Ozone National Ambient Air Quality Standard Health Exceedances on August 19 & 20, 2022

Exceedance Locations and Levels

On Friday, August 19, 2022 and Saturday, August 20, 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 8/19/2022 and 8/20/2022

STATION	Daily Maximum 8-Hr Average (ppb) 8/19/2022	Daily Maximum 8-Hr Average (ppb) 8/20/2022
Ancora State Hospital	50	50
Bayonne	59	55
Brigantine	44	43
Camden Spruce St	55	53
Chester	60	56
Clarksboro	58	58
Colliers Mills	57	48
Columbia	56	55
Flemington	58	56
Leonia	59	58
Millville	48	50
Monmouth University	52	49
Newark Firehouse	54	57
Ramapo	55	57
Rider University	67	55
Rutgers University	59	54
Washington Crossing*	59	53
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 was one (1) exceedance of the ozone NAAQS on Friday, August 19, 2022 and three (3) exceedances of the ozone NAAQS on Saturday, August 20, 2022. See Table 2.

Table 2. Ozone Concentrations at Out-of-State Monitoring Stations in New Jersey's Ozone Nonattainment Areas on 8/19/2022 and 8/20/2022

STATE	STATION	Daily Maximum 8-Hr Average (ppb) 8/19/2022	Daily Maximum 8-Hr Average (ppb) 8/20/2022
CT	Danbury	61	69
CT	Greenwich	72	76
CT	Madison-Beach Road	56	62
CT	Middletown-CVH-Shed	60	64
CT	New Haven	59	66
CT	Stratford	66	72
CT	Westport	68	76
DE	BCSP (New Castle Co.)	41	44
DE	BELLFNT2 (New Castle Co.)	50	53
DE	KILLENS (Kent Co.)	45	49
DE	LEWES (Sussex Co.)	43	46
DE	LUMS 2 (New Castle Co.)	48	53
DE	MLK (New Castle Co.)	53	54
DE	SEAFORD (Sussex Co.)	46	50
MD	Fair Hill	48	53
NY	Babylon	54	56
NY	Bronx - IS52	57	52
NY	CCNY	58	55
NY	Flax Pond	61	64
NY	Fresh Kills	56	51
NY	Holtsville	54	59
NY	Pfizer Lab	59	57
NY	Queens	55	51
NY	Riverhead	56	58
NY	Rockland Cty	56	67
NY	White Plains	60	66
PA	BRIS (Bucks Co.)	70	54
PA	CHES (Delaware Co.)	56	53
PA	NEWG (Chester Co.)	52	57
PA	NORR (Montgomery Co.)	55	56
PA	LAB (Philadelphia Co.)	61	54
PA	NEA (Philadelphia Co.)	No Data	No Data
PA	NEW (Philadelphia Co.)	No Data	No Data
	TOTAL EXCEEDANCES	1	3

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 20, 2022 NAAQS = 70 ppb
Connecticut	22
Delaware	0
Maryland	1
New Jersey	8
New York	9
Pennsylvania	3

Figure 1. Ozone Air Quality Index for Friday, August 19, 2022

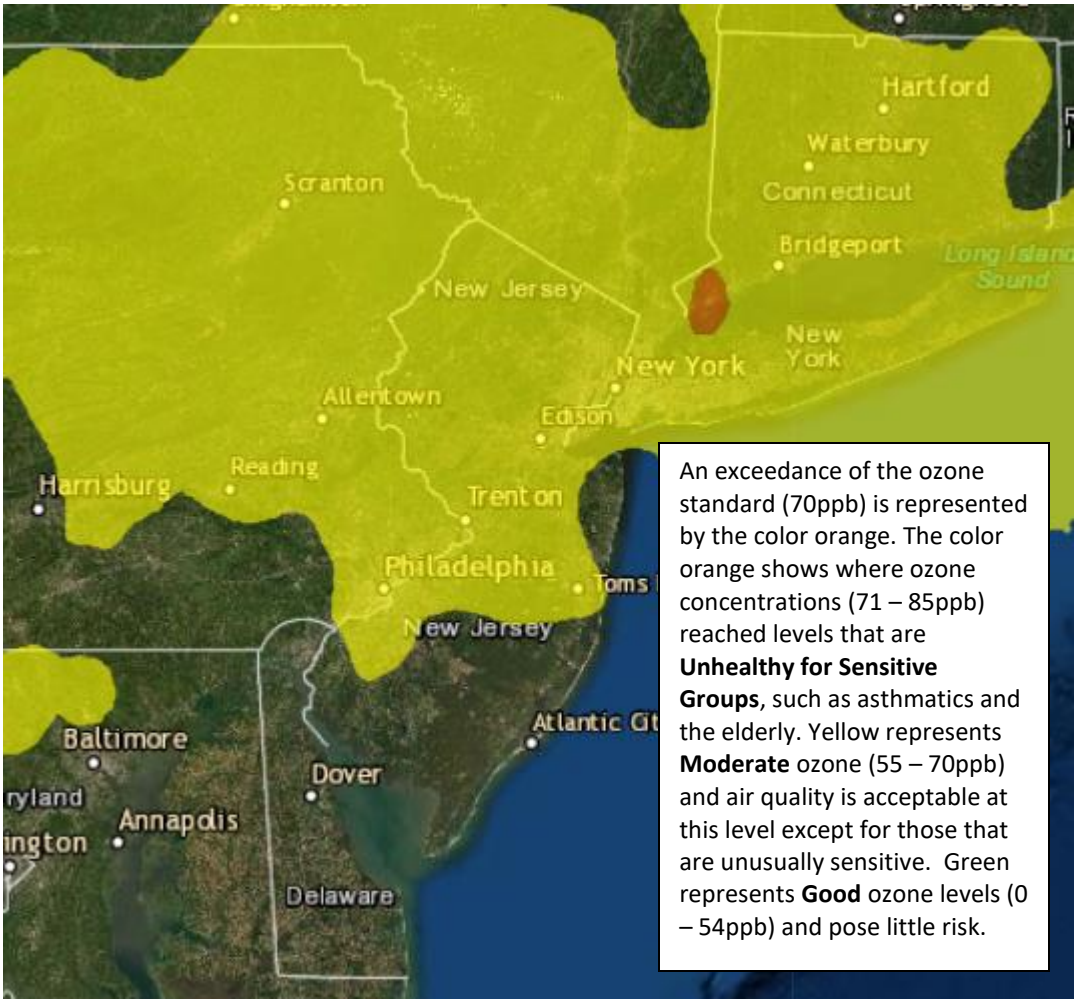
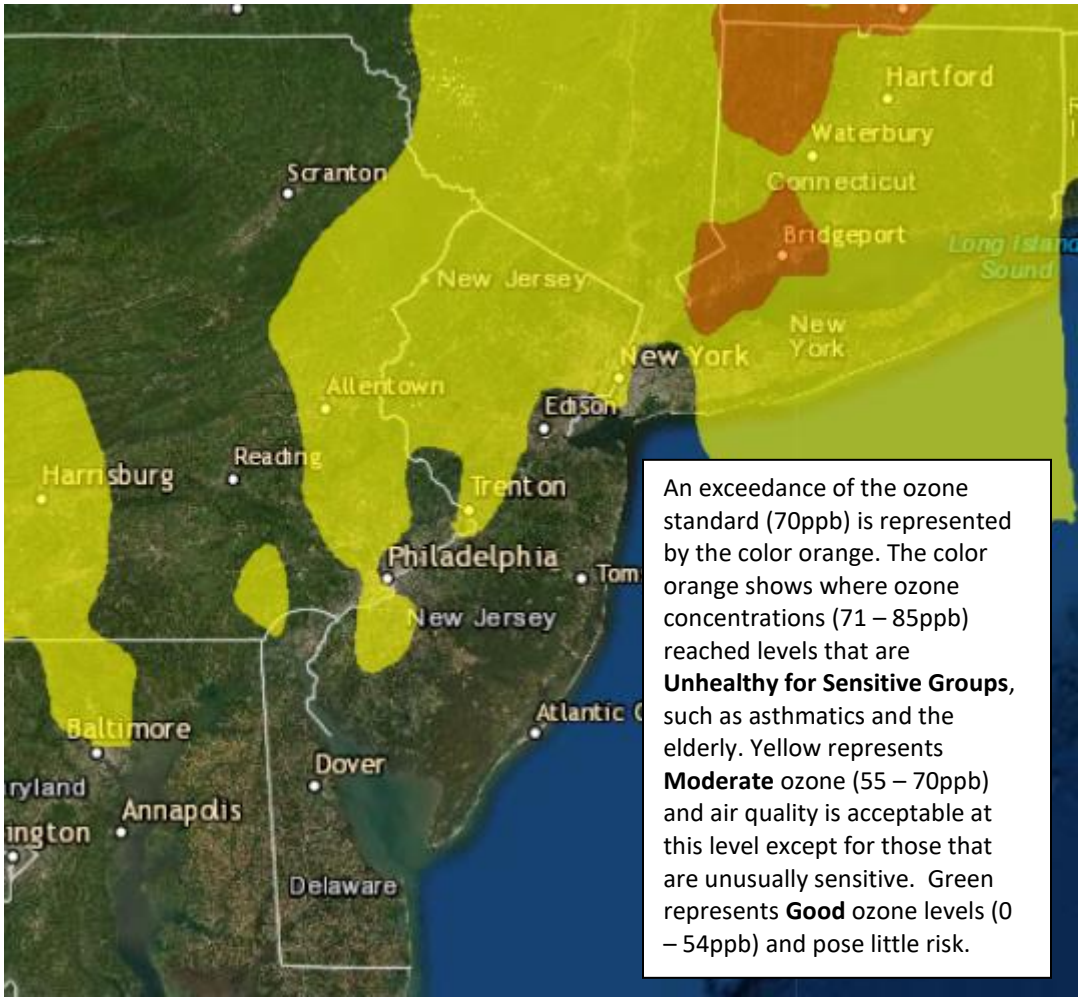


Figure 2. Ozone Air Quality Index for Saturday, August 20, 2022



Source: www.airnow.gov

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

Weather

High pressure was noted over the Mid-Atlantic region Friday August 19th as a surface trough developed mid-day, extending from coastal New England southwest over the NYC metropolitan area and New Jersey. This atmospheric setup allowed for mostly sunny skies with increasing fair weather cloud development throughout the day. Meanwhile, a general light southwesterly flow across the nonattainment area supported warm temperatures over the region. These weather conditions allowed for ozone levels to rise over portions of the northern nonattainment area on this day. Additionally, an afternoon seabreeze developed along the Connecticut coastline which likely further enhanced ozone levels in this location, leading to an isolated exceedance over southwestern Connecticut.

High pressure continued to dominate the region on Saturday August 20th as a frontal boundary off the Mid-Atlantic coast moved little throughout the day. This atmospheric setup not only allowed for partly sunny skies and persistent hot temperatures across the nonattainment area but, a shift in winds to a

more southerly direction. This wind shift allowed for any previously polluted air from the day prior to be transported north. Under conditions already favorable for ozone formation, this transport likely enhanced ozone levels over the northern nonattainment area allowing for another day of exceedances over southwestern Connecticut.

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	8/19, 8/20	Greenwich	72, 76
CT	8/20	Stratford	72
CT	8/20	Westport	76

Figure 3. 72-hour Back Trajectories for August 20, 2022 at 10 meters

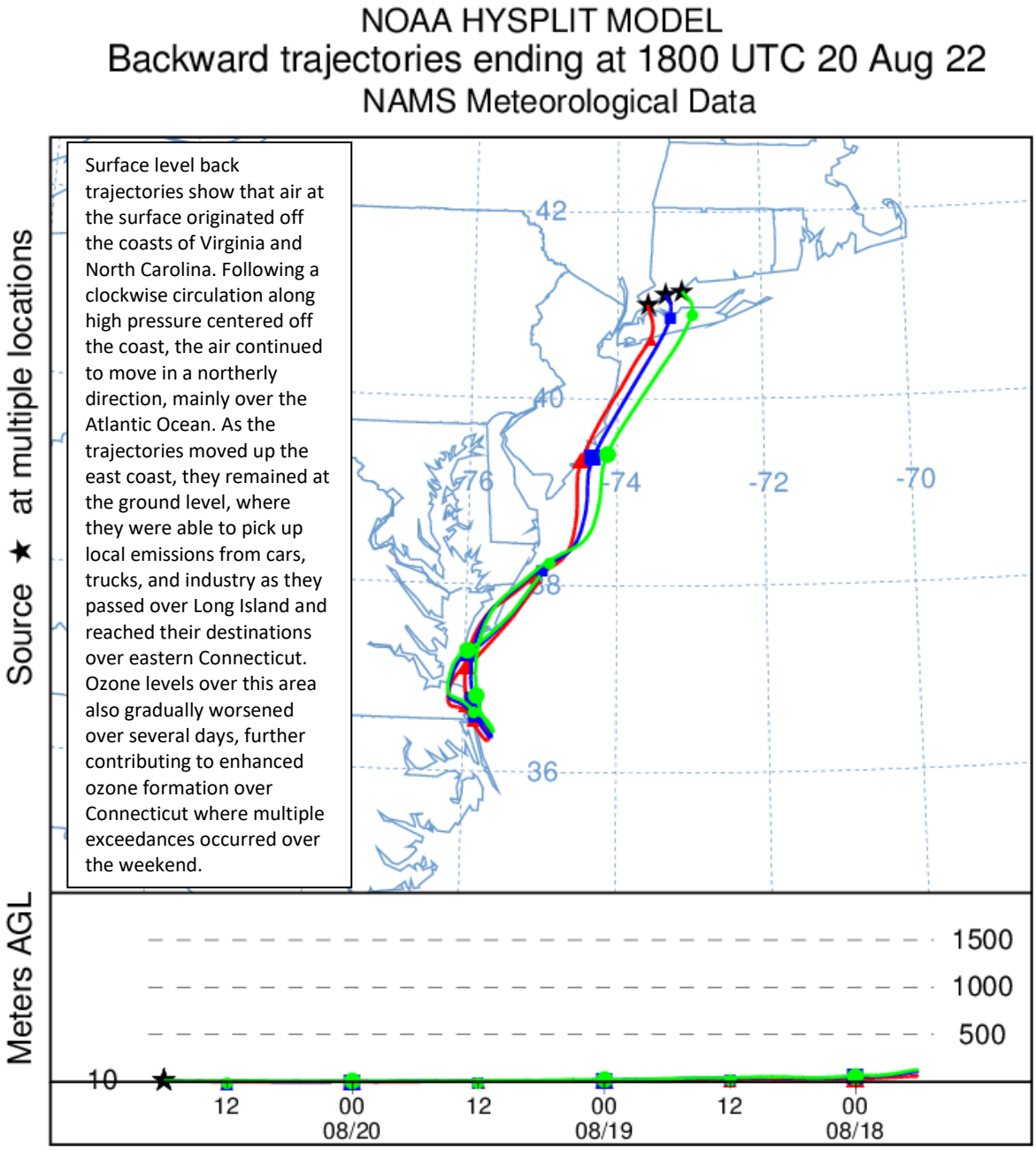
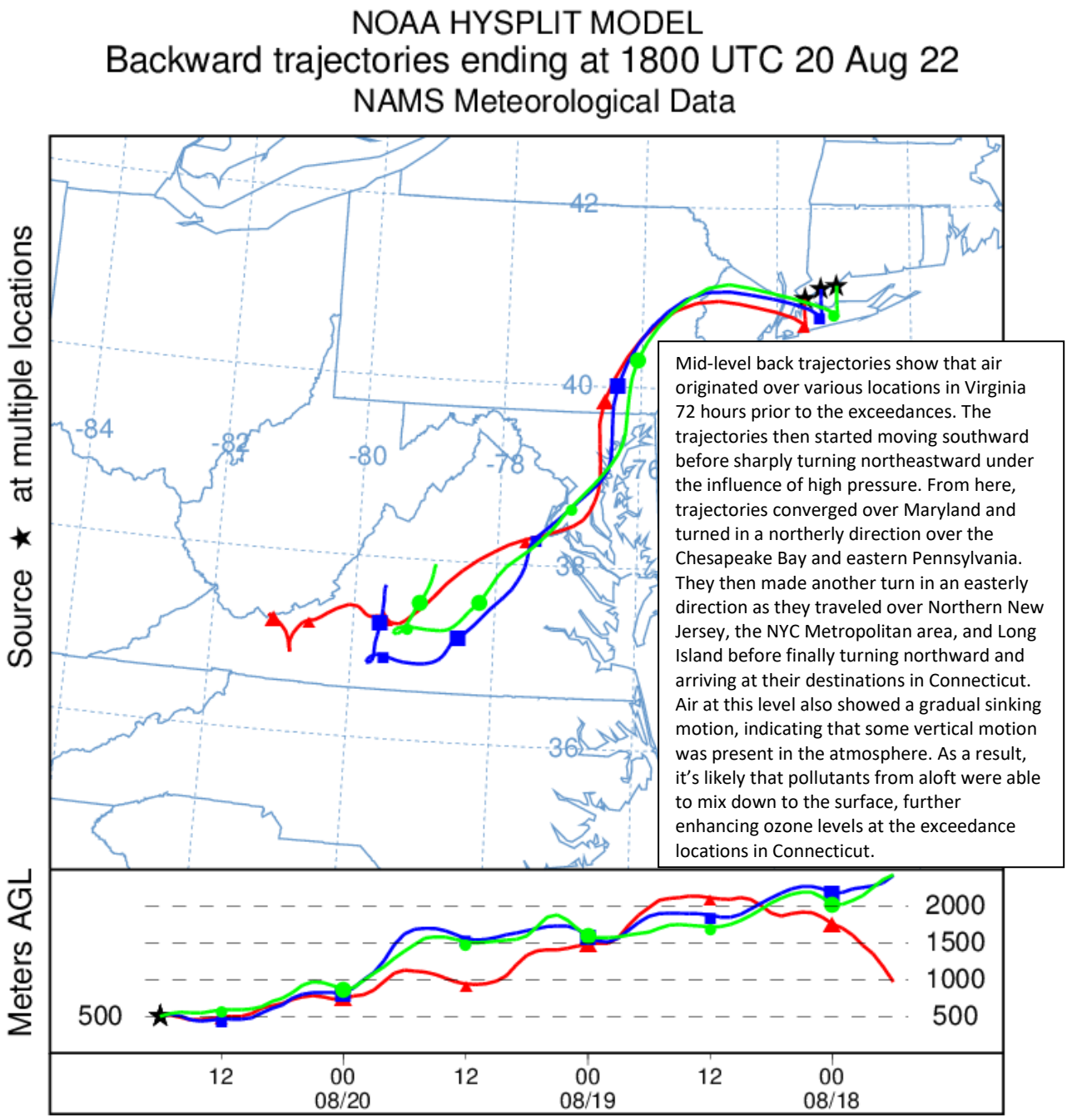


Figure 4. 72-hour Back Trajectories for August 20, 2022 at 500 meters



Mid-level back trajectories show that air originated over various locations in Virginia 72 hours prior to the exceedances. The trajectories then started moving southward before sharply turning northeastward under the influence of high pressure. From here, trajectories converged over Maryland and turned in a northerly direction over the Chesapeake Bay and eastern Pennsylvania. They then made another turn in an easterly direction as they traveled over Northern New Jersey, the NYC Metropolitan area, and Long Island before finally turning northward and arriving at their destinations in Connecticut. Air at this level also showed a gradual sinking motion, indicating that some vertical motion was present in the atmosphere. As a result, it's likely that pollutants from aloft were able to mix down to the surface, further enhancing ozone levels at the exceedance locations in Connecticut.

Figure 5. 72-hour Back Trajectories for August 20, 2022 at 1500 meters

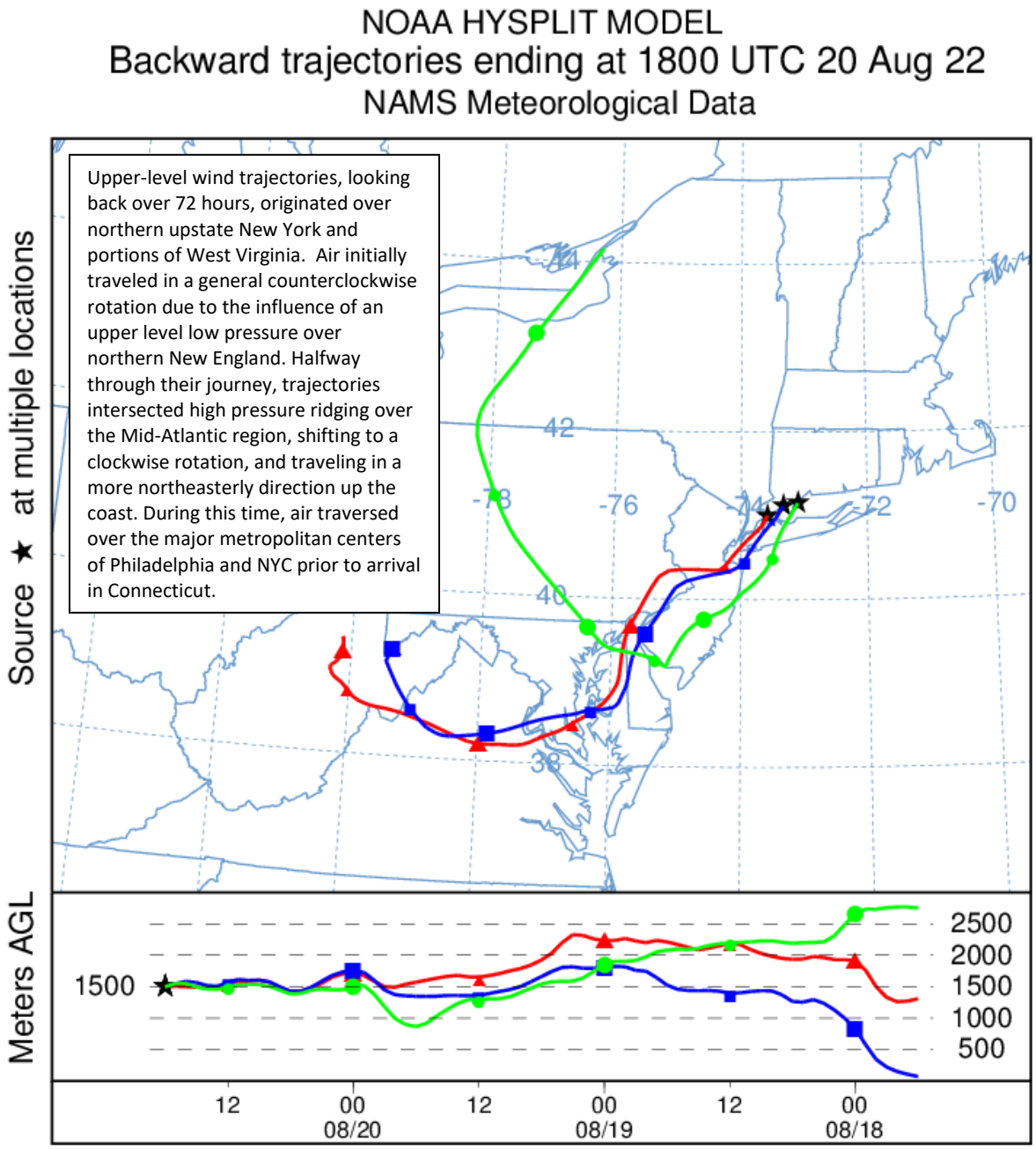


Figure 6. Air Quality Index for the United States on August 18, 2022

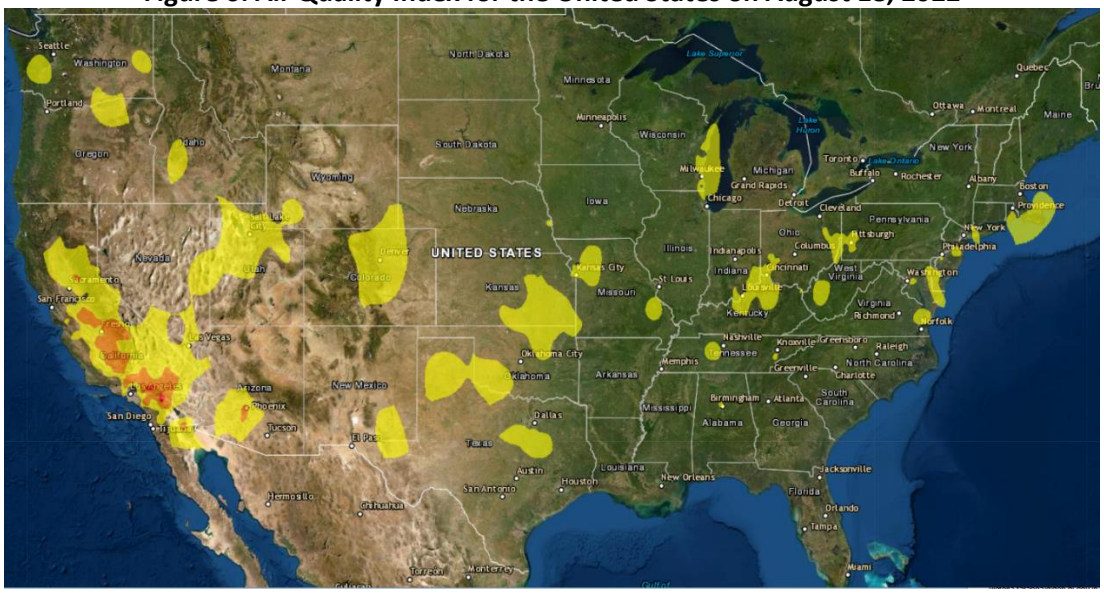
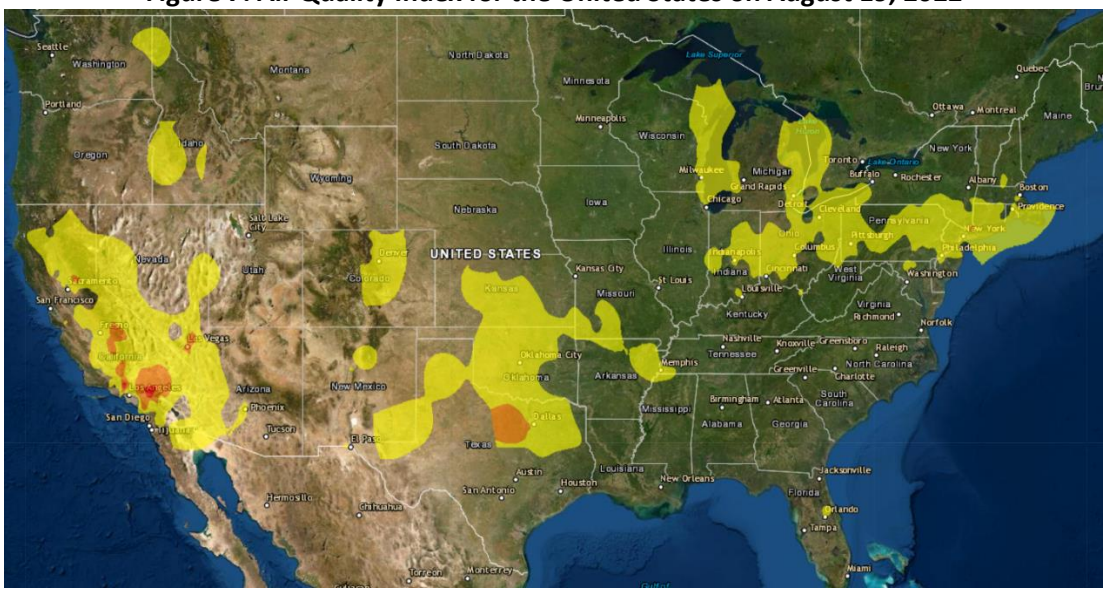


Figure 7. Air Quality Index for the United States on August 19, 2022



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