Ozone National Ambient Air Quality Standard Health Exceedances on July 17, 2023

Exceedance Locations and Levels

On Monday, July 17, 2023, there were no 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 7/17/2023

STATION	Daily Maximum 8-Hr Average (ppb)
Ancora State Hospital	56
Bayonne	No Data
Brigantine	47
Camden Spruce St	64
Chester	58
Clarksboro	63
Colliers Mills	68
Columbia	43
Flemington	62
Leonia	62
Millville	54
Monmouth University	No Data
Ramapo	49
Rider University	62
Rutgers University	No Data
Washington Crossing*	58
TOTAL EXCEEDANCES	0

*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 three (3) 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 7/17/2023

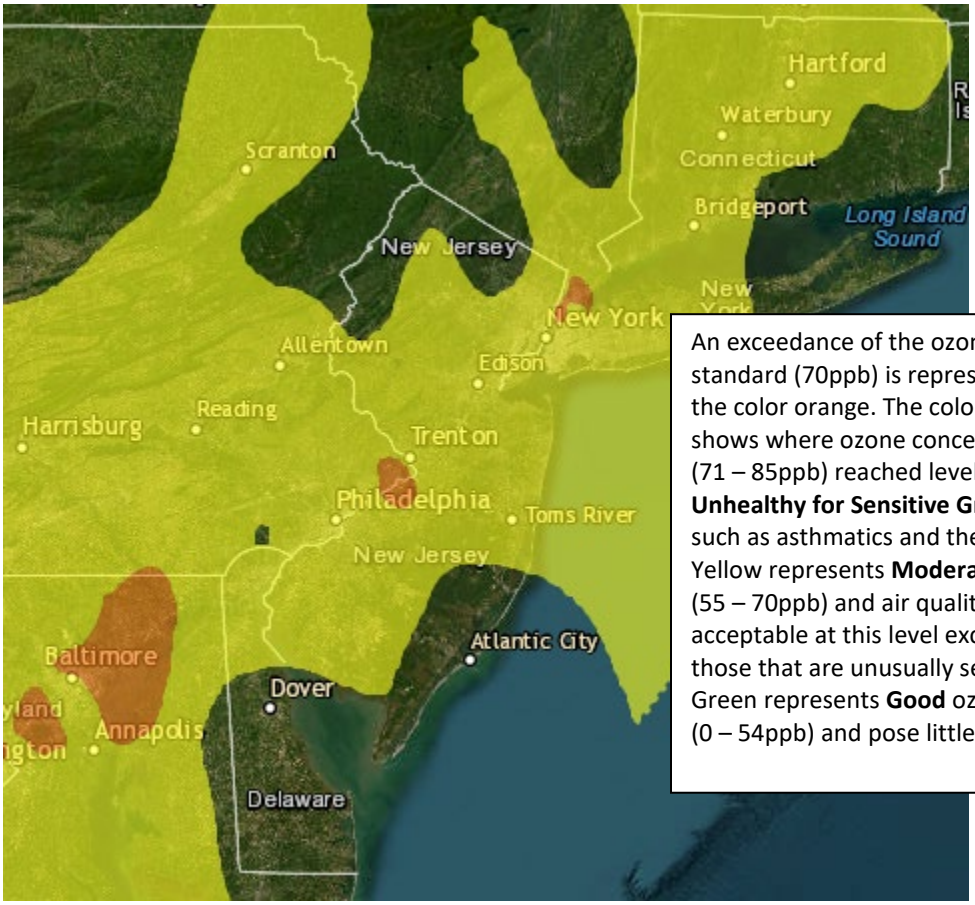
STATE	STATION	Daily Maximum 8-Hr Average (ppb)
CT	Danbury	65
CT	Greenwich	67
CT	Madison-Beach Road	51
CT	Middletown-CVH-Shed	56
CT	New Haven	54
CT	Stratford	56
CT	Westport	58
DE	BCSP (New Castle Co.)	53
DE	BELLFNT2 (New Castle Co.)	61
DE	KILLENS (Kent Co.)	47
DE	LEWES (Sussex Co.)	53
DE	LUMS 2 (New Castle Co.)	57
DE	MLK (New Castle Co.)	62
DE	SEAFORD (Sussex Co.)	52
MD	Fair Hill	62
NY	Babylon	60
NY	Bronx - IS52	69
NY	CCNY	71
NY	Flax Pond	56
NY	Fresh Kills	65
NY	Holtsville	55
NY	Pfizer Lab	71
NY	Queens	70
NY	Riverhead	48
NY	Rockland Cty	55
NY	White Plains	63
PA	BRIS (Bucks Co.)	72
PA	CHES (Delaware Co.)	65
PA	NEWG (Chester Co.)	57
PA	NORR (Montgomery Co.)	63
PA	LAB (Philadelphia Co.)	62
PA	NEA (Philadelphia Co.)	69
PA	NEW (Philadelphia Co.)	69
	TOTAL EXCEEDANCES	3

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 – July 17, 2023 NAAQS = 70 ppb
Connecticut	12
Delaware	4
Maryland	3
New Jersey	12
New York	12
Pennsylvania	8

Figure 1. Ozone Air Quality Index for July 17, 2023



An exceedance of the ozone standard (70ppb) is represented by the color orange. 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

A large area of low pressure over eastern Canada provided an overall unsettled weather pattern with multiple rounds of precipitation across the northeast in the days leading up to this ozone event. On Monday, July 17th a break in the humidity and precipitation was observed as a weak area of high pressure was able to provide a temporary lull in the unsettled weather pattern. Meteorological data from across the region show that sunny skies, light/variable winds, and temperatures reaching the upper 80s were observed on this day. In addition, hazy and smokey skies were noted throughout the day as fine particle concentrations rose into the upper moderate category. As a result, it is possible that the age of the wildfire smoke impacting the region may have played a role in the ozone levels observed on this day. By the afternoon hours, a sea breeze developed, and with the lack of smoke offshore, it brought cleaner conditions to coastal locations. Favorable meteorological conditions in combination with diffuse wildfire smoke likely led to ozone exceedances observed in southeastern Pennsylvania and New York.

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)
NY	CCNY	71
NY	Pfizer Lab	71
PA	BRIS (Bucks Co.)	72

Figure 2. 48-hour Back Trajectories for July 17, 2023 at 10 meters

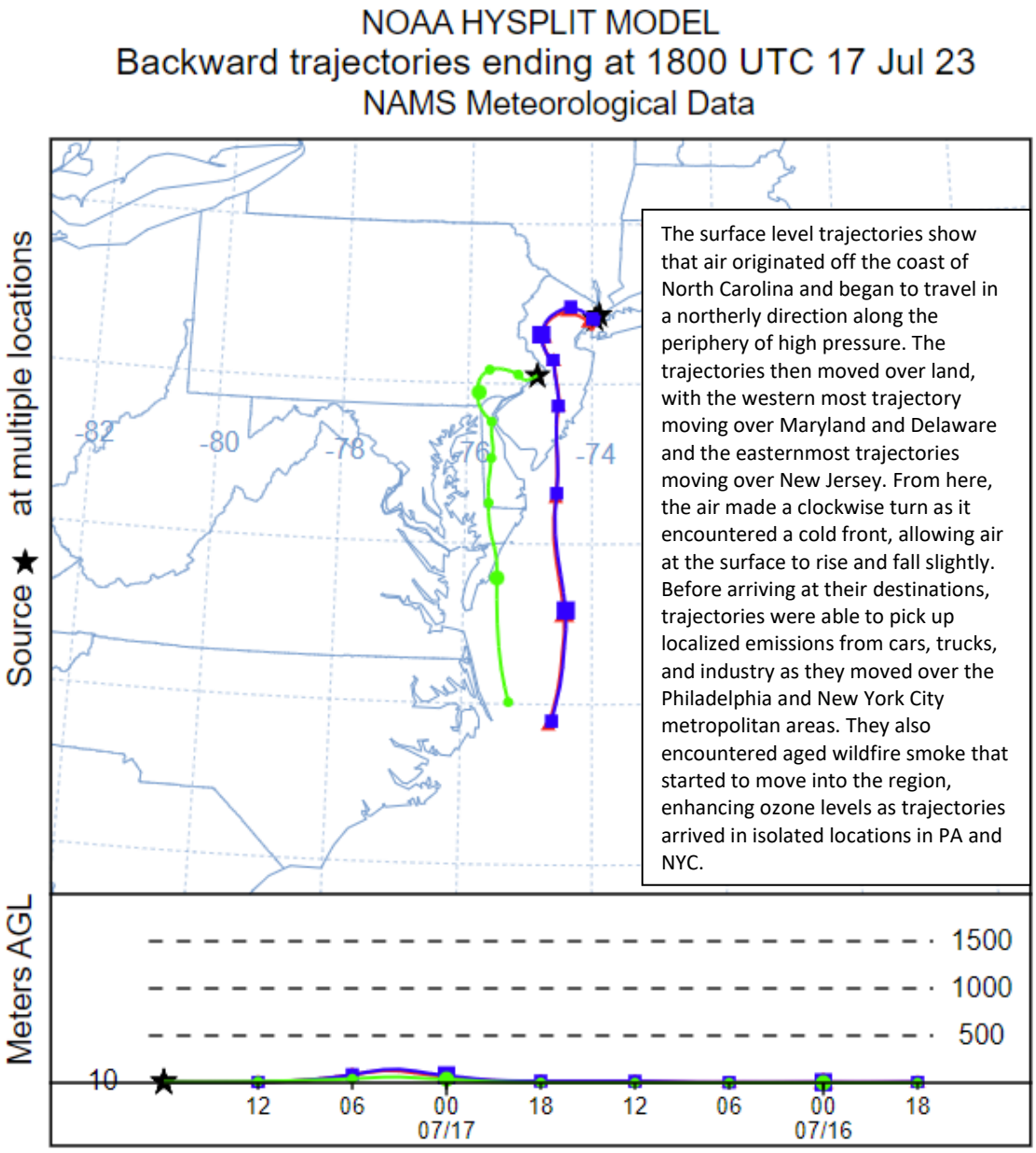
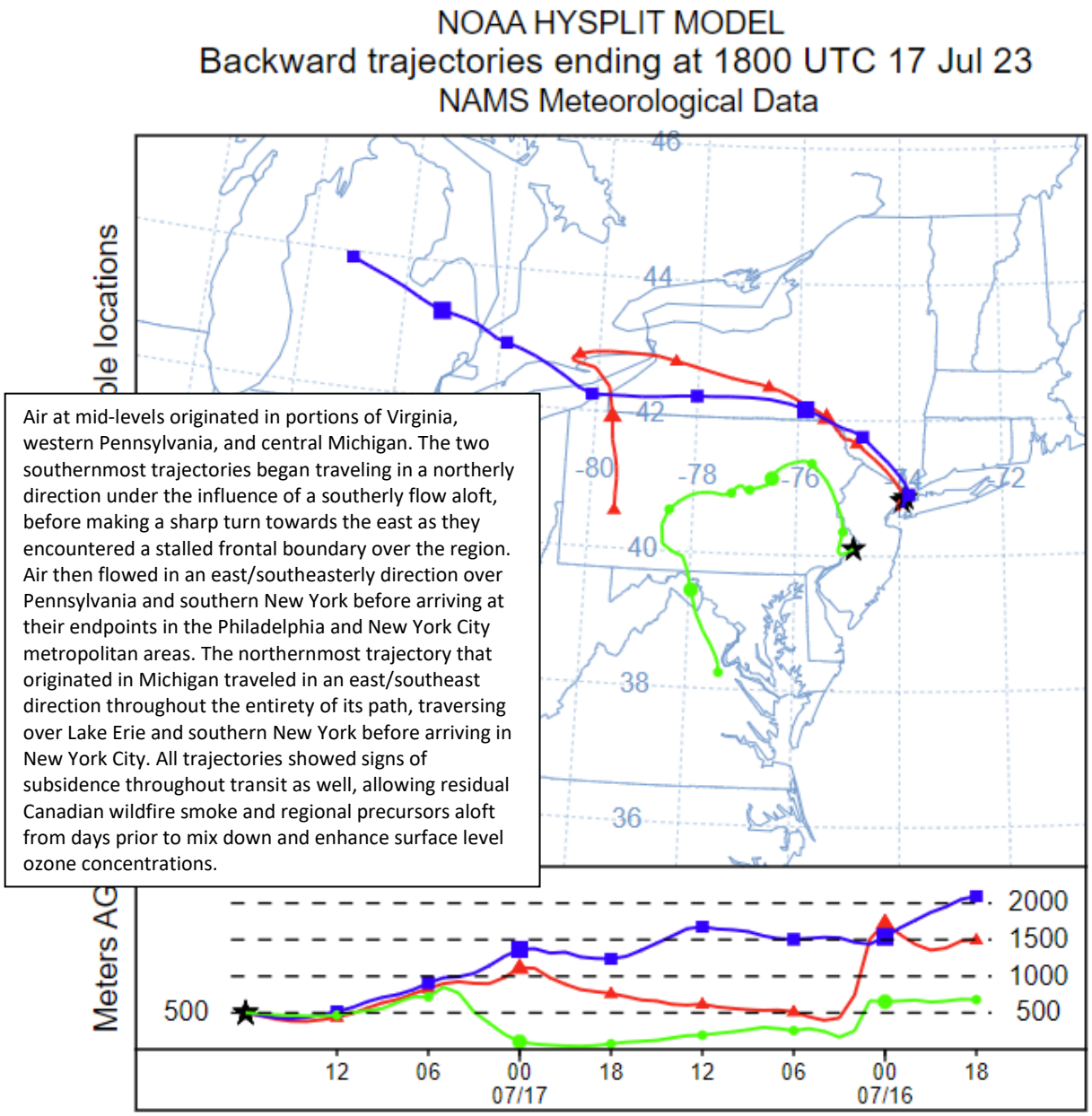


Figure 3. 48-hour Back Trajectories for July 17, 2023 at 500 meters



Air at mid-levels originated in portions of Virginia, western Pennsylvania, and central Michigan. The two southernmost trajectories began traveling in a northerly direction under the influence of a southerly flow aloft, before making a sharp turn towards the east as they encountered a stalled frontal boundary over the region. Air then flowed in an east/southeasterly direction over Pennsylvania and southern New York before arriving at their endpoints in the Philadelphia and New York City metropolitan areas. The northernmost trajectory that originated in Michigan traveled in an east/southeast direction throughout the entirety of its path, traversing over Lake Erie and southern New York before arriving in New York City. All trajectories showed signs of subsidence throughout transit as well, allowing residual Canadian wildfire smoke and regional precursors aloft from days prior to mix down and enhance surface level ozone concentrations.

Figure 4. 48-hour Back Trajectories for July 17, 2023 at 1500 meters

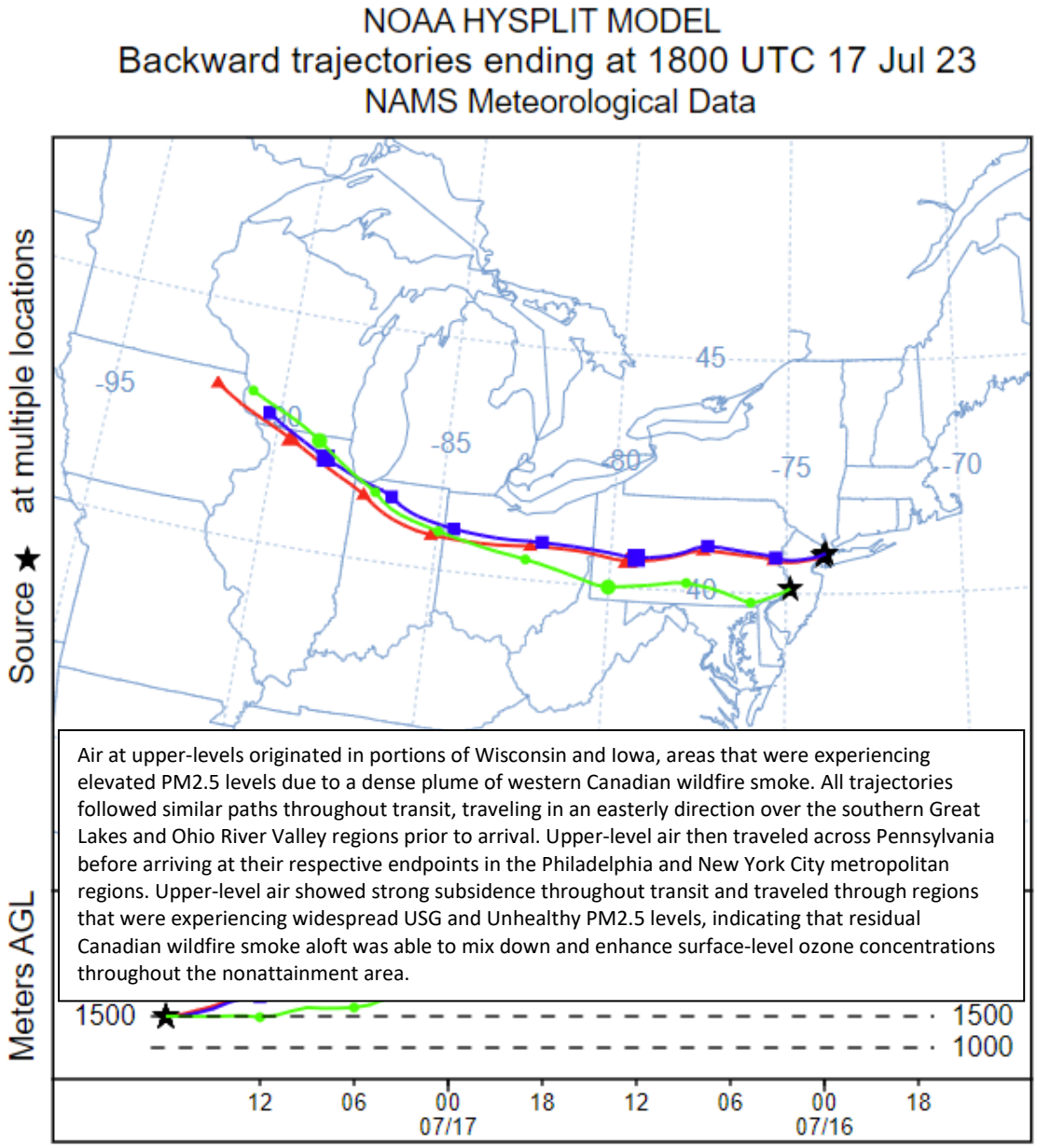
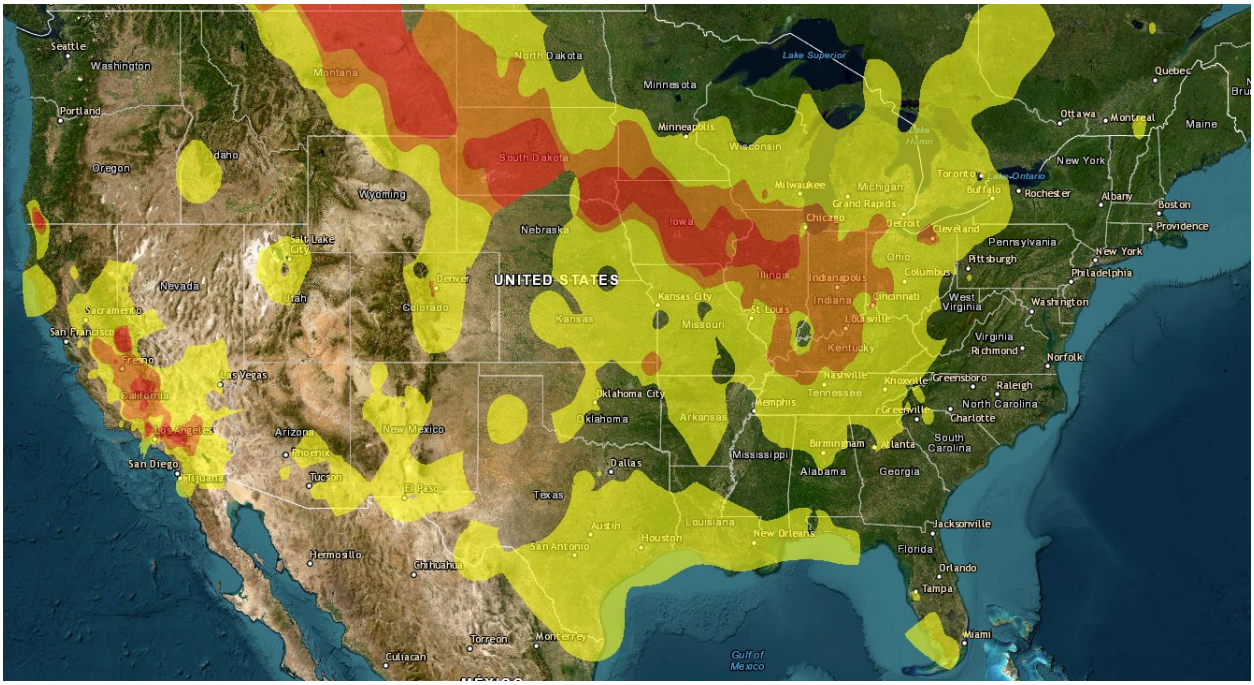


Figure 5. Air Quality Index for the United States on July 16, 2023



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 .