Ozone National Ambient Air Quality Standard Health Exceedances on August 03, 2017

Exceedance Locations and Levels

On Thursday, August 3, 2017, there were no exceedances in New Jersey of the 8-hour average ozone National Ambient Air Quality Standard (NAAQS) of 70 ppb that became effective in December 2015.

No New Jersey station exceeded the 75 ppb ozone NAAQS of 2008, and none exceeded the 84 ppb ozone NAAQS of 1997. The highest 1-hour average ozone concentration recorded on August 3, 2017, in New Jersey was 80 ppb at the Ramapo station, which is below the 1-hour ozone NAAQS of 120 ppb.

The number of days in 2017 on which exceedances of the 70 ppb ozone NAAQS of 2015 were recorded in New Jersey remains at thirteen (13). By the 3rd of August in 2016, there were twenty-one (21) days on which ozone exceedances were measured in New Jersey (based on the 70 ppb NAAQS of 2015), and there were ten (10) days by this same date in 2015 (based on the former 75 ppb NAAQS of 2008) (See Table 1).

Table 1: New Jersey Exceedance Count

	# of Days NAAQS was Exceeded January 1 – August 3, 2017 NAAQS = 70 ppb	# of Days NAAQS was Exceeded January 1 – August 3, 2016 NAAQS = 70 ppb	# of Days NAAQS was Exceeded January 1 – August 3, 2015 NAAQS = 75 ppb
New Jersey	13	21	10

There is a group of monitoring stations in designated counties of 5 states, New York, Connecticut, Pennsylvania, Delaware and Maryland, that are included in New Jersey's ozone nonattainment areas. From this group of stations in the neighboring states, there were three (3) exceedances of the 70 ppb ozone NAAQS of 2015 recorded on Thursday, August 3, 2017 (See Table 2):

Table 2: Ozone NAAQS Exceedances at other Monitoring Stations in New Jersey's Ozone Nonattainment Areas on August 03, 2017

STATE	STATION	Daily Maximum 8-Hr Average (ppb)
CT	Danbury	75
NY	Rockland Cty	72
NY	White Plains	72

No station exceeded the 75 ppb ozone NAAQS of 2008, and none exceeded the 84 ppb ozone NAAQS of 1997. The highest 1-hour average ozone concentration recorded was 95 ppb at the Rockland County station in New York, which is below the 1-hour ozone NAAQS of 120 ppb.

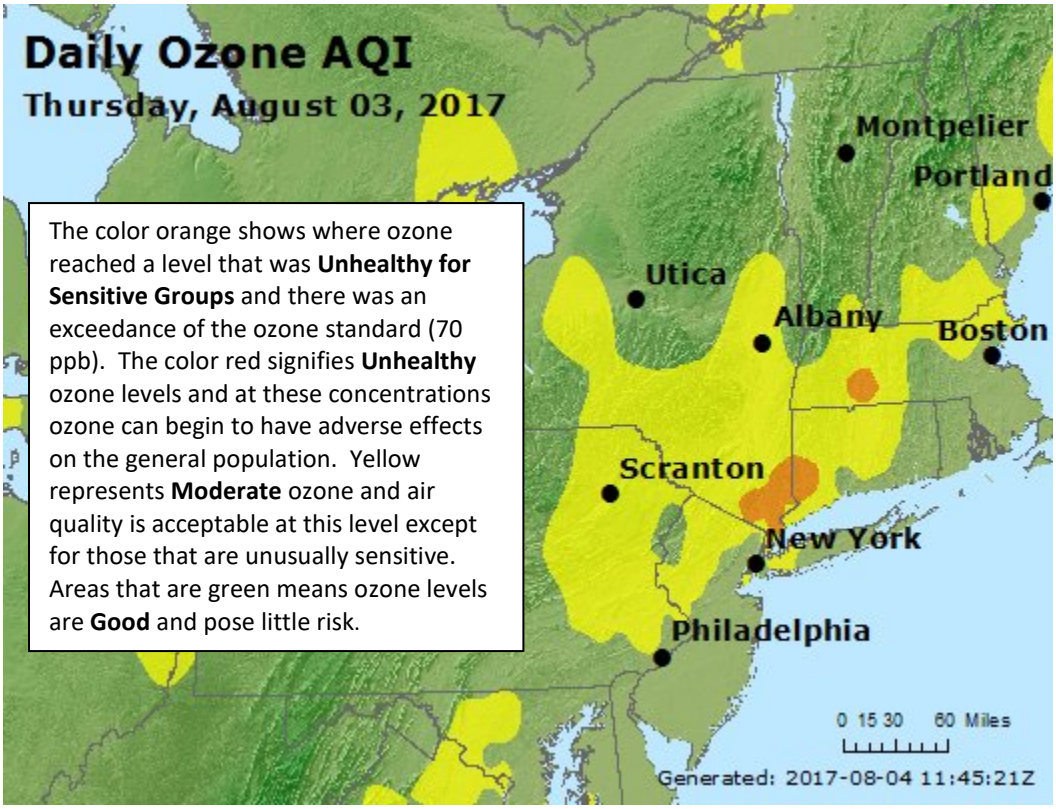
Thursday marks the 18th day in 2017 on which exceedances of the 70 ppb ozone NAAQS of 2015 were recorded for Connecticut, and the 14th day for New York. The number of days for Pennsylvania remains

at twelve (12), and seven (7) days each for Maryland and Delaware (See Table 3). Figure 1 shows graphically the region's ozone concentrations on August 03, 2017.

Table 3: Number of Ozone Exceedances by State

STATE	# of Days NAAQS was Exceeded January 1 – August 3, 2017 NAAQS = 70 ppb
Connecticut	18
Delaware	7
Maryland	7
New Jersey	13
New York	14
Pennsylvania	12

Figure 1. Ozone Air Quality Index for August 03, 2017



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 weak high pressure system remained the primary weather feature over the Northeast and Mid-Atlantic on Thursday. A surface trough developed late morning and extended from the Hudson Valley southward through New Jersey into the Mid-Atlantic states. This trough acted as a boundary which helped dictate wind direction throughout the region as well as provide an area of instability and vertical motion within the surface boundary layer. As a result of this instability, scattered afternoon and evening thunderstorms developed throughout the Northeast.

Weather observations from across the region showed temperatures reaching the mid-80s. Exceedance locations experienced periods of morning fog then partly sunny skies for much of the day. Looking closely, western Connecticut saw more afternoon sun compared to the lower Hudson Valley which may have contributed to the Danbury, CT monitor recording the highest exceedance value. Finally, given the location of the above-mentioned surface trough, winds in the exceedance locations were light and generally from the southerly direction throughout the day.

The weather pattern has been fairly consistent in the days leading up to this particular event. With multiple days in a row of warm temperatures, sunny skies and afternoon/evening thunderstorms, locally generated pollution throughout the region has had the opportunity to mix within the surface boundary layer. During the summer, this convective pattern is known to enhance locally generated ozone concentrations at the surface, leading to an exceedance.

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 August 03, 2017. The figures illustrate where the winds came from during the 48 hours preceding the high ozone event. Three (3) monitoring stations with 8-hr ozone exceedance were chosen to run back trajectories. The selected sites and the maximum 8-hr ozone levels recorded are listed in Table 4 below:

Table 4. Monitoring Stations with 8-hr Ozone Exceedances that Were Selected to Run 48-hr Back Trajectories

STATE	STATION	Daily Maximum 8-Hr Average (ppb)
CT	Danbury	75
NY	Rockland Cty	72
NY	White Plains	72

Surface level back trajectories (Figure 2) show that air at the surface, which affected the exceedance monitors, originated along the Mid-Atlantic coast. This air then traveled northward along coastal New Jersey, through the New York City metropolitan area, and over portions of Long Island to its destination. Air remained at the surface for the duration of its path, collecting emission from cars, trucks and industry. Meanwhile, mid-level back trajectories (Figure 3) originated off the Mid-Atlantic coast before traveling northward through the northern New Jersey and New York City metropolitan area through arrival. This air originated close to the surface and in the presence of lingering showers and

thunderstorms off the coast of New Jersey late Wednesday, it gradually ascended to the mid-levels prior to arrival at the affected monitors on Thursday afternoon. Finally, upper-level back trajectories (Figure 4) originated over central Pennsylvania in lower levels of the atmosphere. As this air traveled east, it quickly ascended to the 1500m height late Wednesday due to a squall line of thunderstorms before continuing eastward through the northern New Jersey and New York City metropolitan area to its endpoint.

Figure 2. 48-hour Back Trajectories for August 03, 2017 at 10 meters

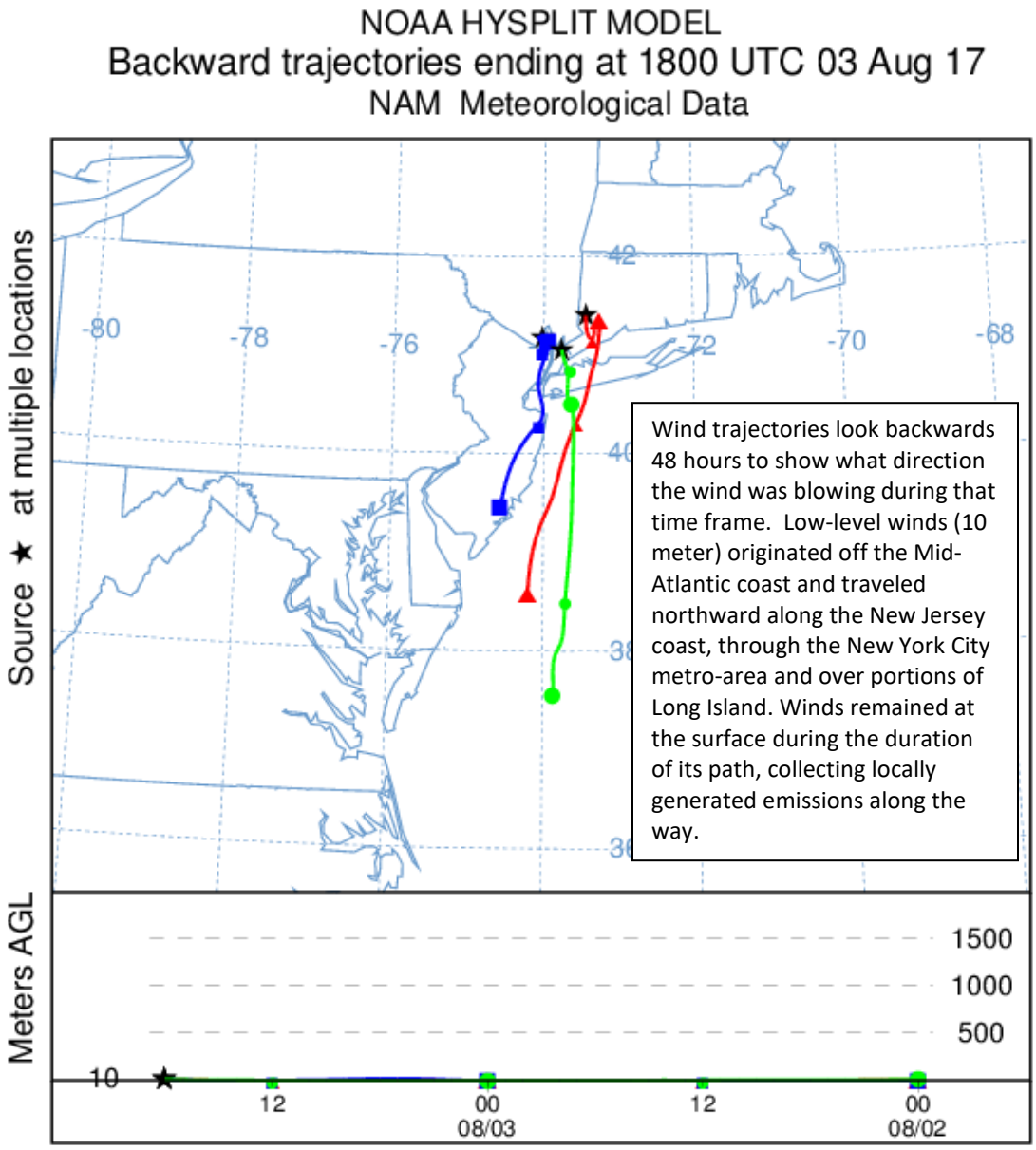


Figure 3. 48-hour Back Trajectories for August 03, 2017 at 500 meters

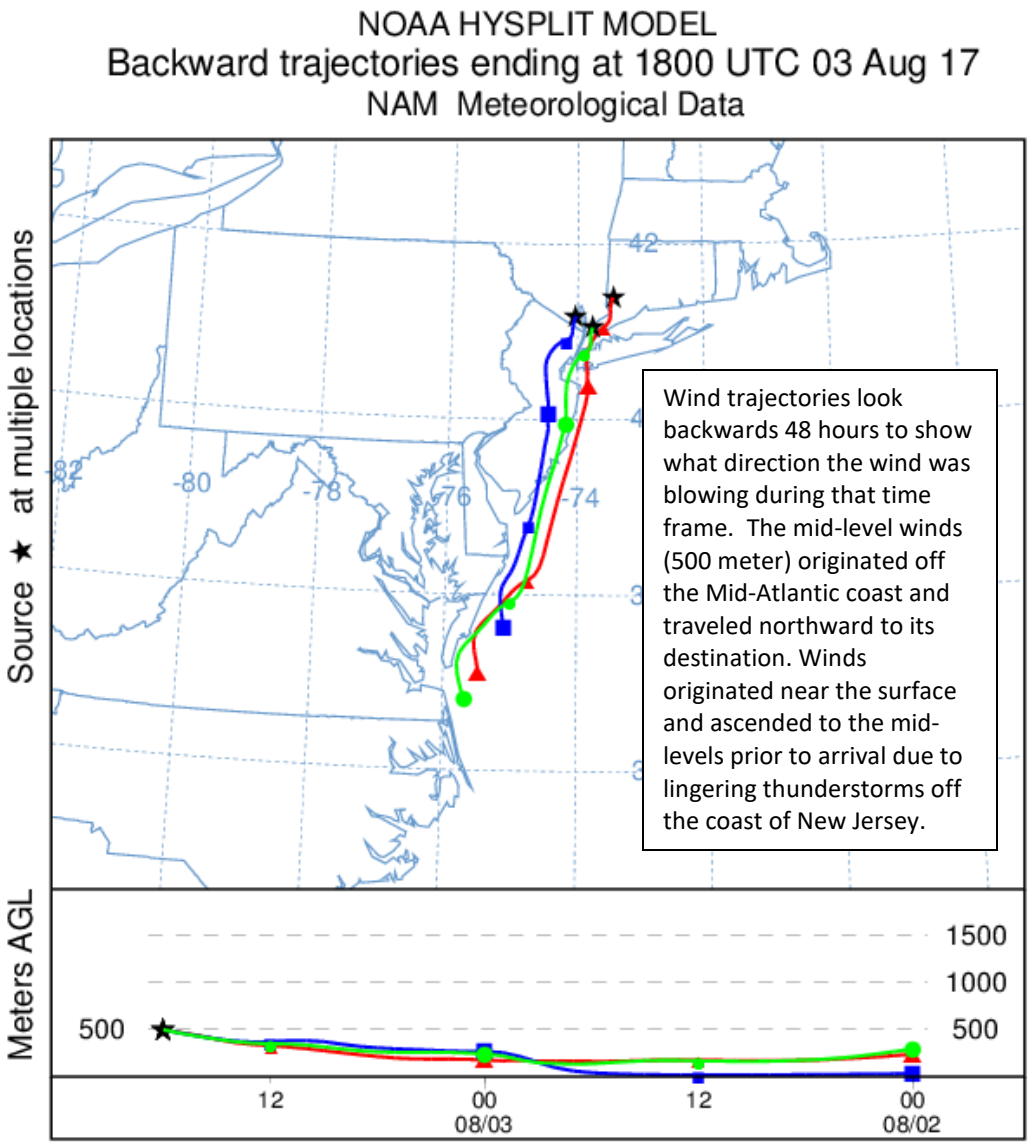
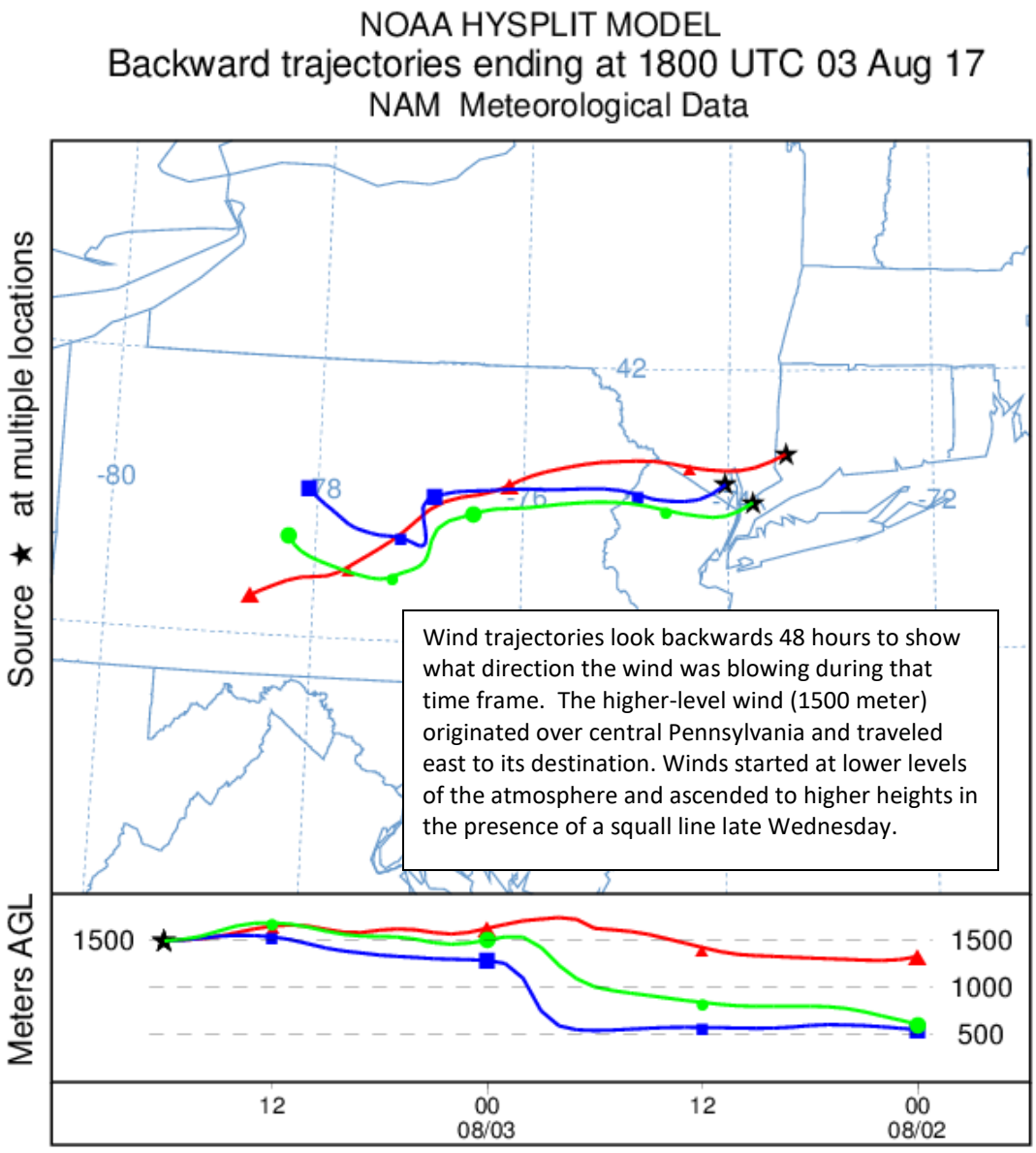


Figure 4. 48-hour Back Trajectories for August 03, 2017 at 1500 meters



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.