Ozone National Ambient Air Quality Standard Health Exceedances on May 2, 2018
Exceedance Locations and Levels

On Wednesday, May 2, 2018, there were seven (7) 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 2, 2018

STATION	Daily Maximum 8-Hr Average (ppb)
Chester	73
Clarksboro	74
Colliers Mills	76
Columbia	74
Flemington	72
Leonia	72
Ramapo	72

One 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 2, 2018, in New Jersey was 81 ppb at the Colliers Mills station, which is below the 1-hour ozone NAAQS of 120 ppb.

Wednesday marks the second day in 2018 on which an exceedance of the 70 ppb ozone NAAQS of 2015 was recorded in New Jersey. By May 2, 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 2, 2018 NAAQS = 70 ppb	# of Days NAAQS was Exceeded January 1 – May 2, 2017 NAAQS = 70 ppb	# of Days NAAQS was Exceeded January 1 – May 2, 2016 NAAQS = 70 ppb
New Jersey	2	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 fourteen (14) exceedances of the 70 ppb ozone NAAQS recorded on Wednesday, May 2, 2018 (See Table 3):

Table 3 : Ozone NAAQS Exceedances at other Monitoring Stations in New Jersey's Ozone Nonattainment Areas on May 2, 2018

STATE	STATION	Daily Maximum 8-Hr Average (ppb)
CT	Danbury	75
CT	Greenwich	71
CT	Madison-Beach Road	71
CT	Stratford	71
DE	BCSP (New Castle Co.)	72
DE	LEWES (Sussex Co.)	74
DE	LUMS 2 (New Castle Co.)	71
DE	SEAFORD (Sussex Co.)	75
MD	Fair Hill	75
NY	Riverhead	72
NY	Rockland Cty	72
NY	Susan Wagner	72
PA	BRIS (Bucks Co.)	71
PA	NORR (Montgomery Co.)	72

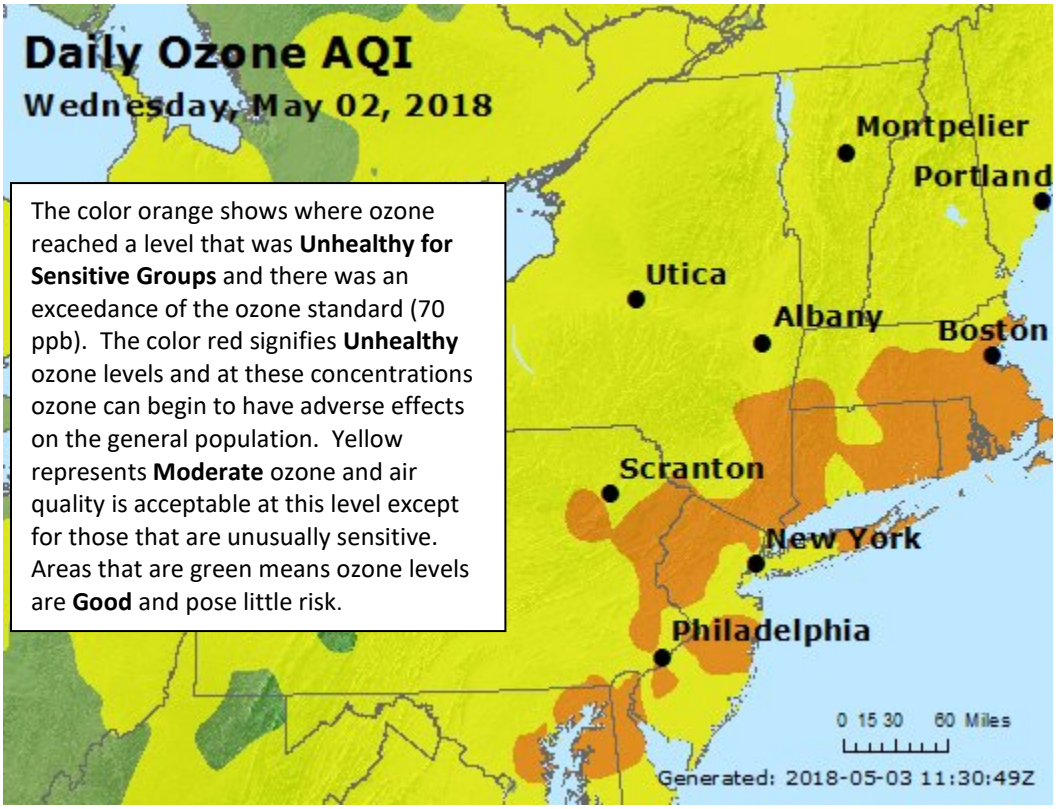
No station exceeded the 75 ppb ozone NAAQS of 2008, and none exceeded the 84 ppb ozone NAAQS of 1997. The highest 1-hour average ozone concentration recorded was 83 ppb, at both the Lums Pond station in Delaware and the Fair Hill station in Maryland, which is below the 1-hour ozone NAAQS of 120 ppb.

The number of days in 2018 on which exceedances of the 70 ppb ozone NAAQS were recorded for Delaware, Maryland and Pennsylvania is two (2), and one day for Connecticut and New York (See Table 4). Figure 1 shows graphically the regions ozone concentrations on May 2, 2018.

Table 4: Number of Ozone Exceedances by State

STATE	# of Days NAAQS was Exceeded January 1 – May 2, 2018 NAAQS = 70 ppb
Connecticut	1
Delaware	2
Maryland	2
New Jersey	2
New York	1
Pennsylvania	2

Figure 1. Ozone Air Quality Index for May 2, 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 high pressure was anchored off the coast of the Southeastern United States on May 2nd and continued to dominate the weather pattern for a second day. Associated high pressure ridging influenced the Mid-Atlantic and Northeastern states and provided abundant sunshine and above average temperatures throughout the day. Breezy southwest winds, steered by this system, further enhanced these conditions. In addition, a surface trough was noted over the northeast, extending from northern New England through New Jersey and into the Mid-Atlantic states.

In the day preceding this event, the abovementioned high pressure allowed for widespread levels of moderate and scattered unhealthy for sensitive group air quality throughout the eastern half of the United States. This pattern is known to enhance locally generated emissions as polluted air downwind travels northeastward through the I-95 corridor. This was observed on May 2nd. An already polluted air mass was enhanced by the weather conditions allowing for widespread exceedances in our nonattainment area.

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 2, 2018. The figures illustrate where the winds came from during the 48 hours preceding the high ozone event. Eleven (11) 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)
CT	Danbury	75
DE	LUMS2	74
MD	Fair Hill	75
NJ	Chester	73
NJ	Clarksboro	74
NJ	Colliers Mills	76
NJ	Columbia	74
NJ	Leonia	72
NJ	Ramapo	72
NY	Riverhead	72
PA	NORR	72

Surface level back trajectories (Figure 2) show that air affecting exceedance locations in much of the nonattainment area originated in portions of eastern Ohio while some locations experienced air originating in portions of Virginia. The location where the trajectories originated dictated the urban locations they would pass through. This is likely due to the influence of the surface trough that developed. Surface level trajectories traveling to northern New Jersey, New York and Connecticut crossed through Pennsylvania and the NYC metropolitan area. Surface trajectories ending in southern New Jersey, Pennsylvania and Delaware crossed through portions of West Virginia, Virginia, Maryland and Delaware before reaching their endpoints. In some cases, these trajectories passed through the metropolitan areas of Baltimore and Wilmington. Trajectories traveling at the low level, were brought down to the surface during the overnight and pre-dawn hours of May 1st and remained at the surface for the remainder of the 48-hour trajectory. During this time, surface air traveled very slowly; allowing emissions from cars, trucks, and industry to accumulate before reaching its destination. Mid and upper level back trajectories (Figures 3 & 4) followed similar pathways. Originating in the southern US, mid and upper air back trajectories traversed through 5 states, including the Ohio River Valley and all of Pennsylvania before reaching their endpoints. On May 1st, the eastern United States was experiencing widespread moderate and scattered unhealthy for sensitive groups air quality (see Figure 5). As a result, trajectories that passed through this region grew increasingly polluted as they traveled northeastward and eventually resulted in an exceedance.

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

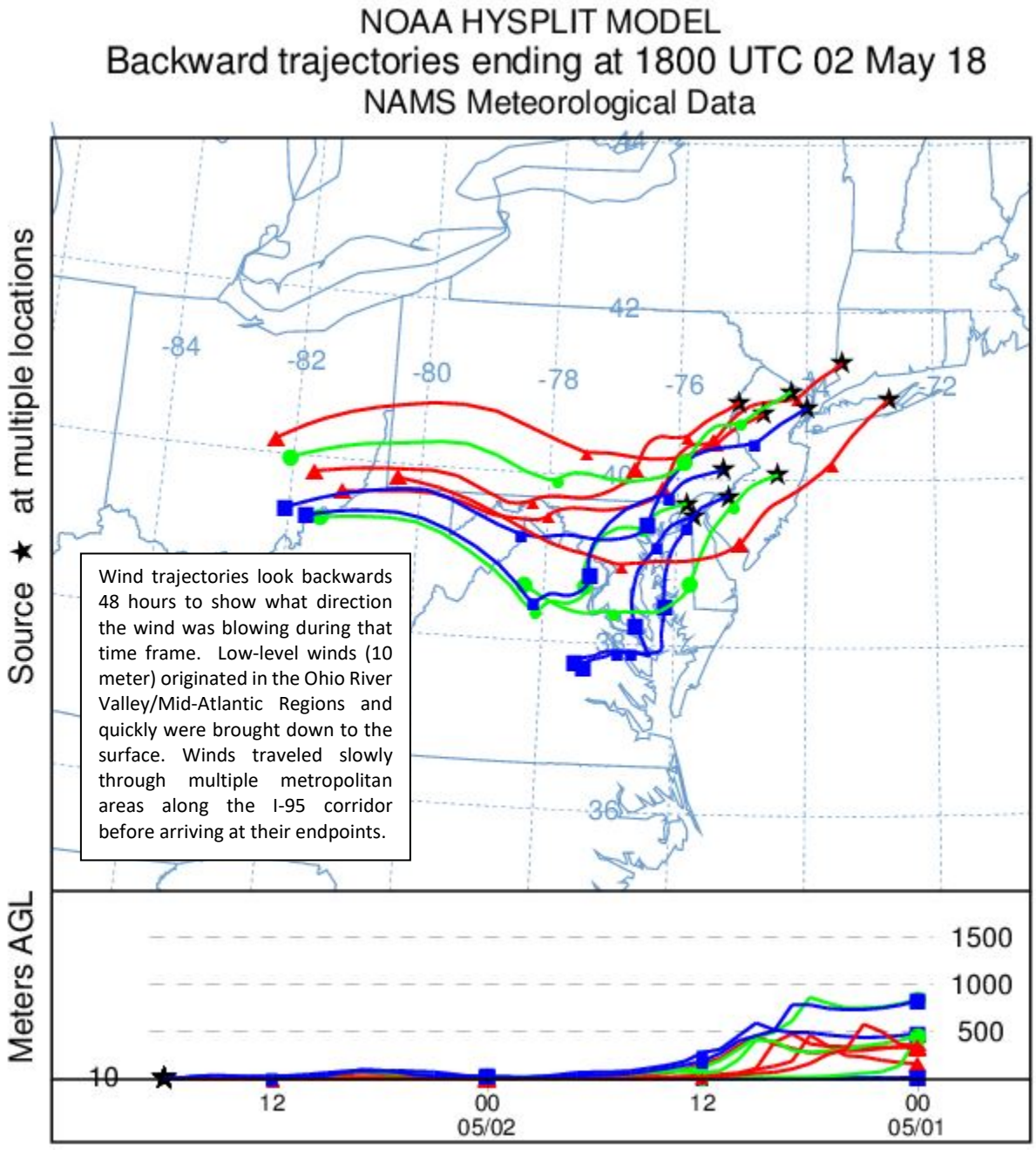


Figure 3. 48-hour Back Trajectories for May 2, 2018 at 500 meters

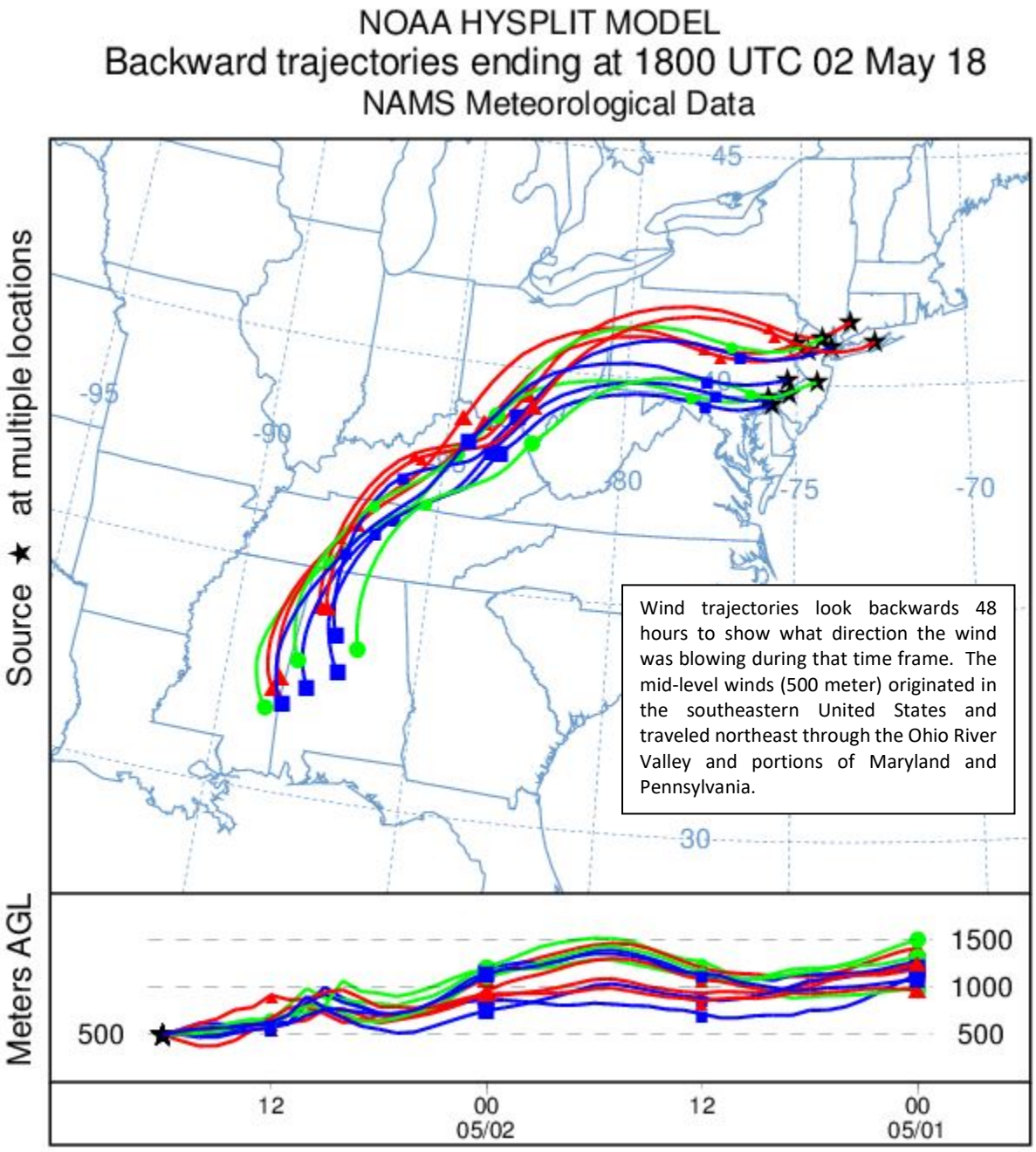


Figure 4. 48-hour Back Trajectories for May 2, 2018 at 1500 meters

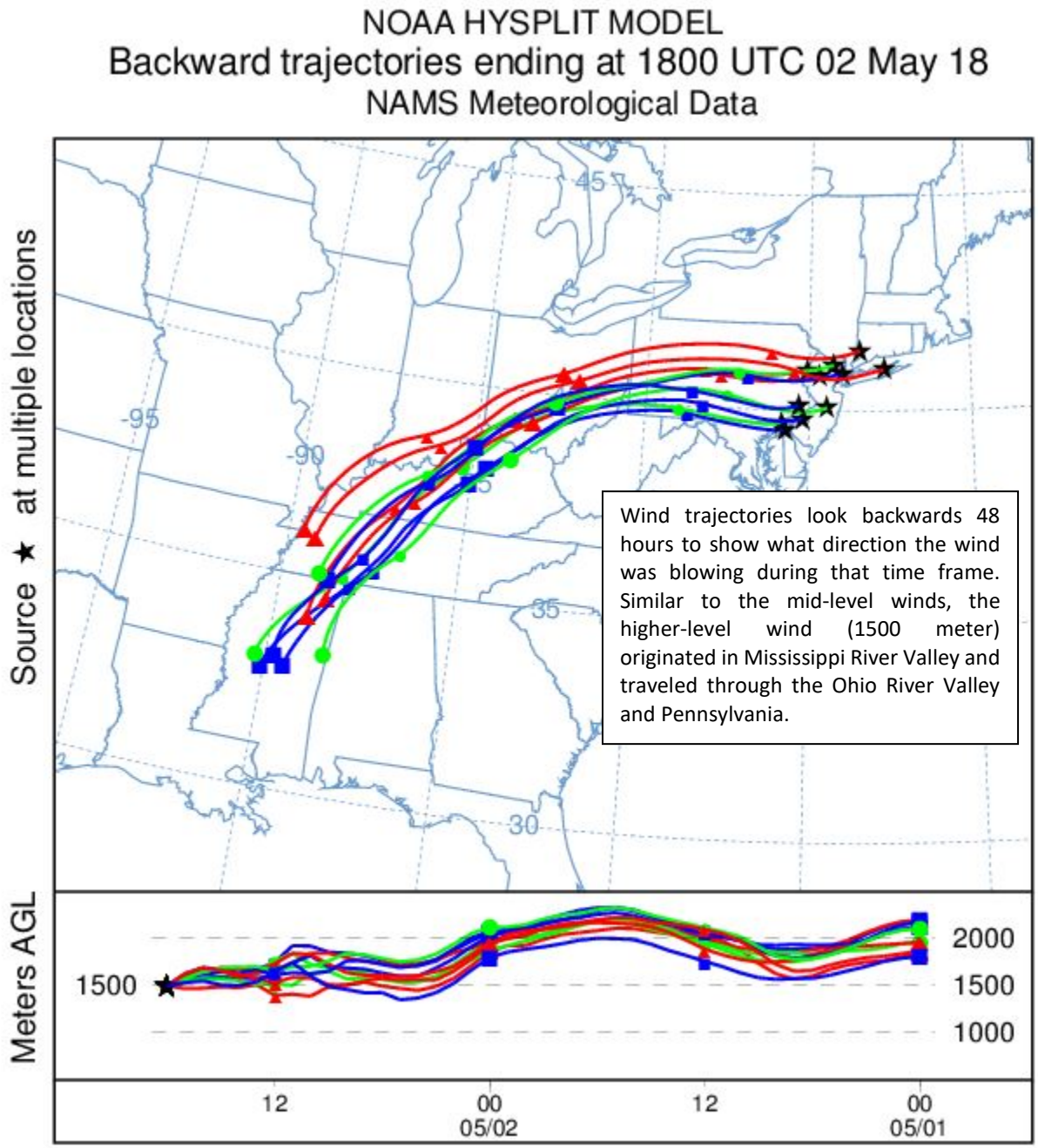
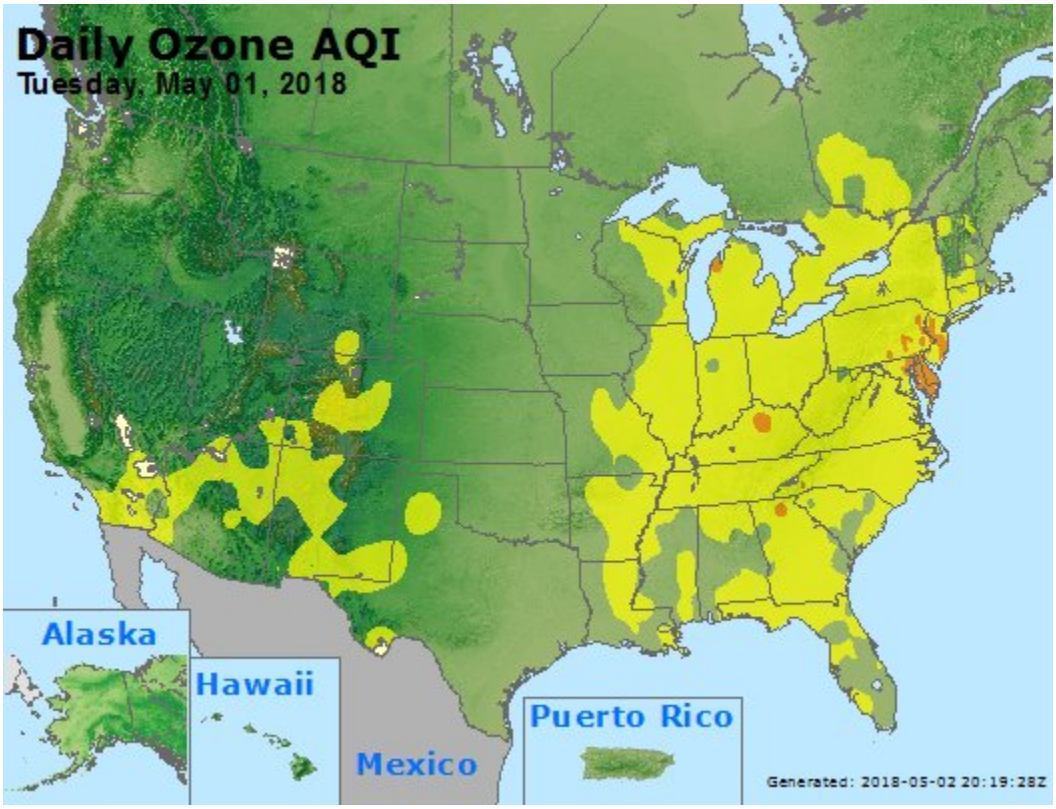


Figure 5. Ozone Air Quality Index for the United States on May 1, 2018



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.