Ozone National Ambient Air Quality Standard Health Exceedances on July 11, 2018

Exceedance Locations and Levels

On Wednesday, July 11, 2018, there were zero (0) 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 11, 2018

STATION	Daily Maximum 8-Hr Average (ppb)
Ancora State Hospital	58
Bayonne	59
Brigantine	64
Camden Spruce St	48
Chester	39
Clarksboro	53
Colliers Mills	61
Columbia	27
Flemington	43
Leonia	48
Millville	63
Monmouth University	58
Newark Firehouse	49
Ramapo	39
Rider University	44
Rutgers University	52
Washington Crossing*	44
TOTAL EXCEEDANCES	0

*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 was one (1) exceedance 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 11, 2018

STATE	STATION	Daily Maximum 8-Hr Average (ppb)
CT	Danbury	36
CT	Greenwich	60

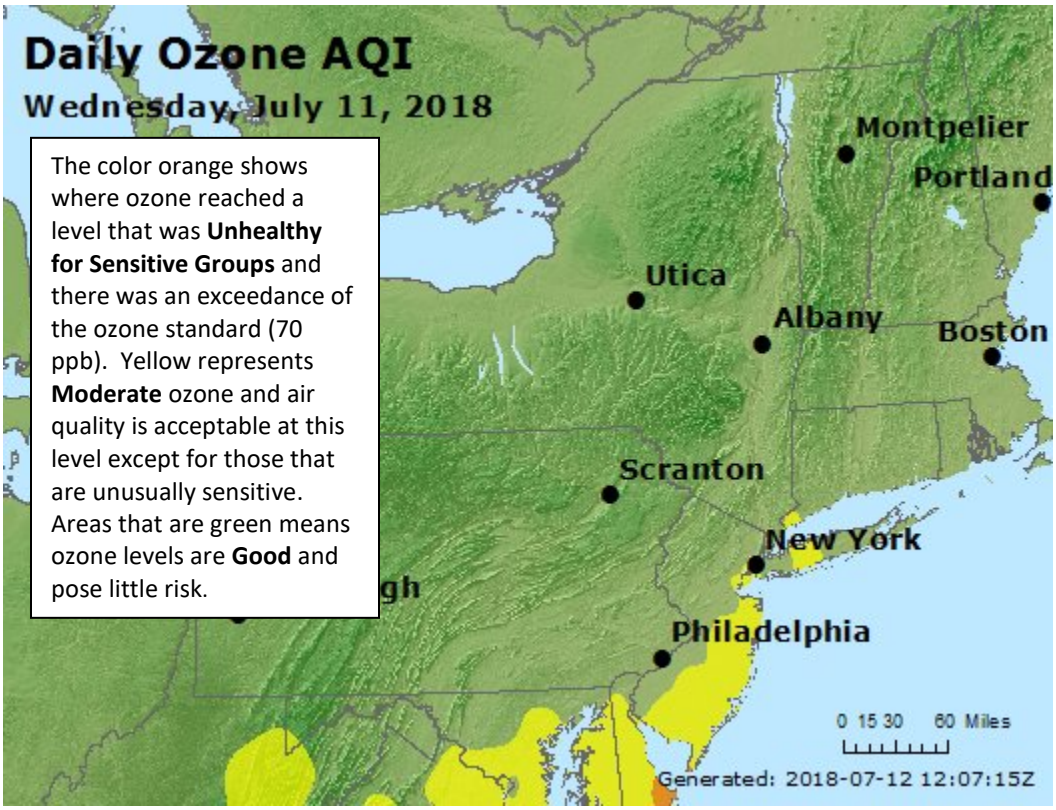
CT	Madison-Beach Road	45
CT	Middletown-CVH-Shed	39
CT	New Haven	46
CT	Stratford	54
CT	Westport	48
DE	BCSP (New Castle Co.)	48
DE	BELLFNT2 (New Castle Co.)	54
DE	KILLENS (Kent Co.)	63
DE	LEWES (Sussex Co.)	72
DE	LUMS 2 (New Castle Co.)	56
DE	MLK (New Castle Co.)	49
DE	SEAFORD (Sussex Co.)	66
MD	Fair Hill	49
NY	Babylon	56
NY	Bronx - IS52	47
NY	CCNY	46
NY	Holtsville	48
NY	Pfizer Lab	47
NY	Queens	52
NY	Riverhead	52
NY	Rockland Cty	42
NY	White Plains	45
NY	Susan Wagner	No Data
PA	BRIS (Bucks Co.)	48
PA	CHES (Delaware Co.)	50
PA	NEWG (Chester Co.)	46
PA	NORR (Montgomery Co.)	44
PA	LAB (Philadelphia Co.)	44
PA	NEA (Philadelphia Co.)	46
PA	NEW (Philadelphia Co.)	44
	TOTAL EXCEEDANCES	1

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 11, 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 11, 2018 NAAQS = 70 ppb
Connecticut	11
Delaware	8
Maryland	6
New Jersey	14
New York	12
Pennsylvania	11

Figure 1. Ozone Air Quality Index for July 11, 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

Two weather features were of particular importance on July 11th. A front associated with weak low pressure had passed through the region by early afternoon and began to interact with Hurricane Chris which was passing east of New Jersey. In addition, high pressure from the Great Lakes began to migrate eastward providing sunny skies and light winds to the region. Between the passing frontal boundary and the edge of high pressure, a surface trough formed and extended from southern Maryland into Virginia where levels of unhealthy ozone were observed the previous day. This may have provided a mechanism for polluted air aloft to mix down to the surface.

As a result, meteorological data from across the region show temperatures reached the low 90s in Southern Delaware with clear skies and calm winds. The features mentioned above in combination with the location of the Lewes, Delaware monitor between several meteorological features resulted in localized trajectories exacerbating ozone concentrations at the surface.

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 11, 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)
DE	LEWES (Sussex Co.)	72

Surface-level back trajectories (Figure 2) originated in the Chesapeake Bay vicinity before traveling north-northeastward into central Delaware early on July 10th. Air was then briefly influenced by a surface trough in the afternoon/evening hours as it traveled into southern New Jersey. After that a passing cold front took control, looping air back south over the Delaware Bay to its destination. Air remained at the surface for the entirety of its path. As seen in Figures 5 and 6 below, portions of the Mid-Atlantic saw USG and isolated Unhealthy ozone levels in the days leading up to this exceedance. Surface back trajectories indicate that in addition to the influence of locally generated emissions, polluted air from the Mid-Atlantic was likely transported into the southern nonattainment area on July 11th.

Mid- and upper-level back trajectories (Figures 3 and 4) followed very similar paths as air was influenced by an upper level trough over the northeastern United States. Mid-level back trajectories originated in Michigan and traveled generally east and southeast through western and central New York through late July 10th. Air then made a turn southward traveling through the Hudson Valley, New Jersey, and the Delaware Bay to its endpoint. Meanwhile, upper-level back trajectories originated over Lake Huron and traveled southeast through western New York, eastern Pennsylvania, and the Wilmington metropolitan

area to its destination. Similar to the surface back trajectory, mid- and upper-level air originated and traveled through areas that saw elevated ozone level in the days preceding this exceedance.

Figure 2. 48-hour Back Trajectories for July 11, 2018 at 10 meters

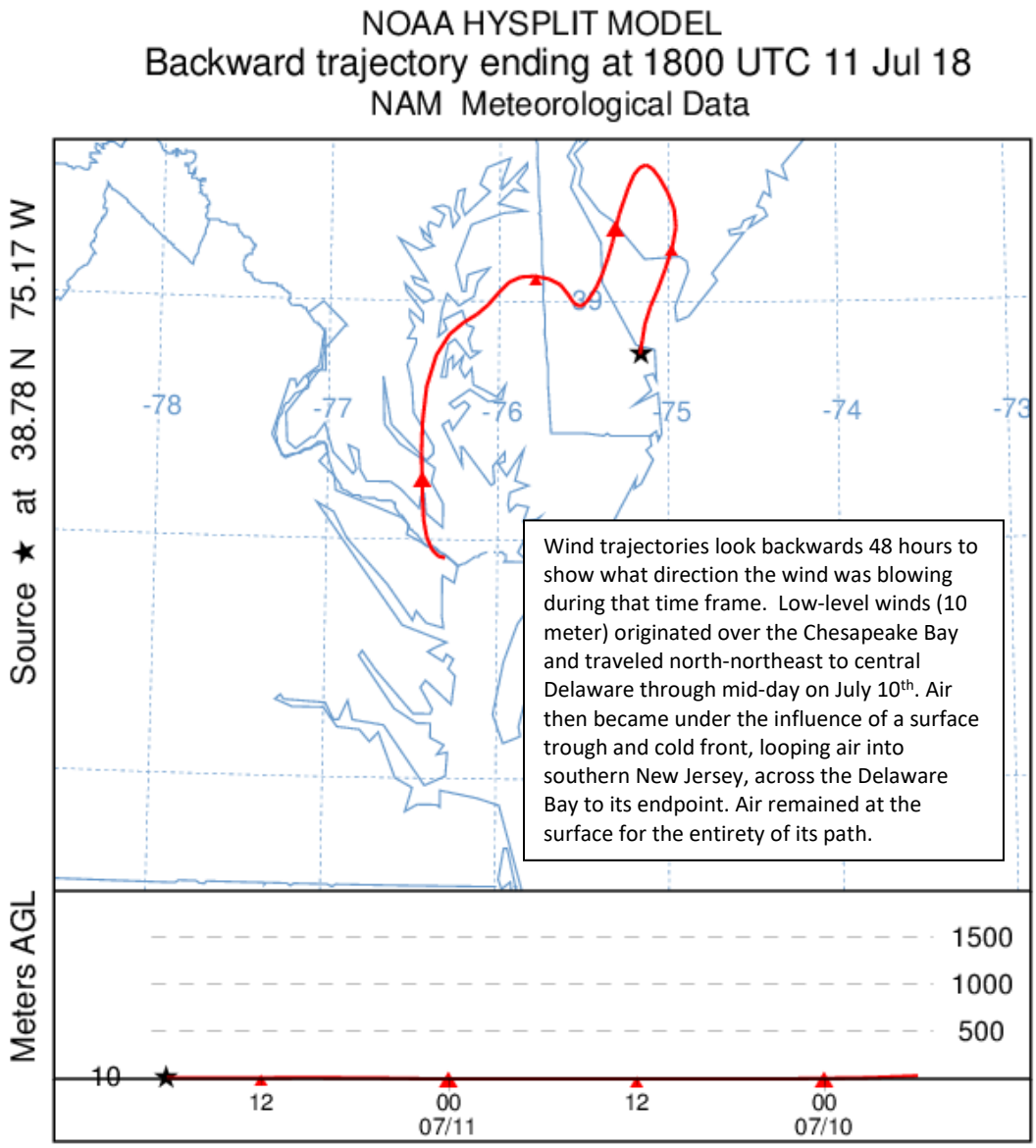


Figure 3. 48-hour Back Trajectories for July 11, 2018 at 500 meters

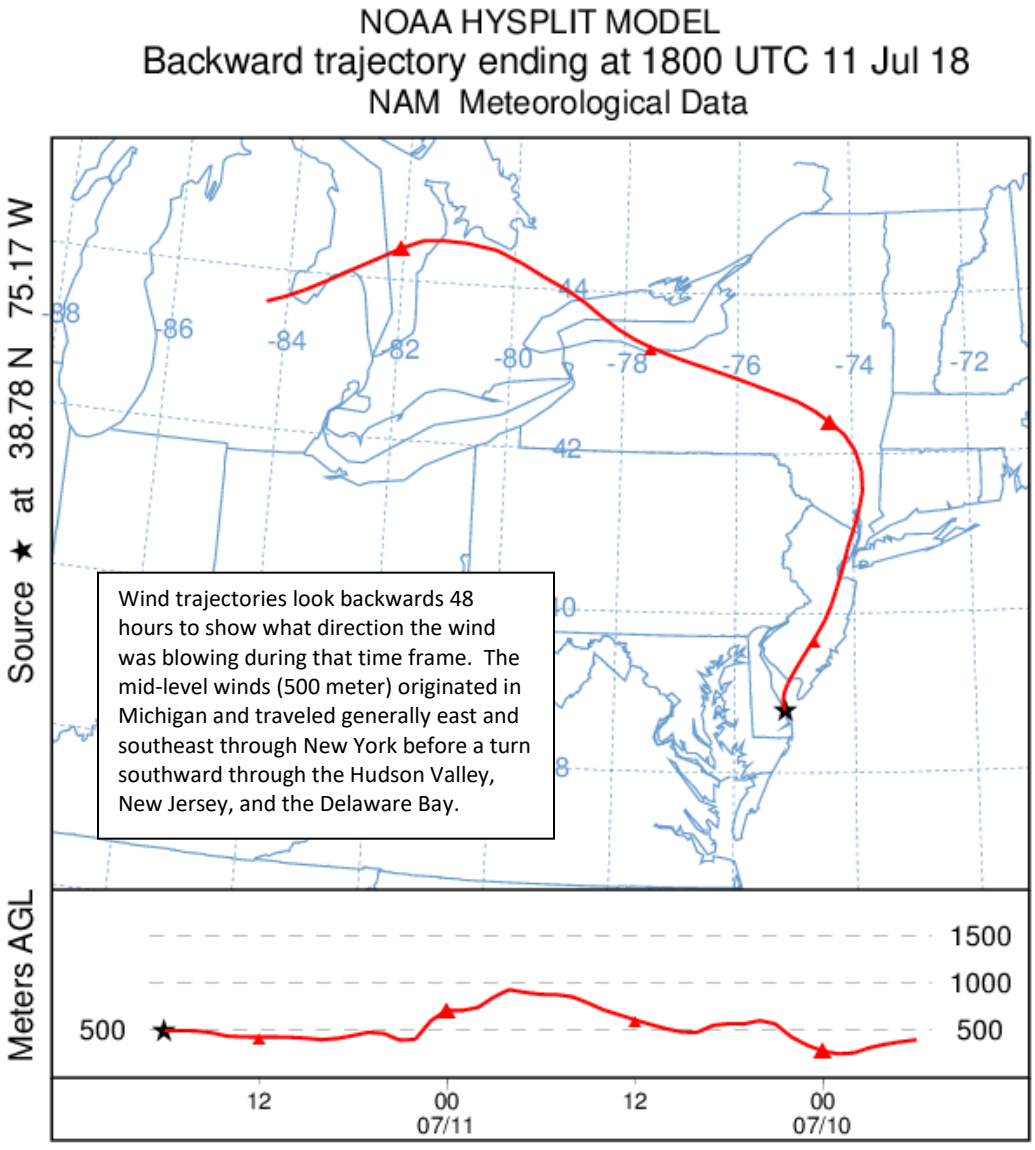


Figure 4. 48-hour Back Trajectories for July 11, 2018 at 1500 meters

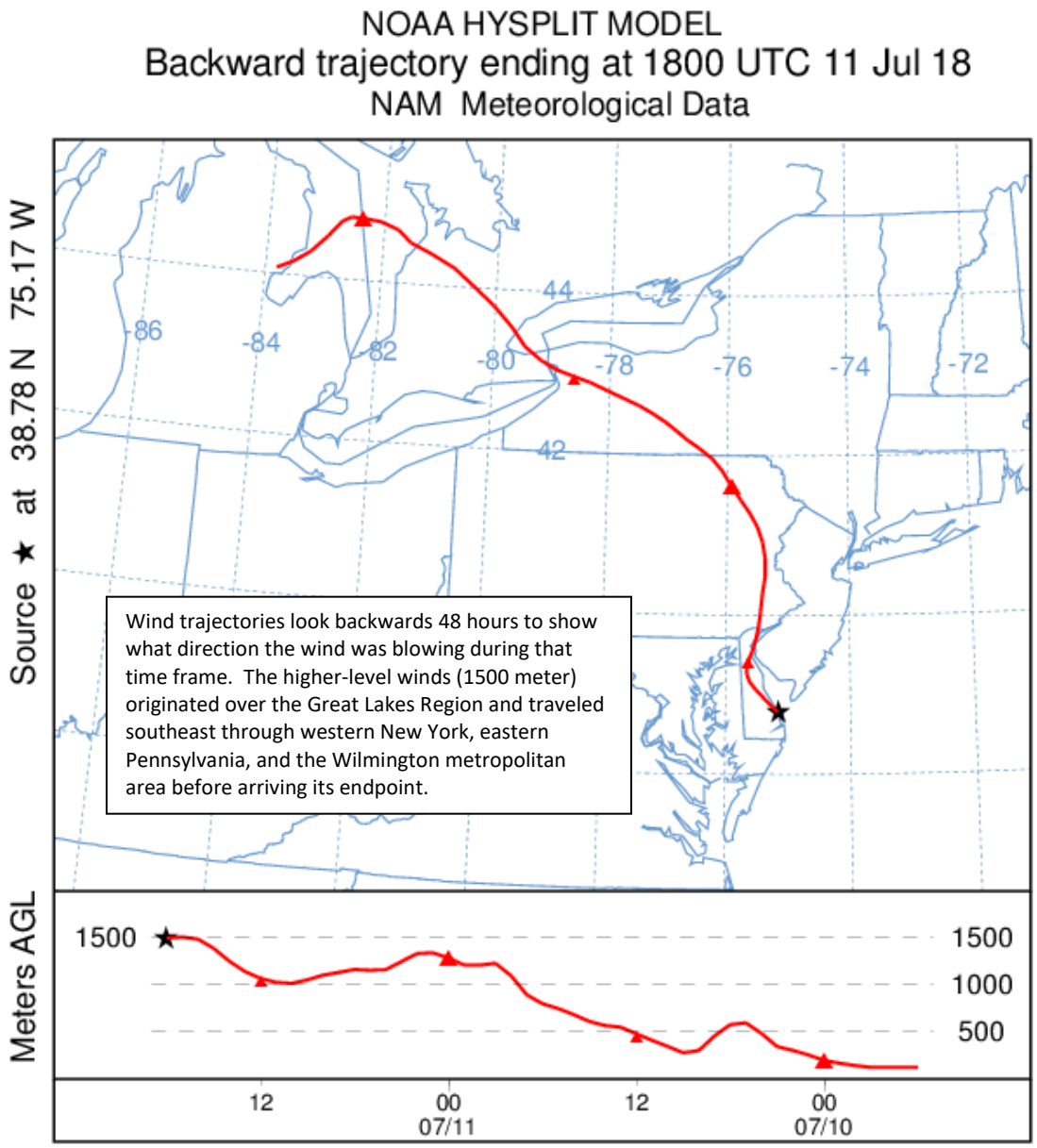


Figure 5. Ozone Air Quality Index for the United States on July 9, 2018

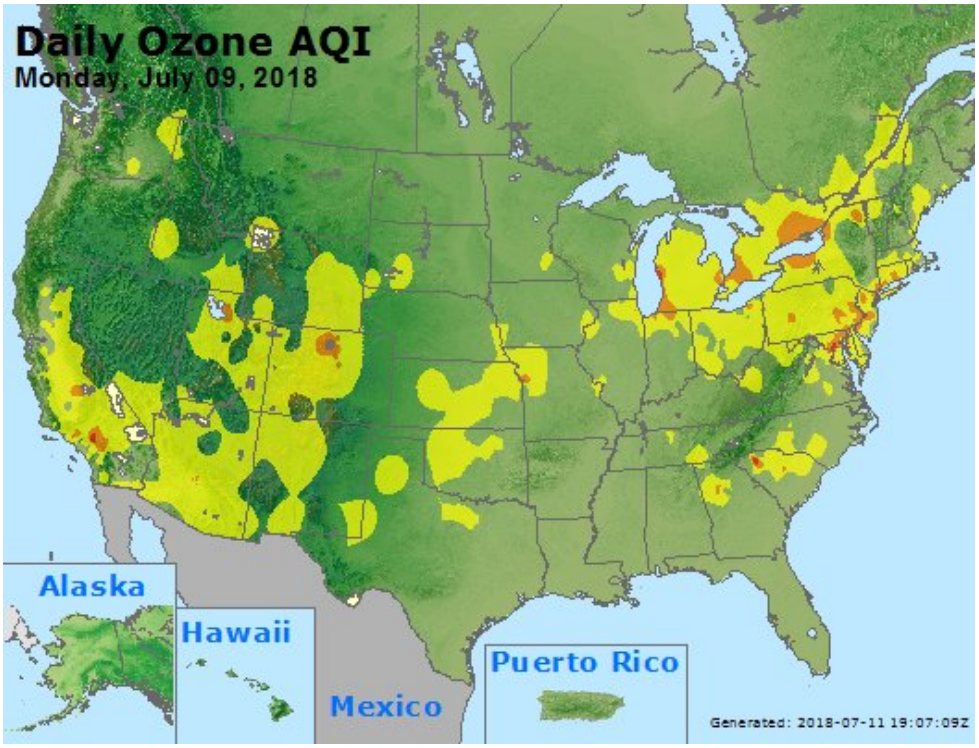
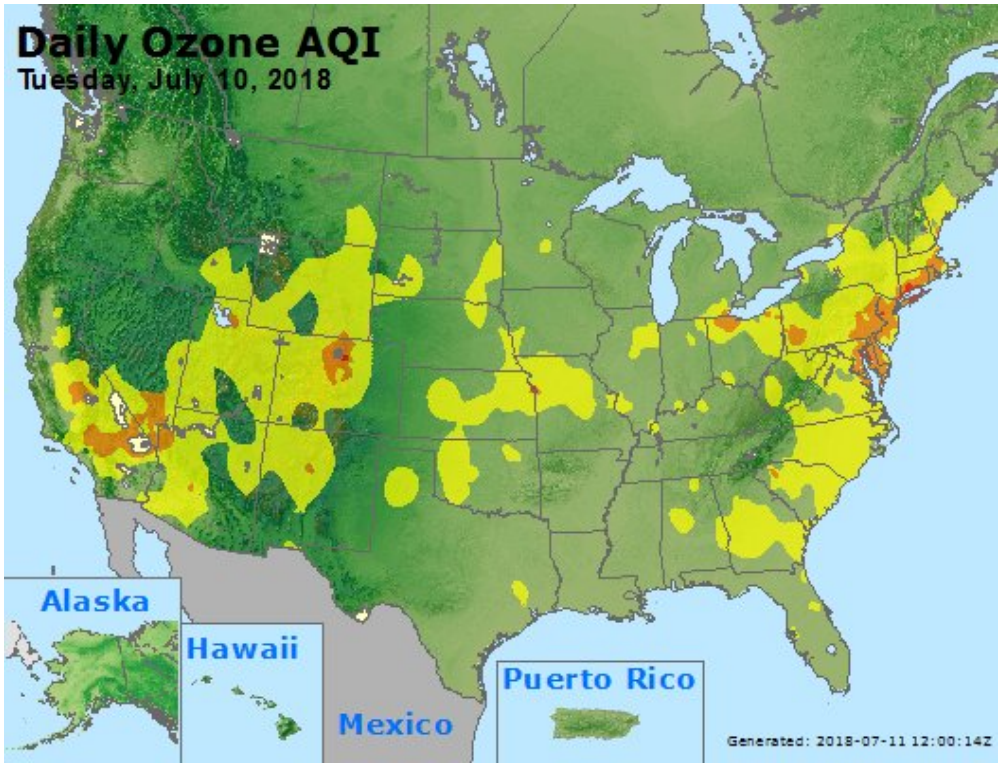


Figure 6. Ozone Air Quality Index for the United States on July 10, 2018



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.