Ozone National Ambient Air Quality Standard Health Exceedances on July 18, 2017

Exceedance Locations and Levels

On Tuesday, July 18, 2017, there were no exceedances in New Jersey of the 8-hour average ozone National Ambient Air Quality Standard (NAAQS) of 70 ppb that became effective in December 2015.

No New Jersey station exceeded the 75 ppb ozone NAAQS of 2008, and none exceeded the 84 ppb ozone NAAQS of 1997. The highest 1-hour average ozone concentration recorded on July 18, 2017, in New Jersey was 86 ppb at the Flemington and Washington Crossing stations, which is below the 1-hour ozone NAAQS of 120 ppb.

The number of days in 2017 on which exceedances of the 70 ppb ozone NAAQS of 2015 were recorded in New Jersey remains at nine (9). By the 18th of July in 2016, there were fifteen (15) days on which ozone exceedances were measured in New Jersey (based on the 70 ppb NAAQS of 2015), and there were seven (7) days by this same date in 2015 (based on the former 75 ppb NAAQS of 2008) (See Table 1).

Table 1: New Jersey Exceedance Count

	# of Days NAAQS was Exceeded January 1 - July 18, 2017 NAAQS = 70 ppb	# of Days NAAQS was Exceeded January 1 - July 18, 2016 NAAQS = 70 ppb	# of Days NAAQS was Exceeded January 1 - July 18, 2015 NAAQS = 75 ppb
New Jersey	9	15	7

There is a group of monitoring stations in designated counties of 5 states, New York, Connecticut, Pennsylvania, Delaware and Maryland, that are included in New Jersey's ozone nonattainment areas. From this group of stations in the neighboring states, there were three (3) exceedance of the 70 ppb ozone NAAQS of 2015 recorded on Tuesday, July 18, 2017 (See Table 2):

Table 2: Ozone NAAQS Exceedances at other Monitoring Stations in New Jersey's Ozone Nonattainment Areas on July 18, 2017

STATE	STATION	Daily Maximum 8-Hr Average (ppb)
CT	Danbury	72
PA	BRIS (Bucks Co.)	72
PA	NEA (Philadelphia Co.)	74

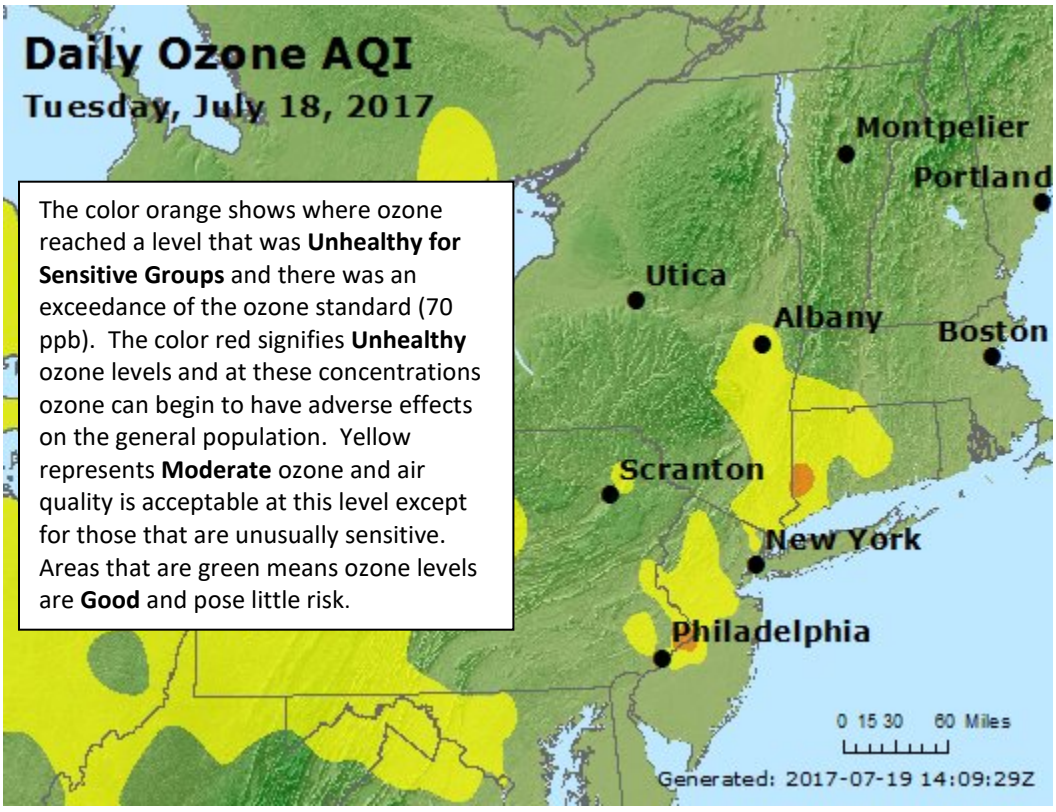
No station exceeded the 75 ppb ozone NAAQS of 2008, and none exceeded the 84 ppb ozone NAAQS of 1997. The highest 1-hour average ozone concentration recorded was 86 ppb at the Danbury station in Connecticut, which is below the 1-hour ozone NAAQS of 120 ppb.

Tuesday marks the 15th day in 2017 on which exceedances of the 70 ppb ozone NAAQS of 2015 were recorded for Connecticut and the 8th day for Pennsylvania. The number of days for New York remains at ten (10), with seven (7) days for Maryland, and five (5) days for Delaware (See Table 3). Figure 1 shows graphically the region's ozone concentrations on July 18, 2017.

Table 3: Number of Ozone Exceedances by State

STATE	# of Days NAAQS was Exceeded January 1 - July 18, 2017 NAAQS = 70 ppb
Connecticut	15
Delaware	5
Maryland	7
New Jersey	9
New York	10
Pennsylvania	8

Figure 1. Ozone Air Quality Index for July 18, 2017



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

An area of low pressure was noted over New England on Tuesday with an associated occluded frontal boundary extending southwest across the Hudson Valley, Pennsylvania and the Ohio River Valley. A surface trough was also noted over the Mid-Atlantic states. Meanwhile, a high pressure system remained anchored off the eastern seaboard. Weather observations in Eastern Pennsylvania and Western Connecticut were similar throughout the day as both locations were south and east of the abovementioned low pressure system and associated frontal boundary. Bristol, Pennsylvania experienced morning clouds and abundant afternoon sunshine. Temperatures were in the lower 90s with light winds from the west and southwest. Further north in Danbury, Connecticut, morning clouds were observed with partly sunny skies in the afternoon and evening. Temperatures were in the upper 80s and winds were light from the south and southwest.

Where Did the Air Pollution that Caused Ozone Come From?

Figures 2, 3, and 4 show the back trajectories at different wind heights for the monitored exceedances on July 18, 2017. The figures illustrate where the winds came from during the 48 hours preceding the high ozone event. Two (2) monitoring stations with 8-hr ozone exceedance was chosen 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)
CT	Danbury	72
PA	BRIS (Bucks Co.)	72

Surface level back trajectories (Figure 2) show that air at the surface traveled mainly over the water and remained at the surface during the 48 hours preceding the high ozone event. The trajectory ending in Pennsylvania traveled through central New Jersey and Philadelphia while the trajectory ending in Connecticut traveled over Long Island and the Sound. Trajectories at the mid-level (Figure 3) originated over coastal North Carolina and over the Atlantic Ocean. The mid-level winds traveling toward Pennsylvania traveled through Maryland, Delaware, South Jersey, and Philadelphia where they picked up emissions from cars, trucks, and industry. The winds traveling toward Connecticut traveled along coastal portions of New Jersey, Long Island, and the Sound picking up polluted air from stationary sources (Industrial, commercial, and EGU). Mid-level back trajectories originated at higher elevations and were brought down to 500m as they passed through a stationary front that was draped across southern Maryland and Delaware. Upper-level trajectories (Figure 3) also originated in coastal locations of North Carolina and the Atlantic Ocean. Both trajectories followed similar pathways entering Maryland, Delaware, and Pennsylvania. Upper-level trajectories ending in Pennsylvania crossed through Wilmington and Philadelphia before reaching its endpoint. Upper-level trajectories ending in Connecticut crossed through industrialized areas of Pennsylvania, Northern New Jersey, and New York City before reaching its endpoint in Connecticut. Winds at the upper level originated at lower elevations and gradually ascended to 1500m throughout the trajectory path. Overall, the trajectories show winds

traversed less land during the 48 hours than ordinary, indicating that high ozone levels likely occurred from locally generated emissions.

Figure 5 below shows graphically the national ozone concentrations on July 17th that contributed to the exceedance on July 18, 2017.

Figure 2. 48-hour Back Trajectories for July 18, 2017 at 10 meters

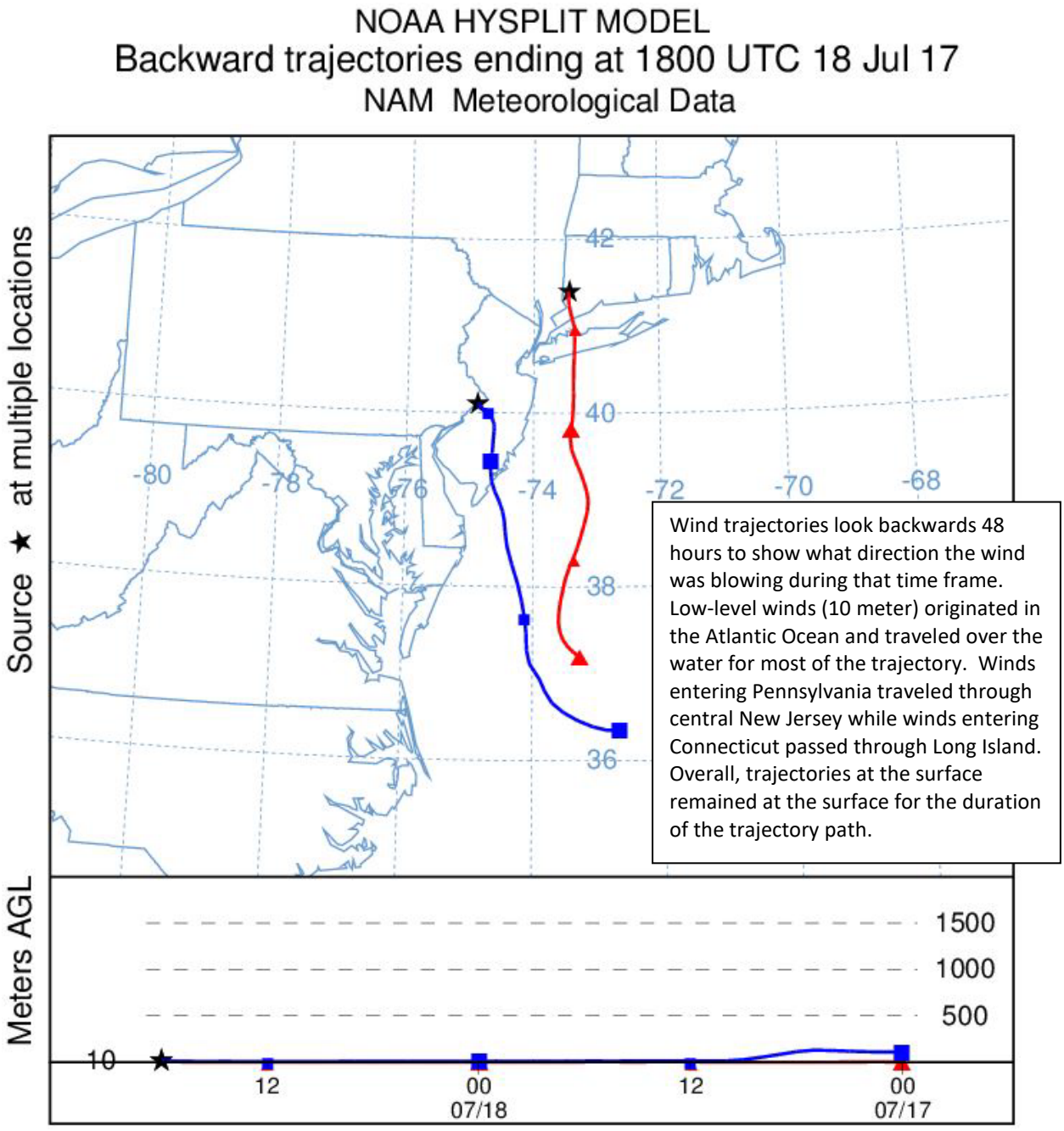


Figure 3. 48-hour Back Trajectories for July 18, 2017 at 500 meters

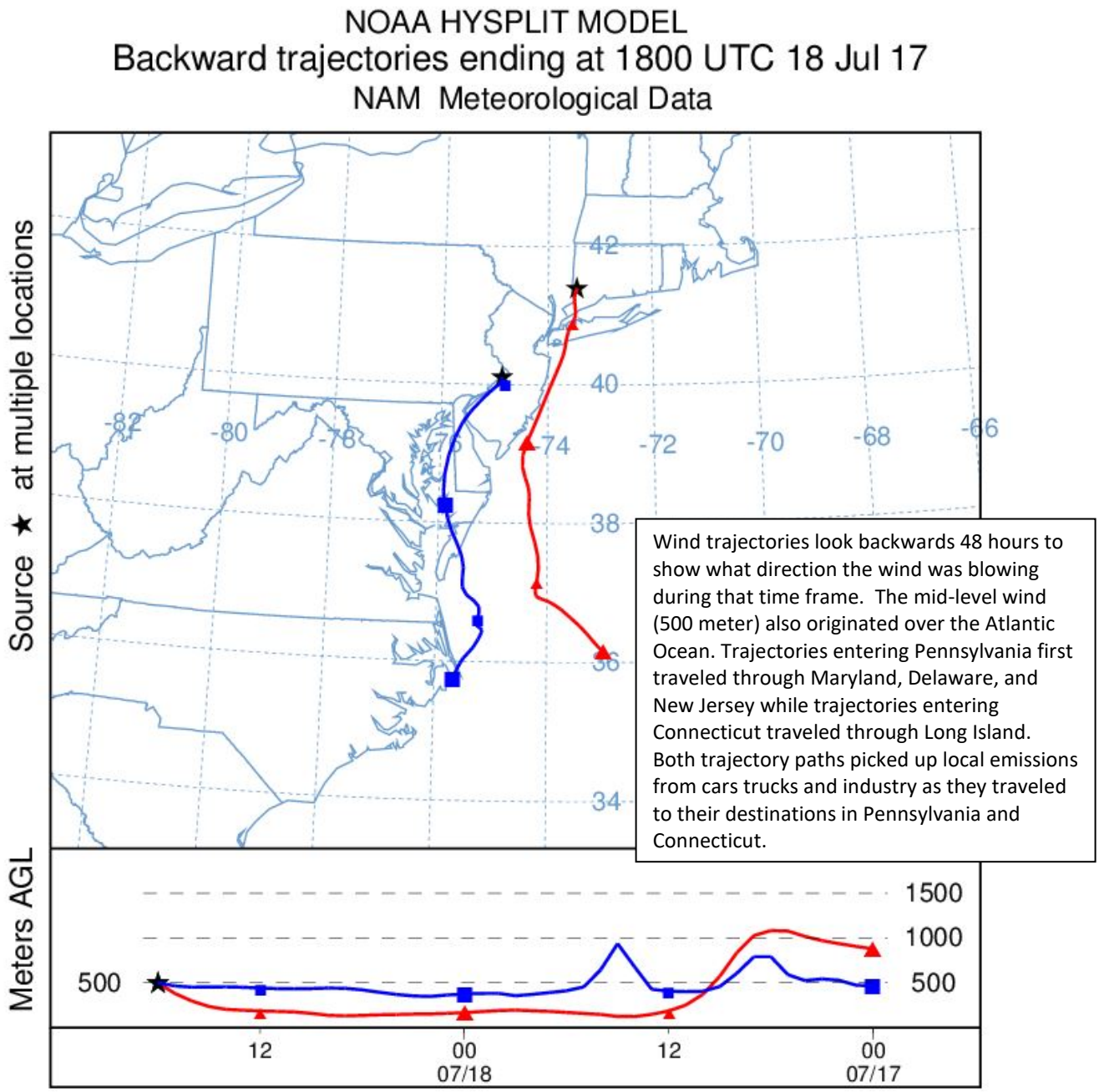


Figure 4. 48-hour Back Trajectories for July 18, 2017 at 1500 meters

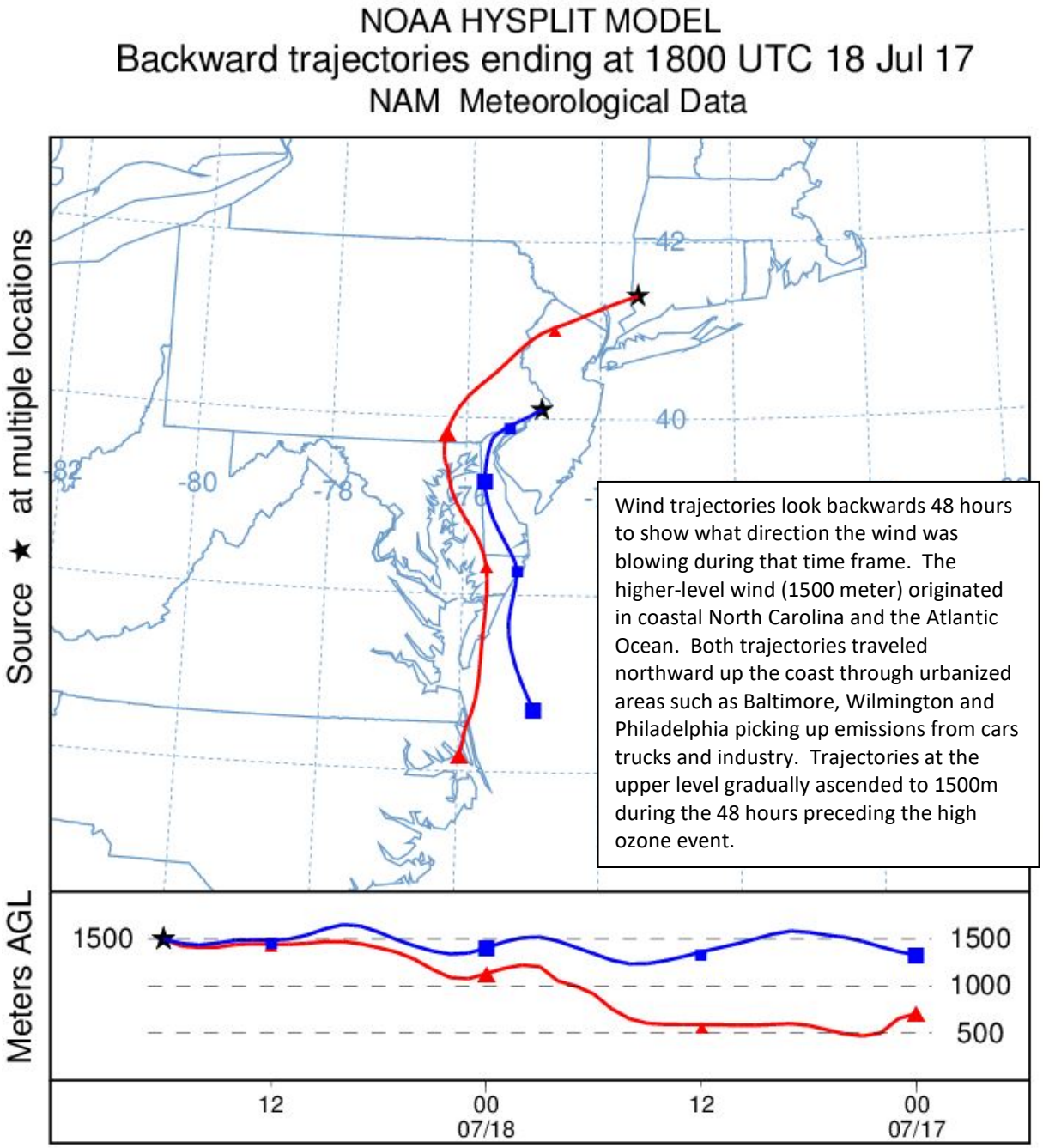
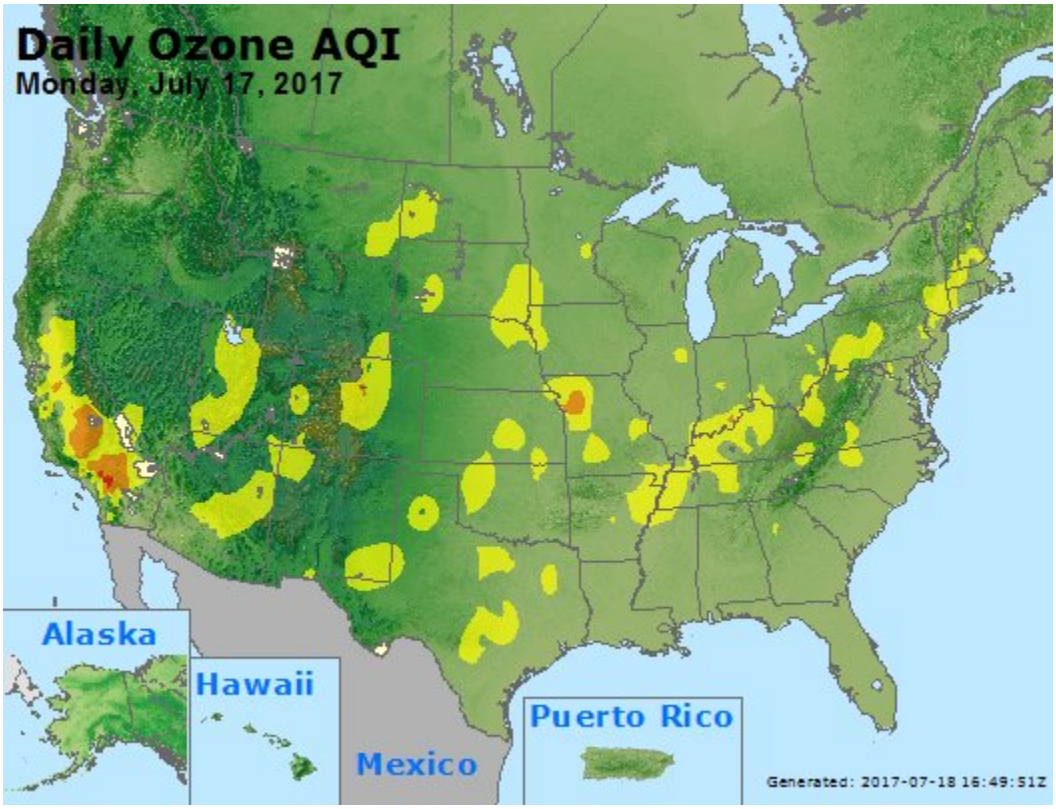


Figure 5. Ozone Air Quality Index for the United States on July 17, 2017



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.