Ozone National Ambient Air Quality Standard Health Exceedances on June 30, 2023

Exceedance Locations and Levels

On Friday, June 30, 2023, there were twelve (12) exceedances in New Jersey of the National Ambient Air Quality Standard (NAAQS) for ozone (daily maximum 8-hour average of 70 ppb). See Table 1.

Table 1. New Jersey Ozone Concentrations on 6/30/2023

STATION	Daily Maximum 8-Hr Average (ppb)
Ancora State Hospital	67
Bayonne	83
Brigantine	59
Camden Spruce St	78
Chester	87
Clarksboro	77
Colliers Mills	73
Columbia	63
Flemington	94
Leonia	87
Millville	72
Monmouth University	69
Ramapo	78
Rider University	86
Rutgers University	87
Washington Crossing*	89
TOTAL EXCEEDANCES	12

*The Washington Crossing station is operated and maintained by EPA as part of the nationwide Clean Air Status and Trends Network (CASTNET).

From the out-of-state stations within New Jersey's ozone nonattainment areas, there were thirty (30) exceedances of the ozone NAAQS. See Table 2.

Table 2. Ozone Concentrations at Out-of-State Monitoring Stations in New Jersey's Ozone Nonattainment Areas on 6/30/2023

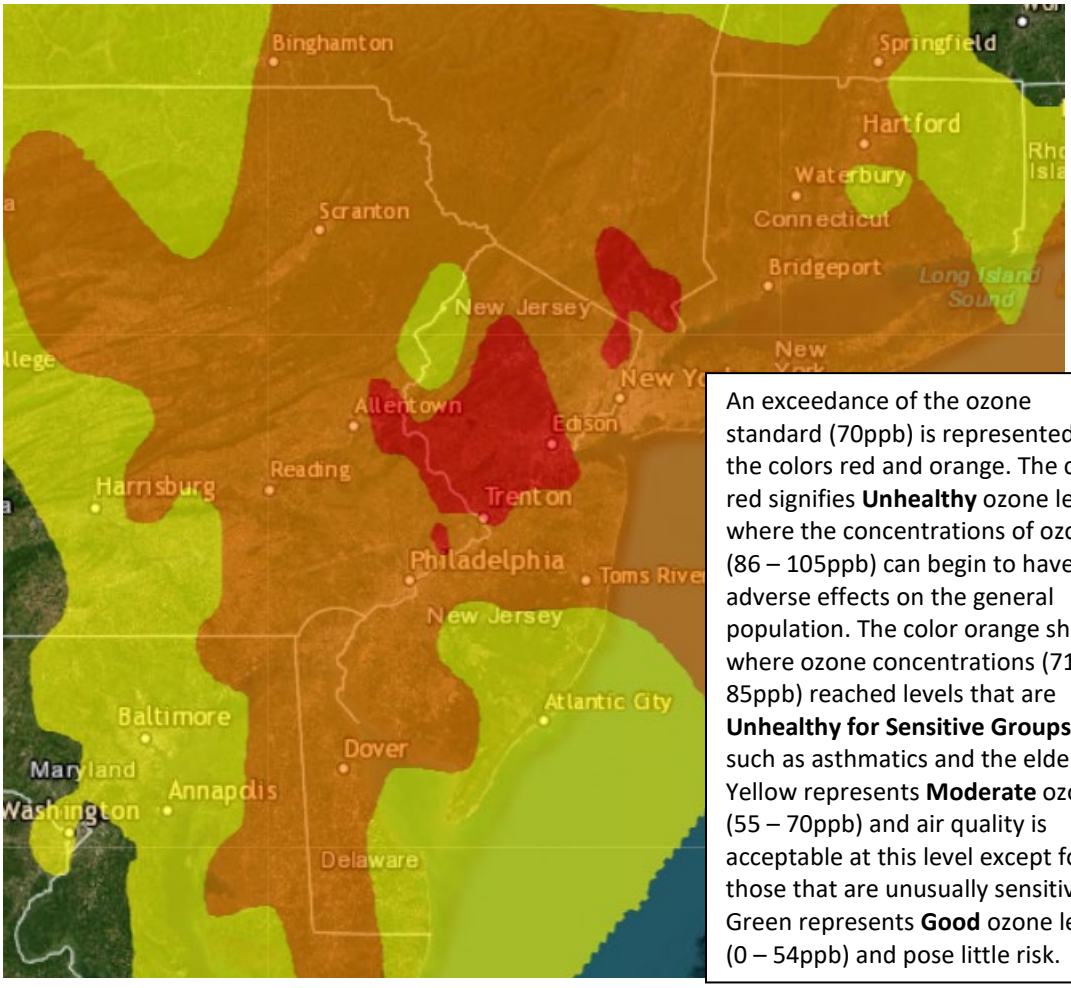
STATE	STATION	Daily Maximum 8-Hr Average (ppb)
CT	Danbury	85
CT	Greenwich	81
CT	Madison-Beach Road	78
CT	Middletown-CVH-Shed	69
CT	New Haven	80
CT	Stratford	81
CT	Westport	79
DE	BCSP (New Castle Co.)	73
DE	BELLFNT2 (New Castle Co.)	73
DE	KILLENS (Kent Co.)	71
DE	LEWES (Sussex Co.)	65
DE	LUMS 2 (New Castle Co.)	72
DE	MLK (New Castle Co.)	78
DE	SEAFORD (Sussex Co.)	73
MD	Fair Hill	70
NY	Babylon	78
NY	Bronx - IS52	81
NY	CCNY	81
NY	Flax Pond	76
NY	Fresh Kills	84
NY	Holtsville	78
NY	Pfizer Lab	82
NY	Queens	83
NY	Riverhead	71
NY	Rockland Cty	86
NY	White Plains	86
PA	BRIS (Bucks Co.)	82
PA	CHES (Delaware Co.)	82
PA	NEWG (Chester Co.)	77
PA	NORR (Montgomery Co.)	76
PA	LAB (Philadelphia Co.)	73
PA	NEA (Philadelphia Co.)	86
PA	NEW (Philadelphia Co.)	81
	TOTAL EXCEEDANCES	30

The number of days in 2023 on which exceedances of the ozone NAAQS were recorded for all the states within New Jersey's ozone nonattainment areas is summarized in Table 3.

Table 3. Number of Days Ozone NAAQS was Exceeded in NJ's Nonattainment Areas in 2023

STATE	# of Days NAAQS was Exceeded January 1 – June 30, 2023 NAAQS = 70 ppb
Connecticut	7
Delaware	4
Maryland	3
New Jersey	8
New York	6
Pennsylvania	6

Figure 1. Ozone Air Quality Index for Friday, June 30, 2023



An exceedance of the ozone standard (70ppb) is represented by the colors red and orange. The color red signifies **Unhealthy** ozone levels where the concentrations of ozone (86 – 105ppb) can begin to have adverse effects on the general population. The color orange shows where ozone concentrations (71 – 85ppb) reached levels that are **Unhealthy for Sensitive Groups**, such as asthmatics and the elderly. Yellow represents **Moderate** ozone (55 – 70ppb) and air quality is acceptable at this level except for those that are unusually sensitive. Green represents **Good** ozone levels (0 – 54ppb) and pose little risk.

Source: www.airnow.gov
For ozone terminology definitions see NJDEP Air Quality Planning's Glossary and Acronyms webpage: https://www.nj.gov/dep/airmon/glossary.html

Weather

On Friday June 30th, widespread ozone exceedances were observed throughout the nonattainment area, marking the second day of a multi-day exceedance event. Frontal boundaries were in place just off the eastern U.S. coast and over the Great Lakes region early on Friday, with high pressure sandwiched in between over the Mid-Atlantic region. This meteorological setup creates a favorable environment for stagnant air between the two frontal boundaries, which allowed residual Canadian wildfire smoke to persist throughout the region and enhance ozone levels. Winds were calm in the morning and gradually began to flow out of the southwest as the day progressed, transporting residual ozone from the day prior up the I-95 corridor and into New Jersey. The Mid-Atlantic region saw widespread Unhealthy for Sensitive Groups (USG), Unhealthy, and even isolated Very Unhealthy ozone levels the day prior, allowing for a heavily deteriorated air mass to enter the nonattainment area, where USG levels were already being observed. Combined with warm temperatures, mostly sunny skies, and residual Canadian wildfire smoke, ozone levels were able to rapidly rise into the USG and Unhealthy categories throughout New Jersey.

Where Did the Air Pollution that Caused Ozone Come From?

Figures 2, 3, and 4 show the back trajectories of different wind heights for the monitored exceedance(s) on this day. The figures illustrate where the air came from during the 48 hours preceding the 8-hour ozone standard exceedances. A transport analysis is provided with each figure shown below along with a map of the National Air Quality Index for the previous day (Figure 5). The monitoring station(s) that were chosen to model back trajectories are listed in Table 4.

Table 4. Monitoring Stations with an 8-hr Ozone Exceedance that were selected to Run 48-hr Back Trajectories

STATE	STATION	Daily Maximum 8-Hr Average (ppb)
CT	Madison – Beach Road	78
DE	SEAFORD (Sussex Co.)	73
NJ	Flemington	94
NJ	Leonia	87
NJ	Millville	72
NJ	Ramapo	78
NY	Babylon	78
NY	Rockland Cty	86
PA	CHES (Delaware Co.)	82
PA	NEA (Philadelphia Co.)	86

Figure 2. 48-hour Back Trajectories for June 30, 2023 at 10 meters

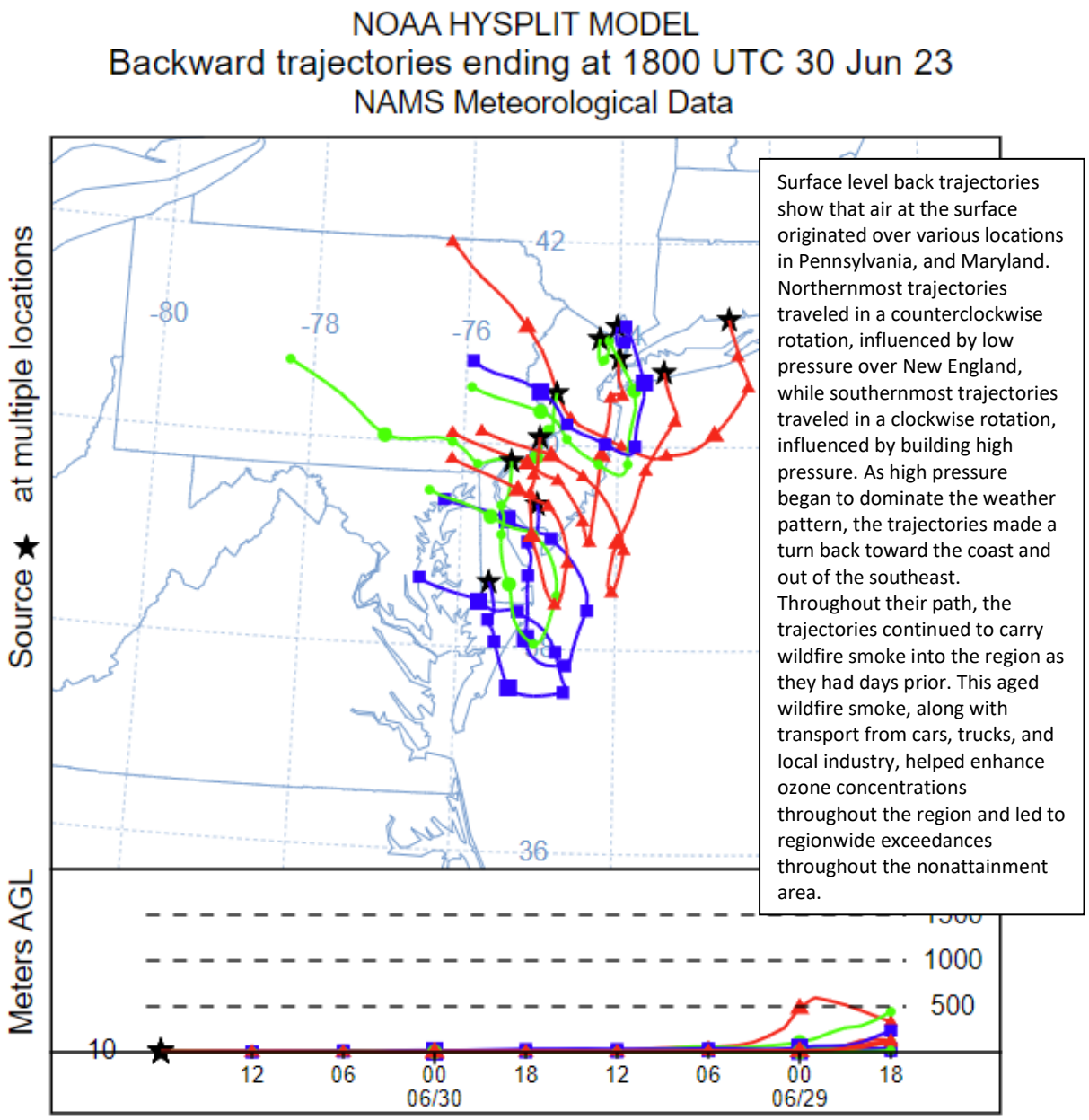


Figure 3. 48-hour Back Trajectories for June 30, 2023 at 500 meters

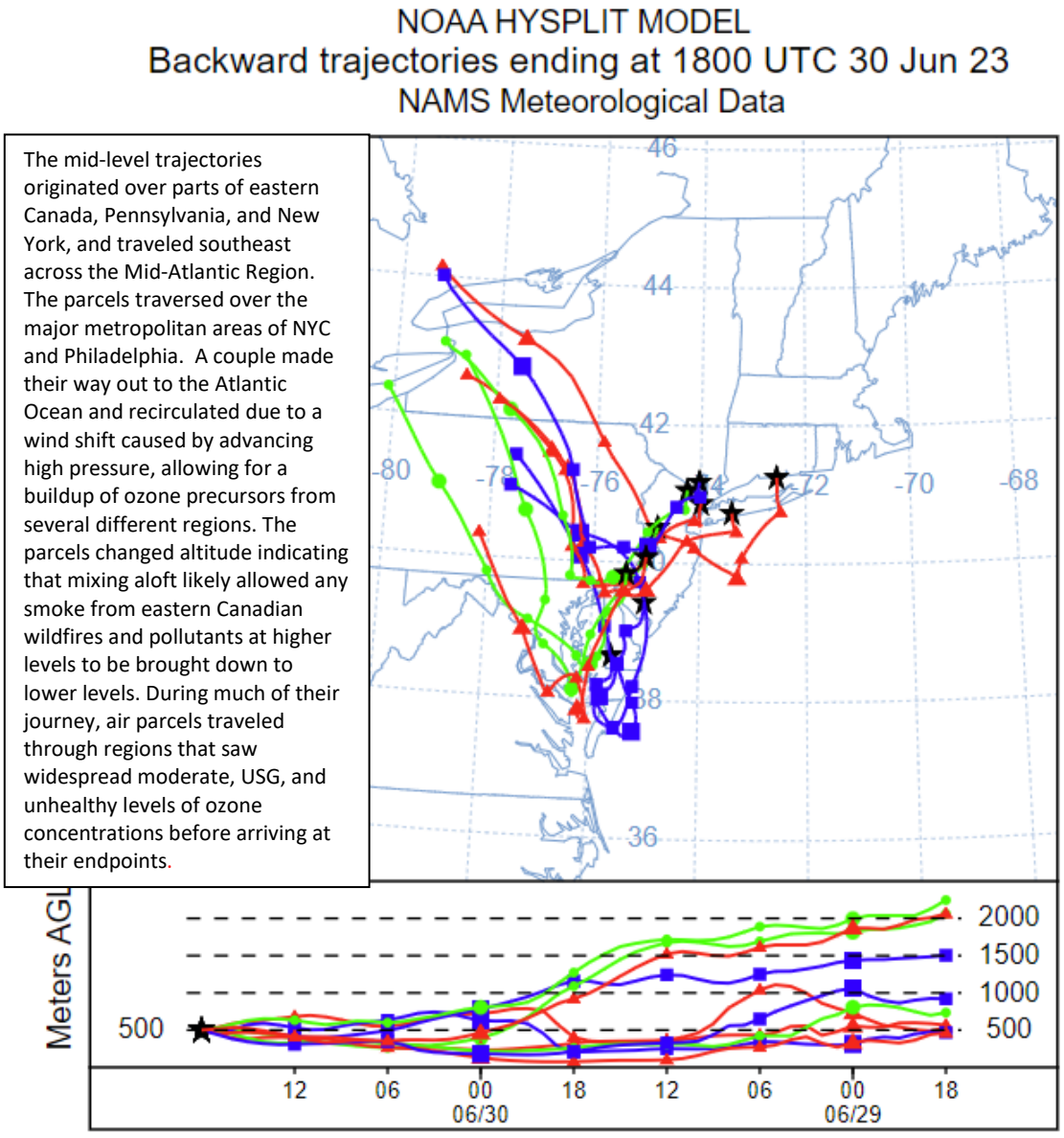
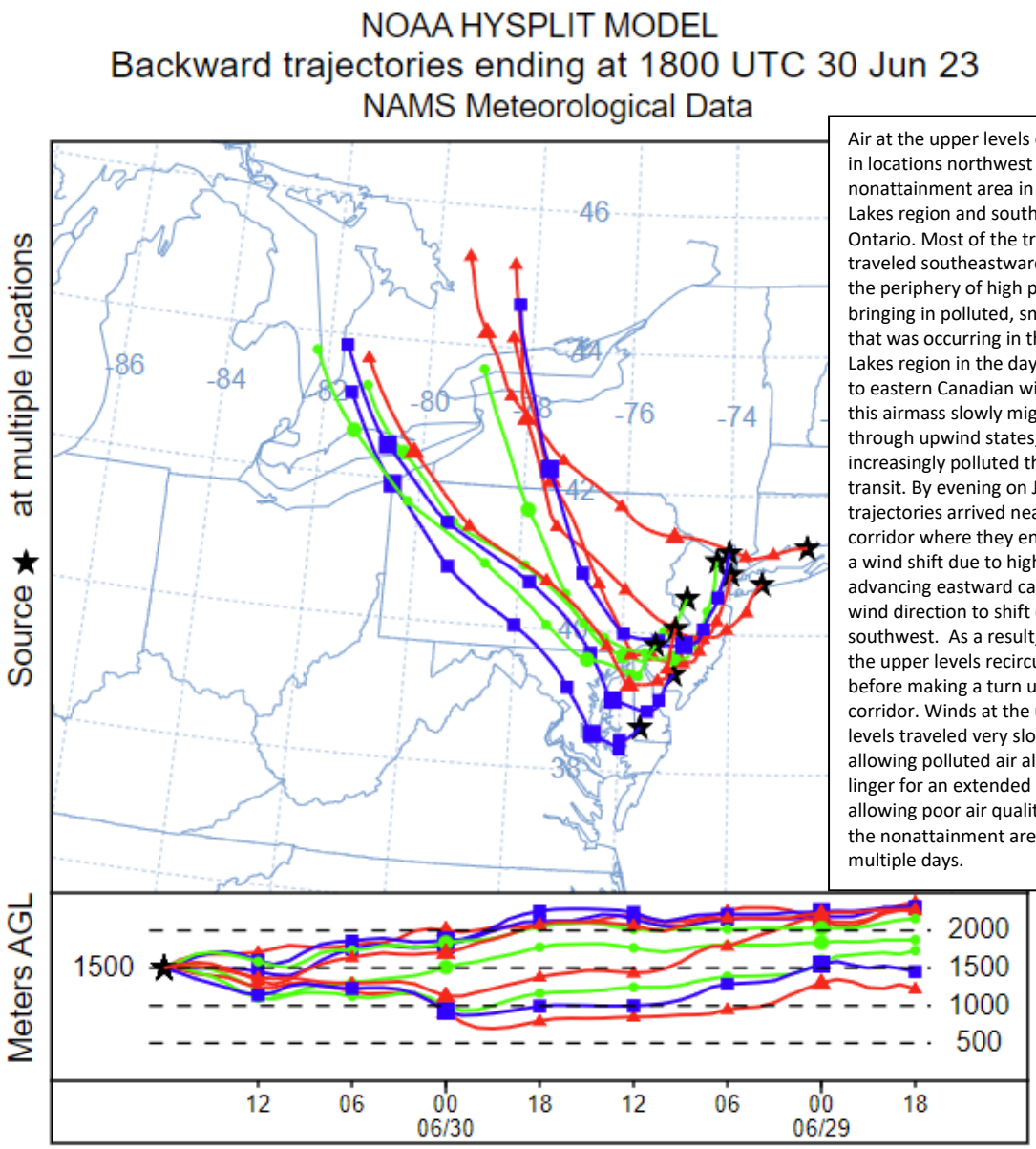
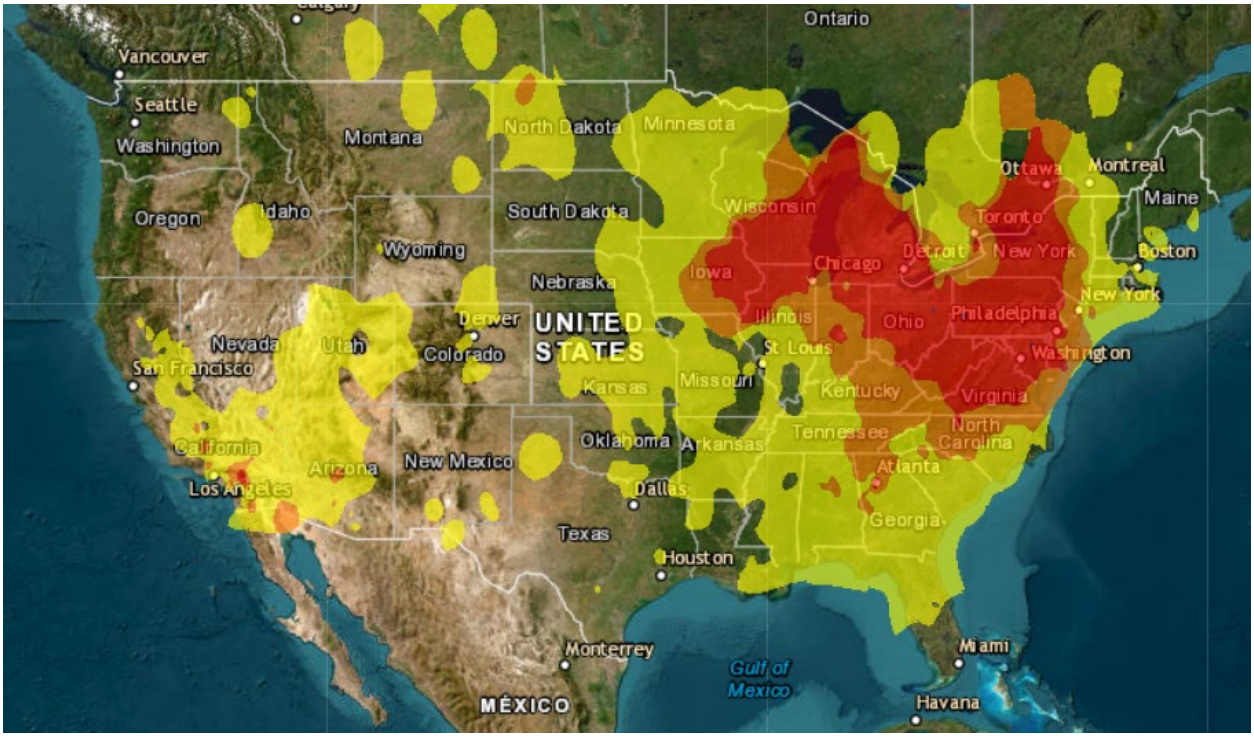


Figure 4. 48-hour Back Trajectories for June 30, 2023 at 1500 meters



Air at the upper levels originated in locations northwest of the nonattainment area in the Great Lakes region and southern Ontario. Most of the trajectories traveled southeastward following the periphery of high pressure, bringing in polluted, smokey air that was occurring in the Great Lakes region in the days prior due to eastern Canadian wildfires. As this airmass slowly migrated through upwind states, it grew increasingly polluted through transit. By evening on June 29, trajectories arrived near the I-95 corridor where they encountered a wind shift due to high pressure advancing eastward causing the wind direction to shift out of the southwest. As a result, winds at the upper levels recirculated before making a turn up the I-95 corridor. Winds at the upper levels traveled very slowly, allowing polluted air aloft to linger for an extended period allowing poor air quality to impact the nonattainment area for multiple days.

Figure 5. Air Quality Index for the United States on June 29, 2023



Source: www.airnow.gov

How is Ozone Created?

Ground-level ozone is an air pollutant known to cause several health effects and negatively impact air quality and the environment in New Jersey. Ozone is formed when oxides of nitrogen (NOx) and volatile organic compounds (VOCs) react in the presence of sunlight. Ozone can irritate any person's lungs, but the effect may be more pronounced for those with existing lung-related deficiencies, and therefore, one should take extra precautions on bad ozone days.

Find Out About Air Quality Every Day

Learn more about your local ozone air quality forecast by visiting the "What's Your Air Quality Today?" page at https://www.nj.gov/dep/baqp/aqitoday.html .