

state of the air 2008

I N B R I T I S H C O L U M B I A

The quality of the air we breathe has recently become one of the most prominent issues in the minds of Canadians from schoolchildren to the most powerful political decision makers. The green wave that is currently sweeping our country has helped make all of us aware of the fragile nature of our planet, and more and more of us are now voluntarily making positive personal and business decisions about the resources we use in the new light of awareness.

The fourth annual edition of the State of the Air in British Columbia Report is intended to help build that awareness of the many issues that affect our air. There is no one villain in this story, nor is there going to be a single solution in helping us meet the chal-

lenges of ensuring a clean air future for the generations that will follow. In some communities, this may require prompt action. In others, where air quality is already good, ongoing vigilance and proactive measures will be needed to preserve air quality in the face of a growth in population. But there are solutions, and by working on the myriad of problems as individuals and in partnerships, we can make a real difference to protect our clean air resource.

This report has been produced by the BC Lung Association with the support of all levels of government, non-governmental organizations, community groups and committed volunteers. It is intended to summarize some of the air quality issues we are

facing here in British Columbia and to give readers ideas about how they might take an active part in preserving and improving our air quality.

We are very grateful to the members of the BC Lung Association Air Quality Health and Steering Committee who have provided the leadership and direction that resulted in the creation of this report, and to the tens of thousands of British Columbians who have made clean air their priority.

Thank you.



Scott McDonald
Executive Director, BC Lung Association



One breath at a time... a personal story...

Louisa Monkman has lived in Chilliwack for most of her life. Louisa is one of the 300,000 British Columbians who suffer from asthma. The good-humored 65-year-old has a positive outlook despite living with chronic lung conditions. Louisa had been a smoker since her early teens and

although she has been smoke-free for the past year she now concedes that "the damage is already done." In 1991, Louisa was diagnosed with asthma and COPD (Chronic Obstructive Pulmonary Disease). She recalls "It had gotten to the point that I couldn't work for two weeks without getting sick."

Louisa now recognizes and adjusts for factors that compromise her breathing such as cold air, summer heat, pollen, and dust. Strong scents and cleaning products also trigger her asthma. She is learning about alternative cleaners such as vinegar and baking soda that do not aggravate her condition. "It's hard to clean when you can't breathe," she says. Louisa says she has

also learned to avoid crowded places where perfumes present another challenge to her breathing. "I go to malls when not too many people are around, because so many people use scents."

Local pollution may be making her condition worse. "I think air quality is a big concern if you have lung problems," she says. "Even healthy people seem to be affected." She's taken measures to avoid triggers that could exacerbate her asthma and COPD, but it's not easy to avoid outdoor air pollution. "On bad days, I spend more time indoors," she says.

Visible signs of air pollution such as haze or physical signals such as eye and throat itchiness are not always reliable warnings of bad air days. Louisa selects days when exercise indoors is preferable to outdoor exercise.

Expert Opinion: What do the experts say?

Dr. Tom Kosatsky, MD, MPH, Environmental Health Services, British Columbia Centre for Disease Control:

"Louisa's knowledge and understanding of air pollution and its consequences for her health will go a long way towards avoiding

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(One breath at a time - cont'd from p.1)

the worst of COPD and perhaps offering some hope of modest improvement in future.”

“Louisa is doing many things well. First, she has stopped smoking. Next, she recognizes and adjusts for factors that compromise her breathing and has switched to less irritating cleaning products. Her reactions to fragrances should send a message to the general public that their excessive use may compromise the health of others.”

“Along with cigarette smoking, air pollution may have contributed to Louisa’s respiratory difficulties. She lives in an area with a confined airshed, where polluted air is trapped by the surrounding mountains. Ozone and particulate matter blowing in from the south and west often hang over the Fraser Valley. Central air conditioning, besides blunting the effect of summer heat, would decrease the entry of outdoor air and may help reduce exposure to outdoor pollutants that otherwise make their way indoors.”

“Prevention is the primary aim of asthma care, and prevention is rooted in exposure avoidance.”

“Although air pollution may be associated with haze, a brownish tinge, or eye and throat itchiness or discomfort, we cannot always trust our observations to warn us of bad air days. Our senses can be assisted by measurements of air quality as provided by the B.C. Ministry of Environment, Metro Vancouver and the Fraser Valley Regional District. Louisa could use these measurements to select days when exercise indoors is preferable to outdoor exercise.”

“In summary, Louisa is doing many things well. Consideration of central air conditioning as an aid, indoor exercise, and checking on broadcast air quality information could make Louisa’s adaptation even better.”

Dr. Chris Carlsten, MD, MPH, Chair, Occupational and Environmental Lung Disease, Vancouver General Hospital has this to say:

“Prevention is the primary aim of asthma care, and prevention is rooted in exposure avoidance. Therefore, Louisa is wise to focus on decreasing exposure to asthma triggers that she has identified based on careful observation. It is important to realize that many such triggers will not be identified by standard medical evaluation (such as allergy skin testing), and so self-directed care such as this, ideally in conjunction with a physician’s input, is laudable. However, not all exposure can be avoided, and there is a role for medications in preventing exacerbation of airway disease. In addition to Louisa’s thoughtful exposure-avoidance strategies, she should be sure to consider appropriate medications, in consultation with a physician, so as to maximize her ability to exercise and spend time enjoying the outdoors.”

Engagement and Education: Grand Forks’ story...

Grand Forks has a history of poor air quality due to a combination of industrial emissions, residential wood burning



and vehicle exhaust. Until recently the city was home to a particle board plant, a lumber mill and a mineral wool insulation plant. “PM10 monitoring in the valley back in 1992 revealed that downtown Grand Forks had some of the worst air quality in the Southern Interior,” says Chris Moslin, city councillor and Chair of the Boundary Air Quality Committee. “It became a concern for public health.”

Concern among residents grew and air quality became a major issue in the 2005 municipal elections. Candidates who supported an air quality committee were elected to council and the Boundary Air Quality Committee (BAQC) was formed in January 2006. Council invited stakeholders from the Chamber of Commerce, the regional district, Interior Health, the BC Lung Association, local industry, and environmental groups to participate in the committee. “The group well represented the community and those who had control of the airshed,” says Chris. “We came up with a mandate statement: To develop an air quality management plan that improves the quality of life and health in the Boundary Region while sustaining a viable economic base.”

The group had its share of challenges and growing pains. Chris notes that, “Air quality is often a fingerpointing game. The challenge is getting everyone to see how they contribute to air quality and to get everybody to change their behaviour.”

Other BC communities had already established air quality management plans and provided a framework for the BAQC to build on. "The road map was already there for us," says Chris. "There was no secret about how to do it, you just had to get it moving and keep it moving. That took the effort."

"One of our first successes was the installation of a monitoring station equipped with Tapered Element Oscillating Microbalance (TEOM) on top of City Hall to measure particulate matter 2.5 microns or less in diameter. Today we have real time access through the internet to the data being gathered by the monitor." This information, for Grand Forks and other BC municipalities, is available from the B.C. Ministry of Environment.

As of last March, the BAQC became a partner in the BC Wood Stove Exchange Program. "We're on target, hoping to take more than 120 old wood stoves out of our airshed over the next two years," says Chris. "We're hoping to expand that program into the whole regional district. We're taking advantage of a provincial government initiative to get rebates to consumers who improve their homes by putting in an efficient, modern wood stove." Chris encourages other communities with air quality issues to take up the cause of reducing pollution and protecting the air they breathe. "Don't wait for

someone from out of town to come in and solve your own air quality problems—it's not going to happen," he advises. "You've got to make do with what you've got. Bring your

people together—they've all got a stake in the air quality. After all, the mill owner and mill manager have kids going to the same school as everybody else's kids. We all breathe the same air." He suggests using a facilitator to keep communication among the group open and respectful. "Then build on those connections: make sure the farmer sits next to the mill owner so that they talk about the problem together. The goal is to oversee the airshed and manage it like a resource." Chris also recommends keeping the public in the picture. In Grand Forks this means engaging and educating people who live in the area through public meetings, exhibits, wood stove "Burn It Smart" demonstrations and Clean Air Days. "You have to convince the public that they have a role to play in it."



Local advocates that made it happen in Grand Forks



Raising awareness in their community

The BAQC has seen the benefits of its hard work. Most important is the shift in public opinion. Chris says "It took some time, but the realization is now there that we can each do something to improve the airshed."

What's in the air we breathe?



Particulate Matter (PM) refers to a combination of microscopic solid and liquid particles that are suspended in the air we breathe. Particle size is usually measured in units of one millionth of a metre – a “micron”. PM₁₀ refers to particle size of 10 microns or smaller. When inhaled, particles between 2.5 and 10 microns in diameter tend to get trapped in our upper and middle airways. Particles less than 2.5 microns in diameter, referred to as PM_{2.5} or fine particulate matter, are the biggest concern to our health because they can be inhaled more deeply into the lungs. PM_{2.5} is a component of regional haze, which results in impaired visibility.

Sulphur Dioxide (SO₂) is a colourless gas with a pungent odour that smells like a struck match. It is irritating to the lungs and, in high concentrations, can damage leaves on trees and agricultural crops. SO₂ is emitted by the burning of sulphur-containing fossil fuels and the processing of

sulphur-containing ores. SO₂ reacts in the atmosphere to form sulphur trioxide, which in the presence of water vapour can readily transform to sulphuric acid, a major component of acid rain.

Nitrogen Oxides (NO_x) are a group of highly reactive gases that include nitrogen dioxide (NO₂) and nitric oxide (NO). In the atmosphere, NO reacts to form nitrogen dioxide (NO₂), an odorous, brown, highly corrosive gas that is harmful to our health and environment. NO₂ is also of concern because it contributes to the secondary formation of ozone and PM_{2.5}. NO_x is formed when fuel is burned at high temperatures.

Ozone (O₃) is an extremely reactive gas with molecules composed of three oxygen atoms. The ozone found high in the upper atmosphere shields us from the sun's ultraviolet rays. However, at ground level, O₃ can cause damage to crops, trees and

materials and is harmful to human health. Ground-level O₃ is formed in the air through complex chemical reactions involving NO_x and volatile organic compounds in the presence of sunlight. Because the production of ozone is dependent on sunlight, the hourly ozone levels tend to be highest in the summer. Ground-level O₃ is a key ingredient of smog.



Human Health Effects:

The air pollutants listed above can all affect human health. Most vulnerable to the effects are children, the elderly, people with pre-existing lung diseases such as asthma and COPD, and those with heart disease.

Short-term exposure (hours/days) is associated with:

- Increased hospital admissions due

to heart and lung conditions

- Increased emergency room visits, work/school absenteeism and use of medications
- Increased symptoms such as wheezing, coughing, production of phlegm, and lung infections
- Decreased lung function

Long-term exposure (months-years) is associated with:

- Increased deaths due to heart and lung conditions
- Permanently damaged lung function
- Increased number of people with lung cancer
- Increased premature births and low birthweight

What are the Pollution Levels in your Community?

Fine Particulate Matter

Ambient PM_{2.5} levels observed in various regions across BC are shown in Figure 1. Two measurement scales are presented: the average of daily measurements over the year and the highest 2% of daily measurements (presented as Canada-wide Standard). Note that the concentrations shown are not necessarily the highest observed concentrations in a region, but are concentrations considered representative of regional air quality. In 2007, all stations met the PM_{2.5} Canada-wide Standard (CWS) of 30 µg/m³ and the Metro Vancouver annual objective of 12 µg/m³. The highest daily values, reflected by the CWS levels, were found in the central interior, including Prince George (23 µg/m³) and Quesnel (22 µg/m³). The highest annual PM_{2.5} concentrations were observed in Grand Forks (7.6 µg/m³), Golden (6.6 µg/m³), Prince George (6.5 µg/m³) and Quesnel (6.4 µg/m³). In contrast, the lowest concentrations were generally found at sites not largely influenced by local sources, either due to the size of local sources or their distance from the monitoring site.

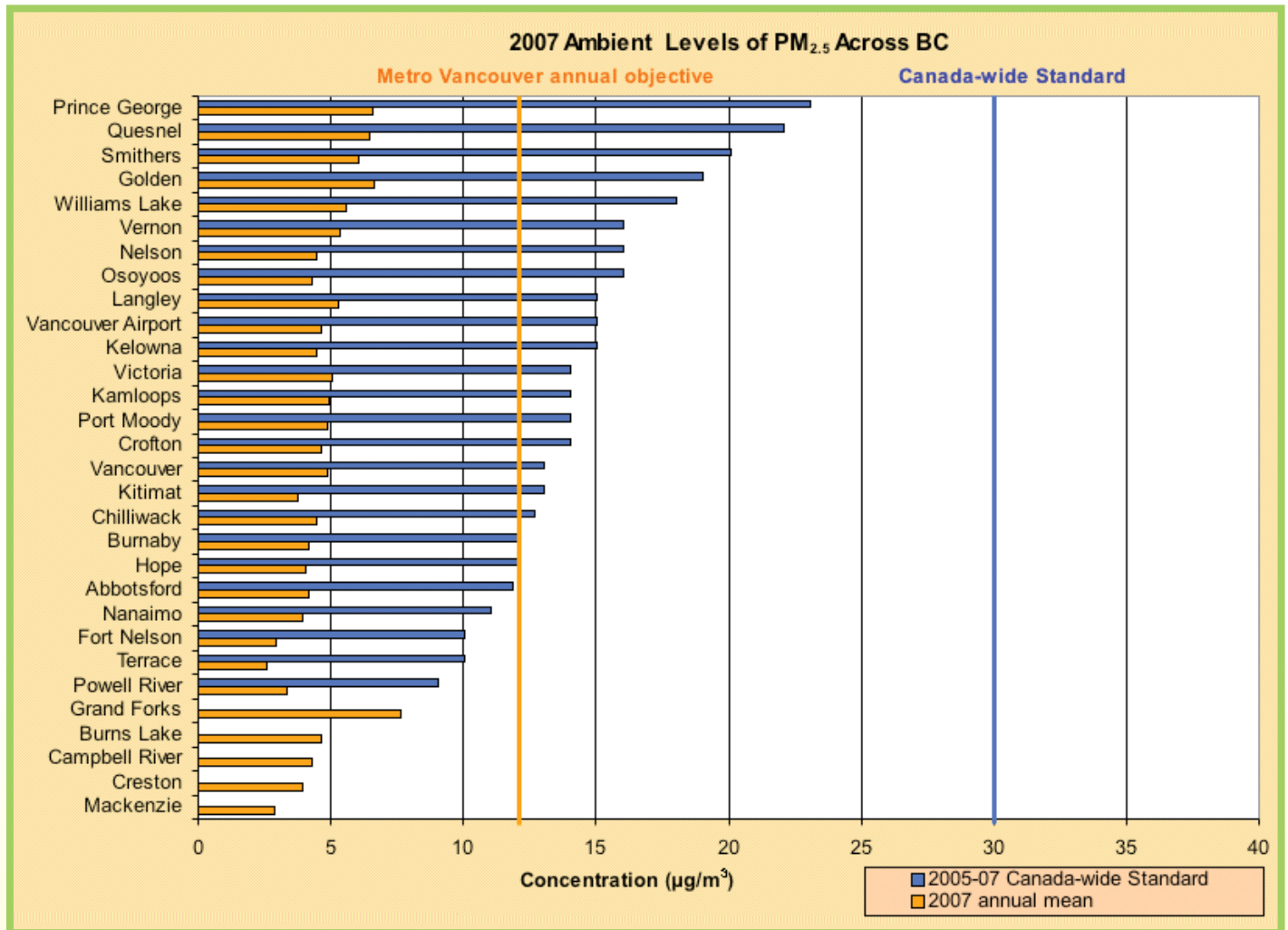


Figure 1: Ambient Levels of PM_{2.5} across BC

Calculating the Canada-wide Standard (CWS) Achievement of the PM_{2.5} Canada-wide Standard is based on the three-year average of the annual 98th percentile 24-hour average concentration.

Where the CWS measurement scale has not been calculated, this is due to insufficient data over a three year period.

Ground-Level Ozone

Illustrated in Figure 2 are ground-level ozone levels across BC. The highest short-term concentrations, as represented by the CWS level, were measured in the eastern Lower Fraser Valley at sites in Chilliwack and Hope during hot, sunny and stagnant weather. In contrast, the highest annual average concentrations were observed at Creston and Kelowna. High background concentrations, limited NOx sources and some local ozone production are possible factors. None of the BC sites exceeded the CWS or the national objective in 2007, although Hope equalled the CWS.



Visibility in Kelowna on 2 separate days in 1998.

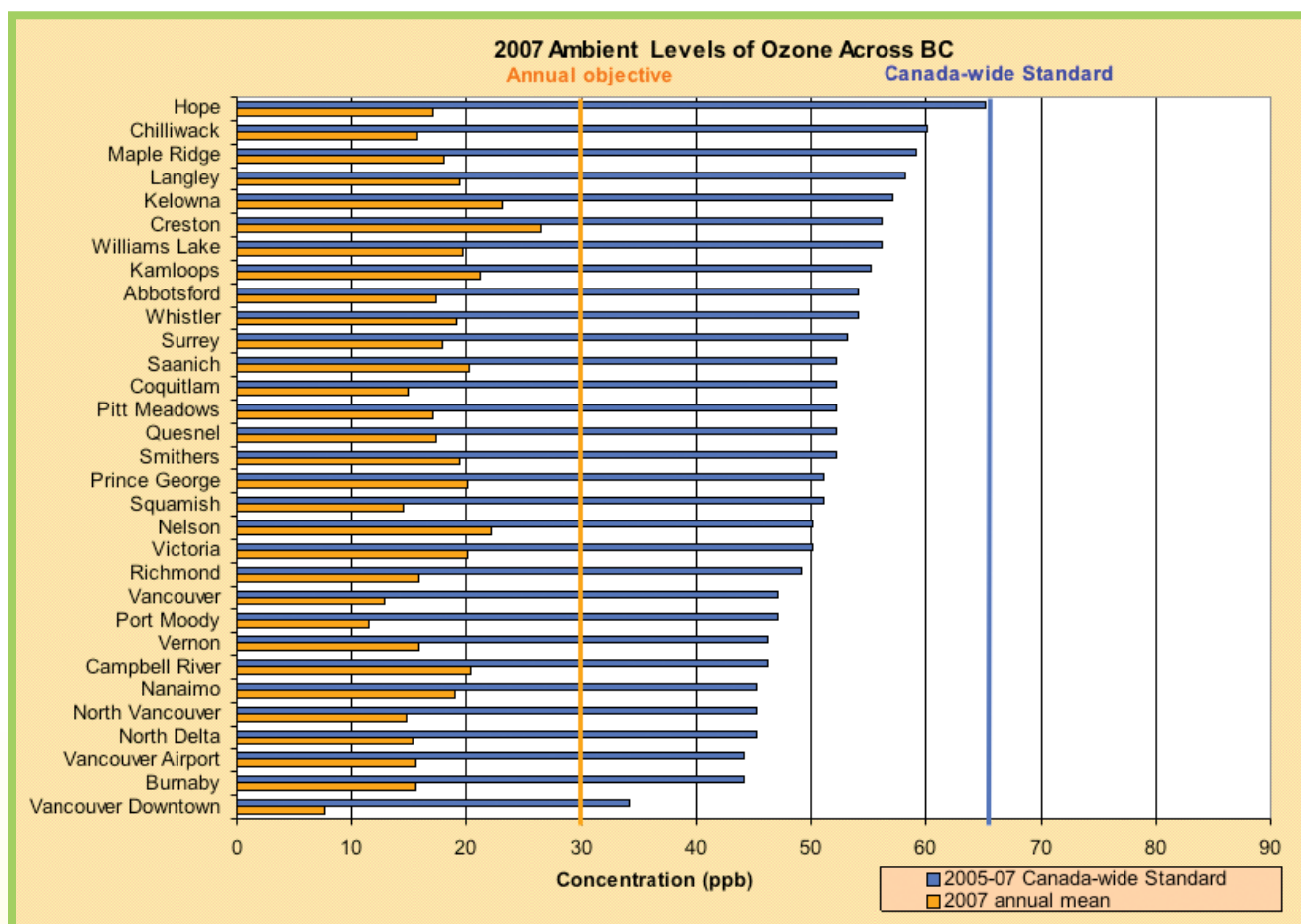


Figure 2: Ambient Levels of Ozone across BC

Calculating the Canada-wide Standard (CWS)

Achievement of ozone Canada-wide Standard is based on the three-year average of the annual 4th highest eight-hour average concentration.

Nitrogen Dioxide

Shown in Figure 3 are the annual average NO₂ concentrations found in various regions of BC. The highest NO₂ concentrations were observed in densely populated regions such as Vancouver and Burnaby where there are high traffic flows. Of all the NO₂ monitoring stations in BC, the Vancouver Downtown station recorded the highest NO₂ level of 43 µg/m³, which exceeds the Metro Vancouver objective of 40 µg/m³ but is less than the federal maximum desirable objective of 60 µg/m³.

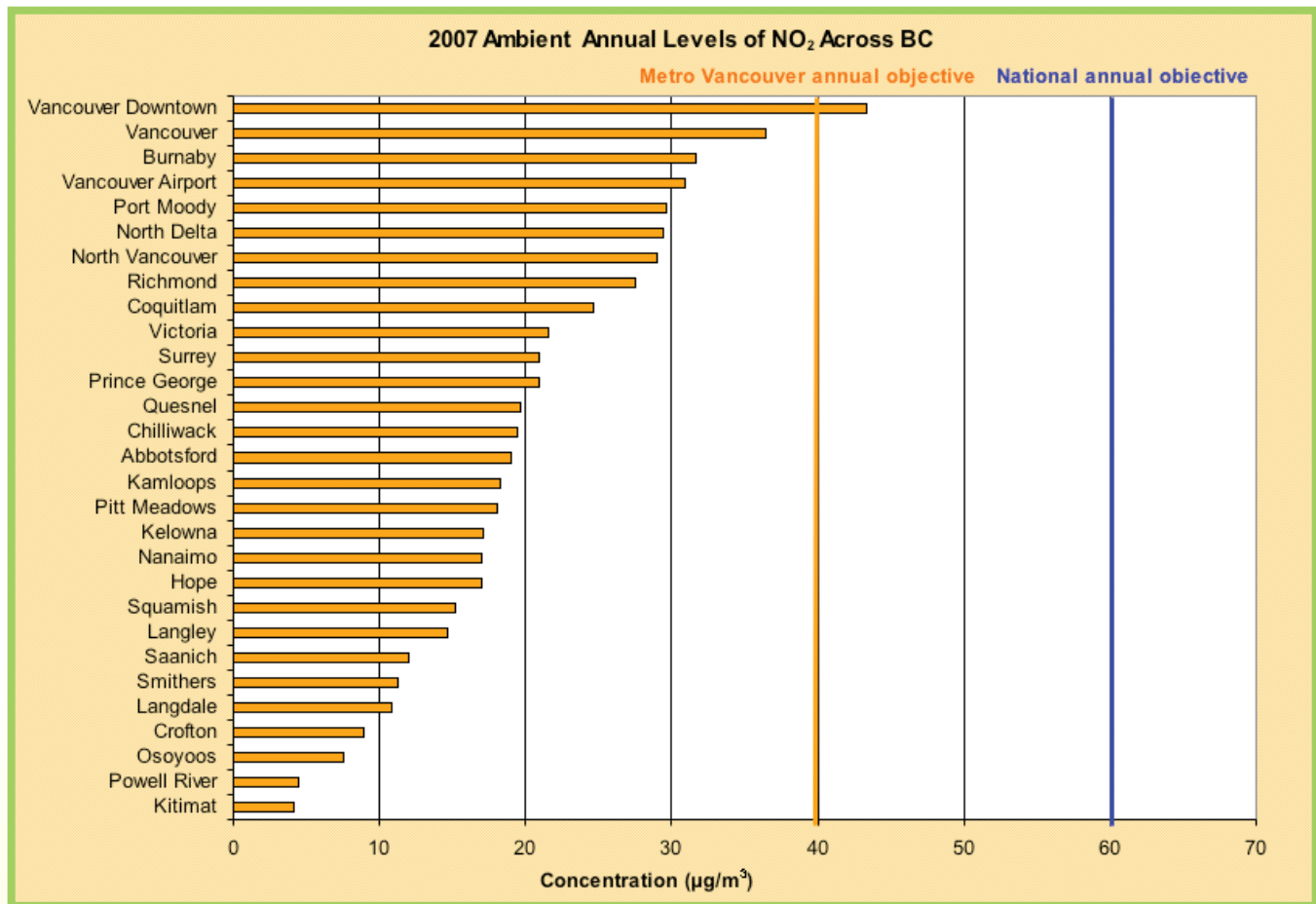


Figure 3: Ambient Levels of Annual NO₂ across BC

If your community does not appear in the figures showing ambient pollutant concentrations, it is due to insufficient data. The ambient air quality station in your community may not have operated for all of 2007 or your community may not be equipped with an ambient air quality station.

Sulphur Dioxide

Shown in Figure 4 are the annual ambient levels of SO₂ across BC in 2007. The highest concentrations are recorded in communities with large industrial SO₂ sources or major rail and port activities. None of the communities in BC exceeded the Metro Vancouver annual objective of 30 µg/m³. Trail is the only community that exceeded the BC Level A objective of 25 µg/m³. The relatively high level of SO₂ observed in Trail is associated with emissions from one of the world's largest zinc and lead smelting and refining complexes located in the region.

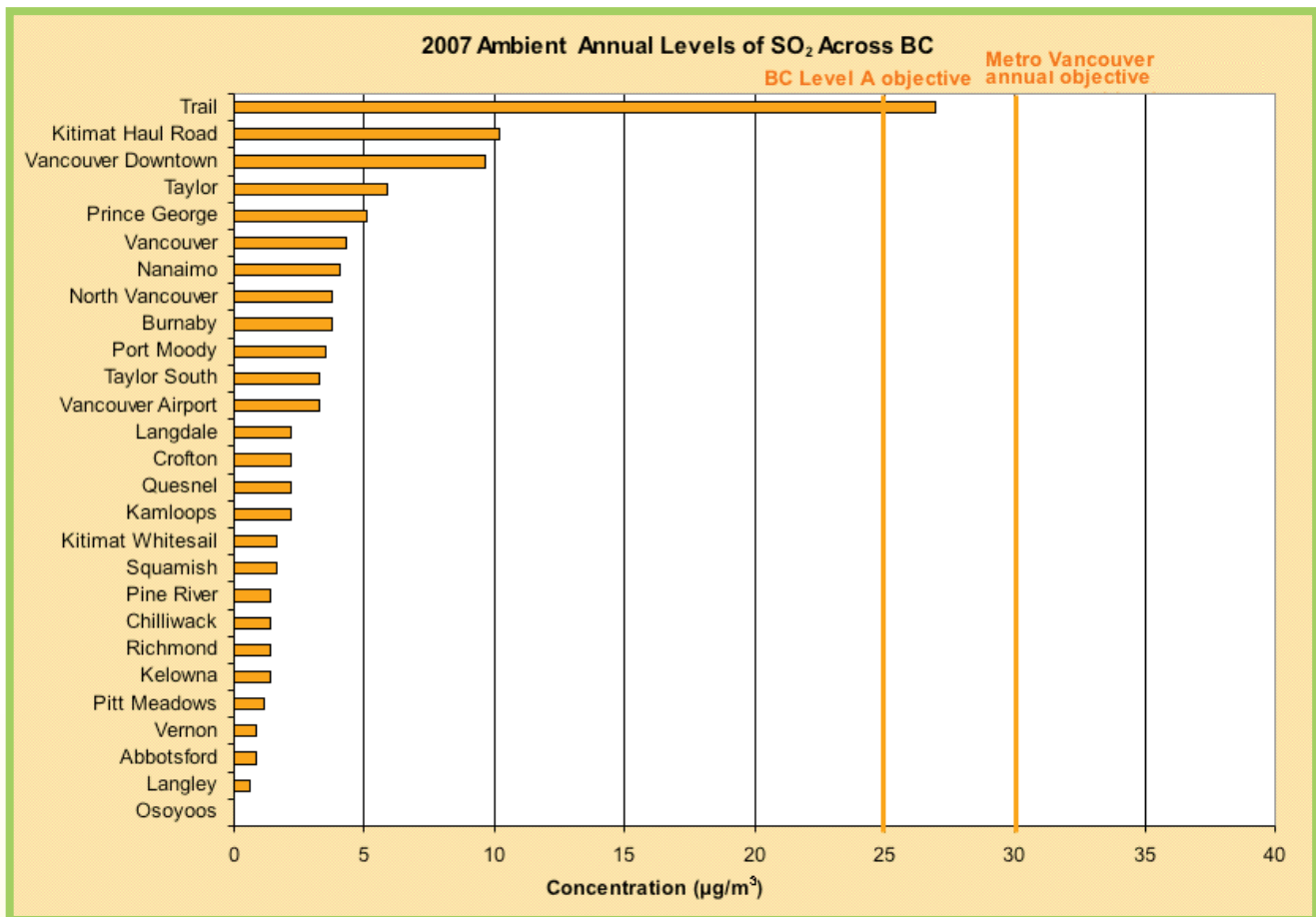


Figure 4: Ambient Levels of Annual SO₂ across BC

Air Pollution in British Columbia over the years

Many factors contribute to the year-to-year variation in ambient air quality levels, including changes in emissions from local and distant sources, as well as meteorology, how pollutants are measured and the data stored. The following analysis is based on a preliminary overview of ambient trends in select BC communities over the past 15 years (10 years for SO₂) and does not take into account the influences of these latter factors on air quality levels.

Community	Ozone Annual Average	NO ₂ 1-hour (based on annual 98th P)	SO ₂ 1-hour (based on annual 98th P)
Vancouver	↑	↓	↓
Port Moody	–	↓	↓
Burnaby South	↑	↓	↓
Abbotsford	–	–	–
Chilliwack	–	↓	–
Hope	↑	–	n/a
Kamloops	–	–	–
Kelowna	↑	–	–
Prince George	↑	–	↓
Smithers	–	–	n/a

In the above table, upward arrows indicate a statistically significant increasing trend (i.e. increasing pollutant levels with time). Downward arrows indicate a statistically significant decreasing trend (i.e. decreasing pollutant levels with time). Dashed lines indicate no statistically significant trends. Finally, “n/a” indicates that data were not available for the given site.

Different measurement scales were looked at: annual average, CWS achievement (for ozone) and hourly averages (based on the annual 98th percentile value or annual 98th P, in which 98% of hourly samples are lower than this value). Those shown in the table represent measurement scales that are relevant to air quality management using data collected and stored in a consistent manner over the years in question. Since 1993, annual average ozone levels have shown an upward trend at a number of sites in the Lower Fraser Valley, including Vancouver,

Burnaby South and Hope. Increasing trends have also been observed for Kelowna and Prince George. No significant trends were observed at the other sites shown. Although not shown in the above table, trends in Canada-wide Standard measurements were also assessed, and no significant trends detected for any of the sites. However, excluding the last four years of data and focusing on the period 1993-2003, a decreasing trend was observed for Port Moody. Previous studies by Environment Canada also indicated that while peak concentrations may be decreasing at sites such as Port Moody, average concentrations are increasing in large part due to increasing background levels.

Hourly peak NO₂ levels have shown a decreasing trend at sites in Vancouver, Port Moody, Burnaby South, and Chilliwack. No significant changes were noted at the other sites. Improved vehicle emission standards and the AirCare vehicle inspection program are believed to be largely responsible for improvements within the Lower Fraser Valley.

Hourly peak SO₂ levels (based on the annual 98th percentile level) were also evaluated for a number of communities. Similar to NO₂, downward trends were found for Vancouver, Port Moody, and Burnaby South, as well as Prince George. Since 1993, no significant trends were observed at the other sites. Within the Metro Vancouver area, reduced sulphur in on-road fuels, the shutdown of several local refineries, and reduced emissions from the cement industry have been identified as contributing factors. In Prince George, reductions in pulp mill emissions have been the largest factor in improved SO₂ levels.

Trend analysis for PM_{2.5} was limited to the site in Port Moody which has the longest monitoring record using a consistent monitoring technique (acknowledging that changes in monitoring techniques may mask or distort trends). Since 1994, annual average PM_{2.5} levels have shown a downward trend. Emission reductions from wood products sectors, petroleum refining and vehicles have contributed to the decline in PM_{2.5} levels.



Sharing the Air: The Border Air Quality Study

The Border Air Quality Study is a combination of research projects looking at health impacts related to air quality in the Georgia Basin-Puget Sound airshed. The airshed includes Vancouver, Victoria, the Sunshine Coast, the Fraser Valley, Seattle and Puget Sound. Because of our geography, we all share the air in this area. The Border Air Quality Study looked at whether increased exposures to air pollution were linked to an increased risk of a number of diseases. This question was examined for a range of

air pollutants and a range of health issues by connecting exposure databases with health databases for different populations.

Why Study the Region's Air Quality?

Overall, air quality in the Georgia Basin-Puget Sound region is good but there are still concerns. Childhood lung health is affected by exposure to air pollutants especially those caused by traffic. Low

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birth weight and premature births are associated with poor air quality. Premature babies and those born with low birth weight tend to have a higher risk of ill health throughout their lives. In this region, where a large part of the population is exposed to traffic, early-life problems from exposure to pollution can increase the risk of ill health throughout a person's life. Air pollution is already a well-known risk factor for cardiovascular disease, but few studies have estimated the effects of long-term exposures. Long-term exposure may have important consequences on people's health. The Border Air Quality Study examined the relationship between air quality and cardiovascular disease in the Metro Vancouver area. The tools developed will let air quality managers identify where high levels of pollution exist that might impact at-risk populations.

Who Took Part in the Study?

The Border Air Quality Study used existing population data to study the health effects of different air pollutants. Where people lived for the period of study, health information (such as hospital visits) along with information on well-known risk factors (like smoking) were used to understand the specific relationships between air pollution exposure and health effects. Data from several groups were studied. Information on 70,000 children born in Metro Vancouver between 1999 and the end of 2002 were studied for birth outcomes. Data on over 40,000 children born in the Georgia Air Basin between 1999 and 2000 were studied for childhood respiratory disease. Information on approximately 50,000 adults over the age of 45 who had lived in the Georgia Air Basin for five years before 1999 was used to study cardiovascular disease. In Puget Sound, childhood

respiratory disease in the first year of life and birth results were studied using data on over 360,000 children.

How were Exposures to Pollution Determined?

Exposure levels in these areas were estimated by a variety of tools: air quality monitors; high resolution maps for woodsmoke and traffic-related pollutants (NO, NO₂, PM_{2.5} and Black Carbon); information on how close people lived to industrial pollution sources; and the



distance they lived from major roads. Air pollution levels for CO (carbon monoxide), NO, NO₂, SO₂, ozone, PM_{2.5} and PM₁₀ were linked to the postal code areas where study participants lived. This gave researchers a picture of pollution levels for each postal code area.

The Border Air Quality Study allows researchers to investigate pollution "hot-spots" and to look at parts of the population that could be vulnerable to pollution. Given the large size of the study populations, the study was able to reveal health impacts that might be overlooked in smaller studies.

Findings of the Study

The Border Air Quality Study found evidence of a link between air pollution and a number of effects on health. Some of these have not been previously well documented. The Study found that traffic pollution increases the risk of premature births and low birth weight. It also found a connection between pollution and the respiratory health of young children.

Specifically, the study found evidence for a link between bronchiolitis and traf-

fic-related air pollution. Bronchiolitis, an infection that affects the tiny airways, is the main cause of hospital stays for young children.

The Border Air Quality Study is the first study of its kind in North America to explore the relationship between air pollution and middle-ear infections. Middle-ear infection, or otitis media, is the number one reason for children under two years of age to visit their doctor and to receive prescription medicine. The Study confirmed findings from Europe indicating that traffic-related air pollution is an additional risk factor for this disease, and found a link with exposure to wood smoke.

Asthma is the most common long-term disease in childhood and is a major cause for hospital stays among children. The Study found that early life exposure to air pollution is associated with new cases of asthma. Traffic-related pollutants appear to be especially important. This information suggests that it is important to consider where daycare facilities and private residences are located if we are to reduce early exposure to traffic-related air pollution.

Wood smoke continues to be an important source of tiny particles in the air we breathe, even in urban centres such as Vancouver, Victoria and Seattle. The results from the Border Air Quality Study suggest that further attention should be given to wood smoke, even in urban areas.

Previous research into the economic costs of air quality has not considered birth outcomes, ear infections or bronchiolitis. Because of this, the true cost of air



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(Sharing the Air - cont'd from p.10)

pollution has been underestimated. Even without including these health effects, the B.C. Ministry of Health has estimated that the annual health-related economic cost of outdoor air pollution in British Columbia is around \$85 million.

Implications for Air Quality Management and Health Policy

The Border Air Quality Study also developed new tools for studying air quality. The tools let researchers identify pollution "hot spots" and develop accurate exposure data for future research. These can be used by other programs that manage and monitor air quality.

The Study findings could influence land-use and building code decisions made by local governments. Bylaws could require that daycares and preschools be built a safe distance from major roads to reduce exposure to pollutants. Building codes could require new buildings to have improved mechanical ventilation of filtered air. This would reduce the amount of outdoor air pollution getting into buildings. Building codes and voluntary design standards could be used to reduce illness caused by poor indoor air quality.



Initiatives to reduce greenhouse gas emissions are promoting wood as a heating fuel in domestic, commercial, and industrial settings. The Border Air Quality Study is a reminder that wood smoke has significant effects on health, and that policies to encourage the use of bioenergy need to be carefully designed if they are not to add to health problems from air pollution.

For more detail see www.cher.ubc.ca/ubcqaq/welcome.htm

Emerging Issues

Agriculture & Air Quality

A strong agricultural sector is important to the economy of BC and the well-being of British Columbians. An estimated 48% of all food consumed in BC is grown in the province.¹

There is a growing level of interest in eating locally—the food is fresh, it supports sustainable development and local farmers, and reduces transport-related emissions of common air contaminants and greenhouse gases.

As well, agricultural land can contribute to healthy ecosystems by providing habitat for wildlife, groundwater recharge and green space for BC communities to enjoy.

Within BC, agricultural activities are a source of common air contaminants, contributing about 10% of PM₁₀ emissions, 2% of PM_{2.5} and less than 4% of VOC emissions. These activities are generally focused in certain parts of the province such as the Lower Fraser Valley and Okanagan. Within the Fraser Valley, agriculture is a major contributor of ammonia—a precursor of PM_{2.5} that affects human health and visibility. Elsewhere, the burning of grass stubble in the Creston Valley and orchard prunings in the Okanagan periodically result in smoky conditions and elevated PM_{2.5} levels. The burning of agricultural plastics (e.g. silage bags, bale wraps, irrigation piping) is also a source of concern in BC. Although this practice is illegal, continued work on options for farmers to handle plastic waste is needed.

Today, various levels of government, public interest groups and agricultural producers are working collaboratively to develop and implement best management practices (BMP's) to minimize the environmental impact of agricultural operations. Examples of BMP's include: the implementation of buffer zones, new tilling and manure spreading techniques, improved barn design and layout, the addition of scrubbers on animal housing facilities, the chipping and mulching of prunings, the recycling of pesticide containers, and the variation of animal feed. A pilot program in the Regional District of Okanagan-Similkameen has looked at the feasibility of recycling agricultural plastics.

As well, individuals from Vancouver Island and the Fraser Valley are championing agricultural recycling programs aimed at more sustainable solutions to agricultural plastics recycling. The BC poultry industry is currently conducting a study to gauge the industry's contribution to air particulate matter emissions as well as test options to mitigate impacts on air quality.

Despite efforts to reduce agricultural air emissions, continued collaboration between air quality agencies and producers is needed to implement emission reduction strategies that preserve the quality of air and protect human health and the environment.



¹ B.C. Ministry of Agriculture and Lands (2006) "B.C.'s Food Self-Reliance. Can B.C.'s Farmers Feed Our Growing Population?"

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Visibility: the view ahead...

Many people judge air quality solely by how clean or dirty the air looks. Visibility (or how distinctly an object stands out from its surroundings) depends on interactions between sunlight and tiny particles and gases in the air. As a general rule, when more of these pollutants are in the air, visibility deteriorates.

British Columbia is known for its spectacular vistas of mountains, coastlines and picturesque islands. Sometimes these views are degraded by a haze from human-caused emissions. Many people are concerned about this visual blight and its effects on tourism, property values and human health (these same particles that degrade visibility also are inhaled deeply into the lungs). One study showed that a single poor visibility day could result in a loss of almost nine million dollars in future tourist revenues for the Lower Fraser Valley².

What can be done about the haze that impairs our views? Since October 2006, agencies including Metro Vancouver (formerly GVRD), B.C. Ministry of Environment, Environment

Canada and Fraser Valley Regional District (FVRD) have been working together to explore ways to protect and improve visibility.

This has involved exploratory meetings, the development of a consultant's report - "The View Ahead - Identifying Options for a Visibility Management Framework for BC" and a workshop to examine the issue and possible solutions. The workshop provided an opportunity to hear about the importance of visibility from various sectors (film industry, agriculture, forestry) and gather feedback on visibility management options (as described in "The View Ahead"). Together with support from Environment Canada, BC air management agencies are exploring the development of a strategy to achieve a visibility management program in British Columbia. For more information, contact JuneYoo Rifkin (June.Yoo.Rifkin@ec.gc.ca) or Steve Sakiyama (Steve.Sakiyama@gov.bc.ca). The report "The View Ahead" is available from:

www.env.gov.bc.ca/air/airquality/index.html#viewahead



*Good Visibility Day - Aug 2006
Chilliwack, BC
PM_{2.5} = 8 µg/m³*



*Poor Visibility Day - Aug 2006
Chilliwack, BC
PM_{2.5} = 22 µg/m³*

² Taken from Environment Canada, "The Impact of Visual Air Quality on Tourism Revenues in Greater Vancouver and the Lower Fraser Valley." McNeill, R and Roberge, A. GBEI report number EC/GB-00-028. July 2000

Air Care ON-ROAD: Helps protect our air!

The AirCare ON-ROAD Program (ACOR) is a mobile inspection program operated by the B.C. Ministry of Transportation. ACOR inspectors carry out roadside tests of heavy-duty diesel vehicles, looking for excessive smoke in exhaust. ACOR protects public health and helps provide safe, clean air by enforcing British Columbia's diesel emission standards.

Diesel Exhaust and Particulate Matter

The exhaust from diesel vehicles contains particulate matter that endangers our health and environment. Particulate matter has been linked to asthma and other lung and heart illnesses. It is produced in diesel engines when droplets of fuel do not completely burn up during combustion. Particulate is formed and released in the vehicle's exhaust.

Opacity is indicative of how much PM is in the smoke. Opacity refers to how much light is blocked by the smoke.

Dark smoke is a sign that a vehicle may be operating outside allowable emission limits. ACOR inspectors use this information to identify which vehicles should be tested. If a vehicle fails to meet BC's diesel emission standards, the owner may be ordered to have the vehicle repaired and then retested. The ACOR team will inspect vehicles at a company's request.

Repairs Make Sense

Reducing smoke emissions helps our environment and our health. Emission problems become more common as vehicles age, so it is important to properly maintain vehicles to ensure they are running cleanly. Regular maintenance will also lead to lower fuel and maintenance costs and a longer engine life.

The Cost of Idling

Truck drivers could also save costs by reducing the amount of time their vehicles

idle. A diesel engine produces much higher emission levels while it is idling than it would on the road. Extended idling causes carbon soot to build up inside the engine. Studies suggest that an engine idling for one hour has the same effect on engine-carbon build-up as two hours of driving. This build-up of soot is often blown out in a puff of smoke when the truck accelerates, releasing particulate matter into the air we breathe. Drivers of diesel vehicles would help their vehicles, our health and the environment by turning off their engines whenever possible.

For More Information

For more information call: 1-888-775-8785 or visit: www.th.gov.bc.ca/ACOR. If you see a truck that is smoking excessively, call the above number.



Air Quality – What can you do about it?



By pursuing options to reduce pollution and the combustion of fossil fuels in our vehicles and homes, your actions as a consumer can improve air quality, your health, the environment, and reduce greenhouse gas (GHG) emissions that contribute to climate change.

1. Participate in the Provincial Woodstove Exchange Program. You can qualify for a rebate to replace older, smoky woodstoves with new, cleaner burning models. By installing and operating the stove correctly, you consume less wood and produce 70% fewer emissions, resulting in improved air quality and a healthier home. The program is available in 6 areas of British Columbia. www.env.gov.bc.ca/epd/woodstove/index.htm

2. Make improvements to your poorly insulated or energy inefficient home. You can save 30% off your energy bill and up to 1,000 pounds of carbon dioxide a year. Qualify for federal grants through the ecoENERGY Retrofit Program by improving energy efficiency in your home. To find out how, visit: www.oeenrcan.gc.ca/residential/personal.

3. Be energy-efficient; Change a light bulb or buy low-energy appliances. Replace lights with compact fluorescent light bulbs (CFL) or light-emitting diodes (LED) to save money, electricity, and greenhouse gas (GHG) emissions. Reduced energy

consumption will reduce your carbon footprint. Visit www.bchydro.com for more information.

4. Purchase environmentally friendly products. Buy locally produced recyclable products with the least amount of packaging, and that are labelled with the EcoLogo^M standard (www.ecologo.org). Packaging makes up about half of our garbage by volume -- by reducing household garbage by 10%, you can reduce CO₂ emissions by 1,200 pounds each year. By purchasing environmentally friendly products, you can significantly reduce your carbon footprint; and reducing travel time by purchasing locally will also improve air quality.

5. Bring your own bag. Purchase a sturdy cloth bag (especially those made with organically grown, sustainable plant fibres) for your trip to the grocery store and other shopping. Plastic bags produce harmful pollutants when burned, negatively impacting your health and environment.

6. Purchase air-friendly products. Products such as cleaning agents, paint products, glues, and aerosol products contain ozone-forming chemicals known as volatile organic compounds (VOCs), which can be harmful to your health. Use products that are waterbased, have low amounts of VOCs and are in a solid or gel state.

7. Switch to fuel-efficient vehicles. Qualify for the ecoAUTO rebate program by purchasing a fuel-efficient vehicle. Fuel-efficient vehicles produce fewer emis-

sions, improving air quality and reducing greenhouse gas emissions. For more information, visit oeenrcan.gc.ca/transportation/personal. Hybrid vehicles qualify for a PST rebate in BC.

Visit: www.env.gov.bc.ca/air/vehicle/

8. Service your vehicle on a regular basis. Maintaining your vehicle will increase fuel economy by 10% and reduce emissions. A poorly maintained vehicle can consume 50% more fuel than one that runs properly. Useful tips include properly inflating your tires, replacing dirty air filters, and changing your oil regularly.

9. Invest in alternative transportation options. The Canadian Automobile Association (www.caa.ca/pdf/2007-04-27%20DrivingCostsBrochure2007.pdf) estimates the cost to keep an average car on the road to be about \$7,080 per year. To save money and reduce air emissions, consider joining a car-share co-operative (www.carsharing.net), carpool program (www.ride-share.com), or invest in a bus pass (and also be eligible for tax refunds). Each year, a single city bus can take 40 vehicles off the road and reduce annual GHG emissions by 25 tonnes.

10. Consider purchasing alternative fuels for your vehicle. To produce fewer greenhouse gas emissions and toxic pollutants, switch to cleaner or renewable fuels, for example, ethanol: natural gas and biodiesel. For more information visit: oeenrcan.gc.ca/transportation/personal, www.biofleet.net and www.hybridexperience.com

What government is doing to protect the air you breathe.

FRASER VALLEY REGIONAL DISTRICT

The Fraser Valley Regional District (FVRD) continues to be involved in the improvement of air quality in the Lower Fraser Valley and Georgia Basin/Puget Sound airsheds. Issues being specifically targeted in 2008 include measures to reduce the high levels of ozone in the eastern Fraser Valley, and increasing the stringency of air quality regulation and enforcement to protect air quality in this sensitive airshed. The FVRD will be working with UBC researchers to determine the conditions under which the high levels of ozone occur. Armed with this information, strategies will be developed to help mitigate the situation.

The 2005 emission inventory forecasts that ammonia emissions from agricultural sources will continue to increase. Sulphates and nitrates in the air react chemically with ammonia to create secondary fine particulate matter which has both health and visibility implications. In 2008 the FVRD intends to work with the Ministry of Agriculture and Lands and other local air quality agencies in an effort to address this issue.

As a signatory to the Climate Action Charter, the FVRD is committed to becoming carbon neutral by 2012. In 2008 opportunities for reducing greenhouse gas emissions through modification of corporate activities and practices will be developed in cooperation with other local municipalities.

There have been many advances over the past decade in the understanding of air quality and in 2008 work will commence to update the FVRD 1998 Air Quality Management Plan. The plan will complement the actions contained in Metro Vancouver's 2005 plan, recognizing the important partnership with its neighbouring region in the Lower Fraser Valley airshed.

HEALTH CANADA

Health Canada's Safe Environments Programme (SEP) promotes healthy living, working and recreational environments for British

Columbians. SEP supports scientific research and develops strategies to help reduce risks to human health from the environment.

During 2008 SEP will be engaged in the following activities:

Air Quality Health Effects Research

In cooperation with BC Centre for Disease Control, SEP is funding a continuing research project at the UBC School of Environmental Health. The project is analyzing data collected in the Georgia Basin Airshed to estimate the different potential health impacts of air pollution from multiple sources.

Air Quality Health Index (AQHI)

In partnership with the BC Lung Association, SEP is providing \$200,000 in 2008 to the Province to expand the AQHI program. The AQHI helps British Columbians understand the relationship between local air quality and their health, and informs their decisions during periods of poor air quality to protect their health www.airhealth.ca

Indoor Air Quality

SEP, with assistance from the BC Lung Association, will continue the series of radon workshops in BC. The program provides information and alternatives for British Columbians wishing to test or reduce radon concentrations in their homes.

For further information please visit Health Canada's website at: www.hc-sc.gc.ca

METRO VANCOUVER

2005 Emission Inventory & Forecast

The "2005 Lower Fraser Valley Air Emissions Inventory & Forecast and Backcast" was completed in 2007. Compiled every 5 years, the emissions inventory provides information on the types, amount and location of air emissions in the region and plays an important role in developing emission reduction measures. Additionally, information from the emissions forecast is important for assessing GHG emission reductions that may be feasible for the Metro Vancouver

region. The report is available at: www.metrovancouver.org/about/publications/Publications/ExecSummary_2005_LFV.pdf

Climate Change

In December 2007, Metro Vancouver signed onto the BC Climate Action Charter, making the commitment to carbon neutral corporate operations by 2012. In February 2008, the Board adopted regional GHG reduction targets – 33% below current levels by 2020 and 80% below current levels by 2050. Regional and corporate climate change plans are being developed which will address both greenhouse gas reductions and adaptation to the impacts of climate change.

Marine Vessels and Port Operations

Metro Vancouver is collaborating with government agencies, marine industry stakeholders and port authorities to improve the air emissions inventory for ocean-going vessels in BC and develop an air emission inventory of Vancouver Fraser Port Authority's landside operations. In 2007, Vancouver Fraser Port Authority, Port of Seattle and Port of Tacoma developed "The Pacific Northwest Ports Clean Air Strategy" to address maritime and port-related emissions that affect the air quality and climate change in the Pacific Northwest. Vancouver Fraser Port Authority is also working on several initiatives that would address diesel emissions.

Local Air Quality Studies

Metro Vancouver is currently examining air quality within communities along the inner and central harbours of Burrard Inlet. Detailed information has been collected about the emission sources in this area. Air quality monitoring will begin in a number of communities in spring 2008 and air quality modelling will also be conducted to estimate ambient concentrations of key pollutants in areas where monitoring is not feasible.

Monitoring Network Review

In partnership with Environment

Canada and the Fraser Valley Regional District, Metro Vancouver led a review of the Lower Fraser Valley air quality monitoring network in 2007. An expert team led by local consultants collaborated to provide Metro Vancouver with several recommendations to improve and update the monitoring network. The recommendations encompass special monitoring studies, changes in monitoring at permanent stations, visibility monitoring, and network operations. Many of these recommendations are now being pursued.

Air Quality Management Bylaw Amendments

An amended Air Quality Management Bylaw is expected to be considered by the Metro Vancouver Board late in 2008. The proposed Bylaw amendments include revisions to the system of permit and regulatory emission fees to better reflect the harmful impacts of different air contaminants, and regulation of emissions from gas and wood-fired boilers and heaters.

GOVERNMENT OF B.C.

In June 2008, the provincial government released its Air Action Plan that sets out 28 actions to reduce pollution from all sources. The government has committed \$28.5 million over three years to implement the Plan, in partnership with industry, communities, and other levels of government. Initiatives include:

- Canada's first mandatory program to fit diesel trucks with diesel oxidation catalyst (DOC) filters to reduce emissions.
- Funding to retrofit school buses in BC with DOC filters and to enable school districts around the province to purchase new clean-energy school buses.
- Plans to move the AirCare On Road Program (ACOR), which focuses on heavy-duty vehicle testing, from an educational system to an enforcement system, with fines for drivers of high-polluting commercial diesel trucks. Vehicle

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(What Government... - cont'd from p.15)

testing will be done at inspection stations around the province.

- Development of a Provincial Idle Reduction Initiative (PIRI), in cooperation with the Ministry of Transportation, to encourage drivers to reduce engine idling.
- Support for Green Fleets BC – a partnership initiative led by the Fraser Basin Council to reduce fleet emissions in the province.
- Establishment of a provincial woodstove exchange program, and funding to support woodstove exchanges in 6 areas: Prince George, Kimberley, Grand Forks, the Okanagan, Revelstoke and Golden.
- Establishment of the \$600,000 BC Clean Air Research (CLEAR) Fund to advance air quality research in this province.
- Investment of \$15 million to enhance and expand the Scrap-It program across British Columbia. The Scrap-It program provides the public with incentives to trade in pre-1993, high-polluting vehicles

for cleaner kinds of transportation.

- On-going support for airshed planning efforts in a number of communities to improve local air quality.

For more information on the Action Plan, see www.bcairsmart.ca

ENVIRONMENT CANADA

Locomotive and rail yard emissions

Environment Canada has been working with partners to assess and reduce emissions from locomotives in BC. Recent activities include:

- In February 2008, Environment Canada tested emissions from a Southern Railway of BC locomotive running on biodiesel (B5 and B10) and petroleum diesel.
- Environment Canada has entered into an agreement with TransLink to demonstrate the effectiveness of a diesel oxidation catalyst on a West Coast Express locomotive. Installation and testing of the device is expected in the summer of 2008.
- Following complaints about

excessive locomotive idling at the Vancouver Terminal, Environment Canada and Transport Canada initiated an agreement with the railway to alter its operating practices to minimize idling.

Agricultural emissions

Environment Canada is collaborating with agriculture and air quality agencies/organizations to minimize agricultural sector emissions and establish nonregulatory national environmental performance standards.

Georgia Basin-Puget Sound International Airshed Strategy

Together with the US Environmental Protection Agency (Region 10), Environment Canada continues to lead a multi-agency, international co-operative strategy to reduce the impact of air pollution on human health, ecosystems, and visibility.

Visual Air Quality

Together with its partners (B.C. Ministry of Environment, Fraser Valley Regional District, Metro Vancouver), Environment Canada

is exploring options for managing visual air quality (visibility) in BC. Environment Canada is also conducting monitoring and scientific studies associated with visibility in British Columbia.

Environment Canada's National Pollutant Release Inventory (NPRI) Program

- The NPRI is Canada's legislated, publicly-accessible inventory of pollutants released, disposed of and recycled by industrial, institutional and commercial facilities across the country.
- NPRI data are used by the Government of Canada to track progress in pollution prevention, evaluate releases and transfers of substances of concern, identify and take action on environmental priorities, and implement policy initiatives and risk management measures.
- Reporting deadline is June 1, 2008.
- For additional information please visit the NPRI website at: <http://www.ec.gc.ca/pdb/npri>

Visit or contact the following agencies for more information:

British Columbia Lung Association
www.bc.lung.ca
2675 Oak St., Vancouver, BC V6H 2K2
(604) 731-5864 or toll-free at 1-800-665-5864 (in BC but outside the Lower Mainland)

Environment Canada, Pacific and Yukon Region
www.pyr.ec.gc.ca
401 Burrard Street
Vancouver, BC V6C 3S5
(604) 664-9100

Health Canada Safe Environment Programme
British Columbia Region
www.hc-sc.gc.ca/ewhsemt/air/index_e.html
Suite 405, Winch Building
Sinclair Centre, 757 West Hastings St., Vancouver, BC V6C 1A1
(604) 666-2671

B.C. MINISTRY OF HEALTHY LIVING AND SPORT
www.gov.bc.ca/hls/index.html
Suite 4-2 – 1515 Blanshard Street
Victoria, BC Canada V8W 3C8
(250) 952-1433

B.C. MINISTRY OF ENVIRONMENT Environmental Quality Branch
www.env.gov.bc.ca/air
PO Box 9341, Stn Prov Govt
Victoria BC, Canada V8W 9M1
(250) 387-9932

Vancouver Island Region
www.env.gov.bc.ca/epd/regions/vanc_island/index.html
2080-A Labieux Road
Nanaimo, BC V9T 6J9
(250) 751-3100

Lower Mainland Region
www.env.gov.bc.ca/epd/regions/lower_mainland/index.html
2nd floor, #10470 152nd Street
Surrey, BC V3R 0Y3; (604) 582-5200

Cariboo Region
www.env.gov.bc.ca/epd/regions/cariboo/index.htm
#400 640 Borland St., Williams Lake, BC V2G 4T1; (250) 398-4530

Kootenay Region
www.env.gov.bc.ca/epd/regions/kootenay/index.html
#401 333 Victoria Street
Nelson, BC V1L 4K3
(250) 354-6333

Skeena Region
www.env.gov.bc.ca/epd/regions/skeena/index.html
3726 Alfred Avenue, Bag 5000
Smithers, BC V0J 2N0
(250) 847-7260

Omineca and Peace Regions
www.env.gov.bc.ca/epd/regions/omineca/index.html
3rd Floor, 1011 Fourth Avenue
Prince George, BC V2L 3H9
(250) 565-6135

Thompson & Okanagan Regions
www.env.gov.bc.ca/epd/regions/thompson/index.html
1259 Dalhousie Drive
Kamloops BC V2C 5Z5
(250) 371-6200

METRO VANCOUVER
www.metrovancouver.org
4330 Kingsway
Burnaby, BC V5H 4G8
(604) 432-6200

FRASER VALLEY REGIONAL DISTRICT
www.fvrd.bc.ca
45950 Cheam Ave., Chilliwack, BC V2P 1N6
(604) 702-5000 / 1-800-528-0061

BRITISH COLUMBIA HEALTH AUTHORITIES

Northern Health Authority
www.northernhealth.ca
600-299 Victoria Street
Prince George, BC V2L 5B8
(250) 565-2649

Interior Health Authority
www.interiorhealth.ca
2180 Ethel Street
Kelowna, BC V1Y 3A1
(250) 862-4367

Vancouver Island Health Authority
www.viha.ca
1952 Bay Street
Victoria, BC V8R 1J8
(250) 370-8699

Vancouver Coastal Health Authority
www.vch.ca
11th Floor, 601 West Broadway
Vancouver, BC V5Z 4C2
(604) 736-2033 or 1-866-884-0888

Fraser Health Authority
www.fraserhealth.ca
300, 10334 - 152A Street
Surrey, BC V3R 7P8
(604) 587-4600 or 1-877-935-5669

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Working Committee:

Dr. Menn Biagtan
Dr. Mike Brauer
Dr. Ray Copes
Mr. Ali Ergudenler
Dr. Tom Kosatsky
Mr. Martin Mullan
Ms. Natalie Suzuki

Writers:

David Gregory
Larry Pellizzari

Media Relations:

Ms. Katrina vanBylandt

Designer:

Little Brown Bros.