Ozone National Ambient Air Quality Standard Health Exceedances on June 13, 2017

Exceedance Locations and Levels

On Tuesday, June 13, 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 13, 2017

STATION	Daily Maximum 8-Hr Average (ppb)
Ancora State Hospital	71
Camden Spruce St	79
Clarksboro	78
Colliers Mills	79
Leonia	74

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 13, 2017, in New Jersey was 87 ppb at the Camden Spruce Street station, which is below the 1-hour ozone NAAQS of 120 ppb.

Tuesday marks the 7th day in 2017 on which exceedances of the 70 ppb ozone NAAQS of 2015 were recorded in New Jersey. By the 13th of June in 2016, there were seven (7) days on which ozone exceedances were measured in New Jersey (based on the 70 ppb NAAQS of 2015), and there were four (4) 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 EXCEEDANCES IN NEW JERSEY	2017 NAAQS=70 ppb	2016 NAAQS = 70 ppb	2015 NAAQS = 75 ppb
January 1 - June 13	7	7	4

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 eighteen (18) exceedances of the 70 ppb ozone NAAQS of 2015 recorded on Tuesday, June 13, 2017 (see Table 3):

Table 3: Ozone NAAQS Exceedances at other Monitoring Stations in New Jersey's Ozone Nonattainment Areas on June 13, 2017

STATE	STATION	Daily Maximum 8-Hr Average (ppb)
CT	Greenwich	74
CT	Madison-Beach Road	95
CT	Middletown	71
CT	Stratford	88
CT	Westport	81
DE	BCSP (New Castle Co.)	74
DE	BELLFNT2 (New Castle Co.)	71
MD	Fair Hill	76
NY	Babylon	86
NY	Holtsville	83
NY	Queens	79
NY	Riverhead	88
NY	Susan Wagner	72
PA	BRIS (Bucks Co.)	75
PA	NEWG (Chester Co.)	71
PA	NORR (Montgomery Co.)	79
PA	NEA (Philadelphia Co.)	76
PA	NEW (Philadelphia Co.)	73

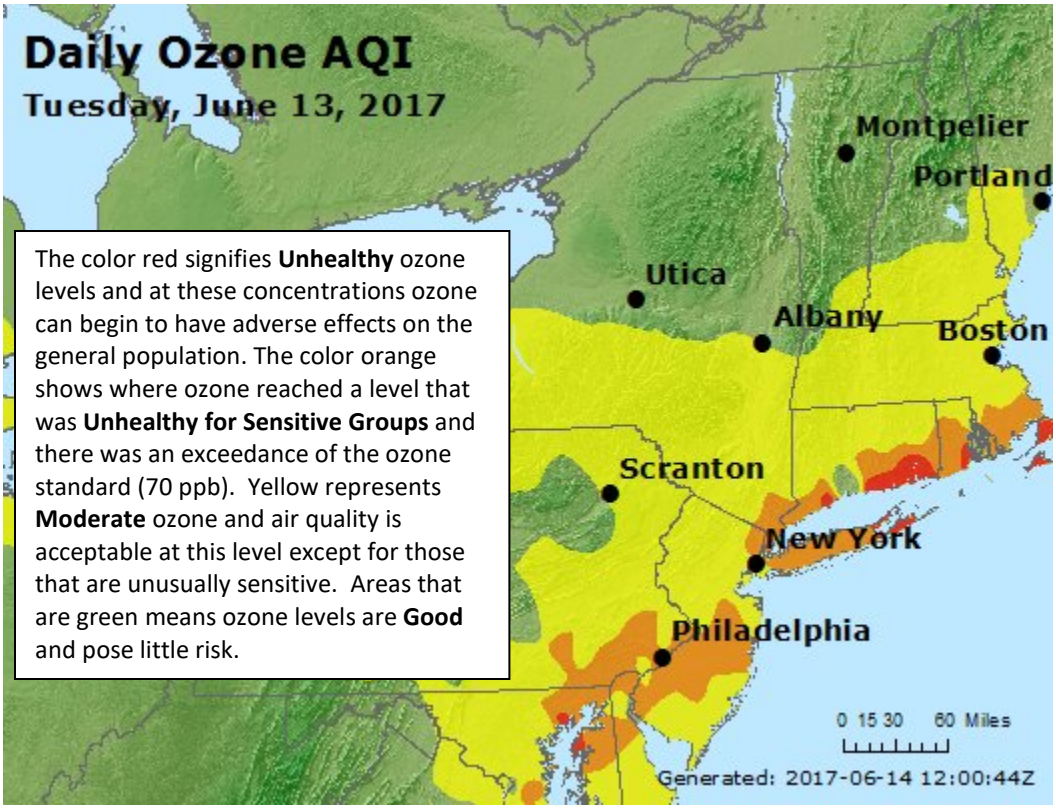
Ten (10) stations exceeded the 75 ppb ozone NAAQS of 2008, and four (4) exceeded the 84 ppb ozone NAAQS of 1997. The highest 1-hour average ozone concentration recorded was 111 ppb at Riverhead, NY, which is below the 1-hour ozone NAAQS of 120 ppb.

Tuesday marks the 7th day in 2017 on which exceedances of the 70 ppb ozone NAAQS of 2015 were recorded in Connecticut and New York, the 6th day for Maryland and Pennsylvania, and the 4th day for Delaware (see Table 4). Figure 1 shows graphically the regions ozone concentrations on June 13, 2017.

Table 4: Number of Ozone Exceedances by State

STATE	# of Exceedances January 1 - June 13, 2017
Connecticut	7
Delaware	4
Maryland	6
New Jersey	7
New York	7
Pennsylvania	6

Figure 1. Ozone Air Quality Index for June 13, 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 reaching the low to mid 90s, and generally light winds from the westerly direction. High pressure which dominated the region for several days began to weaken on June 13th as a cold front approached New Jersey from the north. In addition, a weak surface trough extended from the Gulf of Maine southwestward along the eastern seaboard, across southern New Jersey, and into the Mid-Atlantic region. These features created conditions which allowed polluted air aloft to mix down to the surface through portions of New Jersey's nonattainment area. All of these conditions noted above are features commonly seen with an ozone exceedance.

Where Did the Air Pollution that Caused Ozone Come From?

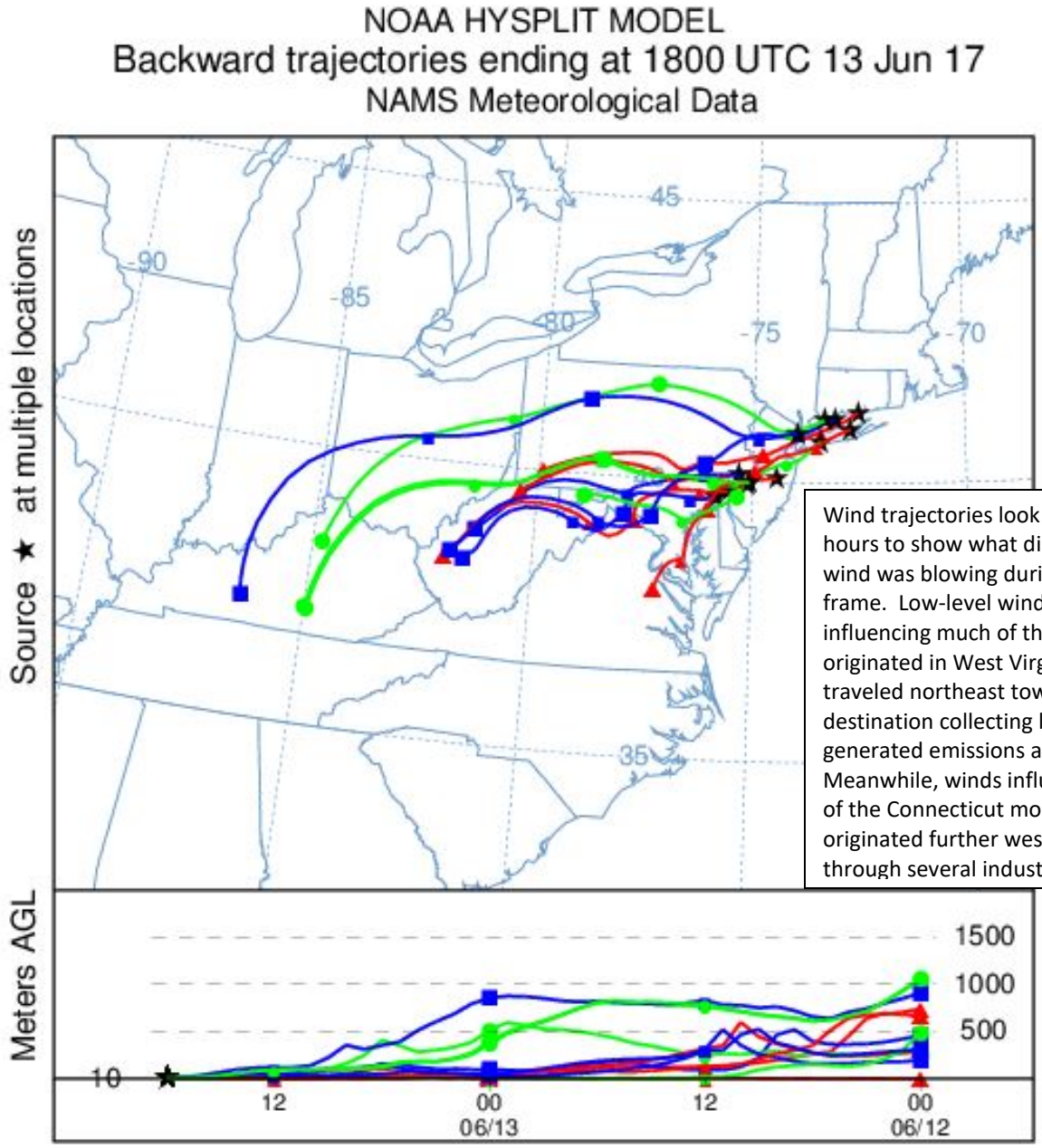
Figures 2, 3, and 4 show the back trajectories at different wind heights for the monitored exceedances on June 13, 2017. The figures illustrate where the winds came from during the 48 hours preceding the high ozone event. Twelve (12) monitoring stations with 8-hr ozone exceedances were chosen to run 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	Madison-Beach Road	95
CT	Stratford	88
CT	Westport	81
DE	BCSP	74
MD	Fair Hill	76
NJ	Camden Spruce St	79
NJ	Colliers Mills	79
NJ	Leonia	74
NY	Babylon	86
NY	Riverhead	88
PA	NORR	79
PA	NEA	76

Surface level back trajectories (Figure 2) show that elevated ozone at the monitored locations originated in West Virginia and traveled northeastward through Maryland and southeastern Pennsylvania. The winds remained generally at the surface, collecting and transporting locally generated emissions into the region. Meanwhile, surface level back trajectories at some Connecticut monitors can be traced back to through Pennsylvania, the Ohio River Valley, and Indiana. These winds seemed to be more influenced by a cold front to the north, which allowed any elevated ozone to be mixed down to the surface. Looking further, both mid-level (Figure 3) and upper level (Figure 4) back trajectories followed very similar paths. Trajectories originated in the Mississippi River valley and traversed through several highly industrialized states including Indiana, Ohio, and Pennsylvania. Overall, these winds remained aloft during the 48 hour time period. Figures 5, 5a, and 5b below show graphically national ozone concentrations on June 12th, 11th, and 10th that contributed to exceedances on June 13, 2017.

Figure 2. 48-hour Back Trajectories for June 13, 2017 at 10 meters



Wind trajectories look backwards 48 hours to show what direction the wind was blowing during that time frame. Low-level winds (10 meter) influencing much of the region originated in West Virginia and traveled northeast toward their destination collecting locally generated emissions along the way. Meanwhile, winds influencing some of the Connecticut monitors originated further west and traveled through several industrialized states.

Figure 3. 48-hour Back Trajectories for June 13, 2017 at 500 meters

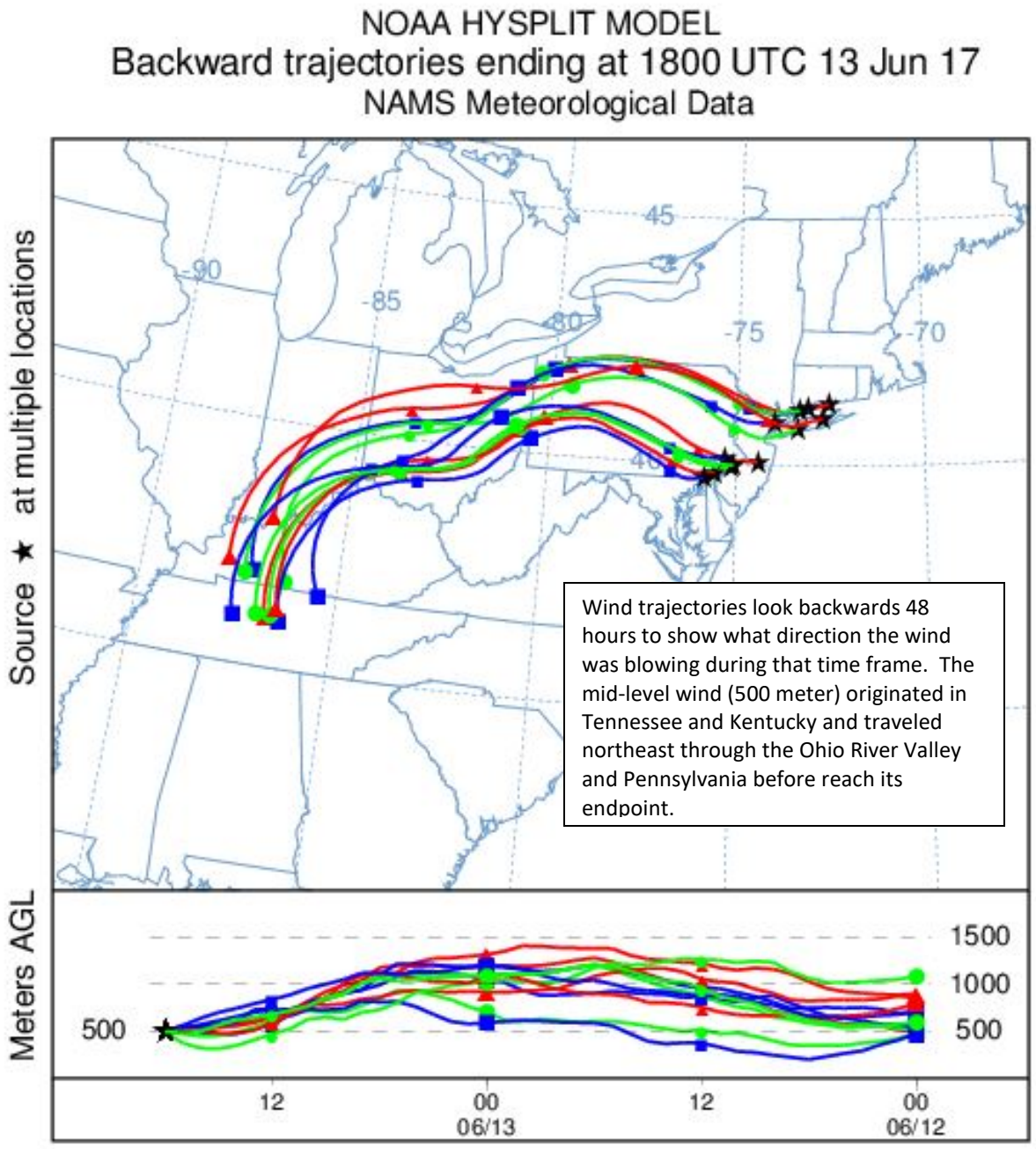


Figure 4. 48-hour Back Trajectories for June 13, 2017 at 1500 meters

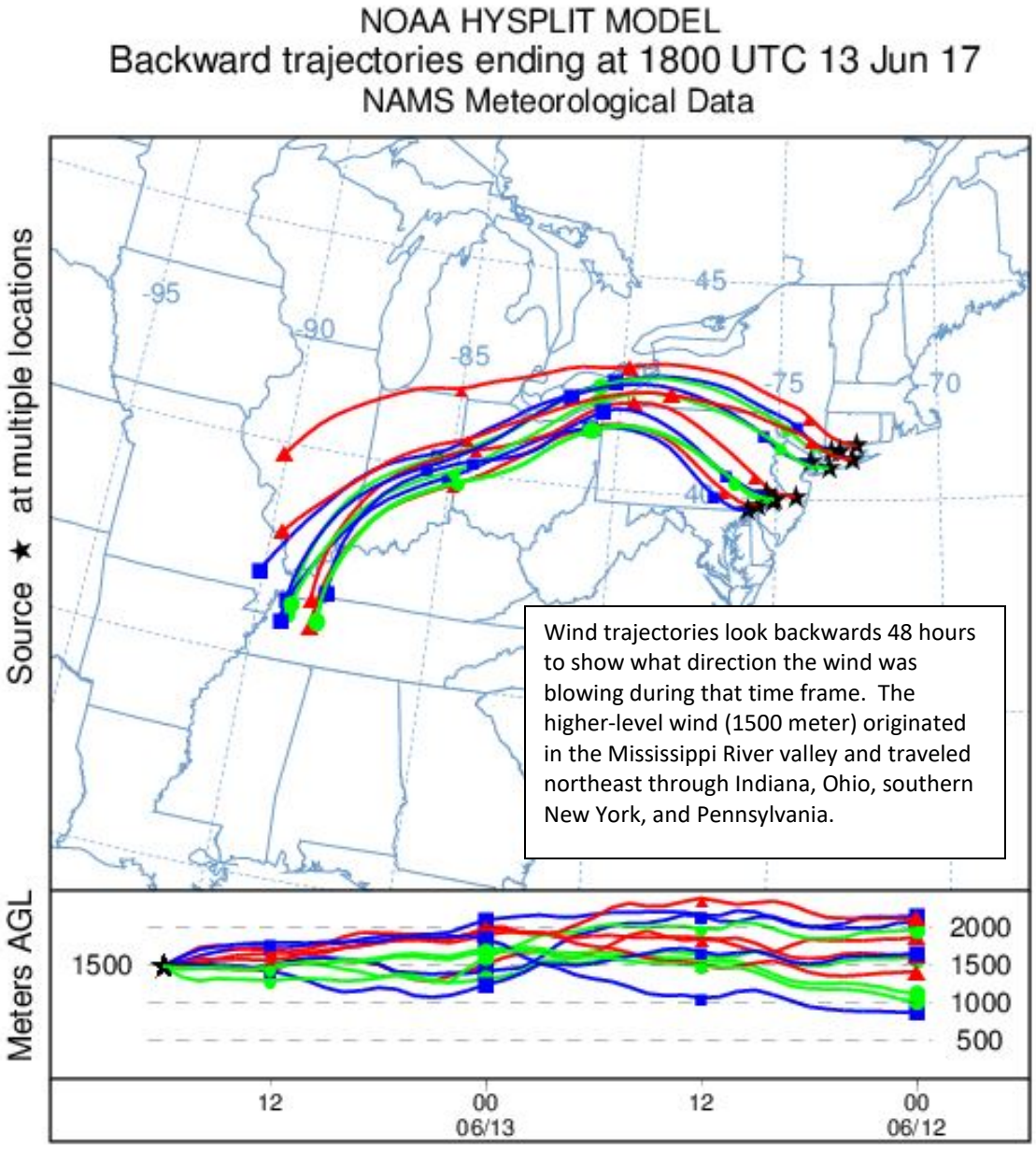


Figure 5. Ozone Air Quality Index for the United States on June 12, 2017

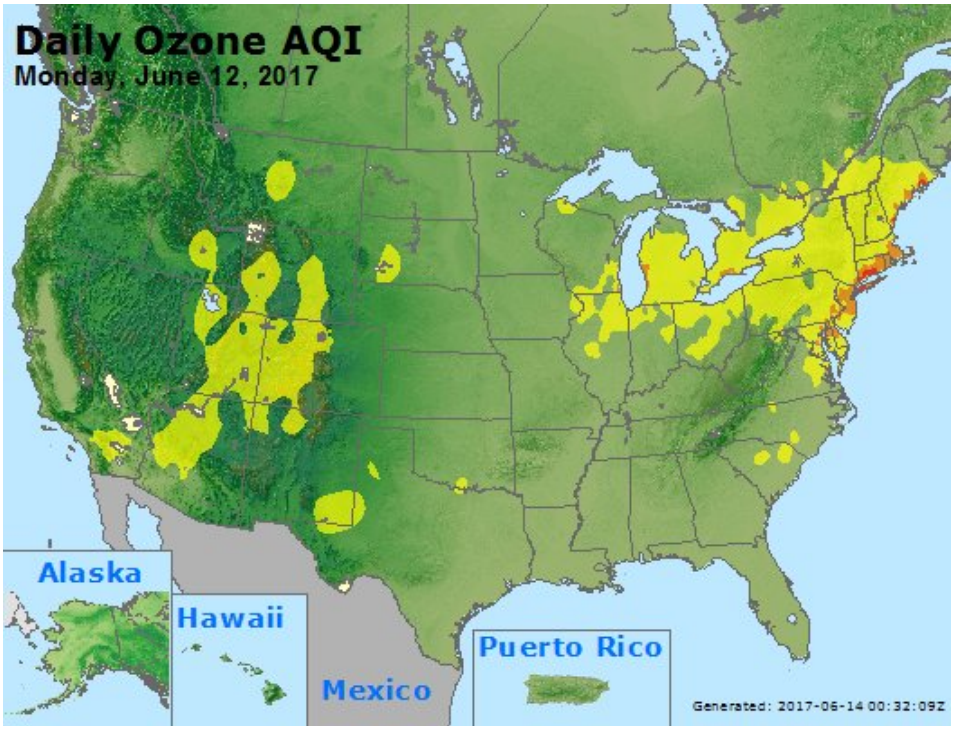


Figure 5a. Ozone Air Quality Index for the United States on June 11, 2017

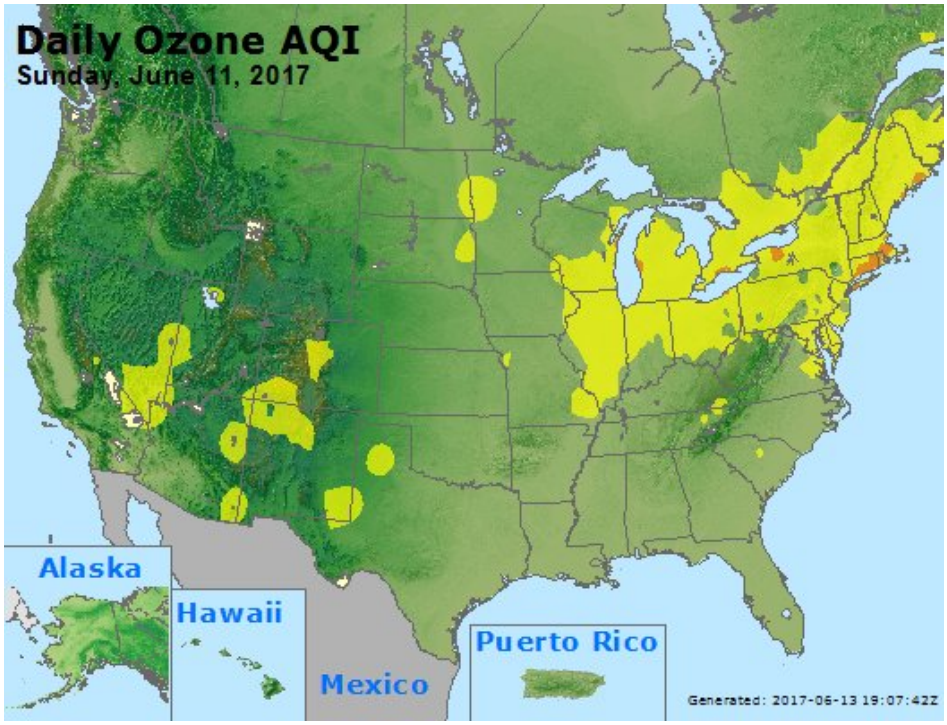
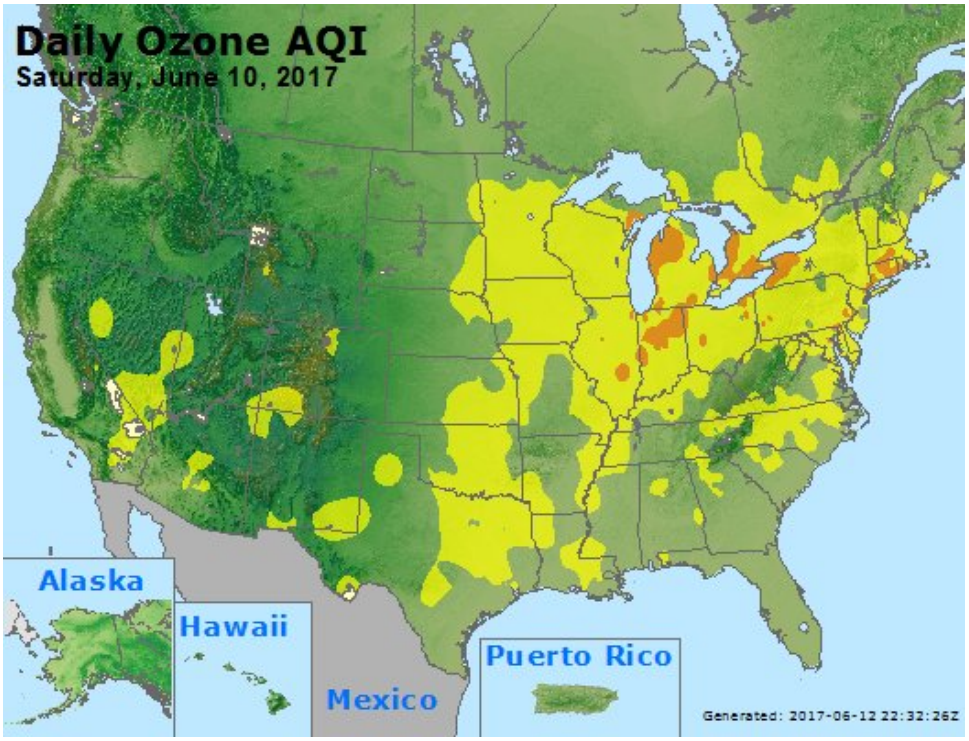


Figure 5b. Ozone Air Quality Index for the United States on June 10, 2017



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.