

Ozone National Ambient Air Quality Standard Health Exceedances on June 27, 2019

Exceedance Locations and Levels

On Thursday, June 27, 2019, there were two 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 27, 2019

STATION	Daily Maximum 8-Hr Average (ppb)
Ancora State Hospital	72
Bayonne	60
Brigantine	70
Camden Spruce St	67
Chester	57
Clarksboro	70
Colliers Mills	67
Columbia	53
Flemington	64
Leonia	60
Millville	72
Monmouth University	61
Newark Firehouse	62
Ramapo	47
Rider University	66
Rutgers University	63
Washington Crossing*	67
TOTAL EXCEEDANCES	2

*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 three exceedances 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 27, 2019

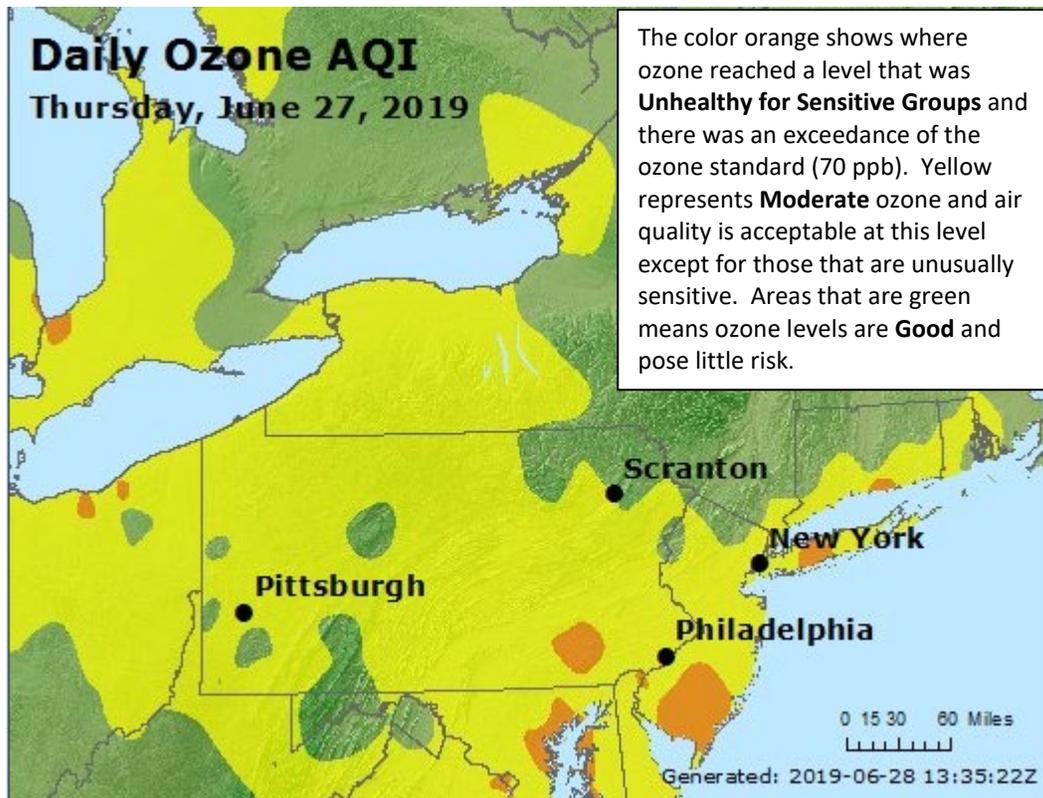
STATE	STATION	Daily Maximum 8-Hr Average (ppb)
CT	Danbury	51
CT	Greenwich	62
CT	Madison-Beach Road	72
CT	Middletown-CVH-Shed	53
CT	New Haven	60
CT	Stratford	64
CT	Westport	63
DE	BCSP (New Castle Co.)	67
DE	BELLFNT2 (New Castle Co.)	72
DE	KILLENS (Kent Co.)	64
DE	LEWES (Sussex Co.)	67
DE	LUMS 2 (New Castle Co.)	64
DE	MLK (New Castle Co.)	67
DE	SEAFORD (Sussex Co.)	66
MD	Fair Hill	68
NY	Babylon	72
NY	Bronx - IS52	61
NY	CCNY	58
NY	Fresh Kills	57
NY	Holtsville	70
NY	Pfizer Lab	58
NY	Queens	66
NY	Riverhead	65
NY	Rockland Cty	52
NY	White Plains	59
PA	BRIS (Bucks Co.)	67
PA	CHES (Delaware Co.)	69
PA	NEWG (Chester Co.)	70
PA	NORR (Montgomery Co.)	65
PA	LAB (Philadelphia Co.)	67
PA	NEA (Philadelphia Co.)	70
PA	NEW (Philadelphia Co.)	64
	TOTAL EXCEEDANCES	3

The number of days in 2019 on which exceedances of the ozone NAAQS were recorded for all the states within New Jersey’s non-attainment area is summarized in Table 3. Figure 1 graphically shows the ozone concentrations on June 27, 2019.

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 27, 2019 NAAQS = 70 ppb
Connecticut	3
Delaware	1
Maryland	0
New Jersey	3
New York	2
Pennsylvania	0

Figure 1. Ozone Air Quality Index for June 27, 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

A large swath of high pressure throughout the eastern half of the United States brought sunny skies, hot temperatures, and light winds to our region. This resulted in several ozone exceedances in northern Delaware, southern New Jersey, Long Island, New York, and coastal central Connecticut on Thursday, June 27, 2019.

As high pressure continued to build in the northeast, temperatures climbed into the upper 80's and lower 90's for the second day in a row. This high pressure resulted in upper level long-range transport from the Great Lakes and Ohio River Valley regions down to the surface in our non-attainment area. Localized transport of already polluted air at the surface from the day prior further enhanced the deteriorating air quality. Additionally, a very weak stationary front extended from northern New England down south through northern New Jersey and central Pennsylvania, allowing for air aloft to mix down to an already polluted surface. The transport of polluted upper-level and surface air from upwind states, along with favorable meteorological conditions allowed for the continued production of ground-level ozone.

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 27, 2019. The figures illustrate where the air came from during the 48 hours preceding the 8-hour ozone standard exceedances. Five monitoring stations with 8-hour ozone exceedances were used to run back trajectories. The selected sites and the maximum 8-hour ozone levels recorded are listed in Table 4 below.

Table 4. Monitoring Stations with an 8-hr Ozone Exceedance Selected to Run 48-hr Back Trajectories

STATE	STATION	Daily Maximum 8-Hr Average (ppb)
NJ	Ancora State Hospital	72
NJ	Millville	72
DE	BELLFNT2 (New Castle Co.)	72
NY	Babylon	72
CT	Madison-Beach Road	72

Back trajectories from June 27th show that air flow, at all levels of the atmosphere, was highly influenced by high pressure circulation centered over the southeastern United States. Favorable weather conditions and the transport from upwind and local industry led to the exceedances in the nonattainment area. Surface-level backward trajectories (Figure 2) originated over the Southern Great Lakes and Ohio River Valley regions. Air at the surface flowed around the high pressure, transported emissions from cars, trucks, and industry along with already polluted air from the prior day. Specific to the exceedance locations in southern New Jersey and Delaware, the trajectories passed directly over southeastern Pennsylvania bringing pollution from cars, trucks, buses, industrial sources and power plants from the metropolitan Philadelphia area into southern New Jersey. Trajectories at the mid-levels (Figure 3) also originated over the Southern Great Lakes and Ohio River Valley regions. The height

portion of the trajectory modeling shows that air, and possibly air pollution aloft, was brought to the surface by the sinking air of the high-pressure system. Upper level trajectories (Figure 4) originated in the upper Mid-west. The transport path at all levels led the trajectories over Chicagoland, Michigan, Ohio, and finally across the states of New York and Pennsylvania before reaching their destinations in New Jersey, northern Delaware, Long Island, New York and coastal central Connecticut.

Figure 5 shows the national air quality observed on June 26th, the day prior to the localized air quality exceedances. As shown in the Ozone AQI map, the majority of the southern Great Lakes, Ohio River Valley, and Mid-Atlantic regions experienced moderate air quality the day before, with isolated areas of unhealthy for sensitive groups (USG) category 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 ground-level ozone production.

Figure 2. 48-hour Back Trajectories for June 27, 2019 at 10 meters
 NOAA HYSPLIT MODEL
 Backward trajectories ending at 1800 UTC 27 Jun 19
 NAMS Meteorological Data

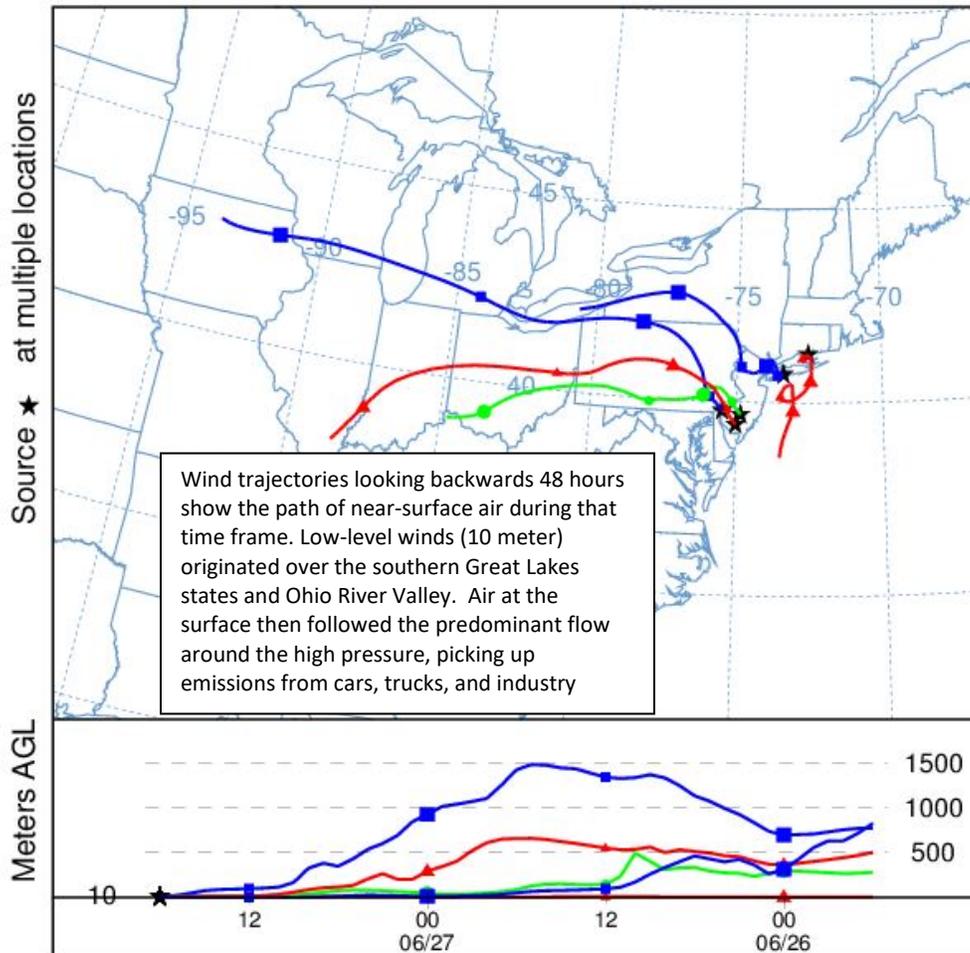


Figure 3. 48-hour Back Trajectories for June 27, 2019 at 500 meters

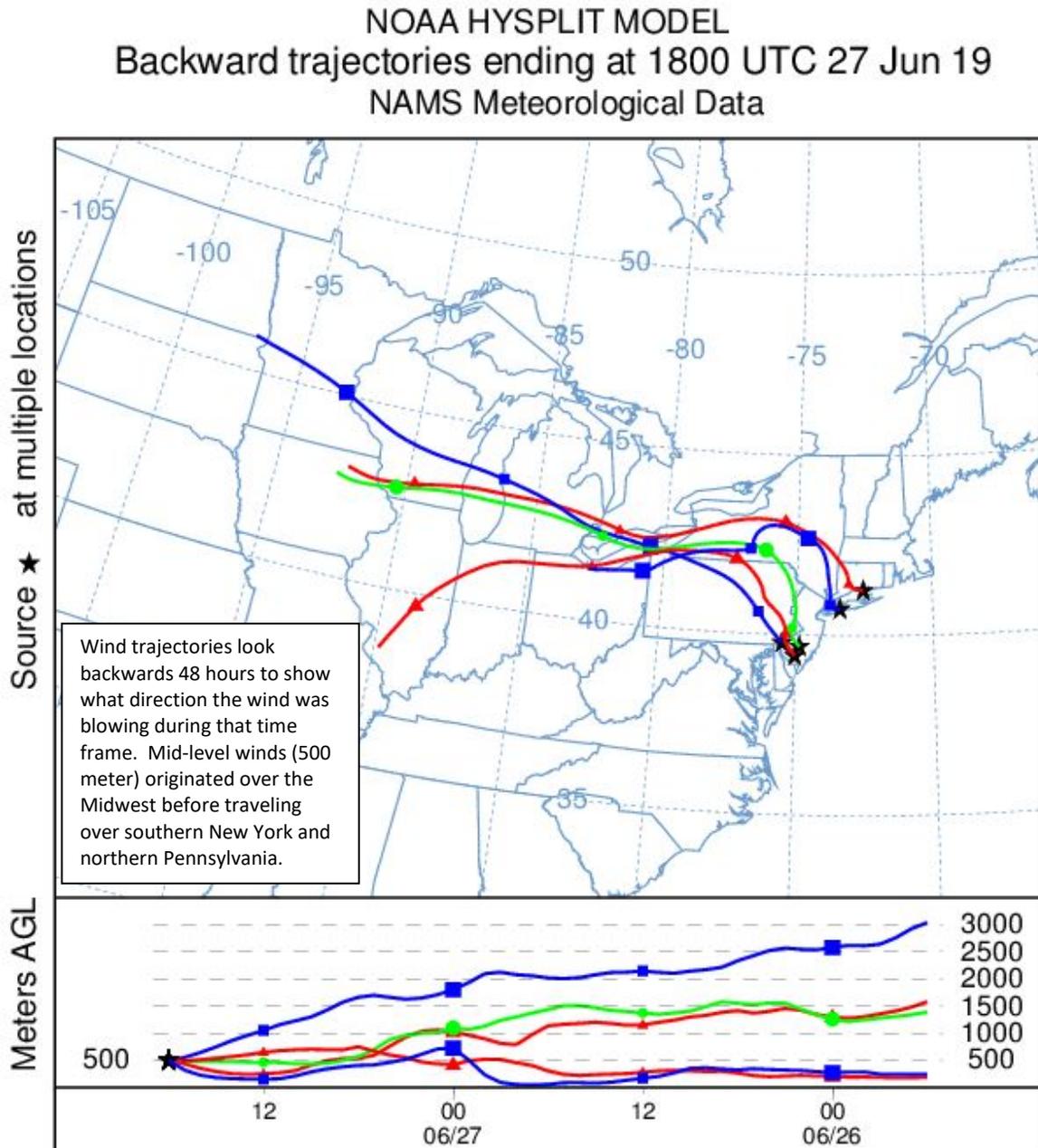


Figure 4. 48-hour Back Trajectories for June 27, 2019 at 1500 meters

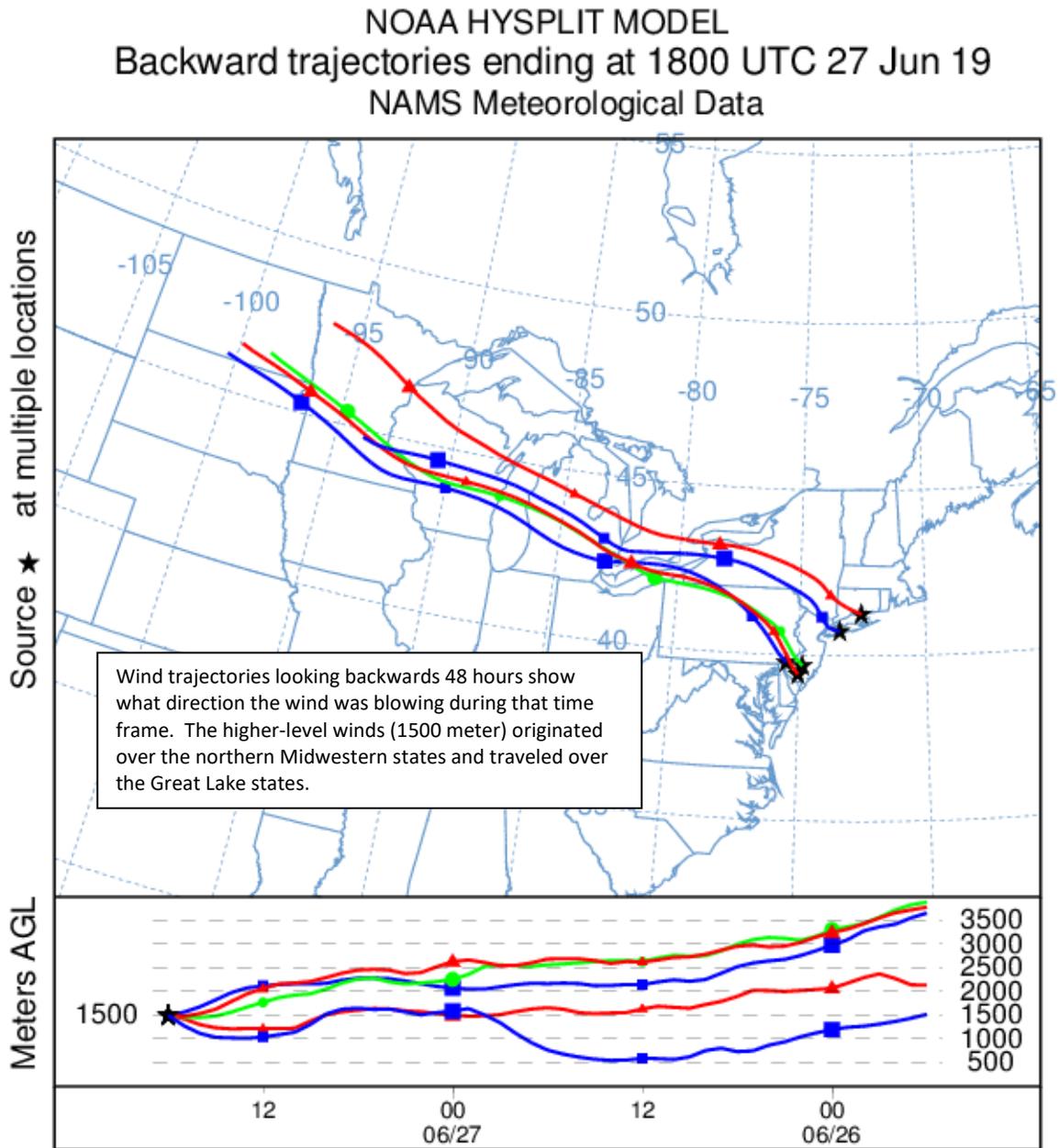
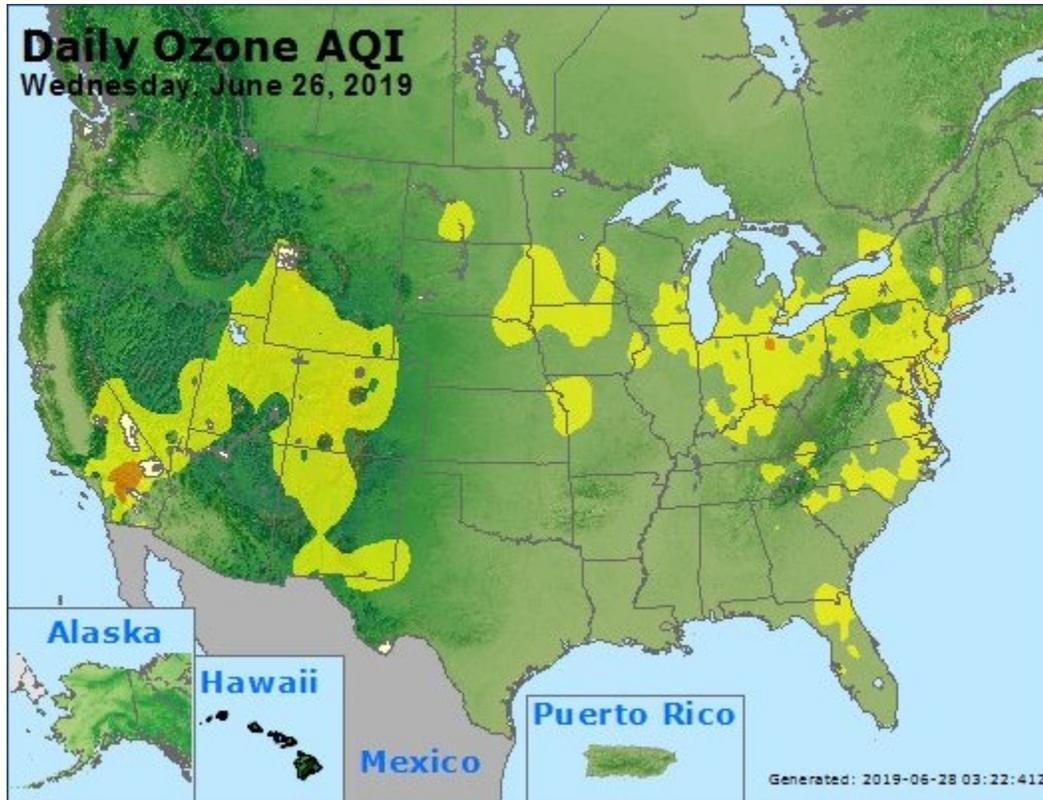


Figure 5. Ozone Air Quality Index for the United States on June 26, 2019



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 (NO_x) 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.