

DATE: September 11, 2019

TO: Chair and Directors
Committee of the Whole

FROM: Russell Dyson
Chief Administrative Officer

RE: Comox Valley Air Quality Framework

FILE: 5280-02

Supported by Russell Dyson
Chief Administrative Officer

R. Dyson

Purpose

To provide an update and a recommendation to include during strategic planning a framework for a regional approach to improve air quality in the Comox Valley.

Recommendation from the Chief Administrative Officer:

THAT the proposed framework for improving air quality in the Comox Valley as described in “A Regional Approach to Improve Air Quality and Health in the Comox Valley: Our Proposal” dated August 2019 be considered at the Comox Valley Regional District’s strategic planning session in October 2019.

Executive Summary

- The Comox Valley Regional District (CVRD) Board directed staff to work towards options to improve air quality in the Comox Valley.
- To address the complex problem of air quality in the Comox Valley, a working group is recommending a framework that includes
 - o a leadership group of local governments and specific provincial ministries with vested interests;
 - o a roundtable of stakeholders, leaders and community members; and
 - o a coordinator to arrange meetings, direct research, convene parties and advance the framework’s goals.
- The Comox Valley Regional Growth Strategy (RGS) is proposed as the overarching guide for the framework, using implementation agreements with member municipalities, senior levels of government and Island Health to fund and align the work
- To enable full consideration of the proposed framework alongside the CVRD’s core services and strategic drivers, staff are recommending the framework be considered during the October 2019 strategic planning session.
- Certain tasks can be undertaken immediately to improve air quality, such as improved online education and awareness, continuing with certain rebates for heating appliances and sharing information amongst parties about regulatory opportunities.
- Working collaboratively on this very complex topic is proposed as the means in which to find solutions, which will take a concerted and prolonged effort for region-wide success
- A significant component of this framework needs to
 - o characterize the limited regulatory role played by local government with respect to managing air quality; and
 - o emphasize the lobbying or advocacy role communities can play towards senior levels of government for funding, outreach and direct actions by those senior roles.

Prepared by:

Concurrence:

J. Warren**A. Mullaly**

 James Warren
 General Manager of Corporate
 Services

 Alana Mullaly
 Senior Manager of
 Sustainability and RGS
Stakeholder Distribution (Upon Agenda Publication)

Richard Kanigan, CAO Town of Comox	✓
David Allen, CAO City of Courtenay	✓
Michelle Mason, Acting CAO Village of Cumberland	✓
Dr. Charmaine Enns, Medical Health Officer, Island Health	✓
Earle Plain, Air Quality Meteorologist, Ministry of Environment	✓
Colin Sauer, Board Director, Comox Valley Community Foundation	✓
Chris Bowen, Pioneer Fireplace	✓
Alan Murphy, Valley Comfort Systems	✓
Jennell Ellis, Breathe Clean Air	✓

Background/Current Situation

At the CVRD Board’s strategic planning session in December 2018 and at its January 2019 meeting, air quality was named as a corporate priority with the following specific direction provided:

“...investigate formation of a Regional Airshed Advisory Group, to consult with staff at The Village of Cumberland, Town of Comox and City of Courtenay and to report back to the Board by spring 2019; and that the mandate of the advisory group would be to provide a report with action items by September 2019.”

In response, a working group was established and a consultant was hired, with the purpose of developing a recommended regional approach for improving air quality. Members of the working group included staff from each of the four local governments (Comox, Comox Valley Regional District, Courtenay and Cumberland) together with representatives from Island Health, the BC Ministry of Environment, and the Comox Valley Community Foundation. Together, this group engaged in a process to better understand the issues affecting air quality and health in the Valley, the conditions that make for successful collaboration, and learned from other examples of regional approaches to improving air quality in BC.

The interactions between the causes, impacts, and potential solutions of poor air quality in the Comox Valley are complex. While we know that there are distinct contributors to elevated PM_{2.5}, the pathways to improving air quality touch on personal choice and behaviours, social norms, socioeconomic inequities, government regulation, the “tragedy of the commons” and cultural values. Improving air quality in the region will require us to align our actions across many individuals and organizations – collaboration around air quality makes sense. Airshed protection is a regional planning issue that requires regional collaboration.

The examples of the Cowichan Airshed Roundtable (and Leadership Group) and the Port Alberni Air Quality Council were the main case studies informing our understanding of what a regional approach to air quality could look like. Prince George and Sea to Sky were also considered when investigating what structures might best support this work. Many of the lessons and success factors

drawn from research and interviews from these examples are incorporated into the recommended approach for the Comox Valley.

With complexity, collaboration, and learning from others in mind, the airshed working group recommends a region-wide framework to improve air quality with a roundtable structure to provide a coordinated approach to improving air quality in the Comox Valley (see Appendix A for the detailed recommendations and working group process) under the umbrella of the RGS service.

The purpose statement for the group will be:

“Working together to ensure the best air possible for a healthy Comox Valley.”

This purpose statement is directly related to implementing Goal 7 of the RGS: “support a high quality of life through the protection and enhancement of community health, safety and well-being”. This purpose statement recognizes that any reduction in PM_{2.5} levels has a positive impact on human health, and that improving air quality is a complex issue that requires strategic action and will take time to change. As such, the focus of the work will be to continually improve air quality in the region, aiming to meet defined targets in the short-, medium-, and long-term.

In order to organize the many partners (i.e. regional district, member municipalities, Ministry of Environment, Island Health) and stakeholders that need to be involved in this work to be effective, the structure will combine a “roundtable” (with broad membership), together with a “leadership group,” “working groups” (where needed for specific projects) and a “coordinator,” who will work on behalf of the collective to strategically plan and guide implementation of the work. CVRD staff suggest that the “leadership group” comprise the partners and that the coordinator role be staffed by an existing CVRD staff person under the umbrella of the Regional Growth Strategy service. A member of the CVRD Board will be appointed to the roundtable, and a broader call for participants for the roundtable (i.e. stakeholders) will be made.

1. Leadership Group

A smaller group of staff from key stakeholders selected to play a strategic role in moving the work forward. This group provides leadership to develop an airshed protection plan and in guiding implementation on behalf of the broader roundtable. As such, it is expected to reflect the diversity and wisdom of the broader collective - consulting and engaging with the roundtable membership as needed - in formulating and carrying out the priorities of the collective. This group meets more regularly to ensure work maintains momentum (e.g. monthly or bi-monthly).

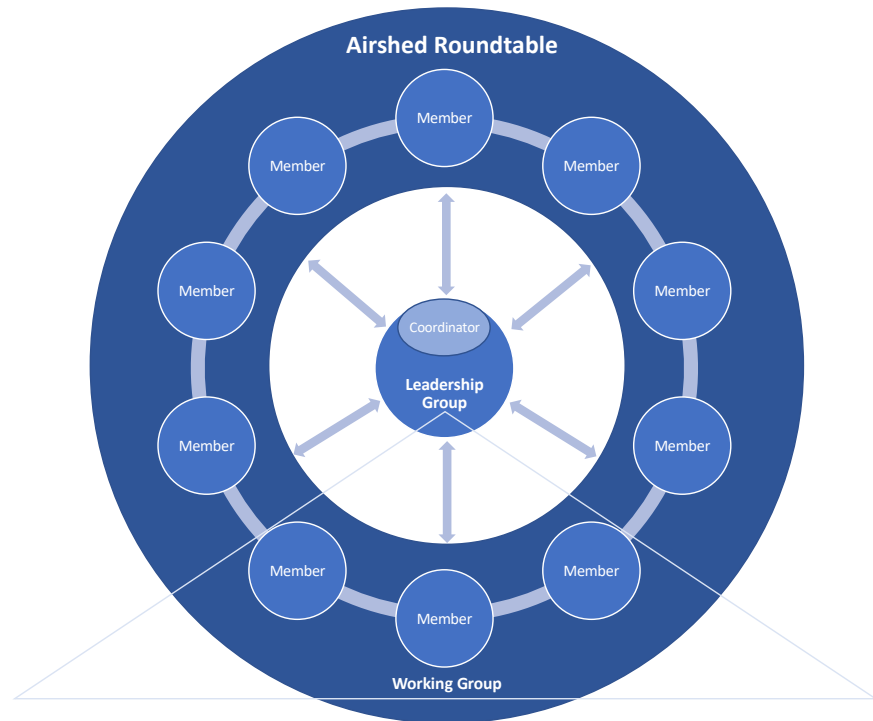
2. Roundtable

The roundtable is a forum to host a broad set of stakeholders with an interest or stake in the issue of air quality and health in the Comox Valley. This forum will meet between two and four times a year, and will provide an opportunity for sharing information, reporting out on activities, providing feedback, and engaging broadly. The roundtable membership should be engaged to provide direction and agree to priorities – they will be heavily engaged in the strategic planning process, for example.

The function of this forum is in part to contribute to education, outreach and relationships across a broader group of stakeholders and into the wider public, which is central to the work of improving air quality and health. Members of the roundtable will also be called on as appropriate, to be involved in and/or lead specific aspects of the work.

3. Working Groups

As priority areas for action are developed (as part of the airshed protection plan and ongoing), those member organizations or individuals who are interested and/or best placed to have influence on the issues will be gathered into “working groups” to carry out the actions. As such, the work gets done in a distributed way and is not the responsibility of any one individual or group alone. These working groups may have an operational focus (e.g. evaluation and learning), or a project-specific focus (e.g. local air quality monitoring network project).



4. Coordinator

A CVRD staff or contract position will fulfill the coordination role for the initiative. This person will be skilled in facilitation, relationship-building, working with a diversity of opinions, and with coordinating complex initiatives.

The proposed initiative will engage in the following work:

- Aligning and coordinating activities across members
- Creating the conditions for working well together
- Researching, air quality monitoring and data collection
- Communications, outreach and education
- Policy and regulatory option development
- Enabling programs and incentives
- Advocacy

A joint funding model will be established under the Regional Growth Strategy service with implementation agreements among the four local government partners, the province and VIHA to adequately resource the role of coordinating and leading the work of the roundtable and leadership group. Adequate ongoing resourcing of the coordinating role was identified as a critical factor for success from the literature on collaboration, as well as the case studies of regional air quality initiatives that were considered. In addition to this, it is expected that additional funding for project-focused work will be secured on a project-by-project basis from various sources.

The expectation is that this Comox Valley air quality framework will put systems in place early on to track, learn from, and adapt its actions to ensure it is making progress and continuously improving the conditions that enable many stakeholders and actors to improve air quality, together. A formal

“terms of reference” will be generated with input from the members of the initiative once it is convened. Such terms of reference would provide clarity around financial contributions as well as characterize the limited regulatory role played by local government with respect to managing air quality and emphasize the lobbying or advocacy role communities can play towards senior levels of government for funding, outreach and direct actions by those senior roles.

One of the primary tasks under this framework, guided by the leadership group and based on input and direction from the roundtable should be to collaboratively develop an airshed protection plan, along with an accompanying communications plan and work plans for priority areas. In addition, several options for early actions that CVRD will undertake over the coming months include:

- Updating the air quality section on the CVRD’s website to better reflect the learning and approach in the “Recommendations Report”;
- Continuing to provide rebates for replacing pre-2015 wood stoves for cleaner heating appliances, such as a heat pumps, or gas, propane or pellet stoves;
- Implementing additional outreach and providing \$2,500 rebates to fourteen homes in a selected “hotspot” area with funds provided via an Island Health grant;
- Investing in a low-cost air quality sensor network to better understand the impact and measure the effectiveness of the “hotspot” initiative as well as future initiatives (funding for this initiative will be pursued through provincial partners);
- Working collaboratively to investigate/test the feasibility of a local wood lot with the goal of improving burning practices by increasing access to dry wood;
- Researching sample bylaws and communicating opportunities for regulatory means to improve air quality with Comox Valley municipalities and other regulatory bodies;
- Building capacity for collaboration across stakeholders.

Policy Analysis

The CVRD operates under its existing services, bylaws and policies, using its strategic plan to identify the priority interest areas for service delivery. Including the proposed framework for improving air quality in the Comox Valley at the CVRD’s strategic planning session will help the Board consider the framework alongside delivering other core services. Should the framework be included as part of a strategic goal and direction, the resources required to coordinate the approach and the specific attention on the terms of reference will be introduced.

Options

Options available are as follows:

1. Include the framework for improving air quality in the Comox Valley as described in “A Regional Approach to Improve Air Quality and Health in the Comox Valley: Our Proposal” dated August 2019 at the CVRD’s strategic planning session in October 2019 (staff recommendation).
2. Endorse the framework and appoint a director for the roundtable.
3. Receive this staff report and direct an alternative action or request.
4. Receive this staff report and take no action.

Financial Factors

To adequately resource the role of coordinating and leading the work, a joint funding model will be established under the Regional Growth Strategy service with implementation agreements among the four local government partners, the province and Island Health. Other funding sources will also be important, particularly from senior levels of government. A substantial amount of staff time is anticipated to be contributed to ensure the successful set-up and ongoing effectiveness in support of ongoing regional air quality work, as described earlier. The CVRD may also contribute in-kind support, such as meeting space.

Legal Factors

The RGS service can enable the air quality framework components, further supported through the proposed implementation agreements. Given the air quality framework relies on an advocacy/advisory approach, any regulatory changes would be available for individual local governments or senior authorities to consider implementing. Such changes could require bylaws or policies to be effective.

Regional Growth Strategy Implications

Clean air is fundamental to human life and healthy ecosystems. Indeed, the RGS vision statement is impossible to achieve without clean air:

...As stewards of the environment, local governments, the K'ómoks First Nation, public agencies, residents, businesses and community and non-governmental organizations will work collaboratively to conserve and enhance land, water and energy resources and ensure a vibrant local economy and productive working landscapes.

Clean air also relates to supporting a high quality of life through the protection and enhancement of community health, safety and well-being (Goal 7: Public Health and Safety) and protecting, stewarding and enhancing the natural environment and ecological connections and systems (Goal 2: Ecosystems, Natural Areas, and Parks).

This air quality framework will serve to assist in achieving the overall objectives of the RGS through collaboration, education initiatives, advocacy work, and the provision of “subject matter expert” feedback on relevant local government policy and program initiatives. Information and data collected through the framework could also feed into the CVRD’s planned efforts to evaluate and monitor progress on RGS and sustainability objectives.

Intergovernmental Factors

As noted above, members of the working group who developed these recommendations included staff from each of the four local governments (Comox, Comox Valley Regional District, Courtenay and Cumberland) together with representatives from Island Health, the BC Ministry of Environment, and the Comox Valley Community Foundation.

Interdepartmental Involvement

Corporate Services and Planning and Development Services - Sustainability coordinated and participated in the Airshed Working group, were involved in collaboratively developing the recommended approach and collaborated in the development of this staff report.

Planning and Development Services - Sustainability staff will lead the project’s implementation, with continued support from Corporate Services.

Citizen/Public Relations

Should the framework be supported, public engagement will follow to identify participants in the roundtable. The Board can expect further reports and information on this approach.

Attachments: Appendix A – “A Regional Approach to Improve Air Quality and Health in the Comox Valley: Our Proposal” dated August 2019

September 2019



A Regional Approach
To Improve Air
Quality and Health In
The Comox Valley:
Our Proposal

This report was written by SHIFT Collaborative, on behalf of the Working Group formed to provide recommendations to the Comox Valley Regional District Board on a regional approach to improving air quality and health. We are:

Charmaine Enns, Medical Health Officer, Island Health
Jenn Meilleur, Sustainability Coordinator, CVRD
Rachel Parker, Deputy Corporate Officer, Village of Cumberland
Earle Plain, Air Quality Meteorologist, Ministry of Environment
Shelly Russwurm, Corporate Officer, Town of Comox
Colin Sauer, Board Director, Comox Valley Community Foundation
John Ward, Director of Legislative Services, City of Courtenay
James Warren, General Manager of Corporate Services, CVRD
Mike Zbarsky, Manager, Transit and Sustainability, CVRD



Executive Summary

In January of 2019, a Board Resolution was passed by the Comox Valley Regional District that instructed staff to investigate the formation of an advisory group on air quality. In response, a working group was established, and a consultant hired, with the purpose of developing a recommended regional approach for improving air quality. Members of the working group included staff from each of the four local governments (Comox, Comox Valley Regional District, Courtenay and Cumberland) together with representatives from Island Health, the BC Ministry of Environment, and the Comox Valley Community Foundation. Together, we engaged in a process to better understand the issues affecting air quality and health in the Valley, the conditions that make for successful collaboration, and to learn from other examples of regional approaches to improving air quality in BC. The result of this process is a proposal for a region-wide Roundtable structure to provide a coordinated approach to improving air quality in the Comox Valley.

Air Quality and Health in the Comox Valley

There is a compelling scientific case establishing that PM_{2.5} levels in the Comox Valley seasonally exceed provincial and national standards, and that biomass burning (from residential heating and open burning) is the predominant source. It is also well understood that the long-term health impacts of PM_{2.5} are significant and of concern, particularly for cardiovascular health, and that residential woodstove use is a main source of concern for these health impacts in the Comox Valley. There is no known threshold for a “safe” level of PM_{2.5}; every bit of improvement in PM_{2.5} levels in the air, decreases negative health impacts.

Taking A Collaborative Approach

Collaboration isn't the right approach for every issue – if you can do something more simply, you should. But for the issue of air quality, collaboration makes sense. While we know that there are distinct contributors to elevated PM_{2.5}, the pathways to improving air quality touch on personal choice and behaviours, social norms, socioeconomic inequities, government regulation, the “tragedy of the commons” and cultural values. Improving air quality in the region will require us to align our actions across many individuals and organizations.

Best practices from the field of collaboration emphasize a number of key factors that contribute to effectiveness, such as convening the right people, investing in building trust and relationships as the foundation for working well together, ensuring strong coordination and alignment through committed funding for this role, and the importance of a “servant leadership” style in the person or group tasked with coordination. Examples from here and elsewhere provided lessons and models for how to structure and operate effective multi-stakeholder groups that make a difference for air quality and health at a regional level.

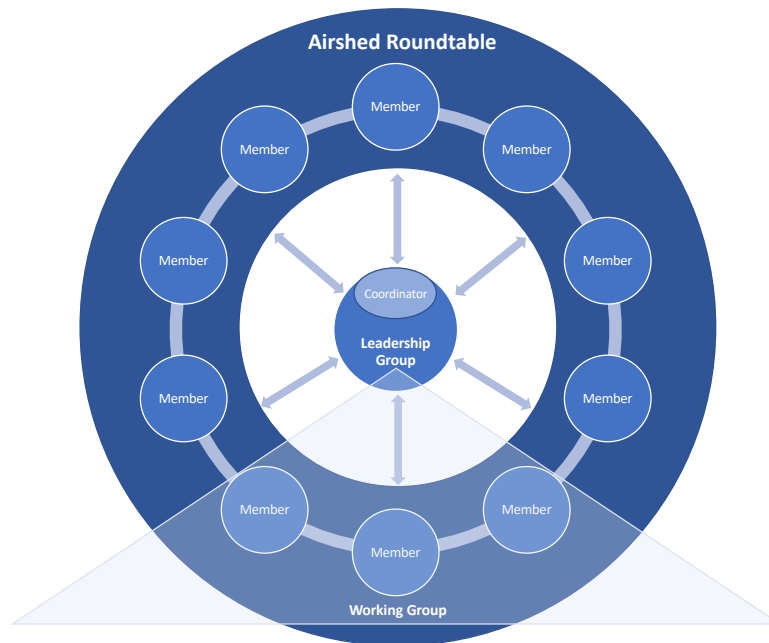
Our Proposal

The purpose statement for the group is: “Working together to ensure the best air possible for a healthy Comox Valley.” We recognize that any reduction in PM_{2.5} levels has a positive impact on human health, and that improving air quality is a complex issue that requires strategic action and will take time to change. As such, we will work to continually improve air quality in the region, aiming to meet defined targets in the short-, medium-, and long-term.

There are two main types of work that the initiative would engage in: coordinating functions (aligning and coordinating activities across members, and creating the conditions for working well together); along with a range of project-focused work. Project-focused work could include:

- Research, air quality monitoring and data collection
- Communications, outreach and education
- Policy and regulatory options
- Enabling programs and incentives
- Advocacy

In order to organize the many partners and stakeholders that need to be involved in this work to be effective, we propose a structure that combines a “Roundtable” (with broad membership), together with a “Leadership Group” and “Coordinator” who work on behalf of the collective to strategically plan and guide implementation of the work.



We recommend that a joint funding model be established through an MOU among the four local government partners, to adequately resource the role of coordinating and leading the work. This is identified as a critical factor for success from the literature on collaboration, as well as the case studies of regional air quality initiatives that were considered. In addition to this, it is expected that additional funding for project-focused work would be secured on a project-by-project basis, from various sources.

We recommend that this initiative puts systems in place early on to track, learn from, and adapt its actions to ensure it is making progress and continuously improving the conditions that enable many stakeholders and actors to improve air quality, together.

The first task of the Roundtable should be to collaboratively develop a strategic plan, along with an accompanying communications plan and work plans for priority areas. In addition, several “no-regrets” options for early actions include:

- Updating the Air Quality section on the CVRD’s website
- Investing in a low-cost air quality sensor network
- Drafting model bylaws
- Building capacity for collaboration across stakeholders

Our proposal provides the building blocks for convening and launching a regional Air Quality Roundtable that is appropriately funded, well-coordinated, and thoughtfully improved over time, so that we have the best chance of success. By coming together as a working group to collaboratively make sense of the issues and devise a regional approach to improve air quality and health, we have begun the process that the Air Quality Roundtable is proposed to continue: creating the conditions to ensure that we can work well together for the best air possible for a healthy Comox Valley. We look forward to continuing to work with the many people and organizations who have an interest and stake in air quality and health in our region.

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Introduction

In January of 2019, a Board Resolution was passed by the Comox Valley Regional District that instructed staff to investigate the formation of an advisory group on air quality, and develop recommendations for a regional model to improve air quality in the Comox Valley. In response, a working group was established, and a consultant hired, with the purpose of developing a recommended regional approach for improving air quality.

The resulting proposal, outlined in Section C, was developed by the joint working group through a series of workshops held in June 2019 and facilitated by SHIFT Collaborative. Members of the working group included staff from each of the four local governments (Comox, Comox Valley Regional District, Courtenay and Cumberland) together with representatives from Island Health, the BC Ministry of Environment, and the Comox Valley Community Foundation. Together, the group engaged in a process to better understand the issues affecting air quality in the Valley and the conditions that make for successful collaboration, and to learn from other examples of regional approaches to improving air quality in BC. The result of that process is a proposal for a region-wide roundtable structure to provide a coordinated approach to improving air quality in the Comox Valley.

This report shares some of our learning about the issues of air quality and health here in the Comox Valley, what makes for successful collaboration, and our specific recommendations for how this work could be carried out on a regional scale.

A. Understanding the Issue of Air Quality and Health in the Comox Valley

While there is extensive data and research into the issue of air quality in the Comox Valley and its health impacts, awareness and understanding of the available information is limited and partial. In comparison to starting conditions in some other jurisdictions that have tackled air quality regionally, the Comox Valley is in a fortunate position of having a **wealth of local data** about the type of air pollution of concern (PM_{2.5}), its sources, and the potential health impacts of exposure. In order to move forward together to improve this situation, it is important that stakeholders, decision-makers and the public become more aware of the available information and its implications. This will enable us to make informed decisions about the best courses of action to take, together.

As background, air quality concerns generally focus around a number of key pollutants (i.e. ground level ozone (O₃), nitrogen dioxide, sulphur dioxide, carbon monoxide, and particulate matter). Since local air quality monitoring began in 2011, **measured levels of PM_{2.5} in the Comox Valley in the fall and winter have repeatedly exceeded provincial and national air quality standards for daily and annual limits.** PM_{2.5}, or fine particulate matter, means particles that are extremely small (less than 2.5 microns diameter – in comparison, a human hair is 50 – 70 microns in diameter).

This type of pollutant is of particular concern due to the fact that its small size enables it to enter deep into the lungs, penetrating the lung barrier and entering the bloodstream. This leads to a range of human health impacts that can be both short term and especially long term. PM_{2.5} from combustion sources in particular, tend to be on the smaller end of even PM_{2.5} (in the 1 micron range), which makes them an even greater health concern than mechanical sources of PM_{2.5} (such as dust produced through wind erosion or industrial processes). According to Sarah Henderson of the BC Centre for Disease Control, “In general, **the smaller the particles, the greater their health impacts.**” In addition, the World Health Organization has stated that “small particulate pollution has health impacts even at very low concentrations – indeed no threshold has been identified below which no damage to health is observed.”

Local experts Earle Plain of the BC Ministry of Environment and Climate Change Strategy and Dr. Charmaine Enns of Island Health, have outlined the “weight of evidence” compiled through studies to date, that have led to the conclusion that open burning and the use of wood-burning stoves are key contributors to PM_{2.5}, and that **the use of wood-burning stoves in fall and winter are of particular concern for human health here in the Comox Valley.** That information is summarized here, to inform our shared understanding of this issue.

Air Quality in the Comox Valley: What Do We Know?

- The earliest study of air quality in the Comox Valley (in the winter of 2008 - 2009) measured elevated levels of PM_{2.5} across large parts of the Valley. These measurements were taken through mobile monitoring at discrete points in time, so further study was

needed to determine the nature of the long-term trends and how the values compared to provincial and national ambient air quality objectives and standards

- An air quality monitoring station was installed at Courtenay Elementary School in 2011, providing the first consistent record of air quality measurements at a local level
- Of the three air quality parameters measured in the Comox Valley since 2011, only fine particulate matter (PM_{2.5}) exceeds Provincial Air Quality Objectives and Canadian Air Quality Standards (CAAQS). Nitrogen Dioxide and ground-level Ozone levels have been far below acceptable standards.
- Fine particulate matter concentrations are generally low during the spring and summer months (outside of wildfire impacts) and elevated during the fall and winter months. Daily PM_{2.5} Objective **exceedances have occurred consistently in the fall and winter** of each year since monitoring began.
- Levels of PM_{2.5} in the fall and winter in the Comox Valley show a consistent daily pattern:
 - Levels are low during the day
 - Levels rise from mid-afternoon to peak in the evening
 - Levels fall overnight, with a smaller spike in the morning
- **The daily pattern of PM_{2.5} observed in the Comox Valley in fall and winter, is a well-known “signature” of wood stove use** – contributions to PM_{2.5} from wood stoves drops during the day when people are at work and stoves are used less, increase at the end of the day as temperatures drop and people return home, and again first thing in the morning as people wake up. Another contributor to the spike in the morning, is likely vehicle emissions from people commuting to work.
- The problem is exacerbated by natural meteorological conditions here in the cold seasons, due to the effect of “inversions” which trap air in the Valley for extended periods, sometimes days.
- In an [Emissions Inventory](#) conducted in 2017 for the Comox Valley, annual sources of PM_{2.5} (excluding road dust) were estimated as:
 - Open burning: 45%
 - Space heating (wood stoves): 36%
 - Mobile sources (transportation): 12%
 - Agriculture: 2%
 - Other, miscellaneous: 5%
- In that same report, a proxy was used to estimate the contribution road dust makes to PM_{2.5}. This proxy gave an unrealistic estimate of its contribution, and therefore this was excluded from the results¹. However, its mention in the report has caused confusion for some readers. A detailed explanation of this issue is available on the CVRD’s website at: <https://www.comoxvalleyrd.ca/services/environment/air-quality>
- Open burns are conducted by forestry operations, agricultural operations, land clearing operators (e.g. for residential or commercial developments) and the general public

¹ The erroneous estimates in the Inventory suggested that road dust could contribute up to 46% of the PM_{2.5} in the Valley. Other studies across Canada, using more robust methods, estimate road dust contributions to PM_{2.5} somewhere between 3-9% of the total.

(backyard burning). The impact of such burns on human health depends on a number of factors that determine the concentration of PM_{2.5} (or other pollutants) when the smoke reaches inhabited areas. These factors include: the overall size of the burn (or multiple burns at once), the qualities of the materials being burned (e.g. well-piled, dry, cured fuels with little to no contaminants are ideal), physical features close to the source that affect air flow (and dilution), the time of year, interactions with weather (especially “inversion” conditions, which occur more in the winter), and distance from people.

- Forestry burns can create large plumes of smoke, which can be visually alarming. However, these **forestry burns are strongly regulated** by the Province to manage the conditions described above and minimize potential impacts to people. Regulation of forestry burns under the Open Burning Smoke Control Regulation (OBSCR) has improved significantly in the past years. **Other types of burns vary in the degree to which these factors are managed.** Backyard burning (exempt from the OBSCR), burns for land clearing, and some agricultural burns, are in closest proximity to people and can contain materials that do not promote the cleanest burns (e.g. green material, dirt in piles, etc.).
- In 2017, another more sophisticated mobile monitoring study was conducted to measure levels of indicators in the composition of the air, which **conclusively confirmed that wood smoke is the key contributor to PM_{2.5}**. It also confirmed that elevated levels of PM_{2.5} continue to be widespread across the Valley during the winter months.
- In summary, **the use of wood stoves for residential heating and certain instances of open burning are the main sources of elevated PM_{2.5} levels in inhabited areas in the fall and winter, which consistently exceed recommended standards and pose a threat to human health.**

Air Quality and Health: Why Does This Matter, and How Do We Know?

- The WHO estimates 4.2 million deaths annually associated with PM_{2.5} in outdoor air
- In studies of the link between air pollution (which includes PM_{2.5} along with other pollutants) and risk of death due to cardiovascular disease, the following correlations have been observed:
 - On days with worse air pollution, more people die (especially from cardiovascular conditions)
 - In cities with worse air pollution, people die younger than in those with less air pollution
 - In the most polluted areas of cities, there is a greater risk of dying from cardiovascular disease than in less polluted areas
- Wood smoke and tobacco smoke contain many of the same harmful substances
- The International Agency for Research on Cancer (IARC) classified outdoor air pollution (and especially fine particulate matter) as a carcinogen in 2013
- There is no known “safe” level of exposure to PM_{2.5}
- **PM_{2.5} has particularly damaging effects to human health through impacts to the cardiovascular system.** The “weight of evidence” (many studies conducted over time) demonstrates conclusively that PM_{2.5} contributes to: shorter life, stroke, heart disease, asthma, lung cancer, reduced lung function and low birth weight

- PM_{2.5} may also be a contributor to: learning disabilities, Alzheimers, depression, autism, obesity, birth defects, and diabetes.
- A study published in 2017 documented the correlation between wood smoke and an increased risk of heart attacks in the Comox Valley (along with Prince George and Kamloops). The results showed that, **in the Comox Valley, increases in PM_{2.5} levels corresponded with increases in the risk of heart attacks among the elderly**. In addition, the more that biomass burning (wood), specifically, contributed to PM_{2.5} levels, the greater the risk of heart attacks.²

According to the [2018 Vital Signs report](#) for the Comox Valley, concern about air quality in the region seems to have risen since 2016: people's rating of air quality has dropped, while the issue rose to #2 on the list of environmental and sustainability priorities overall. Growing awareness has also led to air quality being included as a strategic priority for the CVRD Board, which has led to this project.

These are promising shifts. In our working group process, it was important that we were able to hear about the full range of scientific evidence underlying the conclusions made by local experts about the sources and impacts of elevated PM_{2.5} levels in our air. The process of asking questions and clarifying some areas of incomplete information or misunderstandings of the available data, helped us to come to a shared understanding of the issue of air quality and health in the Valley.

In Summary:

- There is a compelling scientific case establishing that the issue of PM_{2.5} in the Comox Valley exists, and has a negative effect on human health
- Every bit of improvement in PM_{2.5} levels in the air, decreases observed health impacts (it doesn't require a threshold to be met before improvements are seen)
- The long-term health impacts of PM_{2.5} are significant and of concern – it doesn't only affect lungs, but is of particular concern for cardiovascular health (and heart attacks), among other things.
- The predominant source of PM_{2.5} in the air in the Comox Valley is due to biomass burning (residential heating and certain types of open burning in closer proximity to people); road dust is not a significant factor
- There are things we can change, and things that we can't (e.g.: we live in a Valley that experiences inversions – we can't change that, but we can change burning practices)
- The issue of acceptability to the public of whatever approaches are chosen is of great importance – outreach and education is needed. There is a parallel to cigarette smoking and the process it took for norms to change around that.
- There are strong opinions and emotions around this issue for people in the community

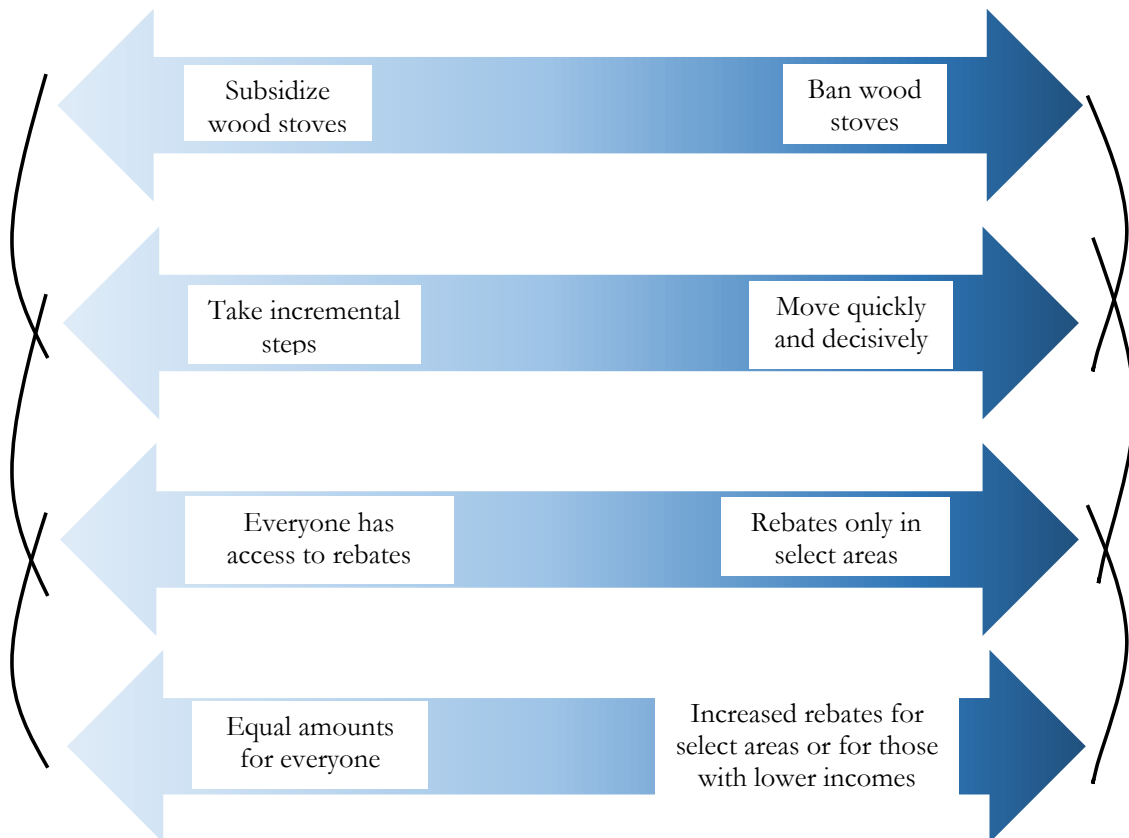
² https://journals.lww.com/epidem/Fulltext/2017/05000/Biomass_Burning_as_a_Source_of_Ambient_Fine.5.aspx

B. What Conditions Make For Effective Collaboration?

Collaboration isn't the right approach for every issue – if you can do something more simply, you should. But for the issue of air quality, collaboration makes sense.

The interactions between the causes, impacts, and potential solutions of poor air quality in the Comox Valley are complex. While we know that there are distinct contributors to elevated PM_{2.5} (mainly attributed to wood smoke from residential heating, backyard burning and larger open burns), the pathways to improving air quality touch on personal choice and behaviours, social norms, socioeconomic inequities, government regulation, the “tragedy of the commons” and cultural values.

As an example, there has already been much discussion about how best to influence a positive change in emissions from residential woodstove heating. The diagram below illustrates just some of the tensions that arise when we consider various options to address this:



Options all along each of these spectrums carry various risks, and benefits; there is no single best solution to this issue. Additional issues include risks and benefits of alternative fuel / heating sources; social and cultural norms; and socioeconomic inequities. Because solutions involve changes in the actions and choices of many individuals, we will need to engage with

those actors and learn about what works, so that we can design, adjust and evolve our approaches to be more effective.

In our first session together, the working group discussed the *degree of certainty* around particular air quality & health issues, along with the *degree of agreement* about what was to be done about them. An observation from this exercise was that there seemed to be a fair deal of certainty about *what* the issues are (when provided with all available information and the opportunity to ask questions), but not a lot of agreement about *how* to best address them. Together with the fact that improving air quality will require actions (and therefore buy-in) by a wide range of actors, this suggests that the process by which the initiative builds understanding, engages with different stakeholders, and develops actions, will be central to garnering buy-in and the will to implement the resulting actions. **Improving air quality in the region will require us to align our actions across many individuals and organizations, in order to achieve our goals.**

To that end, this Working Group was specifically tasked with developing recommendations for how to take a coordinated regional approach to improving air quality in the Comox Valley. Our ideas were informed by background research into the experiences of other jurisdictions in BC who have taken a regional approach to improving air quality, as well as learning from our local knowledge and examples of collaborative approaches. We also informed our discussions with best practices from the literature/field, for collaborative initiatives of this scale.

Best practices in collaboration: learning from the field

Collaboration, like anything, improves with practice and experience. To inform our ideas, we turned to insights from professionals in the field of collaborative and networked approaches to addressing complex issues. Lessons from the field³ emphasized the importance of:

“In our view, trust is the single most important ingredient of effective collaboration. Enduring relationships are not a ‘nice to have’; they are a ‘need to have.’”

*Ehrlichman, Sawyer and Spence,
Stanford Social Innovation Review,
2018*

- Taking the time to “make sense” of the complexity to develop a defined, shared purpose that is ambitious, clear and simple.
- Convening the right people through “thoughtful inclusion,” including those with the ability to influence or act, resources, expertise, information, lived experience, skills to listen deeply and consider diverse perspectives, capacity to stay engaged
- Cultivating trust and enduring relationships – this is emphasized as a “must have” for effectiveness, not to be overlooked
- Aligning activities before initiating new actions – don’t recreate the wheel

³ Adapted from “Cutting Through the Complexity: A Roadmap for Effective Collaboration,” by Ehrlich, Sawyer and Spence, Stanford Social Innovation Review, March 2018.

- Partnering to find quick wins, build trust and discover what you're capable of together
- Addressing power differentials and inequities
- Identifying leverage points to address deeper root causes
- The function of coordinating and aligning across many actors. This requires a very particular skill set and leadership style, sometimes referred to as "systems leadership" or the "servant leader" – someone who is committed to and motivated by the collaboration's purpose and their ability to help others achieve their potential for impact
- Committed funding to support the range of functions needed for coordination of the collective

Local knowledge and experience: learning from local collaboration

While there is much to be learned from other practitioners in the field, there are also helpful examples of collaborative initiatives across local governments in the Comox Valley that informed our ideas. Examples of working together on transportation, watershed management, and solid waste, offered the following lessons:

- The value of strong facilitation and process design
- Importance of relationships & trust; building group cohesion
- Having the right representation (fit to the desired purpose)
- Defining a clear purpose / mandate / role / timeline
- There is strength in numbers (economies of scale; having a collective voice)
- Keep governance simple at first
- Influence that the role of Chair / Facilitator has (choose wisely – again, fit to the desired purpose)
- If one group doesn't join, it can affect the success of the whole

Factors That Have Led To Success, in our experience:

- Clear, common goal (a shared why)
- Leadership commitment to purpose & process (and resources that come with that)
- Coordinated
- Trust
- Buy-in at all levels
- Relationships (support for this as an ongoing process, and as an outcome of this work)
- Community champions
- Passionate people
- Efficient
- Targeted timeline
- Community health as a focus
- Data- and evidence-driven (informed)
- Safe to diverge
- Multiple ways to achieve goals

How it's been done: learning from others

The examples of the Cowichan Airshed Roundtable (and Leadership Group), along with the Port Alberni Air Quality Council, were the main case studies informing our understanding of what a

regional approach to air quality could look like. Some of the lessons and success factors drawn from research and interviews on these two examples included:

- Investing in capacity-building (training and coaching support), early & ongoing, led to a very well-functioning and committed Leadership Group
- Need to come together in “safe space” (importance of the role of the coordinator to help create the conditions for this)
- Thoughtful inclusion: ongoing commitment of a core group keeps the work going
- Health & environment lenses offer different benefits (e.g. access to funding, raising awareness, building buy-in, etc)
- These initiatives each had a clear leader / champion that drove the work in early stages. In the Cowichan example, this work was initially led by Regional District staff, under an existing service area.
- In both cases, an existing organization or individual was well-suited as the Coordinator
- Awareness and education are a core activity, especially early on
- Build credibility and buy-in through early wins – for example, setting up a low-cost neighbourhood air quality monitoring network not only built awareness, but also morale of the group
- It is important to take a long-term perspective on an issue like this
- Ongoing funding for coordination is challenging, and necessary
- Generating and maintaining momentum for an issue that is no one’s main priority, is a challenge. Cowichan developed a strategic plan early on, which has guided the work and clearly delineated who is responsible for different actions.

In addition to the Cowichan and Port Alberni examples, Prince George and Sea to Sky were also considered when investigating what structures might best support this work. Notable features from these examples included:

- The value of a “Roundtable” type of forum, that enabled broad participation in an ongoing manner. This was present in all of the examples. In the case of Sea to Sky, they had originally had a broader forum and then changed structures to launch a stand-alone non-profit organization and no longer convened the broad forum. This had contributed to the work more or less grinding to a halt as commitment, resources and awareness dwindled.
- The effectiveness of a focused, strategic group that provides leadership to the initiative and carries the work forward. This was most strongly demonstrated in the Cowichan and Prince George examples⁴, which formed a “Leadership Group”

“You need a foundation of partners who know and trust each other, who can speak honestly, and can discuss issues. Being able to facilitate a safe, respectful space is one of the most critical foundations for having a roundtable, in particular for a topic that has such polarizing views.”

- *Cowichan Interviewee*

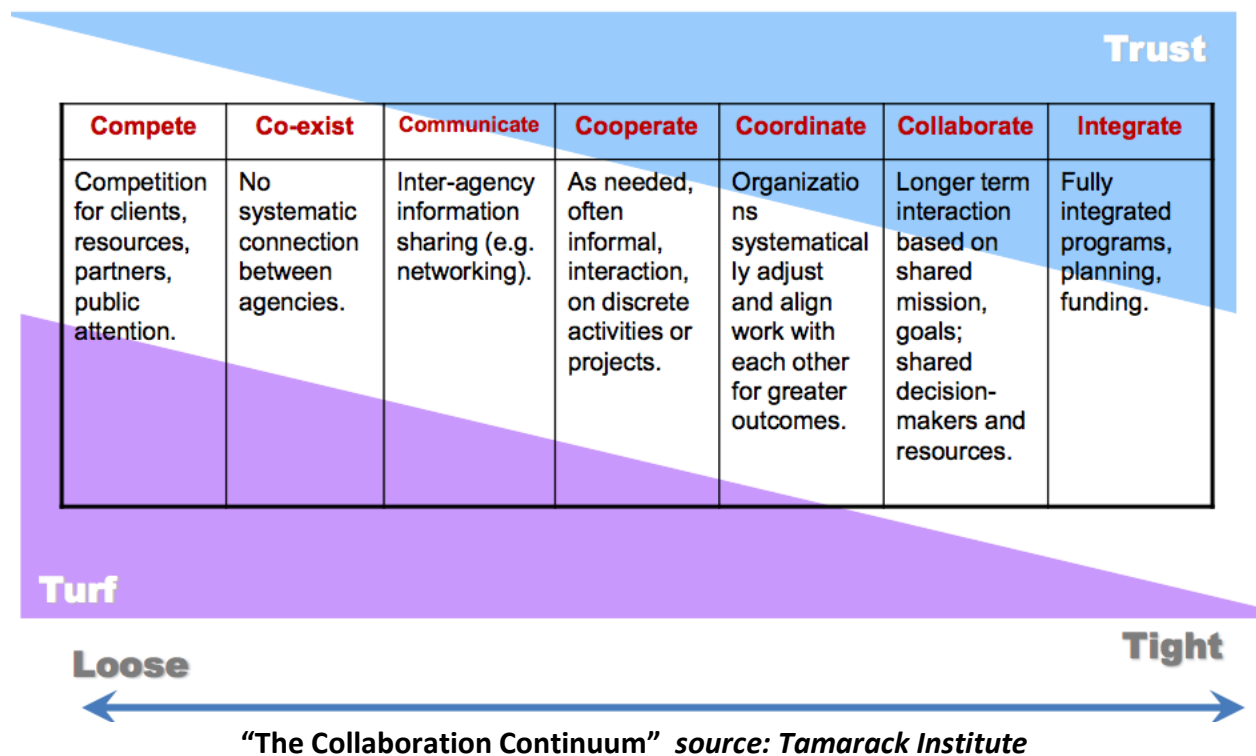
⁴ In the case of Port Alberni, the AQC seems to function more like the Roundtable than a Leadership Group, as its function was mostly advisory and they were not responsible for carrying work forward as representatives of organizations.

and “Technical Committee”, respectively, at the outset of their initiatives. These groups led the initial strategic planning and initial phases of implementation.

- The critical role of the Coordinator (an individual or organization) in ensuring the work gathers and maintains momentum.
- The positive impact of having adequate human resources and/or funding to support the Coordination role, and the notable slow down (or complete stoppage) of the work overall, when this was not available.

Starting Conditions Here In the Comox Valley

“Collaboration” means different things to different people. It can be helpful to distinguish different levels of collective action, for example:



Reflecting on where we are starting from in the Comox Valley, in our experience we tend to be in the range of “co-exist” to “communicate” or in some cases “cooperate.” We have limited experience of what is described here as “coordinate” or “collaborate,” which is how this initiative is being conceived of. So, we have work to do to build the muscles to effectively work together in a more aligned and collaborative way towards shared outcomes.

There are both challenges and opportunities associated with our current starting place – some starting conditions that we had in mind as we considered how best to start building our capacity to work collaboratively, include:

Challenges	Opportunities
<ul style="list-style-type: none"> • Uneven levels of awareness and understanding of the issues • Unclear who could play the role of Coordinator and “servant leader” • Historical relationships, need to build trust • Limited capacity & budgets, and competing priorities (especially for local governments) • Polarizing opinions, finger-pointing • Turf / silos 	<ul style="list-style-type: none"> • Presence of political will & urgency • Existence of good data & evidence • Local governments have taken specific actions already (some more than others) • Presence of provincial expertise, resources and interest • We have what’s needed to expand the conversation, work together • Aligns with the Climate Emergency • Regional Growth Strategy can support this

C. Our Proposal

For A Regional Approach To Improve Air Quality And Health In The Comox Valley

Based on our joint exploration of the issue of air quality and health, and what makes for effective collaboration, we are proposing the following elements to guide formation of a regional initiative to improve air quality in the Comox Valley. A formal “Terms of Reference” could be generated based on these elements, and with input from the members of the Initiative, once it is convened.

Purpose Statement:

Working together to ensure *the best air possible* for a healthy Comox Valley

What do we mean by best air possible? We recognize that any reduction in PM_{2.5} levels has a positive impact on human health, and that improving air quality is a complex issue that requires strategic action and will take time to change. As such, we will work to continually improve air quality in the region, aiming to meet defined targets in the short-, medium-, and long-term. For example⁵:

- Short-term (by 2025): a positive trend in levels of the 24-hour, and annual, BC AAQO standard for PM_{2.5}
- Medium-term (by 2030): meet the 24-hour, and annual, BC AAQO standards for PM_{2.5}
- Long-term: continue to lower the 24-hour and annual levels of PM_{2.5} to surpass the BC AAQO standards

Guiding Principles

The following principles were developed by the working group, drawn from best practices for collaboration and built on successful local examples and with consideration of this specific context. These principles are a starting place to guide this group to develop effective ways of working together collaboratively, with recognition that this will take practice, commitment and a clear sense of shared purpose.

- Be **curious, flexible & open** to ideas—all views are welcome
- Treat each other with **respect**
- Work in ways that cultivate **trust & shared responsibility**
- Take an **informed**, evidence-based approach
- We are **All One Valley**, “leave no jurisdiction behind”
 - Find areas of agreement and move forward from there
- Ensure **commitment** at a leadership level
- Provide **clarity** (of roles, mandate)
- Aim for **excellence**
- Seek short-term wins with a view for the long game

⁵ At this stage these targets are provided as a starting place for discussion by Roundtable once it is formed

- **Iterate:** adapt and continuously improve, while staying **focused** and on task
- Cultivate a **thoughtful**, well-chosen membership (get the right people)

The Work

There are two main areas of work for the initiative, based on a review of other similar initiatives and literature on effective collaborations:

1. Project-focused work
2. Coordinating functions

The scope of project-focused work that the initiative may choose to engage in, to improve air quality and health, includes:

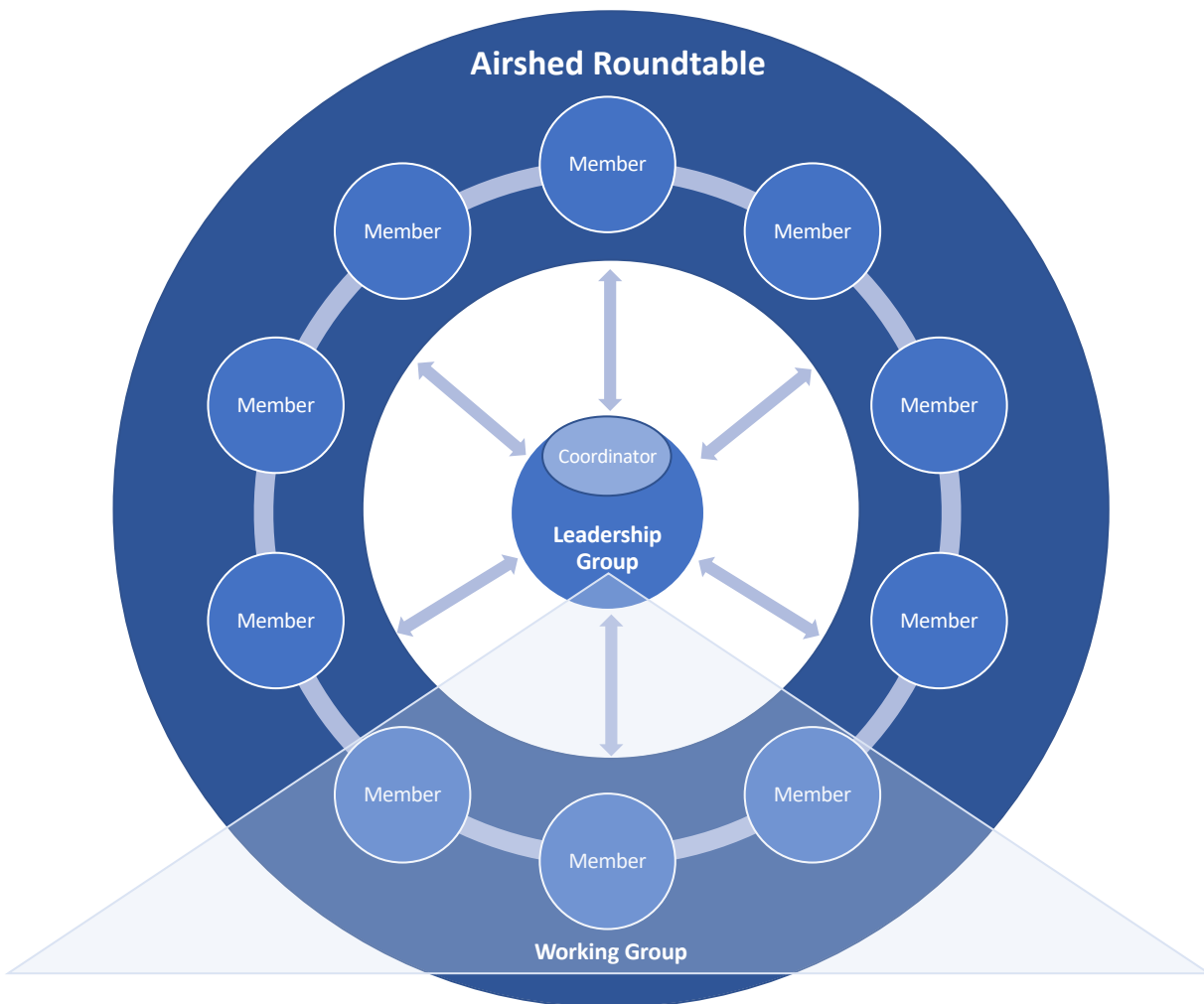
- Research, air quality monitoring and data collection
- Communications, outreach and education
- Policy and regulatory options
- Enabling programs and incentives
- Advocacy

In addition, due to the complex nature of managing this issue (in terms of the range of those who have influence on, and are influenced by, actions relating to air quality), there are essential coordinating functions that are required for this initiative to be effective. The scope of this part of the work includes:

- Conduct strategic planning and develop systems
- Ensure funding and resources for coordination and projects
- Provide support for monitoring, learning and adapting
- Provide other supports (administration, website, internal communications, meeting preparation and facilitation, technical support, etc)
- Build trust, relationships and commitment
- Work to align activities across many actors

How the Work Gets Done

We are recommending an approach that combines a broader “Roundtable” together with a smaller “Leadership Group,” and supported by “Working Groups” (as needed) and a “Coordinator.” This structure is modeled after other examples from the field, including regional air quality initiatives in BC. A description of each of these structures, along with their proposed membership, is provided below.



Relationship between Roundtable, Leadership Group, Coordinator and Working Groups

1. Roundtable

Description

The Roundtable is a forum to host a broad set of stakeholders with an interest or stake in the issue of air quality and health in the Comox Valley. This forum could meet between 2 and 4 times a year, and will provide an opportunity for sharing information, reporting out on activities, providing feedback, and engaging broadly. The Roundtable membership should be engaged to provide direction and agree to priorities – they would be heavily engaged in the strategic planning process, for example. The function of this forum is in part to contribute to education, outreach and relationships across a broader group of stakeholders and into the wider public, which is central to the work of improving air quality and health.

Members of the Roundtable would also be called on as appropriate, to be involved in and/or lead on aspects of the work. As priority areas for action are developed (as part of the strategic plan, and ongoing), those member organizations or individuals who are interested and/or best placed to have influence on the issues, would be gathered into “Working Groups” (see below) to carry out the actions. As such, the work gets done in a distributed way, and is not the responsibility of any one individual or group alone. A good example of working in this way is the Cowichan Airshed Roundtable, as described in their Strategic Plan⁶. Of note, the Coordinator and Leadership Group are not responsible for implementing the actions directly, but do play a key role in coordinating how this work gets done across various partners.

Proposed Representatives

Town of Comox
 Comox Valley Regional District
 City of Courtenay
 Village of Cumberland
 K’ómoks First Nation
 BC Ministry of Environment
 Island Health
 FNHA
 Breathe Clean Air
 Woodstove industry
 Firewood procurers
 Alternative energy professionals
 Forest industry
 FLNRORD (BC Government)
 Privately and community managed forestry
 Agricultural Advisory Committee
 Farmers Institute
 Fire Departments (Fire Chiefs Association)
 Seniors Association
 Community Health Network
 Community Foundation
 Academics
 School District 71
 General Public

2. Leadership Group

Description

⁶ <https://www.cvrld.bc.ca/DocumentCenter/View/70959/Cowichans-Regional-Airshed-Protection-Strategy---18-Nov-2015?bidId=>

A smaller group, selected to play a strategic role in moving the work forward. This group provides leadership to develop a strategic plan, and in guiding implementation, on behalf of the broader Roundtable. As such, it is expected to reflect the diversity and wisdom of the broader collective, therefore consulting and engaging with the Roundtable membership as needed, in formulating and carrying out the priorities of the collective. This group meets more regularly to ensure work maintains momentum (e.g. monthly or bi-monthly).

Proposed Members

Staff from:

- Town of Comox
- Comox Valley Regional District
- City of Courtenay
- Village of Cumberland
- K'ómoks First Nation
- BC Ministry of Environment
- Island Health
- BC Ministry of Forests, Lands, Natural Resource Operations and Rural Development (FLNRORD)
- Academia (North Island College? Vancouver Island University?)

3. Coordinator

Description

An individual or organization, contracted to play a coordination role for the initiative. This person/organization would have the qualities of “servant leadership” – that is, someone who is committed to and motivated by the collaboration’s purpose and their ability to help others achieve their potential for impact. They also need to be skilled in facilitation, listening deeply, relationship-building and working with a diversity of opinions.

This is most likely an external individual or organization (may be a consultant/business or non-profit), reporting to and being supported by RD staff. This person/organization would be responsible for core coordination functions, such as:

- external communications, public relations and outreach, website
- internal communication, process design, meeting facilitation, conflict management, and member on-boarding
- alignment of stakeholders, partners and their activities
- logistical preparation for convenings, project tracking, administrative tasks, evaluation & reporting

Proposed Individual/Organization

To be determined – this could be through a Request for Qualifications/Proposals process. It was suggested that Regional District staff would be best placed to enact the hiring process and manage their contract.

4. Working Groups (as needed)

Description

Working groups could be struck as needed, to work on specific projects or functions needed to advance the work of the initiative. These groups may have an operational focus (e.g. Evaluation & Learning), or a project-specific focus (e.g. Local Air Quality Monitoring Network Project)

Proposed Members

Project- or function-specific, drawn from the membership of the Leadership Group and/or Roundtable (voluntary).

Funding

The funding structure for this initiative would have multiple streams of funding, conceived of as follows:

1. Project-based funding

As described above, the project-based work of this initiative would span a number of key areas of activities. The funding for specific projects is expected to come through a variety of sources, depending on the nature of those projects. For example, in other contexts the Ministry of Environment has had funding available for monitoring and research related work, Island Health may have funding for communications, outreach and education, or other community health-oriented projects, while the federal government, local governments, other departments, or foundations may have funding available for other purposes. The Coordinator and/or partners would be involved in pursuing funding for the priorities identified through the strategic planning process.

2. Core funding for co-ordination functions

In research into other regional air quality groups and best practices for collaborative initiatives, a consistent message was the importance of ensuring that there is stable funding for the core functions of coordinating the initiative. The air quality initiatives in Cowichan, Port Alberni and Sea to Sky have all struggled to make progress when the coordination function was not well-resourced, either by being fulfilled by a partner (e.g. regional district or local government staff) or through adequate ongoing funding to hire an external Coordinator. In one case, very limited funding to a Coordinator (just enough to plan and facilitate Roundtable meetings) has been contributing to a significant slow-down in progress that had been made up until that point.

Another insight into collaborative initiatives, is that having “skin in the game” can make a real difference in the level of buy-in and/or ownership felt by key organizations, and therefore how engaged they will be in supporting the initiative’s purpose and playing strategic roles where needed.

For these reasons, the group proposes the following funding structure to support the coordination functions of the initiative in the initial phase:

- Four-year stable funding for a Coordinator position, and initial operating budget, confirmed in a Memorandum of Understanding across key partners
- Each local government would be asked to contribute (relative to population size) including the Regional District (from existing service areas representing rural areas)
- Island Health and/or MOE would also be asked to contribute (in-kind and/or financial contributions)
- Annual renewal of this funding would be contingent on reporting requirements, showing progress on development and/or implementation of the strategic plan and the operations of the initiative
- It is anticipated that the Regional District would take responsibility for managing this contract with an external Coordinator
- In addition, it was recommended that funding be provided initially, to hire additional facilitation/training support to build the capacity of the Leadership Group and/or Roundtable to work effectively as a collaborative group. This was noted as a key success factor for the effectiveness of the Cowichan Airshed Roundtable and Leadership Group.

“Capacity-building activities went a long way... We developed more informal approaches [to relationship-building] through activities to meet with each other, generate ideas, be able to get to know where each other is coming from, what are our common interests, what are the barriers to implementing plan actions. Being able to look forward and ask, ‘why do we continuously get stuck on these same issues? And how can we have the right groups at the table to find solutions to those barriers?’”

- *Cowichan interviewee*

Measure What Matters, Learn, Adapt

Working collaboratively to address a complex issue such as air quality, does not come with a clear map of how to get from A to B. While there are other examples to follow, this initiative will need to adapt lessons from elsewhere to fit the local context and conditions, and continue to do so over time as the needs and context evolve. This is reflected in the guiding principle of “iterate: adapt and continuously improve, while staying focused and on task.”

And of course, this doesn’t just happen on its own – we need to be intentional about how learning and improvement can be purposeful and focused, to support the effectiveness of this work. The following recommendations outline some ways that the initiative can incorporate monitoring, learning and adapting into its functioning from the outset.

Design an evaluation approach that combines outcome-oriented and principles-focused criteria

- Outcome-oriented:
 - o Early on, come to agreement around meaningful targets for PM_{2.5} (suggested short-, medium-, and long-term targets are outlined above)
 - o Develop milestone goals for development of the collaborative initiative, as this will be central to the work in early stages (e.g. establish a Roundtable and convene twice in the first year; hire a Coordinator and establish initial systems to support the work of coordination; etc)
- Principles-focused:
 - o Using a meaningful process, engage key partners and stakeholders to develop a principles-focused framework to help guide the work and assess the quality of the approach and its effectiveness.

Principles-focused evaluation is a newer approach to evaluation that is more suited to complex issues like air quality and health, and can be used as a complement to traditional forms of outcome-oriented evaluation. Principles-based criteria can help to integrate *what* the work intends to achieve, with *how* the work is done, which will be an important dimension of this work's effectiveness.

The recommendation in this proposal to establish clear reporting requirements linked to funding commitments, is in part to ensure confidence and build trust across all partners that the work of the initiative remains focused and effective. This is an example of one of the "principles" that we may want to track through the principles-focused evaluation framework, to ensure that this (building trust and confidence) is indeed resulting from the reporting process and, if not, to determine the best course of action to improve that.

Establish a regular reporting schedule, learning agenda and annual review

It will be important to ensure that partners, stakeholders and the public are kept informed, and that awareness about the issues and the work of the initiative continues to grow. Based on experience elsewhere, developing an overarching communications strategy can be very helpful.

More specifically:

- It has been proposed that funding will be contingent on fulfillment of regular reporting requirements. These requirements should be laid out clearly as part of the MOU.
- A website for the initiative could be a key method for communicating real-time data (e.g. venting index, "hotspots") and other important information that can be easily accessed to inform actions.
- Create opportunities to engage and share information among key stakeholders and local decision-makers, to ensure that all are equipped to make informed decisions.
- On a regular basis, develop and update strategic learning questions that we are exploring. Again, this can be around the issues of air quality and health, and also about the work of the initiative and what is needed to work together effectively. Assign

someone to hold this agenda and ensure it informs the work that is happening and how it is being done.

- Develop a thoughtful process for conducting an annual (or more frequent) review of the work of the initiative, to “take stock” through assessment of evaluation results and the learning process, determine where changes are needed and update the initiative’s work plan, Terms of Reference, membership, etc.

Early Actions

There is an understandable desire for immediate action to improve air quality and the resulting human health impacts in the Comox Valley. But, as we’ve discovered through our investigation, due to the complex nature of this work we will need to be thoughtful and deliberate in designing actions that have the desired effects. It can be done! But we need to proceed wisely and not reactively.

As an example, it might seem obvious and straightforward for the Electoral Areas to ban backyard burning and thus create a consistent, airshed-wide regulatory approach. But if we do this, how will people in these areas dispose of their yard trimmings? The most likely alternative is roadside collection; however, this is not currently in place and would require time and resources to develop and implement an effective program. In addition, banning backyard burning would require that additional resources and capacity be re-allocated for education and enforcement (and away from other possible priorities). In advance of such a change, significant public engagement would be required to respond to questions and concerns, and to build understanding of the reasons for the ban, as backyard burning has historically been the accepted practice and even considered part of the culture of this place. So, it’s not straightforward, and simply banning backyard burning without considering the interplay of available alternatives, awareness, outreach, enforcement and resource allocation, is unlikely to be effective.

*“We need to know **this is a long term project**. And we are going to get there inch by inch, stove by stove, neighbour by neighbour. You can’t check the box and be done. What we want is partners to be in it for the long haul. If you go in and blast something through, it creates chaos. It needs to be incremental...**We are trying to change a culture** with so many factors, barriers and reasons... this is long-term, step by step. There is progress every time we meet.”*

- *Cowichan Interviewee*

For these reasons, we are recommending that most of the early actions that might be taken, be put to the proposed Airshed Roundtable for careful consideration by this multi-stakeholder group, as part of a **strategic planning process**. This would include:

- Developing a strategic plan collaboratively with the multi-stakeholder Roundtable (and led by the Leadership Group and Coordinator)
- Developing an accompanying communications plan and work plans for priority areas

In the meantime, there are a few “no-regrets” actions that could be taken, that will simultaneously help to build awareness and/or capacity for additional actions decided on through the strategic planning process. These include:

- Hiring a Coordinator for the initiative
- Engaging potential members of the Roundtable, and convening an initial meeting
- Updating the Air Quality section on the CVRD’s website with:
 - o Targeted communications materials to build shared understanding of the issues outlined in Section A above (using existing media, and potentially developing some new materials)
 - o Real-time information (venting index, air quality monitoring, etc)
- Investing in a low-cost air quality sensor network (implemented in various other regions, including Cowichan), and linking this real-time data to display on the CVRD website page
- Drafting model bylaws to begin deliberation among local governments
- Building core capacity of the initiative to work together effectively, including:
 - o Cultivating awareness and ownership (of these issues, and of the work of the initiative) at the leadership level of organizations who are part of the Leadership Group
 - o Establishing metrics and targets, along with systems for monitoring & reporting (based on needs as described in the MOU and strategic plan)
 - o Engaging facilitation/training support to build capacity of the Leadership Group & Coordinator (and Roundtable, as appropriate) to work effectively as a group and develop a strong foundation for the work moving forward (as in the Cowichan example)
 - o Ensuring basic systems are in place and resourced (website, financial & administrative systems, evaluation & reporting systems, etc)

Conclusion

There is a compelling scientific case establishing that PM_{2.5} levels in the Comox Valley seasonally exceed provincial and national standards, and that biomass burning is the predominant source. Long-term health impacts (especially for cardiovascular health) are of concern for residents of the Comox Valley. But here’s the good news: every bit of improvement in PM_{2.5} levels in the air, decreases observed health impacts.

Our proposal provides the building blocks for convening and launching a regional Air Quality Roundtable that is appropriately funded, well-coordinated, and thoughtfully improved over time, so that we have the best chance of success. By coming together as a working group to collaboratively make sense of the issues and devise a regional approach to improve air quality and health, we have begun the process that the Air Quality Roundtable is proposed to continue: creating the conditions to ensure that we can work well together for the best air possible for a healthy Comox Valley. We look forward to continuing to work with the many people and organizations who have an interest and stake in air quality and health in our region.

Appendices

A. Key References

Locally Relevant Air Quality & Health Studies

2008 – 2009 Comox Valley air quality study conducted by researchers from the University of Victoria: <http://web.uvic.ca/~ssrl01/SSRLtemp/CVRD%20Fine%20Particulates.pdf>

2016 peer-reviewed study by researchers at the BC Centre for Disease Control, ranking Courtenay as the 2nd highest wood smoke-impacted community in the province: https://www.researchgate.net/publication/309851264_Systematic_identification_and_prioritization_of_communities_impacted_by_residential_woodsmoke_in_British_Columbia_Canada

2017 Emissions Inventory for the Comox Valley, specifying relative contributions to PM_{2.5} from a range of sources: https://www.comoxvalleyrd.ca/sites/default/files/docs/Services/170317_cv_pm_emissions_inventory_final_report.pdf

2017 Mobile monitoring study of the Comox Valley by researchers at UBC, confirming that PM_{2.5} during the late winter is from wood smoke (using a new monitoring technique to measure “levoglucosan” – a biomarker of wood smoke – and its correlation with PM_{2.5} levels).
Summary report: <https://breathecleanair.ca/wp-content/uploads/2017/10/Woodsmoke-Monitoring-2017-Comox-Valley-Report-summary-Matt-Wagstaff-UPDATED.pdf>
Full report: <https://open.library.ubc.ca/cIRcle/collections/ubctheses/24/items/1.0371217>

2017 peer-reviewed academic study (conducted between 2009 – 2015) linking PM_{2.5}, and biomass burning specifically, to increased risk of heart attacks among the elderly in the Comox Valley: http://journals.lww.com/epidem/Abstract/publishahead/Biomass_Burning_as_a_Source_of_Ambient_Fine.98888.aspx

Examples of Regional Approaches to Airshed Management in BC

Cowichan Regional Airshed Roundtable: <https://www.cvrld.bc.ca/2180/Airshed-Protection>

Air Quality Council of Port Alberni: <https://www.acrd.bc.ca/aqc-of-port-alberni>

Sea to Sky Clean Air Society: <http://seatoskyairquality.com/about.php>

Prince George Air Improvement Roundtable: <https://www.pgairquality.com/>

Kamloops Air Quality Roundtable: https://www.fraserbasin.bc.ca/Kamloops_Air_Quality_Roundtable.html

B. Methodology

Our approach combined an appreciative lens with an orientation to working effectively with complex systems, drawing on best practices for building effective collaborations, and incorporating learning from nearby examples. This included:

- 1) A strengths-based approach: we drew on the existing strengths and experience in this region and among the Working Group organizations as a foundation for the recommendations.
- 2) Working with complexity: the initial working group session focused on building shared understanding of the issues and an orientation to how to understand and engage with a complex issue like air quality through a systems approach. This provided a foundation for subsequent deliberation about what form & structures of working together would best support us to be effective in addressing these issues.
- 3) Design for effective collaboration: we drew on a variety of techniques and models for building effective collaboration – this is often the “glue” that is missing in efforts to make change on complex issues, and there are many resources that can be applied to build the skills and tools to collaborate well.
- 4) Look to inspiring, practical examples: Port Alberni and the Cowichan Valley are two local examples of how to positively affect air quality as a region. We drew on lessons and insight from both of these examples, in addition to Sea to Sky and Prince George, to build on what worked, avoid foreseeable challenges, and translate their experience into the local context.

This project combined three key methods to inform and guide the group’s deliberations and development of the proposed approach:

Method	Description	Purpose
Background Research	The consultant conducted background research into publicly available materials relating to: <ul style="list-style-type: none"> - BC examples of regional approaches to air quality management (Cowichan, Alberni, Sea to Sky, Prince George and Kamloops) - Best practices in the field of regional-scale collaboration 	These materials were summarized and synthesized in order to inform each of the working group sessions.
Interviews	The consultant conducted two types of interviews: <ol style="list-style-type: none"> 1. An interview with each of the four participating local governments (their CAO and the Working Group representative) 	The results of these interviews were summarized into key insights, lessons and information on local conditions, as well as examples from elsewhere,

	<p>2. Interviews with core members of three case study examples: Cowichan, Alberni, and Sea to Sky</p> <p>CVRD staff conducted additional interviews to produce case studies of regional examples of cooperation across local governments</p>	that informed each of the working group sessions.
Collaborative Working Sessions	<p>Three working sessions were held in June 2019, convening the 9 members of the working group to address the elements needed to generate a joint proposal, namely:</p> <ol style="list-style-type: none"> 1. Understanding air quality and health as a complex issue 2. Understanding the conditions that support effective collaborative approaches at this scale 3. Specific components and structures to include in design of a regional approach <p>Each session was informed and supported by extensive research and information compiled from local experts, interviews, and background research.</p>	<p>This approach was designed to model a collaborative approach and take the group through an experiential learning process as a basis for understanding what is needed to collaborate effectively to address a complex issue.</p> <p>The components of our proposed approach were developed in sessions 2 and 3.</p>