Ozone National Ambient Air Quality Standard Health Exceedances on May 25, 2016

Exceedance Locations and Levels

On Wednesday, May 25, 2016, sixteen (16) exceedances were recorded in New Jersey of the new 8-hour average ozone National Ambient Air Quality Standard (NAAQS) of 70 ppb that became effective in December 2015 (See Table 1):

Table 1. Ozone NAAQS Exceedances in New Jersey on May 25, 2016

STATION	Daily Maximum 8-Hr Average (ppb)	Exceeds 70 ppb NAAQS	Exceeds 75 ppb NAAQS	Exceeds 84 ppb NAAQS
Ancora State Hospital	103	Yes	Yes	Yes
Brigantine	79	Yes	Yes	
Camden Spruce St	78	Yes	Yes	
Chester	83	Yes	Yes	
Clarksboro	83	Yes	Yes	
Colliers Mills	90	Yes	Yes	Yes
Columbia	76	Yes	Yes	
Flemington	83	Yes	Yes	
Leonia	86	Yes	Yes	Yes
Millville	81	Yes	Yes	
Monmouth University	81	Yes	Yes	
Newark Firehouse	81	Yes	Yes	
Ramapo	79	Yes	Yes	
Rider University	82	Yes	Yes	
Rutgers University	84	Yes	Yes	
Washington Crossing*	83	Yes	Yes	

*The Washington Crossing station is operated and maintained by EPA as part of the nationwide Clear Air Status and Trends Network (CASTNET).

The only station in New Jersey that did not exceed the new 70 ppb ozone NAAQS was Bayonne with a concentration of 69 ppb. All sixteen stations also exceeded the 75 ppb 8-hour ozone NAAQS of 2008, and three (3) stations exceeded the 84 ppb 8-hour ozone NAAQS of 1997. The highest 1-hour average ozone concentration recorded on May 25, 2016 in New Jersey was 108 ppb at the Ancora station, which is below the 1-hour ozone NAAQS of 120 ppb.

Wednesday marks the second day in 2016 on which exceedances of the new 8-hour ozone NAAQS of 70 ppb were recorded in New Jersey. By the 25th of May in 2015, there were a total of 2 days on which ozone exceedances were measured in New Jersey (based on the 75 ppb NAAQS of 2008), and there were zero days by this same date in 2014.

There is a group of monitoring stations in designated counties of 5 states, New York, Connecticut, Pennsylvania, Delaware and Maryland, which are included in New Jersey's ozone nonattainment areas. From this group of stations in the other neighboring states, there were 29 exceedances of the new 8-hour ozone NAAQS of 70 ppb recorded on Wednesday, May 25, 2016 (See Table 2):

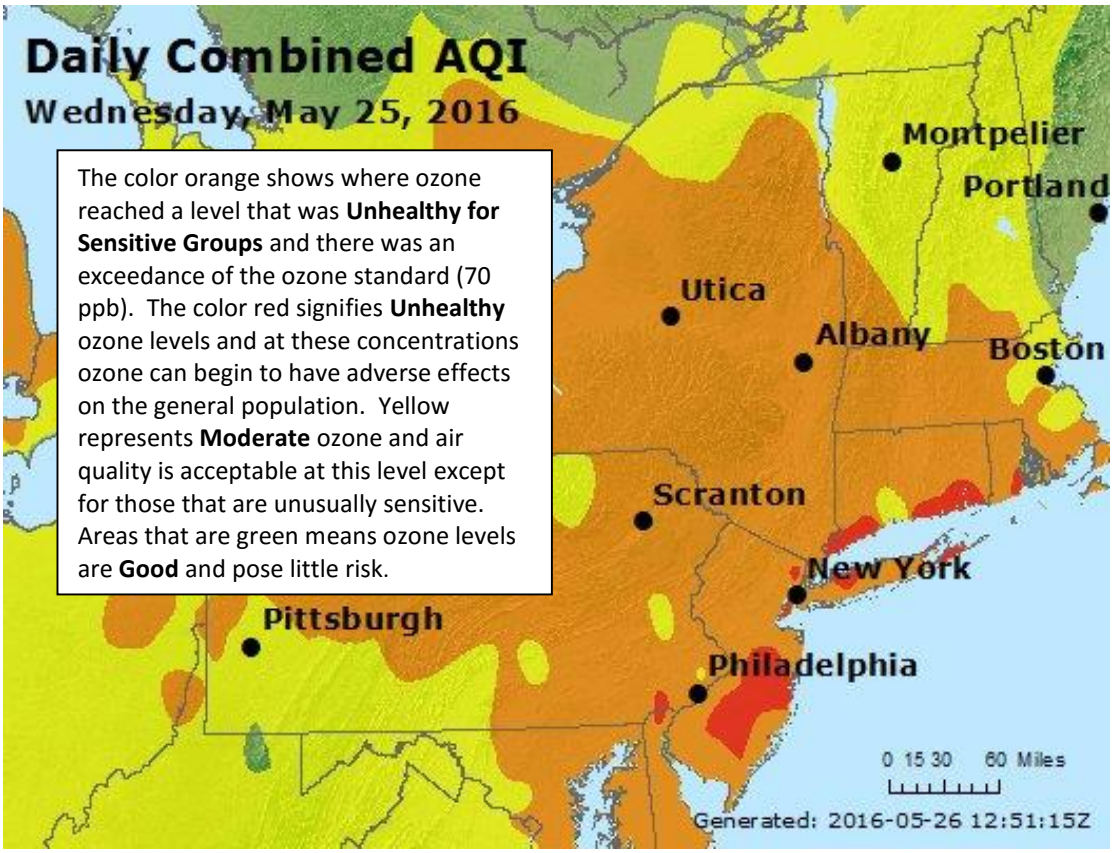
Table 2: Ozone NAAQS Exceedances at other Monitoring Stations in New Jersey's Ozone Nonattainment Areas on May 25, 2016

STATE	STATION	Daily Maximum 8-Hr Average (ppb)	Exceeds 70 ppb NAAQS	Exceeds 75 ppb NAAQS	Exceeds 84 ppb NAAQS
CT	Danbury	82	Yes	Yes	
CT	Greenwich	89	Yes	Yes	Yes
CT	Madison-Beach Road	89	Yes	Yes	Yes
CT	Middletown	80	Yes	Yes	
CT	Stratford	89	Yes	Yes	Yes
CT	Westport	87	Yes	Yes	Yes
DE	Kent (KILLENS)	81	Yes	Yes	Yes
DE	New Castle (BCSP)	87	Yes	Yes	
DE	New Castle (BELLFNT2)	84	Yes	Yes	
DE	New Castle (LUMS 2)	78	Yes	Yes	
DE	Sussex (LEWES)	79	Yes	Yes	
DE	Sussex (SEAFORD)	76	Yes	Yes	
MD	Fair Hill	83	Yes	Yes	
NY	Babylon	85	Yes	Yes	Yes
NY	CCNY	78	Yes	Yes	
NY	Holtsville	81	Yes	Yes	
NY	IS52	82	Yes	Yes	
NY	Pfizer Lab	79	Yes	Yes	
NY	Queens	83	Yes	Yes	
NY	Riverhead	85	Yes	Yes	Yes
NY	Rockland Cty	78	Yes	Yes	
NY	Susan Wagner	86	Yes	Yes	Yes
NY	White Plains	82	Yes	Yes	
PA	Bucks (BRIS)	84	Yes	Yes	
PA	Chester (NEWG)	80	Yes	Yes	
PA	Delaware (CHES)	80	Yes	Yes	
PA	Montgomery (NORR)	82	Yes	Yes	
PA	Philadelphia (NEA)	84	Yes	Yes	
PA	Philadelphia (NEW)	77	Yes	Yes	

All 29 stations also exceeded the 75 ppb ozone NAAQS of 2008, and eight (8) stations exceeded the 84 ppb ozone NAAQS of 1997. The highest 1-hour average ozone concentration recorded was 100 ppb at Stratford, CT, which is below the 1-hour ozone NAAQS of 120 ppb.

Wednesday marks the 3rd day in 2016 on which an exceedance of the new 8-hour ozone NAAQS of 70 ppb was recorded in Connecticut, and the first day for Delaware, Maryland, New York and Pennsylvania.

Figure 1. Ozone Air Quality Index for May 25, 2016



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

Meteorological data from across the region showed temperatures reached into the high 80°F's while winds were light and generally from the west. A high pressure system was located over the southeastern United States leading to mostly sunny conditions across the region. Abundant sunlight, combined with warm temperatures and light southwesterly winds, are all features commonly seen with an ozone exceedance.

Where Did the Air Pollution that Caused Ozone Come From?

Figures 2, 3, and 4 show the back trajectories at different wind heights for selected monitored exceedances on May 25, 2016. The figures illustrate where the winds came from during the 48 hours preceding the high ozone event. Ten monitoring stations with the highest 8-hr ozone readings from each state were chosen to run back trajectories. The selected sites and the maximum 8-hr ozone levels recorded are listed in Table 3 below.

Table 3. Ten 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	Greenwich	89
CT	Madison-Beach Rd	89
DE	BCSP	87
MD	Fair Hill	83
NJ	Ancora Hosptial	103
NJ	Colliers Mills	90
NJ	Leonia	86
NY1	Susan Wagner	86
PA1	BRIS	84
PA2	NEA	84

The back trajectory maps (Figures 2-4) show that the low level (10 meter), mid-level (500 meter), and higher level (1500 meter) winds all originated over the Great Lakes and traveled across Pennsylvania and New York before reaching New Jersey's nonattainment areas, bringing dirty air from a region that had ozone exceedances the prior two days. Figure 5 illustrates the ozone exceedances recorded in the Great Lakes and Ohio River Valley on May 24, 2016, the day before the high ozone event in our region.

The long range transport from the Great Lakes, Pennsylvania, and New York mixed with local pollution created from cars, trucks, and industry along the I-95 corridor to cause the regional ozone exceedance event that occurred on May 25, 2016. It should be noted that this is the most widespread exceedance event we have seen in this region for several years.

Although it was not visible in satellite imagery over the region, smoke from fires burning in western Canada may have been transported over and enhanced the formation of ground-level ozone across the region. Further evaluation will be required to determine if wildfire smoke was a contributing factor to the high ozone in New Jersey's non-attainment areas on May 25, 2016.

Figure 2. 48-hour Back Trajectories for May 25, 2016 at 10 meters

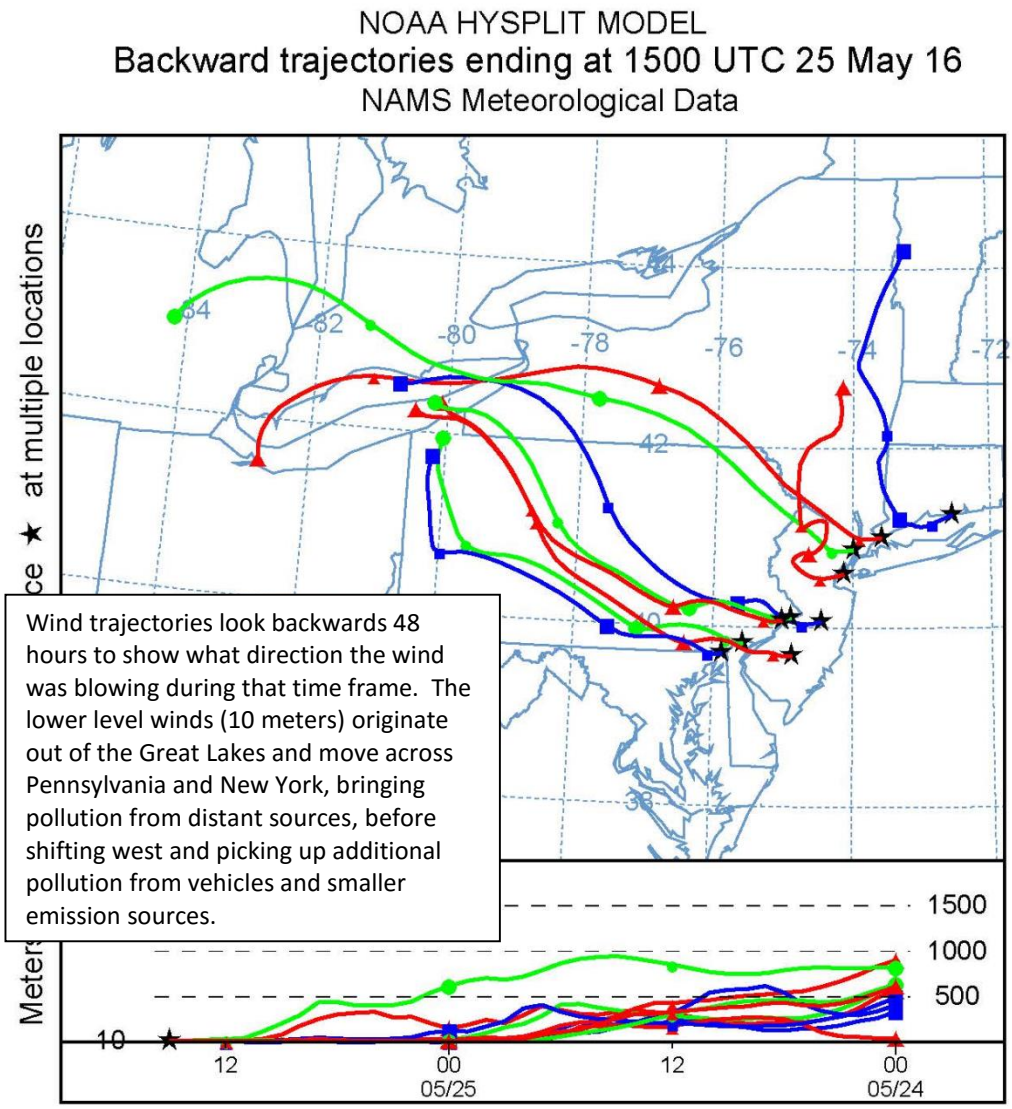


Figure 3. 48-hour Back Trajectories for May 25, 2016 at 500 meters

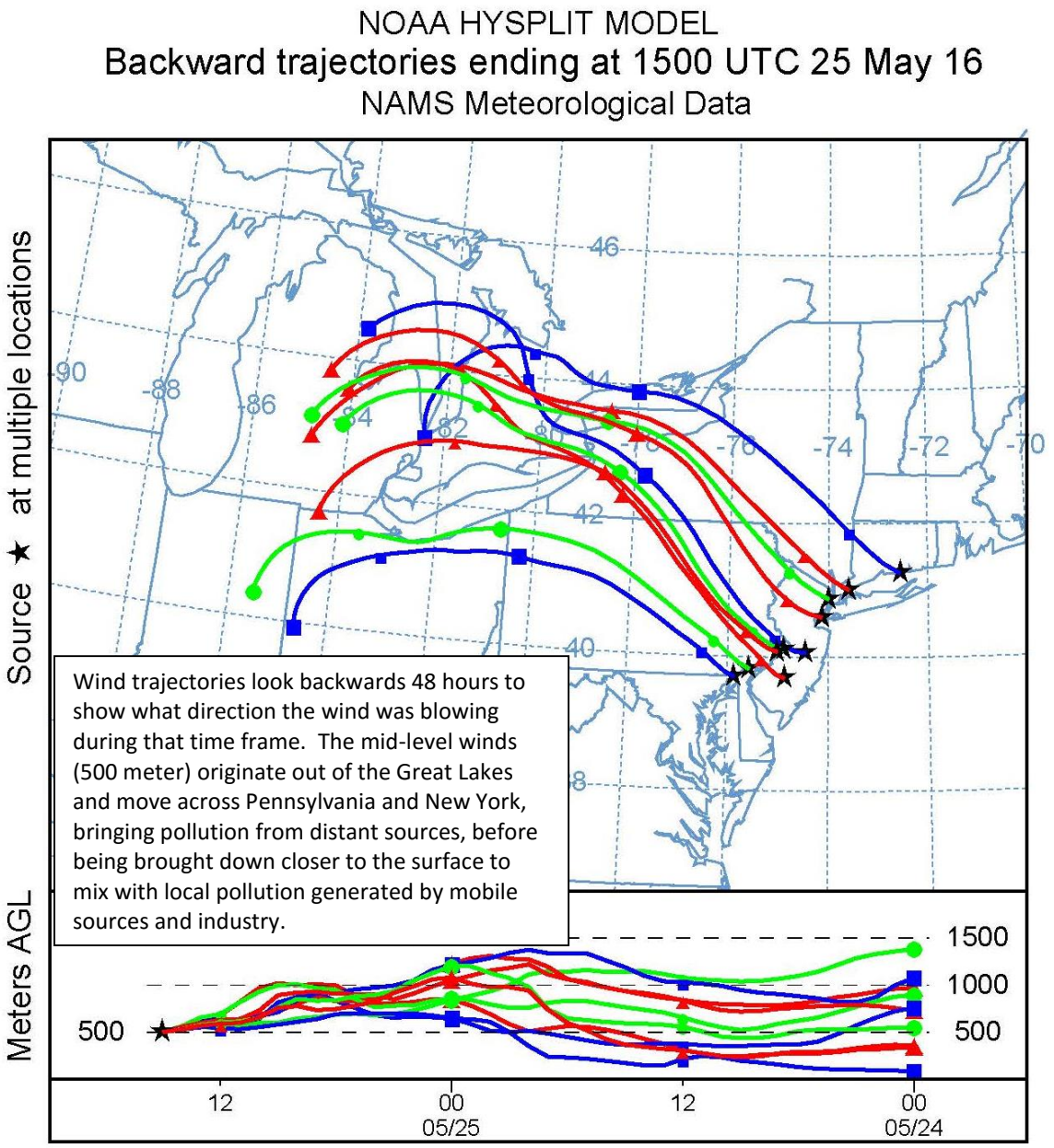


Figure 4. 48-hour Back Trajectories for May 25, 2016 at 1500 meters

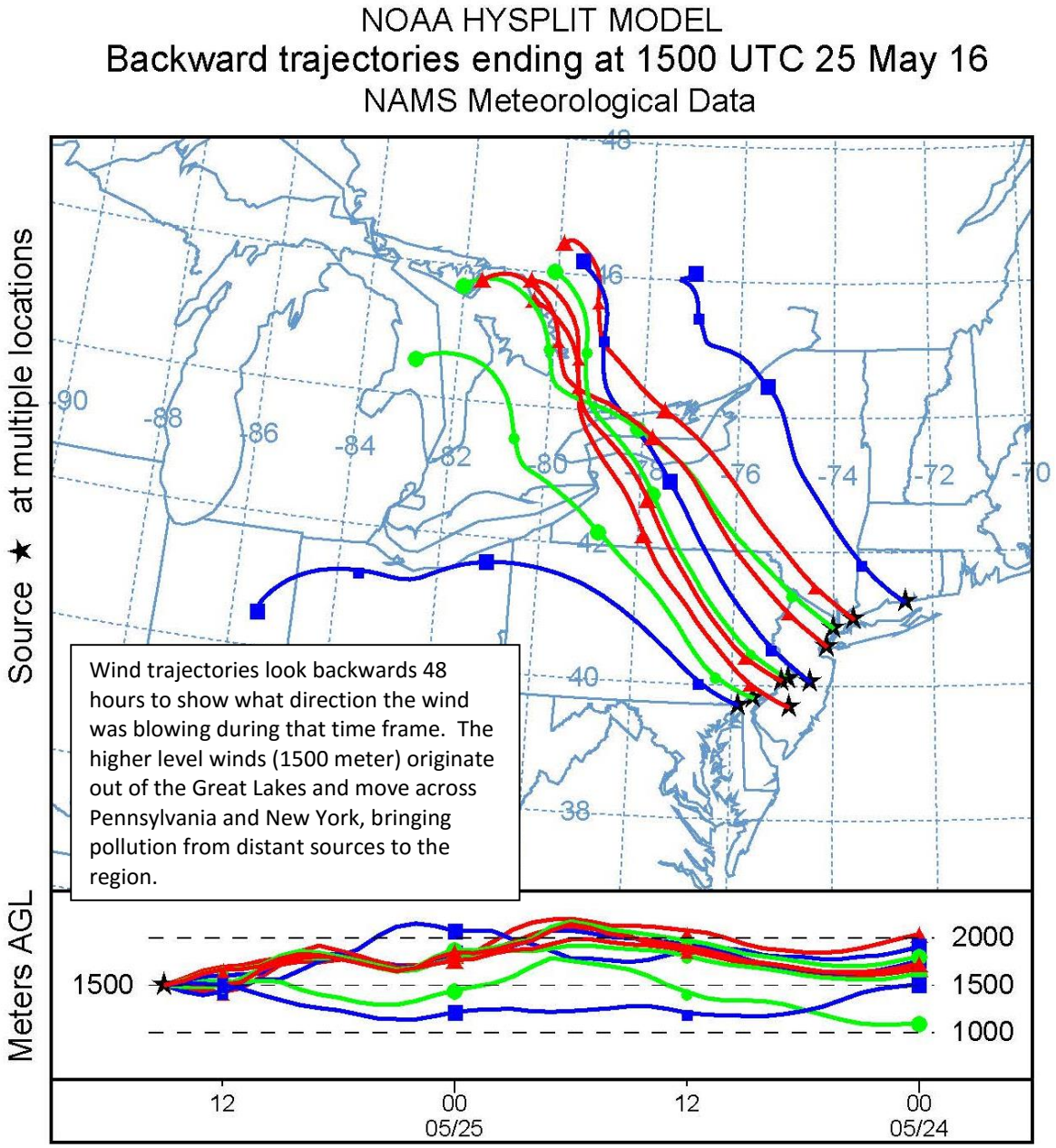
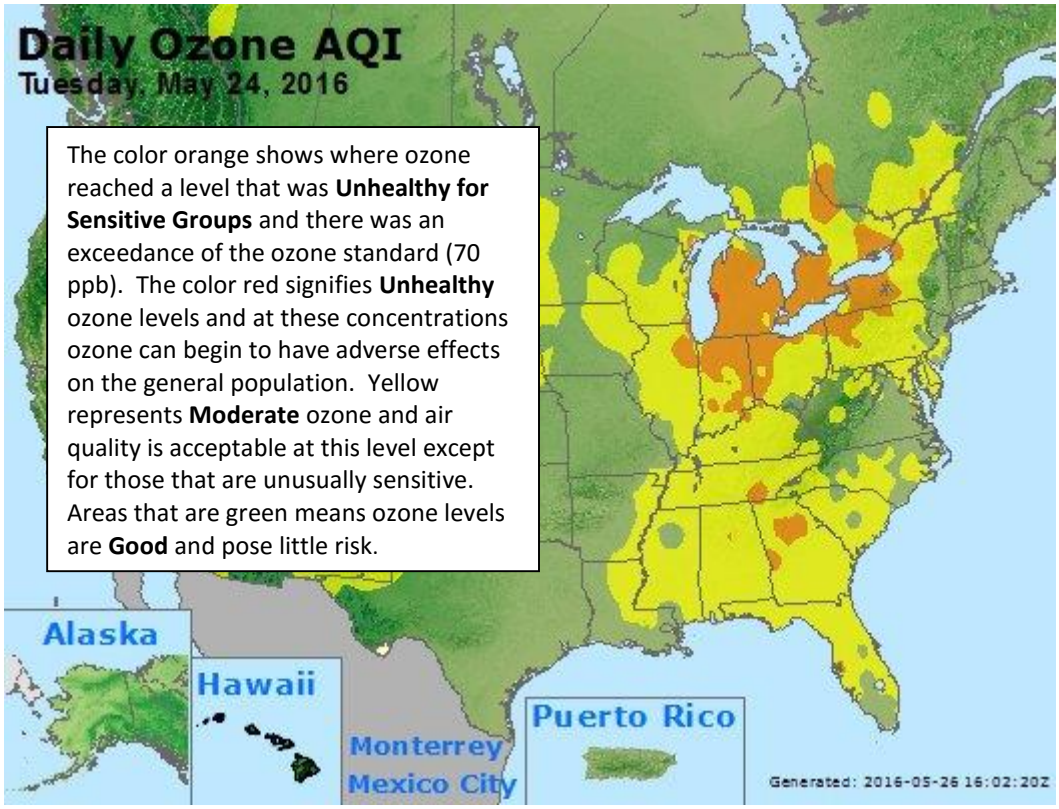


Figure 5. Ozone Air Quality Index for the Great Lakes and Ohio River Valley on May 24, 2016



How is Smog Created?

Ground-level ozone, also known as smog, 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. Smog is formed when oxides of nitrogen (NOx) and volatile organic compounds (VOCs) react in the presence of sunlight. Smog 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.