Ozone National Ambient Air Quality Standard Health Exceedances on July 3, 2018

Exceedance Locations and Levels

On Tuesday, July 3, 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. Since the single exceedance occurred at EPA's Washington Crossing station and the concentration at Washington Crossing was significantly higher than the concentration measured at NJ's nearby Rider University station, we are working with EPA to confirm the measurement.

Table 1. New Jersey 8-hr Maximum Ozone Concentrations on July 3, 2018

STATION	Daily Maximum 8-Hr Average (ppb)
Ancora State Hospital	52
Bayonne	55
Brigantine	38
Camden Spruce St	67
Chester	67
Clarksboro	61
Colliers Mills	51
Columbia	45
Flemington	66
Leonia	61
Millville	40
Monmouth University	36
Newark Firehouse	49
Ramapo	58
Rider University	70
Rutgers University	67
Washington Crossing*	81
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 two (2) 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 3, 2018

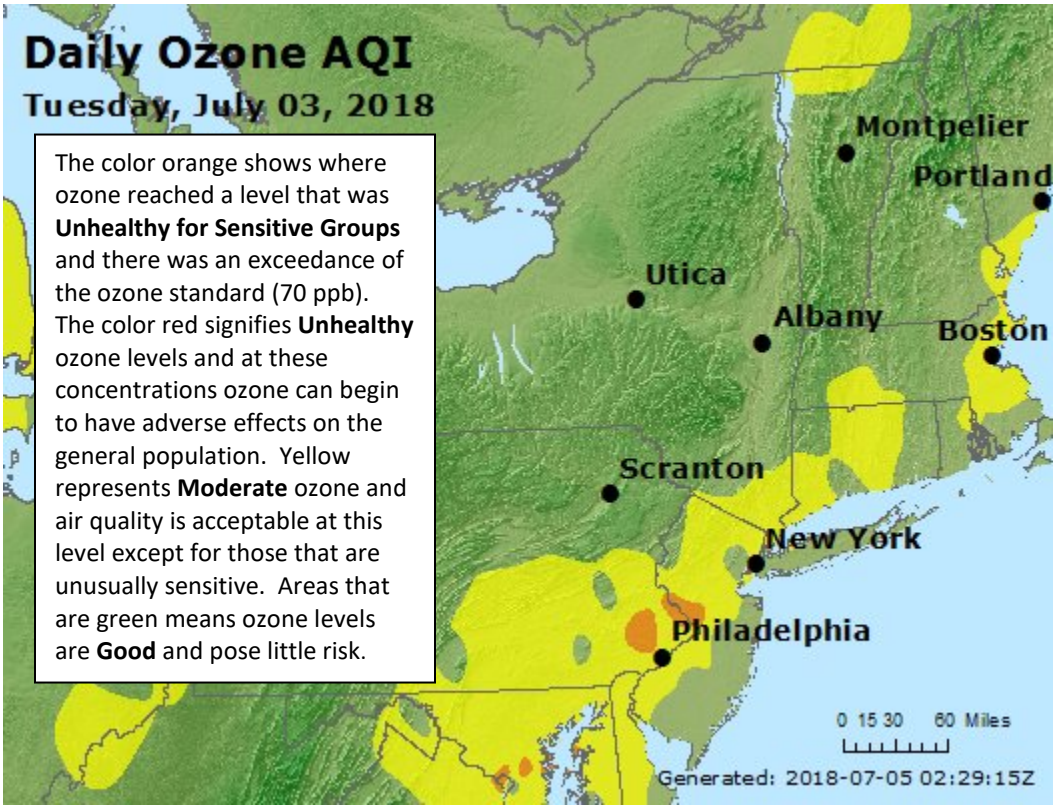
STATE	STATION	Daily Maximum 8-Hr Average (ppb)
CT	Danbury	67
CT	Greenwich	63
CT	Madison-Beach Road	54
CT	Middletown-CVH-Shed	64
CT	New Haven	48
CT	Stratford	57
CT	Westport	62
DE	BCSP (New Castle Co.)	69
DE	BELLFNT2 (New Castle Co.)	65
DE	KILLENS (Kent Co.)	59
DE	LEWES (Sussex Co.)	47
DE	LUMS 2 (New Castle Co.)	63
DE	MLK (New Castle Co.)	72
DE	SEAFORD (Sussex Co.)	55
MD	Fair Hill	69
NY	Babylon	42
NY	Bronx - IS52	50
NY	CCNY	54
NY	Holtsville	43
NY	Pfizer Lab	57
NY	Queens	46
NY	Riverhead	49
NY	Rockland Cty	64
NY	White Plains	66
NY	Susan Wagner	No Data
PA	BRIS (Bucks Co.)	67
PA	CHES (Delaware Co.)	61
PA	NEWG (Chester Co.)	67
PA	NORR (Montgomery Co.)	78
PA	LAB (Philadelphia Co.)	57
PA	NEA (Philadelphia Co.)	60
PA	NEW (Philadelphia Co.)	61
	TOTAL EXCEEDANCES	2

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 3, 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 3, 2018 NAAQS = 70 ppb
Connecticut	9
Delaware	5
Maryland	4
New Jersey	12
New York	10
Pennsylvania	9

Figure 1. Ozone Air Quality Index for July 3, 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

High pressure over the Mid-Atlantic, which was responsible for several days of hazy, hot and humid weather in the nonattainment area, gradually weakened on Tuesday July 3rd as a frontal boundary slowly approached our region from the northwest. This front passed over western/central New York around mid-day, then pushed through portions of Pennsylvania and New England before stalling just west of New Jersey in the evening hours. Ahead of this frontal boundary, large, very slow-moving thunderstorms developed over New Jersey/southeastern Pennsylvania in the afternoon/evening with a focus generally along the I-95 corridor. Although these thunderstorms limited sunshine, they provided vertical motion in the atmosphere which allowed ozone from the upper atmosphere to mix to the surface in isolated locations.

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 2, 2018. The figures illustrate where the winds came from during the 48 hours preceding the high ozone event. Three (3) 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)
DE	MLK	72
OAP	Wash. Crossing	81
PA	NORR	78

Surface level back trajectories (Figure 2) originated off the coast of North Carolina/Virginia and traveled northward over the Atlantic Ocean. The surface trajectory traveling to Delaware crossed through Maryland, Delaware, and the Wilmington metropolitan area before reaching its endpoint. Trajectories traveling to New Jersey and Pennsylvania traveled through Southern New Jersey and Philadelphia before reaching their endpoints. Surface level winds traveled slowly along the surface for the duration of their path picking up emissions from cars, trucks, and industry along the way. Mid-level trajectories (Figure 3) originated in North Carolina and Virginia and traveled northeastward into Maryland and across the Chesapeake Bay. Air at the mid-levels then passed through the metropolitan areas of Wilmington and Philadelphia before reaching their endpoints. Upper level trajectories (Figure 4) originated in southern Virginia and traveled through the state and in the vicinity of the Washington, D.C. metro area. Air at the upper levels then traveled through Maryland, Pennsylvania where high ozone levels were recorded the previous day. Figure 5 shows the national ozone concentrations observed the previous day on July 2nd, 2018.

Figure 2. 48-hour Back Trajectories for July 3, 2018 at 10 meters

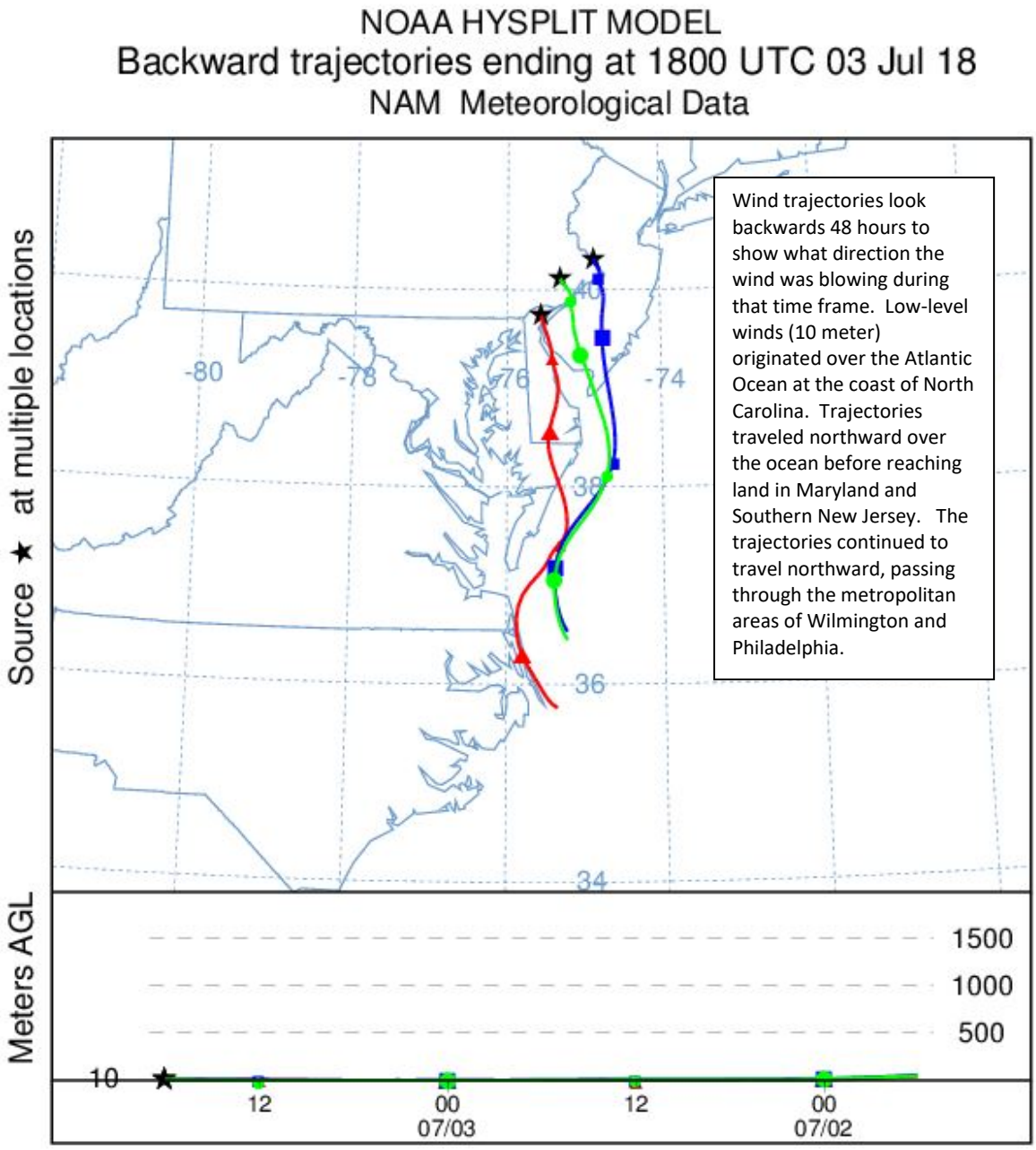


Figure 3. 48-hour Back Trajectories for July 3, 2018 at 500 meters

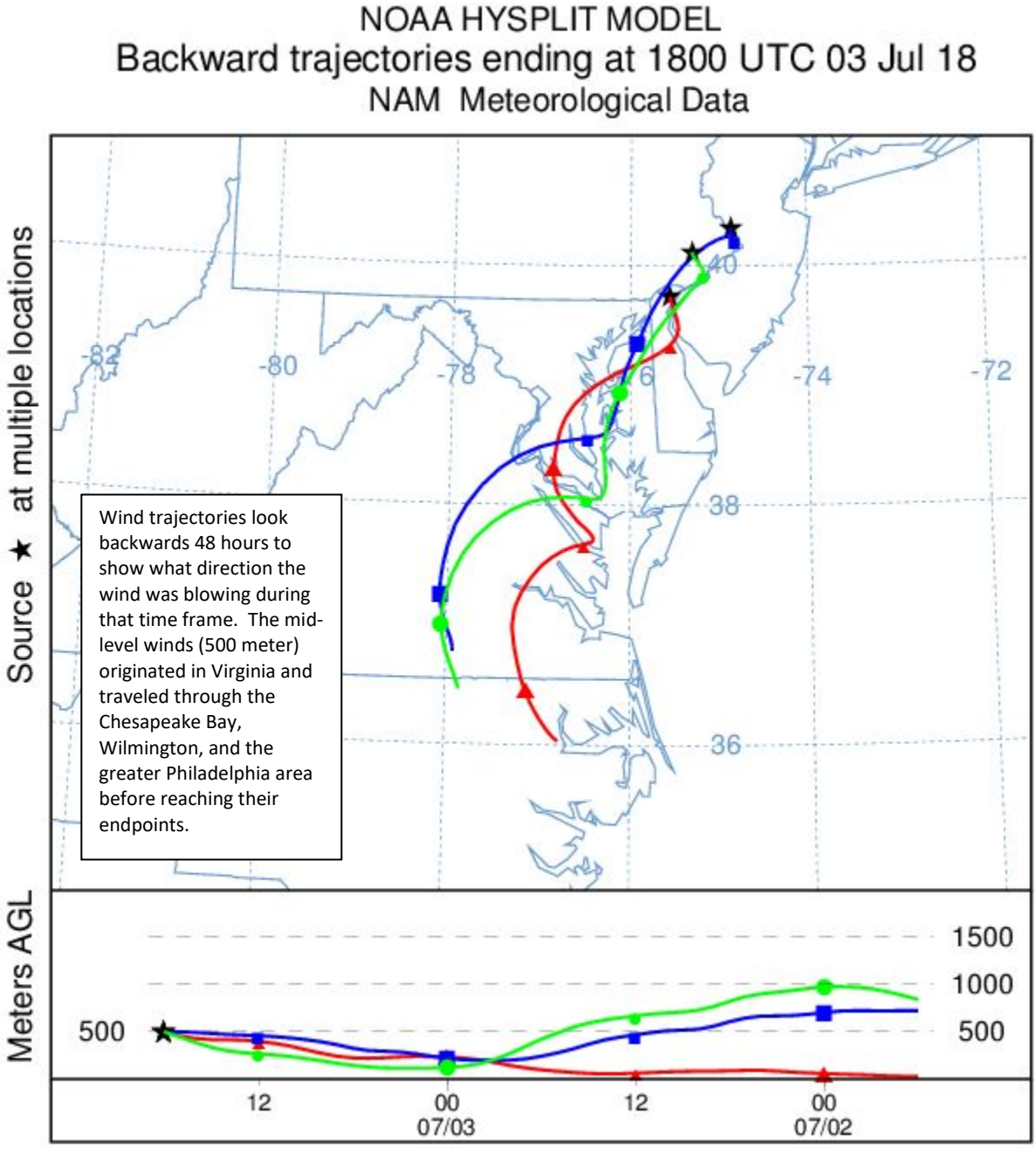


Figure 4. 48-hour Back Trajectories for July 3, 2018 at 1500 meters

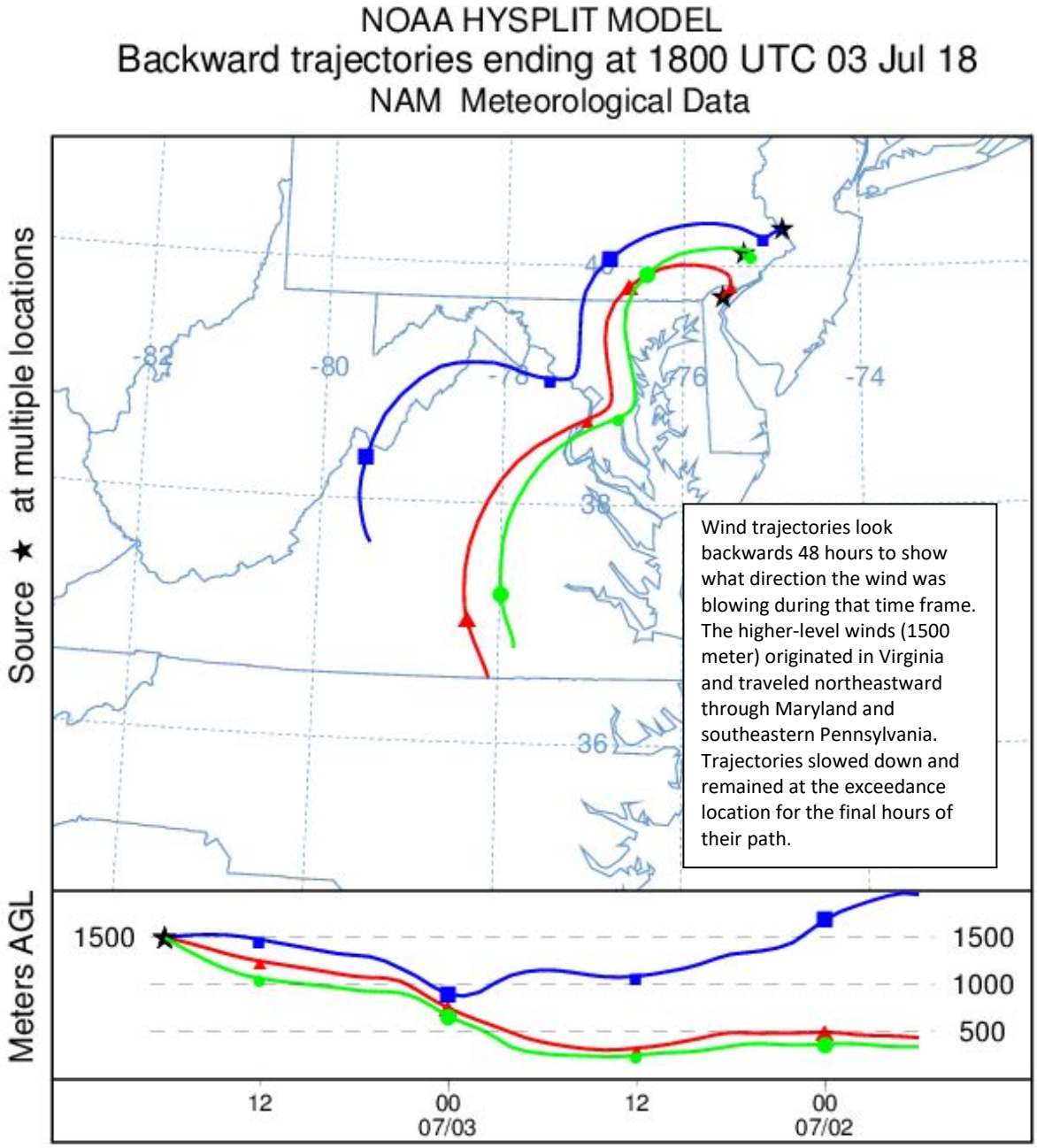
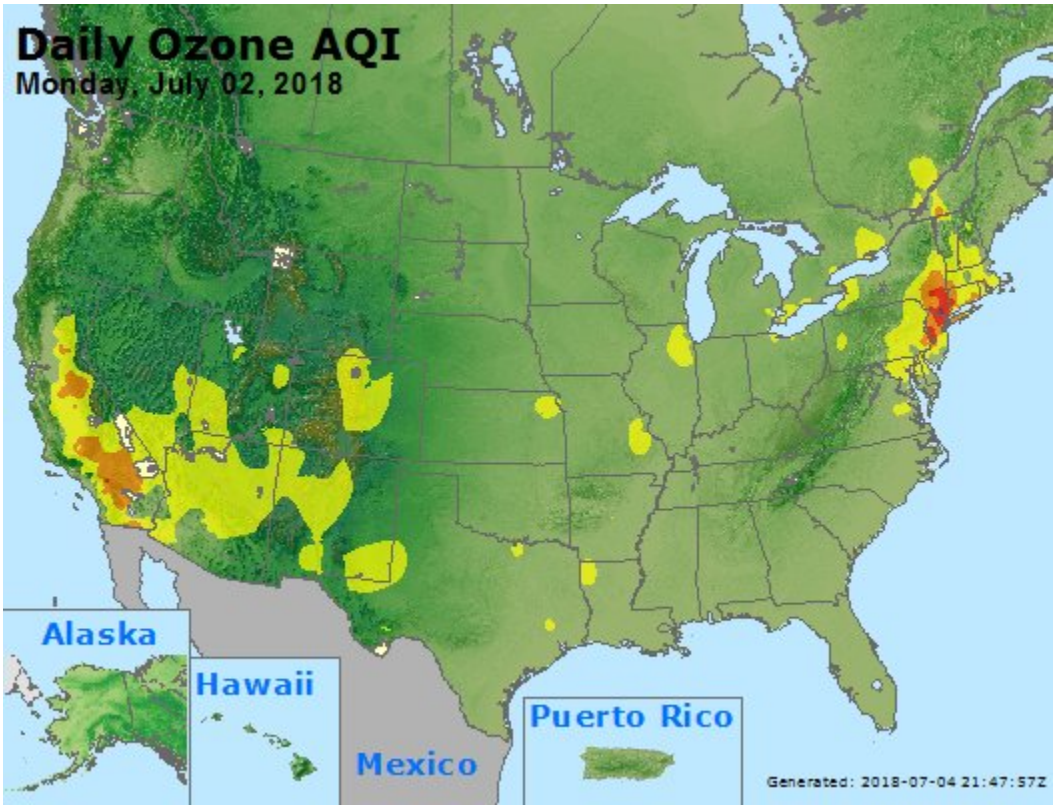


Figure 5. Ozone Air Quality Index for the United States on July 2, 2018



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.