



Air Zone Management Response for British Columbia

March 2019



(Photo credit: Alyse Minifie – Clean Air Day contest winner 2017)

BC Ministry of Environment and Climate Change Strategy

Executive Summary

The Air Quality Management System (AQMS) is a comprehensive management system being implemented across Canada to protect human health and the environment. The system includes: setting Canadian Ambient Air Quality Standards (CAAQS) for fine particulate matter (PM_{2.5}) and ground-level ozone and industrial emission requirements for major industry; implementing air zone management to improve air quality and keep clean areas clean; enhancing coordination where pollution crosses jurisdictional boundaries; and increasing collaboration on actions to reduce transportation emissions.

CAAQS for PM_{2.5} and ground-level ozone were established in 2013. Under the AQMS, air zones are the geographic units for monitoring, reporting and taking action on air quality to achieve the CAAQS. Air zones are broad areas within a jurisdiction that have similar air quality characteristics, issues and trends. British Columbia (BC) has established seven air zones, and began annual reporting on CAAQS achievement in these air zones in 2015, based on 2011-2013 data. To facilitate public reporting and help prioritize actions under the AQMS, BC also assigned colour-coded management levels (“green”, “yellow”, “orange” and “red”) on the basis of air quality, where “red” levels indicate that the CAAQS have been exceeded in at least one community within the air zone.

For the 2015-2017 reporting period two air zones have been assigned a “red” management level for PM_{2.5}: the Central Interior (based on exceedances in Houston, Valemount and Vanderhoof) and the Georgia Strait (based on exceedances in Courtenay). This report summarizes BC activities to support CAAQS achievement provincially and locally, focusing on the air zones and specific communities assigned a “red” management level. The report also contains actions in communities that have improved air quality from a “red” to an “orange” management level for PM_{2.5}.

Background

The Canadian Council of Ministers of Environment (CCME) is an intergovernmental forum for action on national and international environmental issues. The CCME has addressed a number of air quality issues including acid rain, ozone depleting substances, and standards for toxic substances. In 2012 the CCME endorsed the Air Quality Management system as a comprehensive approach to air quality management and it is being implemented across Canada with the exception of Quebec.

Figure 1 illustrates the seven BC air zones.



Figure 1. Map showing boundaries of 7 B.C. air zones

[Annual air zone reports](#) summarize CAAQS achievement and assign a colour-coded management level for each air zone to help communicate air quality to the public and prioritize actions to protect air quality. Management levels are defined by nationally consistent threshold values, as summarized in Table 1. More comprehensive actions are expected as an air zone approaches or exceeds the CAAQS.

Communities reaching the “red” management level are expected to work towards a goal of achieving the CAAQS through advanced air zone management actions. “Orange” management level communities are expected to improve air quality through active management and “yellow” zones are expected to utilize early intervention and ongoing actions to continuously improve air quality. “Green” zones are expected to keep clean areas clean and to proactively manage air quality. Examples of potential actions associated with each management level are provided in the CCME Guidance Document on Air Zone Management.¹

¹ See: http://www.ccme.ca/files/Resources/air/aqms/pn_1481_gdazm_e.pdf.

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 (µg/m ³)		PM _{2.5} - 24h (µg/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					

Management levels assigned to BC air zones on the basis of PM_{2.5} and ozone data collected from 2011-2017 are summarized in Tables 2 and 3, respectively. For the 2015-2017 reporting period two air zones fell into the “red” management level: Georgia Strait (based on PM_{2.5} levels in Courtenay) and Central Interior (based on PM_{2.5} levels in Houston and Vanderhoof).² This document will focus on the specific actions and strategies employed in communities that have been assigned a “red” management level since the start of air zone reporting in 2015. Progress was made in a number of red zone communities: PM_{2.5} levels dropped below the CAAQS threshold in Smithers and Duncan for the 2014-2016 assessment period and in Port Alberni for 2015-2017. As a result these communities are now in the “orange” management level but the respective air zones remain “red” due to elevated PM_{2.5} concentrations in neighbouring communities. Actions in newly “orange” communities are included in this report as it is important to characterize the progress these communities have made.

² Valemount was individually assigned a “red” management level, but due to the fact that it had only two years of data, it does not contribute to the overall air zone management level.

Table 2. Summary of air zone management levels for PM_{2.5}.

Air Zone	Three-year Reporting Periods				
	2015-2017	2014-2016	2013-2015	2012-2014	2011-2013
Central Interior	Houston Vanderhoof (Valemount – based on 2 years of data)	Houston Vanderhoof	Smithers Vanderhoof	Smithers Vanderhoof	Smithers Vanderhoof
Coastal	Kitimat site	Kitimat sites	Kitimat sites	Kitimat sites ³	Kitimat Terrace
Georgia Strait	Courtenay	Courtenay Port Alberni	Courtenay Duncan Port Alberni	Courtenay Duncan	Courtenay Duncan
Lower Fraser Valley	Several sites	Several sites	Langley Abbotsford	Several sites	Several sites
Northeast	Fort St John	N/A	N/A	N/A	N/A
Northwest	N/A	N/A	N/A	N/A	N/A
Southern Interior	Several sites	Several sites	Several sites	Several sites	Castlegar Kamloops Vernon

Table 3. Summary of air zone management levels for ozone.

Air Zone	Three-year Reporting Periods				
	2015-2017	2014-2016	2013-2015	2012-2014	2011-2013
Central Interior	Prince George	Prince George Quesnel	Prince George Quesnel	Prince George Quesnel	Several sites
Coastal	Terrace	Terrace	N/A	N/A	N/A
Georgia Strait	Duncan Whistler	Duncan Whistler	Duncan Whistler	Whistler	Whistler
Lower Fraser Valley	Agassiz Hope Maple Ridge	Agassiz Hope	Hope	Hope	Burnaby Chilliwack Hope
Northeast	Fort St. John Taylor	Fort St. John	N/A	N/A	N/A
Northwest	N/A	N/A	N/A	N/A	N/A
Southern Interior	Kamloops Kelowna	Kamloops Kelowna	Kelowna Vernon	Kelowna Vernon	Kelowna

³ Port Alice-Rumble Beach Hospital site was assigned an “orange” management level for this period, but based on two years of data. Management levels are preferentially assigned on the basis of three complete years of data.

Air Zone Management in BC – A Collaborative Approach

Air zone management is a relatively new concept across Canada. However, local airshed management has been an important approach to managing air quality issues since the 1980's, with the development of local airshed plans. Airshed plans have been completed for the Bulkley Valley-Lakes District, Prince George, Quesnel, Williams Lake, Central Okanagan Regional District, Boundary Region, Merritt, Fraser Valley Regional District, Metro Vancouver, Sea-to-Sky Airshed and the Cowichan Valley. Local airshed management was initiated out of the realization that many sources can affect local air quality, and that the management of these sources requires collaboration across all affected stakeholders, including different levels of government, industry and the public.

The provincial approach to air zone management is to:

- build upon existing regulations and programs to protect air quality across BC; and
- support additional activities at the local level, with a priority on the “red” management areas.

Local action is supported through early engagement, technical support and strategic funding. Local air management plans are a key element of this response.

Current federal and provincial responsibilities and activities to protect air quality are summarized below, followed by specific activities in “red” management areas to address local air quality issues.

Federal Responsibilities for Airshed Management

The federal government has regulations, standards and guidelines related to air quality for vehicles, engines and fuel, marine vessels and rail.

The federal government also provides guidance, research, and support on air quality management through the AQMS.

Transboundary emissions are addressed as part of the Georgia Basin – Puget Sound International Airshed strategy as well as through transboundary project reviews, referrals, and sharing of information across the border.

Provincial Responsibilities/Initiatives

The Province regulates air emissions for industrial sources and prescribed wastes through the [*Environmental Management Act*](#).

There are also a number of [regulations](#) that govern the release of air contaminants in the Province. These regulations cover asphalt plants, agricultural waste, fuel and gasoline, motor vehicle emissions, oil and gas waste, open burning, ozone depleting substances, solid fuels burning appliances, and wood residue incinerators.

Of particular significance to reducing particulate matter are the [Solid Fuel Burning Domestic Appliance Regulation](#) which sets standards for wood burning appliances and the [Open Burning Smoke Control Regulation](#) which governs the burning of vegetative material resulting from a number of activities including land clearing and forestry operations. The Open Burning Smoke Control Regulation encourages vegetative reuse and sets conditions to minimize smoke releases. The regulation is currently under review and revision.

[Woodstove Exchange Program](#) is a provincial initiative available to communities to encourage the change-out of older wood stoves for appliances with lower emissions.

The Province has also drafted a [model municipal bylaw for backyard burning](#). This supports community efforts to control smoke from a local government perspective.

The Province is also involved in initiatives to retrofit diesel buses, setting emission reductions for heavy duty vehicles, reducing fleet emissions, phasing out beehive burners, improving emission technologies for industry and developing biomass burning emission limits for electricity generation and industrial operations.

The Province also sets air quality standards for common air contaminants and provides air quality data to the public through the [BC Air Quality](#) website. The Province partners with other agencies to provide visibility information to the public through the [Clear Air BC](#) website. The Province also partners with other Provinces to deliver the [BlueSky Canada](#) wildfire smoke forecasting program and [BlueSky Playground](#), an online interactive smoke dispersion program to assist in determining smoke impacts arising from wildfires, pile burns and prescribed burning.

The Province has compiled an [inventory of air quality bylaws](#) that exist in BC communities. The inventory covers anti-idling bylaws, open burning, campfires and beach fires, backyard burning and wood burning appliances. The inventory was last updated in 2015.

Management Responses for “Red” Air Zones

Georgia Strait

Georgia Strait Air Zone covers the coastal areas of southwestern BC outside the Lower Fraser Valley. Within the Georgia Strait Air Zone, the community of Courtenay has exceeded the PM_{2.5} annual and/or PM_{2.5} daily mean national standards up to and including the 2015-2017 period. Duncan exceeded the CAAQS threshold for PM_{2.5} in 2011-2013, 2012-2014 and 2013-2015, but was below the threshold for 2014-2016 and 2015-2017 indicating that management strategies are resulting in lower PM_{2.5} levels. Port Alberni exceeded the CAAQS threshold for 2013-2015 and 2014-2016, but has since dropped back down to an “orange” management level. Management efforts are focused on regions surrounding these communities. Initiatives to improve air quality in Courtney are described in the Comox Valley section of this document and actions to reduce air

emissions in Duncan are described in the Cowichan Valley section. Port Alberni actions are described in the Alberni Valley section.

The local airsheds in these valley communities are similar in that all are bounded by mountains and complex valleys which facilitate trapping of pollutants and frequent inversions during the winter. Open burning, woodstove use and forest fires contribute to the particulate matter levels in the region.

Cowichan Valley

The Cowichan Valley Regional District finalized its [Regional Airshed Protection Strategy](#) in 2015. Implementing the strategy appears to have a positive impact on the ambient PM_{2.5} level in the Cowichan Valley and the management level has improved from “red” to “yellow” for PM_{2.5} in Duncan in the 2015-2017 air zone report. Cowichan’s strategy identifies actions that will allow the Region to respond to air quality issues. The strategy was created by a cross jurisdictional committee that included representatives from provincial and local government, industrial and commercial operators, residents, NGO groups, First Nations, school boards, and health professionals.

The strategy brings together actions already underway with additional actions proposed to reduce particulate matter levels in the region. Cowichan’s Regional Air Protection Strategy focuses on PM_{2.5}, identifying it as the contaminant of greatest concern. Actions to reduce PM_{2.5} include reducing open burning and wood burning appliance emissions and ensuring that industrial sources are in compliance with provincial and federal regulatory requirements. The Cowichan Valley Regional District and partners were highlighted in [BC Lung’s 2017 State of the Air Report](#).

The Cowichan Valley Regional District was a recipient of PlanH funding which has been used to engage two professional facilitators and organize three change management sessions to assist in plan implementation. PlanH is a partnership between the BC Healthy Communities Society and Healthy Families BC, which "supports local government engagement and partnerships across sectors for creating healthier communities."

Our Cowichan Community Health Network oversees the implementation of the Regional Air Protection Strategy including facilitating and coordinating work groups and bi-annual roundtable meetings.

In 2018 Cowichan Valley Regional District completed an informative [Airshed Communications and Engagement Roadmap](#) which outlines the path forward on air quality management in the region.

The Cowichan Valley Regional District is also involved in the Province’s woodstove exchange program which provides funding to communities to support replacing old inefficient woodstoves with either higher efficiency wood burning appliances, or cleaner heating options like natural gas or heat pumps. In 2018 the Cowichan Valley is offering [enhanced incentives](#) to those replacing their eligible wood burning appliances for cleaner heating sources.

The Cowichan Valley Regional District also has bylaws in place which regulate backyard burning in six electoral areas and four municipalities. Additionally, the municipalities and the district are working to harmonize and improve air quality regulations throughout the region. In 2018 the [Municipality of North Cowichan updated their open burning requirements](#), a change which effectively bans open burning in the urban containment area.

Other actions currently underway include developing public outreach materials and partnership projects with the Ministry of Environment and Climate Change Strategy (ENV) including an [emissions inventory](#), and a regional [air quality study](#) for the Cowichan Valley. Additionally the district is undertaking an Open Burning Reduction Study which has two phases:

- a) a study to identify key areas for management of open burning, and
- b) a set of recommendations for reducing open burning emissions including:
 - a yard and garden waste feasibility assessment
 - best practices for managing garden debris, and
 - managing debris in agricultural areas.

The Cowichan Valley Regional District also partnered with ENV to install an additional air quality monitoring station. The region now has four stations to characterize air emissions for the region. There has been discussion on the feasibility of installing low cost sensors to further characterize possible air quality hot spots in the region and in 2018 further outreach involving a Purple Air network was initiated. This is expected to help with public outreach and communicating air quality issues.

In past years, a series of five articles on wood smoke were produced and published in a local newspaper to raise awareness of local air quality issues in the Cowichan Valley and they are available online at: [Woodsmoke 101: It's in the air](#), [Backyard burning](#), [Burning garbage](#), [Heating with wood – what's in the smoke?](#), [Managing air quality in the CVRD](#).

Comox Valley Regional District

The communities of Courtenay, Comox and Cumberland are located on the east coast of Vancouver Island at the base of the Comox Valley in the Comox Valley Regional District. Air quality concerns were raised due to the prevalence of open burning and woodstove use in the valley. Emissions from these activities are trapped in the valley bottom by inversions in the winter where they can build up to unacceptable levels. Courtenay has exceeded the CAAQS threshold for PM_{2.5} for all reporting periods including the most recent, 2015-2017.

In April 2017, the Comox Valley Regional District has met with Provincial representatives to discuss a path forward to respond to elevated PM_{2.5} levels. A [forum on air quality](#) was attended by elected officials and experts in the field of air quality. This forum illustrated the importance of woodstoves and open burning contributions to overall emissions in the region and set the stage for future development of strategies to address these concerns. Minutes of the forum, including links to the presented materials are available from the [Comox Valley Regional District](#).

In June 2017, the Comox Valley Regional District board approved a multi-year outreach program for air quality. A brochure titled “Cleaner Air for Our Community” was developed and distributed to homes in wood smoke “hot spots”. An online home heating and air quality survey was also conducted and the outreach program includes print, online and radio delivery as well as a presence at a variety of community events.

In 2018 the Comox Valley [wood stove exchange program](#) offered enhanced incentives to those exchanging their eligible wood burning appliances for cleaner heating sources.

Initiatives in the Comox Valley are gaining momentum as a group of concerned citizens is working to increase awareness of air quality issues in the region. A dedicated website, Facebook page and informative pamphlets have been organized to educate and increase communication about air quality issues in the region. The group called [Breathe Clean Air Comox Valley](#) provides residents a forum to constructively discuss air quality, coordinate action and drive change. This group, led by Jennell Ellis, was recognized as a Clean Air Champion in [BC Lung’s 2017 State of the Air](#) report for their work in the region.

In Cumberland, delegations comprised of community members have approached council to request action on wood smoke and backyard burning. The Village of Cumberland has been responsive, taking action to ban yard waste fires as of February 2017. Additional bylaws related to open burning are being considered in the region.

ENV is completing an air quality report for the Comox Valley and also partnered with the University of British Columbia to complete a spatial monitoring study for PM_{2.5}. The results from both of the pieces of work will support next steps.

Alberni Valley

Port Alberni exceeded the CAAQS for particulate matter in the 2014-2016 Georgia Strait Air Zone Report, and as a result ENV will meet with representatives in Port Alberni to discuss actions that could target and reduce particulate matter emissions. The community has made progress and for the 2015-2017 reporting period Port Alberni did not exceed the threshold for PM_{2.5} and has shifted from a ‘Red’ management level to an ‘Orange’ level.

The community has already established an effective [Air Quality Council](#) (AQC) that will assist in implementing further strategies to improve PM_{2.5}. The AQC consists of provincial and local government officials, community members, First Nations, and industrial representatives. The group has been active in the Alberni Valley since 2006 and has been instrumental in public outreach and local government bylaw development to date.

Over the period of 2017-2018 the Alberni Clayoquot Regional District Committee of the Whole passed three motions:

- a draft bylaw to regulate wood burning stoves and appliances, including a clause to require all wood burning stoves and appliances to meet EPA standards by 2023;

- to investigate options available to Regional Districts to regulate open burning; and
- to allocate 2018 staff resources to complete these two initiatives.

Recent progress includes banning open burning within Port Alberni city limits and regulating woodstoves in the city, producing open burning guidelines for the Regional District, completing a comprehensive [Air Quality Report](#), public outreach and awareness initiatives, including a BC Lung sponsored Air Quality public forum in May 2016 and a [Review of Open Burning Bylaws on Vancouver Island](#). The AQC also plans to complete a woodstove survey in the community to assist local government with next steps.

The [Alberni Valley wood stove exchange program](#) was offered again in 2017 and 2018.

The Alberni Clayoquot Regional District is also discussing an Airshed Emissions Inventory study which will help to develop an Airshed Management Plan for the Alberni Valley.

Central Interior Air Zone

The Central Interior Air Zone includes the communities of Prince George, Williams Lake, Quesnel, Smithers, Houston, Burns Lake, Valemount and Vanderhoof. Emission sources for PM_{2.5} include residential wood heating, open burning of forestry waste and transportation. Industrial sources also contribute, with large sources including the pulp and paper mills in Prince George and Quesnel, a petroleum refinery in Prince George and various wood manufacturing facilities throughout the air zone.

Smithers was assigned “red” management levels for PM_{2.5} in the 2011-2013, 2012-2014 and 2013-2015 air zone reports, but has since dropped below the threshold into the “orange” management level. Vanderhoof has exceeded the CAAQS threshold for PM_{2.5} for all reporting periods including the most recent, 2015-2017. In the most recent air zone report (2015-2017) the District of Houston and the Village of Valemount (based on two years of data) emerged as additional “red” zone communities.

Vanderhoof

The District of Vanderhoof had been in the “red” management level for PM_{2.5} since reporting on air zones commenced in 2013. ENV and Vanderhoof representatives met to discuss potential actions to respond to the “red” management level classification. As a result, Vanderhoof has proposed a number of initiatives to reduce PM_{2.5} emissions.

In 2017 Vanderhoof conducted a woodstove survey designed to collect information on wood burning habits, the number of woodstoves in the community and whether those stoves are certified. The survey also provided residents an opportunity to comment on local air quality. The ENV is supporting Vanderhoof in this initiative.

Data from the survey will feed into a proposed wood burning bylaw in the community that will address woodstove requirements. From a Provincial perspective the information will assist in

developing targeted education materials and woodstove changeout programs. Vanderhoof is also considering allocating funds to assist in woodstove changeout programs.

To reduce the amount of backyard burning, semi-annual yard waste collection options are being considered. Additionally, to support these initiatives and a potential wood burning bylaw, Vanderhoof plans to provide public consultation on the bylaw and an education campaign focused on options to reduce open burning and residential wood stove emissions.

Additionally, in November, 2016 a BC Lung [Air Pollution and Health forum](#) was held in the community. This forum was designed to increase awareness of air quality concerns in the region.

Smithers

Smithers moved from the “red” management level for PM_{2.5} to “orange” in the 2014-2016 reporting period indicating that PM_{2.5} levels are reduced, likely in response to community action and clean air incentives. In 2012 Smithers and the Bulkley Valley area updated their [Clean Air Plan](#). The Plan focuses on improving fine particulate pollution in the region. It is expected that the communities will continue to work toward the goals in those plans. The community of Smithers also completed a [woodstove survey](#) to better understand burning practices and the number and type of stoves in the community. This may assist in evaluating hot spots for wood smoke in which targeted education could be initiated.

Smithers also continues to participate in the woodstove exchange program and is increasing public education by conducting outreach where a bylaw officer visits door to door to advise households of woodstove restrictions that are in place during air quality advisories as per their [Wood Burning Appliance Smoke Control bylaw](#).

Smithers, through the Clean Air Plan, is also working towards a micro-emission inventory for the region with support from ENV. This will be an update to a similar study conducted in 2003. It is expected that the report writing will commence in 2019 after a complete data set has been compiled. The Plan Committee is also evaluating the option of installing low cost sensors to enhance public outreach and to gain information on air quality hot spots. There are currently four low cost sensors being tested in the community.

Additionally, in November, 2016 an [Air Pollution and Health forum](#) was held in the community. The forum was well attended and included experts in wood smoke health effects and air quality.

Houston

The District of Houston was assigned a “red” management level for PM_{2.5} for the first time in the 2014-2016 air zone report. Actions in the community will build on the Bulkley Valley Lakes District (BVLD) Airshed Management Society’s Clean Air Plan which includes the District of Houston. One of the actions the BVLD Airshed Management Society administers in Houston is the [woodstove exchange program](#) which provides incentives for people to remove old woodstoves and replace them with newer more efficient stoves. The District of Houston topped up the program in 2018 by

providing enhanced incentives to residents. There was also a “Burn it Smart” workshop held in Houston in March 2018; residents received a further incentive of \$250 off a new stove for attending the workshop. For more information on actions please see the [BLVD Clean Air Plan](#).

Valemount

The Village of Valemount was assigned a “red” management level for PM_{2.5} in the 2015-2017 reporting period. The Ministry intends to engage with the local government to work towards strategies that will improve PM_{2.5} levels in the community.

Summary

This report shares information on the range of activities being taken to improve PM_{2.5} in BC communities that are exceeding or have recently exceeded the CAAQS, and to highlight collaborative efforts at the local level. The provincial approach to air zone management is to build upon federal and provincial programs to protect air quality across BC and support local actions with the highest priority assigned to communities with “red” management levels. For the 2015-2017 reporting period, this would include Courtenay in the Georgia Strait Air Zone and Houston, Valemount and Vanderhoof in the Central Interior Air Zone as a result of elevated PM_{2.5} levels.

The province supports local efforts through early engagement, technical support and strategic funding and recognizes that local airshed management plans are an important part of these ongoing efforts.