Ozone National Ambient Air Quality Standard Health Exceedances on June 18, 2018

Exceedance Locations and Levels

On Monday, June 18, 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 June 18, 2018

STATION	Daily Maximum 8-Hr Average (ppb)
Ancora State Hospital	61
Bayonne	79
Brigantine	40
Camden Spruce St	73
Chester	65
Clarksboro	66
Colliers Mills	68
Columbia	63
Flemington	72
Leonia	75
Millville	57
Monmouth University	41
Newark Firehouse	70
Ramapo	62
Rider University	76
Rutgers University	78
Washington Crossing*	No Data
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 fifteen (15) 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 June 18, 2018

STATE	STATION	Daily Maximum 8-Hr Average (ppb)
CT	Danbury	82

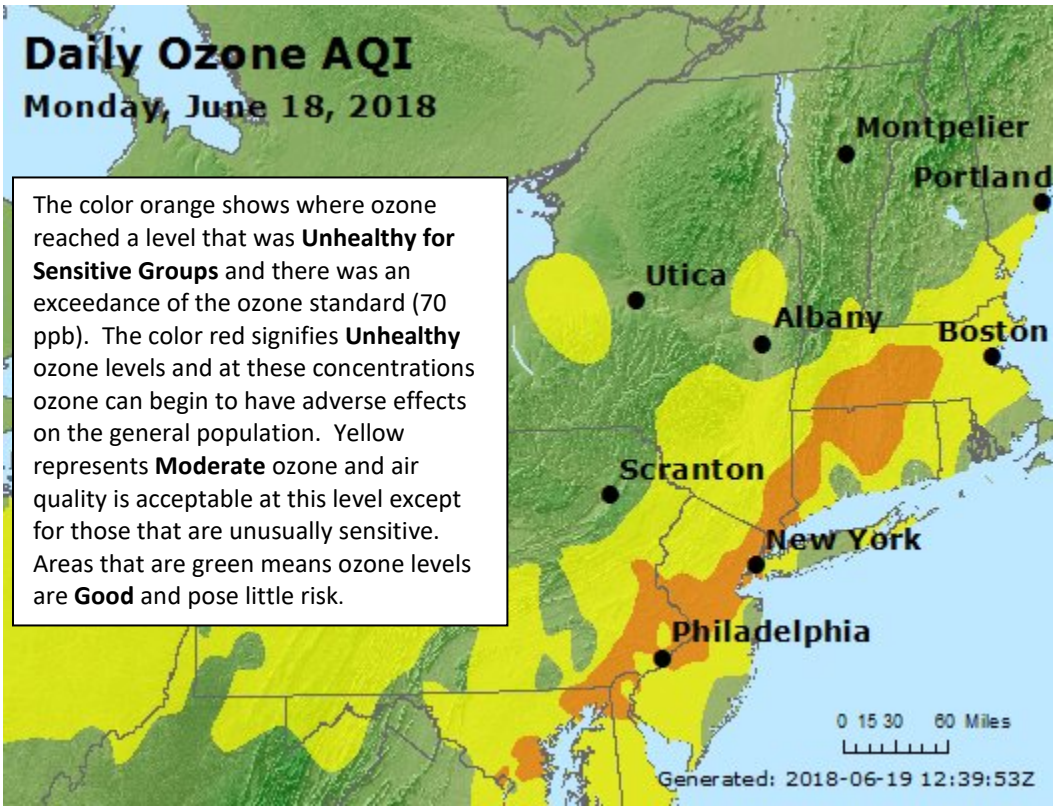
CT	Greenwich	74
CT	Madison-Beach Road	59
CT	Middletown-CVH-Shed	74
CT	New Haven	45
CT	Stratford	63
CT	Westport	66
DE	BCSP (New Castle Co.)	76
DE	BELLFNT2 (New Castle Co.)	72
DE	KILLENS (Kent Co.)	63
DE	LEWES (Sussex Co.)	55
DE	LUMS 2 (New Castle Co.)	71
DE	MLK (New Castle Co.)	68
DE	SEAFORD (Sussex Co.)	57
MD	Fair Hill	79
NY	Babylon	52
NY	Bronx - IS52	71
NY	CCNY	78
NY	Holtsville	48
NY	Pfizer Lab	70
NY	Queens	56
NY	Riverhead	58
NY	Rockland Cty	69
NY	White Plains	80
NY	Fresh Kills	78
PA	BRIS (Bucks Co.)	81
PA	CHES (Delaware Co.)	61
PA	NEWG (Chester Co.)	70
PA	NORR (Montgomery Co.)	74
PA	LAB (Philadelphia Co.)	65
PA	NEA (Philadelphia Co.)	79
PA	NEW (Philadelphia Co.)	73
	TOTAL EXCEEDANCES	15

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 region's ozone concentrations on June 18, 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 – June 18, 2018 NAAQS = 70 ppb
Connecticut	6
Delaware	3
Maryland	3
New Jersey	7
New York	6
Pennsylvania	5

Figure 1. Ozone Air Quality Index for June 18, 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

Meteorological data from across the region on Monday, June 18th show that temperatures reached the low 90s with high humidity and southwesterly winds at the surface. High pressure provided mostly sunny skies with some patches of clouds at times.

The broad area of high pressure over the eastern half of the United States on Sunday, June 17th migrated eastward by Monday, June 18th where it remained anchored off the coast. Two centers of high pressure were noted to influence the weather pattern in the region for a second day in a row. One center of high pressure was located just off the New Jersey coast while another remained over western Pennsylvania. As a result, a surface trough formed a boundary between these two air masses and created a mechanism for polluted air aloft to mix down to the surface. The surface trough remained in place over the I-95 corridor from Maryland to Connecticut.

An expansive upper level ridge provided westerly winds aloft transporting air from a region that was saw widespread moderate and isolated USG air quality the day before. In addition, upper level ridging allowed warm air to surge northward promoting favorable temperatures aloft for ozone production.

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 June 18, 2018. The figures illustrate from where the winds came during the 48 hours preceding the high ozone event. Ten (10) 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 Selected to Run 48-hr Back Trajectories

STATE	STATION	Daily Maximum 8-Hr Average (ppb)
CT	Danbury	82
DE	BCSP (New Castle County)	76
MD	Fair Hill	79
NJ	Bayonne	79
NJ	Rider University	76
NJ	Rutgers University	78
NY	CCNY	78
NY	White Plains	80
PA	BRIS (Bucks County)	81
PA	NEA (Philadelphia County)	79

Surface level back trajectories (Figure 2) show that air originated off the Mid-Atlantic coast and traveled north and northwest on June 17th as air was affected by a regional sea breeze event. This air then made a more northeastward turn on the 18th under the influence of a high pressure circulation and surface

trough development. Air traveled along the I-95 corridor passing through and near various urban locations, such as Wilmington, Philadelphia, and the Northern New Jersey/New York City metropolitan area. It is worth note that air remained at the surface for the entire duration of its path picking up emissions from cars, trucks, and industry along the way. Mid-level back trajectories (Figure 3) originated in the Mid-Atlantic region. Air recirculated in the southern Chesapeake Bay vicinity on the 17th and was mixed vertically in the presence of a surface trough. Similar to the surface trajectories, air then made a turn northeast on the 18th traveling along the I-95 corridor passing in the vicinity of multiple urban locations. Finally, upper-level back trajectories (Figure 4) were strongly influenced by the upper level ridging pattern over the eastern half of the United States. Air originated in the western Great Lakes region and traveled eastward through portions of Indiana, Ohio, New York, and Pennsylvania to its endpoint.

Figure 5 below shows graphically national ozone concentrations on June 17th, 2018.

Figure 2. 48-hour Back Trajectories for June 18, 2018 at 10 meters

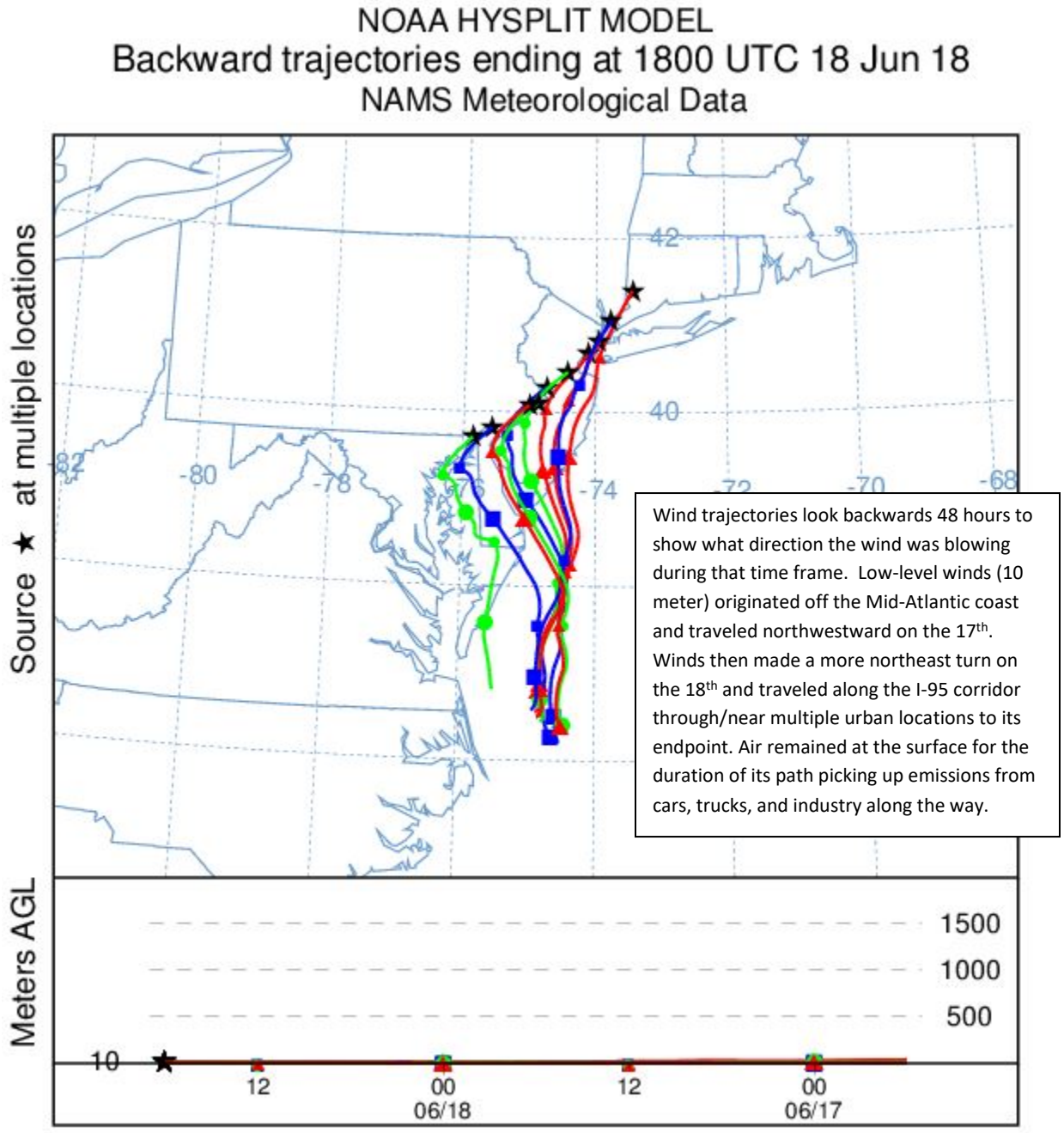


Figure 3. 48-hour Back Trajectories for June 18, 2018 at 500 meters

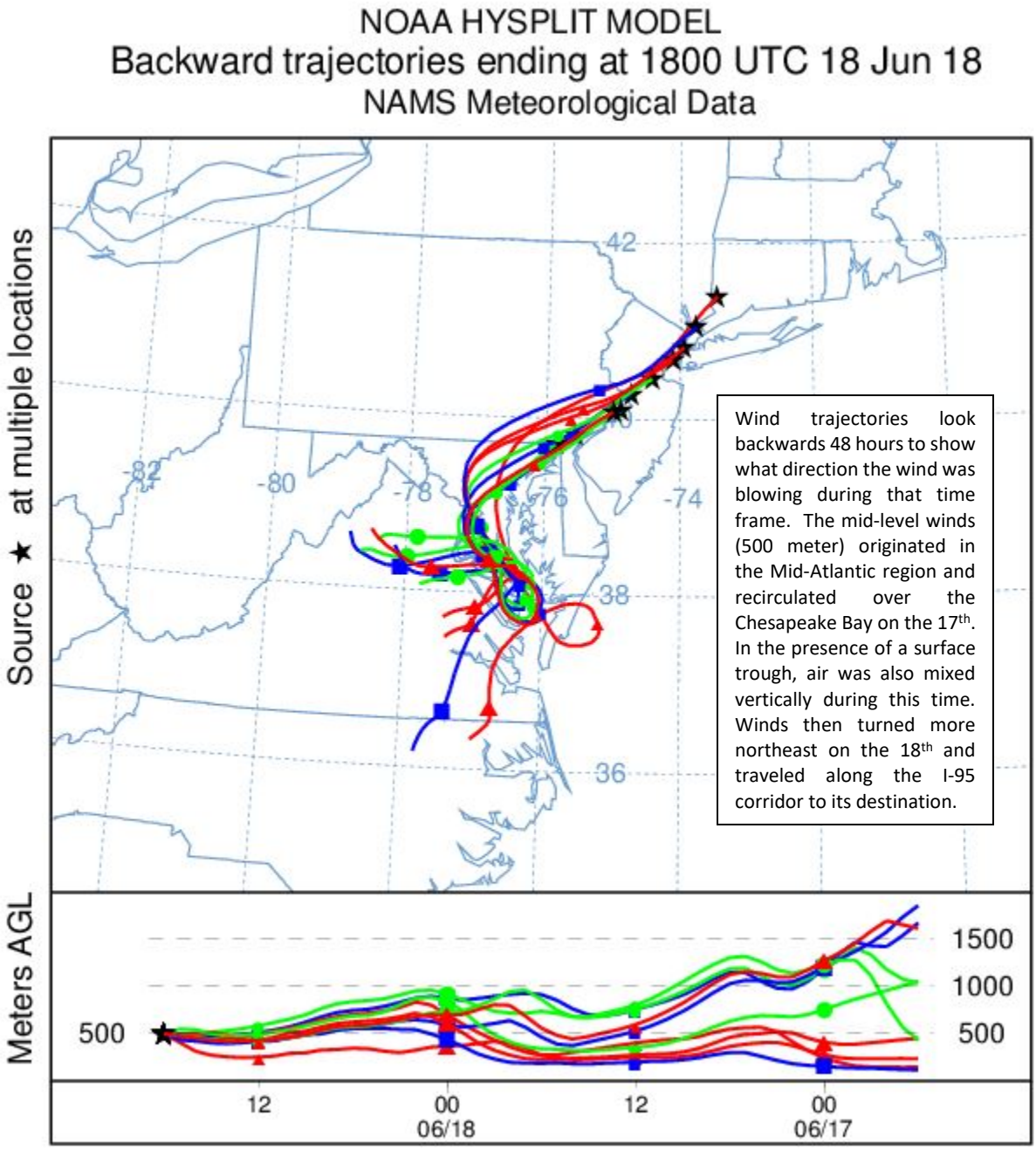


Figure 4. 48-hour Back Trajectories for June 18, 2018 at 1500 meters

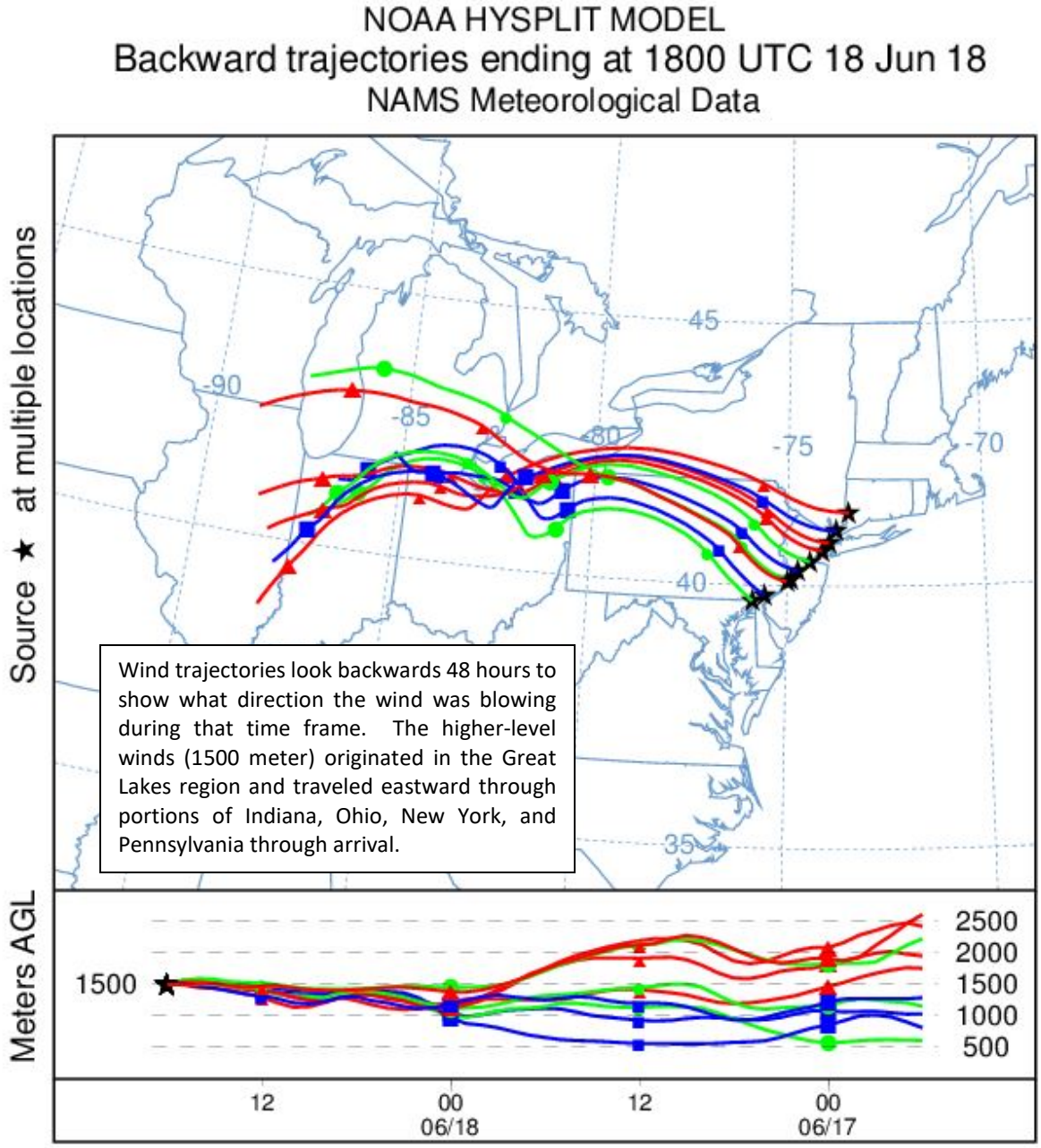
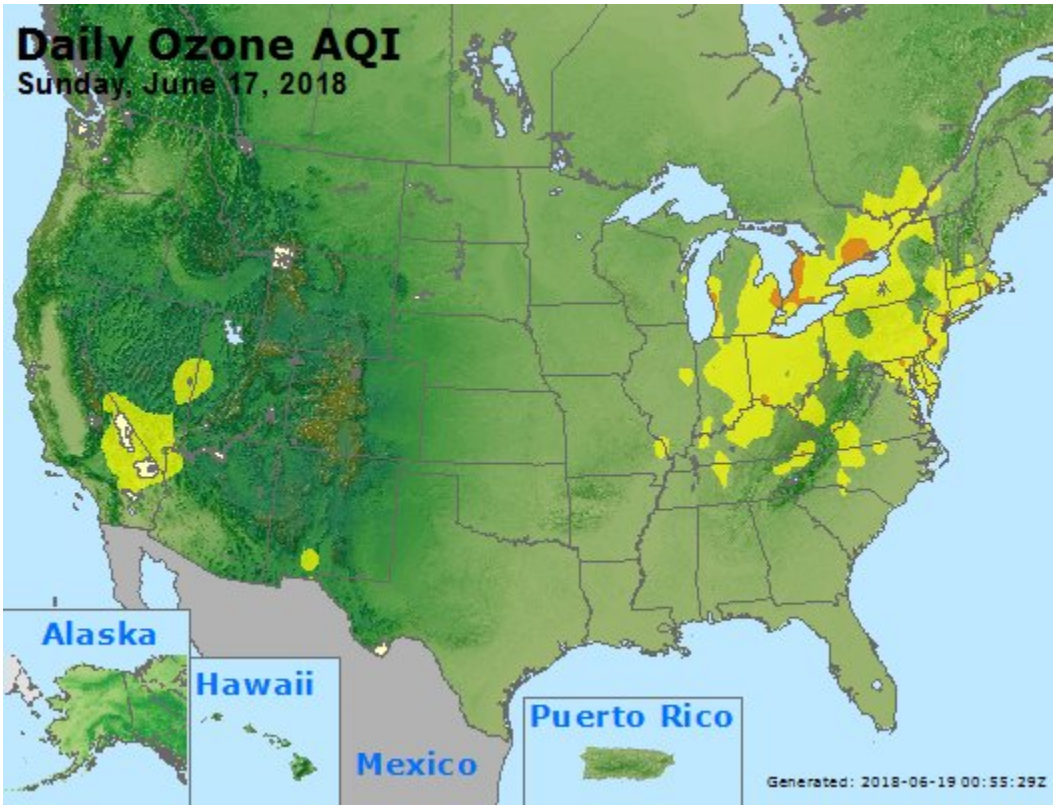


Figure 5. Ozone Air Quality Index for the United States on June 17, 2018



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.