Ozone National Ambient Air Quality Standard Health Exceedances on July 9, 2018

Exceedance Locations and Levels

On Monday, July 9, 2018, there were six (6) 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. New Jersey 8-hr Maximum Ozone Concentrations on July 9, 2018

STATION	Daily Maximum 8-Hr Average (ppb)
Ancora State Hospital	65
Bayonne	72
Brigantine	40
Camden Spruce St	76
Chester	75
Clarksboro	78
Colliers Mills	72
Columbia	57
Flemington	68
Leonia	79
Millville	55
Monmouth University	49
Newark Firehouse	65
Ramapo	65
Rider University	67
Rutgers University	62
Washington Crossing*	67
TOTAL EXCEEDANCES	6

*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 seventeen (17) 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 9, 2018

STATE	STATION	Daily Maximum 8-Hr Average (ppb)
CT	Danbury	65
CT	Greenwich	86

CT	Madison-Beach Road	75
CT	Middletown-CVH-Shed	73
CT	New Haven	63
CT	Stratford	77
CT	Westport	80
DE	BCSP (New Castle Co.)	64
DE	BELLFNT2 (New Castle Co.)	73
DE	KILLENS (Kent Co.)	59
DE	LEWES (Sussex Co.)	48
DE	LUMS 2 (New Castle Co.)	68
DE	MLK (New Castle Co.)	72
DE	SEAFORD (Sussex Co.)	56
MD	Fair Hill	73
NY	Babylon	63
NY	Bronx - IS52	71
NY	CCNY	72
NY	Holtsville	58
NY	Pfizer Lab	74
NY	Queens	63
NY	Riverhead	68
NY	Rockland Cty	55
NY	White Plains	73
NY	Susan Wagner	No Data
PA	BRIS (Bucks Co.)	86
PA	CHES (Delaware Co.)	76
PA	NEWG (Chester Co.)	69
PA	NORR (Montgomery Co.)	69
PA	LAB (Philadelphia Co.)	73
PA	NEA (Philadelphia Co.)	74
PA	NEW (Philadelphia Co.)	79
	TOTAL EXCEEDANCES	17

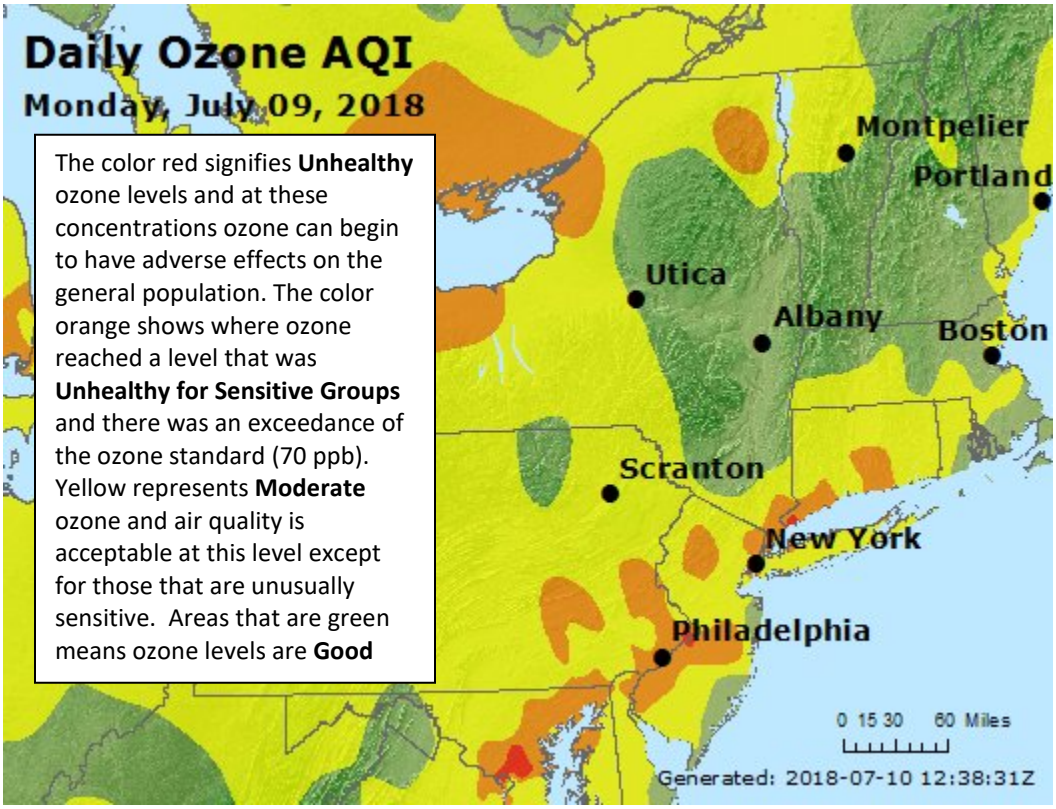
The number of days in 2018 on which exceedances of the ozone NAAQS were recorded for all the states is summarized in Table 3. Figure 1 shows graphically the regions ozone concentrations on July 9, 2018.

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 9, 2018 NAAQS = 70 ppb

Connecticut	10
Delaware	6
Maryland	5
New Jersey	13
New York	11
Pennsylvania	10

Figure 1. Ozone Air Quality Index for July 9, 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 remained in control over the Northeast and Mid-Atlantic on July 8th and July 9th before shifting off shore in the evening of July 9th. This high pressure allowed sunny skies, light surface winds, and warm temperatures to persist for the entire day. As a result, meteorological data from across the region show that temperatures reached the low 90s with light and variable surface winds.

Meanwhile, Tropical Storm Chris was strengthening off the coast of the Carolinas and expected to slowly move up the coast. High pressure in combination with influence of TS Chris helped sustain clear skies and strong subsidence throughout the day. Subsidence (a gentle sinking of air over a broad region) from the high pressure in addition to subsidence occurring in the exterior bands of TS Chris created favorable conditions for polluted air aloft to migrate down to the surface (shown bottom of Figures 3 and 4).

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 9, 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 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	Greenwich	86
CT	Westport	80
DE	BELLFNT2	73
MD	Fair Hill	73
NJ	Camden Spruce St	76
NJ	Chester	75
NJ	Clarksboro	78
NJ	Leonia	79
NY	Pfizer Lab	74
PA	BRIS	86
PA	NEW	79

Surface level back trajectories (Figure2) originated over the Atlantic Ocean and traveled westward toward the New Jersey coastline. Upon entering New Jersey, trajectories traveling to southern points traveled through the metropolitan area of Wilmington, DE and recirculated over the Greater Philadelphia area. Trajectories traveling to points north entered New Jersey and recirculated over central New Jersey before making a turn northward up the I-95 corridor and traveling to their endpoints. Trajectories at the surface traveled 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 upstate New York and Vermont. Some mid-level trajectories traveled southward and recirculated over Northeast Pennsylvania, where they may have picked up emissions from industry before reaching their endpoints in northern New Jersey, New York and Connecticut. Mid-level trajectories traveling to southern points traveled through Connecticut, New York City and recirculated over southeastern Pennsylvania including Lancaster before reaching their endpoints in Maryland, Delaware, Pennsylvania, and New Jersey. Trajectories at the mid-levels originated at higher levels of the atmosphere and were mixed down to

lower levels due to the presence of high pressure and subsidence. Upper level trajectories (Figure 4) originated in Canada and upstate New York and traveled southeastward toward the New York City metropolitan area. Upper level trajectories then traveled down the I-95 corridor before reaching their destinations. Similar to the mid-level, upper level trajectories originated at higher levels of the atmosphere and were mixed down to 1500m.

Figure 2. 48-hour Back Trajectories for July 9, 2018 at 10 meters

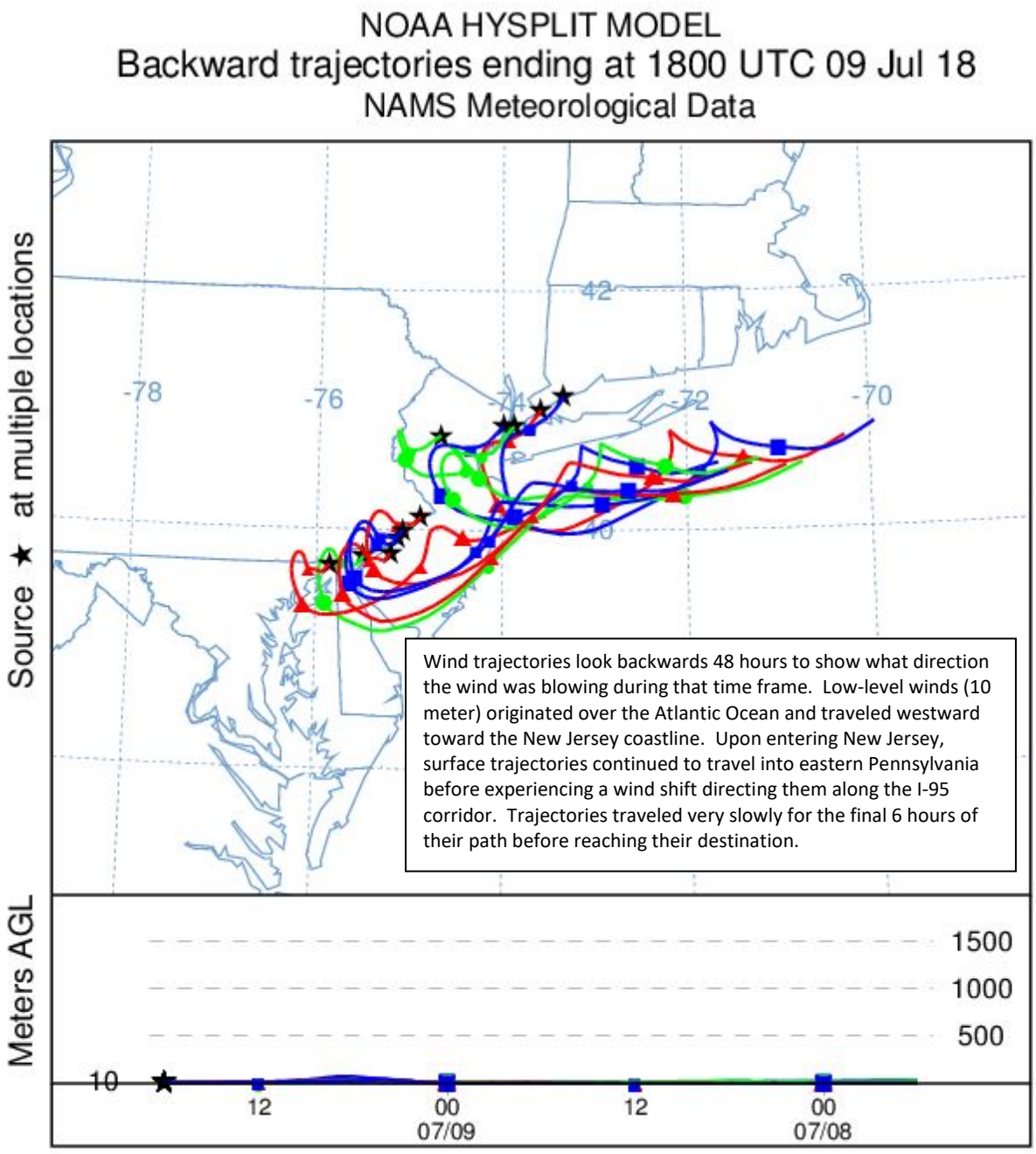


Figure 3. 48-hour Back Trajectories for July 9, 2018 at 500 meters

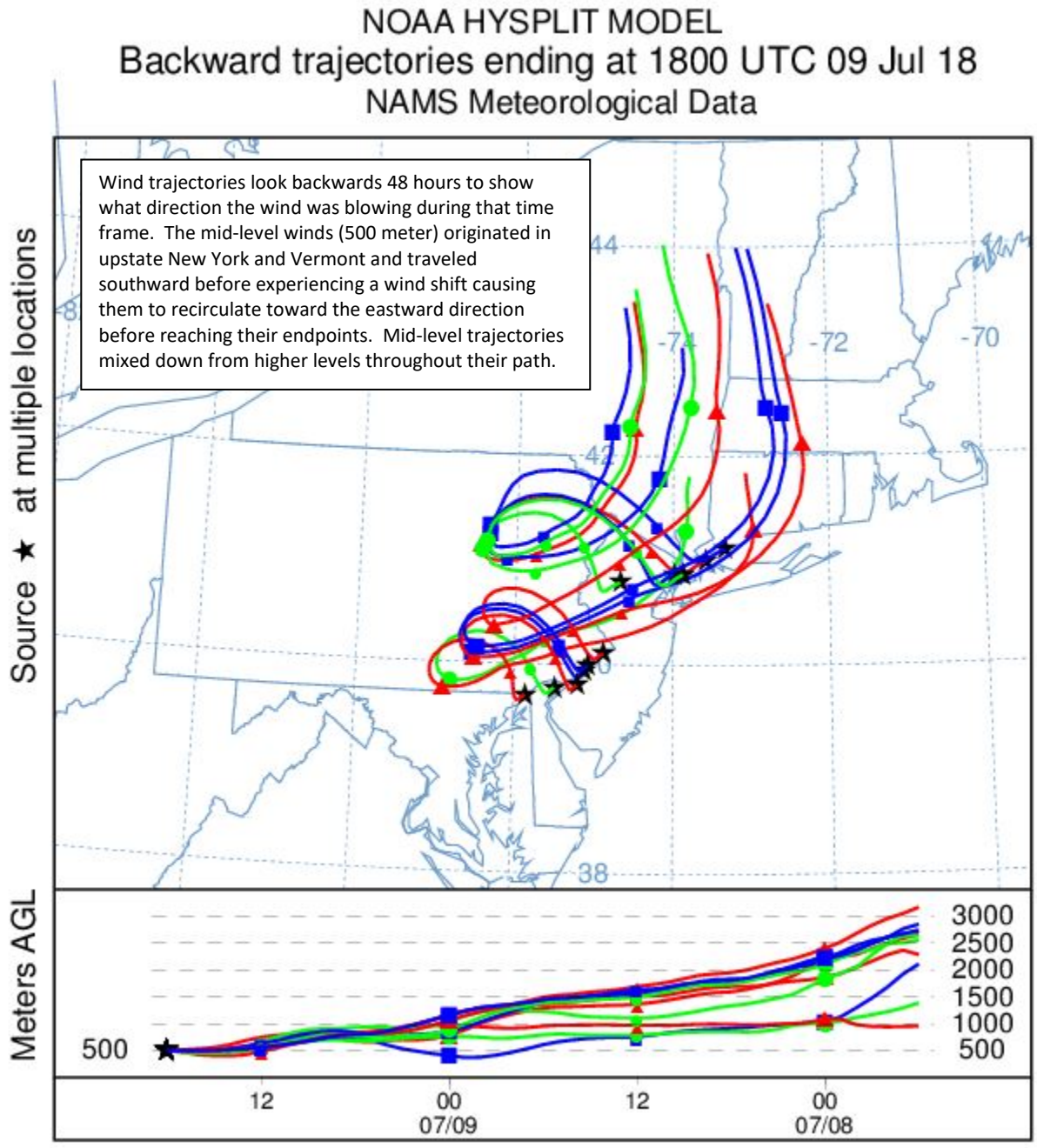


Figure 4. 48-hour Back Trajectories for July 9, 2018 at 1500 meters

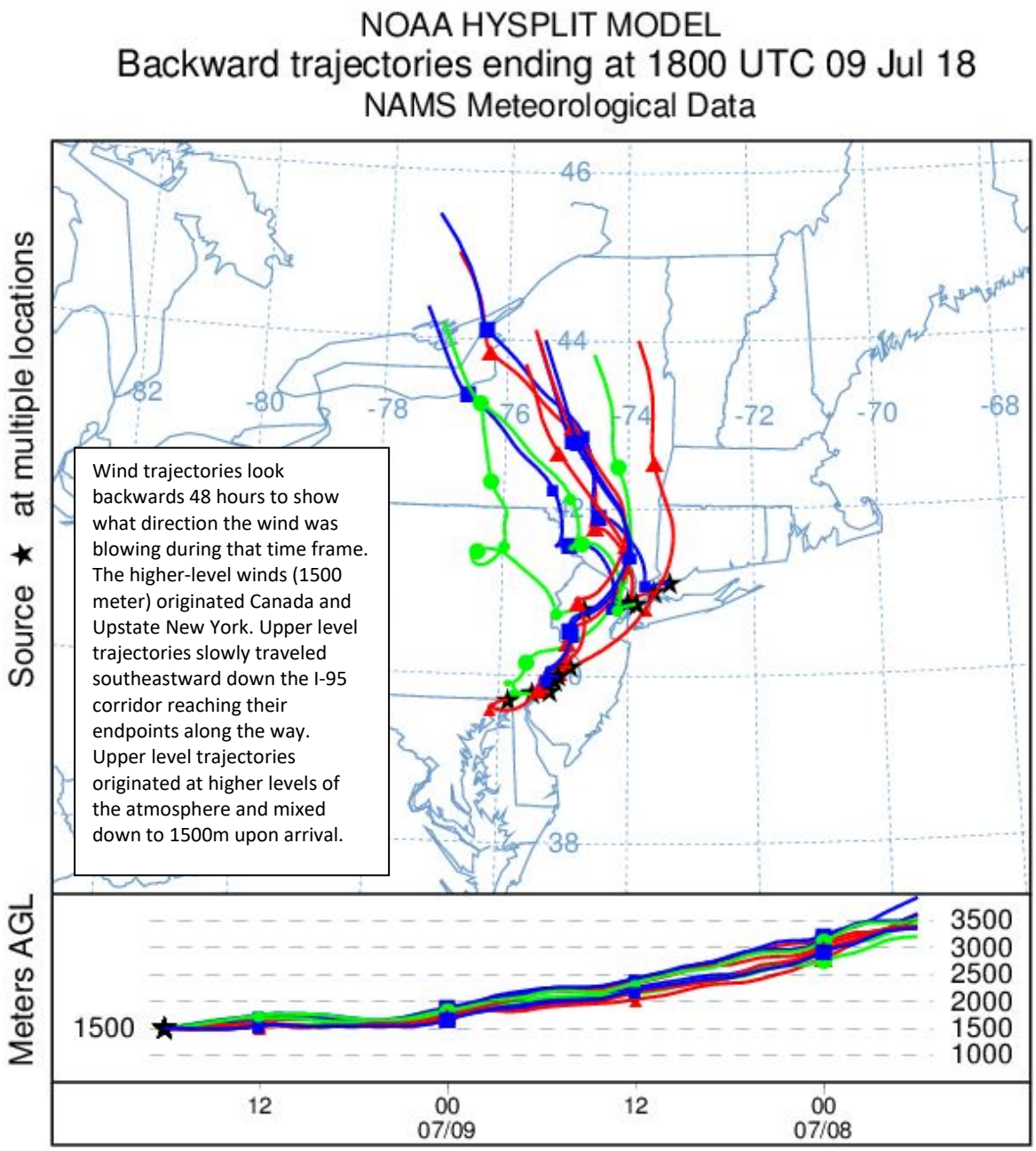
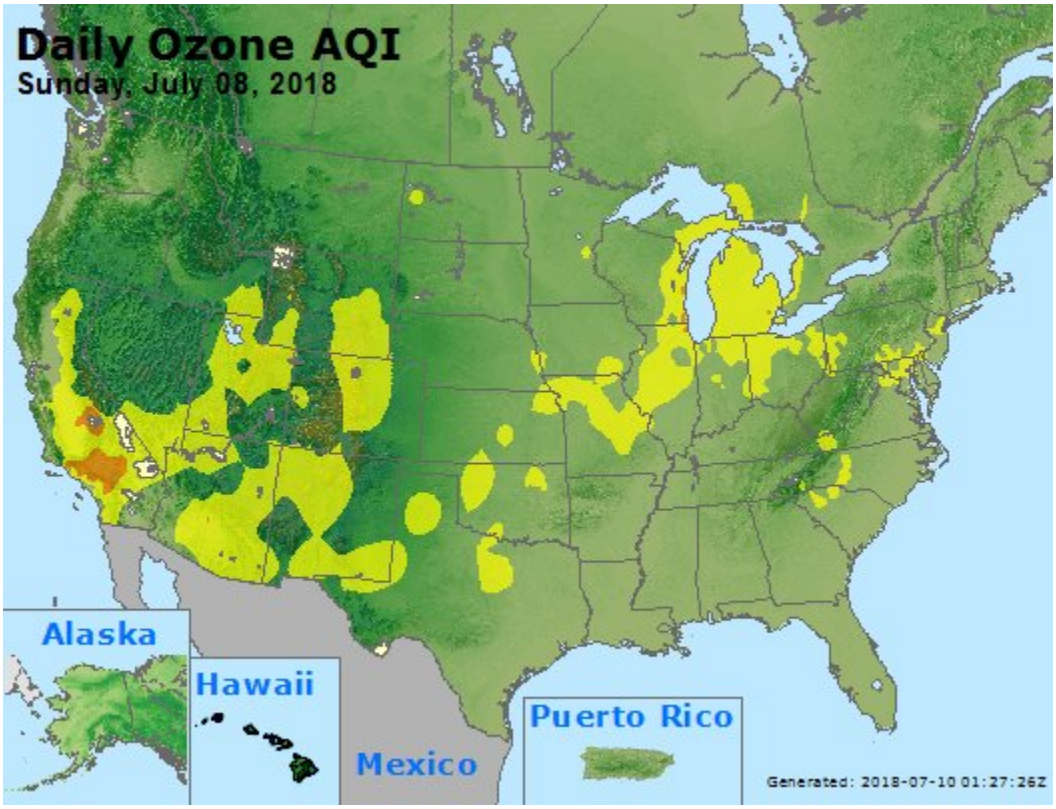


Figure 5. Ozone Air Quality Index for the United States on July 8, 2018



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.