

## GROUND-LEVEL OZONE

2009 April – September

The ground-level ozone season in Maryland occurs during the months of April-September due to an increase in ozone production that commonly takes place during the summertime. This increase in ozone production frequently makes it the primary pollutant for the Mid-Atlantic. Ozone activity is assessed by the number of days that the daily maximum 8-hour average ozone National Ambient Air Quality Standard (NAAQS) is exceeded. This standard is exceeded when the ozone Air Quality Index<sup>1</sup> (AQI, see color bar below) is greater than 100, at which point it is classified as an exceedance day.

The 2009 ozone season was among the cleanest our state has experienced. A mere 11<sup>2</sup> exceedance days were observed with only one reaching the Unhealthy AQI range. This contrasted greatly with the average 39 exceedance days based on the most recent five years (2004-2008). The difference between exceedance days and non-exceedance days can also be seen visually by examining Baltimore Haze Cam images. On the right, the May 10<sup>th</sup> image displays a good air quality day as air quality was within the Good AQI range. However, conditions shown on June 26<sup>th</sup> depict visibility when air quality was within Unhealthy for Sensitive Groups (USG) AQI range. Here, the Key Bridge, only about three miles away, was much more difficult to see than on May 10<sup>th</sup>.



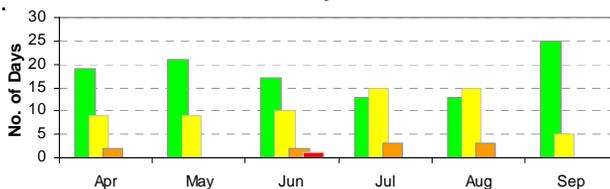
### SEASONAL HIGHLIGHTS

The seasonal distribution of AQI is shown in the pie chart to the right by the percent occurrence of each AQI category within the ozone season. Over the course of the season, about 59% of the days had AQI levels in the Good range while close to 35% observed Moderate levels. This left only 5.5% classified as USG days and 0.5% as Unhealthy days.

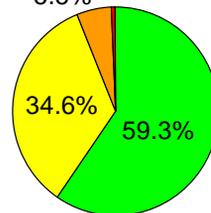
April started off the season with a combination of Good and Moderate days during the beginning of the month. The last weekend of April featured two USG days on the 25<sup>th</sup> and 26<sup>th</sup>. The bar chart "Maryland 8-hour Average Ozone AQI 2009 Monthly Distribution" shows the monthly AQI trends. In May, air quality seemed to improve as the number of Good AQI days increased and air quality never went beyond Moderate throughout the month.

June observed a slight increase in Moderate days with two additional USG days on the 8<sup>th</sup> and 26<sup>th</sup>. Ozone exceedance days are listed in the table on page 2. This table shows the number of air monitoring sites on a particular day that recorded a USG or above AQI, the air monitoring site name that had the highest AQI value, and the AQI value associated with that site. The map above the table displays Maryland's ozone monitoring network. The one and only Unhealthy day during the season occurred on June 25<sup>th</sup> at the Edgewood air monitoring site. *(continued on pg. 2)*

**Maryland 8-hour Average Ozone AQI 2009 Monthly Distribution**



**Maryland 8-hour Average Ozone AQI 2009 Seasonal Total**



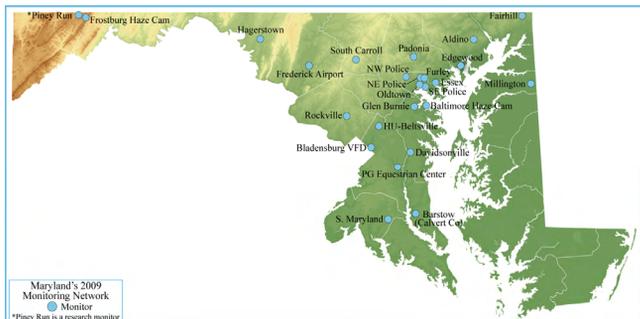
### Air Quality Index (AQI)



<sup>1</sup> AQI based on the 2008 8-hr ozone NAAQS  
<sup>2</sup> Report based on preliminary ozone data

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## SEASONAL HIGHLIGHTS

(continued from pg. 1) Edgewood’s AQI value of 185 was much higher than surrounding sites such as Aldino with a value of 109. This vast difference was due to the development of a strong bay breeze. The formation of the bay breeze is caused by a large contrast in temperature between land and water, and has been known to create a boundary along which ozone accumulates. In July, three more USG days were observed. In August, the distribution of AQI days was identical to that of July with three USG, 15 Moderate, and 13 Good days. September saw a large improvement in air quality as ozone stayed within the Good range on 25 out of 30 days.

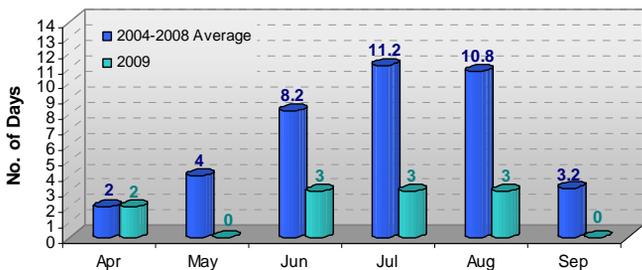
Maryland’s 2009 Ozone Season Exceedance Days

Date	No. of Monitors	Monitor with Highest AQI	8-hour Average Ozone AQI
25-Apr	1	Fairhill	101
26-Apr	1	Edgewood	106
8-Jun	2	Padonia/HU-Beltsville	101
25-Jun	4	Edgewood	185
26-Jun	3	Edgewood	140
13-Jul	1	Edgewood	104
15-Jul	1	Edgewood	116
16-Jul	2	Edgewood	114
16-Aug	1	Edgewood	124
18-Aug	1	Edgewood	119
27-Aug	1	Edgewood	101

## WEATHER & AIR QUALITY

The 2009 ozone season brought generally cooler temperatures in the central U.S. when compared to the climatological average of 1950-2007 (pg. 3). This was most prominent in the Midwest where the states of Illinois, Indiana, Iowa, Ohio, Pennsylvania, and West Virginia had their coldest July on record. In contrast, New England and most of the Southeast region observed normal temperatures during the ozone season. The Mid-Atlantic showed mixed conditions with the majority of the region close to average as well. The comparison between precipitation and the climatological average indicated that conditions were near normal for the western Northeast region while the northern Midwest region had below normal precipitation and were drier than average. Areas that received more precipitation than normal were New England, northern Mid-Atlantic, and east central areas of the U.S.

Seasonal Comparison of Exceedance Days



Temperature and precipitation trends in Maryland proved to be slightly cooler and wetter than normal across the state except for the Eastern Shore which experienced warmer

temperatures of about 1°F above normal. This overall cooler and wetter trend during the summer translated into an ozone season with only 11 exceedance days. This number is remarkable when compared to the 31 exceedance days experienced in 2008 and the 39 exceedance days experienced on average within the last five years. This significant decrease is shown in the bar chart titled “Seasonal Comparison of Exceedance Days” (above) that shows that the five-year average of USG or greater days. Furthermore, April was the only month that matched the number of exceedance days observed in 2009 to the average. All other months were well below normal. It is also interesting to note that during June-August, each month consistently observed three exceedance days. (continued on pg. 3)

### Air Quality Index (AQI)



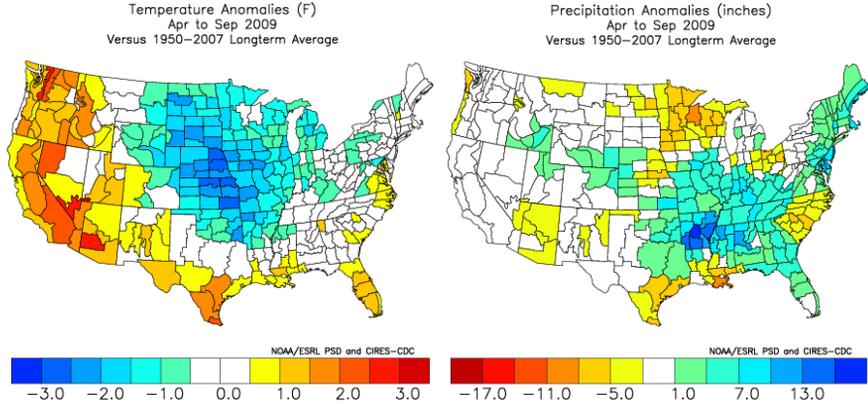
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### WEATHER & AIR QUALITY

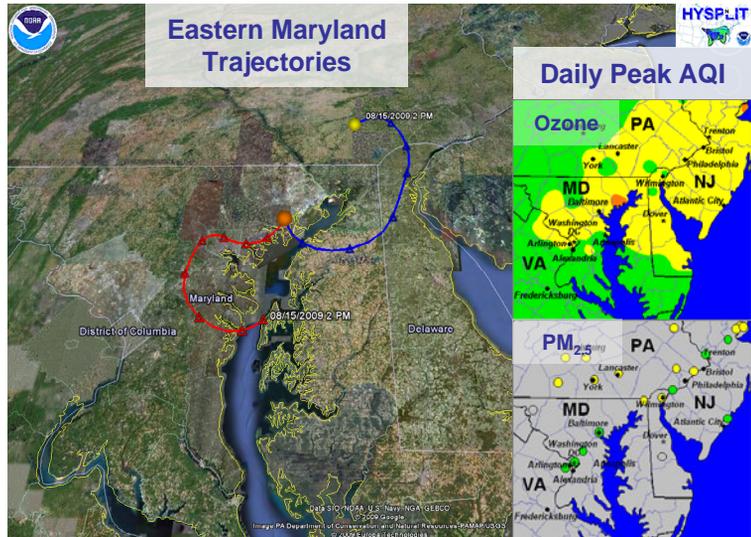
(continued from pg. 2)

Not only did Maryland's cooler and wetter conditions influence the lack of ozone exceedance days in 2009, but the cool summer experienced in the Midwest also played a significant role. The Midwestern states have long been known as a source of transported pollution that travels into the Mid-Atlantic on aloft westerly winds. Because warmer temperatures commonly mean a greater quantity of ozone production, the opposite effect occurred. With less pollution emerging from this region and Maryland, the state experienced better overall air quality.



### FEATURED EVENT: August 16, 2009

On August 16<sup>th</sup>, Maryland experienced hot temperatures in the upper 80's to low 90's (F) along with clear skies and light and variable winds due to a broad high pressure system over the East Coast. The image to the right shows 24-hour back trajectories in red and blue, initiated at 10 m above ground level (AGL) and 500 m AGL, respectively. The red trajectory indicates that the air mass over Edgewood, MD on the 16<sup>th</sup> originated from the Chesapeake Bay on the 15<sup>th</sup>, downwind from Washington D.C metropolitan area. The back trajectory's path carved a slow clockwise circular pattern through Baltimore City. The blue trajectory showed the air mass at 500 m traveled from southern Pennsylvania on the 15<sup>th</sup> which had Moderate AQI values.



As a result of these weather conditions, Maryland observed Moderate AQI values and one USG AQI value of 124 observed at the Edgewood monitoring site. This particular day was also one of many that experienced the influence of the bay breeze. Fine particles were slightly elevated as well with AQI values in the low to mid-Moderate range. This air quality episode concluded a few days later on the 18<sup>th</sup>, when strong late afternoon thunderstorms moved through the region from the west.

### MORE INFORMATION

Visit [www.cleanairpartners.net](http://www.cleanairpartners.net) for current air quality conditions and forecasts, or call the air quality hotline at 410-537-3247. References: [AIRNow](#), [NOAA ARL READY HYSPLIT Trajectory Model](#), [NOAA ESRL PSD Climate Analysis Branch](#)

### Air Quality Index (AQI)

