Ozone National Ambient Air Quality Standard Health Exceedances on June 29, 2019

Exceedance Locations and Levels

On Saturday, June 29, 2019, there were no exceedances 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 Ozone Concentrations on 6/29/2019

STATION	Daily Maximum 8-Hr Average (ppb)
Ancora State Hospital	63
Bayonne	58
Brigantine	56
Camden Spruce St	61
Chester	55
Clarksboro	59
Colliers Mills	69
Columbia	50
Flemington	57
Leonia	61
Millville	64
Monmouth University	61
Newark Firehouse	61
Ramapo	No Data
Rider University	57
Rutgers University	59
Washington Crossing*	No Data
TOTAL EXCEEDANCES	6

*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 were seven (7) exceedances of the ozone NAAQS. See Table 2.

Table 2. Ozone Concentrations at Out-of-State Monitoring Stations in New Jersey's Ozone Non-Attainment Areas on 6/29/2019

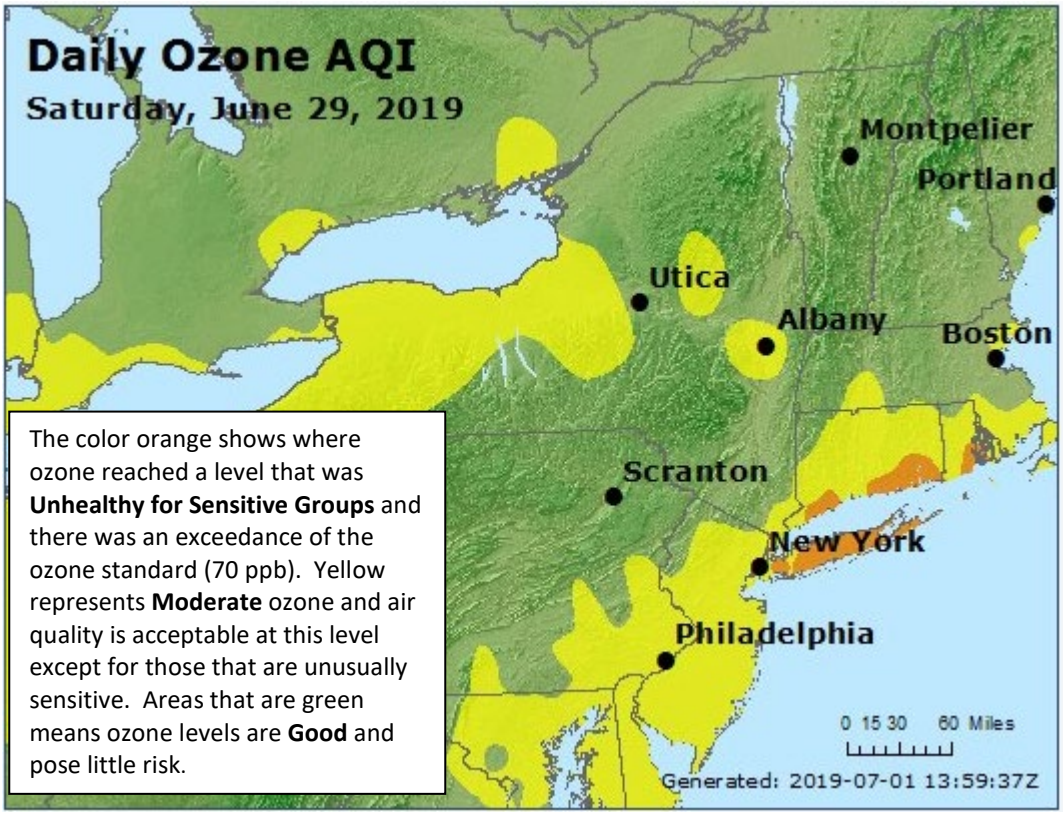
STATE	STATION	Daily Maximum 8-Hr Average (ppb)
CT	Danbury	56
CT	Greenwich	64
CT	Madison-Beach Road	84
CT	Middletown-CVH-Shed	60
CT	New Haven	57
CT	Stratford	76
CT	Westport	73
DE	BCSP (New Castle Co.)	59
DE	BELLFNT2 (New Castle Co.)	63
DE	KILLENS (Kent Co.)	62
DE	LEWES (Sussex Co.)	54
DE	LUMS 2 (New Castle Co.)	58
DE	MLK (New Castle Co.)	60
DE	SEAFORD (Sussex Co.)	57
MD	Fair Hill	56
NY	Babylon	77
NY	Bronx - IS52	62
NY	CCNY	57
NY	Fresh Kills	59
NY	Holtsville	71
NY	Pfizer Lab	58
NY	Queens	72
NY	Riverhead	78
NY	Rockland Cty	48
NY	White Plains	57
PA	BRIS (Bucks Co.)	61
PA	CHES (Delaware Co.)	58
PA	NEWG (Chester Co.)	61
PA	NORR (Montgomery Co.)	58
PA	LAB (Philadelphia Co.)	63
PA	NEA (Philadelphia Co.)	64
PA	NEW (Philadelphia Co.)	60
	TOTAL EXCEEDANCES	7

The number of days in 2019 on which exceedances of the ozone NAAQS were recorded for all the states within New Jersey's ozone non-attainment areas is summarized in Table 3.

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 29, 2019 NAAQS = 70 ppb
Connecticut	5
Delaware	2
Maryland	1
New Jersey	4
New York	4
Pennsylvania	1

Figure 1. Ozone Air Quality Index for June 29, 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

High pressure centered over the southern Appalachians caused hot temperatures, light variable winds, and sunny skies over the region before a line of thunderstorms pushed through from the West. This resulted in seven ozone exceedances in coastal Connecticut, New York City, and Long Island, New York.

With high pressure to the south west, abundant sunshine and temperatures in the upper 80s and low 90s continued in the area for the fourth day in a row. A frontal boundary draped across New York and northern Massachusetts and a surface trough extending south from the front enhanced instability. Ahead of the trough, winds shifted out of the south and brought polluted surface air from the Mid-Atlantic northward into the region. As instability increased from the approaching pre-frontal trough, a line of thunderstorms began to develop over Pennsylvania, moving southeastward. The line of storms increased cloud cover by midafternoon, inhibiting ozone production for Pennsylvania, Maryland, Delaware, and New Jersey. The storms continued to intensify over New Jersey resulting in heavy precipitation that cleaned out the air mass. Due to the timing of the storms, ozone levels continued to climb in Long Island, New York and Connecticut. Eventually the cold front moved through the region, causing a northwesterly wind shift to bring in clean dry air.

Due to the lingering high pressure, previously polluted air mass, and the timing of the storms, ozone was able to build and eventually cause exceedances in Long Island, New York and Connecticut.

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 29, 2019. The figures illustrate where the air came from during the 48 hours preceding the 8-hour ozone standard exceedances. Three (3) 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	Madison-Beach Road	84
NY	Queens	72
NY	Riverhead	78

At the surface, Figure 2 shows that long range transport of surface air primarily came out of the south. The air moved in an easterly direction off shore of the Mid-Atlantic states before shifting in a northerly direction and transporting local pollution from cars, trucks, buses, industry and power plants. At upper levels, air originated from a polluted Ohio River Valley region and travelled east across Pennsylvania and New Jersey. as shown in Figures 3 and 4. The surface trough allowed air at 500 meters to dip down into southern Pennsylvania and Maryland before shifting in an easterly direction.

Figure 5 shows the national air quality observed on June 28th, the day prior to the localized air quality exceedances. As shown in the Ozone AQI map, the majority of the Ohio River Valley and Mid-Atlantic regions experienced moderate air quality the day before, with multiple areas of unhealthy for sensitive groups (USG) air quality. Looking at the HYSPLIT back trajectories suggests that the polluted air in this region was transported into our non-attainment area at upper levels and at the surface, resulting in continued ground-level ozone production.

Figure 2. 48-hour Back Trajectories for June 29, 2019 at 10 meters

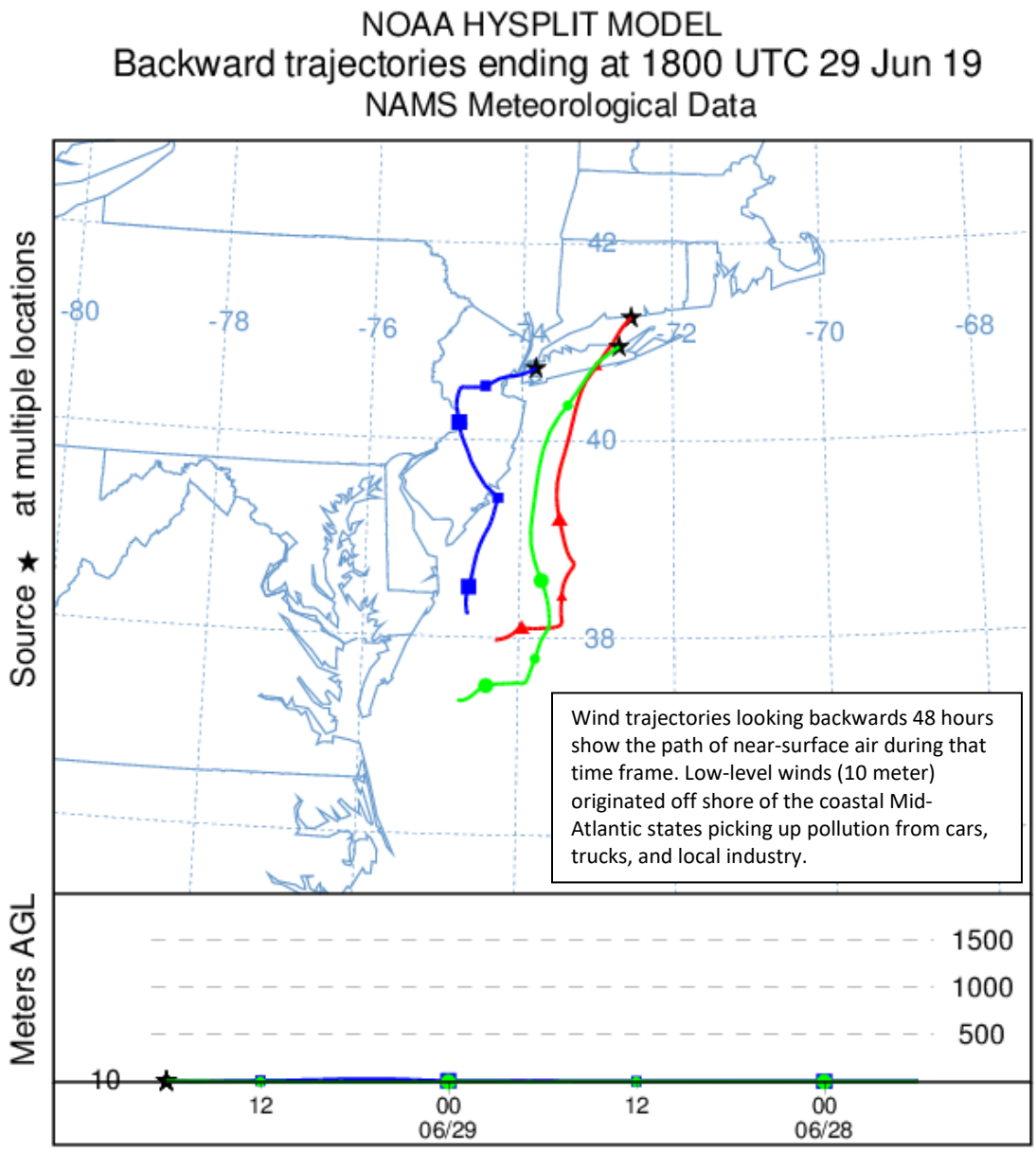


Figure 3. 48-hour Back Trajectories for June 29, 2019 at 500 meters

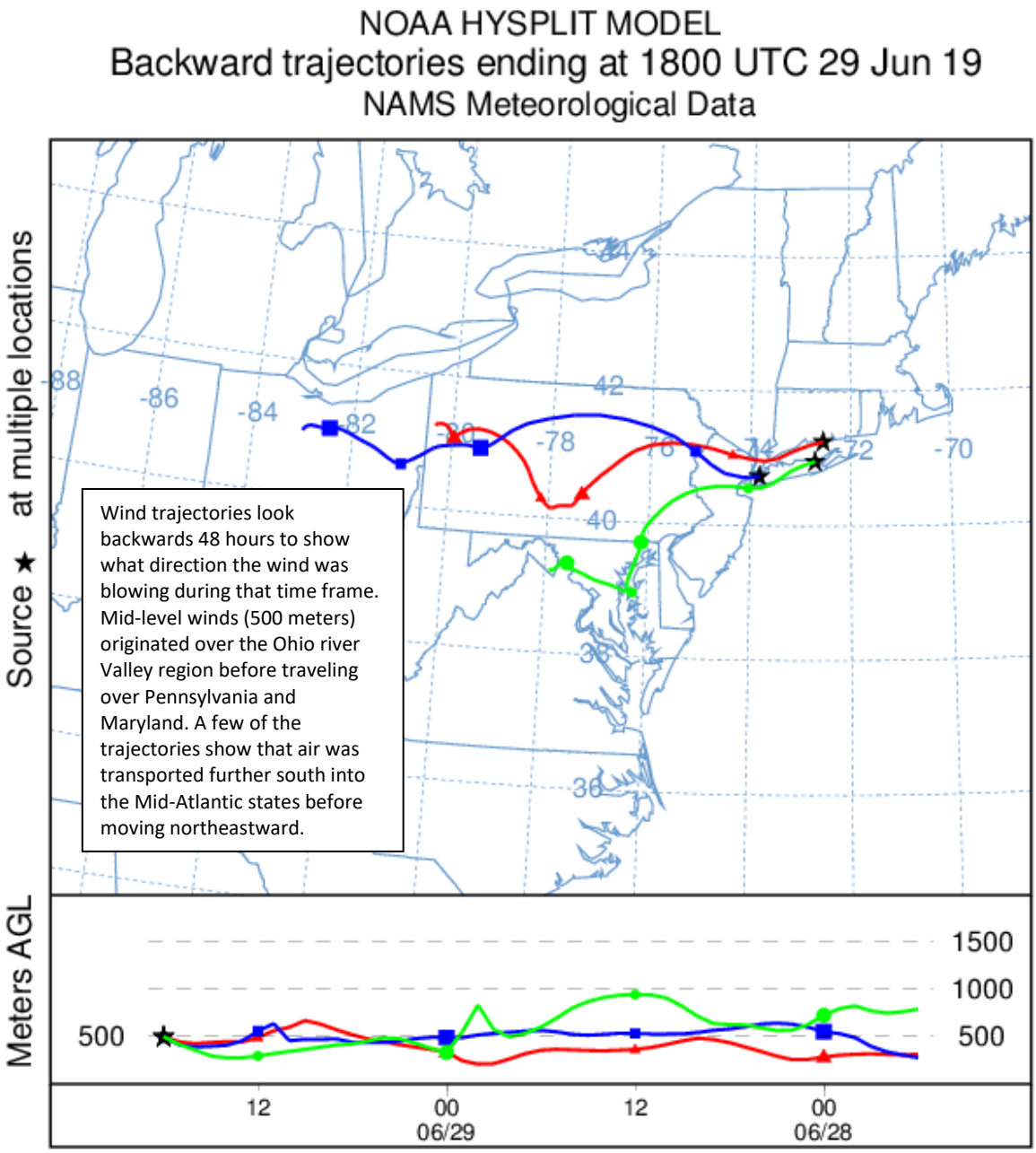


Figure 4. 48-hour Back Trajectories for June 29, 2019 at 1500 meters

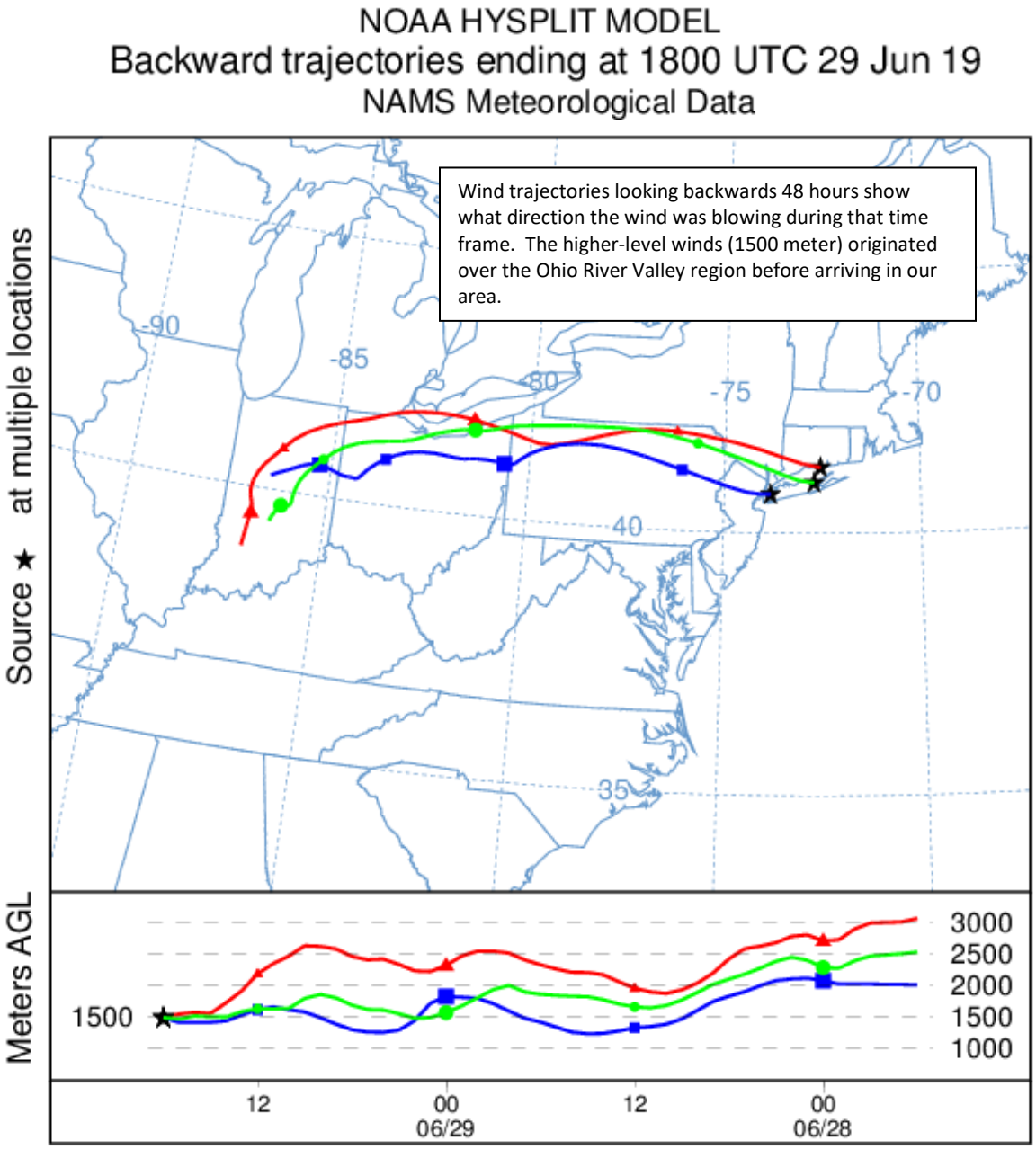
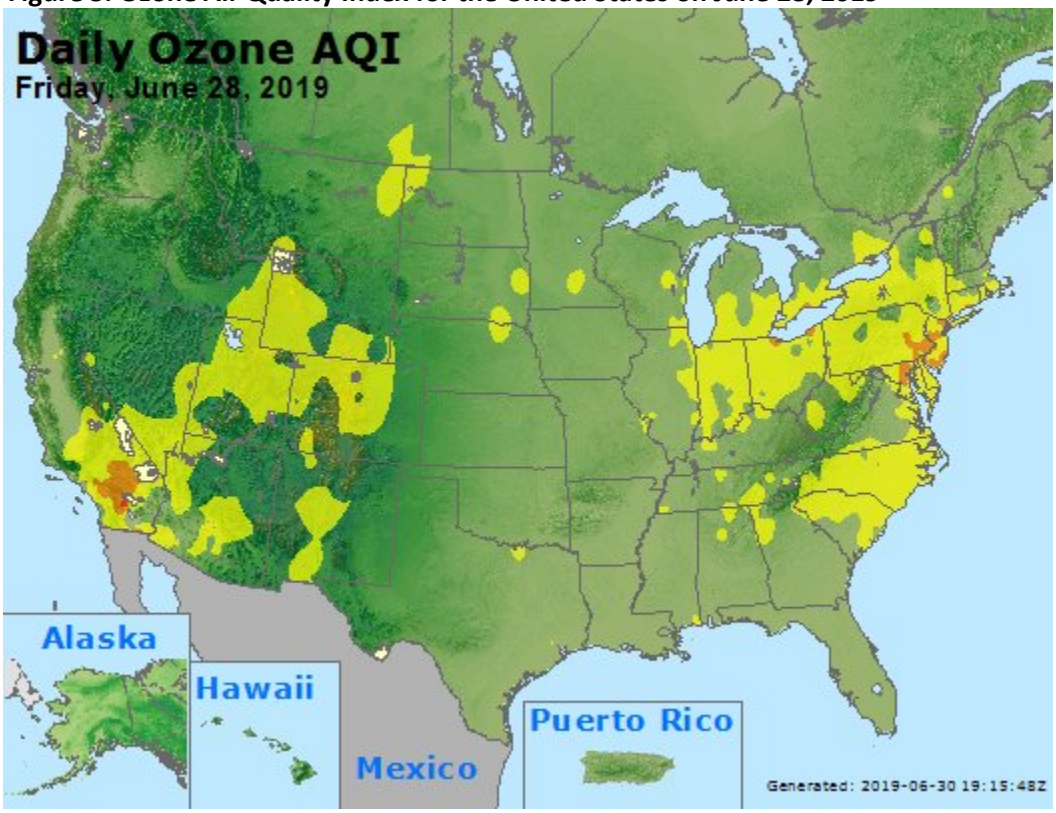


Figure 5. Ozone Air Quality Index for the United States on June 28, 2019



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.