Ozone National Ambient Air Quality Standard Health Exceedances on July 3, 2017

Exceedance Locations and Levels

On Monday, July 3, 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 3, 2017, in New Jersey was 70 ppb at the Ancora State Hospital station, 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 3rd of July in 2016, there were twelve (12) days on which ozone exceedances were measured in New Jersey (based on the 70 ppb NAAQS of 2015), and there were five (5) 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 3, 2017 NAAQS = 70 ppb	# of Days NAAQS was Exceeded January 1 - July 3, 2016 NAAQS = 70 ppb	# of Days NAAQS was Exceeded January 1 - July 3, 2015 NAAQS = 75 ppb
New Jersey	9	12	5

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 was one (1) exceedance of the 70 ppb ozone NAAQS of 2015 recorded on Monday, July 3, 2017 (See Table 2).

Table 2: Ozone NAAQS Exceedances at other Monitoring Stations in New Jersey's Ozone Nonattainment Areas on July 3, 2017

STATE	STATION	Daily Maximum 8-Hr Average (ppb)
CT	Madison-Beach Road	71

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 81 ppb at the Holtsville station in New York, which is below the 1-hour ozone NAAQS of 120 ppb.

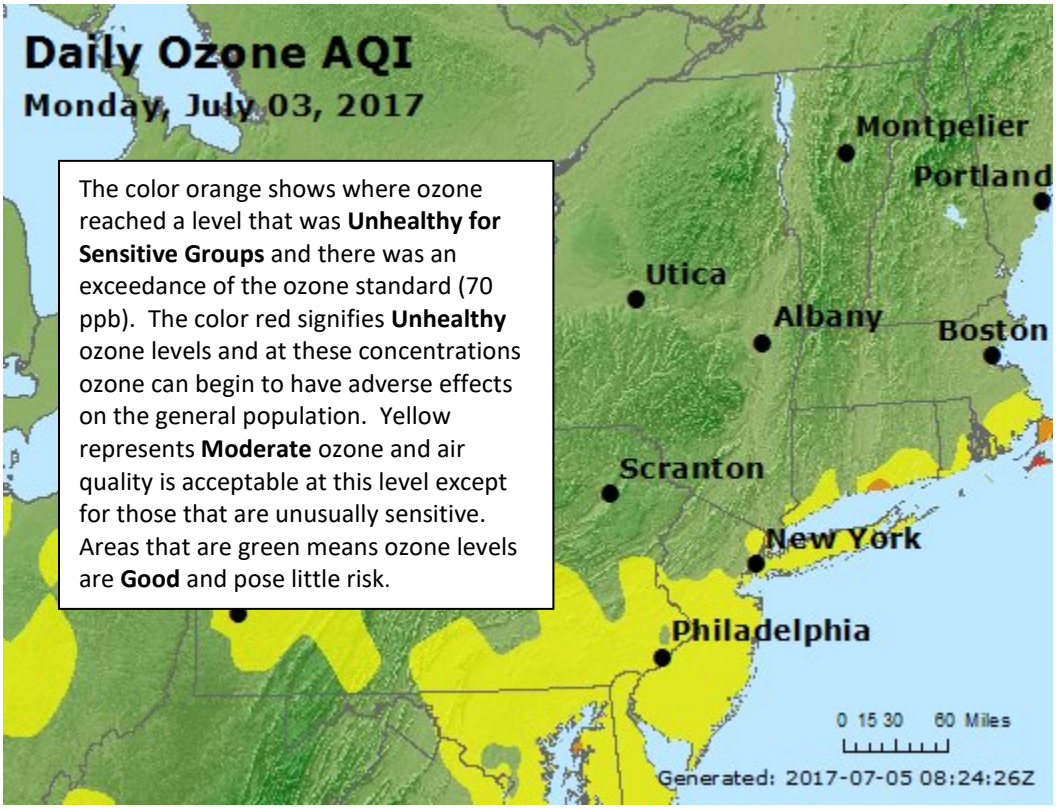
Monday marks the 11th day in 2017 on which exceedances of the 70 ppb ozone NAAQS of 2015 were recorded in Connecticut. The number of days for New York remains at eight (8), with seven (7) days for

Maryland and Pennsylvania, and five (5) days for Delaware (See Table 3). Figure 1 shows graphically the regions ozone concentrations on July 3, 2017.

Table 3: Number of Ozone Exceedances by State

STATE	# of Days NAAQS was Exceeded January 1 - July 3, 2017 NAAQS = 70 ppb
Connecticut	11
Delaware	5
Maryland	7
New Jersey	9
New York	8
Pennsylvania	7

Figure 1. Ozone Air Quality Index for July 3, 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

Meteorological data from the affected monitor in Madison, CT show that temperatures reached the mid-80s by early afternoon. Sunny skies in the morning hours were followed by partly cloudy skies in the afternoon with light winds generally from the west-southwest. A high-pressure system building over the Mid-Atlantic and south was supplying the region with warm air and light southwest winds for several days prior to the exceedance. A cold front draped across the region was passing north to south before it stalled across southern Connecticut. Due to the slow movement of this frontal boundary, limited atmospheric ventilation and periods of calm, variable winds persisted for the remainder of the day. These conditions allowed locally produced ozone to accumulate at the surface level and combine with any ozone created on previous days. The stalled front was located directly overhead of the affected monitor in Madison, CT and likely created a mechanism for any transported ozone aloft to mix down to the surface and combine with locally produced emissions.

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 exceedance on July 3, 2017. The figures illustrate where the winds came from during the 48 hours preceding the high ozone event. One (1) monitoring station with 8-hr ozone exceedances 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

Agency	Site Name	Maximum 8-hr Ozone Conc. (ppb)
CT	Madison-Beach Road	71

The surface level back trajectory (Figure 2) originated in Ohio and traveled through Pennsylvania where it picked up emissions from industrialized areas including power plants. Before it reached its endpoint in Connecticut, it traveled through New York City and the Long Island Sound where it picked up pollutants from cars and trucks as it traveled along the surface. The mid-level trajectories (Figure 3) originated in Wisconsin at an altitude above 2000m. Gradually descending, the air migrated down to a height of 500m bringing any elevated ozone to lower elevations. Mid-level trajectories traveled through 4 states including western New York where there were some occurrences of high ozone one day prior to the ozone exceedance. Upper level trajectories (Figure 4) originated in the Mid-West and traveled northeastward before making a turn and traveling eastward toward its destination. The upper level trajectory started at a lower altitude and ascended to a maximum height of 2000m before returning to 1500m. At all three heights, the trajectories followed a pathway that generally followed along the edge of the frontal boundary that draped across the Mid-Atlantic and Northeast states. This pattern leads to the determination that the boundary likely aided in the accumulation of surface and elevated ozone at the affected monitor. Figures 5 show graphically the ozone concentrations throughout the region on the days prior to the June 22, 2017 exceedance.

Figure 2. 48-hour Back Trajectories for July 3, 2017 at 10 meters

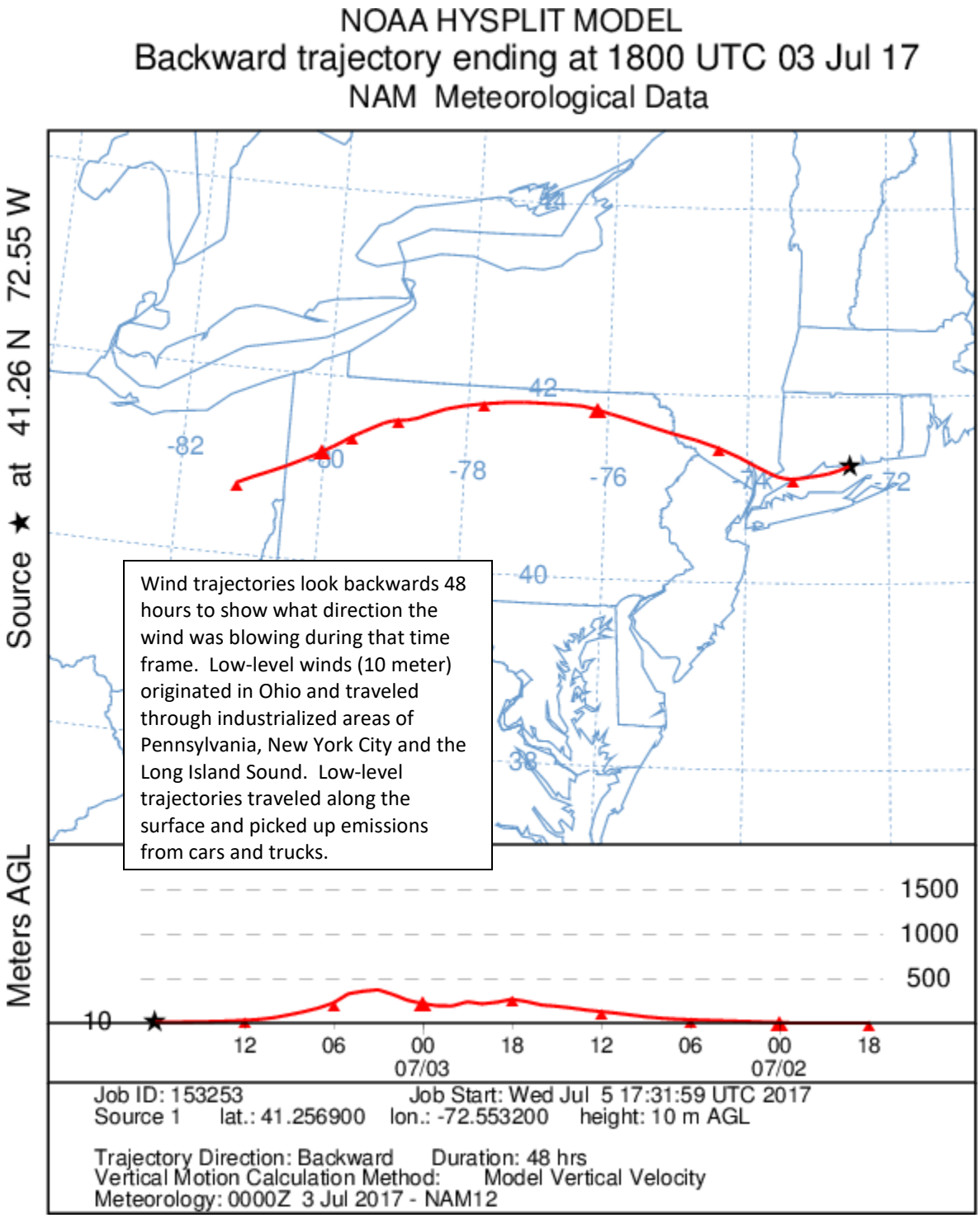


Figure 3. 48-hour Back Trajectories for July 3, 2017 at 500 meters

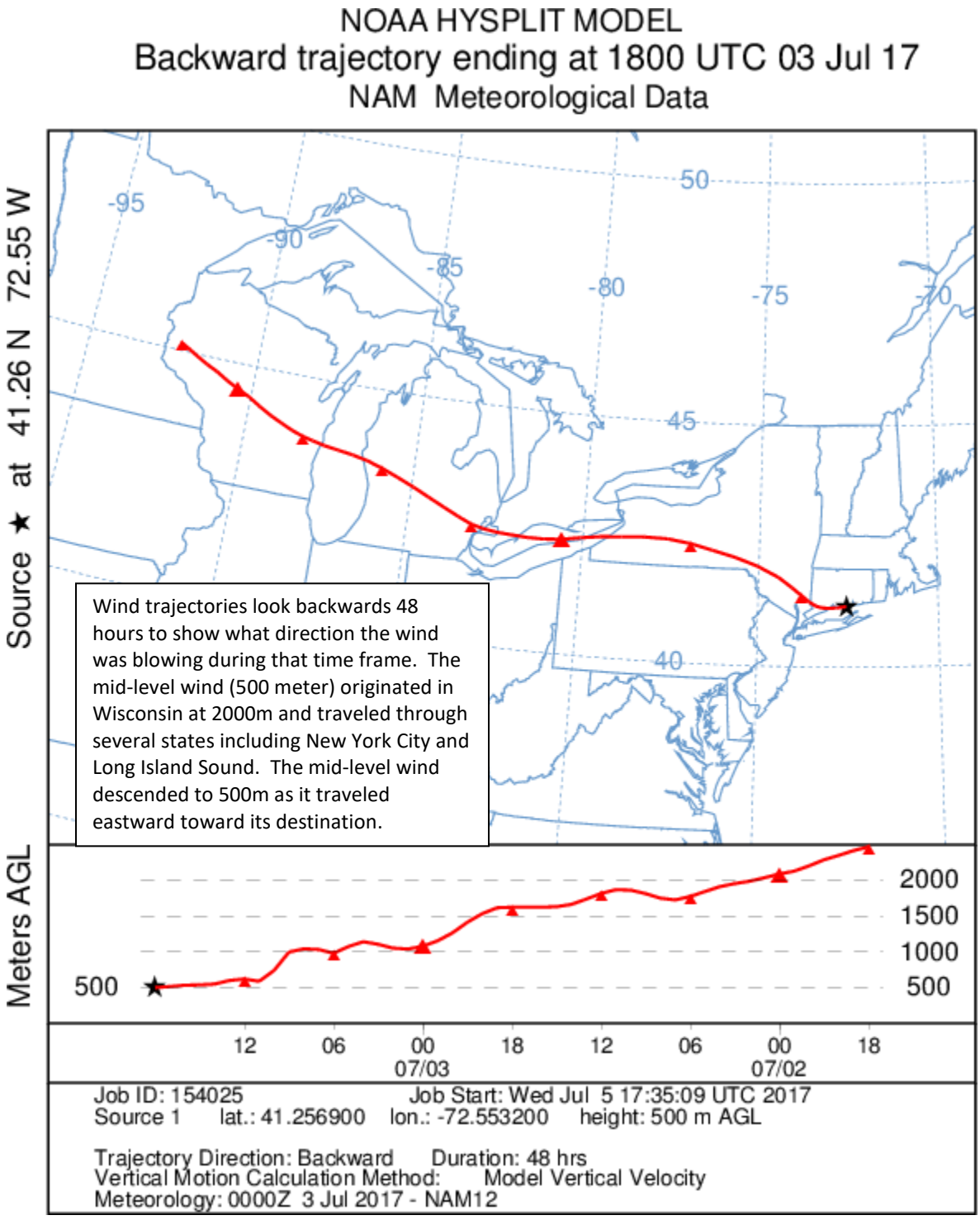


Figure 4. 48-hour Back Trajectories for July 3, 2017 at 1500 meters

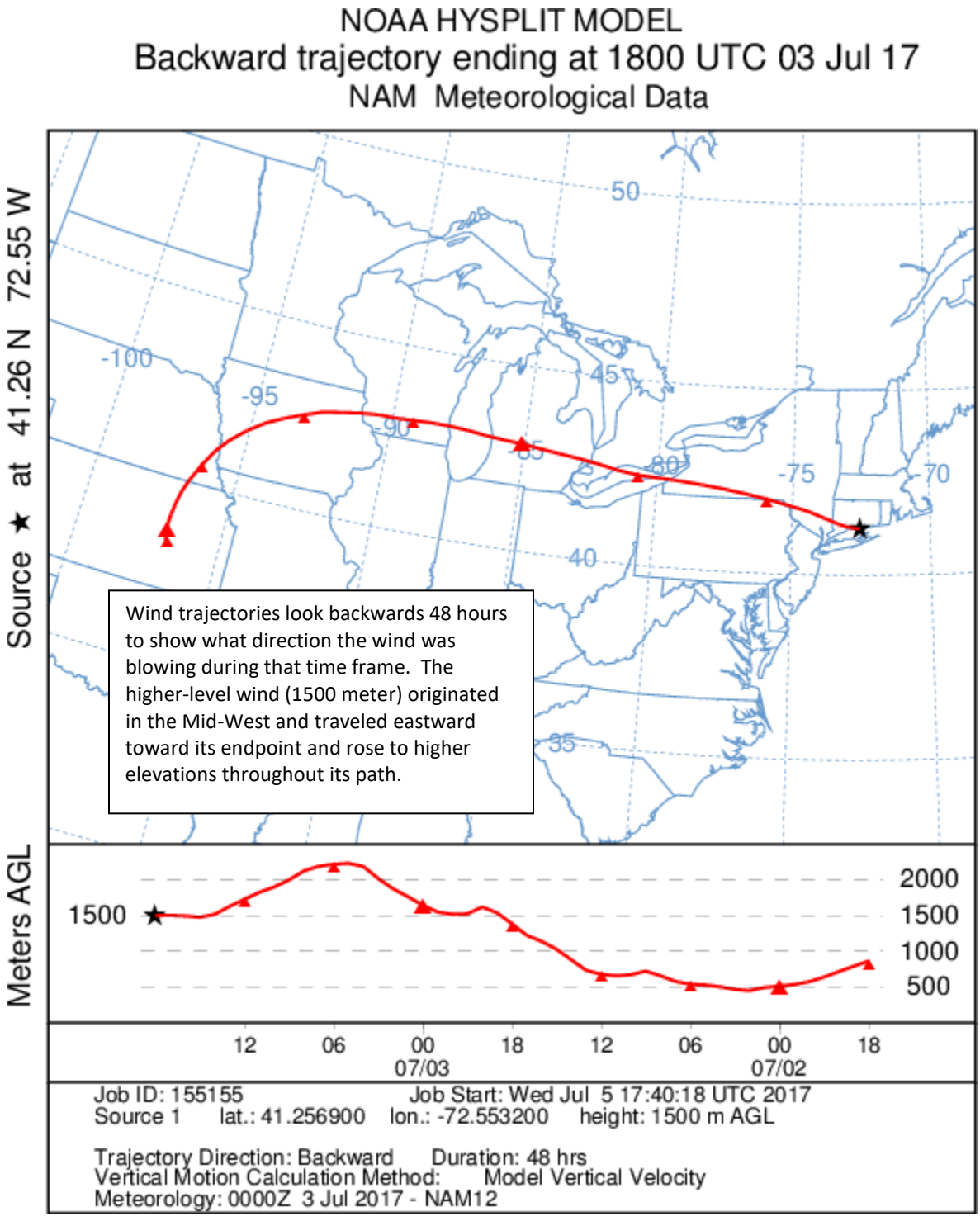
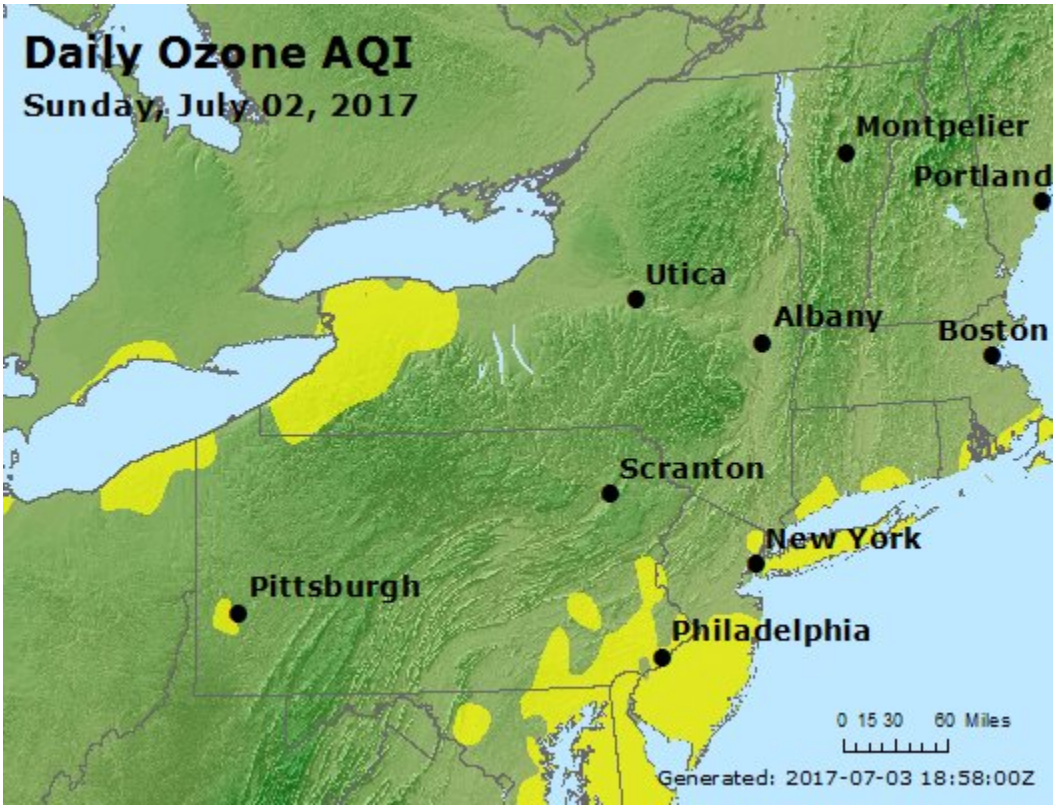


Figure 5. Ozone Air Quality Index for the Northeast Region on July 2, 2017



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.