Ozone National Ambient Air Quality Standard Health Exceedances on June 22, 2017

Exceedance Locations and Levels

On Thursday, June 22, 2017, there were five (5) 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. (See Table 1):

Table 1: Ozone NAAQS Exceedances in New Jersey on June 22, 2017

STATION	Daily Maximum 8-Hr Average (ppb)
Camden Spruce St	76
Leonia	71
Rider University	76
Rutgers University	76
Washington Crossing*	71

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

Three (3) New Jersey stations exceeded the 75 ppb ozone NAAQS of 2008, but none exceeded the 84 ppb ozone NAAQS of 1997. The highest 1-hour average ozone concentration recorded on June 22, 2017, in New Jersey was 89 ppb at Rider University, which is below the 1-hour ozone NAAQS of 120 ppb.

Thursday marks the 8th day in 2017 on which exceedances of the 70 ppb ozone NAAQS of 2015 were recorded in New Jersey. By the 22nd of June in 2016, there were ten (10) days on which ozone exceedances were measured in New Jersey (based on the 70 ppb NAAQS of 2015), and there were five (5) days by this same date in 2015 (based on the former 75 ppb NAAQS of 2008). (See Table 2):

Table 2: New Jersey Exceedance Count

	# of Days NAAQS was Exceeded January 1 - June 22, 2017 NAAQS = 70 ppb	# of Days NAAQS was Exceeded January 1 - June 22, 2016 NAAQS = 70 ppb	# of Days NAAQS was Exceeded January 1 - June 22, 2015 NAAQS = 75 ppb
New Jersey	8	10	5

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 nine (9) exceedances of the 70 ppb ozone NAAQS of 2015 recorded on Thursday, June 22, 2017 (See Table 3):

Table 3: Ozone NAAQS Exceedances at other Monitoring Stations in New Jersey's Ozone Nonattainment Areas on June 22, 2017

STATE	STATION	Daily Maximum 8-Hr Average (ppb)
CT	Danbury	72
DE	BCSP (New Castle Co.)	71
DE	BELLFNT2 (New Castle Co.)	71
DE	MLK (New Castle Co.)	71
MD	Fair Hill	71
PA	BRIS (Bucks Co.)	81
PA	NORR (Montgomery Co.)	74
PA	NEA (Philadelphia Co.)	80
PA	NEW (Philadelphia Co.)	76

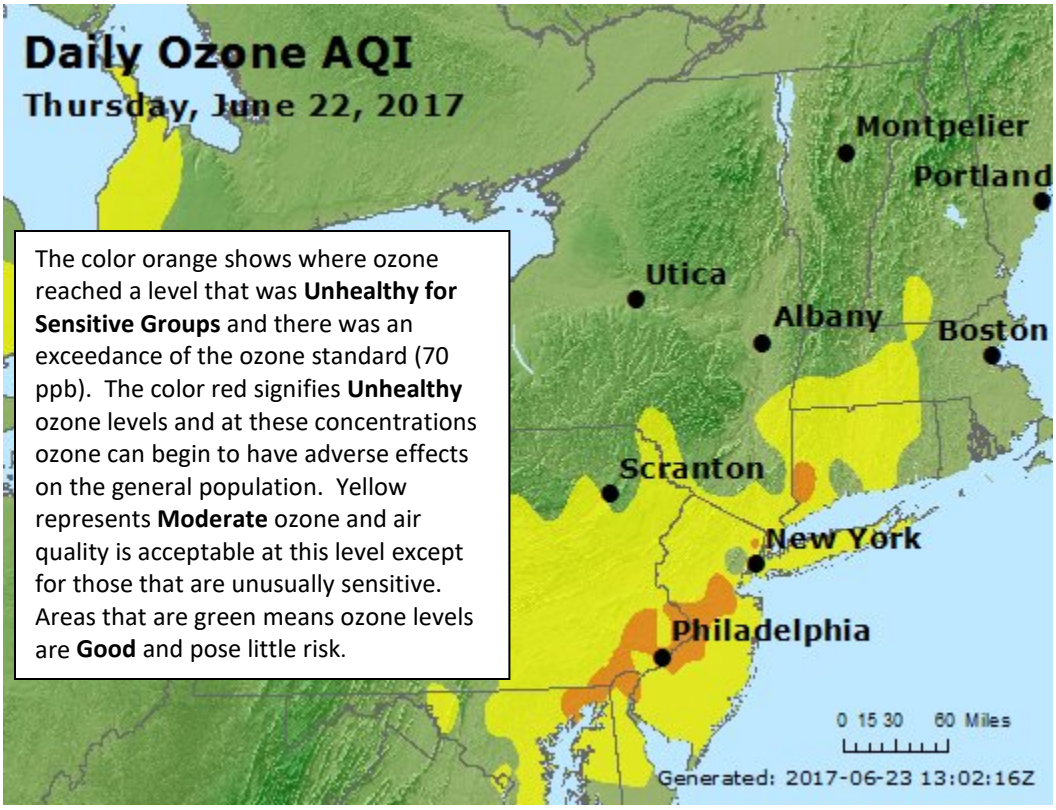
Three (3) stations exceeded the 75 ppb ozone NAAQS of 2008, but none exceeded the 84 ppb ozone NAAQS of 1997. The highest 1-hour average ozone concentration recorded was 91 ppb at the Bristol station in Pennsylvania, which is below the 1-hour ozone NAAQS of 120 ppb.

Thursday marks the 9th day in 2017 on which exceedances of the 70 ppb ozone NAAQS of 2015 were recorded in Connecticut, the 7th day for Maryland and Pennsylvania, and the 5th day for Delaware. The number of days for New York remains at seven (7) (See Table 4). Figure 1 shows graphically the regions ozone concentrations on June 22, 2017.

Table 4: Number of Ozone Exceedances by State

STATE	# of Days NAAQS was Exceeded January 1 - June 22, 2017 NAAQS = 70 ppb
Connecticut	9
Delaware	5
Maryland	7
New Jersey	8
New York	7
Pennsylvania	7

Figure 1. Ozone Air Quality Index for June 22, 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

Meteorological data from across the region showed mostly sunny skies, maximum temperatures in the mid to upper 80s, with light recirculating winds that shifted to the southwest later in the day. A frontal boundary was draped across the state and slowly lifted northward throughout the day. Due to the slow movement of this boundary, limited atmospheric ventilation and recirculating winds caused high ozone levels during the mid-day hours to increase rapidly in central portions of the state, and surrounding northeast and southwest urban locations. All of these conditions noted above are features commonly seen with an ozone exceedance related to persistence and recirculation.

Where Did the Air Pollution that Caused Ozone Come From?

Figures 2, 3, and 4 show the back trajectories at different wind heights for the monitored exceedances on June 22, 2017. The figures illustrate where the winds came from during the 48 hours preceding the high ozone event. Ten (10) monitoring stations with 8-hr ozone exceedances were chosen to run back trajectories. The selected sites and the maximum 8-hr ozone levels recorded are listed in Table 5 below:

Table 5. Monitoring Stations with 8-hr Ozone Exceedances that Were Selected to Run 48-hr Back Trajectories

Agency	Site Name	Maximum 8-hr Ozone Conc. (ppb)
CT	Danbury	72
DE	BELLFNT2	71
MD	Fair Hill	71
NJ	Camden Spruce St	76
NJ	Leonia	71
NJ	Rider University	76
NJ	Rutgers	76
PA	BRIS	81
PA	NEA	80
PA	NEW	76

Surface level back trajectories (Figure 2) show elevated ozone was brought down to the surface and traveled through industrialized areas of West Virginia and Baltimore, collecting locally generated emissions from cars, trucks, and industry. Trajectories show that winds at the surface slowly recirculated over Wilmington, Philadelphia, and the I-95 corridor before reaching their endpoints. Affected monitors in northern locations traveled through eastern Pennsylvania before recirculating in the New York City vicinity. Mid-level trajectories (Figure 3) originated in the Great Lakes and Ohio River Valley and traveled east through multiple states including Ohio and Pennsylvania. Similar to the pathway of the surface winds, the mid-level winds also recirculated around urban locations but remained aloft. Upper level winds (Figure 4) originated in the Mid-West and traveled directly eastward through four states before reaching their destinations. In both the mid and upper level trajectories, the air tended to remain aloft leading to the determination that most of the surface ozone was due to locally generated emissions, persistence from the day before, and recirculation at the surface. Figures 5 and 5a show graphically the ozone concentrations throughout the region on the days prior to the June 22, 2017 exceedance.

Figure 2. 48-hour Back Trajectories for June 22, 2017 at 10 meters

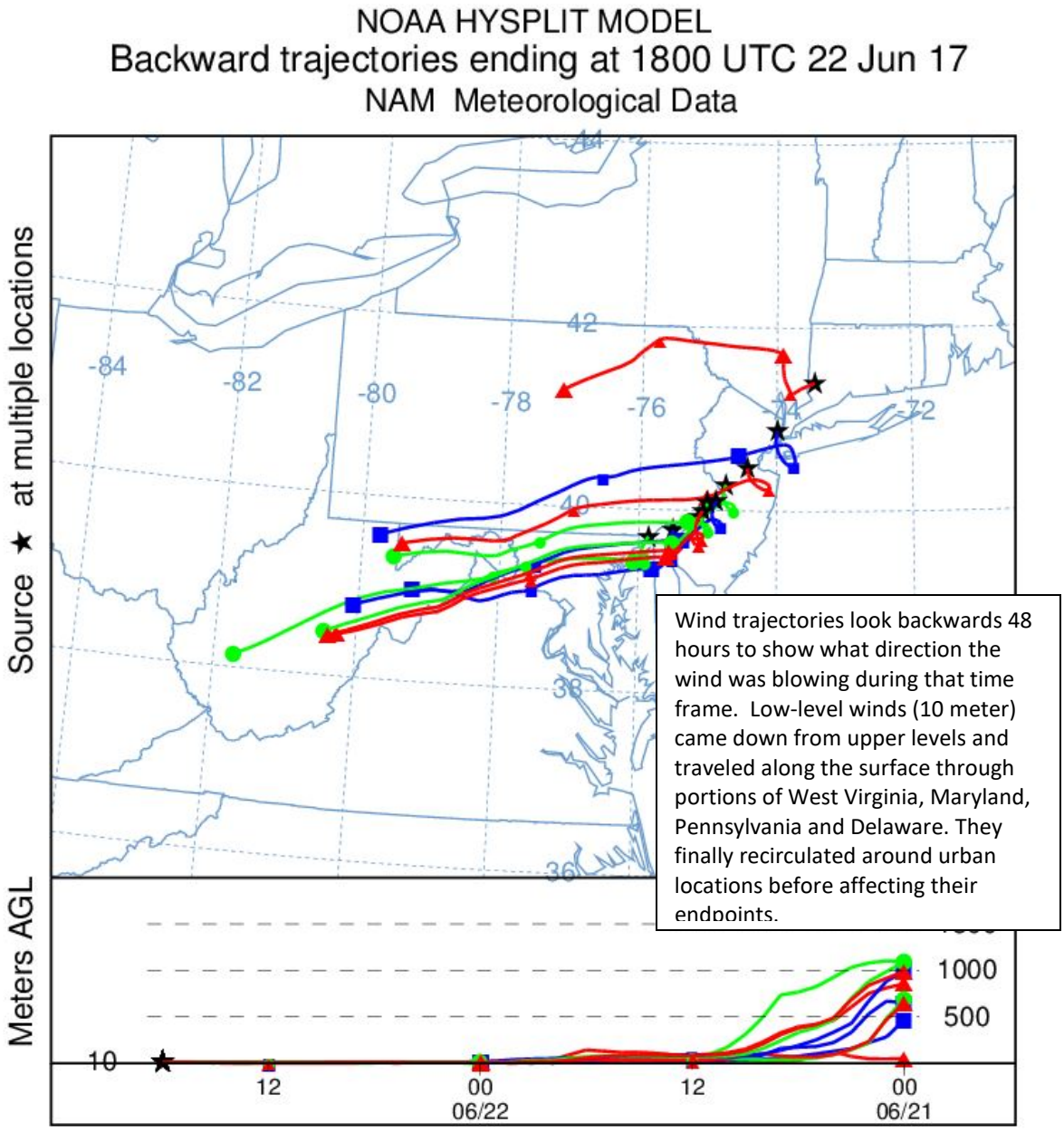


Figure 3. 48-hour Back Trajectories for June 22, 2017 at 500 meters

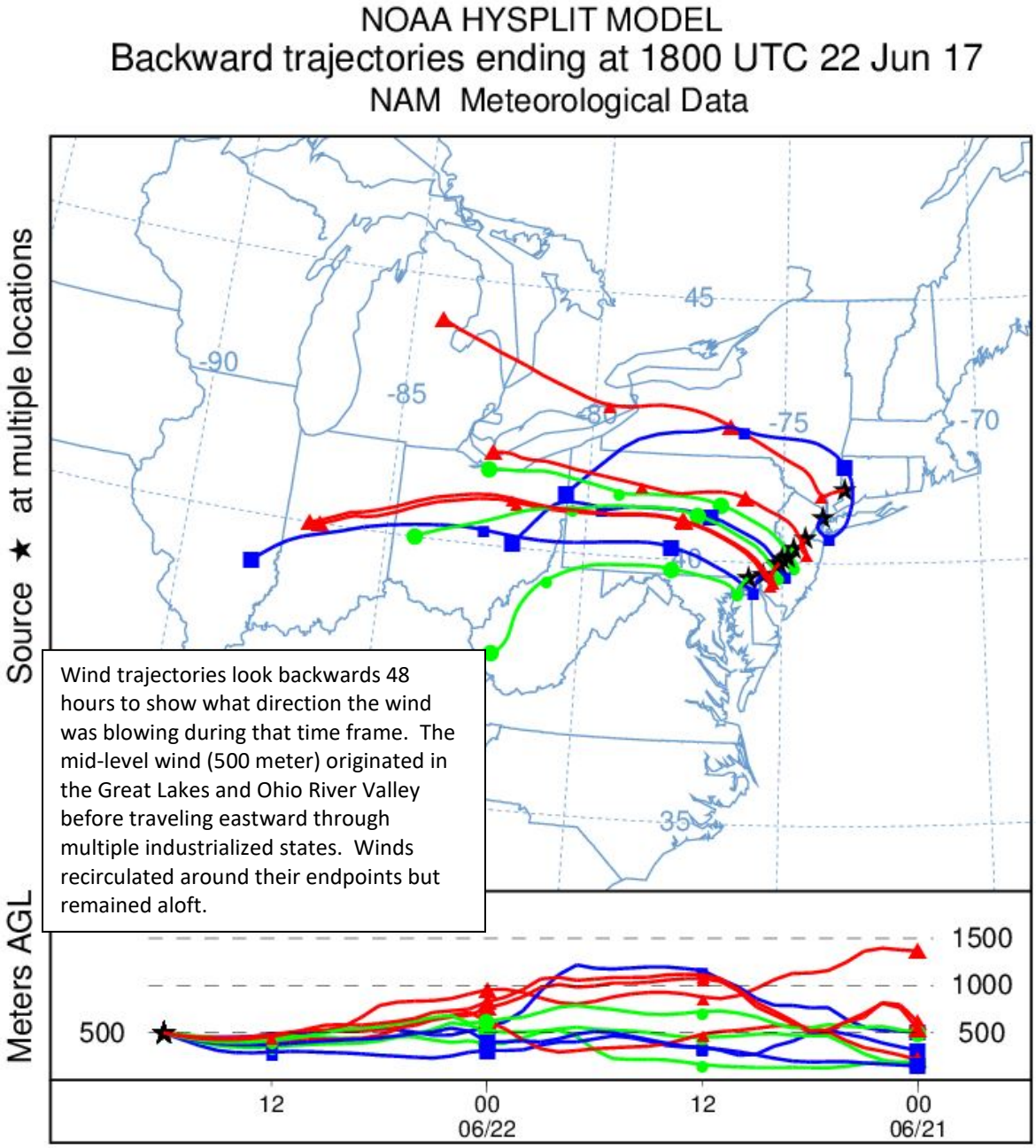


Figure 4. 48-hour Back Trajectories for June 22, 2017 at 1500 meters

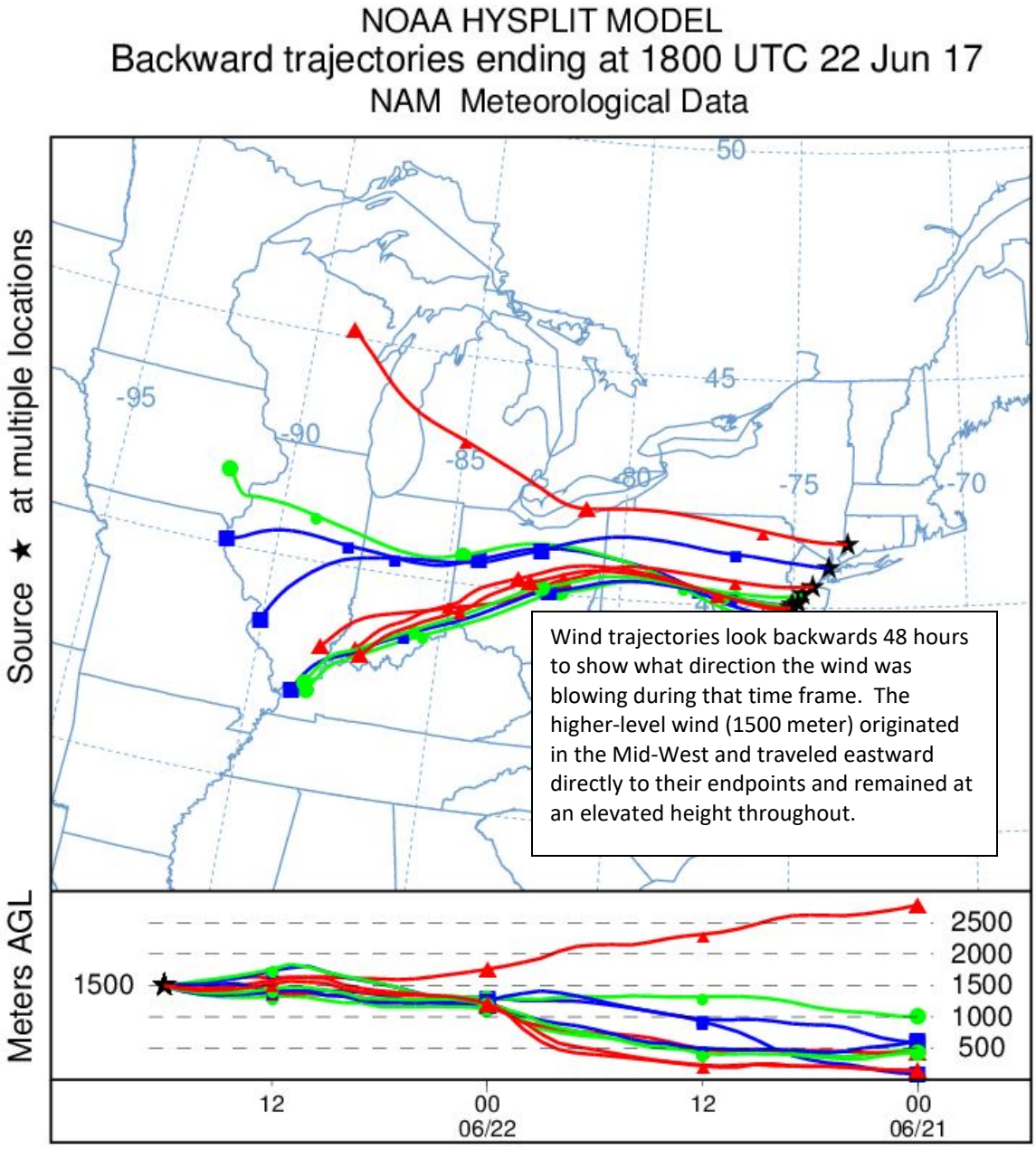


Figure 5. Ozone Air Quality Index for the United States on June 21, 2017

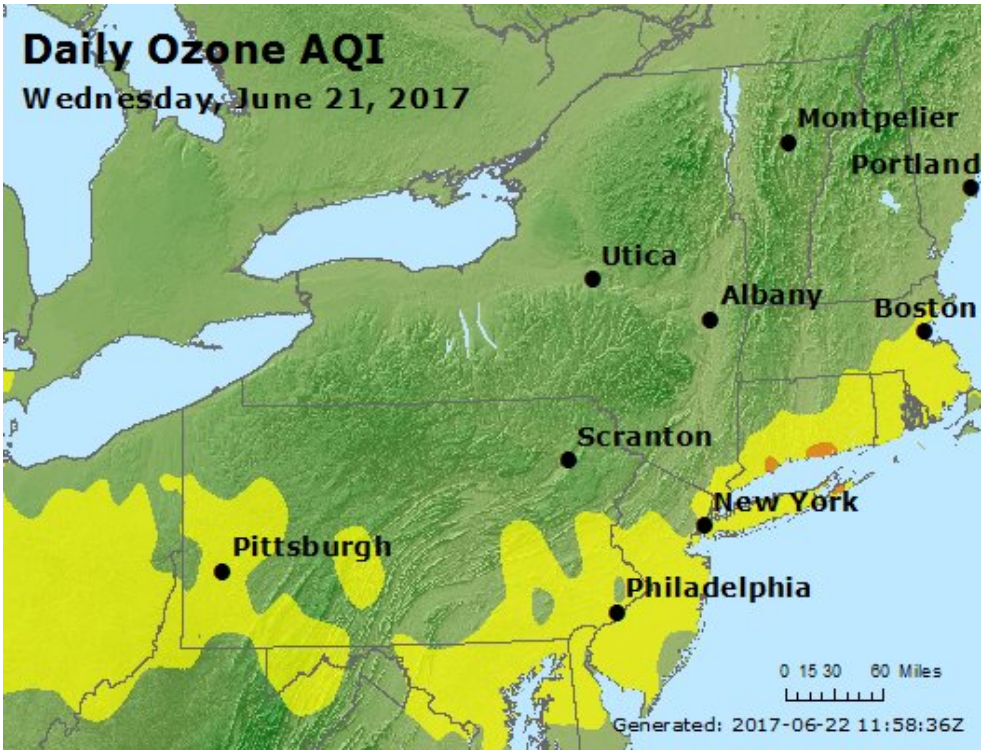
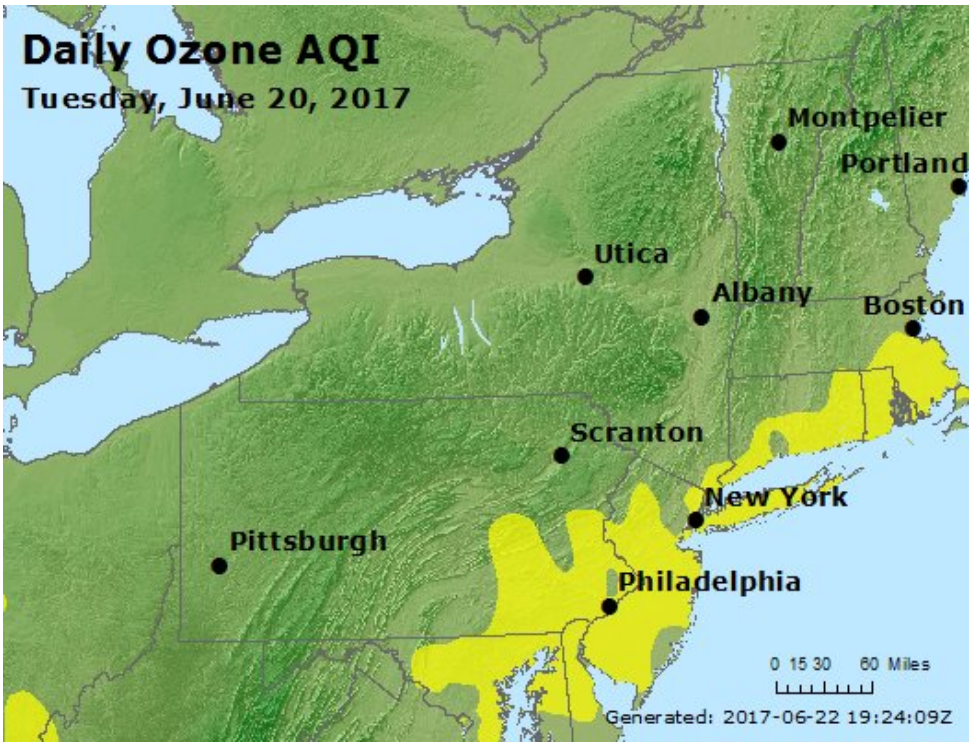


Figure 5a. Ozone Air Quality Index for the United States on June 20, 2017



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.