Introduction

This is the fifth annual air quality report for the Southern Interior Air Zone. Annual 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 particulates ($PM_{2.5}$), 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 that form the basis for monitoring, reporting and taking action on air quality. The Southern Interior Air Zone (see Figure 1) is one of seven broad air zones across the province. 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 Table 1.

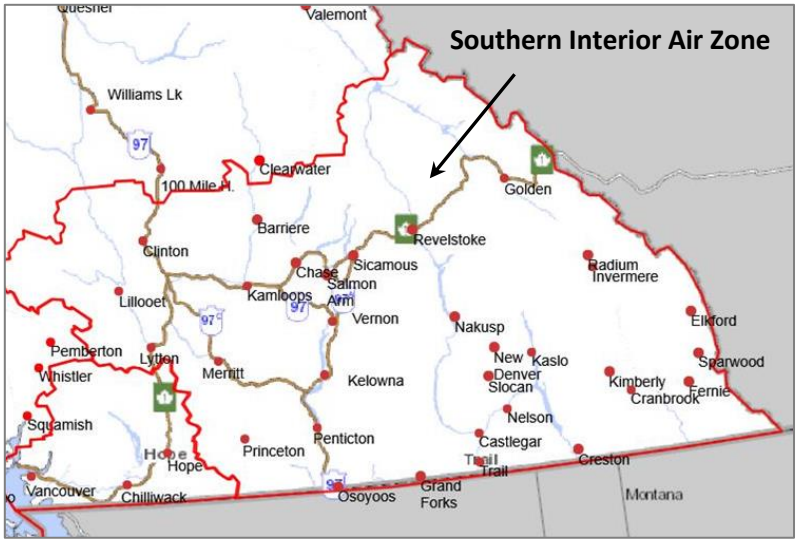


Figure 1. Southern Interior Air Zone.

Table 1. Air zone management framework for ground-level ozone and $PM_{2.5}$. The CAAQS define the upper threshold, separating the "red" and "orange" management levels.

Management Level	O_3 (ppb)		$PM_{2.5}$ – Annual ($\mu g/m^3$)		$PM_{2.5}$ - 24h ($\mu g/m^3$)	
	2015	**2020**	**2015**	**2020**	**2015**	**2020**
Red	Actions for Achieving Air Zone CAAQS					
Threshold (CAAQS)	63	62	10	8.8	28	27
Orange	Actions for Preventing CAAQS Exceedance					
Threshold	56		6.4		19	
Yellow	Actions for Preventing Air Quality Deterioration					
Threshold	50		4		10	
Green	Actions for Keeping Clean Areas Clean					

Ozone Levels

Ozone measurements in the Southern Interior Air Zone are summarized in Figure 2. Concentrations ranged from 45 ppb in Castlegar to 55 ppb in Kelowna.[1] All sites were below the national standard of 63 ppb.

Trends in ozone levels are shown in Figure 3.[2] Concentrations have remained below the level of the national standard throughout this period, with the exception of 2012 in Kelowna, when wildfire smoke led to higher ozone concentrations.[3]

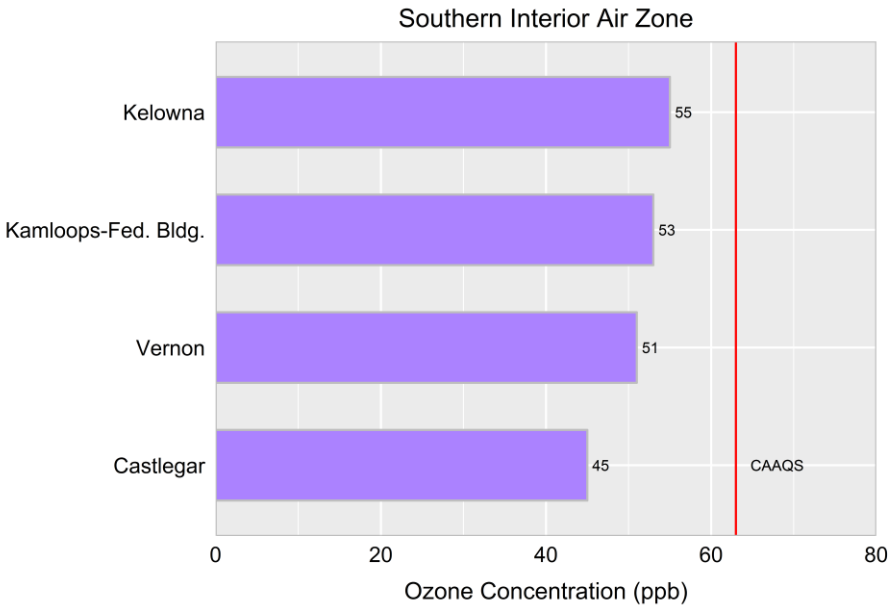


Figure 2. Ozone concentrations in the Southern Interior Air Zone, based on annual 4th highest daily 8-hour maxima, averaged over 2015-2017. Red dashed line identifies the CAAQS of 63 ppb.

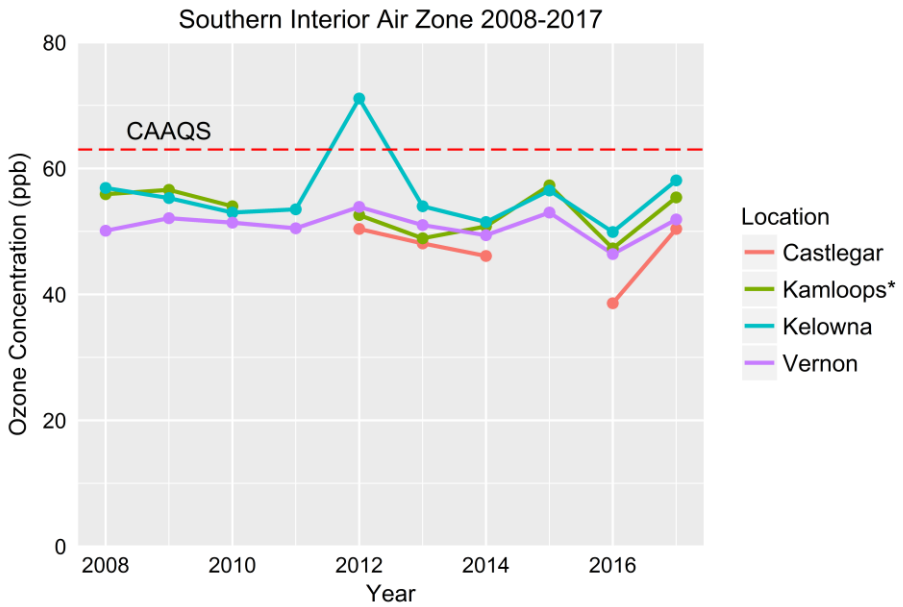


Figure 3. Trends in ozone concentrations (2008-2017), based on annual 4th highest daily 8-hour maxima for a single year. Red dashed line identifies CAAQS of 63 ppb. Asterisk (*) flags combined dataset from multiple sites in Kamloops.

[1] Concentrations based on 4th highest daily 8-hour maximum, averaged over three years (2015-2017).
[2] Concentrations based on 4th highest daily 8-hour maximum, averaged over a single year.
[3] Teakles, A.D., So, Rita, Ainslie, B. et al. (2017) Impacts of the July 2012 Siberian fire plume on air quality in the Pacific Northwest. Atmos. Chem. Phys. 17, pp. 2593-2611.

$PM_{2.5}$ Levels

$PM_{2.5}$ refers to inhalable particles up to 2.5 micrometres in diameter. $PM_{2.5}$ measurements are summarized in Figure 4. A distinction is made between data collected using the new Federal Equivalent Method (FEM) technology and the older TEOM instruments that are being phased out. The FEMs are the preferred instrument as they provide a more complete measure of $PM_{2.5}$ than the TEOMs.

Daily concentrations (upper plot) ranged from 25 µg/m^3 in Grand Forks to 83 µg/m^3 in Kamloops.[4] In addition to Kamloops, other communities that exceeded the national standard of 28 µg/m^3 included Lavington, Vernon, Kelowna and Golden. Wildfire smoke is believed to have been a major factor in the elevated $PM_{2.5}$ levels.

Annual concentrations (lower plot) ranged from 7.7 µg/m^3 in Grand Forks to 10.5 µg/m^3 in Kamloops.[5] All monitoring sites achieved the national standard of 10 µg/m^3, with the exception of Kamloops.

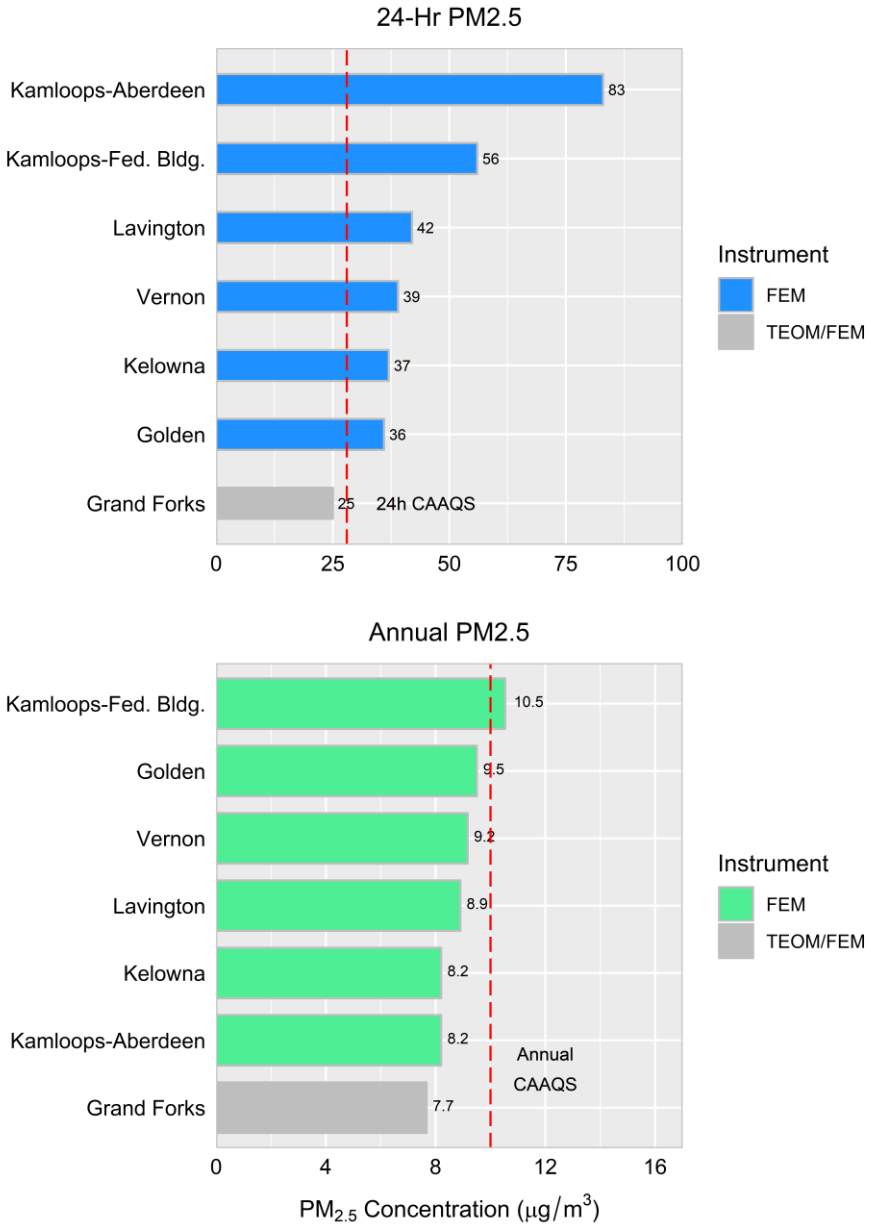


Figure 4. $PM_{2.5}$ concentrations in Southern Interior Air Zone. Upper plot based on 24-hour concentration (annual 98th percentile, averaged over 2015-2017). Lower plot based on annual mean concentration (averaged over 2015-2017). Red dashed lines identify CAAQS of 28 µg/m^3 (upper plot) and 10 µg/m^3 (lower plot).

[4] Concentrations based on the annual 98th percentile of 24-hour values, averaged over three years (2015-2017).
[5] Concentrations based on the annual average of 24-hour values, averaged over three years (2015-2017).

Trends in annual mean $PM_{2.5}$ concentrations between 2008 and 2017 are shown in Figure 5 for a subset of these sites.[6] A shift to higher reported concentrations is seen with the change from TEOM to FEM instruments from about 2010 onward. Among the monitoring sites still operating in 2017, the highest concentrations over the ten-year period were uniformly observed in 2017.

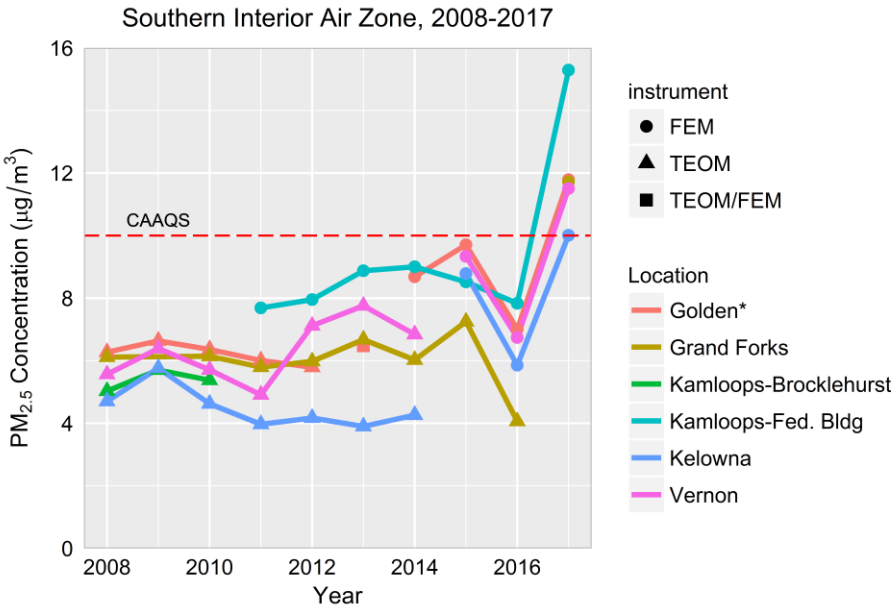


Figure 5. Trends in $PM_{2.5}$ concentrations (2008-2017), based on annual mean concentrations from a single year. The CAAQS value of 10 µg/m^3 is shown by the dashed line. $PM_{2.5}$ measurements prior to 2011 are reported at 25°C and 1 atm. From 2011 onward, measurements are reported at local conditions. Asterisk (*) flags combined dataset from more than one site in community.

Air Zone Management Levels

Air zone management levels are assigned on the basis of the highest concentrations within an air zone, excluding contributions from transboundary flows (TF) and exceptional events (EE) such as wildfires. This is done so that long-term management strategies are not developed on the basis of events that are beyond local or provincial control.

In the Southern 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 summers of 2015 and 2017 were characterized by hot, dry conditions and an above-average number of hectares burned compared to 2016. These fires created smoky conditions and periods of degraded air quality in several communities across the air zone.

[6] Concentrations based on the annual average of 24-hour values over a single year.

Table 2 summarizes the as-measured concentrations for ground-level ozone and the management levels after consideration of TF/EE influences (none were identified). The Southern Interior Air Zone is assigned a "yellow" management level based on ozone concentrations in Kamloops and Kelowna. This indicates that ozone-related actions should focus on preventing further air quality deterioration.

Table 2. Summary of ozone concentrations as measured and air zone management levels for the Southern Interior Air Zone (based on 2015-2017 data).

Location	No. Valid Years	4th Highest Daily 8-hour Maxima		Air Zone Management Level
		As Measured	TF/EE Influences Removed	
Castlegar	2	45	42	Goal: Preventing Air Quality Deterioration
Kamloops	3	53	53	
Kelowna	3	55	55	
Vernon	3	51	51	

Table 3 summarizes $PM_{2.5}$ concentrations as measured and with TF/EE influences removed for each monitoring site (see Appendix II for more information on excluded data). The impact of removing such data changed management levels for Golden, Kamloops, Lavington and Vernon from "red" to "orange" or "yellow". The Southern Interior Air Zone is assigned an "orange" management level, based largely on annual concentrations across the region. This indicates that $PM_{2.5}$-related activities would be appropriate to prevent future CAAQS exceedances.

Table 3. Summary of $PM_{2.5}$ concentrations as measured and air zone management levels for the Southern Interior Air Zone (based on 2015-2017 data).

Location	Monitor Type	No. Valid Years	Daily Mean (98th Percentile)		Annual Mean		Air Zone Management Level
			As Measured	TF/EE Removed	As Measured	TF/EE Removed	
Castlegar	FEM	1	NA	NA	NA	NA	Goal: Preventing CAAQS Exceedance
Golden	FEM	3	36	20	9.5	7.9	
Grand Forks	TEOM/ FEM	3	25	18	7.7	6.4	
Kamloops-Fed. Bldg	FEM	3	56	19	10.5	7.7	
Kamloops-Aberdeen	FEM	2	83	13	8.2	3.8	
Kelowna	FEM	3	37	18	8.2	6.6	
Lavington	FEM	2	42	21	8.9	7.2	
Vernon	FEM	3	39	20	9.2	7.6	

Actions to Protect Air Quality

The reduction of smoke-related $PM_{2.5}$ emissions has been a priority in a number of communities across the Southern Interior Air Zone for the past several years. Strategies and actions to reduce $PM_{2.5}$ emissions have been documented in local airshed plans that have been developed and implemented for the Central Okanagan Regional District,[7] City of Kamloops,[8] the Boundary airshed,[9] and Merritt.[10] Golden is host to an active air quality committee.[11]

Between 2015-2017, wood stove change-out programs were supported in the Regional Districts of Kootenay-Boundary, Central Kootenay and Okanagan-Similkameen as well as in Kimberly, Cranbrook and Golden to encourage residents to change out their older, smoky wood stoves for low-emission appliances. Funding support is also being provided to the District of Coldstream in 2017.

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).

[7] http://www.regionaldistrict.com/media/217275/RDCO_2015_Clean_Air_Strategy_Final_DRAFT_2015_02_03_final.pdf

[8] http://www.kamloops.ca/environment/pdfs/13-05-AirshedManagementPlan.pdf

[9] http://www.grandforks.ca/air/aqmplans/GrandForksAQMP-Oct22.pdf

[10] http://www.env.gov.bc.ca/epd/bcairquality/reports/pdfs/merritt_aqmp.pdf

[11] http://www.goldenairquality.ca/

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 are emitted from wildfires, including $PM_{2.5}$ and gases that include 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 $PM_{2.5}$ or ozone. Criteria used to flag and evaluate wildfire-influenced data included the following:

- 24-hour $PM_{2.5}$ concentrations exceeded the CAAQS level of 28 $\mu g/m^3$ or 8-hour daily maximum ozone concentrations exceeded the CAAQS level of 63 ppb between May and September,
- Wildfires of interest were identified based on data from B.C. Wildfire Management Branch,
- Wildfire smoke advisories had been issued by the Ministry of Environment & Climate Change Strategy during the period of interest,
- NASA satellite images indicated smoke impacts over the region,
- Back-trajectory analyses indicate that air parcel over area may have passed over wildfires,
- Multiple monitoring sites in the area of concern exhibited similar air quality characteristics, suggesting a common source or contributing source, and
- Modelling studies identify enhanced pollutant concentrations due to wildfire smoke.

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 Southern Interior Air Zone (2015-2017)

Ozone and $PM_{2.5}$ data from 2015-2017 for the Southern Interior Air Zone were evaluated based on the criteria set out in Appendix I for TF/EE influences. Supporting evidence included the following:

- Several wildfires of note – either due to size or proximity to populated areas – occurred within or adjacent to the Southern Interior Air Zone in 2015 and 2017 (see Table II-1). These included the Rock Creek, Testalinden Creek and Stickpin wildfires in 2015, and the Elephant Hill wildfire in 2017.
- 2017 also saw huge wildfires to the north of the air zone. This included the Plateau Complex (545,000 ha) and Hanceville Complex (241,000 ha) fires that burned over much of the summer and contributed to smoky skies in B.C. and beyond.
- Days flagged as potentially wildfire-influenced generally coincided with or preceded smoke-related bulletins issued by the Ministry of Environment & Climate Change Strategy (see Tables II-2 and II-3).
- Satellite images during these periods showed smoky plumes over much of southern B.C. (see Figures II-1, 2 and 3), including the Southern Interior Air Zone.

Table II-1. Summary of notable wildfires in the southern interior between 2015-2017.[12]

Date Discovered	Size (ha)	Geographic Location	Description
5 Aug 2015	560	Westside Rd	West side of Okanagan Lake, above Westside Rd
11 Aug 2015	21,965	Stickpin (Washington State)	About 5km south of US/Canada border near Grand Forks
14 Aug 2015	5,133	Testalinden Creek	6 km west of Oliver
06 Jul 2017	191,865	Elephant Hill	Spanned from near Ashcroft at south end to near Hwy 24 at north end
07 Jul 2017	3,278	Princeton	10 km northeast of Princeton
23 Jul 2017	12,453	Diamond Creek	In Ashnola Valley; part of larger fire in the U.S. in the Okanogan/Wenatchee National Forest that crossed into B.C.
24 Aug 2017	465	Philpott Rd	20 km east of Kelowna
2 Sep 2017	2,224	Finlay Creek	7.5 km southwest of Peachland

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

Table II-2. Wildfire-influenced $PM_{2.5}$ data (2015).

Location	Date	24-Hr $PM_{2.5}$ ($\mu g/m^3$)	Wildfire Smoke-related Air Quality Advisory?
Kelowna College	2015-07-07	30.1	Y
Vernon Science Centre	2015-07-07	28.9	Y
Kamloops Federal Building	2015-07-10	38.3	Y
Creston PC School	2015-08-14	31.3	
Grand Forks City Hall	2015-08-14	29.5	
Castlegar Zinio Park	2015-08-15	47.7	Y
Creston PC School	2015-08-15	33.5	Y
Castlegar Zinio Park	2015-08-19	41.6	
Grand Forks City Hall	2015-08-19	55	
Castlegar Zinio Park	2015-08-20	95.3	Y
Creston PC School	2015-08-20	91.1	Y
Grand Forks City Hall	2015-08-20	84.6	Y
Grand Forks City Hall	2015-08-22	28.5	Y
Castlegar Zinio Park	2015-08-23	53.6	Y
Kamloops Federal Building	2015-08-23	78.9	T
Kelowna College	2015-08-23	294.5	Y
Vernon Science Centre	2015-08-23	142.7	Y
Castlegar Zinio Park	2015-08-24	117	Y
Creston PC School	2015-08-24	77.3	Y
Kamloops Federal Building	2015-08-24	45.4	Y
Kelowna College	2015-08-24	183.5	Y
Vernon Science Centre	2015-08-24	103.8	Y
Castlegar Zinio Park	2015-08-25	165.8	Y
Creston PC School	2015-08-25	76.7	Y
Grand Forks City Hall	2015-08-25	311.8	Y
Kelowna College	2015-08-25	43.3	Y
Vernon Science Centre	2015-08-25	31.8	Y
Castlegar Zinio Park	2015-08-26	126.7	Y
Creston PC School	2015-08-26	70.3	Y
Grand Forks City Hall	2015-08-26	241.7	Y
Kelowna College	2015-08-26	79.6	Y
Vernon Science Centre	2015-08-26	72.8	Y
Castlegar Zinio Park	2015-08-27	125.5	Y
Grand Forks City Hall	2015-08-27	250.8	Y
Kelowna College	2015-08-27	53.7	Y
Vernon Science Centre	2015-08-27	68.7	Y
Castlegar Zinio Park	2015-08-28	137	Y
Grand Forks City Hall	2015-08-28	165.1	Y

Table II-2 (continued).

Location	Date	24-Hr $PM_{2.5}$ ($\mu g/m^3$)	Wildfire Smoke-related Air Quality Advisory?
Kelowna College	2015-08-28	29.2	Y
Vernon Science Centre	2015-08-28	41.6	Y
Castlegar Zinio Park	2015-08-29	47.2	Y
Kelowna College	2015-08-29	36.9	Y
Vernon Science Centre	2015-08-29	34.2	Y
Grand Forks City Hall	2015-09-12	29.6	

Table II-3. Wildfire-influenced $PM_{2.5}$ data (2017).

Location	Date	24-Hr $PM_{2.5}$ ($\mu g/m^3$)	Wildfire Smoke-related Air Quality Advisory?
Kamloops Aberdeen	2017-07-08	63.9	Y
Kamloops Federal Building	2017-07-08	51.3	Y
Kamloops Aberdeen	2017-07-10	157.9	Y
Kamloops Federal Building	2017-07-10	141.7	Y
Lavington Baptist Church	2017-07-10	59.7	Y
Vernon Science Centre	2017-07-10	60.7	Y
Golden Helipad	2017-07-11	45.7	Y
Grand Forks City Hall	2017-07-11	35.6	Y
Grand Forks City Hall	2017-07-11	30.7	Y
Kamloops Aberdeen	2017-07-11	127	Y
Kamloops Federal Building	2017-07-11	117.1	Y
Lavington Baptist Church	2017-07-11	67.5	Y
Vernon Science Centre	2017-07-11	82	Y
Golden Helipad	2017-07-12	43.2	Y
Lavington Baptist Church	2017-07-12	31.6	Y
Golden Helipad	2017-07-16	41.9	Y
Kamloops Aberdeen	2017-07-16	51.5	Y
Kamloops Federal Building	2017-07-16	51.4	Y
Vernon Science Centre	2017-07-16	28.3	Y
Castlegar Zinio Park	2017-07-17	45.4	Y
Golden Helipad	2017-07-17	50.5	Y
Grand Forks City Hall	2017-07-17	45	Y
Grand Forks City Hall	2017-07-17	38.3	Y
Kamloops Aberdeen	2017-07-17	161.8	Y

Table II-3 (continued)

Location	Date	24-Hr $PM_{2.5}$ ($\mu g/m^3$)	Wildfire Smoke-related Air Quality Advisory?
Kamloops Federal Building	2017-07-17	153.5	Y
Lavington Baptist Church	2017-07-17	59.8	Y
Vernon Science Centre	2017-07-17	64	Y
Castlegar Zinio Park	2017-07-18	39.2	Y
Golden Helipad	2017-07-18	76.2	Y
Grand Forks City Hall	2017-07-18	37.2	Y
Grand Forks City Hall	2017-07-18	35.2	Y
Kamloops Aberdeen	2017-07-18	66.7	Y
Kamloops Federal Building	2017-07-18	73.9	Y
Lavington Baptist Church	2017-07-18	49.9	Y
Vernon Science Centre	2017-07-18	53.4	Y
Golden Helipad	2017-07-19	79.6	Y
Kamloops Aberdeen	2017-07-28	51.8	Y
Kamloops Federal Building	2017-07-28	42.5	Y
Golden Helipad	2017-07-31	36.5	Y
Kamloops Aberdeen	2017-07-31	100.7	Y
Kamloops Federal Building	2017-07-31	91	Y
Lavington Baptist Church	2017-07-31	40.4	Y
Vernon Science Centre	2017-07-31	42.6	Y
Castlegar Zinio Park	2017-08-01	49.3	Y
Golden Helipad	2017-08-01	34.2	Y
Grand Forks City Hall	2017-08-01	60.6	Y
Grand Forks City Hall	2017-08-01	52.1	Y
Kamloops Aberdeen	2017-08-01	116.1	Y
Kamloops Federal Building	2017-08-01	84.8	Y
Lavington Baptist Church	2017-08-01	59.3	Y
Vernon Science Centre	2017-08-01	61.1	Y
Castlegar Zinio Park	2017-08-02	45.1	Y
Grand Forks City Hall	2017-08-02	54.4	Y
Grand Forks City Hall	2017-08-02	51.7	Y
Kamloops Aberdeen	2017-08-02	142.5	Y
Kamloops Federal Building	2017-08-02	111.2	Y
Lavington Baptist Church	2017-08-02	30.1	Y
Nelson Kutenai Place	2017-08-02	44.2	Y

Table II-3 (continued)

Location	Date	24-Hr $PM_{2.5}$ ($\mu g/m^3$)	Wildfire Smoke-related Air Quality Advisory?
Castlegar Zinio Park	2017-08-03	36.9	Y
Golden Helipad	2017-08-03	40.6	Y
Grand Forks City Hall	2017-08-03	28.8	Y
Kamloops Aberdeen	2017-08-03	206.3	Y
Kamloops Federal Building	2017-08-03	274.4	Y
Lavington Baptist Church	2017-08-03	43.6	Y
Nelson Kutenai Place	2017-08-03	52.1	Y
Vernon Science Centre	2017-08-03	45.2	Y
Castlegar Zinio Park	2017-08-04	30.5	Y
Grand Forks City Hall	2017-08-04	33.8	Y
Grand Forks City Hall	2017-08-04	30.5	Y
Kamloops Aberdeen	2017-08-04	81.1	Y
Kamloops Federal Building	2017-08-04	67.7	Y
Lavington Baptist Church	2017-08-04	39	Y
Nelson Kutenai Place	2017-08-04	48.3	Y
Vernon Science Centre	2017-08-04	38.6	Y
Kamloops Aberdeen	2017-08-05	182.4	Y
Kamloops Federal Building	2017-08-05	105.2	Y
Nelson Kutenai Place	2017-08-05	38.6	Y
Grand Forks City Hall	2017-08-06	35.5	Y
Grand Forks City Hall	2017-08-06	30	Y
Kamloops Aberdeen	2017-08-06	211.5	Y
Kamloops Federal Building	2017-08-06	209.6	Y
Lavington Baptist Church	2017-08-06	35.4	Y
Nelson Kutenai Place	2017-08-06	34.6	Y
Vernon Science Centre	2017-08-06	32.6	Y
Castlegar Zinio Park	2017-08-07	34.5	Y
Golden Helipad	2017-08-07	52.2	Y
Grand Forks City Hall	2017-08-07	51.1	Y
Grand Forks City Hall	2017-08-07	46.2	Y
Kamloops Aberdeen	2017-08-07	193.7	Y
Kamloops Federal Building	2017-08-07	187.5	Y
Lavington Baptist Church	2017-08-07	75.4	Y
Nelson Kutenai Place	2017-08-07	39.9	Y

Table II-3 (continued)

Location	Date	24-Hr $PM_{2.5}$ ($\mu g/m^3$)	Wildfire Smoke-related Air Quality Advisory?
Vernon Science Centre	2017-08-07	72.2	Y
Castlegar Zinio Park	2017-08-08	50.4	Y
Golden Helipad	2017-08-08	52.9	Y
Grand Forks City Hall	2017-08-08	50.9	Y
Grand Forks City Hall	2017-08-08	40.4	Y
Kamloops Aberdeen	2017-08-08	157.6	Y
Kamloops Federal Building	2017-08-08	130.2	Y
Lavington Baptist Church	2017-08-08	84.8	Y
Nelson Kutenai Place	2017-08-08	63.1	Y
Vernon Science Centre	2017-08-08	71.5	Y
Castlegar Zinio Park	2017-08-09	45.9	Y
Golden Helipad	2017-08-09	41.5	Y
Grand Forks City Hall	2017-08-09	38.2	Y
Kamloops Aberdeen	2017-08-09	183.5	Y
Kamloops Federal Building	2017-08-09	183.2	Y
Lavington Baptist Church	2017-08-09	75	Y
Nelson Kutenai Place	2017-08-09	50.9	Y
Vernon Science Centre	2017-08-09	68.8	Y
Castlegar Zinio Park	2017-08-10	46.4	Y
Grand Forks City Hall	2017-08-10	55	Y
Grand Forks City Hall	2017-08-10	49	Y
Kamloops Aberdeen	2017-08-10	210	Y
Kamloops Federal Building	2017-08-10	189.3	Y
Lavington Baptist Church	2017-08-10	77.3	Y
Nelson Kutenai Place	2017-08-10	56.5	Y
Vernon Science Centre	2017-08-10	70	Y
Castlegar Zinio Park	2017-08-11	45.1	Y
Grand Forks City Hall	2017-08-11	42.5	Y
Grand Forks City Hall	2017-08-11	45.5	Y
Kamloops Aberdeen	2017-08-11	73.6	Y
Kamloops Federal Building	2017-08-11	82	Y
Lavington Baptist Church	2017-08-11	60.5	Y
Nelson Kutenai Place	2017-08-11	68.3	Y
Vernon Science Centre	2017-08-11	60.3	Y

Table II-3 (continued)

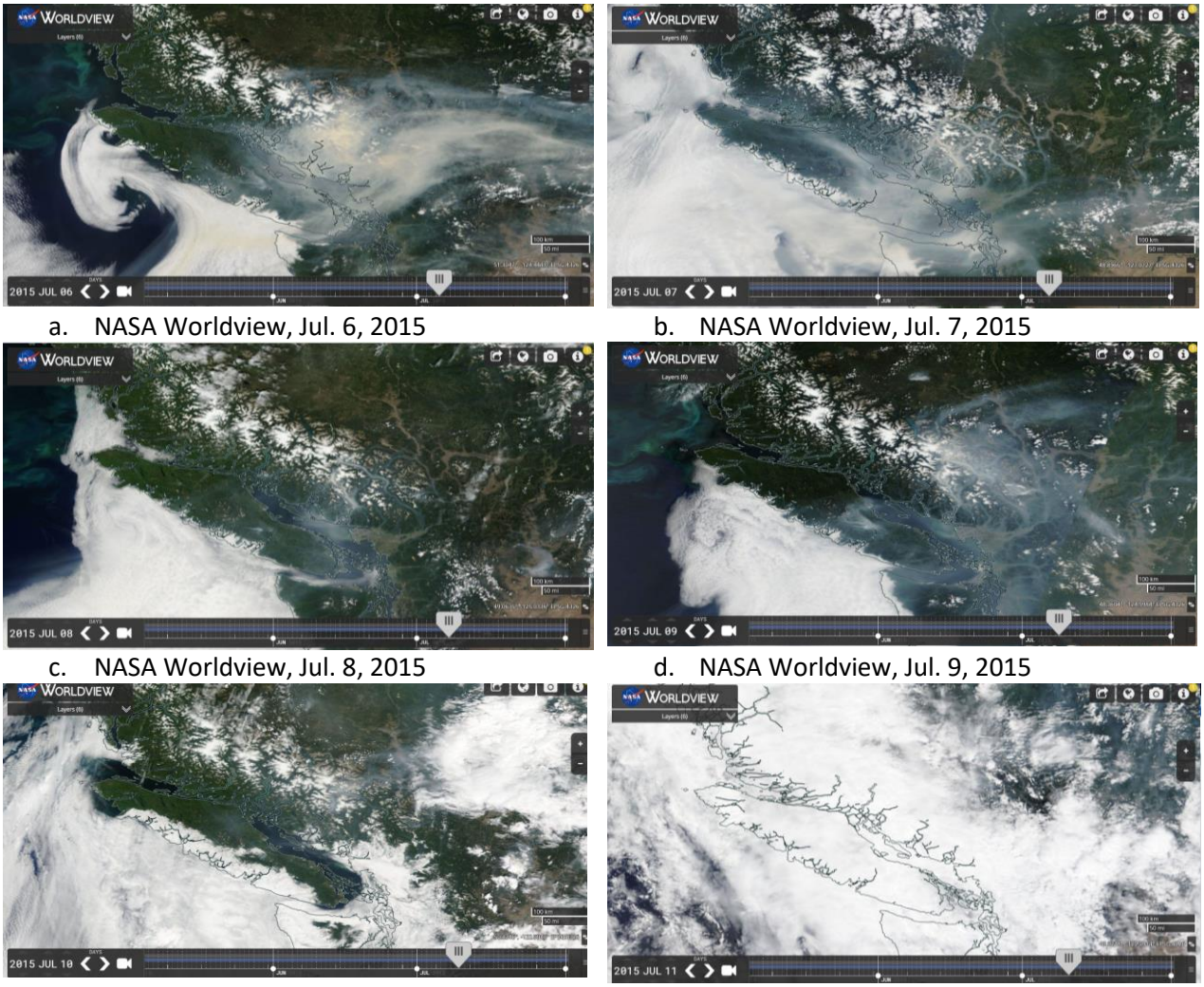
Location	Date	24-Hr $PM_{2.5}$ ($\mu g/m^3$)	Wildfire Smoke-related Air Quality Advisory?
Castlegar Zinio Park	2017-08-12	38.6	Y
Golden Helipad	2017-08-12	29	Y
Grand Forks City Hall	2017-08-12	28.1	Y
Kamloops Aberdeen	2017-08-12	30.7	Y
Kamloops Federal Building	2017-08-12	32.8	Y
Lavington Baptist Church	2017-08-12	35	Y
Nelson Kutenai Place	2017-08-12	55.7	Y
Vernon Science Centre	2017-08-12	34.5	Y
Golden Helipad	2017-08-13	29.4	Y
Golden Helipad	2017-08-14	32.3	Y
Kamloops Aberdeen	2017-08-14	84	Y
Kamloops Federal Building	2017-08-14	77.2	Y
Lavington Baptist Church	2017-08-14	42.2	Y
Vernon Science Centre	2017-08-14	38.8	Y
Castlegar Zinio Park	2017-08-15	42	Y
Golden Helipad	2017-08-15	62.9	Y
Grand Forks City Hall	2017-08-15	34	Y
Grand Forks City Hall	2017-08-15	29.9	Y
Kamloops Aberdeen	2017-08-15	52.6	Y
Kamloops Federal Building	2017-08-15	55.1	Y
Lavington Baptist Church	2017-08-15	67.4	Y
Nelson Kutenai Place	2017-08-15	46.1	Y
Vernon Science Centre	2017-08-15	71	Y
Golden Helipad	2017-08-16	76.9	Y
Golden Helipad	2017-08-17	44.3	Y
Kamloops Aberdeen	2017-08-19	47.5	Y
Kamloops Federal Building	2017-08-19	36	Y
Lavington Baptist Church	2017-08-19	35	Y
Vernon Science Centre	2017-08-19	36.2	Y
Kamloops Federal Building	2017-08-20	30	Y
Golden Helipad	2017-08-21	42.9	Y
Grand Forks City Hall	2017-08-22	72.2	Y
Grand Forks City Hall	2017-08-23	44	Y
Nelson Kutenai Place	2017-08-27	30.4	Y

Table II-3 (continued)

Location	Date	24-Hr $PM_{2.5}$ ($\mu g/m^3$)	Wildfire Smoke-related Air Quality Advisory?
Nelson Kutenai Place	2017-08-28	42.6	Y
Castlegar Zinio Park	2017-08-29	35.1	Y
Grand Forks City Hall	2017-08-29	30.9	Y
Lavington Baptist Church	2017-08-29	37.5	Y
Nelson Kutenai Place	2017-08-29	60.9	Y
Vernon Science Centre	2017-08-29	31.9	Y
Castlegar Zinio Park	2017-08-30	53.6	Y
Golden Helipad	2017-08-30	54.2	Y
Grand Forks City Hall	2017-08-30	38.6	Y
Grand Forks City Hall	2017-08-30	33.5	Y
Lavington Baptist Church	2017-08-30	34	Y
Nelson Kutenai Place	2017-08-30	65.1	Y
Vernon Science Centre	2017-08-30	30.5	Y
Castlegar Zinio Park	2017-08-31	29.3	Y
Golden Helipad	2017-08-31	48	Y
Kamloops Aberdeen	2017-08-31	58.3	Y
Kamloops Federal Building	2017-08-31	63.2	Y
Lavington Baptist Church	2017-08-31	35.7	Y
Nelson Kutenai Place	2017-08-31	28.6	Y
Vernon Science Centre	2017-08-31	36.5	Y
Golden Helipad	2017-09-01	32.1	Y
Kamloops Federal Building	2017-09-01	52.2	Y
Kamloops Aberdeen	2017-09-02	59.2	Y
Kamloops Federal Building	2017-09-02	63.4	Y
Nelson Kutenai Place	2017-09-02	29.1	Y
Kamloops Aberdeen	2017-09-03	128.3	Y
Kamloops Federal Building	2017-09-03	79.6	Y
Lavington Baptist Church	2017-09-03	37.3	Y
Vernon Science Centre	2017-09-03	43.9	Y
Grand Forks City Hall	2017-09-04	32.8	Y
Kamloops Aberdeen	2017-09-04	72.6	Y
Kamloops Federal Building	2017-09-04	39.8	Y
Nelson Kutenai Place	2017-09-04	69.6	Y
Castlegar Zinio Park	2017-09-05	68.9	Y

Table II-3 (continued)

Location	Date	24-Hr $PM_{2.5}$ ($\mu g/m^3$)	Wildfire Smoke-related Air Quality Advisory?
Golden Helipad	2017-09-05	78.5	Y
Grand Forks City Hall	2017-09-05	85.3	Y
Nelson Kutenai Place	2017-09-05	158.9	Y
Castlegar Zinio Park	2017-09-06	73.4	Y
Golden Helipad	2017-09-06	117.8	Y
Grand Forks City Hall	2017-09-06	99.1	Y
Kamloops Aberdeen	2017-09-06	62.2	Y
Kamloops Federal Building	2017-09-06	51.4	Y
Lavington Baptist Church	2017-09-06	51.8	Y
Nelson Kutenai Place	2017-09-06	148.2	Y
Vernon Science Centre	2017-09-06	45.8	Y
Castlegar Zinio Park	2017-09-07	74.2	Y
Golden Helipad	2017-09-07	100.2	Y
Grand Forks City Hall	2017-09-07	94.5	Y
Kamloops Aberdeen	2017-09-07	106.6	Y
Kamloops Federal Building	2017-09-07	87.5	Y
Lavington Baptist Church	2017-09-07	69.6	Y
Nelson Kutenai Place	2017-09-07	129.7	Y
Vernon Science Centre	2017-09-07	62.1	Y
Castlegar Zinio Park	2017-09-08	98	Y
Golden Helipad	2017-09-08	112.1	Y
Grand Forks City Hall	2017-09-08	104.2	Y
Kamloops Aberdeen	2017-09-08	59.3	Y
Kamloops Federal Building	2017-09-08	71.8	Y
Lavington Baptist Church	2017-09-08	79	Y
Nelson Kutenai Place	2017-09-08	131	Y
Vernon Science Centre	2017-09-08	74.6	Y
Castlegar Zinio Park	2017-09-09	38.4	Y
Golden Helipad	2017-09-09	41.9	Y
Grand Forks City Hall	2017-09-09	39	Y
Nelson Kutenai Place	2017-09-09	47.6	Y
Grand Forks City Hall	2017-09-16	28.8	N
Kamloops Aberdeen	2017-09-17	43.2	N
Kamloops Federal Building	2017-09-17	34	N



a. NASA Worldview, Jul. 6, 2015

b. NASA Worldview, Jul. 7, 2015

c. NASA Worldview, Jul. 8, 2015

d. NASA Worldview, Jul. 9, 2015

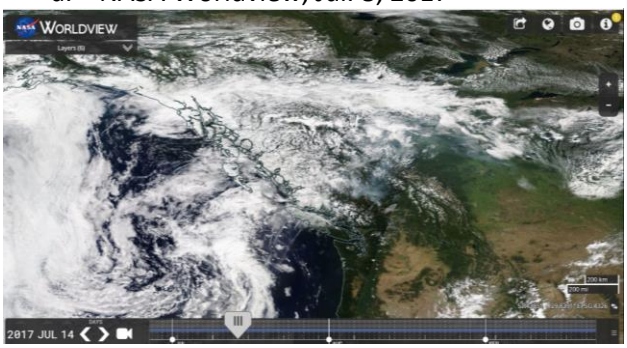
e. NASA Worldview, Jul. 10, 2015

f. NASA Worldview, Jul. 11, 2015

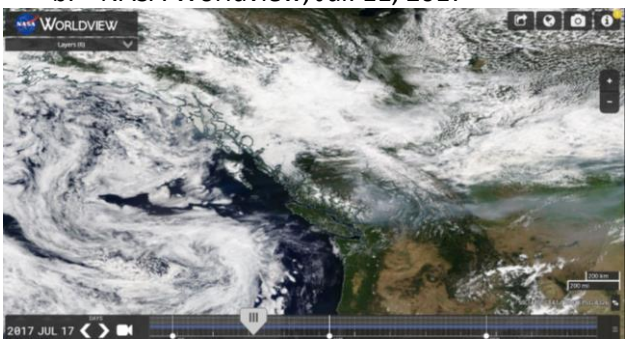
Figure II-1. Satellite images covering Jul. 6-11, 2015, showing wildfire smoke (grey plumes) over southwestern B.C., including the Southern Interior Air Zone. Source of images: NASA Worldview at: https://worldview.earthdata.nasa.gov/.

a. NASA Worldview, Jul. 8, 2017

b. NASA Worldview, Jul. 11, 2017



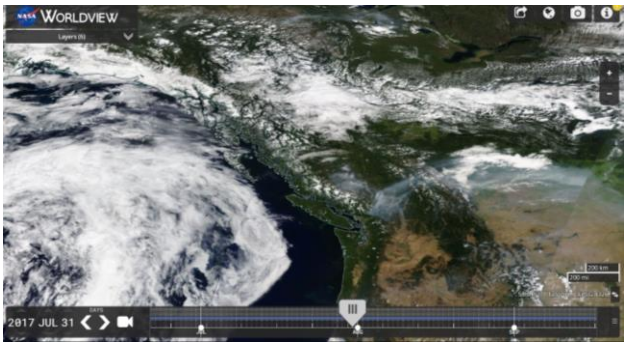
c. NASA Worldview, Jul. 14, 2017



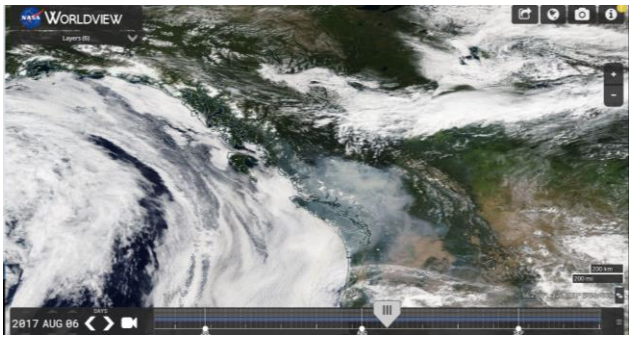
d. NASA Worldview, Jul. 17, 2018

e. NASA Worldview, Jul. 19, 2017

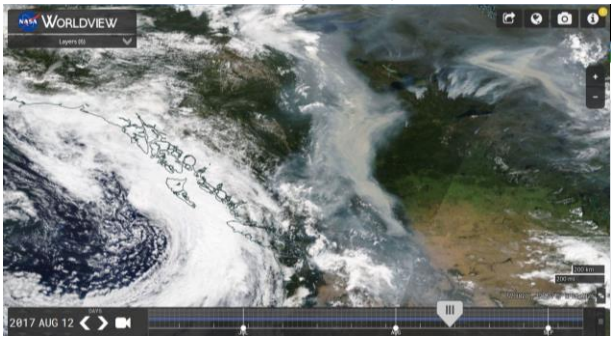
Figure II-2. Satellite images covering Jul. 8-19, 2017, showing wildfire smoke (grey plumes) over southwestern B.C., including the Southern Interior Air Zone. Source of images: NASA Worldview at: https://worldview.earthdata.nasa.gov/.



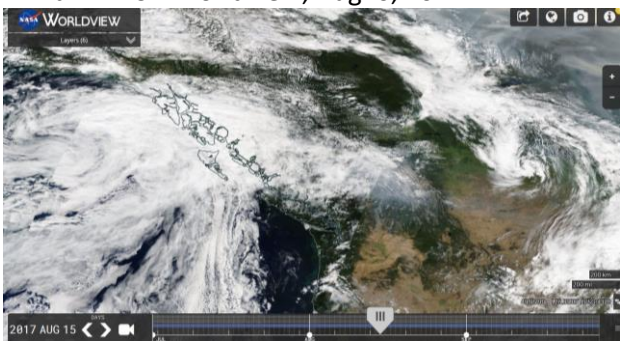
a. NASA Worldview, Jul. 31, 2017



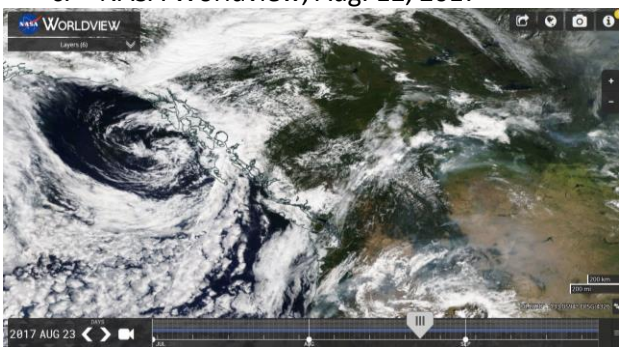
b. NASA Worldview, Aug. 6, 2017



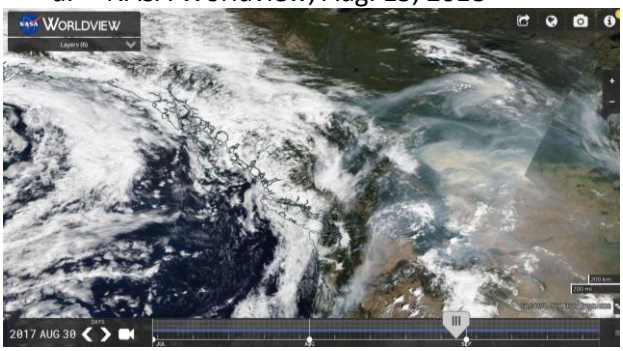
c. NASA Worldview, Aug. 12, 2017



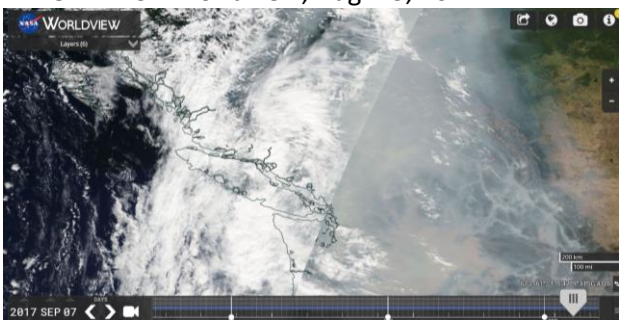
d. NASA Worldview, Aug. 15, 2018



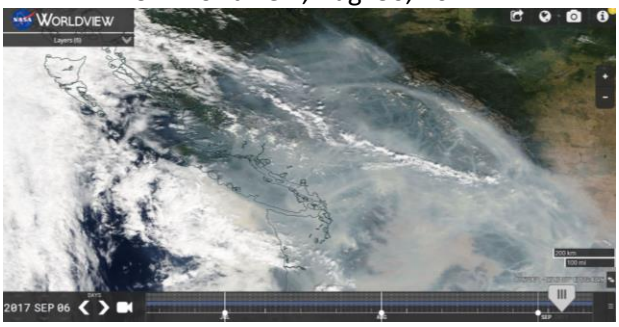
e. NASA Worldview, Aug. 23, 2017



f. NASA Worldview, Aug. 30, 2017



g. NASA Worldview, Sep. 6, 2017



h. NASA Worldview, Sep. 7, 2017

Figure II-3. Satellite images between Aug. 31-Sep. 7, 2017, showing wildfire smoke (grey plumes) over southern B.C., including the Southern Interior Air Zone. Source of images: NASA Worldview at: https://worldview.earthdata.nasa.gov/.