

My name is David Kanter - I'm an Associate Professor of Environmental Studies at New York University and Chair of the International Nitrogen Initiative, which is the world's leading network of scientists and stakeholders working towards more sustainable nitrogen management. My background is in chemistry and law and I have a PhD in environmental science and policy from Princeton University.

As a scientist who lives in New York, and works with institutions up and down the coast, I'm a frequent commuter on Amtrak's northeast corridor. This project in particular has deep personal importance for me, because I love Baltimore, and Reservoir Hill specifically. Dear friends of mine live here, and I've seen firsthand how wonderful this community is. It's incredibly special.

As an environmental expert, I want to emphasize the importance of accounting for climate impacts in infrastructure planning, of which rail is an important component. The best data that we have available comes from the National Climate Assessments, a series of US government reports generated through a congressionally-mandated partnership of 15 federal member agencies, including the Department of Transportation, which oversees the Federal Railroad Administration, the source of this project's funding. The Fifth National Climate Assessment¹, or NCA5, was released in November of 2023, so it's quite recent.

NCA5 states that the frequency and intensity of extreme weather events are projected to increase dramatically in a warming world. If current trends continue, then by 2050 the average number of very hot days, or days above 95 degrees, in the US is expected to double, going from a current average of 15 to 30; by 2100, or the end of the century, that number will range from 50 to 90 days², depending on latitude, meaning that effectively every single summer day in Baltimore may be over 95 degrees Fahrenheit. That will of course increase inside Baltimore City's urban heat islands, where temperatures are consistently 10 degrees higher³, to 105 degrees.

As we saw this week⁴, the Northeast is also highly vulnerable to extreme precipitation. NCA5 — which again, was generated through the cooperation of 15 federal agencies and authored by nearly 500 scientists — asserts that major coastal flooding events per year in the United States are expected to increase from a current level of near zero to a minimum of three per year by 2050, and possibly over 180 - yes, that's one

¹ Full report available at <https://nca2023.globalchange.gov/>

² Berardelli, Jeff. "US Releases Its Most Extensive Climate Assessment Ever," November 16th, 2023, WFLA/NBC Channel 8

³ Baltimore City Office of Sustainability, <https://www.baltimoresustainability.org/urban-heat-island-sensors/>

⁴ Yoon, John. "East Coast Faces Flooding After Day of Rain," January 10th, 2024, *The New York Times*

hundred and eighty - by 2100, due to the potential rapid melting of ice sheets in Greenland to the north, and the Antarctic to the south.

We've already experienced some of these changes. Annual maximum daily precipitation has already increased 14% in the Northeast, while total precipitation on the top 1% of rainy days has increased by 60% compared to the first half of the 20th century.

These changes are real. Climate change will have serious impacts on our ability to build and maintain rail infrastructure across the US. Extreme temperatures will lead to rail buckling and reduced train speeds. More intense storms will lead to flooding of bridges, tunnels, and low-lying rails, in addition to damage from landslides. And increased drought will impact soil stability which could affect track geometry and integrity.

In Baltimore City, where pediatric asthma rates are double the national average⁵, and juvenile asthma rates are triple⁶, rail infrastructure's current impacts on air quality will be worsened in a warming world. Increased temperatures, drought, heatwaves and wildfires are all expected to increase emissions of ground-level ozone and PM2.5 - two of the world's major air pollutants, and significant triggers for asthma attacks.

Severe warming (with a US average increase of 9-14F) would increase annual US air-pollution related deaths by approximately 25,000 in 2100, relative to 2000, currently. These impacts are and will be disproportionately felt by communities of color⁷, like the one you're gathered in today, where much of this infrastructure is sited and thus are more exposed and at risk.

Any project designing, building or maintaining infrastructure in the US today needs to plan for climate change. Both in terms of the project's own environmental footprint, but also how it will be impacted by climate change and the implications for surrounding communities. The changes that are happening in our climate are here.

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⁵ Abell Foundation, Pediatric Asthma, October 2020, <https://abell.org/publication/pediatric-asthma/>

⁶ Baltimore City Health Department, <https://health.baltimorecity.gov/node/454#>

⁷ Marino, E.K., K. Maxwell, E. Eisenhauer, A. Zycherman, C. Callison, E. Fussell, M.D. Hendricks, F.H. Jacobs, A. Jerolleman, A.K. Jorgenson, E.M. Markowitz, S.T. Marquart-Pyatt, M. Schutten, R.L. Shwom, and K. Whyte, 2023: Ch. 20. Social systems and justice. In: *Fifth National Climate Assessment*. Crimmins, A.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, B.C. Stewart, and T.K. Maycock, Eds. U.S. Global Change Research Program, Washington, DC, USA. <https://doi.org/10.7930/NCA5.2023.CH20>