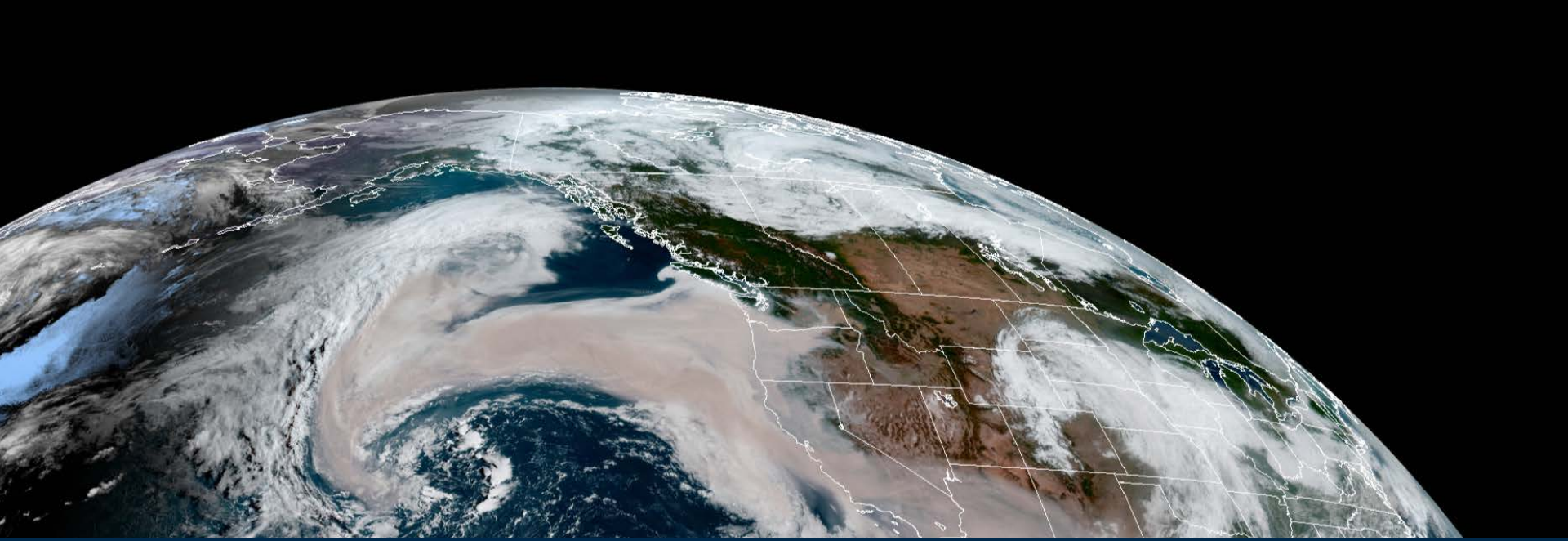

Pacific Northwest Smoke – September 2020

Metro Vancouver's Air Quality Advisory Program

Julie Saxton, PhD

Air Quality Planner

GB/PS International Airshed Strategy Coordinating Committee Meeting – June 9, 2021

46081780

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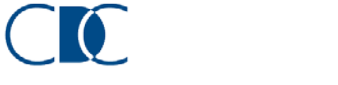
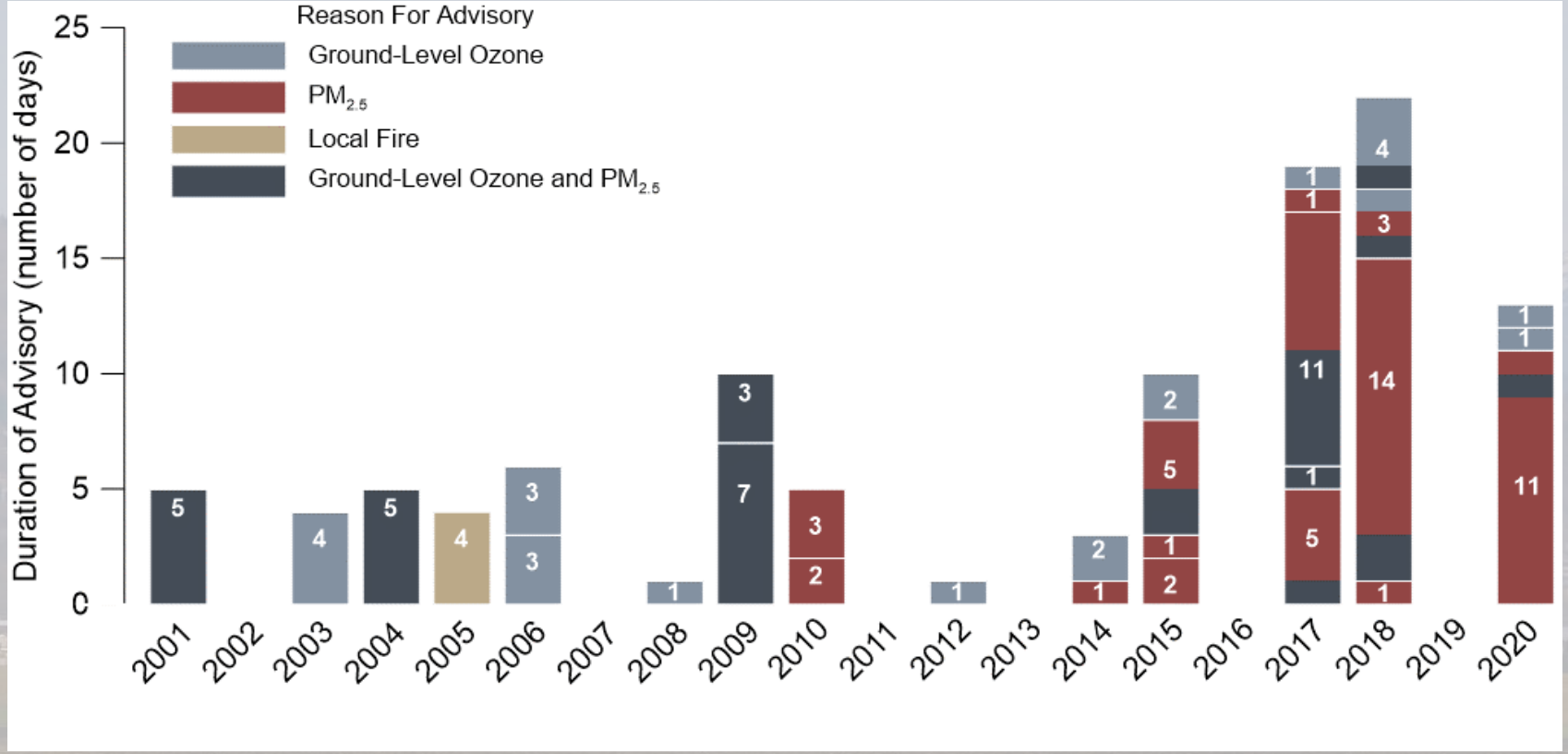
METRO VANCOUVER AIR QUALITY ADVISORY PROGRAM

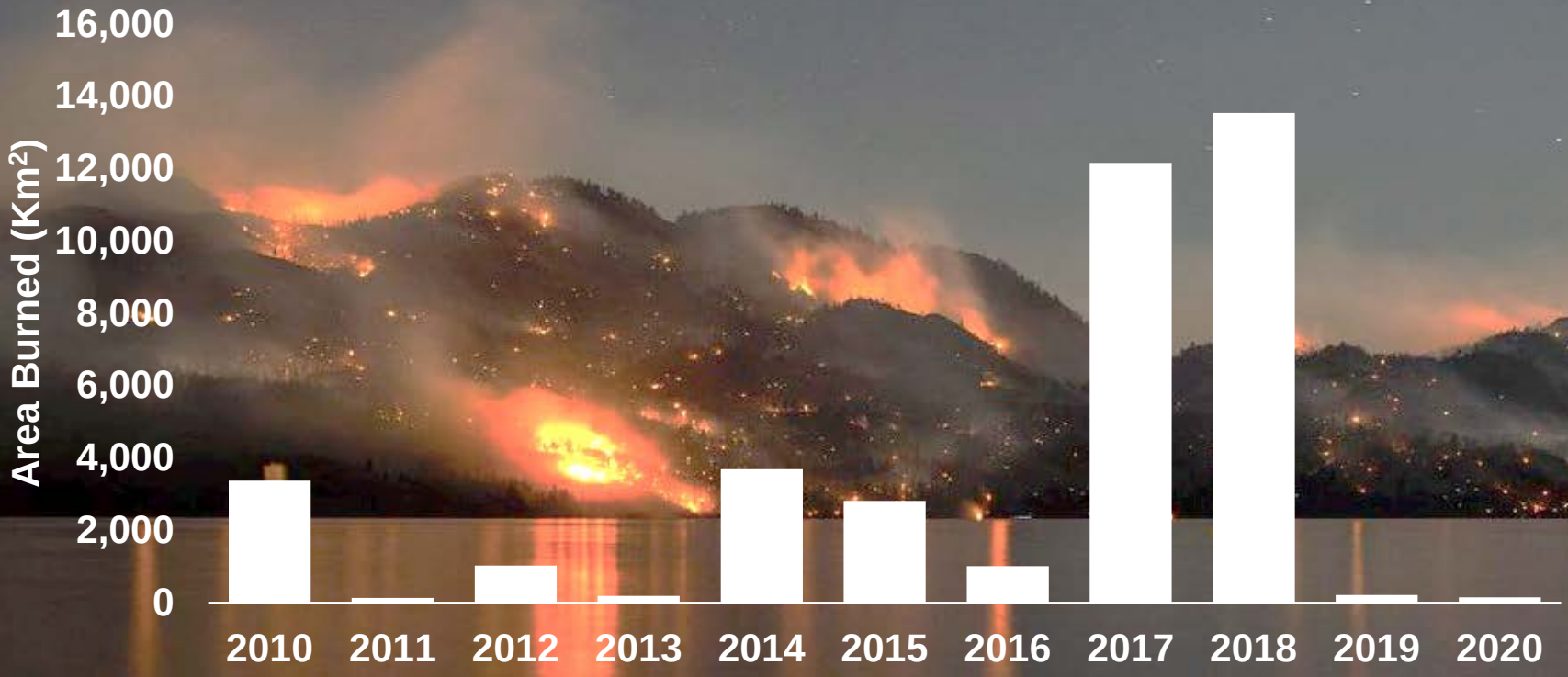
Operated in collaboration with:

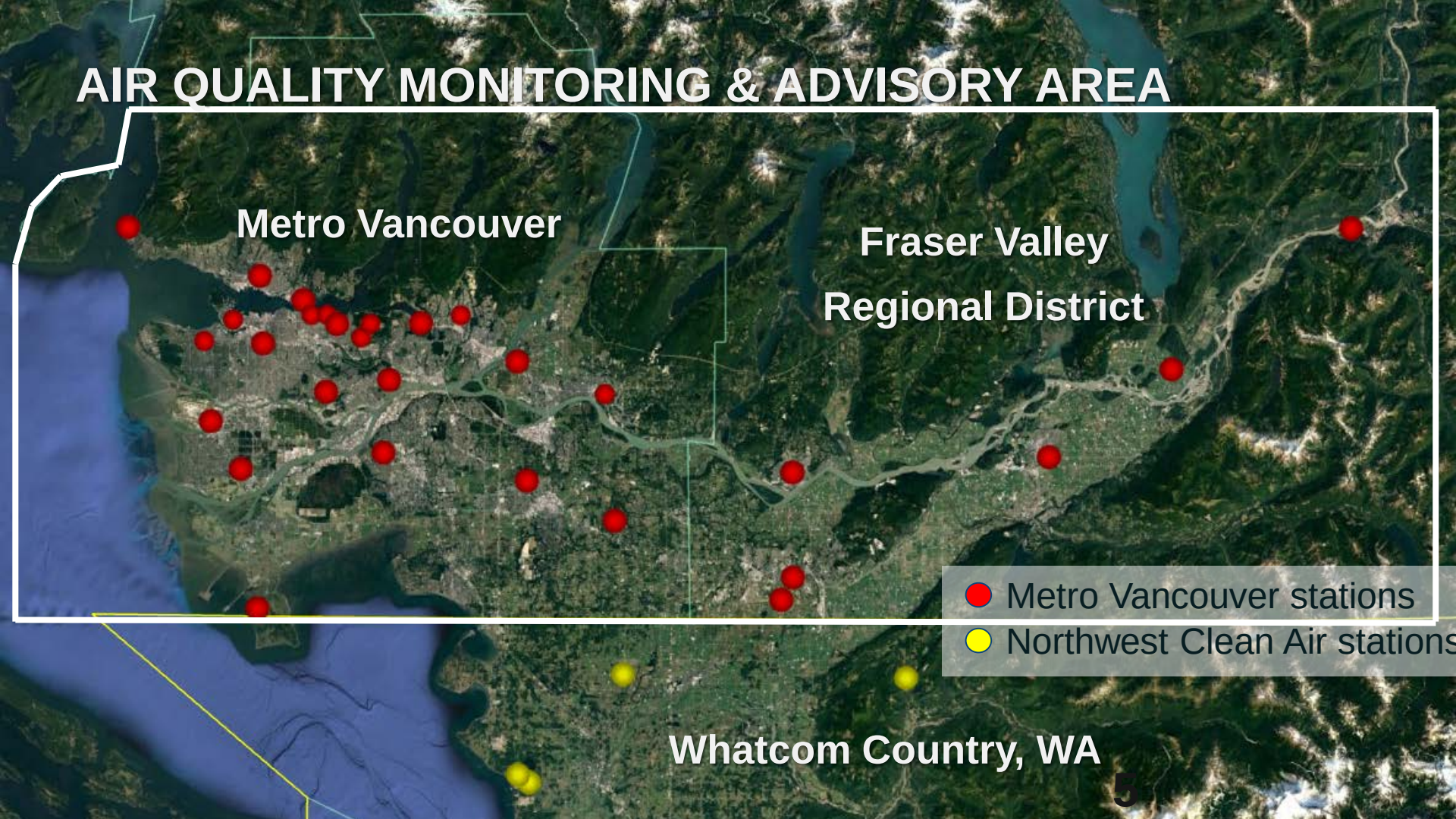


AIR QUALITY ADVISORIES 2001-2020



RECENT BRITISH COLUMBIA WILDFIRE SEASONS




AIR QUALITY MONITORING & ADVISORY AREA
Metro Vancouver
Fraser Valley
Regional District
Metro Vancouver stations
Northwest Clean Air stations
Whatcom Country, WA

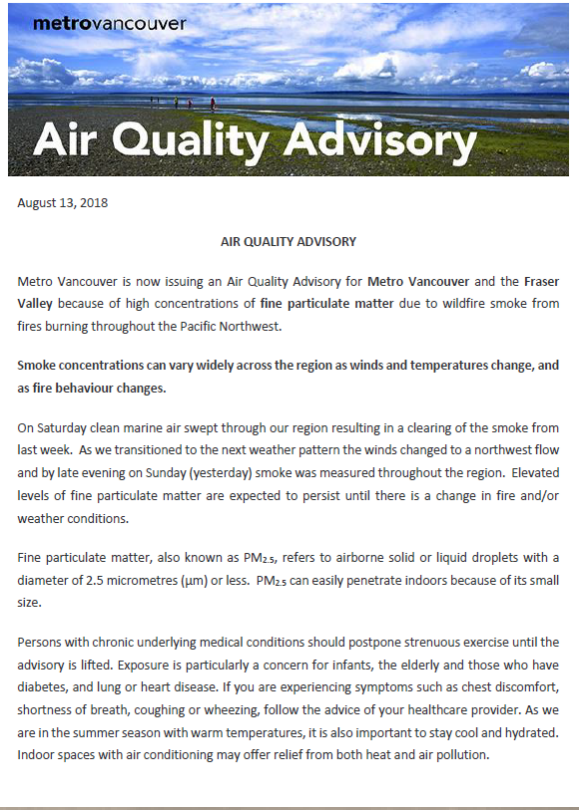
AIR QUALITY ADVISORY CRITERIA

1. Air quality exceeds or expected to exceed objectives at two or more stations

2. Air quality has deteriorated or expected to deteriorate into “high health risk” category (7 or greater) of the AQHI (Air Quality Health Index) for at least two consecutive hours

METRO VANCOUVER AIR QUALITY ADVISORY

- What, where, when, why
- Forecast
- Health risk, affected groups
- Reduce exposure guidance
  - Limit outdoor activity, seek clean air spaces
- Actions to reduce emissions
- Contact information



UPDATE EMAIL

Air Quality Advisory | Ali Ergudenler; 'Amy Lubik (FH)'; Amy Thai; 'Annie Seagram'; 'Aqreporting (MOE)'; Arvir

Air Quality Update - September 8, 2020

Air Quality Update for September 8, 2020

	Yesterday	Today	Tomorrow
LEVEL OF CONCERN	low	high	medium

SUMMARY
It is expected that wildfire smoke will impact our region today and is already visible in western portions of Metro Vancouver. New, aggressive wildfires began yesterday in eastern Washington and Oregon which are contributing significant wildfire smoke to the Pacific Northwest. It is possible an air quality advisory will be issued today and staff are continuing to monitor conditions before a decision is made.

POLLUTANTS OF CONCERN	Yes or No	Reason
Fine particulate matter (PM2.5)	Yes	Wildfires burning in Washington, Oregon and California
Ground-level ozone (O3)	No	

DETAILS
The current ridge of high pressure has made conditions extremely favourable of aggressive fire growth and new fire starts. Yesterday, eastern Washington state saw a significant number of new fires begin and grow, with some estimates of 117,000 hectares burned yesterday alone. Through yesterday evening, smoke began moving westward as outflow winds picked up and the Puget Sound area saw deteriorating air quality just after sunset. Overnight, smoke continued to drain into Puget Sound and up into the Strait of Georgia.

SUMMARY OF PAST ADVISORIES
July 30-31, 2020: Ground-level ozone advisory August 16-17, 2020: Ground-level ozone advisory

CONTACT		
Air Quality Advisory Staff can be reached by phone or email if you have any questions or concerns about air quality.	Phone:	604-240-0708
	Email:	AQAdvisory@metrovancouver.org

BACKGROUND

Ground-level ozone (O3) is not emitted directly into the air. It is formed when nitrogen oxides (pollutants emitted when fuels are burned) and volatile organic compounds (emitted from solvents) react in the air in the presence of sunlight. The highest levels of ground-level ozone are generally observed between mid-afternoon and early evening on summer days. Elevated levels of ground-level ozone are typically experienced in eastern parts of Metro Vancouver and the Fraser Valley Regional District.

Fine particulate matter (PM2.5) refers to airborne solid or liquid droplets with a diameter of 2.5 micrometres (μm) or less. PM2.5 can easily penetrate indoors because of its small size. PM2.5 concentrations tend to be highest around busy roads, industrial operations, major ports as well as areas where residential wood burning activity occurs.

Air Quality Objectives

Metro Vancouver has a 1-hour O3 objective of 82 ppb and a 8-hour O3 objective of 62 ppb. The 8-hour O3 objective is intended to be compared to the 4th highest daily maximum 8-hour average concentration, averages over three consecutive years.

Metro Vancouver has a 24-hour PM2.5 objective of 25 ug/m3 which is intended to be compared to the 24-hour rolling average concentration. There is no 1-hour PM2.5 objective.

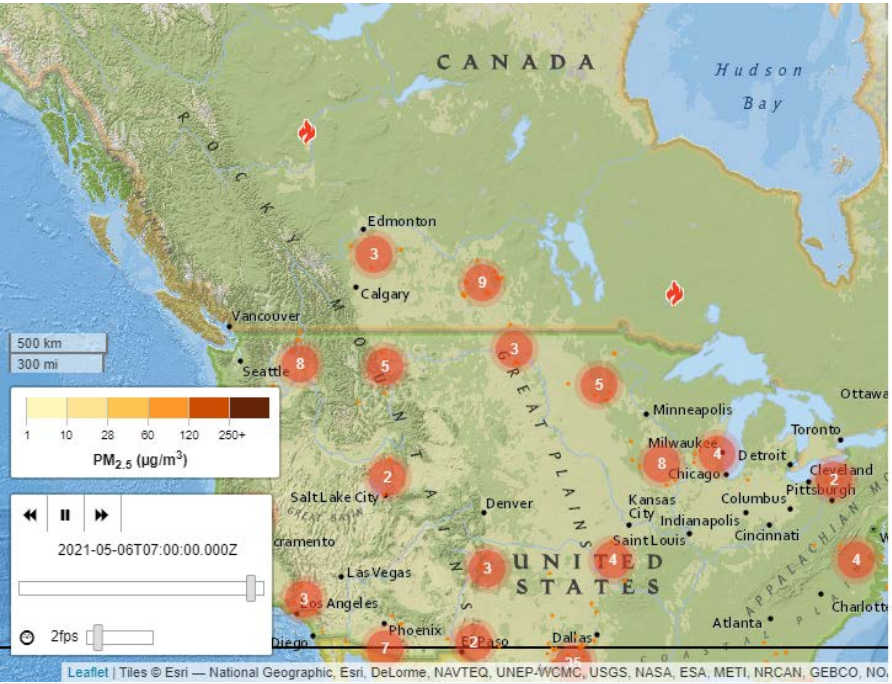
For more information on objectives: http://www.metrovancouver.org/services/air-quality/AirQualityPublications/CurrentAmbientAirQualityObjectives.pdf

WARNING: The attached report is preliminary and the information in the report is based on real-time data and expert opinion and should not be forwarded to third parties.

SMOKE MODELS

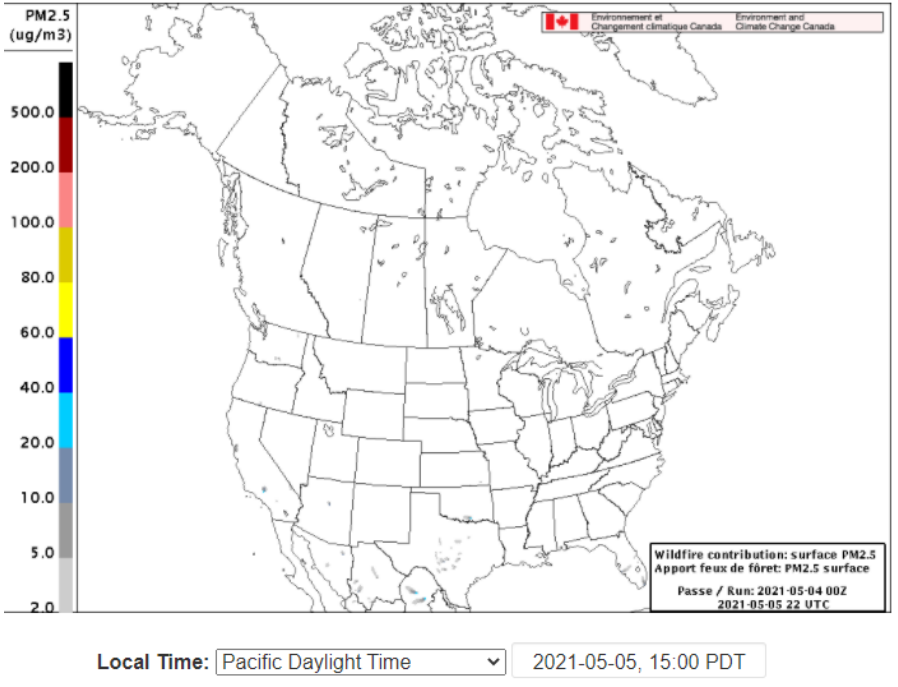
Firesmoke

www.firesmoke.ca



Firework

www.weather.gc.ca/firework



AIR QUALITY ADVISORIES & CLIMATE CHANGE

- Recent studies indicate climate change increasing wildfire likelihood, area burned
- Increasing summer temperatures will increase risk of ground-level ozone formation

AGU100 ADVANCING EARTH AND SPACE SCIENCE

Earth's Future

RESEARCH ARTICLE
10.1029/2018EF001050

Attribution of the Influence of Human-Induced Climate Change on an Extreme Fire Season

M. C. Kirchmeier-Young[1,2], N. P. Gillett[2], F. W. Zwiers[1], A. J. Cannon[3], and F. S. Anslow[1]

[1]Pacific Climate Impacts Consortium, University of Victoria, Victoria, British Columbia, Canada, [2]Canadian Centre for Climate Modelling and Analysis, Environment and Climate Change Canada, Victoria, British Columbia, Canada, [3]Climate Research Division, Environment and Climate Change Canada, Victoria, British Columbia, Canada

Key Points:
- An event attribution analysis is performed for the record-breaking wildfire season of 2017 in BC
- Anthropogenic climate change greatly increased the likelihood of extreme warm temperatures and high fire risk
- A strong anthropogenic climate change contribution is also found for the large area burned

Supporting Information:
- Supporting Information S1

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Citation:
Kirchmeier-Young, M. C., Gillett, N. P., Zwiers, F. W., Cannon, A. J., & Anslow, F. S. (2019). Attribution of the influence of human-induced climate change on an extreme fire season. Earth's Future, 7, 2–10. https://doi.org/10.1029/2018EF001050

Received 18 SEP 2018
Accepted 3 DEC 2018
Accepted article online 13 DEC 2018
Published online 8 JAN 2019

Abstract A record 1.2 million ha burned in British Columbia, Canada's extreme wildfire season of 2017. Key factors in this unprecedented event were the extreme warm and dry conditions that prevailed at the time, which are also reflected in extreme fire weather and behavior metrics. Using an event attribution method and a large ensemble of regional climate model simulations, we show that the risk factors affecting the event, and the area burned itself, were made substantially greater by anthropogenic climate change. We show over 95% of the probability for the observed maximum temperature anomalies is due to anthropogenic factors, that the event's high fire weather/behavior metrics were made 2–4 times more likely, and that anthropogenic climate change increased the area burned by a factor of 7–11. This profound influence of climate change on forest fire extremes in British Columbia, which is likely reflected in other regions and expected to intensify in the future, will require increasing attention in forest management, public health, and infrastructure.

Plain Language Summary A record 1.2 million ha burned in British Columbia, Canada's extreme wildfire season of 2017. Key factors in this unprecedented event were the extreme warm and dry conditions that prevailed at the time, which are also reflected in extreme fire weather and behavior metrics. To quantify the influence of human-induced climate change on this event, we compare the likelihood of the risk factors affecting the extreme fire season to an estimate of what the likelihood might have been without the human component. We find that human-induced climate change contributed greatly to the probability of the observed extreme warm temperatures, high wildfire risk, and large burned areas.

1. Introduction

A record 1.2 million ha (an area nearly the size of Connecticut) burned during the extreme 2017 wildfire season in British Columbia (BC), Canada (BC Wildfire Service, 2017). Amidst persistent hot and dry conditions, the wildfire season saw 65,000 people displaced (BC Wildfire Service, 2017) and widespread impacts on air quality and human health. New records were set for area burned and the length of a provincial state of emergency (BC Wildfire Service, 2017). Projections of increased fire activity (Boulanger et al., 2014; Flannigan et al., 2009; Hope et al., 2016; Wotton et al., 2010), accompanied by increased suppression costs (Hope et al., 2016), make climate change a key consideration for fire management plans (Wildland Fire Management Working Group, 2016) and wildfire management an important component of climate change adaptation plans.

The area that was burned by wildfires in BC in 2017 was 40% greater (Figure 1) than the previous record set in 1958, based on an observational record beginning in 1950. The area burned in southern BC in 2017 was an order of magnitude (Figure 1) greater than the previous record (2009). An immediate question that was posed by forest managers, policy makers, and the public even as the events were ongoing was whether anthropogenic climate change, such as has been detected in Western Canada (Kirchmeier-Young et al., 2017; Wan et al., 2018; Figure S1 in the supporting information) played a role in intensifying this very large loss. We therefore performed event attribution analyses (National Academies of Science, Engineering, and Medicine, 2016) of both the wildfire risk factors and the area burned to assess the role of anthropogenic influence. Previous studies have identified anthropogenic influence on wildfire risk in some regions of western Canada (Gillett et al., 2004; Kirchmeier-Young et al., 2017) and the United States (Abatzoglou & Williams, 2016; Partain et al., 2016; Yoon et al., 2015), but none has previously considered a thorough evaluation of an event

Questions?

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Together we make our region strong