

Citizen Science Program Review



In 2016, Clean Air Carolina (CAC) launched the Citizen Science AirKeeper Program to monitor air quality in Charlotte. Since then, we have developed a statewide network of monitors measuring invisible fine particulate matter (PM_{2.5}). Exposure to PM_{2.5} can have serious health risks linked to asthma, heart and lung disease, and diabetes. The data collected from our network helps inform elected officials, planners, and neighborhood leaders to create healthier communities by protecting air quality.

About the Assessment

In 2020, our Citizen Science Program underwent a formal review by the Eastern Research Group (ERG). Our objectives for the review were to learn about the status of the monitors in the network, whether the placement of monitors are near emission sources, how volunteers use the data, and where we should deploy sensors in the future. Between December 2020 and March 2021, the assessment was conducted and we're currently working with ERG to implement recommendations.

What We Found

About the monitors

- Monitors were located in the urban, suburban and rural areas, with urban areas having the least placements.
- Less than half of monitors at private residences were active, while those placed at organizational locations were mostly active.
- Citizen scientists had some technical issues with Wi-Fi, which could explain the number of inactive monitors.

About the network

- Monitors were placed at sources of emissions like Animal Feeding Operations and Title V facilities, along with vulnerable areas like schools and childcare centers.
- About 75% of air monitors are located in neighborhoods disproportionate health impacts based on social and environmental indicators like race, income, and proximity to roadways.

About the data

- The data were recorded in hourly averages at each site.
- To supplement the results, ERG used the EPA program EJSCREEN to identify demographic information and possible environmental justice impacts.
- Monitors placed 10 to 20 miles from high emission sites had lower PM_{2.5} levels than closer monitors.
- Citizen scientists expressed a need to better understand the data they collected.

Moving Forward



We have outlined the next steps CleanAIRE NC will take to further improve our growing network of air quality monitors across North Carolina.

1

Growing Our Network

CleanAire NC will increase the number of PM2.5 air monitors in underserved urban and rural communities near major pollution sources. These "cluster networks" will allow citizen scientists to gain a better understanding of the impact of nearby emissions.

2

Developing a Support System

We will develop a support system to enable citizen scientists to maintain their air monitor properly and troubleshoot problems when a monitor is down. We will also offer quarterly opportunities for them to meet with others hosting a monitor to share ideas, discuss findings, and consider ways to advocate for solutions.

3

Regular Report Backs

Sending monthly "report backs" on how the monitor is working will provide citizen scientists with average PM2.5 levels and any concerning trends we notice. This process also allows us to include training on interpreting data being collected so it can be used for education and advocacy.

Thank you to all individual and organizational citizen scientists across North Carolina. We look forward to working with you as we strategically expand and deepen the impact of the network. If you have any questions, comments, or suggestions, please contact Citizen Science Program

Manager Maria Sharova at maria@cleanaircarolina.org.