Introduction

This is the sixth annual air quality report for the Georgia Strait 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 Georgia Strait 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. Georgia Strait Air Zone.

Table 1. Air zone management framework for ground-level ozone and $PM_{2.5}$ defined based on 2015 CAAQS criteria.

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

Ozone measurements in the Georgia Strait Air Zone are summarized in Figure 2. Concentrations ranged from 45 ppb in Nanaimo to 53 ppb in Whistler.[1] All sites achieved the national standard of 63 ppb.

Trends in annual ozone levels are shown in Figure 3.[2] Concentrations have remained below the national standard over the 10-year period, but four of the five sites (Courtenay, Duncan, Victoria and Whistler) recorded their highest concentrations in 2017 or 2018.

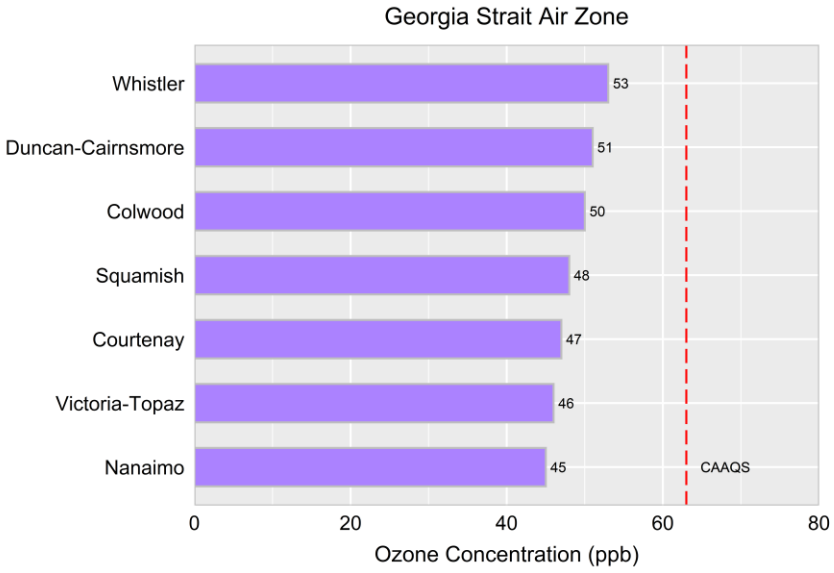


Figure 2. Ozone concentrations in the Georgia Strait Air Zone, based on annual 4th highest daily 8-hour maxima, averaged over 2016-2018. Red dashed line identifies the CAAQS of 63 ppb.

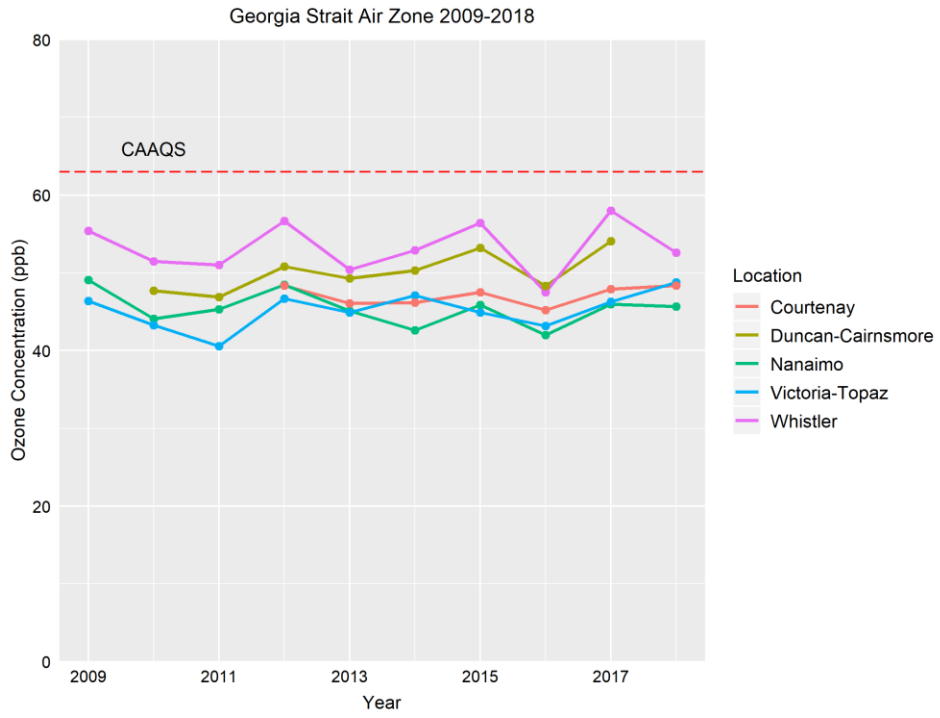


Figure 3. Annual trends in ozone concentrations (2009-2018), based on annual 4th highest daily 8-hour maxima for a single year. Red dashed line identifies CAAQS of 63 ppb.

[1] Concentrations based on 4th highest daily 8-hour maximum, averaged over three years (2016-2018).
[2] Concentrations based on 4th highest daily 8-hour maximum, averaged over a single year.

$PM_{2.5}$ 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 20 to 56 µg/m^3.[3] The national standard of 28 µg/m^3 was exceeded at four sites: Whistler, Langdale, Squamish ad Courtenay. Annual concentrations (lower plot) ranged from 2.9 to 9.2 µg/m^3.[4] All monitoring sites achieved the national standard of 10 µg/m^3.

Trends in annual mean concentrations between 2009 and 2018 are shown in Figure 5 for a subset of these sites.[5] A shift to higher reported concentrations is seen with the change from TEOM to FEM instruments, with the gradual roll-out beginning in 2010 in Victoria. Higher concentrations in 2017 and 2018 at sites like Whistler, Squamish, Victoria and Nanaimo reflect extensive wildfire activity and associated smoky conditions during these years. See Appendix II for more information.

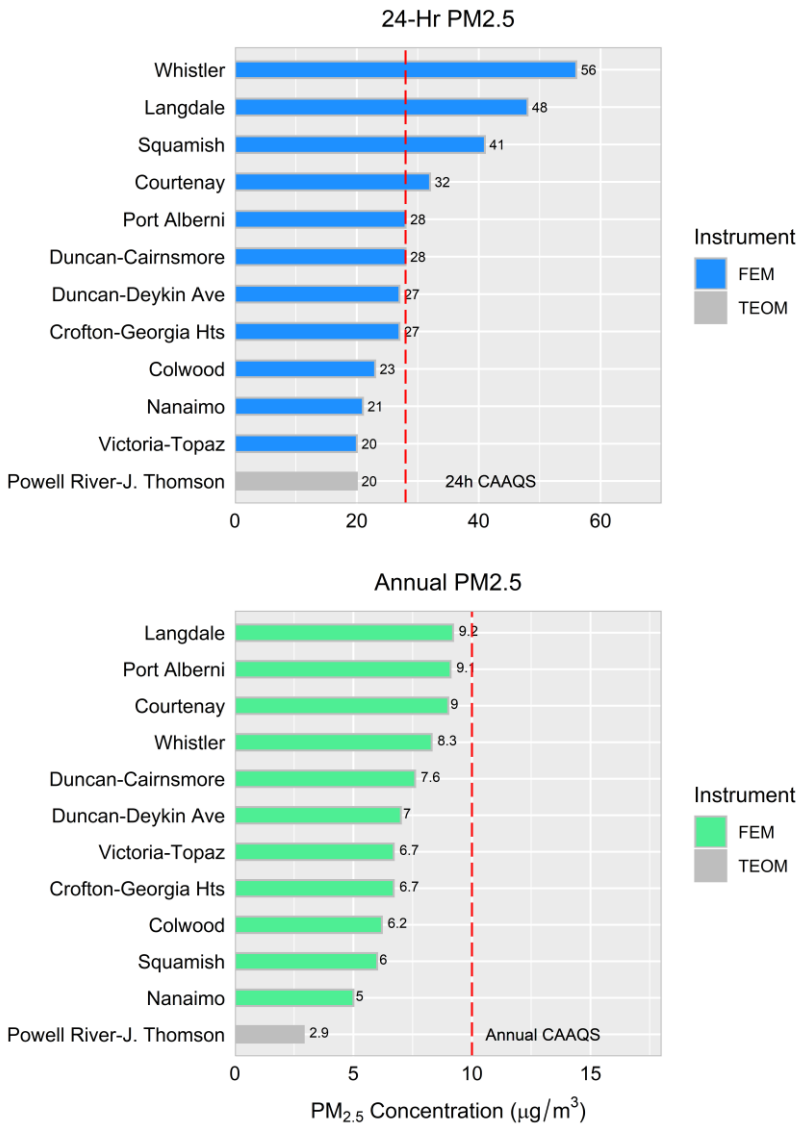


Figure 4. $PM_{2.5}$ concentrations in the Georgia Strait Air Zone. Upper plot based on 24-hour concentration (annual 98th percentile, averaged over 2016-2018). Lower plot based on annual mean concentration (averaged over 2016-2018). Red dashed lines identify CAAQS of 28 µg/m^3 (upper plot) and 10 µg/m^3 (lower plot).

[3] Concentrations based on annual 98th percentile of 24-hour values, averaged over three years (2016-2018).
[4] Concentrations based on annual average of 24-hour values, averaged over three years (2016-2018).
[5] Concentrations based on annual average of 24-hour values over single year.

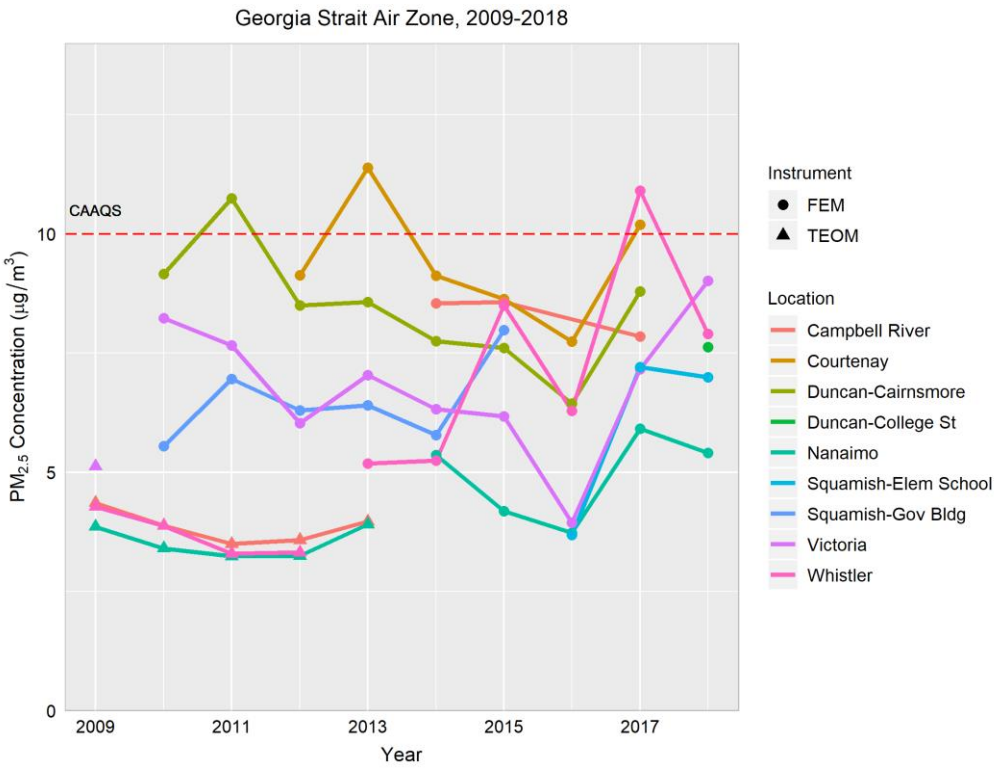


Figure 5. Trends in $PM_{2.5}$ concentrations (2009-2018), based on annual mean concentrations from a single year. The CAAQS value of 10 µg/m^3 is shown by the dashed line. $PM_{2.5}$ measurements prior to 2011 are reported at 25°C and 1 atm. From 2011 onward, measurements are reported at local conditions.

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, and preferentially based on those sites with three years of data. TF/EE influences are removed so that long-term management strategies are not developed on the basis of events that are beyond local or provincial control.

In the Georgia Strait Air Zone, wildfires are the primary contributor to TF/EE. The methodology for identifying wildfire-influenced data is provided in Appendix I. Excluded data are identified in Appendix II. Wildfire influences were particularly noted for the summers of 2017 and 2018, when there was extensive wildfire activity in the central and southern interior of the province that led to periodically smoky conditions and the issuance of smoke-related bulletins that at times covered the entire Georgia Strait Air Zone.

Table 2 summarizes the as-measured concentrations for ground-level ozone and the management levels after any TF/EE influences have been removed. No TF/EE influences were identified for ozone. The ozone management level for the Georgia Strait Air Zone remains in the “yellow”, based on

concentrations in Whistler. This indicates that ozone-related actions should continue to focus on preventing further air quality deterioration.

Table 3 summarizes both as-measured $PM_{2.5}$ concentrations and management levels once estimated wildfire influences have been removed (see Appendix I for more discussion of wildfire influences). The overall $PM_{2.5}$ management level remains in the "red", based on 24-hour $PM_{2.5}$ concentrations in Courtenay. This means that $PM_{2.5}$-related actions should focus on meeting the standards in this community. Red management levels were previously assigned to Duncan and Port Alberni, but both communities achieved the CAAQS in the latest report. To ensure that $PM_{2.5}$ concentrations continue to stay below the CAAQS, a focus should remain on actions to avoid future CAAQS exceedances.

Table 2. Summary of ozone concentrations as measured and air zone management levels for the Georgia Strait Air Zone (based on 2016-2018 data). All concentrations in ppb.

Location	No. Valid Years	4th Highest Daily 8-hour Maxima		Air Zone Management Level
		As Measured	TF/EE Influences Removed	
Colwood	3	50	50	Goal: Preventing Air Quality Deterioration
Courtenay	3	47	47	
Duncan-Cairnsmore	2	51	51	
Nanaimo	3	45	45	
Squamish	3	48	48	
Victoria	3	46	46	
Whistler	3	53	53	

Actions to Protect Air Quality

The reduction of $PM_{2.5}$ emissions is a priority across the province and including the Georgia Straight Air Zone.

In 2016, the Province adopted a new Solid Fuel Burning Domestic Appliance Regulation. This piece of legislation 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 equivalent 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 new CSA-/EPA-certified wood stoves, natural gas or pellet stoves and electric heat pumps. Between 2016 and 2018, wood stove change-out programs were

Table 3. Summary of $PM_{2.5}$ concentrations as measured and air zone management levels for the Georgia Strait Air Zone (based on 2016-2018 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	
Colwood	FEM	3	23	17	6.2	5.6	Goal: CAAQS Achievement
Courtenay	FEM	3	32	31	9.0	8.6	
Crofton-Georgia Hts.	FEM	3	27	18	6.7	5.8	
Duncan-Cairnsmore	FEM	2	28	26	7.6	7.3	
Duncan-Deykin Ave.	FEM	3	27	19	7.0	6.3	
Langdale	FEM	2	48	19	9.2	7.7	
Nanaimo	FEM	3	21	12	5.0	4.2	
Port Alberni	FEM	3	28	27	9.1	8.7	
Powell River-James Thomson School	TEOM	3	20	8	2.9	2.3	
Squamish	FEM	3	41	13	6.0	4.8	
Victoria-Topaz	FEM	3	20	17	6.7	6.3	
Whistler	FEM	3	56	18	8.3	6.5	

supported the Cowichan Valley Regional District[6], Regional District of Nanaimo and the City of Nanaimo, the Alberni-Clayoquot Regional District (including Port Alberni),[7] the Comox Valley Regional District, the Sunshine Coast Clean Air Society and qathet Regional District. The Regional Districts of Cowichan Valley, Comox Valley and Alberni-Clayoquot provided enhanced incentives to further encourage the transition away from wood stoves to natural gas or pellet stoves and electric heat pumps. For more information on the Provincial Wood Stove Exchange Program, see: https://www2.gov.bc.ca/gov/content/environment/air-land-water/air/air-pollution/smoke-burning/exchange.

Individual communities have taken various actions to reduce $PM_{2.5}$ emissions and improve air quality. For additional information, please see the following webpages:

- Comox Valley Regional District: https://www.comoxvalleyrd.ca/services/environment/air-quality
- Cowichan Valley Regional District: https://www.cvrd.bc.ca/2115/Air
- Cumberland: https://cumberland.ca/air-quality/
- Port Alberni and the Alberni-Clayoquot Regional District: https://www.acrd.bc.ca/aqc-of-port-alberni

[6] https://www.cvrd.bc.ca/3010/Apply-for-a-Woodstove-Rebate
[7] https://www.acrd.bc.ca/cms/wpattachments/wpID239atID2875.pdf

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

Ozone and $PM_{2.5}$ data from 2016-2018 for the Georgia Strait 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).
    - 2016 was below-average in terms of the amount of land burned (0.10 million hectares.
    - 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 south-central 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 or were in between periods of Smoky Skies Bulletins.
- Satellite images during this period (see Figures II-1 and II-2) provide additional information on the number of wildfires and spatial extent of wildfire smoke within and near the Georgia Strait Air Zone.

Table II-1. Examples of notable wildfires in the south-central interior during 2017 and 2018.[8]

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
2018-07-31	79,394	Tweedsmuir Complex – Ramsey Creek	Tweedsmuir Provincial Park; lightning-caused

[8] 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
2018-08-01	44,817	Tweedsmuir Complex - Dean River	Tweedsmuir Provincial Park; 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 2016-2018. Al dates shown coincided with a Smoky Skies Bulletin for the area of interest, with exception of those highlighted in red.

Location	Date	Daily $PM_{2.5}$ ($\mu g/m^3$)
Campbell River	2017-08-05	60.5
Campbell River	2017-08-06	40.2
Campbell River	2017-08-08	28.8
Campbell River	2017-08-09	35.9
Campbell River	2018-08-13	42.4
Campbell River	2018-08-19	35.9
Campbell River	2018-08-20	108.9
Campbell River	2018-08-21	146.9
Campbell River	2018-08-22	101.4
Colwood	2017-08-02	46.8
Colwood	2017-08-03	47
Colwood	2017-08-04	31.5
Colwood	2017-08-08	28.7
Colwood	*2017-08-09*	*33.2*
Colwood	2017-09-06	36.5
Colwood	2018-08-14	54.8
Colwood	2018-08-15	45.1
Colwood	2018-08-16	32.3
Colwood	2018-08-20	91.9

Location	Date	Daily $PM_{2.5}$ ($\mu g/m^3$)
Colwood	2018-08-21	106.7
Colwood	2018-08-22	113.1
Colwood	2018-08-23	35
Colwood	2018-08-24	31.8
Courtenay	2017-08-05	74.3
Courtenay	2017-08-06	52.4
Courtenay	2017-08-07	37.8
Courtenay	2017-08-08	29.4
Courtenay	2017-08-09	51.6
Courtenay	2017-08-10	43.5
Courtenay	2017-09-07	34.3
Courtenay	2018-08-13	41.9
Courtenay	2018-08-14	30.1
Courtenay	2018-08-20	104.5
Courtenay	2018-08-21	116.8
Courtenay	2018-08-22	90.3
Crofton-Georgia Hts	2017-08-02	37.3
Crofton-Georgia Hts	2017-08-05	44.5
Crofton-Georgia Hts	2017-08-06	35.3

Table II-2 (continued)

Location	Date	Daily $PM_{2.5}$ ($\mu g/m^3$)
Crofton-Georgia Hts	2017-08-07	45.1
Crofton-Georgia Hts	2017-08-08	45.7
Crofton-Georgia Hts	2017-08-09	49.3
Crofton-Georgia Hts	2017-08-10	47
Crofton-Georgia Hts	2017-08-11	31.7
Crofton-Georgia Hts	2017-09-06	39.5
Crofton-Georgia Hts	2017-09-07	34.6
Crofton-Georgia Hts	2018-08-08	29.3
Crofton-Georgia Hts	2018-08-13	34.5
Crofton-Georgia Hts	2018-08-14	47.3
Crofton-Georgia Hts	2018-08-19	30.6
Crofton-Georgia Hts	2018-08-20	136.2
Crofton-Georgia Hts	2018-08-21	100.4
Crofton-Georgia Hts	2018-08-22	143.5
Crofton-Georgia Hts	2018-08-23	47
Duncan-Cairnsmore	2017-08-02	33.8
Duncan-Cairnsmore	2017-08-03	32.3
Duncan-Cairnsmore	2017-08-07	34.3
Duncan-Cairnsmore	2017-08-08	37
Duncan-Cairnsmore	2017-08-09	38.9
Duncan-Cairnsmore	2017-08-10	36.2
Duncan-Cairnsmore	2017-09-06	34.2
Duncan-College St	2018-08-14	40.2
Duncan-College St	2018-08-20	86.3
Duncan-College St	2018-08-21	82.4
Duncan-College St	2018-08-22	103.2
Duncan-College St	2018-08-23	37.8
Duncan-Deykin Ave	2017-08-02	44.9
Duncan-Deykin Ave	2017-08-03	39
Duncan-Deykin Ave	2017-08-05	31.1
Duncan-Deykin Ave	2017-08-06	33
Duncan-Deykin Ave	2017-08-07	41.5
Duncan-Deykin Ave	2017-08-08	45
Duncan-Deykin Ave	2017-08-09	47.5
Duncan-Deykin Ave	2017-08-10	45.2
Duncan-Deykin Ave	2017-08-11	28.1
Duncan-Deykin Ave	2017-09-06	38.3

Location	Date	Daily $PM_{2.5}$ ($\mu g/m^3$)
Duncan-Deykin Ave	2017-09-07	32.1
Duncan-Deykin Ave	2018-08-13	32.5
Duncan-Deykin Ave	2018-08-14	47
Duncan-Deykin Ave	2018-08-20	107.7
Duncan-Deykin Ave	2018-08-21	90
Duncan-Deykin Ave	2018-08-22	117
Duncan-Deykin Ave	2018-08-23	44.8
Gibsons	2017-08-02	42.2
Gibsons	2017-08-03	52.4
Gibsons	2017-08-04	28.9
Gibsons	2017-08-05	46.5
Gibsons	2017-08-06	44.7
Gibsons	2017-08-07	49.7
Gibsons	2017-08-08	46.7
Gibsons	2017-08-09	60.4
Gibsons	2017-08-10	60.7
Gibsons	2017-08-11	31.5
Gibsons	2017-09-06	39.6
Gibsons	2017-09-07	38.9
Gibsons	2018-08-13	32
Gibsons	2018-08-14	57.4
Gibsons	2018-08-15	45.7
Gibsons	2018-08-16	33.2
Gibsons	2018-08-20	72.9
Gibsons	2018-08-21	54.8
Gibsons	2018-08-22	103.9
Gibsons	2018-08-23	50.2
Langdale	2017-08-02	49.5
Langdale	2017-08-03	71.4
Langdale	2017-08-04	46.9
Langdale	2017-08-05	57.4
Langdale	2017-08-06	54
Langdale	2017-08-07	57.6
Langdale	2017-08-08	62.6
Langdale	2017-08-09	66.6
Langdale	2017-08-10	67.6
Langdale	2017-08-11	46

Table II-2 (continued)

Location	Date	Daily $PM_{2.5}$ ($\mu g/m^3$)
Langdale	2017-09-06	58.7
Langdale	2017-09-07	43
Langdale	2018-08-13	41
Langdale	2018-08-14	67.1
Langdale	2018-08-15	55.3
Langdale	2018-08-16	38.7
Langdale	2018-08-19	33.3
Langdale	2018-08-20	83.9
Langdale	2018-08-21	58.8
Langdale	2018-08-22	91.6
Langdale	2018-08-23	61.3
Nanaimo	2017-08-02	28.1
Nanaimo	2017-08-04	37.6
Nanaimo	2017-08-05	42.6
Nanaimo	2017-08-06	46.2
Nanaimo	2017-08-07	45.3
Nanaimo	2017-08-08	40
Nanaimo	2017-08-09	52.6
Nanaimo	2017-08-10	46.3
Nanaimo	2017-08-11	37.4
Nanaimo	2017-09-06	35
Nanaimo	2017-09-07	38.9
Nanaimo	2018-08-13	36.3
Nanaimo	2018-08-19	47.5
Nanaimo	2018-08-20	145.1
Nanaimo	2018-08-21	125.2
Nanaimo	2018-08-22	160.5
Port Alberni	2017-08-02	32.5
Port Alberni	2017-08-03	28.5
Port Alberni	2017-08-07	35.6
Port Alberni	2017-08-08	38.6
Port Alberni	2017-08-09	36.9
Port Alberni	2018-08-14	48.7
Port Alberni	2018-08-15	34.3
Port Alberni	2018-08-20	79.2
Port Alberni	2018-08-21	83.6
Port Alberni	2018-08-22	73.7
Powell River-James Thomson	2017-08-02	28.5
Powell River-James Thomson	2017-08-05	56.5
Powell River-James Thomson	2017-08-06	42
Powell River-James Thomson	2017-08-07	35.5
Powell River-James Thomson	2017-09-06	32.7
Powell River-James Thomson	2017-09-07	35.2
Powell River-James Thomson	2018-08-13	37.5
Powell River-James Thomson	2018-08-14	36.2
Powell River-James Thomson	2018-08-19	43.3
Powell River-James Thomson	2018-08-20	100.5
Powell River-James Thomson	2018-08-21	84.6
Powell River-James Thomson	2018-08-22	102.5
Powell River-Wildwood	2017-08-02	29.7
Powell River-Wildwood	2017-08-05	58.4
Powell River-Wildwood	2017-08-06	44.1
Powell River-Wildwood	2017-08-07	36.9
Powell River-Wildwood	2017-08-08	31.5
Powell River-Wildwood	2017-08-09	67.5
Powell River-Wildwood	2017-08-10	51.7
Powell River-Wildwood	2017-08-11	35.2
Powell River-Wildwood	2017-09-06	34.2

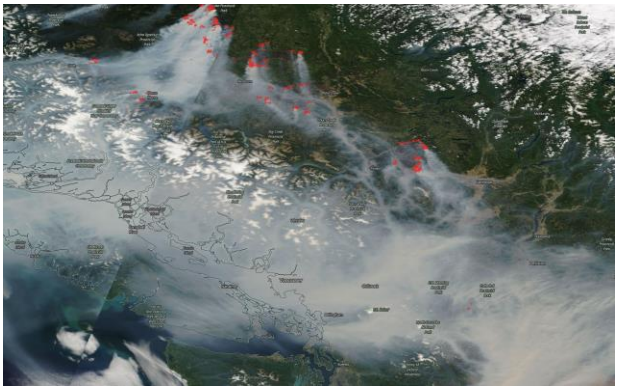
Table II-2 (continued)

Location	Date	Daily $PM_{2.5}$ ($\mu g/m^3$)
Powell River-Wildwood	2017-09-07	36.7
Squamish	2017-08-02	87.5
Squamish	2017-08-03	95.7
Squamish	2017-08-04	69.4
Squamish	2017-08-05	64.1
Squamish	2017-08-06	72.3
Squamish	2017-08-07	69.5
Squamish	2017-08-08	66.6
Squamish	2017-08-09	70.3
Squamish	2017-08-10	67
Squamish	2017-08-11	49.7
Squamish	2017-09-06	75.6
Squamish	2017-09-07	58.8
Squamish	2018-08-13	48.6
Squamish	2018-08-14	73.8
Squamish	2018-08-15	57.3
Squamish	2018-08-16	36.3
Squamish	2018-08-19	44.7
Squamish	2018-08-20	94.4
Squamish	2018-08-21	50.5
Squamish	2018-08-22	75.5
Squamish	2018-08-23	68.8
Victoria-Topaz	2017-08-02	38.5
Victoria-Topaz	2017-08-03	41.8
Victoria-Topaz	2018-08-14	48.1
Victoria-Topaz	2018-08-15	45.6

Location	Date	Daily $PM_{2.5}$ ($\mu g/m^3$)
Victoria-Topaz	2018-08-20	78
Victoria-Topaz	2018-08-21	106.9
Victoria-Topaz	2018-08-22	110
Victoria-Topaz	2018-08-23	30
Victoria-Topaz	2018-08-24	33.5
Whistler	2017-08-01	47.4
Whistler	2017-08-02	116.6
Whistler	2017-08-03	97.7
Whistler	2017-08-04	86.2
Whistler	2017-08-05	142.8
Whistler	2017-08-06	111.5
Whistler	2017-08-07	86.6
Whistler	2017-08-08	73.9
Whistler	2017-08-09	69.9
Whistler	2017-08-10	57.3
Whistler	2017-08-11	44.1
Whistler	2017-09-06	95.1
Whistler	2017-09-07	90.3
Whistler	2018-08-12	29.2
Whistler	2018-08-13	67.6
Whistler	2018-08-14	76.6
Whistler	2018-08-15	49.4
Whistler	2018-08-16	31
Whistler	2018-08-18	104
Whistler	2018-08-19	233.5
Whistler	2018-08-20	75.2
Whistler	2018-08-21	35.8
Whistler	2018-08-22	63.5
Whistler	2018-08-23	85.1

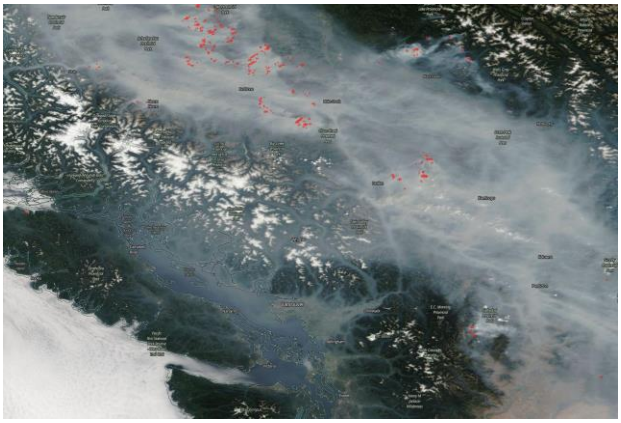
a. Jul. 31, 2017

b. Aug. 1, 2017

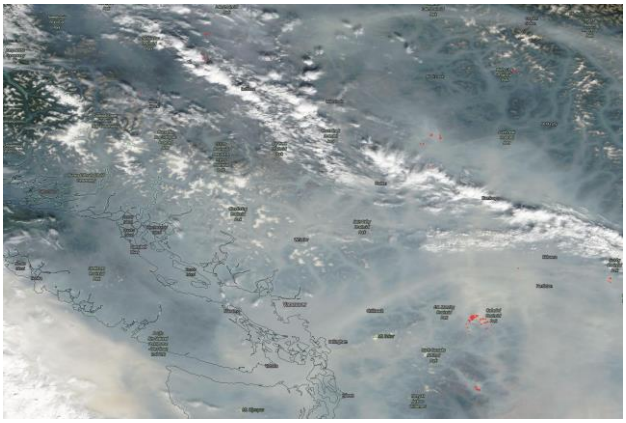


c. Aug. 4, 2017

d. Aug. 7, 2017



e. Aug. 10, 2018



f. Sept. 6, 2017

Figure II-1. Satellite images on Jul. 31, Aug. 1, 4, 7, 10 and Sept. 6, 2017, showing smoke (grey plumes) over the Georgia Strait Air Zone. Red dots indicate fires and thermal anomalies. Large red circle in Figure II-1(a) identifies Nanaimo on map. Source of images: NASA Worldview Snapshots at: https://worldview.earthdata.nasa.gov/.

g. Aug. 13, 2018

h. Aug. 14, 2018

i. Aug. 18, 2018

j. Aug. 22, 2018

Figure II-2. Satellite images on Aug. 13, 14, 18 and 22, 2018, showing smoke (grey plumes) over the Georgia Strait Air Zone. Red dots indicate fires and thermal anomalies. Large red circle in Figure II-1(a) identifies Nanaimo on map. Source of images: NASA Worldview Snapshots at: https://worldview.earthdata.nasa.gov/.