Ozone National Ambient Air Quality Standard Health Exceedances on June 12, 2017

Exceedance Locations and Levels

On Monday, June 12, 2017, there were ten (10) 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 12, 2017

STATION	Daily Maximum 8-Hr Average (ppb)
Bayonne	74
Camden Spruce St	74
Chester	72
Clarksboro	73
Colliers Mills	80
Flemington	73
Leonia	82
Monmouth University	71
Newark Firehouse	71
Rutgers University	72

Two (2) 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 12, 2017, in New Jersey was 87 ppb at the Leonia station, which is below the 1-hour ozone NAAQS of 120 ppb.

Monday marks the 6th day in 2017 on which exceedances of the 70 ppb ozone NAAQS of 2015 were recorded in New Jersey. By the 12th 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).

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 twenty-two (22) exceedances of the 70 ppb ozone NAAQS of 2015 recorded on Monday, June 12, 2017 (see Table 2):

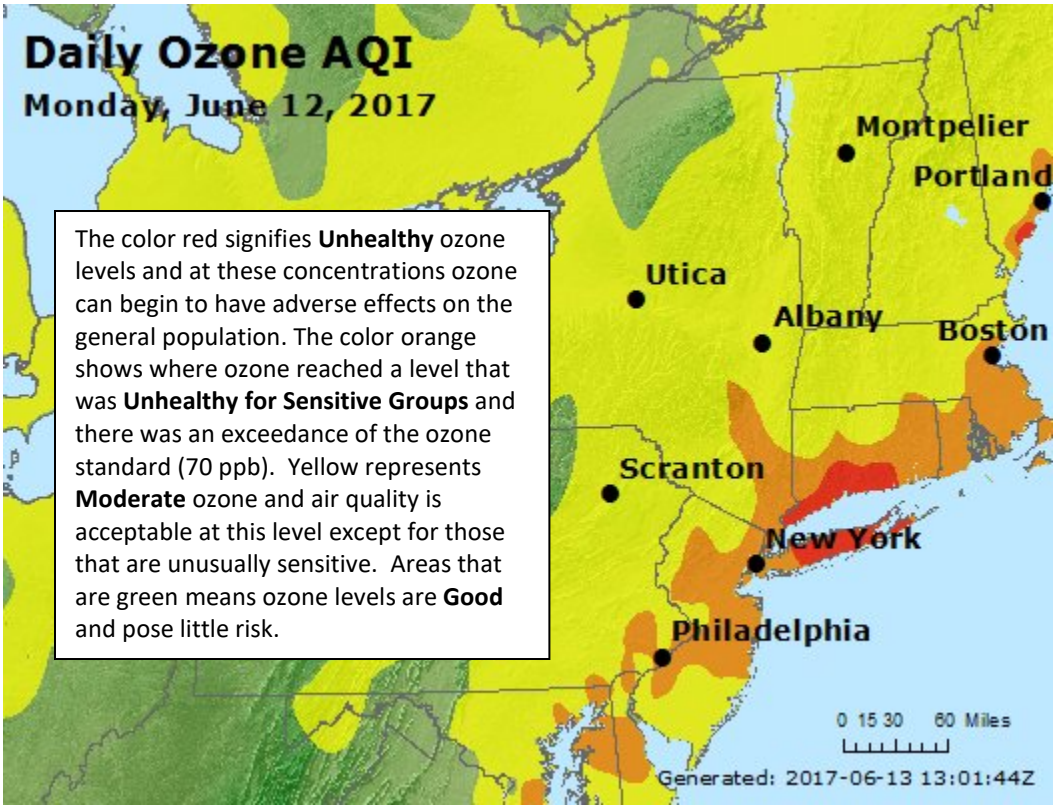
Table 2: Ozone NAAQS Exceedances at other Monitoring Stations in New Jersey's Ozone Nonattainment Areas on June 12, 2017

STATE	STATION	Daily Maximum 8-Hr Average (ppb)
CT	Danbury	71
CT	Madison-Beach Road	97
CT	Middletown	85
CT	New Haven	89
CT	Stratford	95
CT	Westport	97
DE	BCSP (New Castle Co.)	72
DE	KILLENS (Kent Co.)	71
MD	Fair Hill	74
NY	Babylon	90
NY	CCNY	75
NY	Holtsville	80
NY	IS52	76
NY	Pfizer Lab	76
NY	Queens	79
NY	Riverhead	85
NY	Susan Wagner	79
NY	White Plains	75
PA	BRIS (Bucks Co.)	76
PA	NORR (Montgomery Co.)	76
PA	NEA (Philadelphia Co.)	75
PA	NEW (Philadelphia Co.)	71

Fourteen (14) stations exceeded the 75 ppb ozone NAAQS of 2008, and seven (7) exceeded the 84 ppb ozone NAAQS of 1997. The highest 1-hour average ozone concentration recorded was 110 ppb at Stratford, CT, which is below the 1-hour ozone NAAQS of 120 ppb.

Monday marks the 6th day in 2017 on which exceedances of the 70 ppb ozone NAAQS of 2015 were recorded in Connecticut and New York, the 5th day for Maryland and Pennsylvania, and the 3rd day for Delaware. Figure 1 shows graphically the regions ozone concentrations on June 12, 2017.

Figure 1. Ozone Air Quality Index for June 12, 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 with temperatures reaching the low 90s and winds generally from the west. New Jersey remained under the influence of a high pressure system which was anchored off the southeast United States. In addition, a weak surface trough extended from New Hampshire south across central Connecticut, along coastal New Jersey into southern Virginia. This feature created conditions which allowed polluted air aloft to mix down to the surface throughout New Jersey's nonattainment area. All of these conditions 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 12, 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

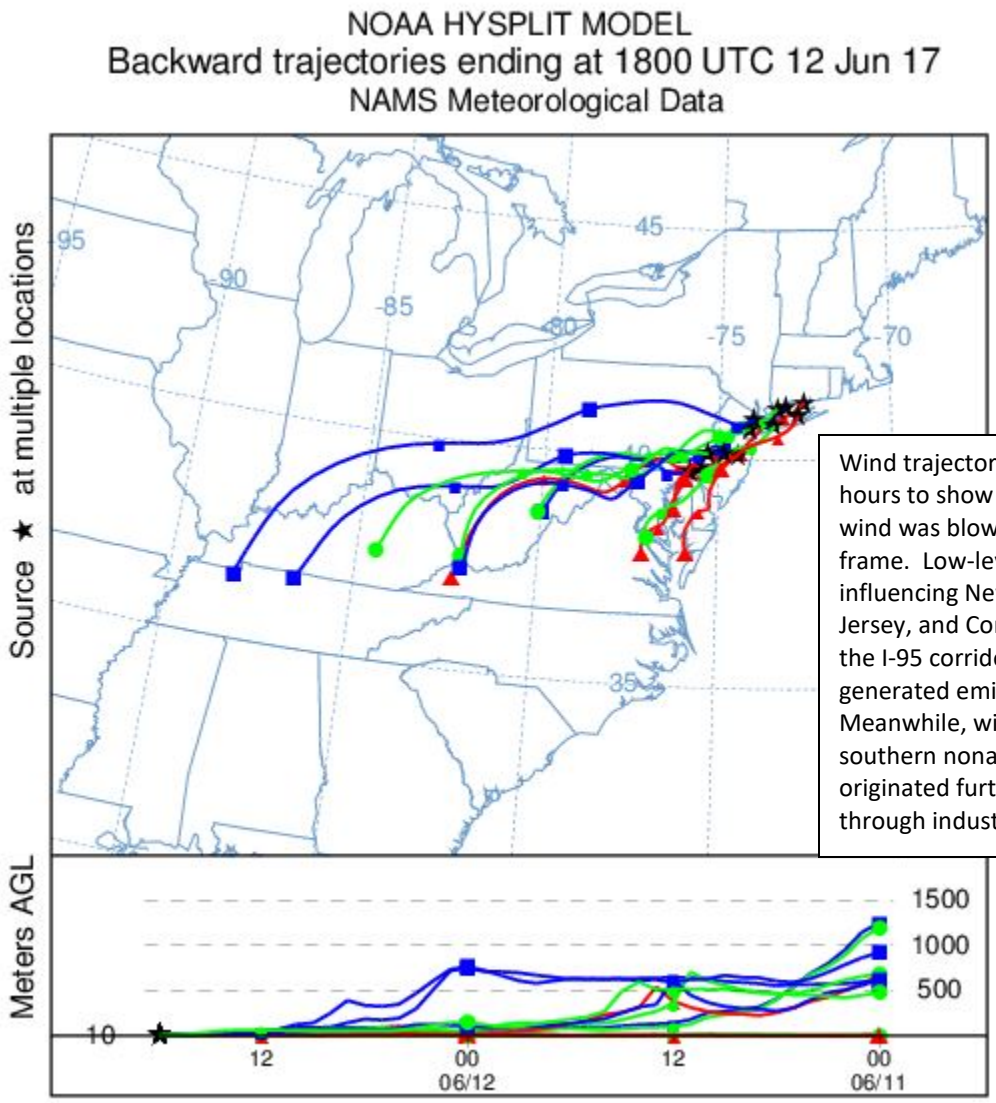
back trajectories. The selected sites and the maximum 8-hr ozone levels recorded are listed in Table 3 below:

Table 3. 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	97
CT	Stratford	95
CT	Westport	97
DE	BCSP	72
MD	Fair Hill	74
NJ	Bayonne	74
NJ	Colliers Mills	80
NJ	Leonia	82
NY	Babylon	90
NY	Riverhead	85
PA	BRIS	76
PA	NORR	76

Surface level winds (Figure 2) which impacted New York, Northern New Jersey and Connecticut originated along coastal Virginia and Maryland before traveling northward along the I-95 corridor. Winds remained at the surface collecting and transporting locally generated emissions into the region. Meanwhile, surface winds influencing the southern portions of New Jersey's nonattainment area originated further west in Tennessee, Kentucky, and western Virginia and traveled northeast through the Ohio River Valley, West Virginia and Pennsylvania before reaching their endpoints. Looking further, both mid-level (Figure 3) and upper level (Figure 4) trajectories followed very similar paths. Winds originated in Alabama, Mississippi, Missouri, and Illinois and traversed northeast through the highly industrialized states of Indiana, Ohio, West Virginia and Pennsylvania. Overall, winds mixed vertically during this 48 hour time period which allowed any elevated ozone an opportunity to mix closer to the surface. Figures 5, 5a, and 5b below show graphically ozone concentrations on June 11th, 10th, and 09th which contributed to exceedances on June 12, 2017.

Figure 2. 48-hour Back Trajectories for June 12, 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 New York, northern New Jersey, and Connecticut traveled along the I-95 corridor collecting locally generated emissions along the way. Meanwhile, winds influencing southern nonattainment areas originated further west and traveled through industrialized states.

Figure 3. 48-hour Back Trajectories for June 12, 2017 at 500 meters

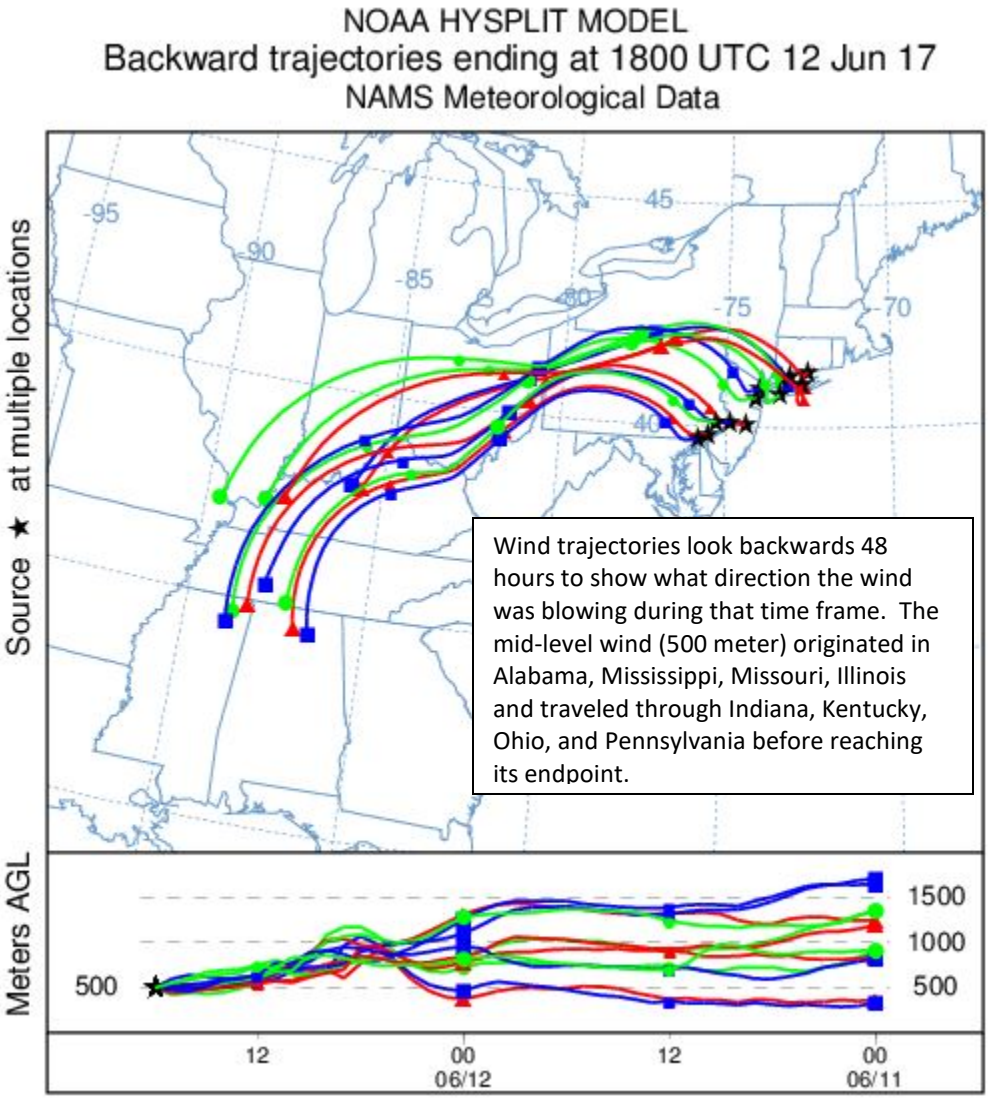


Figure 4. 48-hour Back Trajectories for June 12, 2017 at 1500 meters

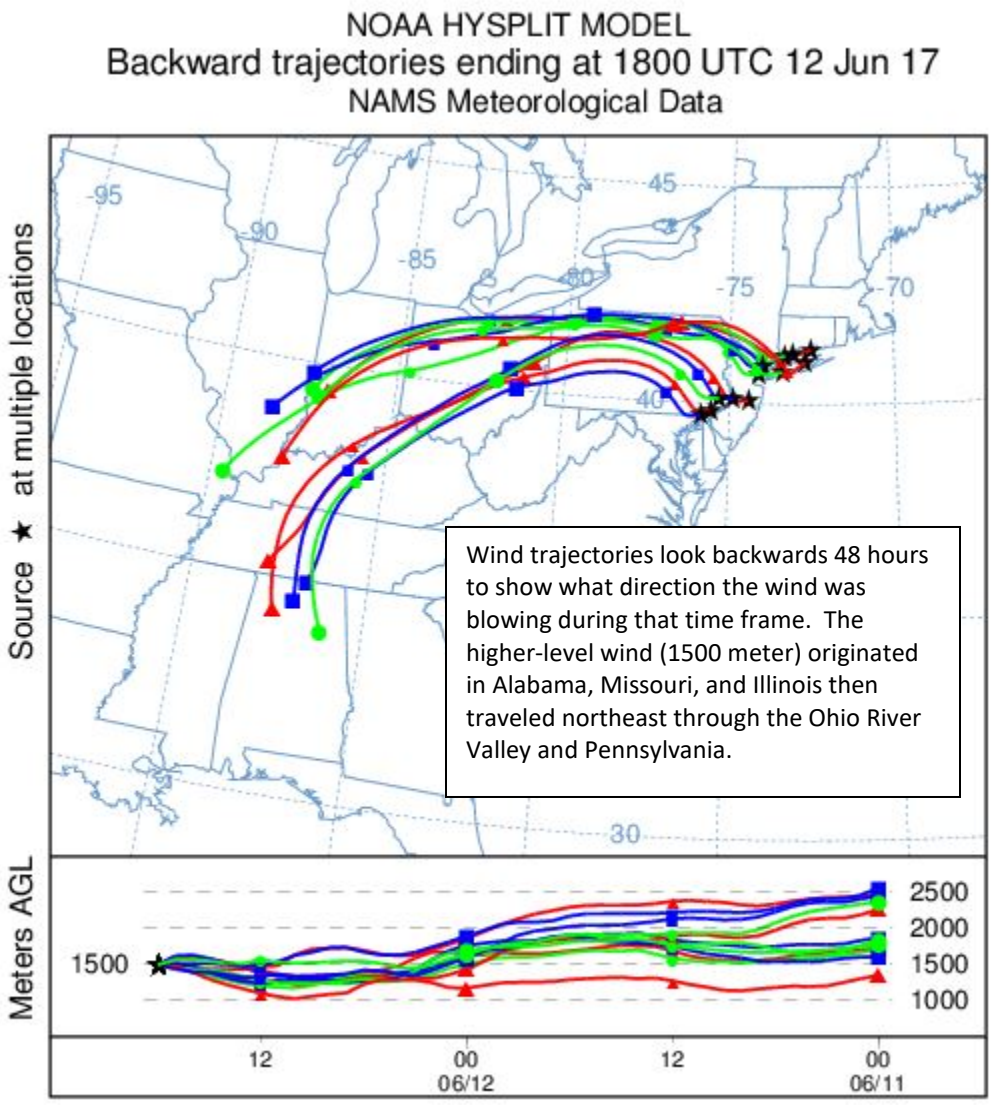


Figure 5. Ozone Air Quality Index for the United States on June 11, 2017

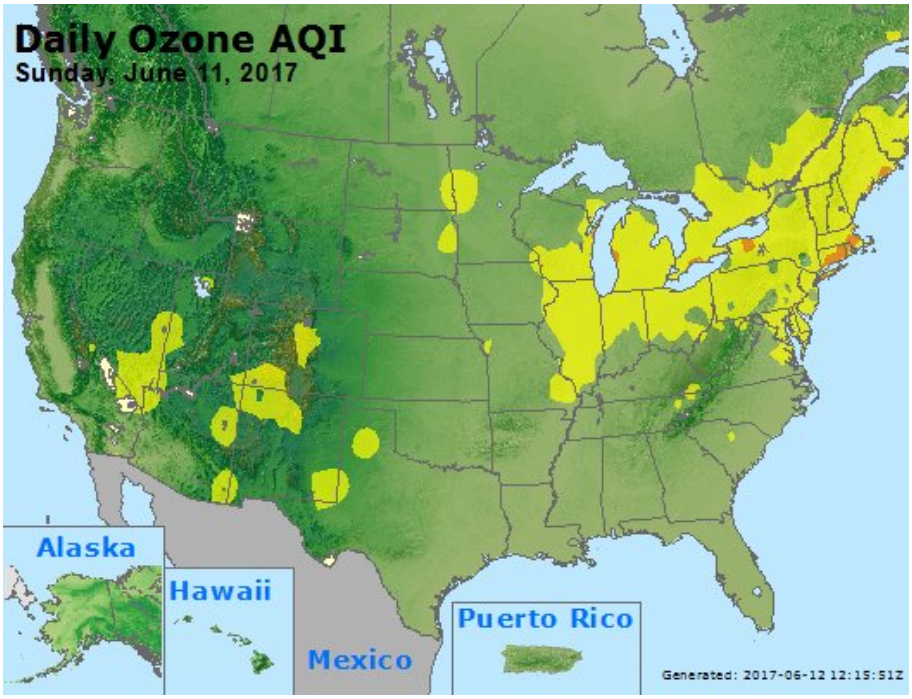


Figure 5a. Ozone Air Quality Index for the United States on June 10, 2017

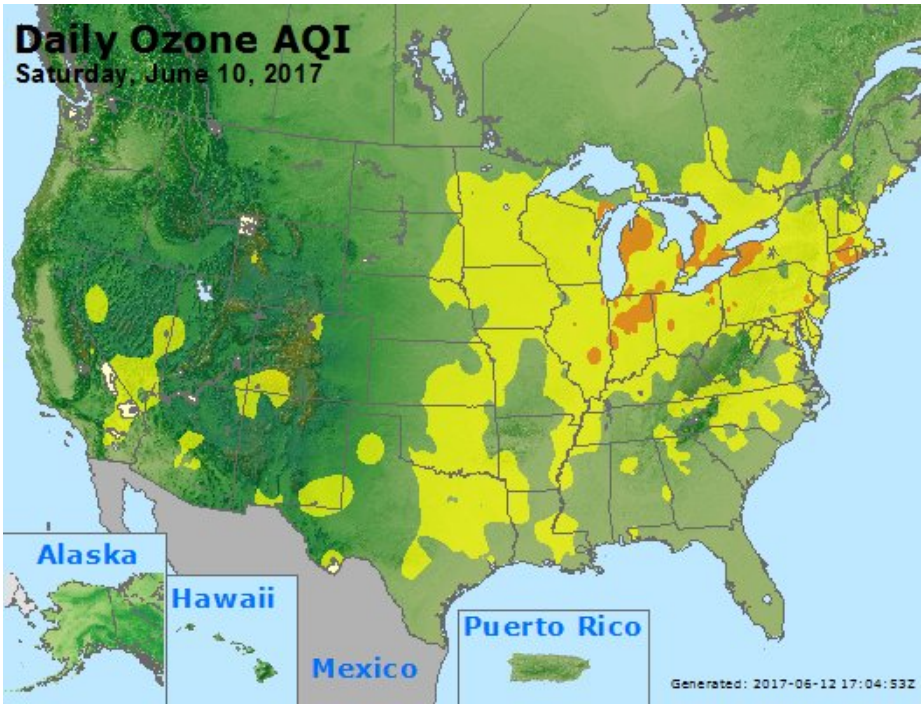
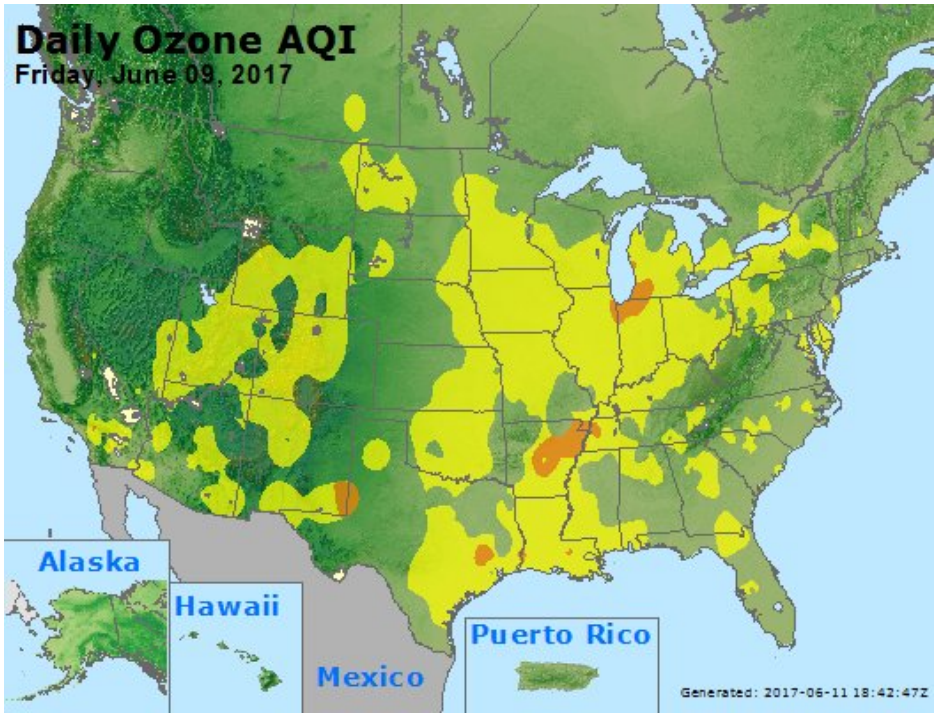


Figure 5b. Ozone Air Quality Index for the United States on June 9, 2017



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.