MECC | MICHIGAN ENVIRONMENTAL COMPLIANCE CONFERENCE

Ambient Air Monitoring in Michigan

Where, What, How and Why

Amy Robinson

EGLE Air Monitoring Section,

Air Toxics Monitoring Specialist

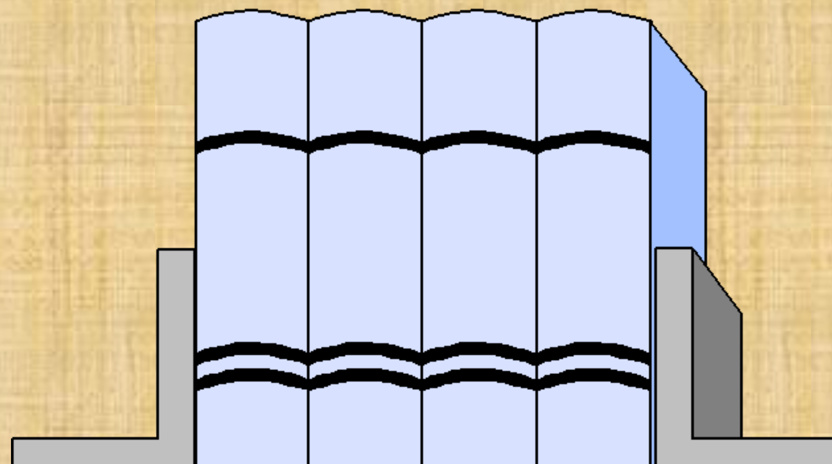
What is "Ambient Air Monitoring?

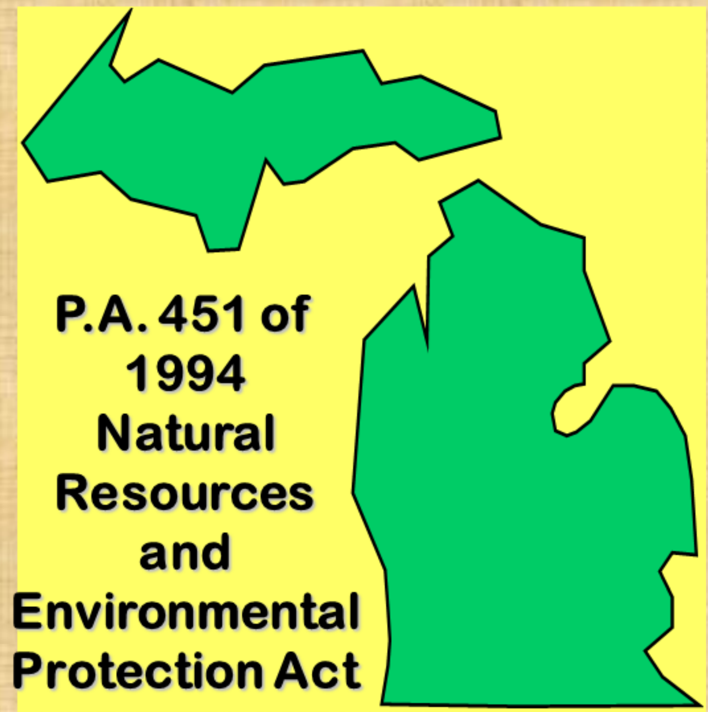
- The ambient air is the air that is available for the general public.

- Ambient air monitoring is taking measurements of outdoor air pollutants near neighborhoods, schools, parks, and off-site from industry.

Air Pollution Laws

Federal CLEAN AIR ACT of 1990



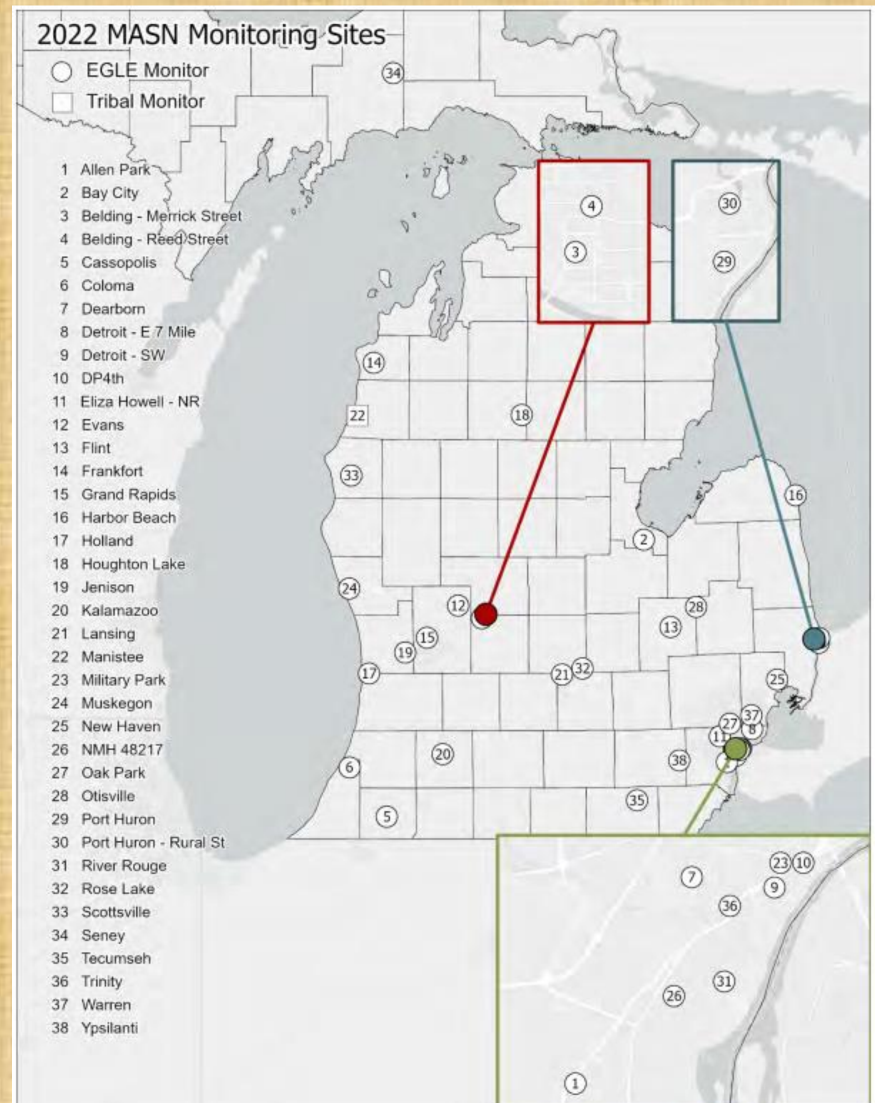


- 1963 and 1970

Where Do We Monitor?

Network Reviews:

- ❖Occur Every Year
  - Open for public comment
- ❖Sites can be added or removed
- ❖New Sites Coming Soon
  - Negaunee Township (UP)
  - North Detroit
  - East Detroit



What Do We Monitor?

- Criteria Pollutants
  - NO_2
  - CO
  - SO_2
  - Ozone
  - Particulate Matter
  - Lead

- Air Toxics
  - Over 60,000 chemicals

- Classes of Air Toxics
  - VOCs (Volatile)
  - Carbonyls
  - PAHs (Semi-Volatiles)
  - Trace Metals

Criteria Pollutants

- The criteria pollutants have concentration limits, averaging times, and monitoring requirements
- Limits are met = the area is "in attainment" for that pollutant
- Limits not met = the area is in "non-attainment" for that pollutant
- EGLE proposes attainment and non-attainment areas and EPA makes the classifications

Pollutant	Level of NAAQS	Averaging Time
Carbon Monoxide	9 ppm	8-hour, not to exceed one per year
	35 ppm	1-hour, not to exceed one per year
Lead	0.15 $\mu g/m^3$	Max 3-month rolling average
Nitrogen Dioxide	53 ppb	Annual Mean
	100 ppb	98^{th} %tile 1-hr, averaged over 3-yrs
Particulate Matter (PM_{10})	150 $\mu g/m^3$	24-hr average, not to exceed once per year over 3 years
Particulate Matter ($PM_{2.5}$)	12.0 $\mu g/m^3$ (9.0 $\mu g/m^3$)	Annual Mean averaged over 3-yrs
	35 $\mu g/m^3$	98^{th} %tile 24-hr concentration, averaged over 3-yrs
Ozone	70 ppb	Annual 4^{th} high, 8-hr daily max, averaged over 3-yrs
Sulfur Dioxide	75 ppb	99^{th} %tile 1-hr daily max average over 3-yrs

How Do We Monitor?

❖ Continuous Monitors

- Gases
  - Ozone, SO_2, NO_2, CO
- Particulate
  - $PM_{2.5}$
  - PM_{10}

❖ Manual Monitors

- Lead
- Particulate Matter
  - $PM_{2.5}$
  - PM_{10}
- Air Toxics

Why Do We Monitor?

- ❖ To provide data to evaluate the air quality in an area or region
- ❖ To show we are meeting the standards for the criteria pollutants
- ❖ To comply with other EPA monitoring rules and requirements

❖ Air Quality Alerts

- AIRNOW EnviroFlash
- https://feeds.enviroflash.info

AQI – What does it tell me?

Index Values	Levels of Health Concern	Cautionary Statements
0-50	Good	None
51-100*	Moderate	Unusually sensitive people should consider reducing prolonged or heavy exertion outdoors.
101-150	Unhealthy for Sensitive Groups	Active children and adults, and people with lung disease, such as asthma, should reduce prolonged or heavy exertion outdoors.
151-200	Unhealthy	Active children and adults, and people with lung disease, such as asthma, should avoid prolonged or heavy exertion outdoors. Everyone else, especially children, should reduce prolonged or heavy exertion outdoors.
201-300	Very Unhealthy	Active children and adults, and people with lung disease, such as asthma, should avoid all outdoor exertion. Everyone else, especially children, should avoid prolonged or heavy exertion outdoors.
301-500	Hazardous	Everyone should avoid all physical activity outdoors.

Thank you!

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Low-Cost Air Sensors

How are they used, and what can they tell you?

James Voss

EGLE BioWatch and Sensor Unit Supervisor

Advantages of Low-Cost Sensors

- ❖Numerous makes and models
- ❖Cost between a few hundred and several thousand dollars – much cheaper than regulatory monitors
- ❖Operate on 110 V or solar panels with batteries
- ❖Report either on SD card or Wi-Fi/direct cellular connection
- ❖Fixed installation or hand-held

(Typically installed within 8 feet of the ground for fixed installation)

Disadvantages of Low-Cost Sensors

- ❖Numerous makes and models – need to choose carefully
- ❖Costs between a few hundred and several thousand dollars
- ❖Limited in scope of pollutants for any given unit
- ❖Can be challenging to find suitable power and Wi-Fi service
- ❖Cannot replace regulatory monitors for National Ambient Air Quality Standards

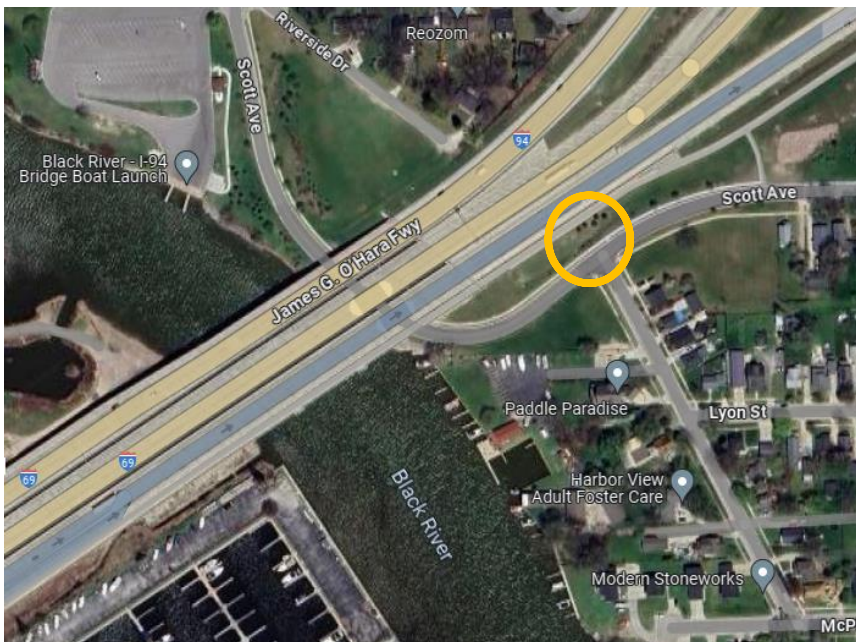
EGLE Uses of Low-Cost Sensors:

- ❖Encourage public awareness of air quality
- ❖Gain insight into areas where there are no regulatory monitors
- ❖Identify areas where future regulatory monitors may potentially be sited
- ❖Support other organizations in their sensor projects

Current Locations of EGLE Sensors

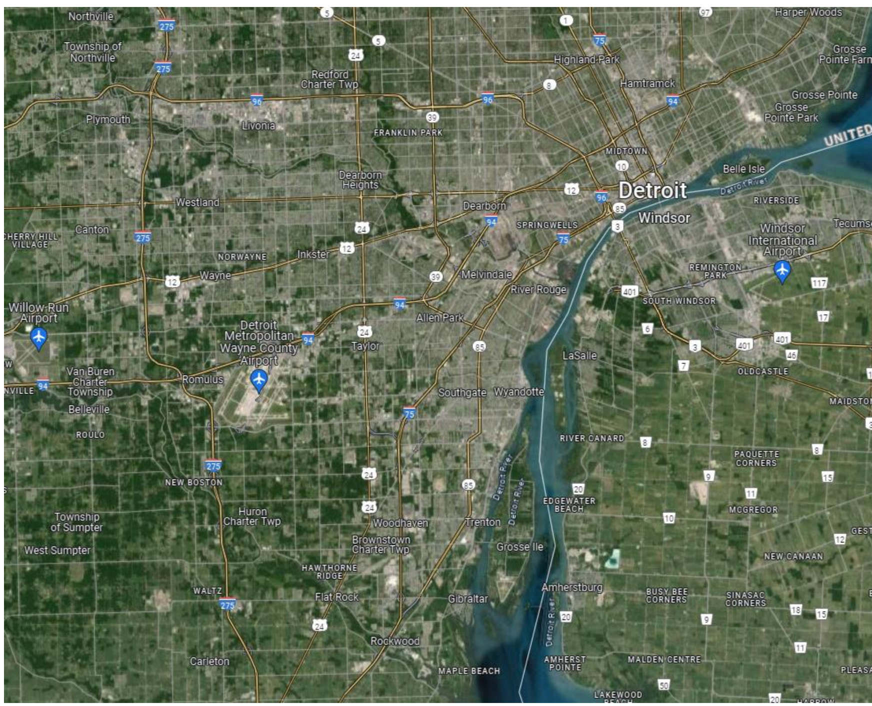
- Saginaw Chippewa Tribal College, Mt Pleasant
- Black River Bridge, Port Huron (MDOT)
- Southeast Michigan District Office, Warren (EGLE)
- Detroit District Office, Detroit (EGLE)
- Detroit Riverwalk, Detroit
- Alpena
- Marquette

EGLE/MDOT PurpleAir Flex



Dr. Okereke (Henry Ford) Co-location

Ecology Center PurpleAir PA II



Useful Sensor Websites

- Air Sensor Toolbox | US EPA – https://www.epa.gov/air-sensor-toolbox
- Fire and Smoke Map (airnow.gov) – https://fire.airnow.gov/
- Real-Time Air Quality Map | PurpleAir – https://map.purpleair.com/1/ls/mAQI/a10/p600/cC5#14.87/42.36717/-83.07519
- CA-PHE | Community Action to Promote Healthy Environments (umich.edu) – https://caphedetroit.sph.umich.edu/

Thank you!

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BioWatch and Sensor Unit

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