Ozone National Ambient Air Quality Standard Health Exceedances on June 20, 2018

Exceedance Locations and Levels

On Wednesday, June 20, 2018, 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 8-hr Maximum Ozone Concentrations on June 20, 2018

STATION	Daily Maximum 8-Hr Average (ppb)
Ancora State Hospital	45
Bayonne	52
Brigantine	37
Camden Spruce St	56
Chester	63
Clarksboro	53
Colliers Mills	45
Columbia	53
Flemington	58
Leonia	57
Millville	44
Monmouth University	38
Newark Firehouse	52
Ramapo	64
Rider University	61
Rutgers University	55
Washington Crossing*	No Data
TOTAL EXCEEDANCES	0

*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 was one (1) exceedance of the ozone NAAQS. See Table 2.

Table 2. 8-hr Maximum Ozone Concentrations for Out-of-State Monitoring Stations in New Jersey's Ozone Non-Attainment Areas on June 20, 2018

STATE	STATION	Daily Maximum 8-Hr Average (ppb)
CT	Danbury	59

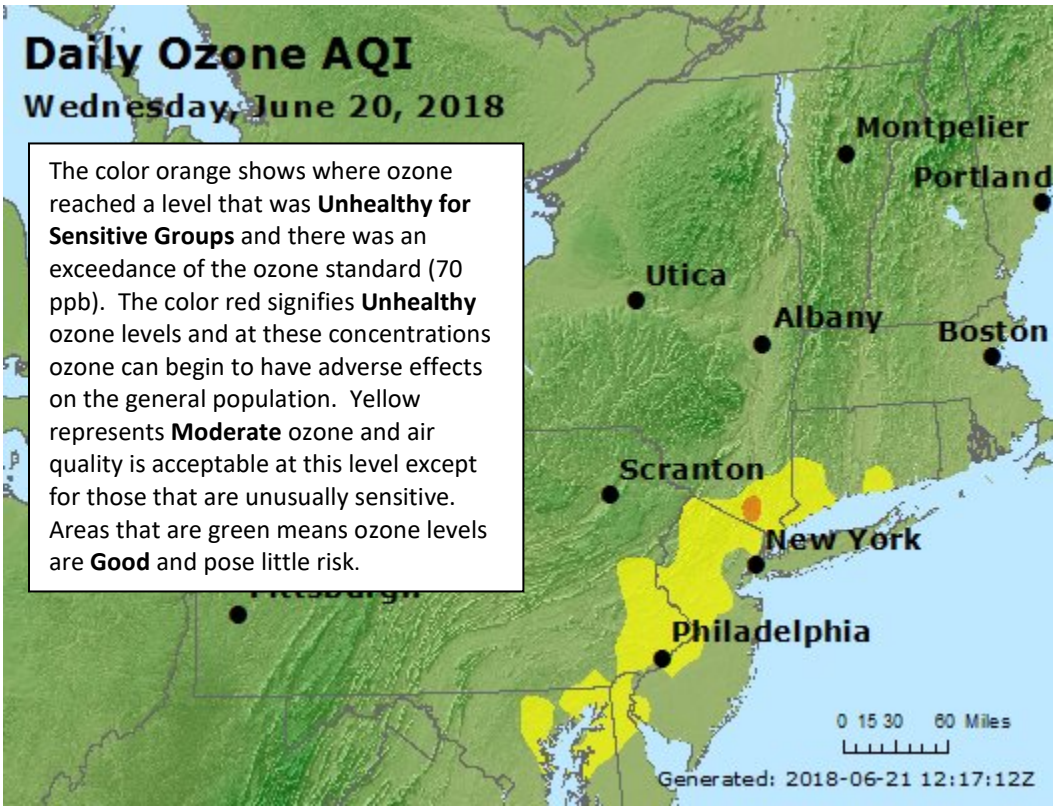
CT	Greenwich	59
CT	Madison-Beach Road	56
CT	Middletown-CVH-Shed	54
CT	New Haven	50
CT	Stratford	55
CT	Westport	55
DE	BCSP (New Castle Co.)	59
DE	BELLFNT2 (New Castle Co.)	53
DE	KILLENS (Kent Co.)	50
DE	LEWES (Sussex Co.)	46
DE	LUMS 2 (New Castle Co.)	56
DE	MLK (New Castle Co.)	54
DE	SEAFORD (Sussex Co.)	No Data
MD	Fair Hill	58
NY	Babylon	47
NY	Bronx - IS52	47
NY	CCNY	52
NY	Holtsville	46
NY	Pfizer Lab	51
NY	Queens	44
NY	Riverhead	51
NY	Rockland Cty	73
NY	White Plains	60
NY	Susan Wagner	No Data
PA	BRIS (Bucks Co.)	No Data
PA	CHES (Delaware Co.)	54
PA	NEWG (Chester Co.)	52
PA	NORR (Montgomery Co.)	56
PA	LAB (Philadelphia Co.)	58
PA	NEA (Philadelphia Co.)	65
PA	NEW (Philadelphia Co.)	62
	TOTAL EXCEEDANCES	1

The number of days in 2018 on which exceedances of the ozone NAAQS were recorded for all the states is summarized in Table 3. Figure 1 shows graphically the region's ozone concentrations on June 20, 2018.

Table 3. Number of Days Ozone NAAQS was Exceeded in NJ's Non-Attainment Areas in 2018

STATE	# of Days NAAQS was Exceeded January 1 – June 20, 2018 NAAQS = 70 ppb
Connecticut	6
Delaware	3
Maryland	3
New Jersey	7
New York	7
Pennsylvania	5

Figure 1. Ozone Air Quality Index for June 20, 2018



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 high pressure system, which originated in the Great Lakes vicinity, passed over our region on June 20th, 2018. Its center was noted over New York and southern New England early in the day before it pushed off shore in the afternoon/evening hours. With this high pressure center passing so close to our region, temperatures were able to reach the upper 80s and winds remained light and variable (or calm) throughout the region for much of the day. This high pressure also allowed for partly sunny skies in parts of New Jersey through mid-day while points north, in the Hudson Valley region, saw sunshine into the evening hours. All these conditions would have provided the opportunity for ozone formation.

Meanwhile to the south, a stalled frontal boundary was draped over the Mid-Atlantic. A wave of low pressure moved west to east along this boundary in the evening hours as the abovementioned high pressure system settled off-shore. This area of low pressure provided increased cloud cover during this time with scattered rain showers noted in our northern non-attainment area. The presence of enhanced cloud formation/development, as well as vertical motion in the atmosphere, may have contributed to ozone levels throughout the region, including the exceedance location in Rockland County, NY.

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 exceedance June 20, 2018. 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 used 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)
NY	Rockland Cty	73

Trajectories at all measured heights followed similar pathways before reaching their destination in Rockland County, New York. Surface back trajectories (Figure 2) originated at the northern border of Ontario and Quebec and quickly traveled southeastward into New York. Upon reaching New York State, trajectory speed began to slow. Meanwhile, low level trajectories were also making a descent closer to the ground after originating at 1000m. At this time, polluted air aloft was transported down to the surface while continuing on its path. Traveling along the surface, air circulated the NYC metropolitan area picking up additional emissions from cars, trucks, and industry along the way. Mid-level trajectories (Figure 3) originated over the Hudson Bay in Canada and traveled southeastward through Quebec and New Hampshire. Upon reaching New England around 00Z, trajectories began a downward descent toward the surface where they likely picked up emissions from cars, trucks, and industry. Trajectories at the mid-level slowed significantly entering New York City and rose slightly to 500m, where they remained until reaching Rockland County. Upper level trajectories (Figure 4) also originated in the Hudson Bay and traveled southeast through Quebec, New York, and industrialized portions of northeastern Pennsylvania. Upper level trajectories then made a turn eastward toward Rockland

County. Trajectories at the upper level originated at higher levels of the atmosphere and descended to 1500m where they remained for the duration of their path. Figure 5 below shows graphically national ozone concentrations on June 19th, 2018.

Figure 2. 48-hour Back Trajectories for June 20, 2018 at 10 meters

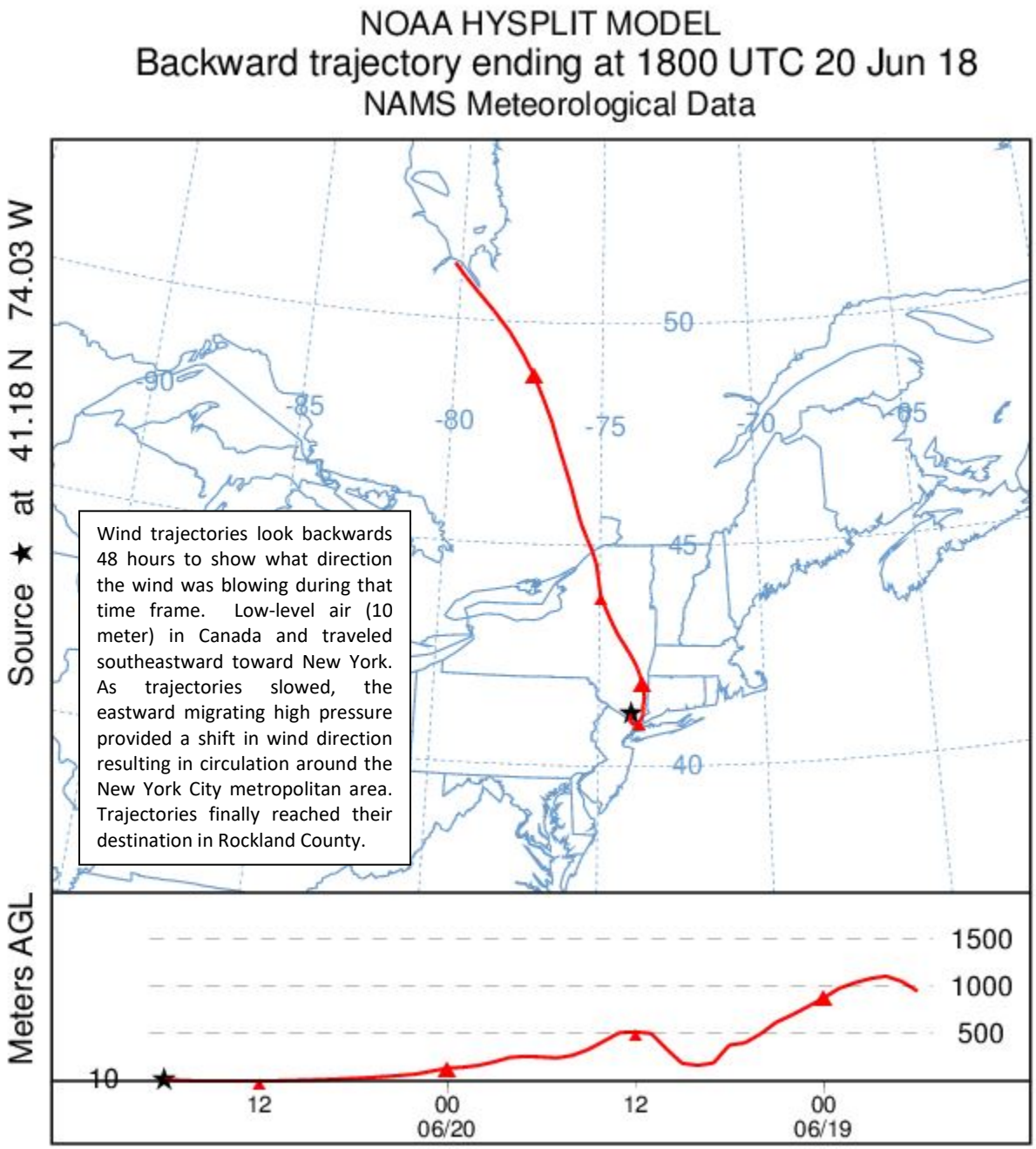


Figure 3. 48-hour Back Trajectories for June 20, 2018 at 500 meters

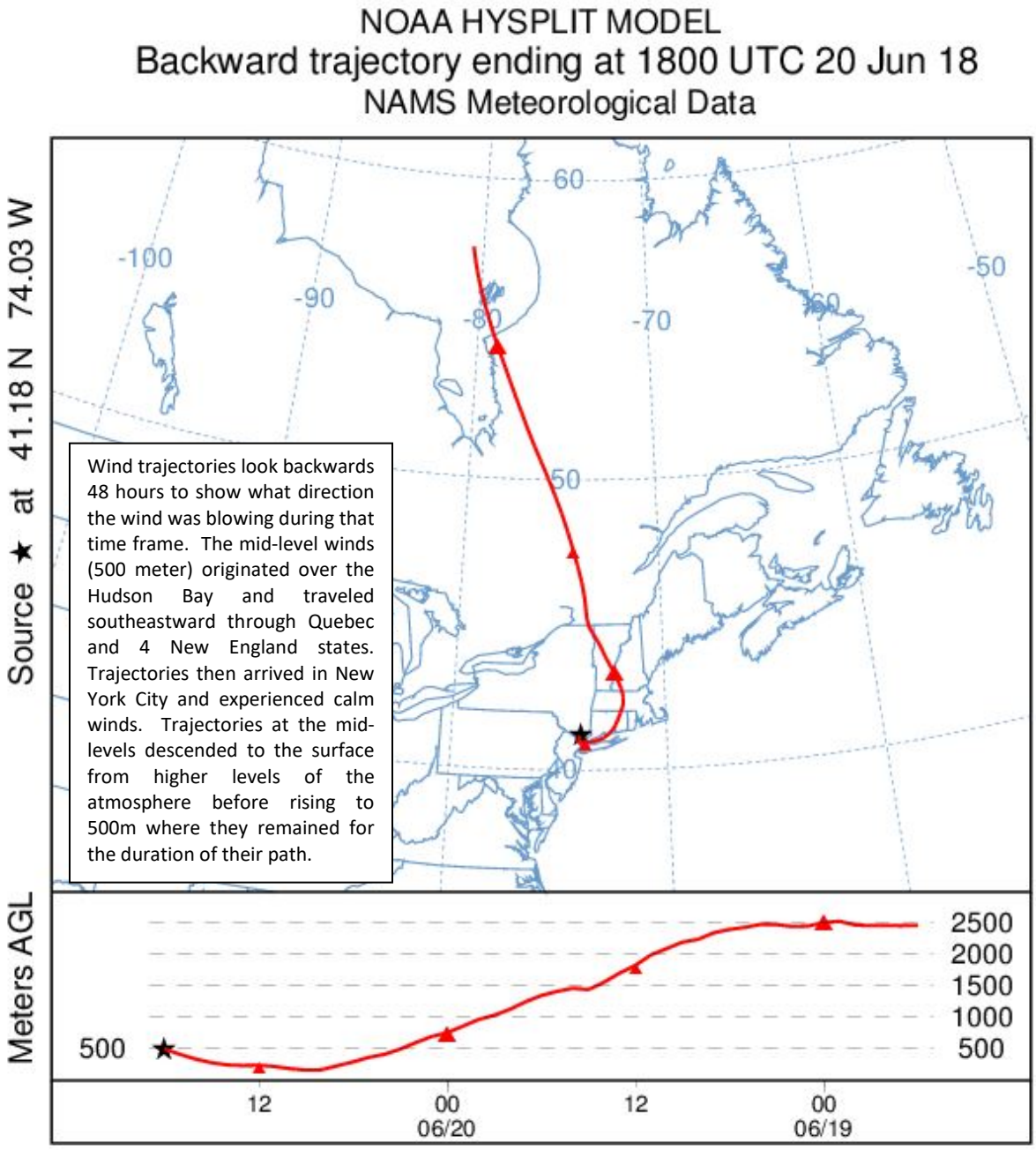


Figure 4. 48-hour Back Trajectories for June 20, 2018 at 1500 meters

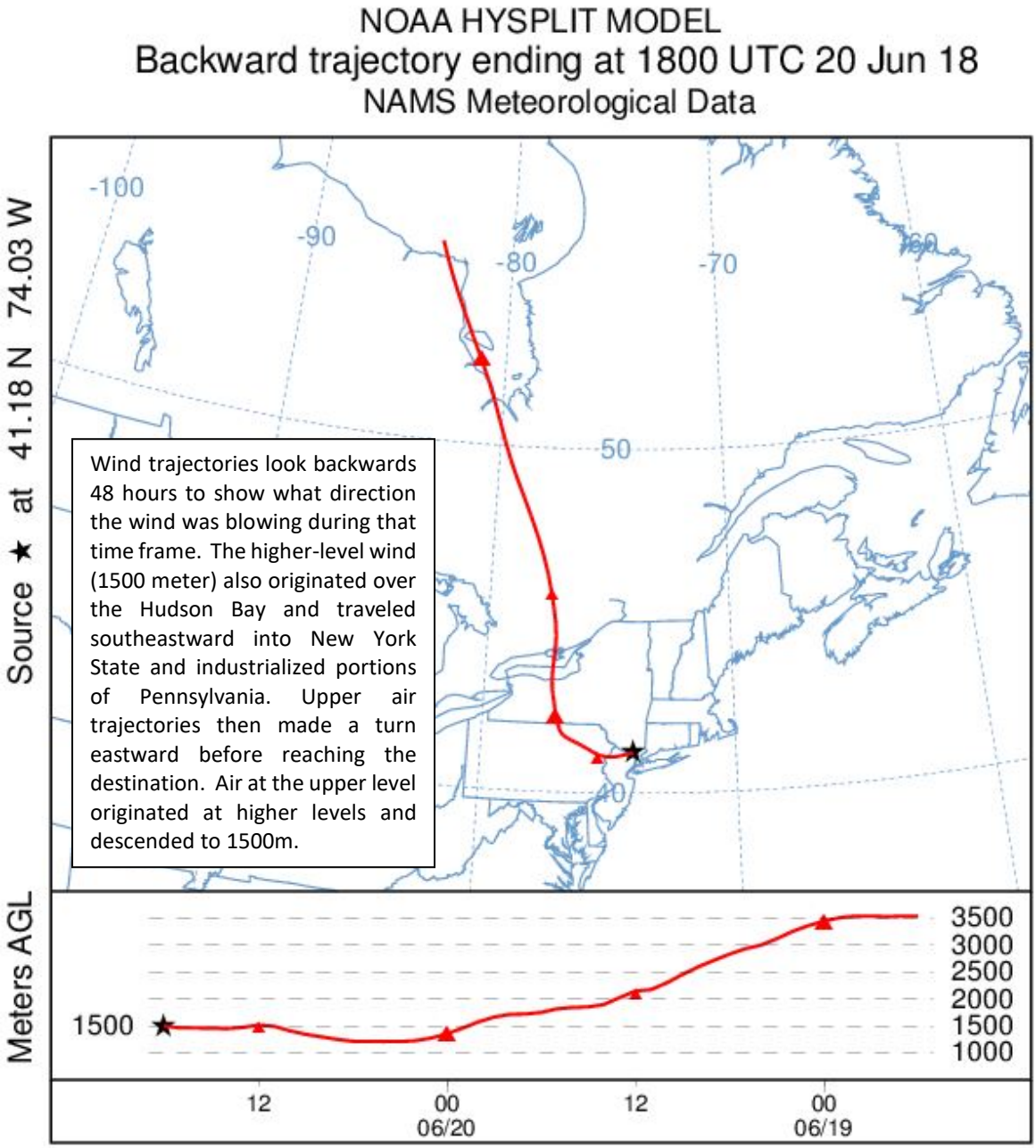
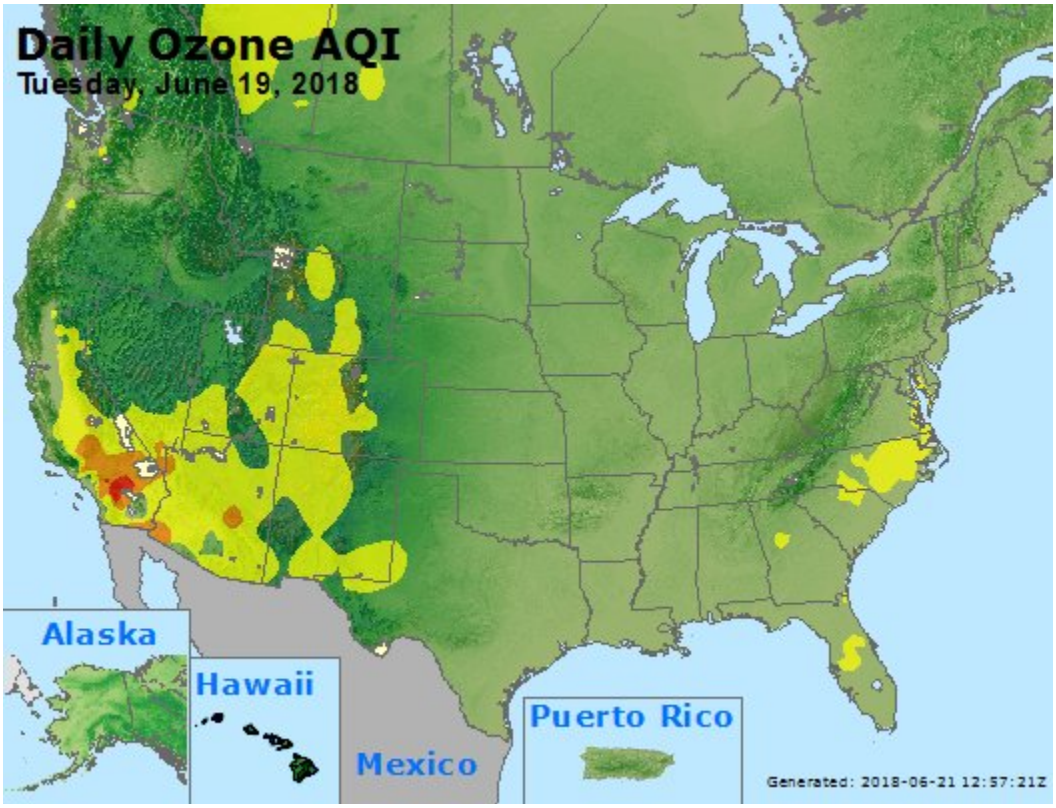


Figure 5. Ozone Air Quality Index for the United States on June 19, 2018



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.