CY2025 AIR QUALITY FORECAST ACCURACY (THROUGH AUGUST 31)

Air Quality Subcommittee

September 19, 2025

ACTION REQUESTED

No action requested. This item is for presentation and discussion.

PREVIOUS ACTION

No prior action (quarterly update for Subcommittee)

NOACA
Northeast Ohio Areawide Coordinating Agency

BACKGROUND

NOACA forecasts daily peak eight-hour ground-level ozone concentrations and fine particulate matter concentrations.

- In 2025, daily forecasts for ozone began March 1 and will conclude October 31
- Daily forecasts for fine particulate matter are year-round

NOACA posts daily air quality forecasts through AirNowTech, in affiliation with the United States Environmental Protection Agency (U.S. EPA)

BACKGROUND

NOACA bases ground-level ozone and fine particulate matter forecasts on a review of several meteorological variables and model guidance

- National Oceanic & Atmospheric Administration (NOAA) National Air Quality Forecast Capability (ozone only)
- Classification and Regression Tree (CART) Model
- Sonoma Tech Guidance (via Columbus/Central Ohio Forecast on AirNow.gov)
- BlueSky Canada Smoke Forecast
- Firework: Canada's Wildfire Smoke Prediction System

BACKGROUND

NOACA Forecast Performance for 2025 ($PM_{2.5}$)

$PM_{2.5}$ GOOD/MODERATE THRESHOLD (12 µg/m^3)		NOACA FORECAST	
		BELOW	ABOVE
OBSERVED	BELOW	41%	14%
	ABOVE	8%	37%
CORRECT = 78%			

BACKGROUND

NOACA Forecast Performance for 2025 ($PM_{2.5}$)

$PM_{2.5}$ MODERATE/UNHEALTHY THRESHOLD (35 µg/m^3)		NOACA FORECAST	
		BELOW	ABOVE
OBSERVED	BELOW	98%	1%
	ABOVE	1%	0%

CORRECT = 98%

BACKGROUND

NOACA and NOAA Forecast Performance for 2025 ($PM_{2.5}$)

FORECAST		THRESHOLD	
		12 µg/m³	35 µg/m³
AGENCY	NOACA	78%	98%
	NOAA 6Z (M/B) NOAA 12Z (M/B)	(75/76)% (75/76)%	(99/99)% (99/99)%

BACKGROUND

Exceedance Days for 2025 ($PM_{2.5}$)

	FORECAST AQI		OBSERVED AQI	
DATE	NOAA 6Z(M/B)/ 12Z(M/B)	NOACA	PEAK	# STATIONS
JUNE 7	2/2/2/2	2	3 (37)	1
AUGUST 4	2/2/2/2	2	3 (37)	3

AIR QUALITY INDEX	
CATEGORY	HEALTH CONCERN LEVEL
1	GOOD
2	MODERATE
3	UNHEALTHY FOR SENSITIVE GROUPS
4	UNHEALTHY
5	VERY UNHEALTHY
6	HAZARDOUS

M = Model; B = Bias-Corrected Model

BACKGROUND

NOACA versus NOAA Forecast Performance ($PM_{2.5}$): Exceedance Days

- "Missed Opportunities" – Two (2) days both NOACA and NOAA did not forecast observed categorical Exceedance of 2006 24-hour $PM_{2.5}$ standard (35 µg/m^3).
- "False Alarms" – One (1) day NOACA forecasted categorical Exceedance of 2006 24-hour $PM_{2.5}$ standard (35 µg/m^3) when observed concentrations did not exceed.

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BACKGROUND

NOACA and NOAA Forecast Performance for 2025 (March 1-August 31) (O_3)

FORECAST		THRESHOLD	
		50 ppb	70 ppb
AGENCY	NOACA	83%	94%
	NOAA 6Z (M/B) NOAA 12Z (M/B)	(79/76)% (82/76)%	(96/95)% (95/93)%

BACKGROUND

Exceedance Days for March-August 2025 (O_3)

	FORECAST AQI		OBSERVED AQI	
DATE	NOAA 6Z(M/B)/ 12Z(M/B)	NOACA	PEAK	# STATIONS
APRIL 24	1/2/2/2	2	3 (71)	3
JUNE 3	2/2/2/2	2	3 (75)	2
JUNE 12	2/2/2/2	2	3 (76)	2
JULY 15	3/2/3/2	2	3 (85)	11
JULY 23	2/2/2/2	3	3 (74)	1

AIR QUALITY INDEX	
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M = Model; B = Bias-Corrected Model

BACKGROUND

NOACA versus NOAA Forecast Performance (O_3): Exceedance Days

- "Missed Opportunities" – Four (4) days each NOACA and NOAA did not forecast observed categorical Exceedance of 2015 eight-hour ozone standard (70 ppb). NOAA standard models forecasted July 15 exceedance, but NOAA bias-corrected models did not.
- "False Alarms" – Eight (8) days NOACA forecasted categorical Exceedance of 2015 eight-hour standard (70 ppb) when observed concentrations did not exceed. NOAA 6Z standard model forecasted four (4) such days; NOAA 6Z bias-corrected model forecasted five (5) such days; NOAA 12Z standard model forecasted six (6) such days; and NOAA 12Z bias-corrected model forecasted seven (7) such days.

NEXT STEPS

- Track forecast performance of NOACA and NOAA for ozone and fine particulate matter
- Collaborate with NOAA personnel to report model performance in Northeast Ohio (National Air Quality Forecasters Conference, October 16-17, 2025)
- Update Air Quality Subcommittee in December 2025


NOACA
Northeast Ohio Areawide Coordinating Agency
NOACA will strengthen regional cohesion, preserve existing infrastructure, and build a sustainable multimodal transportation system to support economic development and enhance quality of life in Northeast Ohio.