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

Exceedance Locations and Levels

On Saturday, June 9, 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:

Table 1. New Jersey 8-hr Maximum Ozone Concentrations on June 9, 2018

STATION	Daily Maximum 8-Hr Average (ppb)
Ancora State Hospital	54
Bayonne	69
Brigantine	51
Camden Spruce St	66
Chester	49
Clarksboro	64
Colliers Mills	60
Columbia	35
Flemington	54
Leonia	52
Millville	46
Monmouth University	64
Newark Firehouse	60
Ramapo	41
Rider University	62
Rutgers University	76
Washington Crossing*	58
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 no exceedances of the ozone NAAQS. See Table 2:

Table 2. Ozone Concentrations at Out-of-State Monitoring Stations in New Jersey's Ozone Non-Attainment Areas on June 9, 2018

STATE	STATION	Daily Maximum 8-Hr Average (ppb)
CT	Danbury	44
CT	Greenwich	52

CT	Madison-Beach Road	48
CT	Middletown-CVH-Shed	45
CT	New Haven	43
CT	Stratford	49
CT	Westport	51
DE	BCSP (New Castle Co.)	53
DE	BELLFNT2 (New Castle Co.)	68
DE	KILLENS (Kent Co.)	50
DE	LEWES (Sussex Co.)	46
DE	LUMS 2 (New Castle Co.)	64
DE	MLK (New Castle Co.)	67
DE	SEAFORD (Sussex Co.)	55
MD	Fair Hill	60
NY	Babylon	54
NY	Bronx - IS52	56
NY	CCNY	52
NY	Holtsville	50
NY	Pfizer Lab	51
NY	Queens	61
NY	Riverhead	50
NY	Rockland Cty	44
NY	White Plains	48
NY	Susan Wagner	No Data
PA	BRIS (Bucks Co.)	70
PA	CHES (Delaware Co.)	67
PA	NEWG (Chester Co.)	58
PA	NORR (Montgomery Co.)	58
PA	LAB (Philadelphia Co.)	No Data
PA	NEA (Philadelphia Co.)	69
PA	NEW (Philadelphia Co.)	62
	TOTAL EXCEEDANCES	0

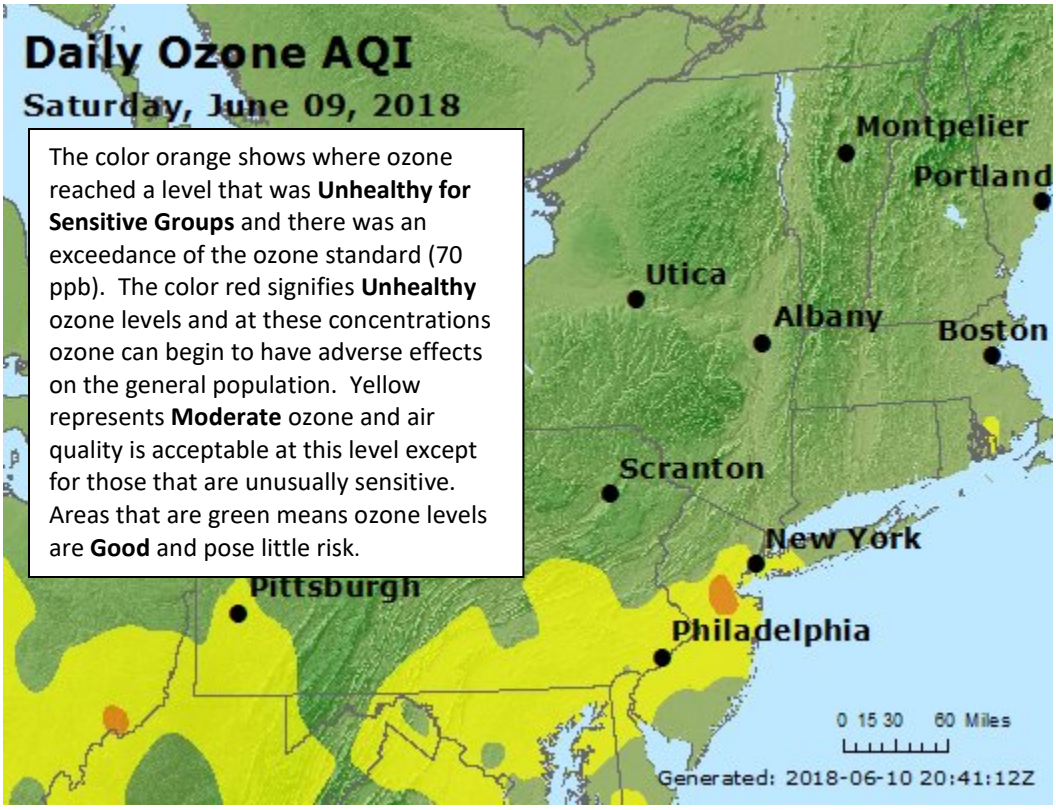
The number of days in 2018 on which exceedances of the ozone NAAQS were recorded for all the states is summarized in Table 3. Figure 1 shows graphically the region's ozone concentrations on June 9, 2018.

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 – June 9, 2018 NAAQS = 70 ppb
Connecticut	4

Delaware	2
Maryland	2
New Jersey	5
New York	4
Pennsylvania	3

Figure 1. Ozone Air Quality Index for June 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

Weather conditions across the state on Saturday June 9, 2018 were unsettled as a lingering cold front and the return of a humid air mass promoted clouds and isolated showers. The cold front settled farther into the southern portion of New Jersey than previously anticipated and stalled in the early afternoon. As a result, the clouds and showers that developed remained south of the frontal boundary and limited any precipitation to southern New Jersey, Delaware, and Maryland. Locations north of the boundary including the exceedance location experienced more sunshine with localized back trajectories. Considering back trajectories had local influences, it is very likely that emissions from New York were transported into New Jersey and impacted the ozone levels at the Rutgers monitor. In addition, winds at

the surface and aloft remained on the lighter side throughout the afternoon which resulted in less clouds and showers developing than expected.

Radar images indicate that a sea breeze front developed in the late afternoon on Saturday in response to the light winds aloft and at the surface. In this instance, polluted air from the previous day was likely pushed onshore and helped contribute to the already elevated ozone levels. The exceedance being exclusive to the Rutgers monitor is likely explained by the calm winds, sunshine, localized back trajectories and the influence of a sea breeze front.

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 9, 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 Selected to Run 48-hr Back Trajectories

STATE	STATION	Daily Maximum 8-Hr Average (ppb)
NJ	Rutgers	76

Surface level back trajectories (Figure 2) show that air at the low-level originated in southeast Pennsylvania and traveled northward into New York. Low level trajectories then made a sharp turn southward as the frontal boundary from the north pushed air to the south. Air then traveled through the NYC – northern NJ metropolitan area as it picked up emissions at ground level along its path. Low level back trajectories then made a turn westward over the New Jersey coast line as a light onshore flow redirected the air to the exceedance monitor. Mid-level backward trajectories (Figure 3) originated in Ontario and traveled southeastward through central New York State and the NYC – Northern NJ metropolitan area and western parts of Long Island. Mid-level winds then made a slight turn southwestward and passed over the New Jersey coast where it eventually reached its endpoint. Winds at the mid-level originated at 2000m and gradually descended to 500m. Upper air back trajectories (Figure 4) originated in central Ohio and traveled westward across the state of Pennsylvania and through New Jersey where it reached its endpoint. Air at the upper level originated at 1000m and slowly rose to 1500m during the 48hrs preceding the ozone event. Figure 5 below shows graphically the national ozone concentrations on June 8, 2018.

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

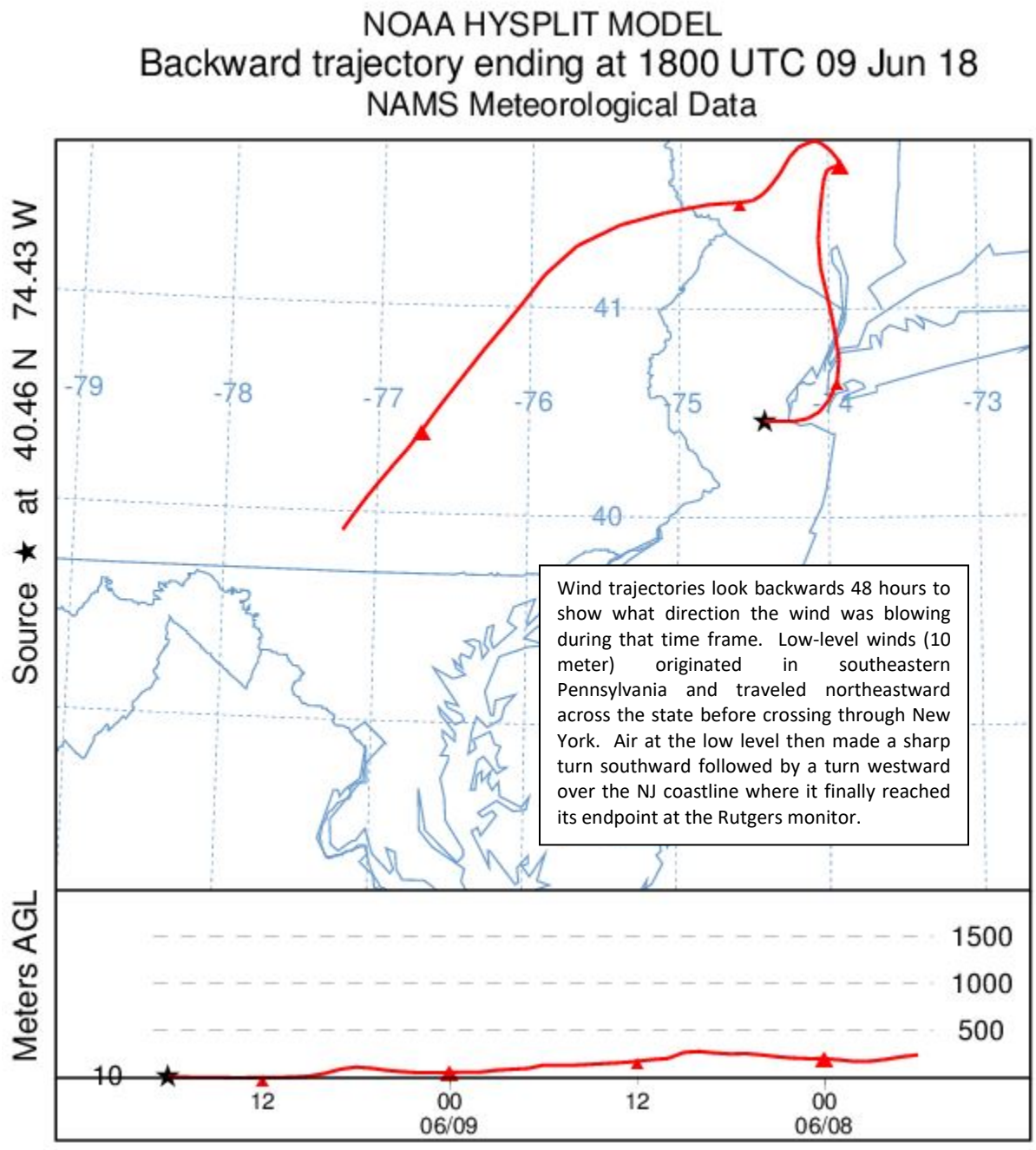


Figure 3. 48-hour Back Trajectories for June 9, 2018 at 500 meters

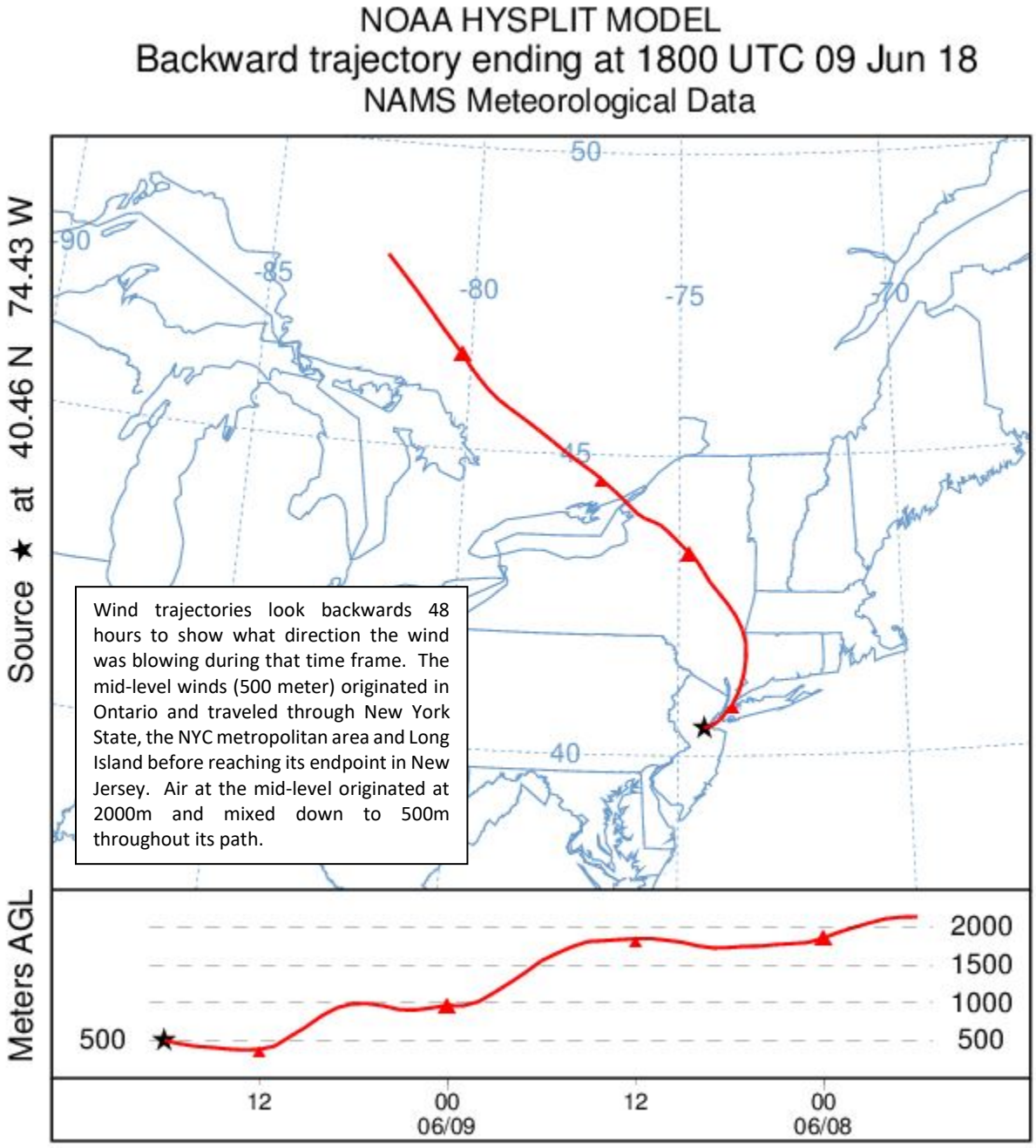


Figure 4. 48-hour Back Trajectories for June 9, 2018 at 1500 meters

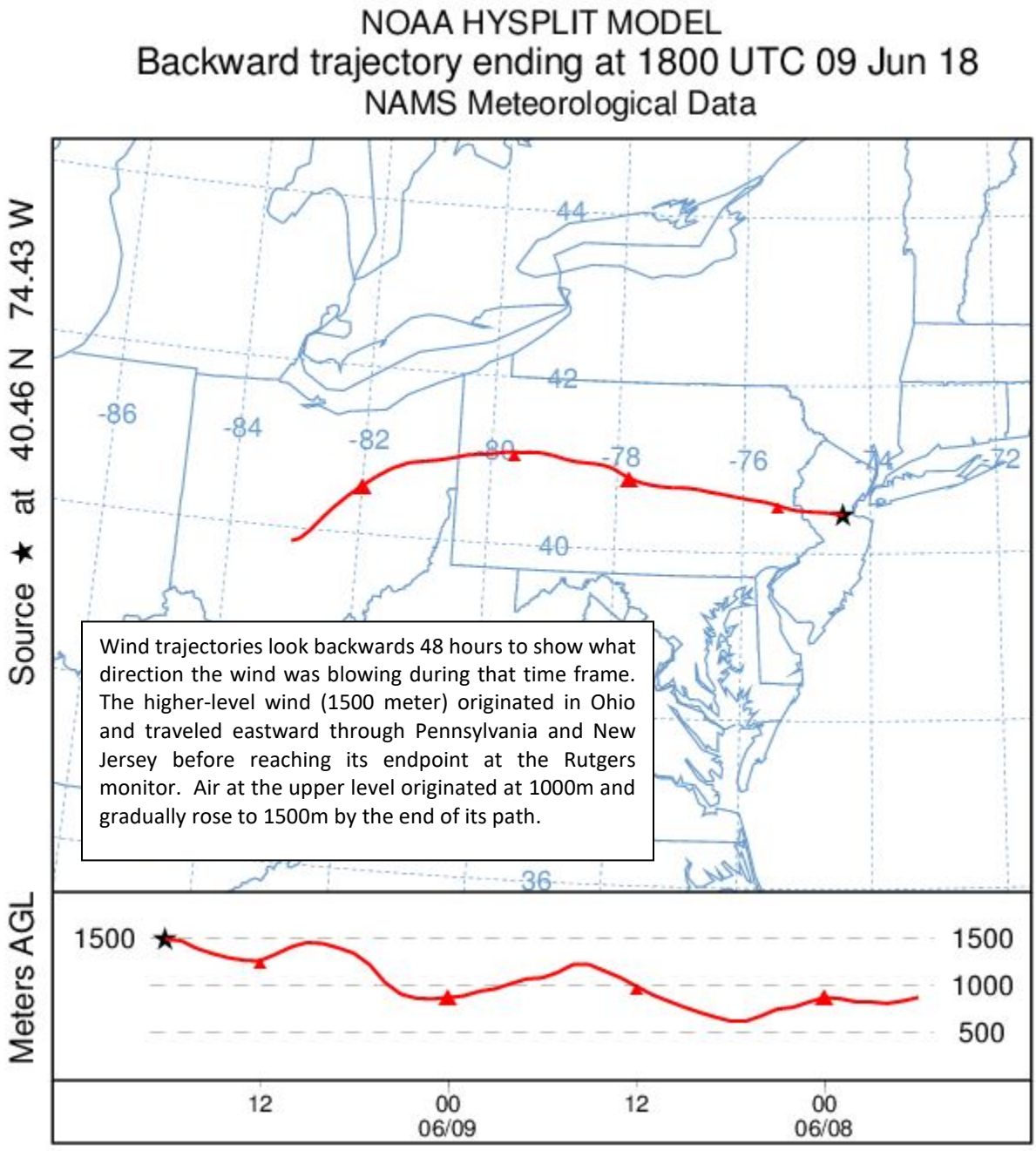
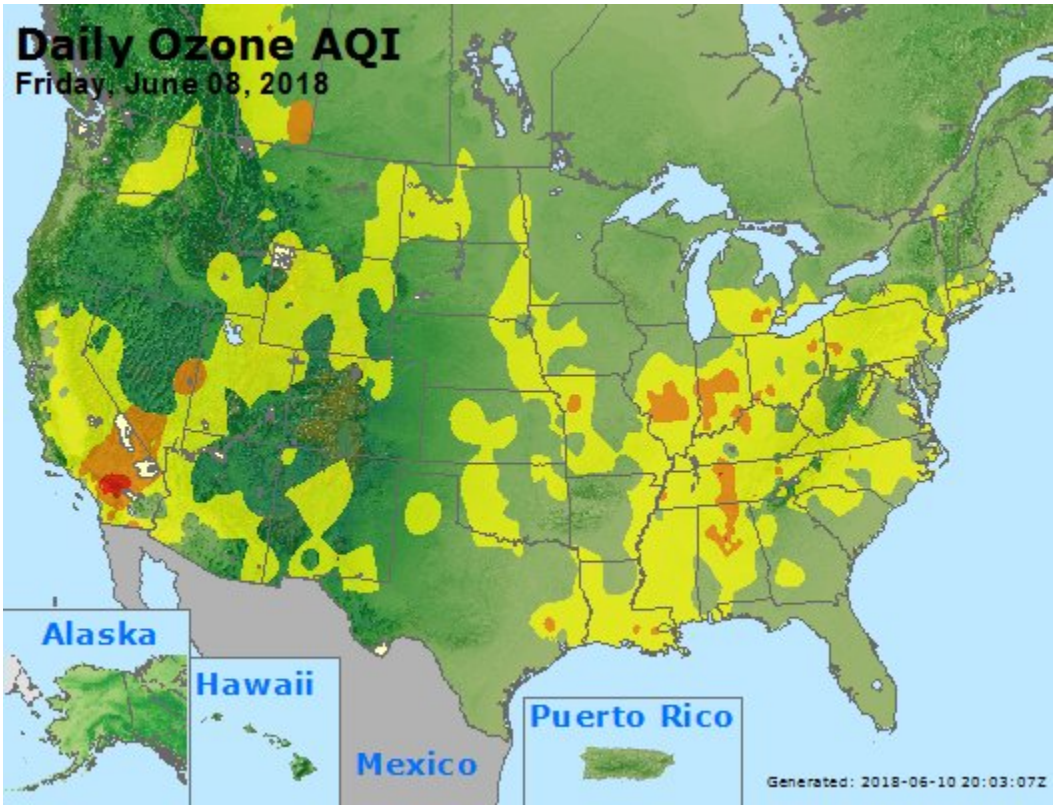


Figure 5. Ozone Air Quality Index for the United States on June 8, 2018



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.