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Canada's Air Quality Health Index (AQHI)

**GEO User Interface Committee
Washington, DC
Kenneth Korporal
Canadian GEO Secretariat
1 August 2007**



Overview

- Status Quo and Rationale
- AQHI development
- AQHI health messaging
- AQHI forecasting and monitoring
- Concluding messages



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Current Canadian Air Quality Indices

- Puts each of six pollutants on a common scale
- Pollutants are compared to a standard
- The highest relative to its standard is reported as the AQI value e.g. “AQI today is 27, good air quality, due to ozone”
- In Ontario, MOE provides forecast for today, tomorrow and the next day
- Advisories used when AQI forecast to reach (or has reached) 50 – transition from fair to poor



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Reasons to revise the AQI

- Existing AQIs do not reflect current scientific evidence:
 - Additive effects of multiple pollutants (only count one pollutant)
 - Effects at low levels of exposure (no-threshold)
- Unevenly applied across Canada
 - Formulations (pollutant averaging times, pollutants included, thresholds)
 - Health protective advice
- Public misperceptions of air quality and health
 - Confirmed by Public Opinion Research



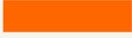
HAMILTON DOWNTOWN: Current Air Quality Reading



Air Quality Readings HAMILTON DOWNTOWN

Date:	Wednesday, January 11, 2006
Time:	2:00 PM
AQI:	39
Reason:	Fine Particulate Matter (PM_{2.5})
Health Effects:	People with respiratory disease at some risk.

Air Quality Index (AQI) Categories

AQI	Colour
0-15 Very Good	
16-31 Good	
32-49 Moderate	
50-99 Poor	
100+ Very Poor	

Process to Develop the AQHI

- 2001-present
- Involvement
 - AQHI Committee and Working Groups
 - Stakeholder Workshops
- Iterative
- Peer review



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Concept

Develop a communications tool:

- health-based
- scientifically accurate
- user-friendly
- nationally consistent
- regionally flexible

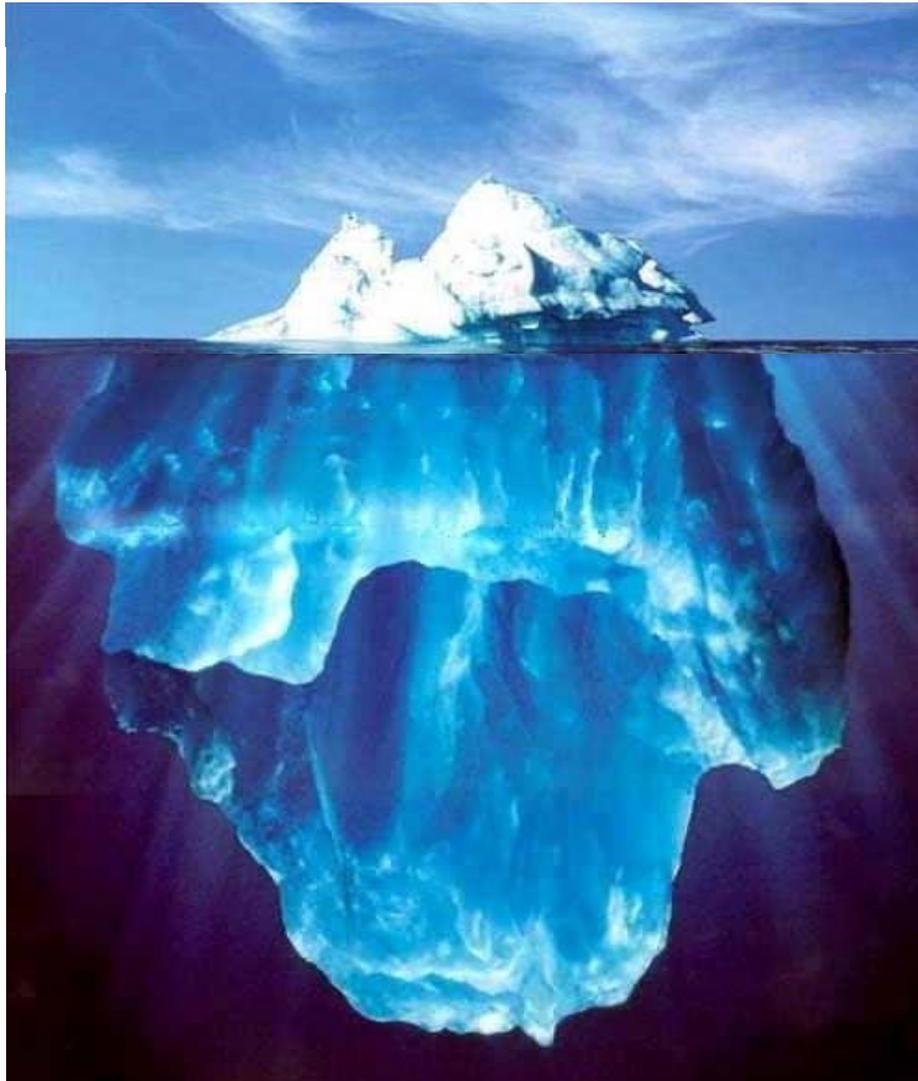


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Tip of the Iceberg



death
hospital
admissions

emergency room visits
physician office visits
reduced physical activity
medication use
respiratory symptoms
impaired lung function
subclinical (subtle) effects



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AQHI Presentation: Underpinnings

The “look” and messaging of the AQHI was developed using the following steps :

- 1. Public Opinion Survey (post “event” & “season”)*
- 2. Mental Models Research*
- 3. Message Development Workshop*
- 4. Crafting Health Messages*
- 5. Focus Testing*
- 6. Pilot Testing(s)*

The results from each preceding step were taken into account & built into the communication products tested.



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AQHI Presentation: UV Index-Like

- Illustrates level of health risk with **colour & number scale** of 1-10+
- **Labels the level of HEALTH risk** as “low”, “moderate”, “high” or “very high”
- **Forecasts** local air quality for the current and next day
- **Empowers individuals** to decide how they might be at risk
- Provides **health messaging** to tell Canadians—both general & at-risk populations—how to minimize that risk

Air Quality Health Index

Toronto



Current

Observed at
9:00 AM EST
Wednesday 2 May 2007

2
Low Health Risk

At risk population:

- Enjoy your usual outdoor activities.
- Follow your doctor's advice for exercise.

General population: • Ideal conditions for outdoor activities such as sports, biking or walking.

Forecast Maximums

Issued 6:00 AM EST Wednesday 2 May 2007

Wednesday
6
Moderate Health Risk
Health Message

Wednesday Night
1
Low Health Risk
Health Message

Thursday
2
Low Health Risk
Health Message

Who is at risk?

People with heart and lung conditions are most affected by air pollution.

To find out if you are at risk, consult:
<http://airplaytoday.org/risk.htm>, your physician and your local public health authority (to be specified) or visit (to be specified).

Did you know...

Riding your bike, walking or rollerblading to work is healthy for you and keeps the air clean.

Past Conditions

The AQHI is an initiative between Environment Canada, Health Canada, The Ontario Ministry of Health and Long-Term Care, and the Toronto Public Health Office.

AQHI Health Messages

Level of Risk	Index Reading	What You Should Do	
		At Risk Population	General Population
Low	1 – 3	<ul style="list-style-type: none"> ▪ Enjoy your usual outdoor activities. ▪ Follow your doctor's advice for exercise. 	<ul style="list-style-type: none"> ▪ Ideal conditions for outdoor activities: sports, biking or walking.
Moderate	• 4 – 6	<ul style="list-style-type: none"> ▪ If you have heart or breathing problems and experience symptoms, consider reducing physical exertion outdoors or rescheduling activities to times when the index is lower. ▪ Follow your doctor's usual advice about managing your condition. 	<ul style="list-style-type: none"> ▪ No need to modify your usual outdoor activities.
High	7-10	<ul style="list-style-type: none"> ▪ Children, the elderly and people with heart or breathing problems should reduce or reschedule physical exertion outdoors to periods when the index is lower, especially if you experience symptoms. ▪ Follow your doctor's usual advice about managing your condition. 	<ul style="list-style-type: none"> ▪ Anyone experiencing discomfort such as coughing or throat irritation should consider reducing or rescheduling strenuous outdoor activities to periods when the index is lower.
Very High	Above 10	<ul style="list-style-type: none"> ▪ Children, the elderly and people with heart or breathing problems should avoid physical exertion outdoors. ▪ Follow your doctor's usual advice about managing your condition. 	<ul style="list-style-type: none"> ▪ Everyone should consider reducing or rescheduling strenuous outdoor activities to periods when the index is lower, especially if you experience symptoms.



Self-calibration

At Risk Population:

People with heart or lung disease (including asthma) should monitor symptoms as the index reading increases.

General Population:

Even healthy people may have more difficulty breathing as air pollution increases.

- Paying attention to the index and your symptoms
- What does a particular index reading mean to you



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Forecasting

- World's first multi-pollutant forecast
- Challenges
 - Skill level with pollutants and understanding behaviour
 - Ground Level Ozone
 - Particulate Matter
 - Nitrogen Dioxide
 - Supporting monitoring data

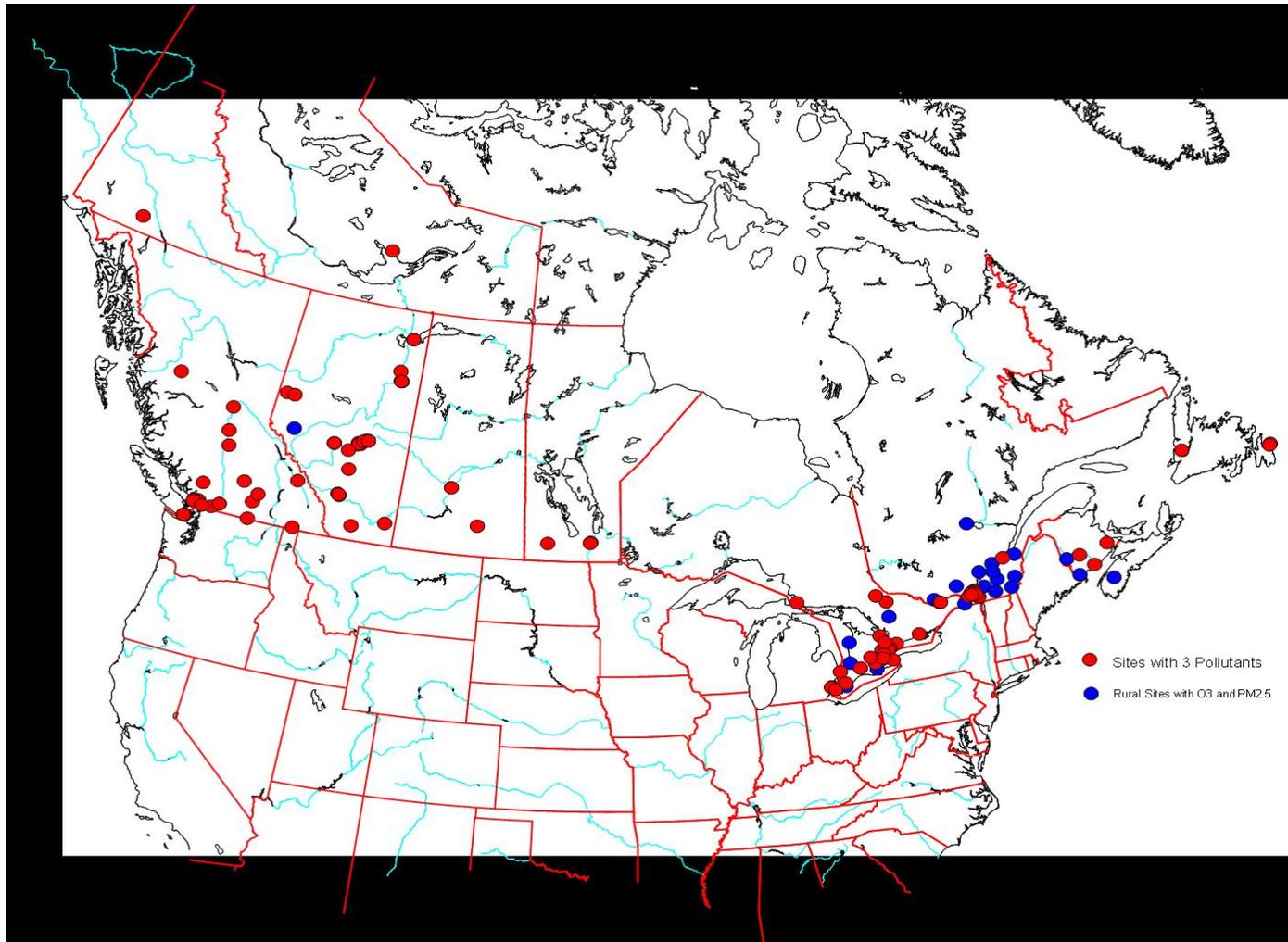


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Monitoring Capacity



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National Pilot: Description

- Staggered implementation across Canada
 - Toronto starting first week in July
 - Windsor, Vancouver and others in BC in October – other locations to follow this year
 - Big push in 2008
- No warnings or advisories issued with the AQHI
- AQI and AQHI issued concurrently



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National Pilot: Roles and Responsibilities

- Monitoring
 - Provincial or municipal responsibility – data transferred in close to real time to EC
- Data Management
 - EC building data base for forecasters, Weather Office and partners
- Forecasting
 - EC - Training, developing forecast tools and expertise for multi-pollutant forecasts
- Dissemination
 - EC Weather Office primary vehicle but not exclusive
 - AirNow client
- Outreach and Communications
 - Local Public Health and Local partners with support from fed, provinces
- Evaluation
 - Jointly administered with federal lead



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Weather Office Presentation

The screenshot displays the Weather Office website interface, which is organized into several key sections:

- Navigation:** A top menu bar includes 'Français', 'Home', 'Contact Us', 'Help', 'Search', and 'canada.gc.ca'. A secondary menu offers 'New Air Quality Health Index'.
- Map:** A central map of Canada allows users to 'Choose a Province, Territory, City or Marine Symbol'. A sidebar on the left lists various weather-related services such as '5-day Weather', 'Text Forecasts', 'Aviation Weather', and 'Satellite Imagery'.
- Toronto Weather Section:**
 - Current Conditions:** Observed at Toronto Pearson Int'l Airport, 9:45 AM EDT, Wednesday 11 July 2007. Conditions include a mix of sun and cloud.
 - 5 Day Forecast:**

Day	High	Low	Conditions
Today	24°C	15°C	A few clouds
Monday	23°C	15°C	A mix of sun and cloud
Tuesday	23°C	15°C	A mix of sun and cloud
Wednesday	24°C	15°C	A few clouds
Thursday	24°C	15°C	A mix of sun and cloud
Friday	24°C	15°C	A mix of sun and cloud
 - Air Quality Health Index (AQHI):** Observed at 9:00 AM EDT Wednesday 11 July 2007. The index is 4, categorized as 'Moderate Risk'. A color-coded scale shows 1-3 as Low, 4-6 as Moderate, 7-10 as High, and above 10 as Very High.
 - Forecast Maximums:** Issued at 5:44 AM EDT Wednesday 11 July 2007.

Day	Index	Risk Level	Action
Wednesday	4	Moderate Risk	Health Message
Wednesday night	2	Low Risk	Health Message
Thursday	3	Low Risk	Health Message
- Who is at risk? / Did you know...?:** Information regarding health risks for people with heart and lung conditions and children, with a link to Toronto Public Health.



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Air Quality Health Index

www.CAS-AQHI.gc.ca

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About the AQHI

[AQI and AQHI](#)

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[Development of the AQHI](#)

[National Air Quality Health Index](#)

[Air Quality and Health](#)

[Air Quality and Weather](#)

[How Can You Improve Air Quality?](#)

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About the Air Quality Health Index

The quality of the air we breathe has long been recognized as an important element of public health. The new Air Quality Health Index (AQHI) is the first health-based index that combines the quality of air with known health effects.



The AQHI takes into account how the level of exposure to multiple pollutants, even at low levels of exposure, can affect your health.

The AQHI is a personal health tool. It provides specific information to individuals who are 'at-risk' from air pollution and to the general Canadian public. This new index helps you make informed choices about your activities throughout the day to protect your health.

The AQHI is a national initiative, developed in partnership with federal, provincial and municipal governments and agencies. National tests/pilots of the AQHI will take place in locations across Canada starting on July 9, 2007 in Toronto. Visit this site often for updates on new pilot locations.

Please select from the options below to learn more about the AQHI.

AQHI for my community?

Check here for AQHI pilot locations across Canada. More locations will be added in the months to come.

[Get your AQHI for Toronto!](#)



How do I use the AQHI?



Toronto

Currently

Observed at: Toronto
Pearson Int'l Airport
1:00 PM EDT Wednesday
1 August 2007



Sunny

Temperature	31°C
Pressure/ Tendency	101.6 kPa ↑
Visibility	24 km
Humidity	49 %
Humidex	37
Dewpoint	19°C
Wind	SSE 15 km/h
Air Quality Health Index	3

5 Day Forecast from Environment Canada

Wednesday	Wednesday night	Thursday
 High 34°C Sunny with cloudy periods	 Low 22°C A few clouds	 High 35°C POP 30% Chance of showers
Friday	Saturday	Sunday
 High 31°C Low 22°C POP 30% Chance of showers	 High 31°C Low 17°C Sunny	 High 29°C Low 17°C POP 60% Chance of showers or thundershowers

[These icons are a summary. See complete text below](#)

[Imperial Units](#)

[Past 24 Hour Conditions](#)

[24 Hour Trends Graph](#)

[Another Forecast ?](#)

Yesterday

Max Temp.	33.8°C
Min Temp.	18.7°C
Precip Total	0.0 mm

Regional Normals

Max Temp.	27°C
Min Temp.	17°C
Record Values	

Today

Sunrise	6:06
Sunset	20:42
Moonrise	22:09
Moonset	9:02

Text Forecast from Environment Canada

Toronto: Issued 11.31 AM EDT Wednesday 1 August 2007

Smog advisory in effect.

Today	Sunny with cloudy periods. High 34 except 27 near Lake Ontario. UV index 8 or very high.
Tonight	A few clouds. Low 22.
Thursday	Sunny with cloudy periods. 30 percent chance of showers in the afternoon and early in the evening with the risk of a thunderstorm. Wind becoming southwest 20 km/h in the afternoon. High 35 except 27 near Lake Ontario.
Friday	A mix of sun and cloud with 30 percent chance of showers. Low 22. High 31.
Saturday	Sunny. Low 17. High 31.
Sunday	A mix of sun and cloud with 60 percent chance of showers and thunderstorms. Low 17. High 29.

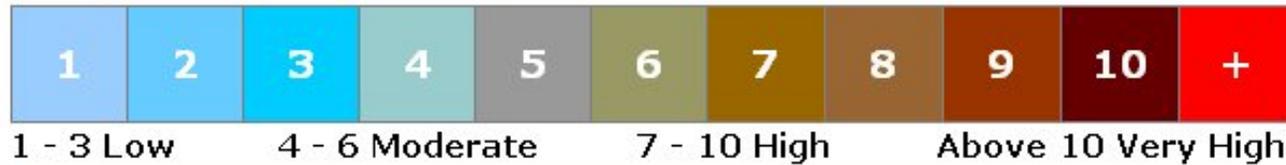


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Current

Observed at
12:00 PM EDT Wednesday 1
August 2007



At-Risk Population:

- Enjoy your usual outdoor activities.
- Follow your doctor's advice for exercise.

General Population:

- Ideal conditions for outdoor activities.

Forecast Maximums

Issued at 5:45 AM EDT Wednesday 1 August 2007



Who is at risk?

People with heart and lung conditions are most affected by air pollution.

Did you know...?

Everyone reacts differently to air pollution.



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Messages

- The AQHI is first and foremost a communications tool for personal health protection
- The AQHI is based on trusted Canadian data and scientific expertise
- The AQHI forecast will be featured
- National Pilot began in July 2007



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