

Board Meeting Item 3A for March 19, 2020

Environmental Justice and Air Quality in the Era of Citizen Science

Summary of the B.C. Lung Association 17th Annual Air Quality Workshop, February 11, 2020, Vancouver

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Ordinary citizens are becoming increasingly able to discover for themselves what is happening in the air that surrounds them. At the same time, the movement towards environmental justice focusses on equalizing environmental benefits and burdens across populations.

“Not everyone breathes the same air,” according to Julian Marshall, Professor of Environmental Engineering at University of Washington. He says, “Historic structural racial segregation and lack of access to health care cause disproportionate impacts for some citizens.”

Other reasons that vulnerability to air pollution is disproportionate include exposure to many sources and multiple hazards, underlying disease rates in some communities and the impact of existing social and environmental stressors.

Many presenters cited readily available, low cost portable air quality measuring devices as a means of providing data to individuals and communities concerned about local conditions and health.

Andrea Clements, research physical scientist with the U.S. Environmental Protection Agency, says that although they have limitations, these devices help make air quality visible and, with informed use, can deliver reasonable data quickly. Even with their existing limitations, sensor systems currently on the market can provide insights for communities wanting ambient air quality data.

Suggestions for getting the best results from these devices include: comparing them to a regulatory reference at the beginning and end of data collection, considering their capacity to adjust for meteorological conditions, and in the case of currently available Particulate Matter devices, their ability or inability to detect very small or very large particles.

Clements says that soon air quality data will be as widely available and interpretable as traffic or meteorological data is now.

At an extreme of low cost, Graeme Carvlin of the Puget Sound Clean Air Agency (PSCAA) has used box fans with furnace filters strapped on to demonstrate the pollution from a freeway running beside a school in his community. PSCAA's Grade Three program educates students to use hand-held air quality monitors, understand the data and take action at a personal level (i.e. determine the safest route to walk to school).

PSCAA also provides a lending library where citizens can borrow sensors and are provided with appropriate guidance. Interestingly, after taking a questionnaire and describing why they want the information, many people realize that the data they are seeking is already available and easily accessed on the internet.

School children in Arrowtown, New Zealand were also lent sensors, which they were taught to assemble and then mount in 85 Arrowtown homes. Nestled in a mountain valley, local homes are mostly heated

with wood. Cold weather often causes inversions which trap the smoke, yet many woodfire burners had developed a hardened attitude against converting to less polluting heating sources.

Ian Langley, Principal Air Quality Scientist at the National Institute of Water and Atmospheric Research in Auckland, New Zealand described the project at the Arrowtown school which he told the students would be “real science”. As well as taking home sensors, the students created an app with a portal to data, a weekly quiz and a health survey. Also included was an animation of overnight air quality fluctuations posted each day at 6 a.m. The program engaged a large portion of the population and the weight of the data encouraged movement towards safer forms of home heating.

Langley now feels a moral responsibility regarding how we talk to kids about the environment. Referring to Australia’s wildfires and their visible effect on the air quality in New Zealand, he says, “kids see this as a sign of the end of the world”. He stresses that we keep conversations solution focussed and that having data from their street, and even their house, is extremely powerful.

A stated goal of this workshop was to provide a Canadian perspective on environmental justice, including a particular focus on the perspective of indigenous communities.

In his opening address, Musqueam Elder Chris described some of the conditions in his original home. He said, “We don’t live there anymore, we don’t know the air quality there and don’t want to hunt there or fish from black sludge.” Activity by pulp mills and other industries has caused air, water and noise pollution. Elder Chris feels environmental justice lies in reconciling and harmonizing traditional and citizen science.

Annita McPhee, from the Tahitian/Tlingite Nations, described her five-month long sojourn at Sitka, British Columbia, in 2018. McPhee was on her annual visit home for the traditional salmon harvest when the area was devastated by a wildfire that destroyed most dwellings and the landscape. After the immediate crisis of the fire was over, McPhee stayed in the community as the Resiliency Outreach Manager. McPhee says she realized then how unprepared and underfunded indigenous communities are to address climate change events or emergencies.

After fifteen years of consulting with First Nation and Metis communities about oil sand development and air quality management, David Spink has some examples of applying citizen science to address air quality concerns. Spink referenced the Fort McKay First Nation near Fort McMurray, explaining that the community developed air quality permissible levels, based on the WHO 2014 Guidelines, and is doing its own monitoring.

Fort McKay is at the centre of the oil sands minable portion and has been dealing with the resulting emissions and odours for decades. Currently the biggest air quality issue is odour, occurring 30% of the time. With so many potential sources, it is difficult to pin down exactly where the odours originate. Enter citizen science and the development of an app to report and monitor odours. Residents supply data to the APP using GPS and their “very own built in air quality monitor-their nose”.

There are many reasons that we don’t all breathe the same air. Each case is unique and calls for its own responses and solutions. As Julian Marshall suggests, “instead of a silver bullet, we need silver buckshot”. He adds that we start by improving air quality in the most polluted locations and increase efficiency until everybody’s air is safe to breathe.