

**THE CITY OF ASPEN'S
AIR QUALITY MONITORING PROGRAM
2018 ANNUAL REPORT**

September 2019
Jannette Whitcomb

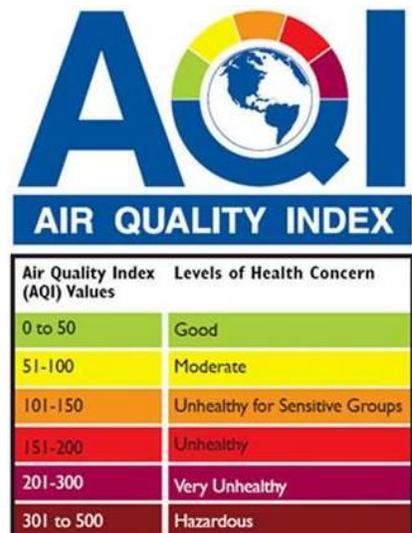
Overview of the City of Aspen's Air Quality Monitoring Program

The City of Aspen (COA) has been monitoring air quality since the early 1980s. Our monitoring capability has improved over the years both in number of pollutants monitored as well as quality of the data. Today, the COA monitors particulate matter 10 microns or less (PM10), particulate matter at 2.5 microns or less (PM2.5) and ground level ozone (O₃) using air quality monitors that provide real time data to the community as well as the state.

From its inception, the COA's air quality program has used air quality monitors as a tool to improve and protect local air quality. Monitoring PM10 played an integral role in verifying that the air quality measures the community adopted in the mid-1980s were working to reduce historical high levels of PM10. These measures included mass transit, paid parking, year-round street sweeping, as well as regulations on idling vehicles, wood burning fireplaces, and restaurant grills. COA staff also educate and promote congestion mitigation programs to protect our local air quality.

With local PM10 pollution under control, Aspen began focusing on regional air pollution concerns from natural and human caused events. Aspen is impacted by wildfires and dust storms locally and regionally. Other natural events include [stratospheric intrusions](#). NASA has found that stratospheric intrusions are detectable in the spring and increase ozone levels in higher elevation communities.

Real time air quality data is provided to the community through the COA's webpage www.aspenairquality.com. This website uses the nationally recognized health-based messaging tool called the Air Quality Index (AQI). The AQI uses local air quality monitoring to determine how healthy our air. It is a tool that can help people understand what local air quality means to their health and influence their outdoor activity choices during impaired air quality days.



The Pollutants Monitored by the City of Aspen

How healthy our air is determined by monitoring pollutants of concern, including ozone and particulate matter.

Ground level ozone is a secondary pollutant that forms in the air rather than being directly emitted, such as from a tail pipe. For ground level ozone to form it requires the right mix of Nitrogen Oxides (NO_x) and Volatile Organics (VOC) that get “cooked” by sunlight or UV. The sources for these precursor pollutants are both natural and man-made. Weather patterns play an important role in producing ozone. Wind can transport pollution to Aspen hundreds of miles from where it originated.

Breathing ozone can trigger a variety of health problems including chest pain, coughing, throat irritation, and congestion. It can worsen bronchitis, emphysema, asthma, and reduce exercise performance.

Particulate matter (PM) is a complex mixture of extremely small particles and liquid droplets. Particle pollution is made up of many components, including nitrates, sulfates, organic chemicals, metals, and soil or dust particles.

The size of particles is directly linked to their potential for causing health problems. The Environmental Protection Agency (EPA) is concerned about particles that are 10 micrometers in diameter or smaller because those are the particles that generally pass through the throat and nose and enter the lungs. Once inhaled, these particles can affect the heart and lungs and cause serious health effects.

- PM 10 is "inhalable coarse particles," and can be found near roadways and uncontrolled construction sites.
- PM2.5 is "fine particles," and can be found in smoke and haze. These particles can be directly emitted from sources such as fireplaces, restaurant grills, and forest fires, or they can form when gases emitted from vehicles react in the air.

Ground level ozone and fine particulates pose the greatest threat to human health in this country. (airnow.gov)

The National Ambient Air Quality Standards

Through the Clean Air Act, the EPA establishes National Ambient Air Quality Standards (NAAQS) for criteria pollutants, including ozone and particulate matter. Limits set by the EPA inform communities when they must act against air pollution. Communities might exceed a standard

without violating the standard. Definition of the standards as well as the COA's current standing are provided below:

- **Ozone** - Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years not to exceed 70 ppb (parts per billion).
To date, Aspen has not exceeded the ozone standard. Aspen's 3-year ozone 8-hour average is 64 ppb. In 2018, Aspen's highest reading of Ozone for 8hr average was 80 ppb.
- **PM 10** - Not to exceed a 24-hour average of 150 $\mu\text{g}/\text{m}^3$ (micrograms per cubic meter of air) more than once per year over a 3-year period.
To date, Aspen has not exceeded the PM 10 standard. In 2018, Aspen's highest reading of PM10 for 24hr average was 71 $\mu\text{g}/\text{m}^3$.
- **PM 2.5** – The NAAQS for PM2.5 are an annual arithmetic mean of 12 $\mu\text{g}/\text{m}^3$, and the 3-year average of the annual 98th percentile of 24-hour PM2.5 concentrations is greater than 35 $\mu\text{g}/\text{m}^3$.
To date, Aspen has not exceeded the PM2.5 standard. In 2018, Aspen's annual arithmetic mean was 4.7 $\mu\text{g}/\text{m}^3$ and the annual 98th percentile was 19.5 $\mu\text{g}/\text{m}^3$.

It is important to note that in the last three years, on occasion, Aspen has had levels of ozone and PM2.5 pollution that were above the standard. However, these above standard incidences did not occur enough times to violate the NAAQS.

Monitoring Results

In 2018, COA had a few days where pollution from wildfires, natural events, or dirt on the roads caused Aspen to have elevated levels. Below are the top ten highest levels for each pollutant for 2018.

Date	8hr O ₃ Level (ppb)
6/11/18	80
8/2/18	73
8/1/18	66
5/14/18	64
8/8/18	64
6/2/18	63
7/18/18	63
5/27/18	62
6/12/18	62
7/12/18	62

Date	PM10 Levels ug/m ₃
1/3/18	71
1/4/18	68
1/17/18	62
3/7/18	59
3/8/18	49
8/16/18	49
8/2/18	44
3/14/18	43
1/5/18	42
6/12/18	42

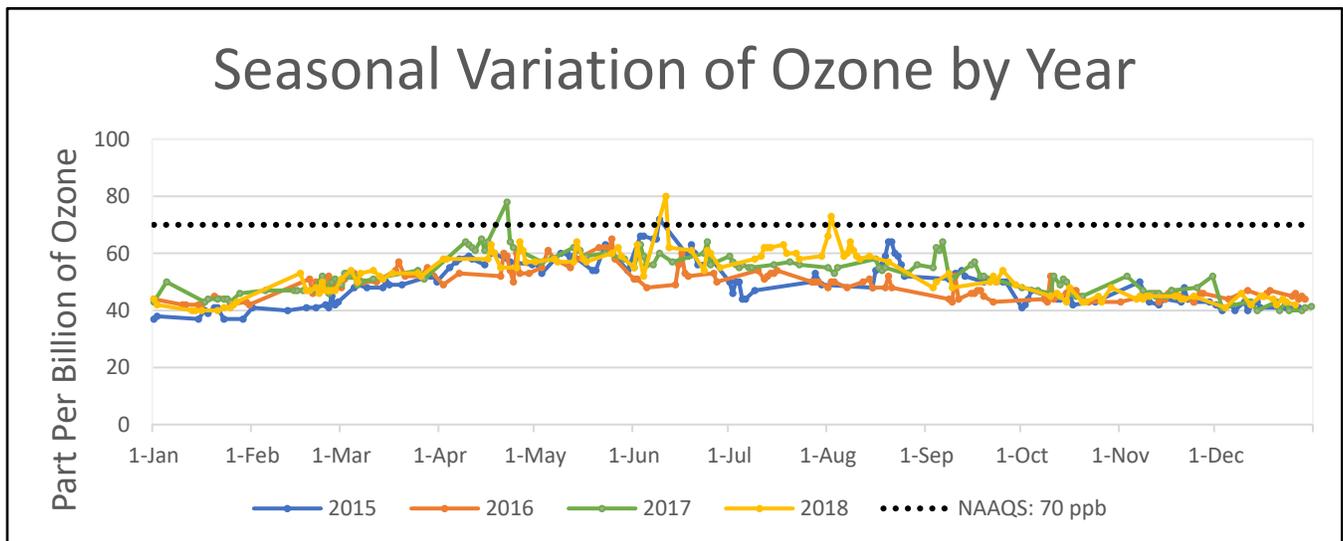
Date	24hr PM2.5 Levels ug/m ₃
4/28/18	28
8/2/18	27
8/14/18	25
8/7/18	23
7/30/18	22
7/5/18	21
8/1/18	20
8/16/18	20
8/15/18	18
1/3/18	17

Seasonal variation of pollution in Aspen.

The topography as well as regional weather patterns influence the impacts of air pollution in a region. Over the past several years this has been evident locally with pollution impacting Aspen more severely due to regional fires in the northwest then from local fires only 20 miles away.

The ozone graph (**Figure 1**) below demonstrates that Aspen typically has its highest days in the spring due to natural events including conifers releasing natural volatile organic compounds (such as terpenes) as well as [stratospheric intrusions](#). NASA has found that stratospheric intrusions are detectable in the spring and increase ozone levels in higher elevation communities. However, wildfire activity both local and regionally can also impact ozone levels as seen this year with the Lake Christine Fire that was active starting July 3, 2018 and continued through the summer.

Figure 1



The PM10 graph (**Figure 2**) below shows that Aspen continues to be vulnerable to local particulate pollution in the winter due to seasonal inversions trapping pollution in our breathing space. Winter time sources of pollution include wood burning fireplaces (PM2.5 source) as well as times when sand on the roads gets ground up (PM10 source) by vehicles and projected into the air. The PM2.5 graph (**Figure 3**) illustrates that during the spring and summertime, Aspen experiences particulate pollution spikes which are generally caused by local and regional wildfire smoke. Wildfire smoke gets transported by weather patterns and can dump large amounts of particulate matter into our area. In the summer of 2017, fires in Colorado as well as the fires from the Northwest impacted Aspen's air quality. In 2018, many fires on the

Western Slope, including the Lake Christine in Basalt/El Jebel, as well as fires from California impacted Aspen's local air quality.

Figure 2

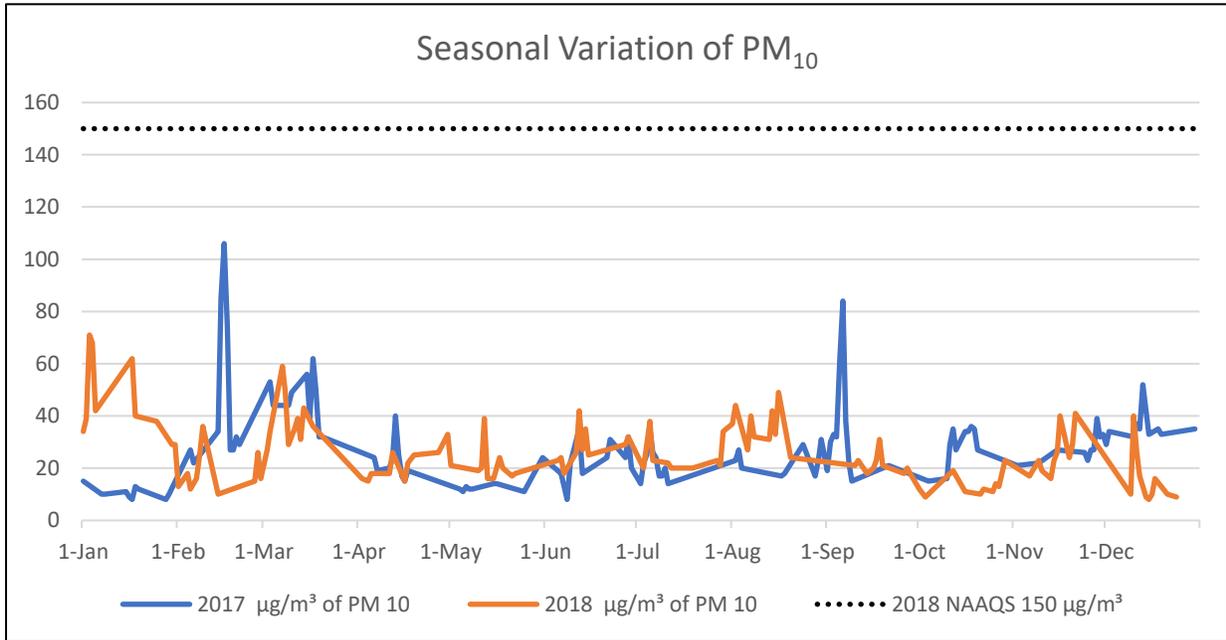
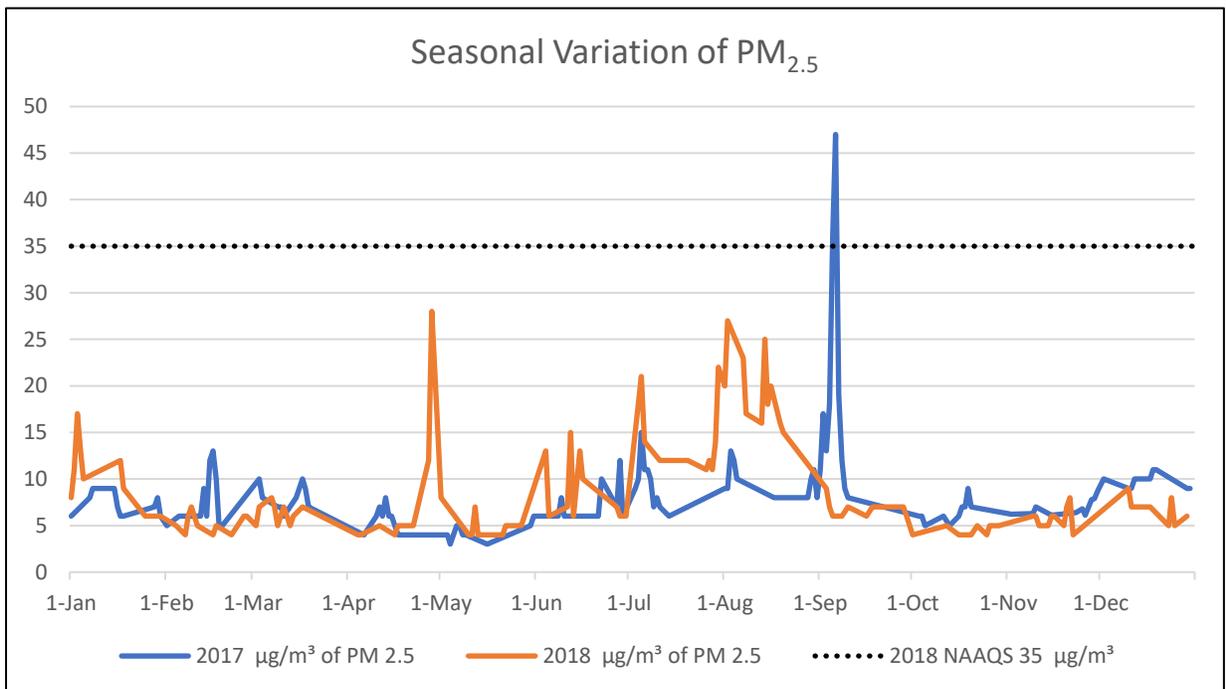


Figure 3



Public Outreach During Air Quality Events

The Colorado Department of Public Health and Environment (CDPHE) monitors Colorado's air quality to determine the potential of poor air quality in a region. Through its forecasting capabilities CDPHE can issue air quality advisories to those regions that may be impacted by pollution. These air quality advisories are a way to prepare residents and visitors, especially those sensitive to smoke and other pollution, for the likelihood of impaired air and to possibly adjust their plans for outdoor activity. Pitkin alerts are also issued when there is an air quality advisory in Aspen and/or other parts of Pitkin County.

In 2018, CDPHE issued two air quality advisories for Ozone on April 17 and June 11. High ozone levels were noticed on both days, but especially on June 11 with Aspen having its highest ever 8-hour average of 80 ppb. In 2018, CDPHE issued 11 air quality advisories for wildfire smoke in July and August. Four were issued specifically related to the Lake Christine fire. The other seven were related to a combination of fires in Colorado and further west, including California.

Staff issued eight Pitkin Alerts for air quality in 2018. Many of those alerts directed people to the COA's air quality website for further information.

During the Lake Christine Fire, www.aspenairquality.com received a significant number of visitors, with several days reaching around a thousand unique pageviews per day. Figure 4 shows for the period between June to August 2018 there was significant traffic on this website.

Figure 4

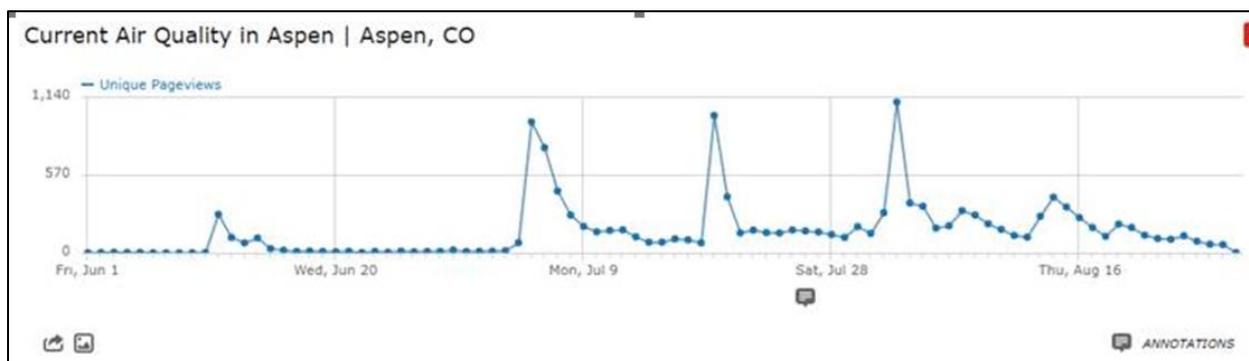


Figure 5 shows that for the period between June and August of 2018, www.aspenairquality.com had the second highest number of unique pageviews for all COA webpages at 13,979.

Figure 5

PAGE NAME	PAGEVIEWS	UNIQUE PAGEVIEWS	BOUNCE RATE	AVG. TIME ON PAGE	EXIT RATE	AVG. GENERATION TIME
Aspen, CO Official Website	22,380	16,899	36%	00:00:45	43%	0.73s
Current Air Quality in Aspen Aspen, CO	17,635	13,979	76%	00:01:18	94%	0.67s
Aspen, CO	22,174	11,696	62%	00:01:10	73%	0.82s
Job Opportunities Aspen, CO	3,934	3,450	18%	00:02:00	80%	0.62s
Parking Aspen, CO	4,100	3,329	25%	00:00:37	28%	0.61s
Parking Tickets Aspen, CO	2,384	2,068	30%	00:00:38	90%	0.6s
Car To Go Aspen, CO	2,441	2,023	57%	00:00:56	77%	0.71s
Public Parking Garage Aspen, CO	2,168	1,869	77%	00:01:00	81%	0.69s
City Webcast/Meetings & Agendas Aspen, CO	2,327	1,858	80%	00:02:19	80%	0.51s

Conclusion

Aspen enjoys clean air and clear vistas due in part to local air quality regulations and congestion mitigation programs. However, on occasion we have days where our air quality is impaired. In response to this, staff has increased outreach to the community about our real-time air quality monitoring website, www.aspenairquality.com. This website is a tool people are using when the air looks smoky or hazy. It provides information on how the current air quality might impact their health. Staff observed a significant increase in online traffic during the Lake Christine this past year. Staff are encouraged by the community's use of the tool and will continue efforts to inform the public about the website and measures they can take to protect themselves against air pollution.