



# Bulkley Valley-Lakes District Air Quality

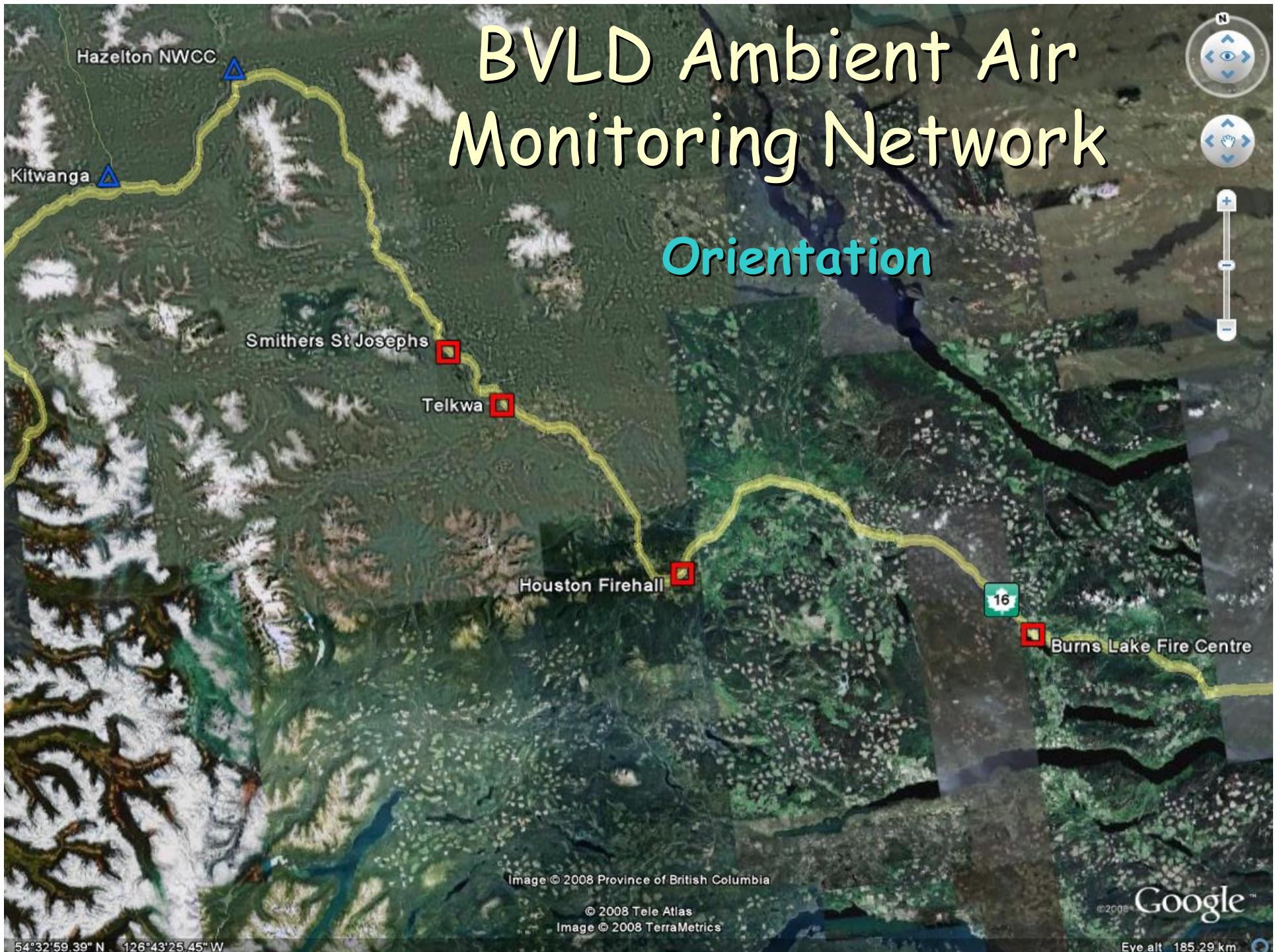
## 2008 Ambient Air Quality Assessment:

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Air Quality Meteorologist  
Ministry of Environment

June 2<sup>nd</sup>, 2009

# BVLD Ambient Air Monitoring Network

## Orientation



54°32'59.39" N 126°43'25.45" W

# Outline

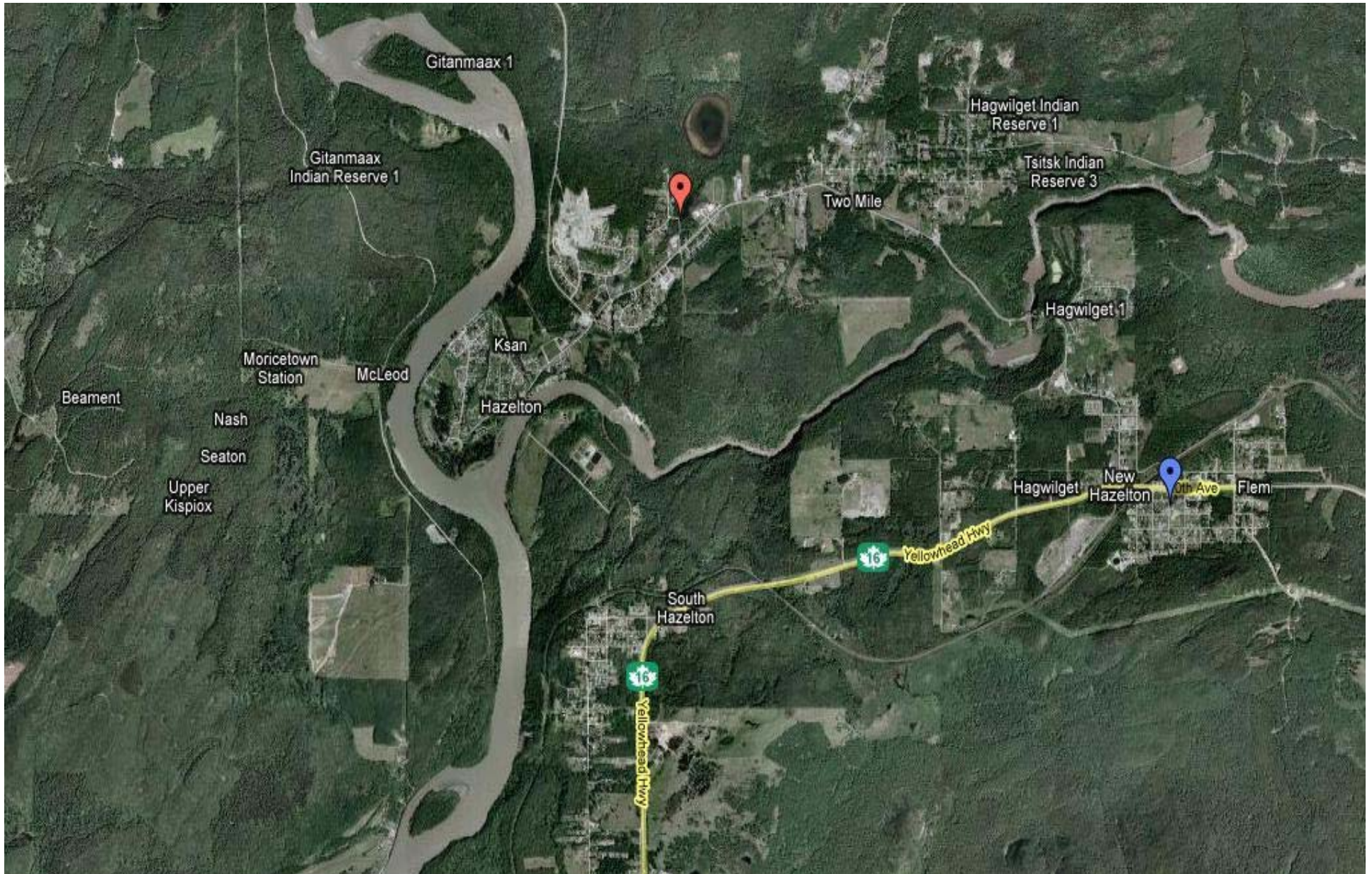
- ▶ Changes to Air Quality Monitoring Network in BVLD
- ▶ 2008 Particulate Matter Data and Significance
- ▶ Other 2008 Air Quality Data and Significance
- ▶ Questions

# Changes to AQ Network

- ▶ Kitwanga non-continuous PM2.5 Partisol has been removed. Over 1 year of data collected and much of the data is below detection limit of the instrument

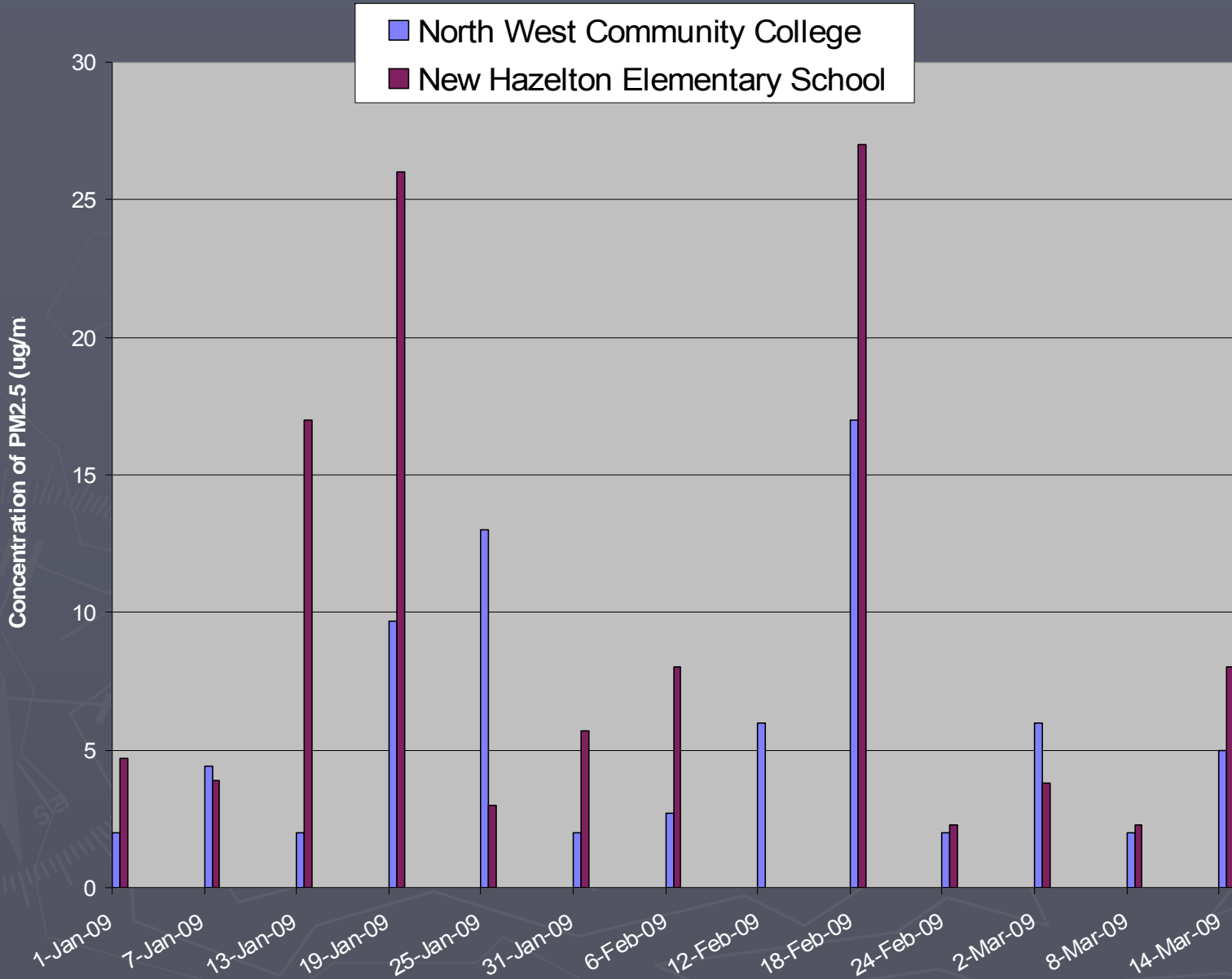
# Hazelton Correlation Study

- ▶ At the beginning of 2009 the PM10 non-continuous Partisol was removed from NWCC and reinstalled as a PM2.5 monitor on top of New Hazelton Elementary School.
- ▶ Purpose: to get a better understanding of PM2.5 in Hazelton, and investigate the relationship between the AQ in 2 Mile and New Hazelton
- ▶ Partisol may be moved to Old Hazelton in 2010.



- 📍 PM2.5 Monitoring Station at NWCC near Two Mile
- 📍 PM2.5 Monitoring Station at New Hazelton School

# PM2.5 at Two Locations in Hazelton

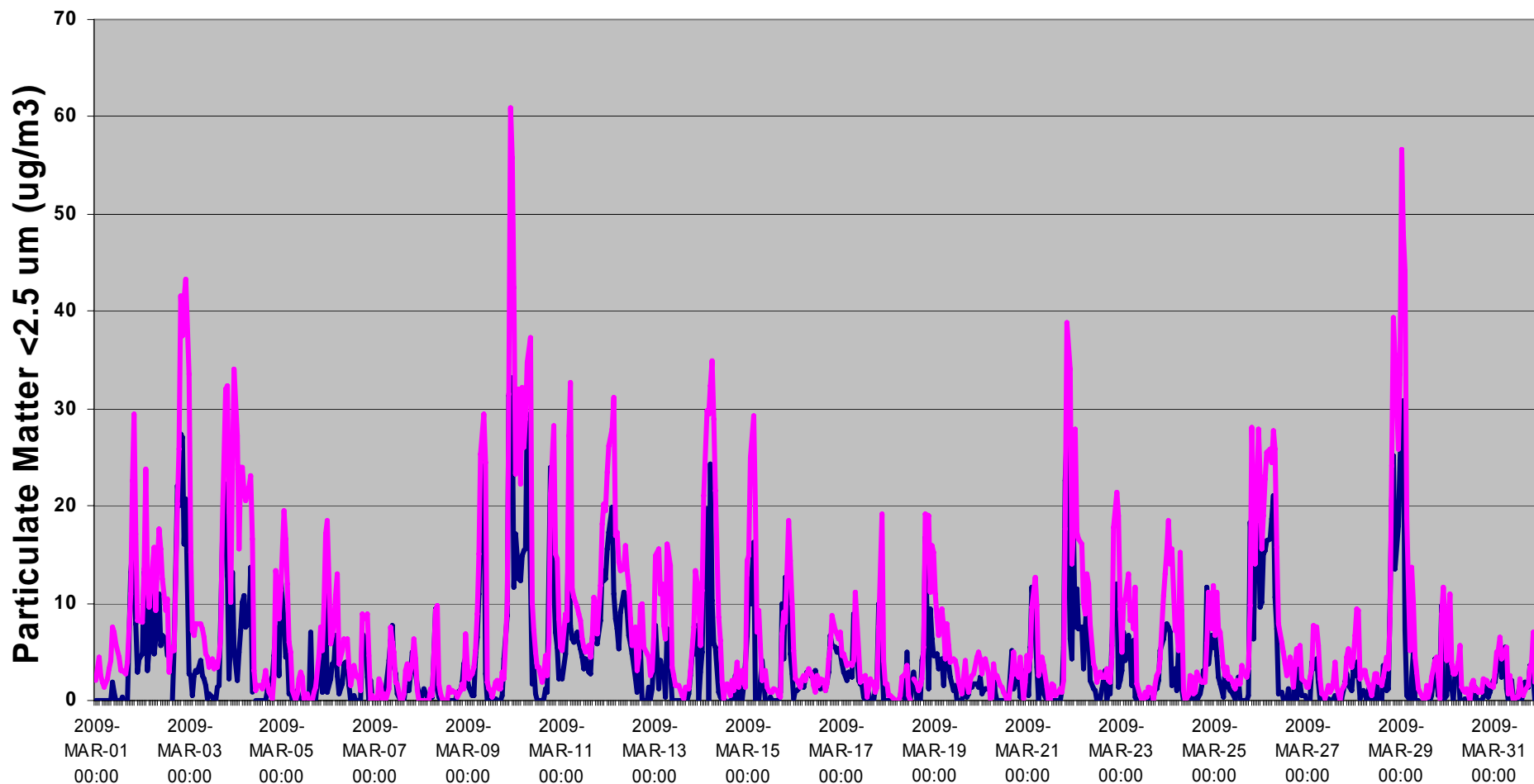


# Telkwa FDMS TEOM

- ▶ Issues with the Telkwa TEOM were uncovered in 2007 resulting in loss of data.
- ▶ Ministry Response
  - In Jan 2009 an FDMS TEOM, a more accurate device, was installed next to the current AB TEOM for a 1 year trial.
  - Results of trial will determine future of Telkwa's monitoring station and aid BC in understanding validity of AB & FDMS results in a northern climate.



# Telkwa PM2.5 AB TEOM vs. FDMS



March 2009

— 2009 PM2.5 Hourly — 2009 FDMS Hourly

# PM2.5 Monitor Upgrade

- ▶ BC is now installing new PM2.5 TEOMs across the province to those with Federal Equivalency Method designation
- ▶ The FDMS TEOM does have FEM status. It has higher accuracy than normal AB TEOMs due to an internal dryer which stops volatile PM from turning into gas and passing through the filter
- ▶ Smithers is expected to be installed by the end of summer 2009 and Burns Lake and Houston by April 2010

# Significance of Changing over TEOMs

- ▶ Changing instruments will have a number of consequences on air quality data:
  - Better, more accurate measurements
  - Data will appear worse because of suddenly higher concentrations.
  - Data discontinuity problems
  - Not all TEOMs being replaced at once, so there will be a lag between stations where some concentrations may appear higher/lower than others

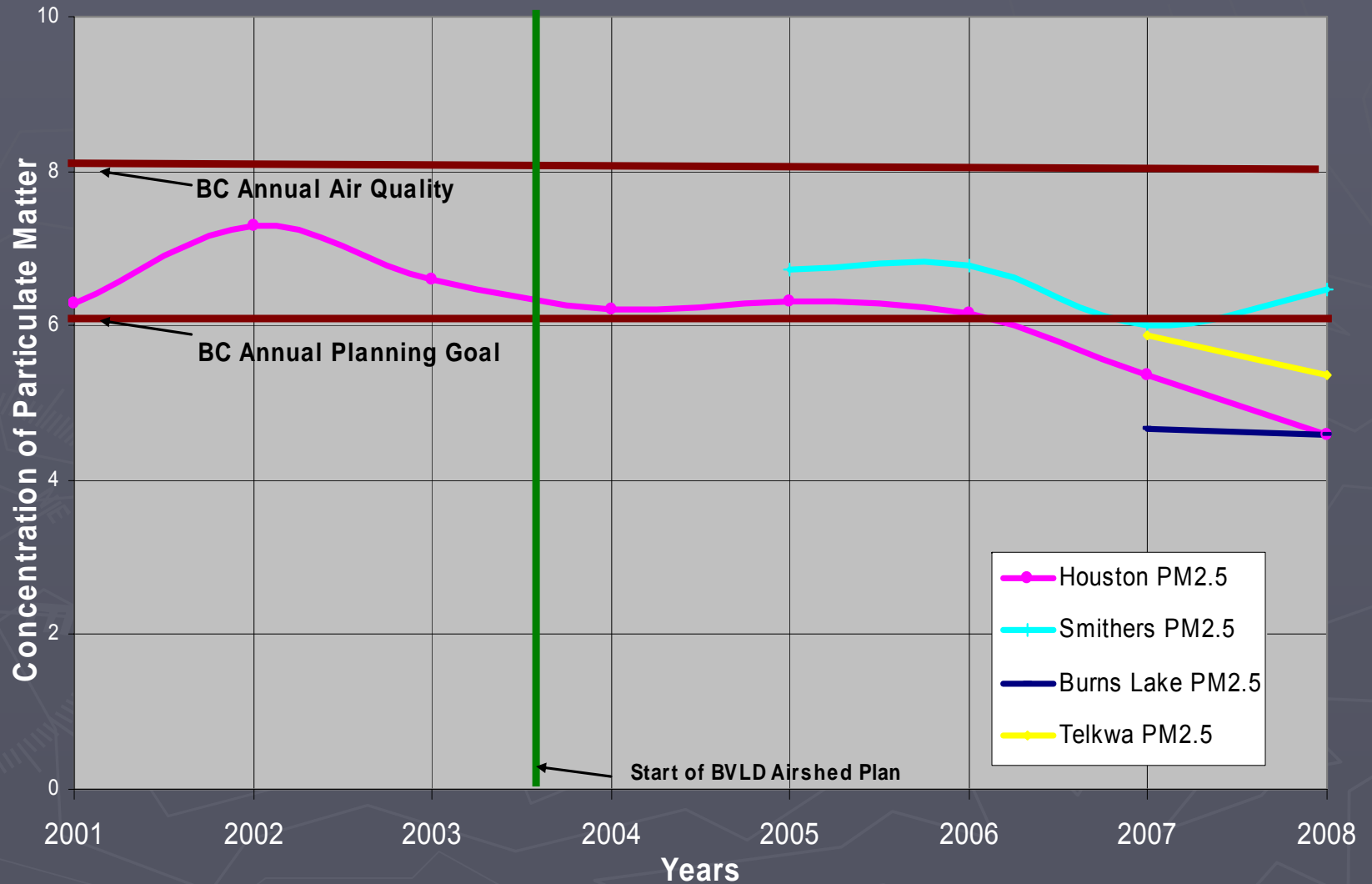
# Results of Goals and Indicators from Chapter 3 of 2006 Clean Air Plan



# Table 3-3 General Goals, Indicators and Strategies (page 3-8)

Goal	Indicators	Strategies
2) Continuous improvement in air quality in the BVLD	<p>Mean annual <math>PM_{10}</math> and <math>PM_{2.5}</math> concentrations</p> <p>Reduce % of days where average daily <math>PM_{10}</math> concentration <math>&gt; 50</math> and <math>PM_{2.5} &gt; 30</math> <math>\mu\text{g}/\text{m}^3</math>. Interim goal = 1%</p> <p>% of PED "potential episode days" where <math>PM_{10}</math> 24 hour average is <math>&gt; 25</math> <math>\mu\text{g}/\text{m}^3</math> and <math>PM_{2.5} &gt; 15</math> <math>\mu\text{g}/\text{m}^3</math> by year and/or season</p>	<p>Reduce/eliminate episodes via source specific emission strategies</p> <p>Education/operational changes to improve on AQ</p> <p>Bring forward emerging research &amp; changing regulations and policies.</p>

# Average Annual PM2.5 in BVLD Communities

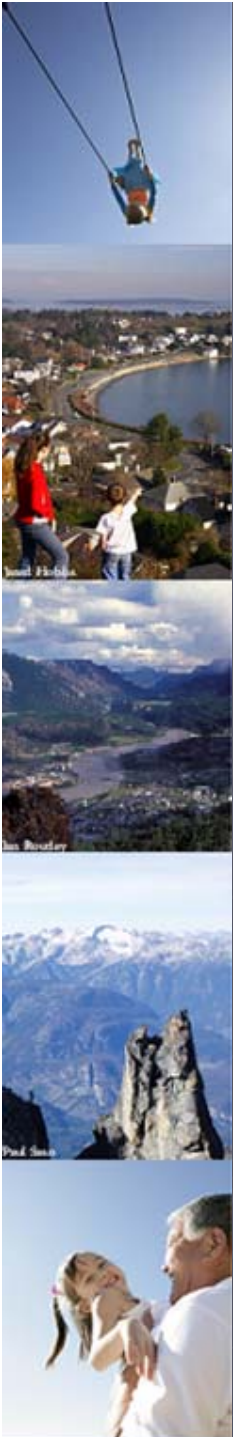
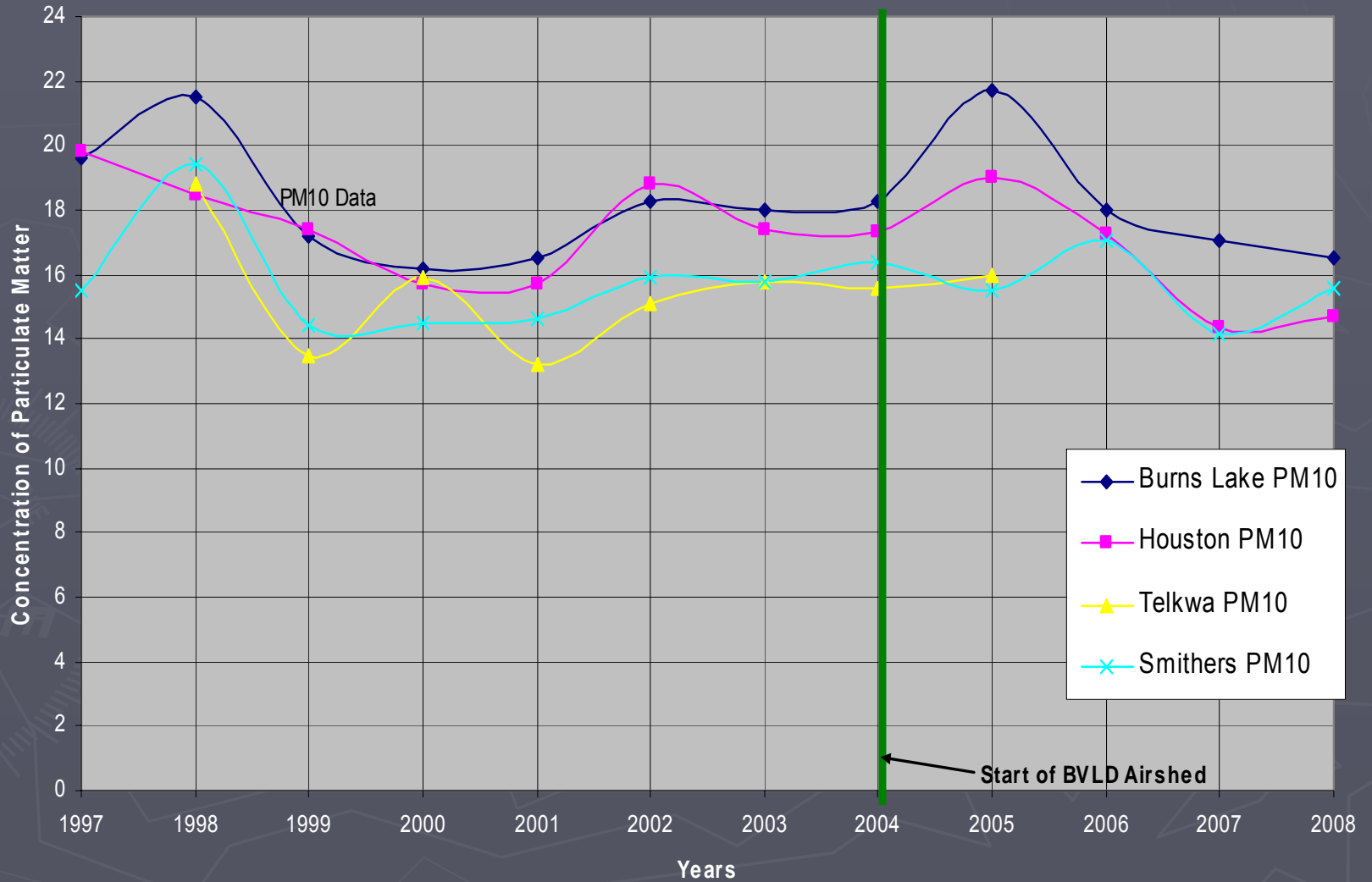


# Annual Concentrations of PM<sub>2.5</sub>

- ▶ We are below BC's Annual Air Quality Objective of 8ug/m<sup>3</sup>, however, not always below BC's Annual Planning Goal of 6ug/m<sup>3</sup>.
- ▶ Hard to say whether there has been an improvement since the start of the Clean Air Plan in 2004 due to lack of data before 2004.



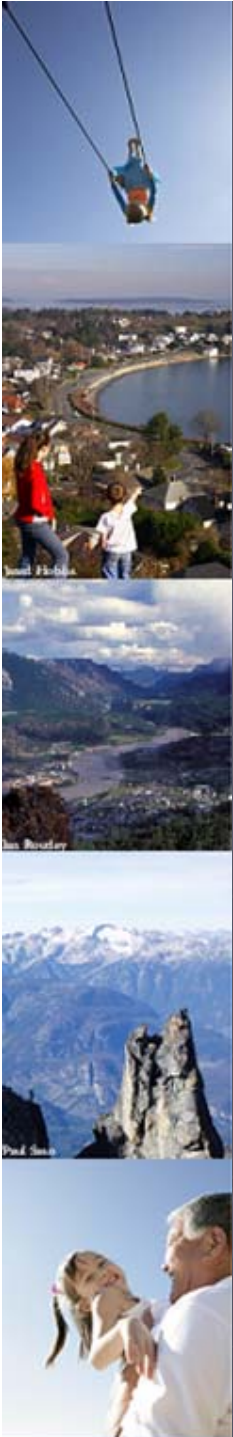
# Average Annual PM10 in BVLD Communities



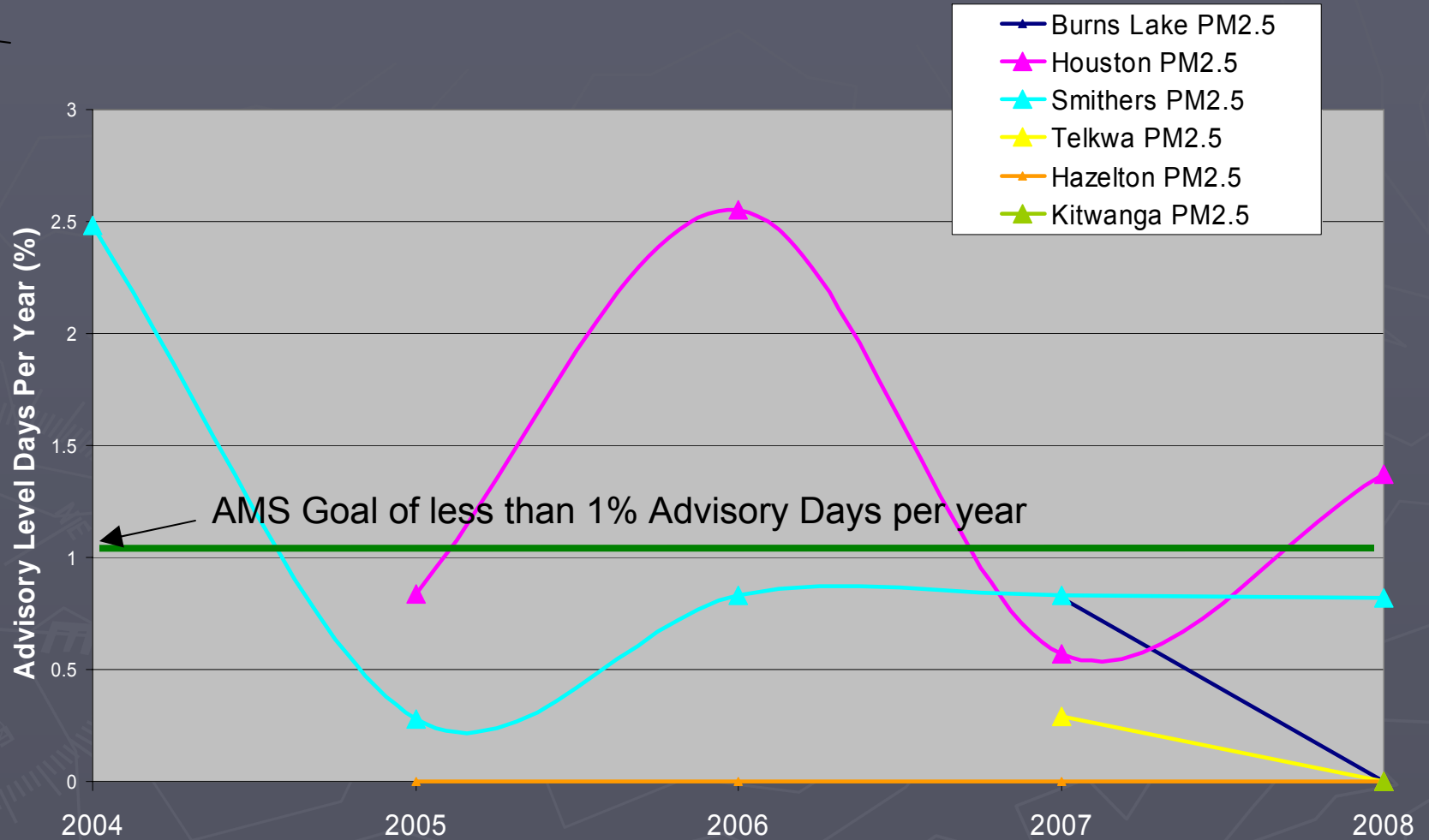


# Annual Average PM10 Concentrations

- ▶ Improvement in PM10 concentrations in recent years, however lower values also detected in 2000-2001.

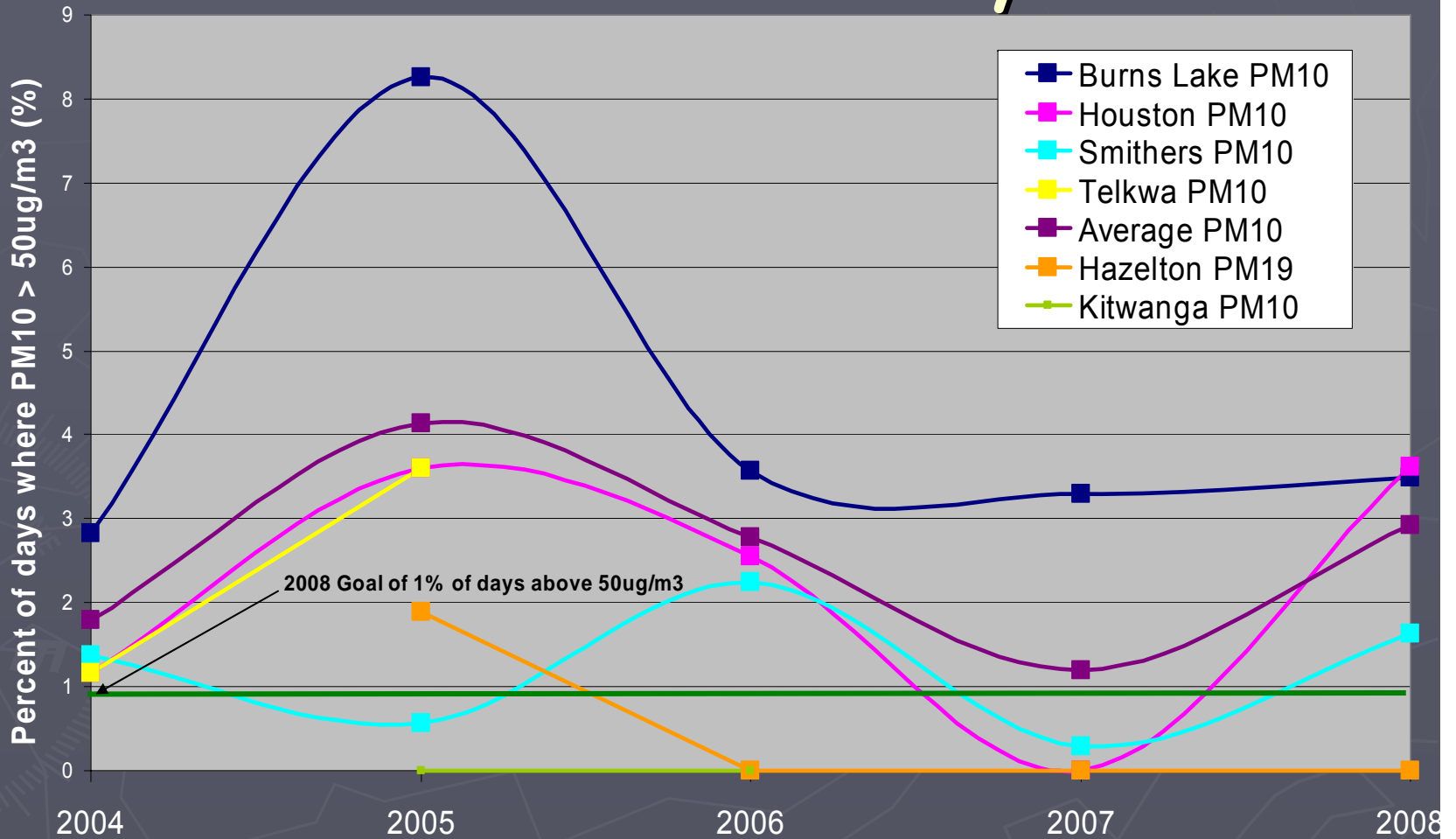


# Percentage of Days where PM2.5 at Advisory Level



This goal from the 2006 Clean Air Plan has still not been met.

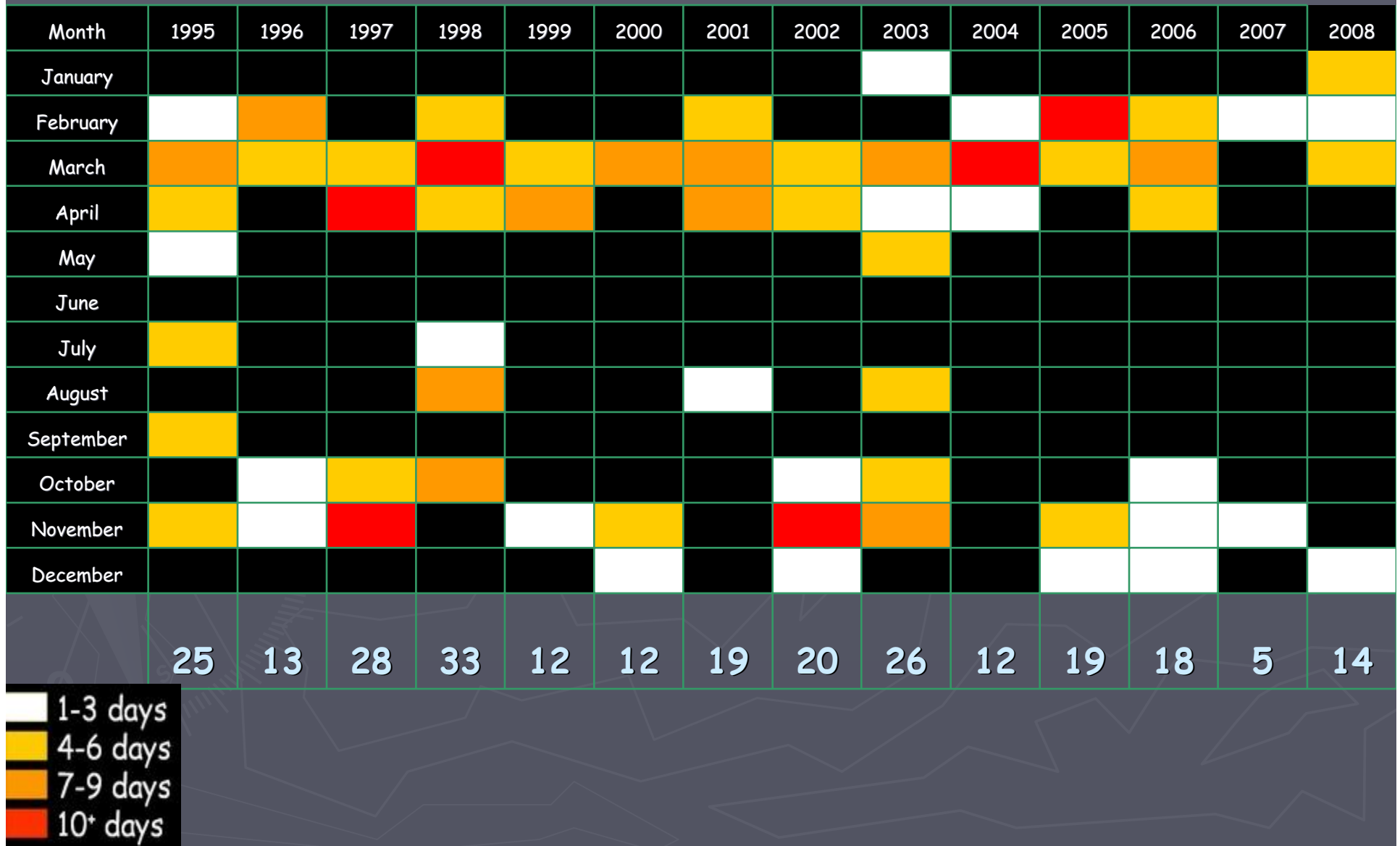
# Percentage of days where PM10 is at Advisory Level



This goal from the 2006 Clean Air Plan has still not been met.



# BVLD Air Quality Episode History



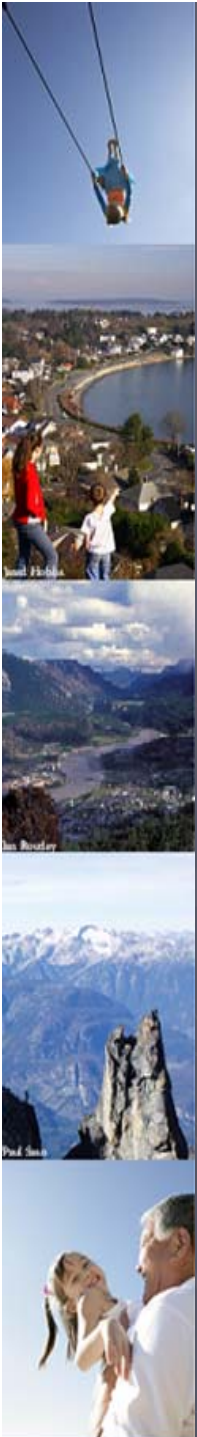
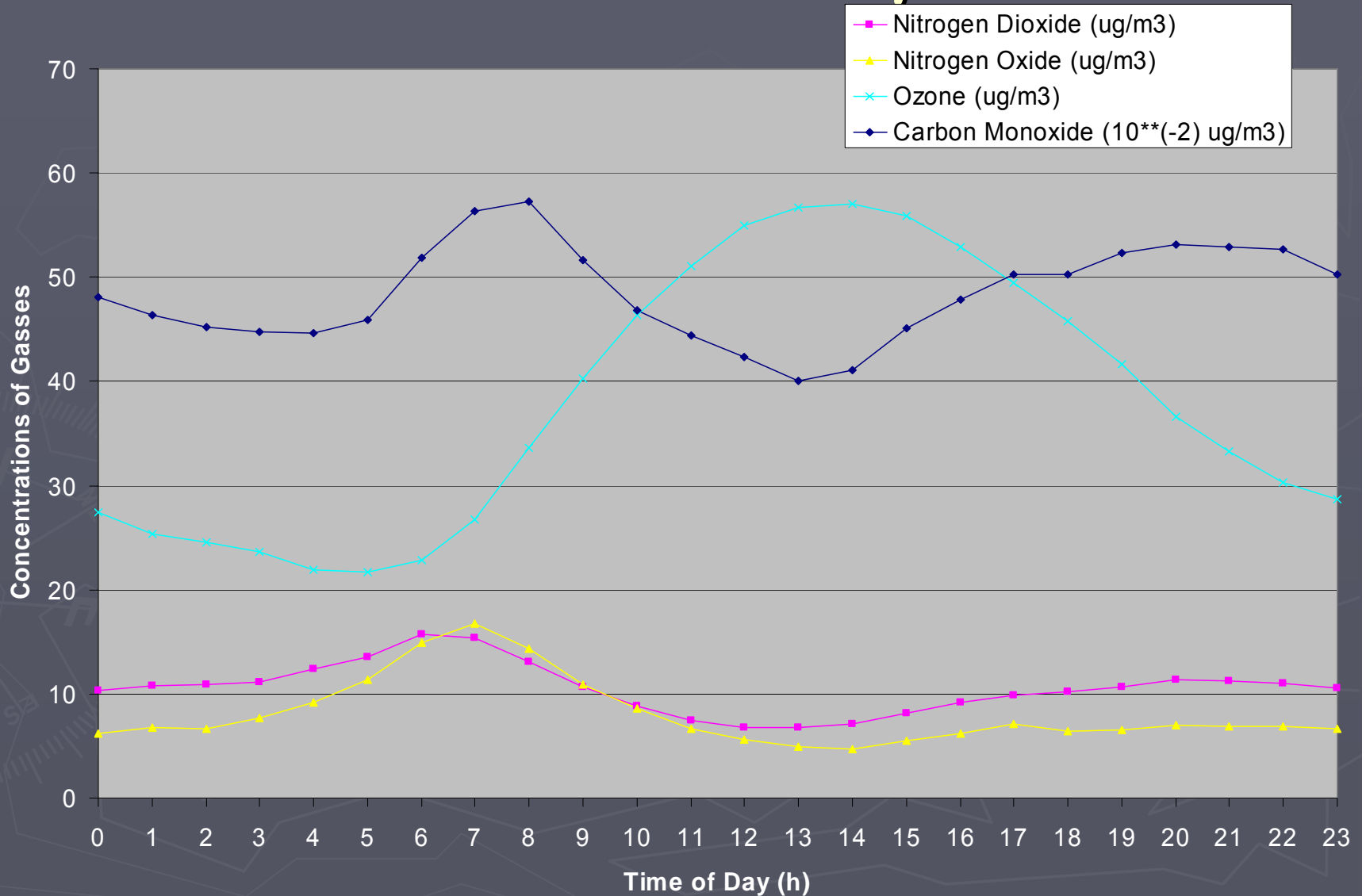
# Smithers Gas Analyser Results



# Context

- ▶ In the past, AMS focused on PM emissions since their levels tend to be a higher health risk in the BVLD.
- ▶ Last year the AMS began taking on emission sources besides PM with their idling program.
- ▶ The following results also relate to the movie shown previously *Air: The Search for One Clean Breath*.

# Smithers Gas Concentrations vs. Time of Day



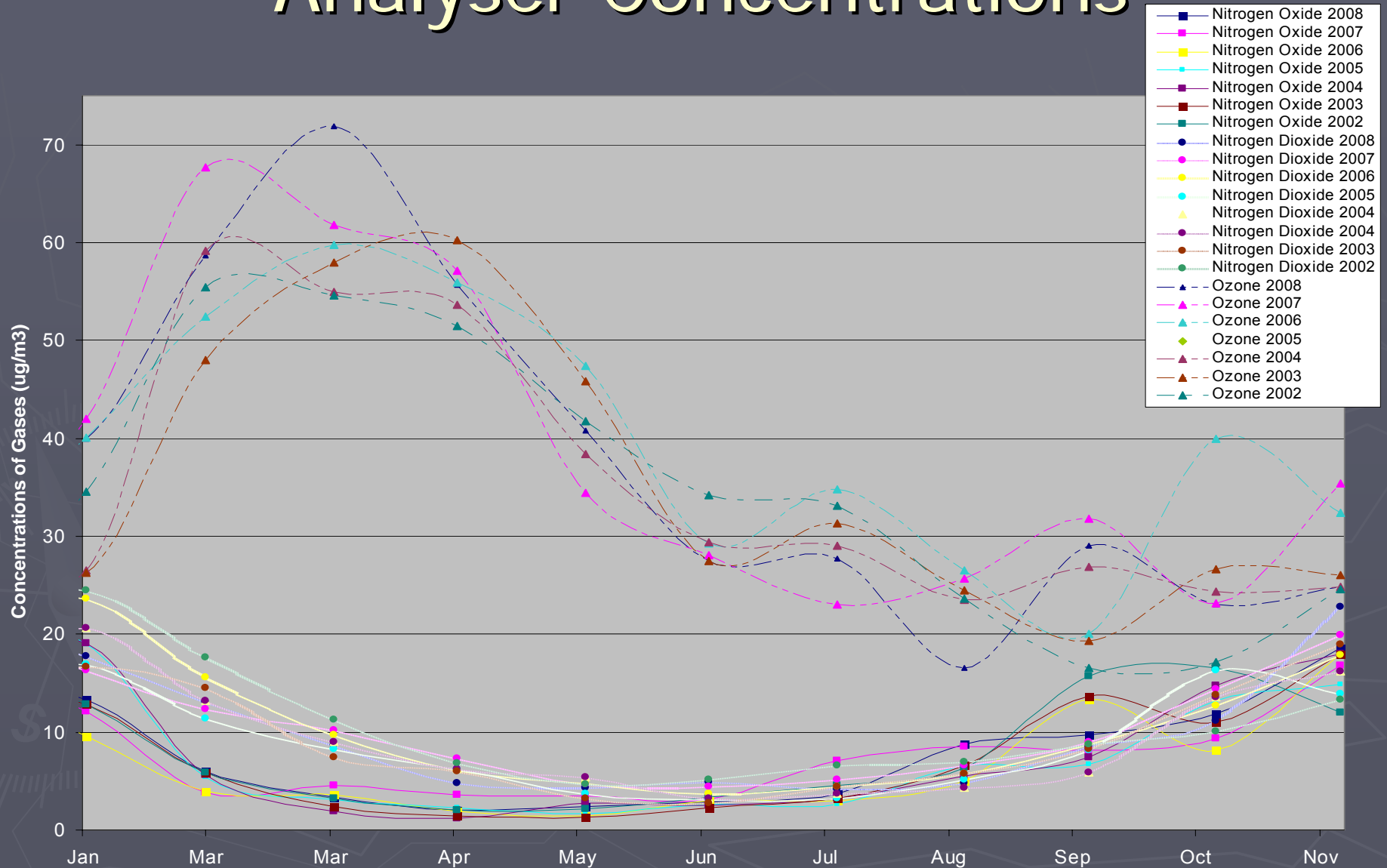
# Smithers Gas Concentrations vs. Time of Day

- ▶ Proceeding graph shows a very distinct peak of NO, NO<sub>2</sub> & CO during morning rush hour and a more smoothed peak at evening rush hour.
- ▶ Ozone is not emitted but forms from the reaction:  
$$\text{NO}_x + \text{VOCs} + \text{Sunlight} \rightarrow \text{O}_3$$
  
VOCs = Volatile Organic Compounds
- ▶ Previous reaction explains why ozone peaks during day after NO<sub>x</sub>.
- ▶  $\text{NO} + \text{O}_3 \text{ (no sunlight)} \rightarrow \text{NO}_2 + \text{O}_2$





# Monthly Average Smithers Gas Analyser Concentrations



# Monthly Gas Analyser Averages

- ▶ Ozone peaks in March/April when days are becoming longer and more sunlight is available. Snow still on mountains re-emits sunlight giving the atmosphere a double dose of radiation.
- ▶ NO<sub>2</sub> peaks in winter when least amount of sunlight is available due to reaction previously shown.

# Questions?

