Ozone National Ambient Air Quality Standard Health Exceedances on August 5 & 6, 2022

Exceedance Locations and Levels

On Friday, August 5, 2022 and Saturday, August 6, 2022, 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 8/5/2022 and 8/6/2022

STATION	Daily Maximum 8-Hr Average (ppb) 8/5/2022	Daily Maximum 8-Hr Average (ppb) 8/6/2022
Ancora State Hospital	48	38
Bayonne	61	55
Brigantine	43	37
Camden Spruce St	49	38
Chester	50	47
Clarksboro	52	38
Colliers Mills	54	43
Columbia	46	43
Flemington	57	48
Leonia	59	59
Millville	47	36
Monmouth University	46	41
Newark Firehouse	65	57
Ramapo	58	50
Rider University	67	51
Rutgers University	66	53
Washington Crossing*	57	45
TOTAL EXCEEDANCES	0	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 five (5) exceedances of the ozone NAAQS on Friday, August 5, 2022 and one (1) exceedance of the ozone NAAQS on Saturday, August 6, 2022. See Table 2.

Table 2. Ozone Concentrations at Out-of-State Monitoring Stations in New Jersey's Ozone Nonattainment Areas on 8/5/2022 and 8/6/2022

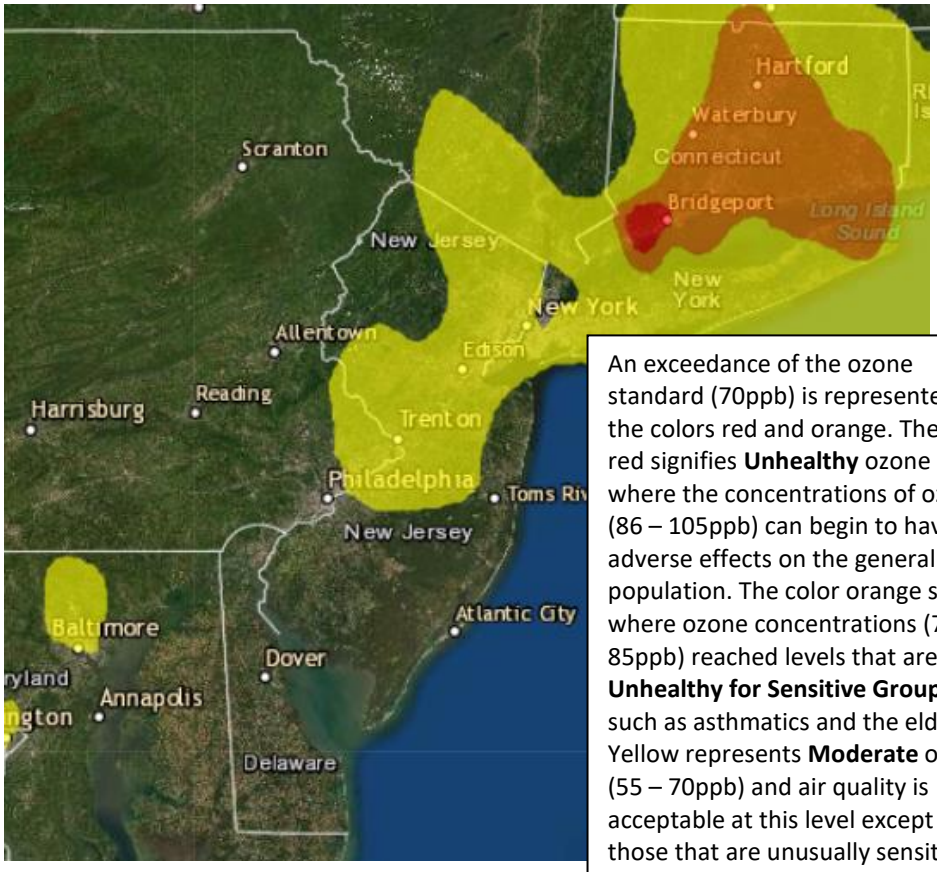
STATE	STATION	Daily Maximum 8-Hr Average (ppb) 8/5/2022	Daily Maximum 8-Hr Average (ppb) 8/6/2022
CT	Danbury	54	73
CT	Greenwich	62	63
CT	Madison-Beach Road	72	55
CT	Middletown-CVH-Shed	80	64
CT	New Haven	80	65
CT	Stratford	85	65
CT	Westport	88	70
DE	BCSP (New Castle Co.)	46	34
DE	BELLFNT2 (New Castle Co.)	50	36
DE	KILLENS (Kent Co.)	45	26
DE	LEWES (Sussex Co.)	42	29
DE	LUMS 2 (New Castle Co.)	49	34
DE	MLK (New Castle Co.)	52	36
DE	SEAFORD (Sussex Co.)	42	26
MD	Fair Hill	46	36
NY	Babylon	54	50
NY	Bronx - IS52	48	53
NY	CCNY	55	59
NY	Flax Pond	68	55
NY	Fresh Kills	62	52
NY	Holtsville	56	49
NY	Pfizer Lab	50	63
NY	Queens	55	53
NY	Riverhead	59	50
NY	Rockland Cty	62	53
NY	White Plains	65	63
PA	BRIS (Bucks Co.)	61	43
PA	CHES (Delaware Co.)	53	39
PA	NEWG (Chester Co.)	39	31
PA	NORR (Montgomery Co.)	45	37
PA	LAB (Philadelphia Co.)	49	37
PA	NEA (Philadelphia Co.)	61	45
PA	NEW (Philadelphia Co.)	56	44
	TOTAL EXCEEDANCES	5	1

The number of days in 2022 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 2022

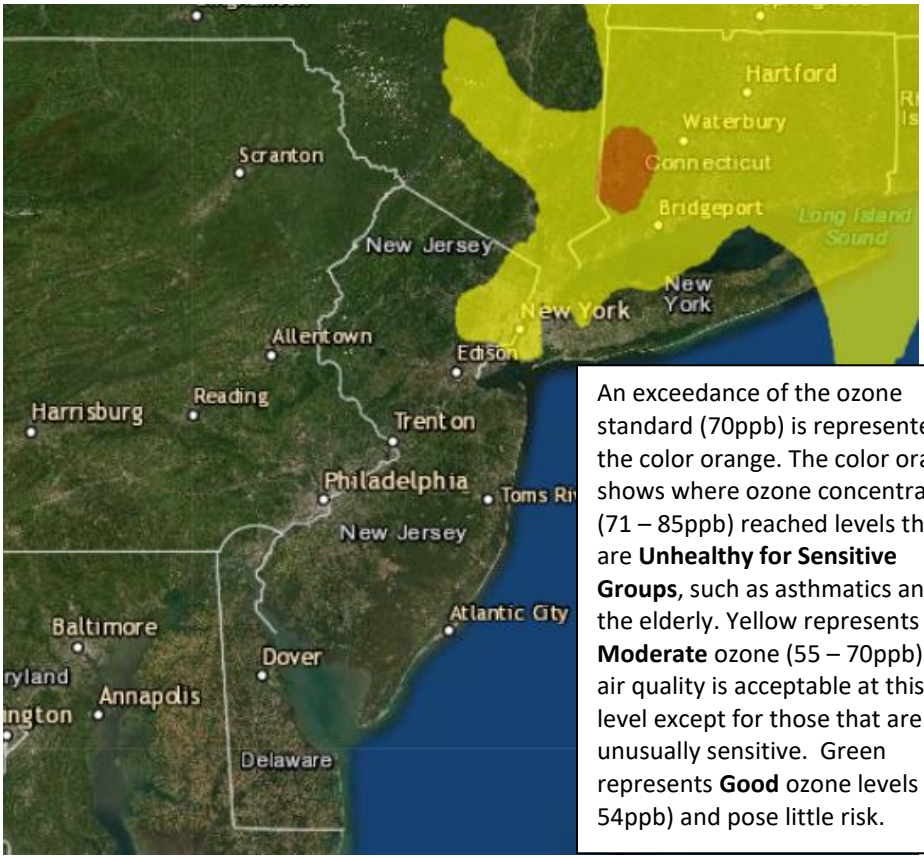
STATE	# of Days NAAQS was Exceeded January 1 – August 6, 2022 NAAQS = 70 ppb
Connecticut	19
Delaware	0
Maryland	1
New Jersey	8
New York	8
Pennsylvania	3

Figure 1. Ozone Air Quality Index for Friday, August 5, 2022



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.

Figure 2. Ozone Air Quality Index for Saturday, August 6, 2022



Source: www.airnow.gov

For ozone terminology definitions see NJDEP Air Quality Planning's Glossary and Acronyms webpage: http://nj.gov/dep/baqp/glossary.html

Weather

A Bermuda high pressure system impacted the region on Friday August 5th as a cold front approached the northeastern United States. This front stalled north of the nonattainment area as a surface trough developed, extending from coastal New England southwest into the Mid-Atlantic region. This atmospheric setup allowed for some unsettled weather with mixed cloud cover and isolated passing showers/thunderstorms. A brief gradual clearing in the afternoon hours, over portions of the northern nonattainment area, led to periods of late day sunshine which, in combination with warm temperatures and a south to southwesterly wind flow, allowed ozone levels to rapidly rise, leading to several exceedances over Connecticut on this day.

High pressure continued to dominate the weather pattern on Saturday August 6th. This persistent atmospheric setup allowed for another day of hot and humid conditions across the nonattainment area. A mix of clouds and sun as well as a breezy southerly wind flow helped to limit ozone production over much of the area. However, in some northern nonattainment area locations, which had seen several days of elevated ozone levels, these conditions proved to be favorable for ozone formation as well as for the transport of not only previously polluted air but local/regional emissions. It was these conditions that likely led to an isolated exceedance at the Danbury, CT monitor on this day.

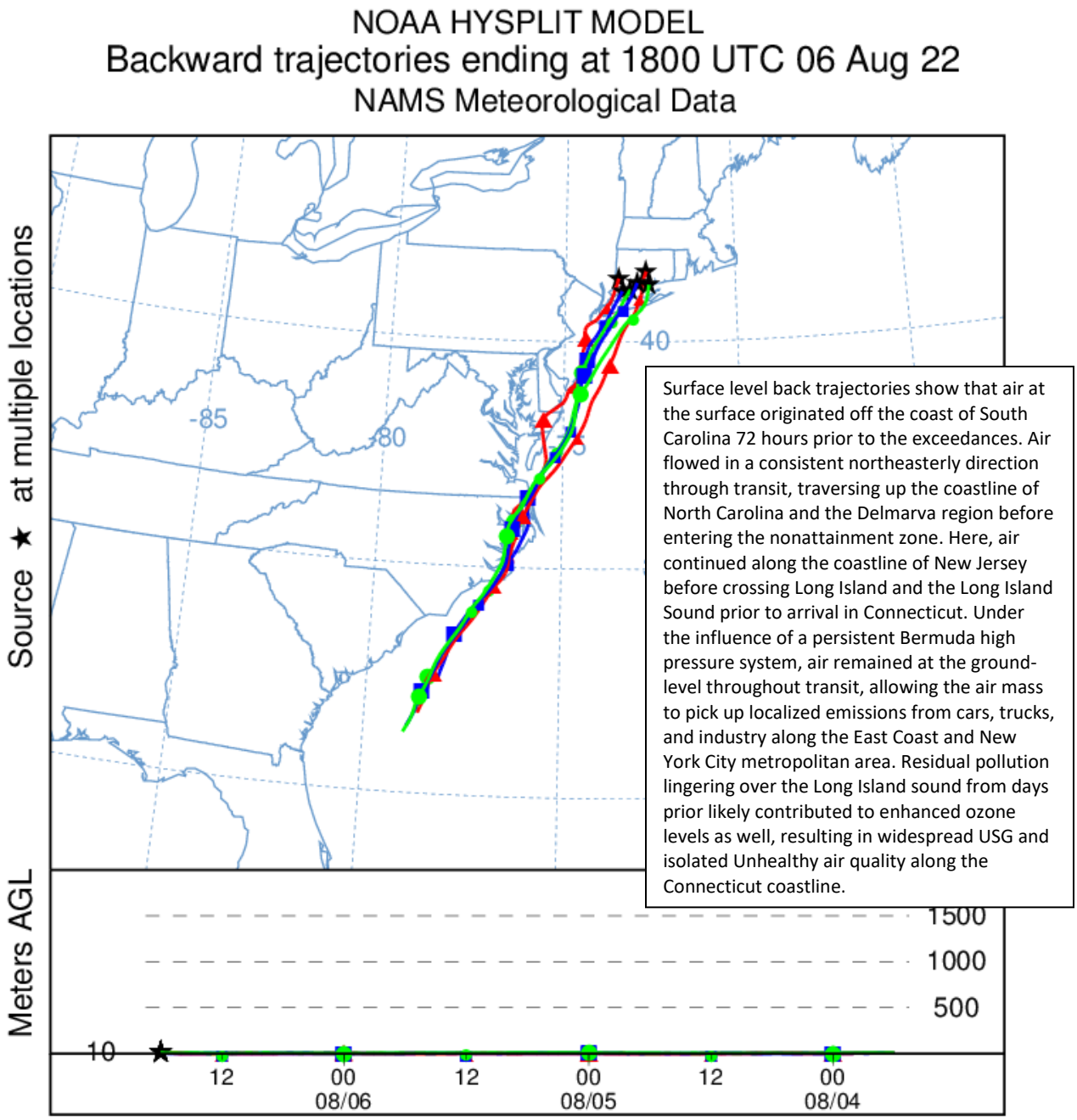
Where Did the Air Pollution that Caused Ozone Come From?

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)
CT	8/5	Madison-Beach Road	72
CT	8/5	Middletown-CVH-Shed	80
CT	8/5	New Haven	80
CT	8/5	Stratford	85
CT	8/5	Westport	88
CT	8/6	Danbury	73

Figure 3. 72-hour Back Trajectories for August 6, 2022 at 10 meters



Surface level back trajectories show that air at the surface originated off the coast of South Carolina 72 hours prior to the exceedances. Air flowed in a consistent northeasterly direction through transit, traversing up the coastline of North Carolina and the Delmarva region before entering the nonattainment zone. Here, air continued along the coastline of New Jersey before crossing Long Island and the Long Island Sound prior to arrival in Connecticut. Under the influence of a persistent Bermuda high pressure system, air remained at the ground-level throughout transit, allowing the air mass to pick up localized emissions from cars, trucks, and industry along the East Coast and New York City metropolitan area. Residual pollution lingering over the Long Island sound from days prior likely contributed to enhanced ozone levels as well, resulting in widespread USG and isolated Unhealthy air quality along the Connecticut coastline.

Figure 4. 72-hour Back Trajectories for August 6, 2022 at 500 meters

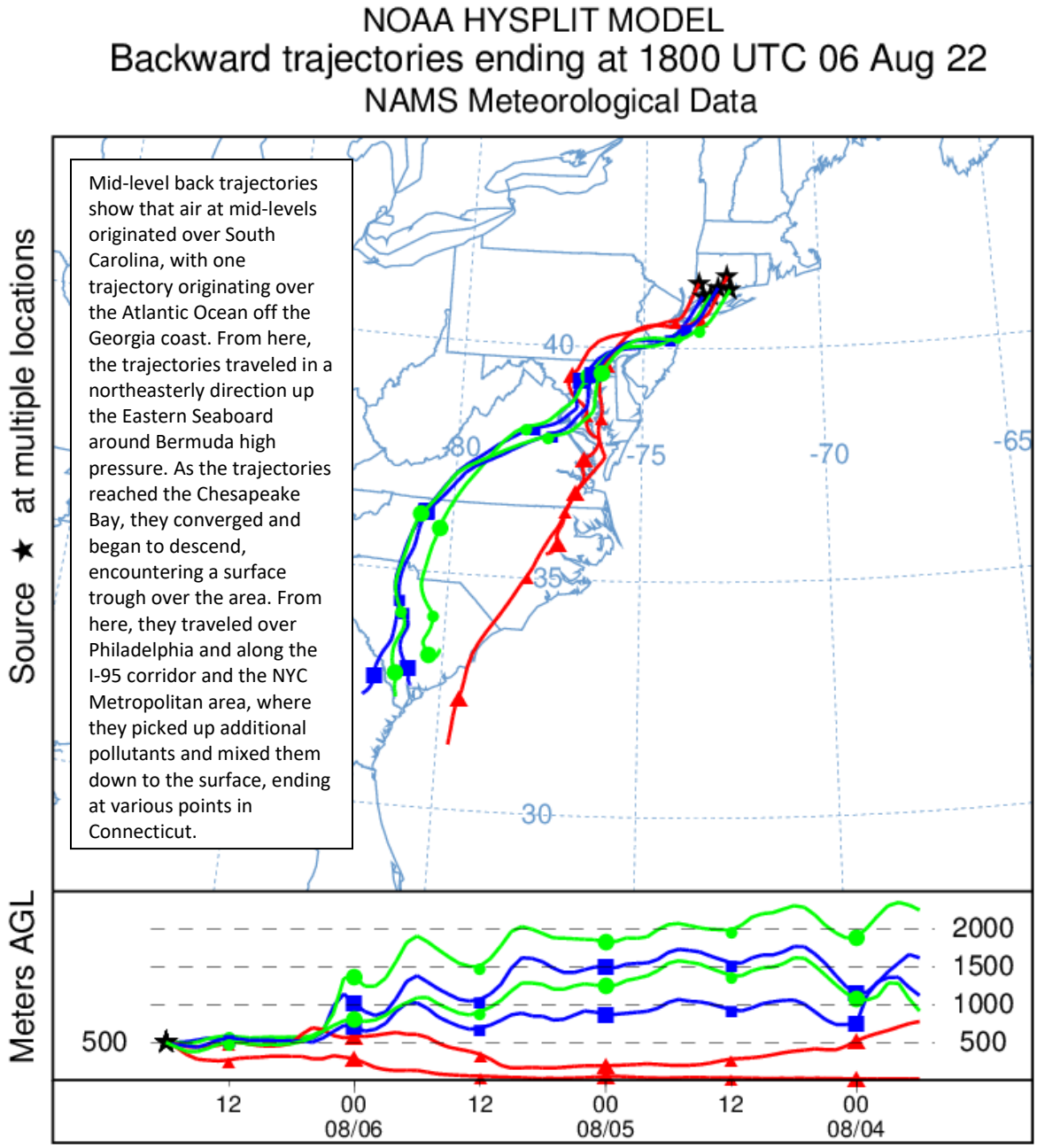


Figure 5. 72-hour Back Trajectories for August 6, 2022 at 1500 meters

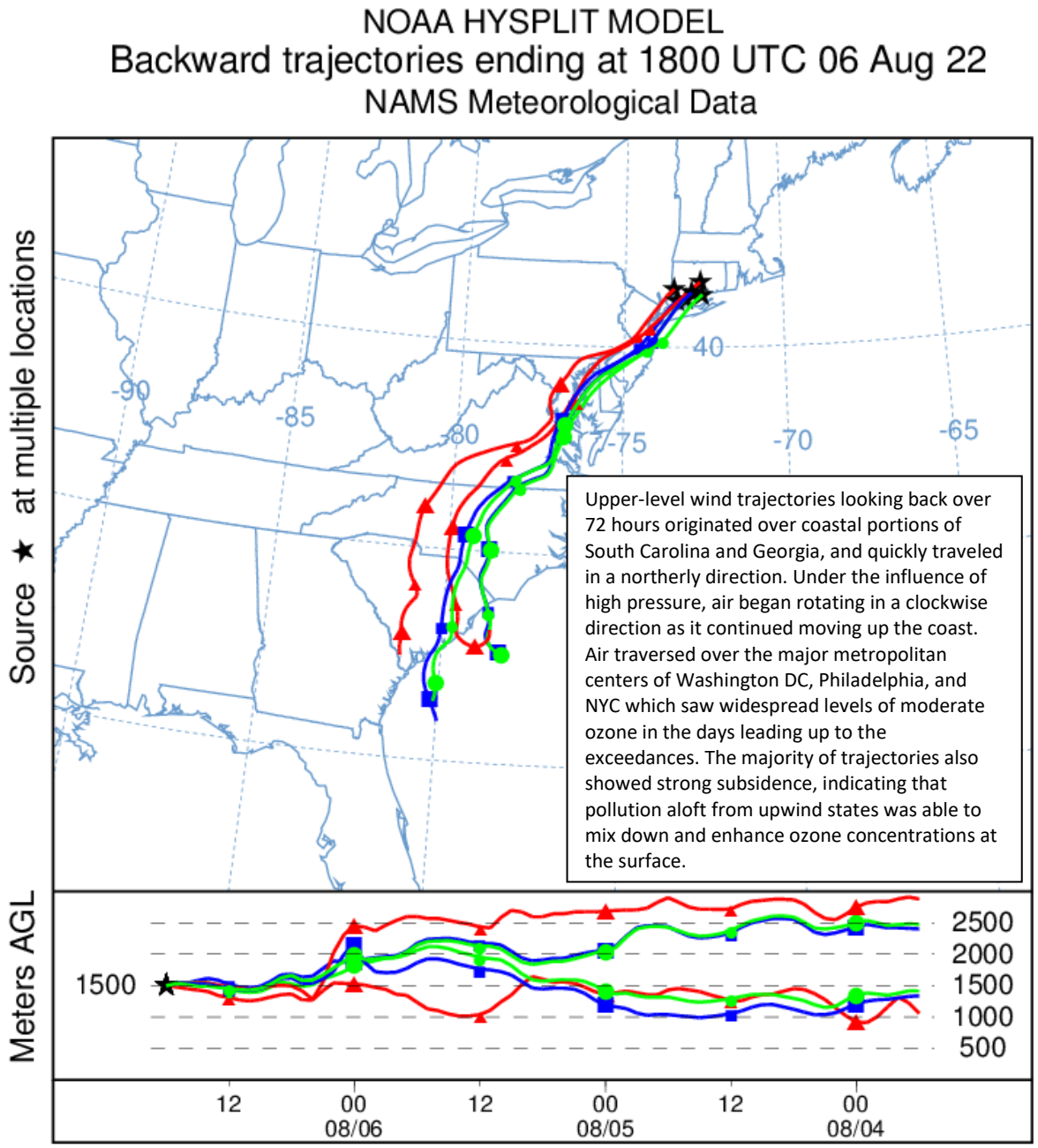


Figure 6. Air Quality Index for the United States on August 4, 2022

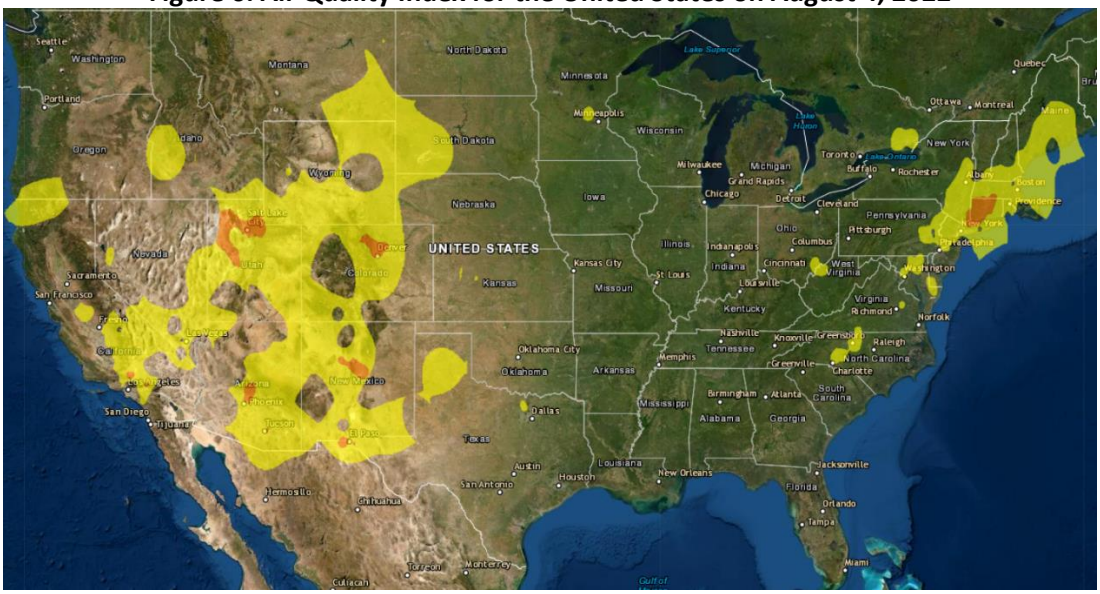
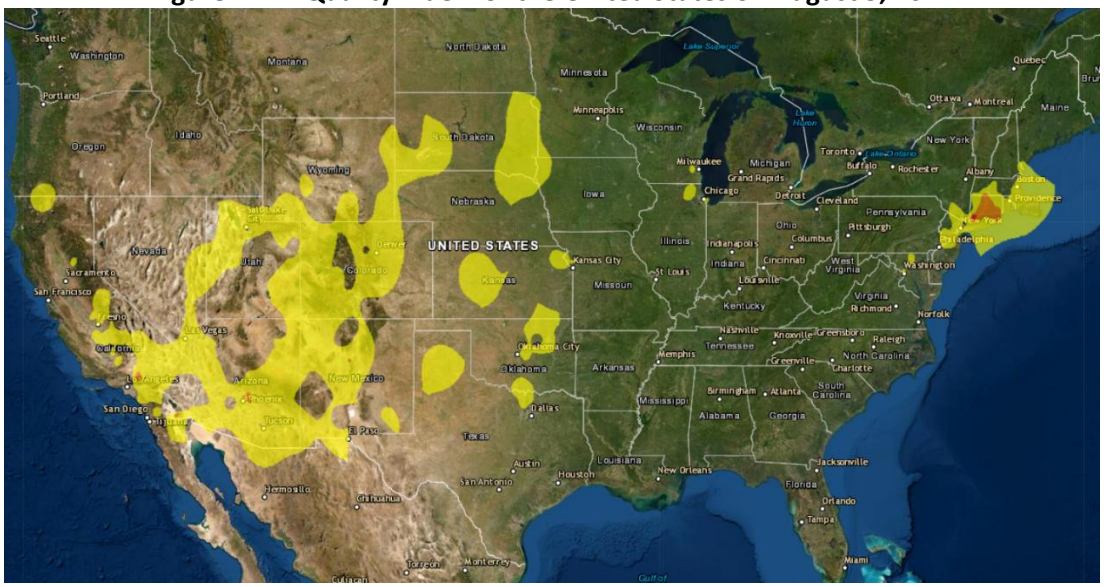


Figure 7. Air Quality Index for the United States on August 5, 2022



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 .