Executive Summary

For the 2017-2019 reporting period, the Central Interior Air Zone is assigned a red management level for fine particulate matter and yellow management level for ozone.

Introduction

This is the seventh annual air zone report for the Central Interior Air Zone. Air zone reporting is a commitment under the national Air Quality Management System (AQMS). This report describes achievement of the Canadian Ambient Air Quality Standards (CAAQS) for ground-level ozone (O_3) and fine particulate matter ($PM_{2.5}$), the associated management levels and recent actions to improve air quality. A province-wide summary can be found at: http://www.env.gov.bc.ca/soe/indicators/air/.

Background

The AQMS is the national approach to managing air quality in Canada. Under the AQMS, the CAAQS are developed to drive action to protect human health and the environment. Air zones are areas that exhibit similar air quality characteristics, issues and trends, and form the basis for monitoring, reporting and taking action on air quality. The Central Interior Air Zone (see Figure 1) is one of seven broad air zones across B.C. Under the AQMS, progressively more rigorous actions are expected as air quality approaches or exceeds the CAAQS. The level of action is guided by the Air Zone Management Framework outlined in the AQMS management levels and objectives in Table 1.

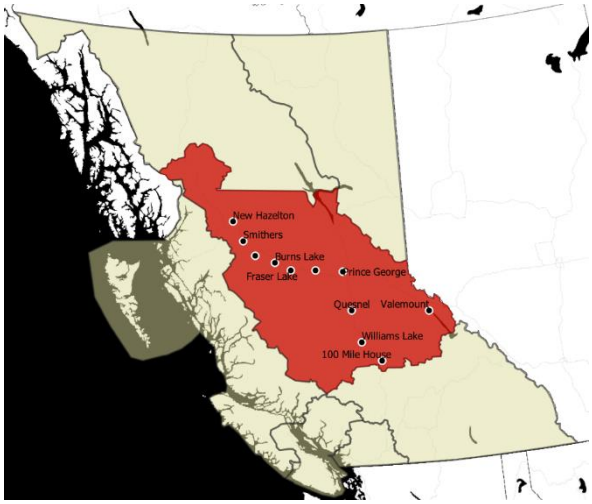


Figure 1. Central Interior Air Zone.

Table 1. AQMS management levels and objectives for $PM_{2.5}$ and ozone based on 2015 CAAQS.

Management Level	Objectives	Ozone	$PM_{2.5}$	
		8-hour (ppb)	Annual ($\mu g/m^3$)	24-hour ($\mu g/m^3$)
Red	Achieve CAAQS	>63	>10.0	>28
Orange	Prevent CAAQS Exceedance	>56 and ≤63	>6.4 and ≤10.0	>19 and ≤28
Yellow	Prevent Air Quality Deterioration	>50 and ≤56	>4.0 and ≤6.4	>10 and ≤19
Green	Keep Clean Areas Clean	≤50	≤4.0	≤10

Ozone Levels

Ground-level ozone is a colourless and irritating gaseous pollutant. It forms just above the earth's surface through chemical reactions between "ozone precursor" emissions. Unlike naturally occurring ozone in the ozone layer, ground-level ozone can be harmful to people, animals, and plants.

Figure 2 is the 2017-2019 summary of ozone levels in the Central Interior Air Zone. Concentrations ranged from 48-51 parts per billion (ppb).[1] Thus, all four sites achieved the national standard of 63 ppb.

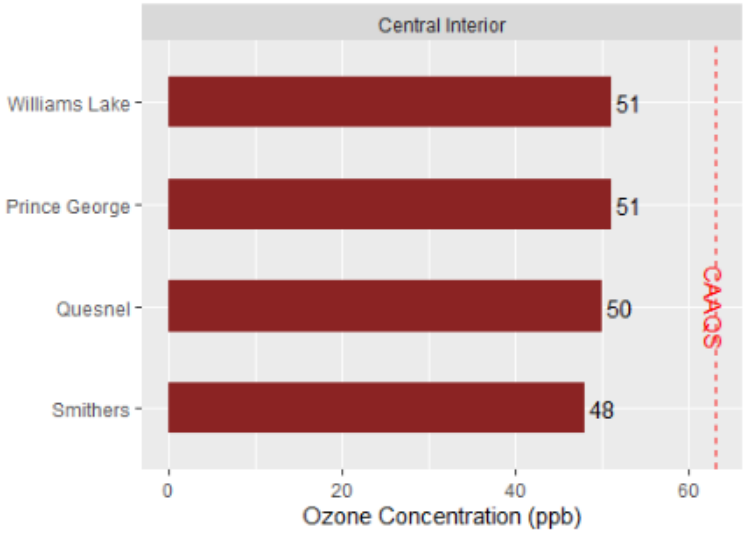


Figure 2. Ozone concentrations in the Central Interior Air Zone, based on annual 4th highest daily 8-hour maximums, averaged over 2017-2019. Red dashed line identifies the 2015 CAAQS of 63 ppb.

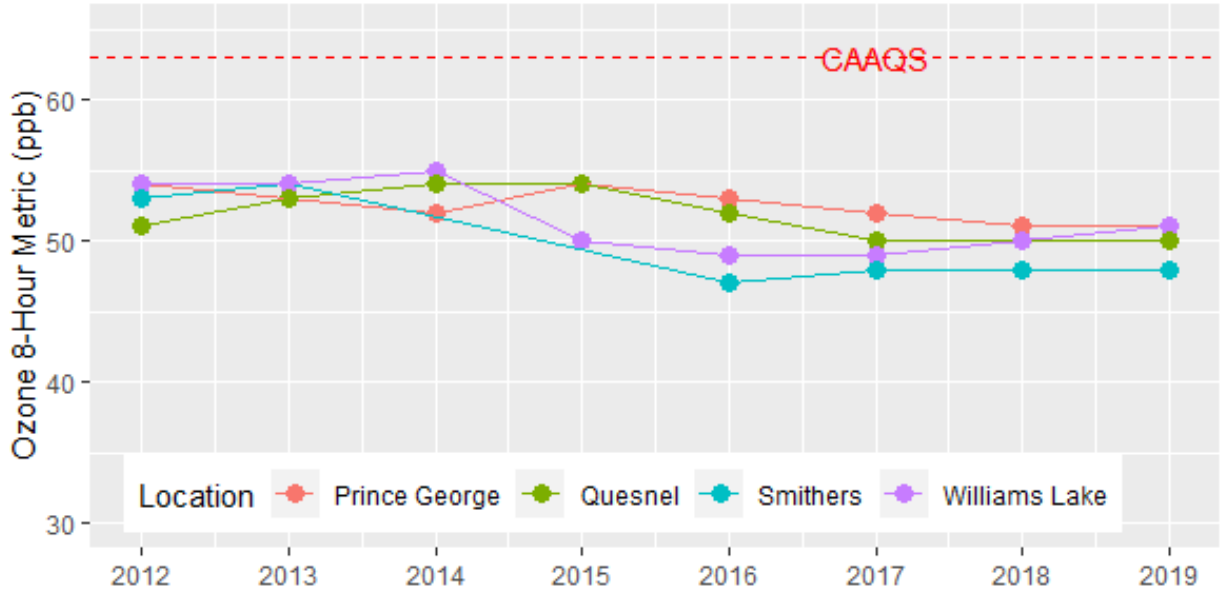


Figure 3. Trends in ozone concentrations (2012-2019), based on annual 4th highest daily 8-hour maximums averaged over three consecutive years. Red dashed line identifies the 2015 CAAQS level of 63 ppb.

[1] Ozone 8-hour metric are based on the 4th highest daily 8-hour maximum, averaged over three years (2017-2019).

$PM_{2.5}$ Levels

$PM_{2.5}$ or fine particulate matter refers to inhalable particles that are smaller than 2.5 microns (µm) in diameter. All $PM_{2.5}$ measurements in this reporting period are based on instruments certified under the US-EPA Federal Equivalent Method (FEM).

$PM_{2.5}$ measurements from eight Central Interior locations are summarized in Figure 4. Daily concentrations (upper plot) based on the 24-hour metric[2] ranged from 29 to 112 µg/m^3. All sites with enough data exceeded the national 24-hour standard of 28 µg/m^3. When adjusted for wildfire smoke following the methodology for transboundary flow/exceptional event (TF/EE) adjustments, $PM_{2.5}$ levels decrease and only Valemount, Vanderhoof, and Houston exceed the 24-hour standard. Data at Valemount is incomplete for the year but presented due to clear exceedance of the 24-hour CAAQS. This reporting exception and data reporting requirements are outlined in the CAAQS guidance document.[3]

Concentrations based on the annual metric[4] (lower plot) ranged from 7.9 to 15.2 µg/m^3. Three of eight sites exceeded the annual standard of 10 µg/m^3. When adjusted for wildfire smoke, only Vanderhoof exceeds the annual standard.

Trends in annual mean concentrations between 2012 and 2019 are shown for a subset of sites in Figure 5. Over the 8-year period, the highest annual averages (without adjustment) were recorded at most sites from 2017 to 2019, reflecting the magnitude of wildfire influence.

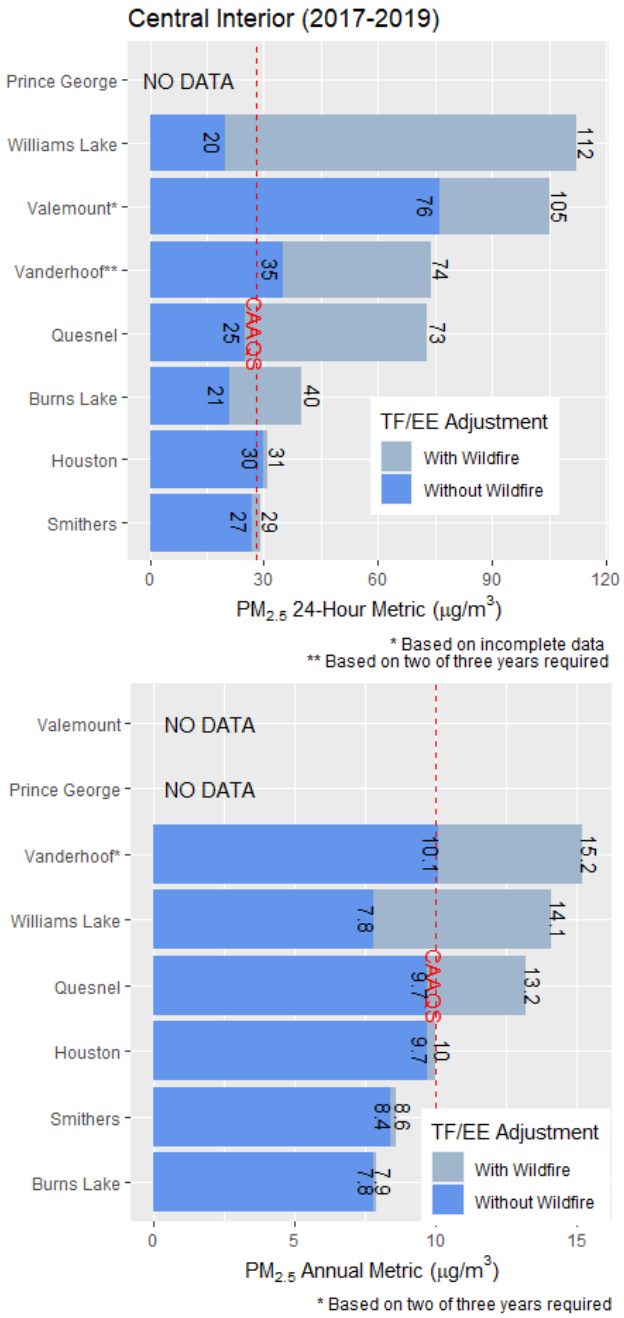


Figure 4. $PM_{2.5}$ concentrations in the Central Interior Air Zone. Upper plot based on 24-hour metric (annual 98th percentile, averaged over 2017-2019). Lower plot based on annual mean concentration (averaged over 2017-2019). The red dashed lines identify CAAQS of 28 µg/m^3 (upper plot) and 10 µg/m^3 (lower plot).

[2] $PM_{2.5}$ 24-hour metric are based on the annual 98th percentile of the 24-hour value, averaged over three years (2017-2019).

[3] See: http://publications.gc.ca/collections/collection_2013/ccme/En108-4-55-2012-eng.pdf

[4] $PM_{2.5}$ annual metric are based on the annual average of 24-hour values, averaged over three years (2017-2019).

When adjusted for wildfire influence, annual trends are flat at most sites since 2016.

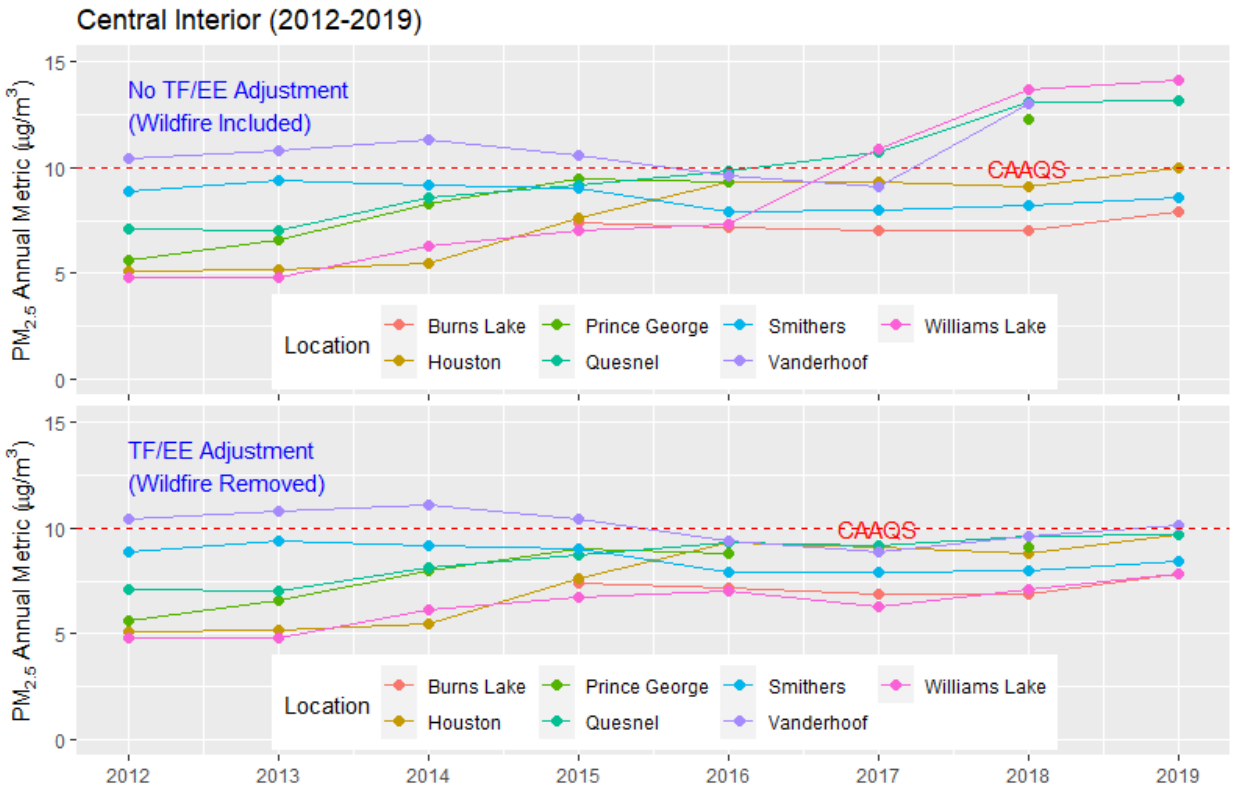


Figure 5. Trends in $PM_{2.5}$ annual metrics (2012-2019) based on the annual average over three consecutive years. Upper plot shows trends without adjustments for wildfire influence. Lower plot is adjusted for wildfire events.

Air Zone Management Levels

Air zone management levels are assigned on the basis of the highest pollutant metrics measured within an air zone, excluding contributions from transboundary flows and exceptional events (TF/EE) such as wildfires, and preferentially based on stations with three complete years of data. TF/EE influences are removed so that long-term management strategies are not developed based on events that are beyond local or provincial control.

In the Central Interior Air Zone, wildfires are the primary contributor to TF/EE. The methodology for identifying wildfire-influenced data is provided in Appendix I and excluded data are summarized in Appendix II. The summer of 2017 and 2018 were record wildfire seasons for B.C. that burned over 1.2 and 1.35 million hectares of land, respectively. In contrast, the 2019 season was the second least active wildfire season since 2011.

Table 2 summarizes the ozone 8-hour metrics as measured and after TF/EE adjustments. No TF/EE influences were identified. Consequently, the Central Interior Air Zone is assigned a "yellow" management level based on concentrations at Prince George and Williams Lake. This indicates that any ozone-related actions should focus on preventing further air quality deterioration.

Table 2. Summary of ozone metrics and air zone management levels for the Central Interior Air Zone (based on 2017-2019 data).

Location	No. Valid Years	Ozone 8-Hour Metric (4^{th} Highest Daily 8-hour Maximums, ppb)		Air Zone Management Level for Ozone
		As Measured	TF/EE Adjusted	
Prince George	3	51	51	Goal: Preventing Air Quality Deterioration
Williams Lake	3	51	51	
Quesnel	3	50	50	
Smithers	3	48	48	

Table 3 summarizes $PM_{2.5}$ concentrations as measured using the 24-hour and annual metrics, and with TF/EE influences removed for each monitoring site. The Central Interior Air Zone is assigned the highest management level, "red", based on TF/EE-adjusted $PM_{2.5}$ metrics exceeding the national standards at Houston, Valemount, and Vanderhoof. This indicates the need for highest level of air quality management in these communities with activities focused on reducing $PM_{2.5}$ levels to achieve CAAQS. Data completeness at Prince George and Valemount are below the minimum required to report the annual metric, but the 24-hour metrics at Valemount are reported on the basis of exceeding the national standards.

Table 3. Summary of $PM_{2.5}$ metrics and air zone management levels for the Central Interior Air Zone (based on 2017-2019 data).

Location	No. Valid Years	$PM_{2.5}$ 24-Hour Metric (98^{th} Percentile, µg/m^3)		$PM_{2.5}$ Annual Metric (Annual Average, µg/m^3)		Air Zone Management Level for $PM_{2.5}$
		As Measured	TF/EE Adjusted	As Measured	TF/EE Adjusted	
Burns Lake	3	40	21	7.9	7.8	Goal: Achieving the CAAQS
Houston	3	31	30	10	9.7	
Prince George	1	N/A	N/A	N/A	N/A	
Quesnel	3	73	25	13.2	9.7	
Smithers	3	29	27	8.6	8.4	
Valemount	1	105	76*	N/A	N/A	
Vanderhoof	2	74	35	15.2	10.1	
Williams Lake	3	112	20	14.1	7.8	

*Based on 2018 and incomplete 2019 data

Actions to Protect Air Quality

The reduction of $PM_{2.5}$ emissions continues to be a major air quality priority in many areas of B.C., including the Central Interior Air Zone.

In 2016, the Province adopted a new Solid Fuel Burning Domestic Appliance Regulation that requires nearly all wood burning appliances sold in B.C. to be certified to meet particulate emissions standards set by the US Environmental Protection Agency (EPA) in 2015, or standards set by the Canadian Standards Association (CSA) in 2010. The regulation also specifies the types of fuels that can be burnt and has provisions around the sale and installation of outdoor wood boilers. For more information on the regulation, see: https://www2.gov.bc.ca/gov/content/environment/air-land-water/air/air-pollution/smoke-burning/regulations/solid-fuel-burning-domestic-appliance-regulation.

The Provincial Wood Stove Exchange Program encourages residents to change out their older, smoky wood stoves for low-emission appliances including heatpumps, natural gas or pellet stoves, or new emissions-certified wood stoves. Between 2017 and 2019, wood stove change-out programs were active in the Bulkley Valley-Lakes District, Prince George, and Vanderhoof.

The Province has supported several community-led initiatives within the Central Interior Air Zone between 2017 and 2019. A few highlights include:

- the 2017 door-to-door residential wood burning survey conducted in Vanderhoof to inform future air quality initiatives (https://www2.gov.bc.ca/assets/gov/environment/air-land-water/air/reports-pub/vanderhoof_wood-burning_appliance_survey_results-2017.pdf);
- the North Central Clean Air Forum 2018 hosted by the Prince George Airshed Roundtable (https://www.pgairquality.com/uploads/North_Central_Clean_Air_Forum_Summary_Report_2018%20(1).pdf); and
- the Village of Valemount formed a Clean Air Task Force in 2019 and has engaged in airshed management activities including implementation of an anti-idling bylaw, and conducting a residential heating and air quality survey

For additional information on community-led action within the Central Interior Air Zone, please see the following webpages:

- Bulkley Valley-Lakes District Airshed Management Society: https://cleanairplan.ca/the-airshed-management-society/
- Prince George Air Improvement Roundtable (PGAIR): https://www.pgairquality.com/
- Quesnel: https://quesnelairshed.wordpress.com/contact-us/
- Williams Lake Air Quality Roundtable: https://breatheasywilliamslake.org/roundtable/

A description of other activities underway in B.C. air zones can be found in the “Air Zone Management Response for British Columbia” (see: www.gov.bc.ca/bcairquality).

Appendix I – Approach to Identify Wildfire-influenced Data

Summertime air quality in British Columbia is periodically influenced by wildfire smoke – from local fires as well as long-range transport from outside of the province. The wildfire season in B.C. typically occurs between May and September, when warm and dry conditions prevail.

A myriad of different pollutants is emitted from wildfires. These include $PM_{2.5}$ and gases such as nitrogen oxides and volatile organic compounds that can react in the atmosphere to form ground-level ozone and additional $PM_{2.5}$.

Given that smoke-affected areas may be extensive, and that smoke may linger for days before being fully dispersed from an airshed, the current analysis has focussed on those periods when wildfire smoke may have contributed to an exceedance of the CAAQS levels for ground-level ozone or $PM_{2.5}$. Process to flag and assess data for wildfire influence are outlined below:

- Examination of 24-hour $PM_{2.5}$ concentrations in excess of the CAAQS level of 28 $\mu g/m^3$ and/or 8-hour daily maximum ozone concentrations in excess of the CAAQS level of 63 ppb between May and September;
- Identification of wildfires of interest based on data from the B.C. Wildfire Management Branch;
- Review Smoky Skies bulletins that were issued by the Ministry to notify the public of rapidly changing smoke conditions;
- Examine NASA satellite images for evidence of regional smoke impacts; and
- Analysis of data from multiple monitoring sites around the area with elevated pollutant levels, suggesting a common source or contributing source.

Wildfire-influenced data were excluded from the calculation of air zone management levels. Excluded data are as summarized in Appendix II.

Appendix II – Wildfire-influenced Data in the Central Interior Air Zone (2017-2019)

Ozone and $PM_{2.5}$ data from 2017-2019 for the Central Interior Air Zone were evaluated based on the criteria set out in Appendix I for TF/EE influences. Various pieces of evidence were used to support identification of wildfire-influenced periods. These included the following:

- Wildfires of note – either due to size or proximity to populated areas – are tracked by the BC Wildfire Service (see: https://www2.gov.bc.ca/gov/content/safety/wildfire-status/about-bcws/wildfire-history/wildfire-season-summary).
    - In contrast, 2017 (1.22 million hectares) and 2018 (1.35 million hectares ha) were record-breaking years in terms of area of land burned.
    - Several large fires burned in the interior of B.C. in the summers of 2017 and 2018 (see Table II-1 for example). The smoke impacts due to these fires was at times widespread and affected air quality in B.C. and beyond.
- Days flagged as wildfire-influenced (Table II-2) coincided with Smoky Skies Bulletins issued by the Ministry of Environment and Climate Change Strategy.
- Satellite images during this period (see Figures II-1 to II-4) provide additional information on both the number of wildfires and the spatial extent of wildfire smoke in and adjacent to the Central Interior Air Zone.

Table II-1. Examples of notable wildfires in the central interior during 2018.[5]

Date Discovered	Size (ha)	Geographic Location	Description
2017-07-06	191,865	Elephant Hill	Large area spanning near Ashcroft to near B.C. Highway 24 at north end
2017-07-06	5,700	Gustafsen fire	Just west of 100 Mile House
~2017-07-07	545,151	Chilcotin Plateau	Complex of nearly 20 separate fires on Chilcotin Plateau
~2017-07-07	241,160	Hanceville Complex	Complex of fires around Hanceville, Riske Creek, Alexis Creek and surrounding areas
~2017-07-07	31,181	Central Cariboo Complex	Complex of fires around Williams Lake, Soda Creek and surrounding areas
~2017-07-07	33,018	West Chilcotin Complex	Complex of fires that included the 7,368 ha Precipice fire 52 km east of Bella Coola

[5] https://www2.gov.bc.ca/gov/content/safety/wildfire-status/about-bcws/wildfire-history/wildfire-season-summary

Table II-1 continued

Date Discovered	Size (ha)	Geographic Location	Description
2018-07-27	92,412	Fraser Complex - Shovel Lake	6.7 km northwest of Endako; caused by equipment use
2018-07-30	20,813	Fraser Complex-Chutanli Lake	11 km northeast of Tatelkuz Lake; caused by equipment use
2018-07-30	10,2602	Fraser Complex-Tezzeron Lake	106 km northwest of Vanderhoof; lightning-caused
2018-07-31	79,394	Tweedsmuir Complex – Ramsey Creek	Tweedsmuir Provincial Park; lightning-caused
2018-08-01	21,381	Fraser Complex - Island Lake	Adjacent to Island Lake; lightning-caused
2018-08-01	44,817	Tweedsmuir Complex - Dean River	Tweedsmuir Provincial Park; lightning-caused
2018-08-01	12,322	Baezaeko Complex-Shag Creek	Lightning-caused
2018-08-01	8,278	Baezako Complex-Blackwater River	Lightning-caused
2018-08-01	13,433	Baezako Complex-North Baezaeko	South of Kluskoil Lake Park, 85 km west of Quesnel; lightning-caused
2018-08-03	60,631	Tweedsmuir Complex – Pondosy Bay	Tweedsmuir Provincial Park; lightning-caused

Table II-2 – Wildfire-influenced $PM_{2.5}$ data from 2017-2019. All dates shown coincided with a Smoky Skies Bulletin for the area of interest, with exception of those highlighted in red.

Location	Date	Daily $PM_{2.5}$ ($\mu g/m^3$)
Burns Lake	2017-08-08	28.9
Burns Lake	2017-08-09	35.2
Burns Lake	2017-08-10	31.4
Burns Lake	2017-08-11	34.3
Burns Lake	2018-07-31	31.1
Burns Lake	2018-08-10	71.7
Burns Lake	2018-08-11	70.2
Burns Lake	2018-08-12	40.8
Burns Lake	2018-08-14	79
Burns Lake	2018-08-16	178.2

Location	Date	Daily $PM_{2.5}$ ($\mu g/m^3$)
Burns Lake	2018-08-19	33.9
Burns Lake	2018-08-20	83.6
Burns Lake	2018-08-21	883
Burns Lake	2018-08-22	251.2
Burns Lake	2018-08-27	71.7
Burns Lake	2018-09-02	51
Burns Lake	2018-09-04	51.7
Burns Lake	2018-09-05	51.2
Burns Lake	2018-09-06	57.1
Burns Lake	2018-09-07	60

Table II-2 (continued)

Location	Date	Daily $PM_{2.5}$ ($\mu g/m^3$)
Houston	2017-08-08	34.7
Houston	2017-08-09	59
Houston	2017-08-10	63.3
Houston	2017-08-11	48.8
Prince George	2017-07-11	29.6
Prince George	2017-07-18	70.6
Prince George	2017-07-19	48.4
Prince George	2017-07-20	28.7
Prince George	2017-07-29	31.7
Prince George	2017-08-11	53.8
Prince George	2017-08-12	282.5
Prince George	2017-08-13	135.9
Prince George	2017-08-15	34.5
Prince George	2017-08-16	48.1
Prince George	2017-08-17	68
Prince George	2017-08-21	41.6
Prince George	2018-07-25	28.1
Prince George	2018-07-26	30.8
Prince George	2018-07-27	31.4
Prince George	2018-07-28	32.1
Prince George	2018-07-29	28.3
Prince George	2018-08-02	30.5
Prince George	2018-08-07	56.7
Prince George	2018-08-08	102.9
Prince George	2018-08-09	130.5
Prince George	2018-08-10	112.6
Prince George	2018-08-11	45.8
Prince George	2018-08-13	92.2
Prince George	2018-08-15	59.8
Prince George	2018-08-16	151.6
Prince George	2018-08-17	366.2
Prince George	2018-08-18	206.9
Prince George	2018-08-19	128.5
Prince George	2018-08-21	60
Prince George	2018-08-22	276.2
Prince George	2018-08-23	120.1
Prince George	2018-08-24	102.4
Prince George	2018-08-25	88.7
Prince George	2018-08-28	66.7
Prince George	2018-08-29	36.8
Prince George	2018-08-30	33.3
Prince George	2018-08-31	41.1
Prince George	2018-09-01	49.3
Prince George	2018-09-02	39.6
Prince George	2018-09-06	30
Quesnel	2017-07-09	49.9
Quesnel	2017-07-10	31.4
Quesnel	2017-07-11	64.3
Quesnel	2017-07-12	42.9
Quesnel	2017-07-15	62.9
Quesnel	2017-07-18	81.1
Quesnel	2017-07-19	67.5
Quesnel	2017-07-20	64.2
Quesnel	2017-07-26	28.9
Quesnel	2017-07-29	46.9
Quesnel	2017-07-30	35
Quesnel	2017-08-03	34.6
Quesnel	2017-08-11	99.9
Quesnel	2017-08-12	173.4
Quesnel	2017-08-13	115.3
Quesnel	2017-08-14	127.1
Quesnel	2017-08-15	66.5
Quesnel	2017-08-16	73.9
Quesnel	2017-08-17	129.1
Quesnel	2017-08-18	48.2
Quesnel	2017-08-19	33.7
Quesnel	2017-08-20	53.5
Quesnel	2017-08-21	42.4
Quesnel	2017-08-30	63
Quesnel	2017-08-31	53.8
Quesnel	2017-09-01	80.9

Table II-2 (continued)

Location	Date	Daily $PM_{2.5}$ ($\mu g/m^3$)
Quesnel	2017-09-02	38.5
Quesnel	2017-09-06	40.8
Quesnel	2017-09-07	70
Quesnel	2018-07-30	35.6
Quesnel	2018-08-07	96.1
Quesnel	2018-08-08	88.2
Quesnel	2018-08-09	89.9
Quesnel	2018-08-10	136.3
Quesnel	2018-08-11	45.5
Quesnel	2018-08-13	81.8
Quesnel	2018-08-14	118.5
Quesnel	2018-08-15	112.7
Quesnel	2018-08-16	161
Quesnel	2018-08-17	296.3
Quesnel	2018-08-18	185.9
Quesnel	2018-08-19	77.4
Quesnel	2018-08-20	32.3
Quesnel	2018-08-21	43.6
Quesnel	2018-08-22	215.5
Quesnel	2018-08-23	179.4
Quesnel	2018-08-24	157.1
Quesnel	2018-08-25	88.3
Quesnel	2018-08-28	53.3
Quesnel	2018-08-31	45.1
Quesnel	2018-09-01	62.4
Quesnel	2018-09-03	36.8
Smithers	2017-08-09	42.2
Smithers	2017-08-10	62.6
Smithers	2017-08-11	37.1
Smithers	2018-08-20	34.8
Smithers	2018-08-21	127.5
Smithers	2018-09-06	35.4
Valemount	2017-07-10	29.5
Valemount	2017-07-11	59.2
Valemount	2017-07-12	41.5
Valemount	2017-07-18	50.9
Valemount	2017-07-19	75.9

Location	Date	Daily $PM_{2.5}$ ($\mu g/m^3$)
Valemount	2017-07-20	32.3
Valemount	2017-08-12	36.6
Valemount	2017-08-13	75.9
Valemount	2017-08-14	42.3
Valemount	2017-08-15	45.9
Valemount	2017-08-16	52.4
Valemount	2017-08-17	65.7
Valemount	2017-08-18	35.1
Valemount	2017-09-06	34.6
Valemount	2017-09-07	75.8
Valemount	2017-09-08	47.7
Valemount	2018-08-07	62.1
Valemount	2018-08-08	56.4
Valemount	2018-08-09	43.4
Valemount	2018-08-10	111.8
Valemount	2018-08-11	116.1
Valemount	2018-08-14	80.6
Valemount	2018-08-15	103.3
Valemount	2018-08-16	92.2
Valemount	2018-08-17	148.3
Valemount	2018-08-18	126.4
Valemount	2018-08-19	33.4
Valemount	2018-08-21	59.6
Valemount	2018-08-22	83.7
Valemount	2018-08-23	180.8
Valemount	2018-08-24	133.6
Valemount	2018-08-25	113.5
Vanderhoof	2017-07-18	52.2
Vanderhoof	2017-07-19	33.9
Vanderhoof	2017-08-11	68.4
Vanderhoof	2017-08-12	91.9
Vanderhoof	2017-09-07	43.6
Vanderhoof	2018-08-02	32.2
Vanderhoof	2018-08-06	29.9
Vanderhoof	2018-08-07	67.5
Vanderhoof	2018-08-08	86
Vanderhoof	2018-08-09	99.1

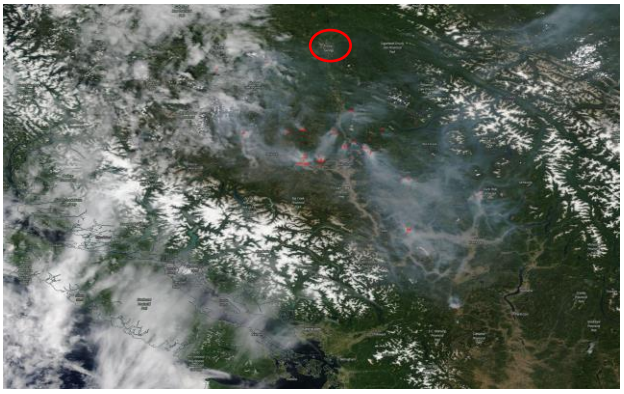
Table II-2 (continued)

Location	Date	Daily $PM_{2.5}$ ($\mu g/m^3$)
Vanderhoof	2018-08-10	78.2
Vanderhoof	2018-08-11	104.1
Vanderhoof	2018-08-12	124.4
Vanderhoof	2018-08-13	73
Vanderhoof	2018-08-14	145.4
Vanderhoof	2018-08-15	194.8
Vanderhoof	2018-08-16	291.3
Vanderhoof	2018-08-17	232.5
Vanderhoof	2018-08-18	124.8
Vanderhoof	2018-08-19	105.8
Vanderhoof	2018-08-20	101.7
Vanderhoof	2018-08-21	220.7
Vanderhoof	2018-08-22	631.5
Vanderhoof	2018-08-23	98.3
Vanderhoof	2018-08-24	151
Vanderhoof	2018-08-25	55.5
Vanderhoof	2018-08-27	39.5
Vanderhoof	2018-08-28	79.9
Vanderhoof	2018-08-29	47.1
Vanderhoof	2018-08-30	57.1
Vanderhoof	2018-08-31	60.6
Vanderhoof	2018-09-01	91.4
Vanderhoof	2018-09-02	39.7
Vanderhoof	2018-09-07	38.8
Williams Lake	2017-07-08	138.8
Williams Lake	2017-07-09	205.5
Williams Lake	2017-07-10	73.1
Williams Lake	2017-07-11	273.3
Williams Lake	2017-07-12	122.4
Williams Lake	2017-07-13	62.8
Williams Lake	2017-07-14	83
Williams Lake	2017-07-15	194.3
Williams Lake	2017-07-16	293.8
Williams Lake	2017-07-17	270.6
Williams Lake	2017-07-18	260.3
Williams Lake	2017-07-19	287.6

Location	Date	Daily $PM_{2.5}$ ($\mu g/m^3$)
Williams Lake	2017-07-20	128.4
Williams Lake	2017-07-25	31.8
Williams Lake	2017-07-26	50.4
Williams Lake	2017-07-27	29
Williams Lake	2017-07-28	37.1
Williams Lake	2017-07-29	57.9
Williams Lake	2017-07-30	59.7
Williams Lake	2017-08-02	43.2
Williams Lake	2017-08-03	124.5
Williams Lake	2017-08-06	95
Williams Lake	2017-08-07	38.2
Williams Lake	2017-08-09	74.9
Williams Lake	2017-08-10	72.5
Williams Lake	2017-08-11	104.3
Williams Lake	2017-08-12	92.5
Williams Lake	2017-08-13	77.4
Williams Lake	2017-08-14	200.1
Williams Lake	2017-08-15	93.4
Williams Lake	2017-08-16	96.1
Williams Lake	2017-08-17	87.4
Williams Lake	2017-08-18	31.5
Williams Lake	2017-08-19	34.7
Williams Lake	2017-08-20	43.7
Williams Lake	2017-08-31	64.8
Williams Lake	2017-09-01	80.7
Williams Lake	2017-09-02	30.3
Williams Lake	2017-09-05	36.8
Williams Lake	2017-09-06	88
Williams Lake	2017-09-07	119.4
Williams Lake	2018-08-06	37.9
Williams Lake	2018-08-09	35.8
Williams Lake	2018-08-10	103.5
Williams Lake	2018-08-11	112.4
Williams Lake	2018-08-12	117.2
Williams Lake	2018-08-13	101.3
Williams Lake	2018-08-14	97.1

Table II-2 (continued)

Location	Date	Daily $PM_{2.5}$ ($\mu g/m^3$)
Williams Lake	2018-08-15	115.4
Williams Lake	2018-08-16	140
Williams Lake	2018-08-17	527.5
Williams Lake	2018-08-18	292.3
Williams Lake	2018-08-19	124.4
Williams Lake	2018-08-21	29.6
Williams Lake	2018-08-22	110.5
Williams Lake	2018-08-23	218.6
Williams Lake	2018-08-24	138.9
Williams Lake	2018-08-25	66.8
Williams Lake	2018-09-01	28.6
Williams Lake	2018-09-03	32.6



a. July 8, 2017

b. July 15, 2017

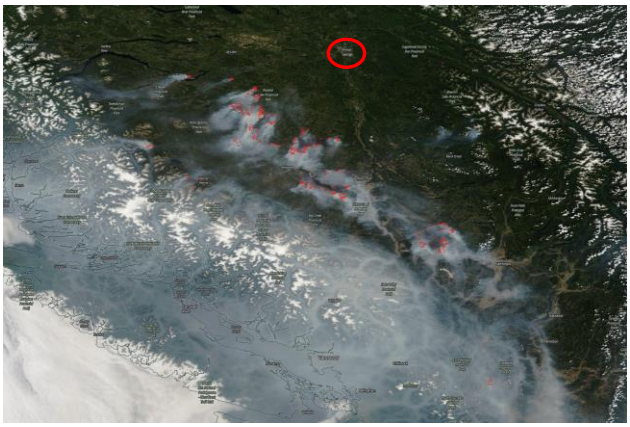
c. July 19, 2017

d. July 29, 2017

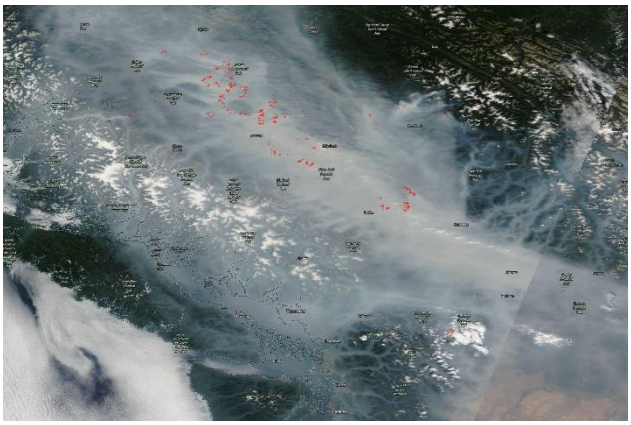
e. July 30, 2017

f. Aug. 3, 2017

Figure II-1. Satellite images from Jul. 8, 15, 19, 29-30 and Aug. 3, 2018, showing smoke (grey plumes) over the province, including the Central Interior Air Zone. Red dots indicate fires and thermal anomalies. Large red circle in Figure II-1(a) identifies approximate location of Prince George on map. Source of images: NASA Worldview Snapshots at: https://worldview.earthdata.nasa.gov/.



a. Aug. 5, 2017

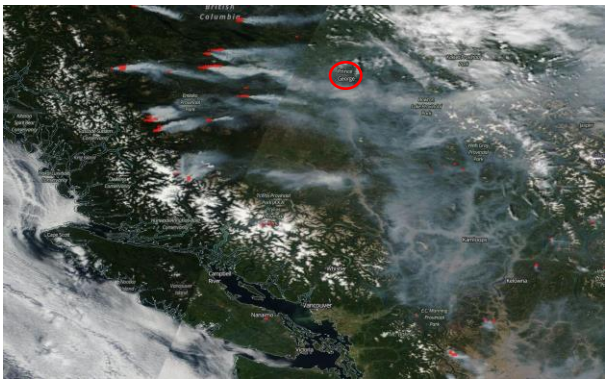


b. Aug. 8, 2018

c. Aug. 17, 2017

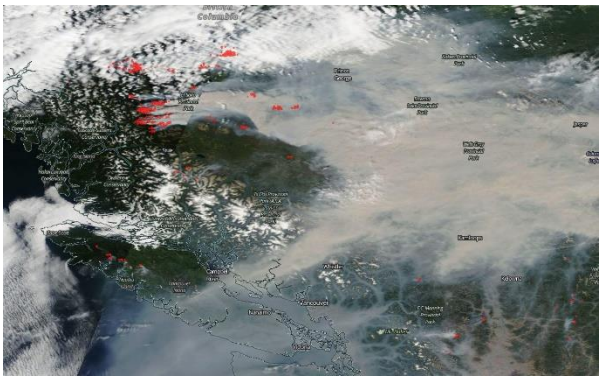
d. Aug. 29, 2017

Figure II-2. Satellite images from Aug. 5, 8, 17 and 29, 2017, showing smoke (grey plumes) over the province, including the Central Interior Air Zone. Red dots indicate fires and thermal anomalies. Large red circle in Figure II-2(a) identifies approximate location of Prince George on map. Source of images: NASA Worldview Snapshots at: https://worldview.earthdata.nasa.gov/.

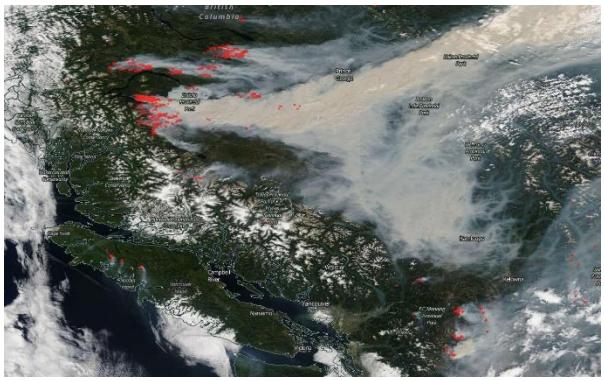


a. Aug. 7, 2018

b. Aug. 10, 2018

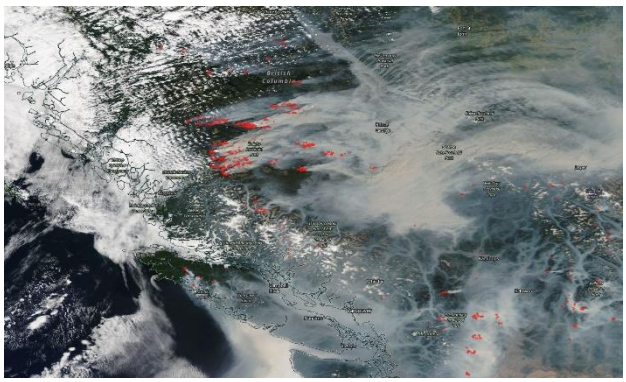


c. Aug. 14, 2018



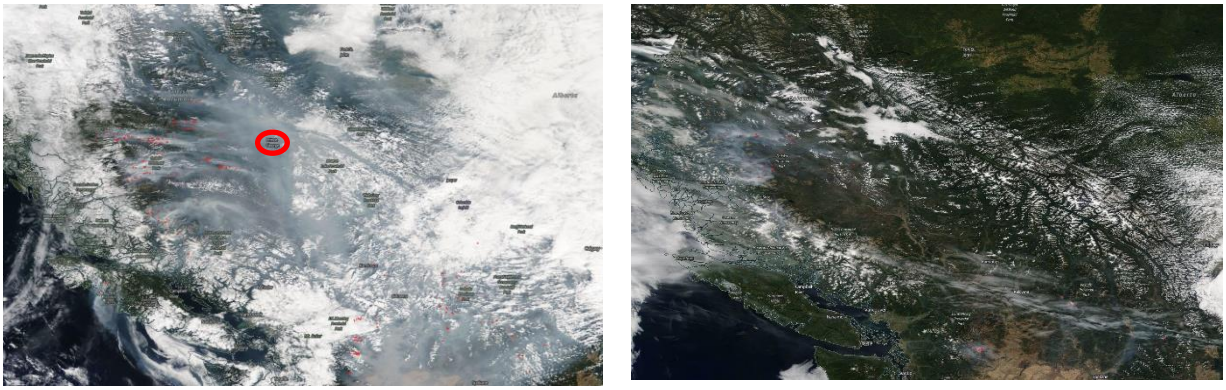
d. Aug. 17, 2018

e. Aug. 20, 2018



f. Aug. 22, 2018

Figure II-3. Satellite images from Aug. 7, 10, 14, 17, 20 and 22, 2018, showing smoke (grey plumes) over the province, including the Central Interior Air Zone. Red dots indicate fires and thermal anomalies. Large red circle in Figure II-3(a) identifies approximate location of Prince George on map. Source of images: NASA Worldview Snapshots at: https://worldview.earthdata.nasa.gov/.



a. Aug. 24, 2018 b. Sept. 4, 2018

Figure II-4. Satellite images from Aug. 24 and Sept 4, 2018, showing smoke (grey plumes) over the province, including the Central Interior Air Zone. Red dots indicate fires and thermal anomalies. Large red circle in Figure II-4(a) identifies approximate location of Prince George on map. Source of images: NASA Worldview Snapshots at: https://worldview.earthdata.nasa.gov/.