

Ozone National Ambient Air Quality Standard Health Exceedances on September 23, 2016

Exceedance Locations and Levels

On Friday, September 23, 2016, there were six (6) exceedances in New Jersey of the new 8-hour average ozone NAAQS of 70 ppb that became effective in December 2015 (see Table 1):

Table 1: Ozone NAAQS Exceedances in New Jersey on September 23, 2016

STATION	Daily Maximum 8-Hr Average (ppb)
Ancora State Hospital	76
Camden Spruce St	78
Clarksboro	77
Colliers Mills	78
Flemington	78
Washington Crossing*	75

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

The highest 1-hour average ozone concentration recorded on September 23, 2016, in New Jersey was 93 ppb at Colliers Mills, which is below the 1-hour ozone NAAQS of 120 ppb.

The number of days in 2016 on which exceedances of the new 8-hour ozone NAAQS of 70 ppb were recorded in New Jersey is twenty-five (25). By the 23rd of September in 2015, there were a total of twenty (20) days on which ozone exceedances were measured in New Jersey (based on the former 75 ppb NAAQS of 2008), and there were three (3) days by this same date in 2014.

There is a group of monitoring stations in designated counties of five (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 were eleven (11) exceedances of the new 8-hour ozone NAAQS of 70 ppb recorded on Friday, September 23, 2016 (see Table 2):

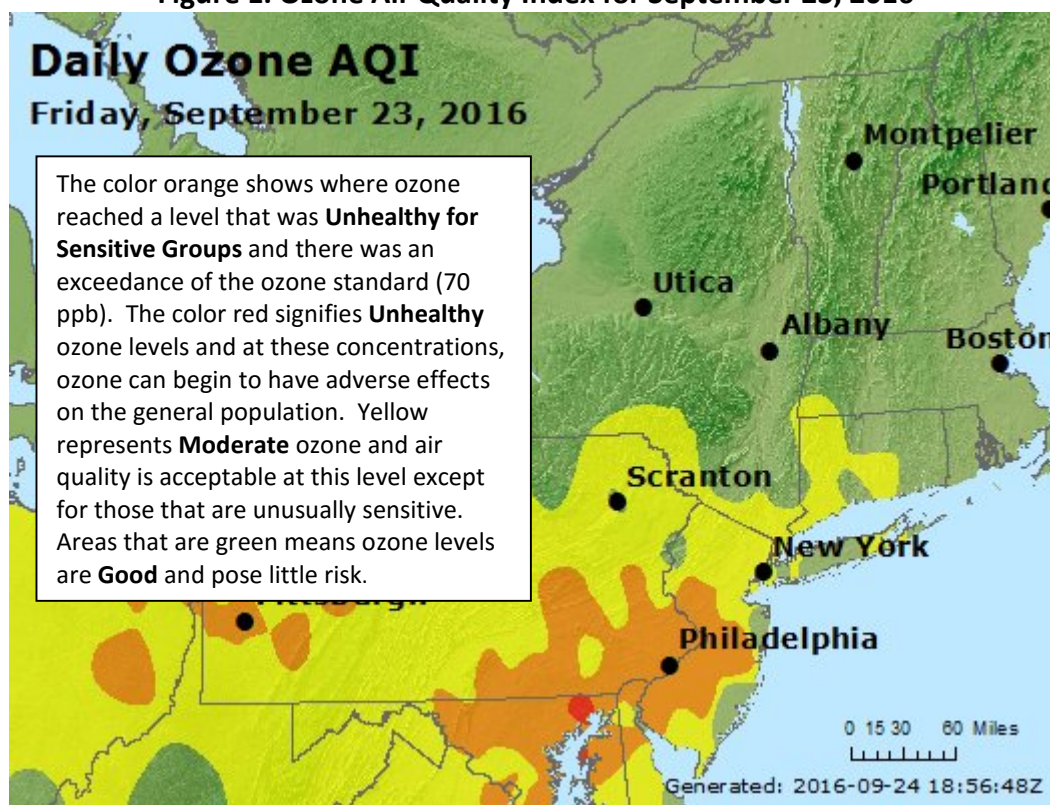
**Table 2: Ozone NAAQS Exceedances at Other Monitoring Stations in New Jersey's
Ozone Nonattainment Areas on September 23, 2016**

STATE	STATION	Daily Maximum 8-Hr Average (ppb)
DE	BCSP (New Castle Co.)	82
DE	BELLFNT2 (New Castle Co.)	77
DE	MLK (New Castle Co.)	76
MD	Fairhill	81
PA	BRIS (Bucks Co.)	81
PA	CHES (Delaware Co.)	81
PA	NEWG (Chester Co.)	78
PA	NORR (Montgomery Co.)	71
PA	LAB (Philadelphia Co.)	78
PA	NEA (Philadelphia Co.)	78
PA	NEW (Philadelphia Co.)	81

The highest 1-hour average ozone concentration recorded was 95 ppb at the BLLFNT2 station in Delaware, which is below the 1-hour ozone NAAQS of 120 ppb.

Friday marks the 11th day in 2016 on which an exceedance of the new 8-hour ozone NAAQS of 70 ppb was recorded in Delaware, the 10th day in Maryland, and 14th in Pennsylvania. The number of days remains at twenty-six (26) in Connecticut, and eighteen (18) for New York.

Figure 1. Ozone Air Quality Index for September 23, 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 that temperatures reached the upper 80°F. Light winds were from the west inland with synoptic on-shore flow along the coast. Weak high pressure was located over West Virginia and a low pressure system was located off the coast. At the same time a strong cold front was approaching from the northwest.

At the surface, light winds were recirculating over the region while a strong elevated temperature inversion formed at approximately 1500-meter high. These weather features combined to trap pollution over the Mid-Atlantic region during the day on September 23. Combined with mostly sunny skies, the inversion conditions and recirculating winds allowed elevated ozone to form.

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 exceedances on September 23, 2016. The figures illustrate where the winds came from during the 48 hours preceding the high ozone event. Ten (10) monitoring stations were chosen to run back trajectories, based on the 8-hour ozone concentrations recorded and their location. It is important to note that all locations that had exceedances on September 23, 2016 were positioned near the I-95 corridor. The selected sites for running back trajectories and the maximum 8-hr ozone levels recorded are listed in Table 3 below.

Table 3. 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)
DE	BCSP	82
DE	BELLFNT2	77
MD	Fairhill	81
NJ	Ancora State Hospital	76
NJ	Camden Spruce Street	78
NJ	Clarksboro	79
NJ	Washington Crossing	75
NJ	Flemington	78
PA	CHES (Delaware Co.)	81
PA	NEWG (Chester Co.)	81

The low level wind (Figure 2) originated to the northeast of New Jersey, traveled through the Garden State and recirculated over portions of New Jersey and Eastern Pennsylvania. These winds picked up air contaminant emissions generated by cars, trucks, and industry along the I-95 corridor from Washington DC up to the Philadelphia metropolitan area.

The mid-level wind (Figure 3) originated over the Atlantic Ocean and recirculated over Maryland and Pennsylvania, before heading towards the exceedance monitors. Recirculating winds allowed polluted air to be picked up from the previous day to accumulate and then mix with local emissions from cars, trucks, and industry along the I-95 corridor and where the monitors are located.

Higher level wind (Figure 4) traveled southeast across New Jersey and circulated over Pennsylvania. However, due to the presence of an elevated inversion between 1000 and 1500 m, it is unlikely that winds at the higher level would have contributed to the elevated ozone. Recirculating winds trapped below an elevated inversion allowed regional pollution to build up over a period of two days which resulted in the elevated ozone. Figure 5 illustrates the ozone exceedances recorded in the Mid-Atlantic region on September 22, 2016, the day before the high ozone event in our area.

Figure 2. 48-hour Back Trajectories for September 23, 2016 at 10 meters

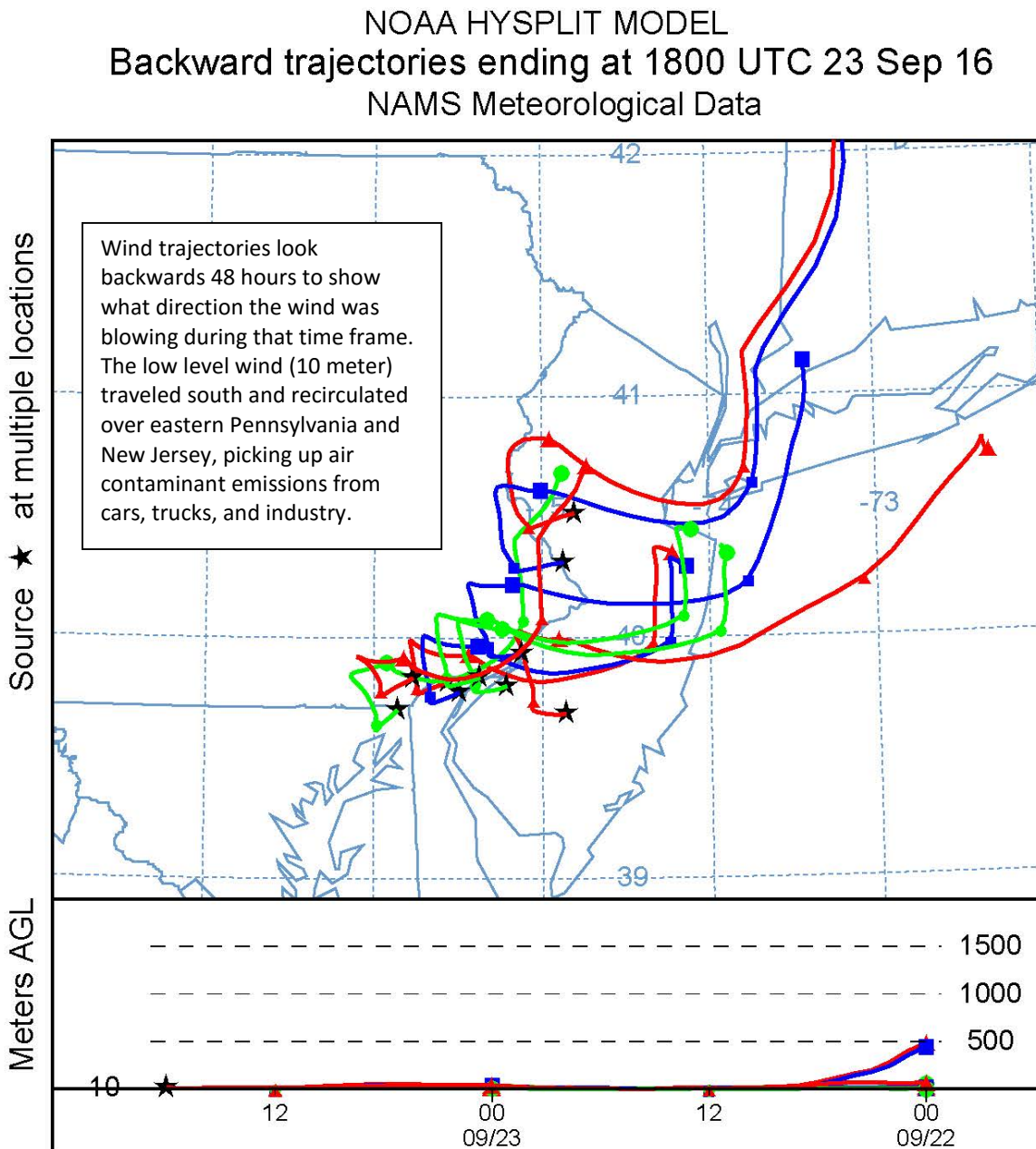


Figure 3. 48-hour Back Trajectories for September 23, 2016 at 500 meters

NOAA HYSPLIT MODEL

Backward trajectories ending at 1800 UTC 23 Sep 16

NAMS Meteorological Data

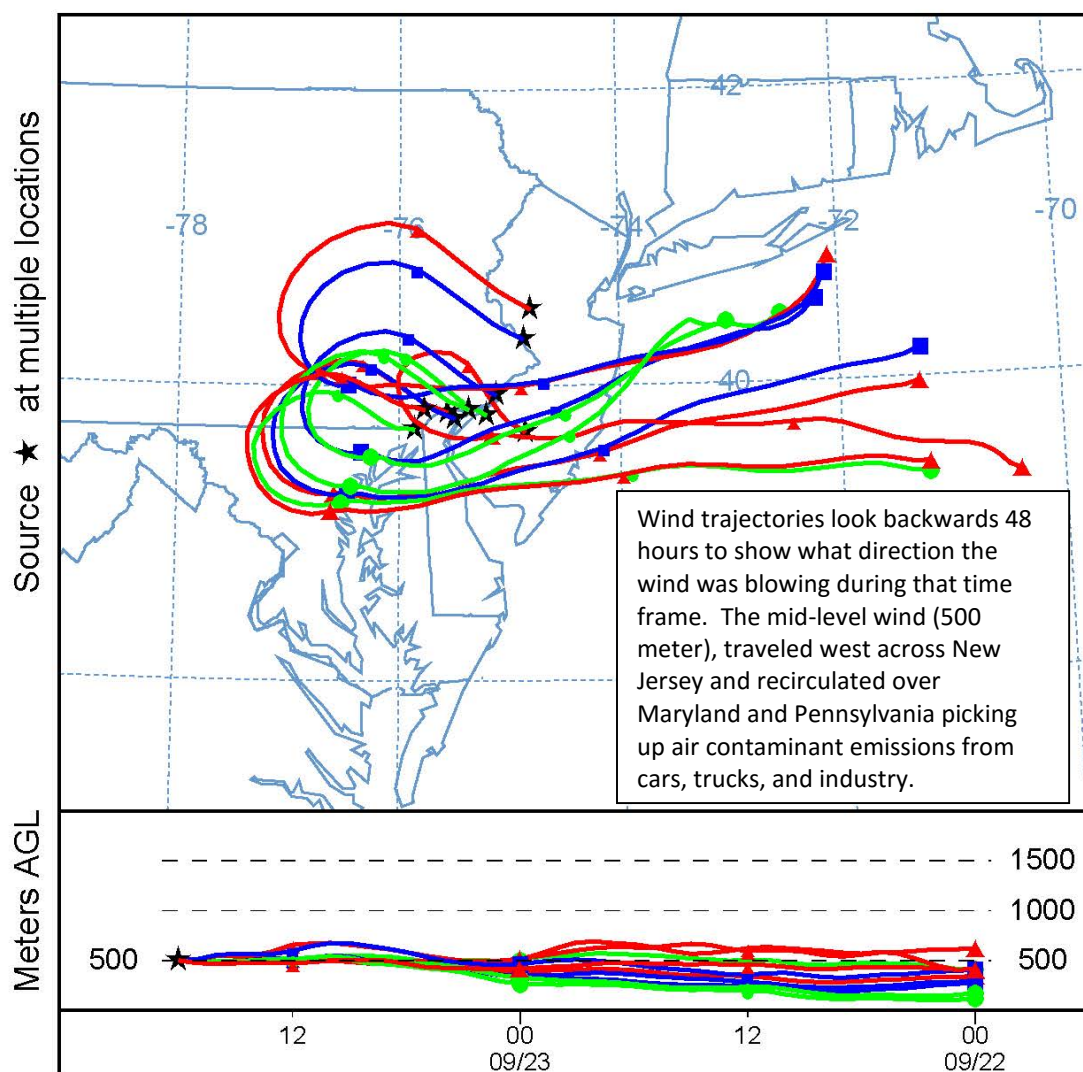


Figure 4. 48-hour Back Trajectories for September 23, 2016 at 1500 meters

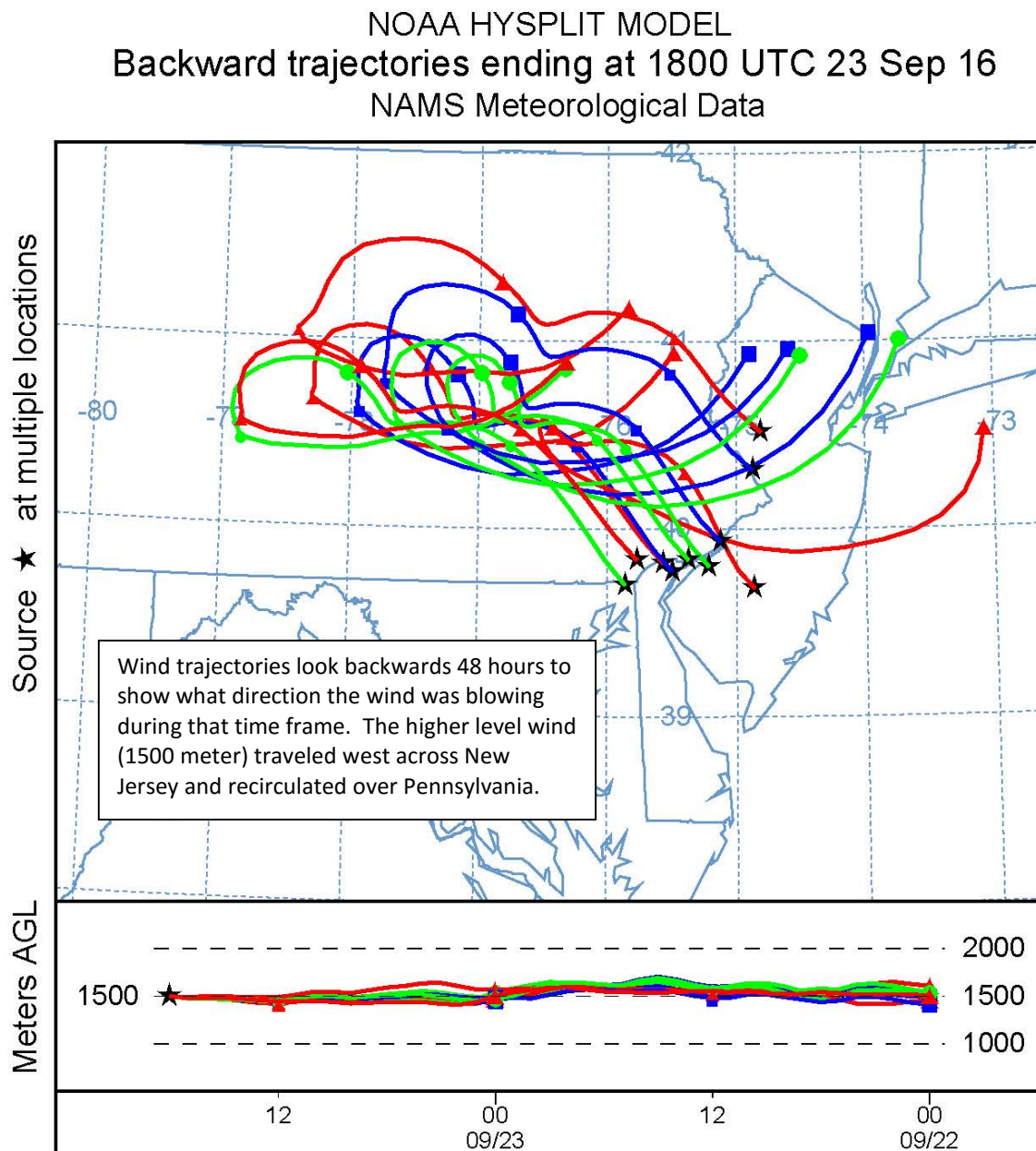
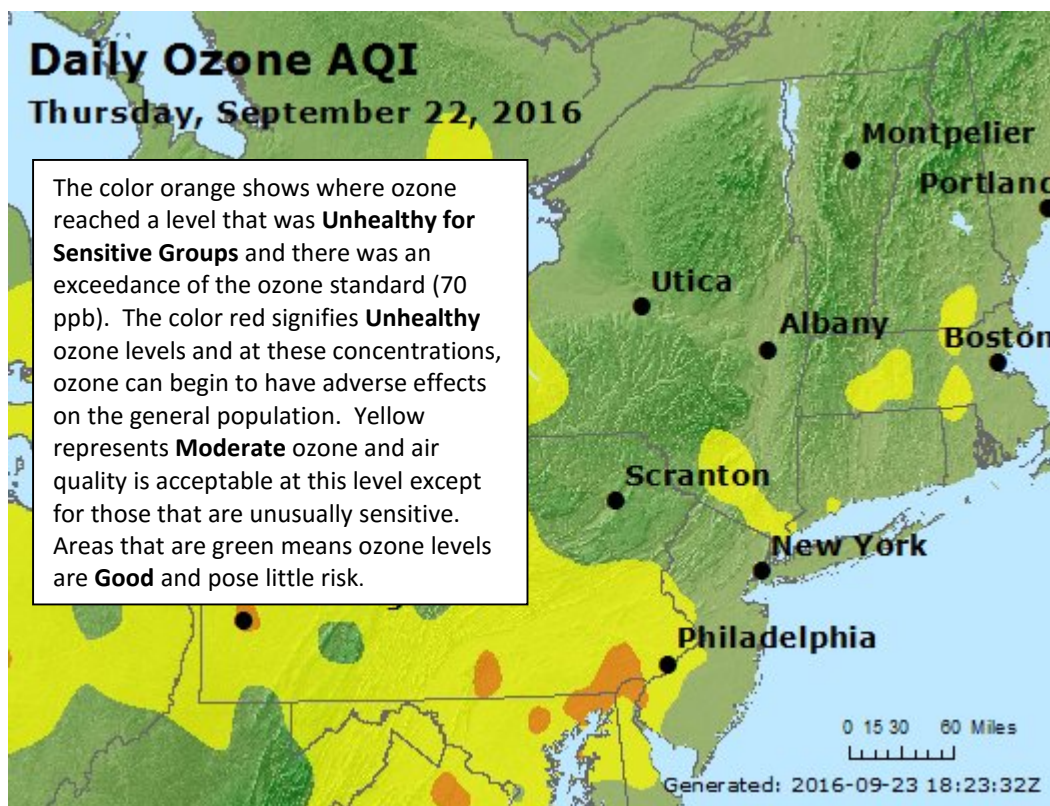


Figure 5. Ozone Air Quality Index for September 22, 2016



Source: www.airnow.gov

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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.