Ozone National Ambient Air Quality Standard Health Exceedances on August 1, 2024

Exceedance Locations and Levels

On Thursday, August 1, 2024, there were two (2) 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 8/1/2024

STATION	Daily Maximum 8-Hr Average (ppb)
Ancora State Hospital	61
Bayonne	66
Brigantine	57
Camden Spruce St	No Data
Chester	64
Clarksboro	75
Colliers Mills	81
Columbia	61
Flemington	68
Leonia	67
Millville	64
Monmouth University	64
Ramapo	57
Rider University	69
Rutgers University	57
Washington Crossing*	69
TOTAL EXCEEDANCES	2

*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 seven (7) 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 8/1/2024

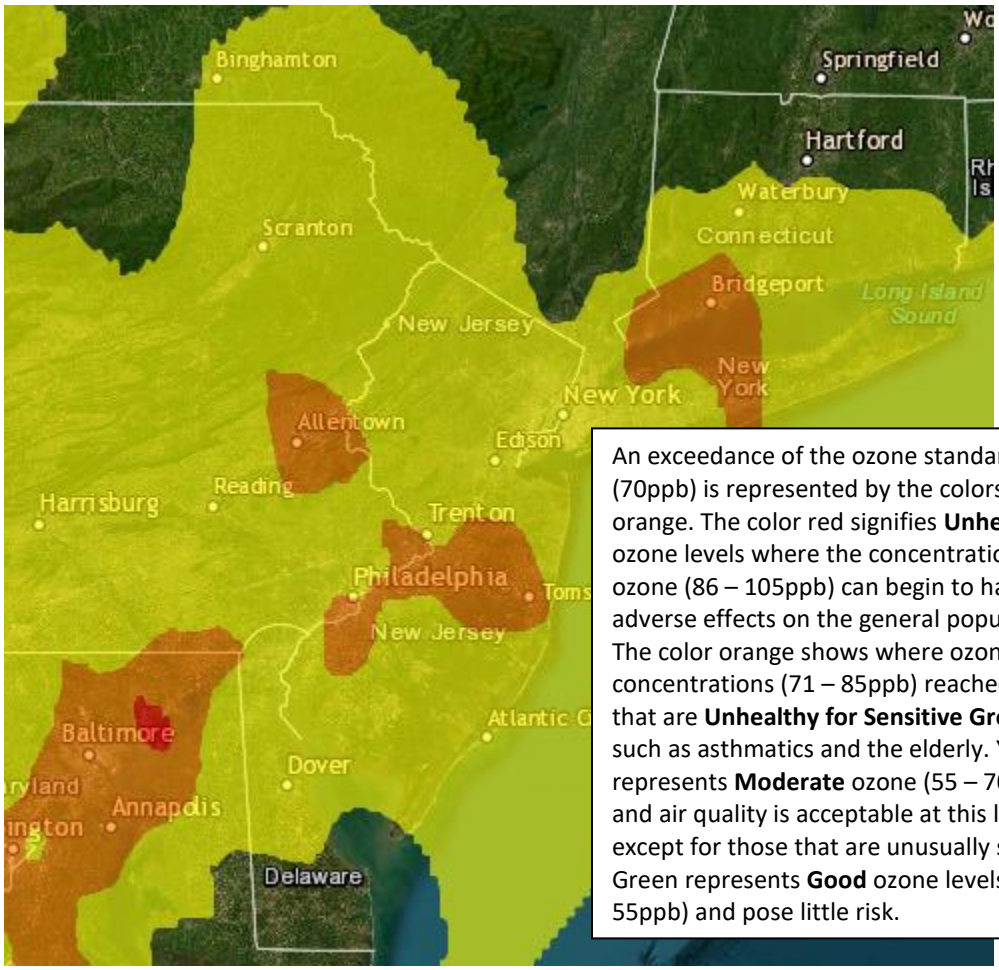
STATE	STATION	Daily Maximum 8-Hr Average (ppb)
CT	Danbury	59
CT	Greenwich	79
CT	Madison-Beach Road	69
CT	Middletown-CVH-Shed	No Data
CT	New Haven	67
CT	Stratford	73
CT	Westport	82
DE	BCSP (New Castle Co.)	57
DE	BELLFNT2 (New Castle Co.)	68
DE	KILLENS (Kent Co.)	59
DE	LEWES (Sussex Co.)	53
DE	LUMS 2 (New Castle Co.)	64
DE	MLK (New Castle Co.)	70
DE	SEAFORD (Sussex Co.)	49
MD	Fair Hill	73
NY	Babylon	No Data
NY	Bronx - IS52	66
NY	CCNY	No Data
NY	Flax Pond	72
NY	Fresh Kills	No Data
NY	Holtsville	70
NY	Pfizer Lab	67
NY	Queens	69
NY	Riverhead	67
NY	Rockland Cty	51
NY	White Plains	60
PA	BRIS (Bucks Co.)	74
PA	CHES (Delaware Co.)	70
PA	NEWG (Chester Co.)	64
PA	NORR (Montgomery Co.)	63
PA	LAB (Philadelphia Co.)	No Data
PA	NEA (Philadelphia Co.)	70
PA	NEW (Philadelphia Co.)	72
	TOTAL EXCEEDANCES	7

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 1, 2024 NAAQS = 70 ppb
Connecticut	15
Delaware	4
Maryland	3
New Jersey	15
New York	13
Pennsylvania	10

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



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 – 55ppb) 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

Several ozone exceedances were observed across the nonattainment area on Thursday, August 1st, with exceedances ranging from Maryland up to Connecticut. In the days prior, high pressure was anchored over the southeastern U.S., allowing warm and humid air to funnel into the region via south-southwest winds. By Thursday, the high began to shift north and situate itself over the Mid-Atlantic, causing winds to become light and shift out of the west-southwest. With ample sunshine over New Jersey, temperatures were able to soar into the mid to upper 90s and cause ozone concentrations to spike. Additionally, a previously deteriorated air mass was already in place over central and southern portions of New Jersey as residual smoke from western U.S. and Canadian wildfires lingered aloft and at the surface. With a surface trough in place over the I-95 corridor, precursors and residual ozone aloft from days prior were also able to mix down to the surface and further aid in rising ozone levels. Combined with favorable meteorological conditions, several ozone exceedances were able to occur across Maryland, Pennsylvania, New Jersey, New York, and Connecticut.

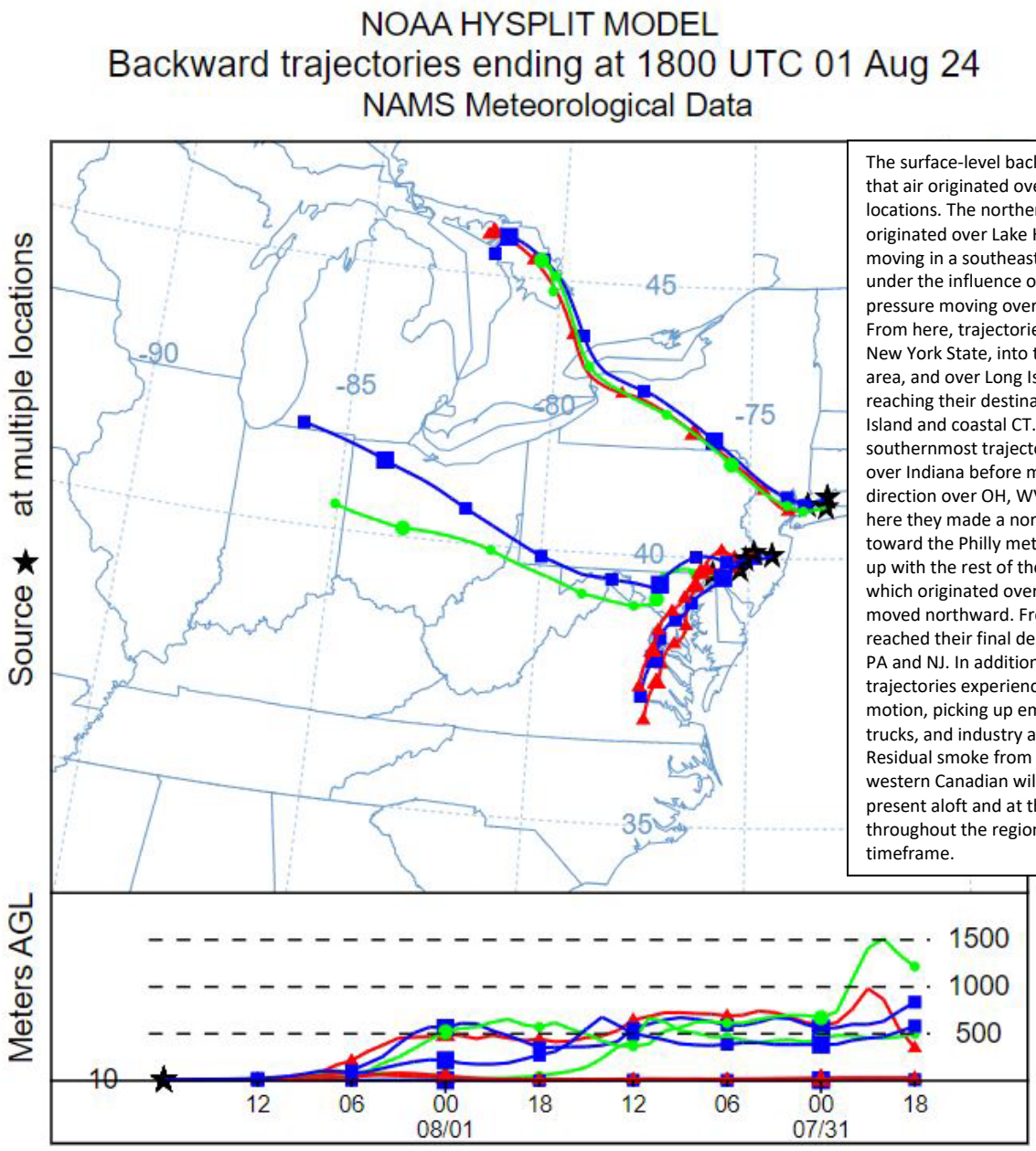
Where Did the Air Pollution that Caused Ozone Come From?

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

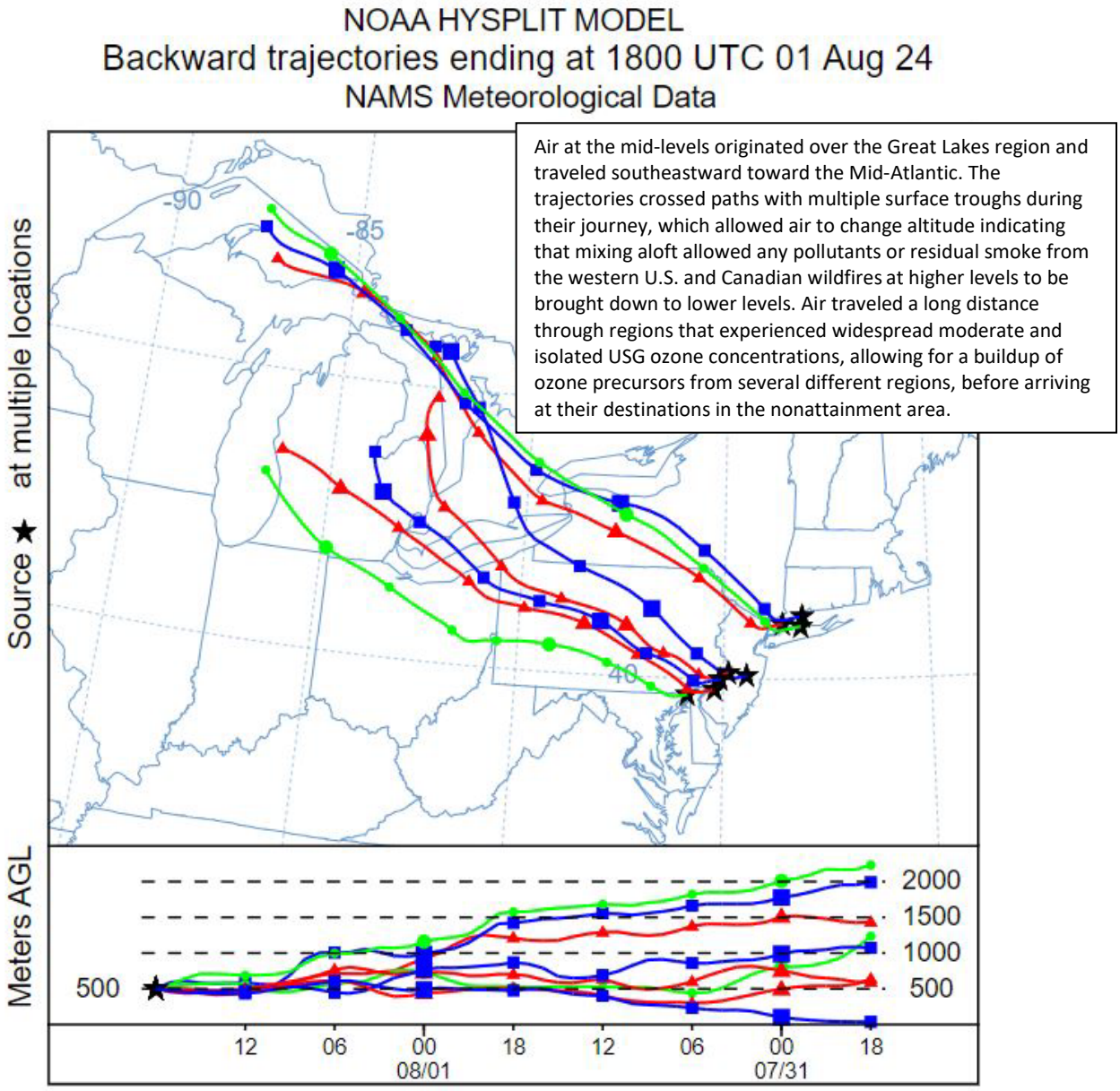
STATE	STATION	Daily Maximum 8-Hr Average (ppb)
NJ	Clarksboro	75
NJ	Colliers Mills	81
CT	Greenwich	79
CT	Stratford	73
MD	Fair Hill	73
NY	Flax Pond	72
PA	NEW (Philadelphia Co.)	72
PA	BRIS (Bucks Co.)	74

Figure 2. 48-hour Back Trajectories for August 1, 2024 at 10 meters



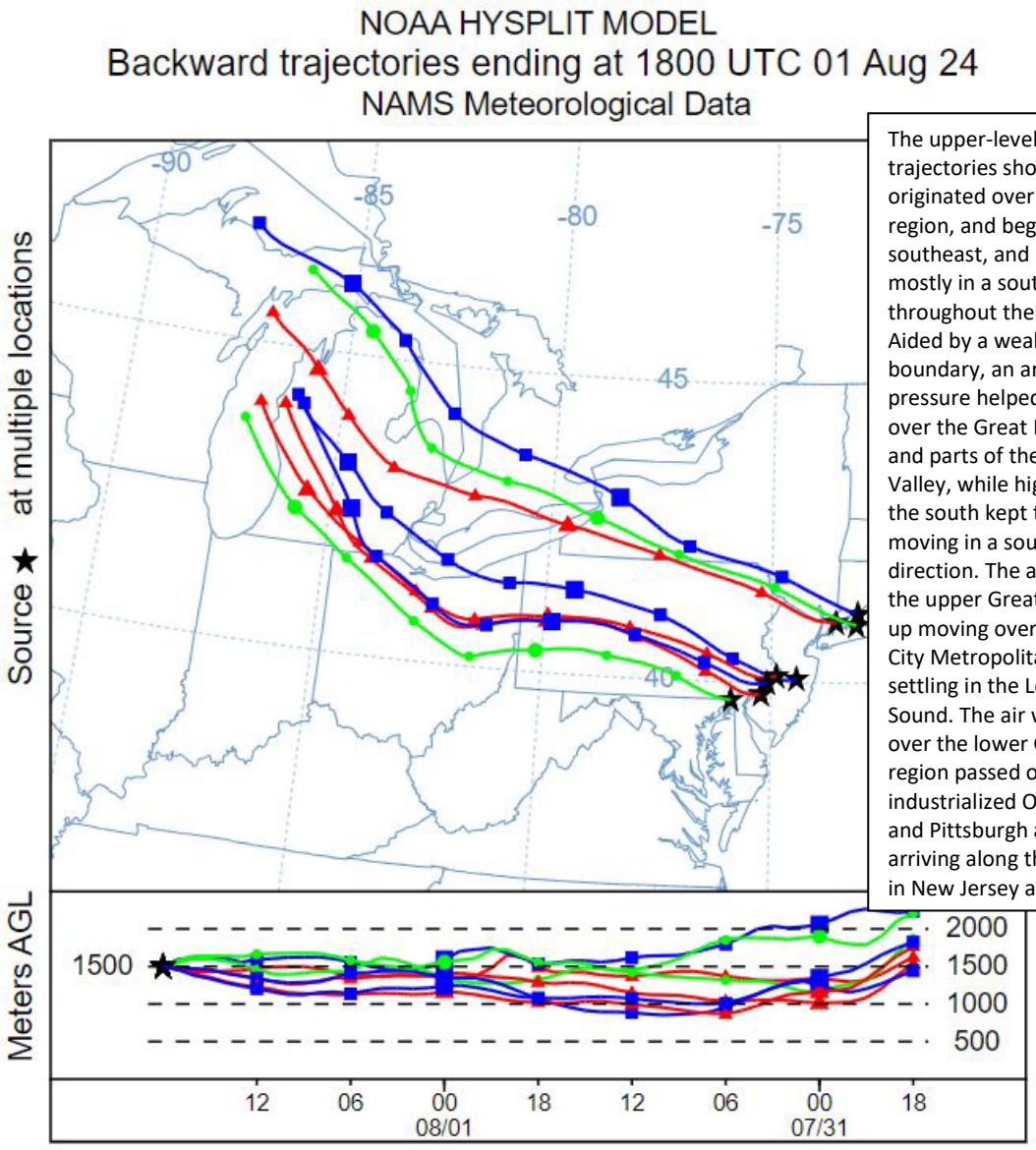
The surface-level back trajectories show that air originated over various locations. The northernmost trajectories originated over Lake Huron and began moving in a southeastward direction under the influence of weak low pressure moving over New England. From here, trajectories moved over New York State, into the NYC Metro area, and over Long Island sound before reaching their destinations in Long Island and coastal CT. Two of the southernmost trajectories originated over Indiana before moving in an ESE direction over OH, WV, and MD. From here they made a northward turn toward the Philly metro area and met up with the rest of the trajectories which originated over southern VA and moved northward. From here, they all reached their final destinations across PA and NJ. In addition, all of the trajectories experienced a sinking motion, picking up emissions from cars, trucks, and industry along the way. Residual smoke from western U.S. and western Canadian wildfires was also present aloft and at the surface throughout the region during this timeframe.

Figure 3. 48-hour Back Trajectories for August 1, 2024 at 500 meters



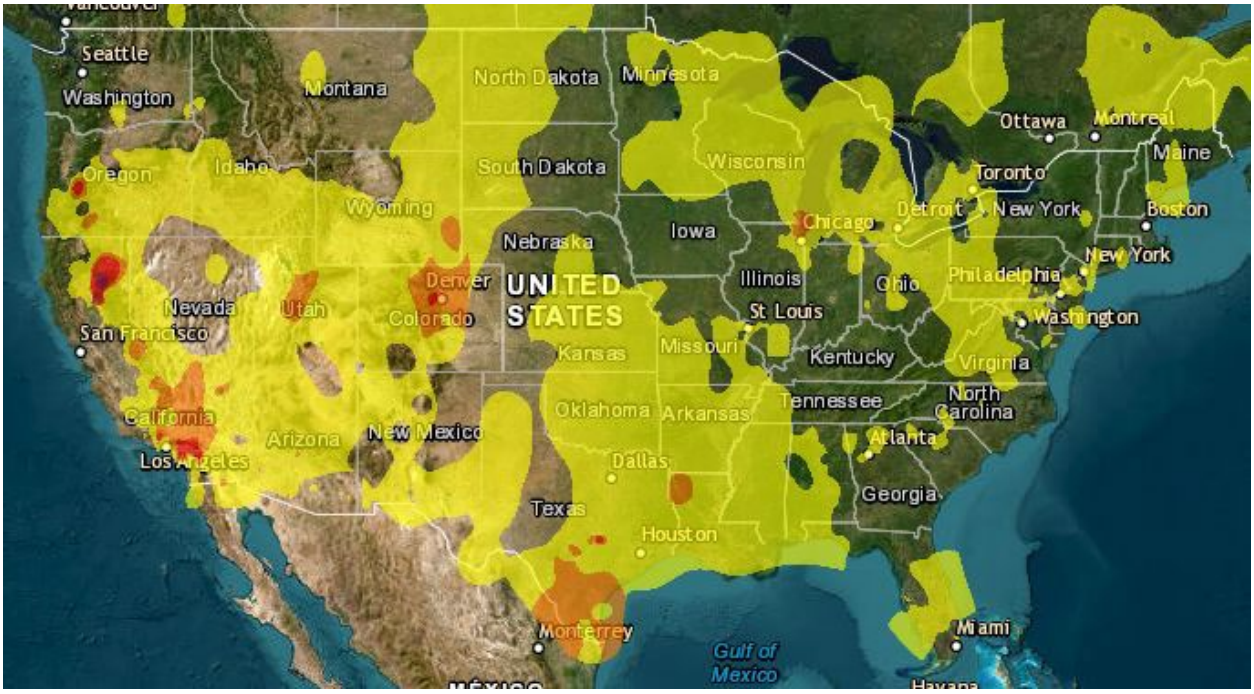
Air at the mid-levels originated over the Great Lakes region and traveled southeastward toward the Mid-Atlantic. The trajectories crossed paths with multiple surface troughs during their journey, which allowed air to change altitude indicating that mixing aloft allowed any pollutants or residual smoke from the western U.S. and Canadian wildfires at higher levels to be brought down to lower levels. Air traveled a long distance through regions that experienced widespread moderate and isolated USG ozone concentrations, allowing for a buildup of ozone precursors from several different regions, before arriving at their destinations in the nonattainment area.

Figure 4. 48-hour Back Trajectories for August 1, 2024 at 1500 meters



The upper-level back trajectories show that air originated over the Great Lakes region, and began traveling southeast, and remained mostly in a southeasterly flow throughout their journey. Aided by a weak frontal boundary, an area of low pressure helped to push this air over the Great Lakes region and parts of the Ohio River Valley, while high pressure to the south kept the masses from moving in a southeasterly direction. The air masses from the upper Great Lakes ended up moving over the New York City Metropolitan Area and settling in the Long Island Sound. The air which started over the lower Great Lakes region passed over the heavily industrialized Ohio River Valley and Pittsburgh area, before arriving along the I-95 corridor in New Jersey and Maryland.

Figure 5. Air Quality Index for the United States on July 31, 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/.