

# Air Quality – Thetis Island

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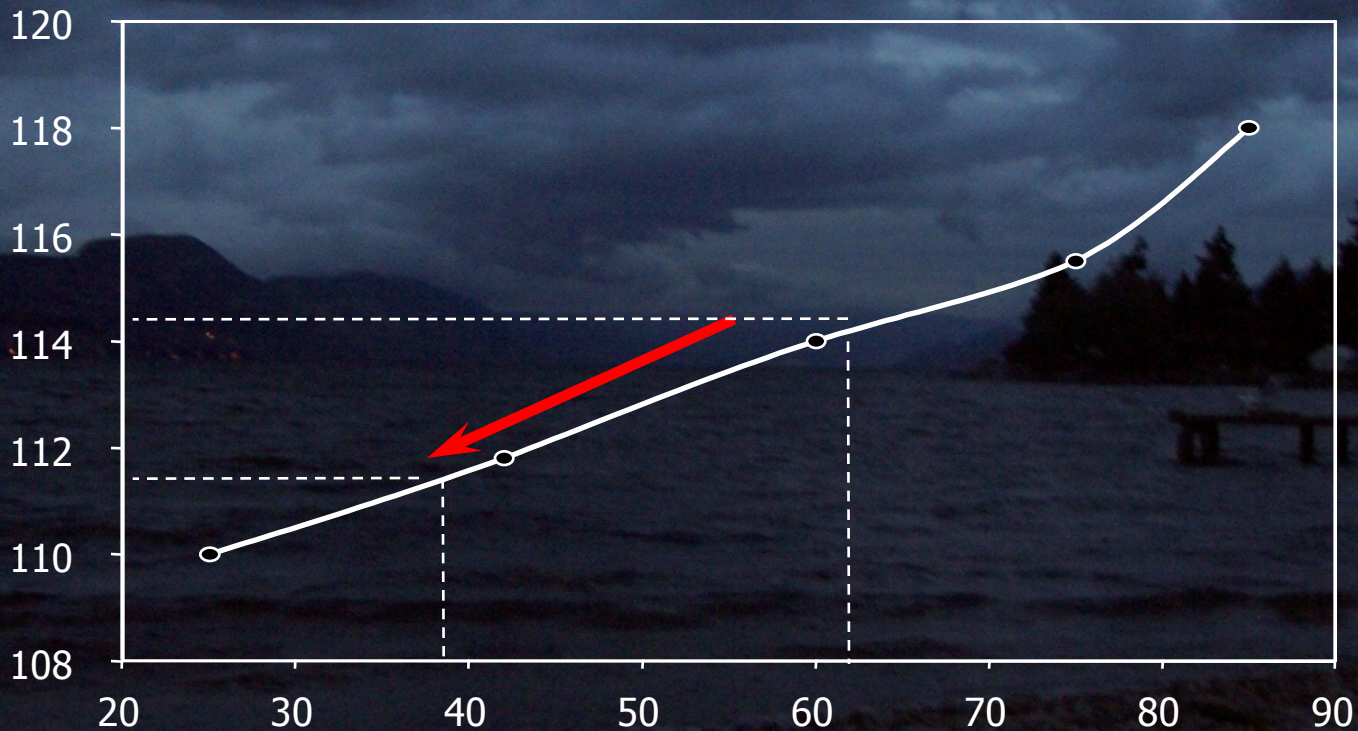
# Canadian Air Quality Impact (BC)

- 2682 acute premature deaths (385).
- 11,000 hospital admissions (1158).
- 92,000 emergency department visits (8763).
- >20,000,000 minor illnesses (2,526,900).
- 620,000 doctor's office visits (62,112).

CMA 2008 [No Breathing Room: National Illness Costs of Pollution,](#)

# Relationship between air quality and mortality as a health outcome

Mortality (% relative to background)



Air quality index units

# Common Pollutants

- Particulate matter
- Ozone
- Nitrogen oxides
- Sulphur dioxide
- Carbon monoxide

# “Un”commoner Pollutants or “Less Talked About” Pollutants

- Volatile organics
- **Wood smoke**
- Diesel fumes
- Tobacco smoke
- Benzene, vinyl chloride, butadiene, formaldehyde ....
- Mercury, arsenic .....

# Source Comment

- **Natural pollutants are just as bad as man made ones.**
  - Forest fires
  - Ozone



# Exposure Comment

- Pollutant concentrations can vary considerably within a community.
- Most health studies have looked at the generic levels of pollutants for a whole community, not individual specific exposure.
- There are things that you can do to reduce your individual exposure.
- Living on an island does not protect airshed

# Health Impact Synopsis

- Air pollution causes both short term and long term affects to health.
- Older studies looked at short term impacts.
- Long term impacts are proving to be even greater.
- While toxicology looks at single pollutant impacts, real life effects involve exposure to multiple pollutants at the same time.

# Major Health Impacts

- **Heart problems**

- Half of air pollution deaths are due to cardiac problems – the hidden killer.
- Increased heart attacks, angina, heart failure, cardiac arrhythmias.

- **Breathing problems**

- Worsening of COPD.
- Exacerbation of asthma.
- Reduced lung function.
- Children's and adult respiratory hospital admissions.

# Other Health Impacts

- **Possible increased risk** of:
  - Lung cancer
  - Chronic heart disease
  - Atherosclerosis (hardening of the arteries)
  - Lung function
  - Development of asthma in children
  - Low birth weight babies
  - Ear infections
  - Increased respiratory and cardiac medication use

# Who Is At Greatest Risk?

- **40% of the population are considered at increased risk.**
  - Unborn fetuses
  - Pre-pubescent youth, the younger the more sensitive
  - Persons over 65
  - Persons with chronic heart and lung disease
    - Up to 14% of population have asthma
    - Smokers
  - Persons living in lower quality housing conditions
    - Proximity to industry, poorer indoor air quality
  - Some chronic diseases: diabetes, rheumatoid illnesses
  - ...

# Airshed Planning

- Irrespective of the quality of the air, **efforts to improve air quality will reduce health outcomes**
- **There is no “safe” level of pollutants.** Air quality objectives are planning tools, but should not be the ultimate goals.
- Most airsheds have multiple sources and attributions of emissions – fairness means **everyone needs to do their share.**
- Such planning only happens when all come together and pull some weight

# Local Government Air Quality Actions

- **Airshed Management Planning**
- **Clean air by-law** (addressing smoking public places).
- Provincial Wood-stove Exchange program.
- Public Education (A Healthier You, [www.airqualitybc.ca](http://www.airqualitybc.ca), link with bylaw changes).
- Access to organic disposal through chipping or composting.
- Curbside pick up or free drop off of backyard wastes.
- Absolute preclusion on burning of garbage.
- Policies to limit burning of organic material.
  - Provincial regulation changes OBSCR – will not address backyard burning.
- Policies to limit transportation related emissions.
  - Idling reduction, drive throughs, public transportation, planning decisions.

# Air Quality Update for the Cowichan Valley

Material courtesy of



Earle Plain, Air Quality Meteorologist  
Air Quality Section  
Environmental Protection Division



Lake Cowichan



Substation



Georgia Park Hts

Duncan Cairnsmore Core Station

Deykin Avenue

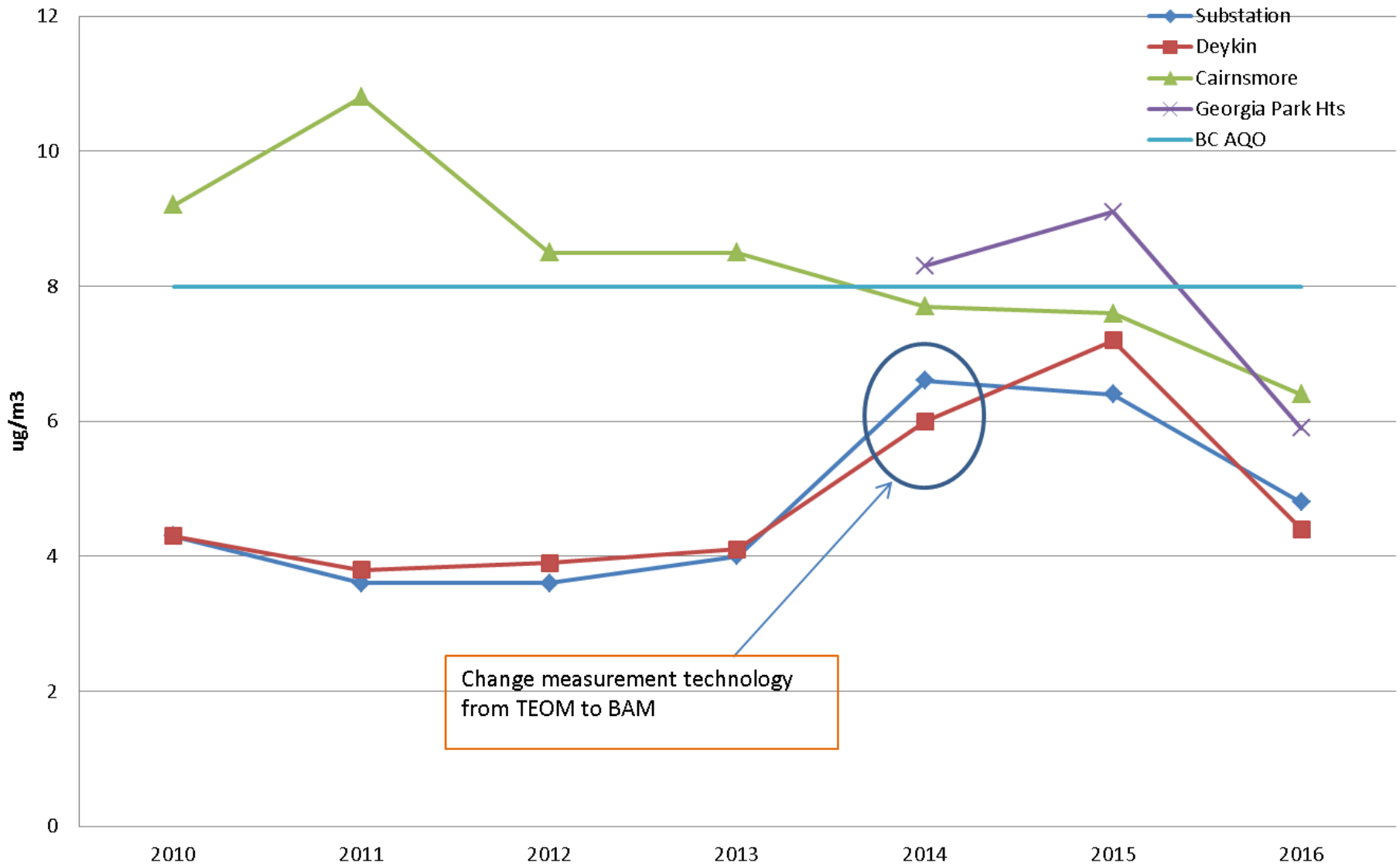
Shawnigan Lake



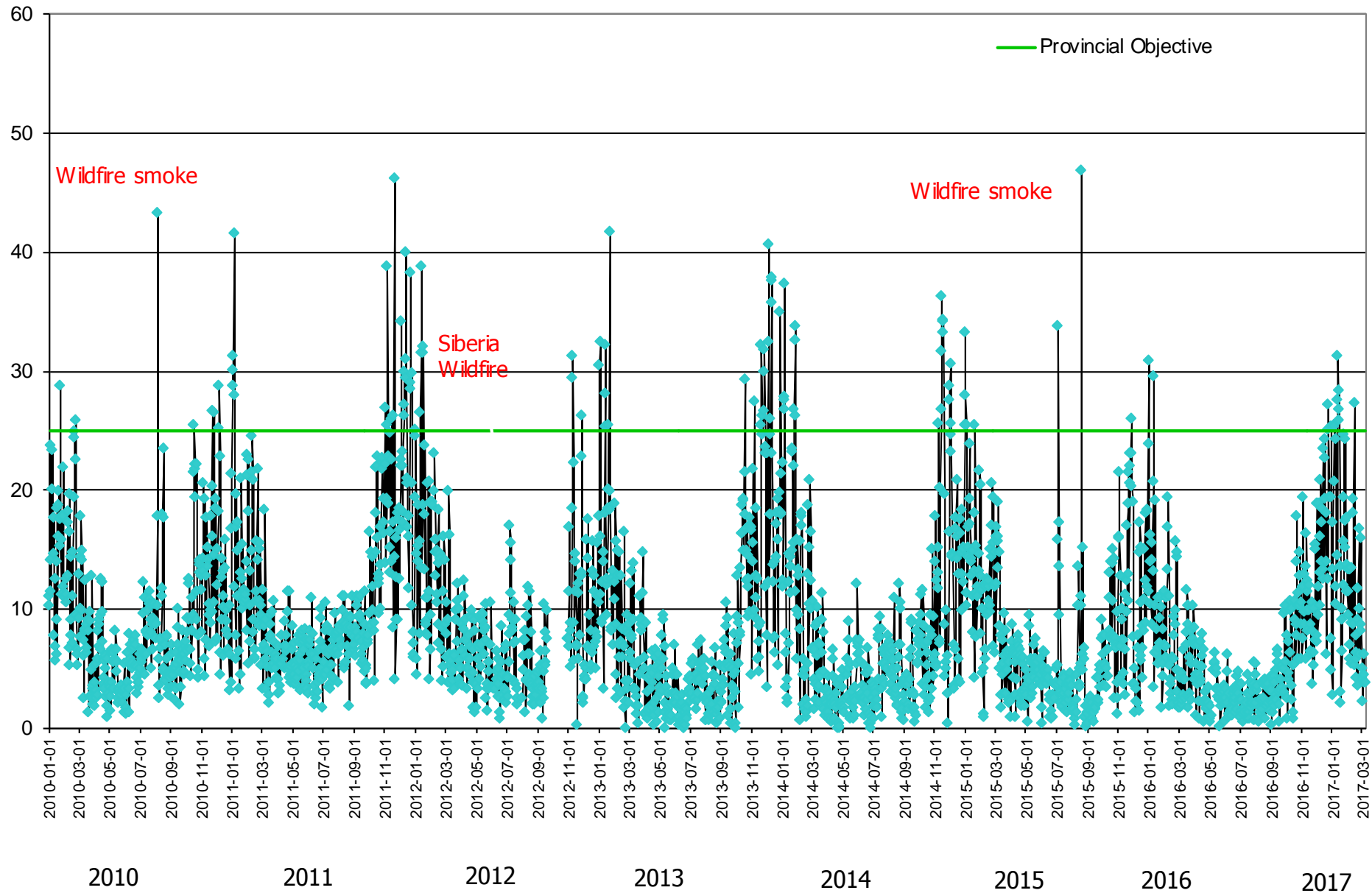
# Data Summary

- NO<sub>2</sub>, SO<sub>2</sub>, and ground level O<sub>3</sub> levels below Provincial Objective levels
- TRS concentrations are below Provincial odour objective levels 99% of the time at Quamichan Lake and 96-98% of the time at sites closer to the pulp mill
  - Remains a pollutant of interest
- Fine particulate matter (PM<sub>2.5</sub>) occasionally exceeds Daily Provincial Air Quality Objectives
  - Main pollutant of concern – health effects, visibility degradation, vegetation damage

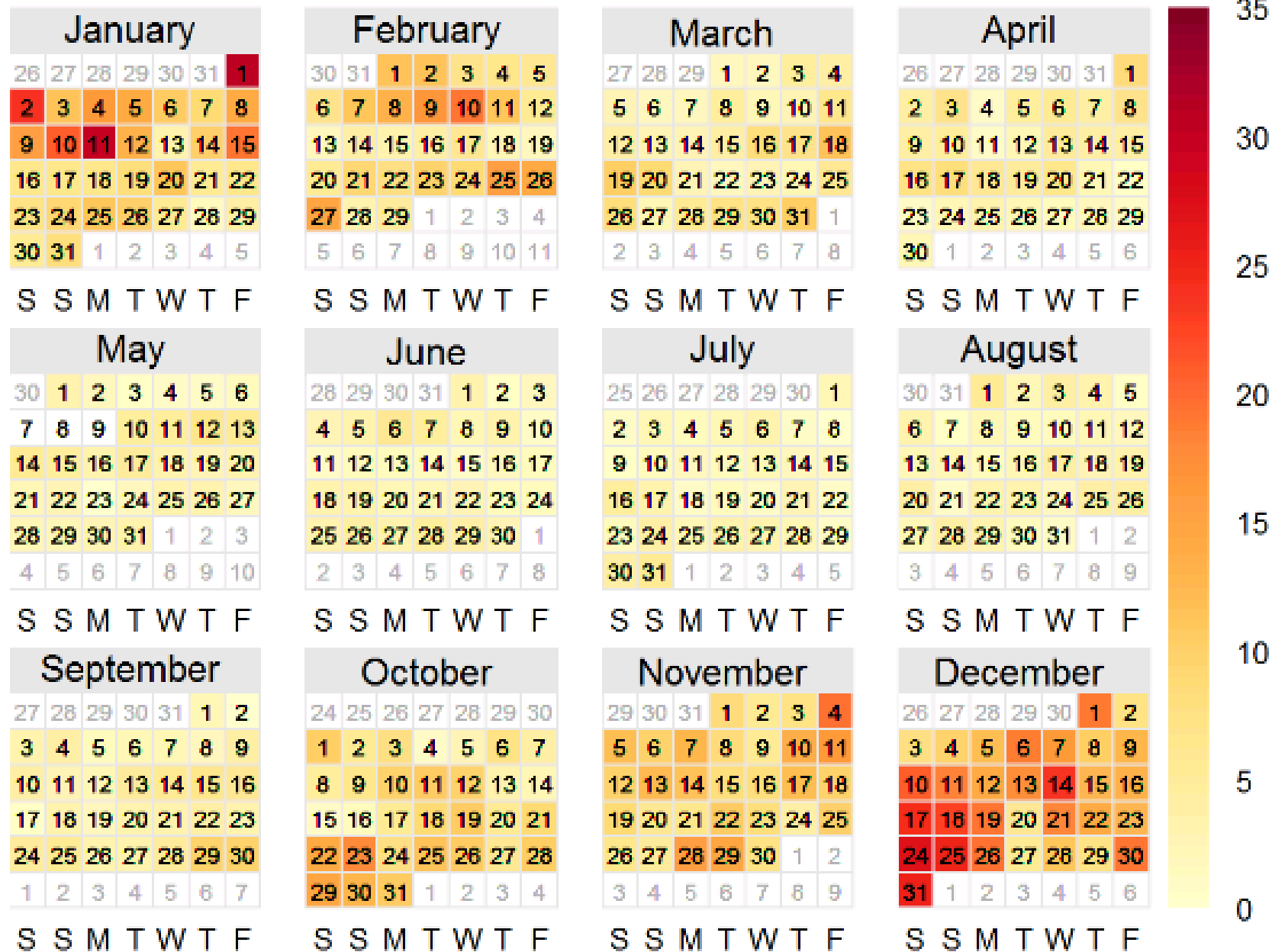
# Annual Average PM2.5 Cowichan Valley 2010-2016



# Daily PM2.5 Concentrations at Duncan Cairnsmore January 2010 - March 2017

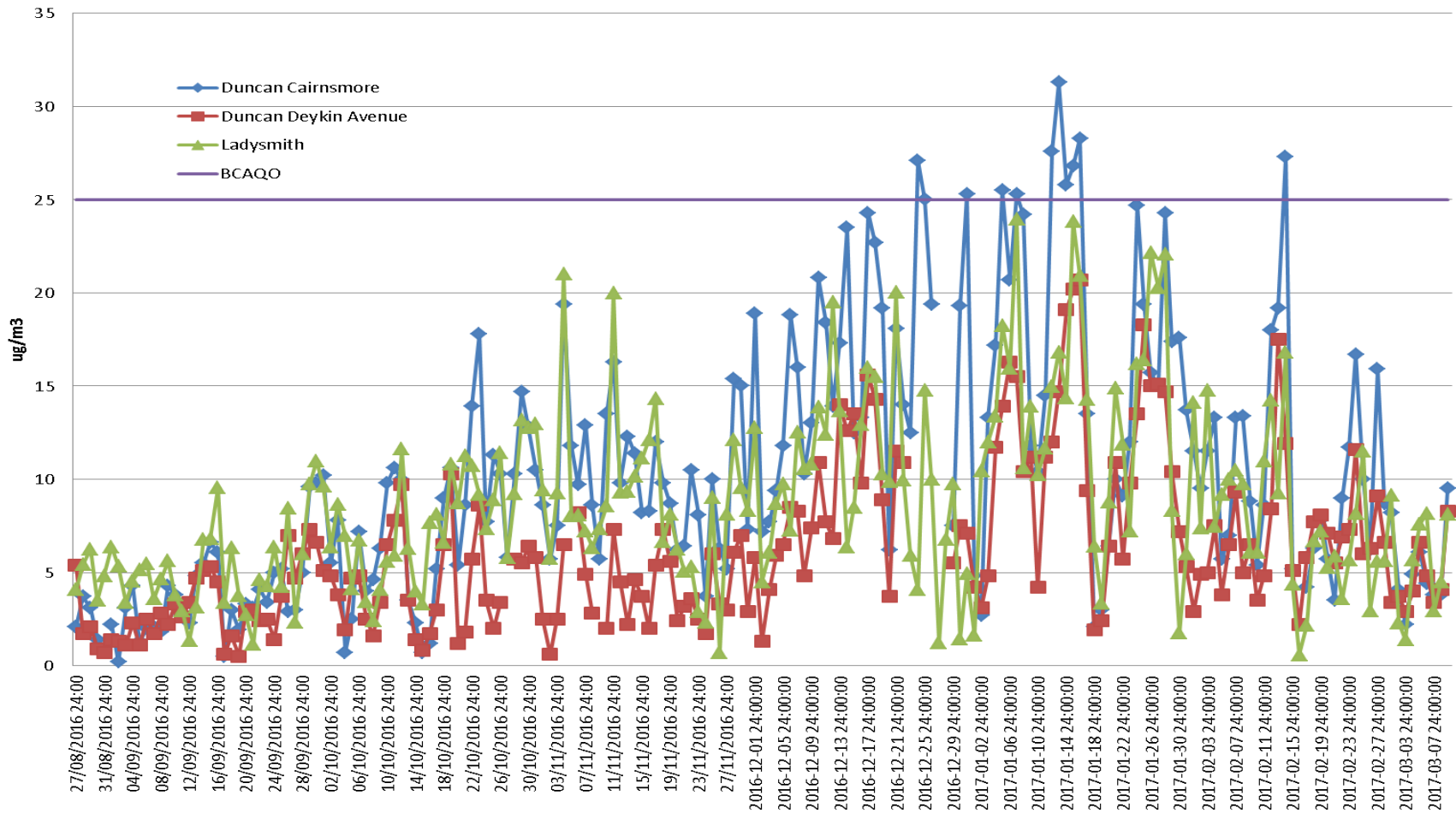


# 2016 PM<sub>2.5</sub> concentrations ( $\mu\text{g m}^{-3}$ ) in Cairnsmore



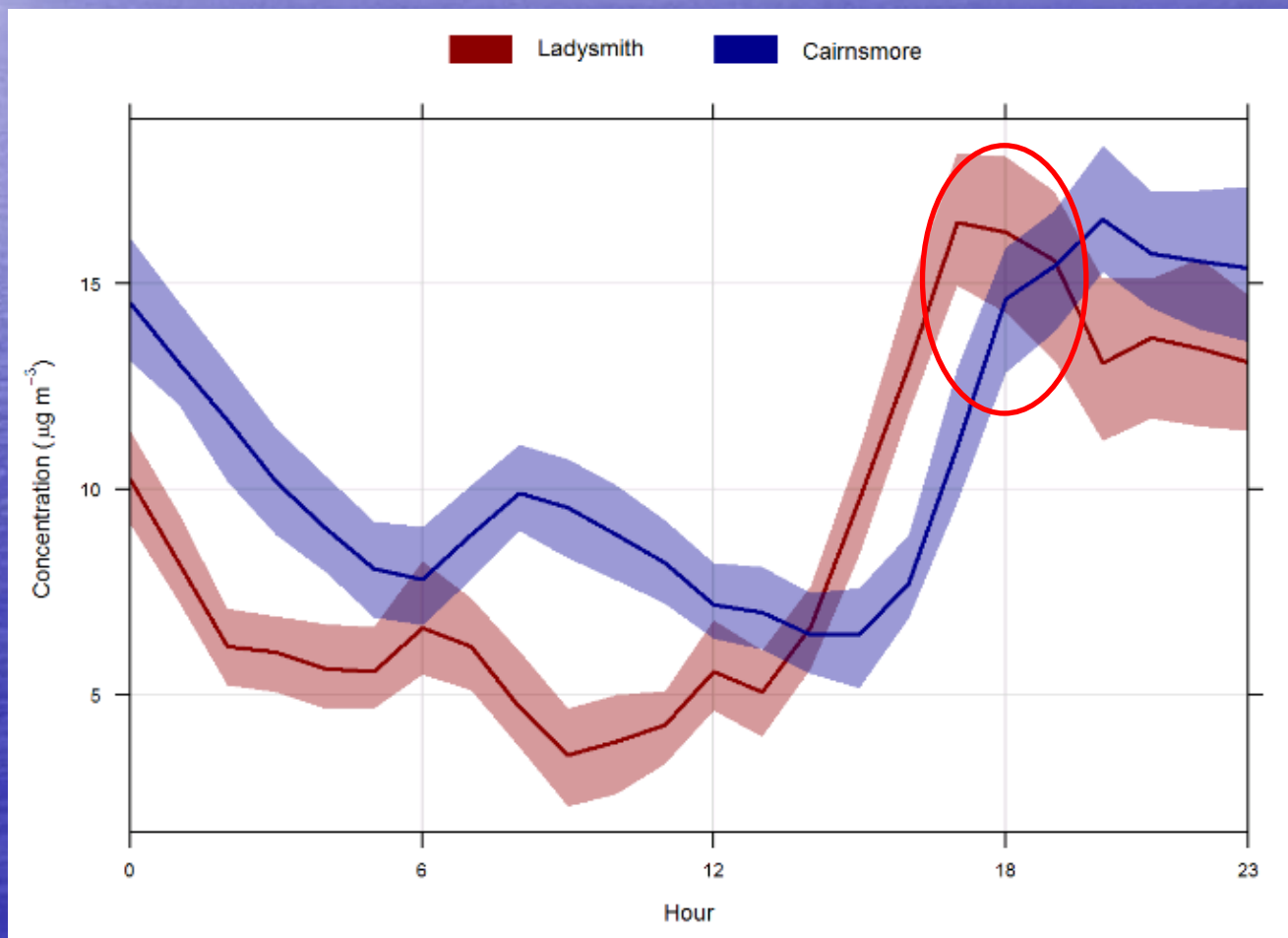
# PM2.5 Monitoring study in Ladysmith

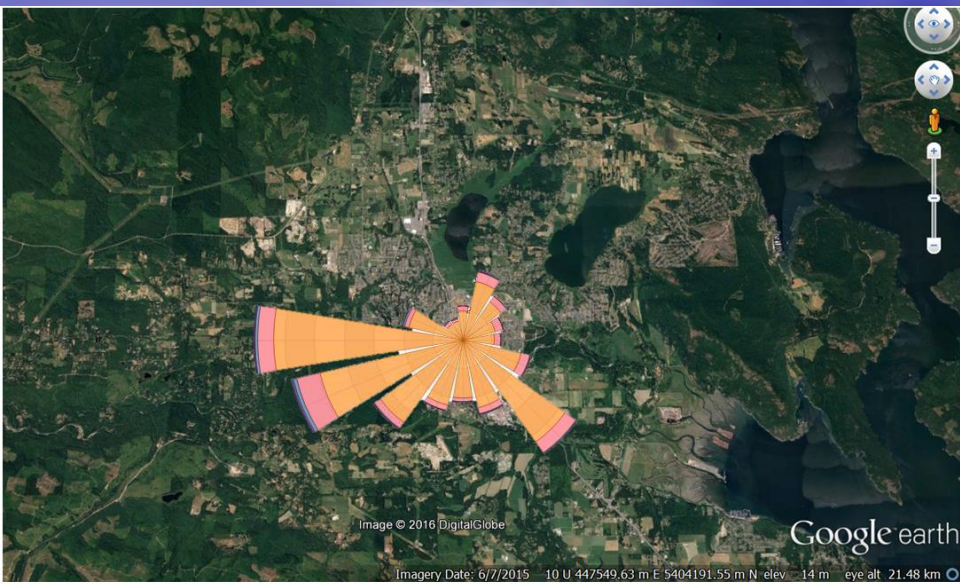
Ladysmith PM2.5 vs Select PM2.5 sites in the CVRD -  
August 27 2016-March 9, 2017



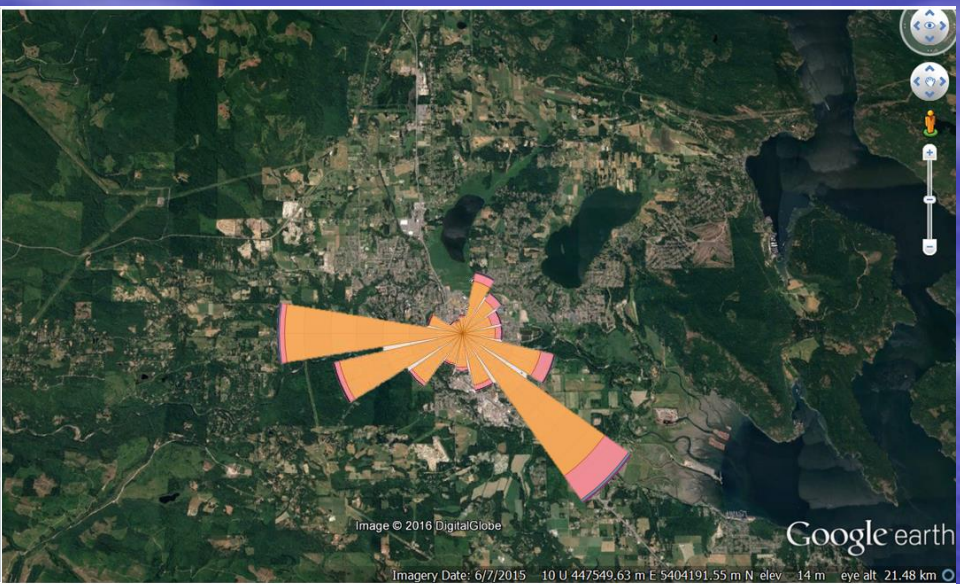
# Ladysmith and Cairnsmore Diurnal and Hebdomadal Plots 09-2016 to 02-2017

- Wood stove signature at both sites

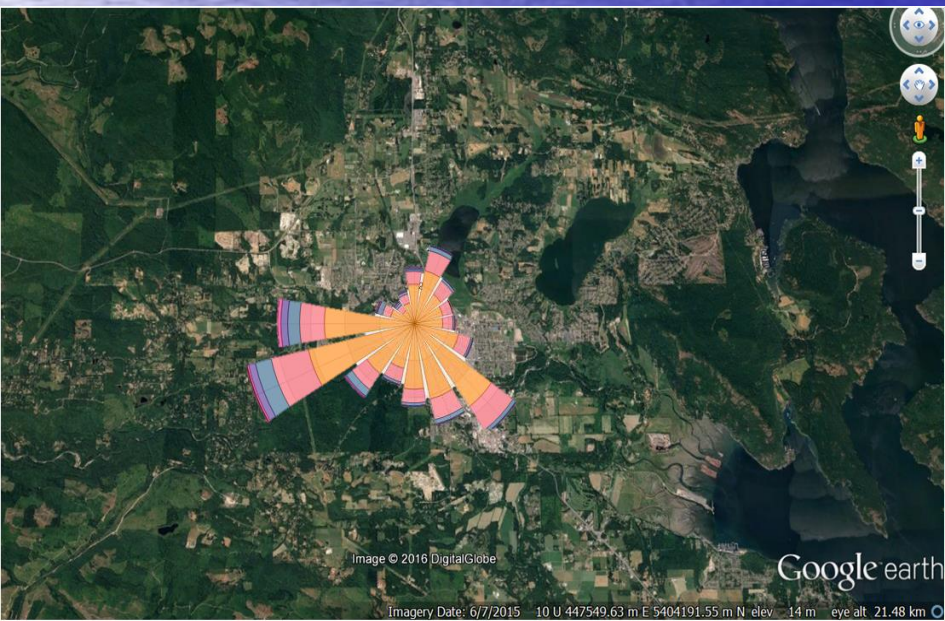




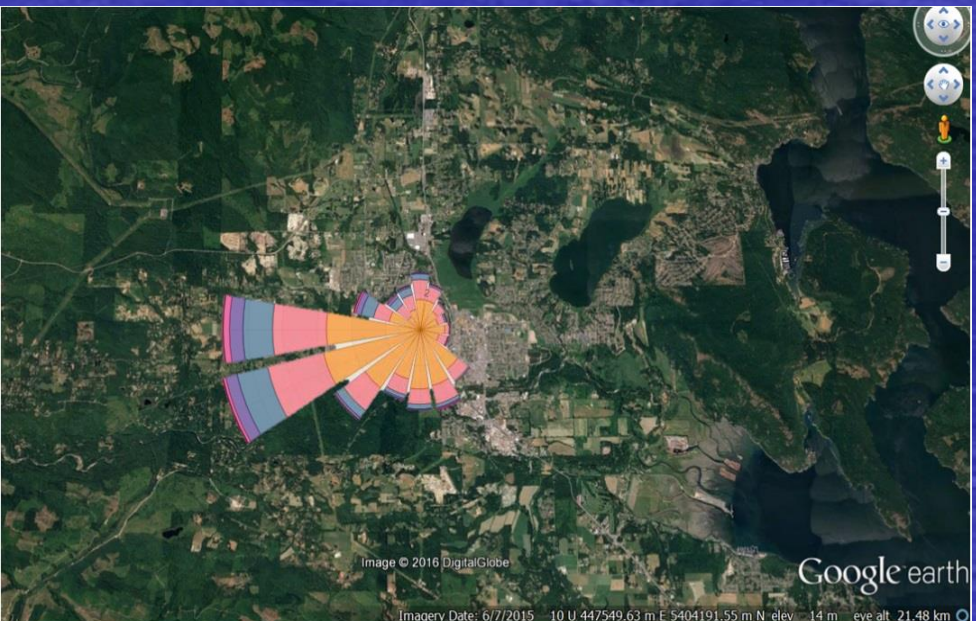
Duncan Cairnsmore PM2.5 Pollution Rose – Spring months (Mar, Apr, May) for all years (2010-2015 data).



Duncan Cairnsmore PM2.5 Pollution Rose – Summer months (Jun, Jul, Aug) for all years (2010-2015 data).



Duncan Cairnsmore PM2.5 Pollution Rose – Fall months (Sep, Oct, Nov) for all years (2010-2015 data).



Duncan Cairnsmore PM2.5 Pollution Rose – Winter months (Dec, Jan, Feb) for all years (2010-2015 data).

# Summary

- SO<sub>2</sub>, NO<sub>2</sub> and O<sub>3</sub> remain below Provincial and National ambient air quality objective levels
- PM<sub>2.5</sub> levels continue to indicate generally good AQ in summer and degraded AQ during cold months due to meteorology and additional emission sources
- Improvement in annual average PM<sub>2.5</sub> at all sites mainly due to meteorological influence in fall of 2016. Still some exceedances of the Daily AAQO
- Ladysmith daily values approached AQO level in January of 2017. Wood stove impacts evident and should be managed to maintain acceptable AQ
- Weekend residential burning continues to contribute to Duncan PM<sub>2.5</sub> levels. WS impacts also evident here.

# Questions (to clear the air)



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