Ozone National Ambient Air Quality Standard Health Exceedances on May 1, 2018

Exceedance Locations and Levels

On Tuesday, May 1, 2018, there were six (6) 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 May 1, 2018

STATION	Daily Maximum 8-Hr Average (ppb)
Brigantine	74
Chester	71
Clarksboro	72
Colliers Mills	74
Flemington	72
Washington Crossing*	72

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

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 May 1, 2018, in New Jersey was 80 ppb at the Brigantine station, which is below the 1-hour ozone NAAQS of 120 ppb.

Tuesday marks the first day in 2018 on which an exceedance of the 70 ppb ozone NAAQS of 2015 was recorded in New Jersey. By the 1st of May in 2017, there was one (1) day on which ozone exceedances were measured in New Jersey, and there were zero (0) days by this same date in 2016 (See Table 2).

Table 2: New Jersey Exceedance Count

	# of Days NAAQS was Exceeded January 1 – May 1, 2018 NAAQS = 70 ppb	# of Days NAAQS was Exceeded January 1 – May 1, 2017 NAAQS = 70 ppb	# of Days NAAQS was Exceeded January 1 – May 1, 2016 NAAQS = 70 ppb
New Jersey	1	1	0

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 recorded on Tuesday, May 1, 2018 (See Table 3):

Table 3 : Ozone NAAQS Exceedances at other Monitoring Stations in New Jersey's Ozone Nonattainment Areas on May 1, 2018

STATE	STATION	Daily Maximum 8-Hr Average (ppb)
DE	BELLFNT2 (New Castle Co.)	74
DE	KILLENS (Kent Co.)	75
DE	LEWES (Sussex Co.)	74
DE	LUMS 2 (New Castle Co.)	74
DE	SEAFORD (Sussex Co.)	74
MD	Fair Hill	74
PA	BRIS (Bucks Co.)	72
PA	NORR (Montgomery Co.)	73
PA	NEA (Philadelphia Co.)	71

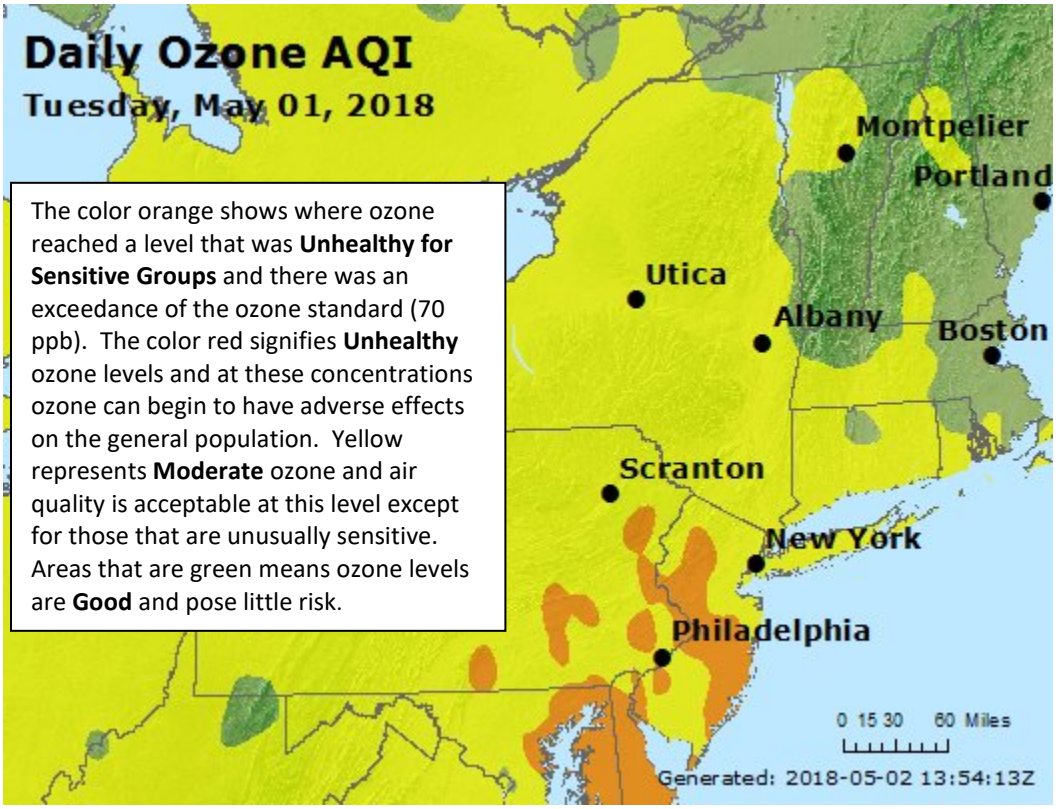
No station exceeded the 75 ppb ozone NAAQS of 2008, and none exceeded the 84 ppb ozone NAAQS of 1997. The highest 1-hour average ozone concentration recorded was 79 ppb at the Seaford station in Delaware, which is below the 1-hour ozone NAAQS of 120 ppb.

The number of days in 2018 on which exceedances of the 70 ppb ozone NAAQS of 2015 were recorded for Delaware, Maryland and Pennsylvania is one (1), and zero days for Connecticut and New York (See Table 4). Figure 1 shows graphically the region's ozone concentrations on May 1, 2018.

Table 4: Number of Ozone Exceedances by State

STATE	# of Days NAAQS was Exceeded January 1 – May 1, 2018 NAAQS = 70 ppb
Connecticut	0
Delaware	1
Maryland	1
New Jersey	1
New York	0
Pennsylvania	1

Figure 1. Ozone Air Quality Index for May 1, 2018



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

An area of strong high pressure remained in control over the southeastern US and shifted offshore during the early morning hours of May 1st. The high-pressure system, remained centered offshore throughout the day providing sunny skies and warm temperatures to the Mid-Atlantic. Temperatures at the exceedance locations reached the low 80s. Meanwhile a weak area of low pressure over New England slowly lifted northward and a surface trough developed behind it. The surface trough extended from eastern New England through New Jersey and into the Mid-Atlantic.

In the day preceding the event, locations west of New Jersey including the Ohio River Valley and Great Lakes experienced widespread levels of moderate air quality. This polluted air was trapped within the boundaries of high pressure system and grew increasingly polluted as it was transported across Pennsylvania into our region. In the presence of the above-mentioned surface trough, the polluted air aloft was able to mix down to the surface due to vertical mixing. These features, in combination with abundant sunlight and warm temperatures, are all 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 starting at different wind heights for the monitored exceedance May 1, 2018. The figures illustrate where the winds came from during the 48 hours preceding the high ozone event. Nine (9) monitoring stations with an 8-hr ozone exceedance were used 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

STATE	STATION	Daily Maximum 8-Hr Average (ppb)
DE	KILLENS (Kent Co.)	75
MD	Fair Hill	74
NJ	Brigantine	74
NJ	Chester	71
NJ	Clarksboro	72
NJ	Colliers Mills	74
NJ	Flemington	72
NJ	Washington Crossing	72
PA	NORR (Montgomery Co.)	73

Surface level back trajectories (Figure 2) show that air originated in the Great Lakes and Ohio River Valley and were transported through the heavily industrialized portions of Michigan, Ohio and Pennsylvania. In Figure 2, this air was brought down to the surface through the sinking motion of the high-pressure system and the surface trough that developed through New Jersey on May 1st. Figures 3 & 4 show the mid and upper level back trajectories originated over the Midwest and followed the periphery of the high-pressure system. The trajectories then passed through the Great Lakes region, Ohio River Valley, and Pennsylvania transporting polluted air aloft. While this air did experience a slight sinking motion, air aloft remained aloft for the duration of its path. Much of the trajectories follow a similar path and local ozone exceedances that occurred were likely exacerbated by the transport pattern described above. Figure 5 below shows graphically the national ozone concentrations on April 30th.

Figure 2. 48-hour Back Trajectories for May 1, 2018 at 10 meters

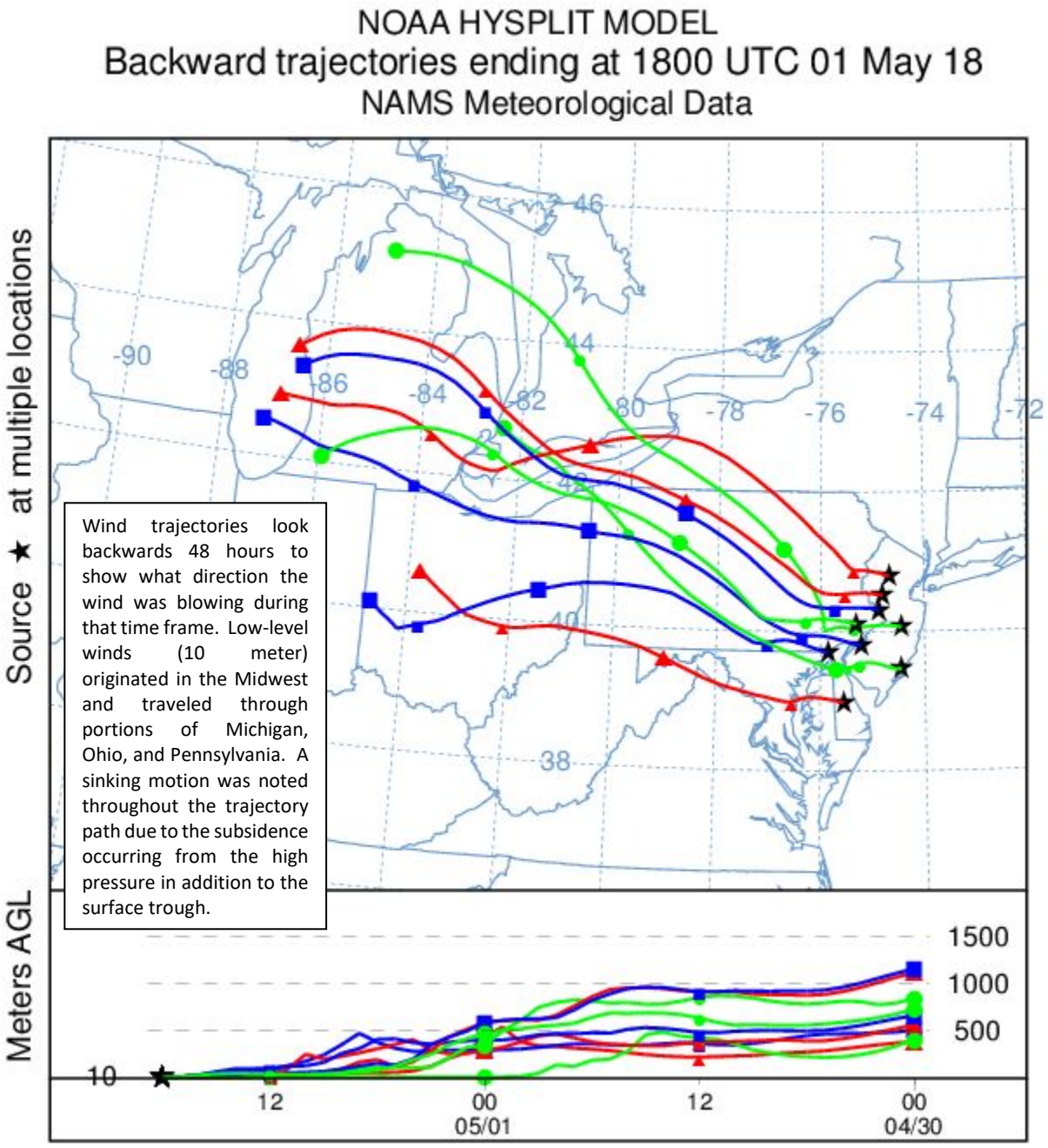


Figure 3. 48-hour Back Trajectories for May 1, 2018 at 500 meters

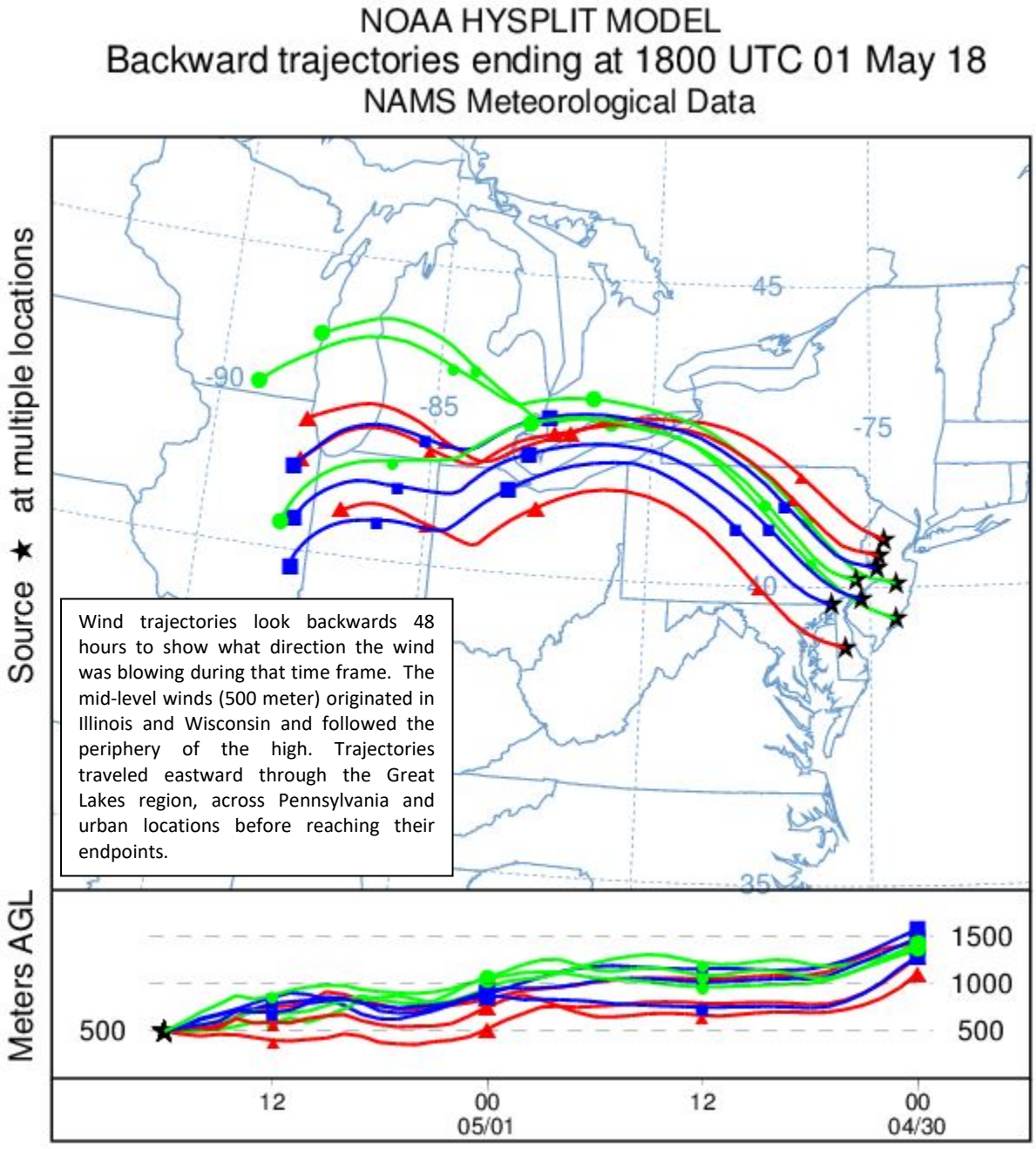


Figure 4. 48-hour Back Trajectories for May 1, 2018 at 1500 meters

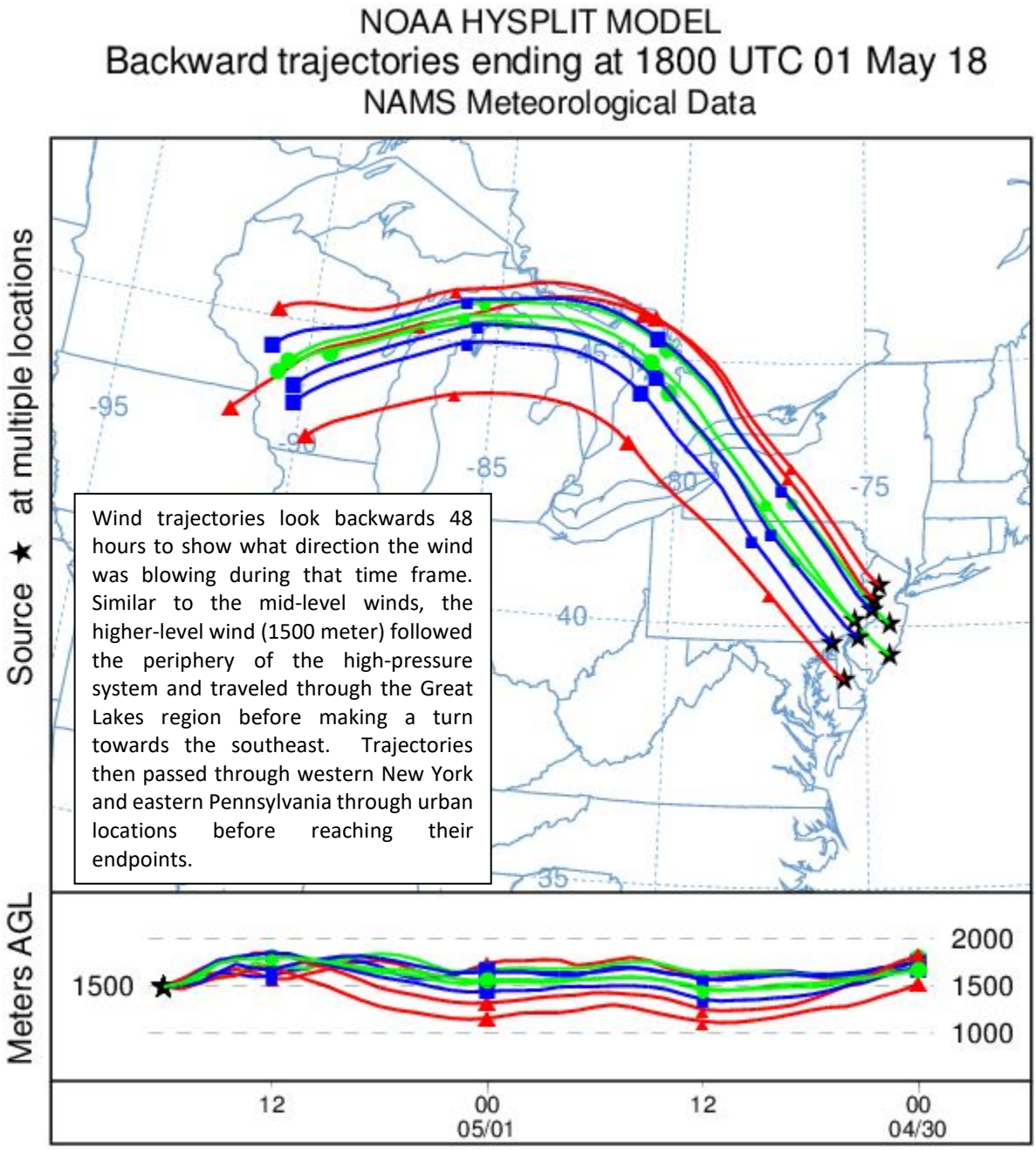
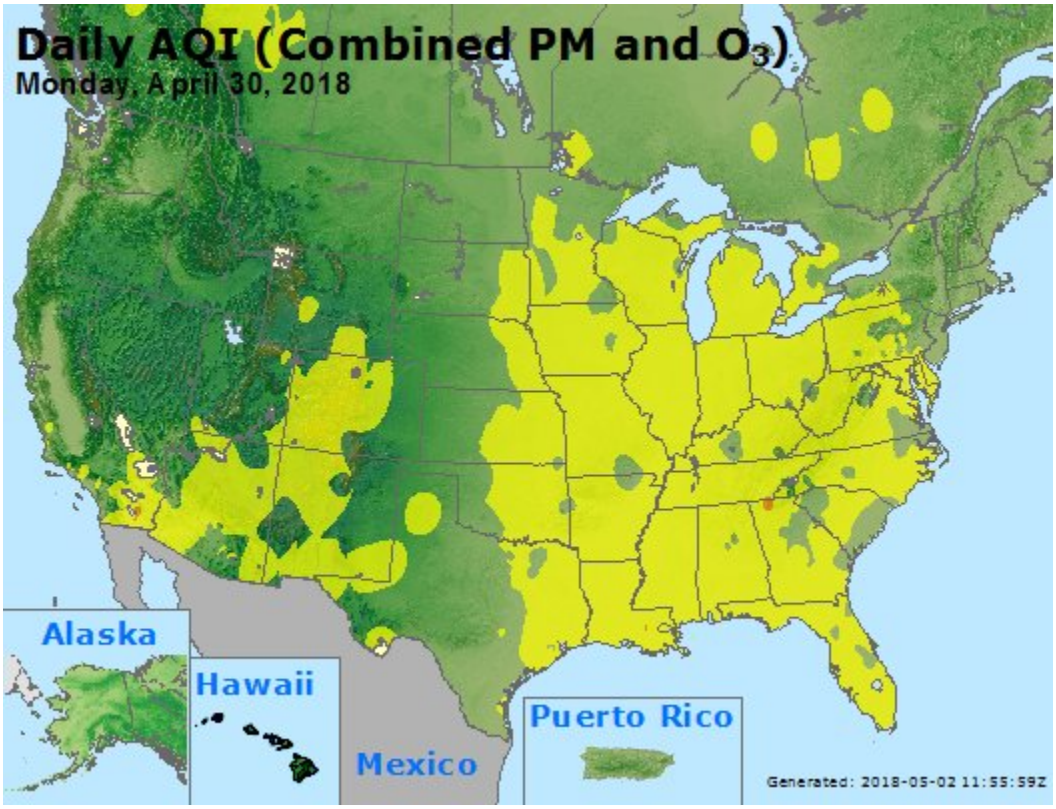


Figure 5. Ozone Air Quality Index for the United States on April 30, 2018



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.