# Ozone National Ambient Air Quality Standard Health Exceedances on July 8, 2017

## Exceedance Locations and Levels

On Saturday, July 8, 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 8, 2017, in New Jersey was 71 ppb at the Colliers Mills 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 8th of July in 2016, there were fourteen (14) days on which ozone exceedances were measured in New Jersey (based on the 70 ppb NAAQS of 2015), and there were six (6) 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 8, 2017 NAAQS = 70 ppb | # of Days NAAQS was Exceeded January 1 - July 8, 2016 NAAQS = 70 ppb | # of Days NAAQS was Exceeded January 1 - July 8, 2015 NAAQS = 75 ppb |
|---|---|---|---|
| New Jersey | 9 | 14 | 6 |

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 Saturday, July 8, 2017 (See Table 2):

**Table 2: Ozone NAAQS Exceedances at other Monitoring Stations in New Jersey's Ozone Nonattainment Areas on July 8, 2017**

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

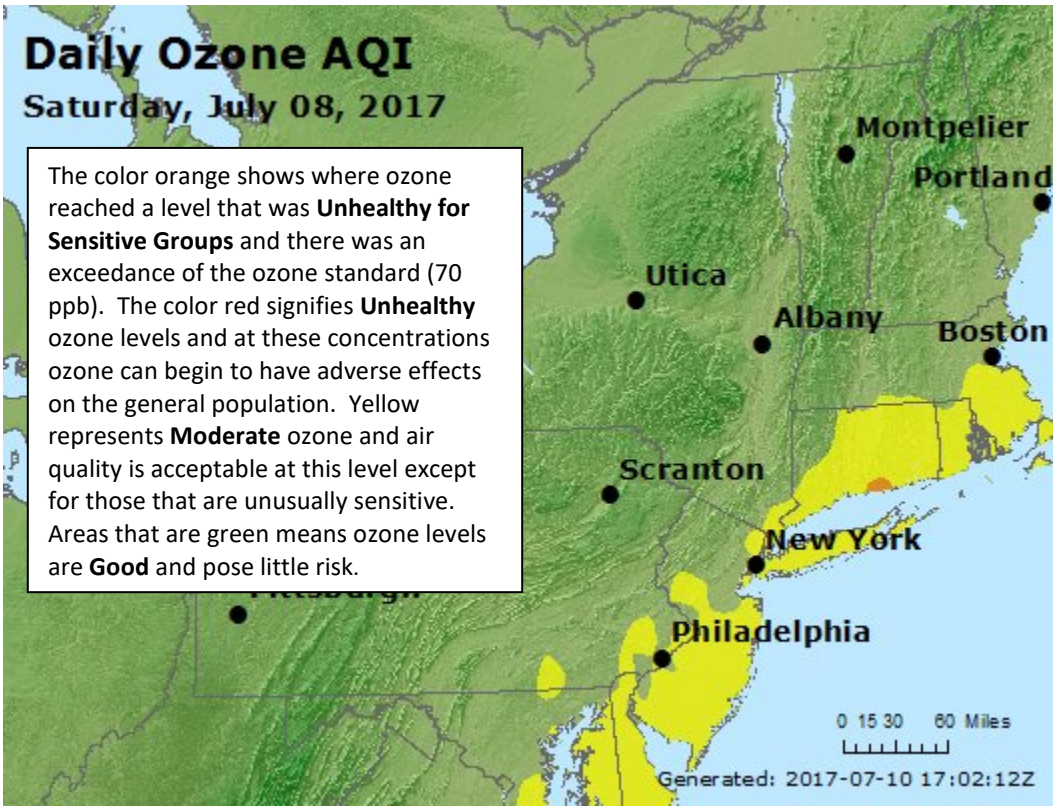
No station exceeded the 75 ppb ozone NAAQS of 2008, and none exceeded the 84 ppb ozone NAAQS of 1997. The highest 1-hour average ozone concentration recorded was 94 ppb at the Madison-Beach Road station in Connecticut, which is below the 1-hour ozone NAAQS of 120 ppb.

Saturday marks the 12th 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 region's ozone concentrations on July 8, 2017.

**Table 3: Number of Ozone Exceedances by State**

| STATE | # of Days NAAQS was Exceeded<br>January 1 - July 8, 2017<br>NAAQS = 70 ppb |
|---|---|
| Connecticut | 12 |
| Delaware | 5 |
| Maryland | 7 |
| New Jersey | 9 |
| New York | 8 |
| Pennsylvania | 7 |

**Figure 1. Ozone Air Quality Index for July 8, 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**

On Saturday, July 8th, a cold front over western New York pushed eastward throughout the day approaching the Atlantic seaboard late in the evening. Ahead of this front, a surface trough extended from New England southward through New Jersey into the Mid-Atlantic region.

Meteorological data showed afternoon sunshine, temperatures reaching the 80s, and winds from the south/southwest directions over southern Connecticut prior to the abovementioned frontal passage. These weather conditions are frequently seen in an ozone exceedance. In addition, with a surface trough just to the west there was an opportunity for any polluted air aloft to be mixed down to the surface, enhancing ozone levels in the vicinity.

**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 8, 2017. 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 chosen to run back trajectories. The selected sites and the maximum 8-hr ozone levels recorded are 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 |

Surface winds (Figure 2) originated over the Atlantic Ocean, southeast of New Jersey and remained at the surface for the duration of the trajectory. The surface winds traveled westward into New Jersey and recirculated over the coastline picking up emissions from cars and trucks as it gradually migrated northward. Winds at the surface then passed through the Long Island Sound which is frequently recognized as having high ozone levels due to the interaction of the land sea interface before landing at its endpoint in Madison, CT. Mid and upper level winds followed similar transport pathways nearly directly west of Connecticut. The mid-level winds (Figure 3) originated in Indiana and traversed the Ohio River Valley, Pennsylvania, northern New Jersey, and the Long Island Sound picking up polluted air from heavily industrialized areas. The upper-level winds (Figure 4) traveled eastward from Iowa and traveled through six states including the same heavily industrialized areas as the mid-level winds: the Ohio Valley, Pennsylvania, and New York City. The mid and upper level winds also brought in polluted air from areas to the west which had isolated regions of elevated ozone levels the day before on July 7, 2017 (shown Figure 5).

**Figure 2. 48-hour Back Trajectories for July 8, 2017 at 10 meters**

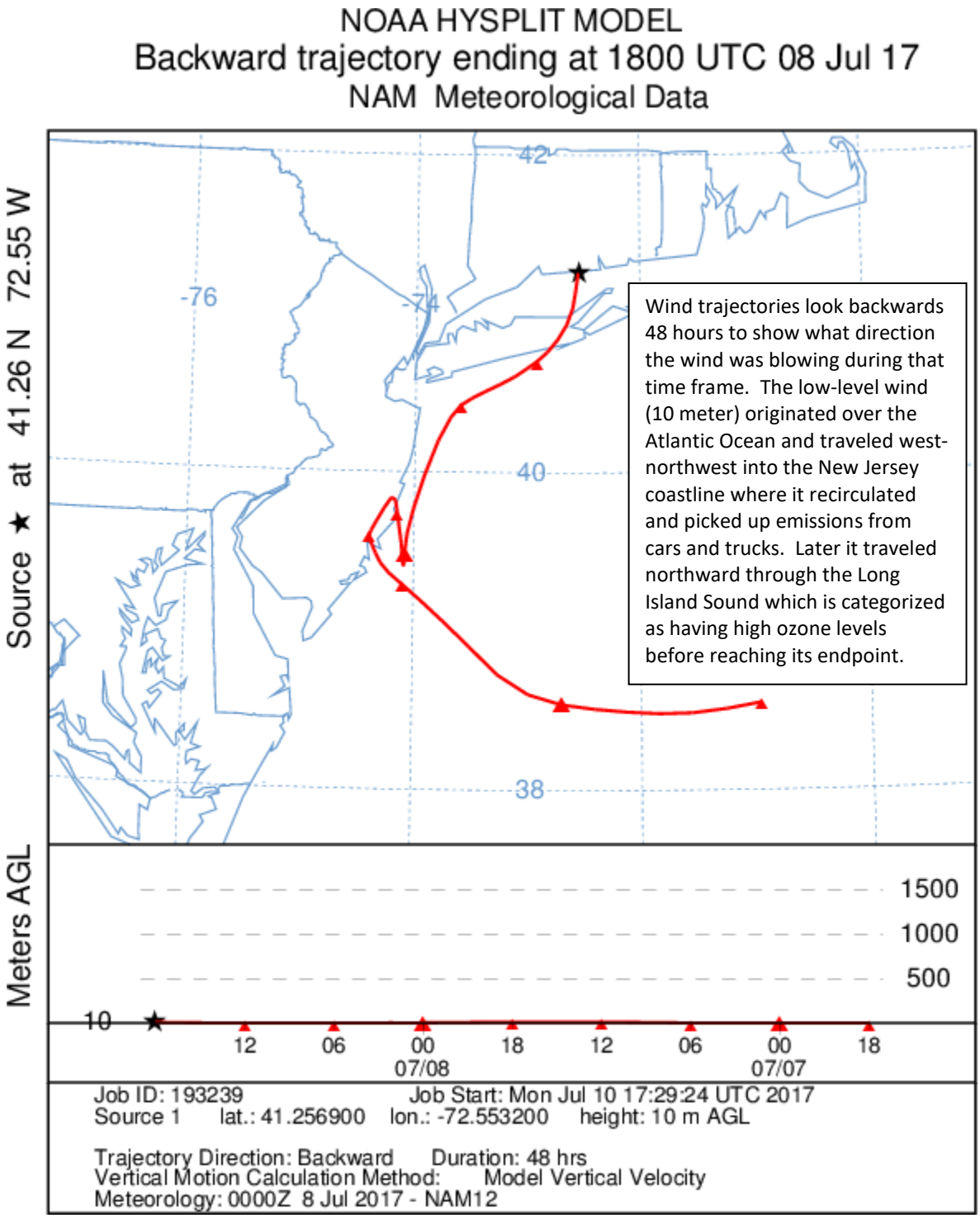


**Figure 3. 48-hour Back Trajectories for July 8, 2017 at 500 meters**

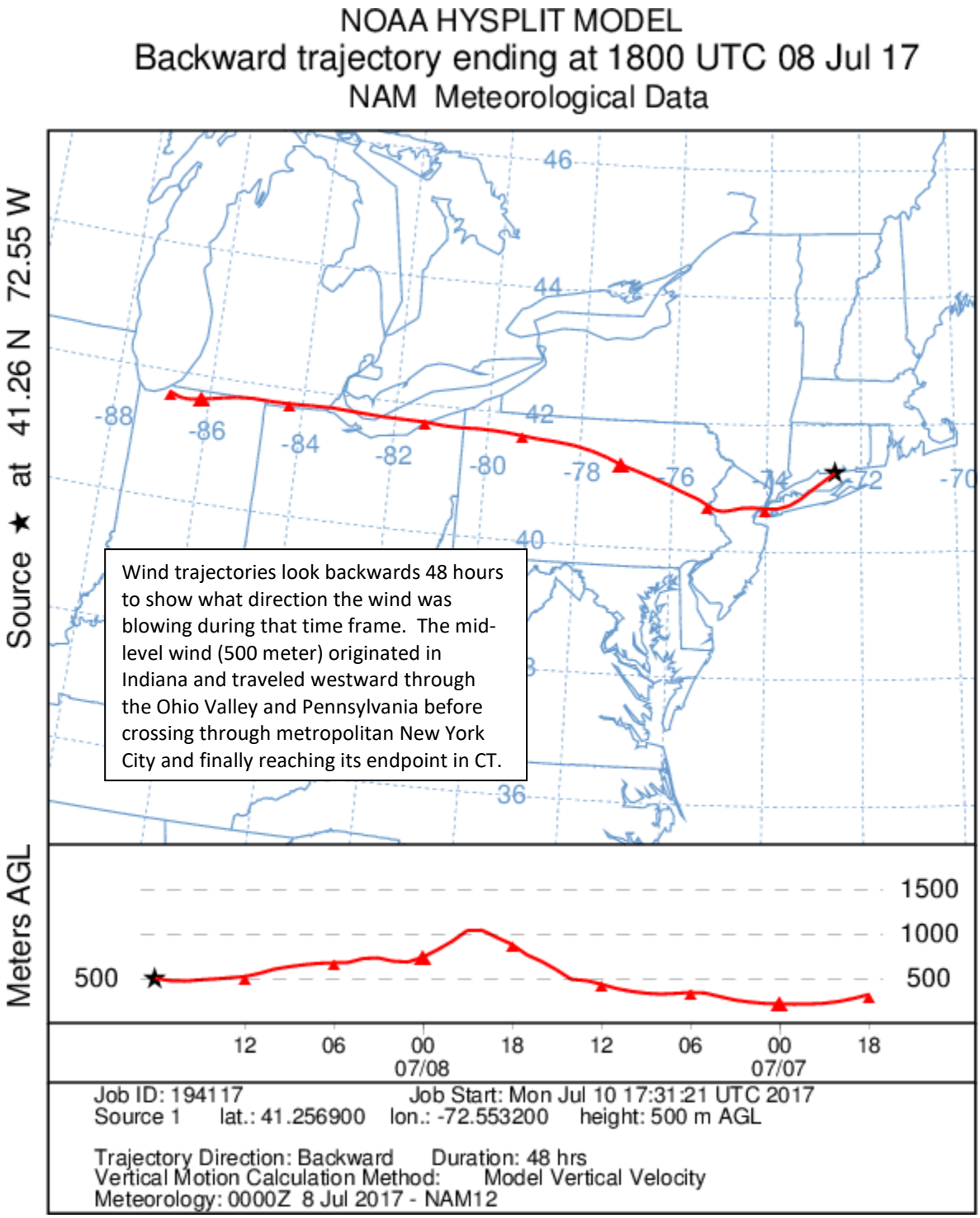


**Figure 4. 48-hour Back Trajectories for July 8, 2017 at 1500 meters**

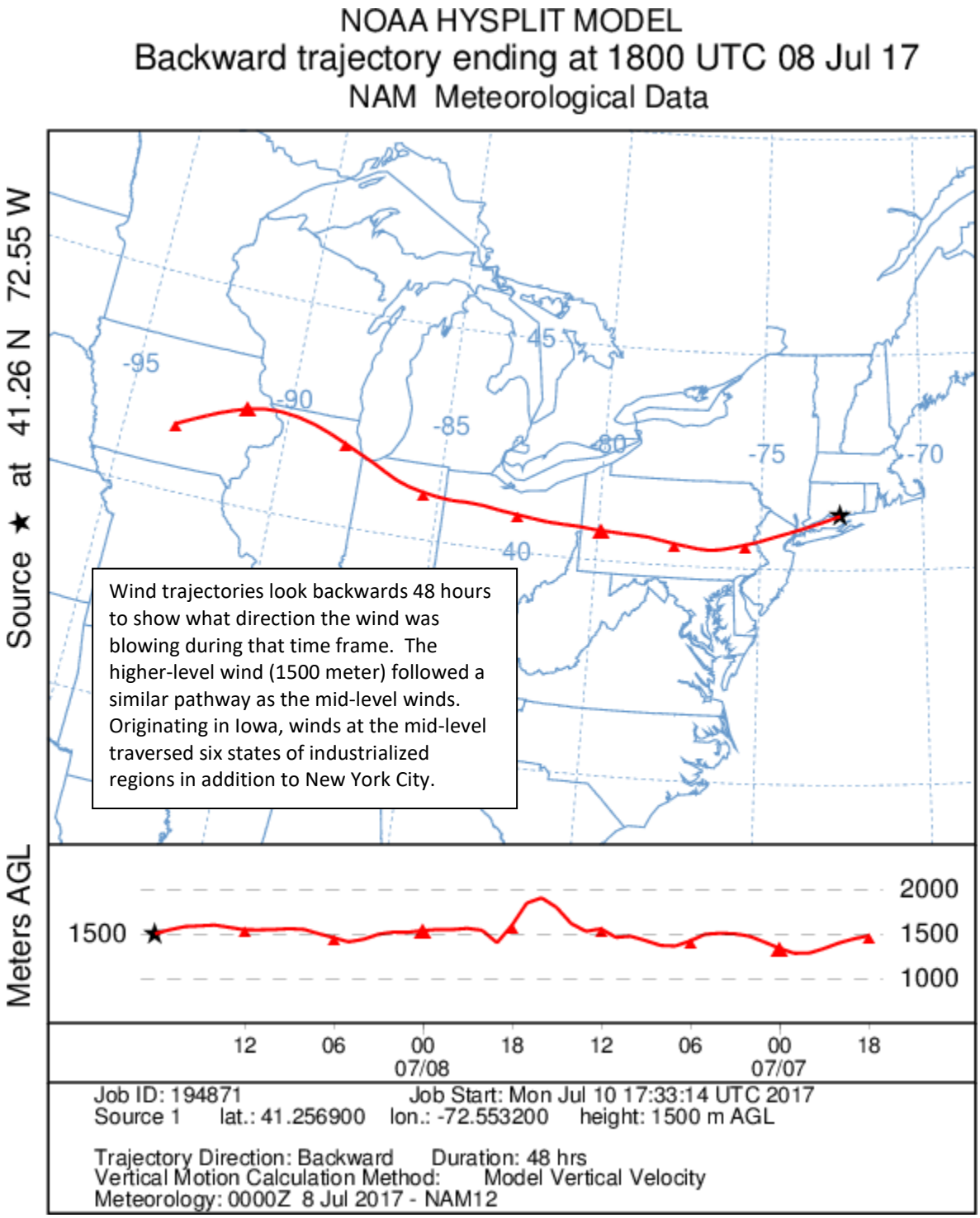
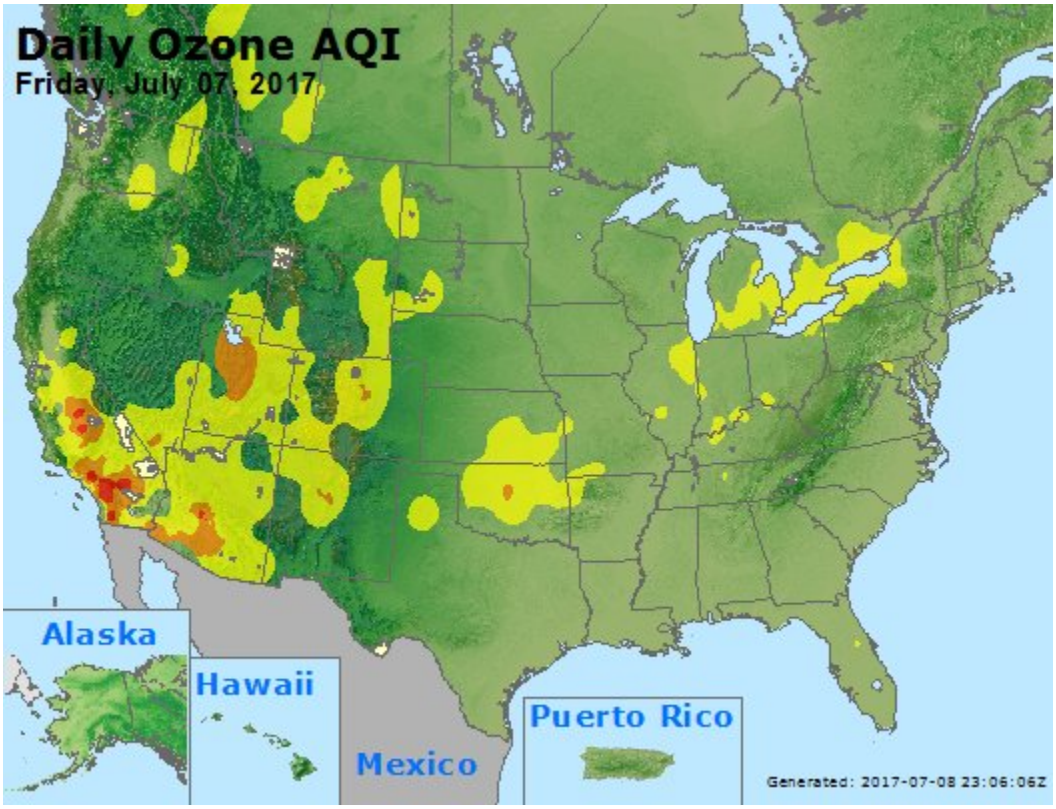


**Figure 5. Ozone Air Quality Index for the United States on July 7, 2017**




**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 the state of 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 set of lungs, but those with lung-related deficiencies 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.