Ozone National Ambient Air Quality Standard Health Exceedances on July 21, 2017

Exceedance Locations and Levels

On Friday, July 21, 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 21, 2017, in New Jersey was 77 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 eleven (11). By the 21st of July in 2016, there were sixteen (16) 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 21, 2017 NAAQS = 70 ppb	# of Days NAAQS was Exceeded January 1 - July 21, 2016 NAAQS = 70 ppb	# of Days NAAQS was Exceeded January 1 - July 21, 2015 NAAQS = 75 ppb
New Jersey	11	16	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 was one (1) exceedance of the 70 ppb ozone NAAQS of 2015 recorded on Friday, July 21, 2017 (See Table 2):

Table 2: Ozone NAAQS Exceedances at other Monitoring Stations in New Jersey's Ozone Nonattainment Areas on July 21, 2017

STATE	STATION	Daily Maximum 8-Hr Average (ppb)
DE	LEWES (Sussex Co.)	76

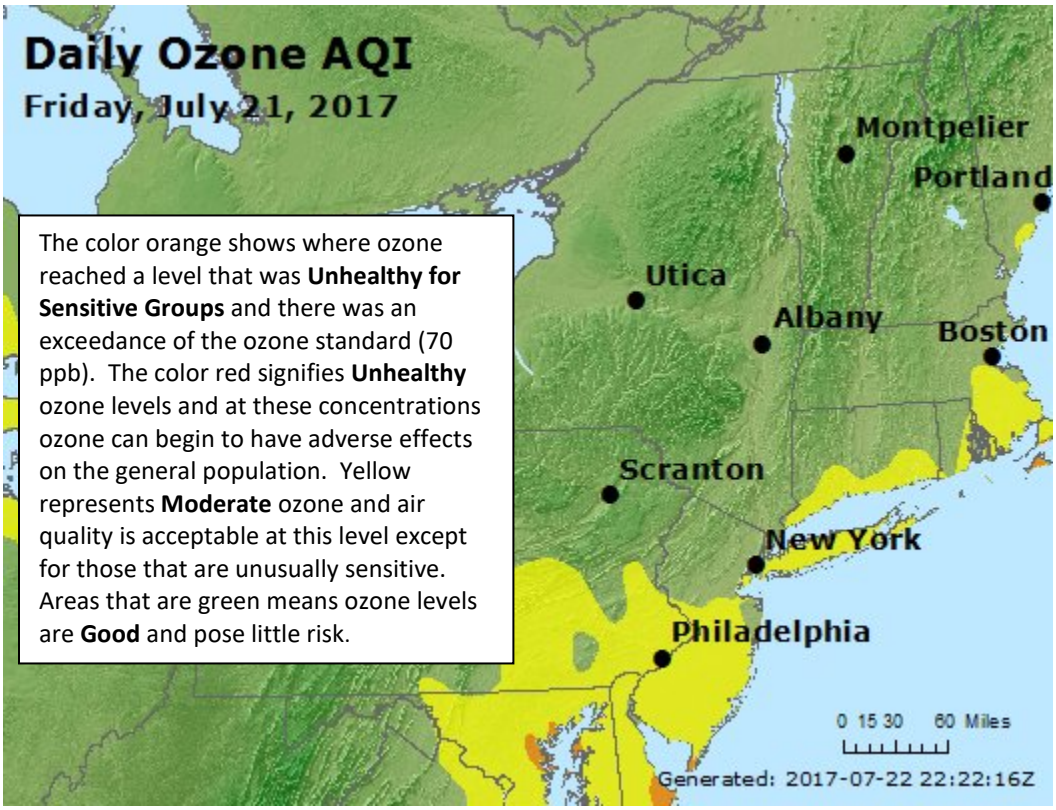
One (1) station exceeded the 75 ppb ozone NAAQS of 2008, but none exceeded the 84 ppb ozone NAAQS of 1997. The highest 1-hour average ozone concentration recorded was 83 ppb at the Lewes station in Delaware, which is below the 1-hour ozone NAAQS of 120 ppb.

Friday marks the 6th day in 2017 on which exceedances of the 70 ppb ozone NAAQS of 2015 were recorded for Delaware. The number of days for Connecticut remains at seventeen (17), the eleven (11) days for New York, ten (10) days for Pennsylvania, and seven (7) days for Maryland (See Table 3). Figure 1 shows graphically the region's ozone concentrations on July 21, 2017.

Table 3: Number of Ozone Exceedances by State

STATE	# of Days NAAQS was Exceeded January 1 - July 21, 2017 NAAQS = 70 ppb
Connecticut	17
Delaware	6
Maryland	7
New Jersey	11
New York	11
Pennsylvania	10

Figure 1. Ozone Air Quality Index for July 21, 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

A weak frontal boundary was draped over the Northeastern U.S. and remained fairly stationary throughout the day. Meanwhile, a surface trough developed in the early afternoon along the east coast. This trough extended from southern New England southward along coastal New Jersey and Delaware into the Mid-Atlantic states. Weather observations for southeastern Delaware show that there were mostly sunny skies with a brief period of clouds in the early to mid-afternoon. Temperatures reached the mid-90s with winds light and variable throughout the day.

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 21, 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 exceedance was chosen to run back trajectories. The selected site and the maximum 8-hr ozone level 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

STATE	STATION	Daily Maximum 8-Hr Average (ppb)
DE	LEWES (Sussex Co.)	76

Surface level back trajectories (Figure 2) originated in northern North Carolina and traveled northward through the Chesapeake Bay region before arriving at the affected Delaware monitor. Winds remained at the surface for the duration of the path, picking up locally generated pollution from cars, truck, and industry. Mid-level back trajectories (Figure 3) started in Ohio and traveled east/southeast through Pennsylvania and along coastal Delaware to its destination. Finally, upper level back trajectories (Figure 4) show that air originated in Illinois and traveled east-southeast through highly industrialized areas across Indiana, Ohio, West Virginia, and Maryland. Air was briefly mixed vertically early during its path before leveling off at 1500m prior to arrival.

Figure 5 and 5a below show graphically the national ozone concentrations on July 19th and July 20th that contributed to the exceedance on July 21st, 2017.

Figure 2. 48-hour Back Trajectories for July 21, 2017 at 10 meters

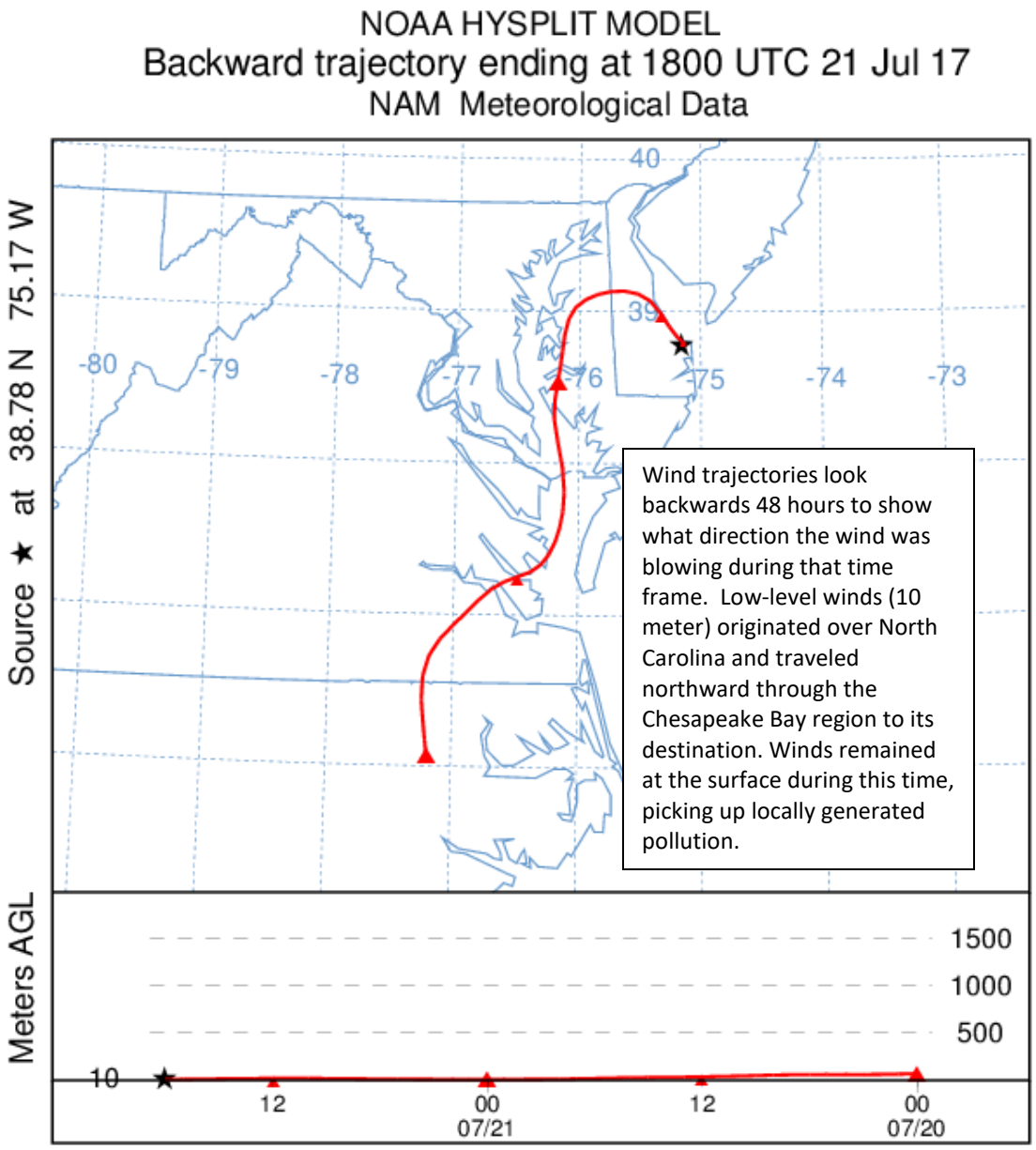


Figure 3. 48-hour Back Trajectories for July 21, 2017 at 500 meters

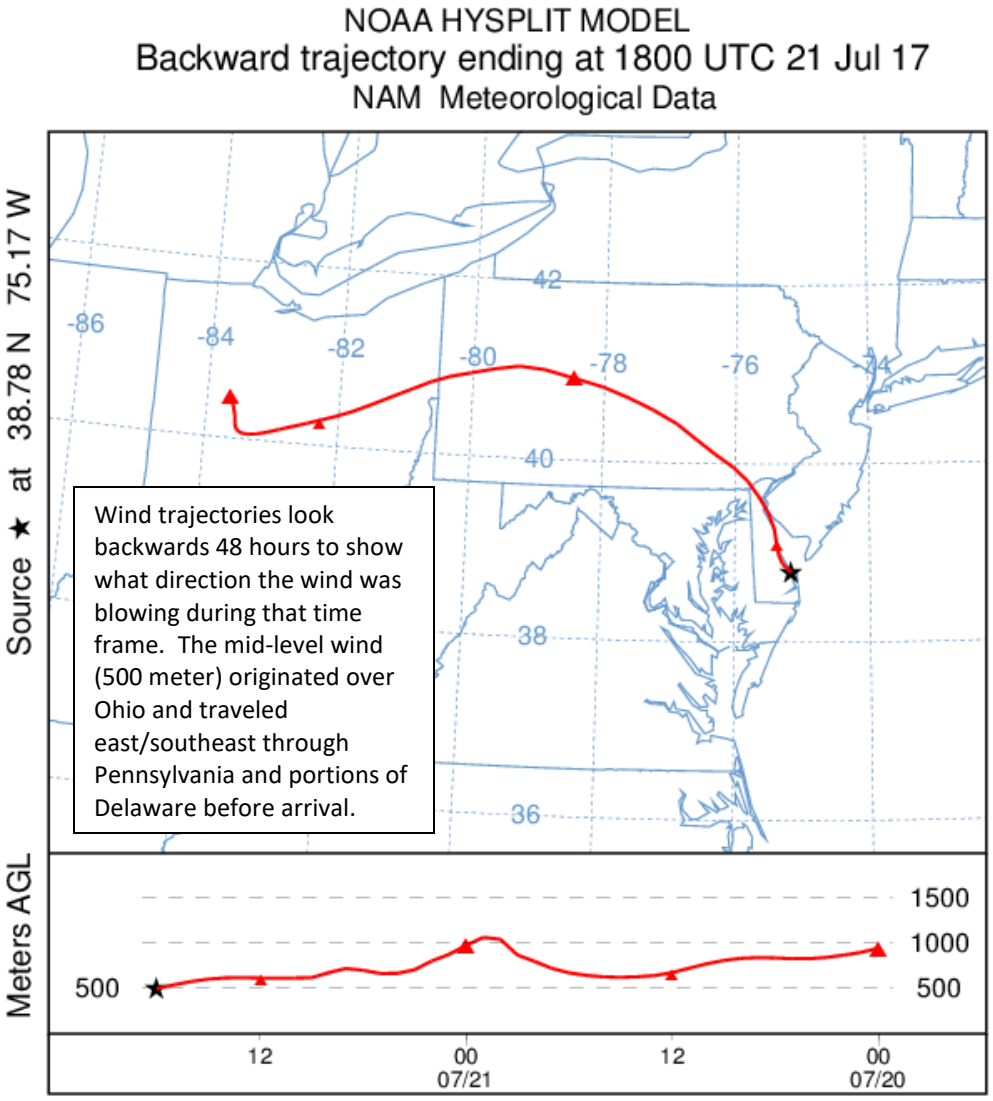


Figure 4. 48-hour Back Trajectories for July 21, 2017 at 1500 meters

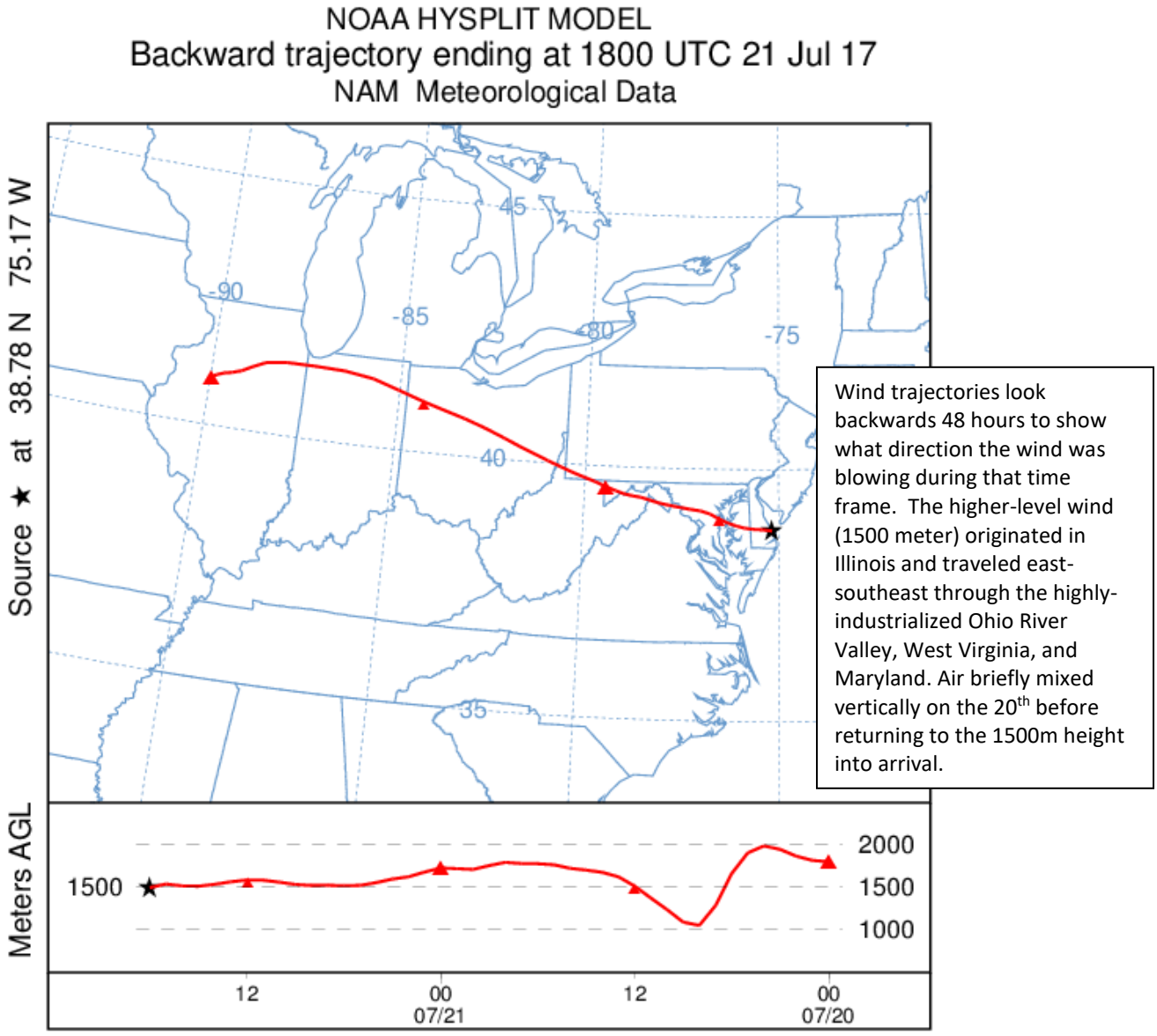


Figure 5. Ozone Air Quality Index for the United States on July 19, 2017

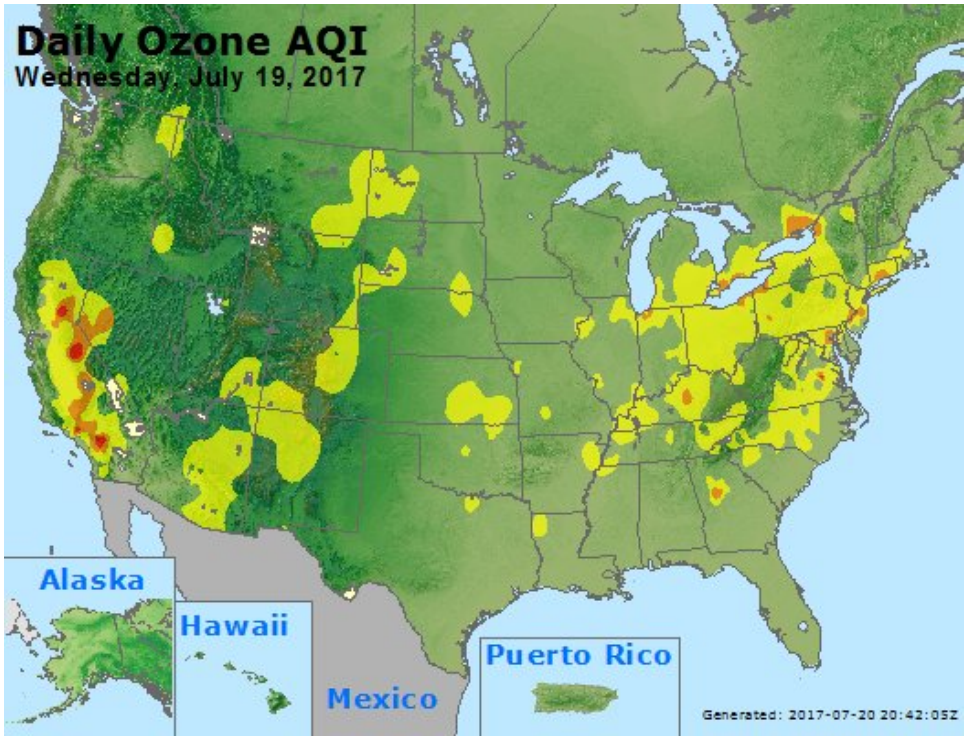
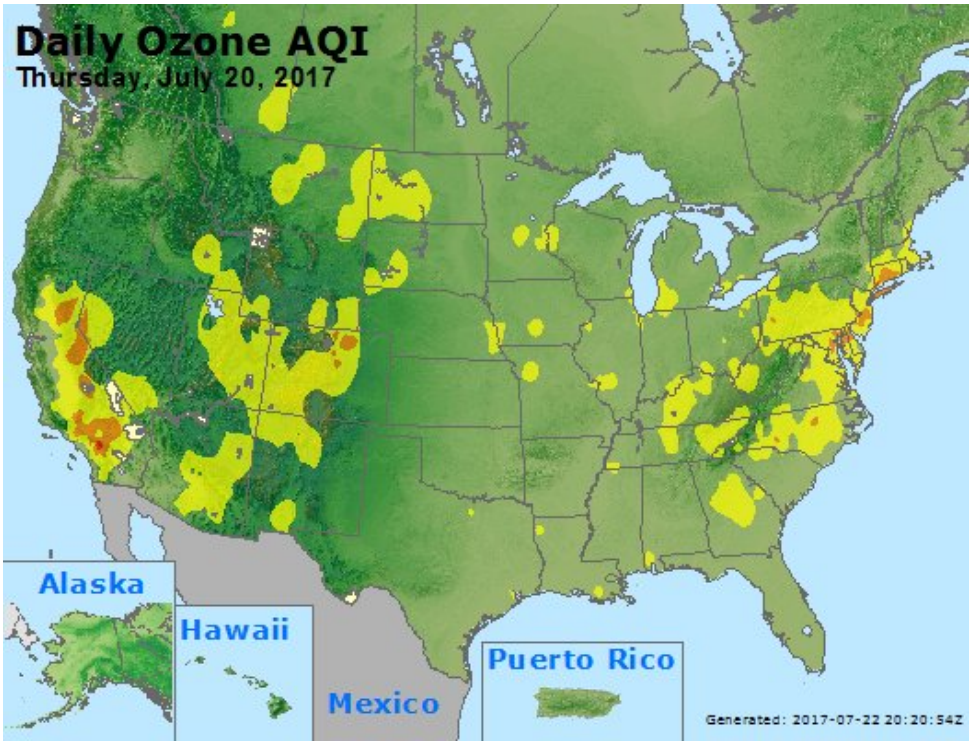


Figure 5a. Ozone Air Quality Index for the United States on July 20, 2017



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.