Ozone National Ambient Air Quality Standard Health Exceedances on June 5, 2019

Exceedance Locations and Levels

On Wednesday, June 5, 2019, there was one 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 5, 2019

STATION	Daily Maximum 8-Hr Average (ppb)
Ancora State Hospital	55
Bayonne	60
Brigantine	47
Camden Spruce St	56
Chester	67
Clarksboro	52
Colliers Mills	57
Columbia	61
Flemington	67
Leonia	64
Millville	55
Monmouth University	45
Newark Firehouse	62
Ramapo	66
Rider University	66
Rutgers University	No Data
Washington Crossing*	71
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 was one 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 June 5, 2019

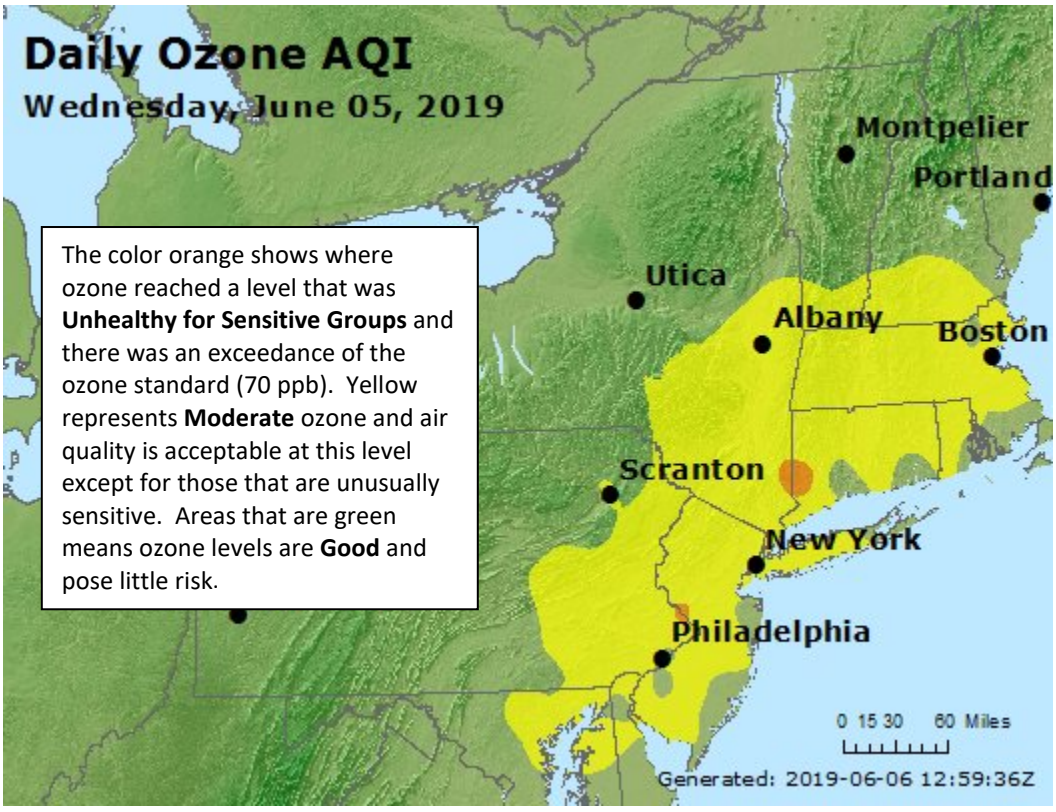
STATE	STATION	Daily Maximum 8-Hr Average (ppb)
CT	Danbury	71
CT	Greenwich	61
CT	Madison-Beach Road	51
CT	Middletown-CVH-Shed	58
CT	New Haven	48
CT	Stratford	57
CT	Westport	60
DE	BCSP (New Castle Co.)	58
DE	BELLFNT2 (New Castle Co.)	61
DE	KILLENS (Kent Co.)	53
DE	LEWES (Sussex Co.)	47
DE	LUMS 2 (New Castle Co.)	52
DE	MLK (New Castle Co.)	No Data
DE	SEAFORD (Sussex Co.)	48
MD	Fair Hill	59
NY	Babylon	47
NY	Bronx - IS52	No Data
NY	CCNY	52
NY	Fresh Kills	52
NY	Holtsville	No Data
NY	Pfizer Lab	No Data
NY	Queens	49
NY	Riverhead	55
NY	Rockland Cty	41
NY	White Plains	49
PA	BRIS (Bucks Co.)	64
PA	CHES (Delaware Co.)	59
PA	NEWG (Chester Co.)	62
PA	NORR (Montgomery Co.)	60
PA	LAB (Philadelphia Co.)	58
PA	NEA (Philadelphia Co.)	65
PA	NEW (Philadelphia Co.)	52
	TOTAL EXCEEDANCES	1

The number of days in 2019 on which exceedances of the ozone NAAQS were recorded for all the states is summarized in Table 3. Figure 1 graphically shows the ozone concentrations on June 5, 2019.

Table 3. Number of Days Ozone NAAQS was Exceeded in NJ's Non-Attainment Areas in 2019

STATE	# of Days NAAQS was Exceeded January 1 – June 5, 2019 NAAQS = 70 ppb
Connecticut	1
Delaware	0
Maryland	0
New Jersey	1
New York	0
Pennsylvania	0

Figure 1. Ozone Air Quality Index for June 5, 2019



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

Long-range and localized transport with the support of favorable weather conditions, including vertical mixing in the atmosphere, led to exceedances in Connecticut and in central New Jersey on June 5, 2019.

High pressure, which had been dominating the weather pattern for much of the eastern United States for several days, pushed offshore as a cold front slowly approached the region from the northwest. Ahead of this front, a mix of sun and clouds was observed throughout the area with southwesterly winds ushering in hot temperatures. Instability before the approaching front produced evening showers and thunderstorms. Thunderstorms are known for strong vertical mixing in the atmosphere which, in this case, may have allowed ozone and its precursors aloft to mix down to the surface, enhancing an increasingly polluted atmosphere.

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 exceedances on June 5, 2019. The figures illustrate where the air came from during the 48 hours preceding the 8-hour ozone standard exceedances. The two monitoring stations with 8-hr ozone exceedances 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 Station with an 8-hr Ozone Exceedance that Was Selected to Run 48-hr Back Trajectories

STATE	STATION	Daily Maximum 8-Hr Average (ppb)
CT	Danbury	71
NJ	Washington Crossing	71

Back trajectories from June 5th show that air flow, at all levels of the atmosphere, was highly influenced by high pressure circulation over the eastern United States. Favorable weather conditions and the transport from upwind and local industry led to the exceedances in the nonattainment area. Surface-level backward trajectories (Figure 2) originated over western Pennsylvania. Air at the surface then followed the predominant flow around the departing high pressure, picking up emissions from cars, trucks, and industry along the I-95 corridor. Trajectories at the mid-levels (Figure 3) originated over West Virginia and recirculated around Virginia and North Carolina before traveling over the I-95 corridor and southeastern Pennsylvania. Upper level trajectories (Figure 4) originated in Kentucky and Indiana and traveled around the perimeter of the high pressure. This path led the trajectories through southern Ohio, West Virginia, and across the state of Pennsylvania before reaching their destinations in New Jersey and Connecticut.

Figure 5 shows the national air quality observed on June 4th, the day prior to the localized air quality exceedances. As shown in the figure, widespread moderate and isolated USG air quality was observed in the Midwest and South, while the Northeast U.S. has good air quality. Back trajectories from June 5th suggest that recirculation of air around the center of high pressure, local sources and the potential influence from upwind sources in the Midwest and South may have contributed to these exceedances.

Figure 2. 48-hour Back Trajectories for June 5, 2019 at 10 meters

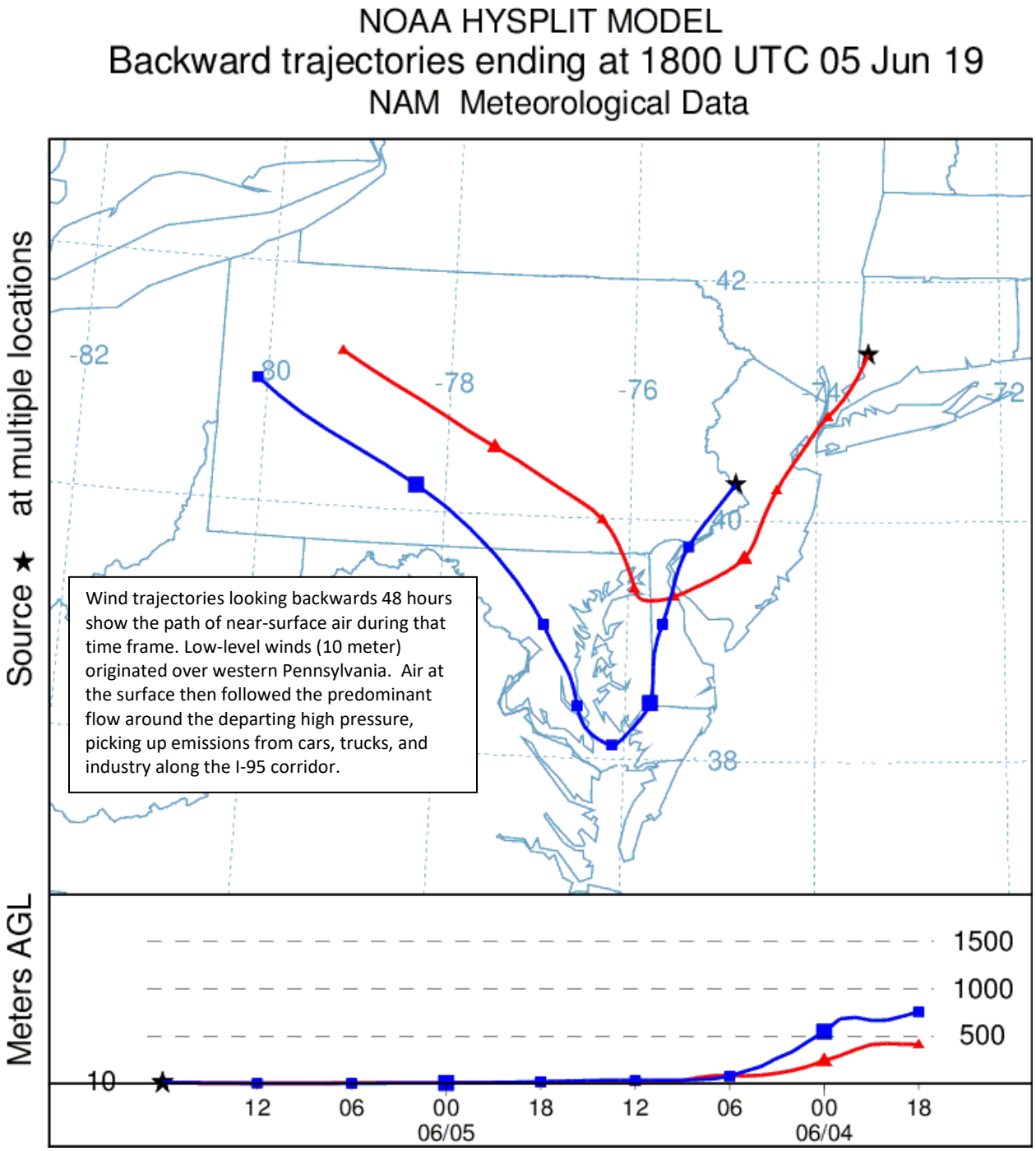


Figure 3. 48-hour Back Trajectories for June 5, 2019 at 500 meters

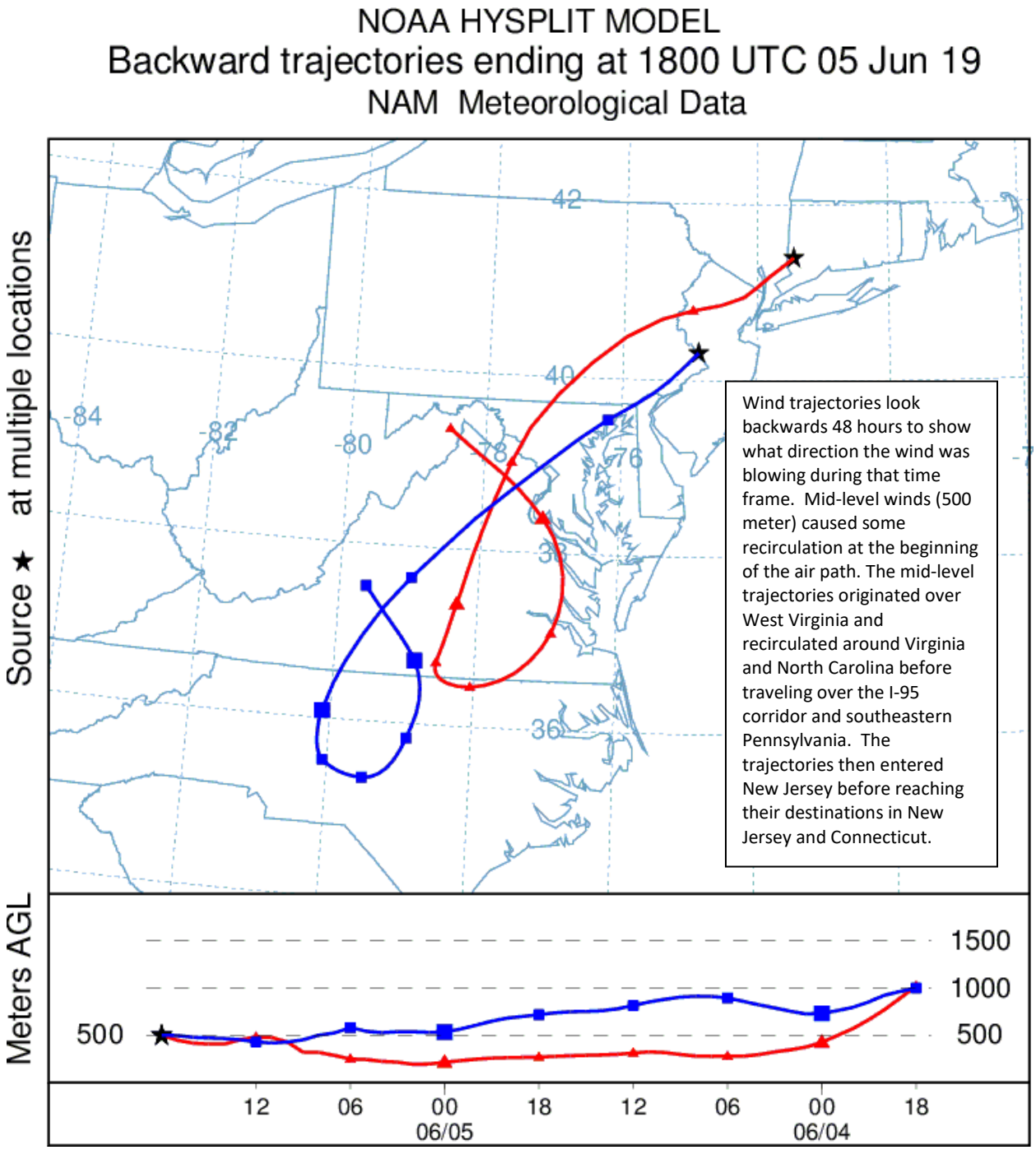


Figure 4. 48-hour Back Trajectories for June 5, 2019 at 1500 meters

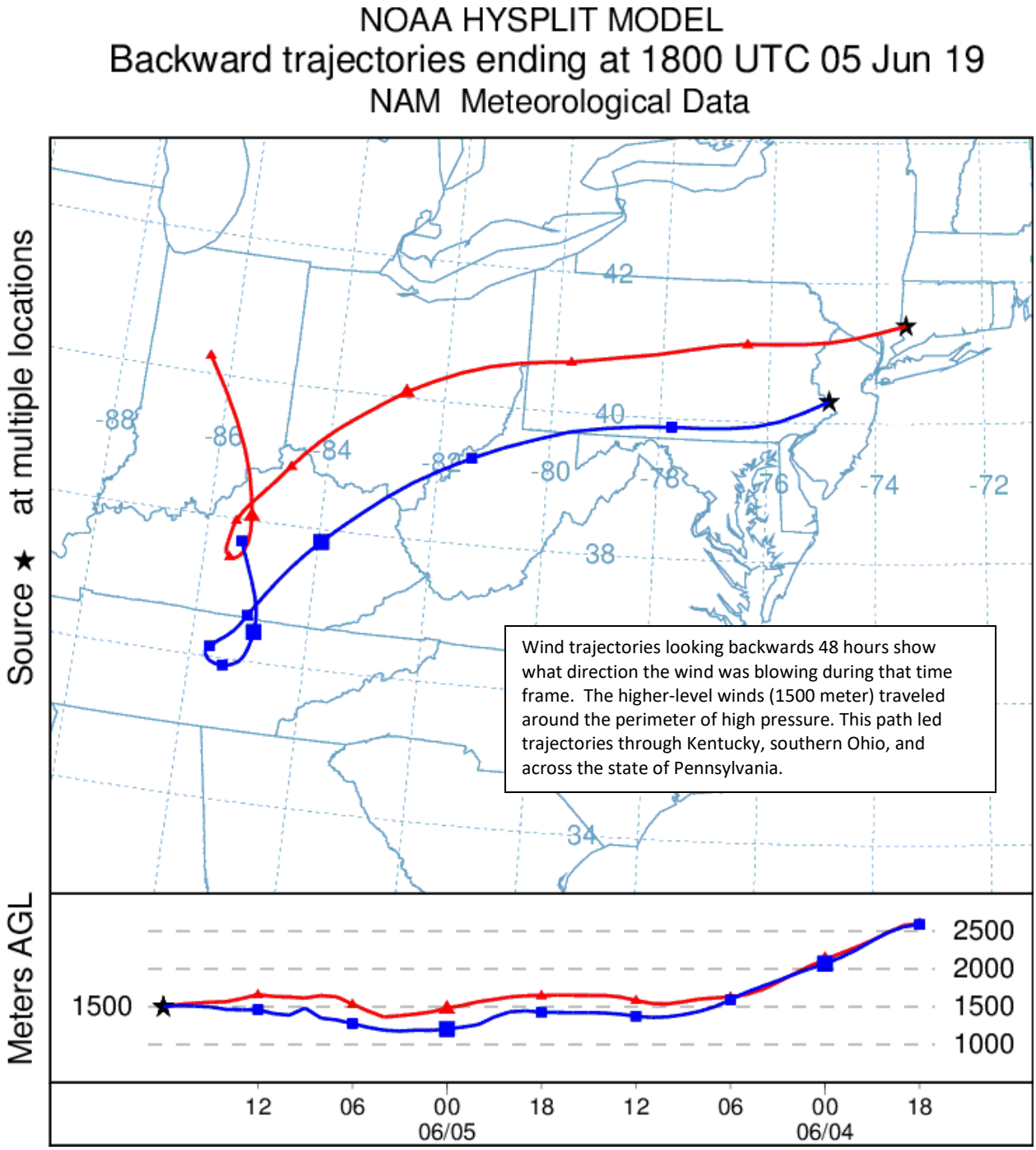
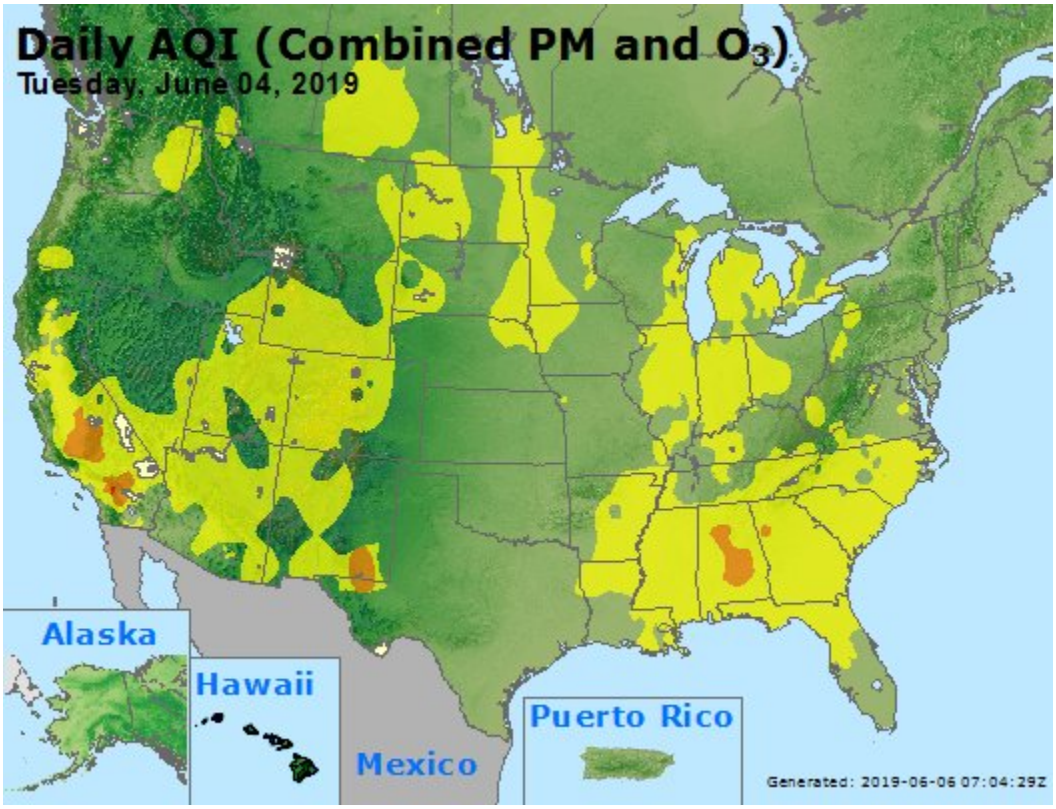


Figure 5. Ozone Air Quality Index for the United States on June 4, 2019



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.