channels with vulnerable populations. Thus, collaboration with faith communities should be encouraged as a way to share information about extreme heat with those that regularly attend churches, mosques, temples, and other houses of worship.



Recommendation 3: Develop a relationship between the NYCEM and local television and radio stations.

A survey conducted in NYC reported that 82 percent of the city's most vulnerable population receives heat-health information from TV (7). This could be an important tool during this summer since most people will remain indoors due to COVID-19. In 2018, the City hosted a workshop with meteorologists and health reporters to improve communication about extreme heat and associated health risks. The city should continue to provide such workshops to strengthen partnerships with reporters, thereby increasing the general public's awareness.

Recommendation 4: Require the announcement of extreme heat emergencies through the emergency broadcast system.

The Federal Communications Commission requires that broadcasters and cable operators provide information during immediate weather emergencies, such as hurricanes, floods, and heavy snows. This requirement should be updated to include extreme heat events. Currently, the Federal Communications Commission must broadcast the information so that is accessible in English, to persons who are deaf or hard of hearing, and to persons who are blind or have visual disabilities (29). However, additional language requirements should be offered to increase inclusivity.

OBJECTIVE 7: IMPLEMENT GREEN DESIGN TECHNIQUES AND INCREASE RENEWABLE ENERGY PRODUCTION TO PROMOTE NATURAL COOLING AND REDUCE NYC'S CARBON FOOTPRINT.

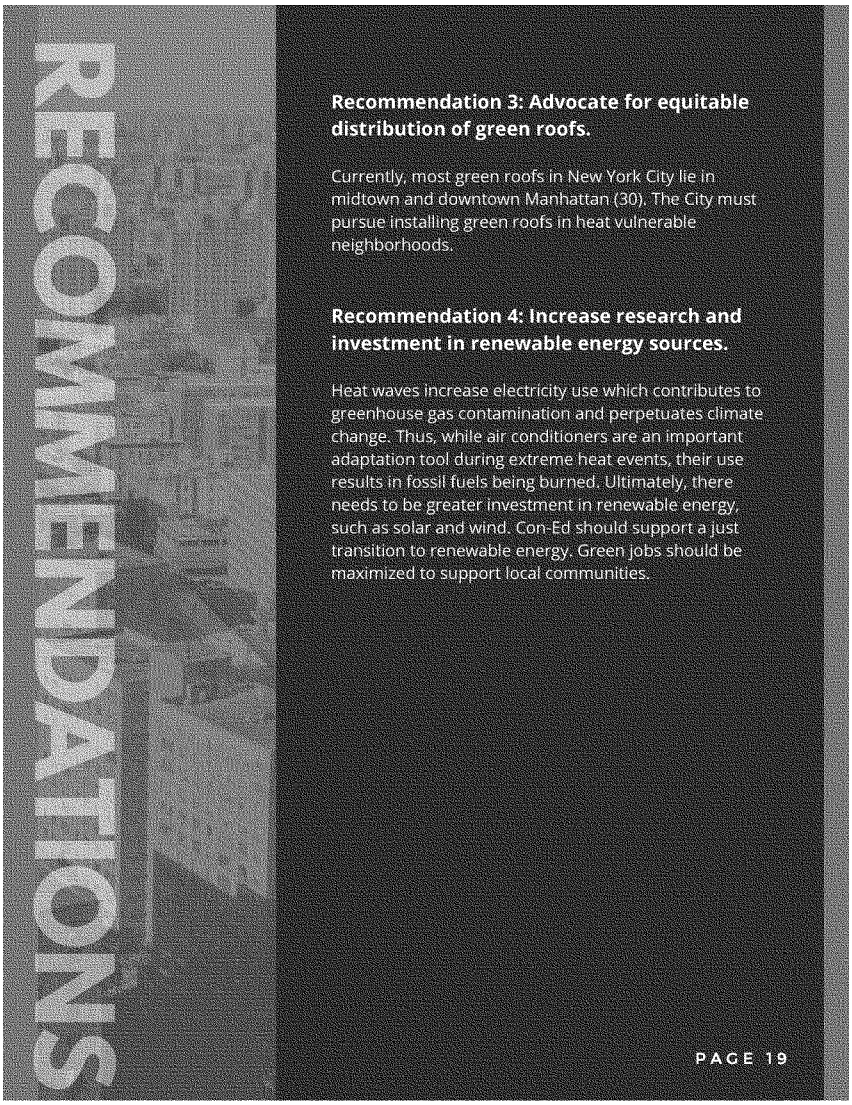
A/C units powered by fossil fuels emit greenhouse gases and exacerbate climate change impacts in the long-term. Green technologies and design, such as renewable energy and vegetation, can offer natural cooling mechanisms. This will require extensive research efforts and significant investment.

Recommendation 1: Plant vegetation and expand green spaces in neighborhoods with high heat vulnerability to reduce the urban heat island effect.

Shade from tree covering can help to naturally cool surrounding areas without the use of energy technologies that produce greenhouse gases, such as air conditioners. Many heat vulnerable neighborhoods have less canopy, and this inequitable distribution must be corrected.

Recommendation 2: Install shade covering over all pedestrian streets this summer.

This summer, the City is implementing 75 miles of pedestrian streets to facilitate social distancing during the COVID-19 pandemic. Street pavement absorbs heat, exposing pedestrians to heat risk. These streets must be covered with shade in order to reduce pedestrian exposure to heat. Priority to shading pedestrian streets must be given to heat vulnerable neighborhoods.



Recommendation 3: Advocate for equitable distribution of green roofs.

Currently, most green roofs in New York City lie in midtown and downtown Manhattan (30). The City must pursue installing green roofs in heat vulnerable neighborhoods.

Recommendation 4: Increase research and investment in renewable energy sources.

Heat waves increase electricity use which contributes to greenhouse gas contamination and perpetuates climate change. Thus, while air conditioners are an important adaptation tool during extreme heat events, their use results in fossil fuels being burned. Ultimately, there needs to be greater investment in renewable energy, such as solar and wind. Con-Ed should support a just transition to renewable energy. Green jobs should be maximized to support local communities.

CONCLUSION

New York City must pursue both short-term and long-term objectives to mitigate the negative impacts that extreme heat can have on the health of vulnerable populations. This will require collaboration and cooperation between government agencies, local organizations, community members, and private companies such as Con-Ed. Given the current restrictions posed by the COVID-19 crisis, the City's summer 2020 cooling strategies must incorporate the appropriate safety measures to protect New Yorkers, especially those that are susceptible to both heat illness and the virus. Plans should focus on expanding LIHEAP funds for cooling services, advocating for legislative action and policy reforms, strengthening emergency plans, improving the use and services of cooling centers, supporting changes to City and State protocols, increasing communication with community members, and implementing green technologies and design.

Additionally, NYC should analyze and evaluate other cities' heat initiatives and cooling programs to develop creative and effective policies. For instance, Paris created an application, EXTREMA Paris, that identifies nearby locations for users to cool off and allows them to create profiles for family members and friends to check on their heat risk (31). While there exists a digital divide in NYC, many residents have smart phones and could benefit from an application that provides information and data on cooling infrastructure and heat vulnerability. Barcelona provides another illustrative example. The city focused on the construction of green infrastructure to reduce the urban heat island effect. The city's plan aims to provide 400 acres of additional green space by 2030 (32). All programs, projects, and policies that New York City implements must champion social equity and prioritize supporting low-income households and people of color.

APPENDIX

List of objectives and corresponding recommendations.

1. **Expand LIHEAP to increase access to air conditioners and reduce the economic burden of electricity use for vulnerable populations.**
   a. Allocate more funding to LIHEAP.
   b. Expand LIHEAP program to finance energy efficiency retrofits.
   c. Revise the definition of eligible recipients for LIHEAP to promote equity and extend support to vulnerable populations that do not meet the current prerequisites.
2. **Advocate for legislative action to address and mitigate extreme heat impacts.**
   a. Support Introduction 1563-2019 to codify cooling centers in NYC.
   b. Support New York City Council Introduction 1945-2020 to require that NYC DOHMH publish heat vulnerability data annually.
   c. Support New York City Council Introduction 1960-2020 requiring the City to submit their summer heat plan by March 1st each year.
   d. Introduce bills that survey the level of green roof and solar roof penetration in environmental justice and heat vulnerable communities.
3. **Coordinate emergency planning strategies during extreme heat events to prevent power outages and promote safety.**
   a. Complete the installation of all 74,000 A/C units provided by the GetCool program by July 1st.
   b. Preemptively set maximum temperatures for larger buildings to reduce energy loads.
   c. Establish a maximum indoor temperature threshold for facilities that house heat vulnerable populations.
   d. Improve the delivery of portable generators.
   e. Support heat vulnerable communities in participatory visioning processes to develop plans for resilience to extreme heat.
   f. Develop a heat action plan to protect vulnerable populations during extreme heat events that is updated yearly.
4. **Encourage the use of and improve the amenities offered by cooling centers.**
   a. Install and upgrade cooling systems throughout the City.
   b. Improve cooling center services to create a safer and more enjoyable environment.
   c. Develop and strengthen neighborhood-specific communication plans that promote the use of cooling centers.
5. **Design and implement new City and State protocols to protect vulnerable populations from heat-related health illnesses.**
   a. Require that NYCHA develop an emergency plan for extreme heat.
   b. Require that NYCHA implement the findings from its study *Sheltering Seniors from Extreme Heat* to reduce heat retention in its buildings.
   c. Require that home health aides participate in trainings to learn how to identify health-related heat impacts.
   d. Increase the collection of heat-related health data, analyze cumulative impacts, and share the findings with the EJ Advisory Board.

APPENDIX

List of objectives and corresponding recommendations.

6. **Implement and expand channels of communication with vulnerable populations to increase awareness of extreme heat impacts.**
   a. Expand and permanently fund the Be a Buddy Program.
   b. Strengthen partnerships with faith communities.
   c. Develop a relationship between NYCEM and local television and radio stations.
   d. Require the announcement of extreme heat emergencies through the emergency broadcast system.
7. **Implement green design techniques and increase renewable energy production to promote natural cooling and reduce NYC's carbon footprint.**
   a. Plant vegetation and expand green spaces in neighborhoods with high heat vulnerability to reduce the urban heat island effect.
   b. Install shade covering over all pedestrian streets this summer.
   c. Advocate for equitable distribution of green roofs.
   d. Increase research and investment in renewable energy sources.

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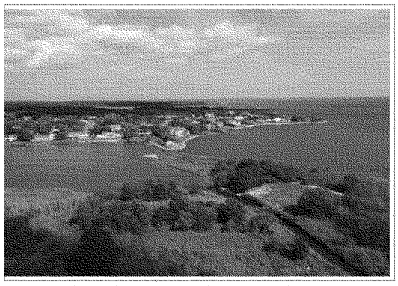
EXECUTIVE SUMMARY

The Protective Value of Nature summarizes the latest science on the effectiveness of natural infrastructure in lowering the risks to communities from weather- and climate-related hazards—benefits that we often describe as "natural defenses." Over the past two decades, the body of research evaluating and quantifying the protective performance of natural infrastructure has increased significantly. Both model-based assessments and empirical evidence from recent floods, hurricanes, wildfires, and other natural disasters underscore the considerable risk reduction services that natural systems such as wetlands, reefs, dunes, floodplains, and forests provide. At the same time, natural infrastructure offers numerous additional benefits to society, from provision of food and clean water for people and habitat for fish and wildlife, to recreational opportunities, and cultural and spiritual fulfillment.

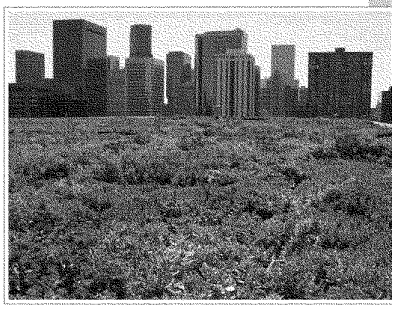


Long Island Nationwal Wildlife Refuge, New York. Photo: U.S. Fish and Wildlife Service

As we highlight throughout this report, evidence suggests that both natural and nature-based approaches for hazard mitigation can be equally or more effective than conventional structural approaches, and they are often more cost-effective. "Natural" approaches refer to intact or restored systems, such as wetlands, forests, and coral reefs; "nature-based" approaches mimic natural systems but are designed and constructed by people. Since healthy, intact ecosystems are often adapted to natural disturbances such as floods and wildfires, they may have the capacity to withstand or recover from extreme weather- and climate-related hazards and adjust to ongoing environmental changes. Conventional structural approaches (i.e., "gray infrastructure"), on the other hand, often require ongoing maintenance, and may need costly repairs when they fail or are damaged (Gittman and Scyphers 2017, Gray et al. 2017, Smith et al. 2017). Thus, natural defenses can play a critical role in enhancing the resilience of human and ecological systems to natural disasters and climate change.

Yet, the use of natural infrastructure for hazard risk reduction has not achieved its full potential. This is due, in part, to perceptions that conventionally engineered approaches, such as seawalls, levees, or dams, are always more effective—despite numerous instances when they have failed (Briaud et al. 2008, Gray et al. 2017, Koskinas et al. 2019). Further, national policies and programs have encouraged development in hazard-prone areas and have resulted in the degradation of existing natural systems that help to absorb floodwaters and buffer communities. As our human population continues to grow and a changing climate increases the frequency and severity of extreme weather events, risks from natural hazards will continue to escalate. Thus, there is an urgent need to dramatically scale up the application of natural infrastructure to better protect our communities.

This report, which builds on two previous publications published by the National Wildlife Federation, Allied World, and other partners (Natural Defenses from Hurricanes and Floods [Glick et al. 2014] and *Natural Defenses in Action* [Small-Lorenz et al. 2016]), is intended to synthesize and elevate the latest science to enhance awareness of the benefits of natural defenses and increase understanding of their effectiveness. The report also highlights key policy reforms needed to mainstream and increase the use of natural infrastructure in communities across the country.

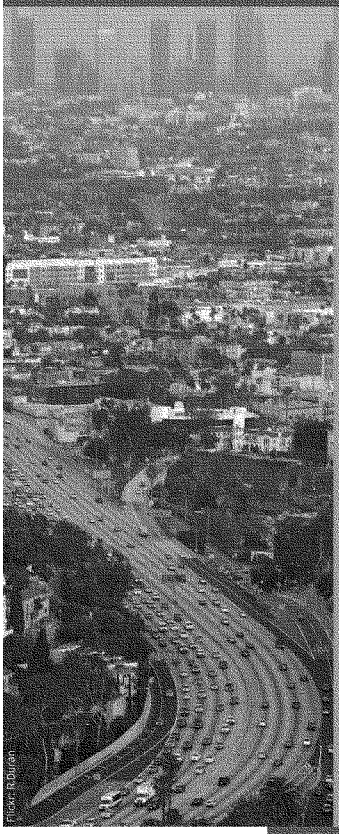


A green roof in the heart of Denver, Colorado. Photo: U.S. Environmental Protection Agency

[For full report, see www.nwf.org/protective-value-of-nature]

More Extreme Heat Waves: Global Warming's Wake Up Call

NATIONAL WILDLIFE FEDERATION 2009



Flickr: R Duran

Global warming will bring more extreme heat waves. As the United States warms another 4 to 11°F on average over the next century, we will have more extremely hot summer days. Every part of the country will be affected. Urban areas will feel the heat more acutely because asphalt, concrete, and other structures absorb and reradiate heat, causing temperature to be as much as 10°F higher than nearby rural areas.

Urban air pollution will be exacerbated by more extreme heat. Warm, sunny conditions accelerate the formation of ground-level ozone, a major component of smog. Even if air pollution is improved, as required by the Clean Air Act, global warming could mean an extra 10 parts per billion (ppb) of ozone during heat waves in the Midwest and Northeast, forcing some cities to take even more aggressive steps to meet the 75 ppb ozone standard.

Heat waves disproportionately impact the very old and very young, as well as people who are poor, have asthma or heart disease, or live in big cities. With often diminished health and a greater likelihood of living alone, the elderly are especially vulnerable. As the U.S. demographics shift toward an older and more urban population, efforts to protect these at-risk communities from extreme heat will become increasingly important.

Natural habitats and agriculture are also vulnerable to extreme heat. More extreme temperatures are already pushing wildlife and their habitats beyond their normal tolerance levels. Heat-related declines have been documented for wild salmon and trout, moose, and pika. Livestock and crops have lower productivity and increased mortality associated with heat stress and drought.

We can reduce the severity of heat waves and their impacts on vulnerable people. Curbing global warming pollution as much and as quickly as possible is an essential first step. Shifting to clean solar energy is an especially promising option because sunlight is plentiful during heat waves, when electricity demand for air conditioning peaks. At the same time, we must make our cities cooler and greener; for example, introducing more green space – parks, trees, and "green" roofs – can greatly reduce the urban heat island effect. Furthermore, cities must implement public health measures to reduce the impact of extreme heat that we can not avoid.

NATIONAL WILDLIFE FEDERATION

PSR® Physicians for Social Responsibility

CONFRONTING GLOBAL WARMING

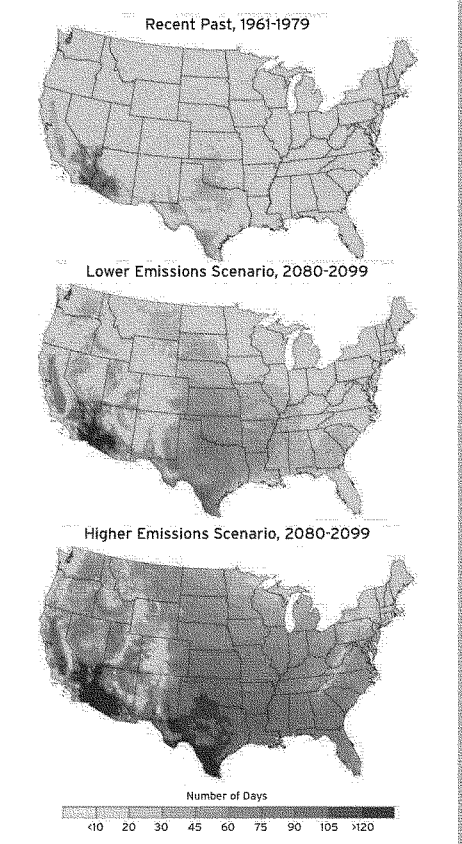


FIGURE 1:
The number of days in which the temperature exceeds 100°F for (top) the 1960s and 1970s, (middle) the 2080s and 2090s under a lower emissions scenario, and (bottom) the 2080s and 2090s under a higher emissions scenario.[6] If global warming emissions are not curbed, many parts of the country will have more than two months each year with 100-degree weather.
SOURCE: U.S. Global Change Research Program

Hot Days Ahead

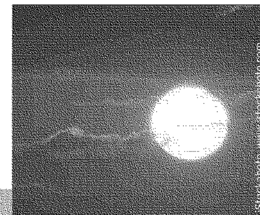
The United States has warmed more than 2°F over the last 50 years, even more than the warming averaged for the whole planet.[1] This warming has shifted the annual distribution of temperatures to warmer temperatures, thereby making record hot days more likely and extremely cold days less likely. Nighttime temperatures have increased somewhat more than peak daytime temperatures, an alarming trend because excess heat-related mortality has been linked to unusually warm nights.[2]

The Dust Bowl Era in the 1930s brought some of the most frequent and severe heat waves on record for the United States. These extremely high temperatures were associated with an intense multi-year drought pattern that affected the Great Plains, likely caused by natural oscillations in ocean surface temperatures.[3] In contrast, the recent increase in heat waves is associated with world-wide warming, attributed to human-caused emissions of greenhouse gases. Furthermore, the recent heat waves have often been accompanied by high humidity, which contributes to elevated nighttime temperatures as water vapor condenses and releases heat to the atmosphere.[4]

With another 4 to 11°F warming projected for the United States over the next century, heat waves will continue to get worse, especially if steps are not taken to reduce greenhouse gas emissions.[5] In fact, the magnitude of emissions will have a significant impact on the number of days over 100°F we will have each year, as shown in Figure 1. For example, heat wave days in Chicago could quadruple by the end of the century. The average number of deaths associated with

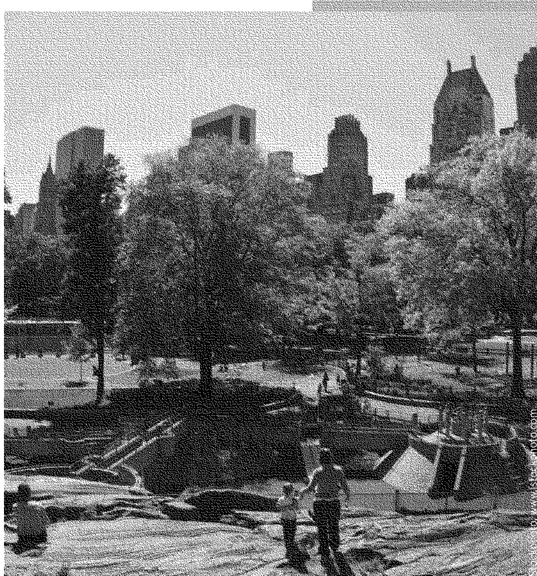
extremely hot weather could increase by twice that, even after accounting for the likely acclimatization to warmer temperatures and efforts to put public health assistance programs in place.[6]

It is well known that cities feel the heat more acutely due to the urban heat island effect. Asphalt, concrete, and other structures absorb and reradiate heat in cities, increasing temperatures by as much as 10°F compared to nearby rural areas.[7] Urban parks, tree planting, and "green" roofs can reduce the urban heat island effect by providing shade and increasing the rate of daytime evaporation, which has a cooling effect.[8]



BUT THIS SUMMER HAS BEEN SO COOL WHERE I LIVE...

With mostly pleasant temperatures across the Midwest and Northeast in summer 2009, it is easy to lose sight of the long-term warming trend. But, this is not the time to let down our guard. This temporary respite is due largely to natural climate oscillations working in our favor. We are nearing the end of a minimum in the 11-year solar cycle during which the Earth is receiving slightly less heat from the Sun. At the same time, the jet stream has taken an unusually southern track across the nation this summer, bringing more Arctic air and less tropical air to the Midwest and Northeast.



These sorts of natural variations will continue to take place as the climate warms.[9] When it comes to heat waves, we need to prepare for the years when the natural variations line up in the opposite way: a year with maximum solar heating, a northward shift in the jet stream, and global warming could add up to record hot weather.[10]

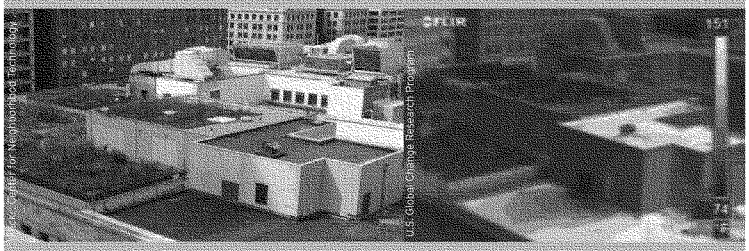
Furthermore, while it has been pleasantly cool in some parts of the country, the South and West have been sweltering. At the end of June 2009, numerous daily temperature records were equaled or broken in Texas, Louisiana, and Mississippi.[11] In late July the Pacific Northwest had an extreme heat wave as a high pressure weather system stalled overhead. While these specific events can not be blamed on global warming, it is likely that warming did make them worse than they might otherwise have been.

CHICAGO HEAT WAVE OF JULY 1995

Chicago experienced one of the most severe heat waves to strike the United States in recent memory. Temperatures peaked at 106°F on July 13, and high humidity and high nighttime temperatures exacerbated the impact. Over 5 days in July 1995, approximately 739 people died and 3,300 people visited the emergency room with heat-related ailments.[13] The high demand for electricity led to brownouts and blackouts, leaving people without air conditioning when they needed it most.

Many of the victims were elderly poor living in the heart of the city, who had no air conditioning or could not afford to turn it on. Other vulnerable groups included those already suffering from chronic illness,[14] confined to bed, unable to care for themselves, or isolated. Because people with pre-existing medical conditions are more vulnerable to heat, the number of deaths attributed to this episode is probably underestimated because the other illness would be recorded as the primary cause of death.[15] Mortality rates among black people were 50 percent higher than those for white people,[16] perhaps reflecting discrepancies in poverty and access to health care.

Following this devastating heat wave, the City of Chicago developed detailed response plans. When a similar heat wave occurred in 1999, strongly worded warnings were issued immediately, over 90 cooling centers were opened across the metropolitan area, and over 30,000 at-risk individuals were personally contacted. These efforts are credited with limiting the heat-related mortalities to 114 individuals.[17] In addition, the city embarked on a program to identify places in the city where heat tends to build up, figure out the reasons for these hot spots, and identify steps to address them, such as reflective or green roofing.[18]



A green roof at Chicago's City Hall has been observed to be as much as 77°F cooler than nearby conventional roofs.[19] The infrared photograph on the right shows the temperature difference between the two types of roofs on a hot day.

Warming Degrades Urban Air Quality

In areas that already have problems with air pollution, global warming will make it even harder to reduce smog. Warmer temperatures accelerate the chemical reactions in the atmosphere that create unhealthy ground-level ozone, a major component of smog. At the same time, warmer conditions increase emissions of ozone precursors. For example, increased demand for air conditioning means more emissions from electricity generation, and wildfires are more common when the weather is hot and dry. Finally, heat waves are typically associated with stagnant air masses and strong inversions that trap and recirculate ozone pollution, rather than allowing it to disperse.[20]

Future ozone pollution levels will depend on the emissions pathways for both greenhouse gases and other ozone precursors. Figure 2 shows that average surface ozone could increase by 2 to 15 percent under a higher emissions scenario, or could decrease 4 to 12 percent under a lower emissions scenario.[21] A subsequent study quantified the climate penalty, even if ozone precursor emissions are decreased as required by the Clean Air Act. They found that global warming could increases the daily maximum 8-hour average concentration of ground-level ozone 3 to 5 parts per billion (ppb) by 2050 in the Midwest and Northeast. During heat waves, higher temperatures and increased stagnation could lead to increases exceeding 10 ppb.[22] This climate penalty will require some cities to take even more aggressive steps to meet the 75 ppb ozone standard.

Some emissions reductions offer a win-win in terms of both limiting global warming and improving air quality. Methane is both an ozone precursor and a potent greenhouse gas, which makes a strong case for reducing its emissions.[23] Curbing emissions of fine soot particles, which include black carbon that directly absorbs incoming solar heat, would have similar benefits. These particles can exert a strong local warming effect and have significant impacts on respiratory and cardiovascular health.[24]

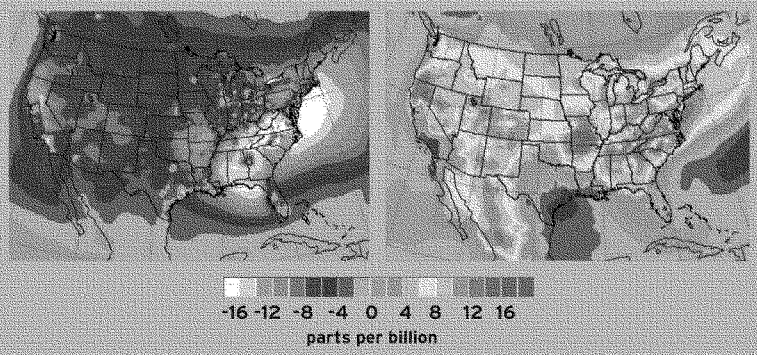


FIGURE 2:

Change in summertime ground-level ozone in the 2090s compared to the average for 1996-2000. The left panel shows decreasing ozone almost everywhere under a lower emissions scenario. The right panel shows widespread increases in ozone under a higher emissions scenario.[25]

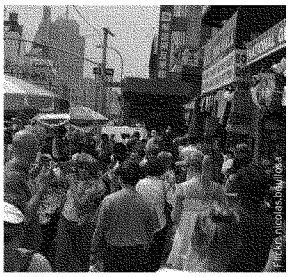
SOURCE: U.S. Global Change Research Program

Heat Waves and Health

Heat waves can be deadly, especially for the very old and the very young. Between 1999 and 2003, more than 3,400 people in the United States died from exposure to excessive heat.[26] Historically, about 20 to 28 percent of weather-related deaths have been due to heat, more than any other single weather-related cause in some analyses.[27]

Mortality can occur due to heat stroke or exacerbation of underlying health conditions, one reason that the elderly are more vulnerable.[28] For example, extreme heat increases the risk of heart attack, strokes, and asthma attacks. The increased air pollution that typically accompanies heat waves can especially harm children, who have a higher risk of developing asthma, have lungs that are still developing and growing, and have higher exposure because they breathe at a higher rate than adults and spend more time outdoors engaging in vigorous physical activity.[29]

Air conditioning and other responses can mitigate some of the risk associated with extreme heat.[30] Air conditioning use has expanded significantly in the United States. Fifty-six percent of households had air conditioning in 1978 compared to 84 percent in 2005, including 97 percent of households in the South.[31] Expanded use of air conditioning along with heat warning and watch systems and other public health interventions helped reduce mortality from heat waves from the 1970s through the 1990s. Since then, however, mortality has stayed about the same, suggesting that the combination of an aging population and more oppressively hot days may be offsetting the benefits of more widespread access to air conditioning.[32]



Residents of cities are at elevated risk due to the urban heat island effect. Northern city residents have less access to air conditioning on average and are often not as well acclimated to extremely hot temperatures, especially early in summer.[33] That ozone pollution and high temperatures affect mortality synergistically further increases the risk in cities where air quality is typically poorer.[34]

HEAT WAVES AND THE ELDERLY

The elderly are especially vulnerable to extreme heat because their bodies are less able to effectively regulate temperatures.[35] Their risk is further heightened because the elderly often have diminished health and are more likely to live alone.[36] The severe European heat wave in 2003 is a stark example of this risk: more than 30,000 people, mostly elderly, perished due to heat that summer.

At the same time that extreme heat waves are becoming more likely, the U.S. population is aging. More than one fifth of U.S. citizens are expected to be over 65 years of age by 2050 and 5 percent will be over 85 years.[37] By 2030, Florida, California, and Texas are projected to add the greatest number of elderly people, and the largest number of elderly poor, as shown in Figure 3.[38] These elderly poor can have the added risk of being unable to afford health care or air conditioning. Thus, efforts to protect the elderly from extreme heat will become increasingly imperative in the coming decades.

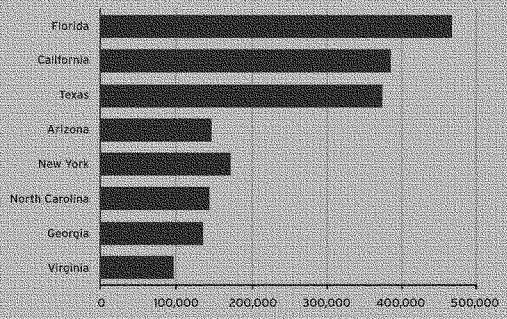
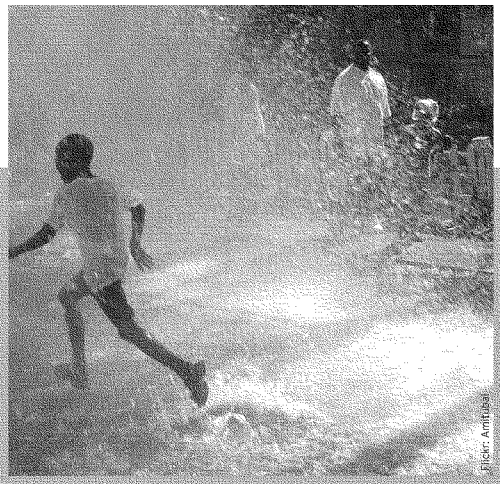


FIGURE 3:
Projected increase in number of elderly poor from 2000 to 2030.
SOURCE: U.S. Census Bureau



Flickr: Amitdas

HEAT WAVES AND ENVIRONMENTAL JUSTICE

People living in cities and those with low income are more vulnerable to extreme heat waves. Over 43 percent of black people in the United States live in urban areas, compared to 20 percent of white people. And, blacks are twice as likely as other Americans to live in poverty. Thus, they are both more likely to live in the places where heat waves are most severe and less likely to be able to afford air conditioning, insulation, and other home improvements that reduce exposure to extreme heat.[39]

The prevalence of asthma is about 28 percent higher for black people in the United States than for white people, making them more vulnerable to the elevated air pollution associated with heat waves. Even more troubling is that the asthma mortality rate for blacks is nearly triple the rate for whites.[40] This startling discrepancy is largely attributed to socioeconomic differences, including indoor and outdoor air quality, smoke exposure, and access to healthcare.[41]

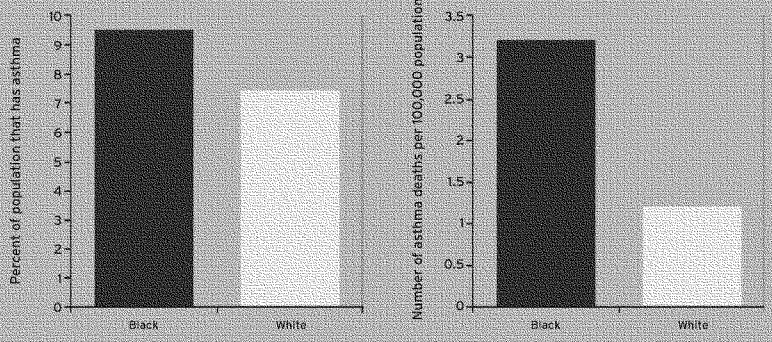


FIGURE 4:

Asthma prevalence and mortality rate for black and white Americans in 2005.

SOURCE: Center for Disease Control

Cities on the Frontlines

Cities are especially vulnerable to heat waves. Global warming will mean that nearly every city in the United States will be affected by more extreme heat. Yet, differing climatic, demographic, and socioeconomic conditions will mean that some locations at more risk than others.

We examined four major risk factors associated with heat-related mortality to identify 30 large cities in the United States that are especially vulnerable to heat waves based on current conditions (see Table 1).[42] Factors considered include:

- **Number of oppressively hot days each year.** We used the Spatial Synoptic Classification system developed by Scott Sheridan at Kent State University to calculate the 1979 to 2008 average of daily dry tropical and moist tropical air masses during the summer months of June, July, and August. A subset of extremely hot tropical days is used for areas where hot weather is common.[43]

- **Fraction of homes without central air conditioning.** We used the *American Housing Survey* conducted by the U.S. Census Bureau.[44] The Metropolitan-level surveys are conducted in different years for selected locations. Possible trends in air conditioning use could modify results slightly.

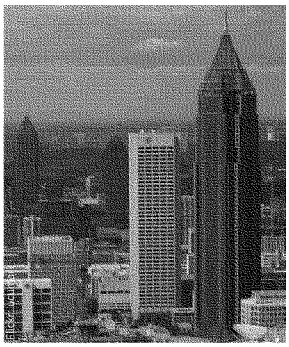
- **Ground-level ozone pollution.** For the most populous county in each metropolitan region, we used the quantity designated by the U.S. Environmental Protection Agency (EPA) for compliance with air quality standards: the 4th highest 8-hour ozone concentration. The 2006-2008 average of this value was considered in this analysis. Metropolitan areas must keep this quantity below 75 ppb to meet the current standard.[45]

- **City population living in poverty.** We used the 2007 U.S. Census Bureau estimates for population and poverty rates, where the poverty level is defined as annual income of less than $16,530 for a family of three.[46]

These four factors were given equal weight and summed to identify the 30 cities in Table 1 that have elevated risk. The cities are grouped into three tiers, with Tier 1 having the most vulnerability. More than 10 percent of the U.S. population resides in these cities, and many more live in the broader metropolitan areas they anchor.

Some cities make the list because they have a high number of extremely hot days each year, for example, cities in Texas and Oklahoma. Because hot weather is common in these places, central air conditioning is installed in most homes, and the remaining homes typically have one or more room air conditioning units. The widespread use of air conditioning reduces the vulnerability to some extent.

Another group of cities make the list because of the low availability of air conditioning. For example, only 24 percent of homes in Buffalo, New York have central air. If the number of extremely hot days there quadruples, as could be the case under a higher emissions scenario, then significant investments and planning will be



required to help residents cope with extreme heat. This effort will have to contend with high poverty levels in many of these cities. The eight cities on the list with low availability of central air in the Northeast and Midwest have an average poverty rate of 23 percent, about double the national average.

Philadelphia, Pennsylvania stands out as a city with high levels of all the risk factors considered. This is no doubt a reason that the city has been especially proactive in developing a system to reduce the risk of heat-related mortality. The program combines heat alerts, personalized outreach to elderly residents, a voluntary program by which electric utilities refrain from shutting off services, public cooling places with extended hours, and home improvement assistance for low-income residents. Over its first three years, the program is estimated to have saved 117 lives.[47]

Other factors could be considered in such an analysis, for example, the percentage of city residents who are elderly, live alone, and other demographic variables; health indicators such as prevalence of asthma, cardiovascular disease, or diabetes; the amount of green space in the city; and climate projections for future heat waves. Analyses that have considered these other factors have identified a similar distribution of cities at risk.[48]

TABLE 1: EXTREME HEAT RISK FACTORS FOR 30 U.S. CITIES

	City	Average number of days per summer with oppressive heat	Percent of households without central air conditioning	Ground-level ozone in parts per billion relevant to EPA standard	Percent of households below poverty line	
TIER 1	Boston, MA	12	73	79	20	
	Charlotte, NC	15	16	94	12	
	Dallas, TX	20	8	82	21	
	Houston, TX	18	11	93	21	
	Los Angeles, CA	9	61	110	19	
	New York, NY	11	84	78	19	
	Philadelphia, PA	16	52	89	24	
	Phoenix, AZ	20	8	82	18	
	Sacramento, CA	19	20	103	14	
	San Diego, CA	10	65	93	12	
TIER2	Austin, TX	21	8	78	18	
	Baltimore, MD	12	25	87	20	
	Buffalo, NY	5	76	82	28	
	Chicago, IL	11	40	78	21	
	Detroit, MI	10	39	82	34	
	Memphis, TN	15	19	83	26	
	Oklahoma City, OK	18	16	80	16	
	Saint Louis, MO	19	14	82	22	
	Tulsa, OK	21	16	79	19	
	Washington, DC	15	12	88	16	
TIER 3	Atlanta, GA	10	9	93	23	
	Cincinnati, OH	5	36	85	24	
	Cleveland, OH	8	49	82	30	
	Las Vegas, NV	15	8	83	12	
	Louisville, KY	15	17	79	17	
	New Orleans, LA	10	25	79	32	
	Pittsburgh, PA	6	48	86	21	
	Raleigh, NC	16	16	80	12	
	San Antonio, TX	12	22	80	18	
	Toledo, OH	11	49	76	23	

Heat Waves Could Cause Waves of Extinction

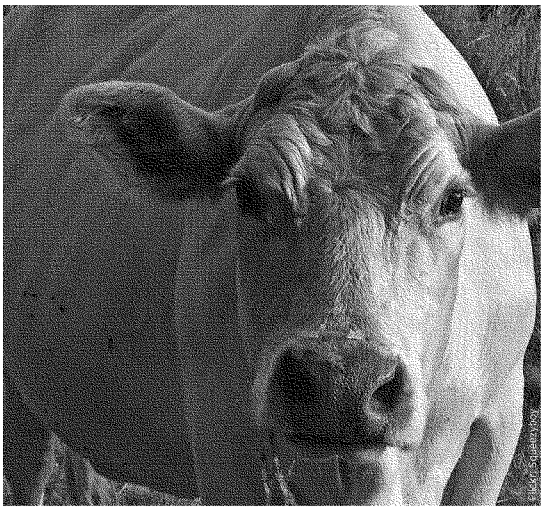
Wildlife and their habitats have natural mechanisms to help them endure normal summertime heat waves. However, the more extreme temperatures brought on by global warming are pushing wildlife and their habitats beyond their normal tolerance levels.[49]

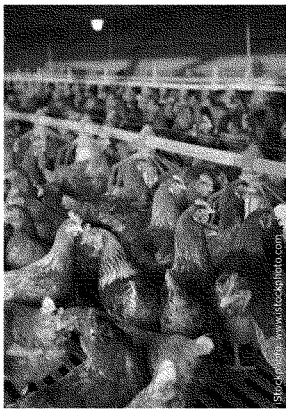
Fish that prefer cold water are already being impacted by more intense heat waves. The summer of 2007 brought the largest known fish kill in the 135-year history of Yellowstone National Park as trout succumbed to high water temperatures. Park rangers had little choice but to implement unprecedented fishing closures on some 232 miles of rivers throughout the Park to reduce stress on the fish.[50] Warmer water could also shrink available habitat for Coho salmon by 23 to 41 percent by 2100 if greenhouse gas emissions are not reduced.[51]

Terrestrial species are also vulnerable to heat waves. Minnesota's northwestern population of moose has plummeted from over 4,000 to fewer than 200 animals in the last two decades. Scientists believe that warmer summers stressed the moose, which then ate less and became more vulnerable to parasites and diseases as their body condition declined.[52] The pika, a small mammal related to the rabbit, has also been disappearing from the lowest portions of its western high mountain habitat. Pikas are well adapted to the cold, but stop foraging for grasses and herbs when summer midday heat becomes too warm. Currently, the U.S. Fish and Wildlife Service is considering whether the pika should be listed under the Endangered Species Act because global warming is rapidly eliminating viable habitat.[53]

Plants are also vulnerable to heat stress.[54] Although increases in carbon dioxide can enhance plant growth, normal metabolic processes such as photosynthesis become disrupted and plant growth slows when temperatures exceed certain tolerance

levels. An even greater concern, however, is the reduced soil moisture that accompanies heat waves, which can stress and even kill otherwise healthy plants. The combined moisture and heat stress makes trees and other plants more susceptible to disease, insect infestation, and wildfire.[55]





Heat Waves and Agriculture

The nation's three most important commercial livestock species – cows, pigs, and poultry – are all sensitive to extreme heat.[56] Recent studies indicate that the negative effects of hotter summers will outweigh the positive effects of warmer winters. For example, the optimal temperature range for milk production is 31 to 79°F, with higher temperatures causing cows to decrease their food intake, which reduces milk production.[57] One study found that dairy operations in the Southeast, Appalachia, and the southern Plains could see a 10 percent decline in annual yield if global warming pollution continues unabated.[58]

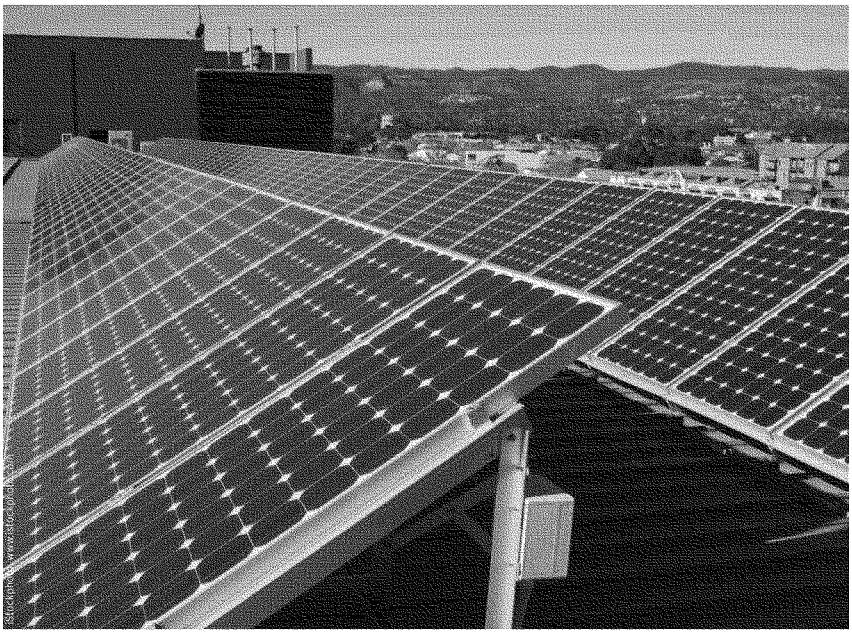
Even relatively brief spikes in temperature can be deadly for livestock, especially if they come early in the summer, before animals have had a chance to acclimate to warmer conditions. In June 2009, nearly 4000 cattle died in Nebraska when temperatures jumped to the 90s after a long, cool spring. Elevated humidity kept the heat index high overnight, further stressing the animals.[59]

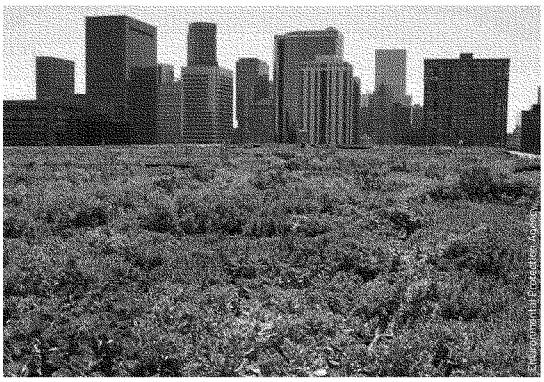
High temperatures at critical development stages can also significantly reduce yields of wheat, rice, maize, potato, and soybean crops.[60] Exposure to high temperatures during pollination can be especially detrimental. The most costly heat-related crop losses typically occur when extreme temperatures are paired with drought conditions. The August 2007 drought and heat wave that affected the Southern United States is a prime example. By late in the month, the corn crops in Alabama and Tennessee were devastated.[61]

Keeping Our Cool: Recommendations for a Warming World

We need to take these trends toward more extreme heat waves into account when designing urban areas and public health programs. We can no longer plan based on the climate we used to have. Fortunately, there are several common-sense strategies for addressing extreme heat waves, some of which also provide other benefits such as energy cost savings, air pollution reductions, and improved urban landscapes. In particular, we must:

Reduce global warming pollution to minimize future extreme heat waves. To limit the magnitude of changes to the climate and the impacts on communities and wildlife, we must curb global warming pollution as much and as quickly as possible. It is important that policy makers, industry, and individuals work together to reduce global warming pollution from today's levels by at least 80 percent by 2050. This target is achievable with technologies either available or under development, but we must take aggressive action now to avoid the worst impacts. Shifting from reliance on burning fossil fuels to solar energy sources has the combined benefits of greatly reduced air pollution and plentiful energy when electricity demand for air conditioning peaks during extreme heat waves. Furthermore, emissions of methane and black carbon should be reduced to address both global warming and air pollution.

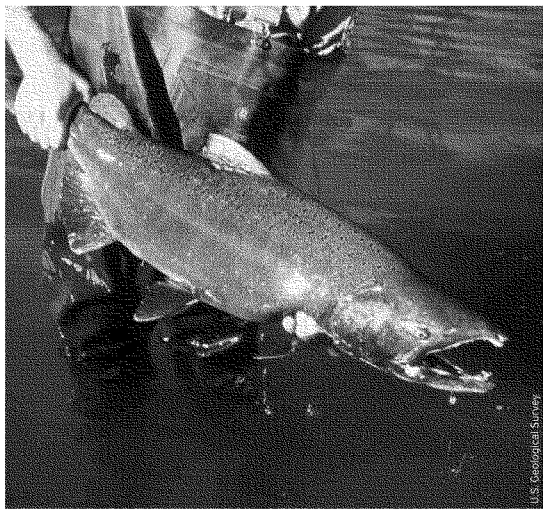




Make cities cooler and greener. Well-designed urban areas can contribute significantly to reducing the potential health impacts of extreme heat waves. More reflective or lighter colored roof coatings and other building materials absorb less heat and can reduce some of the urban heat island effect. Similarly, introducing more green space – parks, trees, and "green" roofs – can greatly reduce the urban heat build-up. Vegetation absorbs less incoming sunlight than pavement, concrete, and other building materials, and also provides some cooling through evapotranspiration. Greener cities can have the added benefits of providing local sources of fresh produce from community gardens and creating educational and community-building opportunities.

Implement public health measures that reduce the impact of extreme heat waves. Planning for extreme heat waves has been shown to significantly reduce health impacts on urban residents. Cities vulnerable to extreme heat should develop heat watch and warning systems. Such programs can identify dangerous conditions and alert residents through public service announcements, hotlines, and personalized outreach to at-risk citizens, especially the elderly, homeless, and poor. Cities also can establish public cooling places and encourage electric companies to refrain from shutting off services for non-payment. In addition, cities and charitable organizations can provide assistance to low-income residents for light-colored roof coatings, improved insulation, and to lessen cooling costs (similar to programs that provide winter heating assistance). Stakeholders from vulnerable communities should be included in decision-making processes to ensure that policies and programs address their needs and concerns.

Safeguard wildlife, fish, and habitats from extreme heat. Targeted habitat restoration and wildlife management approaches can reduce the impact of extreme heat on key species. For example, cold water fish can be assisted by restoring stream-shading vegetation, maintaining sufficient in-stream flows to keep water cooler, and restricting catch and release fishing when summertime stream temperatures reach stressful levels. Congress should include dedicated funding to take these and other steps for safeguarding natural resources in comprehensive climate change legislation.



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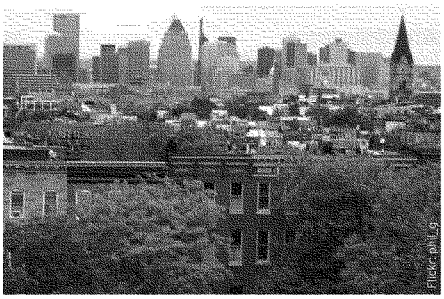

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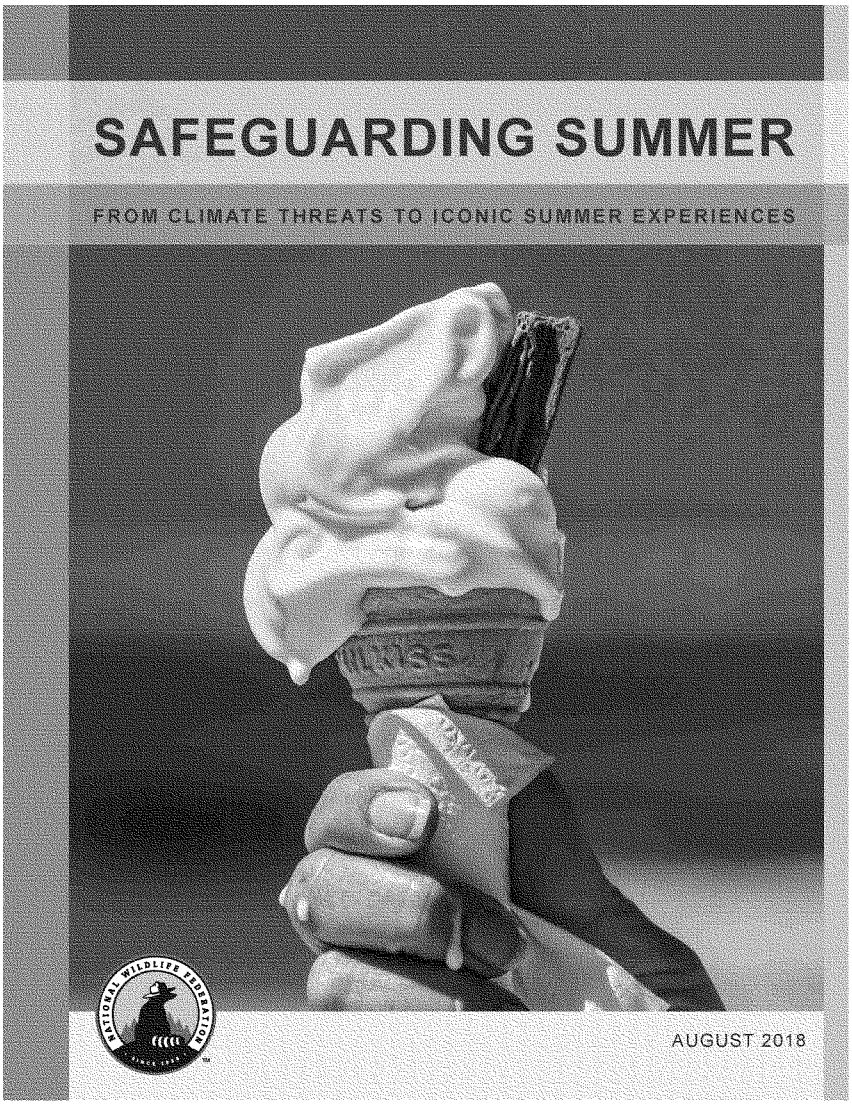
SAFEGUARDING SUMMER
FROM CLIMATE THREATS TO ICONIC SUMMER EXPERIENCES
AUGUST 2018

SAFEGUARDING SUMMER

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Lead authors: Frank Szollosi and Casey Skeens

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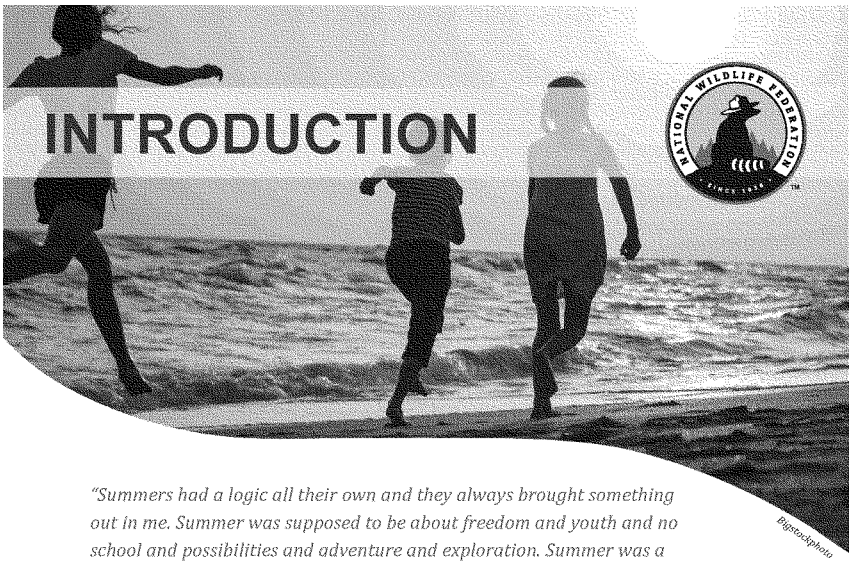
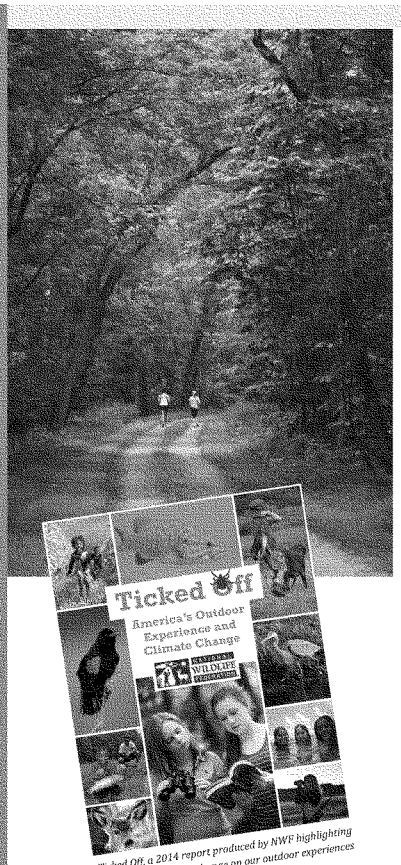


"Summers had a logic all their own and they always brought something out in me. Summer was supposed to be about freedom and youth and no school and possibilities and adventure and exploration. Summer was a book of hope. That's why I loved and hated summers. Because they made me want to believe." —*Benjamin Alire Sáenz, Texan and author of popular children's books*

Summer in the United States is, for most of us, a distinct, time-bound season especially suited for enjoying time outdoors, swimming, fishing, hiking, cooking, boating, and spending hours with friends and family. We go to parks and baseball and softball games, let our children walk barefoot in the grass or on beaches, make lemonade, tend gardens and grills, and look for ways to cool off, either in a pool, sprinkler or in a lake, pond, bay, or ocean. And when we go outside, we remember what the experts have said and try not to forget the sunscreen and bug spray, and we bring along clean drinking water.

But what happens when, as a result of human-caused climate change, we load the dice and disrupt the rhythms of summer that we grew up experiencing? What happens when sea levels rise and changing ocean currents scrub away our favorite beaches? When forest fires are supercharged by drought? When toxic algal outbreaks foul waterfronts, threaten drinking water, disrupt charter fishing, and pose fatal risks to our pets? When more ticks, mosquitoes, noxious weeds, and even allergens get a leg up and more frequently and intensely disrupt public health? When baseball games are increasingly rained out in the spring and unbearably hot in the middle of July? How do more ticks hurt iconic species like moose? When are people with low or fixed incomes forced to make tradeoffs to escape an increasing number of days of extreme heat?

Our summertime experiences are being impacted now by climate change, and if we don't make the public policy and personal decisions that scientists have long advocated, wildlife, critical habitat, and many human activities will face even greater disruptions in the near and distant future.



Ticked Off, a 2014 report produced by NWF highlighting the effects of climate change on our outdoor experiences and what needs to be done to combat it.

Photo above: The towpath in the Chesapeake & Ohio National Historical Park is a popular recreational trail. Photo: Doug Inkley

In this follow-up to our 2014 report, *Ticked Off*, we chronicle emerging science and present recent developments across the country that can help you connect the dots—and spur advocacy for the local, state and federal public policy needed to combat the drivers of climate change. We also present steps that you can take to reduce the emissions that spur climate change as well as help our communities, wildlife, and habitat adapt to some changes that have already occurred or are, at this point, simply unavoidable.

Now is the time to engage with this science, with these stories, and with decision-makers in business, education and in local, state, and federal government. Although the rate of change can make discussing climate change difficult, by connecting popular and time-honored outdoor summertime experiences with science, we think you will be motivated to join us in taking action to preserve the "great American summer" for our children and future generations.

WHAT'S AT STAKE

IMPACTS TO OUTDOOR RECREATION

Nearly half of the people in the U.S. spend time engaged in outdoor recreation including canoeing, fishing, hiking, camping, hunting, kayaking, swimming, bird and wildlife watching, and more.[1] Today, this outdoor economy is worth $887 billion in the U.S. economy and supports 7.6 million jobs.[2] But a changing climate is negatively impacting these recreational activities because of rising temperatures, more frequent extreme weather events, and increases in the number of pests like ticks.

In 2016, over 103 million U.S. residents 16 years and older participated in wildlife-related recreation. This love of the outdoors is an important pastime for many Americans. Over 35.8 million people fished, 11.5 million hunted, and 86.0 million participated in at least one type of wildlife-watching activity.[3]

EXCESSIVE HEAT AND ENERGY POVERTY

Summer days and nights are turning deadly, as the number of consecutive days above 90 degrees Fahrenheit increasingly occur, especially across cities in the northern United States. According to the National Weather Service, excessive heat causes more U.S. deaths than any other natural disasters.[4] The well-documented "urban heat island" effect—where over a period of days or weeks excessive daytime heat is retained by asphalt and buildings—is leading to more nights where overnight temperatures in some urban areas stay above 80 degrees Fahrenheit. In some cities, that warmer air is increasingly very humid, as warmer air is able to retain more moisture. With increases in humidity, human's natural defense to overheating—perspiration—is much less effective. In regions across North America where air conditioning wasn't needed in the past, vulnerable citizens are disproportionately impacted by summer time heat.

Paying for air conditioning to cope with excessive heat costs poor and fixed-income Americans a much greater share of their monthly household income, forcing many to make difficult choices that may result in eviction and homelessness, hunger, forgoing healthcare, or enduring dangerous summer heat, a substantial risk to the elderly, infants, and those who already have serious health conditions.

U.S. cities with highest percentage of low and fixed income people paying high energy bills

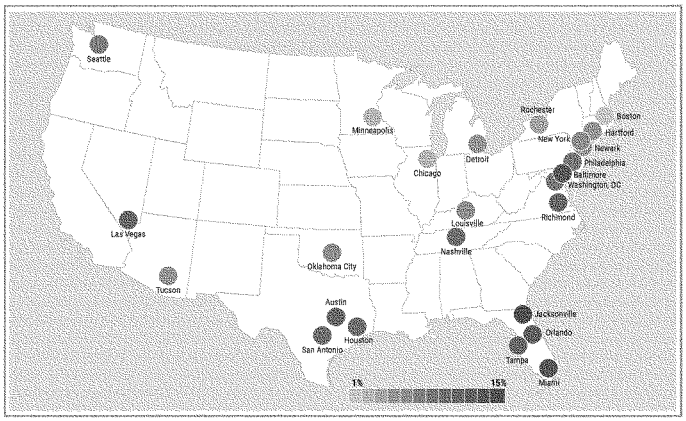
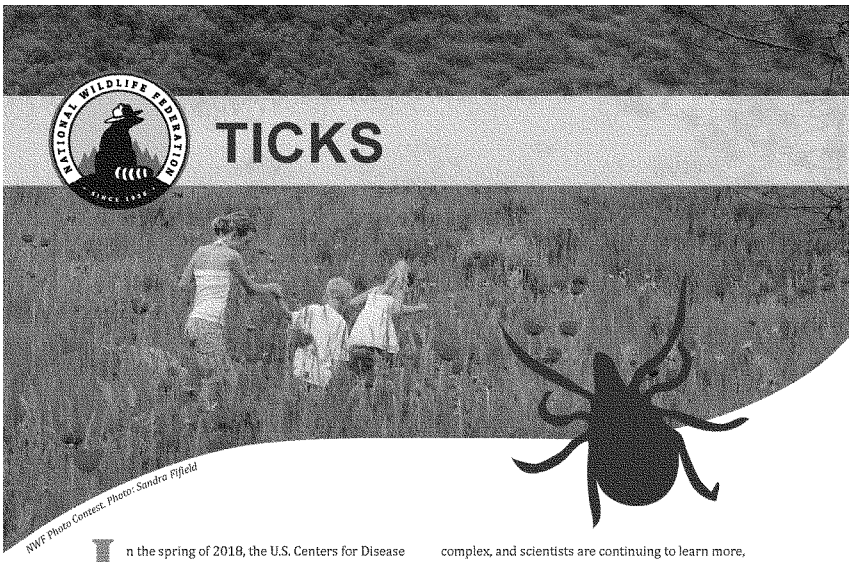


Figure 1: While the median electricity bill in the United States in 2013 was approximately $114 a month, a large number of low income families pay more than $200 a month on electricity. This is a serious burden for these households considering that a family of four living in poverty earns $24,250 a year. There are five cities where over 10 percent of those living in poverty pay in excess of $200 a month on their power bills: Jacksonville, Baltimore, Miami, Orlando, and Austin. Source: Groundswell Institute[5]



TICKS

NWF Photo Contest. Photo: Sandra Fifield

In the spring of 2018, the U.S. Centers for Disease Control and Prevention (CDC) issued a warning that the risks from tick-borne diseases would increase as a result of warming winters across the United States. Lyme disease, spread by ticks, is being called the "first epidemic of climate change" in a new book by Mary Beth Pfeiffer.[6] Lyme disease is now the most common vector-borne disease in the United States, making it a big problem for outdoor lovers.

The CDC estimates that about 300,000 Americans get Lyme disease each year, even though only about 35,000 diagnoses are reported.[7] As the climate warms, ticks are both expanding their range and overwintering in greater numbers. According to the European Commission and others, climate change is enabling mosquitoes to expand the reach of human diseases such as dengue, chikungunya, Zika, West Nile, and yellow fever.[8]

Ticks, which are not insects but arachnids (like spiders), are pests that Americans are struggling to avoid. The ways in which temperature, humidity, and precipitation are affecting the spread of tick-borne illnesses is complex, and scientists are continuing to learn more, but some general trends can be gleaned:

- The geographic areas in which ticks can survive and thrive are expanding as a result of climate change.

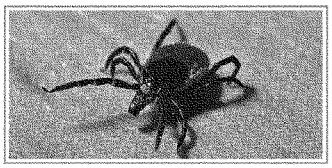
- Milder winters, which are becoming more frequent as a result of climate change, also result in more ticks surviving the cold season. This can lead to tick-population booms, which in turn can increase the risk of tick-borne illness.

Only a few species of ticks can transmit disease to people. Of these, different species transmit different diseases.[9] According to the U.S. Centers for Disease Control and Prevention, the incidence of tick-borne diseases more than doubled between 2004 and 2016. Ticks were also responsible for three-quarters of all vector-borne disease reports (i.e. fleas, mosquitoes, ticks, etc.). The most prevalent disease carried by ticks was Lyme disease, which accounted for 82 percent of all tick-borne cases. However, spotted fever and other diseases are also on the rise.[10]

BLACKLEGGED TICKS MOVE INTO THE CITY, BRINGING LYME DISEASE

Many people assume that city living protects them from outdoor pests like ticks, but in a changing world this is no longer the case. In the Northeast, the primary host of blacklegged ticks is the white-footed mouse. Warming winters and displacement of natural habitats by development is leading to surging populations of these mice in many suburban and urban landscapes.[11] White-tailed deer, another tick host, are also increasing in density in many of these same areas. As a result, many cities and suburbs in the region are experiencing dramatic increases in the number of mice carrying ticks capable of transmitting Lyme disease.[12]

Lyme disease, caused by the bacterium *Borrelia burgdorferi*, can be a serious illness if not identified quickly and treated with antibiotics. Infected individuals will see a rash around the bite area that looks like a bullseye. If treated quickly, the negative effects of Lyme disease can usually be avoided. But for a small subset of people, antibiotics do not work. If the bite is not detected and treated, Lyme disease can turn into a debilitating illness that can cause joint stiffness, brain inflammation, and nerve pain. Ticks usually must be attached for 36-48 hours before they can transmit the disease, so early detection and removal is critical for preventing infection.[13]



Blacklegged tick, the vector for Lyme disease.
Photo: Jerzy Gorecki/Pixabay

"This spring I encountered numerous blacklegged deer ticks while outdoors. The doctor put me on antibiotics when a classic bull's-eye rash characteristic of Lyme infection appeared. This is nothing like when I was a kid running around in the woods of central Vermont. We didn't even think about ticks because there weren't any here! Now, they seem to be everywhere, and I take appropriate precautions whenever I go outside."

— Doug Inkley, NWF Senior Scientist (retired)

LONE STAR TICKS CAUSE MEAT ALLERGIES

Another summer tradition for millions of Americans is barbecue. The lone star tick—which is spreading throughout United States—is associated with a different suite of diseases, including allergies to meat in people. This allergy is caused by a small sugar molecule called alpha-gal that triggers the human immune system to create antibodies to attack the sugar molecule. This can be a problem for fans of barbecue and other meat eaters as meat has lots of alpha-gal, and human antibodies now trigger an allergic reaction in response.

There is a delay in the time it takes for the full reaction to be triggered, so people can have a challenging time connecting meat consumption to their symptoms.

These symptoms include hives, shortness of breath, vomiting, and diarrhea. In severe cases, patients have needed to seek emergency room treatment. There is no cure for the allergy once it develops.[14]

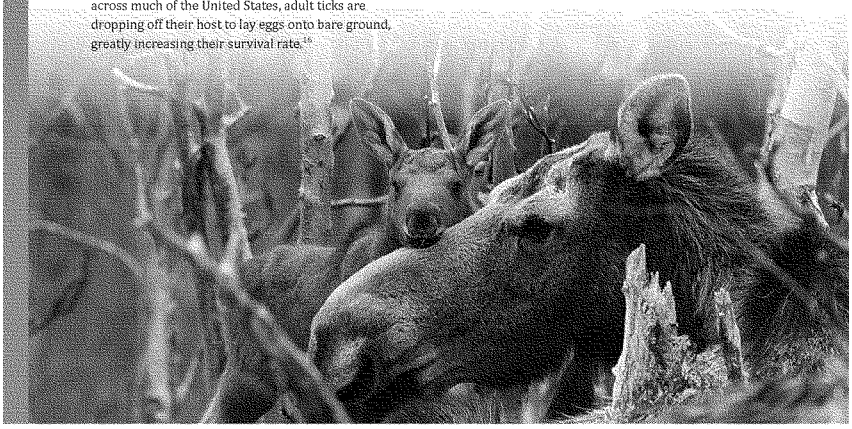
IMPACTS ON WILDLIFE

Winter ticks are a common parasite for large game in North America. During the fall, winter tick larvae transfer from vegetation to large mammals, such as moose, when they brush by them. A moose can be parasitized by thousands of ticks at a time, as they stay on their host throughout their winter lifecycle.[15]

Increasing winter temperatures are setting the stage for explosive increases in tick populations. Tick activity increases as temperatures increase, meaning they have more time to find a host during a warmer fall. A late onset of winter also means higher tick populations, since snow and cold normally help kill some of them off. With less snow on the ground in many locales across much of the United States, adult ticks are dropping off their host to lay eggs onto bare ground, greatly increasing their survival rate.[16]

Winter ticks can infest moose, elk, caribou, white-tailed deer, and mule deer, but moose appear to be the most susceptible to severe infestation. It is unclear why, but their vulnerability appears to be related to the fact that they are less effective at grooming the ticks off. Severe infestations can cause high moose mortality as the winter progresses. Heavily-infested moose lose body heat due to hair loss and suffer extensive blood loss from the ticks.[17]

Moose are in jeopardy across the continental U.S.—from New Hampshire, Vermont, and Maine, to Minnesota, Michigan, and Wyoming. Rising winter tick populations in Maine, New Hampshire, and Vermont have contributed to increased mortality, reduced productivity, and population decline. The New Hampshire moose population has plummeted by more than 40 percent in the last decade from over 7,500 moose to just 4,000 today. In 2014, tick overloads contributed to a 64 percent mortality rate of radio-collared moose calves in the state. As a result, the moose hunting season has been cut back, with about 80 percent fewer permits issued.[18] In 2014, moose hunting permits in Maine were slashed by 25 percent because of an explosion in the winter tick population.[19]



Moose in Gaspesie National Park, Quebec, Canada. Photo by National Wildlife Photo Contest entrant Philippe Henry.

BEACHES

Pacific Ocean. Photo: OpenClipart-Vectors/Pixabay

According to the National Climate Assessment, 180 million tourists make a stop on one of our coasts every year, joining 160 million U.S. coastal residents.[20] That translates to a lot of trips to a beach to swim, fish, sunbathe, picnic, watch birds, or enjoy water sports. Beaches, composed largely of slender ribbons of sand, face disruptions from land use change and often punishing, extreme weather events. Climate impacts such as sea-level rise, flooding, and increasing severity and frequency of heavy storms are taking additional tolls, and experts are sounding the alarm that many popular beaches are at heightened risk from erosion, and in certain cases, to the point of some beaches disappearing completely.

A recent U.S. Geological Survey study found—absent significant and costly resilience projects—as many as two-thirds of Southern California beaches are at risk of being washed away by 2100 from sea-level rise.[21] In 2017, the iconic beach at Big Sur was closed from a massive mudslide on Highway 1, due to an abnormally wet spring.

Florida's more than 1,200 miles of coastline—including barrier islands, beaches and inlets—are increasingly subjected to more intense storm surges and nuisance flooding. According to Florida SeaGrant, "almost half of the state's beaches are already experiencing critical erosion" and "local expectations of beach quality may have to be modified" as a result of a large deficit of nearshore, available sand in some Florida coastal areas.[22] "Beach renourishment" —a process of importing vast quantities of sand and sediment to restore receding beaches—in Florida alone has cost $2.17 billion, largely paid for by federal taxpayers.[23] Unfortunately, both beach erosion and beach renourishment are detrimental several species of sea turtles, contributing to their endangerment.[24]

Sea Turtle. Photo: Pexels/Pixabay

THREATS TO OUR BEACHES AND COASTLINES

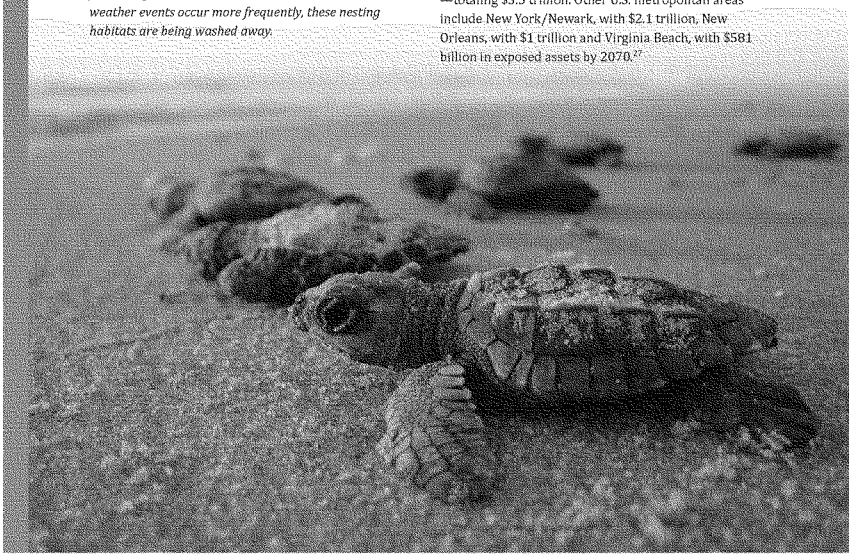
A National Wildlife Federation affiliate, Virginia Conservation Network, recently wrote to state officials:

Virginia's beaches and coastal waters also support five of the seven sea turtle species found worldwide. Every year between 5,000 and 10,000 sea turtles swim into the Chesapeake Bay. Most of these turtles are the threatened loggerhead and endangered Kemp's ridley, which depend on the bay for food and safety. The loggerhead sea turtle also depends on the bay's sandy beaches and dunes for nesting habitat. As the sea level rises and extreme weather events occur more frequently, these nesting habitats are being washed away.

Further, the gradual subsidence of coastal land in Virginia is magnifying the impacts of sea-level rise in the region. At Swells Point in Norfolk, water levels over the past 80 years have risen 14.5 inches — well above the global average.[25]

Beaches are at risk from inundation in both the near- and long-term. Scientists with the U.S. National Oceanic and Atmospheric Administration project up to 2.1 feet (0.63 meters) of sea level rise by 2050, 8.2 feet (2.5 meters) by 2100.[26]

An international study found that several U.S. coastal cities ranked in the top twenty for future assets exposed to coastal flooding by 2070. Miami, Florida is projected to have the most at-risk assets in the world—such as public and private property and infrastructure —totaling $3.5 trillion. Other U.S. metropolitan areas include New York/Newark, with $2.1 trillion, New Orleans, with $1 trillion and Virginia Beach, with $581 billion in exposed assets by 2070.[27]



Kemp's ridley sea turtle hatchlings. Photo: skeeze/Pixabay

Bigstockphoto

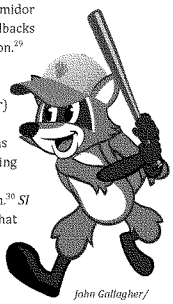
HOW WILL CLIMATE CHANGE AFFECT THE FUTURE OF BASEBALL?

Baseball is America's oldest pastime. But as climate change takes a greater toll all across America, the changes it will bring may have a lasting effect on the game—from hotter games to more rainfall, the wood that can be used for bats, and even how easy it is to hit home runs. There's a lot that may be different about the future of baseball.

HUMIDITY AND HOME RUNS

Watching someone hit a huge home run is one of the biggest thrills in baseball. But did you know that humidity can play a big role in how easily the ball can fly through the air? When air is more humid, it means that there are more water molecules in the air. According to *Popular Science*,[28] gaseous water vapor displaces heavier gases like nitrogen and oxygen—decreasing the air density and making it easier to hit balls further. Another factor is that the yarns in baseballs can actually absorb some of the water molecules in the air, which effects their flight.

This may seem like a minor issue, but Major League teams are concerned enough that they've started storing their baseballs in humidors to prevent this problem. *Sports Illustrated* reported that the Colorado Rockies have stored their balls in a humidor since 2002, with the Arizona Diamondbacks following their lead for the 2018 season.[29] *Popular Science* noted that, while Denver had an average Earned Run Average (runs scored against a pitcher) over two runs higher than other Major League Baseball (MLB) stadiums from 1995-2001, once they started using their humidor, the average earned run average (ERA) dropped by about a run.[30] *SI* also reports that MLB has mandated that all teams for 2018 store their balls in "an air conditioned and enclosed room" with a sensor so MLB can determine whether or not every team should be forced to have a humidor for the upcoming 2019 season. Everyone loves to see home runs, but climate change will mean that humidity



John Gallagher/ NWF Art Director

Number of U.S. participants in baseball in 2016:

14.76 million[31]

Pennsylvanians who participate in baseball:

846,800[32]

Ohioans who participate in baseball:

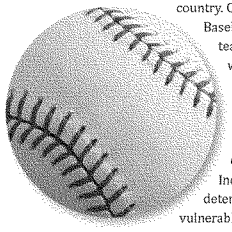
657,000[33]

As of April 25th, 2018, there were a record 28 MLB games postponed due to extreme weather[34]

changes will affect teams differently depending on their stadiums' altitude and geography. As climate change makes some stadiums more humid while others become less, MLB will need to work to make the playing field as level as possible for hitters and pitchers alike.

INCREASING WEATHER EXTREMES FROM CLIMATE CHANGE

Rain. Baseball's mortal enemy. Thanks to climate change, extreme weather conditions are becoming the new normal. This season, the Weather Channel reported that rain and other extremes like ice/snow/cold had postponed 28 games by the end of April—breaking the MLB record for most "weather-related postponements" since they started keeping track in 1986.[35] (The Associated Press reported that the previous record was 26 games.[36])



These climate trends and shifting rainfall patterns are going to continue to affect baseball around the country. Only 7 of the 30 Major League Baseball stadiums have roofs, so most teams are very vulnerable to weather-related issues. The remaining 23 MLB teams have 20 major cities that they call home (some cities have more than one team). *The Weather Channel's* Climate Disruption Index looked at six factors to determine the top 25 U.S. cities most vulnerable to climate change: sea-level rise, extreme precipitation, extreme drought, urban heat islands, and changes in precipitation and temperature.[37] Of the 20 cities hosting roofless MLB teams, over half of them were among the 25 cities the Climate Disruption Index lists as most at-risk from climate change.

But these changes will not affect every part of the country in the same way. According to the third National Climate Assessment, incidences of very

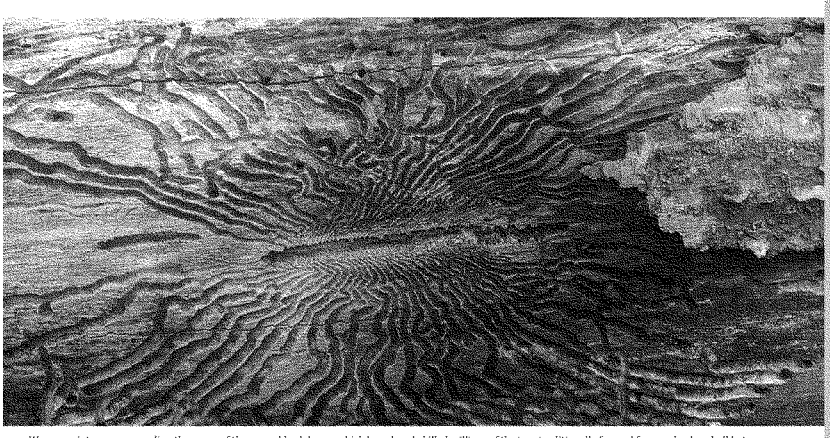
heavy precipitation are up 71 percent from Maryland to Maine, up 37 percent in the Midwest, and 27 percent across southern states from Louisiana to Florida and Virginia.[38]

CLIMATE, ASH TREES, AND AN INVASIVE BEETLE

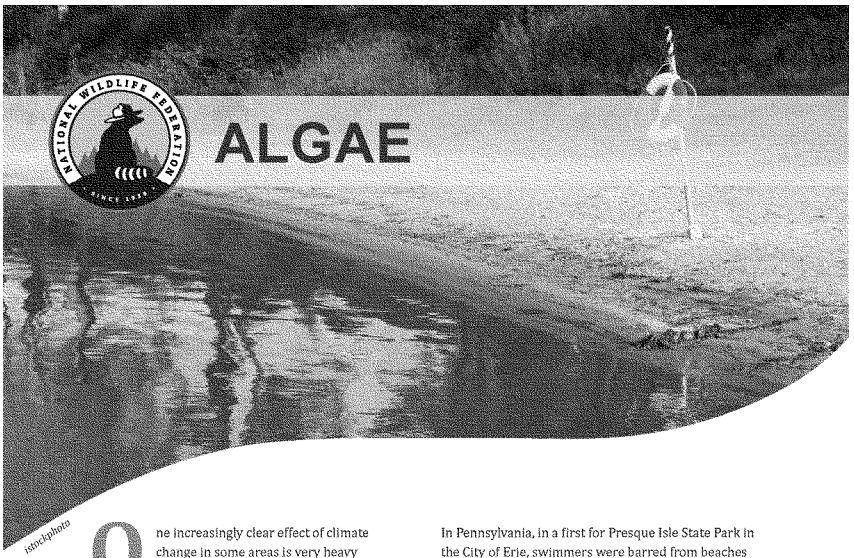
Ash is one of the most popular materials for baseball bats. Ash wood has a little bit more give than a harder wood like maple, which means that baseballs spring off the bat when hit, not unlike a trampoline. Maple bats are harder, with a denser grain so they don't flex as much as ash bats, but this extra flexibility gives ash bats a larger "sweet spot" than maple bats—making it a popular choice for baseball players.

Unfortunately, the number of ash trees has been decimated due to an invasive beetle with a shiny, green shell called the emerald ash borer. The beetle lays eggs in ash trees and then its larvae burrow into the tree and eat away at the bark, disrupting the trees' nutrient systems and eventually killing them. Originally from northeastern Asia, the invasive beetle was first discovered near Detroit, Michigan in 2002. Since then, it has been discovered in 30 states and has killed hundreds of millions of ash trees and caused millions of dollars in damages. The U.S. Forest Service estimates costs to communities ranging from $10 billion to $20 billion through 2019.[39]

Efforts are underway to contain the beetle, but researchers have discovered vast new tracks of ash trees at risk as warmer winters could expand the ash borers range deep into Canada.[40] The ash borer is also spread as infested wood, transported by hapless hikers and campers in bundles of firewood. More research and studies are underway to develop new methods to contain the emerald ash borer, but unless we can get this invasive beetle under control, and stem climate change and warmer winters, we may be kissing our ash goodbye.



Warmer winters are expanding the range of the emerald ash borer, which has already killed millions of the tree traditionally favored for wooden baseball bats. Photo: MaxPixel.net



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One increasingly clear effect of climate change in some areas is very heavy precipitation. Heavy rains, especially in Spring, are contributing to an explosion of these toxic algal blooms, threatening drinking water, and carrying neurological agents that spark public health warnings. The blooms also kill family dogs, undercut outdoor recreation and local economies, and ruin summertime beach and boating experiences.[41]

According to an April 2018 report by the Environmental Working Group, 169 algal blooms were reported in 2017 across 40 U.S. states. (Figure 2)[42]

Off the coasts of Maine, Massachusetts, and Rhode Island, shellfish were recalled from restaurants and wholesalers in 2017 after the neurotoxin domoic acid was discovered. Algal blooms had never been seen by fishermen before in these waters. Repeated toxic blooms prompted regulators to shut down shellfish harvests twice in 2017. While larger shellfish operations may be able to afford expensive testing and can continue to provide mussels, scallops, oysters, quahogs, and clams, smaller businesses have lost significant revenue.[43]

In Pennsylvania, in a first for Presque Isle State Park in the City of Erie, swimmers were barred from beaches three times in 2017 because of toxic algal blooms. An annual triathlon had to cancel the swimming portion of the contest.[44] High levels of exposure to certain kinds of harmful algal blooms can cause liver damage in humans as well as disrupt the nervous system.

In Nevada, both Lake Tahoe and Lake Mead tributaries were hit with public health advisories in 2017 from toxic algal blooms, discouraging summertime activities. Warmer water helps toxic algae grow and contributes to other water quality problems. July 2018 was the hottest month recorded ever recorded in Reno, and a severe decline in Lake Tahoe's water clarity the previous year may have been an anomaly from a heavy snow year but was caused by premature snow melt—a direct impact of climate change.[45]

Over Fourth of July weekend in 2016, city parks in Denver, Colorado scrambled to combat green slime—in some places 10 feet thick. As reported in the Denver Post:

"This is depressing. It is disgusting," Polly Gibb, 68, said, walking golden retriever Maggie, worrying the slime might hurt birds. "It's so unattractive... I won't be coming back for a couple weeks."[46]

Major toxic algal bloom events occurred recently in Oregon, Utah, Florida, and Ohio. In June 2018, officials in Salem, Oregon issued "civil emergency" warnings over toxins in drinking water because of threats to sources of the region's drinking water for families and businesses. The National Guard was activated to provide clean drinking water. Florida's governor issued a state of emergency, as toxic algae covered more than 90 percent of Lake Okeechobee, and the continuing "red tide" algal bloom on Florida's Gulf Coast kills sea turtles and manatees. More than 100 outdoor recreationists were sickened by toxic algae in Utah Lake, resulting in diarrhea, headaches, rashes, and vomiting. In Ohio, 2018 is shaping up to be another rough summer for Western Lake Erie, where just a few years before, residents and citizens in Toledo were without drinking water for three days as the toxin *microcystin* entered the city's water supply.

The Calusa RiverKeeper, John Cassani, recently told the Tampa Bay Times:

"I've worked around this river for 40 years and I've never seen anything like it," said Cassani, a retired Lee County biologist. "I've never seen an algae bloom of this magnitude or this toxic. It looks like another lost summer here." [47]

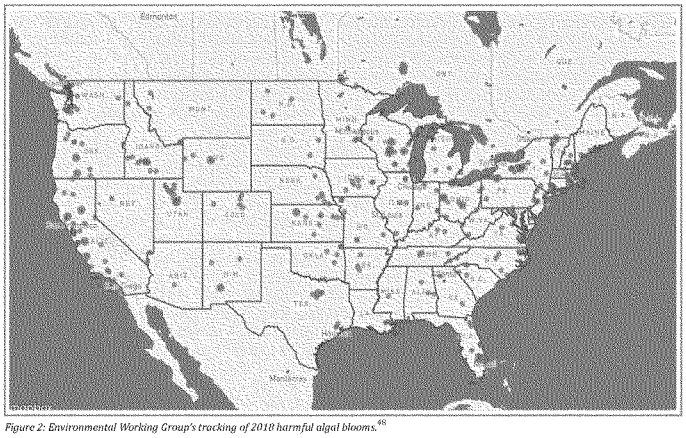

Figure 2: Environmental Working Group's tracking of 2018 harmful algal blooms.[48]

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TAKING A STAND

Americans have a responsibility and opportunity to defend our outdoor heritage from the threat of climate change. There are ways to protect ourselves from the pests that climate change is helping to proliferate. Ticks should not stop you from enjoying activities like camping, hiking, and playing outdoors—but make sure to take steps to prevent tick bites. Also, we must take action as a nation to combat the root of the problem—carbon pollution. It is critical for Congress to enact federal climate policy, and for state and local governments to cut pollution and advance responsible clean energy solutions as well. The following examples highlight five ways in which our policymakers can take climate action:

REDUCE CARBON EMISSIONS FROM THE POWER SECTOR

The power sector is the second-largest source of climate pollution in the U.S. To minimize climate change risks such as the spread of tick-borne disease, the federal government should take action to reduce these harmful emissions. The Clean Power Plan, currently being repealed by the Trump Administration, would have reduced power plant climate pollution by more than thirty percent if implemented. The plan is an example of the type of proactive policy we need. Our leaders at the national and state levels should adopt policies to require pollution cuts from power plants and adopt other policies to expand clean, wildlife-responsible renewable energy use, such as offshore wind and rooftop solar power.

REDUCE METHANE POLLUTION FROM OIL AND GAS INFRASTRUCTURE

Methane gas that leaks and is intentionally released from oil and gas facilities in the U.S. is a significant source of climate pollution. This climate-altering gas is a super pollutant, with 80 times the impact of carbon dioxide in the short term. This gas should be captured, not released freely to the air, providing not only environmental benefit but also economic gains for companies and local communities through resale of gas.

The Environmental Protection Agency and Bureau of Land Management have each developed cost-effective rules for minimizing methane emissions, though both rules are under threat due to rollback actions from the Trump Administration. Some states have implemented their own policies to cut down on methane pollution and waste; other states should follow suit.

REDUCE CARBON EMISSIONS FROM THE TRANSPORTATION SECTOR

The transportation sector is now the top source of harmful climate pollution in the U.S. Automakers had been working to continually improve fuel efficiency and reduce carbon pollution in their fleets over time, as required by federal rules. Recent actions by the Trump Administration to roll back clean car standards pose a serious threat to climate progress. This country needs stronger climate rules, not weaker ones. Americans should express support for continued federal fuel efficiency requirements, but also let their state lawmakers and transportation agency know that clean cars and electric vehicles should be supported by state policies as well.

ENACT AN ECONOMY-WIDE PRICE ON CARBON

One of the most cost-effective, far reaching, and quickest avenues for reducing climate pollution is a federal price on carbon. By making polluters pay for what they emit, they receive a strong market signal to cut pollution. A federal price on carbon could take the form of either a cap-and-trade program or a carbon tax, or some combination of the two. Such policies could dramatically reduce carbon emissions while generating revenues for national priorities, such as protecting vulnerable people and wildlife from unavoidable climate impacts or developing wildlife-friendly renewable energy.

Federal action on climate is necessary, not only for America's wildlife, fish, and birds, but for the millions of sportsmen, wildlife watchers, and nature lovers who cherish America's outdoor heritage. In addition to the mitigation of carbon pollution, the United States must also invest in actions that increase the resiliency and adaptability of human communities, wildlife, and habitat.

SAFEGUARD PEOPLE AND WILDLIFE FROM CLIMATE IMPACTS

Healthy and resilient natural systems can help both wildlife and people cope with increasing impacts from climate change. Adopting climate-smart approaches to land and water management can reduce risks from flooding, drought, and other climate-related extreme events, while providing opportunities to better conserve and connect vital wildlife habitat.

Iconic species such as the horseshoe crab are at risk from climate impacts to water temperature, extreme weather and changes to beach habitat. Photo: Bill Shadel

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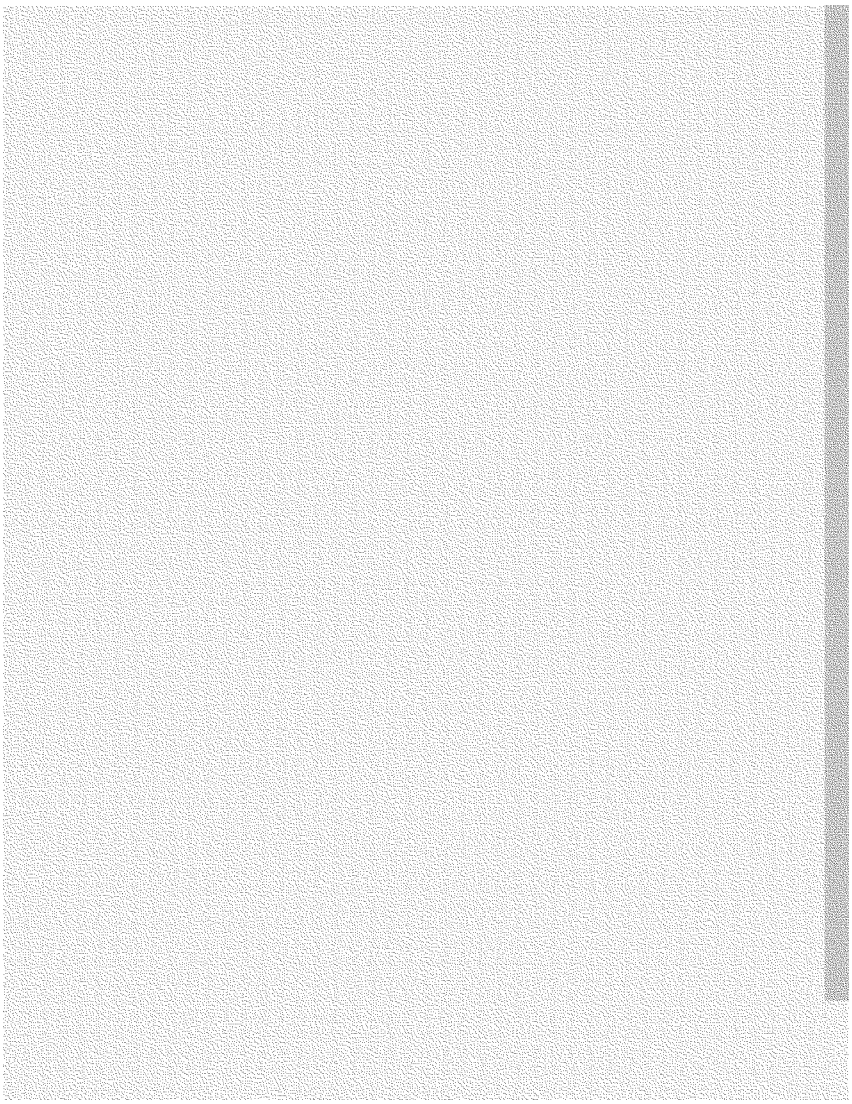

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Natural Climate Solutions

A Federal Policy Platform of the National Wildlife Federation

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Cover images: Front cover (left to right): *Restored wetlands on a farm in Queen Anne's County, Maryland. Credit: Will Parson, Chesapeake Bay Program; A Chinese mantis devours a monarch butterfly along a riparian buffer next to the Anacostia River in Washington, D.C. Credit: Will Parson, Chesapeake Bay Program; Tree seedlings from a reforestation project in Oregon. Credit: BLM Oregon & Washington; Plants at an Organic Cover Crop Workshop in Corvallis, Oregon. Credit: NRCS Oregon; A marsh crab on Deal Island in Maryland. Credit: Matt Ruth, Chesapeake Bay Program; Chesapeake Bay wetlands. Credit: Timothy Pohlhaus, via Flickr; A green tree frog in a North Carolina wetland. Credit: Amanda Mueller, NC Wetlands.* ***Back cover (left to right):*** *Marsh restoration projects in the Mississippi River delta, Credit: Lauren Sullivan, via Flickr; Planted seagrass along Jensen Beach, Florida. Credit: Rick Scheratz, via Flickr; A spring fawn. Credit: Ray Fellhrman, USFWS Volunteer; Sharp-tailed grouse in a North Dakota prairie. Credit: Rick Bolin, USFS Mountain-Prairie; A hamer blue butterfly. Credit: Jill Utrup, USFWS; Abandoned mine drainage ponds in Colorado. Credit: USGS Unmanned Aircraft Systems; Restored wetlands on a farm in Queen Anne's County, Maryland. Credit: Will Parson, Chesapeake Bay Program.*

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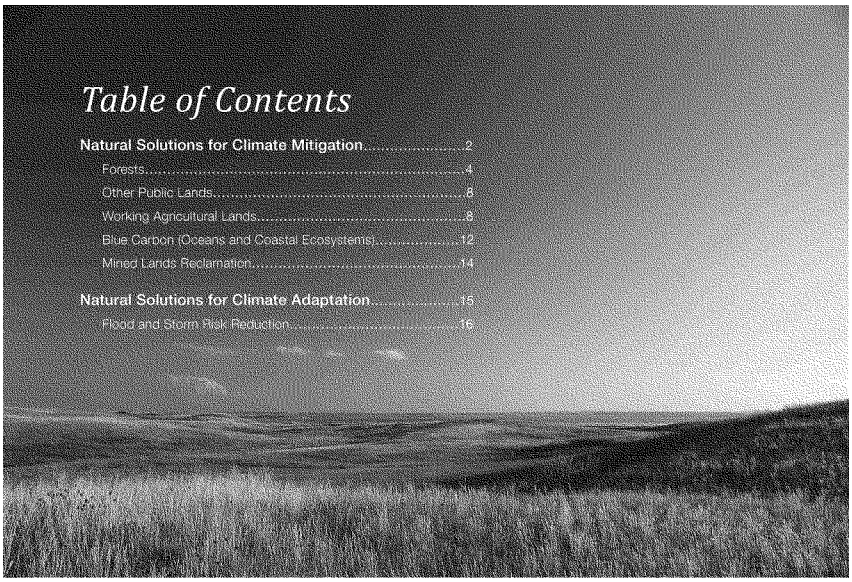

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Native prairie at North Dakota's Chase Lake National Wildlife Refuge. Credit: Rick Bohn, USFWS Mountain-Prairie.

Fall in Montana's Beaverhead-Deerlodge National Forest. Credit: USFS, Northern Region

Amidst the global effort to confront the growing risks of climate change, natural climate solutions have risen to the forefront of policy discourse as being critical to success. The National Wildlife Federation defines the concept of natural climate solutions as strategies that support or enhance the ability of natural systems to both mitigate climate change (enhancing the removal or storage of carbon) and strategies that increase the resilience of human communities and wildlife populations to the impacts of climate-related natural hazards. These two focal areas are subsets of our broader efforts to support climate solutions through policies and programs that reduce anthropogenic greenhouse gas (GHG) emissions and enhance climate adaptation for natural and human systems.

This document lays out the National Wildlife Federation's federal policy recommendations to swiftly scale up natural climate solutions, for both climate mitigation and climate resilience. Recommendations are structured around several analytical categories based on land or habitat type. We include key principles for consideration and specific policy recommendations within each.

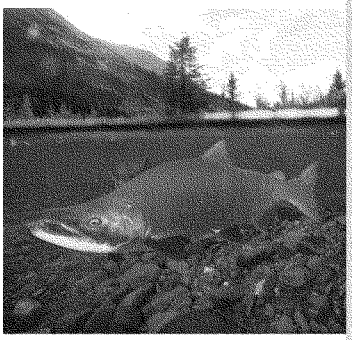
We look forward to working with partners and policymakers to find and implement solutions that benefit people, wildlife, and the climate.

Natural Solutions for Climate Mitigation

Natural climate solutions harness nature's inherent ability to sequester atmospheric carbon in soils, water, and living organisms. They have the potential to remove and store up to 10 gigatons of carbon dioxide cumulatively by 2050,[1] and should be a central component of any mitigation strategy. Though, with a suggested U.S. carbon removal target of 2 gigatons annually,[2] natural solutions alone will be insufficient. Technological approaches to carbon removal are also necessary, but are beyond the scope of this policy platform.

The Intergovernmental Panel on Climate Change (IPCC) estimates that the lands on Earth currently serve as a net carbon sink, capturing and storing roughly 29 percent of all carbon dioxide emissions.[3] U.S. lands, however, are currently sequestering 11 percent of domestic carbon dioxide emissions.[4] The IPCC also reports that, in order to limit planetary warming to 1.5 degrees Celsius over the pre-industrial era, an array of carbon-capturing practices will need to be implemented worldwide, in addition to measures that reduce emissions. Natural sequestration pathways often offer the most cost-effective means of carbon removal while also providing numerous co-benefits that will help human and biological communities adapt to a changing climate.

A range of nature-based strategies can be deployed in our forests, watersheds, coastal areas, grasslands, farmlands, and other natural systems to enhance the health of our soils and ecosystems. In turn, these approaches can expand the national carbon sink, improve the quality of wildlife habitat, reduce climate risks to communities, and create economic opportunity through reclamation, restoration, and maintenance of these sinks, or the implementation of new management practices.



Alaskan salmon, including the sockeye pictured here, are one of many species in the U.S. at risk from climate change. Natural climate solutions can benefit wildlife populations while mitigating climate change. Credit: USFS Alaska Region.

Carbon Sequestration Principles

• Climate policies should work towards the goal of slashing global greenhouse gas emissions roughly in half by 2030, and reaching net zero emissions by midcentury at the latest. These are the benchmarks established by the IPCC as necessary to avoid the most catastrophic effects of climate change, roughly equivalent to limiting warming to 1.5 degrees Celsius over the pre-industrial era.

• Mitigation strategies should include carbon removal and storage, in addition to emissions reductions. Meeting a net-zero emissions goal will necessitate strategies to sequester and store carbon dioxide that is already in the atmosphere—i.e., negative emissions strategies—as well as strategies to capture emissions in industrial applications for storage or reuse. However, carbon removal strategies should not be viewed as a substitute for emissions reduction efforts, as they are insufficient to meet climate stabilization targets.[3]

• Natural solutions should be part of any carbon emissions strategy, particularly in the near term. While some technological approaches for capturing or reusing carbon emissions require investment and time to mature, natural solutions are readily available and cost-effective, and should be employed immediately.[4]

• Carbon sequestration efforts must be compatible with other ecological values. It is important that carbon sequestration and other climate mitigation strategies do not undermine natural ecosystem resilience, and the services and benefits natural systems provide. Significant trade-offs can exist between managing systems for carbon and biodiversity. For example, growing trees in a grassland ecosystem or planting fast-growing invasive species may maximize carbon sequestration, but cause negative impacts to grassland birds, pollinators, and other native wildlife species.

• Carbon offset policies or programs should adhere to strong environmental integrity principles. This includes ensuring that carbon pools are quantifiable and sustainable over the long term. Doing so requires robust approaches to measure carbon in live and dead biomass, soils, and harvested wood products. It also requires managing the natural systems that sequester and store carbon (e.g., forests and coastal wetlands) in ways that reduce the risks of damage or loss due to both climate and non-climate stressors.[5] Natural sequestration for carbon offsets should not come at the expense of air and water quality elsewhere, particularly in disadvantaged communities, communities of color, and areas already facing disproportionate pollution burden.

Bottomland hardwoods in North Carolina's Lumber River State Park. Credit: NC Wetlands.

In 2017, the combination of forest land, harvested wood products, and urban trees in the United States accounted for an estimated net uptake of 730.9 million metric tons of carbon dioxide equivalent (MMT CO2 eq.).

Forests

Forests and other wooded areas represent perhaps the best opportunity to remove carbon from the atmosphere quickly, reliably, and relatively cheaply. In 2017, the combination of forest land, harvested wood products, and urban trees in the United States accounted for an estimated net uptake of 730.9 million metric tons of carbon dioxide equivalent (MMT CO2 eq.).[8] Between 1990 and 2017, "forest land remaining forest land" was the nation's largest net sink, and conversions of forest land were the largest source of land-based emissions.[9] However, these benefits depend on careful policy and program design and implementation.

Key Principles

• **Strive for optimization, not maximization, of carbon.** Strategies focused strictly on enhancing carbon sequestration (e.g., converting habitat to plantations of rapid-growing tree species) may run counter to other important ecological and social values, including biodiversity conservation. To account for trade-offs between carbon management and biodiversity conservation, prioritize strategies that achieve both climate mitigation and ecosystem resilience.

• **Avoid conversion of forests to other uses.** Protecting and restoring existing forests, including via strategies that support complex systems and diverse patchworks of old-growth and young trees, are especially useful in optimizing carbon removal and storage. Such strategies also provide a range of additional ecosystem services.[10]

• **Increase reforestation of historically forested areas.** Aggressively scaling up reforestation in historically forested areas is one of the best ways to enhance carbon sequestration and support other important ecosystem services. Reforestation strategies should strive to support habitat complexity (rather than monoculture plantations) and should account for long-term climate trajectories and other ecological concerns (such as the potential for introducing invasive species).[11]

• **Focus afforestation efforts on severely degraded lands.** Afforestation (i.e., planting trees in areas not historically in forest cover) can contribute to meeting carbon goals when implemented carefully. Afforestation efforts should focus on severely degraded lands, such as brownfields and mined lands, that do not border remaining naturally treeless systems such as native grasslands and shrublands, which also sequester carbon and support a range of important social and ecological values. Carbon sequestration efforts on other altered lands (e.g., farmland or pasture) should focus on restoring ecologically appropriate habitat types.

• **Implement climate-smart management of the nation's forests to enhance the capacity of these systems to sequester carbon over the long term.** In particular, managers should implement strategies to restore natural patterns of fire and other processes and manage changing intensity and frequency of fires, disease, and insect infestations due to climate change. While some strategies, such as strategic thinning and the use of prescribed burns, may release some carbon in the near term, they can enhance forest health and resilience and support long-term sequestration and storage of carbon.[12,13]

Aspen trees along the Abineau Trail in Arizona's Coconino National Forest. Credit: USFS, Coconino National Forest.

• **Consider mutually beneficial harvest and carbon sequestration opportunities.** Supporting markets for sustainably sourced, long-lived wood products can help incentivize keeping forest land forested. Forest management practices should also focus on enhancing harvest and processing efficiency.[14]

• **Prevent conversion of natural forests to intensively managed plantations.** Intensively managed plantations do not achieve the carbon storage potential of natural forests (with an estimated 28 percent lower total carbon stock).[15] Additionally, they have greatly reduced wildlife and biodiversity values. Preventing the conversion of remaining natural forest areas to plantations is critical to maintaining forest carbon stocks.

• **Increase investments and application of agroforestry practices in appropriate landscapes.** Agroforestry refers to the incorporation of trees into agricultural landscapes, and can provide an effective way of increasing carbon on farms and pastures located in historically forested regions, while providing other

To account for trade-offs between carbon management and biodiversity conservation, prioritize strategies that achieve both climate mitigation and ecosystem resilience.

Southern live oaks in Audubon Park, a 35-acre city park in New Orleans. Credit: Kristen Bobo, via Flickr.

important ecosystem services (e.g., riparian buffers, windbreaks, and pollinator habitat).[16] This practice is not generally appropriate on naturally treeless landscapes, as it can fragment remaining habitat and reduce populations of declining grassland bird species.

• **Increase investment in urban forestry.** Urban trees in the United States store an estimated 643 million metric tons of carbon, and they currently sequester an estimated 25.6 million tons annually.[17] Urban forests also provide a range of additional ecosystem services, including reducing energy use during heat waves, absorbing stormwater, and providing habitat for wildlife. Strategies to enhance urban forests should prioritize use of climate-resilient, non-invasive tree species.

Policy Recommendations for National Forests

• **Increase the pace and scale of climate-informed, ecologically appropriate forest restoration on national forests** in ways that provide benefits for carbon sequestration, wildlife, water, resilience, and public safety.

• **Increase the U.S. Forest Service (USFS) budget for proactive and climate-informed restoration and management activities,** particularly now that there is a wildfire-funding fix in place, which should reduce the practice of drawing from such proactive funding accounts to pay for wildfire response.

• **Increase mandatory funding levels for the USFS Reforestation Trust Fund** to prioritize reforestation and restoration.

• **Provide additional resources for USFS to accelerate the timetable for revising national forest plans under the 2012 forest planning rule,** which incorporates elements of climate resilience. Direct USFS to finalize and issue guidance for applying key components of the planning rule to encourage full consideration of climate mitigation and adaptation in these plans.

• **Increase opportunities and incentives for the use of prescribed fire in restoring forest health and reducing extreme fire events;** identify policy mechanisms for better coordination on smoke management with respect to Clean Air Act compliance.

• **Protect bedrock environmental authorities (e.g., Endangered Species Act, Clean Water Act, National Environmental Policy Act) and their application for forest management and restoration.**

Forest of hemlocks and white pine trees in Pennsylvania's Reynolds Spring Natural Area. The protected area is part of the Tioga State Forest. Credit: Nicholas A. Tonelli, via Flickr.

• **Create incentives for investing non-federal funding in climate-smart forest management.** Innovative conservation finance offers a potentially significant source of funding to complement more limited congressional dollars. Policies would include establishing a restoration fund for non-federal matching contributions, promoting sourcewater fund models, and supporting capital impact investment.

• **Build on the existing Forest Inventory and Analysis program to fund the design of an advanced forest carbon monitoring system within USFS** to monitor carbon enhancing activities, increase statistical sampling of stored carbon in select projects, and estimate ecosystem carbon storage averages that include regular use of remote sensing data.

Policy Recommendations for Private Forests

• **Incentivize private forest management for ecologically appropriate carbon storage by creating a new, transferable tax credit.**

• **Include climate-informed, ecologically appropriate forest restoration and management programming in allocation of revenues from any carbon pricing legislation.**

• **Include forests in any climate legislation creating a carbon "offsets" market that pairs negative emission strategies with comparable carbon emissions made elsewhere.** Encourage inclusion of forests in any market where emitters can purchase carbon reduction credits from projects in other sectors, but ensure projects are verifiable, additional, transparent, permanent, and ecologically sound. Plus, ensure offsets do not allow increased environmental degradation by emitters.

• **Significantly increase mandatory funding for the USFS Healthy Forests Reserve, Urban and Community Forestry, and State and Private Forestry Programs.**

• **Support developing markets for long-lived wood products through:**

  • Increased research and development into long-lived wood products;

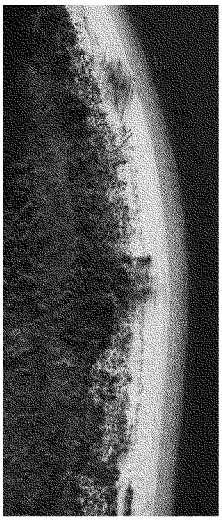
  • Increased funding for USFS's Wood Innovation Grant program to accelerate development of new products, conduct independent lifecycle carbon accounting (LCA) analyses, and develop markets for new, long-lived wood products that have net benefits to the climate. Direct USFS to limit the program to long-lived wood products that reduce GHGs within the timeframe needed to address global warming (less than 20 years);

  • Offer tax credits for use of new, long-lived wood products with LCAs that show a certain level of improvement in GHG emissions over materials being replaced, when considered over a 20-year timeframe (e.g., mass timber over steel in construction of tall buildings); and

  • Use the bio-preferred program and funding for pilot programs to incentivize use of new, long-lived, GHG-beneficial wood products in government buildings, and offer grant preferences to federal funding recipients that utilize these products.

• **Improve forest health by increasing funding for research into forest diseases, pests, and non-target impacts from agricultural chemicals,** such as Dicamba and 2-4D.

• **Develop a bottomland hardwood forest restoration program** that offers a retirement option for frequently flooded croplands that would put the lands in a permanent easement and restore them to hardwoods.



A living shoreline built to withstand sea level rise at Conquest Preserve, on the Corsica River in Maryland. Credit: Will Parson, Chesapeake Bay Program, with aerial support from Southwings.

Other Public Lands

Public lands comprise nearly a third of our country.[18] Resource development on those lands is responsible for nearly 25 percent of our country's GHG emissions annually.[19] In fact, according to government research, emissions from energy extraction on federal lands and oceans have been contributing roughly four times more GHG emissions than the lands have been absorbing naturally, making federal lands a net source of climate pollution.[20]

Investment in carbon removal through natural systems on public lands would benefit the climate, and has the potential to create numerous jobs. Optimizing the potential for public land to store carbon requires a massive investment in jobs to deliver the necessary restoration of forests, grasslands, and wetlands. These jobs tend to be durable and concentrated in rural or semi-rural areas in need of employment opportunity and investment.

Key Principles

• **The Department of the Interior should manage its 500 million acres of land to optimize carbon sequestration and storage in natural ecosystems.** Non-forested areas also offer meaningful potential for climate mitigation. For example, federal rangelands offer potential sequestration of 16.6 million metric tons of carbon dioxide each year.[21]

• **Carbon emissions on U.S. public lands should reach net zero by 2030,** including by putting people to work on restoration of our natural systems and responsibly permitting and building zero-carbon energy projects.

Policy Recommendation

• **Conserve and restore wetlands and grasslands,** thus increasing their capacity to store carbon, including through reauthorizing and increasing funding for successful programs such as the North American Wetlands Conservation Act.

Working Agricultural Lands

America's farmers, ranchers, and private forest owners are both highly threatened by climate change and well equipped to play a role in successful climate mitigation and adaptation. The agriculture sector can help mitigate climate change through management practices that sequester carbon in soil and vegetation, through reducing GHG emissions (including nitrous oxide and methane emissions), and through avoiding conversion of grasslands, wetlands, and forests. Climate-smart agricultural practices such as cover cropping, reduced tillage, rotational grazing, and diversified cropping systems have the potential to sequester carbon while also providing benefits for soil, water, and wildlife—and helping farmers adapt to climate change. Fully implementing these practices could remove as much as 100-200 million metric tons of carbon dioxide annually by 2050.[22]

Key Principles

• **Avoid conversion of natural ecosystems such as grasslands, which sequester carbon and have high biodiversity value.** Plowing natural areas like native prairie and converting the land to intensive crop production

reverses decades, centuries, or even millennia of carbon accumulation and storage in the soil. This massive release of carbon into the atmosphere—which has rivaled that from tropical deforestation hotspots in the last two decades—is particularly problematic, as we have a very limited amount of time available to avoid the most destructive impacts of climate change.[23]

• **Make the most out of limited funding.** Even envisioning a significant increase in funding for conservation practices, federal money would still be limited. To make the most of available dollars, funding should be targeted to:

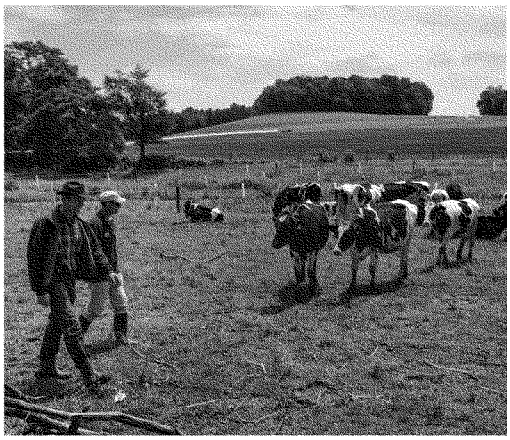
  • The most effective practices and processes that offer the biggest bang for the buck;

  • Practices with multiple natural resource benefits, to maximize co-benefits to water, wildlife, air quality, farm resilience, soil health, and biodiversity;

  • Practices with high carbon benefits but low return to farmers and ranchers. Practices such as buffer strips provide significant carbon benefits and wildlife and water co-benefits, but don't help improve yield or reduce inputs for farmers—so we can't expect farmers to adopt these practices on their own; and

  • Practices that promote both sequestration and resilience.

• **Provide transition assistance, but not indefinite funding, for adoption of practices that can provide net benefits to farmers and ranchers in the short-to-medium term.** Some GHG-beneficial practices, such as cover cropping, rotational grazing and no-till planting can yield net



Esh Farm in Lancaster County, Pennsylvania. The farm has implemented best management practices to support trout habitat, as well as stream fencing, livestock crossings, and a riparian forest buffer. Credit: Will Parson, Chesapeake Bay Program.

The agriculture sector can help mitigate climate change through management practices that sequester carbon in soil and vegetation, through reducing GHG emissions, and through avoiding conversion of grasslands, wetlands, and forests.

benefits to producers within a few years. In such cases, paying indefinitely for such practices sends the wrong message—that the practice is only worth adopting if it results in a payment—and cessation of the payments may result in high rates of practice reversal. However, when culturally appropriate outreach and technical assistance are targeted at assisting producers in meeting their production needs and realizing the benefits the practices provide, the motivation is built to maintain the practice long term. Short-term transitional payments, and/or risk management protection to increase producer willingness to try something new, may help accelerate adoption.

• **Reward high performers and early adopters, but pay for adoption of new practices and increased levels of conservation.** Only providing benefits to new adopters of GHG-beneficial practices fails to reward early adopters and the GHG benefits they have provided, and can even lead to practice reversal. Yet paying for practices that would have been implemented anyway does not result in net benefits. A middle ground is to allow early adopters of GHG-beneficial practices bonuses or enhanced payments and/or priority access to programs that reward adoption of additional practices.

• **Prioritize socially disadvantaged, veteran, and beginning farmers and ranchers.** These are the producers least likely to have access to the capital and information required to implement many practices. They may also represent some of the farmers most ready and willing to adopt these practices.

• **Focus on more permanent conservation strategies to ensure long-term benefits.** Examples include long-term or permanent easements and putting mechanisms in place to ensure against reversibility.

• **Ensure the predicted GHG benefits of practices are based on best available science, but allow for some degree of uncertainty in instances where measurement is prohibitively expensive or resource intensive.** The difficulty in measuring the exact GHG benefits for some practices, such as cover cropping, can mean that some practices become prohibitively expensive or impractical to monitor if a high degree of accuracy is required. An alternative is to use the best available science to conservatively predict the GHG benefits of a practice in a given region. Periodic sampling of results can be used to fine-tune predicted GHG benefits.

• **Provide significantly more technical assistance, outreach, education, and conservation planning.** Outreach efforts should expand on current technical assistance to address social and cultural components of climate-smart agriculture to ensure lasting adoption of sustainable practices.

• **Invest heavily in research and development, particularly around new and innovative crops and practices.** Research efforts should include both traditional institutions (U.S. Department of Agriculture (USDA) agencies, land grant universities) and innovative arrangements (citizen science, data sharing platforms) to maximize applicability across field, farm, and landscape contexts.

Policy Recommendations

• **Establish a new federal conservation policy for grasslands, a North American Grassland Conservation Act,** modeled after the North American Wetland Conservation Act, that will maintain or increase carbon storage capacity, bolster community resilience from flooding and hurricanes, support ranchers, and have the additional benefit of improving habitat for birds, pollinators, and wildlife.

• **Improve climate benefits of existing conservation programs.** In addition to increased funding to existing Farm Bill programs, there are numerous ways in which these programs can better utilize limited dollars to achieve climate gains. These include cataloging climate benefits or drawbacks of all existing conservation practice standards; adjusting programmatic rankings of projects to reward those that better benefit the climate and denying projects likely to harm it; adding climate as a priority initiative within the Environmental Quality Incentives Program (EQIP);

creating bundles of climate-smart agriculture practices within the Conservation Stewardship Program (CSP) and adding these practices into nutrient management bundles; better emphasizing and utilizing easements (including permanent easement options) and targeting them to areas at greatest risk of conversion; expanding the Conservation Reserve Program (CRP) and creating long-term and permanent contract options to avoid losing the land's carbon storage in the future; and making climate a subcategory of project initiatives within the Regional Conservation Partnership Program (RCPP).

• Reform initiatives across various USDA agencies to spark climate action and encourage climate mitigation.

- Call on the Secretary of Agriculture to study the risk implications of climate change for USDA programs (including the consequences to crop insurance of inhibiting or failing to encourage producers to adapt by implementing less risky practices) and establish a plan for USDA to address those risks.

- Create a department-wide crop diversification initiative, with an emphasis on establishing diverse cropping systems through research, credit, conservation, and rural development programs.

- Create a climate-smart agriculture certification program, modeled after the National Organic Program.

A farm in Linn County, Iowa. America's farmers and ranchers are well equipped to play a role in successful climate mitigation and adaptation. Credit: Rich Hermann, via Flickr.

- Direct USDA to study how each Farm Bill program—including but not limited to conservation programs—can do more to address climate change. This can include ways to sequester more carbon and avoid GHG emissions.

• Reform the federal crop insurance program to actively promote climate-smart agriculture practices, remove barriers to their adoption, and incorporate the resulting reduction in risk. Right now there are many ways in which existing crop insurance structure and rules stand in the way of farmers who want to implement new practices. There are missed opportunities for rewarding farmers who do the right thing, and for using the immense taxpayer subsidies of the crop insurance program to force better climate performance. The program has not recognized that better conservation and climate stewardship reduce taxpayer risk by conferring to the farm increased performance and resilience.

• Prevent conversion of native grasslands to croplands through a nationwide Sodsaver provision, which protects native prairies by reducing federal premium subsidies for crop insurance on land where native sod has been plowed for row crop planting.

• Reduce on-farm emissions and support on-farm renewable energy.

- Expand the Rural Energy for America Program through significant new funding, with a strong investment in anaerobic digesters.

- Incentivize or mandate methane reduction from manure lagoons.

• Dedicate significant resources to research, data collection, and dissemination of knowledge.

- Increase funding for research into crop varieties with increased carbon sequestration potential, such as perennial varieties of crops and enhanced root crops.

Native vegetation planted on restored sand dunes in Florida. Natural infrastructure such as dunes can enhance the resilience of human communities to climate change. Credit: Kim Shiflet, NASA.

• Create and maintain data sharing networks to allow farmers, agencies, researchers, and industry to share and utilize data on practices, soil health, yield, carbon sequestration, and climate impacts.

• Increase funding for the Sustainable Agriculture Research and Education (SARE) program and the National Institute of Food and Agriculture (NIFA) and direct a portion of the funding to climate-smart agriculture and resilience.

• Direct USDA to increase research on manure storage, biogas, and digestive emissions from livestock.

• Provide mandatory funding for Climate Hubs for each state and the Long Term Agricultural Research (LTAR) network. Direct LTAR to address long-term climate mitigation strategies.

• Significantly increase funding for technical assistance within the Natural Resources Conservation Service (NRCS) and other USDA agencies, with a focus on guidance on practices benefiting long-term climate adaption and mitigation.

• Increase capacity and climate literacy for outreach from USDA, land grant universities, and Cooperative Extension services. Establish a state-level climate outreach coordinator position within each state NRCS office.

• Increase USDA social science capacity to better guide outreach efforts to address social and cultural barriers to long-term adoption of climate-smart agricultural practices, and share this learning with other outreach agents.

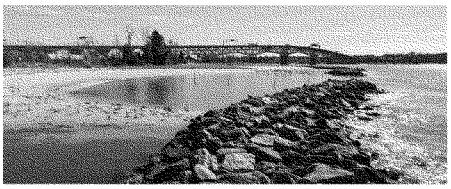
Blue Carbon (Oceans and Coastal Ecosystems)

Oceans and coastal ecosystems play a valuable role in mitigating climate change, particularly through the ability of wetlands, mangroves, and seagrasses to capture and store carbon, as well as buffer the effects of sea-level rise and increasingly severe storms. These repositories of "blue carbon" sequester more carbon per unit area than forests with longer average duration.[34] Therefore, maintenance and enhancement of these ecosystems are a critical part of a successful climate strategy—for mitigation, climate adaptation, and community resilience objectives.

Key Principles

• **Coastal and marine systems are a major part of the climate solution.** Protection of existing coastal and marine ecosystems—specifically mangroves, seagrass, and salt marshes—offers the best opportunities for carbon mitigation and broader adaptation co-benefits. In particular, resource managers should implement strategies to enhance the resilience of these habitats to sea-level rise and coastal storms, which can result in habitat loss and subsequent carbon losses.

• **Habitat protection is more effective as a carbon sink, but habitat restoration and creation are also important.** Existing healthy habitat has greater carbon sequestration and storage capacity than degraded or lost habitat that has been restored. In addition, as habitat is lost or degraded, it can release stored carbon and methane back into the atmosphere.



Riprap lining a living shoreline in Gloucester County, Virginia. Credit: Steve Droter, Chesapeake Bay Program.

Oceans and coastal ecosystems play a valuable role in mitigating climate change, particularly through the ability of wetlands, mangroves, and seagrasses to capture and store carbon. In fact, these repositories of "blue carbon" sequester more carbon per unit area than forests with longer average duration.

• **Prioritize blue carbon solutions that offer sustained atmospheric carbon dioxide removal benefits.** Investing in coastal ecosystem restoration to ensure blue carbon habitats persist and remain resilient in the face of future threats will likely result in long-term carbon removal benefits.

Policy Recommendations

• **Invest in planning and construction of ecosystem restoration and protection projects, including blue carbon ecosystems, to mitigate the impacts of climate change, promote community resilience, and allow wildlife to thrive.** Many iconic ecosystems around the nation, including but not limited to the Everglades, Mississippi River Delta, the Great Lakes, the Chesapeake Bay, and the Delaware River Watershed have associated restoration plans or opportunities that should be better resourced to expedite recovery. Many of these iconic ecosystems absorb and store carbon and serve as the first line of defense against climate-fueled storms and flooding for surrounding communities. These special places are also nationally significant hubs of tourism, and many support and protect other critical industries including fisheries, shipping, and energy production. Restoration implementation also supports $25 billion in economic activity that directly employs 126,000 people and supports 95,000 other jobs, mostly in small businesses.[25]

• **Support creative finance opportunities.** To increase investments in conservation and restoration of blue carbon ecosystems, innovative finance opportunities and public-private partnerships should be explored, such as insurance, debt swaps, taxes, and credits. Ecosystem restoration and natural infrastructure investments should be focused in the most vulnerable areas that are sensitive to natural and human threats, including where salt marshes, mangroves, and seagrass beds are currently healthy and functioning but are facing future disturbance threats such as development.

• **Fund research into the carbon removal benefits of blue carbon ecosystems.** Additional research is needed to develop a more comprehensive understanding of carbon fluxes, assess existing blue carbon sinks, and fill research gaps—particularly in blue carbon hotspots identified by scientists, such as the Gulf of Mexico. Similarly, improved methods of accounting for carbon storage and sequestration fluxes would enable the integration of all blue carbon sources (not just wetlands) in Environmental Protection Agency and local GHG inventories.

The Shamokin Abandoned Mine Reclamation Project in Pennsylvania. Credit: U.S. Department of the Interior.

With proper management, abandoned mine lands have the potential to sequester millions of tons of carbon dioxide annually in new and restored forests, grasslands, and soils.

Mined Lands Reclamation

Degraded lands lose significant amounts of carbon from the soil through erosion, leaching, and decomposition.[25] The U.S. Department of the Interior's Office of Surface Mining estimates there are approximately 1 million acres of abandoned mine land in Appalachia alone. With proper management, these lands have the potential to sequester millions of tons of carbon dioxide annually in new and restored forests, grasslands, and soils. There is no national clean-up program or fund to reclaim the more than 500,000 abandoned hardrock mine sites across the United States (clean-up that would cost an estimated $50 billion). There is, however, an existing federal clean-up fund for abandoned coal mine sites, the Abandoned Mine Lands Reclamation Fund, set to expire in 2021 even though there remains more than $10 billion in outstanding abandoned coal site reclamation work. This could be an important resource for conducting vital reclamation and ecosystem restoration projects that optimize carbon removal and storage.

Key Principles

• **Invest in and address the compelling national need to aggressively reclaim and restore abandoned coal and hardrock mine sites to produce multiple benefits.** Reclamation should fix serious existing environmental damage while contributing to future carbon sequestration. Cleaning up these sites will abate serious land erosion and severe long-term water pollution problems. With intentional revegetation methods, reclaiming these lands can bolster carbon sequestration from previously severely degraded landscapes. Reclamation of abandoned underground coal mines also helps reduce leaking methane. In certain cases, underground mine openings and cracks emit fugitive methane emissions from coal shafts. Reclamation work to close or seal them would protect public safety and curb emissions.

• **Invest in abandoned mine reclamation to create well-paying jobs, stimulate local economies, and spur new economic development.** Reclamation work produces direct and indirect employment and economic benefits. When reclamation priorities and plans are created with local community involvement, they can be built to deliver longer-term economic development in some of the most climate/energy/economically distressed regions.

Policy Recommendations

• **Enact bipartisan legislation (RECLAIM Act) to invest $1 billion over 5 years in eligible coal states** to accelerate abandoned mine cleanups while helping distressed coal communities transition to a more stable and equitable future.[27]

• **Reauthorize Title IV of the Surface Mining Control and Reclamation Act of 1977** to extend the Abandoned Mine Land Fund for coal through 2036, to ensure the fund does not expire in 2021 and has the financial resources to address the unmet coal reclamation need.[28]

• **Through 1872 Mining Law reform legislation, establish a national hardrock abandoned clean-up program funded by industry fees.** Supporting agency regulations and policies for such legislation must require reclamation and revegetation standards or directives to optimize carbon sequestration and climate resiliency outcomes.[29]

Arrow arum, a freshwater marsh plant, in the Alligator River National Wildlife Refuge. Credit: NC Wetlands.

Natural Solutions for Climate Adaptation

Recognizing that climate change is already having significant impacts on people and wildlife, and that further changes are inevitable, climate adaptation is a necessary complement to mitigation efforts. Broadly, climate adaptation refers to strategies and actions that enhance the ability of natural and human communities to withstand or adjust to climate change and its associated impacts. Resilience, in turn, may be a desired outcome of those adaptation strategies.

For human communities, resilience refers to their ability to maintain valued socio-economic systems in the face of near-term disturbances and long-term climatic changes. For natural communities, resilience generally reflects the ability of ecological systems (e.g., forests, coastal wetlands, coral reefs) to resist, recover from, or adapt to those changes and maintain desired functions.

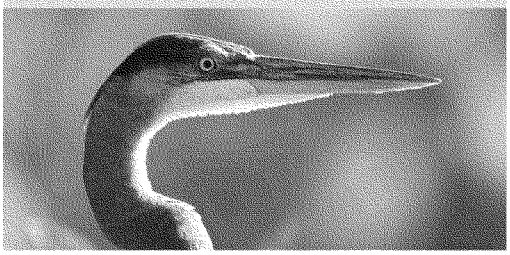
While efforts are wide-ranging to enhance the resilience of both natural and human communities to the impacts of climate change, this platform is focused on natural and nature-based strategies to reduce risks to human communities from climate-related natural hazards.

Principles for Natural and Nature-Based Resilience Measures

• **Protecting and restoring natural infrastructure, such as wetlands, dunes, and riparian corridors, can enhance resilience of human communities to climate-fueled disasters and provide critical co-benefits to society.** Natural and nature-based approaches (e.g., living shorelines and constructed oyster reefs) should be prioritized for hazard mitigation because of their benefits for water and habitat quality. They should be used in combination with or as an alternative to gray infrastructure wherever feasible.

• **Investing in risk reduction now can produce large savings in the long term.** Investing in risk reduction measures well in advance of floods, hurricanes, wildfires, and other hazards provides better outcomes for communities than rebuilding post-disaster. It is estimated that for every $1 spent on risk reduction activities, the United States saves $6 in disaster costs, producing large savings for taxpayers and insurance policy holders over the long term.[90]

• **Social equity considerations are a necessary component of any community resilience strategy.** Climate impacts are unevenly distributed across society, and frontline communities directly impacted by climate change should be engaged in resilience planning to help ensure shared benefits. Social justice and equity are important considerations in the development and implementation of durable and fair national climate policy and any related adaptation or disaster policy.



A great blue heron. Credit: Miki Jzvetan, via Flickr.

Flood and Storm Risk Reduction

Key Principles

• **Along our coastline and in floodplains, we must prevent new development and protect natural open space in hazard-prone areas.** One of the best opportunities to reduce risks to communities from flooding and hurricanes is to keep people out of harm's way in the first place. We must also work to protect natural open spaces adjacent to vulnerable marsh habitat, to enable marsh migration with rising sea levels, and avoid conversion of marsh to open water.

• **It is time to adapt to increased risk through new forms of protection, accommodation, and retreat.** With rising coastal risks, we'll need to shift our traditional approaches to flood control and community protection and effectively buffer communities from natural hazards. We must also plan for inevitable changes and making community lifelines (i.e., essential community and government services) more resilient to extremes in climate and weather.

• **We should restore for the future, not recreate the past.** With the realities of sea level rise, our coastlines in particular will fundamentally change despite our best interventions. Smart, strategic restoration should be future-facing, and designed to sustainably provide ecosystem services.

• **Planning is critical to successful adaptation, particularly along our dynamic coastlines and in floodplains.** Resilience and hazard mitigation planning is an iterative process that requires a long-term commitment by states and supportive federal agencies. To the extent possible, different state planning efforts (hazard mitigation plans, coastal zone management plans, etc.) should be coordinated or integrated in furtherance of a multi-sectoral, science-based, and cohesive vision for adaptation. Strong plans should also: define goals and set clear expectations; be anchored in science; account for uncertainty and residual risk; focus on impacts to people; and identify funding needs and challenges.

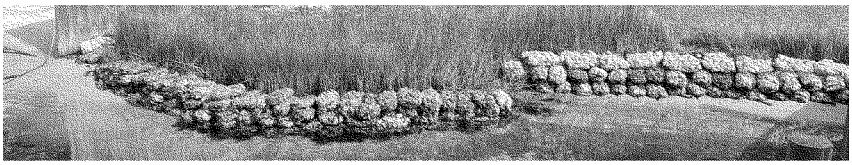
Policy Priorities

• **Establish a Resilient Communities Revolving Loan Fund (RLF) and Grant Program** to provide low- to zero-interest loans for communities to invest in projects and programs that improve disaster preparedness and long-term resiliency, with an emphasis on the use of natural defenses to achieve those goals. To support efforts in lower-income communities, the RLF should be administered alongside a grant program with aligned goals, or should include a mechanism to ensure access to the program for communities that otherwise would not have the resources available to participate. The National Wildlife Federation recommends an initial federal investment of $60 billion over 5 years, where loan repayments replenish the fund for additional projects over time.[31]

• **Increase investments in pre-disaster mitigation programs.** Historically, the vast majority of mitigation dollars have flowed to communities after disaster strikes, often through Federal Emergency Management Agency (FEMA) and Department of Housing and Urban Development (HUD) grant programs. While this support is critical to help communities get back on their feet, an increased investment in proactive mitigation is an efficient and cost-effective way to decrease future damages. Per provisions in the 2018 Disaster Recovery Reform Act, FEMA now has the authority to set aside an amount equivalent to 6 percent of the estimated aggregate total of other FEMA disaster grants for pre-disaster mitigation assistance. This set-aside authority as drafted is optional and at the discretion of the President. It should be made mandatory and the percentage increased, to ensure adequate investment in resilience pre-disaster. Congress must also prioritize direct mitigation investments in historically disadvantaged and economically vulnerable communities.

The Dosewallips River floodplain in Washington, site of a project to create and maintain wetland habitats. Credit: C. Swenson, USFWS Pacific Region.

It is time to adapt to increased risk through new forms of protection, accommodation, and retreat.



Oyster reef breakwaters and native marsh grasses line a living shoreline in Destin, Florida. Credit: Jennifer McPeek.

Protecting and restoring natural infrastructure, such as wetlands, dunes, and riparian corridors, can enhance resilience of human communities to climate-fueled disasters and provide critical co-benefits to society.

• **Reauthorize and reform the National Flood Insurance Program (NFIP).** After 13 short-term extensions, Congress must fully reauthorize and modernize the NFIP. Needed reforms include resources to increase accuracy of flood risk maps and additional mitigation investments to reduce overall risk, including through community-wide nature-based mitigation approaches. Such improvements would both decrease at-risk infrastructure and help inform future, smarter infrastructure investments.

• **Strengthen NFIP eligibility rules to address natural infrastructure.** FEMA is responsible for establishing eligibility rules for community participation in the NFIP. FEMA should update eligibility criteria to require communities to include within their Flood Hazard Mitigation Plans an analysis of the flood risk mitigation potential of the natural infrastructure within their boundaries. Communities already participating in the program should be given a 5-year deadline to update their plans and complete this analysis.

• **Reestablish Federal Flood Protection Standards that apply to all federal infrastructure spending.** Ensure that all federal dollars expended to support the construction of public buildings, facilities, and other infrastructure account for the future impacts of climate change and associated risks in their design and construction, and avoid investments in floodplains and coastal areas vulnerable to sea level rise.

• **Strengthen and expand the Coastal Barrier Resources Act.** As more storms and sea level rise alter high-risk areas along our coast, it is imperative to update and modernize the Coastal Barrier Resources System (CBRS) maps to continue to maximize the benefits of this program, and to protect coastal communities and natural resources. Anticipating the migration of shoreline features inland, we must look for ways to support open spaces that can accommodate this change in a fiscally and environmentally responsible way. Strategically expanding the CBRS shoreward, in consideration of anticipated sea level rise scenarios, would make good fiscal, environmental, and public safety sense.

• **Significantly increase funding for competitive grant programs that fund natural infrastructure or climate-smart solutions.** Such programs can encourage innovation and create a low-risk opportunity for communities to increase their comfort level with new risk reduction techniques or types of projects. Examples of grant programs that merit new or increased funding include:

  • The National Coastal Resilience Fund, a competitive grant program administered by the National Fish and Wildlife Foundation in partnership with the National Oceanic and Atmospheric Administration (NOAA), to restore, increase, and strengthen natural infrastructure to protect coastal communities from storm and flood hazards.[32]

• The Living Shorelines Act of 2019 (H.R. 3115), which establishes a NOAA grant program and associated monitoring requirements for implementation of living shorelines projects around the nation.

• **Reform Army Corps and FEMA Benefit Cost Analyses.** These benefit-cost analyses (BCAs) are often wildly inaccurate and do not provide a reliable assessment of whether a project is in the federal interest. Congress should modernize the BCA requirements to ensure that ecosystem services lost are counted as a project cost, and ecosystem services gained are counted as a benefit. Congress should also prevent the Army Corps from counting as benefits actions that are contrary to federal law and policy, such as agricultural development benefits created by draining wetlands, development benefits resulting from new or intensified use of floodplains or wetlands, or flood reduction benefits from new or intensified use of lands subject to flood easements or permanent conservation easements.

• **Direct the development of national guidance on how to value natural solutions.** Despite the many benefits that natural systems provide, the majority of these often go unaccounted for in project or impact evaluations. There have been some federal steps in a helpful direction (such as the 2013 Principles and Requirements for Federal Investments in Water Resources by the Council on Environmental Quality).[33] However, there is still a need for a consistent approach for valuing the benefits of natural infrastructure and to develop tools, data, and best practices to advance the integration of such approaches into hazard mitigation and water resource planning.

• **Significantly increase federal investments in America's water infrastructure, prioritizing natural solutions and climate-resilient infrastructure.** Our water and wastewater facilities have exceeded their intended lifespans and are breaking down, with the most severe impacts often disproportionately borne by low-income communities and communities of color. The threat of climate change is further stressing these water systems as they increasingly struggle to keep up with flooding, sea level rise, droughts, and other impacts. To help address our infrastructure backlog and adapt our water and wastewater utilities to a changing climate, Congress should increase federal investments in water infrastructure, including roughly tripling appropriations to the Clean Water State Revolving Fund (from $1.7 billion in FY18 to $6 billion annually) and the Drinking Water State Revolving Fund (from $1.95 billion in 2020 to $6 billion). This funding should require and incentivize the use of natural and green infrastructure and invest in making our water systems more climate resilient.[34]

Mangroves in Everglades National Park. Protection of existing coastal ecosystems, including mangroves, offers opportunities for carbon mitigation and climate adaptation. Credit: dconvertini, via Flickr.

Endnotes

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[27] See RECLAIM Act, H.R. 2156/S. 1232, which would accelerate abandoned coal mine land reclamation work while improving economic redevelopment with direct engagement and support from affected communities. The $1 billion would come from existing surplus reclamation funds already collected but not yet allocated by Congress.

[28] See H.R. 4248, the Surface Mining Control and Reclamation Act Amendments of 2019, and S. 1193, the Abandoned Mine Land Reclamation Fee Extension Act of 2019.

[29] See H.R. 2579/S. 1386, the Hardrock Leasing and Reclamation Act of 2019, which, among other things, establishes a national hardrock abandoned clean-up program funded by industry fees and royalties.

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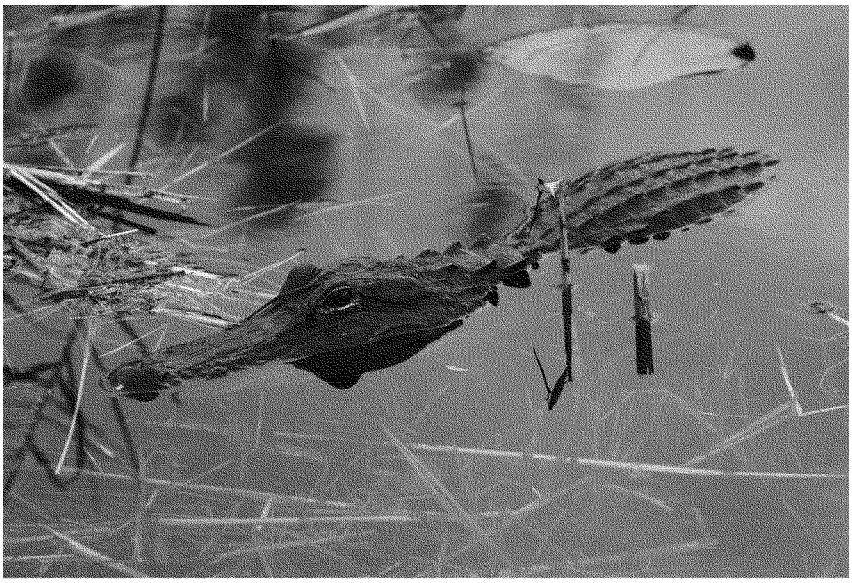
[31] A $60 billion recommended investment is derived from total disaster damages from 2008-2017 (pre-2017 hurricane season), divided by a factor of 6 per the National Institute of Building Sciences mitigation spending-to-savings ratio of 6:1. See report in footnote 27. (This is similar to a proposal in the Senate Democrats' Jobs and Infrastructure Plan for American Workers; there are a variety of other resilience revolving loan fund bills that have been introduced this Congress, though with a less pronounced emphasis on natural infrastructure, including: H.R. 1610, State Flood Mitigation Revolving Loan Fund; H.R. 3779, Resilience Revolving Loan Fund Act of 2019).

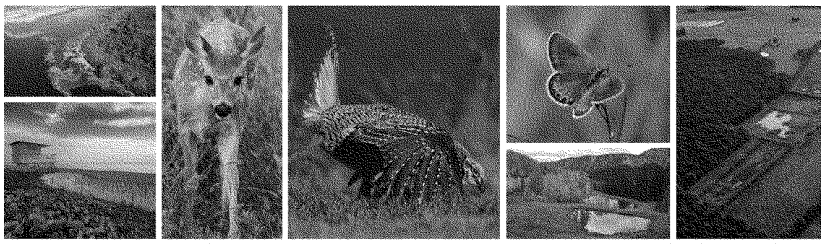
[32] See H.R.4093, National Oceans and Coastal Security Improvements Act.

[33] White House. 2013. Principles and Requirements for Federal Investments in Water Resources. obamawhitehouse.archives.gov/sites/default/files/final_principles_and_requirements_march_2013.pdf.

[34] Examples of legislation that achieves this include the Water Quality Protection and Job Creation Act (HR 1497), which makes much needed investments to help address our nation's infrastructure backlog by increasing authorized funding levels for the Clean Water State Revolving Fund (CWSRF) to $4 billion annually. The bill also includes a provision that directs 15 percent of the CWSRF to projects that incorporate natural infrastructure, which will help provide social and economic benefits to communities while also protecting water quality and fish and wildlife habitat. The bill also takes important steps to address climate impacts to these systems by assessing future vulnerabilities they face from climate change and by implementing more resilient practices and modifications to reengineer these water systems to make them more resilient.



An American alligator in Everglades National Park. Credit: Judy Gallagher via Flickr.



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