Ozone National Ambient Air Quality Standard Health Exceedances on July 19, 2018

Exceedance Locations and Levels

On Thursday, July 19, 2018, there was one (1) exceedance 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. New Jersey 8-hr Maximum Ozone Concentrations on July 19, 2018

STATION	Daily Maximum 8-Hr Average (ppb)
Ancora State Hospital	49
Bayonne	56
Brigantine	40
Camden Spruce St	69
Chester	66
Clarksboro	76
Colliers Mills	51
Columbia	50
Flemington	66
Leonia	63
Millville	57
Monmouth University	51
Newark Firehouse	54
Ramapo	62
Rider University	66
Rutgers University	57
Washington Crossing*	69
TOTAL EXCEEDANCES	1

*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 zero (0) exceedances of the ozone NAAQS. See Table 2.

Table 2. 8-hr Maximum Ozone Concentrations for Out-of-State Monitoring Stations in New Jersey's Ozone Non-Attainment Areas on July 19, 2018

STATE	STATION	Daily Maximum 8-Hr Average (ppb)
CT	Danbury	44
CT	Greenwich	51

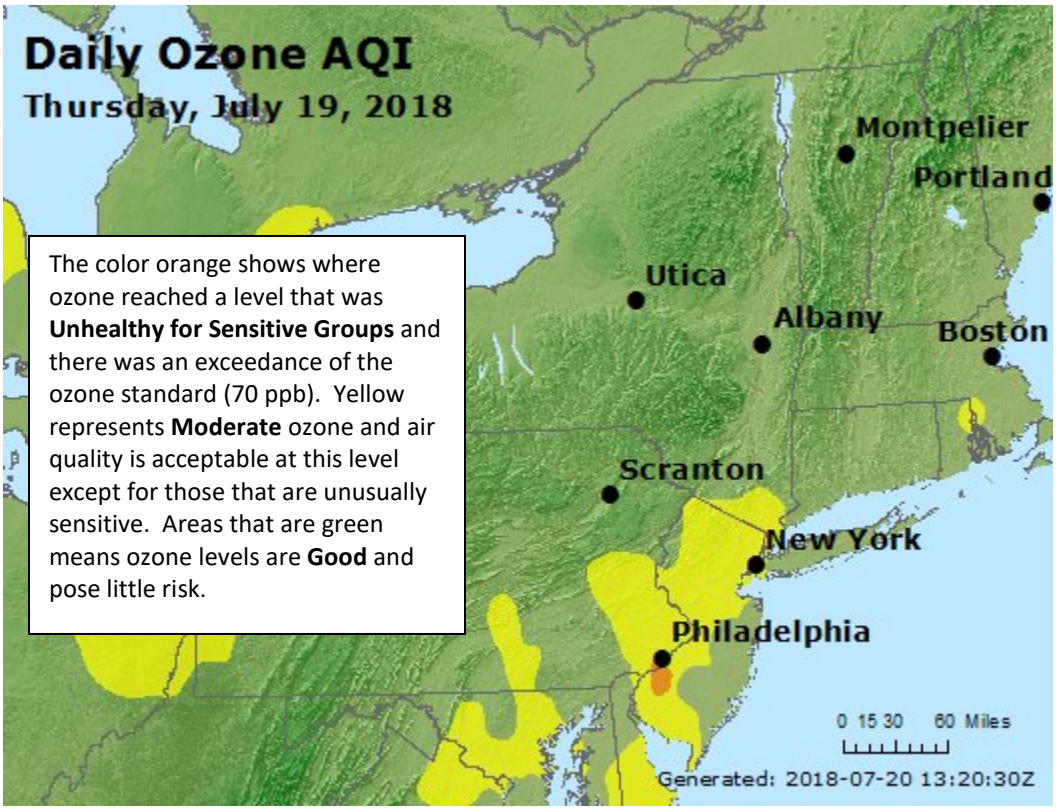
CT	Madison-Beach Road	48
CT	Middletown-CVH-Shed	54
CT	New Haven	48
CT	Stratford	52
CT	Westport	46
DE	BCSP (New Castle Co.)	53
DE	BELLFNT2 (New Castle Co.)	58
DE	KILLENS (Kent Co.)	58
DE	LEWES (Sussex Co.)	59
DE	LUMS 2 (New Castle Co.)	50
DE	MLK (New Castle Co.)	51
DE	SEAFORD (Sussex Co.)	56
MD	Fair Hill	47
NY	Babylon	49
NY	Bronx - IS52	55
NY	CCNY	55
NY	Holtsville	47
NY	Pfizer Lab	56
NY	Queens	53
NY	Riverhead	48
NY	Rockland Cty	56
NY	White Plains	58
NY	Susan Wagner	No Data
PA	BRIS (Bucks Co.)	63
PA	CHES (Delaware Co.)	68
PA	NEWG (Chester Co.)	51
PA	NORR (Montgomery Co.)	59
PA	LAB (Philadelphia Co.)	66
PA	NEA (Philadelphia Co.)	69
PA	NEW (Philadelphia Co.)	64
	TOTAL EXCEEDANCES	0

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 regions ozone concentrations on July 19, 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 – July 19, 2018 NAAQS = 70 ppb
Connecticut	14
Delaware	8
Maryland	6
New Jersey	16
New York	14
Pennsylvania	12

Figure 1. Ozone Air Quality Index for July 19, 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 large high pressure system was the dominant weather feature for the northeastern United States on Thursday, July 19th. The high pressure's center was noted over the Lake Erie/Lake Ontario region in the morning, slowly moved east over the nonattainment area in the afternoon and evening, and then emerged off the east coast late in the day.

With high pressure in control, mostly sunny skies were observed across the nonattainment area. Temperatures ranged from the upper 70s in northern locations to the mid-80s down south. Wind direction observed at a particular location depends upon its location relative to the high pressure circulation. For example, winds near the exceedance location in southern New Jersey were northerly in the morning and as the high pressure center moved east throughout the day, winds veered to a more southeasterly direction. Winds were also light in nature at this location with periods of calm noted in the early evening hours.

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 July 19, 2018. The figures illustrate where the winds came from during the 48 hours preceding the high ozone event. One (1) monitoring station with an 8-hr ozone exceedance was used to run back trajectories. The selected site and the maximum 8-hr ozone level recorded is 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)
NJ	Clarksboro	76

Surface-level back trajectories (Figure 2) originated in the upper atmosphere near the Hudson Bay and traveled quickly southward through portions of Ontario, Quebec, and New York through July 18th. Air was steered by a large high pressure system over the Great Lakes Region during this time and was highly influenced by the sinking motion associated with the system. As the high pressure center moved east over the northeastern United States, air began to slow as it traveled over eastern Pennsylvania through early July 19th. The surface-level trajectory shows that there was very little air movement during the last 6 hours of its path over the Philadelphia metropolitan area. Similarly, mid-level back trajectories (Figure 3) originated near the Hudson Bay and traveled south through portions of northern and eastern New York through late July 18th. Air then continued south through the Hudson Valley, New York City metropolitan area, and central New Jersey to arrival. Meanwhile, upper-level back trajectories (Figure 4) originated in eastern Ontario and traveled southeast through western New York to northeastern Pennsylvania through July 18th. Air then continued generally south across eastern Pennsylvania and the Philadelphia metropolitan area before reaching it endpoint. Finally, Figure 5 below shows the ozone air quality index values recorded for the United States on July 18th, 2018. This map shows how clean the northeastern United States was the day prior to this exceedance, and therefore suggests that the cause

of the isolated exceedance on July 19th is a combination of stagnant, slow-moving air masses and local emissions, including emissions from neighboring Pennsylvania sources.

Figure 2. 48-hour Back Trajectories for July 19, 2018 at 10 meters

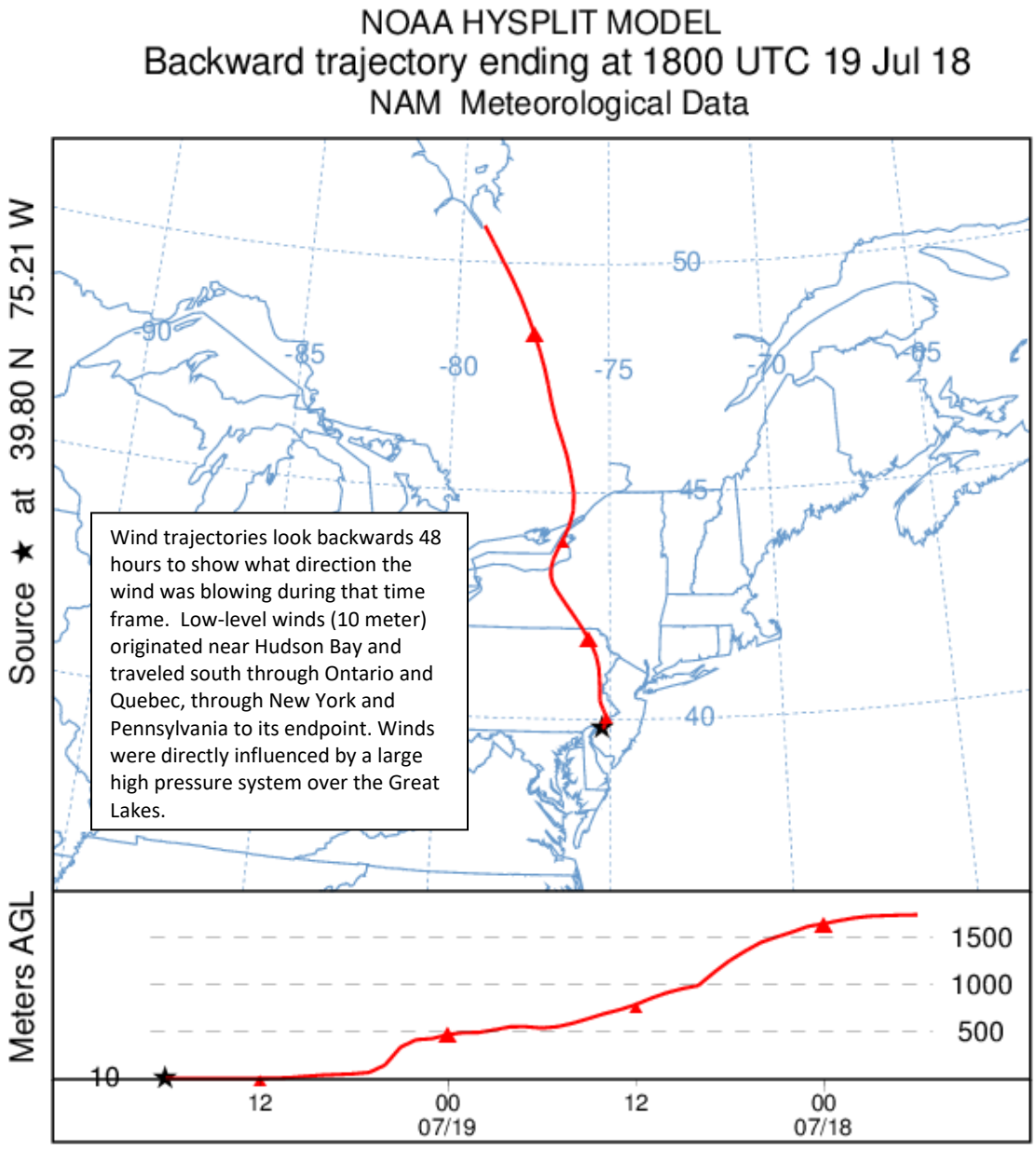


Figure 3. 48-hour Back Trajectories for July 19, 2018 at 500 meters

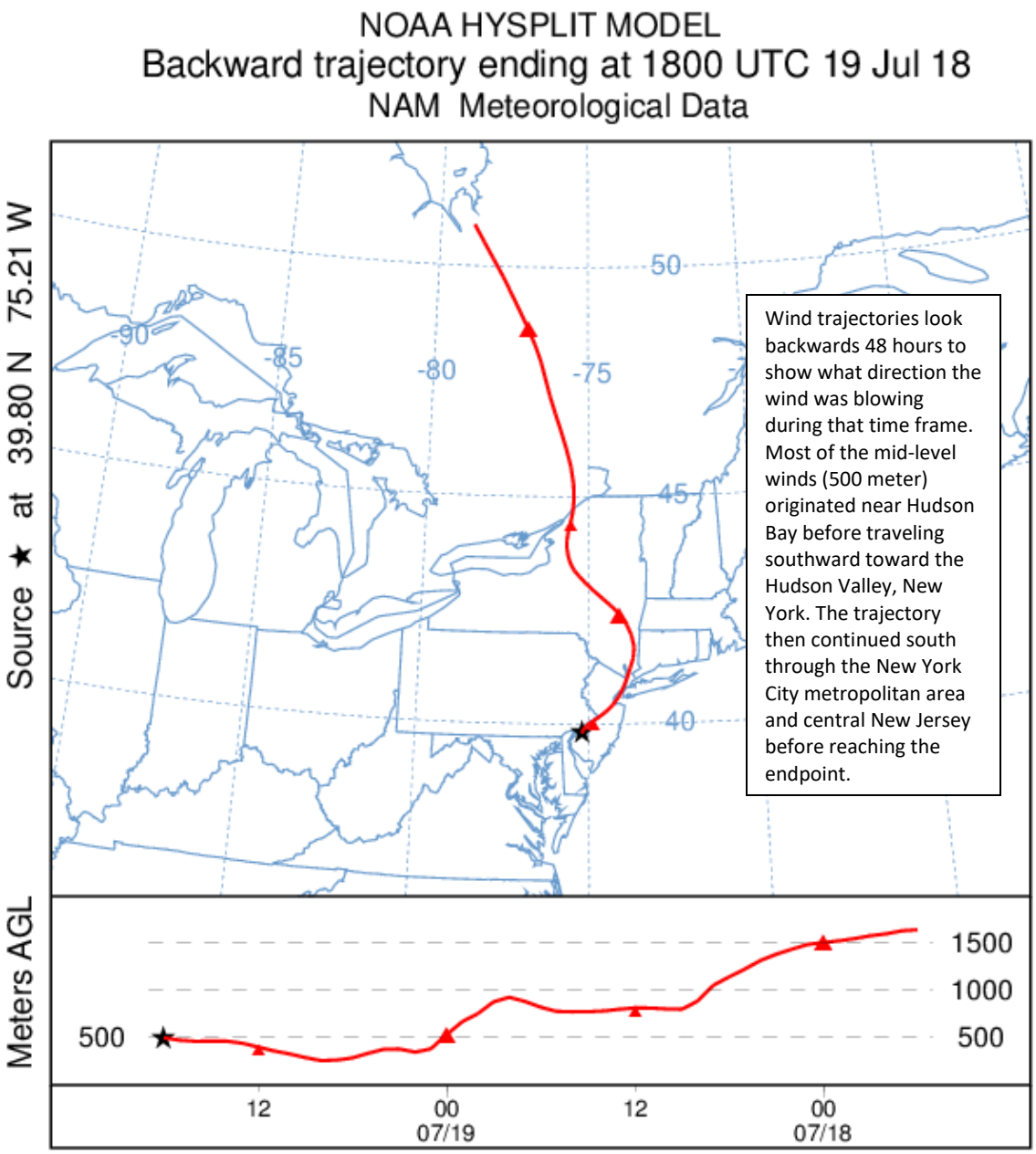


Figure 4. 48-hour Back Trajectories for July 19, 2018 at 1500 meters

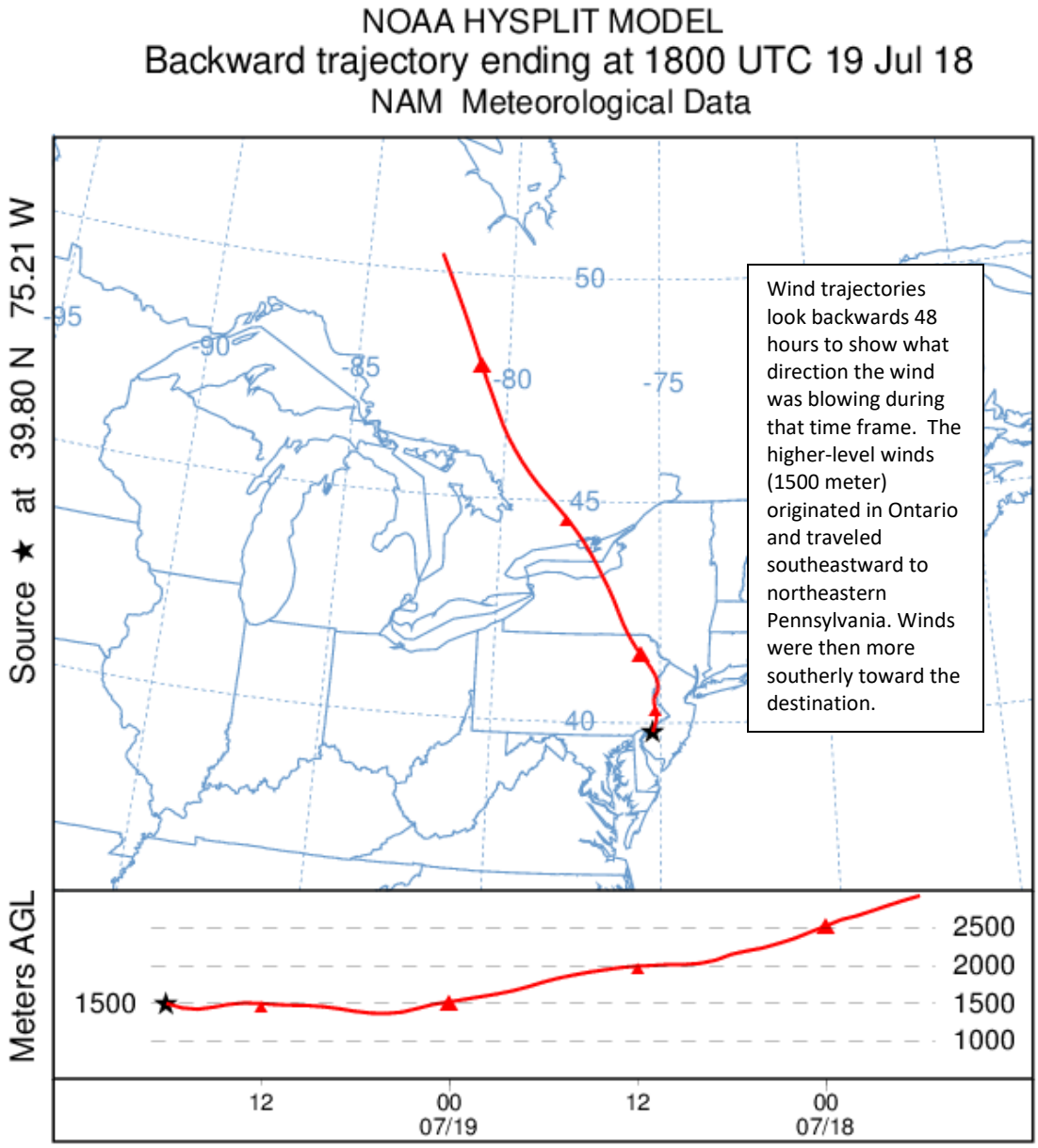
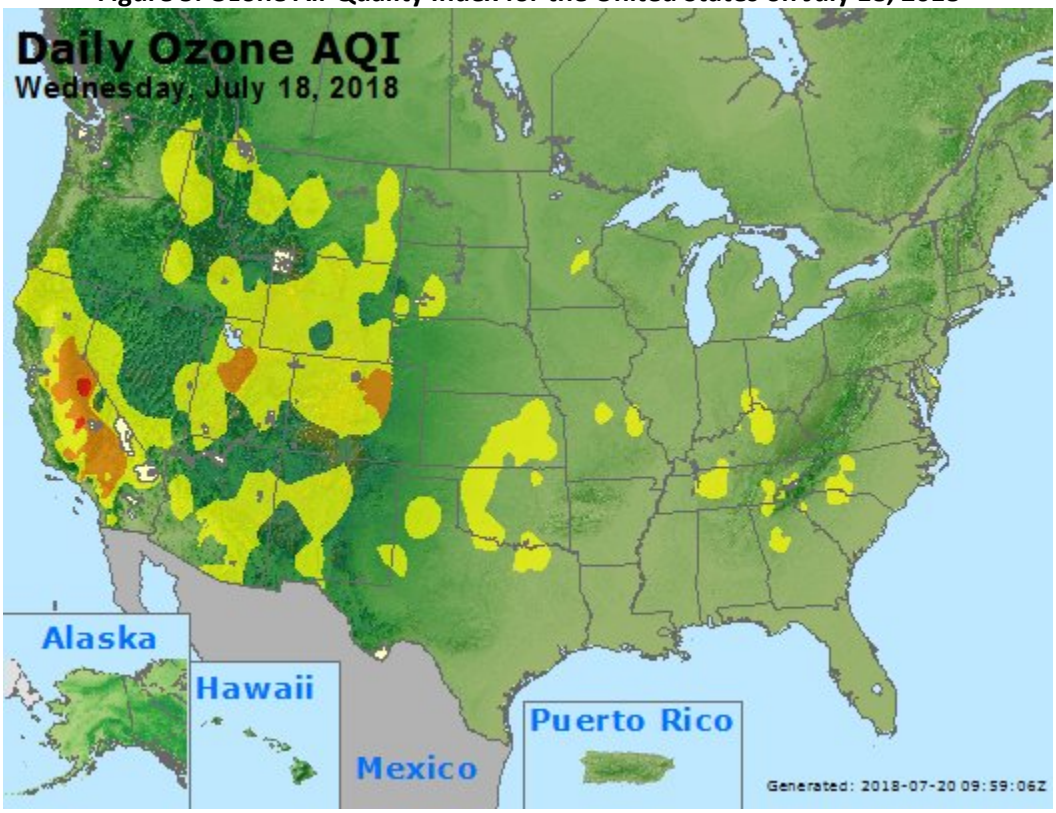


Figure 5. Ozone Air Quality Index for the United States on July 18, 2018



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.