



Yukon Initiative for Healthy Air
Air Quality Improvement Report
Office of the Chief Medical Officer of Health



Project Team and Acknowledgements

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Introduction

Excellent air quality in Yukon is both valued and expected, as much as Yukoners cherish clean water and close access to the wilderness. But there are two main threats to air quality in Yukon: wildfire smoke in summer and smoke related to winter wood heating appliances in winter. Two recent related initiatives have helped us understand neighborhood air pollution in winter contributed by wood burning stoves.

The [Whitehorse Air Quality Monitoring Study \(WAQMS\)](#) monitored the air quality in nine Whitehorse neighbourhoods over a near two-year period from 2015-2017. The study found that air pollution was particularly high in four of the neighbourhoods and that this was likely primarily due to smoke from residential wood burning devices.

Release of the monitoring results was followed by a public engagement initiative that helped to:

- raise awareness of the issue;
- solicit views from Yukon citizens on the importance of local air quality, and
- obtain opinions on how local air quality might be improved.

In this report I will highlight recommendations based on the monitoring results, practices in other areas, and the public engagement process, which I feel are the most feasible and the highest priority to move ahead with.

Background

From 2015-2017 the air in most Whitehorse neighbourhoods was monitored through the WAQMS. This study found that there were exceedances in national and local ambient air quality standards for fine particulate matter in some Whitehorse neighbourhoods during winter months. The trends seen in this study were reflective of outdoor pollution from residential wood smoke. Results showed peaks in particulate matter in the morning and evening, when wood stoves are typically lit, with the highest concentrations seen during periods of very cold weather combined with temperature inversions, that trap the polluted air. This study does not predict the situation in Yukon communities outside Whitehorse. However, other Yukon communities could also experience high levels of particulate matter in the winter time due to a large number of people who heat their homes with wood in the winter. High levels of particulate matter

from wood smoke is a health concern for the Yukon population. Wood smoke particulate pollution has been found to be especially harmful for vulnerable populations including children, seniors and people with existing cardiovascular or respiratory conditions. Wood smoke irritates the lungs and interferes with air exchange, making breathing difficult for susceptible individuals. Wood smoke can worsen chronic conditions such as asthma, chronic bronchiolitis and heart disease.

Starting with the monitoring study, the Yukon Initiative for Healthy Air (YIHA) working group was created to help address some of the concerns surrounding residential wood smoke in Whitehorse, concerns which also apply to rural Yukon communities. As a collaboration between various Yukon government departments, the City of Whitehorse, and the office of the Yukon Chief Medical Officer of Health (CMOH), YIHA organized the near two year monitoring study, followed by the public engagement that was carried out through the work of a consultant. Both the monitoring study and the consultant's "What We Heard" report are now publicly available. Based on these reports, recommendations from this office for further action are listed on the following pages.



Recommendations

Education and Communication

Build on wood smoke awareness and communication campaign

The public engagement strategy showed that a number of people learned from and appreciated the information on wood smoke pollution and the importance of clean burning. The Yukon government and City of Whitehorse have periodically conducted awareness campaigns to inform people of good wood burning practices. This campaign should continue each year in the fall to make Yukoners aware of effective ways to procure, store and burn wood. It should expand to target retailers of wood and wood stoves as well as the Yukon government Energy Mines and Resources - Forest Management branch, which provides permits to people who wish to cut their own wood. This could include messaging which retailers and the Forest Management branch could distribute when people access their services. This would ensure communication is consistent across the continuum of wood use from harvesting to burning.

Implement voluntary 'no-burn days' during periods of temperature inversions

It is clear that the previous bylaws restricting wood burning on cold inversion days were largely unpopular, controversial, and difficult to enforce, as well as causing difficulty for those households without alternative heat sources. However, many people appear to be willing to reduce wood burning if appropriately warned of inversion conditions, should they have a backup fuel source. Similar to days when there are Wildfire Smoke and Air Quality advisories through Environment Canada, an air quality statement could be released on days where there are temperature inversions, which are anticipated to lead to deteriorating air quality. This information could be added to the Whitehorse- Air Quality Health Index site. These statements would include information related to health, and a statement that encourages people to use a secondary heat source instead of wood stoves, if they are able to during the inversion period.

Mitigation Efforts

Improve access for clean and dry firewood to Yukoners

It was apparent from some of the engagement sessions that clean dry firewood is not accessible for some people, which may lead to inefficient and inappropriate burning causing harmful emissions. The reasons behind this are many, including socioeconomic barriers, physical barriers, and lack of knowledge. For example, the Pioneer Utility Grant appears to be underused, and eligibility to this grant could be expanded. Where economic priorities override the ability to obtain clean wood, provision of subsidized wood with appropriate means testing would help to address this inequitable access to fuel. I suggest that a key next focus of the YIHA committee would be to examine the costs, and feasibility of the various steps to enhance access to clean fuel sources with a view to implementation of the most feasible options over the next two years.

Feasibility analysis of enforcing that all stoves in Yukon are either EPA or CSA certified by 2025

Not all wood stoves are equal when it comes to efficiency. Ideally all stoves would be certified by reputable agencies to improve the efficiency of wood burning in Yukon, which could decrease the emissions from stoves and the amount of wood that is needed for heating homes each year. However, this would require changes in regulations as well as an incentivized wood stove exchange program since replacement of these stoves is costly. There are also various opinions in the literature on the effectiveness of such an approach. I recommend having a feasibility analysis completed on regulating wood stoves and ensuring that all stoves are either EPA or CSA certified within a certain period of time.

Pilot Projects

Implement pilot projects in lower income neighbourhoods

Through the public engagement process, it became clear to the members of YIHA that burning cleaner wood is more than simply a matter of knowledge. Wood burning in households with economic challenges is more about survival than a comfort or luxury. Clearly one cannot focus only on education or incentives when residents are struggling with multiple economic demands, not least of which may be keeping homes in

reasonable states of repair. For this reason, a comprehensive approach could be piloted in one or more communities with both higher levels of pollution, and more challenging economic circumstances. In this case a pilot project could examine the feasibility of offering a number of targeted initiatives, including the following:

- Provide subsidized fire wood to homes in Yukon neighbourhoods with low air quality and more challenging socio-economic circumstances.
- Conduct a survey in selected neighborhoods to get information on heating sources that will help inform an air pollution reducing pilot project.
- Pilot a geography-based home heating fund in selected neighborhoods.

Such a broader initiative requires close and careful consultation first and foremost with the affected community, but could lend itself to partnership with non-governmental organizations aimed at poverty reduction or improved housing. Thus, wood burning pollution could potentially be mitigated as part of a broad sweep of initiatives aimed at improving overall housing and living conditions.

Governance

Coordinate a complaints process

A coordinated complaints process that includes the role of Municipal Bylaw Officers, Environmental Protection Officers and Environmental Health Officers is necessary for a consistent and efficient response to air quality concerns.

Complaints may be heard beyond those concerning residential wood smoke; for example, complaints related to industrial projects, bush clearing, or wildfire smoke. A coordinated approach that is a 'one-stop complaints process' for air quality concerns will improve the process by which these concerns are currently handled.

Enforce the Waste Management Bylaw Section 72 that prohibits burning waste with fines

Currently bylaws that restrict burning waste are not enforced. We heard from engagement sessions that many people did not know about section 72 of the City of Whitehorse Waste Management Bylaw and many people were in favour of this bylaw

being enforced. Bylaws may be an effective way of limiting the amount of waste burned within the City of Whitehorse and curb the amount of air pollution produced. Similar bylaws should be enacted or enforced in other Yukon communities to reduce waste burning throughout the territory.

Enforcing waste burning bylaws should not be an isolated act. Bylaws require significant public education to ensure public is informed before fines are implemented. Furthermore, there are some people that may burn waste products because they are not able to access clean firewood. Without improving access to clean firewood, enforcing these bylaws could be detrimental to these citizens,

Information Gathering

Continue current monitoring and expand monitoring throughout the territory

Air monitoring for particulate matter has taken place in most Whitehorse neighborhoods and additional monitoring in selected neighborhoods is already underway for more complete data. Monitoring has also commenced in Dawson City since the fall of 2018. Ongoing and future monitoring will allow us to learn more about changing trends over the years as well as understanding potential health effects. As resources allow it would be of benefit to continue monitoring air quality throughout the year in Whitehorse, expand monitoring to communities throughout Yukon and develop permanent monitoring stations in rural communities where feasible, to better understand the impact of residential wood smoke and wildfire smoke.

Include speciation techniques to determine the contribution of wood smoke to days with poor air quality

There is concern that particulate matter may be emitted in high concentrations from other sources, such as other avenues for home heating and motor vehicle emissions. It is possible to monitor emissions to differentiate between the various sources of particulate matter. Previous studies (Riverdale, 2009) confirmed wood heating to be the main source of pollution, and daily and seasonal variations in the monitoring results also implicate wood heat as the main source. However, with increasing traffic in Whitehorse and shifting weather patterns, it would be useful to periodically speciate



monitoring results to confirm sources of pollution. Speciation would also ensure that mitigation activities are targeting the main source of pollution.

Obtain information about amount and quality of wood that is sold

There are many different sources of firewood in Yukon. People may obtain a permit to cut wood themselves or buy wood from local retailers. However, like wood stoves, not all wood is of equal quality, especially if it is not procured or stored properly. We do not presently have information on the amount or quality of wood being sold in Yukon. Without this information it is not possible to address the issue of poor wood being sold and burned as we do not know the impact it has. Gathering this information is imperative to understanding the current situation and developing mitigation efforts to decrease the amount of poor quality wood being sold.

Partner with Health Canada to use the Air Quality Benefits Assessment Tool (AQBAT)

The Air Quality Benefits Assessment Tool (AQBAT), developed by Health Canada, is designed to estimate the human health impacts of changes in ambient air quality. AQBAT could be used in Yukon to estimate the benefits as well as potential harms of proposed regulatory initiatives related to outdoor air quality and examine a wide range of scenarios combining pollutants. This tool could also be used when exploring different initiatives to manage outdoor air quality in the territory to show the associations between air pollution and health effects.

Furthermore, it would be beneficial to develop a method to take a closer look at the air quality in individual Whitehorse neighbourhoods. Currently Whitehorse air quality is reported on the Environment Canada website. However, as this is based on a downtown monitor, this does not predict the air quality in individual neighbourhoods. Creating a tool that would predict the concentration of particulate matter in neighbourhoods throughout Whitehorse based on the central reading would help give residents a better idea about the quality of air in their own neighbourhood.

Strategic Direction

Create a Yukon Healthy Air Strategy

Clean air in Yukon can no longer be taken for granted. While strategies such as the Climate Change, Energy and Green Economy Strategy (under development) and the Biomass Strategy are associated with air quality, there is no overarching intergovernmental air quality strategy, leading to gaps and ambiguity in responsibilities and accountability for different air concerns or initiatives. The *Yukon Water Strategy and Action Plan*, created with the intention of helping the Yukon government "ensure that its water management decisions maintain the quality, quantity and overall health of waters while allowing sustainable use," provides a good example for how an air quality strategy could be created.

As mentioned at the outset, air quality issues in Yukon are many, including summer wildfire smoke, climate change effects, industrial pollution, and airborne contaminants, such as vehicle emissions. A comprehensive air quality strategy would give us the enduring tools and policies for maintaining optimal air quality. Such an air quality strategy could stand on its own, or be integrated into a larger project such as the Climate Change, Energy and Green Economy Strategy.

Host a Healthy Air Forum

As a follow-up to the public engagement held recently, a healthy air forum held in the next two years would be a useful way to deliberate on what will have been attempted or achieved to date towards a clear air strategy. This would also be a time for Yukon health and environment professionals and policy makers to inform each other, engage with and learn from the public, and learn about current air issues and initiatives in other regions

Evaluation

Burning wood in the winter is typical of many people in Yukon. Yukon's *Biomass Energy Strategy* outlines an approach to expand the use of biomass energy use in Yukon as an opportunity to build local economy, reduce greenhouse gas emissions and become more energy self-sufficient. If the use of biomass for heat in Yukon is indeed truly viable, its implementation cannot compromise air quality. Thus, potential biomass



projects must include assessment and mitigation of potential negative health effects related to emissions, and action must be taken to reduce any particulate matter produced. Similarly, air quality improvement projects and any projects that may affect air quality should be monitored and evaluated in order to protect the well-being of Yukoners.

Next Steps

My recommendations were made as the YIHA moves forward with measures to improve the air quality in the territory.¹ This includes working with contractors on communication and education campaigns as well as an assessment for promising mitigation tactics. YIHA plans to continue the work that they are doing to improve the air quality and health of Yukoners. Although limited funding has been made available through federal sources, some of these recommendations will evidently need financial review and consideration of funding sources before they can be enacted.

¹ Note: YIHA initiatives and mitigation strategies are contingent on ongoing funding and Yukon government support and commitment.