

Clearing the Air in the Historic West End

Ron Ross

President

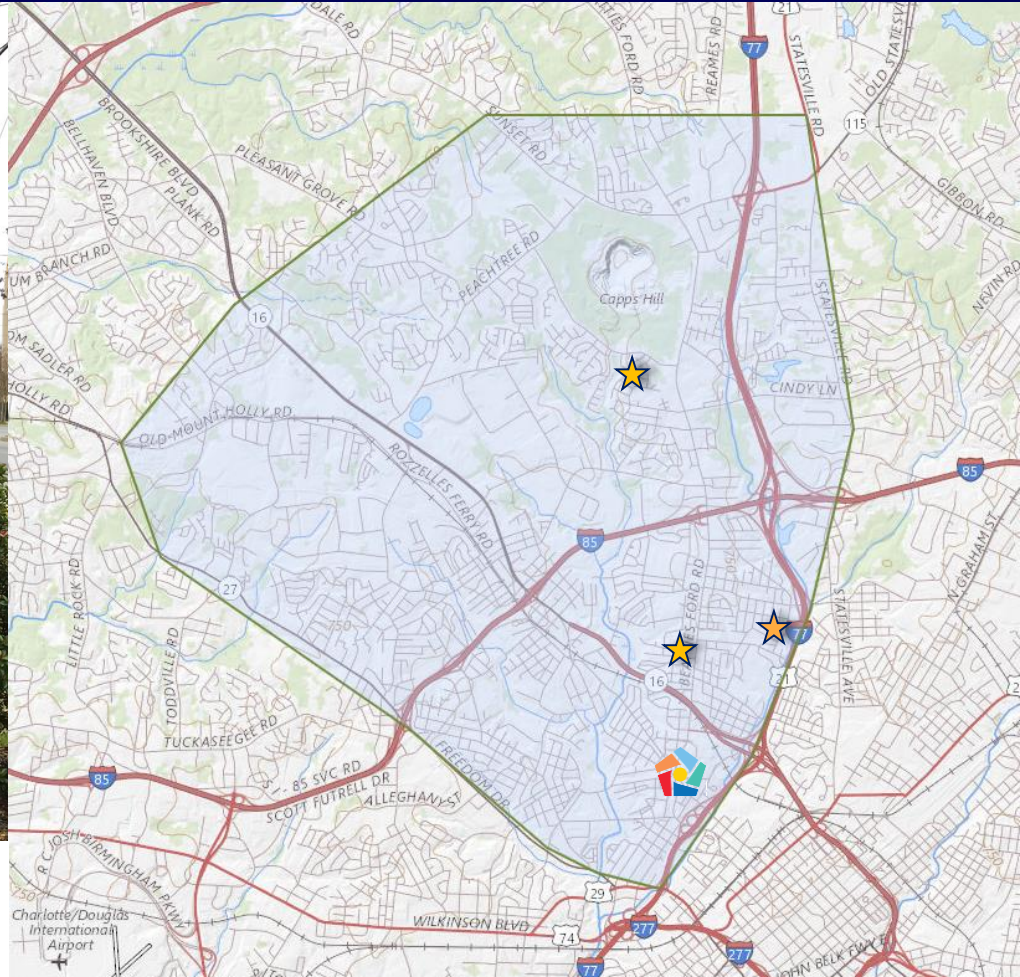
Northwood Estates Community Organization

Calvin Cupini

Citizen Science Program Manager

Clean Air Carolina

Historic Communities



Ron Ross, Northwood Estates (left)
Mattie Marshall Historic Washington Heights (center)
William Hughes, Oaklawn Park (right)

Social Determinants of Health

At every stage of life, health is determined by complex interactions between social and economic factors, the physical environment and individual behavior. The social conditions we face each day, where we are born, live, work and play, have a greater impact on our health and life expectancy than the health care we receive. For additional maps of Mecklenburg County social and economic indicators see the Appendix.

Education, Income and Health

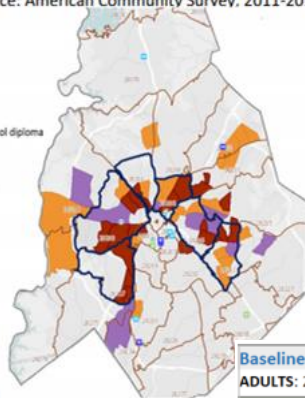
- People with less education and income tend to live in neighborhoods which lack access to nutritious foods and safe places to exercise.
- These residents may also be exposed to risk factors that increase their chances for chronic diseases later in life.
- A crescent-shaped area of poverty and low educational attainment exists around the center city of Charlotte which tends to have higher rates of chronic disease and deaths.

Mecklenburg County Public Health Priority Areas

Source: American Community Survey, 2011-2015

Legend

- $\geq 25\%$ population less than High School diploma
- $\geq 30\%$ population below Poverty
- Populations below both Thresholds (Below Poverty Level $\geq 30\%$ and Less than High School $\geq 25\%$)
- Public Hospital
- Private Hospital
- Other Hospital











2017 Local Behavior Risk Factor Surveillance Survey, Mecklenburg Selected Chronic Disease Indicators for Mecklenburg and PHPA

	Mecklenburg	Public Health Priority Area (PHPA)
Behavioral Health Risks		
Smoking	13.8%	13.9%
Overweight/Obesity	64.5%	64.7%
No Physical Activity	18.5%	24.4%
Chronic Conditions		
High Blood Pressure	30.1%	42.0%
High Cholesterol	30.2%	36.3%
Diabetes	9.6%	15.8%
Cardiovascular Disease	7.5%	11.5%

People can be at greater risk despite experiencing the same exposures

Baseline Measurements

ADULTS: 20% of adults in Mecklenburg County report not being able to see a doctor due to cost (BRFSS, 2017)

Relevant Data Selected Health Indicator (data source)	MECK	NC	Trend in Mecklenburg compared to previous years	Racial and Ethnic Health Disparity Ratios	
				African American/Black	Whites
2018, Adults without a primary care provider (BRFSS)	28%	21%	Increasing	 1.3 to 1	
2018, Adults unable to see a doctor due to cost (BRFSS)	19%	13%	Stable	 1.6 to 1	
2018, Adults unable to see a dentist due to cost (BRFSS)	26%	N/A	Stable	 1.8 to 1	
2018, Uninsured Population (18 - 64 yrs) (US Census)	16%	16%	Increasing	 1.9 to 1	

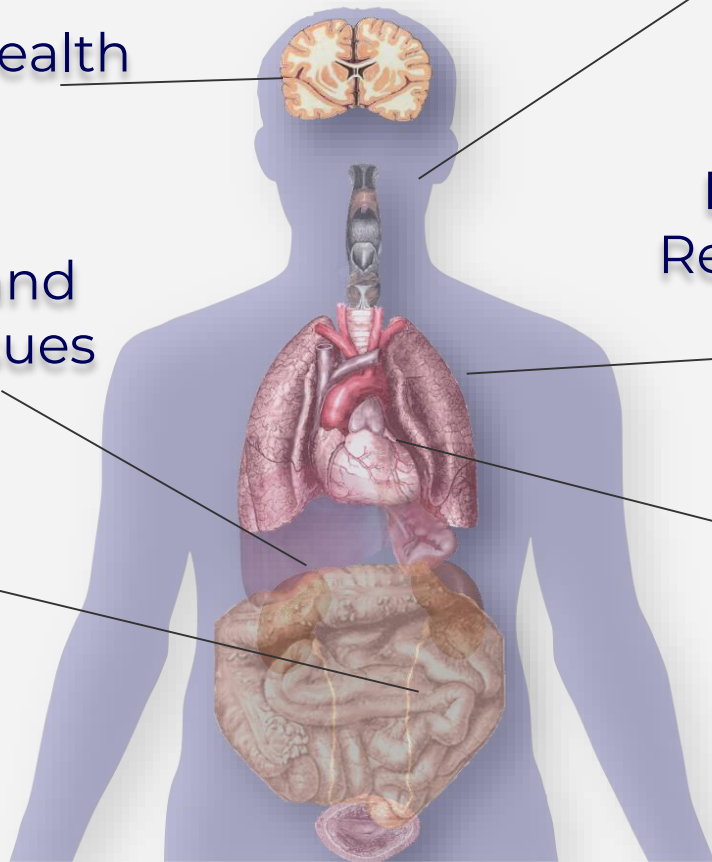
Source: 2017-18 Mecklenburg County Health Assessment, 2018 Mecklenburg State of the County Health Report (SCOTCH)

Air Quality Health Links

Headache, CNS
impacts, mental health
impacts

Obesity, Diabetes and
other metabolic issues

Low birth
weight,
Premature birth,
Birth defects,
Miscarriage



Irritation of eyes,
nose and throat

Asthma and other
respiratory illnesses,
Exacerbated allergies,
Reduced lung function,
Lung cancer

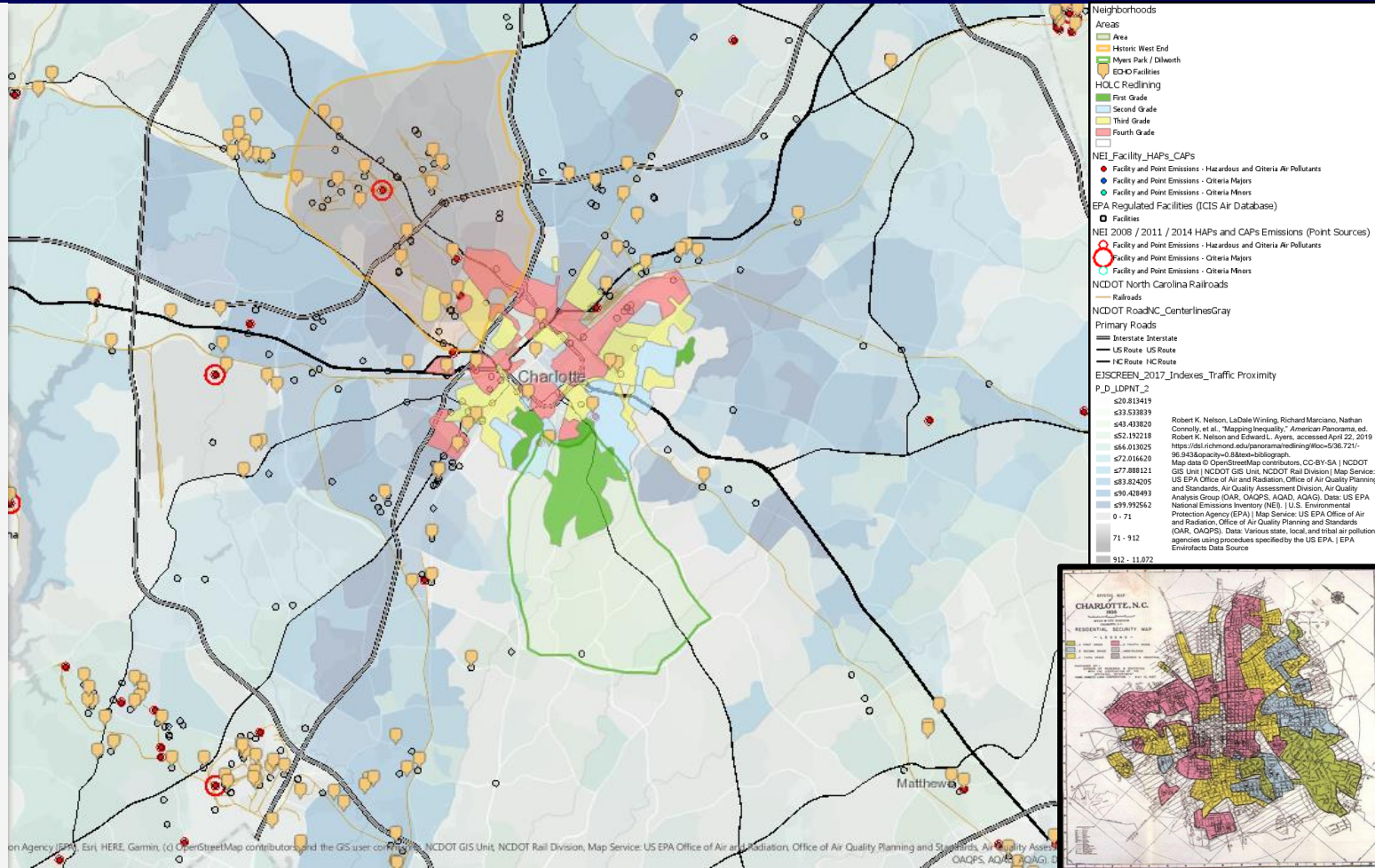
Cardiovascular
diseases,
Elevated blood
pressure

Lelieveld et al., *Nature* 2015; Calzavara et al., *Atmospheric Environment* 2015
Gray, S.C., Edwards, S.E., Schultz, B.D., Miranda, M.L. (2014). Assessing the impact of race,
social factors and air pollution on birth outcomes: a population-based study.
Environmental Health, 13(4). doi: 10.1186/1476-069X-13-4
Lepeule, J., Laden, F., Dockery, D., & Schwartz, J. (2012). Chronic Exposure to Fine Particles and
Mortality: An Extended Follow-up of the Harvard Six Cities Study from 1974 to 2009.
Environmental Health Perspectives, 120(7), 965-970.
Calderón-Garcidueñas, L., Calderón-Garcidueñas, A., Torres-Jardón, R., Avila-Ramirez, J.,
Kulesza, R.J. and Anguiano, A.D. (2015). Air pollution and your brain: what do you need to
know right now. *Primary Health Care Research & Development*, 16(4), 329-345.
doi:10.1017/S146342361400036X.

Environmental Justice

Environmental justice (EJ) means that no group of people should bear a **disproportionate share** of negative environmental effects that result from operations or policies pursued by commerce, industry or government.

The issue of environmental justice arises when certain communities, **through no fault of their own**, are more impacted than others by the sources of pollution located near where **they live, work, and play**.





Clean Air
Carolina

Your advocates for healthy air

Z. Smith Reynolds
FOUNDATION



Clean Air Carolina Programs

Medical Advocates for Healthy Air



Clean Air for Kids!

AIR

made visible

ANDREA POLLI *PARTICLE FALLS*



Citizen Science Monitors

- Fraction of the **Cost**
- **Compact** size
- **Neighborhood** deployment

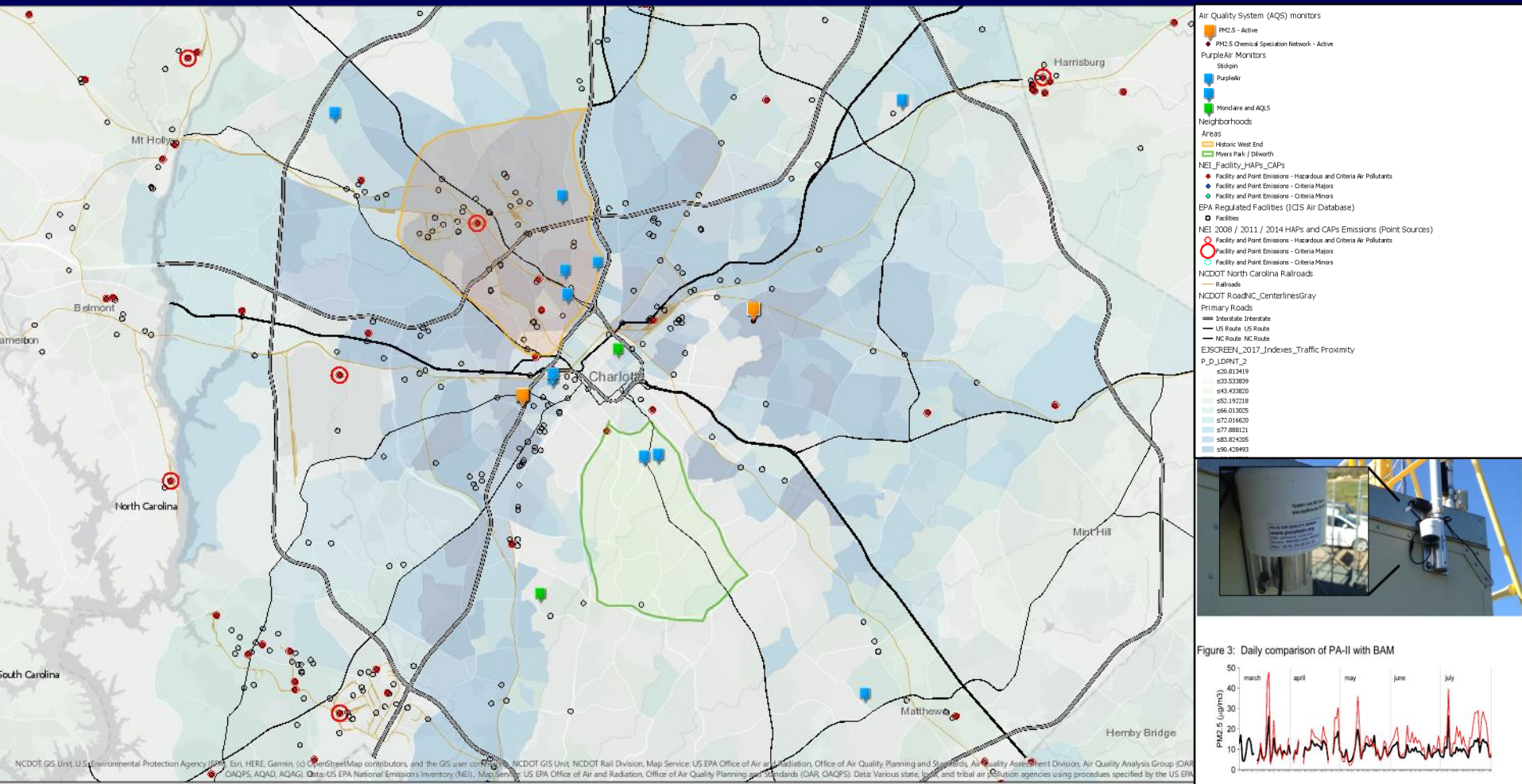


Collocation Partnerships



Sensor Evaluation from the Community
Perspective - Tools and Techniques
Teri Conner1 Andrea Clements Ronald Williams
Amanda Kaufman
1U.S. EPA, Office of Research and
Development, Research Triangle Park, North
Carolina, USA
2U.S. EPA, Office of Air Quality Planning and
Standards, Research Triangle Park, North
Carolina, USA

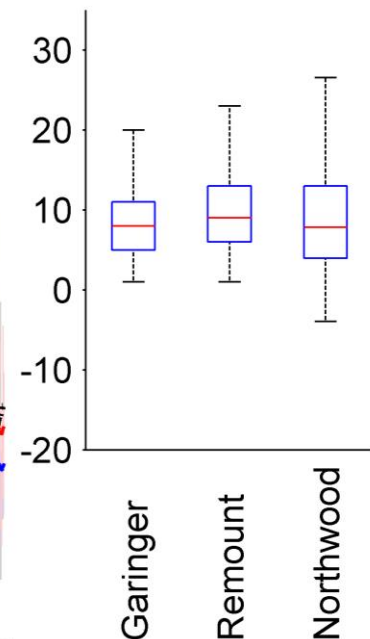
Citizen Science Monitoring



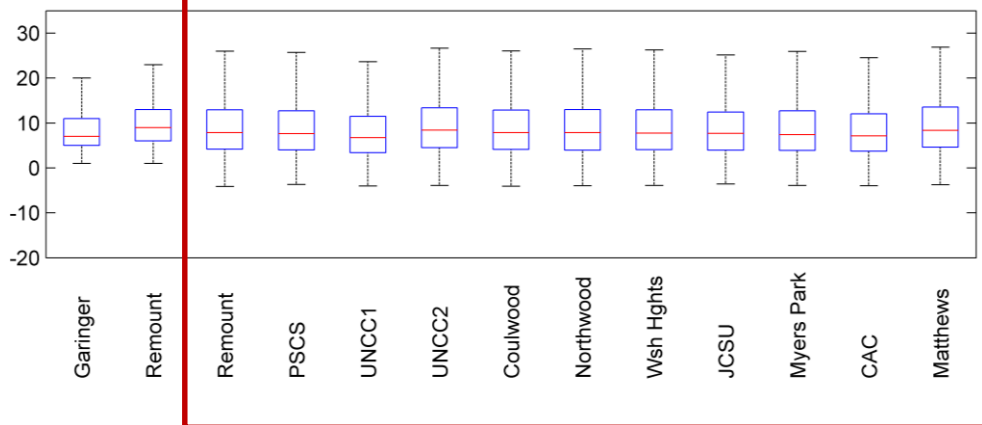
Citizen Science Monitoring

Northwood A (black/gray) compared with MCAQ Remount (red) and Garinger (blue)

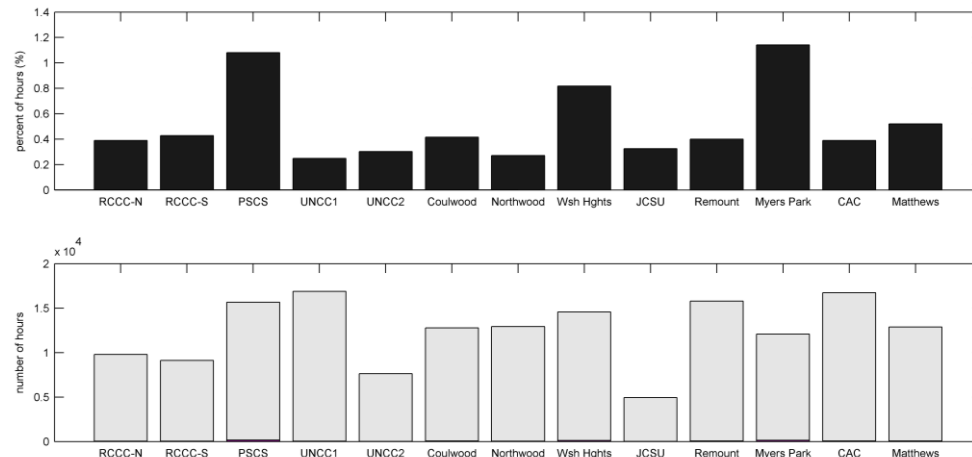
Northwood mean = 9.01 ± 6.8
MCAQ Remount mean = 9.78 ± 5.2
MCAQ Garinger mean = 8.44 ± 4.9



Citizen Science Monitoring



For the most part, **average concentrations** of PM2.5 are **nearly the same** at all of our monitoring sites.



What we found were events likely very **local to just one sensor**, that produced **higher** than average levels for **very short periods**.

Neighborhood residents reported construction trucks, rush hour, or days of street repaving as being the likely sources for these local spikes.

AirKeepers Advocacy Training



Tuesday, March 5:

Clean Air Corridor Visioning Session; Stakeholder Group Power Mapping

Tuesday, March 12:

Air and Health in the Corridor; Proximity of Polluting Industries

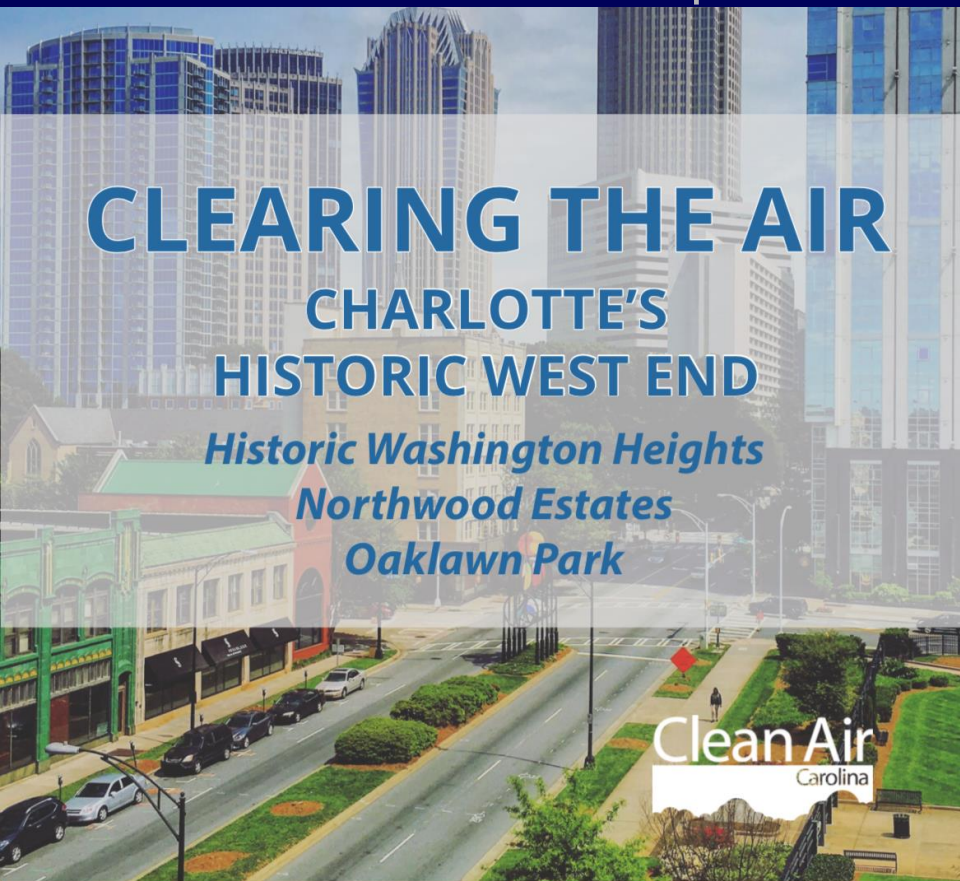
Tuesday, March 19: Permits and Zoning; Searching Permitted Facilities in the Corridor *(Thank you MCAQ!)*

Tuesday, March 26:

Meeting with Elected Officials; Community Benefits Agreements, Serving on Boards and Commissions



Historic West End Report



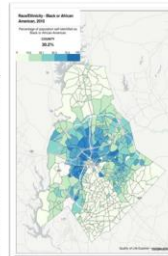
FALL 2018

Environmental Justice

The federal Environmental Protection Agency (EPA) defines environmental justice (EJ) as, "the fair treatment of all people regardless of race, color, national origin, or income with respect to implementation and enforcement of environmental laws, regulations and policies." Fair treatment means that no group of people should bear a disproportionate share of the negative environmental effects resulting from industrial, governmental and commercial operations or policies.

Like many cities in the U.S., Charlotte has a troubled history with segregation and inclusion. Clearly visible in the figure to the right is the distribution of African-American populations in Charlotte, known as the "crescent and wedge".

The following figures were created using the EPA's EJScreen tool, which illustrates how Historic West End residents and surrounding areas are more likely to be exposed to toxic diesel pollution and direct emissions from sources with permits to emit pollution. There is a direct relationship between the neighborhoods and environmental impacts where residents live, work, and play. Residents are disproportionately burdened by factors like air pollution more than other Charlotteans.



Map of Diversity in Charlotte by Census Tract: Charlotte Quality of Life Explorer, 2018

It's important for policy makers and the public to understand that "fairness" is not always "sameness."

Citizen Science in Action

With the help of community leaders, Clean Air Carolina established three permanent PM2.5 monitoring sites in three distinct neighborhoods in the area: Oaklawn Park, Historic Washington Heights, and Northwood Estates. We compared the results with a monitor installed in the Myers Park neighborhood, as well as Mecklenburg County's federal regulatory monitor at Garinger High School in the east. We collected a year of data from all five sites and have made a preliminary comparison of neighborhood pollution levels of PM2.5, with more extensive analysis to be completed in the future.

The chart (Figure 6) shows the summary of measurements of PM2.5 from each sensor. The boxes contain the range of typical readings from each sensor and the median over the course of the year. The "spike" shows the maximum and minimum of what the sensors picked up. Each dot represents an outlier, or an unlikely event well outside the normal range.

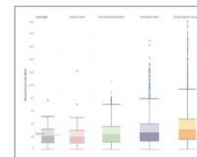
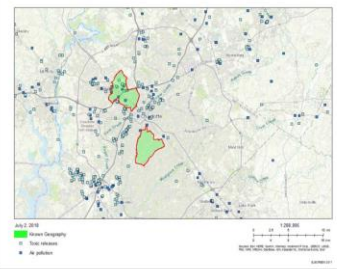


Figure 6 PM2.5 concentrations in 5 distinct areas of Charlotte, 2017

We see a close relationship between the typical readings from each sensor and the median over the course of the year. The "spike" shows the maximum and minimum of what the sensors picked up. Each dot represents an outlier, or an unlikely event well outside the normal range.

Further research of these differences is being studied in the area, and more monitors are being deployed around the city to gather important data on these local differences.

In the map below, there are two highlighted regions of Charlotte, the Historic West End to the north, and Myers Park/Selwyn (historically affluent, white neighborhoods) to the south. The small blocks are the locations of facilities with permits to emit pollution into the air as part of their operations. You will notice the location of these facilities is more concentrated in the north and west of the city, and less in the south.



Map of Charlotte neighborhoods and permitted facilities, 1990-2017

This distribution of industrial facilities, transportation infrastructure, and sources of emissions is common in most cities. The issue of environmental justice arises when certain communities, under no fault of their own, are more impacted than others by what is located near where they live, work, and play.

School Engagement

During the two-year project, Clean Air Carolina partnered with five Charlotte-Mecklenburg schools in the Historic West End to educate students about air pollution and engage them in hands-on STEM learning. The project utilized our citizen science tools, specifically hand-held personal air quality monitors and Android tablets, to create maps (Figure 9) which show variation in particle pollution levels in real-time.



The air monitoring team at West Charlotte Project UPT

The schools were able to choose from three options (or a combination of these) to best fit their needs.

1. Fixed monitoring site and class presentation
2. A class presentation and a mobile air monitoring activity
3. Customized air monitoring school project

All participating schools received introductory training on air quality, citizen science and monitored air quality around their school campus. Air monitoring teams uploaded their collective data to the AirCasting website, an open source platform for environmental data that anyone can access. Some schools had students use Chromebooks to view their data on AirCasting. Teams also learned how to protect their health from poor air quality and they were encouraged to think of ways to improve air quality at their respective schools.

PARTICIPATING SCHOOLS

Johnson C. Smith University
J.T. Williams Montessori
HW School of the Arts
Oaklawn Language Academy
West Charlotte High
Project UPT Academy

CREATING A CLEAN AIR CORRIDOR

PASSENGER VEHICLE EMISSIONS: Passenger vehicles are the most significant source of air pollutants linked to a wide range of health impacts. This effort would expand Clean Air Carolina's IdleFree Schools campaign into the broader Historic West End community by installing signage in key places such as libraries, health clinics, churches, fast-food restaurants and other public places.

CLEAN CONSTRUCTION: Diesel emissions from construction projects are highly toxic and carcinogenic. Developers can voluntarily join Clean Air Carolina's Clean Construction Partnership, demonstrating their commitment to protect the health of residents by using low-emission equipment in the area. Residents can also advocate for special zoning which would require the use of low-emission equipment.

PERMITTING AND ZONING: Businesses must apply for and receive air quality permits, and many request rezoning when they open or expand operations. The density and proximity of these areas often coincides with historic non-white communities. Neighborhood residents can learn more about how permits and zoning requests are reviewed and approved, about the role that they can play in commenting on those permits, and about opportunities to serve on the Mecklenburg County Air Quality Commission. Better communication between the two can go a long way to providing equitable outcomes for residents in the West End.

USE OF COMMUNITY BENEFITS AGREEMENTS: A Community Benefits Agreement or "CBA" is a contract signed by community groups and a company whose operations are impacting the community in a detrimental way. The agreement can state that the company provide specific amenities and/or mitigations to the local community or neighborhood.

TREE PLANTING AND GREEN INSTALLATIONS: A healthy tree canopy can absorb a portion of an area's air pollution. Strategic tree planting in the Historic West End would help filter air pollution from vehicles along Beatties Ford Road and surrounding highway, while providing many co-benefits for neighborhood wellness and beauty.

Clean Air Carolina

Your advocates for healthy air

Thank you

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