metrovancouver
SERVICES AND SOLUTIONS FOR A LIVABLE REGION

METRO VANCOUVER REGIONAL DISTRICT
CLIMATE ACTION COMMITTEE

REGULAR MEETING

Friday, May 17, 2019
1:00 p.m.
28th Floor Committee Room, 4730 Kingsway, Burnaby, British Columbia

A G E N D A[1]

1. ADOPTION OF THE AGENDA

1.1 May 17, 2019 Regular Meeting Agenda
That the Climate Action Committee adopt the agenda for its regular meeting scheduled for May 17, 2019 as circulated.

2. ADOPTION OF THE MINUTES

2.1 April 12, 2019 Regular Meeting Minutes
That the Climate Action Committee adopt the minutes of its regular meeting held April 12, 2019 as circulated.

3. DELEGATIONS

3.1 Patricia Bell, Community Energy Association
Subject: Emerging Climate and Energy Issues, and Strategies to Accelerate Building Retrofits in Metro Vancouver

4. INVITED PRESENTATIONS

5. REPORTS FROM COMMITTEE OR STAFF

5.1 2019 Update on Liquid Waste Sustainability Innovation Fund Projects
Designated Speaker:
Paul Kadota, Program Manager, Utility Research & Innovation
Liquid Waste Services Department
That the Climate Action Committee receive for information the report dated May 2, 2019, titled "2019 Update on Liquid Waste Sustainability Innovation Fund Projects".

[1] *Note: Recommendation is shown under each item, where applicable.*

5.2 2019 Update on Regional District Sustainability Innovation Fund Projects

Designated Speaker:
Roger Quan, Director, Air Quality and Climate Change
Planning and Environment Department

That the Climate Action Committee receive for information the report dated May 2, 2019, titled "2019 Update on Regional District Sustainability Innovation Fund Projects".

5.3 2019 Update on Water Sustainability Innovation Fund Projects

Designated Speaker:
Inder Singh, Director, Policy, Planning and Analysis
Water Services Department

That the Climate Action Committee receive for information the report dated April 17, 2019, titled "2019 Update on Water Sustainability Innovation Fund Projects".

5.4 Expanded Consultation on a Potential Cannabis Production Emission Regulation for Metro Vancouver

Designated Speakers:
Julie Saxton, Air Quality Planner
Esther Berube, Division Manager, Bylaw and Regulation Development
Planning and Environment Department

That the MVRD Board:

a) endorse the engagement plan attached to the report titled "Expanded Consultation on a Potential Cannabis Production Emission Regulation for Metro Vancouver", dated May 3, 2019; and
b) direct staff to proceed with engagement and consultation on the proposed approach to regulating air emissions from cannabis production and processing, based on the bylaw development discussion paper attached to the report titled "Expanded Consultation on a Potential Cannabis Production Emission Regulation for Metro Vancouver", dated May 3, 2019.

5.5 Consultation on Proposed Changes to Metro Vancouver's Ambient Air Quality Objectives

Designated Speakers:
John Lindner, Air Quality Planner
Laura Taylor, Public Engagement Coordinator
Derek Jennejohn, Lead Senior Engineer
Planning and Environment Department

That the MVRD Board direct staff to proceed with consultation on the proposed changes to Metro Vancouver's ambient air quality objectives, based on the consultation paper attached to the report titled "Consultation on Proposed Changes to Metro Vancouver's Ambient Air Quality Objectives," dated April 12, 2019.

5.6 Air Quality and Climate Action Initiatives in the Caring for the Air 2019 Report

Designated Speakers:
Julie Saxton, Air Quality Planner
Amy Thai, Environmental Technician II
Planning and Environment Department

That the Climate Action Committee receive for information the report titled "Air Quality and Climate Action Initiatives in the Caring for the Air 2019 Report", dated April 11, 2019.

5.7 Sensitive Ecosystem Inventory – Sub-Regional Profiles and Assessment of Ecosystem Loss

Designated Speaker:
Josephine Clark, Planner
Planning and Environment Department

That the MVRD Board:

a) receive for information the report titled "Sensitive Ecosystem Inventory – Sub-Regional Profiles and Assessment of Ecosystem Loss", dated April 10, 2019; and,
b) distribute the report to member jurisdiction Councils for information.

5.8 Manager's Report

Designated Speaker:
Roger Quan, Director, Air Quality and Climate Change
Planning and Environment Department

That the Climate Action Committee receive for information the report dated April 24, 2019, titled "Manager's Report".

6. INFORMATION ITEMS

6.1 Report from Laurie Bates-Frymel, Senior Planner re Metro 2040 Environment Policy Review – Scope and Process, dated March 22, 2019 to the Regional Planning Committee April 5, 2019 meeting.

7. OTHER BUSINESS

8. BUSINESS ARISING FROM DELEGATIONS

9. RESOLUTION TO CLOSE MEETING

Note: The Committee must state by resolution the basis under section 90 of the Community Charter on which the meeting is being closed. If a member wishes to add an item, the basis must be included below.

10. ADJOURNMENT/CONCLUSION

That the Climate Action Committee adjourn/conclude its regular meeting of May 17, 2019.

Membership:

Carr, Adriane (C) - Vancouver
Dhaliwal, Sav (VC) - Burnaby
Arnason, Petrina - Langley Township
Dupont, Laura - Port Coquitlam
Hocking, David - Bowen Island
Kruger, Dylan - Delta
McIlroy, Jessica - North Vancouver City
McLaughlin, Ron - Lions Bay
Pettigrew, Steven - Surrey
Steves, Harold – Richmond
van den Broek, Val - Langley City
Yousef, Ahmed - Maple Ridge

METRO VANCOUVER REGIONAL DISTRICT
CLIMATE ACTION COMMITTEE

Minutes of the Regular Meeting of the Metro Vancouver Regional District (MVRD) Climate Action Committee held at 1:00 p.m. on Friday, April 12, 2019 in the 28th Floor Committee Room, 4730 Kingsway, Burnaby, British Columbia.

MEMBERS PRESENT:
Chair, Councillor Adriane Carr, Vancouver
Vice Chair, Councillor Sav Dhaliwal, Burnaby
Councillor Petrina Arnason, Langley Township
Councillor Laura Dupont, Port Coquitlam
Councillor David Hocking, Bowen Island
Councillor Dylan Kruger, Delta
Councillor Jessica McIlroy, North Vancouver City
Mayor Ron McLaughlin, Lions Bay
Councillor Steven Pettigrew, Surrey
Councillor Harold Steves, Richmond
Mayor Val van den Broek, Langley City
Councillor Ahmed Yousef, Maple Ridge

MEMBERS ABSENT:
Chief Bryce Williams, Tsawwassen

STAFF PRESENT:
Roger Quan, Director, Air Quality and Climate Change, Planning and Environment
Genevieve Lanz, Legislative Services Coordinator, Board and Information Services

1. ADOPTION OF THE AGENDA

1.1 April 12, 2019 Regular Meeting Agenda

It was MOVED and SECONDED
That the Climate Action Committee:
a) amend the agenda for its regular meeting scheduled for April 12, 2019 by adding Item 7.1 Update on Surrey's Tree Protection Bylaw; and
b) adopt the agenda as amended.

CARRIED

2. ADOPTION OF THE MINUTES

2.1 March 15, 2019 Regular Meeting Minutes

It was MOVED and SECONDED
That the Climate Action Committee adopt the minutes of its regular meeting held March 15, 2019 as circulated.

CARRIED

3. DELEGATIONS

3.1 Rebecca Hamilton, Lilah Williamson, and Amy Daiminger, Sustainabiliteens

The Sustainabiliteens spoke to members regarding physical, emotional and mental consequences of climate change, alignment with Climate Strike Vancouver, and asked that the Climate Action Committee declare a climate emergency, increase reduction targets to 65% by 2040 and achieve net zero by 2040.

Members discussed having the delegation appear at their municipal council meetings and directed staff to provide the delegation with contact information.

Presentation material titled "Youth Climate Strike" is retained with the April 12, 2019 Climate Action Committee agenda.

4. INVITED PRESENTATIONS

No items presented.

5. REPORTS FROM COMMITTEE OR STAFF

5.1 Development and Engagement Process for the Metro Vancouver *Clean Air Plan*

Report dated March 22, 2019 from John Lindner, Air Quality Planner, and Derek Jennejohn, Lead Senior Engineer, Planning and Environment, providing the MVRD Board with information on the proposed development and engagement process for the *Clean Air Plan*.

Members were provided with a presentation on the development and engagement process of the *Clean Air Plan*, highlighting previous air quality and greenhouse gas management plans, proposed scope, simultaneous development with the *Building, Industry and Transportations Roadmaps*, and alignment of goals, targets and actions with *Climate 2050*.

Presentation material titled "Metro Vancouver's Clean Air Plan Development and Engagement Process" is retained with the April 12, 2019 Climate Action Committee agenda.

It was MOVED and SECONDED
That the MVRD Board receive for information the report dated March 22, 2019, titled "Development and Engagement Process for the Metro Vancouver *Clean Air Plan*".

CARRIED

5.2 Staff Appointment as a Board-designated Officer

Report dated March 26, 2019 from Kathy Preston, Lead Senior Engineer, Planning and Environment, seeking MVRD Board appointment of an officer pursuant to the *Greater Vancouver Regional District Air Quality Management Bylaw* and the *Environmental Management Act*.

It was MOVED and SECONDED
That the MVRD Board, pursuant to the *Greater Vancouver Regional District Air Quality Management Bylaw* and the *Environmental Management Act,* appoint Curtis Wan, Project Engineer, as an officer.

CARRIED

5.3 Wildfire Smoke Preparedness and Air Quality Advisory Planning for 2019

Report dated March 22, 2019 from Francis Ries, Senior Project Engineer and Ken Reid, Superintendent of Environment Sampling and Monitoring, Planning and Environment, providing information on Metro Vancouver's wildfire smoke preparedness and air quality advisory planning for the 2019 summer season.

Members were provided with a presentation on Metro Vancouver's wildfire smoke preparedness and air quality advisory planning, highlighting air quality monitoring network, previously-issued advisories, area burned by wildfires, advisory program partner agencies, and an example air quality advisory.

Presentation material titled "Wildfire Smoke Preparedness and Air Quality Advisory Planning for 2019" is retained with the April 12, 2019 Climate Action Committee agenda.

It was MOVED and SECONDED
That the MVRD Board receive for information the report dated March 22, 2019, titled "Wildfire Smoke Preparedness and Air Quality Advisory Planning for 2019".

CARRIED

5.4 Climate Change Impacts on Precipitation and Stormwater Management

Lillian Zaremba, Senior Project Engineer, Liquid Waste Services, provided members with a presentation on the impacts of climate change on precipitation and stormwater management, highlighting future climate scenarios and rainfall intensity, annual exceedance probability, infrastructure resilience planning, and regional coordination.

Presentation material titled "Climate Change impacts on Precipitation Implications for Stormwater Management" is retained with the April 12, 2019 Climate Action Committee agenda.

It was MOVED and SECONDED
That the Climate Action Committee receive for information the presentation titled "Climate Change Impacts on Precipitation and Stormwater Management".

CARRIED

5.5 Metro Vancouver Odour Management Communication and Engagement Strategy

Report dated March 22, 2019 from Mia Edbrooke, Senior Policy Analyst and Laura Taylor, Public Engagement Coordinator, Planning and Environment, seeking MVRD Board endorsement of the communication and engagement strategy for Metro Vancouver's enhanced framework for odorous air contaminants emissions management.

Members were informed of Metro Vancouver's goals regarding odour management and communication strategies with the public, businesses and local stakeholders.

It was MOVED and SECONDED
That the MVRD Board endorse the communication and engagement strategy described in the report dated March 22, 2019, titled "Metro Vancouver Odour Management Communication and Engagement Strategy".

CARRIED
Mayor van den Broek absent at the vote.

5.6 Outreach on the Non-Road Diesel Engine Emission Program and Future Directions

Report dated March 28, 2019 from Darrell Wakelin, Environmental Control Officer and Mia Edbrooke, Senior Policy Analyst, Planning and Environment, informing of upcoming outreach activities related to the Tier 1 engine registration deadline for the *MVRD Non-Road Diesel Engine Emission Regulation Bylaw No. 1161,* 2012, and the process for considering future directions or expansions in scope of the bylaw requirements.

It was MOVED and SECONDED
That the MVRD Board receive for information the report dated March 28, 2019, titled "Outreach on the Non-Road Diesel Engine Emission Program and Future Directions".

CARRIED

5.7 Manager's Report

Report dated March 19, 2019 from Roger Quan, Director, Air Quality and Climate Change, Planning and Environment, providing the Climate Action Committee with

the status of the 2019 work plan, highlighting the EV Emotive campaign and test drive at the BC Tech Summit and Vancouver International Auto Show.

It was MOVED and SECONDED
That the Climate Action Committee receive for information the report dated March 19, 2019, titled "Manager's Report".

CARRIED

6. INFORMATION ITEMS

It was MOVED and SECONDED
That the Climate Action Committee receive for information the following Information Items:

6.1 Commercial Cannabis Production on Agricultural Land
6.2 Proposed Consultation on the Regulation of Legal Cannabis Cultivation

CARRIED

7. OTHER BUSINESS

7.1 Update on the City of Surrey's Tree Protection Bylaw

Members were informed that the City of Surrey will be updating its bylaws related to tree protection in the municipality.

8. BUSINESS ARISING FROM DELEGATIONS

No items presented.

9. RESOLUTION TO CLOSE MEETING

No items presented.

10. ADJOURNMENT/CONCLUSION

It was MOVED and SECONDED
That the Climate Action Committee conclude its regular meeting of April 12, 2019.

CARRIED
(Time: 2:55 p.m.)

_____
Genevieve Lanz,
Legislative Services Coordinator

_____
Adriane Carr, Chair

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Introducing Community Energy Association

Community Energy Association

Community Energy Association (CEA) was founded in 1995 by the Province and UBCM as a committee to help BC local governments prepare energy plans for their community. CEA became a non-profit society with charitable status in 2004. Since beginning operation, our services have grown to help local governments with implementing both corporate and community plans, including helping implement new energy efficient building standards, measuring progress on existing energy and emission plans, designing and delivering rural electric vehicle charging networks and preparing energy-related studies. We have worked with around 60% of all municipalities in BC. In recent years, our work has taken us to the Yukon and Alberta, as well as working with cross-Canada organizations like Quality Urban Energy Systems for Tomorrow (QUEST) on national level projects like Getting to Implementation. We also:

- support local government leadership through our BC Municipal Climate Leadership Council,
- recognize achievement through the Climate & Energy Action Awards,
- have designed and currently deliver the Certificate in Community Energy Management courses offered through BCIT,
- are Federation of Canadian Municipalities' Regional Climate Facilitator for BC and the Yukon, and
- are beginning to work with aboriginal communities in BC on energy planning and efficiency projects.

Thank-you for Metro Vancouver's Support

CEA is in part supported by a membership base which includes over 30 BC municipalities (including several within Metro Vancouver), Union of BC Municipalities, Federation of Canadian Municipalities, BC energy utilities and transportation agencies, related institutes and foundations and private sector entities that share our goals. Metro Vancouver has been a member since 2013. Your support is important for achieving our mission and is much appreciated. We support our members through quarterly membership meetings where members share progress, ask questions and receive presentations on pertinent subjects.

The Problem

BC local governments are still struggling to reduce GHG emissions from existing buildings. Air source heat pumps are a viable solution in Metro Vancouver, yet uptake is inappropriately low. There are a number of compelling reasons to accelerate the uptake of heat pumps in Metro Vancouver:

- Existing residential buildings account for 20% of the regions GHG emissions and existing Part 9 buildings (including single-family homes, attached dwellings, townhouses and low-rise (fewer than five storeys) apartments) account for 83% of all structures (around 800,000 in total) in Metro Vancouver.
- Achieving climate targets require a fuel-switching rate of approximately 3% annually for all existing buildings heated by fossil fuels (most buildings in Metro Vancouver).
- Annual energy demand to heat buildings in BC is decreasing while cooling requirements are increasing. The greatest increase in cooling requirements has been in the southern part of BC, which has experienced an increase of 25 cooling degree-days in the last 100 years. Warmers summers have led to increased demand for air conditioning units.
- An air-source heat pump provides an efficient and renewable way to heat and cool buildings. Using a heat pump can reduce a typical home's GHGs by up to 6 tonnes per year while providing significant financial savings.

- Heat pumps are ideally suited to the mild Metro Vancouver climate.
- Yet According to Natural Resources Canada, in 2015, heat pumps made up just over 3% of heating systems in BC. This is despite the fact that heat pumps provide significant benefits over natural gas heat.

The current "model" for achieving heat pump retrofits is consumer driven. Even with incentives in place, consumers must:

- Research the benefits of heat pumps and develop an understanding of how they work and what level of performance is expected
- Identify the requirements and process to qualify for any available utility, provincial or municipal incentives
- Ensure availability of personal funds to support the retrofit (savings or loan)
- Consult with private sector service providers on available equipment and costs
- Occasionally debate the value of a heat pump with service providers who are unknowledgeable or not interested in selling, installing and servicing equipment they are unfamiliar with
- Purchase equipment and arrange for appropriate permits and installation
- Be available in the home on installation day
- Complete any related pre and post energy audits or other requirements associated with receiving an incentive
- Finalize incentive application processes

Short-term provincial and federal retrofit incentives and the existing consumer driven business model have not delivered the sustained level of activity needed to reduce emissions from existing buildings. How can we make this process easier?

Seeking a Solution

We have planned a two-year process (2019-2020) to research, consult and test a new approach to supporting an on-going heat pump retrofit rate that will have the necessary impact on GHG emission reductions from existing buildings. We will consult with local governments, utilities, heating system retailers and installers, the Province of BC, professional organizations and other stakeholders to identify a solution. The consultation will be open to all ideas, based on research on successful initiatives elsewhere in Canada and the US, with an intention to create a viable and stakeholder-supported model that can be tested in Metro Vancouver, then expanded to the rest of the Province. When a new approach is agreed upon, it will be tested with participating municipalities. We will measure results and make recommendations to scale the project to the provincial level.

We currently have support from the Real Estate Foundation of BC ($150k), in-kind support from five Metro Vancouver municipalities, and a UBC sustainability scholar beginning research. We have a grant application in process with Bullitt Foundation ($200k).

We are asking Metro Vancouver to support the project through in-kind contributions (providing meeting space, participating in meetings) in 2019 and through project funding of approximately 18% of total project costs ($37,000) in 2020. Metro Vancouver will receive quarterly project reports to help inform climate action in the region and will have the opportunity to use any materials generated by the project in your own programs.

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SERVICES AND SOLUTIONS FOR A LIVABLE REGION

To: Climate Action Committee

From: Fred Nenninger, Director, Policy, Planning and Analysis
Liquid Waste Services Department

Date: May 2, 2019 Meeting Date: May 17, 2019

Subject: **2019 Update on Liquid Waste Sustainability Innovation Fund Projects**

RECOMMENDATION
That the Climate Action Committee receive for information the report dated May 2, 2019, titled "2019 Update on Liquid Waste Sustainability Innovation Fund Projects".

PURPOSE
This report provides an update on projects funded under the Liquid Waste Sustainability Innovation Funds.

BACKGROUND
The Liquid Waste Sustainability Innovation Fund was created by the Board in 2004 to provide financial support to Liquid Waste Utility projects that contribute to the region's sustainability. The GVS&DD Board adopted the *Liquid Waste Sustainability Innovation Fund Policy* on June 27, 2014, with further amendments in 2016, to guide the use and management of the Fund. The policy requires that the Climate Action Committee be updated on an annual basis on the deliverables, outcomes and measurable benefits of the projects receiving funding.

This report presents an update on projects that have not yet been reported as complete to the Climate Action Committee. The projects outlined below were approved for funding from 2016 to 2018. Projects that were approved for funding in 2019 have not been included in this report, but will be reported on in 2020, per the policy.

Project	Approval Year	Amount Approved	Status
Smart Sewers: Development of Wireless In-Situ Sensors	2016	$200,000	In Progress
High Efficiency Aeration Demonstration	2017	$750,000	In Progress
Genomics Approach to Anaerobic Digestion Optimization	2017	$460,000	In Progress
Microwave-enhanced Advanced Oxidation Process Sludge Destruction Pilot	2017	$850,000	In Progress
Capture of wastewater contaminants of concern and beneficial use of residuals	2018	$450,000	In Progress
Intelligent Water Systems - Making Use of Sensors and Big Data Analytics	2018	$200,000	In Progress
Hydrothermal Processing - Biofuel Demonstration Facility	2018	$8,250,000	In Progress

SMART SEWERS: DEVELOPMENT OF WIRELESS IN-SITU SENSORS: IN PROGRESS

The goal of this project is to develop a smart sensor capable of early detection of nuisance odours and corrosion that erodes the service life of Metro Vancouver's multi-billion dollar sewage collection network. Since funding approval in May 2016, the UBC Engineering Team from the Advanced Thermo-Fluidic Laboratory has leveraged Sustainability Innovation Funds to secure two grants from the federal Natural Sciences and Engineering Research Council, totaling $225,000 to date.

Applying advanced electro-mechanical engineering techniques, the UBC Team is applying iterative design and manufacturing of two functionally distinct types of sensor prototypes using 3D printers. The sizing of prototypes has decreased with each iteration, while recent innovations have enabled operation in explosive sewer atmospheres. Auxiliary components under development include a touchscreen graphical user interface and a multi-stage sample filtration module. Sensor testing on sewage is currently under way, with plans for pilot-testing in a continuously flowing sewer-reactor set for mid-2019.

HIGH EFFICIENCY AERATION DEMONSTRATION: IN PROGRESS

More than one-half of the energy consumed at a wastewater treatment facility can be for aerating the wastewater. A new device called the Perlemax Fluidic Oscillator has shown its ability to increase energy efficiency by 25% at small scale and this project is to evaluate the device at near-full water depths. The Perlemax device induces the formation of microbubbles using standard air diffusers to effectively increase the area of contact between oxygen and water given the same volume of air.

Since project start in 2017, Metro Vancouver has retained Perlemax as the technology provider who has provided their conceptual design, secured the Water Research Foundation as a third party independent evaluator, and staff are in the process of formalizing collaborative work with the District of Columbia Water and Sewer Authority (DC Water) at their large wastewater treatment plant. DC Water has provided in-kind contributions to the project by way of specialized test facilities and some staff time for the duration of our collaboration.

GENOMICS APPROACH TO ANAEROBIC DIGESTION OPTIMIZATION: IN PROGRESS

The goal of this project is to increase energy generation from existing anaerobic digestion processes used at Metro Vancouver Wastewater Treatment Plants. There are two academic teams on this project: i) environmental genomic experts at UBC's Department of Microbiology and Immunology, and ii) anaerobic digestion experts from UBC's School of Engineering, Bioreactor Technology Group. Since project approval in February 2017, the genomics team and Bioreactor Technology Group have leveraged Sustainability Innovation Funds to secure four grants from the Natural Sciences and Engineering Research Council totaling over $700,000.

The team has completed sampling of existing anaerobic digesters at the Lulu Island WWTP for baselining and grant proposal submissions. Preliminary findings show that less than 1% of microorganisms present are methanogens, those responsible for producing the methane content in biogas. Given the relatively small starting community of methanogens, even a marginal increase in this population should result in a significant increase in methane production. The genomic analysis suggests methane-limiting conditions are present such as availability of trace elements and electron donors. Ongoing work involves execution of agreements, student recruitment, laboratory set-up, and

bench testing to identify the key constraints to methane production. Insights to alleviate the constraints are informing prototype design of a potentially patentable Renewable Natural Gas Optimizer.

MICROWAVE-ENHANCED ADVANCED OXIDATION PROCESS SLUDGE DESTRUCTION PILOT: IN PROGRESS

Anaerobic digestion (AD) at Wastewater Treatment Plants is a common process to convert municipal sewage sludge into biogas that can be used as a renewable source of energy. Sludge pre-treatment processes can accelerate sludge destruction to increase AD efficiency and biogas production. At its February 24, 2017 meeting, the GVS&DD Board approved the allocation of funds from the Liquid Waste Sustainability Innovation Fund to the Microwave-enhanced Advanced Oxidation Process Sludge Destruction Pilot. The process consists of exposing secondary sludge to microwave heating after injection of hydrogen peroxide (H2O2). The combination of heat and H2O2 increases solids disintegration, making them more available for biogas production. The project is being undertaken in collaboration with academics in the Civil Engineering Department of UBC who patented this process in 2006. Leveraging contributions from the Sustainability Innovation Fund, UBC was successful in a NSERC funding award of $518,000 for this project.

The first phase of the project is underway and will be completed by end of 2019. The trailer pilot plant was designed and built. Installation at the Annacis Research Centre (ARC) is under way and commissioning will be completed in May 2019. This first phase will test the process to assess potential for methane recovery, energy consumption and life cycle costs to confirm cost effectiveness of the process. If this first phase is successful, a second phase will be considered to carry out pilot testing at one of Metro Vancouver Wastewater Treatment Plants.

CAPTURE OF WASTEWATER CONTAMINANTS OF CONCERN AND BENEFICIAL USE OF RESIDUALS: IN PROGRESS

Dr. Loretta Li at the Civil Engineering Department at the University of British Columbia (UBC) has been developing a process using sewage sludge-based activated carbon (SBAC) to capture contaminants of emerging concern (CECs) in storm water and is proposing to apply her research to the capture of contaminants in municipal wastewater. On February 23, 2018, the GVS&DD Board approved funding for the project from the Liquid Waste Sustainability Innovation Fund for $450,000 over three years, starting in 2018. On December 5, 2018, a Collaborative Research Agreement (CRA) was executed between UBC, GVS&DD and KWL for the project titled “Sludge-Based Activated Carbon for Contaminants Capture”. That CRA covers the work associated with the first phase of the research work at UBC aimed at demonstrating technical feasibility. Subsequent phases of the research work will be covered under a future or amended CRA, following confirmation of technical feasibility in the Phase 1 work.

A separate collaboration agreement between GVS&DD and KWL to cover KWL’s scope of work was executed on January 1, 2019. KWL’s scope of work includes developing a preliminary business case including SBAC material quantity requirements, production costs and market size and assessment of the commercial feasibility of the opportunity. KWL has also applied for additional funding from Mitacs Inc., a federal not-for-profit corporation that supports industrial and social innovation in Canada, to

hire researchers to work on the project with UBC. Once funding is confirmed at the end of April, UBC will hire researchers and initiate Phase 1 technical work.

INTELLIGENT WATER SYSTEMS - MAKING USE OF SENSORS AND BIG DATA ANALYTICS: IN PROGRESS
Metro Vancouver and its municipal members currently monitor and collect large amounts of data from many different sources. With the advent of new and less expensive sensor and data collection technology this trend is expected to increase exponentially. This results in the need to be able to collect, process, and analyze a large amount of data (Big Data) before it can become usable information. The process to adapt to this shift for the water industry is currently in its infancy. There is a need to identify and evaluate new and innovative tools and techniques to take advantage of this change, and this project is intended to help Metro Vancouver prepare for the coming wave of "Big Data".

The Water Research Foundation (WRF) is managing a study to help the water industry prepare for the need to manage this coming wave of data. Metro Vancouver is partnering with WRF through a $200,000 Sustainability Innovation Fund contribution and will be a key subject case study. A possible example is to explore the use of Artificial Intelligence for comprehensive quality assessment and quality control of data. Another possible example is to develop procedures to assess patterns and predict malfunctions for adapting operational rules or scheduled maintenance. Other study considerations can include the integration of various datasets, and the ability to input and process key information such as real time rainfall and flow data, land use and population data, and environmental monitoring data.

HYDROTHERMAL PROCESSING - BIOFUEL DEMONSTRATION FACILITY: IN PROGRESS
Hydrothermal Processing is a technology that has proven at bench-scale, its ability to transform Annacis Island wastewater sludge into a low carbon biocrude oil. The biocrude can be subsequently refined into liquid transportation fuels having carbon intensities that are three-fold lower than that produced from typical petroleum sources. A complete Hydrothermal Process includes two steps. This demonstration project covers Step 1 to validate operational viability of the core technology, assess its outputs for revenue-generation potential or return to treatment, and calculate greenhouse gas reductions.

In addition to contributions from the Sustainability Innovation Fund, Metro Vancouver has raised funding from external partners for this project as outlined below.

Line	Funding Source	Amount	Status
1	Province of BC, Innovative Clean Energy (ICE) Fund	$750,000	Received in 2018
2	Parkland Fuel Corporation, Part 3 Agreement	$2,475,000	Received in 2018
3	Parkland Fuel Corporation, Part 3 Agreement	$1,775,000	Future year contributions
4	Sustainability Innovation Fund	$4,000,000	Approved in 2018
	Total Project Cost	$9,000,000	

The $9 million in total funding covers the design, fabrication, implementation, as well as approximately one year of operating Step 1 of the complete Hydrothermal Process. To date, the project team has secured the demonstration site at the Annacis Island Wastewater Treatment Plant, retained rights to proprietary technology, as well as preliminary design and support from Genifuel

Corporation. The team will proceed with additional contracts for an owner's engineer, fabricator, operator, and evaluator in the coming months.

ALTERNATIVES
This is an information report. No alternatives are presented.

FINANCIAL IMPLICATIONS
The projects summarized in this report, had funding approved by the GVS&DD Boards in 2016, 2017, and 2018. The disbursals of funds were made in accordance with the applicable *Sustainability Innovation Fund Policy* that governs the use and management of the Funds. Annually, $1,127,000 is contributed to the reserve fund. The projected 2019 reserves in the Liquid Waste Sustainability Innovation Fund total $13.6 million.

The table below outlines the funding approved and the amount spent to date for each project. Any unspent funds for completed projects remain in the Sustainability Innovation Fund reserve.

Project	Total Amount of Funding Approved	Amount Spent (as of Mar 31, 2019)
2016 Approval Year		
Smart Sewers: Development of Wireless In-Situ Sensors	$200,000	$200,000
2017 Approval Year		
High Efficiency Aeration Demonstration	$750,000	$91,871
Genomics Approach to Anaerobic Digestion Optimization	$460,000	$98,718
Microwave-enhanced Advanced Oxidation Process Sludge Destruction Pilot	$850,000	$585,000
2018 Approval Year		
Capture of wastewater contaminants of concern and beneficial use of residuals	$450,000	$103,000
Intelligent Water Systems - Making Use of Sensors and Big Data Analytics	$200,000	$0
Hydrothermal Processing - Biofuel Demonstration Facility	$8,250,000	$1,224

SUMMARY / CONCLUSION
This report has presented an update on seven projects funded under the Liquid Waste Sustainability Innovation Fund. The Sustainability Innovation Funds were created by the Board in 2004 to provide financial support to utility or Regional District projects that contribute to the region's sustainability.

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SERVICES AND SOLUTIONS FOR A LIVABLE REGION

To: Climate Action Committee

From: Roger Quan, Director, Air Quality and Climate Change
Planning and Environment Department

Date: May 2, 2019 Meeting Date: May 17, 2019

Subject: **2019 Update on Regional District Sustainability Innovation Fund Project**

RECOMMENDATION
That the Climate Action Committee receive for information the report dated May 2, 2019, titled "2019 Update on Regional District Sustainability Innovation Fund Projects".

PURPOSE
To provide an update on six projects funded under the Regional District Sustainability Innovation Fund.

BACKGROUND
The Regional District Sustainability Innovation Fund was created by the Board in 2004 to provide financial support to Regional District projects that contribute to the region's sustainability. The GVRD Board adopted the *Regional District Sustainability Innovation Fund Policy* on June 27, 2014, with further amendments in 2016, to guide the use and management of the Fund. The policy requires that the Climate Action Committee be updated on an annual basis on the deliverables, outcomes and measurable benefits of the projects receiving funding.

This report presents an update on projects that have not yet been reported as complete to the Climate Action Committee. The projects outlined below were approved for funding between 2015 and 2018. Projects that were approved for funding in 2019 have not been included in this report, but will be reported on in 2020, per the policy.

Project	Approval Year	Amount Approved	Status
Strata Energy Advisor Program	2015	$200,000	In Progress
Transit-Oriented Affordable Housing Study Phase 2	2016/ 2018	$100,000	Complete
DC Fast Charger at Metro Tower III	2017	$150,000	In Progress
National Industrial Symbiosis Program	2017	$100,000	In Progress
LumiAir: Lighting Your Path to Clean Air	2018	$140,000	In Progress
Air Aware: Air Quality and Citizen Science	2018	$95,000	In Progress

STRATA ENERGY ADVISOR PROGRAM: IN PROGRESS
The Strata Energy Advisor (SEA) Pilot Program provides information and advice to strata corporations to support them in choosing more energy efficient and lower greenhouse gas (GHG) options as part

of building maintenance and renovation projects. The Strata Energy Advisors provide professional advice to help stratas identify opportunities to improve efficiency and reduce GHGs, and turn them into on-the-ground projects. Through the SEA program, strata councils have access to free building energy assessments, business cases and implementation support. Small grants (up to $1500) are available through the program to offset the cost of in-depth feasibility studies for more complex projects, or building tune-ups/smart building upgrades to get stratas started on implementation.

The program launched in April 2018 and will be completed at the end of 2019. There has been high interest in the program that resulted in 211 program registrations. To date, the Strata Energy Advisors have completed 82 energy assessments and 65 business cases. The business cases have identified 70 building tune-up and smart building upgrade projects, 28 major mechanical projects, and 11 building enclosure projects. The program has received 5 grant applications as of March 31, 2019.

The SEA Pilot Program is funded through SIF ($200,000), air quality reserves ($192,500) and partner funding ($366,500). The funding partners are the cities of North Vancouver, New Westminster, Richmond, Surrey, Vancouver and UBC. A portion of the partners' contribution ($204,000) has been designated for grant funding. The program development phases ($292,000) were completed between Q1 2016 and Q1 2018. A more detailed interim report will be presented to the Climate Action Committee and the Board in Q3 2019 and a final report will be presented in Q1 2020 with the proposed next steps for the SEA program.

TRANSIT-ORIENTED AFFORDABLE HOUSING STUDY PHASE 2: COMPLETE

The Transit-Oriented Affordable Housing (TOAH) Study Phase 2 examines the effectiveness, limitations, and applicability of specific tools to support the delivery of new transit-oriented affordable rental housing units in the region. The Phase 2 partners include the BC Non-Profit Housing Association, BC Housing, TransLink, Vancity, Ministry of Municipal Affairs and Housing, CMHC, Urban Development Institute, and Metro Vancouver.

The two research components – TOAH Fund and TOAH Policy Tools – are complete. The TOAH Fund research examined the applicability of a regional revolving loan fund to support the financing of affordable rental housing. The TOAH Policy Tools research examined ways to address the barrier of high land cost (acquisition and deployment of land and airspace, inclusionary housing requirements, density increases, and residential rental tenure zoning). One of the key lessons emerging from the two research components is that aligning purpose and missions within and between organizations with roles in housing, land use, and transportation planning are crucial. Without this alignment of purpose and mission, the tools in the toolbox will not be used optimally and the outcome will be incomplete and inequitable transit-oriented communities.

The consultant deliverables are available on the Metro Vancouver website at:
http://www.metrovancouver.org/services/regional-planning/housing-affordability/transit-oriented/Pages/default.aspx

The TOAH Study Phase 2 was considered by the Regional Planning Committee at its meeting of April 5, 2019. The MVRD Board will consider the recommendations at its meeting of April 26, 2019 – to communicate the key findings to the federal and provincial governments, Mayors' Council on

Regional Transportation, TransLink, and member jurisdiction councils; and to direct staff to continue to explore options to collaborate with interested partners on a regional TOAH fund, including identifying potential champions, and report back to the Regional Planning Committee.

DC FAST CHARGER AT METRO TOWER III: IN PROGRESS

In 2017, the MVRD Board approved $150k to purchase, install and commission a Direct Current Fast Charger (DCFC) at Metro Vancouver's head office. The installation is meant to support electric vehicle charging for a wide range of user groups, including the public, Metro Vancouver's fleet, and staff and Metro Tower III tenants. One of the main objectives of the project is to establish and test innovative pricing and usage rules to accommodate these various groups.

The DCFC has been installed on the P1 level of the Metrotown parking lot. This location is accessible to the public 24 hours per day, seven days per week, within a sheltered and patrolled parkade. At the same time that the DCFC was installed, four Level 2 electric vehicle charging stations were also installed in the same vicinity of the parkade. These stations are outside the scope of the SIF project, but pricing and access for the DCFC is being evaluated in conjunction with these stations to maximize the benefit of all the corporate charging infrastructure at this location.

The EV charging stations are in the process of being commissioned and staff expect the stations to be operational in mid-2019. Testing of innovative pricing schemes and usage rules will be undertaken for a period of one-year post-commissioning. Staff will monitor and adjust pricing and access as necessary, as user charging behaviour and price sensitivity become better understood.

NATIONAL INDUSTRIAL SYMBIOSIS PROGRAM – METRO VANCOUVER: IN PROGRESS

Metro Vancouver has partnered with the Light House Sustainable Building Centre to pilot Canada's first National Industrial Symbiosis Program (NISP). Additional funding partners include the City of New Westminster, the City of Surrey, the BC Innovation Council, BC Ministry of Agriculture, BC Ministry of Energy, and the federal government.

Industrial symbioses support the circular economy by transforming "wastes" from one business into higher value inputs for another business, such as using shredded tires as a building material for a new road. The NISP approach helps facilitate business-to-business relationships to maximize efficient use of logistics, space, or even research and development resources. Greater resource efficiency and waste management can help support regional goals associated with reducing, reusing, and recycling solid waste, reducing GHG emissions, and reducing water demand.

The Metro Vancouver NISP pilot is centered on a series of six facilitated workshops that were delivered throughout region, with the last workshop taking place in February 2019. There were 189 participants in the workshops and 2400 potential resource matches were discussed at these workshops. The NISP practitioners are currently working to prioritize high potential matches to convert them into viable business opportunities that deliver triple bottom line benefits. A final report outlining all outcomes to date will be delivered to Metro Vancouver in mid-2019, which will mark the completion of this pilot.

LUMIAIR: LIGHTING YOUR PATH TO CLEAN AIR: IN PROGRESS

LumiAIR is a project to engage and educate the public through a thought-provoking and accessible visual display of air quality. The display will help the public understand that the Metro Vancouver region has good air quality most of the time, and that air quality can also be degraded for brief periods of time. The public will be able to interact with the display to better understand current air quality in the region, and compare regional air quality with air quality in other international cities or during air quality events such as wildfires. The display is intended to be deployed at a number of different public locations throughout the region over time, such as community centres, libraries, or other public spaces.

A consultant was hired in November 2018 to develop a prototype display ($85,000). Following information gathering and preparation of several initial conceptual designs, the consultant has presented three display options to Metro Vancouver staff and a public focus group ($10,000) held in Vancouver. A single design will be selected and further refined by the consultant. The final prototype is anticipated to be completed in July 2019. Of the $140,000 budget, the remaining $45,000 is anticipated to be directed to completion of the final build for the project. Education and outreach materials are also being developed in-house to support the deployment of the display.

When complete, the project will enhance public understanding of air quality in the region and Metro Vancouver's role in monitoring air quality, and will promote actions that community members can take to improve air quality.

AIR AWARE: AIR QUALITY AND CITIZEN SCIENCE: IN PROGRESS

The Air Aware project is studying the strengths and limitations of small low-cost air quality monitoring sensors, how they might play a role in Metro Vancouver's air monitoring network, and how and why the public are using them. There is a growing interest in these sensors amongst the public, other government agencies and academic organizations, and Metro Vancouver aims to contribute to this emerging field. Online resources will be prepared to help guide the public in the use and interpretation of data collected by these sensors.

In the fall of 2018 several different low-cost sensors were purchased and co-located at air monitoring stations in the region for approximately two months alongside reference instruments. When the low-cost sensor data was compared to data collected by reference instruments, preliminary analysis showed that sensor performance and operability varied widely.

An important part of Air Aware involves working with the public to help understand differences between low-cost sensors and the reference instruments at Metro Vancouver's air monitoring stations, and interpret the air quality data they produce. Metro Vancouver chose sensors that performed well, were easy to set up, and had a user-friendly interface. These sensors are being lent to volunteers during the spring of 2019. This will provide insights about a user's experience with air quality sensors and data, and will help Metro Vancouver understand how to best respond to their air quality needs and questions. Volunteers were selected from residents responding to a social media campaign, with good representation across the region's municipalities including Burnaby, Coquitlam, Delta, New Westminster, North Vancouver, Pitt Meadows, Port Moody, Richmond, and Vancouver.

Metro Vancouver will use the results from the co-location testing, as well as feedback from volunteers, to create resources that will include information on strengths and limitations of low-cost sensors, guidance on choosing and setting up a sensor suitable for the user's needs, and challenges that a user might encounter when using low-cost air sensors. Staff will report on the appropriate use, accuracy, and reliability of the sensors and the quality of the data they collect, and potential policy and program implications.

ALTERNATIVES

This is an information report. No alternatives are presented.

FINANCIAL IMPLICATIONS

The projects summarized in this report, had funding approved by the MVRD Board between 2015 and 2018. The disbursal of funds was made in accordance with the *Regional District Sustainability Innovation Fund Policy* that governs the use and management of the Funds. Annually, $347,000 is contributed to the reserve fund. The estimated 2019 year-end balance of the Regional District Sustainability Innovation Fund is $11.45 million.

The table below outlines the funding approved and the amount spent to date for each project. Any unspent funds for completed projects remain in the Sustainability Innovation Fund reserve.

Project	Total Amount of Funding Approved	Amount Spent (as of Mar 31, 2019)
2015 Approval Year		
Strata Energy Advisor Program	$200,000 *	$200,000
2016 Approval Year		
Transit Oriented Affordable Housing Study Phase 2	$100,000	$100,000 (invoices pending)
2017 Approval Year		
DCFC at MT3	$150,000	$113,210
National Industrial Symbiosis Program – Metro Vancouver	$100,000	$90,000
2018 Approval Year		
LumiAir: Lighting Your Path to Clean Air	$140,000	$5,460
Air Aware: Air Quality and Citizen Science	$95,000	$26,743

* In October 2017, the MVRD Board approved additional funding of $192,500 from Air Quality reserves for this project, and directed staff to proceed with the program under a revised scope

SUMMARY / CONCLUSION

This report has presented an update on six projects funded under the Regional District Sustainability Innovation Fund. The Sustainability Innovation Funds were created by the Board in 2004 to provide financial support to utility or Regional District projects that contribute to the region's sustainability.

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metrovancouver
SERVICES AND SOLUTIONS FOR A LIVABLE REGION

To: Climate Action Committee

From: Inder Singh, Director, Policy, Planning and Analysis
Water Services Department

Date: April 17, 2019 Meeting Date: May 17, 2019

Subject: **2019 Update on Water Sustainability Innovation Fund Projects**

RECOMMENDATION
That the Climate Action Committee receive for information the report dated April 17, 2019, titled "2019 Update on Water Sustainability Innovation Fund Projects".

PURPOSE
This report provides an update on four projects funded under the Water Sustainability Innovation Fund.

BACKGROUND
The Water Sustainability Innovation Fund was created by the Board in 2004 to provide financial support to Water projects that contribute to the region's sustainability. The GVWD Board adopted the *Water Sustainability Innovation Fund Policy* on June 27, 2014, with further amendments in 2016, to guide the use and management of the Fund. The policy requires that the Climate Action Committee be updated on an annual basis on the deliverables, outcomes and measurable benefits of the projects receiving funding.

This report presents an update on projects that have not yet been reported as complete to the Climate Action Committee. The projects outlined below were approved for funding in 2017 and 2018. Projects that were approved for funding in 2019 have not been included in this report, but will be reported on in 2020, per the policy.

Project	Approval Year	Amount Approved	Status
Earthquake Early Warning System	2017	$100,000	In Progress
Smart Watering App	2017	$80,000	Discontinued
Residential Indoor and Outdoor End Uses of Water	2018	$380,000	In Progress
Greywater Reuse and Rainwater Harvesting Demonstration	2018	$350,000	In Progress

EARTHQUAKE EARLY WARNING (EEW) SYSTEM: IN PROGRESS
Approved in 2017, Metro Vancouver's Earthquake Early Warning (EEW) System project is assessing the opportunities for an earthquake early warning system that could reduce the potential for disruption to the provision of water to the region in the event of a major earthquake. A consultant's technical assessment report was completed in late 2018; however, additional time is required in 2019 to select and verify the proposed pilot design elements.

The assessment showed that the application of EEW is evolving, and identified potential opportunities to implement EEW through a network of integrated sensors placed at key facilities such as water treatment plants, reservoirs and dams. This will help safeguard workers, conserve water (in reservoirs) and exercise key automated functions to aid in the recovery process. The assessment noted that versions of EEW have been successfully implemented in many schools in the region, at the legislature buildings in Victoria, and elsewhere around the world; however, no comparative applications were found for water or liquid waste infrastructure.

Sensor placements are recommended at the Seymour Capilano Filtration Plant, various reservoirs and water main valves as part of the pilot phase assessment. Staff are currently considering the criteria and operational factors to select the pilot test sites. The consultant is also in the process of supplying a test sensor to evaluate and define the requirements for integrating the sensor signals with the existing system control and SCADA network. Design of the pilot program will be completed by the end of 2019 within the remaining project budget. A separate funding request for execution of the pilot program will be brought forward in 2020.

SMART WATERING APP: DISCONTINUED

This project was approved in 2017 to develop a predictive application that would inform Metro Vancouver residents on how to effectively and efficiently water outdoor plants, by providing location specific and weather based watering requirements, based on Drinking Water Conservation Plan (DWCP) watering restrictions, historical and forecasted weather data, soil conditions, landscape characteristics, and other user-specified factors.

Project work began in 2018 and included focus group testing with Metro Vancouver residents to assist in solidifying the project scope. The focus groups explored public awareness and understanding of watering guidelines and restrictions as well as interest levels in the proposed watering application. Results showed there was a lack of interest in a standalone watering application, with the purpose of understanding water restrictions. However, respondents expressed interest in augmenting existing sources of information currently available on Metro Vancouver applications and websites.

Based on the focus group feedback, the Smart Watering App funded through the Water Sustainability Innovation Fund will not be proceeding. To address the feedback received from the focus groups, Metro Vancouver will instead be undertaking updates to the Grow Green Guide, additional support for the DWCP on the Metro Vancouver website, and stronger integration of Grow Green Guide and We Love Water websites. This work will move forward outside of any Water Sustainability Innovation Funding as part of Metro Vancouver's ongoing communications initiatives, funded through the Water Services Communications Program Budget managed by the External Relations Department.

RESIDENTIAL INDOOR AND OUTDOOR END USES OF WATER: IN PROGRESS

Approved in 2018, this two-year study will measure and record both indoor and outdoor water use patterns of about 150 single-family homes over a two-month period in the summer months. The results from the study will provide a detailed understanding of how water is used indoors by each fixture and appliance. The study will also provide detailed analysis of outdoor water use, and in particular, the frequency and quantity of water applied to lawns and gardens.

The study will evaluate water use patterns in the Metro Vancouver region in comparison to other North American jurisdictions as reported in the Water Research Foundation 2016 Residential End Uses of Water Study. The study will also allow communications materials to be research-based, incorporating water use and public attitudes research information specific to this region.

A project working group of local government representatives has been established through which the preliminary list of candidate properties has been identified. A Request for Proposals to engage consulting services is in progress.

GREYWATER REUSE AND RAINWATER HARVESTING DEMONSTRATION: IN PROGRESS
Approved in 2018, this two-year project will investigate the feasibility of greywater reuse and rainwater harvesting systems in the region and provide guidance on integrating water reuse into new residential and commercial developments. The project will draw on the experience of existing reuse installations in the region to share lessons learned in navigating regulatory, implementation and operational challenges. The objective is to support and encourage new developments that may be considering water reuse to successfully implement and maintain greywater or rainwater systems.

The lessons learned from this demonstration project will be shared with stakeholders such as member jurisdictions, developers, businesses, and residents. A key project deliverable will be a guidebook that details lessons learned and offers practical recommendations.

A Request for Proposals to engage consulting services is in progress.

ALTERNATIVES
This is an information report. No alternatives are presented.

FINANCIAL IMPLICATIONS
The projects summarized in this report, had funding approved by the GVWD Board in 2017 and 2018. The disbursal of funds was made in accordance with the *Water Sustainability Innovation Fund Policy* that governs the use and management of the Funds. Annually, $723,000 is contributed to the reserve fund. The estimated 2019 year-end balance of the Water Sustainability Innovation Fund is $12.33 million.

The table below outlines the funding approved and the amount spent to date for each project. Any unspent funds for completed projects remain in the Sustainability Innovation Fund reserve.

Project	Total Amount of Funding Approved	Amount Spent (as of Mar 31, 2019)
2017 Approval Year		
Earthquake Early Warning System	$100,000	$64,924
Smart Watering App	$80,000	$11,189
2018 Approval Year		
Residential Indoor and Outdoor End Uses of Water	$380,000	$0
Greywater Reuse and Rainwater Harvesting Demonstration	$350,000	$0

SUMMARY / CONCLUSION

This report has presented an update on four projects funded under the Water Sustainability Innovation Fund. The Sustainability Innovation Funds were created by the Board in 2004 to provide financial support to utility or Regional District projects that contribute to the region's sustainability.

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SERVICES AND SOLUTIONS FOR A LIVABLE REGION

To: Climate Action Committee

From: Julie Saxton, Air Quality Planner
Planning and Environment Department

Date: May 3, 2019 Meeting Date: May 17, 2019

Subject: **Expanded Consultation on a Potential Cannabis Production Emission Regulation for Metro Vancouver**

RECOMMENDATION

That the MVRD Board:

a) endorse the engagement plan attached to the report titled "Expanded Consultation on a Potential Cannabis Production Emission Regulation for Metro Vancouver", dated May 3, 2019; and
b) direct staff to proceed with engagement and consultation on the proposed approach to regulating air emissions from cannabis production and processing, based on the bylaw development discussion paper attached to the report titled "Expanded Consultation on a Potential Cannabis Production Emission Regulation for Metro Vancouver", dated May 3, 2019.

PURPOSE

To seek Metro Vancouver Regional District (MVRD) Board approval for staff to proceed with an expanded consultation program on proposals to regulate air emissions from cannabis production and processing operations.

BACKGROUND

On March 29, 2019, the MVRD Board received a report seeking direction to proceed with consultation on a proposed approach to regulating air emissions from cannabis production. This report was considered by the Climate Action Committee at its meeting of March 15, 2019 and is presented as Reference 1.

The MVRD Board resolved to:

a) receive for information the report titled "Consultation on a Cannabis Production Emission Regulation for Metro Vancouver", dated February 27, 2019;
b) refer the following recommendation to the Climate Action and Regional Planning Committees for further information and consideration:

direct staff to proceed with consultation on the proposed approach to regulating air emissions from cannabis production, based on the bylaw development discussion paper attached to the report titled "Consultation on a Cannabis Production Emission Regulation for Metro Vancouver", dated February 27, 2019;

c) write a letter to Health Canada requesting that they actively enforce federal regulations regarding the prevention of odours from federally-licensed cannabis producers.

In response to the Board's referral motion in (b) above, this report presents:

- an expanded consultation program (Attachment 1), with a longer timeline and additional opportunities for engagement with the agricultural industry and cannabis producers;
- clarification on concerns that the proposed initiative may affect the agricultural sector through the regulation of odorous emissions from agricultural activities; and
- clarification on the intent of the proposed initiative to address broader regional environmental and health impacts related to emissions from cannabis production.

This initiative was presented to Metro Vancouver's Agricultural Advisory Committee on April 10, 2019. A draft of this report was presented to the Regional Planning Committee at its regular meeting on May 3, 2019 to seek any comments that would be shared with the Climate Action Committee and the MVRD Board for consideration when deciding on the proposed consultation program. A summary of feedback from the Agricultural Advisory Committee and the Regional Planning Committee is presented in this report.

REGULATORY FRAMEWORK

Federal Government Requirements for Odour Control

Health Canada is responsible for licensing cannabis production and processing facilities. Licensed facilities are required to filter air to prevent the escape of odours. However, local governments continue to have concerns about the environmental and health impacts of emissions of air contaminants, including volatile organic compounds and particulate matter. In addition, Metro Vancouver and member municipalities continue to receive complaints about odorous emissions from cannabis production operations.

Metro Vancouver's Authority to Regulate Emissions from Cannabis Production Operations

Metro Vancouver has the authority to control air pollution and manage air quality in the Metro Vancouver region under section 31 of the *BC Environmental Management Act*. This authority includes the ability to regulate the discharge of air contaminants from industries, trades and businesses, including on agricultural and industrial land. The *BC Environmental Management Act* defines air contaminants as substances introduced into the air that cause or are capable of causing injury to health or safety, damage to the environment, material physical discomfort, interference with visibility, or interference with the normal conduct of business as specified in section 1(1) of the Act.

ADDRESSING POTENTIAL IMPACTS OF EMISSIONS

Volatile Organic Compounds, Particulate Matter and Ground-Level Ozone

Volatile organic compounds (VOC) are air contaminants that are emitted by cannabis plants. Information on emissions from cannabis production in other jurisdictions and projections for cultivation in the Metro Vancouver region suggest that cannabis production has the potential to be a significant source of VOC if emissions are not adequately controlled. A new source of VOC in the region raises environmental and health concerns due to the role of VOC in the formation of harmful ground-level ozone and fine particulate matter, as described in Reference 1.

The *Regional Ground-level Ozone Strategy for the Canadian Lower Fraser Valley* (RGLOS), adopted by the MVRD Board in 2014, highlights the respiratory and other human health impacts, as well as damage to plants including crops, caused by exposure to ground-level ozone. Policy directions

outlined in RGLOS emphasize the importance of reducing VOC in order to manage ozone, particularly in the Metro Vancouver region.

In addition to its role in ground level ozone formation, the 2018 Special Report of the Intergovernmental Panel on Climate Change identifies the reduction of ground-level ozone in some pathways to limit global warming, due its role as a short-lived climate forcer.

Odorous Air Contaminants
Metro Vancouver applies the regional Odour Management Framework, presented as Reference 2, to control odours when the odorous substances emitted into the air are capable of causing material physical discomfort, interference, or harm because of their odorous properties. Metro Vancouver also regulates air contaminants, such as those discharged by cannabis plants, that are capable of causing various impacts to the environment and public health as a result of their odorous properties and other chemical properties.

DEVELOPMENT OF REGULATORY PROPOSALS
Staff have investigated best practices, including established technologies, for controlling VOC and other emissions from cannabis production operations through discussions with staff from the BC Ministry of Environment and Climate Change Strategy, BC Ministry of Agriculture, and jurisdictions that regulate emissions from cannabis production. This research, coupled with information from site visits to cannabis production operations and Metro Vancouver's experience with regulating air emissions, resulted in the development of possible requirements that could be included in a potential regulation to control emissions from cannabis production operations. The requirements under consideration are outlined in the proposed discussion paper presented in Attachment 2.

Preliminary discussions with cannabis producers and site visits to facilities in the Metro Vancouver region indicate that producers are applying a variety of approaches to address emissions. There is limited information available about some of the approaches employed, due to the innovative nature of this emerging sector. While novel approaches may be successful tools for controlling emissions, the discussion paper's proposals for an emission regulation focus on approaches with a proven track record for controlling emissions from cannabis production operations in other jurisdictions. Facilities seeking to employ novel approaches will continue to use the established site-specific air emission permit application process to seek authorization for the controlled discharge of air emissions.

The regional Odour Management Framework notes that best practices for technology and management can be applied alone as control measures, or in combination with other control measures such as limits on emissions at the source or limits on concentrations in the receiving environment. These types of limits seek to ensure the technology and management practices are performing as intended. The discussion paper proposes a limit on concentrations in the receiving environment. Preliminary discussions with municipal staff and cannabis producers in the Metro Vancouver region have noted the value of establishing an emission limit for VOC at the source to guide the design of control technology. Work is ongoing to identify feasible ways of measuring and setting limits for VOC emissions at the source for various types of enclosures for cannabis production. If practical, such limits may be proposed in a second phase of consultation.

PROPOSED ENHANCEMENTS TO THE CONSULTATION AND ENGAGEMENT PROGRAM

The objectives of the expanded engagement are to ensure that key audiences are informed about proposals to develop an emission regulation for cannabis production and processing operations and have the opportunity to provide feedback and input.

In response to the MVRD Board's concerns about the timeline for engagement, staff are proposing to expand the consultation time frame and add a second phase of engagement. The revised program calls for an initial phase of engagement between June and September 2019 and a second phase between January and March 2020. The attached proposed engagement plan provides details about the activities, participants, and timelines of the proposed engagement.

The proposed expanded engagement will involve the public, cannabis producers and associations, the agricultural industry, businesses providing services to the cannabis industry, and municipal agricultural advisory committees as well as staff from government agencies with responsibility for agriculture, the Agricultural Land Reserve, health and the environment at the federal, provincial and local levels. If the MVRD Board endorses the expanded engagement program presented in Attachment 1, the discussion paper presented to the MVRD Board in March 2019 would be amended to add the agricultural industry to the list of potentially interested parties. The discussion paper would also be amended to indicate that the initial phase of the consultation period would extend from June to September 2019 and that Metro Vancouver would invite feedback on the discussion paper by September 30, 2019. These proposed amendments to the discussion paper are blacklined and highlighted within the text of Attachment 2.

FEEDBACK FROM COMMITTEES

Staff presented to Metro Vancouver's Agricultural Advisory Committee (AAC) on April 10, 2019 for consideration of the potential regulatory proposals and guidance on engaging with the agricultural industry. The range of opinions expressed about emission controls during that meeting reinforced the importance of engaging extensively with the agricultural sector. The AAC expressed support for requesting that Health Canada actively enforce federal requirements to prevent the escape of odours from cannabis production operations.

Staff sought comments from the Regional Planning Committee at its regular meeting on May 3, 2019 regarding Metro Vancouver's potential regulation of emissions from cannabis production and processing as well as the proposed expanded engagement plan. Regional Planning Committee members discussed several issues including:

- the role of federal and provincial authorities in regulating emissions from this sector;
- Health Canada's responsibility to enforce its requirements to control odour;
- Metro Vancouver's authority to regulate emissions from crops grown on agricultural land subject to the BC *Farm Practices Protection (Right to Farm) Act*;
- the level of VOC emissions from cannabis cultivation compared to other activities in the region;
- defining an acceptable VOC limit before initiating public engagement on a potential cannabis production emission regulation;
- the ability of the measures proposed to meet public expectations related to addressing impacts from cannabis production;

- exposure of farmers not involved in cannabis production to odorous emissions from neighbouring cannabis production operations;
- the retroactive applicability of any requirements of a potential regulation to facilities currently in operation; and
- potential impacts on food security arising from the provincial designation of lawful cannabis production as a farm use for the purposes of the BC *Agricultural Land Commission Act*.

Other discussion offered clarification about the potential health and environmental impacts of cannabis production in the Metro Vancouver region and the actions taken by municipal and provincial governments.

ALTERNATIVES

1. That the MVRD Board:
   a) endorse the engagement plan attached to the report titled "Expanded Consultation on a Potential Cannabis Production Emission Regulation for Metro Vancouver", dated May 3, 2019; and
   b) direct staff to proceed with engagement and consultation on the proposed approach to regulating air emissions from cannabis production and processing, based on the bylaw development discussion paper attached to the report titled "Expanded Consultation on a Potential Cannabis Production Emission Regulation for Metro Vancouver", dated May 3, 2019.

2. That the MVRD Board receive for information the report titled "Expanded Consultation on a Potential Cannabis Production Emission Regulation for Metro Vancouver", dated May 3, 2019 and provide alternate direction to staff.

FINANCIAL IMPLICATIONS

Under Alternative 1, the resources needed for consultation, including staff time and consulting amounts up to $30,000 to support the initial phase of engagement, will be covered through approved program budgets for 2019. Equivalent resources for engagement on regulatory development in 2020 have been considered in 5-year financial plans, and resources for a second phase of engagement would be requested as part of the 2020 budget in response to the outcomes of the initial phase of engagement.

Under Alternative 2, the Committee and Board may wish to provide alternate direction to staff on how to address emissions from cannabis production. The absence of an emission regulation will require authorization of emissions from cannabis production operations under site-specific permits, which are more resource-intensive.

SUMMARY / CONCLUSION

The production of cannabis has increased substantially in the Metro Vancouver region since the legalization of recreational cannabis in October 2018. A report on consultation on a cannabis production emission regulation was received by the Climate Action Committee at its March 15, 2019 meeting. At the March 29, 2019 meeting of the MVRD Board, Board members expressed concerns about regulating odours from agricultural sources and referred the report back to the Climate Action

Committee and to the Regional Planning Committee for additional information and for consideration of an extended consultation program with more involvement of the agricultural industry and cannabis producers. Members also identified the potential for local government to impose and enforce requirements that address local impacts.

This report responds to the Board's referral motion with additional information on the issues raised, and proposes an expanded consultation program. Input has been received from the Regional Planning Committee, and with this report, the Climate Action Committee.

This report seeks direction to engage on a bylaw development discussion paper summarizing possible requirements to address emissions from cannabis production in a potential regulation as well as an engagement plan describing the proposed expanded consultation. The initial phase of engagement is proposed to be conducted between June and September 2019 and the second phase between January and March 2020. The proposed expanded consultation will involve the public, the agricultural sector, cannabis producers and associations, businesses providing services to the cannabis industry, and municipal agricultural advisory committees as well as staff from government agencies with responsibility for agriculture, the Agricultural Land Reserve, health and the environment at the federal, provincial and local levels.

Staff recommend Alternative 1, to endorse the engagement plan attached to this report and to proceed with expanded engagement and consultation on the proposed approach to regulating air emissions from cannabis production and processing, based on the attached bylaw development discussion paper. A longer, two-phase consultation with additional key audiences is intended to offer any person who may be affected by a possible future regulation the opportunity to provide input on potential measures to control emissions.

Attachments *(29499957)*

1. Engagement Plan for a Potential Emission Regulation Bylaw for Cannabis Production and Processing
2. "A Proposed Emission Regulation for Cannabis Production and Processing Operations in Metro Vancouver: Discussion Paper", dated May 2019

References

1. Consultation on a Cannabis Production Emission Regulation for Metro Vancouver, dated March 15, 2019: Item E6.3 in MVRD Board agenda for March 29, 2019
2. Metro Vancouver Odour Management Framework: A Guide to Odour Management in Metro Vancouver, dated October 25, 2017

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Engagement Plan for a Potential Emission Regulation Bylaw for Cannabis Production and Processing

The objectives of the engagement plan are to ensure that key audiences are informed about proposals to develop an emission regulation for cannabis production and processing and have the opportunity to provide feedback and input for MVRD Board consideration.

KEY AUDIENCES

Staff expect to engage with the following audiences on a potential emission regulation bylaw for cannabis production and processing:

- The public;
- Member jurisdictions;
- Provincial and federal agencies;
- Local First Nations;
- Licensed cannabis producers and processors;
- Businesses providing services to the cannabis industry;
- Cannabis industry associations;
    - Currently identified:
        - Cannabis Council of Canada
        - NICHE Canada
        - Craft Cannabis Association of BC
        - BC Micro License Association
- Agricultural producers and industry associations;
    - Currently identified:
        - Township of Langley Agricultural Advisory and Economic Enhancement Committee
        - Pitt Meadows Agricultural Action Committee
        - Maple Ridge Agricultural Action Committee
        - Surrey Agriculture and Food Policy Advisory Committee
        - Richmond Agricultural Action Committee
        - Delta Agricultural Advisory Committee
        - BC Greenhouse Growers Association
        - BC Landscape and Nursery Association
        - BC Agriculture Council
        - BC Dairy Association
        - BC Chicken Growers Association
        - BC Farmland Owners Association
- Municipal agricultural advisory committees;
- Agricultural Land Commission;
- Health associations in the region;
- Staff from government agencies with responsibility for agriculture;
- Neighbouring jurisdictions; and

- Professional organizations.

ENGAGEMENT PLAN

Below is the preliminary timeline for the engagement process on a potential emission regulation bylaw for cannabis production and processing.

PHASE 1: Discussion paper on a potential emission regulation bylaw for cannabis production and processing

June – September 2019

- Meetings consisting of an informational presentation and feedback session with:
  - government staff from member jurisdictions, neighbouring jurisdictions, and senior orders of government (approximately 10)
  - licensed cannabis producers in the Metro Vancouver region (approximately 7)
  - health agencies in the region (approximately 4)
  - cannabis industry associations and technical service providers (approximately 3)
  - agricultural industry associations (approximately 7)
- Conduct webinars for public information and feedback (2)
- Presentations and feedback sessions at municipal agricultural advisory meetings in the region (approximately 6)
- Conduct a feedback survey online and at stakeholder meetings to gauge opinion and compile feedback
- Make informational brochures available at public access points, such as libraries and public events

September – December 2019

- Consider feedback received during consultation on the discussion paper
- Draft the bylaw development consultation paper on a potential Cannabis Production Operations Emission Regulation

PHASE 2: Bylaw development consultation paper on a potential emission regulation bylaw for cannabis production and processing

January – March 2020

Please note, Phase 2 engagement will be largely shaped by what is heard in Phase 1. However, initial plans are to engage key audiences through:

- Meetings with government staff from member jurisdictions, neighbouring jurisdictions, and senior orders of government (approximately 10)
- Meetings with licensed cannabis producers operating in the Metro Vancouver region (approximately 7-10)
- Meetings or webinars with cannabis industry associations and technical service providers (approximately 3)

- Meetings with agricultural industry associations (approximately 7)
- Presentations and feedback sessions at Metro Vancouver Agricultural Advisory Committee and at municipal agricultural advisory committee meetings in the region (approximately 6)
- Webinars to inform the general public and any interested stakeholders of the proposed regulatory approach and obtain feedback (approximately 2)

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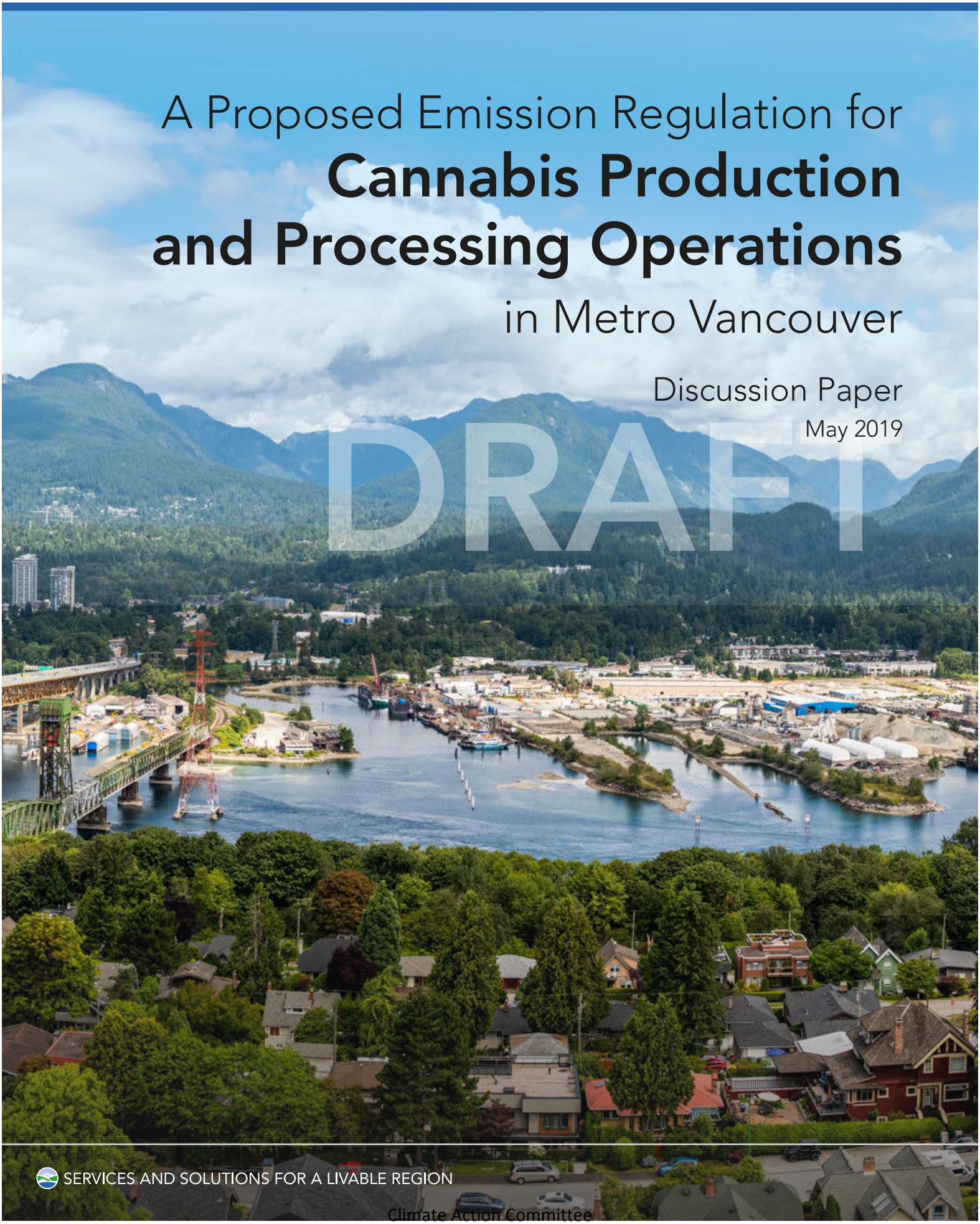
ATTACHMENT 2

A Proposed Emission Regulation for **Cannabis Production and Processing Operations** in Metro Vancouver

Discussion Paper

May 2019

DRAFT



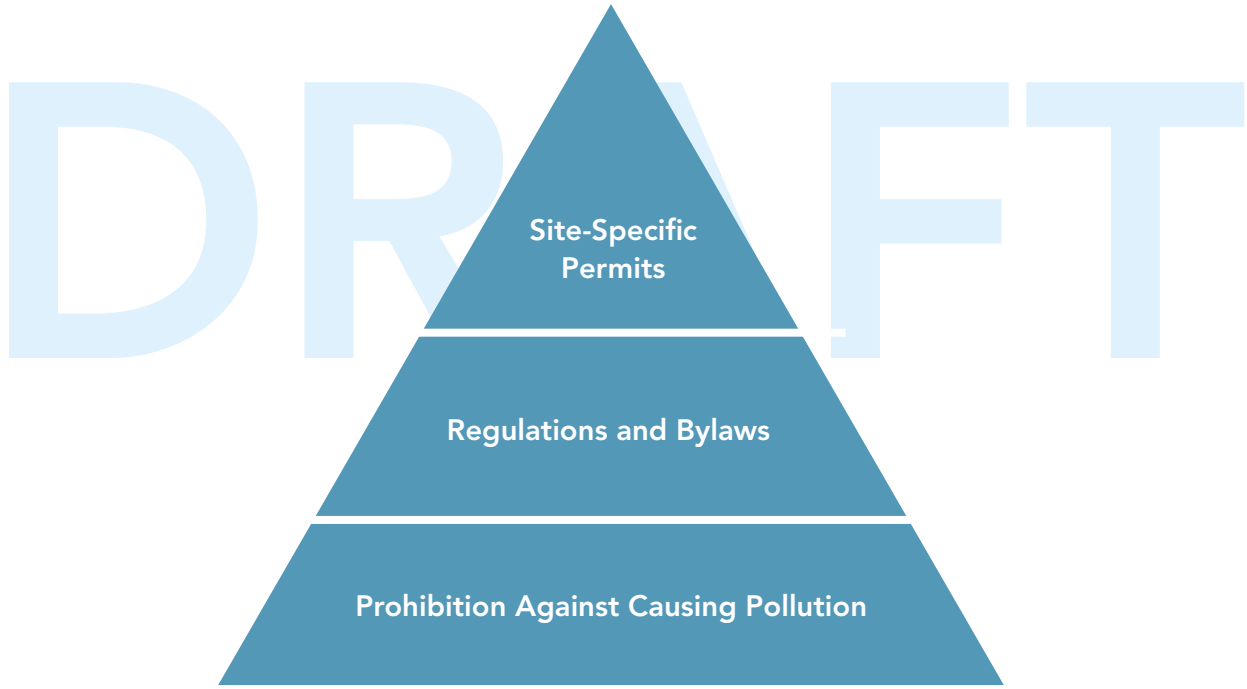
SERVICES AND SOLUTIONS FOR A LIVABLE REGION

Climate Action Committee

INTRODUCTION

Metro Vancouver Regional District (MVRD, operating as Metro Vancouver) is responsible for managing and regulating air quality in the region under authority delegated from the provincial government in the *BC Environmental Management Act*. Metro Vancouver protects public health and the environment through a tiered approach to managing the discharge of air contaminants that applies the use of site-specific permits, sectoral emission regulations, and provisions in the *Greater Vancouver Regional District (GVRD) Air Quality Management Bylaw No. 1082, 2008* (Bylaw 1082). Permits are required for activities and complex facilities with significant levels of emissions that may have the potential for high impacts on the environment and public health. Regulations apply air emissions control requirements to a group of facilities or activities that share similar characteristics. Bylaw 1082 prohibits any person from discharging air contaminants so as to cause pollution.

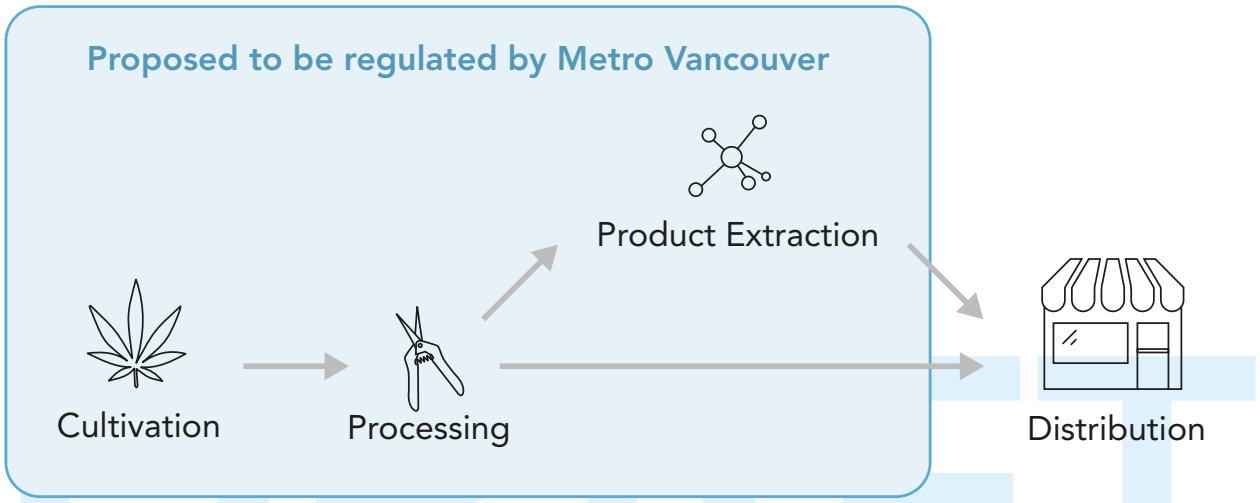
TIERED APPROACH TO REGULATING AIR CONTAMINANTS IN METRO VANCOUVER.



The following sections outline regulatory proposals to control air emissions from cannabis production and processing operations.

PURPOSE

This discussion paper provides information about the potential environmental impacts from cannabis production and processing operations and summarises potential regulatory proposals to reduce air emissions from the cultivation, harvesting, and processing of cannabis plants. Facilities that would be subject to the proposed regulation include operations conducting indoor cultivation, outdoor cultivation, cultivation by several individuals in cooperatives, and cannabis processing operations such as drying and harvesting of cannabis plant material. Facilities carrying out the extraction of oils from cannabis and manufacturing derived products are also proposed to be addressed within the regulation.



This discussion paper may be of interest to:

- Businesses that produce and process cannabis in Metro Vancouver indoors or outdoors, as well as associations representing these parties;
- Consultants, manufacturers, and suppliers that provide services such as air emission control;
- Businesses involved in the design and construction of cannabis production or processing operations;
- Persons holding a Health Canada licence to produce or process cannabis in the Metro Vancouver region;
- Metro Vancouver's member jurisdictions;
- Agricultural industry;
- Public health experts;
- Members of the public affected by emissions from cannabis production and processing operations; and
- Other interested parties affected by potential regulatory proposals related to cannabis production and processing operations or by air quality in the Metro Vancouver region.

A consultation program will allow Metro Vancouver to inform interested parties and the public of the proposals for regulating emissions from facilities that produce and process cannabis described in this discussion paper, and to receive feedback. Representatives of interested parties and the public will be invited to provide feedback in person and online ~~between April and May~~ from June to September 2019.

DEFINING THE PROBLEM

The legalization of recreational use of cannabis in October 2018 has led to the rapid expansion of commercial cannabis production in the Metro Vancouver region and caused concerns about the potential resulting impacts to the environment and public health. In the Metro Vancouver region, a number of greenhouses formerly used for vegetable production have been retrofitted for cannabis production, yet were not designed or constructed to collect and treat air contaminants. Metro Vancouver as well as member municipalities have received complaints about odorous emissions from cannabis production operations.

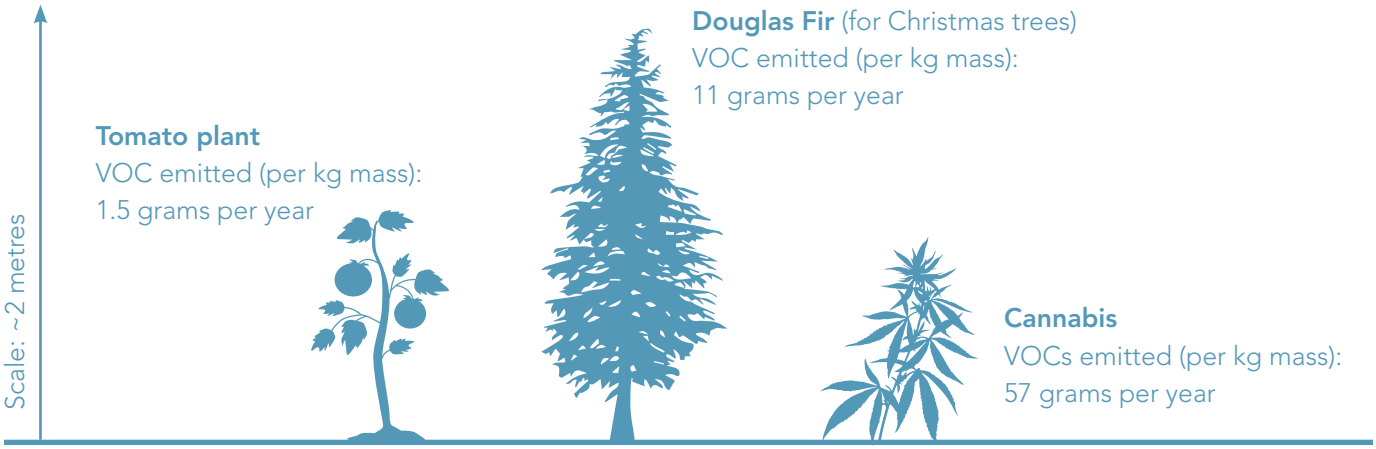
Information from other jurisdictions in which cannabis is produced suggests that potential environmental impacts related to air quality, solid waste management, water consumption, and wastewater discharges could occur. While these impacts will be addressed as part of Metro Vancouver's broader efforts related to this sector, this discussion paper focuses on regulatory proposals for managing air emissions from cannabis production.

Cannabis production has the potential to cause negative air quality impacts if emissions are not adequately controlled.

- Odorous air contaminants emitted during cannabis production and processing are volatile organic compounds (VOC) that may contribute to the formation of harmful ground-level ozone and fine particulate matter through reactions with other substances and sunlight in the lower atmosphere. Emissions most notably occur during the flowering and harvesting phases, during which high levels of a group of VOC called terpenes can be produced. Terpenes are known for their strong odour and involvement in the production of secondary air contaminants.
- Odour masking agents introduce an alternative fragrance to reduce the ability of the human nose to detect odorous air contaminants. They contain VOC and may also create particulate matter.
- The power production equipment needed to meet the requirements for heating, lighting and suitable growing environment for the indoor production of cannabis generates emissions of nitrogen oxides and may emit particulate matter, depending on the fuel.

A number of technologies are available to control VOC in general (see text box on page 5), but these may not all be suitable for cannabis production operations in the Metro Vancouver region.

EXAMPLE VOC EMISSIONS FOR SOME OF THE PLANTS GROWN COMMERCIALLY IN THE METRO VANCOUVER REGION



AVAILABLE CONTROL TECHNOLOGIES

Carbon Filters

Activated carbon filters are widely used to control VOC and reduce odours. Carbon filters can be effective and reliable when properly maintained and replaced at appropriate intervals. These filters have relatively large surface areas that adsorb and remove VOC.

Biofilters

A biofilter is a filtration system that employs biological activity to remove odorous contaminants from an air stream. The microorganisms responsible for removing the odorous air contaminants may include bacteria and fungi.

Odour neutralizers

Plant-based odour neutralizers use natural plant oils that interact with and alter VOC emitted by cannabis so they are no longer odorous. VOC reduction can vary from 20% to 90% depending on product and contact time. Odour neutralizers may also contain odour-masking agents.

Thermal oxidation

A thermal oxidizer applies high levels of heat to decompose VOC to waste products that are without odour, typically carbon dioxide and water.

Ozone generators

These generators are used for disinfection and sometimes used in industrial settings to control strong odours. Ozone generators are potentially harmful to crops and human health because they produce ozone by design.

GUIDING PRINCIPLES

A regulation to address emissions from cannabis production operations in Metro Vancouver would aim to:

- Emphasize prevention and control of emissions through best management practices and continuous improvement;
- Minimize emissions of volatile organic compounds which can contribute to the formation of ground-level ozone and fine particulate matter, and lead to odour impacts;
- Address concerns expressed by members of the public about impacts from emissions of cannabis production operations; and
- Align with the goals and strategies of management plans adopted by Metro Vancouver including:
  - the Integrated Air Quality and Greenhouse Gas Management Plan,
  - the Regional Ground-Level Ozone Strategy, and
  - the Odour Management Policy Development Plan.

Metro Vancouver is enhancing its odour management framework, which relies on five broad approaches that can be applied, either alone or in combination, through bylaws and permits to reduce impacts from emissions of odorous air contaminants. These approaches could be applied to a potential regulation for managing emissions from cannabis production and processing operations:

- Setting criteria for levels of odorous air contaminants outside the boundary of the facility;
- Setting criteria for levels of odorous air contaminants emitted at the facility;
- Requirements related to technology and facility management practices;
- Economic instruments to encourage reductions in emissions; and
- Clearly defined terms related to odour management.

WORKING WITHIN THE LEGISLATION

With the adoption of Bill C-45 (the *Cannabis Act*), recreational marijuana became legal in Canada on October 17, 2018. Federal, provincial and local governments, including Metro Vancouver and its member jurisdictions, have roles in the regulation of legal cannabis production and processing.

The federal government is responsible for establishing and maintaining the national framework for regulating the production of cannabis, which includes setting standards for health and safety, and for licensing production and processing facilities. Regulations under the *Cannabis Act* allow cannabis production in enclosed indoor facilities, in greenhouses, and outdoors, provided that security requirements can be met. The new regulations brought into force in 2018 state that if produced in a building, "the building must be equipped with a system that filters air to prevent the escape of odours". All processing activities must be conducted indoors.

Provinces and territories are responsible for determining how cannabis is distributed and sold within their jurisdictions, and can restrict consumption and possession. The *BC Cannabis Control and Licensing Act* describes requirements and restrictions developed to support public safety, including limits on production for personal use. In addition, the provincial government amended the *BC Agricultural Land Reserve Use, Subdivision and Procedure Regulation* on July 13, 2018. The amendment clarified that the lawful production of cannabis cannot be prohibited on the Agricultural Land Reserve (ALR) if cultivation takes place in an open field, a structure with a soil base, or an existing structure or structure under construction by July 13, 2018 for the purpose of growing crops.

Under Section 31 of the *BC Environmental Management Act* (EMA), Metro Vancouver has delegated authority for air pollution control and air quality management within the Metro Vancouver region, including industrial and agricultural land. EMA states that the Metro Vancouver Board "may, by bylaw, prohibit, regulate and otherwise control and prevent the discharge of air contaminants". Under *GVRD Air Quality Management Bylaw No. 1082, 2008* (Bylaw 1082), Metro Vancouver exercises its air quality regulatory authority with a system of permits that apply to individual facilities, and emission regulations that apply to types of operations and activities with similar characteristics. For example, Metro Vancouver regulates air emissions from agricultural sources within the region through permits and regulations such as the *GVRD Agricultural Boilers Emission Regulation Bylaw No. 1098, 2008*.

Bylaw 1082 prohibits the discharge of air contaminants by an industry, trade or business unless the discharge is conducted in accordance with a Metro Vancouver emission regulation or permit. The release of air contaminants, including VOC and odorous air contaminants, has the potential to cause air pollution if present in a way that substantially alters or impairs the usefulness of the environment. Bylaw 1082 prohibits any person from discharging, or allowing or causing the discharge of any air contaminant so as to cause pollution. Metro Vancouver can set emission regulations for emissions of air contaminants in the region that are more stringent compared to other parts of the province.

Metro Vancouver's member jurisdictions are responsible for land-use zoning and business licensing, which can impose conditions on the location and conduct of cannabis production and processing to the extent allowed under provincial legislation such as the *Community Charter* and the *BC Agricultural Land Reserve Use, Subdivision and Procedure Regulation*.

PROPOSED REGULATORY APPROACH

The objective of introducing an emission regulation for cannabis production and processing operations is to set requirements that will efficiently protect the public and enable the operation of environmentally responsible facilities. Facilities can choose to have their emissions authorized under an emission regulation, if they meet all the requirements, or under a permit.

Proposed Requirements to Control Emissions

It is anticipated that the proposed regulation would apply to facilities that can operate in compliance with best practices and use best available control technologies to control emissions.

Facilities suitable to be authorized under the emission regulation would:

- Enclose all cannabis processing in structures;
- Enclose all cannabis waste management activities, including composting, in structures when conducted on a property where cannabis is produced or processed;
- Equip structures with rapidly closing doors or a double door system that provides a barrier to the escape of air contaminants from inside the structure;
- Draw facility air through activated carbon filters for VOC emission control in all structures used for cultivation, processing, or waste management of cannabis;
- Use temporary containment, collection, and treatment of VOC emissions from outdoor cultivation using activated carbon filters during periods of peak VOC production generally coinciding with flowering;
- Use activated carbon filters alone or in combination with particulate filters, such as HEPA filters;
- Prevent the escape of insufficiently treated emissions and fugitive emissions from structures and from temporary containment of outdoor cultivation, so recognizable odorous air contaminants associated with the VOC emissions from facility activities cannot be detected beyond the property boundary;
- Submit a comprehensive air emission management plan certified by a qualified professional to control odorous air contaminants and other emissions;
- Avoid outdoor use of odour masking agents and odour neutralizing agents (odour masking agents would be allowed to be used in enclosed areas within a facility, such as in office spaces, provided there is no escape of untreated emissions to the environment);
- Avoid the uncontrolled release of emissions or the bypassing of emission controls, unless authorized by the District Director;
- Avoid the uncontrolled release of emissions or the bypassing of emission controls when an air quality advisory is in effect anywhere within the Metro Vancouver and Fraser Valley Regional Districts; and
- Be located more than 200 metres from land zoned for residential use, hospitals, schools, daycares, playgrounds, and senior care facilities.

Thresholds of applicability may be proposed in the emission regulation. For example, the regulation may apply to facilities with an operational area of less than 50,000 m^2 or a cannabis production or processing capacity of less than 50,000 kg per year. Larger facilities may be more suited to having their discharge of air contaminants authorized under a permit.

In addition to requirements under the proposed regulation to control emissions from cannabis production and processing, boilers and heaters used by a facility would need to comply with the applicable regulations. For facilities with a capacity of 50 MW or less, boilers can register under the *GVRD Agricultural Boilers Emission Regulation Bylaw No. 1098, 2008* for facilities in the Agricultural Land Reserve, or under

the *GVRD Boilers and Process Heaters Emission Regulation Bylaw No. 1087, 2008*, as amended, for facilities not in the Agricultural Land Reserve.

Metro Vancouver intends to regulate emissions from reciprocating engines through permits. Facilities using reciprocating engines as a power source, but that would otherwise meet the requirements of the proposed regulation, could choose to apply for a permit authorizing emissions from the entire facility or from the reciprocating engine only.

If the facility is not able to comply with all of the emission regulation requirements, or if the facility employs unique technologies in its emission controls that are not authorized in the regulation, the facility may seek authorization for air discharges through the Metro Vancouver permitting process.

Emission management plans

The proposed regulation could require that a comprehensive odour and VOC emission management plan, certified by an appropriately qualified professional, be submitted for each facility producing or processing cannabis and be approved by Metro Vancouver. The plan would be required to include the following elements as a minimum:

- A description of the odour mitigation system and engineering controls in place to prevent impacts from odorous air contaminants arising from activities associated with producing or processing cannabis;
- An operational processes and maintenance plan, including a description of how intervals between air filter changes will be determined and inspection activities that will be undertaken to ensure the odour mitigation system remains functional and capable of preventing the discharge of VOC to the environment;
- Documentation that emission controls, including filtration systems, are sufficient to effectively remove the VOC associated with cannabis production and processing activities;
- Monitoring conducted by the facility to verify that no recognizable odorous air contaminants can be detected beyond the boundary of the property; and
- Management of waste such that odorous air contaminants associated with the waste cannot be detected beyond the property boundary.

Metro Vancouver expects odour mitigation systems and odour and VOC emission management plans to be consistent with accepted best available technologies and applicable best management practices. Metro Vancouver will provide references to published information on best practices and technologies as the information becomes available.

Monitoring

Assessment of the presence of recognizable odorous air contaminants beyond the property boundary that can be attributed to the facility on the balance of probabilities could be conducted by an approved person through a standard procedure using the human nose or other instruments.

Record Keeping

The proposed bylaw would describe the records a facility would need to maintain to demonstrate compliance with the emission regulation. Records would include testing, inspection and maintenance procedures on equipment used for controlling and treating emissions, routine tests of filtration systems used for removing VOC, concentrations and amounts of VOC discharged from a facility, and events such as bypasses of control systems. The record keeping requirements would include details about the extent and frequency of emissions reporting.

EXAMPLES OF BEST PRACTICES

Full enclosure ensures that emissions can be captured and directed to suitable control technologies. Enclosed areas should be fitted with rapidly closing doors, or an air-lock system with double doors for entry and exit.

Odour control equipment should be sized and serviced according to the manufacturer's recommendations, and undergo cleaning and filter replacements as often as required.

Air circulation systems should be maintained in accordance with manufacturer recommendations.

Waste must be regularly transferred, stored, and disposed of in order to minimize the development of odours.

Administration of the Emission Regulation

Metro Vancouver's regulatory system includes a system of user fees which are intended to provide recovery of the costs of developing and administering permits and regulations, following a 'discharger pay' principle. The costs associated with administering the emission regulation are intended to be covered by registration and annual fees.

The proposed registration fee of $2,000 would cover the cost of the registration process, the review of applications including odour and VOC emission management plans, and an initial inspection. The annual fee for facilities operating under the proposed regulation would be a composite comprising a fixed fee portion of $250 and an additional variable air contaminant emissions fee portion calculated using the emission fee per tonne of VOC established in the *GVRD Air Quality Management Fees Regulation Bylaw No. 1083, 2008*, as amended. This variable fee portion could be determined using measured VOC emissions, estimated emissions, or a proxy for estimated emissions, based on the size of the operational area of the facility, the number of plants grown, or the amount of cannabis produced or processed.

The proposed regulation would also specify supplemental increases based on inflation that would occur on an annual or other fixed schedule to reflect increases in administration costs. The fees would come into effect upon implementation of the emission regulation.

Definitions would also be included in the emission regulation to ensure a common understanding of applicable terminology.

Providing Comments on the Potential Regulatory Initiative

Metro Vancouver is seeking input about proposals to regulate air emissions from cannabis production and processing from stakeholders representing different perspectives, and will consider all input in the development of a proposed emission regulation. The MVRD Board will receive a summary of the input received.

Metro Vancouver welcomes feedback with respect to the regulatory initiative outlined in this discussion paper. Metro Vancouver will carefully consider all feedback when considering potential proposals for managing emissions from cannabis production operations in the region.

Metro Vancouver staff and contractors will treat comments received with confidentiality; please note that comments you provide and information that identifies you as the source of those comments may be publicly available if a freedom of information (FOI) request is made under the *Freedom of Information and Protection of Privacy Act*. If you have any questions or comments regarding the consultation process, please call 604-432-6200.

Metro Vancouver invites you to provide feedback on this discussion paper by ~~May 31~~ September 30, 2019 to AQBylaw@metrovancouver.org. Feedback will be considered until the MVRD Board adopts an emission regulation bylaw for managing emissions from cannabis production operations.

Thank you for taking the time to consider and provide input on potential regulatory proposals for cannabis production operations in Metro Vancouver.

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SERVICES AND SOLUTIONS FOR A LIVABLE REGION

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To: Climate Action Committee

From: John Lindner, Air Quality Planner
Laura Taylor, Public Engagement Coordinator
Derek Jennejohn, Lead Senior Engineer
Planning and Environment Department

Date: April 12, 2019 Meeting Date: May 17, 2019

Subject: **Consultation on Proposed Changes to Metro Vancouver's Ambient Air Quality Objectives**

RECOMMENDATION
That the MVRD Board direct staff to proceed with consultation on the proposed changes to Metro Vancouver's ambient air quality objectives, based on the consultation paper attached to the report titled "Consultation on Proposed Changes to Metro Vancouver's Ambient Air Quality Objectives," dated April 12, 2019.

PURPOSE
To seek MVRD Board approval for staff to proceed with consultation on the proposed changes to Metro Vancouver's ambient air quality objectives for nitrogen dioxide, ozone, and carbon monoxide.

BACKGROUND
On January 11, 2019, the Climate Action Committee endorsed its 2019 Work Plan that directed staff to develop consultation plans on proposed updates to Metro Vancouver's ambient air quality objectives.

Metro Vancouver establishes air quality objectives for ambient concentrations of air contaminants to minimize their impacts on public health and the environment. New federal objectives are coming into effect for nitrogen dioxide (NO_2) and ground-level ozone (ozone), and the provincial government now has a more stringent objective for carbon monoxide (CO). As a result, Metro Vancouver's objectives for these air contaminants need to be revised.

This report responds to Committee direction and presents the scope of the consultation on proposed changes to Metro Vancouver's ambient air quality objectives, along with a proposed engagement process that allows stakeholders to provide feedback on the proposed changes.

PROPOSED CHANGES TO AMBIENT AIR QUALITY OBJECTIVES
Metro Vancouver and the federal and provincial governments establish ambient air quality objectives and standards for air contaminants in their respective jurisdictions. Within the Metro Vancouver region, ambient air quality objectives and standards are used to assess regional and local air quality, guide air management decisions, such as the issuance of permits and air quality advisories, and support the development of air quality management plans and regulations. An objective or standard is achieved if the measured ambient concentration is at or lower than (i.e., better than) the objective.

Objectives and standards are defined using three components:

- A numerical value, which is the concentration that denotes if the standard or objective is achieved or exceeded (e.g., 60 parts per billion);
- An averaging time, which is the time period over which the standard applies (e.g., 1-hour, 24-hour, annual); and
- The statistical form, which is the calculation method used to convert measured ambient concentrations into a single number to compare against the numerical value of the objective or standard (e.g., 8-hour rolling average).

The federal and provincial governments have updated their air quality objectives and standards for NO_2, ozone and CO. Based on these updates, Metro Vancouver is proposing the following changes to its ambient air quality objectives (see table). For the numerical values, "ppb" denotes "parts per billion", a common measure of ambient concentration for air contaminants.

Air contaminant	Averaging time	Current numerical value (ppb)	Proposed numerical value (ppb)	Proposed statistical form (and current form, if different)
Nitrogen dioxide	Annual	21	**17**	Annual average
	1-hour	106	**60**	Annual 98th percentile of the daily maximum 1-hour concentration (currently: Not to exceed)
Ozone	8-hour	65	**62**	Annual 4th highest daily maximum 8-hour average concentration (currently: 8-hour rolling average)
Carbon monoxide	8-hour	8,700	**5,000**	8-hour rolling average
	1-hour	26,200	**13,000**	Not to exceed

These proposed changes will drive continuous improvement in regional air quality, to further protect public health and the environment. In most cases, the proposed objectives align with the equivalent objectives and standards at the provincial and federal levels. For the 1-hour NO_2 and 8-hour ozone objectives, Metro Vancouver is proposing to use a stricter statistical form than the CAAQS. These more stringent objectives take into consideration the high population density in the Metro Vancouver region, and the increased overall population exposure risk from air contaminants. Additional information on the air contaminants, current and proposed objectives, and implications are outlined in Attachment 1.

ENGAGEMENT PROCESS

Metro Vancouver is committed to engaging with stakeholders that have the potential to be impacted by proposed changes to ambient air quality objectives in the region. Consistent with the Metro Vancouver *Public Engagement Policy*, Metro Vancouver will provide a variety of forums, listed below, to learn about stakeholders' interests and concerns related to the proposed ambient air quality objectives. Metro Vancouver will consider all feedback from stakeholders representing diverse perspectives in the development of the final air quality objectives.

Scope of the Engagement
Metro Vancouver will be seeking feedback on the numerical values and forms of the objectives, as well as the expected implications of the proposed changes. Metro Vancouver will also accept additional feedback on problem definition (e.g., sources of emissions, trends in ambient concentrations, impacts), guiding principles, and other relevant aspects of the proposed changes.

Stakeholders
Staff have identified the following stakeholders who may be impacted by, or have an interest in, the proposed changes to the ambient air quality objectives:

- The public;
- Metro Vancouver's member jurisdictions;
- Local First Nations;
- Businesses that currently hold or are seeking an air emissions permit, or are authorized or seeking authorization under a Metro Vancouver emission regulation;
- Neighbouring regional districts;
- Local health authorities and other partner agencies;
- Local industry and business associations;
- Professional organizations and local academic institutions;
- Environmental non-governmental organizations; and
- Other interested parties.

Methods and Timing
To engage with the identified stakeholders, the following methods are proposed as part of the engagement strategy, along with online and printed materials.

Method	Purpose	Timing
Workshops and meetings	Provide information and obtain feedback on the proposed changes	June to July 2019
Letter/email notification	Provide notification on engagement and information on opportunities to engage	
Webinar	Provide information and obtain feedback on the proposed changes from stakeholders who wish to participate remotely	
Metro Vancouver Website	Provide up to date information about the engagement process; obtain feedback on the proposed changes	

ALTERNATIVES

1. That the MVRD Board direct staff to proceed with consultation on the proposed changes to Metro Vancouver's ambient air quality objectives, based on the consultation paper attached to the report titled "Consultation on Proposed Changes to Metro Vancouver's Ambient Air Quality Objectives," dated April 12, 2019.

2. That the MVRD Board receive for information the report titled "Consultation on Proposed Changes to Metro Vancouver's Ambient Air Quality Objectives," dated April 12, 2019 and provide alternate direction to staff.

FINANCIAL IMPLICATIONS

Under Alternative 1, staff will proceed with consultation on proposed changes to Metro Vancouver's ambient air quality objectives. The resources needed, including staff time and other costs associated with the consultation program, have been approved within program budgets for 2019. Under Alternative 2, further analysis may be required to determine the resulting financial implications.

SUMMARY / CONCLUSION

To align with federal standards and provincial objectives, Metro Vancouver is proposing changes to its ambient air quality objectives for nitrogen dioxide, ground-level ozone and carbon monoxide, to better protect human health and the environment. Staff recommend Alternative 1, to proceed with consultation on the proposed changes to objectives as described in the attached consultation paper titled, "Proposed Changes to Metro Vancouver's Ambient Air Quality Objectives for Nitrogen Dioxide, Ground-Level Ozone and Carbon Monoxide". Engagement with the public, member jurisdictions, local First Nations, businesses, health authorities and other stakeholders is intended to provide interested parties who may be affected with sufficient opportunity to learn about the proposed changes and provide feedback.

Attachment

Consultation Paper: "Proposed Changes to Metro Vancouver's Ambient Air Quality Objectives for Nitrogen Dioxide, Ground-Level Ozone and Carbon Monoxide" *(29627806)*

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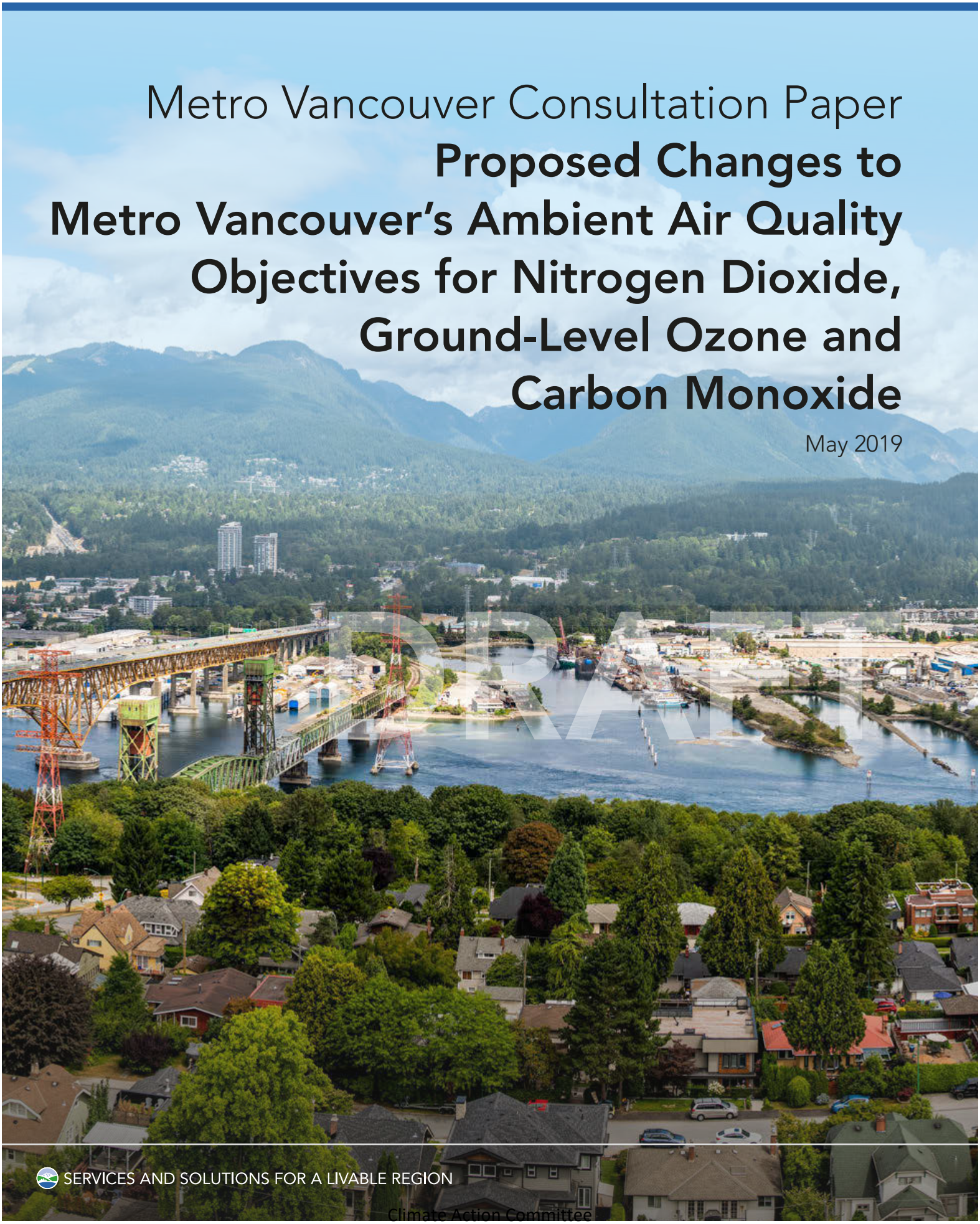
ATTACHMENT

Metro Vancouver Consultation Paper

Proposed Changes to Metro Vancouver's Ambient Air Quality Objectives for Nitrogen Dioxide, Ground-Level Ozone and Carbon Monoxide

May 2019



SERVICES AND SOLUTIONS FOR A LIVABLE REGION

Climate Action Committee

INTRODUCTION

Metro Vancouver Regional District (MVRD, operating as Metro Vancouver) is responsible for managing and regulating air quality in the region under authority delegated from the Province of BC in the BC *Environmental Management Act*. As part of its management program, Metro Vancouver monitors air quality in the Lower Fraser Valley through a network of 31 fixed air quality monitoring stations and 1 mobile air monitoring unit, in cooperation with several partner agencies.

Residents in the region generally experience good air quality. To continue improving air quality, Metro Vancouver is working to further reduce emissions of air contaminants. Nitrogen dioxide (NO_2), ground-level ozone (ozone) and carbon monoxide (CO) are among the air contaminants managed by Metro Vancouver. Metro Vancouver develops ambient air quality objectives for these and other contaminants to minimize their impacts on public health and the environment.

New federal objectives are coming into effect for NO_2 and ozone, and the provincial government now has a more stringent objective for CO. This consultation paper describes proposed updates to Metro Vancouver's ambient air quality objectives based on the provincial objectives and federal standards, to drive continuous improvement in air quality in our region.

PURPOSE

This consultation paper provides information about the proposed changes and potential impacts of updating Metro Vancouver's ambient air quality objectives for NO_2, ozone and CO. A consultation program will allow Metro Vancouver to inform interested parties and the public of the proposed updates, and to receive feedback. Representatives of interested parties and the public will be invited to provide feedback in person and online during June and July 2019.

This consultation paper may be of interest to:

- The public;
- Metro Vancouver's member jurisdictions;
- Local First Nations;
- Businesses that currently hold or are seeking an air emissions permit from Metro Vancouver under the *Greater Vancouver Regional District Air Quality Management Bylaw No. 1082, 2008 (Bylaw 1082)*;
- Businesses currently authorized or seeking authorization under Metro Vancouver air emission regulations;
- Neighbouring regional districts;
- Local health authorities and other partner agencies;
- Local industry and business associations;
- Professional organizations and local academic institutions;
- Environmental non-governmental organizations (NGOs); and
- Other interested parties affected by proposed changes to ambient air quality objectives.

DEFINING THE PROBLEM

Ambient Air Quality Objectives and Standards

Ambient air quality objectives and standards are used to:

- Assess ambient air quality;
- Guide air management decisions, such as the issuance of permits and air quality advisories; and
- Support the development of air quality management plans and regulations.

Objectives and standards are defined using three components:

- a **numerical value**, which is the concentration that denotes if the standard or objective is achieved or exceeded (e.g., 60 parts per billion);
- an **averaging time**, which is the time period over which the standard applies (e.g., 1-hour, annual); and
- the **statistical form**, which is the calculation method used to convert measured ambient concentrations into a single number to compare against the numerical value of the objective or standard (e.g., 8-hour rolling average, or 3-year average of annual 98th percentile of daily maximum 1-hour concentrations).

Canadian Ambient Air Quality Standards

The Canadian Ambient Air Quality Standards (CAAQS) are a key element under the national Air Quality Management System, adopted by Canadian Council of Ministers of the Environment (CCME) in 2012. CAAQS are established as objectives under the *Canadian Environmental Protection Act* and are intended to drive action to protect human health and the environment. Development of the CAAQS is supported by recent and comprehensive scientific health assessments, conducted through multi-stakeholder collaboration (involving representatives from NGOs, indigenous groups, public health agencies and industry), and reflects consensus among these representatives.

CAAQS for ozone and fine particulate matter ($PM_{2.5}$) were established in 2013, for achievement by 2015 and 2020. CAAQS for sulphur dioxide (SO_2) and NO_2 were established in 2017, for achievement by 2020 and 2025. The CCME is finalizing a review of the 2020 ozone CAAQS and potential establishment of 2025 ozone CAAQS.

Metro Vancouver's current objectives for SO_2 and $PM_{2.5}$ are equivalent to or more stringent than the current CAAQS and provincial objectives, so the proposed updates in this consultation paper focus on ozone and NO_2, with additional consideration of CO.

Comparison of CAAQS, Provincial Objectives, and Metro Vancouver Objectives

The BC Ministry of Environment and Climate Change Strategy (MoECCS) adopted interim objectives for NO_2 in 2014, with an intent to review these objectives when CAAQS became available. The CCME, including BC's Minister, endorsed the 2020 CAAQS for NO_2 in 2017. This prompted the MoECCS to review how it sets provincial objectives, and will apply the updated approach to the review of provincial NO_2 objectives. The Ministry completed consultation on the proposed process for reviewing provincial objectives in March 2019. The Province of BC may update additional objectives later in 2019, following the finalization of its objective-setting process.

The table below shows a comparison of the CAAQS, provincial objectives, and Metro Vancouver objectives for NO_2 and ozone. In the numerical value column, "ppb" denotes "parts per billion", a common measure of ambient concentration for air contaminants.

AIR CONTAMINANT	AVERAGING TIME	JURISDICTION (ACHIEVEMENT YEAR)	NUMERICAL VALUE (ppb)	STATISTICAL FORM
Nitrogen dioxide	1-hour	Metro Vancouver (current)	106	Not to exceed
		CAAQS (2020), BC (2020)	60	3-year average of annual 98th percentile of daily maximum 1-hour concentration
		CAAQS (2025)	42	
	Annual	Metro Vancouver (current)	21	Annual average
		CAAQS (2020), BC (2020)	17	
		CAAQS (2025)	12	
Ozone	1-hour	Metro Vancouver (current), BC (current)	82	Not to exceed
	8-hour	Metro Vancouver (current)	65	8-hour rolling average
		CAAQS (2015), BC (current)	63	3-year average of annual 4th highest daily maximum 8-hour average concentration
		CAAQS (2020)	62	

In the table, the "not to exceed" statistical form means that every valid hour of measured ambient concentrations in a given year must be equal to or below the numerical value to achieve the objective. An "8-hour rolling average" is calculated by averaging the concentrations from the previous eight hours. As can be seen, the CAAQS use more complicated statistical forms. For the NO_2 1-hour objective, the CAAQS form includes 98% of ambient measurements from each year and excludes the remaining 2%, i.e., the seven days per year with the highest NO_2 concentrations. The statistical form for the ozone CAAQS follows a similar approach, but is calculated in a different way.

The statistical forms of the CAAQS were selected so that the comparisons against the CAAQS are stable over time. This stability ensures that if a region fails to achieve the CAAQS in a given year, it is likely due to increases in air contaminant emissions that need to be addressed rather than unusual weather conditions that lead to poor air quality.

The numerical values of the CAAQS were selected to drive actions to reduce contaminant exposure levels of average Canadians by between 1% and 20%, depending on the air contaminant, averaging time, achievement year, and underlying health science. By design, the CAAQS numerical values were selected so that they become more stringent over time, to drive continuous improvement in air quality. The scientific health assessments have indicated that public health outcomes improve with continued reductions in ambient concentrations and exposures. Furthermore, for some air contaminants there is scientific evidence of adverse public health impacts even at very low concentrations; in other words, some air contaminants do not appear to have a "safe" ambient concentration threshold. These air contaminants, which include $PM_{2.5}$, ozone and NO_2, are commonly known as "non-threshold" contaminants.

As shown in the table, Metro Vancouver's current annual and 1-hour objectives for NO_2 and current 8-hour objective for ozone are less stringent than the 2020 CAAQS for these air contaminants and averaging times. Thus, Metro Vancouver's objectives for these contaminants need to be revised.

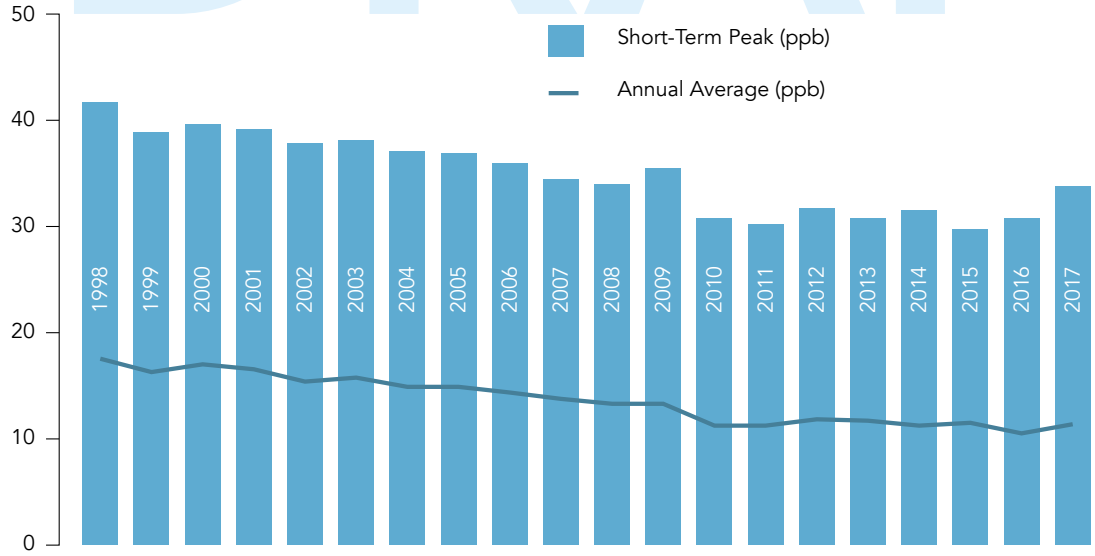
In addition, Metro Vancouver's objectives for CO are less stringent than the Province of BC's CO objectives. The current 1-hour objective is 26,200 ppb for Metro Vancouver and 13,000 ppb for BC, using a not to exceed form. The current 8-hour objective is 8,700 ppb for Metro Vancouver and 5,000 ppb for BC using an 8-hour rolling average. The provincial CO objectives are used for reference purposes and are no longer formal objectives.

The following sections provide more detail on the regional sources and trends for each air contaminant, a summary of their health and other impacts, and a comparison of recent ambient concentrations to air quality objectives.

Nitrogen Dioxide

Nitrogen dioxide (NO_2) is one of a group of gases known as nitrogen oxides (NO_X) that are produced during high-temperature fuel combustion. On hot and sunny days, NO_X can react with volatile organic compounds (VOC) to form ground-level ozone. NO_X can also react with other air contaminants to form $PM_{2.5}$, a priority air contaminant in the region.

TRENDS IN NITROGEN DIOXIDE CONCENTRATIONS IN THE LOWER FRASER VALLEY[1]



Regional Sources and Trends

The major sources of NO_X in the region are marine vessels, passenger vehicles, non-road equipment, industrial facilities and building heating. As shown in the figure below, measured NO_2 concentrations have been declining at Metro Vancouver monitoring stations since the mid-1990s, largely due to more stringent vehicle emission standards and the AirCare vehicle inspection and maintenance program.

According to the *2015 Lower Fraser Valley Air Emissions Inventory and Forecast* [2], emissions of NO_X in Metro Vancouver are expected to decline by 16% between 2020 and 2030, which is anticipated to lead to reductions in ambient NO_2 concentrations.

1 2018 data is not yet available.

2 http://www.metrovancouver.org/services/air-quality/AirQualityPublications/2015LowerFraserValleyAirEmissionsInventory.pdf

Health and Other Impacts

As well as contributing to the formation of $PM_{2.5}$ and ozone, NO_2 has direct and indirect effects on human health and the environment. There is strong evidence that NO_2 causes respiratory effects and contributes to early mortality at ambient concentrations commonly found in Canada, particularly for the young, elderly and those with pre-existing respiratory conditions. Health Canada estimated that 1,300 deaths per year in Canada can be attributed to acute exposure to above-background concentrations of NO_2. The scientific evidence indicates that NO_2 is a non-threshold contaminant (i.e., has no known safe level)[3].

In addition, NO_2 can damage ecosystems through acid rain and eutrophication (when bodies of water become overly enriched with minerals and nutrients). Secondary $PM_{2.5}$ formed by reactions of NO_X with other air contaminants is a factor in the impairment of visual air quality which can result in economic losses for tourism and recreational activities. Therefore, there are significant benefits to be gained from further reducing ambient concentrations of NO_2.

Comparing to Air Quality Objectives

In 2018, NO_2 concentrations in Metro Vancouver compared as follows to current and future NO_2 objectives:

- The current 1-hour and annual objectives were achieved at all stations;
- The 2020 CAAQS annual objective was achieved at all stations except two[4]; and
- The 2020 CAAQS 1-hour objective (using 2016 to 2018 readings) was achieved at all stations[4].

The exceedances of the NO_2 objectives occurred in dense urban areas where ambient concentrations are influenced by traffic emissions.

3 http://publications.gc.ca/site/eng/9.846412/publication.html

4 Using calculations in draft guidance document for NO_2 CAAQS from the CCME; final guidance expected to be released in 2019.

Ground-level Ozone

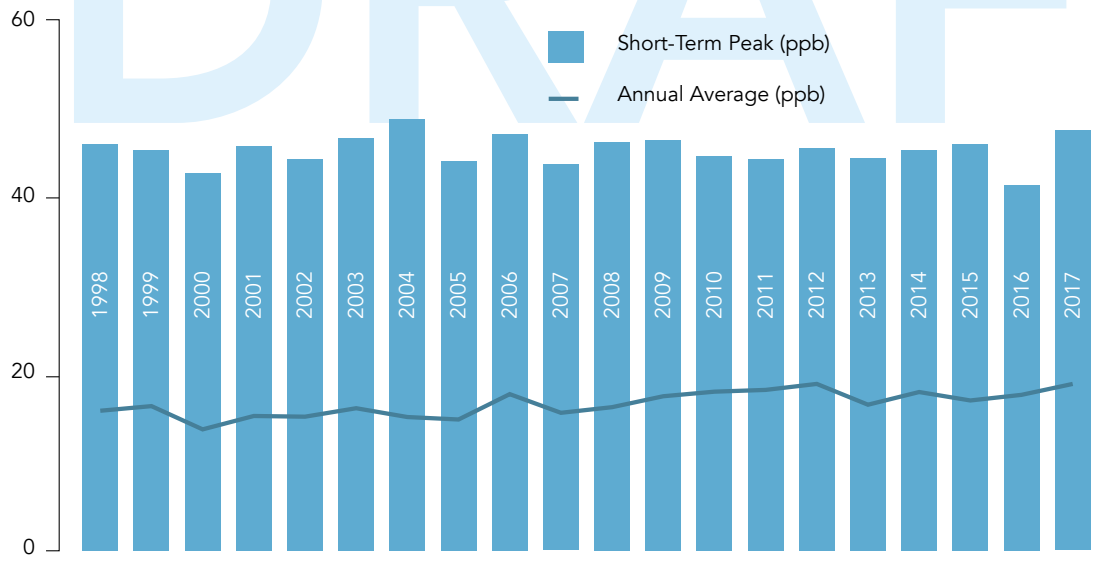
Ozone is a highly reactive gas composed of three oxygen atoms. It can form near the ground or high up in the atmosphere. High in the atmosphere, ozone is beneficial, blocking out most of the sun's harmful ultraviolet rays. At ground level, however, ozone has direct impacts on human health and the environment. Ground-level ozone is primarily formed when NO_X and VOC react in the air on hot and sunny days.

Regional Sources and Trends

The major sources of NO_X in the region are noted in the previous section. For VOC, the major sources in the region are chemical products (e.g., paints, household products, asphalt), vegetation, passenger vehicles, non-road equipment and fuel distribution.

While emissions of NO_X and VOC have decreased substantially over the past two decades, similar reductions in the ambient concentrations of ozone have not been observed. Peak ozone episodes diminished in the 1980s, but have been largely unchanged in the past two decades. As shown in the figure below, annual average ozone concentrations are trending slightly upwards. Research has suggested that this increasing trend is in part due to rising background ozone concentrations (i.e., ozone transported here from outside the region).

TRENDS IN GROUND-LEVEL OZONE CONCENTRATIONS IN THE LOWER FRASER VALLEY [5]



5 2018 data is not yet available.

Health and Other Impacts

There is strong evidence that ozone adversely affects human health even at low concentrations, particularly for the young, elderly and those with heart and lung conditions. Health Canada estimated that 3,600 deaths per year in Canada can be attributed to acute and chronic exposure to above-background concentrations of ozone. The scientific evidence indicates that ozone is a non-threshold contaminant (i.e., has no known safe level)[6].

In addition, ozone is also a short-lived climate forcer and contributes to climate change. Because it is a very strong oxidant, ozone also damages ecosystems and vegetation, reduces crop yields and damages buildings and materials.

Comparing to Air Quality Objectives

In 2018, ozone concentrations in Metro Vancouver compared as follows to the current and future ozone objectives:

- The current 1-hour objective was exceeded on five days;
- The current 8-hour objective was exceeded on twelve days;
- The 2015 CAAQS 8-hour objective (based on 2016 – 2018 readings) was achieved at all stations except two; and
- The 2020 CAAQS 8-hour objective (based on 2016 – 2018 readings) was achieved at all stations except two.

Metro Vancouver has experienced considerable impacts from wildfire smoke in recent years which, under certain conditions, has enhanced ozone formation. A number of exceedances noted above are due in part to wildfire smoke. While Metro Vancouver's air quality management program focuses on managing emissions sources within our region, the increased prevalence of wildfire smoke transported here from outside the region will require additional consideration due to its potentially increasing impact on ozone and $PM_{2.5}$ concentrations.

Carbon Monoxide

Carbon monoxide (CO) is produced by the incomplete combustion of fuels containing carbon. At very high concentrations, CO is acutely toxic, and immediately dangerous to health. Long-term exposure to low concentrations of CO may cause adverse effects in people suffering from cardiovascular disease. The major sources of CO in the region are passenger vehicles and non-road equipment. Measured CO concentrations have decreased by almost 70% at Metro Vancouver monitoring stations since the mid-1990s, largely due to more stringent vehicle emission standards and the AirCare vehicle inspection and maintenance program.

The maximum 1-hour and 8-hour concentrations of CO observed in the region in 2018 were 4,500 and 2,000 ppb, respectively, both of which are well below the current Metro Vancouver and BC objectives.

6 http://publications.gc.ca/site/eng/9.846412/publication.html

GUIDING PRINCIPLES

Proposed changes to Metro Vancouver's ambient air quality objectives were developed using these principles:

- Protection of human health and the environment by encouraging or requiring the use of processes, practices, materials and energy in ways that avoid or minimize the creation of air contaminants at the source;
- Continuous improvement in regional air quality toward the long-term goal of reducing overall ambient concentrations to levels that do not pose health and environmental concerns;
- Consideration of current sources and ambient concentrations of air contaminants, and availability and affordability of best available control technology; and
- Alignment with objectives and standards adopted by the provincial and federal governments.

WORKING WITH THE LEGISLATION

Under its delegated authority, Metro Vancouver currently uses ambient air quality objectives for a number of air quality management purposes, which are outlined below.

Guiding Regional Air Quality Planning Efforts

Comparisons of ambient concentrations of air contaminants against air quality objectives inform air quality planning directions. Recognizing the need for a proactive approach to continue to make progress with ozone issues, the *Regional Ground-Level Ozone Strategy* was adopted by Metro Vancouver and partner agencies in 2014. Based on local scientific research, the *Strategy* indicates that, generally, the most effective approach to reducing ambient concentrations of ozone in Metro Vancouver is to reduce emissions of VOC. Ambient air quality objectives also informed the policy directions in Metro Vancouver's Integrated *Air Quality and Greenhouse Gas Management Plan*, one of its key planning documents.

Reporting on Current and Historical Air Quality

As noted previously, Metro Vancouver monitors air quality in the Lower Fraser Valley through a network of 31 fixed air quality monitoring stations and one mobile air monitoring unit. Concentrations measured at these stations are compared to ambient air quality objectives to determine achievement of the objectives, as well as for trend analysis. These comparisons are reported in annual air quality monitoring reports and in *Caring for the Air*, both available at www.metrovancouver.org, as well as in BC Lung Association's *State of the Air Report*, the Province of BC's *Lower Fraser Valley Air Zone Report* and national reports by the federal government. Real-time ambient concentrations are compared to objectives at www.airmap.ca.

Issuing Air Quality Advisories

Metro Vancouver, in coordination with partner agencies, issues air quality advisories and bulletins to inform the public during periods of degraded air quality. One of the triggers for issuing an advisory is when ambient concentrations approach or exceed one of Metro Vancouver's short-term ambient air quality objectives. Historically, advisories have been issued for ozone and $PM_{2.5}$, while bulletins are issued for $PM_{2.5}$ during cool weather seasons.

Input to Decision Making on Air Quality Permits

Metro Vancouver issues permits under *Bylaw 1082* which include restrictions on emission quality and quantity, requirements for emission control works and management procedures, as well as requirements for emission testing and other studies.

Metro Vancouver considers all relevant matters when deciding on permit requirements that are advisable for the protection of the environment, including best available control technology, dispersion modelling, ambient air quality objectives, the current and future receiving environment, and economic and social considerations.

Informing Regulatory Development

Metro Vancouver develops or amends emission regulations to protect human health and the environment. These regulations include bylaws with common requirements for similar types of emission sources, such as boilers and gasoline service stations. For example, several bylaws limit allowable NO_X emissions from some sources.

Ambient air quality objectives and the health-based and environmental evidence for establishing these objectives are considered during bylaw development and amendment processes, to ensure that regulatory requirements provide sufficient control of emissions.

PROPOSED CHANGES AND POTENTIAL IMPLICATIONS

Metro Vancouver is seeking input from interested parties on proposed changes to Metro Vancouver's ambient air quality objectives for nitrogen dioxide, ozone, and carbon monoxide.

Proposed Changes to Metro Vancouver's Ambient Air Quality Objectives

Metro Vancouver is proposing to update its ambient air quality objectives as shown in the table below.

AIR CONTAMINANT	AVERAGING TIME	CURRENT NUMERICAL VALUE (ppb)	PROPOSED NUMERICAL VALUE (ppb)	PROPOSED STATISTICAL FORM (AND CURRENT FORM, IF DIFFERENT)
Nitrogen dioxide	Annual	21	**17**	Annual average
	1-hour	106	**60**	Annual 98th percentile of the daily maximum 1-hour concentration (currently: not to exceed)
Ozone	8-hour	65	**62**	Annual 4th highest daily maximum 8-hour average concentration (currently: 8-hour rolling average)
Carbon monoxide	8-hour	8,700	**5,000**	8-hour rolling average
	1-hour	26,200	**13,000**	Not to exceed

These proposed changes will drive continuous improvement in regional air quality, to further protect public health and the environment. In most cases, the proposed objectives align with the equivalent objectives and standards at the provincial and federal levels. For the 1-hour NO_2 and 8-hour ozone objectives, Metro Vancouver proposes to use a stricter statistical form than the CAAQS by using a 1-year average, rather than a 3-year average. This more stringent objective is needed because Metro Vancouver has a high population density, which increases the overall population exposure risk from air contaminants.

All calculations for the statistical forms will follow the guidance provided by the CCME on the CAAQS.

Implications of the proposed objectives are outlined below.

Guiding Regional Air Quality Planning Efforts

The proposed NO_2 objectives reflect a significant tightening relative to current NO_2 objectives. Based on recent measured concentrations in the region, Metro Vancouver expects the proposed annual NO_2 objective will be exceeded in 2020 (and potentially future years), and the proposed 1-hour NO_2 objective may be exceeded in 2020 (and potentially future years). NO_2 concentrations are expected to improve in future years due to more stringent federal NO_X engine emission standards for passenger vehicles, heavy-duty trucks and marine vessels. However, additional measures may be required to further reduce NO_X emissions in the region.

For ozone, the proposed 8-hour objective is also more stringent than the current objective and additional measures may be required to further reduce emissions of VOC that are the key driver of ozone formation in the region, while continuing to work on reducing NO_X emissions.

Additional measures to reduce emissions would be included as part of the Metro Vancouver's updated air quality management plan, called the *Clean Air Plan*, that is currently under development. This new plan would also consider the potential impacts of 2025 CAAQS, including for ozone and $PM_{2.5}$ if adopted.

In developing the *Clean Air Plan,* Metro Vancouver will consider the relative impact of all priority air contaminants in the region when identifying appropriate emission reduction measures. Although NO_2 has direct impacts on public health and the environment in the region, scientific health studies have consistently shown that the health impacts from $PM_{2.5}$ and ozone are larger than for NO_2, so they are expected to remain as the key focus of Metro Vancouver's air quality directions in the *Clean Air Plan*.

Issuing Air Quality Advisories

Historically, Metro Vancouver has issued air quality advisories for ozone and $PM_{2.5}$, and has not issued an advisory for NO_2 since implementing its advisory system in the mid-1990s. The statistical form of the proposed 1-hour NO_2 objective (annual 98th percentile of the daily maximum 1-hour concentration) is not directly useable as a trigger for air quality advisories, so the implication of the proposed objective will be further considered by Metro Vancouver and its advisory partners.

It is anticipated that the proposed 8-hour ozone objective would continue to be used as a trigger for issuing air quality advisories. The trigger would continue to be calculated using an "8-hour rolling average" statistical form instead of the CAAQS statistical form, which is not directly useable as a trigger. The current 1-hour ozone objective would be maintained at 82 ppb, since it is an effective trigger for issuing ozone advisories.

Input to Decision Making on Air Quality Permits

The decision making process for air quality permits would not change with the adoption of revised ambient air quality objectives. The proposed objectives would be considered when determining requirements that are advisable for the protection of the environment for applications for new permits or permit amendments. The proposed objectives would also be considered when assessing whether it is necessary for the protection of the environment to amend an existing permit.

Exceedances of the objectives predicted using an air dispersion model would not preclude Metro Vancouver from issuing a new permit. However, a detailed evaluation of site-specific factors contributing to predicted exceedances would likely be needed and such permits could be subject to additional conditions.

The proposed objectives could be considered as part of air dispersion modeling requirements. Metro Vancouver is working with the BC MoECCS on updating dispersion modelling guidelines, to provide improved guidance on selecting NO_2 baseline levels and NO_X to NO_2 conversion methods.

Informing Regulatory Development

Some of Metro Vancouver's existing emission regulations include NO_X limits for some categories of boilers and heaters. Metro Vancouver will evaluate whether the limits are sufficiently protective of human health and the environment given the increased stringency of the proposed NO_2 objectives. Metro Vancouver may also review other requirements in these regulations, including stack height requirements, and applicability to all sources.

Given the increased stringency of the proposed ozone objectives, Metro Vancouver may also review regulations that target emissions that lead to ozone formation.

PROVIDING COMMENTS ON PROPOSED CHANGES TO AMBIENT AIR QUALITY OBJECTIVES

Metro Vancouver is seeking input on proposed changes to ambient air quality objectives from stakeholders representing different perspectives, and will consider all input in the development of the final air quality objectives. The MVRD Board will receive a summary of the feedback received.

Metro Vancouver staff and contractors will treat comments received with confidentiality; please note that comments you provide and information that identifies you as the source of those comments may be publicly available if a freedom of information (FOI) request is made under the *Freedom of Information and Protection of Privacy Act*. If you have any questions or comments regarding the consultation process, please call 604-432-6200.

Metro Vancouver invites you to provide feedback by July 31, 2019, to AQPlanning@metrovancouver.org.

Feedback will be considered until the MVRD Board adopts updated ambient air quality objectives. Thank you for taking the time to consider and provide input on the proposed changes to Metro Vancouver's ambient air quality objectives.

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To: Climate Action Committee

From: Julie Saxton, Air Quality Planner
Amy Thai, Environmental Technician II
Planning and Environment Department

Date: April 11, 2019 Meeting Date: May 17, 2019

Subject: **Air Quality and Climate Action Initiatives in the Caring for the Air 2019 Report**

RECOMMENDATION
That the Climate Action Committee receive for information the report titled "Air Quality and Climate Action Initiatives in the Caring for the Air 2019 Report", dated April 11, 2019.

PURPOSE
To present the 2019 edition of the annual Caring for the Air report and provide information about outreach conducted for the previous edition of the report with the intention of raising awareness about climate change and air quality initiatives in the Lower Fraser Valley airshed.

BACKGROUND
Metro Vancouver's *Integrated Air Quality and Greenhouse Gas Management Plan* (IAQGGMP) includes strategies and actions to raise awareness and enhance understanding of the actions being taken to improve air quality and reduce emissions of greenhouse gases and other air contaminants. The Caring for the Air report provides information in accessible plain language about actions being taken by Metro Vancouver and partner agencies to reduce emissions, activities that individuals can carry out, and summaries of air quality measurements.

The Climate Action Committee 2019 Work Plan identifies the development of the eighth annual Caring for the Air report as a priority for the second quarter. This report brings forward the 2019 report for the Committee and Board's information, along with analytics on the 2018 report.

CARING FOR THE AIR REPORTS
Caring for the Air reports have been published annually since 2012 to provide updates about activities to reduce greenhouse gas emissions, protect against the effects of climate change, and improve air quality. It also reports on performance measures used to monitor progress in these areas. Each report is written to be accessible for any reader with a general interest in air quality and climate change and includes information related to the goals of the IAQGGMP as well as background material to provide context and guidance about technical features of the activities described.

INSIDE CARING FOR THE AIR 2019
The 2019 edition of Caring for the Air describes the progress made by Metro Vancouver and partners on significant climate action and air quality initiatives. The articles underscore the relevance of these policy initiatives to improving the lives of residents of the region. Key areas for action featured in Caring for the Air 2019 include:

- Reducing carbon emissions and adapting to the impacts of climate change with *Climate 2050*;
- Reducing waste and greenhouse gases in the region in new ways through the National Industrial Symbiosis Program;
- Supporting clean and renewable energy for industry, buildings and transportation through initiatives by Metro Vancouver and the provincial government;
- Dealing with wildfire smoke and air quality advisories;
- Controlling air emissions from open burning and cannabis production; and
- Developing the next air quality management plan (Clean Air Plan).

Graphics visually summarize air quality data for 2018 as well as trends in key air contaminant levels over the last ten years. An infographic illustrates forecasts for future emissions of greenhouse gases and smog-forming pollutants and describes the reasons for projected changes in emissions over the next 15 years. Background material on how air quality is regulated in Metro Vancouver, what is involved in public consultation processes, how to navigate AirMap to find real-time air quality measurements, and the latest research on low-cost air quality sensors is also included, as well as updates about air quality monitoring activity in the region.

The cover photo for Caring for the Air 2019 was selected from photos submitted through a staff photo contest. The photo reflects the general theme of the report, which is to provide insights into how climate and air quality actions and policies developed by Metro Vancouver and other partners enhance livability in the Metro Vancouver region. A total of 30 photos were submitted for the photo contest and a selection of the entries has been included in the report.

Outreach through traditional media, social media, at relevant events and through other agencies and organizations will be used in 2019 to build on established audiences for Caring for the Air. These activities will help to publicize current and recent initiatives to address climate change and improve air quality.

CARING FOR THE AIR 2018 DISTRIBUTION AND PROMOTION

Outreach on the 2019 report will build on the activities from previous years' reports. The 2018 report utilized increased social media promotion for Caring for the Air, including posts via Metro Vancouver's Facebook channel and Twitter, to reach out to potential audiences about Caring for the Air 2018 between October and December, 2018. Posts highlighted the range of topics covered by articles in the report and provided links to the online version of Caring for the Air 2018. Analytics indicate that Caring for the Air social media posts reached over 94,000 people, resulting in over 800 engagements through likes, shares and comments.

Copies of Caring for the Air 2018 were circulated to municipal offices and libraries in the region, and additional copies were provided on request. A rack card was developed to highlight the purpose and content of Caring for the Air 2018. More than 3,000 rack cards were distributed to community centres and hospitals in the region and, in cooperation with the BC Lung Association, more broadly to other individuals with an interest in health and air quality. Rack cards and copies of the report were also made available at events including Electrafest, regional Emotive events, BC Lung Association events, community festivals, public meetings and open houses, the Metro Vancouver Information Centre,

and at the Pacific Northwest International Section of the Air & Waste Management Association conference in Nanaimo.

At the time of writing, there have been over 2,500 views of the electronic version of the Caring for the Air 2018 report, of which over 86% have been by one-time viewers. The vast majority of these views (97%) occurred from October to December of 2018, during the promotional period.

ALTERNATIVES
This is an information report. No alternatives are presented.

FINANCIAL IMPLICATIONS
The Caring for the Air 2019 report describes projects and programs that were undertaken within approved budgets and work plans or by successful application to the GVRD Sustainability Innovation Fund. The report is prepared with input from partner organizations, providing information about work that is relevant to Metro Vancouver's air quality and climate action interests but supported by their own resources.

SUMMARY / CONCLUSION
The annual Caring for the Air report is used to share information about climate and air quality initiatives in a manner that is accessible, relevant and of interest to a wide range of readers. It helps to address strategies in the IAQGGMP to increase public understanding of air quality and climate change issues and shares information to encourage public engagement and personal action. The eighth edition of the report provides updates and news about actions, activities and performance measures related to the work conducted by Metro Vancouver and other organizations in 2018 and 2019, with a focus on the relevance of this work to people's lives.

Caring for the Air complements other outreach activities and publications, such as the State of the Air report produced by the BC Lung Association, which describes air quality programs throughout British Columbia, and Metro Vancouver's annual technical air quality monitoring report, the Lower Fraser Valley Air Quality Monitoring Report.

Attachment
Caring for the Air 2019 report *(29347841)*

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ATTACHMENT

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Caring for the Air

2019

IN THIS ISSUE

- Your Life with Climate Action
- When Air Quality Emergencies Strike
- Gearing Up for Electric Vehicles

SERVICES AND SOLUTIONS FOR A LIVABLE REGION

Climate Action Committee

Contents

The Lower Fraser Valley airshed

Air pollutants can travel between Metro Vancouver and surrounding areas. Managing air quality successfully requires effective collaboration with our neighbours and other levels of government, and participation from businesses, public institutions, non-government organizations and residents. Articles in this publication reflect this cooperation.

Clean Air, Cool Climate

Metro Vancouver's clean air doesn't happen on its own. Actions resulting from policies are responsible for protecting our air quality. The actions underway by government organizations, businesses and residents stem in part from the direction described in the *2011 Integrated Air Quality and Greenhouse Gas Management Plan*. It is now time to take a new look at goals, targets and actions for the next 5 to 10 years.

The development of a new management plan will be structured around a series of key questions: what is happening, where do we want to go, what could we do and what should we do. A comprehensive approach that considers existing challenges, emerging threats and the social context for the region will be built on the answers to these key questions.

Important features:

- Evaluation of emissions reduction actions based on expected environmental, health and climate impacts, equity, impact on visibility, corporate leadership and other criteria. Highly ranked actions will be prioritized for earlier implementation.
- An equity assessment to help Metro Vancouver consider our public engagement and management plan development processes through an equity, fairness and affordability lens.
- Increased consideration of the potential air quality impacts of a changing climate.
- Broader consideration of climate change mitigation and adaptation through *Climate 2050*, a regional climate strategic framework that sets a 30-year vision for Metro Vancouver's climate policies and actions.

The new management plan will build on Metro Vancouver's existing air quality management activities, and outline strategies and actions that will continue to protect public health and the environment, improve visual air quality and reduce our contribution to global climate change. Metro Vancouver will be consulting with stakeholders and the public on the new management plan in 2019, with adoption to be considered by the Metro Vancouver Board in 2020.

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Your Life With Climate Action

Our climate is changing. Local governments are at the forefront of taking action to reduce carbon emissions and adapt to the impacts of climate change while maintaining the quality of life we enjoy in the region. So what does all this mean for you?

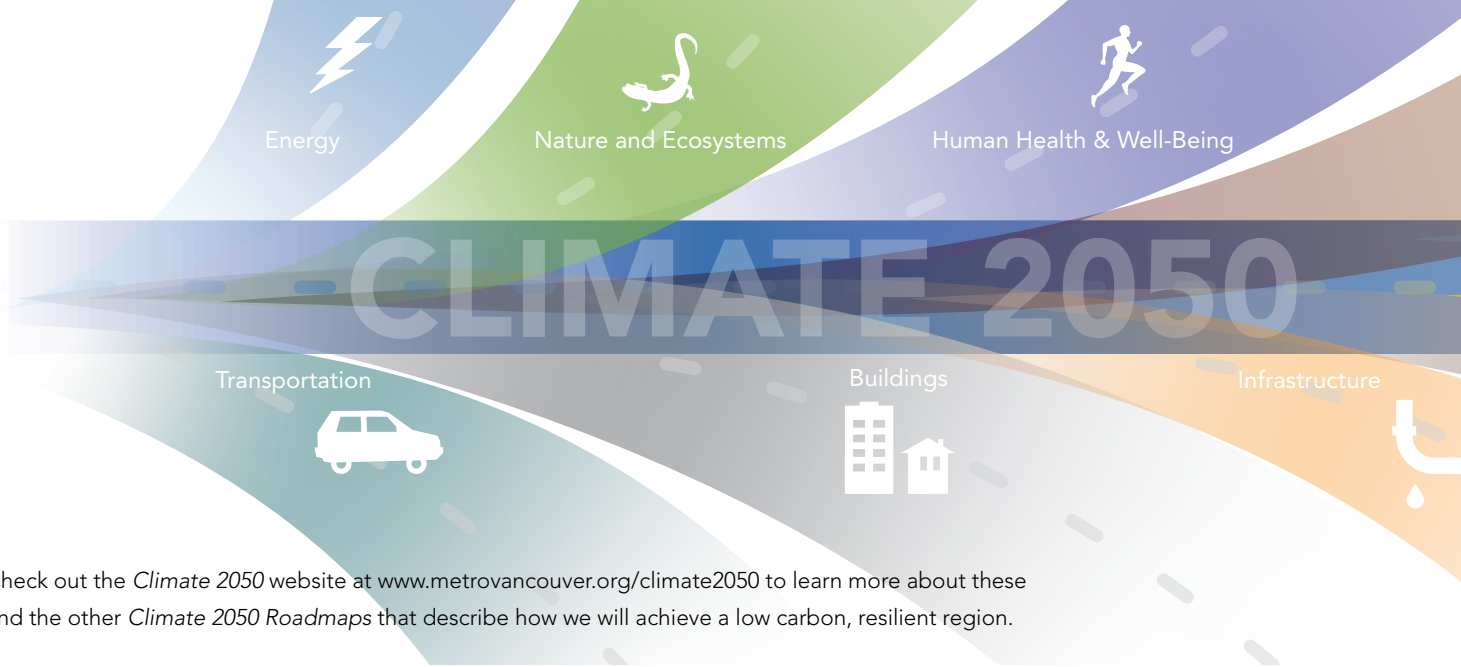
First, let's take a quick trip down memory lane.

You remember your first car, the roar of the V8 engine and the smell of the exhaust? Grandma's drafty house, Uncle Joe always helping her with the winter heating bills? Spring skiing, and salmon runs that made it seem that you could walk across the Fraser River? Climate change means that many of these things are already changing but with planned action, together we can reduce the negative impacts of climate change.

Climate 2050, Metro Vancouver's regional climate action strategy, will help us all step with confidence into these changing conditions. Let's take a glimpse at your new life with climate action by looking at a selection of the *Climate 2050 Roadmaps*!

Agriculture will both benefit from and be challenged by climate change. A resilient, low carbon agriculture sector is an increasingly important part of our region's food supply as climate change makes food production even more difficult in other parts of the world. Rising temperatures and changing precipitation patterns will shift the growing season and the types of viable crops.

Metro Vancouver plays an important role in protecting the region's agricultural land and strengthening local food systems. The Agriculture Roadmap will ensure our food supply is protected.



Check out the *Climate 2050* website at www.metrovancouver.org/climate2050 to learn more about these and the other *Climate 2050 Roadmaps* that describe how we will achieve a low carbon, resilient region.

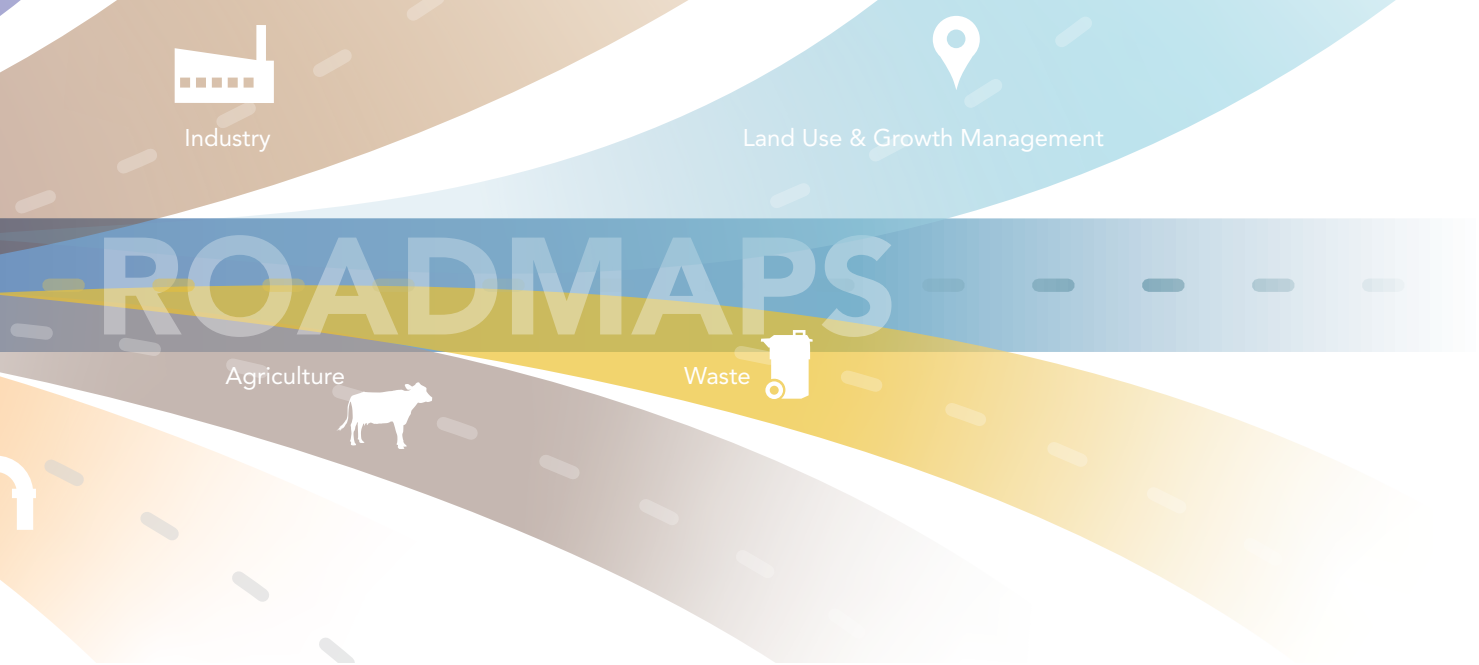
Climate change can affect **Human Health and Well-Being**: compromised food security, chronic stress, displacement due to flood or fire risk, loss of livelihood and adverse mental health effects are all associated with climate change. This Roadmap will identify how we can protect human health and well-being in the face of climate change. A stressful situation that might occur more often in the future is a wildfire smoke event. To find out more about Metro Vancouver's actions on wildfire threats, see page 7.

Transportation is the region's largest source of greenhouse gas emissions, approximately 45%. This Roadmap will help us design our communities so it is easier to walk, bike and take transit and encourage the adoption of clean technologies such as electric vehicles and low carbon fuels like renewable natural gas. To learn about how Metro Vancouver is helping people switch to electric vehicles, see page 6.

Industry generates greenhouse gas emissions from burning natural gas, propane and fuel oil to produce heat for industrial processes, using diesel fuel in non-road engines and other smaller sources. Industrial chemical processes such as cement production also produce a significant amount of greenhouse gas emissions. Reducing emissions from the various industrial sectors will require approaches that are appropriate to those sectors, such as encouraging or requiring a switch to low carbon fuels like renewable natural gas.

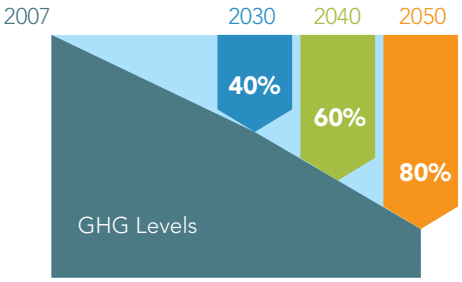
To find out more about Metro Vancouver's support for reducing emissions from industry, see page 5.

The impacts of climate change can sound alarming, but with these changes comes an exciting low carbon and resilient future ahead of us all.



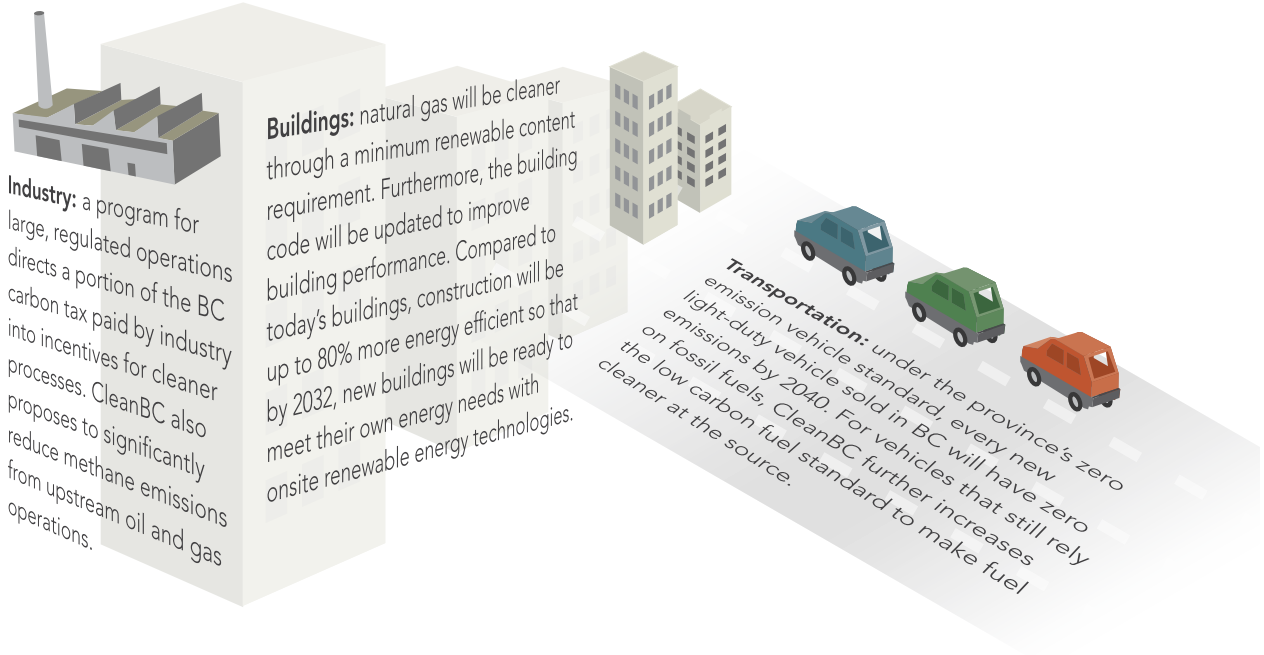
A Clean Future for BC

In December 2018, the provincial government released its renewed climate strategy, CleanBC. The strategy will be developed and implemented in phases with its initial release focused on clean and renewable energy actions in the industrial, building and transportation sectors.



Province of BC commitment to GHG reductions compared to 2007 levels

What do the actions in CleanBC mean in practice?

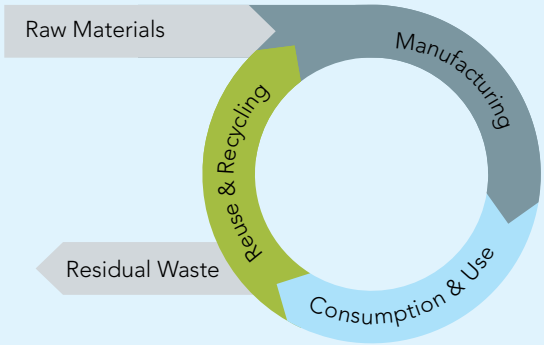


Together, the initial set of actions under CleanBC puts the province on track to meet its short-term and long-term greenhouse gas (GHG) reduction goals. As Metro Vancouver develops its own climate strategy, *Climate 2050*, we will continue to stay engaged with the provincial government to support and accelerate actions that impact our region. Through the implementation of these complementary strategies, we can look forward to cleaner industry, buildings, vehicles and a cleaner Metro Vancouver region.

Mimicking Nature to Reduce Waste

Metro Vancouver is constantly seeking new ways to reduce the waste and greenhouse gases generated in our region. That's why we are piloting Canada's first **National Industrial Symbiosis Program (NISP)** with the Light House Sustainable Building Centre.

NISP is about finding new uses for waste by-products, which create valuable resources and provide environmental and financial benefits.

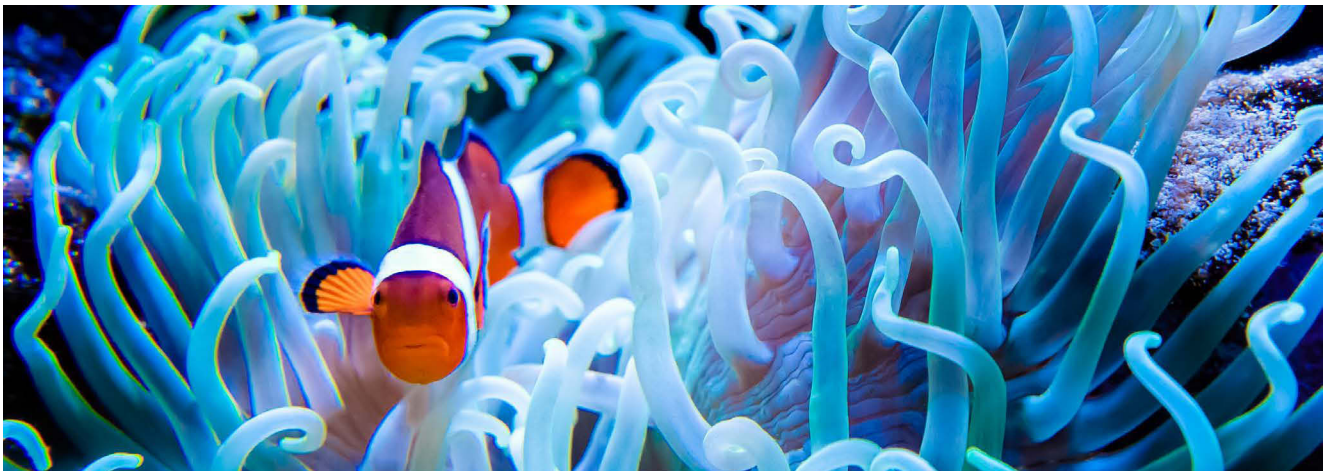


The idea is based on the mutually beneficial associations found in the natural world, such as the relationship between the clownfish and the sea anemone. The anemone's stinging tentacles (to which clownfish are immune) protect the clownfish from predators. In return, the clownfish help protect their host from anemone-eating fish and provide the anemone with nutrient-rich excrement in a win-win outcome for both species.

The unique NISP model for industrial symbiosis fosters the creation of partnerships that mimic the successes we see in nature. Workshops focus on identifying resource matches, and ongoing support from professionals helps turn the matches into projects that reduce waste and greenhouse gas emissions. In addition to the environmental benefits, NISP projects can help businesses build their networks, achieve cost savings and generate sales from new markets.

Two local businesses have solved a waste and resource challenge through the Metro Vancouver NISP pilot by transforming landfill-bound wood waste into fuel for a district energy system. The Great Northern Way Scene Shop generates an abundance of wood scraps from scene construction and historically has had to pay to dispose of this waste. By partnering with the British Columbia Institute of Technology (BCIT), they've discovered a better use for their waste – fuel for a wood boiler in BCIT's district energy system that provides space heating in campus buildings. From an environmental and economic standpoint, this is a win-win solution for both businesses that prevents waste from going to landfill and offsets fuel purchases for heating. See more about this project at www.metrovancouver.org/media-room/video-gallery/mv-video/277699619

Information about NISP in Canada is available at nispcanada.ca



Helping You Electrify Your Ride

In 2018, electric vehicles (EVs) reached a milestone of 10,000 vehicles on the road in British Columbia, a 10-fold increase since 2011. In April 2019, the provincial government introduced a Zero Emission Vehicle standard that will see an estimated 120,000 EVs on BC roads by 2025 and 350,000 by 2030.

The biggest barriers to owning an EV are awareness and access to charging at home or at work.

Metro Vancouver operates three programs, Emotive, EVCondo.ca and EVWorkplace.ca, that engage directly with residents of the region to help overcome these issues.

We spoke to members of the public to hear about the problems they face and how our electric vehicle programs are helping them find solutions to EV adoption.

emotive
THE ELECTRIC VEHICLE EXPERIENCE

Emotive promotes electric vehicles by using demonstration vehicles to encourage interaction at public events. A popular part of the Emotive program is test drives, which are offered throughout the year.

"We had many questions about EVs, and really by chance, the annual festival on Main Street was just around the corner with all the answers. This is where we met the staff from Emotive. They had us hooked with a non-biased discussion about this new world of electric cars, the options and the misconceptions."

– Ryan Good, EV owner

EVCONDO

EVCondo.ca is an online resource designed to assist EV owners, strata councils and property managers install electric vehicle charging stations in multi-unit residential buildings.

"Thank you for the EVCondo presentation at our council meeting last evening. You provided the right information at exactly the right time as we try to decide what to do about the installation of EV Chargers."

– Gordon McLennan, Strata Council Member

EVWORKPLACE

EVWorkplace.ca is complementary program targeted at Lower Mainland workplaces to assist with the setup of electric vehicle charging stations. Staff regularly attend information sessions, meetings and give presentations to provide insights into all aspects of our programs.

"While we initially installed charging infrastructure as a way to tangibly support staff behavior change, what workplace charging has really done is create a community of engaged individuals who understand themselves as active stakeholders."

– Erin LaRocque, Vancouver City Credit Union

Reducing the Risks of Wildfire Smoke in Metro Vancouver

In the past, smoke from wildfires has infrequently impacted our region. However, in recent years those impacts have occurred more often, for longer periods and with higher levels of smoke negatively affecting our air quality. In three of the last four years, wildfire smoke has triggered lengthy air quality advisories, with an unprecedented 22 advisory days during the summer of 2018.

The wildfire smoke we experience in Metro Vancouver is primarily from fires far outside of our region, but wildfires can also occur closer to home. Metro Vancouver's Water Services and Regional Parks staff actively work to prevent wildfires in our region.

- Metro Vancouver has developed a Wildfire Risk Management System for our water supply areas. Fuel management activities are carried out in the water supply areas close to residential areas to reduce the risk of fire spreading from or to residences.
- Metro Vancouver staff have the necessary equipment and training for wildland firefighting and maintain a resource sharing agreement with the BC Wildfire Service.
- During 'High' and 'Extreme' fire danger periods staff restrict their own activities within water supply areas and regional parks. They also communicate fire risk to park visitors and implement restrictions on public activities such as campfires and barbeque use.
- Regional Parks has a 'Burn it Smart' program for outdoor campfires when they are not restricted by 'High' and 'Extreme' fire danger ratings.

Metro Vancouver works with health experts to advise individuals about reducing activity and limiting exposure to smoky air, particularly young children, the elderly and anyone with heart or lung conditions. Metro Vancouver also aims to minimize the impacts of climate change. Research published in December 2018 drew attention to the linkage between human-induced climate change and high wildfire risk because of extreme warm temperatures in 2017. The *Climate 2050* strategy outlines how we can reduce greenhouse gas emissions and improve our resilience to the future effects of climate change on wildfire activity.

What Could You Be Breathing in 2035?

Every five years, Metro Vancouver estimates and forecasts emissions of smog-forming pollutants (SFP) and greenhouse gases (GHG) for the Lower Fraser Valley airshed. These forecasts provide insights into key sources of air emissions and whether those emissions are going up or down, and help us evaluate actions to improve the region's air quality and tackle climate change.

See Caring for the Air 2018 for a summary of our region's emissions in 2015.

How do we use an emissions forecast?

The emissions forecast:

- informs the development of new regional climate action and air quality management plans; and
- assesses policy and regulatory scenarios for the region by evaluating the impacts of managing emissions from specific sources.

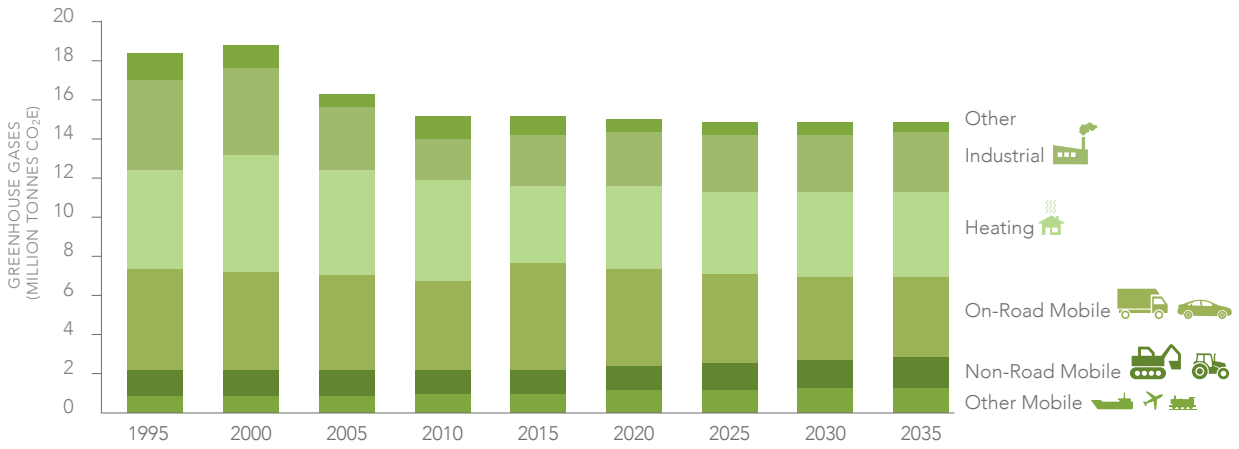
For a more detailed look at the Emissions Inventory results, search 'Emissions Inventory' on metrovancouver.org.

How it's done

A forecast represents 'business as usual' projections, which account for current regulations and policies, but not those that may be in development. Emissions forecasts are based on projected changes in activity, such as growth in vehicle travel, and changes in emission rates or controls, which can be influenced by technological advances, regulations, fuel formulations or other factors.

Let's take a closer look at how this all came together with the last emissions forecast.

Emissions Overview

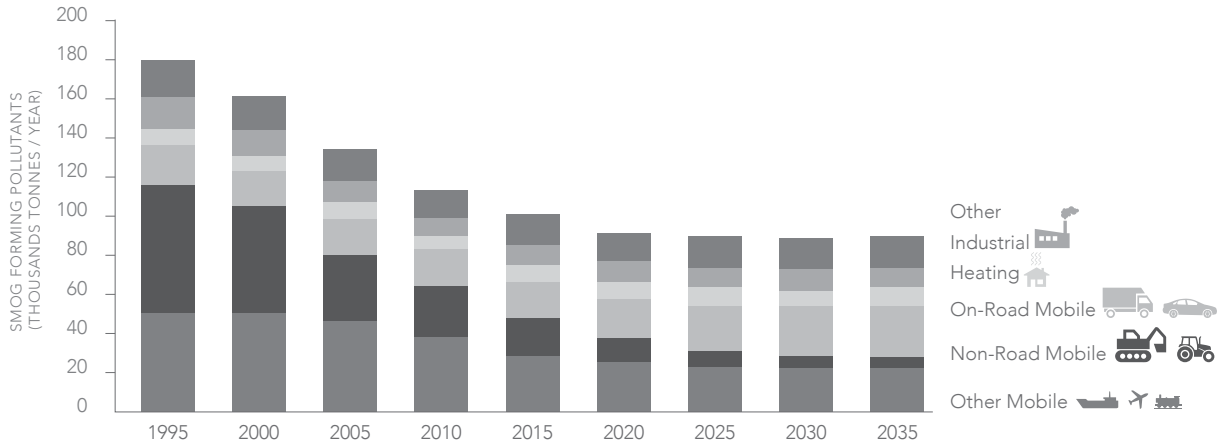


Modest decreases in overall greenhouse gas emissions

Regional GHG emissions are projected to decrease by about one percent from 2015 to 2035, to approximately 14.9 million tonnes.

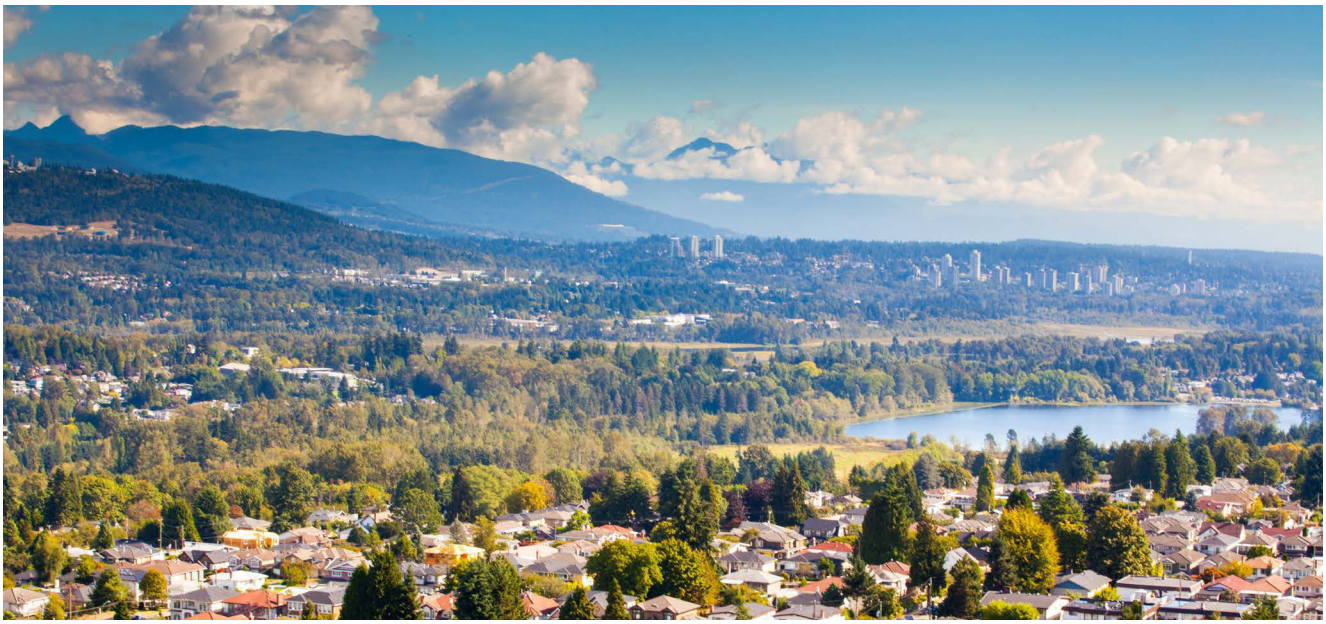
Key Sources of Emissions

EMISSION SOURCE				
HOW MUCH WAS EMITTED IN 2015?	4.7million tonnes GHG 16,000 tonnes SFP	2,300 tonnes SFP	2 million tonnes GHG	2.5 million tonnes 9,500 tonnes SFP
WHAT'S THE FORECAST FOR 2035?				
GHG:	35% ↓		11% ↑	13% ↑
SFP:	70% ↓	3% ↓		14% ↑
WHY?	• Vehicle emission standards • Fuel efficiency standards • Lower-carbon fuels	• Standards for new appliances • Switching to gas • Wood Stove Exchange Program	• More buildings • Increased natural gas demand	• Economic growth • Increased throughput and production
	CHALLENGES		HOW WE CAN REDUCE EMISSIONS	
	• More vehicles • More km travelled	• Slow replacement of old appliances	• Improved energy efficiency • Carbon pricing	• Improved emission controls • More stringent permit requirements



Modest decreases in overall smog-forming emissions

SFP are the combination of various air contaminants that play a role in smog formation.
Regional smog-forming emissions are projected to decrease by approximately 10% from 2015 to 2035.



Regulating Air Quality in Metro Vancouver

Metro Vancouver manages and regulates air quality under authority from the province. Bylaws control the release of air contaminants (substances capable of causing environmental harm) from industry and other activities. These bylaws include environmental protection conditions that the Metro Vancouver Board considers to be in the public interest.

The Board has appointed a **District Director** who may issue permits to businesses following a public notification process. This allows people who may be affected to voice their concerns. A permit authorizes **discharge of air contaminants** to the environment and may be subject to conditions considered **advisable for the protection of the environment**. This does not mean zero discharge; it means balancing the potential risk of harm from an activity against the potential benefits, such as jobs, products or services, of that activity.

Human activities, whether driving cars, cooking, heating homes and buildings, or having industry and jobs – all the necessities of modern society – result in the discharge of air contaminants. It is not in the public interest to ban discharges altogether – that would mean that virtually no activity would be allowed. Instead, the goal is to limit exposure to the maximum extent reasonably possible, based on sound facts.

While Metro Vancouver has the power to authorize certain discharges to the environment, we do not have the authority to regulate indoor air quality, noise and nuisance releases. However, Metro Vancouver's ability to manage its own air quality has resulted in some of the best air quality in the world.

For more information about the permit application public notification process, see Caring for the Air 2018.

The **District Director** is a staff person appointed by the Metro Vancouver Board who issues permits.

The **discharge of air contaminants** means the release of substances into the air.

Advisable for the protection of the environment means the requirements in a permit that the District Director believes, based on his education, knowledge and experience, will minimize harm.

Solutions To Smoke

Open-air burning of woody and vegetative materials creates smoke. Smoke can negatively affect air quality and health, even at low concentrations. It can cause short-term health effects such as coughing, runny nose and asthma symptoms. It can also lead to chronic heart and lung diseases like bronchitis and emphysema.

What's in smoke?

- Fine particulate matter ($PM_{2.5}$) can travel deep into the lungs, causing irritation and disease. $PM_{2.5}$ can also penetrate into buildings from outside.
- Nitrogen oxides (NOx) and volatile organic compounds (VOC) can contribute to the formation of haze that obscures distant views.
- Other harmful substances such as dioxins and furans, polycyclic aromatic hydrocarbons (PAHs) and carbon monoxide.

Metro Vancouver, along with municipal fire departments and agricultural advisory committees, provides information about the impacts of smoke from open burning. Options are available to dispose of woody debris and vegetation to minimize smoke produced or eliminate the need to burn. Biomass materials can be recycled or reused to help build healthy soil, conserve water, suppress dust and reduce weed growth. For example, nursery crop foliage, culled plants and culled fruit can be composted to produce a nutrient-rich soil amendment. Chipped branches can be used for soil conditioning, erosion control and landscaping.

Using equipment such as chippers, brush fans and air curtain burners helps promote clean burning and reduce smoke emissions. For information about the different types of equipment that can be used to reduce air emissions from burning or avoid burning vegetation completely, search 'open burning equipment rental' on metrovancouver.org.

If you plan to open burn woody debris and vegetation, you must obtain a permit or approval from Metro Vancouver before you burn. Open burning is prohibited without authorization.

When Odour is More Than a Smell

Cannabis plants are known for their distinctive scent. This scent arises from the release of organic chemicals, known as VOC, from the plant. These VOC, and so the characteristic smell of cannabis plants, can be detected by humans at very low concentrations. What is less obvious is the adverse effect these air pollutants may have on air quality.

The legalization of cannabis in October 2018 led to increased interest in cannabis production in the Metro Vancouver region. Several facilities have been licenced by Health Canada or are going through the licencing process to produce cannabis. This could potentially increase VOC in our air if emissions from production operations are not adequately controlled. An increase in VOC in our region could lead to increases of ground-level ozone and fine particulate matter.

Metro Vancouver is looking at how to mitigate the potential impact of VOC produced by cannabis plants on air quality. In July 2018 the Odour Management Policy Development Plan highlighted the need to consider developing an emission regulation bylaw for cannabis production operations, which would involve receiving input from the public during a period of consultation. (See page 13 for some ideas about how you can participate in consultation activities.) In the meantime, Metro Vancouver is directing new cannabis production operations to apply for site-specific air quality permits to authorize the controlled discharge of air contaminants.

Volatile organic compounds, or VOC, are organic chemicals found in the air. VOC can be man-made or natural. Plants release natural VOC – the aroma you smell in a pine forest is thanks to VOC – but even though they are naturally occurring, they can affect air quality. VOC contribute to the formation of ground-level ozone and fine particulate matter, both pollutants that can negatively impact our health.

Have Your Say in Caring for Our Air

Metro Vancouver makes decisions about air quality management that impact the region's 2.5 million residents. We reach out to government organizations, businesses and the public for input on proposals for air quality and climate change management plans and strategies, new and modified bylaws and permits, and air quality monitoring. Public input can maximize the benefits of a project, minimize the impacts and provide new ideas for communities across the region.

Public and community engagement can involve online surveys, open houses or advisory committees. The format of engagement depends on the needs of the project. For example, the *Climate 2050* strategy requires high levels of public involvement because of its complexity, but an amendment to an emission regulation for a specific type of industrial activity would focus on seeking input from the industry affected.

Metro Vancouver also requires that all businesses that apply for new or amended air emission permits notify the public, as outlined in the BC Public Notification Regulation.

IAP2 SPECTRUM	metrovancouver CONSULT	metrovancouver INVOLVE	metrovancouver COLLABORATE
PUBLIC PARTICIPATION GOAL	To obtain public feedback on analysis, issues, alternatives and decision.	To work with the public to make sure that concerns and aspirations are considered and understood.	To partner with the public in each aspect of the decision-making.
EXAMPLE	Amendments to non-road diesel engine emission regulation related to registration of engine types	*Climate 2050 Roadmaps*	North Shore Wastewater Treatment Plant odour management approach

This spectrum of public participation demonstrates how Metro Vancouver communicates and consults based on the needs and goals of a proposed project. Adapted from the International Association of Public Participation (IAP2).

By participating in Metro Vancouver's engagement opportunities, anyone can contribute to decisions on projects or plans that affect them and their neighbourhoods. Here's how you can get involved:

- Sign up for a **mailing list** through the Metro Vancouver website to receive updates and meeting invitations on specific issues.
- Check our website for public notification of applications for permits.
- Follow 'Metro Vancouver' on **Facebook**, **Twitter** or **YouTube**.
- Read the agendas and minutes or attend the meetings of the **Metro Vancouver Regional District Board** and the **Climate Action Committee**.
- Email AQInfo@metrovancouver.org.

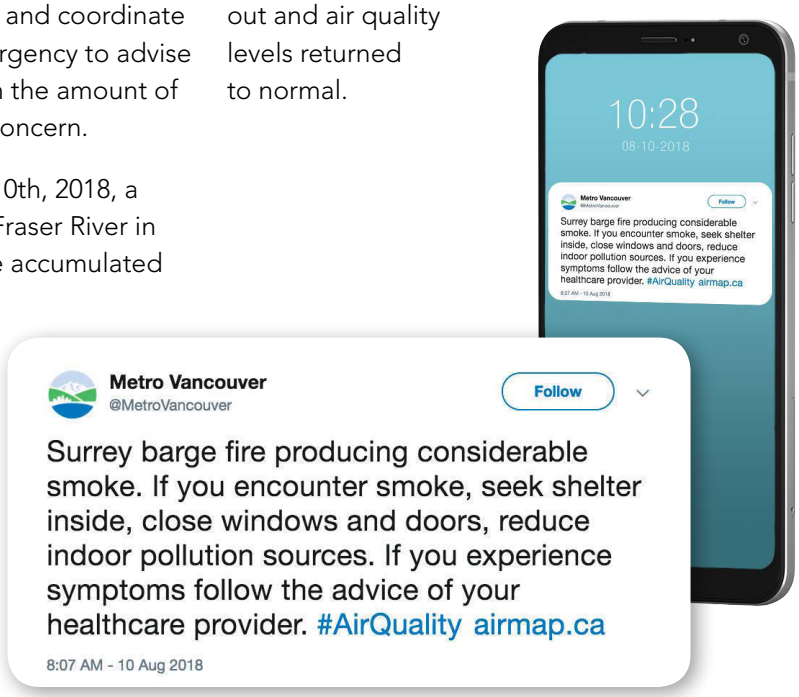
When Air Quality Emergencies Strike

Most of the time Metro Vancouver enjoys good air quality. However, emergencies can strike at any time and air quality can deteriorate quickly. When an air quality emergency occurs, Metro Vancouver's air quality staff work around the clock, liaising with emergency officials and local health authorities in an Emergency Operations Centre (EOC) to provide dependable information to the public.

Metro Vancouver's air quality monitoring network is positioned to measure air pollutants from emergencies within minutes and relay real-time data to our air quality experts. Staff actively monitor air quality and meteorological conditions and coordinate air quality information during the emergency to advise the public and health authorities when the amount of pollutants in the air reaches levels of concern.

In the early morning hours of August 10th, 2018, a barge full of recycled vehicles on the Fraser River in Surrey caught fire. Smoke from the fire accumulated near the ground in New Westminster and Burnaby before sunrise, and then winds blew the plume into Vancouver, North Vancouver, Coquitlam and Port Moody. Metro Vancouver initiated federal emergency plume modelling which uses a sophisticated computer model to predict the location and movement of the air contaminants. We also worked with health authorities, including Fraser Health and Vancouver Coastal Health, to keep each other informed and advise the public on actions to take.

As the impact of the emergency became more widespread, Metro Vancouver issued a region-wide air quality advisory that contained important health messaging. Through media releases and social media the public received updates on the status of the emergency. Metro Vancouver participated in emergency operations until the fire was put out and air quality levels returned to normal.



Air Quality in 2018

Metro Vancouver generally has good air quality; however, residents experienced a record number of days with air quality advisories in 2018. Advisories were in place for a total of 22 days, with the longest advisory period lasting 14 consecutive days. In 2018, wildfire smoke transported from outside the region was the main issue, triggering 18 days of advisories. Unprecedented levels of fine particulate matter in the airshed were seen and ground-level ozone formation also appeared to be intensified by the smoke. Widespread exceedances of the air quality objectives for fine particulate matter and ozone were recorded at many stations in both the western part of the airshed and eastern locations (see pages 16 and 17).

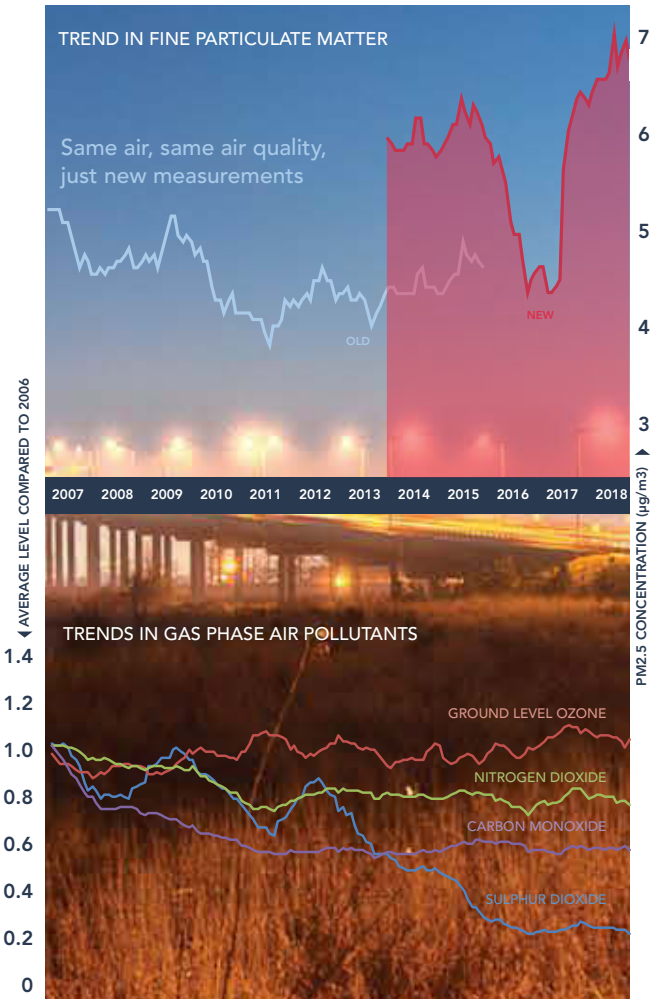
Hot sunny weather in late July 2018 also increased the formation of ground-level ozone in our air, causing a four-day air quality advisory. This coincided with hazy skies due to smoke from wildfires in Siberia and Alaska. Local events, including a bog fire in Richmond, barge fires on the Fraser River, and wildfires near West Vancouver and Agassiz also caused air quality concerns in 2018.

Air Quality Trends

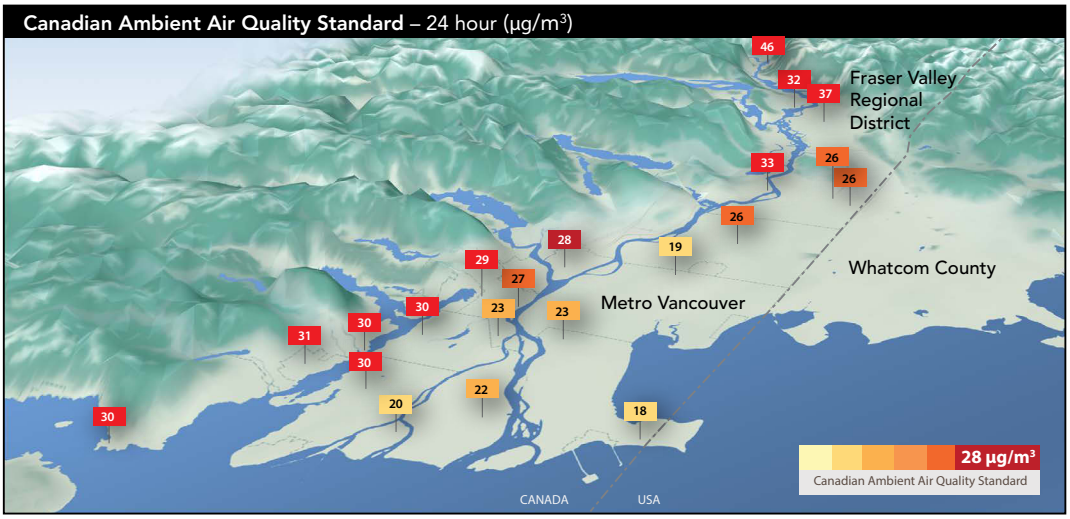
Regional trends charts (right) illustrate the change in average air quality across the region over time. Measurements from air quality monitoring stations are averaged to represent the outdoor air quality typically experienced in the region.

The average trends show that over the last decade most air contaminant levels have been improving, even while the region's population has grown. The region's air quality improvements are a result of continued emission reduction actions, which are expected to further reduce air contaminants, in the years to come (see pages 8 and 9). Metro Vancouver is also working on developing a new clean air plan to keep our air clean (page 1).

For the most part, gas phase air pollutants continued to improve. Sulphur dioxide levels continued to decrease, mainly due to stricter requirements for low sulphur marine fuels. Peak ground-level ozone levels (not shown), which occur during summertime hot and sunny afternoons, are better now than in the 1980s and early 1990s. However, despite reductions in the pollutants that form ground-level ozone, average levels have increased, partly due to an increase in ozone formed outside Canada coming into our region.



FINE PARTICULATE MATTER ($PM_{2.5}$) IN 2018

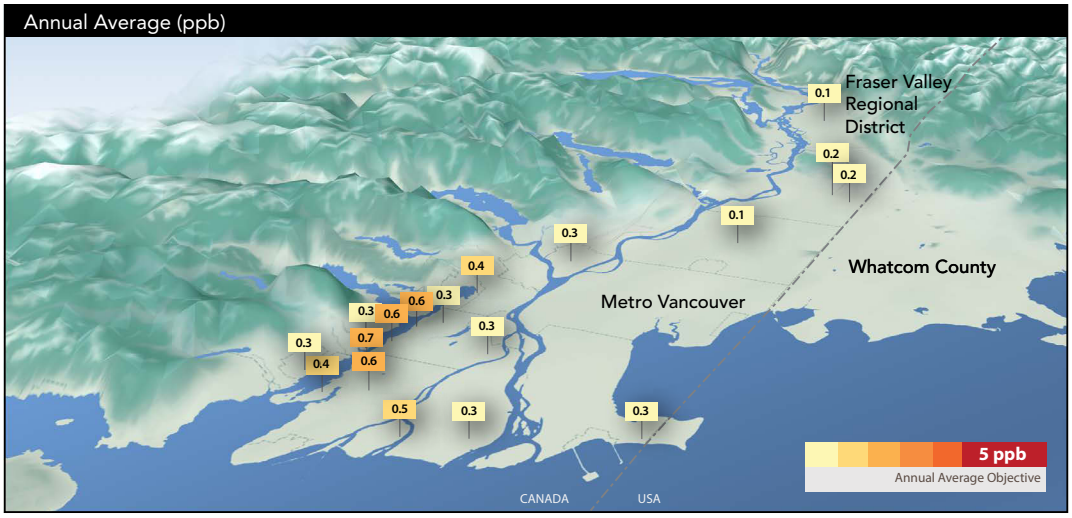


Unprecedented amounts of wildfire smoke blanketed the region in 2018. The Canadian Ambient Air Quality Standard metric for fine particulate matter ($PM_{2.5}$) averages $PM_{2.5}$ levels from the two previous years and the current year to calculate if the standard in a given year was exceeded. Based on this short-term calculation, the standard was exceeded in 2018 at almost half of the monitoring locations across the region (see map above). Levels were below Metro Vancouver's annual objective at all locations except for Hope and the Vancouver near-road monitoring station. Peak levels based on averages over 24 hours were worse than the short-term objective (25 µg/m³) at all stations in 2018. Widespread exceedances occurred in July, August and September due to wildfire smoke. Exceedances also occurred in October and November and are thought to be caused by outdoor burning and indoor residential wood burning.

GROUND-LEVEL OZONE IN 2018

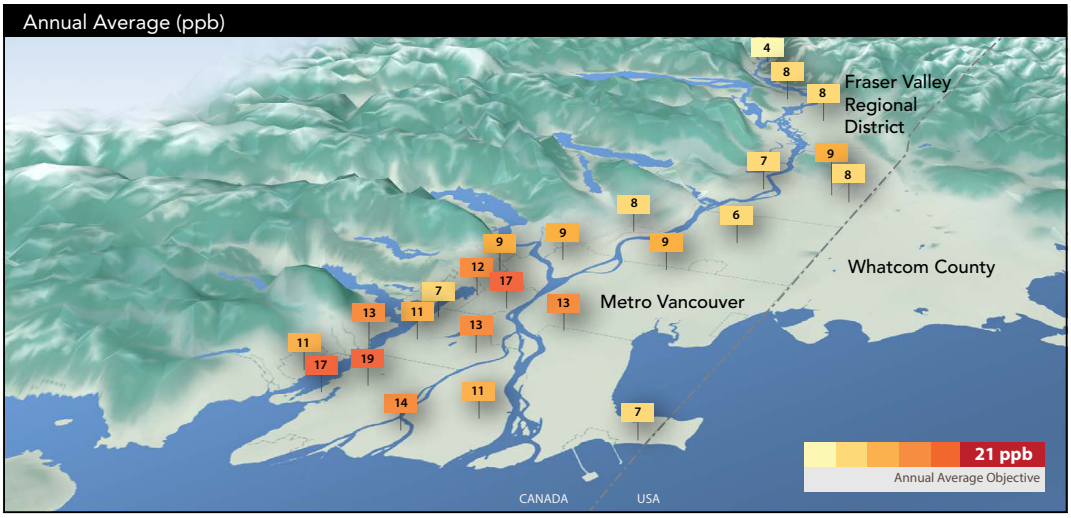
The map above shows that in 2018, the Canadian Ambient Air Quality Standard for ground-level ozone was achieved at all monitoring locations except Agassiz and Hope. There were more exceedances of Metro Vancouver's short-term objectives in 2018 than usual. Metro Vancouver's 8-hour objective (65 ppb) was exceeded for brief periods of time at more than two thirds of the monitoring locations across the region while the 1-hour objective (82 ppb) was exceeded at over half of the locations. In 2018 there were more ozone exceedances throughout the region due to pollutants that enhance ozone formation being carried in wildfire smoke plumes.

SULPHUR DIOXIDE IN 2018



Sulphur dioxide was a tale of two stories in 2018. Average levels have continued to dramatically improve with all monitoring locations reporting less than 1 ppb, as seen on the map above. This is well below Metro Vancouver's annual objective of 5 ppb. Peak levels of SO_2 on the other hand, exceeded Metro Vancouver's 1-hour objective (70 ppb) at two stations, including the near-road monitoring station in Vancouver and Capitol Hill in Burnaby. This is thought to be due to emissions from the oil refinery in Burnaby over 7 km away. Levels at all other SO_2 monitoring stations were better than Metro Vancouver's 1-hour objective of 70 ppb throughout the year.

NITROGEN DIOXIDE IN 2018



Nitrogen dioxide concentrations were better than Metro Vancouver's long-term and short-term air quality objectives throughout 2018. Annual averages are shown above. More than half of the regional emissions of nitrogen oxides (which include nitrogen dioxide) come from transportation sources. The highest average nitrogen dioxide concentrations in the region are measured in highly urbanized areas near busy roads.

Network News: Caring for Our Air Together

Metro Vancouver operates a comprehensive air monitoring network of 31 stations spanning Metro Vancouver and the Fraser Valley. This year, two specialized study stations were changed to long-term network stations. They are:

- on Clark Drive in Vancouver, to measure near-road emissions
- in Pandora Park in Vancouver, to measure emissions near Burrard Inlet

Partnerships are key to making the network successful and keeping our air clean.

Fraser Valley Regional District (FVRD) collaborates on reviews of the monitoring network, improvement planning such as additional stations or new measurements, and provides funding for stations operated within the FVRD.

Environment and Climate Change Canada provides instruments for some network stations, sample analysis and guidelines to ensure the data meet high performance standards. They also analyze weather patterns and how they might affect air quality, as well as help report the Air Quality Health Index (AQHI).

BC Ministry of Environment and Climate Change Strategy collaborates on technical matters, including training, and reporting the state of air quality in the Lower Fraser Valley airshed and achievement of air quality standards and objectives.

The **Port of Vancouver**, **Vancouver Airport Authority**, **Parkland Refining** and **Trans Mountain Pipeline** contribute funds to ensure that the monitoring network provides effective monitoring in communities near their facilities.

Where's MAMU?

MAMU, our Mobile Air Monitoring Unit, is used for specialized studies in locations where there are no air monitoring stations, or to measure a specific pollutant. It can go where monitoring is needed and contains many of the same instruments as other stations. MAMU's latest specialized study was on the North Shore on Tsleil-Waututh Reserve Lands. Since February 2018 it has monitored air quality and meteorology to better understand the levels of air pollutants in the area, such as sulphur dioxide from petroleum refining and marine vessels.

Tools we use to issue an advisory

Metro Vancouver tracks air quality using our network of monitoring stations, and issues air quality advisories if pollutants reach levels of concern. There are also other tools we use:

- **Data from satellites and smoke prediction models** such as Firework and BlueSky help us check for smoke from wildfires
- **Weather forecasts** for Canada and the US allow us to assess conditions that could influence smoke or smog
- **Discussions with experts from other agencies**, including Environment and Climate Change Canada, BC Ministry of Environment and Climate Change Strategy and the Fraser Valley Regional District, ensure we are all aware of the full picture as conditions change

Information from stations, including when an advisory is in effect, can be found on AirMap.ca (page 20).

Measuring Fine Particulate Matter with Low-Cost Monitors

By Peter Jackson, UNBC

Routine air quality monitoring is mainly done by air quality agencies using 'gold standard' instruments. While these instruments are reliable and accurate, they are large and expensive, so cannot be placed in every neighbourhood. Newly developed small low-cost air quality sensors have created an explosion in the number and types of monitors available. Their price can make them accessible to anyone, and they can be set up almost anywhere. But how good are they? Researchers at the University of Northern British Columbia (UNBC) have been taking a closer look.

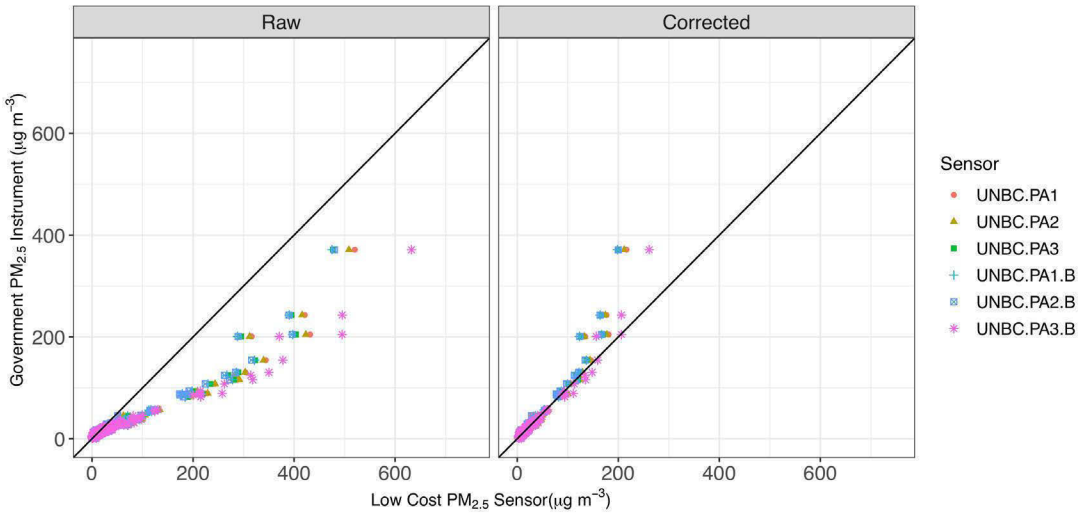
The PurpleAir PAII is a low-cost fine particulate matter ($PM_{2.5}$) monitor. Thousands have been installed world-wide, with over 150 across BC. UNBC researchers tested six of these sensors and found that readings correlated very well with government-run instruments. The average correlation – a measure of how well the sensor responds to changes in $PM_{2.5}$ levels – was 0.97 (1.00 is perfect) for 24-hour averages from the six sensors over 450 days. The average difference between the low-cost sensor and 'gold standard' instruments was 9.3 µg/m^3. But when sensor $PM_{2.5}$ readings are corrected by UNBC researchers to better match the 'gold standard', the average error is reduced to 2.5 µg/m^3.

A map of all 'gold standard' $PM_{2.5}$ readings in BC alongside calibrated sensor readings is available at weather.unbc.ca/aqmap. Anyone wishing to have their PurpleAir monitor reading corrected and included on this map can contact UNBC through the web page.

Low-cost sensors can help people understand air quality in their neighbourhood. In addition to accuracy, other issues to consider are:

- **Location:** Sensors have to be installed properly in a well-ventilated outdoor location, away from nearby pollution sources.
- **Lifespan:** Testing suggests that some sensors begin degrading and then fail after 1-2 years.

Figure by: Brayden Nilson, UNBC



Comparison of 'gold standard' daily average $PM_{2.5}$ readings with six PurpleAir sensors in Prince George. Raw sensor values are on the left and corrected values are on the right. The unusual daily averages over 100 µg/m^3 were from wildfire smoke in the summers of 2017 and 2018.

What's My Air Quality?

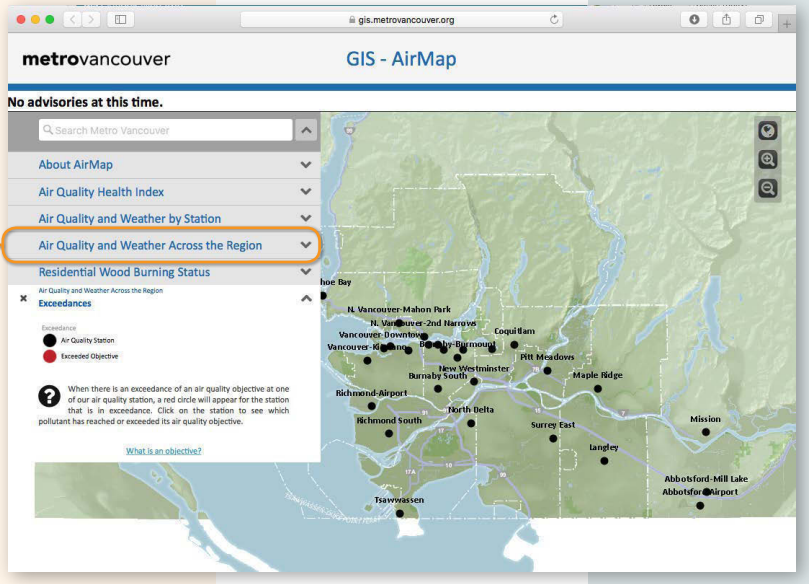
Check out www.airmap.ca

Real-time air quality measurements are on our website. AirMap displays air quality and weather data from the Lower Fraser Valley air quality monitoring network. This means you can find out what you are breathing now or see what air quality was like over the past month.

Here are two easy ways to see your air quality data.

1

Click on "Air Quality and Weather Across the Region", and select an air pollutant, such as ozone.

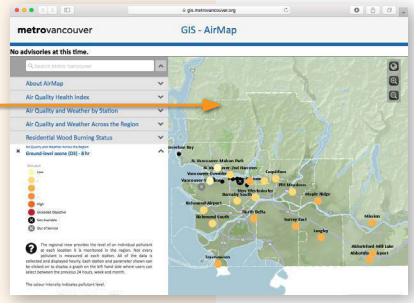


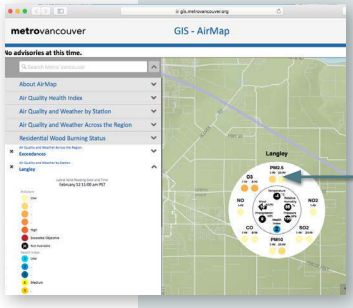
A

Click on an air quality station.

2

The map shows you levels of ozone across the region.





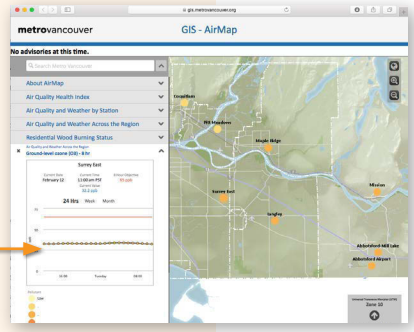
B

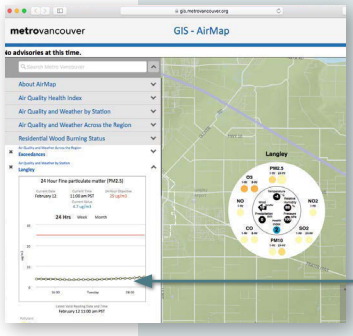
Click on an air pollutant you're concerned about, such as fine particulate matter ($PM_{2.5}$). The colours indicate pollutant levels.

3

Click on a station on the map to display a chart like this.

The chart shows you what you are breathing now.





Hover over the points on the chart to see concentrations for that day. You can also click Week or Month to see how your air quality has changed.

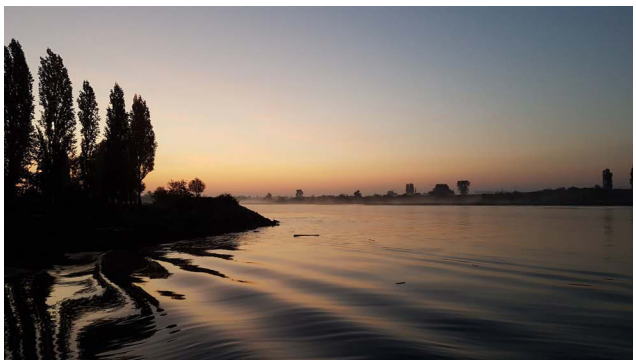
C

The chart shows pollutant levels compared to relevant air quality objectives.

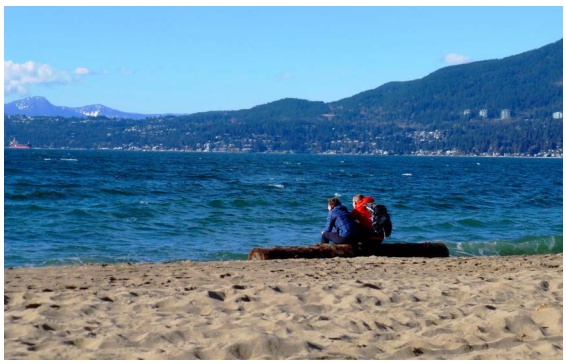
Photo Contest

The winner of the 2019 photo contest is Brendon Smith, whose photo is featured on the cover. Below are runner-up photos highlighting striking scenes from around the region.

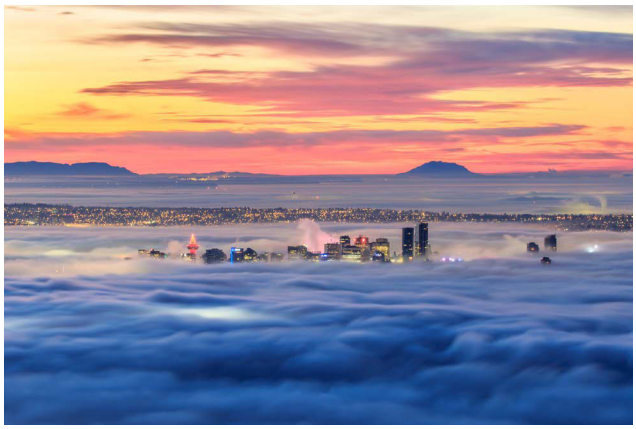
Congratulations and thank you to all those who submitted photos.



Florence Ho



David Sheffield



Nicolas Carbajales

Pete Hagens

Jan-Michelle Lemon

Brendon Smith

If you have questions or comments about Caring for the Air,
please contact us at AQinfo@metrovancouver.org or 604.432.6200.

Electronic copies of this and previous editions of Caring for the Air can be found on metrovancouver.org

metrovancouver
SERVICES AND SOLUTIONS FOR A LIVABLE REGION

To: Climate Action Committee

From: Josephine Clark, Planner, Regional Planning
Planning and Environment Department

Date: April 10, 2019 Meeting Date: May 17, 2019

Subject: **Sensitive Ecosystem Inventory – Sub-Regional Profiles and Assessment of Ecosystem Loss**

RECOMMENDATION

That the MVRD Board:

a) receive for information the report titled "Sensitive Ecosystem Inventory – Sub-Regional Profiles and Assessment of Ecosystem Loss", dated April 10, 2019; and,
b) distribute the report to member jurisdiction Councils for information.

PURPOSE

To provide the Climate Action Committee and MVRD Board with sub-regional analysis from the updated Metro Vancouver Sensitive Ecosystem Inventory, and an in-depth assessment of ecosystem loss.

BACKGROUND

The Climate Action Committee's 2019 Work Plan includes "Ecological Health - Sensitive Ecosystem Inventory - update and implications" in the second quarter.

The results of the first 5-year update of the Metro Vancouver Sensitive Ecosystem Inventory were presented to the Climate Action Committee at the June 2018 meeting. This report provides additional results from the 5-year Sensitive Ecosystem Inventory update including sub-regional analysis and an assessment of ecosystem loss at the regional, regional core (primarily developed areas), and sub-regional levels.

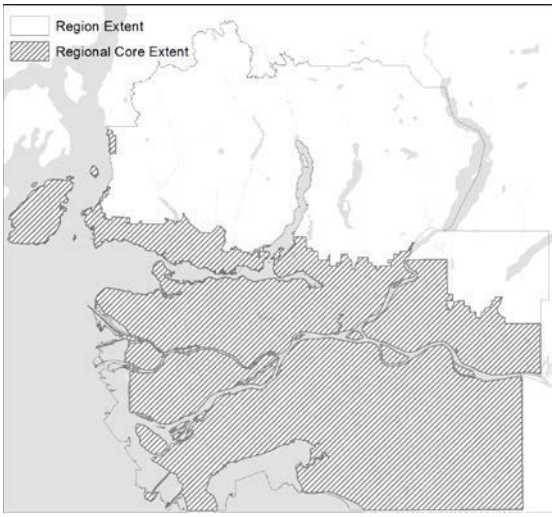
METRO VANCOUVER'S SENSITIVE ECOSYSTEM INVENTORY

Metro Vancouver's Sensitive Ecosystem Inventory is a GIS inventory of ecologically significant lands across the region. The Sensitive Ecosystem Inventory was originally completed in 2013 in response to the need for up-to-date, standardized information for the region to facilitate conservation of important ecological areas through informed land use and conservation planning. The Sensitive Ecosystem Inventory maps 'Sensitive Ecosystems', including wetlands, older forests and woodlands, as well as 'Modified Ecosystems' such as old fields and young forests that are younger and more human modified but still have ecological value and importance to biodiversity. Sensitive and modified ecosystems provide key ecosystem services to the region including carbon storage, and flood absorption, and contribute to our resilience to climate change. They also provide vital habitat and connectivity for biodiversity.

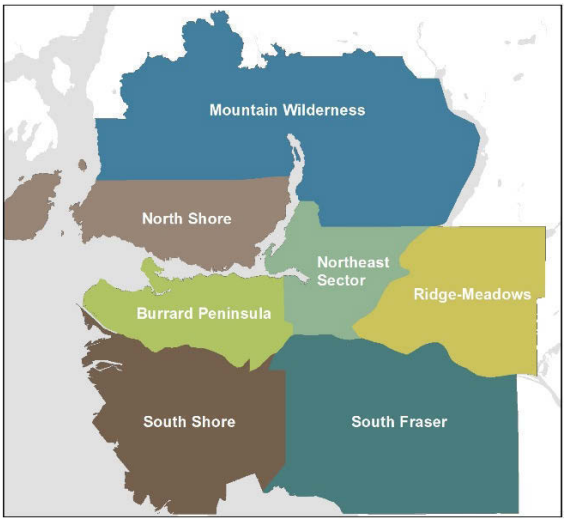
In 2018, the first 5-year update was completed to ensure the Sensitive Ecosystem Inventory continues to be an effective and relevant land use and conservation planning tool. The purpose of the update was to document changes to mapped ecosystems and quantify the amount, rate and type of ecosystem loss. Initial results from the update were provided to the Climate Action Committee in June 2018 (Reference 1).

RESULTS

Sensitive Ecosystem Inventory results are reported for the region, regional core and sub-regions, and these areas are shown in Maps 1 and 2. The regional core is the more urbanized southern part of the region and is most relevant to policy and planning.



Map 1 – Region and Regional Core Extents



Map 2 – Sub-Region Extents

Assessment of Ecosystem Loss

The 5-year Sensitive Ecosystem Inventory update found a total loss of 1,640 ha (0.9%) of sensitive and modified ecosystem for the region, 1,190 ha (3.4%) of which were within the regional core. The ecosystem classes with the highest recorded losses were:

- Mature Forests (aged 80-250 years) – 518 ha (-2%)
- Young Forests (aged 30-80 years) – 459 ha (-2%)
- Old Field – 426 ha (-20%)
- Riparian – 96 ha (-0.3%)
- Wetland – 120 ha (-1.2%)

Charts 1 and 2 summarize the main causes of ecosystem loss in the region and in the regional core respectively. Logging activities resulted in the highest losses at the regional level. These occurred within the academic research forests and as part of commercial logging operations. Other causes of loss were clearing and mowing (no further development or other activity on the site was observed), agriculture, residential development, transportation and communication (which includes road building), and utilities. Smaller categories of loss include resource extraction, industrial activities, and

recreation. Loss at the regional core level showed similar patterns, except very little logging took place.

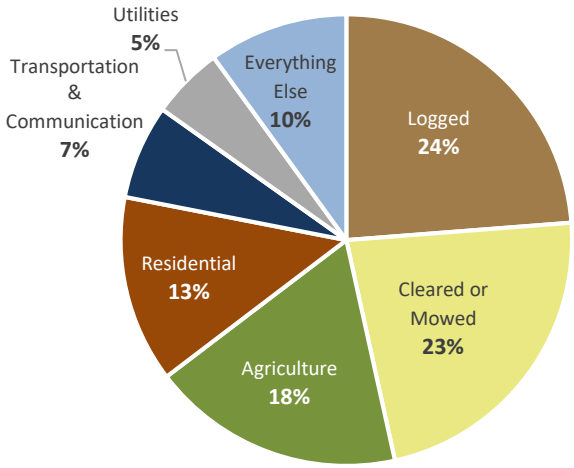


Chart 1 – Causes of ecosystem loss for the region

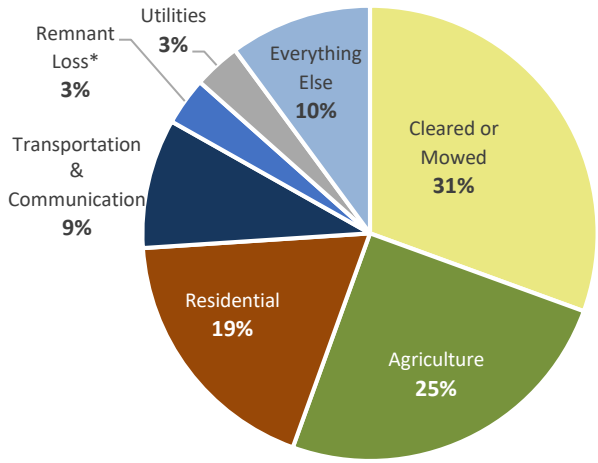


Chart 2 – Causes of ecosystem loss for the regional core

**Remnant Loss – ecosystems that due to adjacent loss are now very small and fall below the minimum size for inclusion in the Sensitive Ecosystem Inventory*

Attachment 1 provides a breakdown of causes of loss for the ecosystems classes listed above which experienced the highest levels of loss. Logging was the cause of most loss for mature and young forests. For old fields, over 80% of loss was a result of agriculture or clearing and mowing. It is possible that some of these sites may be allowed to return to an old field state over time. However, if this was a system in balance we would expect a similar amount of additions of old fields to the inventory as losses, but only 35 ha was added, compared to 426 ha lost.

Old field additions were due to areas naturally aging to the point they met the criteria for inclusion within this class. Additions to other classes totaled 3 ha and appeared to be due largely to restoration activities.

Changes in Ecosystem Quality

Ecosystems in the Sensitive Ecosystem Inventory are assessed for 'ecosystem quality', which is determined through an evaluation of their condition, visible disturbances, context within the landscape, and size. As shown in Table 1 below, at the regional level, a high percentage of ecosystems in the Sensitive Ecosystem Inventory are rated higher quality (84.7%), but this number drops considerably when looking at the regional core (39.1%). This difference is due to the dominating effect of the watersheds and large provincial parks in the north which contain very large areas of undisturbed ecosystems.

	% Ecosystems rated Higher Quality	Change over 5-years
Region	84.7%	-0.3%
Regional Core	39.1%	-0.7%

Table 1 – Ecosystem quality for the region and regional core

Changes in ecosystem quality were assessed during the recent Sensitive Ecosystem Inventory update. A decrease of less than 1% was detected at both the region and regional core level.

Sub-Regional Profiles

Attachment 2 provides breakdowns of the Sensitive Ecosystem Inventory analysis for each sub-region, as well as the region and regional core for comparison. The following information is included within the profiles:

- Map of sub-region extent;
- Top three sensitive or modified ecosystems present in the sub-region by area;
- Proportion of the sub-region that is a sensitive or modified ecosystem;
- Percent of ecosystems rated higher quality in the sub-region and change over 5-years;
- Proportion of regional sensitive or modified ecosystems found within the sub-region; and
- Ecosystem loss information including the proportion of regional loss that occurred within the sub-region.

In 2013 with the first release of the Sensitive Ecosystem Inventory, a 'Sub-Regional Profiles' document (Reference 2) was created with a public audience in mind and is available on the Metro Vancouver website. An updated version of the sub-regional profiles will be created using the information in Attachment 2.

Next Steps

This report is provided to the Climate Action Committee in keeping with its Terms of Reference, which identify that the Environment portfolio of Regional Planning provides data, monitoring and research to support the Committee's role in guiding and monitoring the organization's actions under the *Ecological Health Framework*. Staff welcome any feedback or direction that arises from consideration of the Sensitive Ecosystem Inventory.

This report will be provided to the Regional Planning Committee through its role in updating *Metro Vancouver 2040: Shaping Our Future* (*Metro 2040*), the regional growth strategy. A key environmental objective of this update is to better integrate sensitive ecosystems into the regional growth strategy. Staff will report back to the Climate Action Committee as work on the update to *Metro 2040* advances.

ALTERNATIVES

1. That the MVRD Board:
   a) receive for information the report titled "Sensitive Ecosystem Inventory – Sub-Regional Profiles and Assessment of Ecosystem Loss", dated April 10, 2019; and,
   b) distribute the report to member jurisdiction Councils for information.

2. That the Climate Action Committee receive for information the report titled "Sensitive Ecosystem Inventory – Sub-Regional Profiles and Assessment of Ecosystem Loss", dated April 10, 2019.

FINANCIAL IMPLICATIONS

If the MVRD Board chooses Alternative 1, the report will be distributed to member jurisdiction Councils for information. The report highlights the loss of sensitive ecosystems in the region between 2009 and 2014, and identifies the causes for ecosystem loss both for the region and within the regional core (excluding the North Shore watersheds, estuaries and intertidal areas). Residential development was the cause of 19% of the loss of ecosystems in the regional core between 2009 and 2014. Agriculture was the cause of the 25% of that same loss. Metro Vancouver will be looking at how better to monitor and address this loss through the update to the Regional Growth Strategy, and member jurisdictions play a critical role in the protection of ecosystems in the region. If the Committee chooses Alternative 2, no further action will be taken.

Costs associated with the Metro Vancouver Sensitive Ecosystem Inventory update were included in MVRD Board-approved Regional Planning program budgets and work plans.

SUMMARY / CONCLUSION

The Metro Vancouver Sensitive Ecosystem Inventory update provides key insights into the state of the region's most important ecological areas and changes over a 5-year period. Causes of loss observed in the Sensitive Ecosystem Inventory update were assessed and quantified. Logging, clearing and mowing, agriculture, and residential development were among the primary causes of ecosystem loss recorded for the region. Very little logging was documented within the regional core but other causes of loss were similar. Ecosystem quality was assessed and was found to have decreased slightly for the region and regional core, a change of -0.3% and -0.7% respectively. Sub-regional breakdowns of information from the Sensitive Ecosystem Inventory are provided in Attachment 2 and will be made available on the Metro Vancouver website in a format suitable for a public audience. Staff recommend Alternative 1, that the MVRD Board receive the Sensitive Ecosystem Inventory update for information and distribute the report to member jurisdiction councils.

Attachments *(29630740)*

1. Summary of ecosystem loss by Sensitive Ecosystem Inventory class
2. Sensitive Ecosystem Inventory Sub-Regional Profiles

References

1. Update of the Metro Vancouver Sensitive Ecosystem Inventory, dated, June 6, 2018
2. Metro Vancouver Sensitive Ecosystem Inventory Sub-Regional Profiles (2013)

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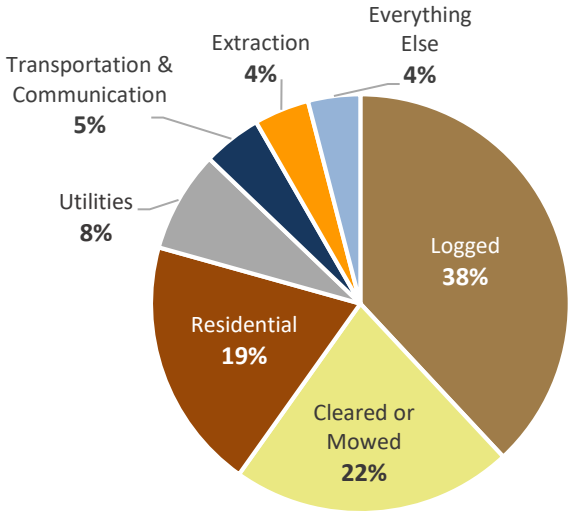
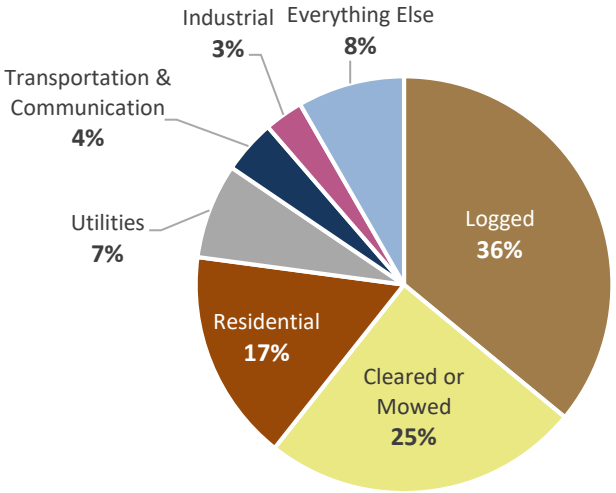
Sensitive Ecosystem Inventory – Causes of Loss by Sensitive or Modified Ecosystem Class

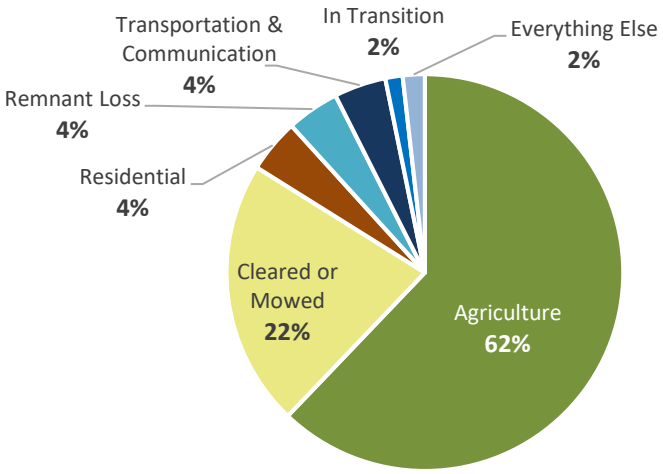
The following charts present the causes of loss for the sensitive and modified ecosystem classes that experienced the highest levels of loss in the 5-year SEI update completed in 2018.



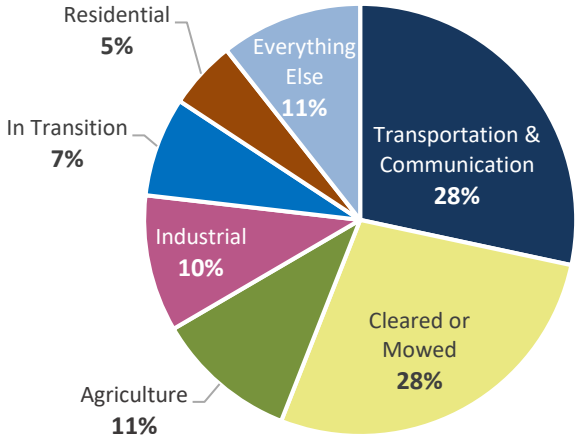
Causes of loss for Mature Forest (80-250 yrs) ecosystems
Loss = 518 ha



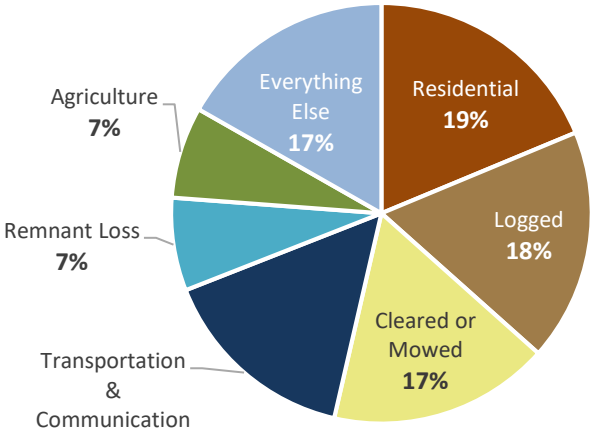
Causes of loss for Young Forest (30-80 yrs) ecosystems
Total = 459 ha



Causes of loss for Old Field ecosystems
Total = 426 ha

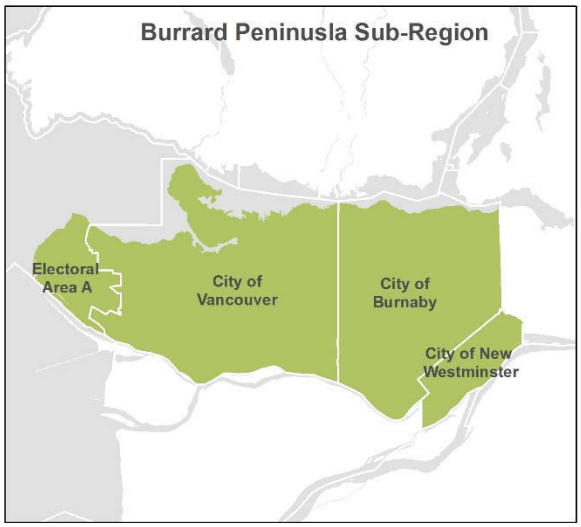


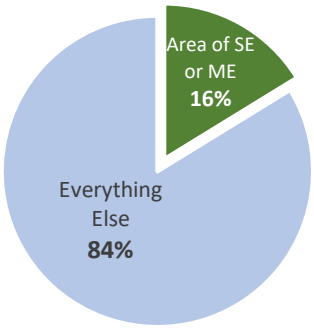
Causes of loss for Wetland ecosystems
Total = 120 ha



Causes of loss for Riparian ecosystems
Total = 96 ha

Sensitive Ecosystem Inventory – Burrard Peninsula Sub-Regional Profile

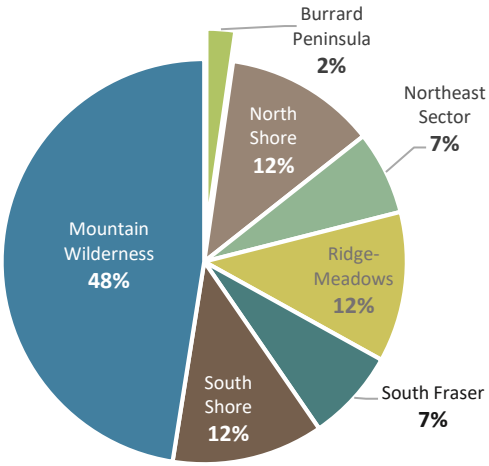




Proportion of Burrard Peninsula that is a Sensitive Ecosystem (SE) or Modified Ecosystem (ME)

Ecosystem Profile:

Top 3 Sensitive or Modified Ecosystems in Burrard Peninsula by area	
Mature Forest	1,216 ha
Riparian	1,013 ha
Young Forest	522 ha



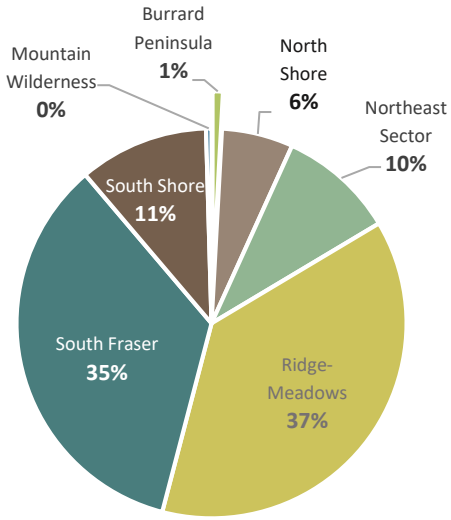
Proportion of regional Sensitive or Modified Ecosystems found within the Burrard Peninsula Sub-Region

Ecosystem Quality:

% Ecosystems rated 'Higher Quality' in Burrard Peninsula	44.5%
Change in % of Ecosystems rated 'Higher Quality' in Burrard Peninsula	0%

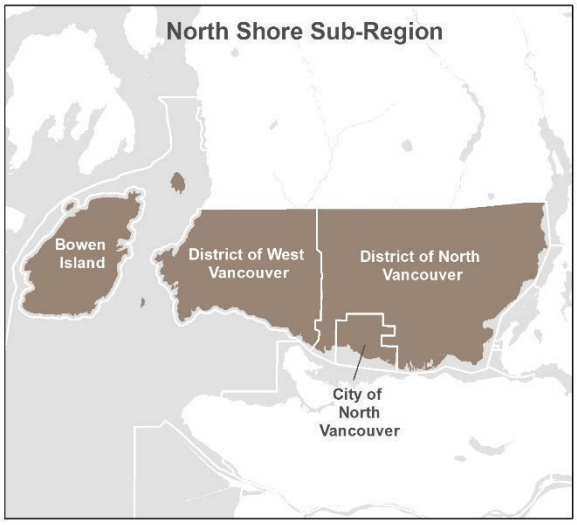
Ecosystem Loss:

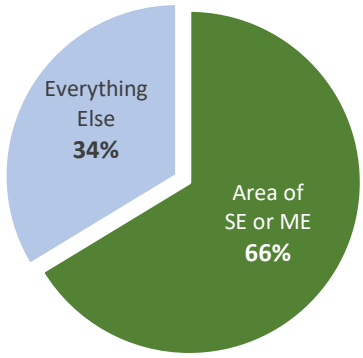
- 14 ha of Sensitive or Modified Ecosystems were lost in Burrard Peninsula
- Sensitive or Modified Ecosystems that experienced the most loss in Burrard Peninsula:
  - -1.2% of Wetland (-6 ha)
  - -0.8% of Young Forest (-4 ha)
  - -0.2% of Mature Forest (-3 ha)
- Top 3 causes of loss in Burrard Peninsula were in transition (construction was in process but the purpose was unclear), transportation and communication, and recreation



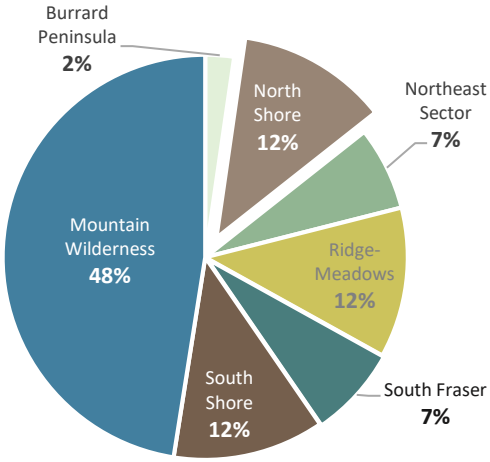
Proportion of regional loss that occurred within the Burrard Peninsula Sub-Region

Sensitive Ecosystem Inventory – North Shore Sub-Regional Profile

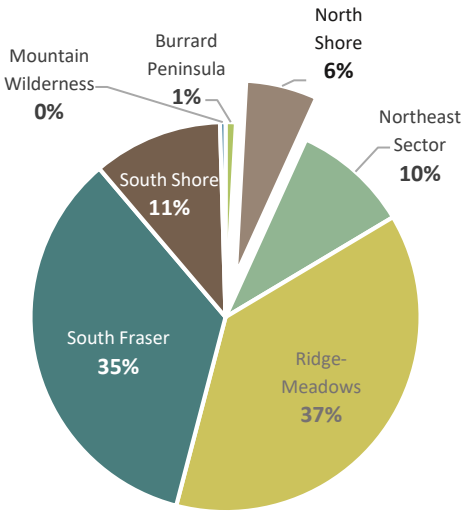




Proportion of North Shore that is a Sensitive Ecosystem (SE) or Modified Ecosystem (ME)



Proportion of regional Sensitive or Modified Ecosystems found within the North Shore Sub-Region



Proportion of regional loss that occurred within the North Shore Sub-Region

Ecosystem Profile:

Top 3 Sensitive or Modified Ecosystems in North Shore by area	
Mature Forest	6,856 ha
Young Forest	4,101 ha
Old Forest	3,733 ha

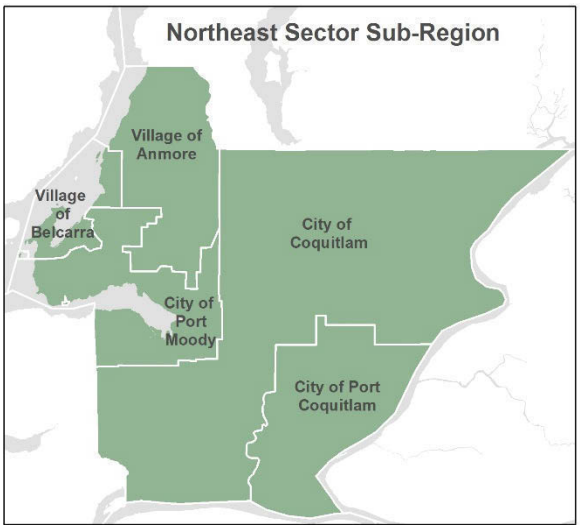
Ecosystem Quality:

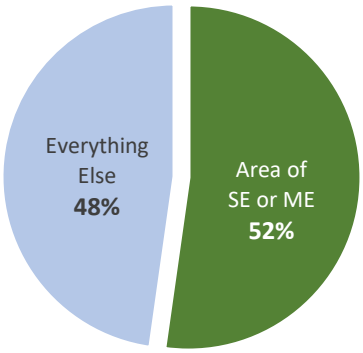
% Ecosystems rated 'Higher Quality' in North Shore	86.2%
Change in % of Ecosystems rated 'Higher Quality' in North Shore	-0.5%

Ecosystem Loss:

- 97 ha of Sensitive or Modified Ecosystems were lost in North Shore
- Sensitive or Modified Ecosystems that experienced the most loss in North Shore:
  - -1% of Mature Forest (-69 ha)
  - -0.3% of Young Forest (-13 ha)
  - -0.3% of Riparian (-10 ha)
- Top 3 causes of loss in North Shore were clearing and mowing, in transition (construction was in process but the purpose was unclear), and transportation and communication

Sensitive Ecosystem Inventory – Northeast Sector Sub-Regional Profile

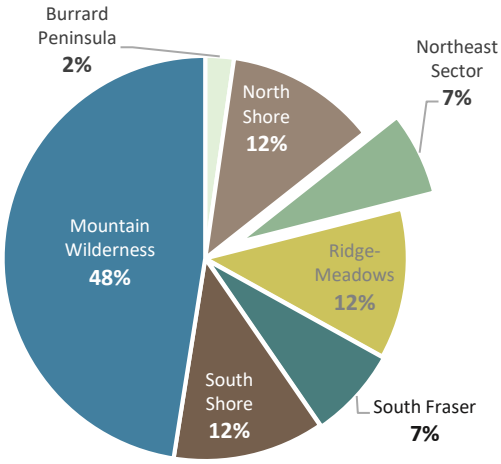




Proportion of Northeast Sector that is a Sensitive Ecosystem (SE) or Modified Ecosystem (ME)

Ecosystem Profile:

Top 3 Sensitive or Modified Ecosystems in Northeast Sector by area	
Mature Forest	4,057 ha
Riparian	2,684 ha
Young Forest	2,443 ha



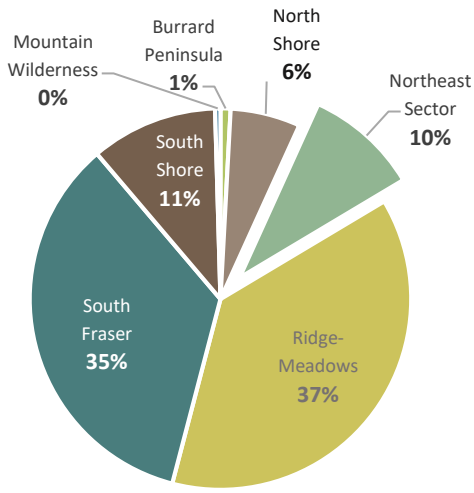
Proportion of regional Sensitive or Modified Ecosystems found within the Northeast Sector Sub-Region

Ecosystem Quality:

% Ecosystems rated 'Higher Quality' in Northeast Sector	-73.7%
Change in % of Ecosystems rated 'Higher Quality' in Northeast Sector	-0.3%

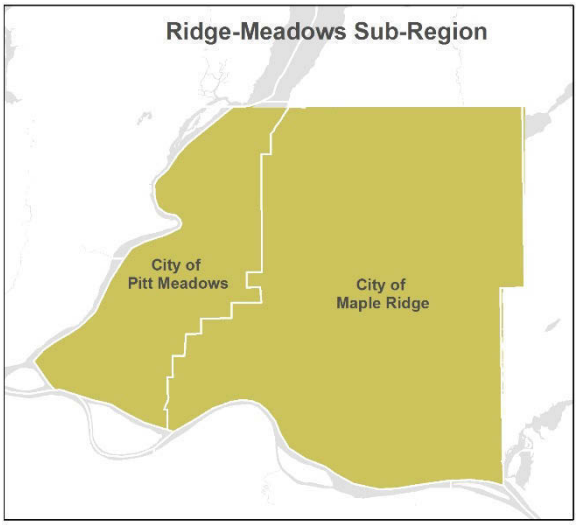
Ecosystem Loss:

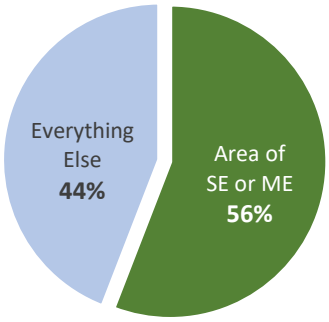
- 158 ha of Sensitive or Modified Ecosystems were lost in Northeast Sector
- Sensitive or Modified Ecosystems that experienced the most loss in Northeast Sector:
  - -2% of Mature Forest (-83 ha)
  - -1.5% of Young Forest (-38 ha)
  - -2.3% of Wetland (-22 ha)
- Top 3 causes of loss in Northeast Sector were residential development, utilities, and extraction



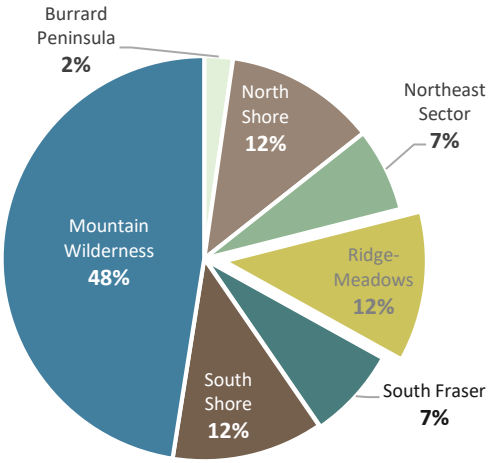
Proportion of regional loss that occurred within the Northeast Sector Sub-Region

Sensitive Ecosystem Inventory – Ridge-Meadows Sub-Regional Profile

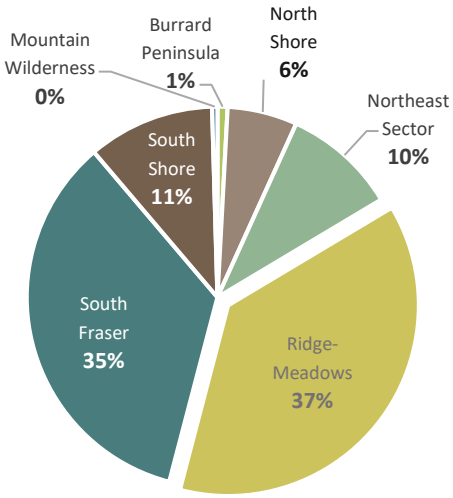




Proportion of Ridge-Meadows that is a Sensitive Ecosystem (SE) or Modified Ecosystem (ME)



Proportion of regional Sensitive or Modified Ecosystems found within the Ridge-Meadows Sub-Region



Proportion of regional loss that occurred within the Ridge-Meadows Sub-Region

Ecosystem Profile:

Top 3 Sensitive or Modified Ecosystems in Ridge-Meadows by area	
Mature Forest	6,774 ha
Young Forest	5,056 ha
Riparian	4,435 ha

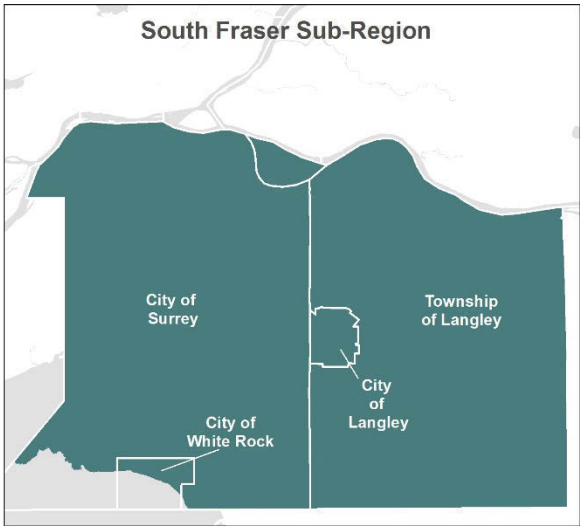
Ecosystem Quality:

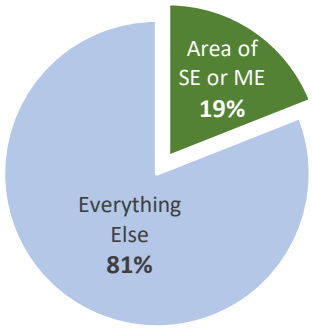
% Ecosystems rated 'Higher Quality' in Ridge-Meadows	78.4%
Change in % of Ecosystems rated 'Higher Quality' in Ridge-Meadows	-1.3%

Ecosystem Loss:

- 616 ha of Sensitive or Modified Ecosystems were lost in Ridge-Meadows
- Sensitive or Modified Ecosystems that experienced the most loss in Ridge-Meadows:
  - -4.3% of Mature Forest (-306 ha)
  - -4.0% of Young Forest (-213 ha)
  - -25.3% of Old Field (-47 ha)
- Top 3 causes of loss in Ridge-Meadows were logging, residential development, and clearing and mowing.

Sensitive Ecosystem Inventory – South Fraser Sub-Regional Profile

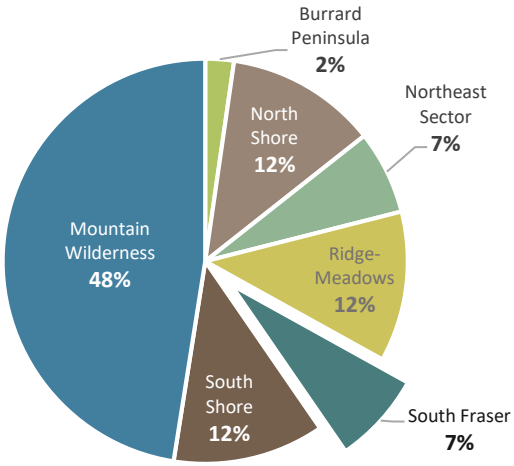




Proportion of South Fraser that is a Sensitive Ecosystem (SE) or Modified Ecosystem (ME)

Ecosystem Profile:

Top 3 Sensitive or Modified Ecosystems in South Fraser by area	
Riparian	4,735 ha
Young Forest	2,164 ha
Wetland	1,952 ha



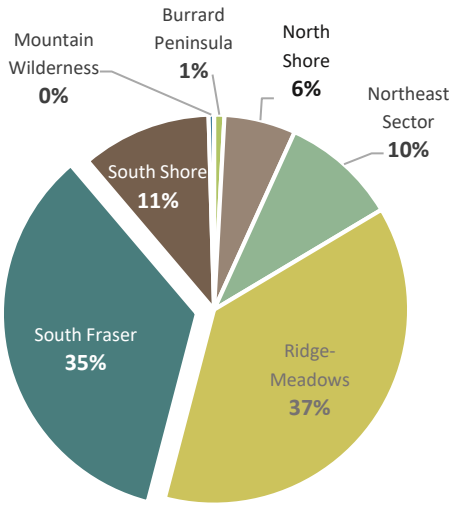
Proportion of regional Sensitive or Modified Ecosystems found within the South Fraser Sub-Region

Ecosystem Quality:

% Ecosystems rated 'Higher Quality' in South Fraser	23.3%
Change in % of Ecosystems rated 'Higher Quality' in South Fraser	-0.4%

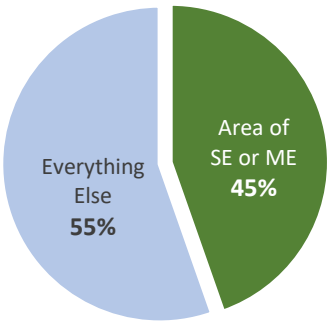
Ecosystem Loss:

- 568 ha of Sensitive or Modified Ecosystems were lost in South Fraser
- Sensitive or Modified Ecosystems that experienced the most loss in South Fraser:
  - -24.1% of Old Field (270 ha)
  - -7.8% of Young Forest (184 ha)
  - -4.6% of Mature Forest (54 ha)
- Top 3 causes of loss in South Fraser were agriculture, clearing and mowing, and residential development

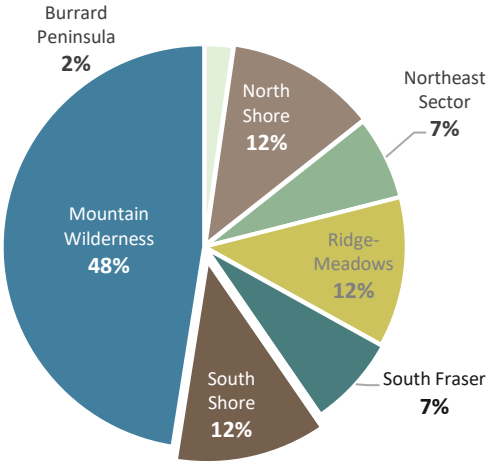


Proportion of regional loss that occurred within the South Fraser Sub-Region

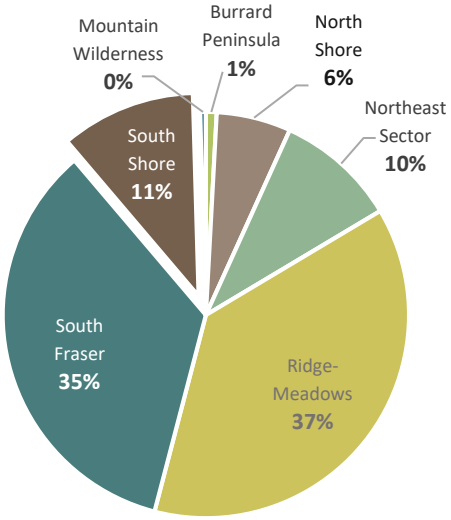
Sensitive Ecosystem Inventory – South Shore Sub-Regional Profile



Proportion of South Shore that is a Sensitive Ecosystem (SE) or Modified Ecosystem (ME)



Proportion of regional Sensitive or Modified Ecosystems found within the South Shore Sub-Region



Proportion of regional loss that occurred within the South Shore Sub-Region

Ecosystem Profile:

Top 3 Sensitive or Modified Ecosystems in South Shore by area	
Estuarine	7,139 ha
Intertidal	6,559 ha
Riparian	3,661 ha

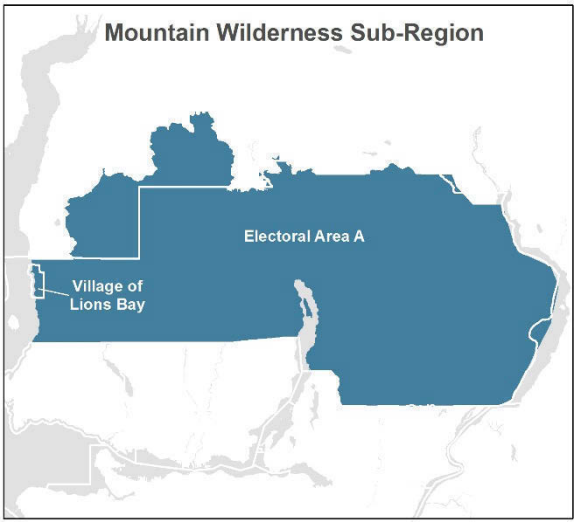
Ecosystem Quality:

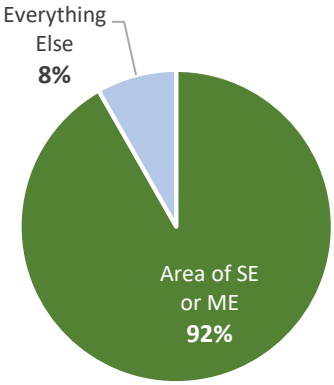
% Ecosystems rated 'Higher Quality' in South Shore	86.2%
Change in % of Ecosystems rated 'Higher Quality' in South Shore	-0.1%

Ecosystem Loss:

- 176 ha of Sensitive or Modified Ecosystems were lost in South Shore
- Sensitive or Modified Ecosystems that experienced the most loss in South Shore:
  - 18.9% of Old Field (106 ha)
  - 1.8% of Wetland (57 ha)
  - 0.2% of Riparian (8 ha)
- Top 3 causes of loss in South Shore were agriculture, clearing or mowing, and transportation and communication.

Sensitive Ecosystem Inventory – Mountain Wilderness Sub-Regional Profile

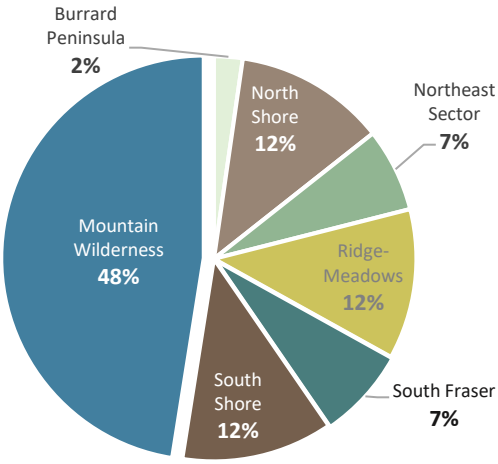




Proportion of Mountain Wilderness that is a Sensitive Ecosystem (SE) or Modified Ecosystem (ME)

Ecosystem Profile:

Top 3 Sensitive or Modified Ecosystems in Mountain Wilderness by area	
Old Forest	28,737 ha
Alpine	13,635 ha
Riparian	10,548 ha



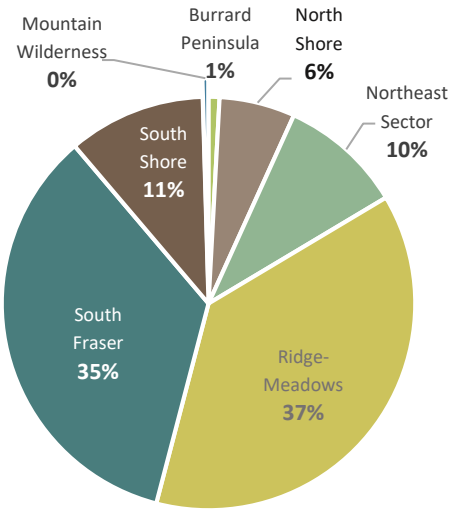
Proportion of regional Sensitive or Modified Ecosystems found within the Mountain Wilderness Sub-Region

Ecosystem Quality:

% Ecosystems rated 'Higher Quality' in Mountain Wilderness	98.4%
Change in % of Ecosystems rated 'Higher Quality' in Mountain Wilderness	-0.02%

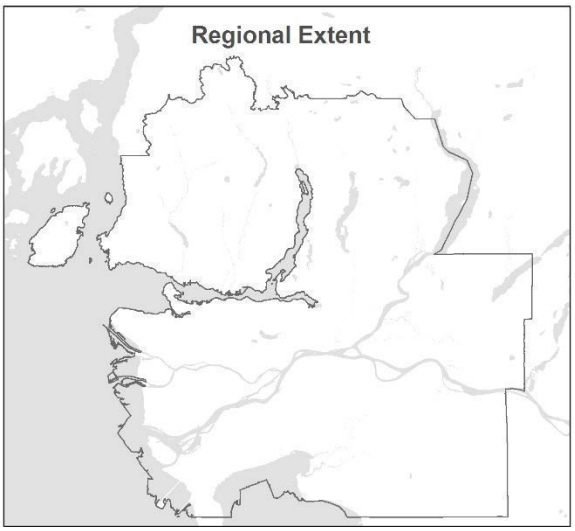
Ecosystem Loss:

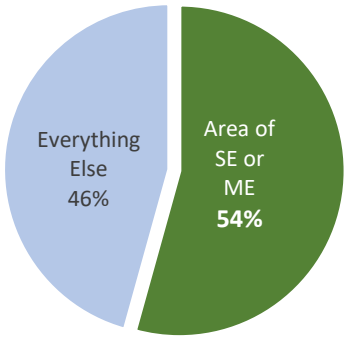
- 7 ha of Sensitive or Modified Ecosystems were lost in Mountain Wilderness
- Sensitive or Modified Ecosystems that experienced the most loss in Mountain Wilderness:
    - 0.1% of Young Forest (3.6 ha)
    - 0.1% of Mature Forest (3 ha)
    - 0.02% of Woodland (0.7 ha)
- The 2 causes of loss in Mountain Wilderness were clearing and mowing, and transportation and communication



Proportion of regional loss that occurred within the Mountain Wildnerness Sub-Region

Sensitive Ecosystem Inventory - Regional Profile





Proportion of the region that is a Sensitive Ecosystem (SE) or Modified Ecosystem (ME)

Ecosystem Profile:

Top 3 Sensitive or Modified Ecosystems in the region by area	
Old Forest	34,332 ha
Riparian	30,611 ha
Mature Forest	26,089 ha

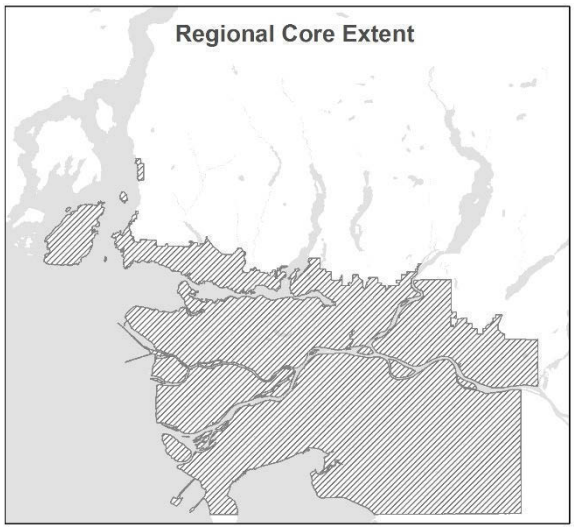
Ecosystem Quality:

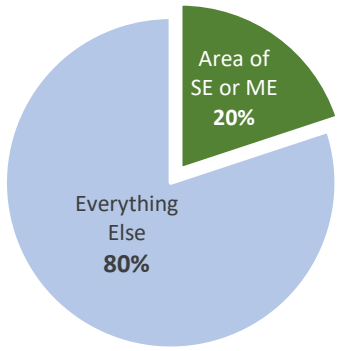
% Ecosystems rated 'Higher Quality' in the region	84.7%
Change in % of Ecosystems rated 'Higher Quality' in the region	-0.28%

Ecosystem Loss:

- 1,640 ha of Sensitive or Modified Ecosystems were lost in the region
- Sensitive or Modified Ecosystems that experienced the most loss in the region:
  - -1.9% of Mature Forest (-518 ha)
  - -2.1% of Young Forest (-459 ha)
  - -20% of Old Field (-426 ha)
- Top 3 causes of loss in the region were logging, clearing and mowing, and agriculture

Sensitive Ecosystem Inventory – Regional Core Profile





Proportion of the regional core that is a Sensitive Ecosystem (SE) or Modified Ecosystem (ME)

Ecosystem Profile:

Top 3 Sensitive or Modified Ecosystems in the regional core by area	
Mature Forest	9,614 ha
Riparian	7,902 ha
Wetland	6,780 ha

Ecosystem Quality:

% Ecosystems rated 'Higher Quality' in the regional core	39.1%
Change in % of Ecosystems rated 'Higher Quality' in the regional core	-0.7%

Ecosystem Loss:

- 1,189 ha of Sensitive or Modified Ecosystems were lost in the regional core
- Sensitive or Modified Ecosystems that experienced the most loss in the regional core:
  - -20% of Old Field (-426 ha)
  - -3.1% of Mature Forest (-303 ha)
  - -4.7% of Young Forest (-261 ha)
- Top 3 causes of loss in the regional core were clearing and mowing, agriculture, and residential development

To: Climate Action Committee

From: Roger Quan, Director, Air Quality and Climate Change
Planning and Environment Department

Date: April 24, 2019 Meeting Date: May 17, 2019

Subject: **Manager's Report**

RECOMMENDATION
That the Climate Action Committee receive for information the report dated April 24, 2019, titled "Manager's Report".

Climate Action Committee 2019 Work Plan
The attachment to this report sets out the Committee's Work Plan for 2019. The status of work program elements is indicated as pending, in progress, or complete. The listing is updated as needed to include new issues that arise, items requested by the Committee or Board, and changes to the schedule.

Update on Trans Mountain Pipeline Expansion Project
On February 22, 2019, the National Energy Board released its report and recommendations pursuant to the Trans Mountain Pipeline Expansion Project Reconsideration hearing. The NEB recommended that the Governor in Council approve the project, subject to 156 recommended conditions imposed on Trans Mountain and 16 new, non-binding recommendations to the federal government. A final decision from the Governor in Council would typically be expected within 90 days of the issuance of the NEB report, but on February 22, in reference to ongoing consultations with First Nations groups, Minister of Natural Resources Amarjeet Sohi stated:

> "The NEB's 156 conditions and 16 new recommendations will inform our Phase III consultations. To date, Crown Consultation teams have met with over 85 communities and are actively engaging in meaningful, two-way dialogue. I also continue to meet with Indigenous communities to build strong relationships. We know how important this process is to Canadians. Moving forward, the Governor in Council will make a decision on TMX once we are satisfied that the Crown has adequately fulfilled its duty to consult. We are hopeful the work we are doing will put us in a strong position to make a decision within the NEB's legislated timeframe."

On April 18, Minister Sohi issued a follow-up statement, confirming that the Governor in Council would not make a decision on the Trans Mountain Pipeline Expansion Project within the expected 90 day timeframe. Instead, the statement indicated:

> "…the Governor in Council (GiC) has extended the timeline so that a decision on TMX can be made by June 18, 2019. Our goal is to make a decision at the end of this period. This provides the time required to respond to what Indigenous groups are telling us and to conclude the Phase III Crown consultations before the GiC decision."

Staff will continue to monitor communications from the NEB and federal government, and will notify the Committee of the final decision of the Governor in Council.

Clean Energy and Mission Innovation Ministerial Event - May 27-29, 2019
Metro Vancouver, in collaboration with Parkland Fuel Corporation, will participate in a trade show display at the Clean Energy Ministerial and Mission Innovation Showcase taking place May 27-29, 2019 at the Vancouver Convention Centre.

Metro Vancouver's collaboration with Parkland stemmed from a 2016 GVS&DD Board approval to partially fund the demonstration of a technology called Hydrothermal Processing, subject to the balance of funds sourced externally. This is a promising technology with much improved metrics compared to anaerobic digestion that transforms wastewater solids into a biocrude oil. Parkland engineers determined the biocrude has good potential to produce a low carbon fuel at their Burnaby refinery. This led to Parkland making a monetary contribution towards the demonstration project in 2018 with additional amounts expected over the next two years for a total of $4.25 million. In addition, the Province of BC contributed $0.75 million towards the demonstration and in 2018, the GVS&DD Board approved proceeding with the project. An allocation of $4 million is expected to be drawn from the Liquid Waste Sustainability Innovation Fund over the project's duration.

The Mission Innovation Ministerial was conceived following the 2015 signing of the Paris Accord on climate action, when 23 countries and the European Commission determined that the global initiative would reinvigorate and accelerate clean energy innovation with the objective to make clean energy widely affordable. In 2016, the first Mission Innovation event was held in Paris, followed by annual events in Beijing and Malmo.

Additional information can be found at: http://mission-innovation.net/events/fourth-mission-innovation-ministerial-mi-4/.

Registration for the event is free and can be done via this link:
https://www.regonline.com/registration/checkin.aspx?EventId=2546286&RegTypeID=878246

Attachment
Climate Action Committee 2019 Work Plan

29289220

ATTACHMENT

Climate Action Committee 2019 Work Plan
Report Date: April 24, 2019

Priorities

1st Quarter	**Status**
Climate 2050 - work plans and engagement strategy for roadmaps	Complete
SIF (Sustainability Innovation Fund) - 2019 proposals	Complete
Electric vehicle outreach program - schedule for 2019	Complete
Air Quality - cannabis production - discussion paper for potential regulations	In Progress
Air Quality - proposed amendments to ticketing bylaws	Complete
Air Quality - odour management - community outreach for enhanced management options	Complete
Metro 2040 - environment policy review scoping	In Progress
Participate in environmental assessment processes as required	Complete
2nd Quarter	
Climate 2050 - strategy and roadmap update	In Progress
Air Quality Management Plan - discussion paper	In Progress
Ambient Air Quality - intentions paper on new objectives for nitrogen dioxide	In Progress
Ambient Air Quality - intentions paper on new objectives for ground level ozone	In Progress
Air Quality - 8th annual Caring for the Air report	In Progress
Air Quality - automotive refinishing emissions regulation - outcomes of consultation	In Progress
Air Quality - indoor residential wood burning - proposed bylaw	In Progress
Air Quality - outdoor burning - discussion paper for potential bylaw	Pending
SIF - progress report on Strata Energy Advisor Program	In Progress
Metro Vancouver's Carbon Price Policy implementation Update	In Progress
SIF - status report on previously approved Sustainability Innovation Fund Projects	In Progress
Air Quality - discussion paper on odour management framework	Pending
Air Quality – outreach program on updated non-road diesel engine bylaw	Complete
Ecological Health - invasive species - best management practices	In Progress
Ecological Health - Sensitive Ecosystem Inventory - update and implications	In Progress
Ecological Health - regional ecosystem carbon storage	Pending
30 year financial Plan - Air Quality function	Pending
Participate in environmental assessment processes as required	In Progress
3rd Quarter	
Climate 2050 - strategy and roadmap update	Pending
Metro Vancouver's climate actions and carbon neutral progress for 2018	In Progress
SIF - prototype design for public display of air quality monitoring data	In Progress
SIF - outcomes of National Industrial Symbiosis Program pilot	Pending
SIF - results of DC fast charger project at Metro Tower III	Pending
Review of user fees related to air quality permits and regulations	In Progress
Air Quality - proposed amendments to automotive refinishing emissions regulation	Pending
Metro 2040 - environment policy forum results	Pending

Ecological Health - tree canopy and landscape imperviousness monitoring	Pending
Ecological Health - regional ecosystem connectivity index	Pending
Participate in environmental assessment processes as required	Pending
4th Quarter	
Climate 2050 - strategy and first set of draft Climate 2050 roadmaps	Pending
Annual budget and 5 year financial plan	Pending
Draft Air Quality Management Plan and phase 2 engagement strategy	Pending
Ambient Air Quality - proposed objectives for nitrogen dioxide	Pending
Ambient Air Quality - proposed objectives for ground level ozone	Pending
SIF - Strata Energy Advisor pilot program preliminary outcomes	Pending
SIF - results of Air Aware citizen science air quality monitoring	Pending
Ambient Air Quality - review of monitoring network	Pending
Electric vehicle outreach program outcomes for 2019	Pending
Air Quality - indoor residential wood burning – public outreach plan	Pending
Metro 2040 - environment policy review - update	Pending
Ecological Health Framework - update	Pending
Participate in environmental assessment processes as required	Pending

metrovancouver
SERVICES AND SOLUTIONS FOR A LIVABLE REGION

To: Regional Planning Committee

From: Laurie Bates-Frymel, Senior Planner, Regional Planning

Date: March 22, 2019 Meeting Date: April 5, 2019

Subject: **Metro 2040 Environment Policy Review – Scope and Process**

RECOMMENDATION
That the MVRD Board receive for information the report dated March 22, 2019, titled "Metro 2040 Environment Policy Review – Scope and Process".

PURPOSE
To provide the Regional Planning Committee and MVRD Board with an overview of the proposed scope and process for the *Metro 2040* Environment Policy Review.

BACKGROUND
In preparation for an update to *Metro 2040*, the regional growth strategy, staff are conducting several policy reviews. The output of these reviews will inform the upcoming update to the regional growth strategy. As key implementers of the regional growth strategy, member jurisdictions will be involved throughout these policy reviews, through the Regional Planning Advisory Committee (RPAC), appropriate RPAC Subcommittees, Regional Planning Committee and MVRD Board.

The RPAC received this report for information during its regular meeting on March 15, 2019. This report is provided for information and to seek committee comments on the proposed scope and process.

EXISTING POLICY CONTEXT
Adopted in July 2011, *Metro 2040* created the region's "Conservation and Recreation" land use designation, which is intended to *"protect significant ecological and recreation assets, including: drinking watersheds, conservation areas, wildlife management areas and ecological reserves, forests, wetlands, riparian corridors, major parks and recreation areas, ski hills and other tourist recreation areas"*. *Metro 2040 Goal 3: Protect the Environment and Respond to Climate Change Impacts* (Attachment) also established the following strategies:

Strategy 3.1	Protect Conservation and Recreation lands
Strategy 3.2	Protect and enhance natural features and their connectivity
Strategy 3.3	Encourage land use and transportation infrastructure that reduce energy consumption and greenhouse gas emissions, and improve air quality
Strategy 3.4	Encourage land use and transportation infrastructure that improve the ability to withstand climate change impacts and natural hazard risks

Each strategy identifies policy actions for Metro Vancouver and member municipalities, and requests actions of other governments.

POLICY REVIEW SCOPE AND PROCESS

Scope

The *Metro 2040* Environment Policy Review seeks to determine if, and to what extent, policies in the regional growth strategy can be adjusted to better support the region's shared environmental goals. The scope of the policy review will focus on Strategy 3.1 Protect Conservation and Recreation lands, and Strategy 3.2 Protect and enhance natural features and their connectivity, including related maps. Strategies 3.3 and 3.4 are focused on minimizing air emissions from land use and transportation, and adapting to climate change. Staff will also be conducting a separate Metro 2040 Climate Policy Review.

The objectives of the *Metro 2040* Environment Policy Review are to:

1. Evaluate *Metro 2040* Strategies 3.1 and 3.2;
2. Ensure that member jurisdictions participate in the review process; and
3. Develop a set of policy options to inform an update to the regional growth strategy.

Process

The policy review will consist of three main phases: 1) background research, 2) a policy forum, and 3) policy option exploration, as described below. Staff will involve RPAC, the RPAC-Environment Subcommittee, and the Regional Planning Committee throughout the process and will report on the outcomes at each stage.

Phase 1: Evaluation and research (Spring 2019)

Staff will evaluate the existing policies under Strategy 3.1 and 3.2 by:

- Reviewing past policy reports and regional growth strategies;
- Conducting a scan of the regional context statements of member municipalities;
- Comparing Conservation and Recreation designated lands to the Sensitive Ecosystem Inventory;
- Assessing existing greenways, ecological connectivity, and green infrastructure policies; and
- Exploring regional growth strategy policies related to green space within urban areas.

A consultant will be retained to investigate how environmentally sensitive areas are designated in regional growth strategies from other areas, and how they incorporate connectivity language, maps, regional green infrastructure planning, urban green spaces, and ecosystem services. This consultant will also investigate and report on a range of tools and mechanisms and governance structures that have been used to deliver tangible outcomes.

Phase 2: Policy forum (Summer 2019)

Staff will host a policy forum with key stakeholders (including RPAC members, RPAC-Environment Subcommittee members, provincial staff, academics, and other Metro Vancouver staff) to obtain additional feedback about existing policy gaps and implementation challenges.

Phase 3: Policy options exploration (Winter 2019 – Summer 2020)
During this phase, staff will build on the results from the background research and the policy forum to develop policy options and a set of evaluation criteria in collaboration with RPAC and the RPAC-Environment Subcommittee.

Staff are seeking input from Regional Planning Committee and MVRD Board members on the proposed scope of work.

ALTERNATIVES
As this is an information report, no alternatives are provided.

FINANCIAL IMPLICATIONS
There are no financial implications associated with receipt of this report for information. The project cost of $15,000 is included in the 2019 Board-approved Regional Planning budget to engage a consultant to undertake research in phase 1 of the policy review.

SUMMARY / CONCLUSION
Adopted in July 2011, *Metro 2040* established policies to protect the region's Conservation and Recreation lands, natural features and their connectivity. The *Metro 2040* Environment Policy Review, consists of three phases:

1. evaluating the existing policies and researching good examples from other areas;
2. hosting a policy forum with key stakeholders to better understand environmental policy gaps and implementation challenges; and
3. exploring environmental policy options.

Metro Vancouver staff will involve the Regional Planning Advisory Committee, the RPAC-Environment Subcommittee, and the Regional Planning Committee throughout the process and will report on the outcomes at the end of each phase.

Attachment *(orbit doc # 28918552)*
Metro 2040 Goal 3 Protect the Environment and Respond to Climate Change Impacts - Including Maps 8-10

28918555

GOAL 3
Protect the Environment and Respond to Climate Change Impacts

Metro Vancouver has a spectacular natural environment. Many of Metro Vancouver's ecosystems have global significance and provide both internationally important fish habitat and key feeding and resting points for migratory birds along the Pacific Flyway. The region's forests, fields, coastal and intertidal areas, wetlands, and watercourses together are integral pieces of a habitat network for fish and wildlife.

The natural environment is important to livability and sustainability as well as our sense of place. The region's diverse open space in mountain, coastal and river areas offers recreation and healthy lifestyle opportunities for residents and visitors. The region's environment also provides essential ecosystem services such as clean drinking water. Protecting these natural features boosts the region's ecological health and resiliency in the face of climate change and natural hazard risks.

The Conservation and Recreation land use designation is intended to help protect the important environmental and recreation areas throughout the region. Strategies and actions recognize the importance of providing connectivity throughout the region linking important natural features, and emphasize the collaborative effort needed to protect and enhance natural assets.

A strategy in this section also addresses climate change, noting that to a large extent greenhouse gas reductions will be achieved by actions contained throughout the Regional Growth Strategy as well as by actions in other Metro Vancouver management plans. The most significant contributions of the Regional Growth Strategy to climate change mitigation will be made through a continued focus on urban containment and land use patterns that support sustainable transportation and reduce energy use. Policies on climate change adaptation, such as protection for at-risk coastal floodplain areas, are included. The strategy also addresses other natural hazards such as flooding, mudslides, interface fires, and earthquakes.

Strategies to achieve this goal are:

3.1 Protect Conservation and Recreation lands

3.2 Protect and enhance natural features and their connectivity

3.3 Encourage land use and transportation infrastructure that reduce energy consumption and greenhouse gas emissions, and improve air quality

3.4 Encourage land use and transportation infrastructure that improve the ability to withstand climate change impacts and natural hazard risks

STRATEGY 3.1
Protect Conservation and Recreation lands

Metro Vancouver's role is to:

3.1.1 Direct the Greater Vancouver Sewerage and Drainage District to not allow connections to regional sewerage services to lands with a Conservation and Recreation regional land use designation. Notwithstanding this general rule, in the exceptional circumstances specified below, the GVRD Board will advise the GVS&DD Board that it may consider such a connection for existing development or for new development where, in the GVRD Board's opinion, that new development is consistent with the underlying Conservation and Recreation regional land use designation and where the GVRD Board determines either:

a) that the connection to regional sewerage services the only reasonable means of preventing or alleviating a public health or environmental contamination risk; or

b) that the connection to regional sewerage services would have no significant impact on the strategy to protect lands with a Conservation and Recreation regional land use designation.

3.1.2 Implement the Metro Vancouver Regional Parks and Greenways Plan in collaboration with municipalities, to identify, secure and enhance habitat and park lands and buffer, where feasible, park and conservation areas from activities in adjacent areas.

3.1.3 Accept Regional Context Statements that protect lands within the Conservation and Recreation areas and that meet or work towards Action 3.1.4.

The role of municipalities is to:

3.1.4 Adopt Regional Context Statements which:

a) identify Conservation and Recreation areas and their boundaries on a map generally consistent with the Regional Land Use Designations map (Map 2);

b) include land use policies to support the protection of Conservation and Recreation areas that are generally consistent with the following:

   i) public service infrastructure, including the supply of high quality drinking water;

   ii) environmental conservation;

   iii) recreation, primarily outdoor;

   iv) education, research and training facilities and uses that serve conservation and/or recreation users;

   v) commercial uses, tourism activities, and public, cultural or community amenities that are appropriately located, scaled and consistent with the intent of the designation;

   vi) limited agricultural use, primarily soil-based;

c) include policies, where appropriate, that effectively buffer Conservation and Recreation areas from activities in adjacent areas.

Actions Requested of Other Governments and Agencies

3.1.5 That the province, utility companies and TransLink strive to avoid fragmentation of Conservation and Recreation areas when developing and operating utility and transportation infrastructure, but where unavoidable, consider mitigating the impacts, including possible enhancement to the areas.

3.1.6 That the province actively manage provincial park / environmental lands with the intent of enhancing natural assets and recreational opportunities.

3.1.7 That the federal government and the province and their agencies:

a) recognize the Conservation and Recreation areas and ensure that activities within or adjacent to these areas are consistent with the intent of the Conservation and Recreation land use designation;

b) strive to improve consultation and collaboration among all levels of government in the planning of Conservation and Recreation lands.


Map 8: Conservation and Recreation Areas
Conservation and Recreation
Metro Vancouver Boundary
Municipal Boundaries
Fraser Valley Regional District
Sunshine Coast Regional District
Electoral Area A
Maple Ridge
Langley Township
Langley City
Pitt Meadows
Port Coquitlam
Port Moody
Coquitlam
Anmore
Belcarra
Burnaby
New Westminster
Surrey
White Rock
Delta
Richmond
Tsawwassen First Nation
Vancouver
UEL
UBC
District of North Vancouver
City of North Vancouver
West Vancouver
Lions Bay
Bowen Island
USA

STRATEGY 3.2
Protect and enhance natural features and their connectivity

Metro Vancouver's role is to:

3.2.1 In collaboration with other agencies, develop and manage the Metro Vancouver Regional Recreation Greenway Network, as conceptually shown on the Regional Recreation Greenway Network map (Map 9).

3.2.2 Manage Metro Vancouver assets and collaborate with municipalities and other agencies to:

a) protect, enhance and restore ecologically important systems, features and corridors and establish buffers along watercourses, coastlines, agricultural lands, and other ecologically important features, as conceptually shown on the Natural Features and Land Cover map (Map 10);

b) incorporate into land use decision-making and land management practices planning tools, incentives, green technologies and infrastructure that support ecological innovation, minimize negative impacts on ecologically important features and maximize ecosystem function through restoration.

3.2.3 Accept Regional Context Statements that advance the protection and enhancement of a connected network of ecosystems, features and corridors throughout the region, and that meet or work towards Actions 3.2.4 to 3.2.7.

The role of municipalities is to:

3.2.4 Adopt Regional Context Statements which include policies and/or maps that indicate how ecologically important areas and natural features will be managed (as conceptually shown on Map 10) (e.g. steep slopes and ravines, intertidal areas and other natural features not addressed in Strategy 3.1).

3.2.5 In collaboration with other agencies, develop and manage municipal components of the Metro Vancouver Regional Recreation Greenway Network and connect community trails, bikeways and greenways to the Regional Recreation Greenway Network where appropriate.

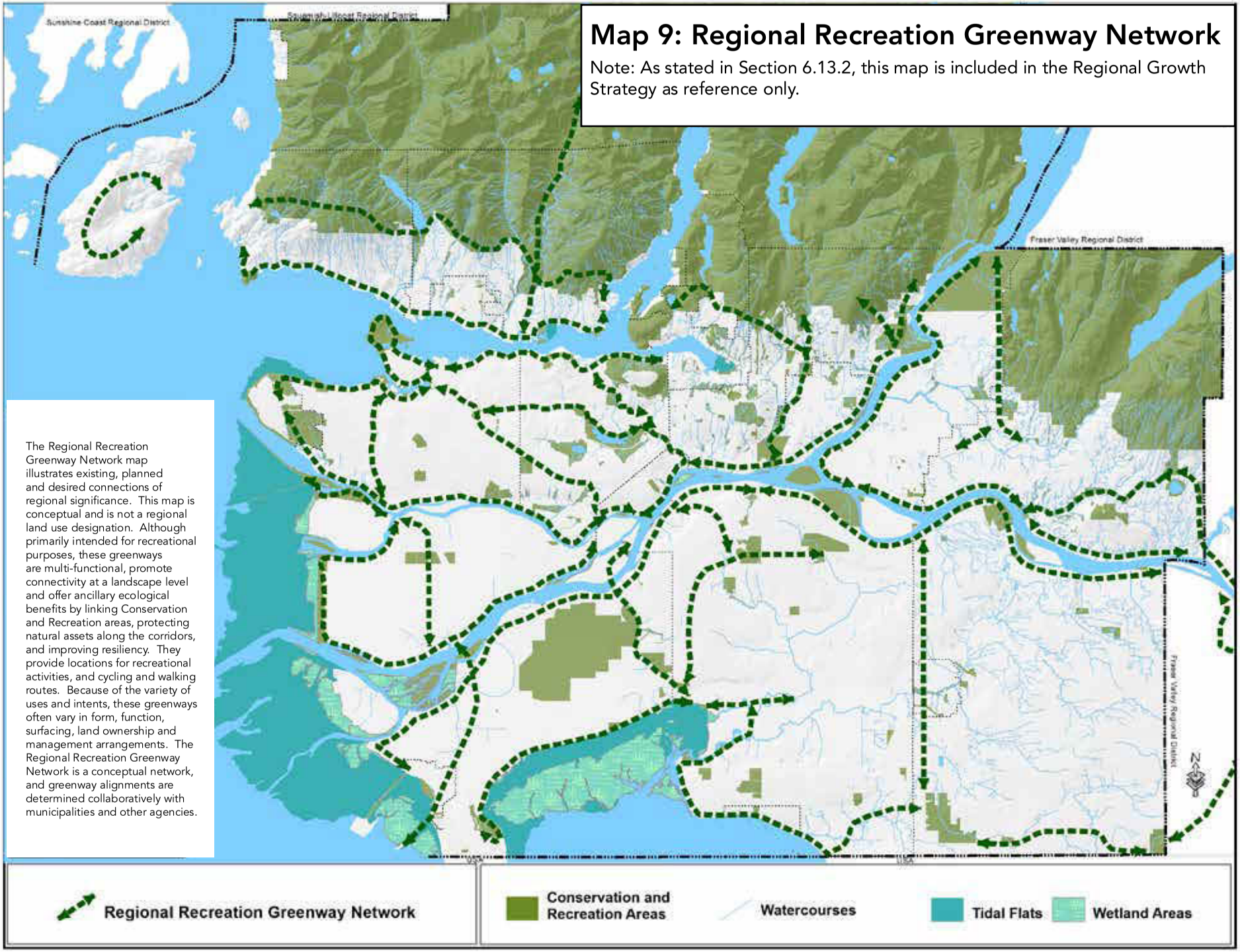
3.2.6 Identify where appropriate measures to protect, enhance and restore ecologically important systems, features, corridors and establish buffers along watercourses, coastlines, agricultural lands, and other ecologically important features (e.g. conservation covenants, land trusts, tax exemptions and ecogifting).

3.2.7 Consider watershed and ecosystem planning and/or Integrated Stormwater Management Plans in the development of municipal plans.

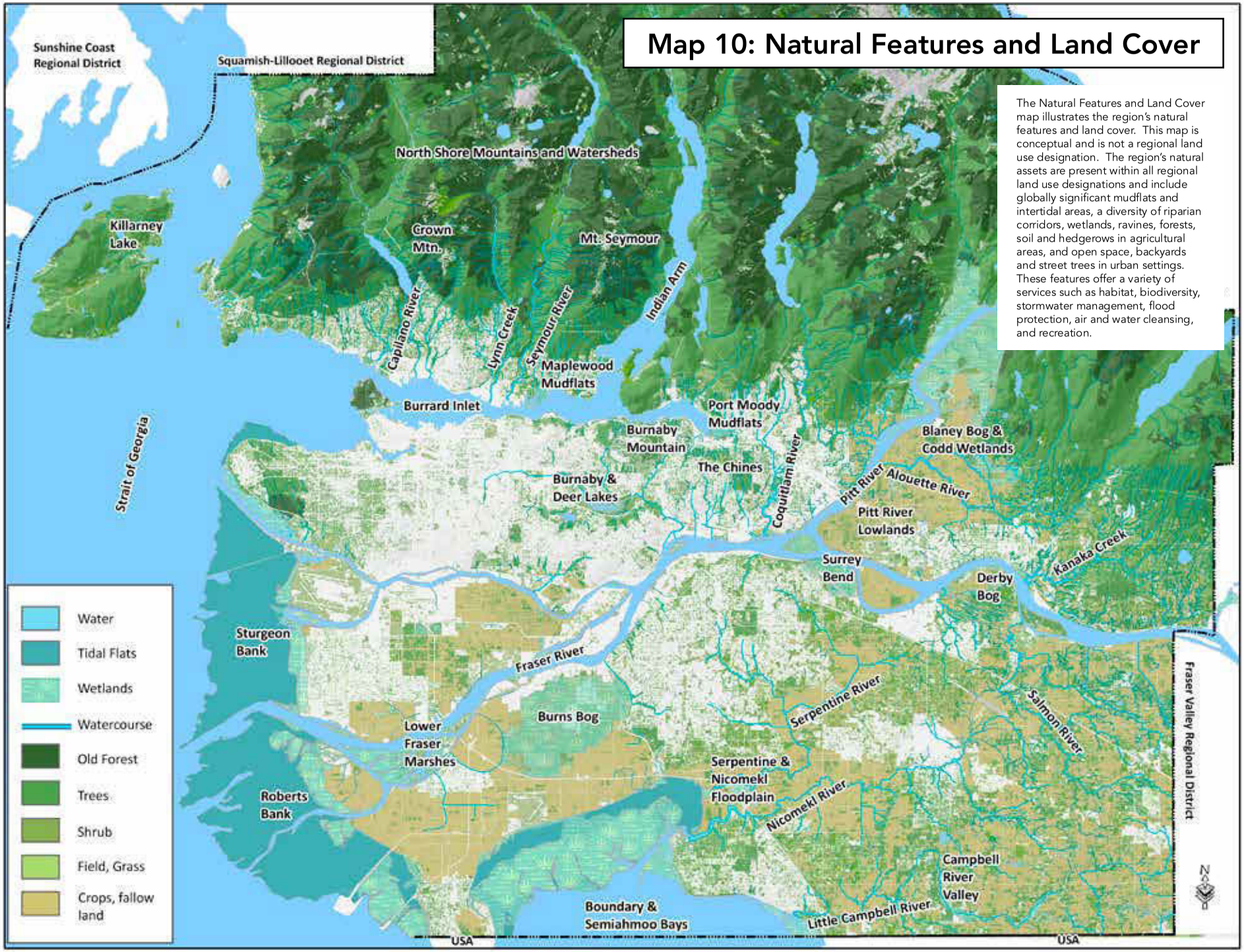
Actions Requested of Other Governments and Agencies

3.2.8 That TransLink coordinate the development of a regional cycling network with Metro Vancouver's Regional Recreation Greenway Network.

3.2.9 That the federal government and the province collaborate to enhance endangered species and ecosystem protection legislation that identifies, protects and restores habitats and biodiversity.



Note: Map for reference only, see section 6.13.2.



Note: Map for reference only, see section 6.13.2.

STRATEGY 3.3

Encourage land use and transportation infrastructure that reduce energy consumption and greenhouse gas emissions, and improve air quality

Metro Vancouver's role is to:

3.3.1 Implement the strategies and actions of the Regional Growth Strategy which contribute to regional targets to reduce greenhouse gas emissions by 33 percent below 2007 levels by 2020 and 80 percent below 2007 levels by 2050. Figure 3 identifies examples of strategies and actions contained in the Regional Growth Strategy to address climate change.

3.3.2 Work with the federal government and the province, TransLink, municipalities, non-governmental organizations, and the private sector to:

a) support the ongoing monitoring of energy consumption, greenhouse gas emissions, and air quality related to land use and transportation infrastructure;

b) promote best practices and develop guidelines to support local government actions to reduce energy consumption and greenhouse gases, and improve air quality related to land use and transportation infrastructure (e.g. district heating systems and renewable energy opportunities).

3.3.3 Accept Regional Context Statements that encourage land use and transportation infrastructure that reduce energy consumption and greenhouse gas emissions, and improve air quality, and that meet or work towards Action 3.3.4.

The role of municipalities is to:

3.3.4 Adopt Regional Context Statements which:

a) identify how municipalities will use their land development and transportation strategies to meet their greenhouse gas reduction targets and consider how these targets will contribute to the regional targets;

b) identify policies and/or programs that reduce energy consumption and greenhouse gas emissions, and improve air quality from land use and transportation infrastructure, such as:

- existing building retrofits and construction of new buildings to green performance guidelines or standards, district energy systems, and energy recovery and renewable energy generation technologies, such as solar panels and geoexchange systems, and electric vehicle charging infrastructure;
- community design and facility provision that encourages transit, cycling and walking (e.g. direct and safe pedestrian and cycling linkages to the transit system);

c) focus infrastructure and amenity investments in Urban Centres and Frequent Transit Development Areas, and at appropriate locations along TransLink's Frequent Transit Network;

d) implement land use policies and development control strategies which support integrated storm water management and water conservation objectives.

Actions Requested of Other Governments and Agencies

3.3.5 That TransLink, in collaboration with Metro Vancouver and municipalities, establish criteria for defining major development proposals, which are referenced in the *South Coast British Columbia Transportation Authority Act*, in order to help meet the objective of concentrating major trip-generating uses in areas well served by transit.

3.3.6 That TransLink pursue reductions of common air contaminants and greenhouse gas emissions from on-road transportation sources in support of regional air quality objectives and greenhouse gas reduction targets.

3.3.7 That TransLink manage its transit fleet and operations with the goal of increasing fuel efficiency and reducing common air contaminants and greenhouse gas emissions over time, in support of the Regional Growth Strategy and Air Quality Management Plan.

3.3.8 That the federal government and the province and their agencies establish further legislative and fiscal actions to help the public and private sectors to maximize reductions in energy consumption and greenhouse gas emissions, and improve air quality, such as:

a) in the building sector,

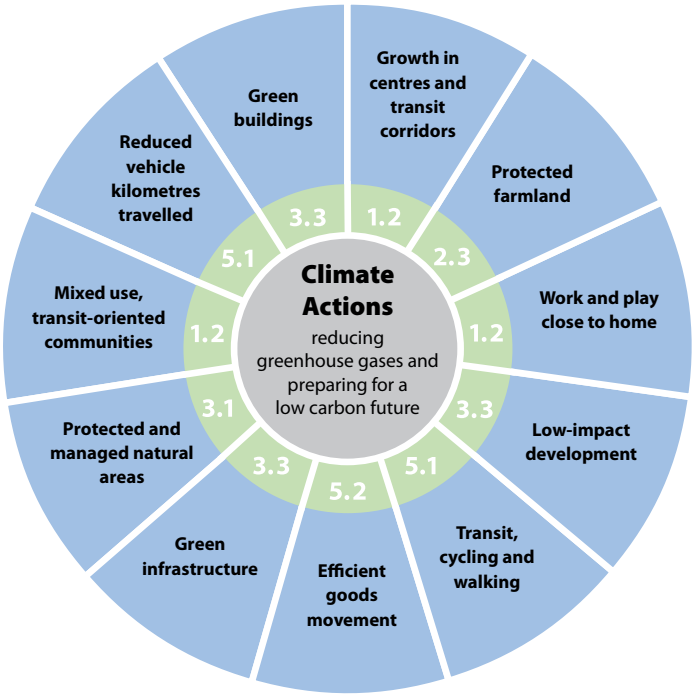
- accelerate the modernization of the BC Building Code
- increase incentives for residential and commercial building retrofits
- support, where feasible and appropriate, energy recovery, renewable energy generation and district energy systems and related transmission needs

b) in the transportation sector,

- enable the implementation of regional transportation demand management measures such as transportation user-based pricing
- increase funding for sustainable transportation infrastructure
- continue to advance stringent standards for on-road vehicle emissions and fuel carbon content.

FIGURE 3

How Land Use and Transportation Actions Address Climate Change



Note: Figure for reference only, see section 6.13.2
The numbers relate to the applicable strategy in the Regional Growth Strategy

STRATEGY 3.4

Encourage land use and transportation infrastructure that improve the ability to withstand climate change impacts and natural hazard risks

Metro Vancouver's role is to:

3.4.1 Incorporate climate change and natural hazard risk assessments into the planning and location of Metro Vancouver utilities, assets and operations.

3.4.2 Work with the federal government and the province, TransLink and municipalities to:

a) consider climate change impacts (e.g. sea level rise) and natural hazard risks (e.g. earthquake, flooding, erosion, subsidence, mudslides, interface fires) when extending utilities and transportation infrastructure that encourages land use development;

b) research and promote best practices in adaptation to climate change as it relates to land use planning.

3.4.3 Accept Regional Context Statements that encourage land use, transportation and utility infrastructure which improve the ability to withstand climate change impacts and natural hazard risks and that meet or work towards Actions 3.4.4 and 3.4.5.

The role of municipalities is to:

3.4.4 Adopt Regional Context Statements that include policies to encourage settlement patterns that minimize risks associated with climate change and natural hazards (e.g. earthquake, flooding, erosion, subsidence, mudslides, interface fires).

3.4.5 Consider incorporating climate change and natural hazard risk assessments into the planning and location of municipal utilities, assets and operations.

Actions Requested of Other Governments and Agencies

3.4.6 That the Integrated Partnership for Regional Emergency Management, in collaboration with the federal government and the province, and other agencies:

a) identify areas that are vulnerable from climate change and natural hazard risks, such as those listed in Actions 3.4.2 and 3.4.4;

b) coordinate priority actions to address the vulnerabilities identified, including implementation and funding strategies.

3.4.7 That the federal government and the province, in collaboration with the Integrated Partnership for Regional Emergency Management and other agencies:

a) provide financial assistance and timely data and information, such as flood hazard mapping, shoreline mapping, hydrological and hydraulic studies, to better enable local governments to fulfill their flood hazard management roles and responsibilities;

b) provide a coordination role to address flood hazard issues and management decisions;

c) implement appropriate preparatory actions to address the implications of long-term sea level rise on infrastructure planning, construction, and operations;

d) review and improve the effectiveness of existing provincial legislation and guidelines regarding flood hazard management by municipalities.