




Regional Airshed Protection Strategy 2023

 **Comox Valley**
REGIONAL DISTRICT

comoxvalleyrd.ca   



Acknowledgements

The Regional Airshed Protection Strategy (the Strategy) was developed by the Comox Valley Regional District with the support of member municipalities. The Strategy was developed to provide direction on actions to improve regional air quality. The Comox Valley Regional Airshed Roundtable was engaged to develop a shared understanding of air quality issues and help identify areas for prioritization. Wood smoke was identified as a pollutant of concern and there were various areas of agreement as well as strongly held positions by the Roundtable members. Not all actions were unanimously supported by the Roundtable, however the Strategy reflects various contributions from the Roundtable process and provides direction for many groups and individuals to be a part of improving regional air quality. The development of this Strategy would not have been possible without the time of representatives from member municipalities, the Airshed Roundtable and the Airshed Roundtable Steering Committee.

Steering Committee (Also Roundtable Members)

- Island Health
- Vancouver Island University
- Ministry of Forests
- Ministry of Water Land and Resource Stewardship
- City of Courtenay
- Village of Cumberland
- Town of Comox
- BC Ministry of Environment and Climate Change Strategy (BC ENV)

Roundtable Members

- Comox Valley Chamber of Commerce
- Elemental Energy Advisors
- Focused Energy Assessments
- Comox Valley Farmers Institute
- Breathe Clean Air Comox Valley
- Mid Island Farmers Institute
- Hearth Patio and Barbeque Association
- Cumberland Community Forest Society
- Comox Valley Nurses for Health and the Environment
- Manulife Investment Management
- Comox Valley Community Health Network
- Residents from each municipality and electoral area



Executive Summary

The *Regional Airshed Protection Strategy (the Strategy)* was developed by the Comox Valley Regional District through the engagement of the Regional Airshed Roundtable (the Roundtable). The Strategy is an iterative document providing a foundation for actions that can be undertaken to improve air quality. The Roundtable was established following the direction of the Comox Valley Regional District Board (CVRD) to create a collaborative framework for improving air quality in the region.

The Roundtable provided diverse perspectives and insights on addressing air quality in the valley and the complexity involved. A key finding in this engagement was the prioritization and focus of wood smoke pollution. However, the Strategy is an iterative document, that will be refined over time to accommodate changing needs and performance monitoring as part of the adaptive process.

Wood Smoke in the Comox Valley

Particulate matter, 2.5 microns and smaller in aerodynamic diameter (PM_{2.5}), has been identified as the pollutant with the greatest cause of concern for human health in the Comox Valley. The largest source of PM_{2.5} in the Comox Valley is wood burning (indoor and outdoor). Reducing PM_{2.5} is the most effective way to address the health impacts from air pollution in the

Comox Valley. There is no safe level of PM_{2.5} and wood burning has significant implications on health.

Air quality in the Comox Valley is concerning especially during the fall and winter seasons when PM_{2.5} levels regularly exceed provincial and national standards. Local efforts to reduce wood smoke have been spearheaded by the Province, health authority, local governments and community groups. Efforts to date include bylaw amendments, incentive programs, education and outreach. More work is needed however, as the the Comox Valley remains one of the lowest ranked communities for air quality in the province.

“The issue of how to improve air quality in the Comox Valley is a complex one. It is for this reason that the CVRD brought together a large diversity of voices to the Roundtable.”

– Roundtable Member

The Roundtable is a recent initiative tackling the issue of regional air quality through the development of this strategy. The guiding principles, vision and goals developed through the Roundtable are summarized in the following section.



Vision

The Comox Valley has clean and healthy air all year round, for current and future generations.

Guiding Principles



Health Protection: Work together to ensure the best air possible for all residents in all areas of the Valley.



Accessibility: Improve access to actions, programs and investments that help clean our air.



Innovative and evidence-based approaches: Use the best available science, evidence and practice to implement innovative approaches to achieve our vision. Continually assess the effectiveness of these approaches.



Minimizing contributions to climate change: Focus on minimizing both air pollution and greenhouse gas (GHG) emissions to support climate action targets. Climate change is linked to air quality, and the key health harming air contaminants (e.g. PM_{2.5}) and GHGs have the same sources (e.g. buildings and transportation).

Goals

1

Achieve measurable reductions in fine particulate matter levels to protect public health.

2

Improve and expand knowledge of sources and impacts of air pollution.

3

Educate and involve the community in understanding and reducing the impacts of air pollution and the links to climate change.

The Strategy's Action Plan consists of the following six actions.

1	Reduce emissions from existing wood-burning appliances
2	Transition away from using wood-burning appliances, prioritizing densely populated areas
3	Reduce emissions from recreational fires and eliminate yard waste burning
4	Promote and advocate for alternatives to non-residential open burning
5	Expand PM_{2.5} data research and collection to inform actions
6	Expand wood smoke education programs

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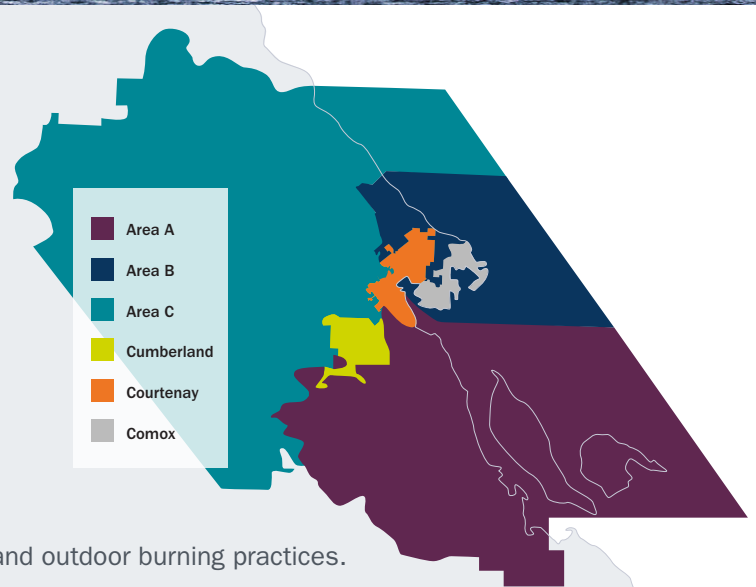
Comox Valley Air Quality Impacts

The Comox Valley

The Comox Valley is located on the traditional, unceded territory of the K'ómoks First Nation.

Home to over 72,000 residents, the Comox Valley offers a diversity of urban and rural areas surrounded by mountains, beaches, and rivers where residents and visitors enjoy a multitude of outdoor activities and vibrant communities. The Comox Valley Regional District (CVRD) is a federation of three municipalities, Town of Comox, City of Courtenay and the Village of Cumberland and three electoral areas (A (Baynes Sound-Denman/Hornby Islands), B (Lazo North) and C (Puntledge Black Creek)).

The Comox Valley has access to areas of natural heritage and beauty such as the Beaufort Mountains and Strathcona Park. Just as the locational beauty and resources are shared by the Comox Valley communities, so is the air which is breathed. A key pollutant of this air is wood smoke from various indoor



and outdoor burning practices.

Wood Smoke Sources

Wood Smoke has various environmental and health impacts. Wood smoke is emitted from natural and man-made causes, including sources such as indoor wood-burning appliances, outdoor burning (backyard burning, recreational burning, land clearing and fire abatement). In the Comox Valley, wood is a prevalent and common fuel source due to its relative affordability, reliability and availability.

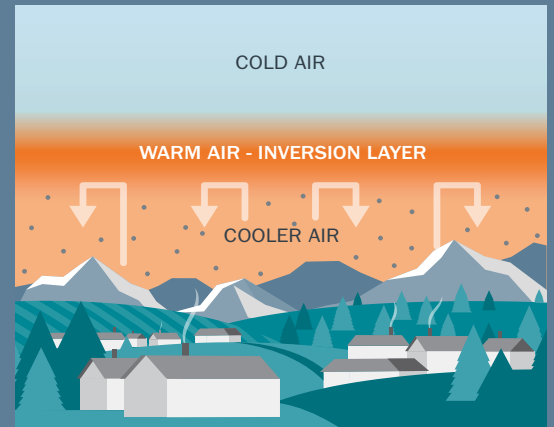


Topographical and Meteorological Factors

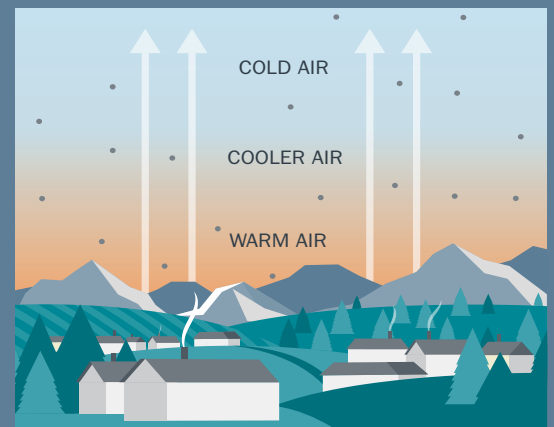
Wood Smoke Pollution is further exacerbated in valley locations by topographic and meteorological conditions. In cold seasons, the Comox Valley is subject to poor ventilation and temperature inversions. Inversions reduce the ability of the atmosphere to disperse pollutants and trap emissions near the ground, prolonging PM_{2.5} exposure to residents. Inversions occur when temperature increases with the height above the ground, causing colder, denser air to be trapped under a layer of warmer, lighter air, with very little vertical mixing.

Colder air from the surrounding mountains often flows down to the valley bottom, these “drainage flows” confine wood smoke emissions near the ground, prolonging air pollution and PM_{2.5} exposure to residents. As a result PM_{2.5} levels in the Comox Valley are elevated during the cold season and often exceed provincial and federal acceptable limits [1].

WITH TEMPERATURE INVERSION



WITHOUT TEMPERATURE INVERSION



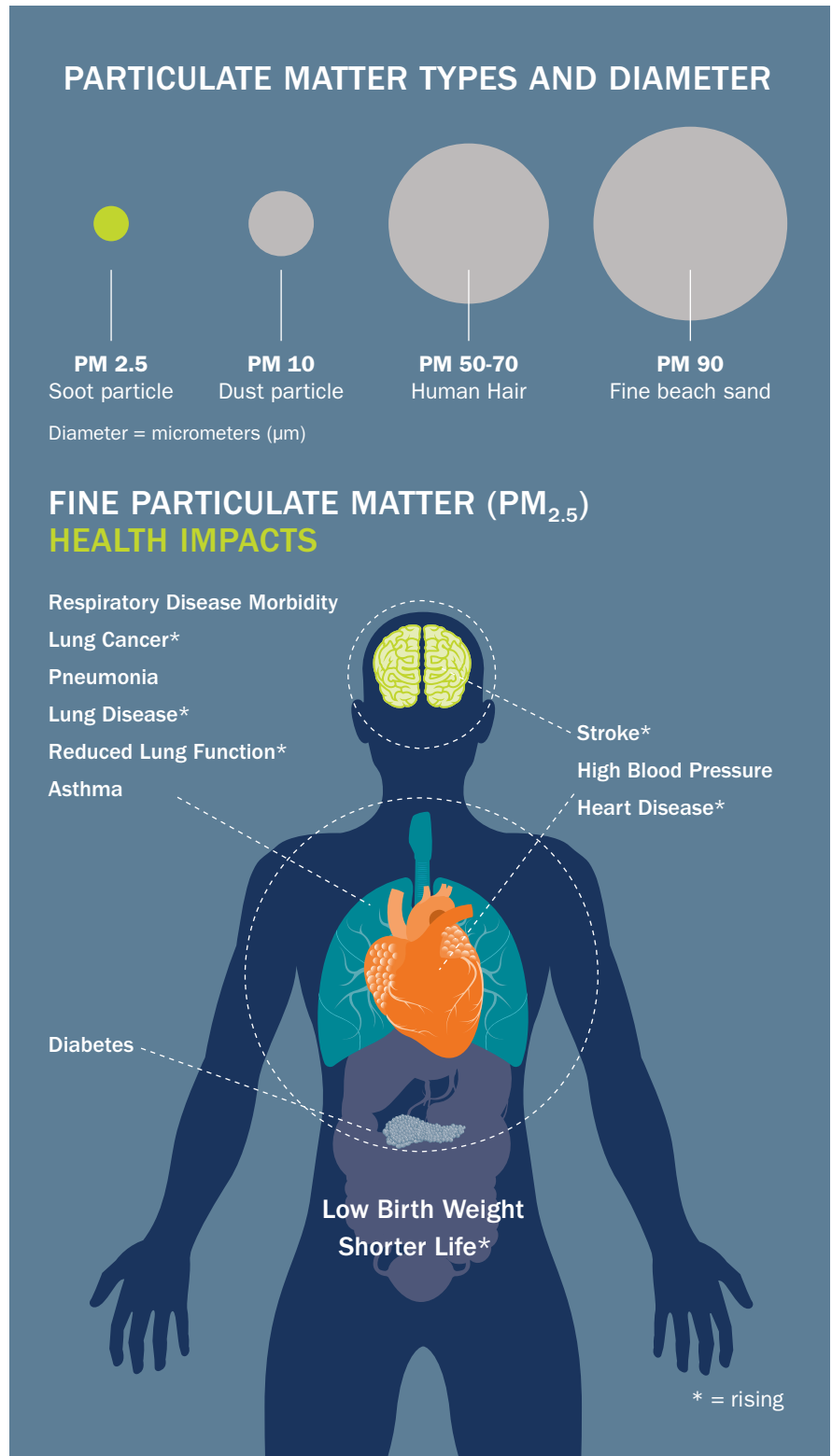
PM_{2.5} Health Impacts

PM_{2.5}

PM_{2.5} is a pollutant with suspended particles in the air that are 2.5 microns wide or smaller. PM_{2.5} particles are small enough to penetrate into the lungs and the bloodstream, causing health problems. PM_{2.5} is directly emitted from combustion (e.g. forest fires, wood burning, vehicle engines, debris burning), and can also form when other pollutants in the air undergo chemical reactions.

PM_{2.5} Health Impacts

PM_{2.5} particles in wood smoke pose a health risk to all people and disproportionately impact children, the elderly and people with asthma and other lung disease or heart conditions. Health Canada estimates that 1,200 British Columbians die prematurely every year due to air pollution from PM_{2.5}, nitrogen dioxide and ozone [2]. PM_{2.5} affects multiple organs and causes both acute and chronic health effects. Exposure to PM_{2.5} can lead to asthma attacks, chronic bronchitis and heart attacks. The long-term health impacts are significant and concerning as they affect the lungs and cardiovascular health. Furthermore there are many other emerging and rising health effects.



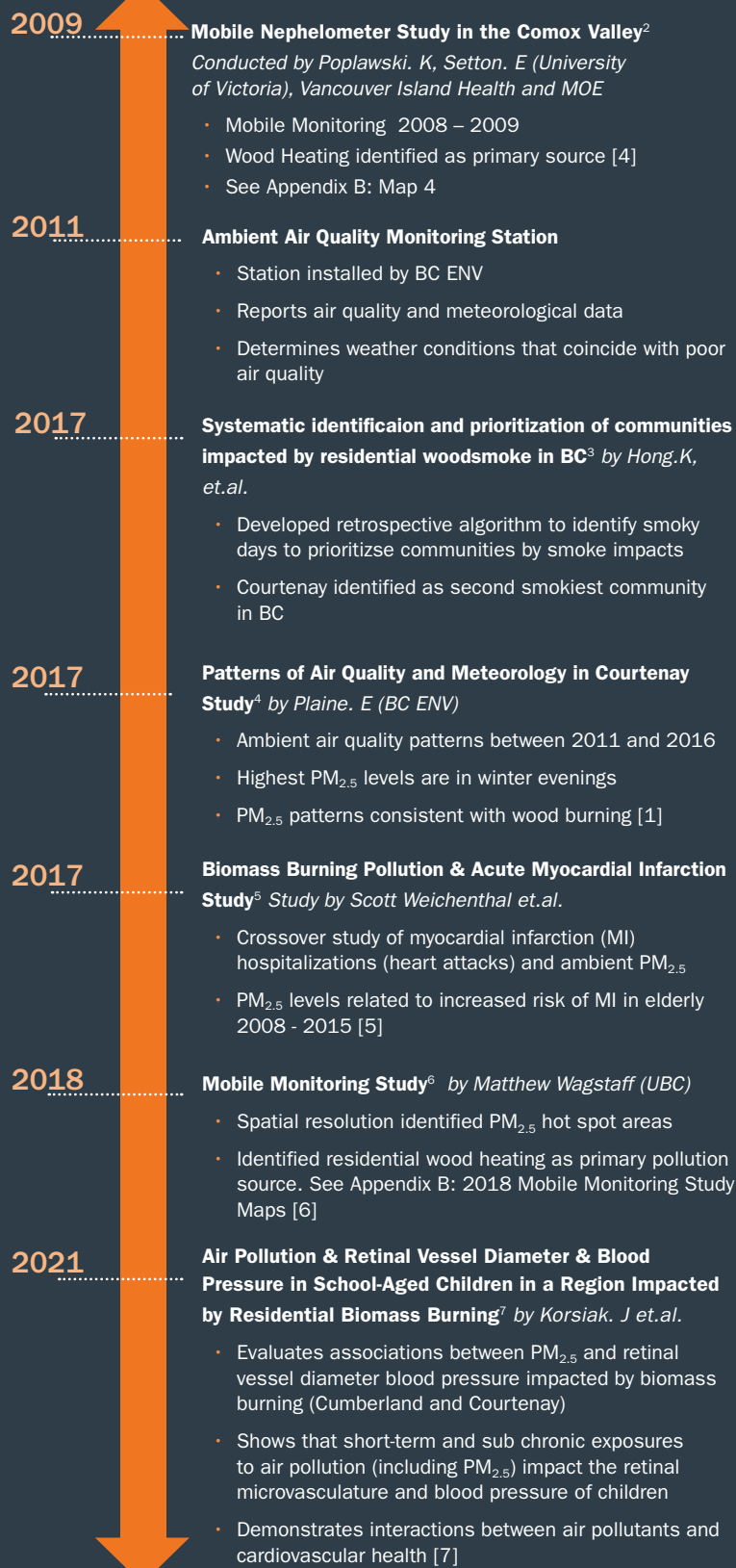
Comox Valley PM_{2.5} Levels

Several provincial and local government research and monitoring initiatives have contributed to the weight of evidence on PM_{2.5} levels and impacts in the Comox Valley. These include, stationary monitoring, mobile monitoring and a particulate matter inventory. Stationary monitoring contributes continuous data that is useful for identifying trends. Mobile monitoring is valuable for the identification of PM_{2.5} concentrations and hotspot locations. The particulate matter emissions inventory provides a holistic overview of PM_{2.5} sources. These various monitoring methods present data for research to better understand the public health and environmental impacts of PM_{2.5}.

The Comox Valley ambient air concentrations including PM_{2.5} and meteorology are measured and monitored by the Ministry of Environment and Climate Change Strategy (BC ENV) at the Courtenay ambient air station, under commitments to protect the health of communities. Monitoring shows that the Comox Valley has consistently exceeded Canadian Ambient Air Quality Standards (CAAQS) and BC Air Quality Objectives (AQOs). These acceptable limits are expressed as PM_{2.5} concentrations in micrograms per cubic metre (µg/m³) averaged over a 24 hour period or annually [3].

Air quality reports and real-time data from the Courtenay monitoring station are available on the BC Ministry's website and in the Georgia Strait Air Zone Reports¹. Real-time data is used to inform air quality advisories and the Air Quality Health Index (AQHI). Since 2012, the Comox Valley has exceeded the BC annual AQOs for PM_{2.5} every year except for 2016 and 2019 (see appendix A). Furthermore, Comox Valley PM_{2.5} levels have exceeded the BC 24-hour AQO every year except for 2019.

PM_{2.5} Research & Monitoring Timeline



1 <https://www2.gov.bc.ca/gov/content/environment/air-land-water/air/reports/latest-air-zone-reports>

2 http://www.llbc.leg.bc.ca/public/pubdocs/bcdocs2010/463390/viha2009airqualitymonitoringreport_1.pdf

3 <https://www.sciencedirect.com/science/article/abs/pii/S0269749116318292?via%3Dihub>

4 https://www2.gov.bc.ca/assets/gov/environment/air-land-water/air/reports-pub/courtenay_airquality_report_2011-2016.pdf

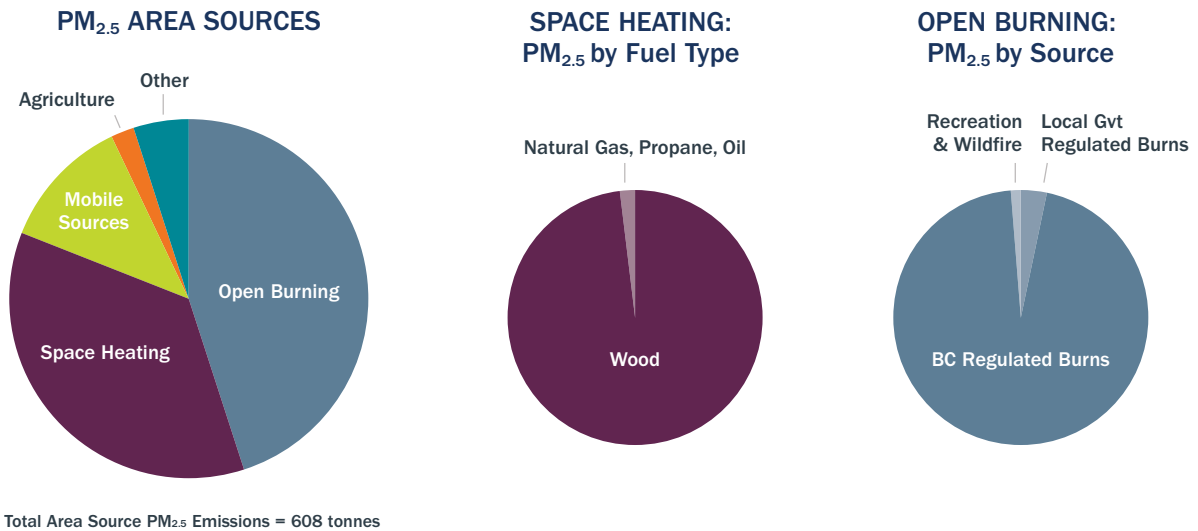
5 https://journals.lww.com/epidem/Fulltext/2017/05000/Biomass_Burning_as_a_Source_of_Ambient_Fine_5.aspx

6 <https://open.library.ubc.ca/media/stream/pdf/24/1.0371217/4>

7 <https://rdcu.be/deYlt>

Comox Valley Particulate Matter Emissions Inventory

PM_{2.5} Areas Sources



BC ENV compiled a Particulate Matter (PM) Emissions Inventory for the Comox Valley Regional District for 2015 (includes City of Courtenay, the Town of Comox, Village of Cumberland, CVRD Electoral Areas A, B and C and the K'ómoks First Nation). Emissions were computed for total particulate matter (i.e. PM₁₀ and PM_{2.5}) from various area sources including open burning, space heating and mobile sources. Open burning and space heating were identified as the top two dominant sources of PM_{2.5} [8].

Space heating contributed **36%** of PM_{2.5} pollution, 35% was generated from residential wood burning, and less than 1% from natural gas, propane and heating oil.

Open burning accounted for **45%** of the total PM_{2.5} emissions. Provincially-regulated pile and area burns contributed 41.5%. Municipally-regulated backyard burns and pile burns accounted for 3.5% and recreation and wildfires contributed less than

1%. Although forestry burn sites are a large source of PM_{2.5}, they are often remotely located and occur under stringent conditions. These conditions are in place to ensure that smoke from fire hazard abatement does not impact community public health and safety. Industrial burning from forestry occurs for two months of the year and only when the venting index is at acceptable levels for PM_{2.5} dispersement.

Uncaptured PM_{2.5} sources and factors

The inventory provides a quantitative account of PM_{2.5} emissions from area sources that include space heating, open burning, mobile sources and agriculture. Analysis of PM_{2.5} environmental risks, smoke concentration exposure and impacts are available in other research and monitoring studies. Uncaptured PM_{2.5} sources and factors include unregulated backyard burning, spatial context, timing, weather and meteorological conditions.

- **Unregulated Backyard Burning** - Backyard burning sometimes take place outside regulatory requirements, and such instances are not fully captured in the inventory.
- **Spatial Context** - PM_{2.5} pollution occurs in various spatial contexts and health impacts increase when emissions are concentrated and close to populated areas. Backyard burning is a smaller source of PM_{2.5} in the inventory and can have greater health impacts due to residential population proximity.
- **Timing** - Higher concentrations of PM_{2.5} can be associated with time of day and season. Winter months and evenings have higher levels of PM_{2.5} from

indoor wood heating in residential areas, meaning greater health impacts on larger populations.

- **Weather and Local Meteorological Conditions** - Winds, temperatures, humidity and atmospheric conditions can affect the dispersement of pollution and there is more PM_{2.5} accumulation with stagnant air. The venting index estimates how well the air disperses smoke and how well it will mix into the air.



Air Quality and Wood Smoke Management

Planning and Tools

Managing air quality is a multi-jurisdictional challenge: wood smoke emissions can be managed through regulations, standards and initiatives set by various levels of government and authorities. Additionally various partnerships have been developed for measuring air quality, outreach and education.

Air Quality Authority

The *Canadian Environmental Protection Act* (CEPA) coordinates the National Air Quality Management System (AQMS), which establishes limits on air pollutants for the protection of human health and the environment through the Canadian Ambient Air Quality Standards (CAAQS). CAAQS are set to keep air pollutants below the identified levels. When pollutants near or surpass standards, governments act to reduce those pollutant levels.

The primary authority for air management is the **BC Government** through the Environment Management Act. This is key legislation in regards to wood smoke and includes the following regulations:

- *Open Burning Smoke Control Regulation*: Makes provisions for open burning to minimize smoke, and human and environmental health risks [9].
- *Solid Fuel Burning Domestic Appliance Regulation*: Regulates wood-burning appliances to reduce pollution from wood smoke.

The *Wildfire Act and Regulation* is also key legislation that relates to open air burning as it specifies rules and regulations around fire use, fire prevention and wildfire control.

Local government air quality bylaws can be enacted under provisions of the Local Government Act or the Community Charter through land use planning and environmental policies and programs. Where bylaws cannot be developed, robust educational and incentive programs can be administered.

Measuring and Monitoring PM_{2.5}

In addition to the air quality research and studies, consistent and reliable monitoring is key to reducing emissions and for evaluating initiatives. The Courtenay monitoring station provides reliable real-time data that can be compared to CAAQS and BC AQOs. The Comox Valley had been identified as a ‘red zone’ in all the Georgia Strait Air Zone Reports from 2012 to 2018 and as an ‘orange zone’ from 2017-2020. ‘Red zone’ communities are those that exceed CAAQS and ‘orange zone’ communities are those where action is still needed to prevent CAAQS exceedance.

As an ‘orange zone’ community, it is pertinent to continue to reduce PM_{2.5} levels. The Comox Valley has one of the top PM_{2.5} levels in the Georgia Strait Air Zone communities and had the highest PM_{2.5} 24-hour metric and the second-highest PM_{2.5} annual metric in the 2018–2020 Georgia Strait Air Zone Report.

Although the Courtenay monitoring station provides reliable data it does not capture the spatial variations of PM_{2.5} pollution such as the hot spot areas identified in past mobile monitoring studies.



Partnerships

- Island Health has partnered with local governments for educational initiatives and provided resources, grants and support for programs such as the Wood Smoke Reduction Program.
- The Airshed Roundtable is a collaborative initiative supported by member municipalities, local health authorities, academia, BC ENV, and represented by various community stakeholders.
- The Ministry of Environment and Climate Change Strategy (BC ENV) and the BC Lung Foundation support the CVRD's Wood Smoke Reduction Program by providing grant funding through the B.C Community Wood Smoke Reduction Program.
- Municipal partners (the Village of Cumberland, Town of Comox and the City of Courtenay) continue to support regional air quality initiatives and are also represented on the Airshed Roundtable.

Local Regulations

- Local governments in the Comox Valley have adopted various wood-burning appliance regulations and bylaws that prohibit the installation of wood-burning appliances in new buildings and bylaws that address nuisance smoke emissions. These bylaws are listed in Appendix B Table 3.
- Open burning bylaws are for fire protection and regulation, these bylaws are mainly intended for

reducing the risk of fire and resulting property damage. There are various fire service areas and fire protection regulations in the Comox Valley. Fire protection and regulation bylaws are listed in Appendix B Table 4 and the Fire Service Areas are depicted on Map 1. Beach fire programs in CVRD Parks are temporarily suspended on poor air quality days when the AQHI reaches a rating above 10 (very high risk).

Education

- Education and outreach initiatives have been undertaken by the CVRD and local community groups including the Wood Smoke Reduction Program which aims to increase awareness of wood smoke impacts while incentivizing and encouraging the removal of wood-burning appliances.

The Wood Smoke Reduction Program is offered through funding from the Provincial Community Wood Smoke Reduction Program. The program aims to reduce wood smoke pollution by providing rebate incentives, education and outreach. Increased rebate amounts have been offered through additional funding from Island Health. Rebates are provided for switching out 5+ year old appliances in exchange for an electric heat pump. Enhanced rebates have been provided for hot spot areas (areas that were identified as having higher concentrations of wood smoke) [10].

Reducing Wood Smoke

The Roundtable explored and identified a core set of challenges and opportunities for the effective improvement of air quality in the Comox Valley. These were analyzed further by the working groups that were formed in the Roundtable process. This analysis was foundational in the development of targeted and appropriate actions.

Challenges

Awareness: Lack of public awareness on local wood smoke conditions, health impacts, spatial conditions, existing bylaws and wood smoke reduction initiatives and programs. This makes outreach and behavioural change challenging.

Acceptance: Existing strong cultural practices of burning will take time to change. Burning has been linked to social connections and the value of self-reliance.

Access: Lack of access to or knowledge of available alternatives such as heat pump installation requirements, accessing seasoned, dry wood and alternative yard waste disposal locations.

Economic: High upfront heating system replacement costs can be a barrier for low income households. Education is required on the health impact costs of wood-burning appliance use.

Regulatory: A complex regulatory landscape that lacks clarity on local government's authority in some areas. Also effective enforcement of bylaws can be resource intensive.

Data: Limitations to available data, particularly in relation to air pollution distribution levels over time. Only one permanent air quality monitor exists in the Comox Valley. There is a lack of information about the number and types of wood-burning appliances currently in use.

Opportunities

Policy Potential: Regional policy support and potential for alignment on air quality initiatives (e.g. through the Regional Growth Strategy and policies).

Previous Studies: Existing studies and research on the Comox Valley Air Quality provide a strong foundation for understanding the regional air quality issue.

Active Community Groups: Grassroots community groups in the Comox Valley provide and run active local programs.

Air Quality Improvements: There are general improvements in PM_{2.5} levels in the recent years as demonstrated in the 2018-2020 Georgia Strait Air Zone Report.

Increased Public Interest: Public interest in the air quality problem and exploring solutions to reduce PM_{2.5} levels has increased.

Alternative Heating Options: Increased options for wood-burning appliance switches and success stories of exchanges to cleaner heating appliances exist.



The Airshed Roundtable

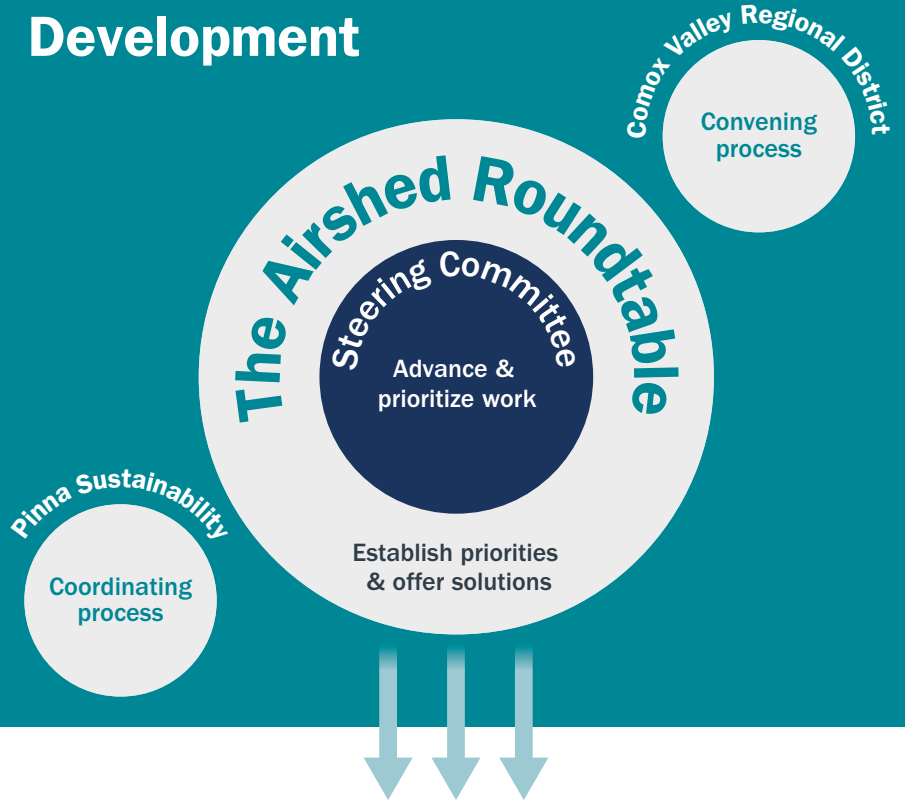
The CVRD launched the Airshed Roundtable initiative in Spring 2020 as a collaborative approach to tackle regional air quality. This was, in part, an effort to recognize the complexity of managing air quality in a community with divergent experiences and opinions about the role of wood burning. The Roundtable, appointed by the CVRD Board, is broadly represented by community members, non-profit organizations, and local industry. These members provided input and expertise on their understanding of the air quality issues in the Comox Valley, and pathways to improve air quality. The Roundtable primarily focused its understanding on the wood smoke issue and on PM_{2.5} pollution for air quality improvement in the Comox Valley. The Roundtable was supported by a steering committee comprising air quality and public health experts and local government staff, who provided direction and leadership to support strategic planning.

The **Regional Airshed Protection Strategy** is the culmination of the efforts of many organizations and individuals from the Comox Valley who came together as a Roundtable to define a vision, goals, strategies and implementation actions for clean and healthy air for everyone in the region.

The Process

Substantial input from the Roundtable in 2020 and 2021 developed the Regional Airshed Protection Strategy. The initial engagement focused on local air quality issues and the development of the Vision and Goals. Subsequent Roundtable meetings focused on smaller Working Groups that identified actions to achieve Goal 1. The Roundtable later convened to review the Working Group's outcomes considering Goal 2 and Goal 3. This engagement informed the Action Plan. Although the Action Plan focuses on PM_{2.5}, linkages to Climate Action will be part of Future Work.

The Airshed Roundtable Process in the Strategy Development



Vision

The Comox Valley has clean and healthy air, all year round for current and future generations

Goals

1 Achieve measurable reductions in PM_{2.5} to protect public health

2 Continually improve and expand knowledge of sources and impact of air pollution

3 Educate and involve the community in understanding and reducing the impacts of air pollution and the links to climate change

Future Work

Working Group 1

Reduce emissions from existing residential wood burning appliances

Working Group 2

Transition away from biomass systems in populated areas

Working Group 3

Eliminate the burning of yard waste in residential neighbourhoods

Action Plan

- 1** Reduce emissions from existing wood burning appliances
- 2** Transition away from using wood burning appliances, prioritizing densely populated areas
- 3** Eliminate biomass burning of yard waste and reduce emissions from recreational fires

- 4** Promote and advocate for alternatives to non-residential open burning
- 5** Expand air quality data collection and research to inform actions
- 6** Expand wood smoke education programs



The Comox Valley has clean and healthy air all year round, for current and future generations.

Vision Statement

Currently, areas in the Comox Valley experience recurring episodes of poor air quality that negatively affect the health of our residents. Our actions need to be effective in order to **continually improve air quality** while reducing greenhouse gas emissions to mitigate climate change where possible. Our initial focus is on **reducing fine particulate matter** – the air pollutant of greatest concern to the health of our Comox Valley residents. Achieving this vision is complex and will require **working together** and coordinating efforts across several governments, organizations, industry, and community members. **Engaging and involving community members** will be instrumental to our success.

Goals

- 1 Achieve measurable reductions** in fine particulate matter levels to protect public health.
- 2 Improve and expand** knowledge of sources and impacts of air pollution.
- 3 Educate and involve** the community in understanding and reducing the impact of air pollution and the links to climate change.

The three overarching goals were developed to support the vision and are foundational to guiding the actions. Most of the actions fleshed out in the working groups were developed from **Goal 1**.

Goals 2 and 3 will be accomplished by some of the 6 proposed actions and 3 will require further expansion and exploration.

The Roundtable demonstrated the need to focus on PM_{2.5} and the working groups were established from Goal 1: Achieve measurable reductions in fine particulate matter to protect public health.

The Airshed Protection Strategy Action Plan

Based on the input of the Airshed Roundtable, its working groups, and the Steering Committee, an action plan was developed. This action plan is intended to coordinate efforts and highlight actionable steps to improve air quality with a focus on wood smoke reduction and, in turn, PM_{2.5} in the Comox Valley.

Reading the Action Plan

The **Action Plan** contains six main actions to improve air quality through wood smoke reduction. These main actions include sub actions and are expanded to include **Key Steps**, **Key Partners**, **Current Initiatives** and **Similar Initiatives** as shown in below example. Actions are also categorized according to the activities and tools available for implementation.

Example

2 Transition Away from Using Wood Burning Appliances, Prioritizing Densely Populated Areas

The use of wood burning appliances in densely populated areas produces higher smoke concentrations that impact larger numbers of the population. Prioritizing populated areas will likely impact more people as compared to rural areas or sparsely populated areas. Core settlement areas can provide initial areas of focus (see Map 2: Core Settlement Areas Map). Core settlement areas are used in the Regional Growth Strategy to define areas where the existing population density is, and where the most significant growth is planned for the region. Rural areas are more dependent on wood burning appliances as a reliable heating option in power outage events.

2A **Collect, review and publish data comparing space heating options.** Various space heating options are available such as heat pumps. Incentivizing alternative heating options must consider the added benefits and consequences such as cost, equity, health and climate impacts.

Key Steps	Key Partners
<ul style="list-style-type: none">Update and compile information on appliance emissions, functionality, cost and health impacts.Work with property owners to use wood heating appliances as a secondary source of heating during power outages.	<ul style="list-style-type: none">Local GovernmentsProvincial GovernmentAcademic Institutions

Current Initiative:
Transition 2050 Residential Retrofit Acceleration Strategy

Similar Initiative:
Home Energy Navigator

Action Categorization

The sub-actions are organized by the type of activity required for the action (i.e. education, research, monitoring and bylaws). This aids in the identification of the capacity, resources and tools required for actions. For example if implementation of actions is dependent on grants identified for education, then educational actions can be easily selected. The following icons facilitate the categorization of activity types and tools required for the actions.



Research



Education



Monitoring



Bylaws

Action Plan Overview

1	Reduce emissions from existing wood-burning appliances
2	Transition away from using wood-burning appliances, prioritizing densely populated areas
3	Reduce emissions from recreational fires and eliminate yard waste burning
4	Promote and advocate for alternatives to non-residential open burning
5	Expand PM _{2.5} data research and collection to inform actions
6	Expand wood smoke education programs

1

Reduce Emissions from Existing Wood-Burning Appliances

Wood-burning appliances are a source of heat for many homes in the Comox Valley. Based on a home heating and air quality survey report for the Comox Valley conducted in 2018, 38% of respondents use wood-burning appliances, and 75% of those would like to change their heating source. The CVRD's Wood Smoke Reduction Program has been working to reduce emissions from existing residential wood-burning appliances through education and awareness, and by offering incentives to replace old wood-burning appliances with non-wood-burning heating appliances – which has directly led to the replacement of over 230 old wood-burning appliances in the region since 2016. Wood-burning appliances are not permitted in new residential buildings in the Town of Comox, The City of Courtenay and the Village of Cumberland have enacted bylaws that restrict wood-burning appliances. (See Appendix A Table 2). Wood-burning appliances who are allowed in new buildings in the CVRD electoral areas but must meet CSA or US EPA certification. Rebates are also available through the Wood Smoke Reduction Program to the entire CVRD for residents who replace their wood-burning appliance with a heat pump.



Collect and maintain data on operating wood-burning appliances. Data can provide direction on targeted efforts and resources to reduce smoke. Useful data may include: number and types of wood-burning appliances in use, frequency of use and sources of fuel. Maintaining this data provides a way to track progress being made and assess the effectiveness of rebates and incentives.

Key Steps	Key Partners
<ul style="list-style-type: none"> • Provide incentives for wood-burning appliance inspections. • Create targeted education and incentives from collected data. • Work with municipal building departments to promote rebates and incentive programs. • Develop a wood-burning appliances inventory (e.g., a door-to-door campaign). 	<ul style="list-style-type: none"> • Local Government • Health Authority • Provincial Government

Similar Initiative:

- Alberni Air Quality Society and Port Alberni Air Quality Council wood-burning appliance survey.¹



Develop targeted strategies to enhance cleaner burning education. Recognizing that some wood-burning appliances will continue to operate, it is important to reach people with wood-burning appliances to improve their burning practices.

Key Steps	Key Partners
<ul style="list-style-type: none"> • Leverage existing resources from the wood smoke reduction program for creative smart burning campaigns. • Disseminate updated information through retailers to clientele. 	<ul style="list-style-type: none"> • Local Government • Health Authority • Industry • Provincial Government

¹ <https://www.acrd.bc.ca/cms/wpattachments/wpID321atID3489.pdf>

- Incorporate additional education methods such as collaborative campaigns, courses and themed webinars.
- Coordinate and collaborate with member municipalities for educational campaigns.

Current & Similar Initiatives:

- CVRD’s Wood Smoke Reduction Program - Moisture meter campaign distributes moisture meters with smart burning tip brochures.
- Healthier Home Heating: Clear the Air Cowichan - Air quality education campaign (Cowichan Valley Regional District, Island Health and BC ENV).¹



1C

Review, evaluate and update local bylaws related to indoor burning. This includes the consideration of local bylaws and enforcement mechanisms such as plume visibility and opacity limits, no burn days during periods of poor air quality, wood-burning appliance registration and complaint mechanisms.

Key Steps	Key Partners
<ul style="list-style-type: none"> • Collaborate with local governments to identify potential bylaw mechanisms and effectiveness and areas of alignment. • Identify resource and enforcement requirements and feasibility for potential bylaws. • Establish process for the declaration of compliance for wood smoke appliance users. • Review and monitor bylaws to ensure effectiveness 	<ul style="list-style-type: none"> • Local Governments • Provincial Government

Similar Initiatives:

- Metro Vancouver Regional District Bylaw regulates the discharge of air contaminants from residential indoor wood-burning appliances, controls burning times, requires registration of wood-burning appliances and permits for operation. Users of residential indoor wood-burning appliances are required to submit a declaration of compliance with best burning practices.²
- District of Saanich Fire Prevention Bylaw - Includes opacity regulation.³
- The City of Port Alberni - Prohibits the installation of uncertified wood-burning appliances. Only wood pellets or untreated, non-contaminated, and seasoned wood with a moisture content of 20% or less shall be burned in a wood-burning appliance or fireplace.⁴
- Regional District of Alberni-Clayoquot Bylaw - Regulates solid fuel burning appliance emissions. Appliances must comply with CSA Standards. Non-compliant appliances are permitted to remain in service until July 1, 2024.⁵
- The City of Courtenay - Prevention of Public Nuisance Bylaw was amended to regulate smoke that visibly drifts on adjacent property and is a nuisance.

1 <https://www.youtube.com/watch?v=sOxtX9g6hZc>

2 https://metrovancover.org/boards/Bylaws/MVRD_Bylaw_1303.pdf#search=bylaw%201303

3 <https://www.saanich.ca/assets/Local-Government/Documents/Bylaws-and-Policies/fire-prevention-bylaw-2006-no-8807.pdf>

4 https://portalberni.ca/sites/default/files/bylaws/4802_SolidFuelBurning_tm.pdf

5 <https://www.courtenay.ca/EN/main/community/environment/air-quality/air-quality-bylaws.html>

2

Transition Away from Using Wood-Burning Appliances, Prioritizing Densely Populated Areas

The use of wood-burning appliances in densely populated areas produces higher smoke concentrations that impact larger numbers of the population. Prioritizing populated areas will likely impact more people as compared to rural areas or sparsely populated areas. Core settlement areas can provide initial areas of focus (see Map 2: Core Settlement Areas Map). Core settlement areas are used in the Regional Growth Strategy to define areas where the existing population density is, and where the most significant growth is planned for the region. Rural areas are more dependent on wood-burning appliances as a reliable heating option in power outage events.



Collect, review and publish data comparing space heating options. Various space heating options are available such as heat pumps. Incentivizing alternative heating options must consider the added benefits and consequences such as cost, equity, health and climate impacts.

Key Steps	Key Partners
<ul style="list-style-type: none"> • Update and compile information on appliance emissions, functionality, cost and health impacts. • Work with property owners to use wood heating appliances as a secondary source of heating during power outages. • Partner with academic institutions and organizations link to and build knowledge and resources such as the Residential Retrofit Acceleration Strategy. 	<ul style="list-style-type: none"> • Local Governments • Provincial Government • Academic Institutions

Current Initiative:

Transition 2050 Residential Retrofit Acceleration Strategy

The CVRD Regional Growth Strategy and Comox Valley Sustainability Strategy have adopted targets to reduce GHG emissions. The CVRD provides incentive support and promotion of CleanBC programs that improve home efficiency and support the transition to heat pumps.¹

¹ <https://www.comoxvalleyrd.ca/projects-initiatives/past-current-projects/transition-2050-residential-retrofit-acceleration>



2B

Assess the societal costs of wood-burning appliance smoke. More understanding on the societal costs of wood smoke can inform public policy on wood smoke particularly in relation to health care costs.

Key Steps

- Partner with local health institutions, local municipalities and academic institutions to coordinate and conduct research on health impacts and costs.

Key Partners

- Local Governments
- Provincial Government
- Health Authorities

Similar Initiatives:

- The Health and Economic Impacts of Residential Wood Burning in Metro Vancouver report (2017)¹ highlights annual cost benefits associated with PM_{2.5} reductions using four scenarios for two policy options. The cost benefits range from ~\$282 million to ~\$869 million.



2C

Expand financial support and education for wood-burning appliance removals.

Financial incentives and awareness of incentives encourage switches to healthier sources of heat, however low-income homes in particular face additional barriers to changing heat sources. Current incentive programs could be expanded to increase targeted areas, support low income residents and to align with climate related programs.

Key Steps

- Increase targeted incentives for homes in hotspot areas.
- Explore the establishment of no- or low-interest loans to ease transitions to new heat sources.
- Align with CleanBC and other climate action incentives and low-income support programs for heat pumps.
- Explore additional funding sources.
- Provide supports for rental properties using wood-burning appliances. Consider alignment with initiatives such as the CVRD's Poverty Reduction Strategy.

Key Partners

- Local Governments
- Provincial Government
- Health Authorities

Similar Initiative:

- The District of Saanich Home Energy Retrofit Municipal Financing Program provides up to \$12,000 in zero-interest financing to homeowners to encourage the replacement of oil heating with electric heat pumps².

¹ <https://metrovancover.org/services/air-quality-climate-action/Documents/health-economic-impacts-of-wood-burning.pdf#search=Air%20Quality%20Health%20and%20economic%20benefits>

² <https://www.saanich.ca/EN/main/community/sustainable-saanich/climate-change/programs-rebates/heat-pump-financing.html#:~:text=The%20District%20>



2D

Develop local bylaws to phase out use of wood-burning appliances in densely populated areas.

Air quality data and studies in the Comox Valley demonstrate high levels of wood-burning appliance pollution linked to health impacts. Developing bylaws to phase out wood-burning appliances is an effective step to reducing emissions from wood-burning appliances.

Key Steps	Key Partners
<ul style="list-style-type: none"> • Build on action 1.C: To review, evaluate and update local bylaws related to indoor burning, and incorporate bylaws that phase out the use of wood-burning appliances. 	<ul style="list-style-type: none"> • Local Governments • Provincial Government

Current & Similar Initiatives:

- Town of Comox, Village of Cumberland and City of Courtenay have “no new installation bylaws” to prevent the increase in wood-burning appliances in their communities (See Appendix B Table 2).
- Metro Vancouver Regional District Residential Indoor Wood Burning Emission Regulation Bylaw No. 1303 - Requires the registration of wood-burning appliances in urban containment areas. Registered appliances must meet required emission standards and non registered appliances will be restricted in September 2025. Bylaw renewal and restricted use conditions will be updated every three years¹

¹ http://www.metrovancouver.org/boards/Bylaws1/MVRD_Bylaw_1303.pdf

3

Reduce Emissions from Recreational Fires and Eliminate Yard Waste Burning

Recreational fires: Small recreational fires are allowed in the Comox Valley under various conditions outlined in the fire protection and regulation bylaws. The bylaws outline permit requirements, size of fire, location and time. Locational restrictions include commercial, industrial and comprehensive development areas, and in some areas recreational fires are only allowed in designated campgrounds and tourist parks. Recognizing the cultural and social aspect of occasional small recreational campfires and cooking fires where permitted, smoke from recreational fires must be minimized. Smart burning tips and adherence to recreational fire bylaws and regulations require ongoing education and emphasis.

Yard waste: Yard waste burning for the CVRD Electoral Areas is also specified in the fire protection and regulation bylaws. These outline yard burning conditions including permit requirements, season, time and fire size. Comox, Cumberland and Courtenay have curbside collection programs where yard waste can be picked up. The CVRD Electoral Areas do not have yard waste pick up. Therefore residents are responsible for setting up their own curbside pick-up through private providers, or taking their waste to the one of the Comox Strathcona Waste Management facilities. Results from a survey by the CVRD in 2020 showed residents managed yard waste as follows: 49% personal composting, 28% burn when they are allowed, 11% take waste to the landfill, and 5% to private facilities.¹



3A

Identify the needs, options and alternatives for debris disposal for all areas.

Understanding the alternatives to burning yard debris in serviced areas is required to support program expansion.

Key Steps

- Identify the population without a pickup program, and the biomass types that residents manage.
- Use information collected to inform the program and bylaw updates.

Key Partners

- Local Government

Similar Initiative:

- Regional District of Central Okanagan Mow/chip/rent-buy-it rebate program.²
- Comox and Cumberland: Municipal pilot to test composting technology at Comox Valley Waste Management Centre (SkyRocket compost for sale)

¹ <https://www.cswm.ca/organics/regional-organics-compost-project/past-engagemet>

² <https://www.rdco.com/en/environment/wood-waste-disposal.aspx>



Provide outreach and education on composting, chipping and other alternatives to yard waste burning. Raise awareness of the alternative options to burning yard waste and wood smoke impacts from yard waste management on neighbours.

Key Steps	Key Partners
<ul style="list-style-type: none"> • Provide education on alternatives to burning. • Educate and provide outreach for “no burn days” and the air quality venting index. 	<ul style="list-style-type: none"> • Local Government



Expand current chipping program to include smoke control measures and consider the establishment of a permanent program. In 2020, the CVRD delivered the pilot curbside yard-waste chipper program funded by the provincial Community Resiliency Investment (CRI) grant. The program provided residents with an alternative to burning yard waste. Yard waste was collected and chipped curbside by mobile chippers and delivered to CVRD composting facilities. This reduced wood smoke and lessened wildfire fuel load and subsequent hazards. Although the program benefits included wood smoke reduction, the program was intended to reduce the risk of wildfires and mitigate their community impacts.

Key Steps	Key Partners
<ul style="list-style-type: none"> • Identify an alternative authority to operate the chipping program, and expand the program to include areas identified in action 3A: Identify the needs, options and alternatives for debris disposal for all areas. • Explore expansion of chipping program with smoke control measures. • Establish initiatives that allow mulching on property for yard work purposes, and exchange incentives for participation such as bonus composted material. These must align with as the “FireSmart” best practices.¹ 	<ul style="list-style-type: none"> • Local Governments

Similar Initiative:

- Community Resiliency Investment Funding Program. The 2020 program removed ~65 tons of wood chips from ~485 residential properties.

¹ <https://firesmartbc.ca/resource/landscaping-guide/>



3D

Review and identify opportunities to update local outdoor burning bylaws. Electoral areas and improvement districts each have separate and unique regulations. The intent of these bylaws are for fire safety under the jurisdiction of the fire departments and not for air quality.

Key Steps

Key Partners

- Create local government group to review current bylaws.
- Develop guidelines and potential bylaw amendments for alignment.
- Identify feasibility, enforceability and promoting compliance with permits and regulations.

- Local Governments
- Provincial Government



3E

Develop educational materials and messages to minimize smoke from recreational fires. Where recreation fires are permitted awareness and education on minimizing smoke, venting index and weather conditions must be communicated continually.

Key Steps

Key Partners

- Develop creative ways for education and information dissemination.
- Provide education for recreational burning in permitted areas such as campfire park programs (i.e. Goose Spit Park, Joe Walker Park & Royston Marine Drive Park)
- Establish smart burning tip campaign customized for recreational fire burning.

- Local Governments
- Provincial Government

Current and similar Initiative:

- CVRD Wood Smoke Reduction Program Smart Burning Campaign.
- US EPA Burn Wise Program. Provides tips for backyard recreational fires.¹
- American Lung Association Learn Before You Burn. Provides information and resources on backyard fires.²

1 <https://www.epa.gov/burnwise>

2 <https://www.lung.org/local-content/mn/learn-before-burn>

4

Promote and Advocate for Alternatives to Non-Residential Open Burning

Non-residential open burning occurs outside of residential properties for land clearing, agricultural waste burning, and fire abatement (prevention) in woodlots and large forest operations. The management, potential alternatives, materials and applicable regulations differ. Air quality for all open burning activities within the CVRD is regulated by the Open Burning Smoke Control Regulation (OBSCR). The large forest operations in the region are signatories to the *West Coast Fuel-Smoke Management Plan* which outlines additional air quality best management practices that are to be followed. Open burning is regulated by fire protection service area and fire protection an regulation bylaws (see Appendix B: Table 4). For areas where there is no Fire Protection Service Area bylaw then the Wildfire Act and Regulation apply. Recent and updated fire safety laws and information are available through local fire departments.



4A

Identify and assess sources and quantity of material that could be diverted to compost facilities. Understanding the region’s capacity for managing organic debris from more sources will aid the development of a targeted response to non-residential open burning. This includes understanding the the capacity of local facility debris management as wood chips need further management and time for safe composting.

Key Steps	Key Partners
<ul style="list-style-type: none"> • Review of local capacity to manage organic material. • Review the amount and type of material requiring management. • Acquire data via surveys, local burn permit records or academic research initiatives. 	<ul style="list-style-type: none"> • Local Governments • Provincial Government



4B

Identify and research fuel abatement opportunities for non-harvested lands and communicate results. Major forestry land owners are mandated for debris management best practices in operations. Other land owners, such as woodlots, do not have similar mandates and may benefit from information on how to manage debris using alternatives to burning or using practices that minimize smoke from burning when needed.

Key Steps	Key Partners
<ul style="list-style-type: none"> • Collaborate with academic groups to research fuel abatement best practices and debris management on other managed properties including parks, agricultural areas, and land clearing for development. 	<ul style="list-style-type: none"> • Local Governments • Academic Institutions

- Communicate and provide education on fuel abatement alternatives such as an agricultural chipper program, land spreading, preservation of some trees in land clearing for ecological benefits.

Similar Initiatives:

- Regional District of Central Okanagan Agricultural Wood Waste Chipping Program (Okanagan Air Quality Free chipping program).
- Regional District of Central Okanagan Mow/chip/rent-in rebate program. Provides rebates for farmers/orchardists to manage wood waste on their property.¹



Build an understanding of the holistic nature of non-residential wood burning and raise awareness of industry best practices. Outdoor burning management can be complex due to multiple land owners under different regulations and mandates, also having different materials, contexts, economics and land management issues.

Key Steps	Key Partners
<ul style="list-style-type: none"> • Build communications material to accompany outreach efforts highlighting the different land management and economics. • Integrate concepts relating to climate change, including maximizing carbon sinks and minimizing black carbon emissions. 	<ul style="list-style-type: none"> • Local Governments • Academic Institutions • Industry



Assess the biomass market development opportunities. The Province supports biomass market development opportunities in regions where forestry is primarily public land (known as the Forest Carbon Initiative). This is not available to Comox Valley operations as they are on private lands.

Key Steps	Key Partners
<ul style="list-style-type: none"> • Conduct research on the various land management and economic opportunities on private lands for fibre utilization e.g) wood waste use for bio energy, pulp paper and other products and long-lived wood composite products. • Integrate climate change concepts in biomass market opportunity assessments e.g) maximizing carbon sinks, tree improvement and minimizing black carbon emissions. 	<ul style="list-style-type: none"> • Local Governments • Provincial Government

¹ <https://www.rdco.com/en/environment/wood-waste-disposal.aspx>

² <https://www2.gov.bc.ca/gov/content/environment/natural-resource-stewardship/natural-resources-climate-change/natural-resources-climate-change-mitigation/forest-carbon-initiative>

5

Expand PM_{2.5} Data Collection and Research to Inform Actions

Expanding local pollution data and exposure impact information can improve actions, policies, and regulations to reduce PM_{2.5}. In addition, there is a need to expand the existing air quality monitoring and support research



5A

Expand air quality monitoring networks for education and to conduct ongoing data analysis. There is currently one permanent monitoring station in the region. Given the results of mobile monitoring studies, this station does not typically reflect the spatial variation in smoke emissions and PM_{2.5} concentrations, which may result in “hot spots” where PM_{2.5} levels can be higher than what is captured by a single station.

Key Steps

- Establish a low-cost monitoring network in the Comox Valley, similar to other networks in BC.
- Analyze the expanded monitoring data and report findings to guide and inform further action.
- Advocate to the Province for additional monitoring stations.

Key Partners

- Local Governments
- Community Groups
- Provincial Government
- Environment and Climate Change Canada (ECCC)

Similar Initiatives:

- Environment and Climate Change Canada (ECCC) Small Low-Cost Air Quality PM Sensor Pilot Project: (ECCC) has undertaken a nationwide initiative of supporting low-cost PM_{2.5} monitoring in partnership with First Nations, local and provincial governments, and interested stakeholders. The main objective of this project is to expand current air quality monitoring networks, especially in areas with limited or no air monitoring coverage. Under this initiative, communities can obtain and operate PurpleAir sensors for PM_{2.5} monitoring in partnership with ECCC, BC ENV and citizen groups.
- City of Courtenay PurpleAir Monitoring Network. Through this initiative 10 PurpleAir monitors were installed on public buildings across the city providing real time air quality readings to support educational initiatives.
- Cowichan Valley Regional District PurpleAir Monitoring Network.¹ The Cowichan Valley Regional District worked with partners to establish a neighbourhood sensor network that provides real time air quality readings.



5B

Conduct studies and mobile monitoring to fill network gaps. Regional academic mobile monitoring studies have deployed instruments for short periods, at temporary locations.

¹ <https://www.cvrld.ca/2187/Air-Quality-Mapping>

Mobile monitoring has provided samples from various geographical points and pockets in the region. This has provided insight for “hot spots” as areas with greater pollution

Key Steps	Key Partners
<ul style="list-style-type: none"> • Collaborate with an academic groups to undertake additional updated mobile monitoring studies. 	<ul style="list-style-type: none"> • Local Governments • Provincial Government • Academic Institutions

Similar Initiative:

- Monitoring Residential Wood Smoke in British Columbia Communities Study (Monitored Whistler, Courtenay and Vanderhoof) ¹



Identify and establish academic partnerships for research projects. A number of actions identified in this strategy would benefit from additional academic partnerships or support and professional research projects. These include:

- 2A & 2B: Collect, review and publish data comparing space heating options, including PM_{2.5} emissions, climate impacts and societal costs
- 4A: Assess the type and quantity of biomass material, and capacity for managing additional material in local compost facilities.
- 4B: Research fuel abatement opportunities for non-harvested lands.
- 5B: Conduct mobile monitoring study to fill gaps in the monitoring network.
- Research fuel abatement opportunities for non-harvested lands and use results for *Action 4B: Identify and research fuel abatement opportunities for non-harvested lands and communicate results.*
- Identify partnerships and to conduct mobile monitoring study to support *Action 5B: Conduct mobile monitoring study to fill gaps in the monitoring network.*

Key Steps	Key Partners
<ul style="list-style-type: none"> • Identify and prioritize research projects and initiatives. • Coordinate and promote prioritized research projects to academic institutions. • Source funding and support grant applications for research initiatives. 	<ul style="list-style-type: none"> • Local Governments • Provincial Government • Academia

¹ <https://open.library.ubc.ca/media/stream/pdf/24/1.0371217/4>

6

Expand wood smoke impact education programs

Various educational initiatives for wood smoke impacts are active in the Comox Valley. These initiatives include partnerships with local community groups, government and health authorities. Ongoing campaigns and or creative multi-stakeholder collaboration will support and increase awareness and education.



6A

Align education and communication initiatives from the Wood Smoke Reduction Program with the Action Plan.

Key Steps

- Obtain testimonies and feedback from residents on experiences with the Wood Smoke Reduction Program. This includes residents impacted by wood smoke and residents that have exchanged wood-burning appliances for heat pumps.
- Incorporate findings from research and monitoring from the Regional Airshed Protection Strategy such as health impacts, costs, monitoring initiatives with the Wood Smoke Reduction Program.

Key Partners

- Local Government
- Provincial Government
- Community Groups
- Health Authority

Similar Initiative:

- Fraser Basin Council (FBC) wood smoke education course.¹



6B

Identify and incorporate creative and collaborative educational campaigns on wood smoke reduction impacts.

Key Steps

- Identify and align messaging with local governments, Island Health, BC ENV and BC Wildfire.
- Integrate messaging into existing and new communication tools and education campaigns such as newsletters, signage and webinars.
- Plan educational campaigns that focus on specific themes including health impacts, smart burning tips, available rebates and alternative appliance options.

Key Partners

- Local Government
- Provincial Government
- Community Groups
- Industry

Current and Similar Initiatives:

- CVRD smart burning and education campaigns include advertising and in person events (e.g. Spring and Fall Home Shows)
- San Francisco Bay Area Spare the Air Program creatively incorporates messaging to emphasize the health impacts.²

¹ https://www.fraserbasin.bc.ca/WoodSmokeCourse/story_html5.html

² <https://www.sparetheair.org/>



6C

Plan and implement educational events, courses and webinars.

Key Steps

- Identify opportunities for strategic/themed educational campaigns.
- Source grant funding and support applications to fund research initiatives.
- Leverage existing communications to expand outreach by adding air quality AQHI and VI widgets, targeted flyers.

Key Partners

- Local Government
- Provincial Government
- Community Groups
- Health Authority



Implementation

The implementation of the Strategy is an iterative process and periodic adjustment will be required. The action plan in the previous section identifies various approaches to address air quality in the Comox Valley. The actions cannot be implemented simultaneously due to resources, timing and jurisdictional considerations.

The Airshed Protection Strategy is a resource that can be utilized by various collaborative and municipal initiatives to improve air quality. Actions can be prioritized based on identified criteria such as resources, jurisdictional control and ability to achieve more than one goal. Appendix B provides a sample prioritization criteria and evaluation process that can be used to guide implementation. Prioritization does not undermine other actions but helps identify the most efficient and effective implementation approaches.

Funding and Resources

The Strategy was developed as an initiative under the CVRD's Regional Growth Strategy service area. The CVRD committed to complete this Strategy and begin its implementation, with the support of multiple committed government, community and industry organizations. The CVRD does not currently have a service to address air quality. Ensuring the medium and longer-term success of the Strategy will involve identifying a stable source of funding, and partnerships for ongoing implementation.

Ongoing Multi-Agency Committee

The development of the Strategy has been a multi-agency effort, with substantial input and effort from members of the Steering Committee and the Roundtable. The input of these participants has been invaluable and is greatly appreciated. Existing members of the Steering Committee have committed to this process and will continue to be involved in the first year of implementation to support and champion initiatives, and to seek alignment with similar initiatives underway in their realms. Following the first year of implementation, a renewed multi-agency committee with ongoing input, support and leadership from its members, will be integral to medium and longer-term success of the Strategy.

Monitoring and Reporting

Under the current initiative, the CVRD committed to providing periodic reports on the development and implementation of the Strategy. The Strategy is an iterative document to be updated periodically as required. Other related reporting to date include:

- **State of the Air Memo (2020)**
- **Regional Airshed Roundtable Year 1 Report (2021)**
- **Staff reports, roundtable meeting presentations**
- **Draft Wood Smoke Reduction Strategy 2022 (Initial iteration of this report). It is recommended that an implementation status report be provided within one year of adoption by the board.**

Periodic reports will serve to state progress on the Strategy and identified initiatives. Reports can include updated air quality monitoring data for the region, as provided by the BC ENV, developed metrics for progress reporting and updated approaches based on lessons learned.

Other Considerations and Limitations

Other emission sources and air pollutants were not explored in detail due to limited resources and prioritization of PM_{2.5} as the main pollutant of concern. The Strategy follows the direction of the Airshed Roundtable to focus on wood smoke as the primary issue. Although other pollutants and emission sources related to transportation and climate action were not explored in detail, there is opportunity to include these emissions in the subsequent strategy reporting and updates.



Glossary

Air zone – Air Zone Management is used to assist with air quality management, provinces and territories have defined smaller geographic areas called air zones that divide their jurisdictions and that have unique air quality characteristics. These characteristics may include pollutant sources, topography, meteorological patterns, population density and other potential factors that influence ambient air concentrations.

Airshed – An airshed is a region sharing common airflow patterns hindered by local features, such as mountains and weather, and often exposed to similar levels of air pollution.

AQHI – The Air Quality Health Index is a scale (1–10+) designed to help understand what the quality of the air around us means to our health. It is a tool developed by health and environmental professionals based on air pollutants levels including PM_{2.5} and is used to communicate the health risk posed by air pollution.

AQMS – The Air Quality Management Systems is a comprehensive and collaborative approach by federal, provincial and territorial governments to reduce the emissions and ambient concentrations of various pollutants of concern.

AQOs – Air Quality Objectives are adopted air quality objectives and standards for a number of contaminants, including Particulate Matter (PM₁₀ and PM_{2.5}), ozone, sulphur dioxide, nitrogen dioxide and carbon monoxide.

BC ENV – The Ministry of Environment and Climate Action Strategy is responsible for the effective protection, management and conservation of BC's water, land, air and living resources. It leads work on climate preparedness and adaptation and leads plans to meet greenhouse gas reduction targets.

CAAQS – The Canadian Ambient Air Quality Standards are developed as a key element of the Air Quality

Management System to drive improvement of air quality across Canada. CAAQS have been developed for nitrogen dioxide (NO₂), sulphur dioxide (SO₂), fine particulate matter (PM_{2.5}) and ozone (O₃). Ongoing reviews of the CAAQS help ensure they reflect the latest scientific information. The CAAQS are established as air quality objectives under the *Canadian Environmental Protection Act, 1999*.

Campfire – An open fire that burns piled material no larger than 0.5m in width and 0.5m in height used for recreational purposes.

CEPA – The Canadian Environmental Protection Act is an Act respecting pollution prevention and the protection of the environment and human health in order to contribute to sustainable development.

CSA Standard – The Canadian Standards Association is a Canadian standards development organization that develops and maintains consensus standards to help protect the health and safety of Canadians, enhance Canadians' quality of life, protect the environment, and facilitate trade.

CSA-B415.1 standard. Performance Testing of Solid Fuel-Burning Heating Appliances. The standard specifies requirements for performance testing of solid-biofuel-burning heating appliances, including maximum emission rates.

MI – Acute Myocardial Infarction is also known as a heart attack, it is a life-threatening condition that occurs when blood flow to the heart muscle is abruptly cut off, causing tissue damage.

Nephelometer – Instrument used for measuring air quality to estimate PM_{2.5} an instrument for measuring the size and concentration of particles suspended in a liquid or gas, especially by means of the light they scatter.

OBSCR – The *Open Burning Smoke Control Regulation*

regulates land clearing, forestry operations and agriculture, giving the conditions when and where open burning is allowed. It applies to several categories of fire use i.e. category 2 & 3. When diameter exceeds 3cm (partial) and 10cm (full) for local and provincial jurisdictions. Does not apply to campfires or resource management open fires. Also addresses venting and fuel conditions for open burning.

PM_{2.5} – Fine particulate matter are liquid or solid airborne particles smaller than 2.5 micrometres (μm) in diameter. PM may be classified as primary or secondary, depending on the process that led to its formation. PM exists in various sizes and the particles of most concern for human health are those with a diameter of less than 2.5 micrometres.

PM₁₀ – Fine particulate matter are liquid or solid airborne particles smaller than 10 micrometres (μm) in diameter.

RGS – The Comox Valley Regional Growth Strategy is a shared vision for managing growth and community impacts in our diverse urban and rural neighbourhoods. It is a commitment made by the Comox Valley Regional District (CVRD), the City of Courtenay, the Town of Comox, and the Village of Cumberland to work together to promote communities that are socially, economically and environmentally sustainable for generations to come. The RGS is implemented within each community through local Official Community Plans, Infrastructure Plans, and regulatory tools such as zoning.



SFB DAR – The *Solid Fuel Burning Domestic Appliance Regulation* requires solid fuel burning appliances sold in BC to meet certified emission standards, and regulates that only untreated seasoned wood or wood products can be burned.

Temperature Inversion – A temperature inversion is a reversal of the normal behaviour of temperature in the troposphere (the region of the atmosphere nearest to the Earth’s surface in which a layer of cool air at the surface is overlain by a layer of warmer weather. Air temperatures usually decreases with height under normal conditions.

The Roundtable – The Airshed Roundtable is a collaborative framework that was established direction from the CVRD Board on September 17, 2019 to create a collaborative framework for improving air quality in the Comox Valley.

TPM – Total Particulate Matter is particulate matter 10 microns and smaller in aerodynamic diameter and particulate matter 2.5 microns and smaller in aerodynamic diameter.

US EPA – The US Environmental Protection Agency is an environmental agency that is responsible for developing and enforcing regulations to protect the environment. The “EPA Standard” means the “New Source Performance Standards, Title 40, Part 60, Sub-part AAA of the Code of Federal Regulations (USA) (7-1-02 Edition)”.

VI – The Ventilation Index is a forecast released daily by Environment and Climate Change Canada. It estimates how well the atmosphere disperses smoke on any given day. The index is similar to a weather forecast, except it provides information on how well smoke will mix into the air.

West Coast Fuel Smoke Management Plan – The West Coast Fuel Smoke Management Plan standardizes smoke management best practices for major forestry companies in the west coast, providing a pathway to maximize opportunities to abate fire hazards and manage smoke emissions responsibly and appropriately. The signatories agree to open burning subject to conditions for a defined period, in a defined area, during which the conditions are assessed for their effectiveness in reducing fire hazard. The Plan provides a forum to ensure that the smoke from fire hazard abatement does not impact communities, public health and safety. The plan includes developing best management practices for piling, curing, and burning woody debris within their operating areas.

Wildfire Act and Regulation – specifies rules and regulations around fire use, fire prevention and wildfire control. It regulates open burning on provincial crown land. Applies on private land and within a local jurisdiction when: there is no structural fire department assigned/responsible for responding to fire in a given





References

- 1 BC Ministry of Environment and Climate Change Strategy. (2017). *Patterns of Air Quality and Meteorology in Courtenay B.C. 2011-2016*. Retrieved from: https://www2.gov.bc.ca/assets/gov/environment/air-land-water/air/reports-pub/courtenay_airquality_report_2011-2016.pdf
- 2 Health Canada. (2021). *Health Impacts of Air Pollution in Canada: Estimates of morbidity and premature mortality outcomes*. Retrieved from: <https://www.canada.ca/en/health-canada/services/publications/healthy-living/health-impacts-air-pollution-2021.html>
- 3 BC Ministry of Environment and Climate Change Strategy. (2012-2020). *Georgia Strait Air Zone Reports*. Available at: <https://www2.gov.bc.ca/gov/content/environment/air-land-water/air/reports/latest-air-zone-reports>
- 4 Poplawski, K., Setton, E. (2009). *Monitoring of Fine Particulate Matter (PM2.5) in the Comox Valley Regional District, BC*. Retrieved from: https://www.llbc.leg.bc.ca/public/pubdocs/bcdocs2010/463390/viha2009air-qualitymonitoringreport_1.pdf
- 5 Weichenthal, S., Kulka, Ryan, et al. (2017). *Biomass Burning as a Source of Ambient Fine Particulate Air Pollution and Acute Myocardial Infarction*. Retrieved from: https://journals.lww.com/epidem/Full-text/2017/05000/Biomass_Burning_as_a_Source_of_Ambient_Fine.5.aspx
- 6 Wagstaff, M. 2018. *Monitoring Residential Woodsmoke in British Columbia Communities*. Retrieved from: <https://open.library.ubc.ca/media/stream/pdf/24/1.0371217/4>
- 7 Korsiak, J., Perepeluk, K, et al. (2021). *Air Pollution and reitnal vessel diameter and blood pressure in school-aged children in a region impacted by residential biomass burning*. Retrieved from: <https://pubmed.ncbi.nlm.nih.gov/34140605/>
- 8 RWDI Air. (2017). *Particulate Matter Emissions Inventory for the Comox Valley 2015 Base Year*. Retrieved from: https://www2.gov.bc.ca/assets/gov/environment/air-land-water/air/reports-pub/comox_valley_pm_emissions_inventory.pdf
- 9 Ministry of Environment and Climate Change Strategy. (2023) *Open Burning Smoke Control Regulation*. Available at: <https://www2.gov.bc.ca/gov/content/environment/air-land-water/air/air-pollution/smoke-burning/regulations/openburningregulation>
- 10 Comox Valley Regional District. (2023). *The Wood Smoke Reduction Program*. Available at: <https://www.comox-valleyrd.ca/projects-initiatives/past-current-projects/wood-smoke-reduction-program>

Appendices

Appendix A

PM_{2.5} Metrics, Standards and Management Levels

Appendix B

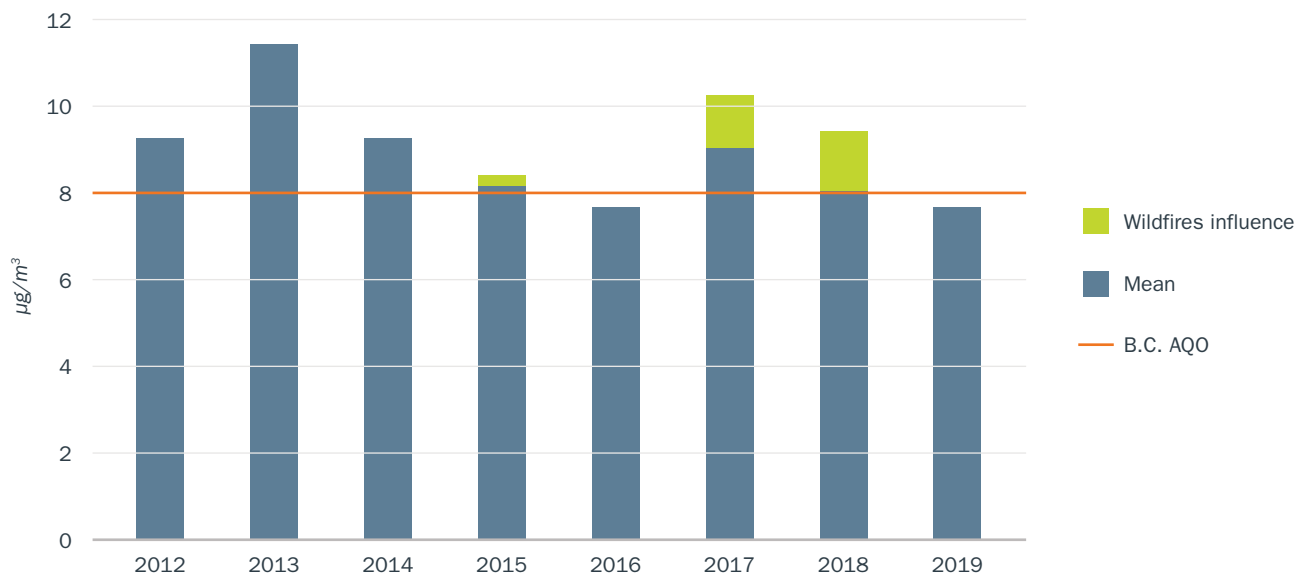
Comox Valley Air Quality Related Regulations and Programs

Appendix C

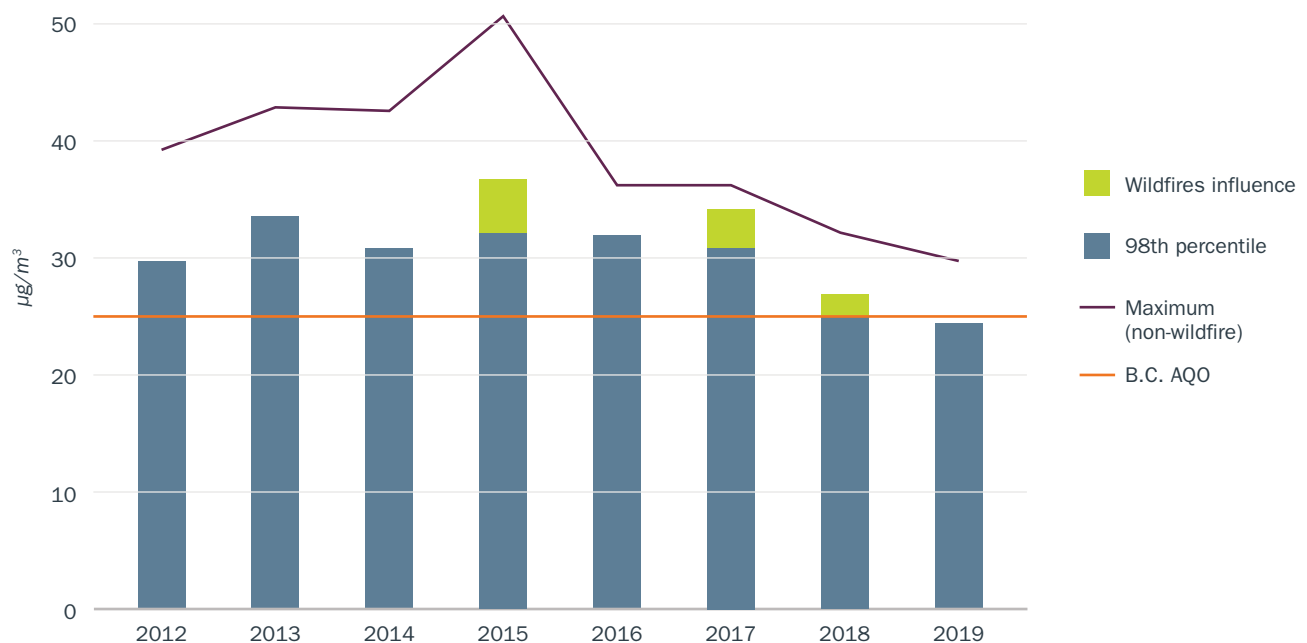
Sample Prioritization Criteria

Appendix A: PM_{2.5} Metrics, Standards and Management Levels

Comox Valley PM_{2.5} Annual Metrics Relative to BC Air Quality Objectives (AQOs)



Comox Valley PM_{2.5} 24-hour Metrics Relative to BC Air Quality Objectives (AQOs)



Federal Standard and Provincial PM_{2.5} Objectives [2]

Averaging Period	Federal Standard (µg/m ³)	Provincial Objective (µg/m ³)
24 hour	27	25
Annual	8.8	8

Canadian Ambient Air Quality Standards (CAAQS) Levels and Objectives 2015–2020

Air Quality Management Levels	Management Levels for the Annual Fine Particulate Matter CAAQS (micrograms per cubic metre)		Management Levels for the 24-hour Fine Particulate Matter CAAQS (micrograms per cubic metre)	
	2015	2020	2015	2020
Red	>10	>8.8	>28	>27
Orange	6.5 to 10	6.5 to 8.8	20 to 28	20 to 27
Yellow	4.1 to 6.4		11 to 19	
Green	≤4.0		≤10	

Level Objectives

Red	Achieve CAAQS
Orange	Prevent CAAQS Exceedance
Yellow	Prevent Air Quality Deterioration
Green	Keep Clean Areas Clean

PM_{2.5} Metrics and Air Zone Management Levels for the Georgia Strait Air Zone (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)		Level Objectives
		As Measured	TF/EE Adjustment*	As Measured	TF/EE Adjustment	
		Campbell River	3	20	18	
Colwood	2	28	18	7.1	6.2	Orange Prevent CAAQS Exceedance
Courtenay	2	30	28	9.0	8.6	Yellow Prevent Air Quality Deterioration
Crofton	3	23	23	5.1	4.3	Green Keep Clean Areas Clean
Duncan	2	27	25	8.3	8.0	
Duncan-Deykin Ave.	3	27	20	8.0	7.2	
Langdale	3	35	16	7.3	6.3	
Nanaimo	3	22	13	5.1	4.3	
Port Alberni	3	28	27	9.7	9.3	
Powell River - James Thomson	3	20	8	3.1	2.5	
Squamish	3	42	14	6.3	5.1	
Victoria	3	22	19	7.7	7.3	
Whistler	3	55	17	7.9	6.0	

2017-2020 Level Objective = Orange (To prevent CAAQS exceedance)

PM_{2.5} Metrics and Air Zone Management Levels for the Georgia Strait Air Zone (2018 – 2020) data

Location	PM _{2.5} 24-hour Metric (98 th percentile, µg/m ³)		PM _{2.5} Annual Metric (Annual Average, µg/m ³)	
	As Measured	TF/EE Adjustment*	As Measured	TF/EE Adjustment
	Campbell River	23	16	7.3
Colwood	39	15	7.5	5.6
Courtenay	27	24	8.3	7.4
Crofton	28	16	6.3	5.6
Duncan	28	22	7.8	6.9
Duncan-Deykin Ave.	28	18	8.0	6.9
Langdale	33	14	6.3	5.2
Nanaimo	23	11	5.3	4.1
Port Alberni	26	23	9.4	8.6
Powell River - James Thomson	18	7	3.1	2.2
Squamish	34	14	6.4	5.2
Victoria	31	17	7.9	6.8
Whistler	38	15	6.6	5.3

*Transboundary flows TF and exceptional events EE adjustment are accounted for cases where CAAQS's are not achieved because of pollutants over which jurisdictions have little or no control. TF's are defined as the transport of air pollution across provincial and territorial boundaries. EE's are events that contribute to air pollution levels in an air zone that are not reasonably controllable or preventable e.g. forest fires by non-controllable causes, intercontinental transport of air pollution.

Appendix B: Comox Valley Air Quality Related Regulations and Programs

Table 1. Air Quality Improvement Action Summary

Action	CVRD Electoral Areas	City of Courtenay	Town of Comox	Village of Cumberland
<i>Bylaw regulating and/or prohibiting open burning (fire protection bylaws)</i>	✓*	✓	✓	✓
<i>Bylaw prohibiting installation of wood-burning appliances in new construction</i>		✓	✓	✓
<i>Bylaw referencing smoke as a nuisance</i>	✓	✓	x	x
<i>Park/camp recreational fire restrictions on poor air quality days (applies to designated campgroundns and parks)</i>	✓	***	***	
<i>Education and Outreach (The Wood Smoke Reduction Program)</i>	✓	✓**	✓	✓
<i>Comox Valley Waste Management Centre composting program</i>	✓ (drop-off only)	✓ (collection)	✓ (collection)	✓ (collection)

* This CVRD bylaw has open burning restrictions that are limited in geographic scope

** Education and outreach in addition to the Wood Smoke Reduction Program

*** Open burning banned all year round

Please note

Provincial open burning restrictions apply to all open burning including camp and recreational fires.

Beach fire programs (managed campfire rings) only available at the following CVRD Parks (Goose Spit, Joe Walker & Royston Marine Drive)

Table 2. Wood-Burning Appliance Regulations

Jurisdiction	Bylaw Banning Wood-Burning Appliances in New Building	Bylaw	Bylaw Adoption Date
<i>CVRD Electoral Areas</i>		N/A	N/A
<i>Village of Cumberland</i>	✓	The Village of Cumberland Solid Fuel Burning Appliance Bylaw No. 1091	December 10, 2018
<i>Town of Comox</i>	✓	Town of Comox Building Bylaw 1472 & 1903	March 20, 2019
<i>City of Courtenay</i>	✓	City of Courtenay Building Bylaw No. 3001, 2020	April 6, 2020

Table 3. Smoke Nuisance Related Bylaws

Jurisdiction	Bylaw Details	Bylaw Adoption Date
City of Courtenay	City of Courtenay Prevention of Public Nuisances Bylaw. 2804 & 3079	September 08, 2014 03 October 2022
CVRD Electoral Areas	Electoral Areas Unightly Premises and Nuisances Regulation Bylaw 377	July 28, 2015

Please note

Nuisance smoke identification criteria and bylaw enforcement vary.

Table 4. Fire Protection & Regulation Bylaws

Jurisdiction/ Fire Service Area	Governing Bylaws/ Regulation	Bylaw Adoption Dates
Black Creek Oyster Bay, Greater Merville, Mount Washington Resort Community Fire Protection Service Area	Northern Fire Protection Service Areas Regulation Bylaw No. 689	January, 25 2022
Comox Fire Protection District	Comox Fire Prevention and Regulation Bylaw No. 1856	April 19, 2017
Courtenay Fire Protection District	Courtenay Fire Protective Services Bylaw No. 2556	October 9, 2008
Denman Island Fire Protection Service Area	Denman Island Fire Control Bylaw No. 281 & 529	November 26, 2013 June 5, 2018
Fanny Bay Fire Protection Service Area	Fanny Bay Fire Protection Service Regulation Bylaw No. 283 & 531	November 26, 2013 June 5, 2018
Hornby Island	Hornby Island Fire Protection Service Regulation Bylaw No. 282 & 530	November 26, 2013 June 5, 2018
Rural Cumberland	Rural Cumberland Fire Protection Service Regulations Bylaw No. 258 & 532	July 30, 2013 June 5, 2018
Ships Point Improvement District	Ships Point Fire Protection and Regulation Bylaw No. 117	May 8, 2023
Union Bay Fire Protection Service Area	Union Bay Fire Protection Service Regulations Bylaw No. 688	January 25, 2022
Village of Cumberland	Fire Protection Services and Regulation Bylaw No. 988	August 11, 2014
Bates-Huband Fire Protection Service Area	BC Wildfire Act Regulation	
Comox Fire Protection Improvement District	BC Wildfire Act Regulation	
Courtenay Fire Protection Improvement District	BC Wildfire Act Regulation	
CFB Fire Protection Area	Federal Regulations / Open Burning Smoke Control Regulation	

Please note

Fire Service & Protection Bylaws are intended for fire protection and not for air quality.

This bylaw lists compiled in July 2023. Please confirm with the associated municipalities/ governing bodies for current bylaws as they are subject to change.

Appendix C: Prioritizing Actions

Various approaches can be used to prioritize actions for (e.g. using a set of criteria or by identifying or categorization of a set of actions according to the capacity, tools and authority of the municipality. The following 2 examples can be used as guidelines to develop priorities for implementation. Example 1 provides sample criteria that can be used for prioritization. Example 2 provides an example of how actions can be categorized for implementation according to the capacity and authority of the local government.

Example 1: Prioritization Criteria:

1. Resources (max score 3 points)

Availability of resources, financing and funding to cover actions. This includes costs of the action, commitment of partners, staff time and related skills and expertise.

<i>High resource availability</i> =	High score
<i>Low resource availability</i> =	Low score

2. Jurisdiction (max score 3 points)

Ability for implementation of actions that are within the direct jurisdictional control of the local government. Can the action be carried out with existing local government structures and services?

<i>Action within jurisdictional control</i> =	High score
<i>Action is not within jurisdictional control</i> =	Low score

Total Score (max score 10) = Resources + Jurisdiction + Goal Impact

Each individual action in under the Regional Airshed Protection Strategy Action Plan has been evaluated using the three outlined criteria. Each action has a priority score of either Low, Medium or High.

<i>Total Score</i>	Priority
1-3	Low
4-7	Medium
8-10	High

3. Goal Impact (max score 4 points)

How many goals does the action support? Each of the goals are worth the following:

<i>Goal 1: Reduce PM2.5</i>	2 points
<i>Goal 2: Expand Air Quality Data</i>	1 point
<i>Goal 3: Air Quality Education</i>	1 points

If all the goals are selected the goal impact total will add up to 4 points.

Time Frames

The Regional Airshed Protection Strategy is designed to guide wood smoke reduction initiatives. Implementation timelines may vary and may not be related to prioritization of actions. The following demonstrates a how timelines can be assigned to the actions:

<i>Short-Term</i>	1 – 3 years
<i>Medium-Term</i>	4 - 6 years
<i>Long-Term</i>	More than 6 years
<i>Ongoing</i>	ongoing and anticipated to continue

Example of Action Priority Score Calculation

“**Action 2A.** Collect, review and publish data comparing space heating options”

	Priority Criteria			
	Resources (1-3)	Jurisdiction (1-3)	Goal Impact (1-4)	Total (1-10)
Action Score	3	3	3	9
What does it mean?	High resource availability	Action is within jurisdictional control	Addresses high percentage of goals	Impact for action is high

Example 2: Categorization of Actions

A list of actions for implementation can be developed through the identification of actions that fall within the jurisdiction’s authority and capacity. For example if resources and funding are available for educational initiatives, the actions for implementation will be selected accordingly as demonstrated below.

Education Related Actions



1B

Develop targeted strategies to enhance cleaner burning education



2C

Develop targeted strategies to enhance cleaner burning education



3B

Provide outreach and education on composting, chipping and other alternatives to yard waste burning



3E

Develop educational materials and messages to minimize smoke from recreational fires



4C

Build an understanding of the holistic nature of non-residential wood burning and raise awareness of industry best practices



5A

Expand air monitoring networks for education and to conduct ongoing data analysis



6A

Align education and communication initiatives from the Wood Smoke Reduction Program with the Action Plan



6B

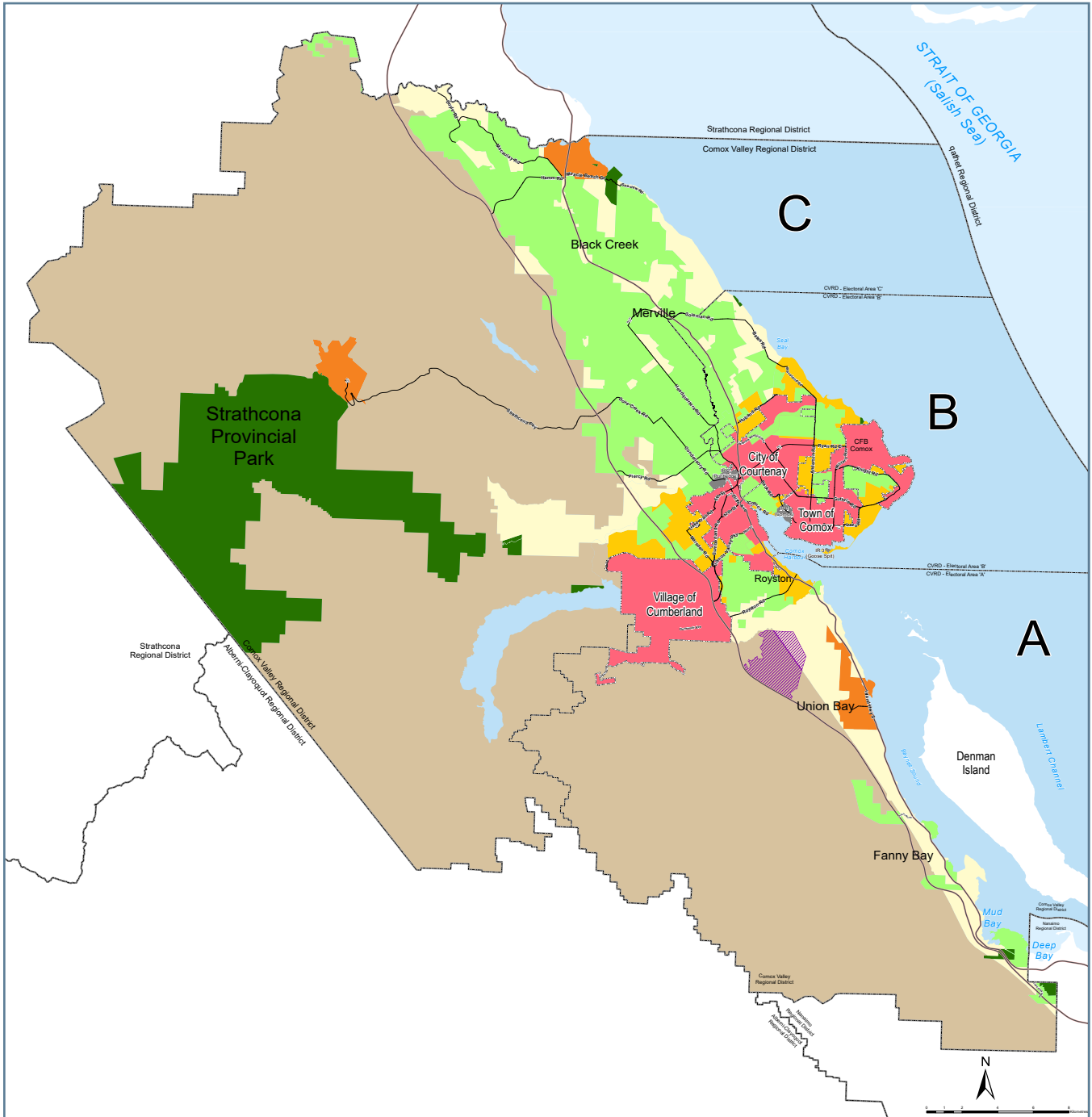
Identify and incorporate collaborative education campaigns



6C

Plan and implement educational events, courses and source funding

Map 2. Core Settlement Areas Map



Core Settlement Areas:

- Municipal Areas
- Settlement Nodes
- K'ómoks First Nation Lands
- Sage Hills Employment and Settlement Node
- Settlement Expansion Areas
- Agricultural Areas within Municipal Areas

Rural Areas:

- Rural Settlement Areas
- Agricultural Areas

Resource Areas and Provincial Parks:

- Resource Areas
- Provincial Park

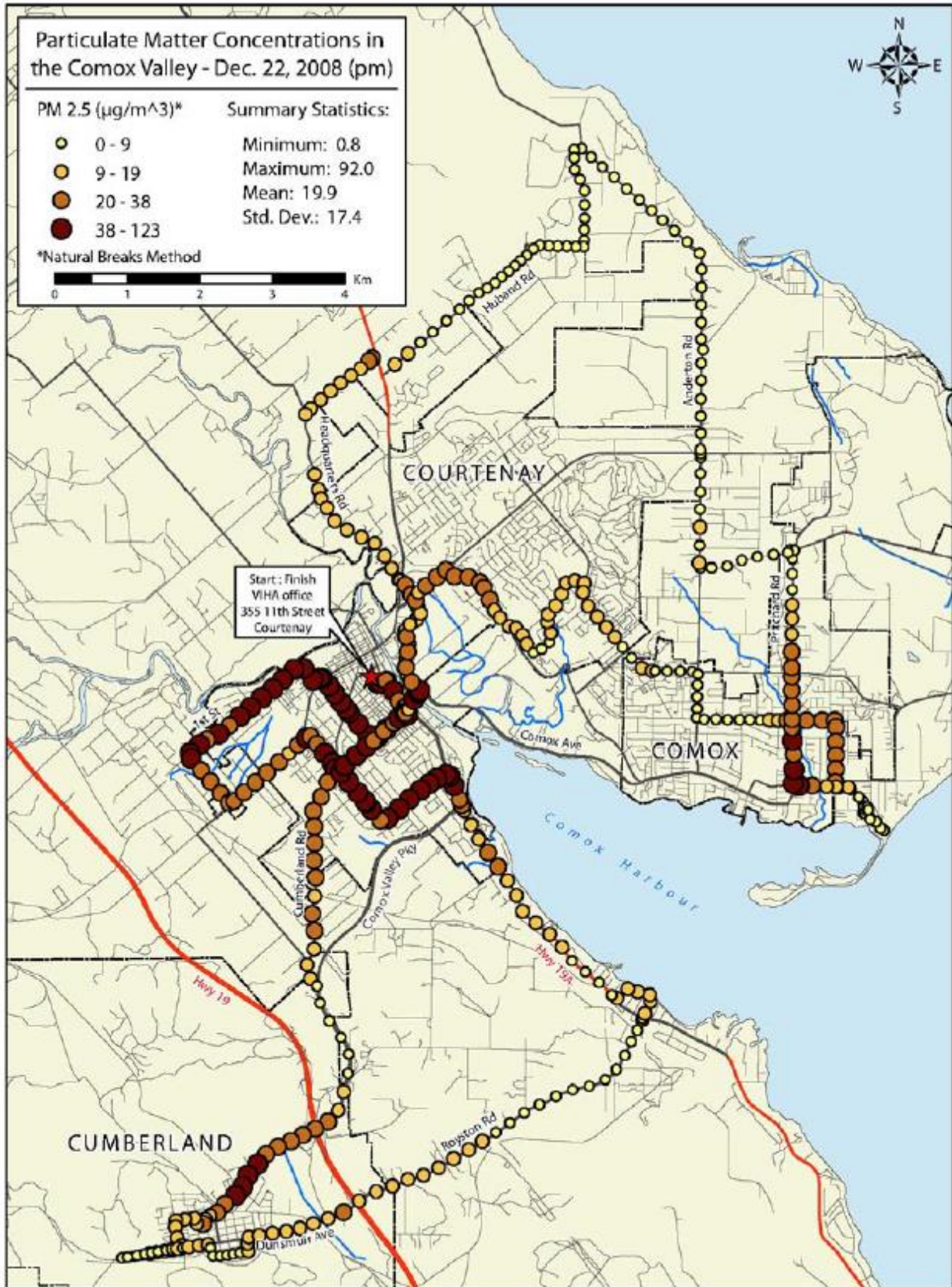
This map was prepared by the CVRD for internal purposes only. It is not intended to be used for any other purpose. The CVRD is not responsible for any errors or omissions in this map. The CVRD is not responsible for any damages resulting from its use.



Regional Growth Strategy

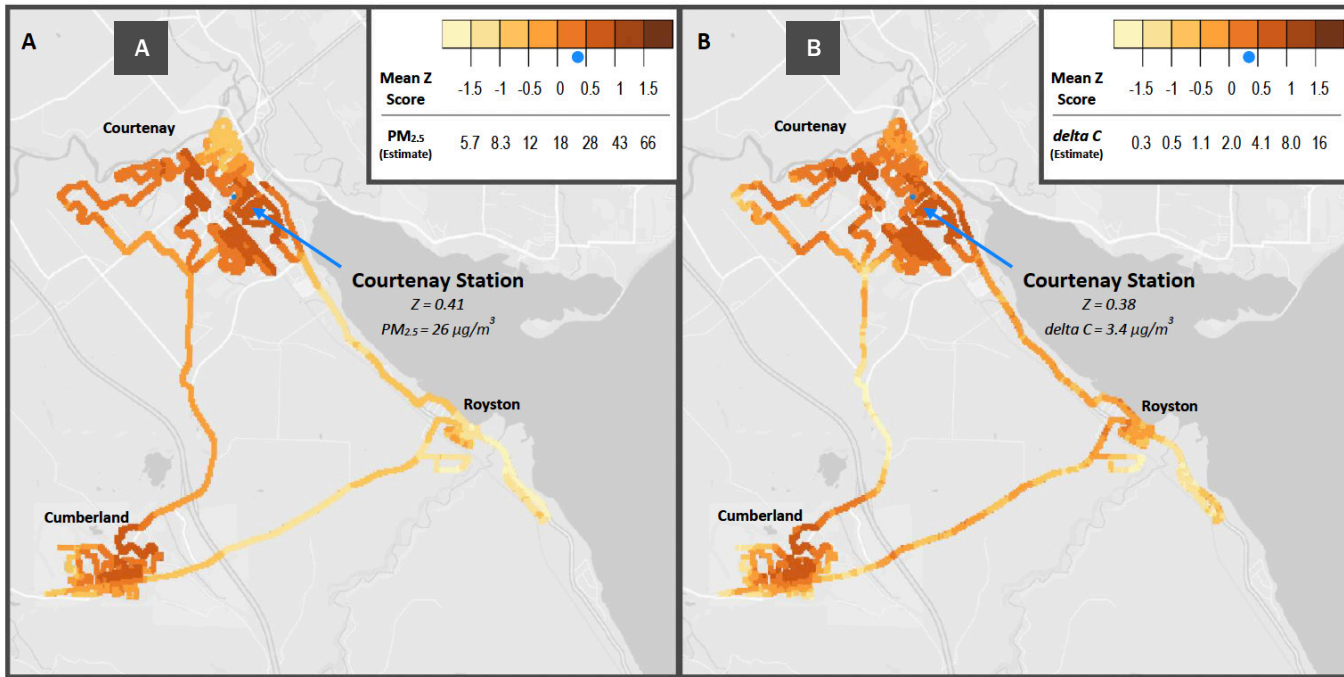
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Map 3. 2009 Mobile Nephelometer Monitoring Study Map

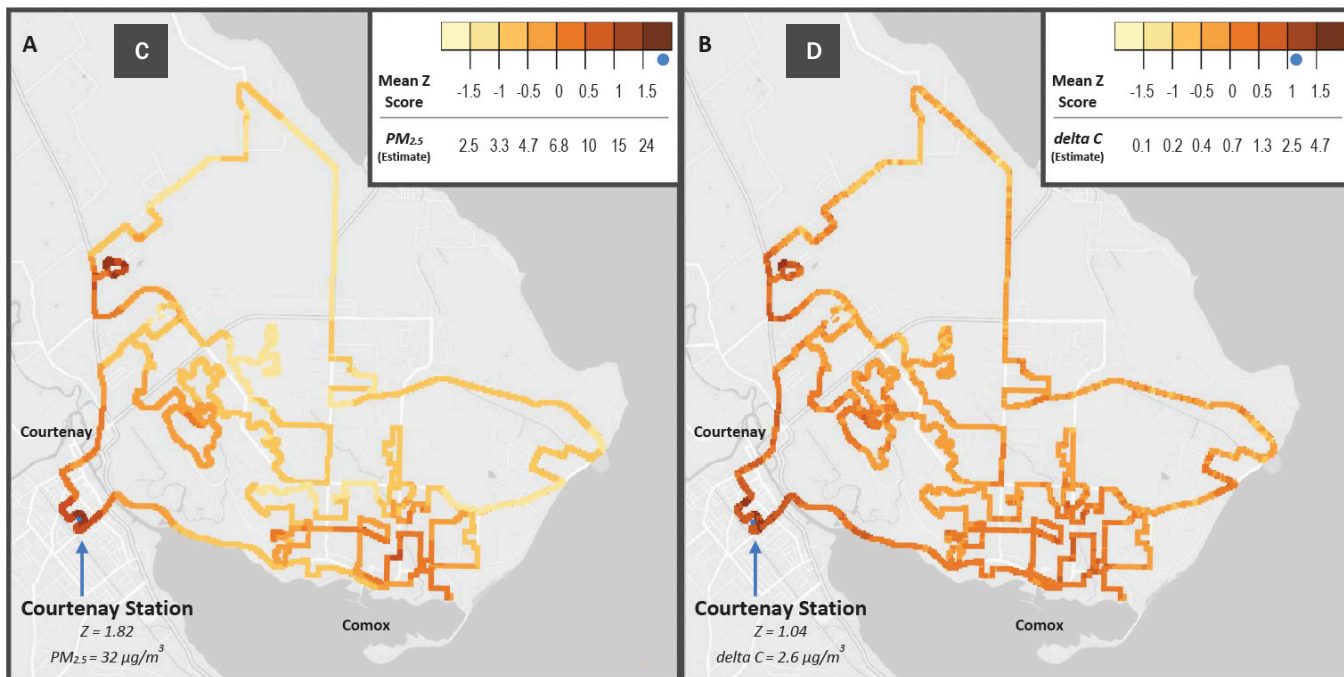


Map 4. 2018 Mobile Monitoring Study Maps (Matthew Wagstaff)

Courtenay and Cumberland Monitoring Route



Courtenay and Comox Monitoring Route





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