Ozone National Ambient Air Quality Standard Health Exceedances on May 25, 2018

Exceedance Locations and Levels

On Friday, May 25, 2018, there were two (2) exceedances in New Jersey of the National Ambient Air Quality Standard (NAAQS) for ozone (daily maximum 8-hour average of 70 ppb). See Table 1.

Table 1. Maximum 8-Hour Average Ozone Concentrations in New Jersey on May 25, 2018

STATION	Daily Maximum 8-Hr Average (ppb)
Ancora State Hospital	54
Bayonne	65
Brigantine	43
Camden Spruce St	62
Chester	68
Clarksboro	61
Colliers Mills	62
Columbia	61
Flemington	65
Leonia	65
Millville	53
Monmouth University	59
Newark Firehouse	63
Ramapo	64
Rider University	72
Rutgers University	71
Washington Crossing*	No Data

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

From the out-of-state stations within New Jersey's ozone non-attainment areas, there were six (6) exceedances of the ozone NAAQS. See Table 2.

Table 2: Ozone Concentrations at Out-of-State Monitoring Stations in New Jersey's Ozone Non-Attainment Areas on May 25, 2018

STATE	STATION	Daily Maximum 8-Hr Average (ppb)
CT	Danbury	72
CT	Greenwich	67
CT	Madison-Beach Road	71
CT	Middletown	77

CT	New Haven	59
CT	Stratford	70
CT	Westport	75
DE	BCSP (New Castle Co.)	57
DE	BELLFNT2 (New Castle Co.)	66
DE	KILLENS (Kent Co.)	56
DE	LEWES (Sussex Co.)	57
DE	LUMS 2 (New Castle Co.)	58
DE	MLK (New Castle Co.)	63
DE	SEAFORD (Sussex Co.)	58
MD	Fair Hill	67
NY	Babylon	63
NY	Bronx - IS52	63
NY	CCNY	61
NY	Holtsville	62
NY	Pfizer Lab	65
NY	Queens	73
NY	Riverhead	68
NY	Rockland Cty	66
NY	White Plains	70
NY	Susan Wagner	No Data
PA	BRIS (Bucks Co.)	71
PA	CHES (Delaware Co.)	57
PA	NEWG (Chester Co.)	63
PA	NORR (Montgomery Co.)	70
PA	LAB (Philadelphia Co.)	No Data
PA	NEA (Philadelphia Co.)	68
PA	NEW (Philadelphia Co.)	64

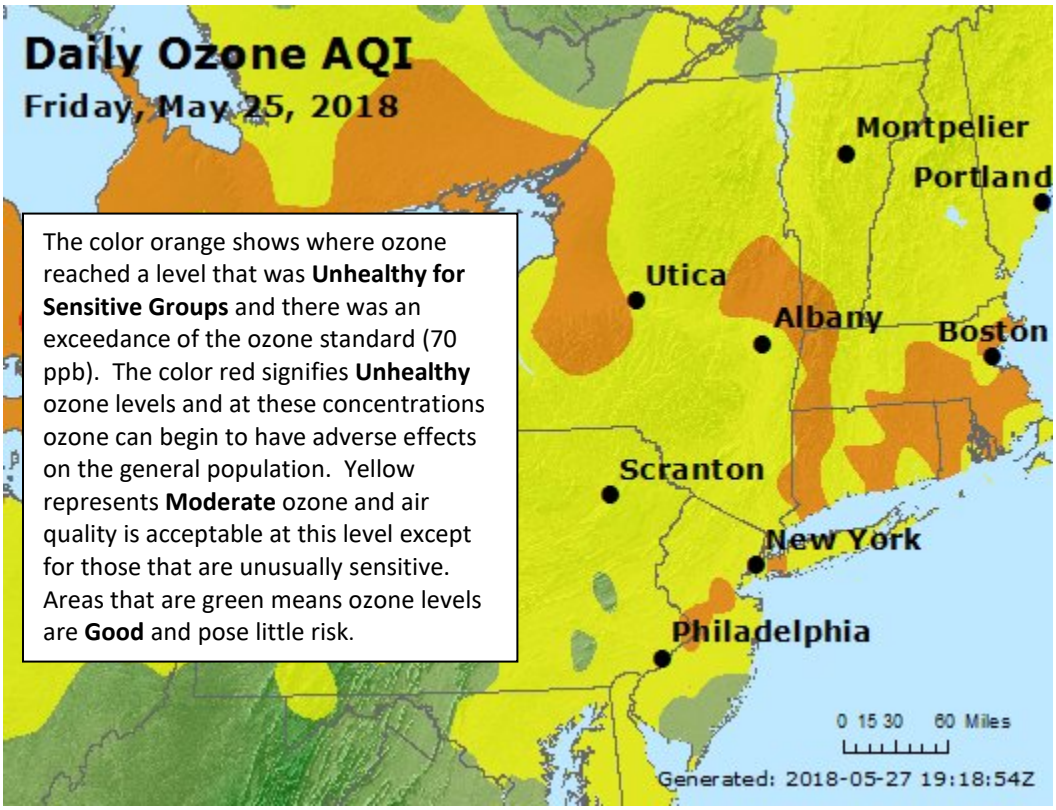
The number of days in 2018 on which exceedances of the ozone NAAQS were recorded for all the states is summarized in Table 3. Figure 1 shows graphically the region's ozone concentrations on May 25, 2018.

Table 3: Number of Days Ozone NAAQS was Exceeded in NJ's Non-Attainment Areas in 2018

STATE	# of Days NAAQS was Exceeded January 1 – May 25, 2018 NAAQS = 70 ppb
Connecticut	3
Delaware	2
Maryland	2
New Jersey	3

New York	2
Pennsylvania	3

Figure 1. Ozone Air Quality Index for May 25, 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

A high pressure system over the Great Lakes region on May 24th moved east-southeast toward the Mid-Atlantic early on the May 25th and merged with a secondary high pressure off the U.S. east coast. This newly established high pressure system remained anchored off shore for the remainder of the day allowing for abundant sunshine, light winds becoming southwesterly, and temperatures reaching the mid-upper 80s throughout the non-attainment area. Meanwhile, a surface trough was noted throughout the day and extended from southern New England through the Hudson Valley, northwestern New Jersey, and Pennsylvania.

In the day preceding this event, moderate and scattered USG ozone levels were noted throughout the Mid-Atlantic, Great Lakes, and Mid-West regions of the United States. As the abovementioned high pressure traveled east and stalled off-shore, already polluted air was transported into our region, both

at the surface and aloft. At the surface, southwest winds ushered air from the Mid-Atlantic region and Chesapeake Bay along the I-95 corridor. As this already polluted air traveled northeast, it was enhanced by locally generated emissions from cars, trucks, and industry along the way. In addition, the upper level pattern allowed for a westerly transport of polluted air from the Great Lakes and Mid-West into our region.

Finally, vertical smoke was noted over our region on May 25th which appears to have been transported from wildfires in the Canadian Prairies. As smoke is known to contain pollutant precursors for ozone formation, it is possible that, in addition to the above, this smoke enhanced ozone levels across our non-attainment 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 on May 25, 2018. The figures illustrate where the winds came from during the 48 hours preceding the high ozone event. Seven (7) monitoring stations with an 8-hr ozone exceedance were used to run back trajectories. The selected sites and the maximum 8-hr ozone level recorded are listed in Table 4 below:

Table 4: 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	72
CT	Madison Beach Road	71
CT	Westport	75
NJ	Rider University	72
NJ	Rutgers University	71
NY	Queens	73
PA	BRIS (Bucks Co.)	71

Surface level back trajectories (Figure 2) originated in portions of southeastern Pennsylvania, Maryland and Delaware and recirculated around this region the day prior to the exceedances (May 24th). This recirculation is due to the strong sea-breeze that developed on the 24th causing the polluted air to be blown back onshore and pick up additional emissions along the remainder of its path. The trajectory affecting western Connecticut was likely influenced by weak low pressure that developed over Connecticut and formed a surface trough. Back trajectories at the mid-level (Figure 3) originated in central Pennsylvania and southern Ontario. Mid-level trajectories traveled southward where they met a stationary front causing the air to stall in Virginia before being looped back into the circulation of high pressure. Some mid-level trajectories descended from aloft while others remained at 500m for the duration of their path. Unlike the low and mid-level back trajectories, the upper level trajectories (Figure 4) did not show a recirculation pattern. However, upper level trajectories originated in Ontario and traveled southeastward towards Pennsylvania where they made a sharp change in direction traveling eastward to their destinations in central New Jersey, New York, and Connecticut. Upper level

trajectories passed through portions of Pennsylvania that saw widespread moderate levels of ozone on the 24th before reaching their endpoints.

Figure 2. 48-hour Back Trajectories for May 25, 2018 at 10 meters

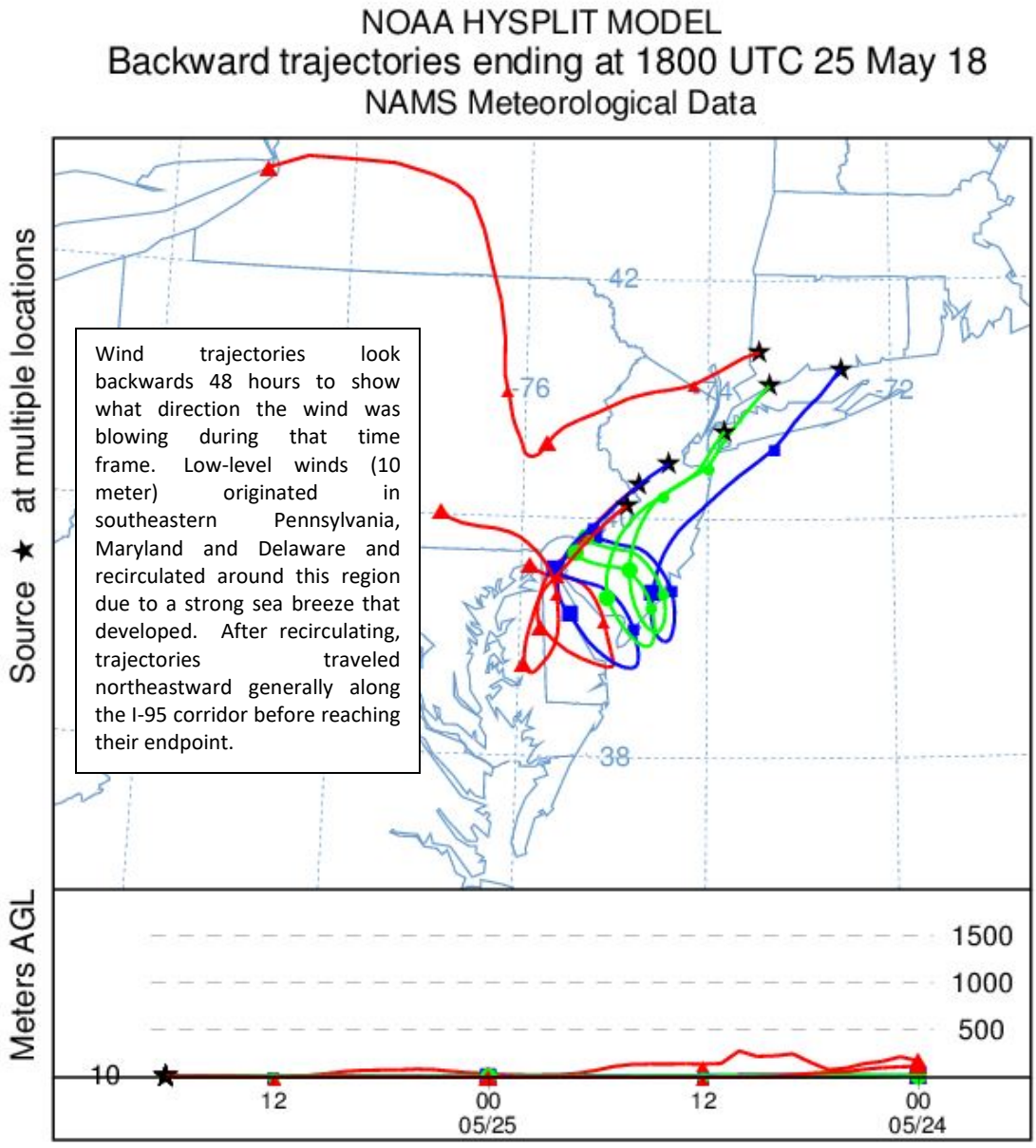


Figure 3. 48-hour Back Trajectories for May 25, 2018 at 500 meters

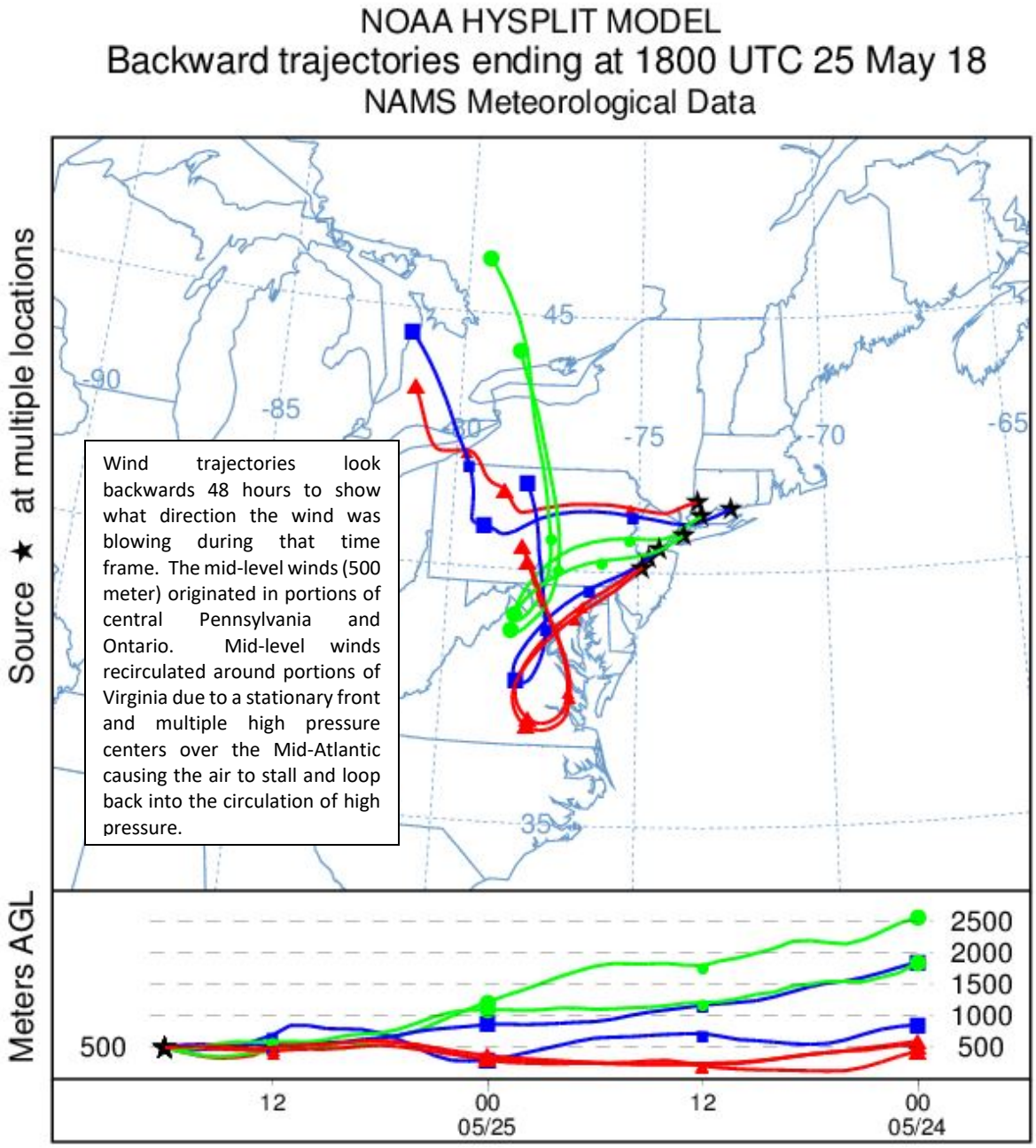


Figure 4. 48-hour Back Trajectories for May 25, 2018 at 1500 meters

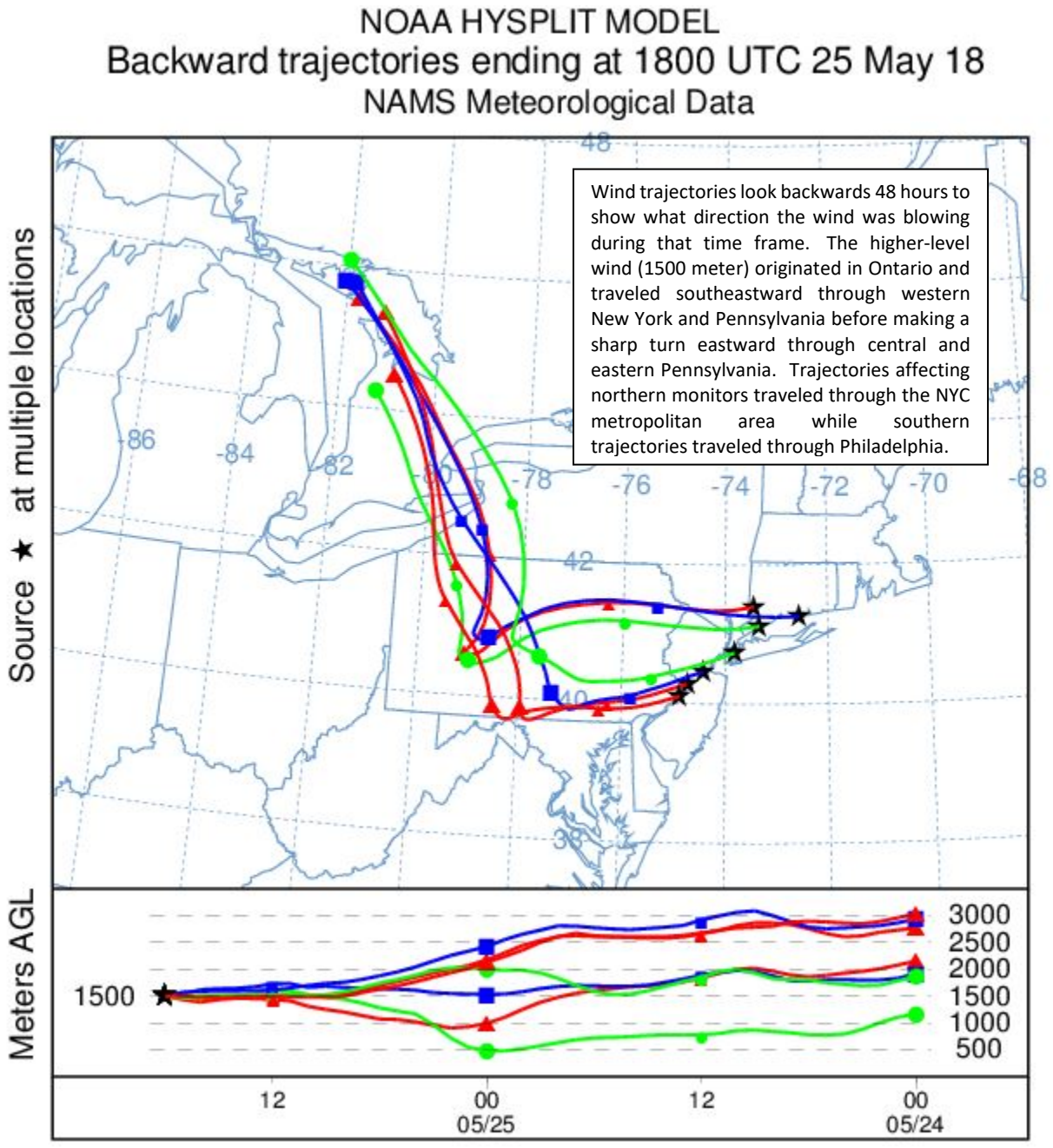
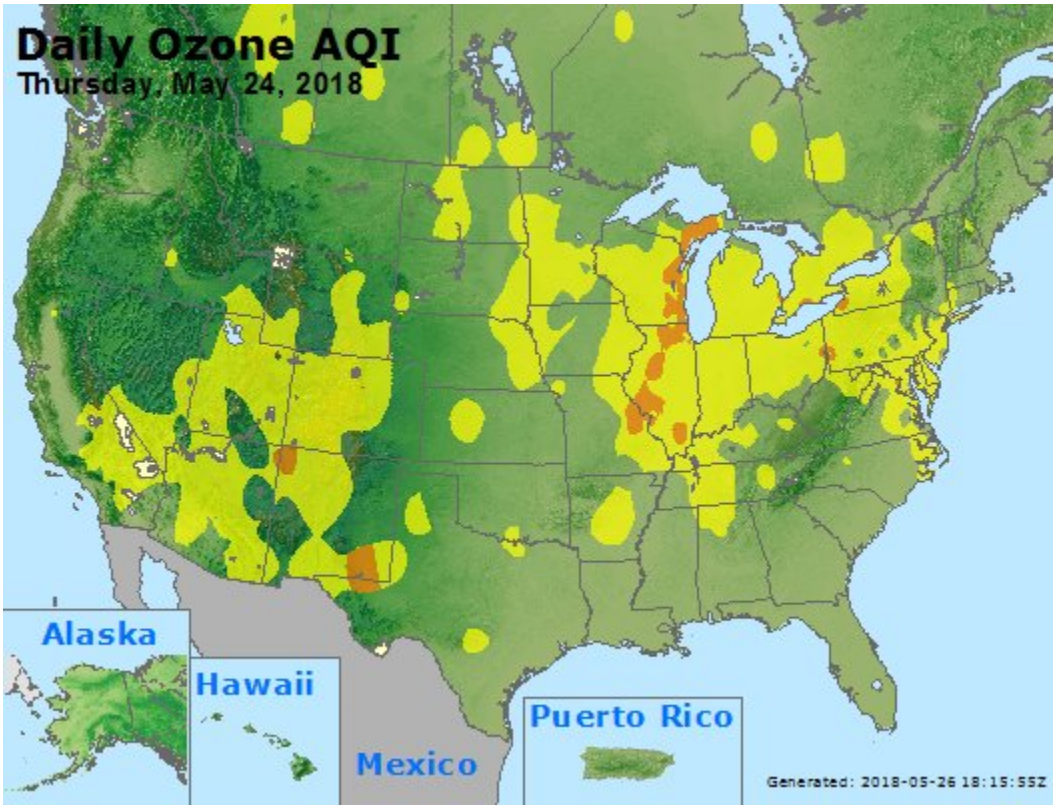


Figure 5. Ozone Air Quality Index for the United States on May 24, 2018



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.