Ozone National Ambient Air Quality Standard Health Exceedances on June 26, 2019

Exceedance Locations and Levels

On Wednesday, June 26, 2019, there was one exceedance 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 8-hr Maximum Ozone Concentrations on June 26, 2019

STATION	Daily Maximum 8-Hr Average (ppb)
Ancora State Hospital	71
Bayonne	60
Brigantine	55
Camden Spruce St	61
Chester	61
Clarksboro	61
Colliers Mills	63
Columbia	56
Flemington	64
Leonia	61
Millville	68
Monmouth University	67
Newark Firehouse	63
Ramapo	55
Rider University	60
Rutgers University	63
Washington Crossing*	62
TOTAL EXCEEDANCES	1

*The Washington Crossing station is operated and maintained by EPA as part of the nationwide Clear Air Status and Trends Network (CASTNET).

From the out-of-state stations within New Jersey's ozone non-attainment areas, there were four exceedances of the ozone NAAQS. See Table 2.

Table 2. 8-hr Maximum Ozone Concentrations for Out-of-State Monitoring Stations in New Jersey's Ozone Non-Attainment Areas on June 26, 2019

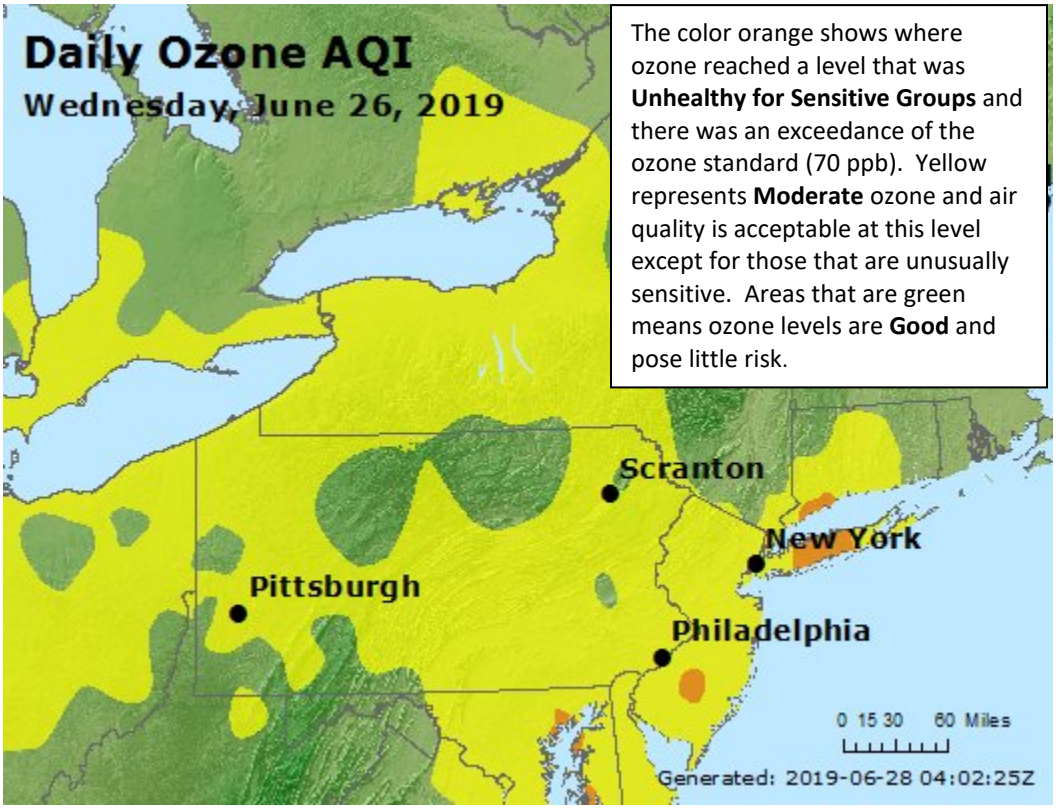
STATE	STATION	Daily Maximum 8-Hr Average (ppb)
CT	Danbury	55
CT	Greenwich	70
CT	Madison-Beach Road	63
CT	Middletown-CVH-Shed	58
CT	New Haven	63
CT	Stratford	71
CT	Westport	71
DE	BCSP (New Castle Co.)	64
DE	BELLFNT2 (New Castle Co.)	67
DE	KILLENS (Kent Co.)	62
DE	LEWES (Sussex Co.)	59
DE	LUMS 2 (New Castle Co.)	64
DE	MLK (New Castle Co.)	62
DE	SEAFORD (Sussex Co.)	68
MD	Fair Hill	67
NY	Babylon	73
NY	Bronx - IS52	62
NY	CCNY	57
NY	Fresh Kills	58
NY	Holtsville	71
NY	Pfizer Lab	58
NY	Queens	69
NY	Riverhead	67
NY	Rockland Cty	52
NY	White Plains	58
PA	BRIS (Bucks Co.)	64
PA	CHES (Delaware Co.)	63
PA	NEWG (Chester Co.)	66
PA	NORR (Montgomery Co.)	65
PA	LAB (Philadelphia Co.)	65
PA	NEA (Philadelphia Co.)	67
PA	NEW (Philadelphia Co.)	62
	TOTAL EXCEEDANCES	4

The number of days in 2019 on which exceedances of the ozone NAAQS were recorded for all the states within New Jersey's non-attainment area is summarized in Table 3. Figure 1 graphically shows the ozone concentrations on June 26, 2019.

Table 3. Number of Days Ozone NAAQS was Exceeded in NJ's Non-Attainment Areas in 2019

STATE	# of Days NAAQS was Exceeded January 1 – June 26, 2019 NAAQS = 70 ppb
Connecticut	2
Delaware	0
Maryland	0
New Jersey	2
New York	1
Pennsylvania	0

Figure 1. Ozone Air Quality Index for June 26, 2019



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

Long-range and localized transport, along with weather conditions related to a large area of high pressure moving into the region from the southwest led to exceedances in southern New Jersey, Long Island, New York, and coastal portions of western Connecticut on Wednesday, June 26, 2019.

As the high pressure moved in, it brought light winds out of the west along with abundant sunshine, which allowed temperatures to climb into the upper 80's and low 90's. The high-pressure system brought upper level air from the Great Lakes region and Ohio River Valley down to the surface by mid-day on Wednesday. The weak frontal passage that occurred late Tuesday night into Wednesday morning allowed for additional mixing of upper-level air down to the surface. The abundant sunshine, light westerly winds, and polluted air from upwind states were all conducive for the production of ground-level ozone.

Where Did the Air Pollution that Caused Ozone Come From?

Figures 2, 3, and 4 show the back trajectories starting at different wind heights for the monitored exceedances on June 26, 2019. The figures illustrate where the air came from during the 48 hours preceding the 8-hour ozone standard exceedances. Three monitoring stations with 8-hour ozone exceedances were used to run back trajectories. The two monitoring sites in Connecticut and the two monitoring sites on Long Island, New York with exceedances of the 8-hour ozone standard are close to each other. Therefore, only one monitoring site from each state was selected for back trajectory modeling. The selected sites and the maximum 8-hour ozone levels recorded are listed in Table 4 below.

Table 4. Monitoring Stations with an 8-hr Ozone Exceedance Selected to Run 48-hr Back Trajectories

STATE	STATION	Daily Maximum 8-Hr Average (ppb)
NJ	Ancora State Hospital	71
NY	Holtsville	71
CT	Westport	71

Back trajectories from June 26th show that air flow, at all levels of the atmosphere, was highly influenced by high pressure circulation entering from the southwest. Favorable weather conditions and the transport from upwind and local industry led to the exceedances in the nonattainment area. Surface-level backward trajectories (Figure 2) originated over the Southern Great Lakes Region in the Mid-west. Air at the surface flowing around the high pressure, transported emissions from cars, trucks, and industry. Trajectories at the mid-levels (Figure 3) also originated over the Southern Great Lakes Region West. The air mass then passed directly over southeastern Pennsylvania bringing pollution from cars, trucks, buses, industrial sources and power plants from the metropolitan Philadelphia area into southern New Jersey. The height portions of the trajectory modeling show that air, and possibly air pollution aloft, was brought to the surface by the sinking air of the high-pressure system. Upper level trajectories (Figure 4) originated in the upper Mid-west. This path at all levels led the trajectories over Chicagoland, Michigan, Ohio, and finally across the states of New York and Pennsylvania before reaching their destinations in New Jersey, Long Island, New York and coastal western Connecticut.

Figure 5 shows the national air quality observed on June 25th, the day prior to the localized air quality exceedances. Isolated areas of moderate air quality were observed in the upwind states of Illinois, Indiana, Michigan and Ohio.

Figure 2. 48-hour Back Trajectories for June 26, 2019 at 10 meters

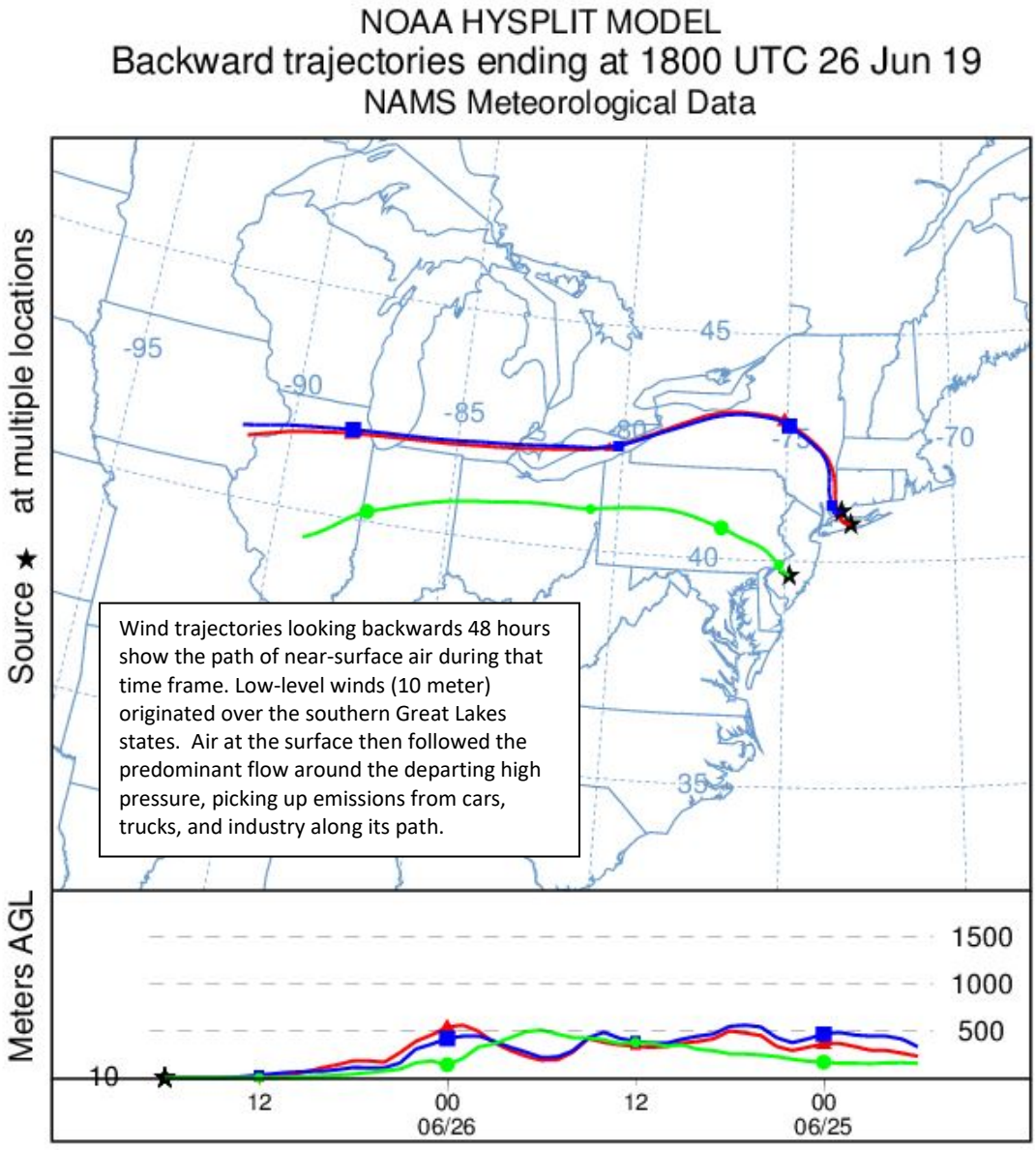


Figure 3. 48-hour Back Trajectories for June 26, 2019 at 500 meters

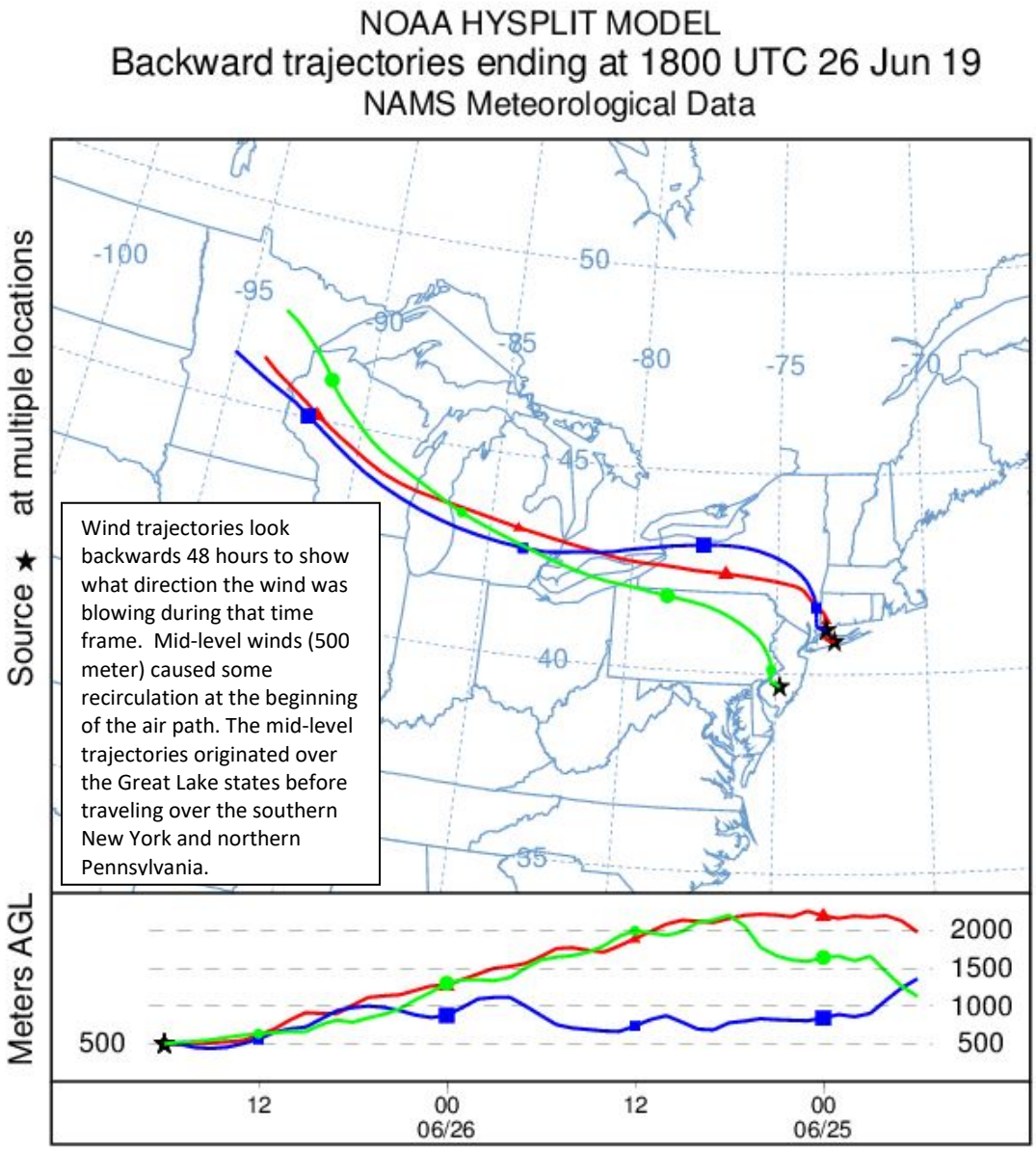


Figure 4. 48-hour Back Trajectories for June 26, 2019 at 1500 meters

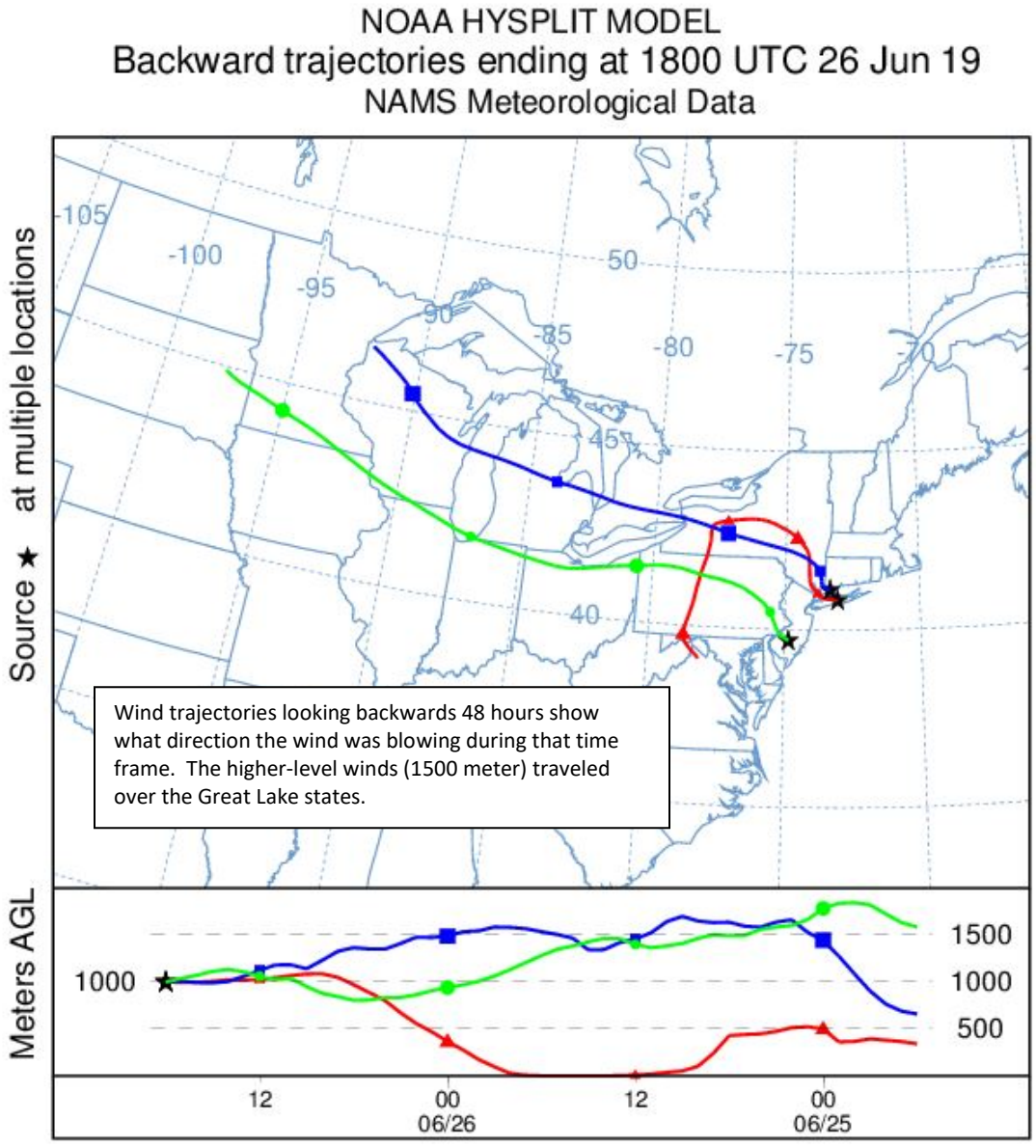
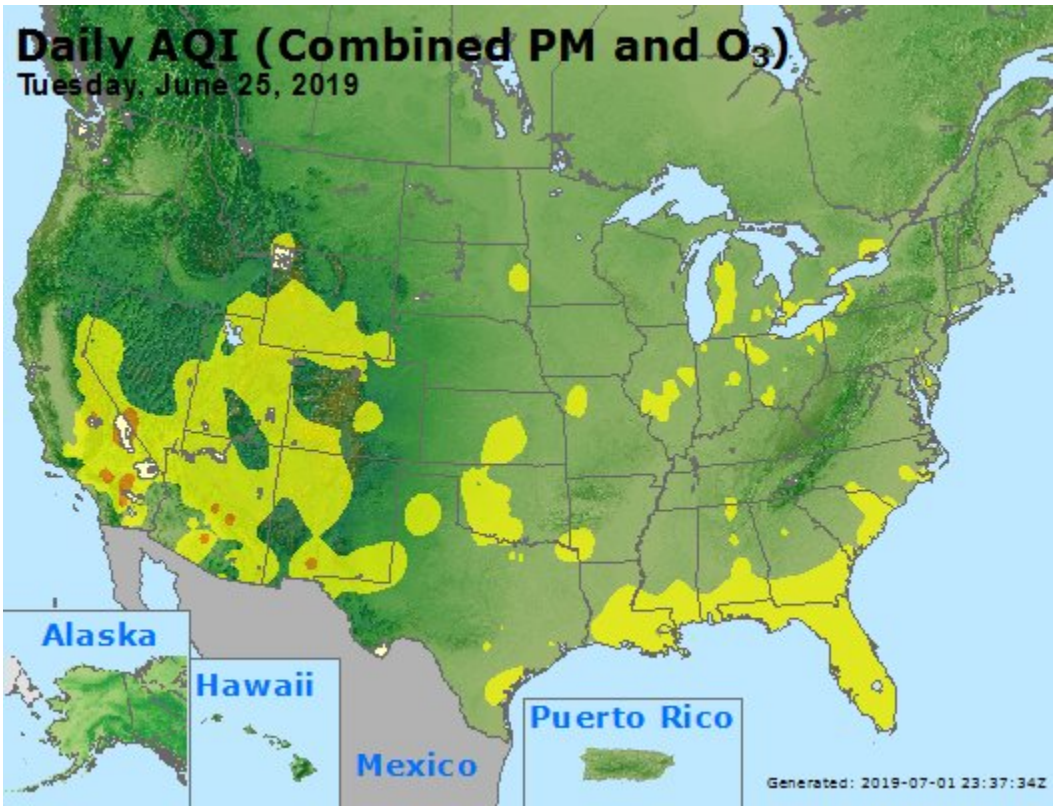


Figure 5. Ozone Air Quality Index for the United States on June 25, 2019



Source: www.airnow.gov

How is Ozone Created?

Ground-level ozone is an air pollutant known to cause a number of 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

The "What's Your Air Quality Today?" page at http://www.nj.gov/dep/cleanairnj/ tells you how to sign up to receive notifications and find out when your local air has reached unhealthy ozone levels.