

COMMUNITY AIR MONITORING NETWORK (CAMN)

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Background of Community Monitoring



- **Community Concerns about Neighborhood Air Quality**
- **I-275 Traffic and Associated Emissions**
- **EPC Commission Presentation August 2020**
- **Subsequent Presentations to TPO**
- **TPO, USF, and EPC began Pilot Project in September 2021**



EPC AIR MONITORING NETWORK

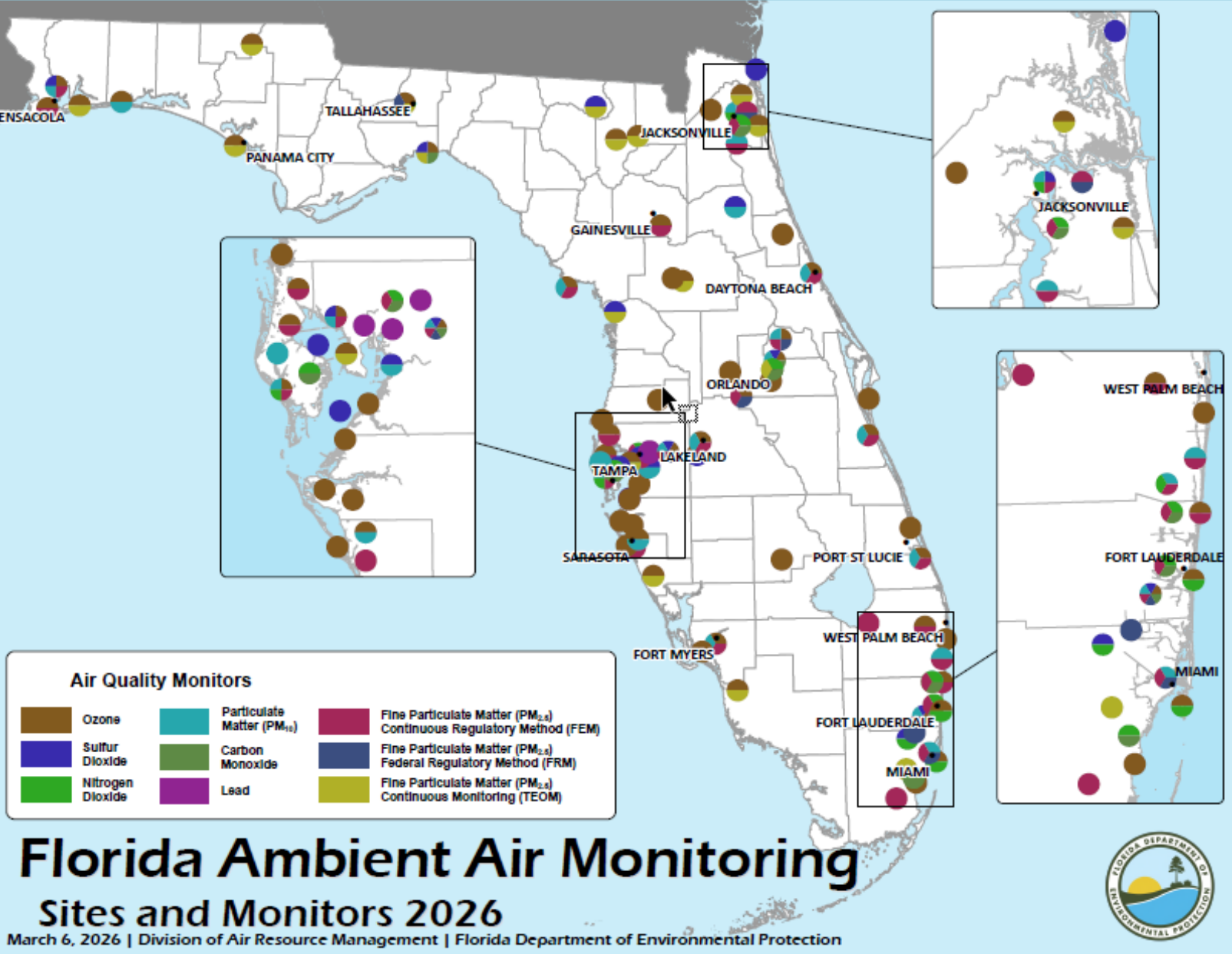


● Air Monitoring Site

Last Updated: August 21, 2026



Statewide Air Monitoring Map



Goal of Community Monitoring



- **Determine Best Low Cost Sensors for Network**
- **Partner with the Community for Host Sites**
- **Collect Data along Traffic Corridors**
- **Educate the Community on Air Quality**
- **Compare Data to Regulatory Monitors**



Community Monitoring



- **Project Funding**
 - **Transportation Planning Organization (TPO)**
 - **Federal Highway Administration (FHWA)**
 - **US Environmental Protection Agency (US EPA)**
 - **University of South Florida (USF)**
- **EPC Provided Access for Collocation Sites and Staff Resources for Project**



Work Performed by University of South Florida (USF)

Monitor Selection and Testing



PurpleAir



Clarity Node



AirBeam



Cairsens



Atmotube

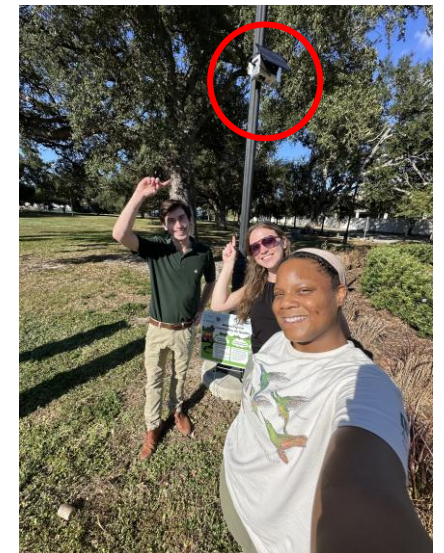
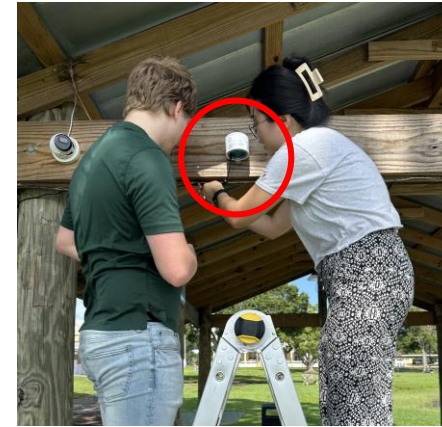


Flow

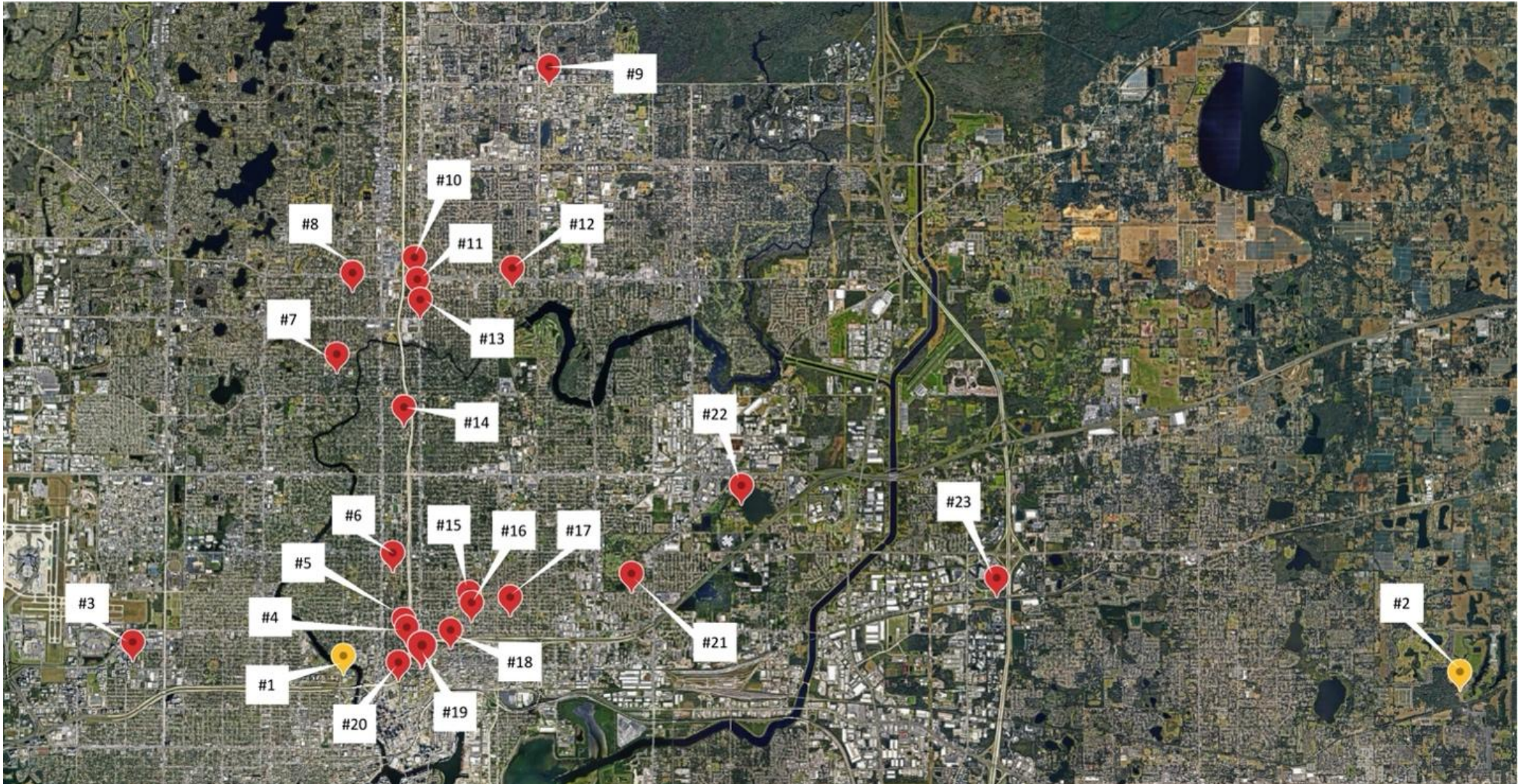
fine particles ($PM_{2.5}$)
nitrogen dioxide (NO_2)
black carbon (BC)



Monitor siting, installation, and maintenance



The community network



Red locations are community sites. Yellow locations are EPC reference sites.

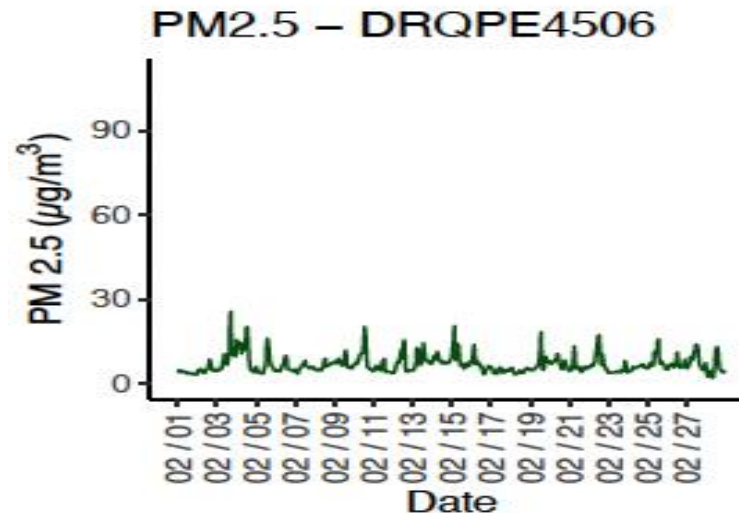
Data quality management



Quality Assurance Project Plan (QAPP):
Distributed Air Quality Monitoring
Along the I-275/I-4 Corridor

Category III QAPP

**F1b. Standard Operating Procedure:
Monthly Air Sensor Data Collection**



EPA/600/R-20/280 | February 2021

Performance Testing Protocols, Metrics, and Target Values for Fine Particulate Matter Air Sensors

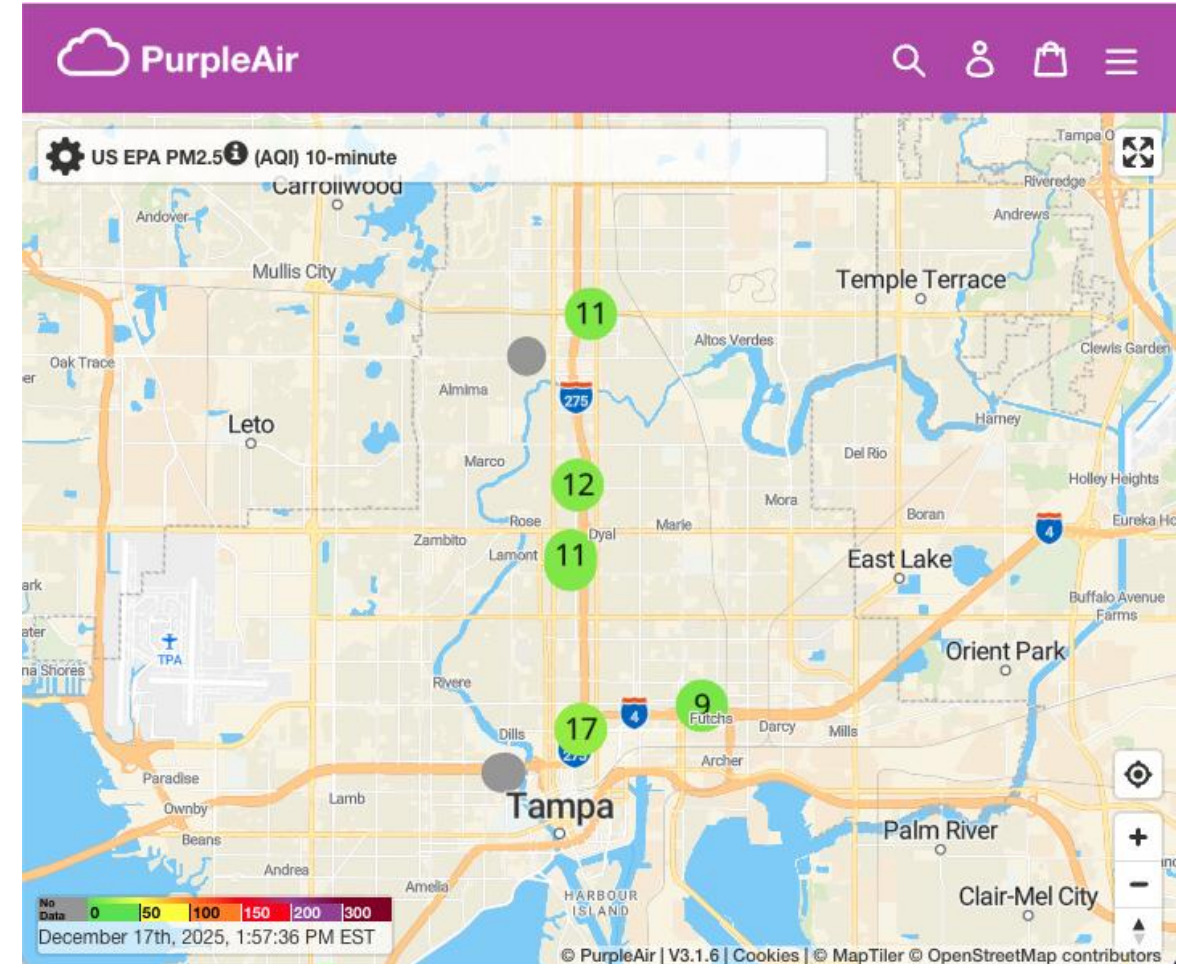
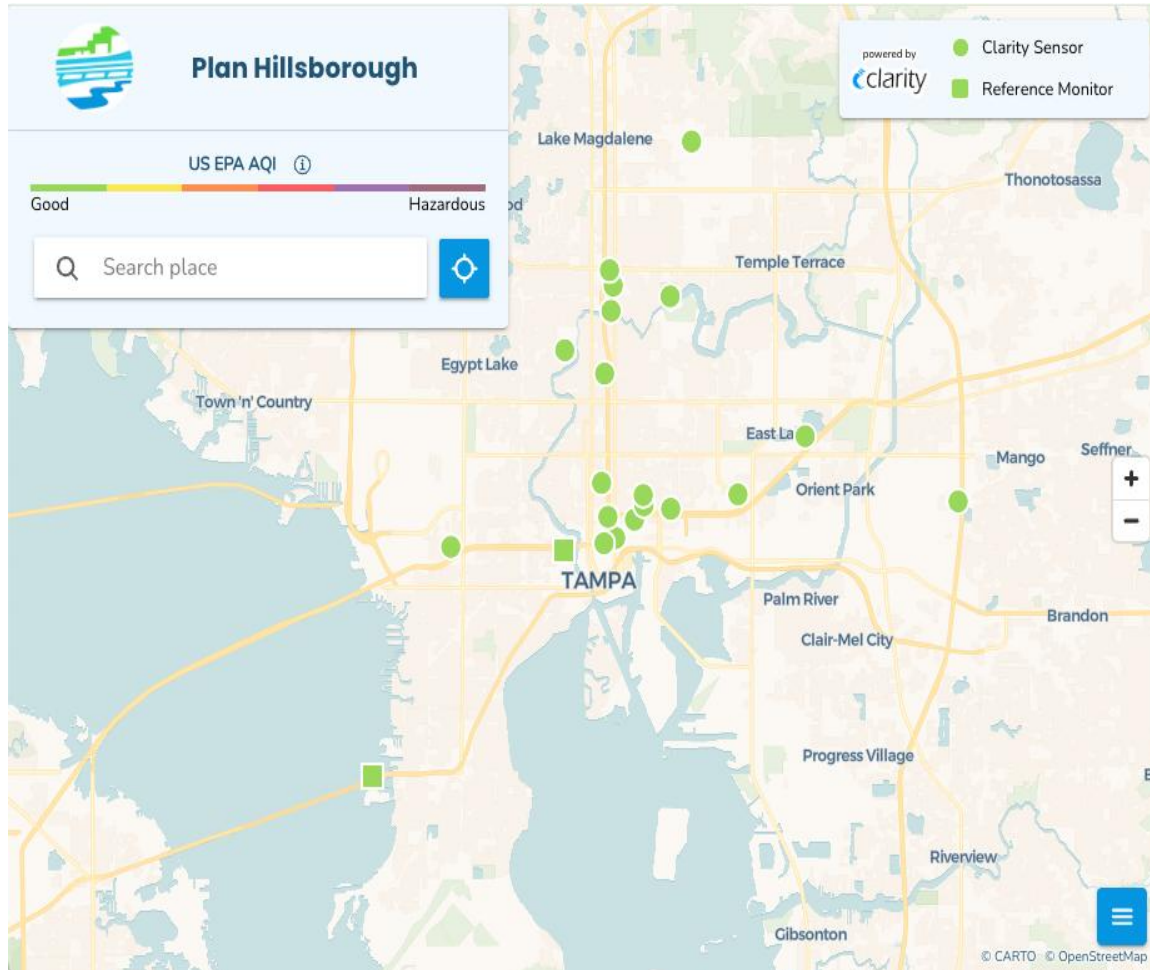
USE IN AMBIENT, OUTDOOR, FIXED
SITE, NON-REGULATORY
SUPPLEMENTAL AND INFORMATIONAL
MONITORING APPLICATIONS



Office of Research and Development
Center for Environmental Measurement and Modeling

Data for everyone

Guidebook for the Hillsborough Community Air Quality Monitoring Network



Website: planhillsborough.org/low-cost-air-quality-monitoring-pilot-study/



Hillsborough TPO
Transportation
Planning Organization



UNIVERSITY of
SOUTH FLORIDA

Measuring Our Community Air Quality

**Why measure air
quality here?**

- Air pollution can be inhaled and have negative health effects
- Some communities near heavy traffic may have higher exposure
- Local air data can help design healthier communities

**How do we know
community air quality?**

- Small, low-cost air monitors are placed where people live, work, learn, and play
- Real-time air quality maps tell us the amount of air pollution and possible health concerns.

**What's the air like
right now?**

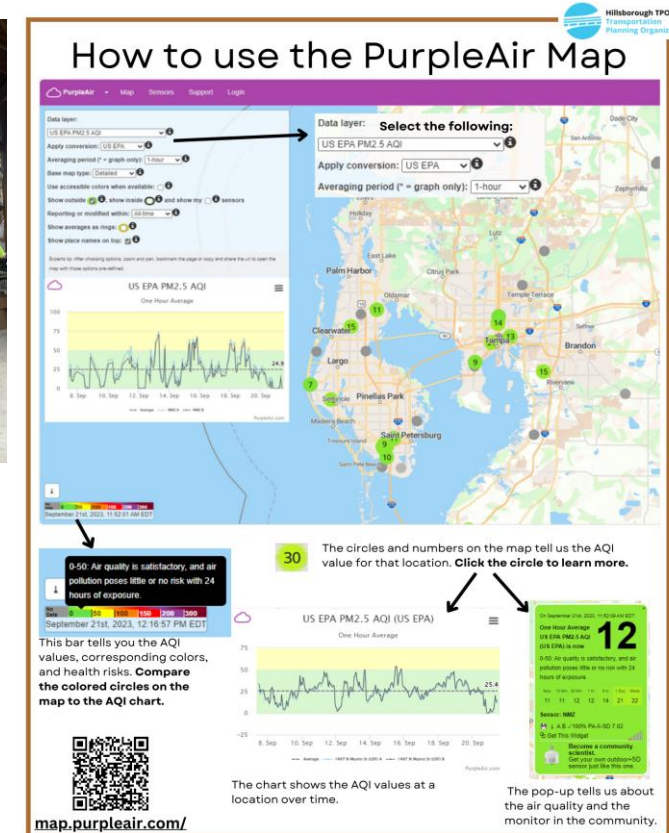
View real-time maps and
learn more at:
tinyurl.com/usfaq



Community involvement and education



Air Aware!
CAMN Data in Action



Quality of data from sensors

- **24-hr PM_{2.5}**: Both monitors performed well against the co-located reference measurements, capturing the temporal dynamics (daily/monthly/seasonal)
- **1-hr NO₂**: Performance is unreliable

Quality objective	Metric		Clarity 24-hr PM _{2.5}	
			Raw	Corr.
Accuracy	Bias	Slope	1.8 (IV)	0.7 (I)
		Intercept	-2.1 (I)	2.1 (I)
	Linearity (R ²)		0.61 (II)	0.65 (II)
	Error (RMSE)		7.1 (II)	2.1 (I)
Precision	SD		8.8 (III)	3.8 (I)
	CV (%)		51 (III)	37 (II)
	K-S p-value		<0.001 (IV)	0.061 (I)
Reliability	Count / Possible		723/723	723/723
	Completeness (%)		100 (I)	100 (I)

Logistics



Clarity Node-S.

Solar + Cellular = ~100% Uptime.



PurpleAir II.

Wi-Fi + Ext. Power = 67% Data Completeness.

Best for public sites

Good for individual homes

Usability Ladder

Class A

Non-regulatory quantitative patterns and contrast

Class B

indicative screening, community dashboards, or planning support

Class C

support qualitative interpretation or public education, but not quantitative analysis

Class D

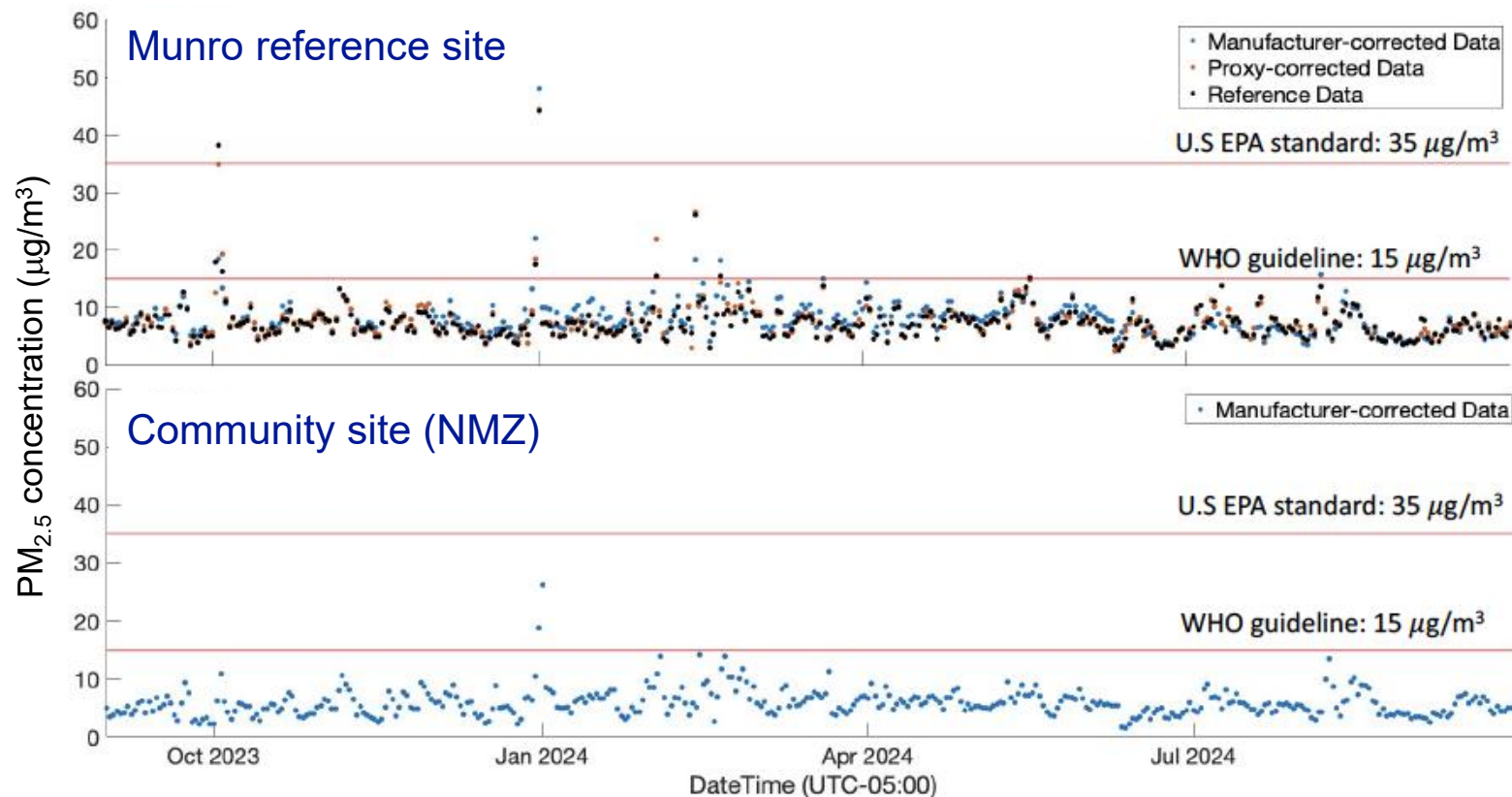
useful for demonstration or outreach but are inappropriate for any application requiring analytical integrity

Luo, Y. PhD Dissertation, USF, 2026.

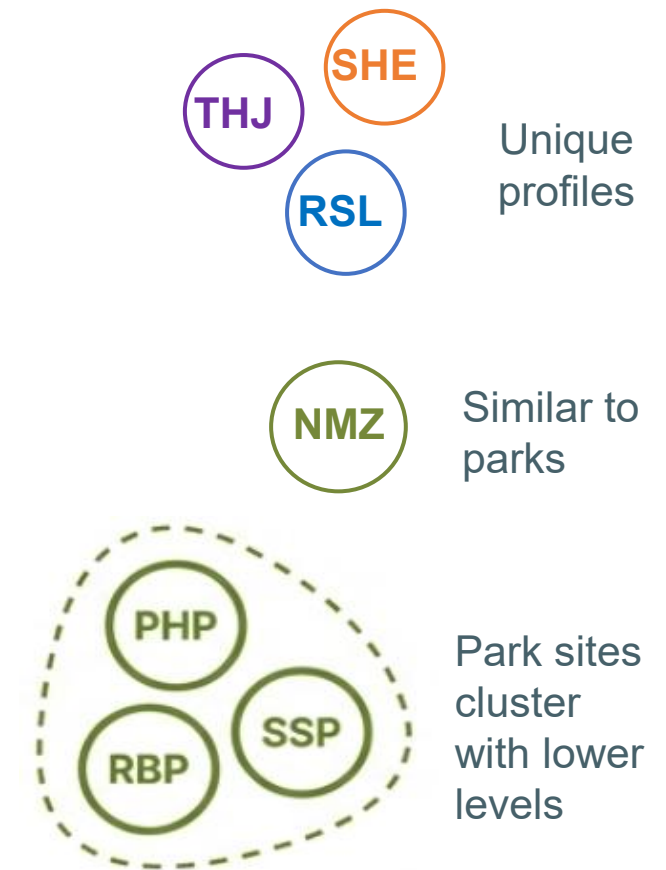
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Added value of sensor data for 24-hr PM_{2.5}

- Community and reference sites have similar average levels
- Reference site data captured the general trends at community sites
- Community data provide localized peaks, variability



Spatial variability among community sites



**Florida Chapter of the
American Planning Association
Grassroots Initiative Award of Excellence
September 2025**

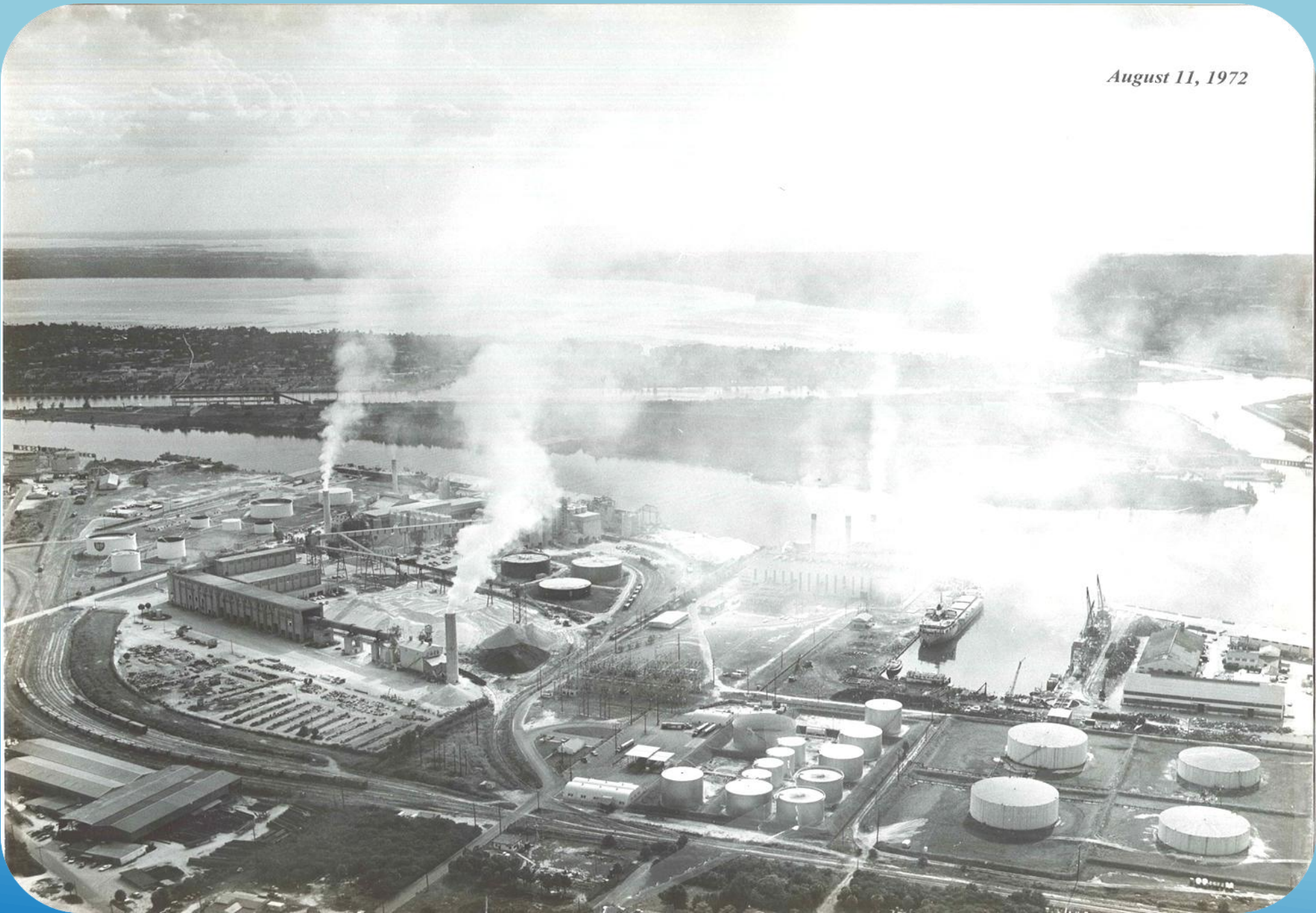
Conclusion



- **Low Cost Sensors are Useful in Air Quality Management and Planning**
- **Provides Data for areas not near a regulatory monitor**
- **Engaged Community Partners are Needed for an Effective Network**
- **PM2.5 Sensors were the most consistent**
- **Hillsborough County is in Attainment with all US EPA National Ambient Air Quality Standards**



August 11, 1972





Thanks to All Our Partners



Insights on community air quality



- Most days have good air quality
- A wildfire May 24-25 caused level to spike throughout the network
- Impacts of fireworks evident in early July

EPA's Criteria Air Pollutants



Pollutant	Hillsborough County's Status
Nitrogen Dioxide	Attainment
Ozone	Attainment
Particulate Matter	Attainment
Carbon Monoxide	Attainment
Sulfur Dioxide	Attainment
Lead	Attainment

FOR IMMEDIATE RELEASE: March 5, 2020

CONTACT: DEP Press Office, 850.245.2112, DEPNews@FloridaDEP.gov

DEP Announces Cleanest Air On Record, Florida Meets All Ambient Air Quality Standards



TALLAHASSEE, Fla. – Today, the Florida Department of Environmental Protection announced that Florida meets all of the National Ambient Air Quality Standards (NAAQS) statewide. This is the culmination of several years of collaborative efforts between DEP, EPA and industry to reduce emissions and improve air quality for Florida's citizens. These efforts have not only resulted in Florida having the cleanest air on record, but to its being the most populous state in the United States to meet these stringent federal standards.