Ozone National Ambient Air Quality Standard Health Exceedances on July 28, 2018

Exceedance Locations and Levels

On Saturday, July 28, 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. New Jersey 8-hr Maximum Ozone Concentrations on July 28, 2018

STATION	Daily Maximum 8-Hr Average (ppb)
Ancora State Hospital	55
Bayonne	73
Brigantine	38
Camden Spruce St	54
Chester	48
Clarksboro	57
Colliers Mills	49
Columbia	42
Flemington	50
Leonia	77
Millville	46
Monmouth University	54
Newark Firehouse	60
Ramapo	43
Rider University	51
Rutgers University	53
Washington Crossing*	51
TOTAL EXCEEDANCES	2

*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 28, 2018

STATE	STATION	Daily Maximum 8-Hr Average (ppb)
CT	Danbury	57
CT	Greenwich	79

CT	Madison-Beach Road	52
CT	Middletown-CVH-Shed	52
CT	New Haven	59
CT	Stratford	68
CT	Westport	70
DE	BCSP (New Castle Co.)	47
DE	BELLFNT2 (New Castle Co.)	54
DE	KILLENS (Kent Co.)	48
DE	LEWES (Sussex Co.)	50
DE	LUMS 2 (New Castle Co.)	52
DE	MLK (New Castle Co.)	52
DE	SEAFORD (Sussex Co.)	53
MD	Fair Hill	46
NY	Babylon	No Data
NY	Bronx - IS52	66
NY	CCNY	68
NY	Holtsville	51
NY	Pfizer Lab	68
NY	Queens	66
NY	Riverhead	48
NY	Rockland Cty	51
NY	White Plains	78
NY	Susan Wagner	No Data
PA	BRIS (Bucks Co.)	56
PA	CHES (Delaware Co.)	53
PA	NEWG (Chester Co.)	48
PA	NORR (Montgomery Co.)	50
PA	LAB (Philadelphia Co.)	52
PA	NEA (Philadelphia Co.)	53
PA	NEW (Philadelphia Co.)	53
	TOTAL EXCEEDANCES	2

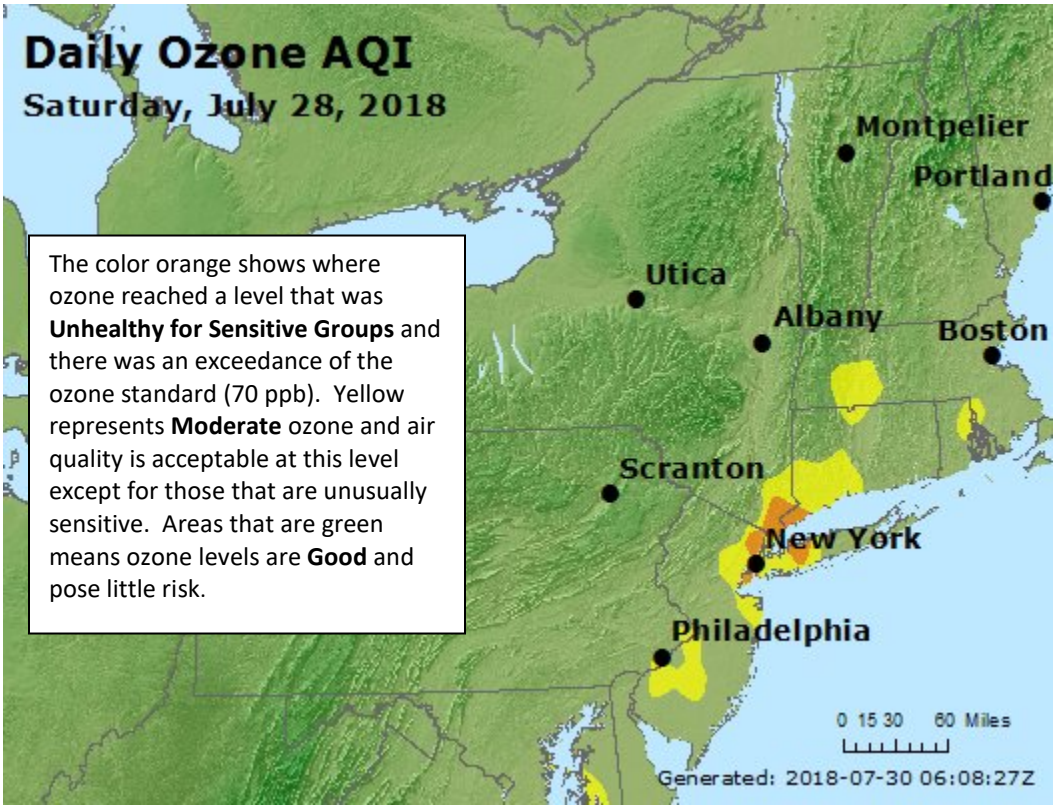
The number of days in 2018 on which exceedances of the ozone NAAQS were recorded for all the states is summarized in Table 3. Figure 1 shows graphically the regions ozone concentrations on July 28, 2018.

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 28, 2018 NAAQS = 70 ppb
Connecticut	15

Delaware	8
Maryland	6
New Jersey	17
New York	15
Pennsylvania	12

Figure 1. Ozone Air Quality Index for July 28, 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 stalled front allowed for local emissions from cars, trucks, and industry to mix with pollution transported from upwind areas as far south as the District of Columbia and Eastern Virginia. The frontal boundary slowly approached the region early on July 28, 2018 before stalling along the eastern seaboard by mid-morning. This front moved very little for the remainder of the day, extending from New England southward through western Connecticut, the New York City metropolitan area, along the New Jersey shoreline, into the Mid-Atlantic, and greatly affected the weather observed in the nonattainment area.

With the front in the vicinity, morning fog was noted throughout much of the region. As fog gradually lifted, a mix of sun and clouds was observed for the rest of the day, with a general clearing in the afternoon and evening hours. In addition, the location of the frontal boundary played a key role in observed wind direction throughout the nonattainment area. Locations east of the front, which saw isolated USG ozone levels on this day, observed slow-moving southerly winds. Meanwhile, locations west of the frontal boundary experienced a more northwest or westerly flow. Isolated thunderstorms developed along the front in the afternoon/evening hours; Radar images indicate a concentrated area of convection moving through the lower Hudson Valley and western Connecticut in the evening. These thunderstorms may have allowed pollutants upwind to be transported at different heights along the slow-moving front and mix with locally polluted air at the surface, causing isolated high ozone concentrations.

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 28, 2018. The figures illustrate where the winds came from during the 48 hours preceding the high ozone event. Four (4) 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 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	79
NJ	Bayonne	73
NJ	Leonia	77
NY	White Plains	78

Surface-level back trajectories (Figure 2) originated off the North Carolina coast and traveled northward toward the New Jersey coastline through late July 27th. Air then slowed as it continued generally northward through the New York City metropolitan area, western Long Island, and portions of the Long Island Sound over the next 18 hours as it was affected by the above-mentioned stalled frontal boundary. Surface-level back trajectories also show air remained at the surface during this time, picking up locally generated emissions from cars, trucks, and industry along the way. Similarly, mid-level back trajectories (Figure 3) originated over coastal North Carolina and moved northward along the eastern seaboard. Air passed through southern portions of the Chesapeake Bay, Delaware Bay, southern New Jersey, and the New York City metropolitan area through arrival. Finally, upper-level back trajectories (Figure 4) originated over Virginia. Air then traveled northeast over the Washington, DC and Baltimore metropolitan areas through late July 27th, which saw scattered moderate levels of ozone (Figure 5) during this time. Upper level air then continued northeast through southeastern Pennsylvania, central New Jersey, and the New York City metropolitan area through arrival at the endpoints.

Figure 2. 48-hour Back Trajectories for July 28, 2018 at 10 meters

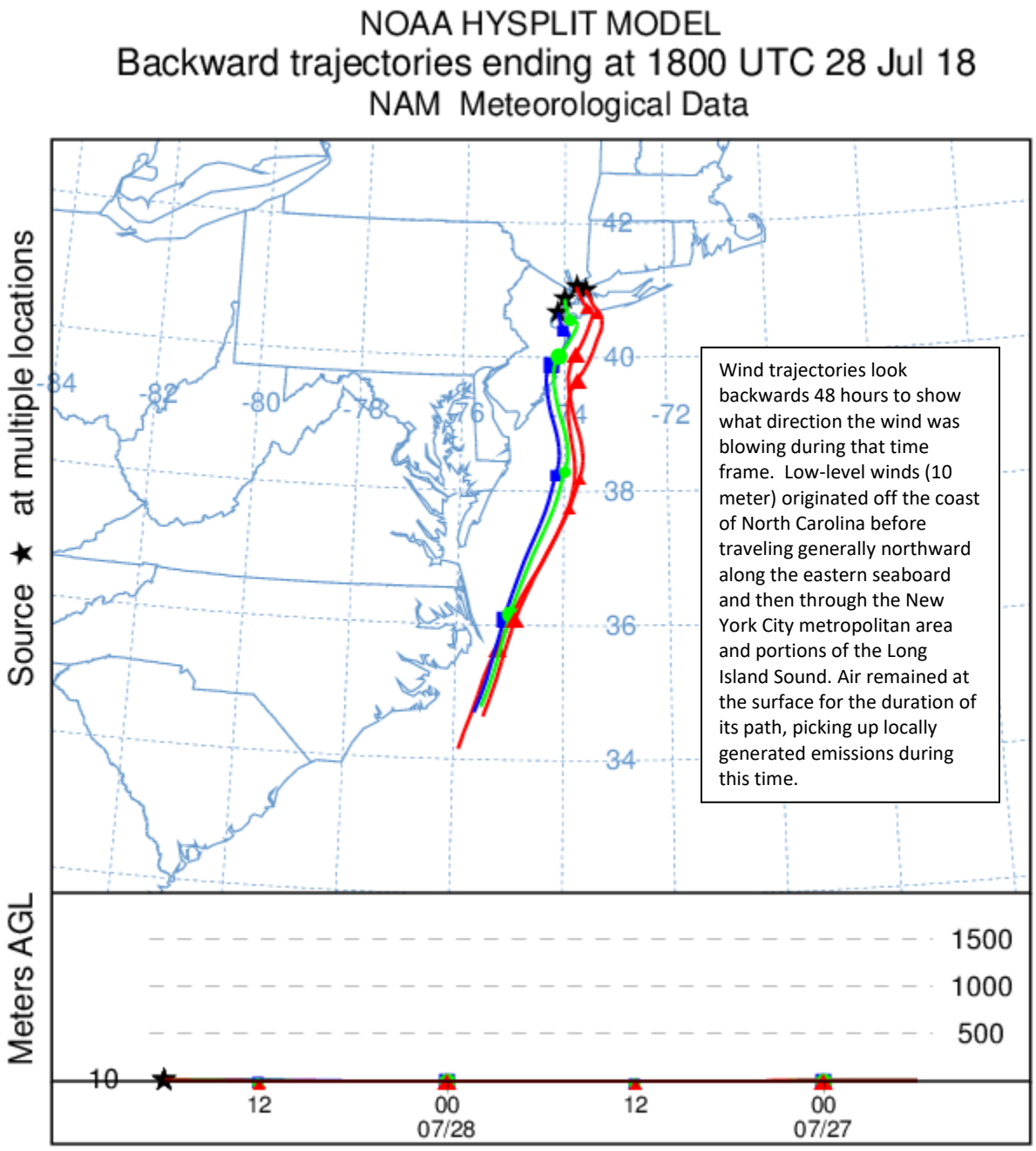


Figure 3. 48-hour Back Trajectories for July 28, 2018 at 500 meters

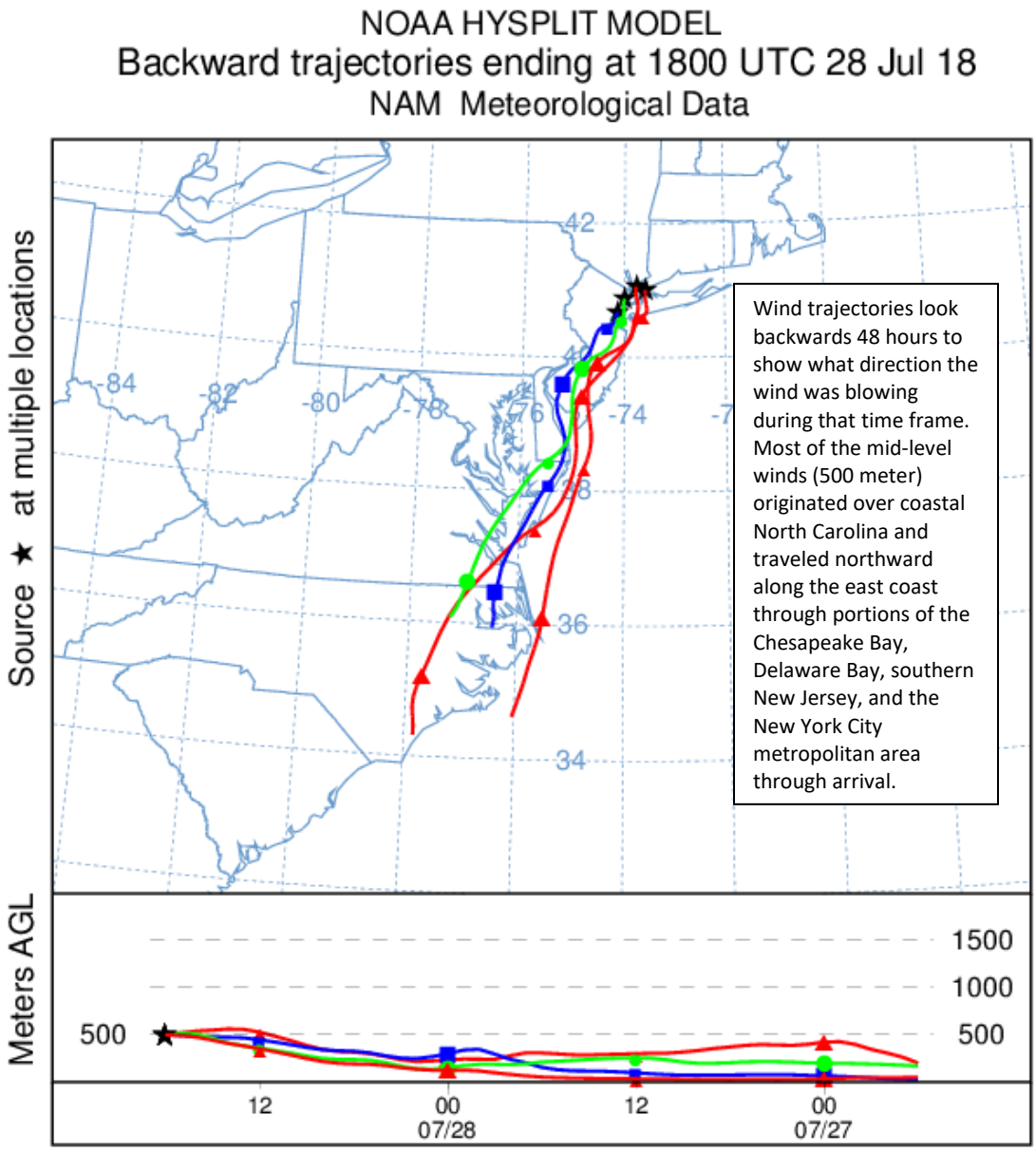


Figure 4. 48-hour Back Trajectories for July 28, 2018 at 1500 meters

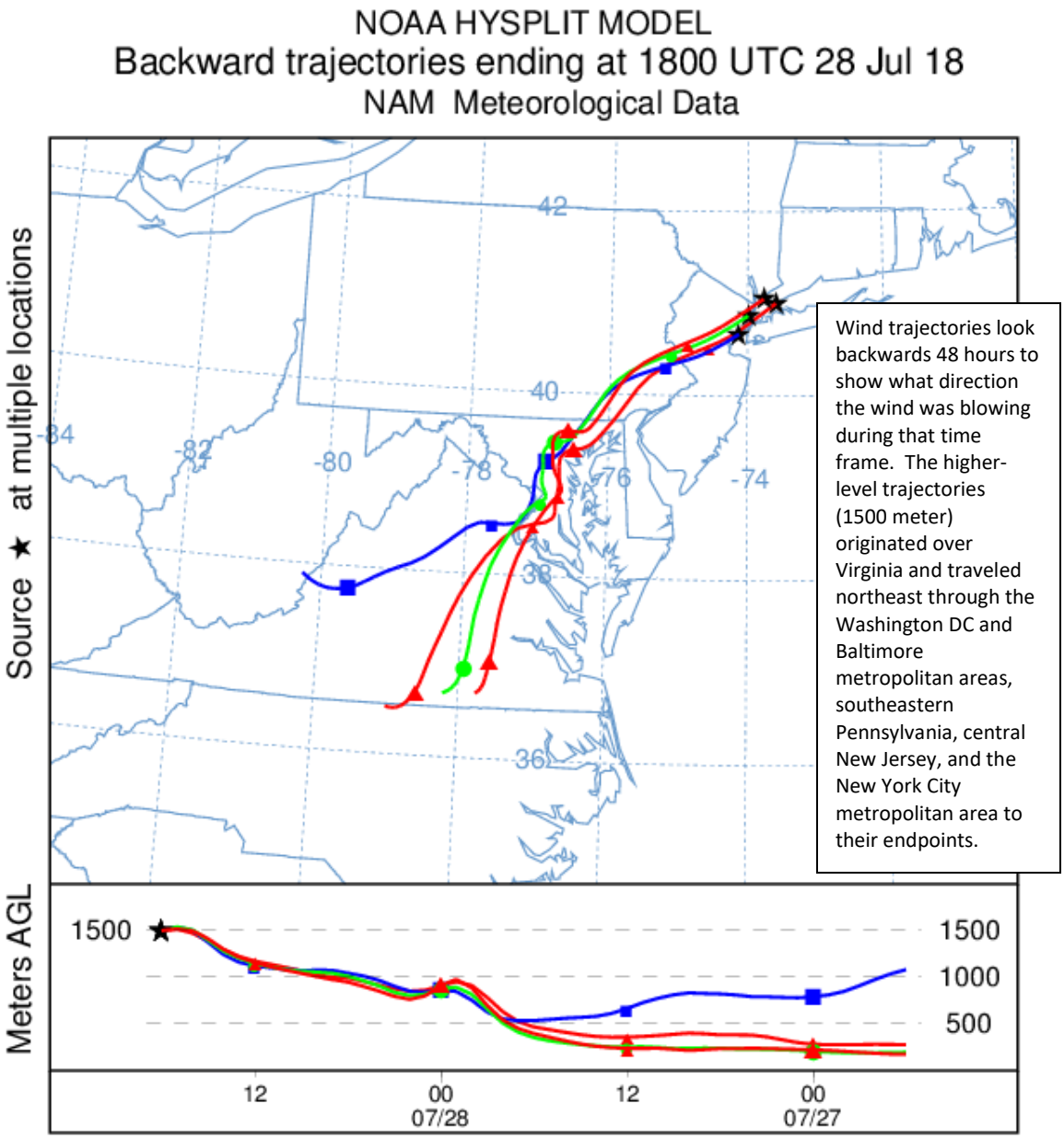
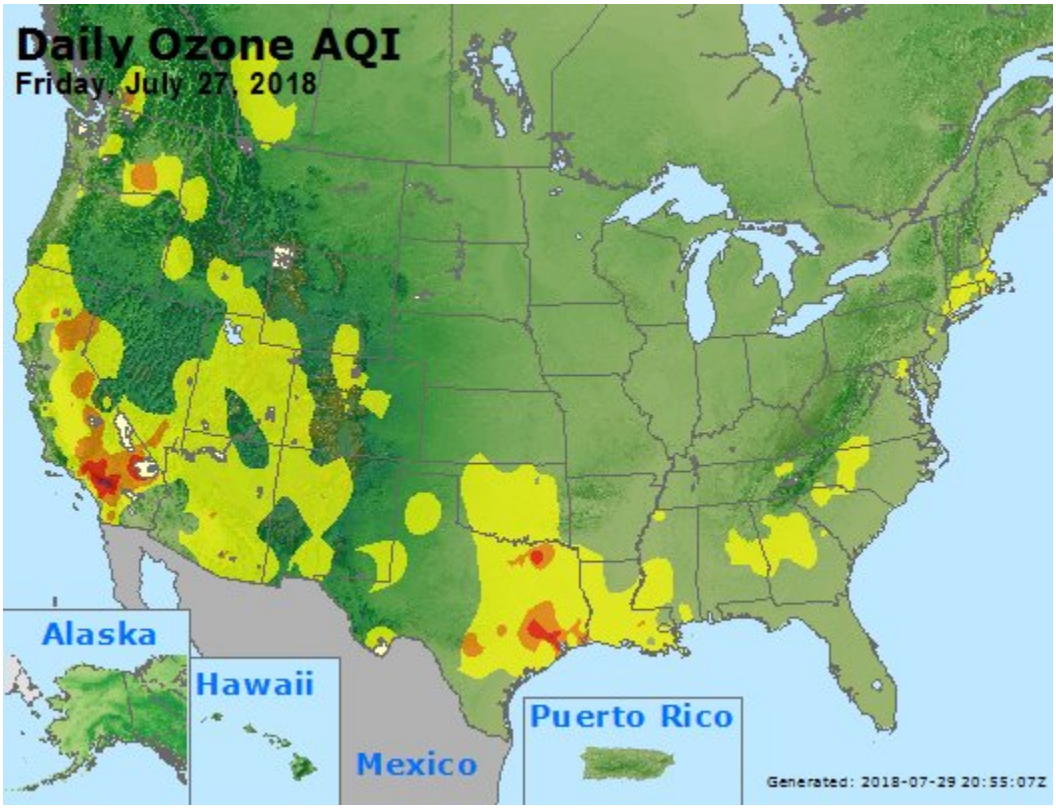


Figure 5. Ozone Air Quality Index for the United States on July 27, 2018



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.