

To: Regional and Corporate Services Committee
From: Marina Richter, Environmental Services Coordinator

Date: 2018-09-05
File No: 9050-30-075

Subject: Air quality and wildfire smoke in 2018

INTENT

This report is intended to advise the Fraser Valley Regional District Board of information pertaining to regional air quality issues and wildfire smoke experienced during the summer of 2018. Staff is not looking for a recommendation and has forwarded this information should members want more clarification or to discuss the item further.

STRATEGIC AREA(S) OF FOCUS

Support Environmental Stewardship
Support Healthy & Sustainable Community

PRIORITIES

Priority #2 Air & Water Quality

BACKGROUND

Air quality (AQ) management in the Lower Fraser Valley (LFV) is administered by a collaborative committee of multiple government agencies, including the Fraser Valley Regional District (FVRD). The LFV Air Quality Monitoring Network performs an essential function for the AQ management system. Twenty-nine stations continuously monitor air pollutants and weather parameters from Hope to Horseshoe Bay. Collected data provides the foundation for AQ decisions at the airshed scale. The FVRD hosts six stations in the network spanning over the eastern part of the valley, which often sees episodes of the worst air quality in the airshed.

An air quality advisory is issued when the data shows that levels of key air pollutants (known as Criteria Air Contaminants), such as particulate matter, ground-level ozone, nitrogen and sulfur oxides, and carbon monoxide, exceed ambient AQ objectives. The advisories notify the public of poor air quality and recommend actions in order to protect their health. Release of an advisory typically occurs after it has been discussed and agreed upon by air quality experts from the local agencies, including the FVRD.

All AQ advisories issued in the LFV since 1996 have been due to exceedance of AQ objectives for ground-level ozone, fine particulate matter PM_{2.5}, or both at the same time (Figure 1). The most common sources of regional air pollution are forest wildfires and meteorological conditions conducive

to ozone formation. The effects on air quality are typically widespread through the large portions of the airshed.

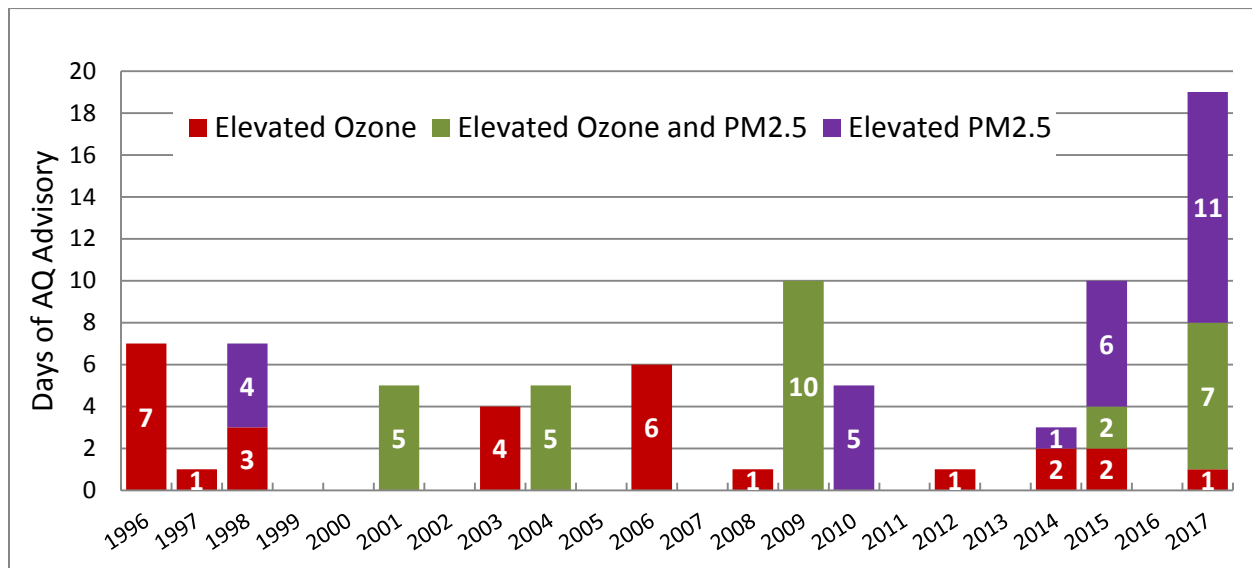


Figure 1. Number of days under AQ advisories in the LFV (adopted and modified from: 2015 Lower Fraser Valley Air Quality Monitoring Report, 2016-2017 data added)

DISCUSSION

Air Quality Advisories

The summer of 2018 has seen unprecedented degradation of air quality in the Lower Fraser Valley. In July-August 2018, the AQ advisories have been issued for 21 days (up to the date this report was submitted), and the advisory season is expected to continue through September. The 2018 numbers have already exceeded the totals in some of the worst years of 2009, 2015, and 2017 (Figure 1), setting a new record for poor air quality in our region.

An AQ advisory during wildfire smoke is typically issued in the LFV when the 24-hour average concentration of PM_{2.5} exceeds 25µg/m³ at two or more monitoring stations. This might or might not coincide with episodes of poor visibility, which sometimes occur when PM_{2.5} concentrations are below the advisory levels.

While most of the advisories were due to forest wildfire smoke from the interior BC and western USA, the current state of air quality cannot be blamed entirely on factors originating from outside our airshed. A significant number of local advisories were due to elevated ground-level ozone levels, resulting from local emissions (nitrogen oxides and volatile organic compounds, primarily), as well as hot temperatures, dry weather, and intense sunshine. The advisory level for ground-level ozone in the LFV is 65ppb (particles-per-billion) for 8-hour average concentration at two or more monitoring stations.

Figures 2 and 3 show concentrations of PM_{2.5} and ground-level ozone, respectively, measured at the AQ stations in the FVRD in July-August 2018 (the numbers are preliminary and have not been validated or quality assured). The highest levels were observed for PM_{2.5} occurred between August 19-26, and for ozone between July 25-30.

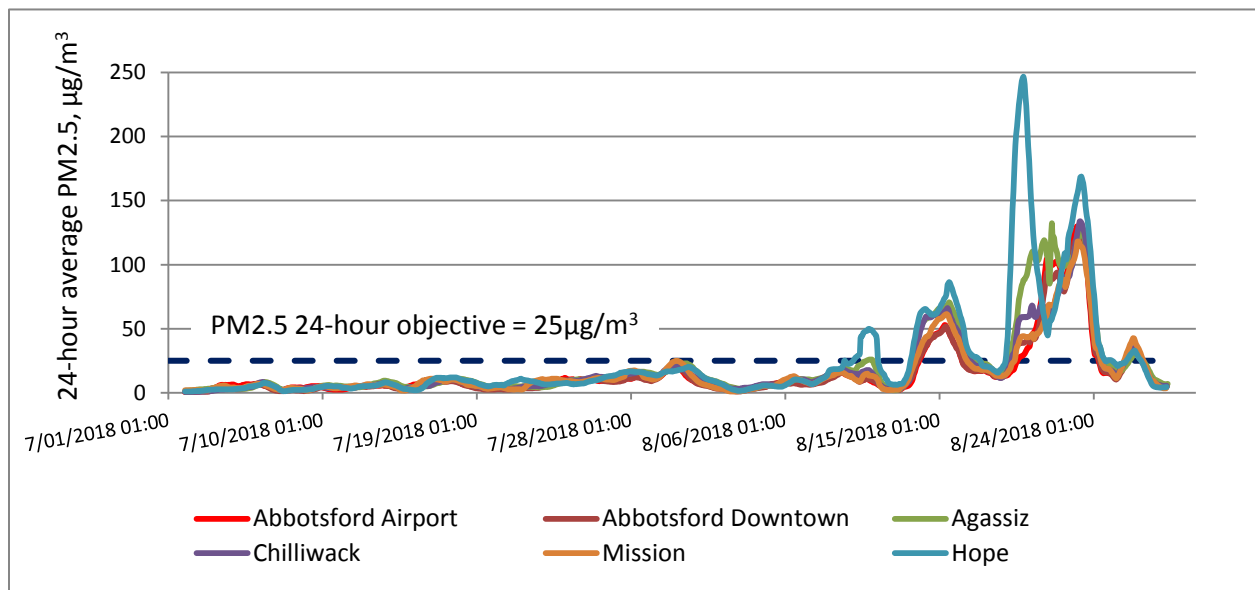


Figure 2. PM_{2.5} ambient concentrations in the FVRD in July-August 2018

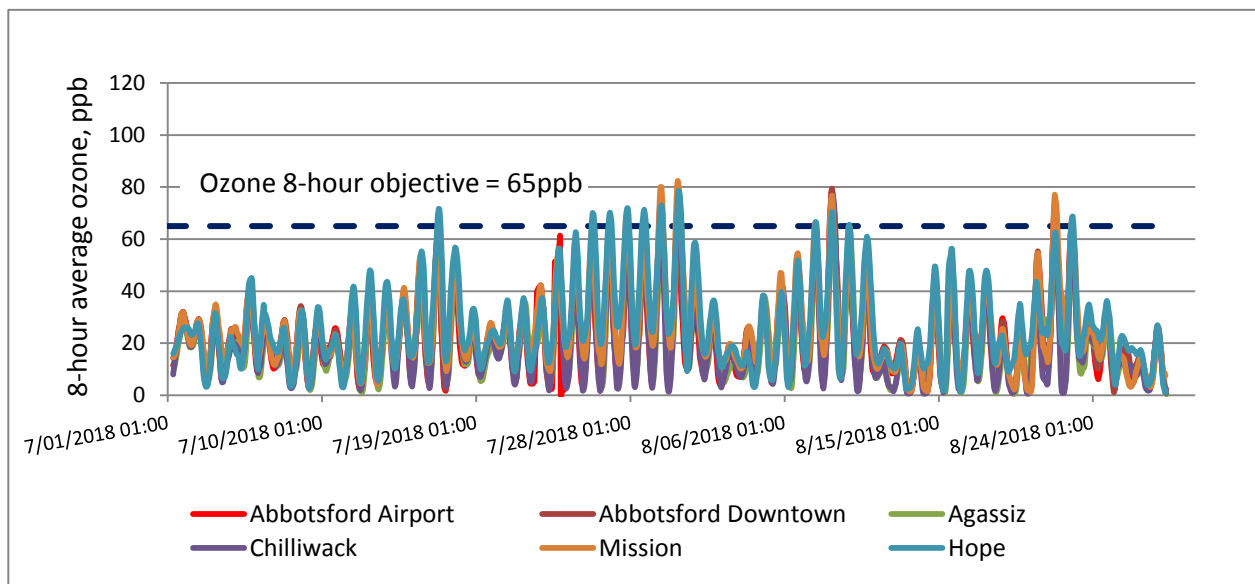


Figure 3. Ground-level ozone ambient concentrations in the FVRD in July-August 2018 (the graph also shows diurnal variation of daylight-sensitive ozone)

Wildfire smoke and public health

Recent trends suggest that BC forest wildfire seasons are becoming longer and more extreme each year. Wildfires generate lots of smoke which can saturate ambient air, travel long-distance, and linger over large territories for extended periods of time. Wildfire smoke is a complex mixture of air pollutants, including fine particulate matter (PM_{2.5}), carbon monoxide, nitrogen oxides, volatile organic compounds, and small amounts of heavy metals. The health effects of smoke might vary from slight discomforts to serious health problems, especially for those with pre-existing respiratory and cardiopulmonary conditions. Studies of wildfire smoke health effects showed that asthma medication dispensations and physician visits increased rapidly and significantly during fire smoke episodes in British Columbia¹.

Earlier in 2018, the local health and air quality agencies, including the FVRD, coordinated developing proactive messaging about wildfire smoke targeting the general population exposed to smoke effects. The objective of proactive messaging is to inform residents of risks and hazards of wildfire smoke, where to obtain information, and how to minimize smoke impacts and protect their health. The messaging is designed by public health professionals as brief information sheets intended to answer questions frequently asked during wildfire smoke events and cover some basic topics, such as smoke effects on health, use of masks and air filters, working outside, taking care of children, and overall minimizing exposure during smoke episodes. The information also includes interactive AQ data and maps and is available at <https://bc.lung.ca/news/latest-news/wildfires-what-you-should-know>.

The wildfire smoke information is also publicized through the FVRD's website and social media channels and provides links to the air quality resources available provincially and regionally.

COST

N/A

CONCLUSION

The summer of 2018 has seen a record number of AQ advisories in the Fraser Valley. Most of these were due to wildfire smoke from interior BC and western USA; however, ground-level ozone formation also played a contributing role, resulting from high temperatures, dry weather and high precursor concentrations. The FVRD is working collaboratively with other agencies in the airshed to improve communications to help our residents to minimize exposure and protect their health during degraded air quality events.

¹ Evidence Review: Health surveillance for wildfire smoke events, 2014 BC Centre for Disease Control

COMMENTS BY:

Barclay Pitkethly, Director of Regional Programs

Reviewed and supported

Mike Veenbaas, Director of Financial Services

No further financial comments.

Paul Gipps, Chief Administrative Officer

Reviewed and supported