Ozone National Ambient Air Quality Standard Health Exceedances on August 27 & August 28, 2024

Exceedance Locations and Levels

On Tuesday, August 27, 2024, there were two (2) exceedances in New Jersey of the National Ambient Air Quality Standard (NAAQS) and on Wednesday, August 28, 2024, there were three (3) exceedances of the NAAQS for ozone (daily maximum 8-hour average of 70 ppb). See Table 1.

Table 1. New Jersey Ozone Concentrations on 8/27/2024 and 8/28/2024

STATION	Daily Maximum 8-Hr Average (ppb) 8/27/2024	Daily Maximum 8-Hr Average (ppb) 8/28/2024
Ancora State Hospital	57	69
Bayonne	64	53
Brigantine	52	52
Chester	52	53
Clarksboro	79	73
Colliers Mills	62	73
Columbia	53	50
Flemington	57	59
Leonia	70	52
Millville	64	74
Monmouth University	56	64
Ramapo	43	43
Rider University	61	63
Rutgers University	60	58
South Camden	75	69
Washington Crossing*	57	63
TOTAL EXCEEDANCES	2	3

*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 two (2) exceedances of the ozone NAAQS on Tuesday, August 27, 2024 and three (3) exceedances of the ozone NAAQS on Wednesday, August 28, 2024. See Table 2.

Table 2. Ozone Concentrations at Out-of-State Monitoring Stations in New Jersey's Ozone Nonattainment Areas on 8/27/2024 and 8/28/2024

STATE	STATION	Daily Maximum 8-Hr Average (ppb) 8/27/2024	Daily Maximum 8-Hr Average (ppb) 8/28/2024
CT	Danbury	56	52
CT	Greenwich	66	62
CT	Madison-Beach Road	55	82
CT	Middletown-CVH-Shed	55	54
CT	New Haven	55	55
CT	Stratford	60	72
CT	Westport	67	59
DE	BCSP (New Castle Co.)	55	61
DE	BELLFNT2 (New Castle Co.)	64	68
DE	KILLENS (Kent Co.)	61	70
DE	LEWES (Sussex Co.)	50	59
DE	LUMS 2 (New Castle Co.)	62	66
DE	MLK (New Castle Co.)	61	67
DE	SEAFORD (Sussex Co.)	59	63
MD	Fair Hill	60	65
NY	Babylon	64	71
NY	Bronx - IS52	64	59
NY	CCNY	64	56
NY	Flax Pond	57	63
NY	Fresh Kills	60	52
NY	Holtsville	57	66
NY	Pfizer Lab	66	53
NY	Queens	62	63
NY	Riverhead	51	70
NY	Rockland Cty	46	46
NY	White Plains	65	52
PA	BRIS (Bucks Co.)	76	66
PA	CHES (Delaware Co.)	67	66
PA	NEWG (Chester Co.)	58	63
PA	NORR (Montgomery Co.)	58	58
PA	LAB (Philadelphia Co.)	68	61
PA	NEA (Philadelphia Co.)	70	64
PA	NEW (Philadelphia Co.)	71	66
	TOTAL EXCEEDANCES	2	3

The number of days in 2024 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 2024

STATE	# of Days NAAQS was Exceeded January 1 – August 28, 2024 NAAQS = 70 ppb
Connecticut	18
Delaware	4
Maryland	3
New Jersey	19
New York	15
Pennsylvania	12

Figure 1. Ozone Air Quality Index for Tuesday, August 27, 2024

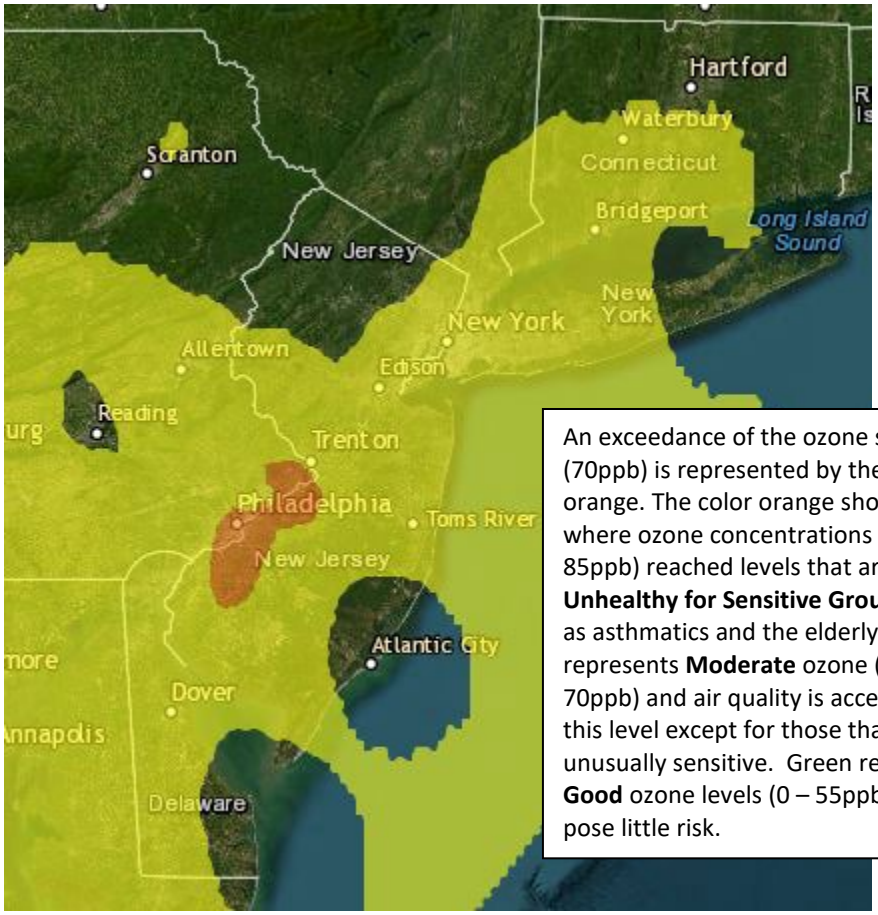
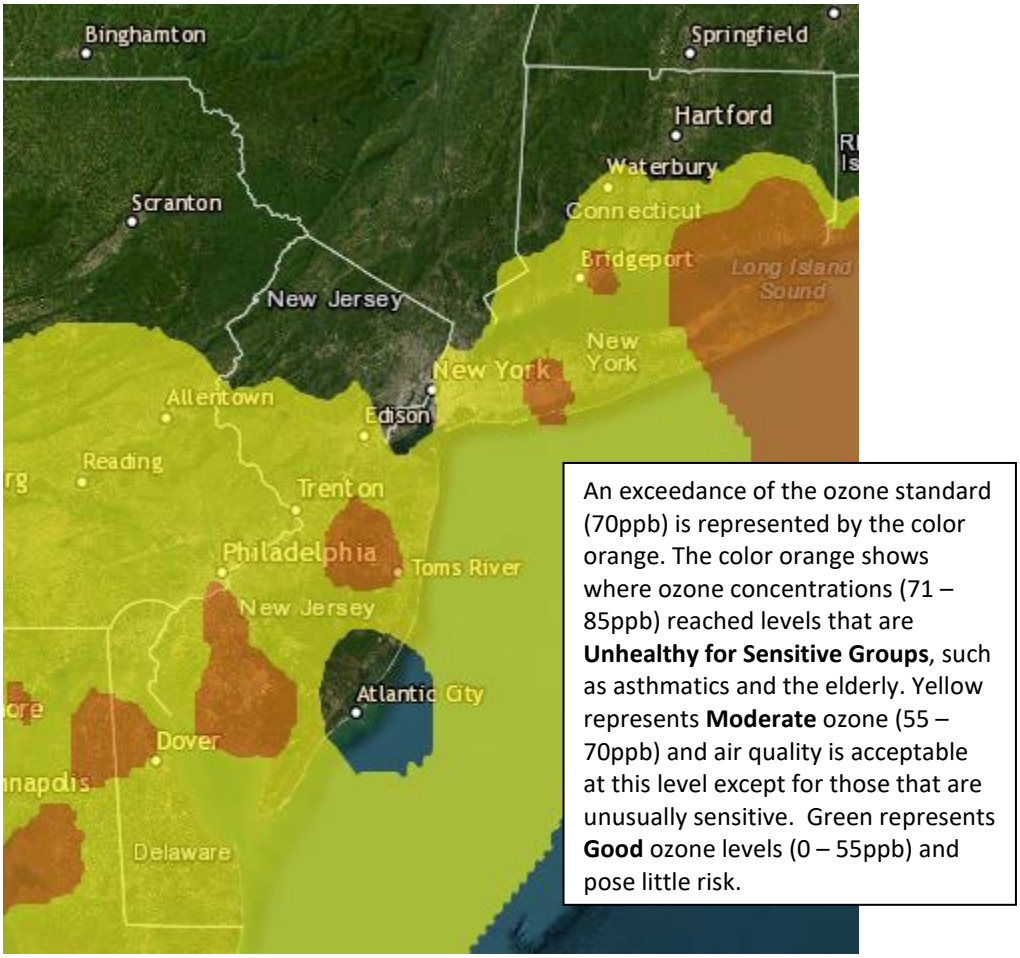


Figure 2. Ozone Air Quality Index for Wednesday, August 28, 2024



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

Tuesday, August 27th and Wednesday, August 28th were days two and three of a three-day ozone exceedance event that occurred throughout the nonattainment area. As low pressure slid off the coast early Tuesday morning, high pressure began building in behind it. Temperatures reaching the upper 80s, sunny skies, and calm winds were observed across New Jersey. Along the coast, winds shifted from the northeast to the southeast allowing for a stagnant air mass and recirculated air to linger over the region. A surface trough developed and meandered over the I-95 corridor throughout the afternoon allowing a previously polluted air mass aloft to mix down to the surface. Meanwhile, a sea breeze developed along the coast helping to keep ozone levels at the Jersey Shore cleaner as pollution was pushed further inland. These favorable conditions enhanced ozone concentrations to the Unhealthy for Sensitive Groups (USG) category near the Philadelphia metropolitan area in New Jersey and Pennsylvania.

By Wednesday August 28th, high pressure throughout the region began to push south, centering itself over the southeastern U.S. As a result, calm winds observed the day prior began to tend out of the west-southwest, before shifting out of the northwest by mid-afternoon. Winds however remained light, allowing the stagnant deteriorated air mass that lingered over the region for several days to remain in place along with the aforementioned surface trough. Combined with abundant sunshine and hot temperatures peaking in the mid-90s, ozone was able to rise again into the USG category in southern New Jersey for the third day in a row, with additional exceedances observed in Long Island, NY and along the Connecticut coastline.

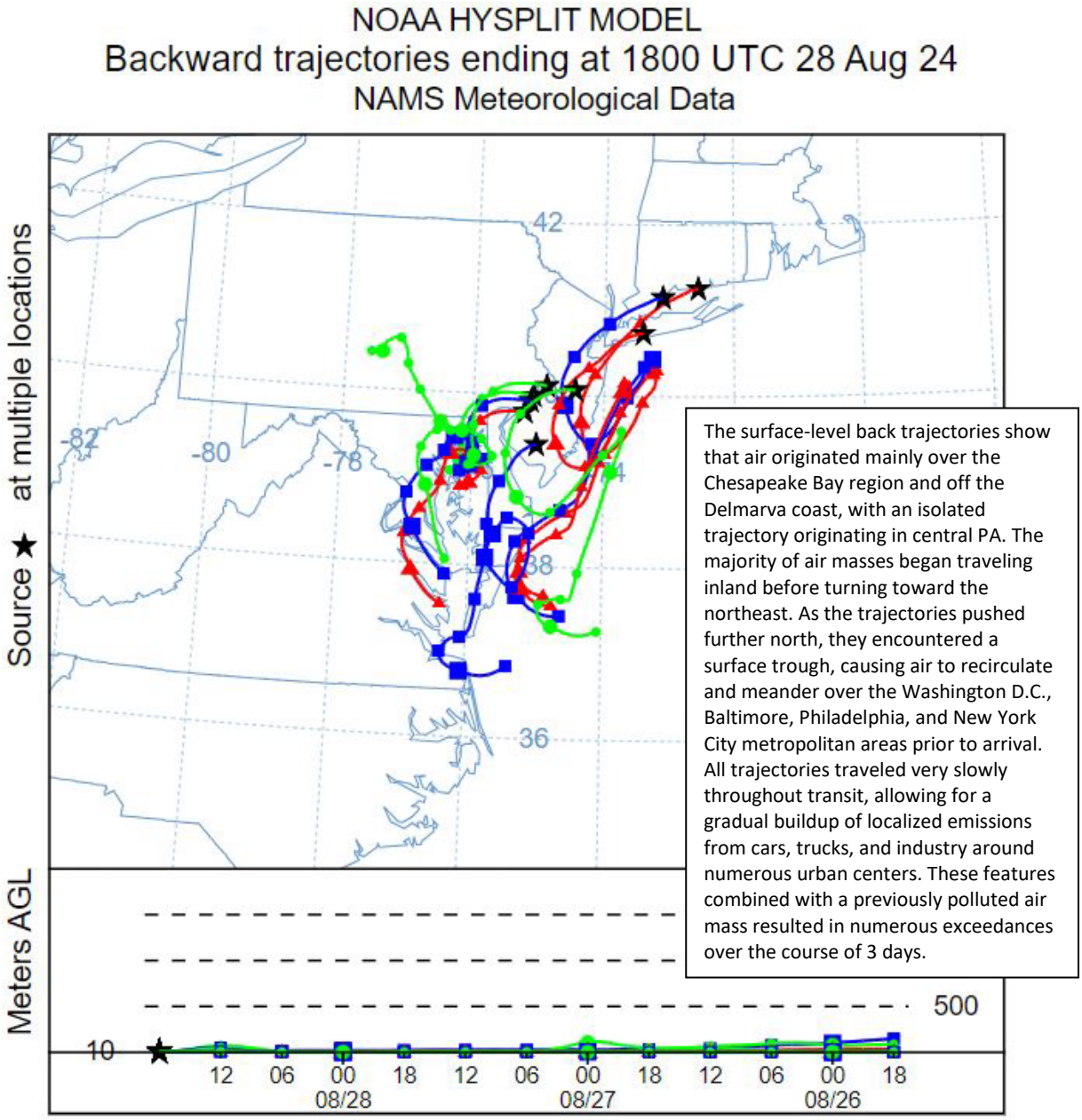
Where Did the Air Pollution that Caused Ozone Come From?

Figures 3, 4, and 5 show the back trajectories of different wind heights for the monitored exceedance(s) on these days. The figures illustrate where the air came from during the approximate 72 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 days (Figures 6 & 7). 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 72-hr Back Trajectories

STATE	DATE	STATION	Daily Maximum 8-Hr Average (ppb)
NJ	8/27, 8/28	Clarksboro	79, 73
NJ	8/28	Colliers Mills	73
NJ	8/28	Millville	74
NJ	8/27	South Camden	75
CT	8/28	Madison-Beach Road	82
CT	8/28	Stratford	72
NY	8/28	Babylon	71
PA	8/27	BRIS (Bucks Co.)	76
PA	8/27	NEW	71

Figure 3. 72-hour Back Trajectories for August 28, 2024 at 10 meters



The surface-level back trajectories show that air originated mainly over the Chesapeake Bay region and off the Delmarva coast, with an isolated trajectory originating in central PA. The majority of air masses began traveling inland before turning toward the northeast. As the trajectories pushed further north, they encountered a surface trough, causing air to recirculate and meander over the Washington D.C., Baltimore, Philadelphia, and New York City metropolitan areas prior to arrival. All trajectories traveled very slowly throughout transit, allowing for a gradual buildup of localized emissions from cars, trucks, and industry around numerous urban centers. These features combined with a previously polluted air mass resulted in numerous exceedances over the course of 3 days.

Figure 4. 72-hour Back Trajectories for August 28, 2024 at 500 meters

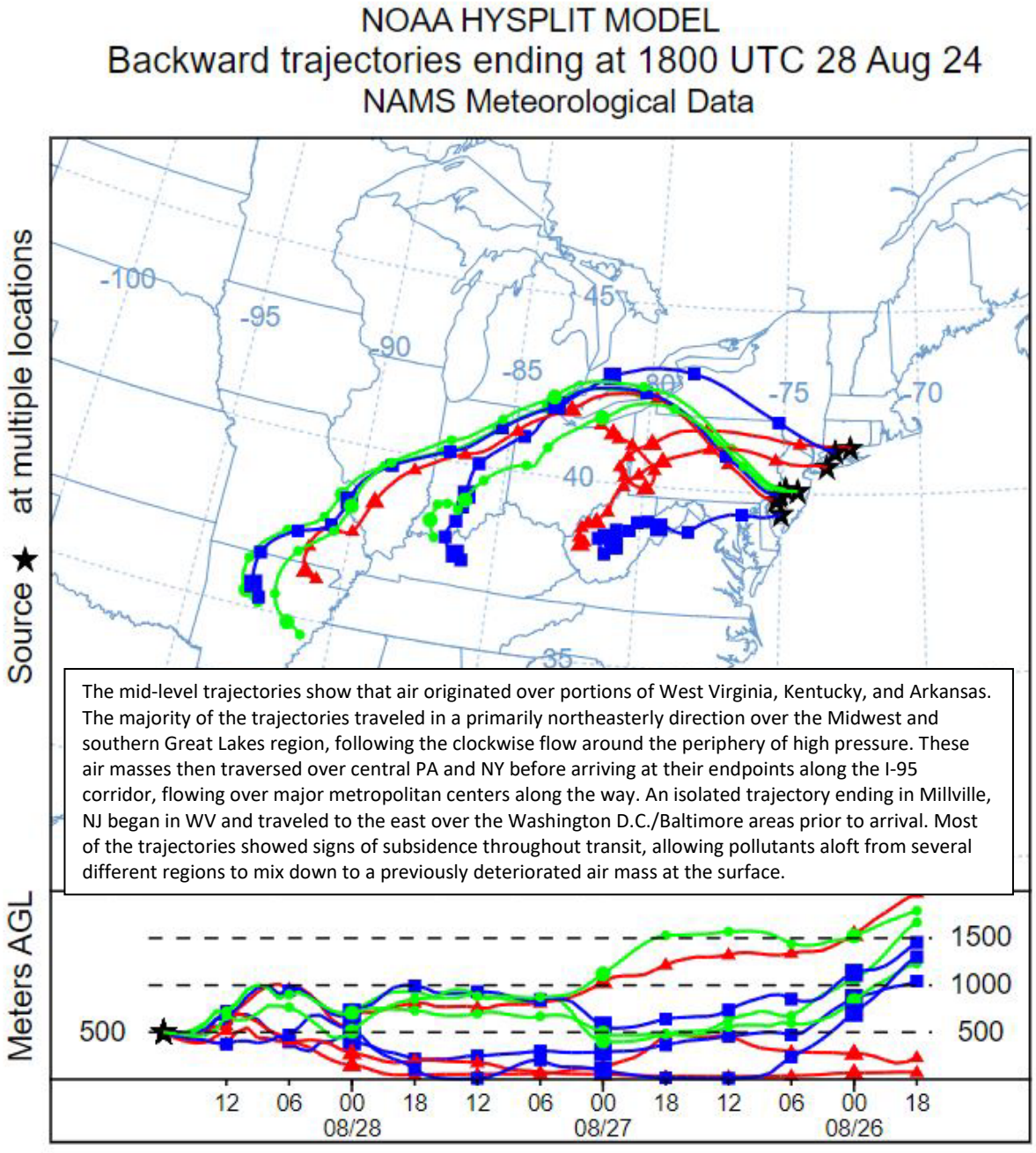
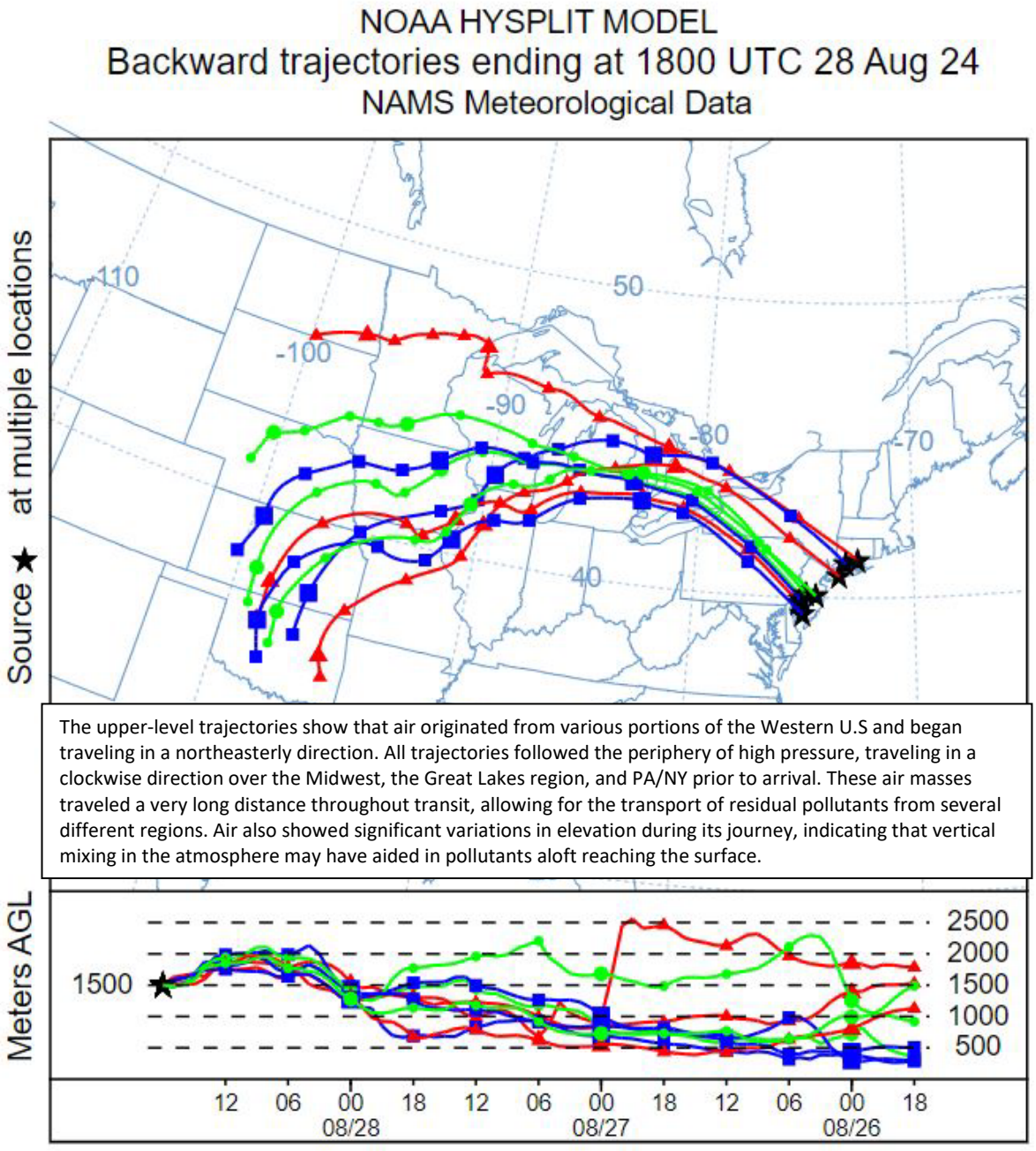


Figure 5. 72-hour Back Trajectories for August 28, 2024 at 1500 meters



The upper-level trajectories show that air originated from various portions of the Western U.S and began traveling in a northeasterly direction. All trajectories followed the periphery of high pressure, traveling in a clockwise direction over the Midwest, the Great Lakes region, and PA/NY prior to arrival. These air masses traveled a very long distance throughout transit, allowing for the transport of residual pollutants from several different regions. Air also showed significant variations in elevation during its journey, indicating that vertical mixing in the atmosphere may have aided in pollutants aloft reaching the surface.

Figure 6. Air Quality Index for the United States on August 26, 2024

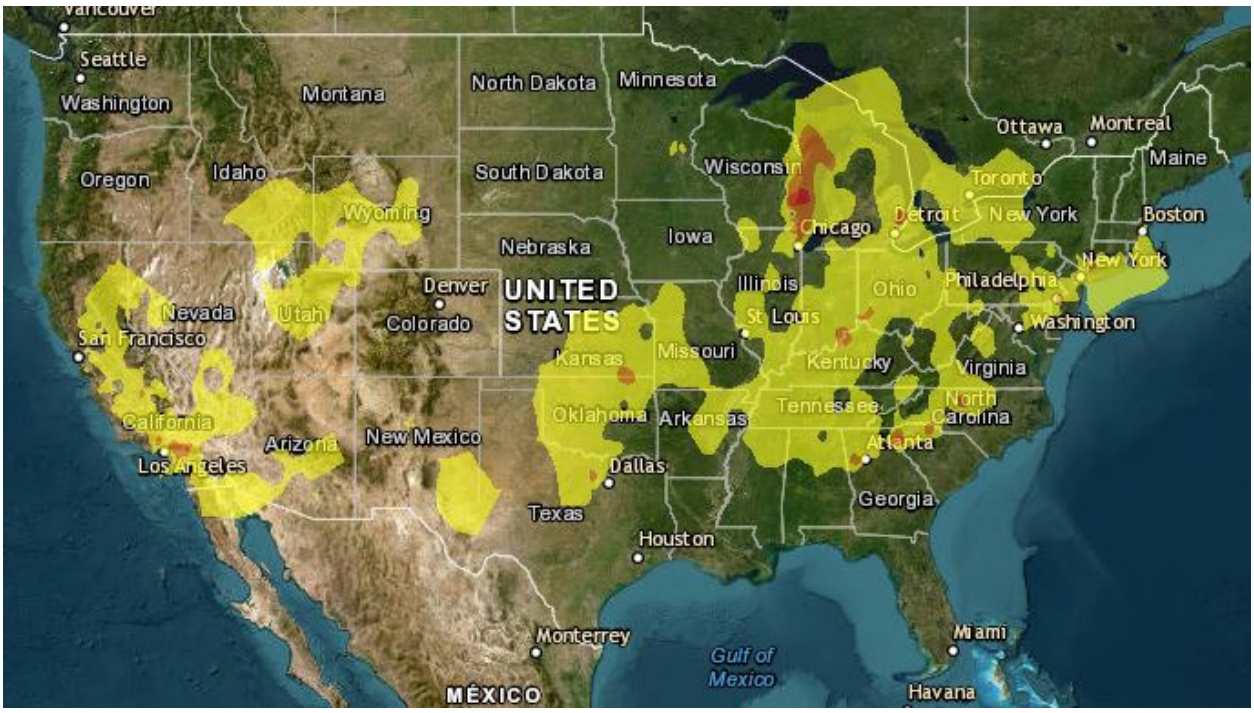
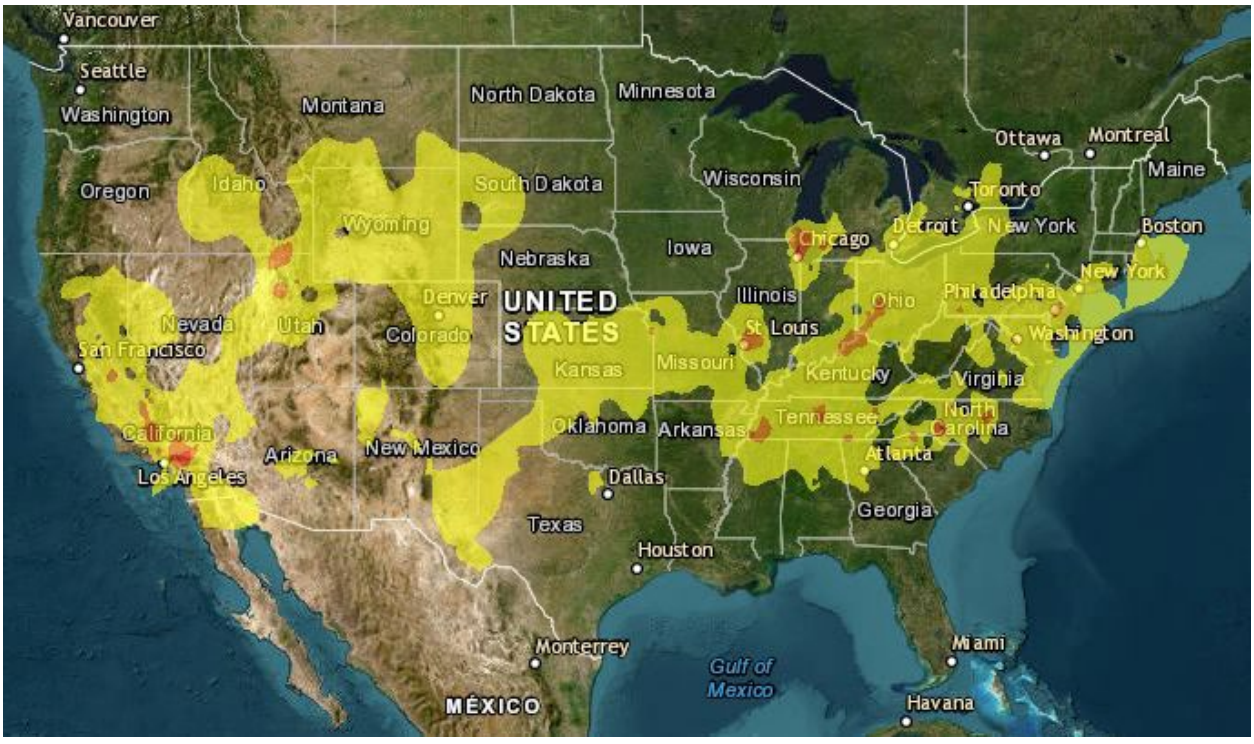


Figure 7. Air Quality Index for the United States on August 27, 2024



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://dep.nj.gov/airplanning/aqi-today/.