

2018 GROUND-LEVEL OZONE FORECAST ACCURACY FOR NORTHEAST OHIO

National Oceanic and Atmospheric Administration (NOAA) Air
Quality Forecasters Workshop

September 27-28, 2018

Northeast Ohio Areawide Coordinating Agency (NOACA)

Joe MacDonald



OVERVIEW

- What is NOACA?
- NOACA Air Quality Monitors and Forecasts
- 2018 Operational Model Performance: May-September
- 2018 Experimental Model Performance: Exceedance Days
- Questions and Discussion

Achieving Increased Mobility 🚗 🚲 Achieving Increased Mobility 🚗 🚲 Achieving Increased Mobility 🚗 🚲 Achieving Increased Mobility 🚗 🚲 Achieving Increased Mobility 🚗 🚲

WHAT IS NOACA?

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WHAT IS NOACA?

Metropolitan Planning Organization (MPO) and Areawide Agency for Northeast Ohio

Planning: transportation, air and water quality

Controls approximately \$50M in spending per year

Vision Statement



NOACA'S VISION STATEMENT

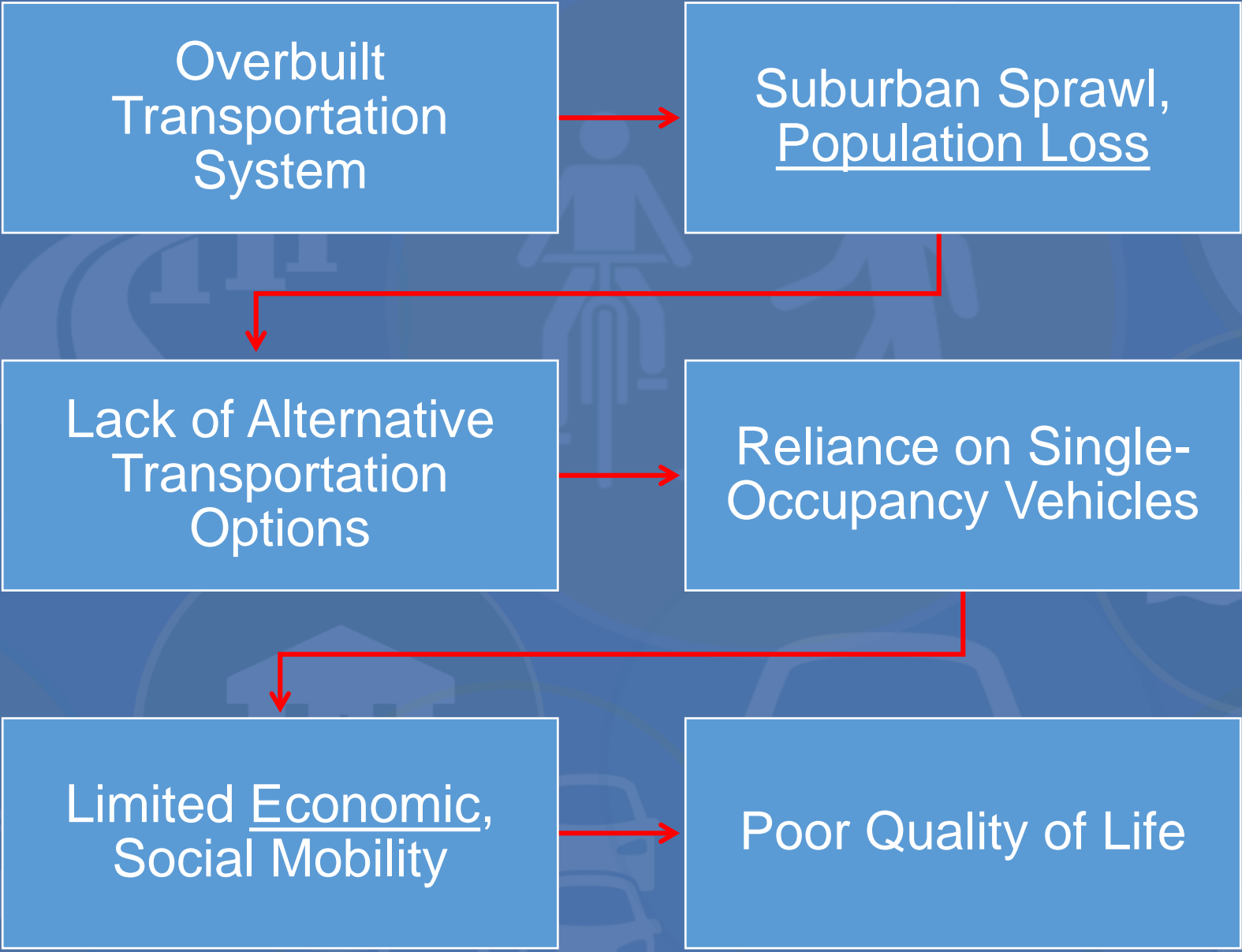
NOACA will STRENGTHEN regional cohesion, PRESERVE existing infrastructure, and BUILD a sustainable multimodal transportation system to SUPPORT economic development and ENHANCE quality of life in Northeast Ohio.



TRANSPORTATION CHALLENGES

NOACA established in 1968, developed first Long-Range Transportation Plan

- Assumed regional population would grow by 1 million
- 1970 Census: 2.32 million residents
- 2010 Census: 2.08 million residents



TRANSPORTATION & AIR QUALITY

Nonattainment for 4 of 6
National Ambient Air Quality
Standards (NAAQS)

Mobile emissions a major
source of pollution, greenhouse
gas emissions

Fine particulate matter (PM_{2.5})

- Most harmful of the criteria air pollutants
- Mobile emissions: 2,200 tons
- 384 premature deaths in 2005

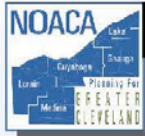


Source: *Chicago Tribune*

AIR QUALITY MONITOR LOCATIONS IN NORTHEAST OHIO

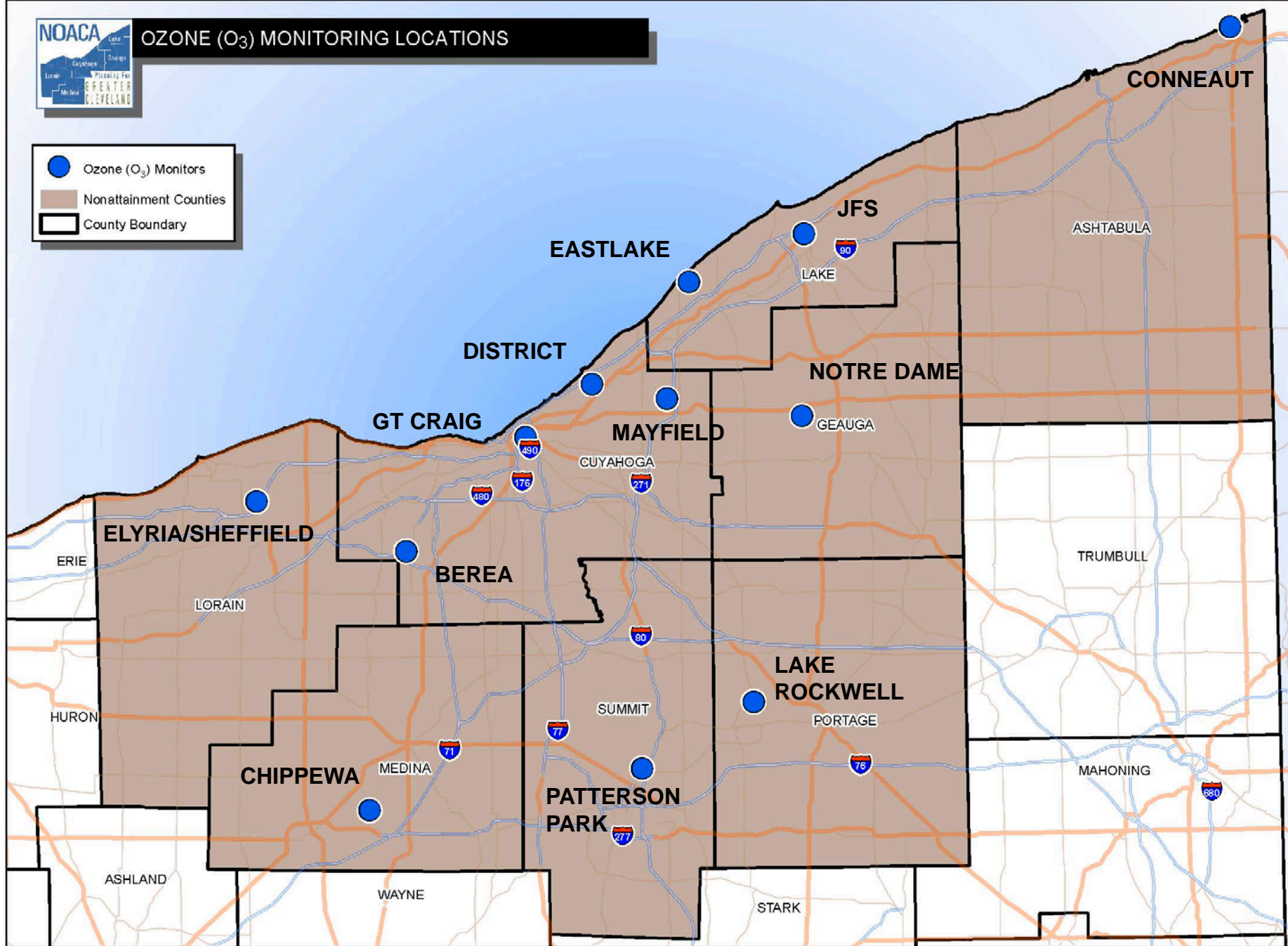
- Ohio Environmental Protection Agency has sited 12 monitors for ground-level ozone in Northeast Ohio
- Air Quality Monitoring Region includes:
 - NOACA counties (5): Cuyahoga, Geauga, Lake, Lorain, Medina
 - AMATS counties (2): Portage and Summit
 - Ashtabula County





OZONE (O₃) MONITORING LOCATIONS

- Ozone (O₃) Monitors
- Nonattainment Counties
- County Boundary



NOACA makes no representations or warranties with respect to the accuracy and/or completeness of the map.

DATA SOURCES:
NOACA
EPA



AIR QUALITY FORECASTS IN NORTHEAST OHIO

NOACA forecasts daily peak 8-hour ground-level ozone concentrations and fine particulate matter concentrations.

- In 2018, daily forecasts for ozone began March 1 and will conclude October 31
- Daily forecasts for fine particulate matter are year-round

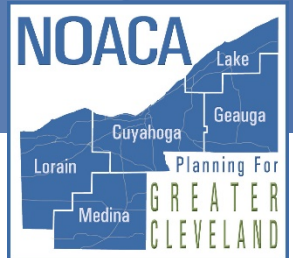
NOACA posts daily air quality forecasts through AirNowTech, in affiliation with the United States Environmental Protection Agency (U.S. EPA)



AIR QUALITY FORECASTS IN NORTHEAST OHIO

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

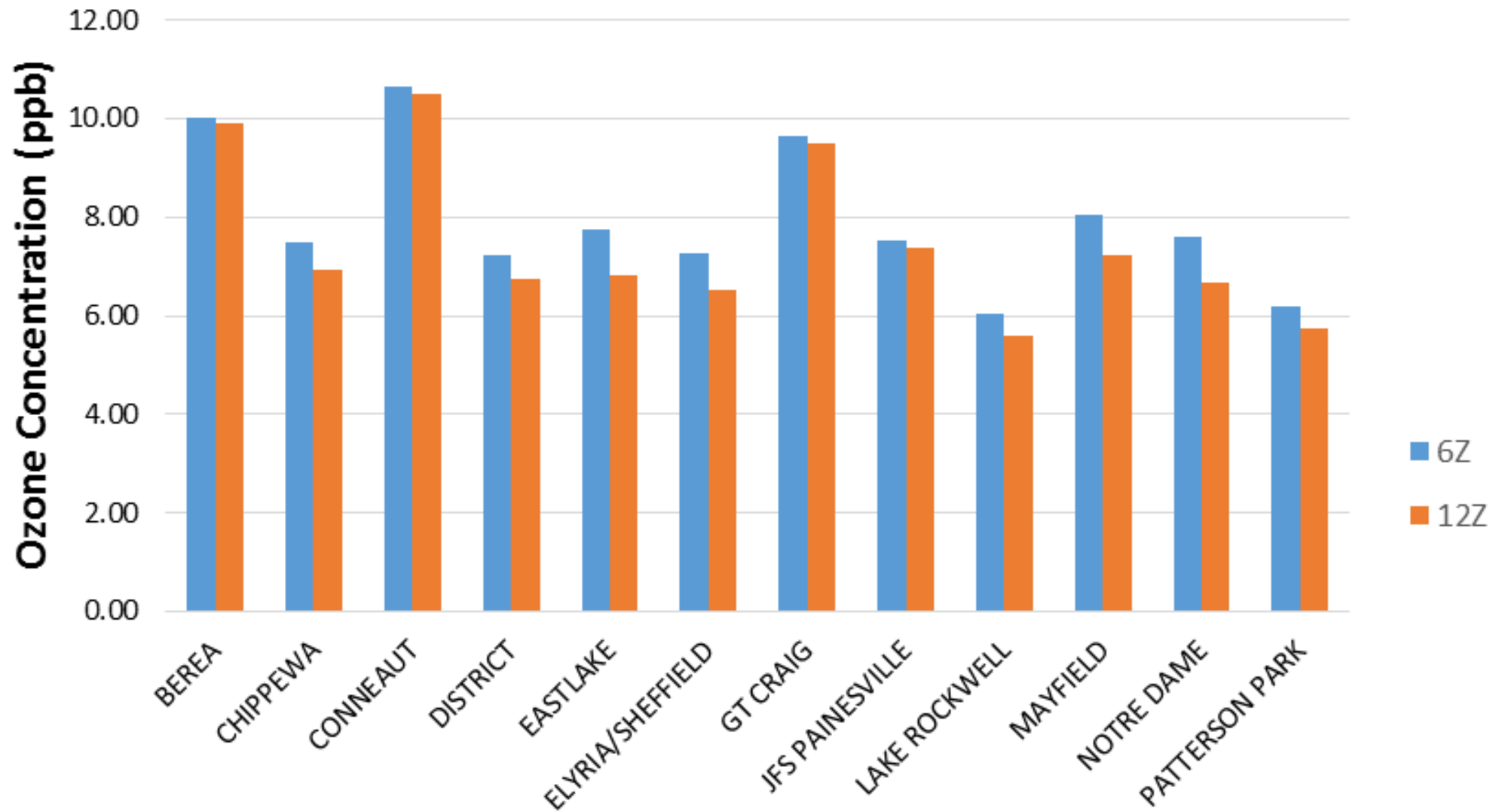
- National Oceanic & Atmospheric Administration (NOAA) National Air Quality Forecast Capability (ozone only).
- Classification and Regression Tree (CART) Model
- Sonoma Tech Guidance (via Columbus/Central Ohio Forecast on AirNow.gov)



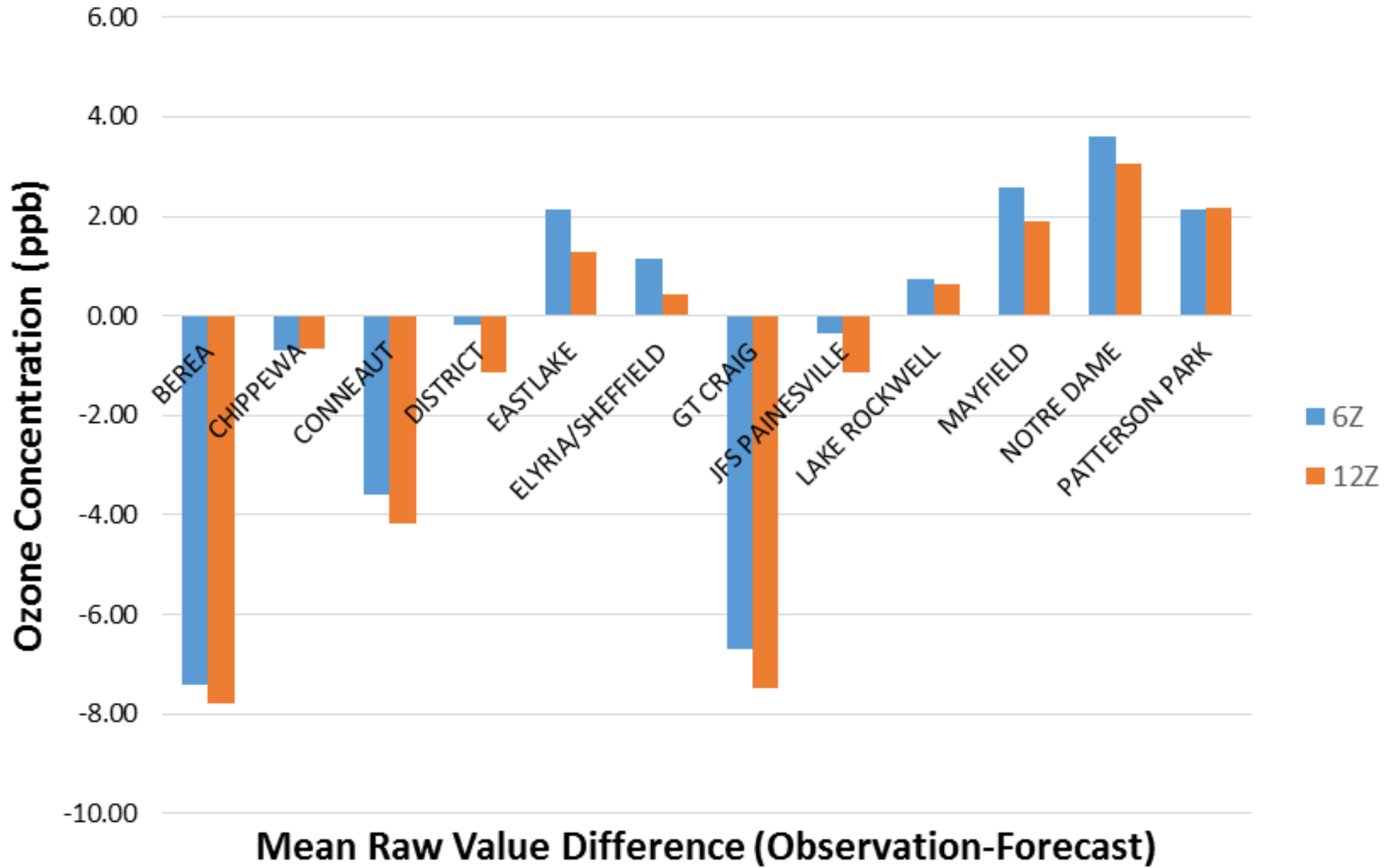
NOACA AND NOAA FORECAST PERFORMANCE FOR 2018

FORECAST		THRESHOLD	
		50ppb	70ppb
AGENCY	NOACA	75%	95%
	NOAA (6Z/12Z)	(77/77)%	(91/91)%





Mean Absolute Value Difference Between Forecast and Observation



EXCEEDANCE DAYS

DATE	FORECAST CATEGORY		OBSERVED	
	NOAA	NOACA	PEAK (ppb)	# STATIONS
MAY 17	1/2	2	3	2
MAY 25	2/3	3	3	6
MAY 28	2/3	2	3	4
MAY 29	2/3	3	3	2
JUNE 16	2/1	3	3	2
JUNE 17	2/4	3	3	3
JUNE 29	3/4	2	3	4
JUNE 30	4/4	3	3	1
JULY 9	3/3	2	3	2
JULY 10	1/2	2	3	2
JULY 13	3/2	3	3	1
JULY 14	4/3	3	3	5
JULY 15	4/4	2	3	7

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



NOAA VERSUS NOACA FORECAST PERFORMANCE: EXCEEDANCE DAYS

- “Missed Opportunities” – Seven (7) days each NOAA and NOACA did not forecast observed categorical Exceedance of 2015 8-hour ozone standard (70ppb)
- “False Alarms” – 10 days NOAA forecast categorical Exceedance of 2015 8-hour standard (70ppb) when observed concentrations did not exceed the standard (NOACA had three (3) such days).



CHALLENGES

- Data Disruptions: Many daily experimental model forecast reports not received
 - Only five (5) of 13 Exceedance Day reports received
 - Only six (6) of 10 “False Alarm” Day reports received
- Data Entry: Very time consuming. Difficult to sift through three reports per day and manually find and enter both 8-hour peak ozone values (same day, next day) for 12 stations (72 data points per day). Many competing responsibilities.

DATE	STATION	FORECAST		OBSERVED
		OPERATIONAL	EXPERIMENTAL	
25-May	Conneaut	2	3	3
	District	2	3	3
	Eastlake	2	3	3
	JFS Painesville	2	3	3
	Mayfield	2	3	3
	Notre Dame	2	3	3
28-May	District	2	3	3
	Eastlake	2	3	3
	Mayfield	2	3	3
	Notre Dame	1	2	3
29-May	Elyria	2	3	2
	Mayfield	1	2	3
	Notre Dame	1	2	3
9-Jul	Mayfield	2	2	3
	Notre Dame	2	2	3
10-Jul	Mayfield	2	2	3
	Notre Dame	2	2	3



FOR MORE INFORMATION:

www.noaca.org



50 YEARS OF PLANNING

1968 - 2018



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.