$PM_{2.5}$ in New Brunswick

A case study of monitoring from a Citizen's Right-to-Know perspective

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NB LUNG
POUMON NB

NB Lung is:

- Provincial lung health charity devoted to lung health and protecting the air we share since 1933
- Grounded in science and evidence-based decision making
- An advocate for the 1 in 5 New Brunswickers living with lung disease
- Vision: All people free of lung disease
- Unique access to senior scientific air quality advisors

Overview

- Purpose and context: Why $PM_{2.5}$ in New Brunswick
- What NPRI, provincial monitoring, and citizen science each bring
- Key findings from the New Brunswick case study
- Implications and opportunities for the NPRI program
- Discussion

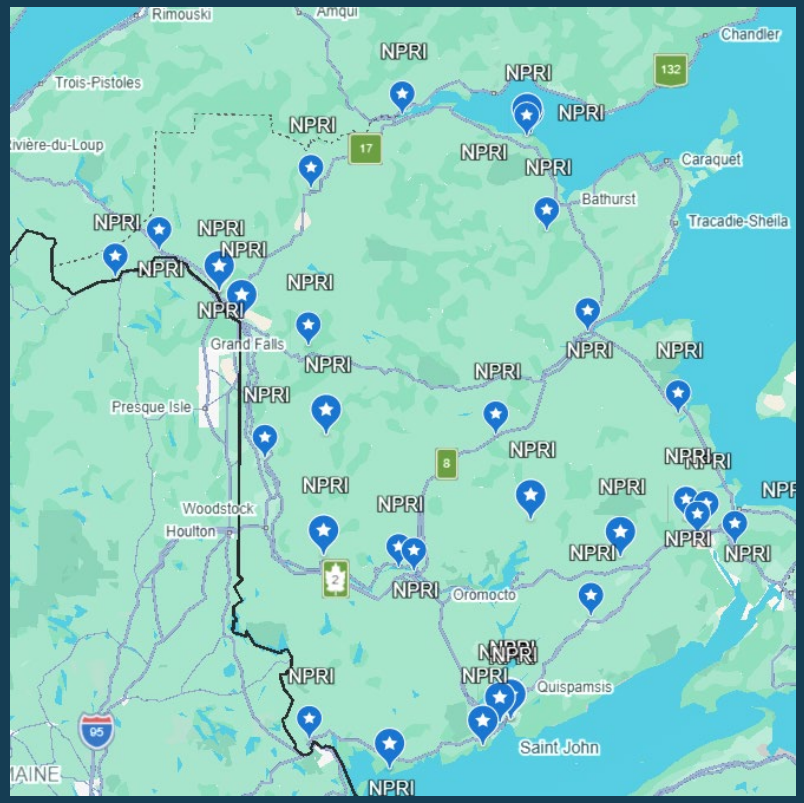
Purpose and Scope

Use New Brunswick as a case study for $PM_{2.5}$ and community right-to-know

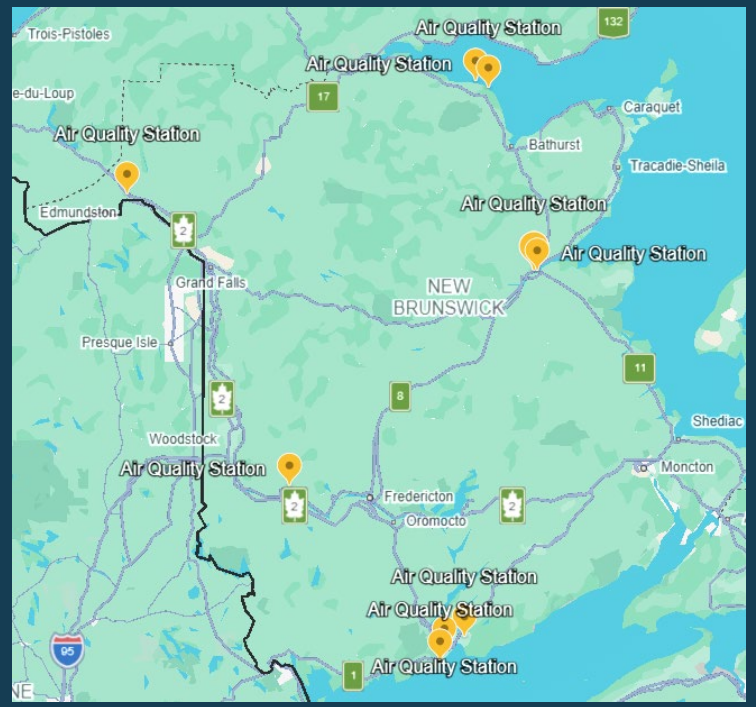
Compare and connect three data systems:
- NPRI facility emissions
- Provincial ambient monitoring and CAAQS reporting
- Citizen-science $PM_{2.5}$ networks (e.g., AQMap)

Explore practical options to make these systems more useful together for health protection and public communication

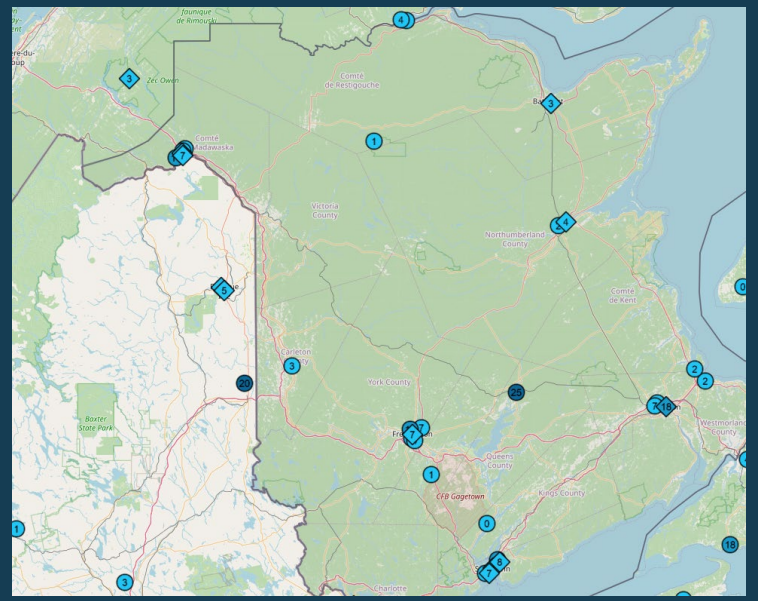
New Brunswick



NPRI stations



Provincial AQ network
(including NAPS)



Purple Air network
(including NAPS)

$PM_{2.5}$: Health and Equity

- Linked to asthma, COPD, cardiovascular disease, stroke, lung cancer, and premature death
- Health risks begin at levels below current regulatory thresholds
- Disproportionate impacts on children, older adults, pregnant people, and people with pre-existing conditions
- Economic burden through health-care costs and lost productivity

$PM_{2.5}$ Sources in New Brunswick

- Residential wood burning is a major source; nationally, wood-burning homes emit more $PM_{2.5}$ than all transportation combined
- Industrial facilities (refining, pulp and paper, power, manufacturing) are regulated but remain consistent contributors
- Transportation, off-road equipment, and other mobile sources add to local exposures
- Transboundary and clustered sources (e.g., Saint John, Edmundston–Madawaska) complicate attribution

NPRI: Strengths for $PM_{2.5}$

- Canada's primary public database for facility-based air pollutant releases under CEPA
- Provides facility-specific $PM_{2.5}$ emissions (tonnes/year) and supports transparency and accountability
- Enables comparisons across sectors, facilities, and provinces
- Foundational for understanding industrial contributions to $PM_{2.5}$ in New Brunswick

NPRI: Limitations for $PM_{2.5}$ in NB

- Reporting thresholds mean many smaller emitters and non-industrial sources are outside NPRI
- Current guidance focuses on filterable $PM_{2.5}$; condensable $PM_{2.5}$ is flagged but excluded from final totals
- Annual tonnes/year cannot be directly compared with CAAQS ambient concentrations (µg/m³) without modelling
- Reliance on self-reported data and varying estimation methods can affect comparability

Provincial Monitoring and CAAQS

- Nine NAPS stations plus additional provincial and industrial monitors track $PM_{2.5}$ across New Brunswick
- Air Quality Data Portal provides near real-time public access to $PM_{2.5}$ and other pollutants
- CAAQS management levels are used to assess ambient air quality and guide risk management
- Strong temporal and spatial detail, but not designed to attribute concentrations to specific facilities

Citizen Science and AQMap

- Growing network of low-cost $PM_{2.5}$ sensors across New Brunswick and Canada (e.g., PurpleAir, AQMap.ca)
- Provides real-time, hyper-local information that communities can see and use
- Complements regulatory networks by filling spatial gaps and illustrating local variability and wildfire smoke
- Data require careful interpretation but are powerful tools for engagement and right-to-know

Potential for Integration

- NPRI, provincial monitoring, and citizen science each answer different questions about $PM_{2.5}$
- Viewed together, they can show: who emits, when and where people are exposed, and how patterns evolve
- The New Brunswick case study highlights the value of cross-analysis across these systems
- Goal is to make it easier to use these data together for health-focused decisions and communication

Key Findings from the NB Case Study

- NPRI is essential for understanding industrial $PM_{2.5}$ but cannot, on its own, represent total $PM_{2.5}$ burden
- Differences in units and time scales make it hard to relate NPRI tonnes/year to CAAQS and ambient concentrations
- Transboundary and closely spaced facilities make cumulative impacts particularly important in NB
- Citizen-science data and provincial monitoring provide important context for interpreting NPRI emissions

Questions for the NPRI Committee

How can NPRI $PM_{2.5}$ data be better contextualized for health and right-to-know?

What low-barrier options exist to link NPRI facility information to nearby ambient data and CAAQS status?

Where might New Brunswick serve as a practical pilot for integrated $PM_{2.5}$ tools or communication products?

High-Level Directions (Future Consideration)

- Methodology: continue examining how condensable $PM_{2.5}$ is treated in NPRI guidance
- Data integration: explore prototype tools that link NPRI, NAPS/provincial data, CAAQS, and citizen science
- Communication and equity: support products that translate complex data into clear, actionable information for communities

Role of Community Organizations

- Community and health organizations can help translate technical data into accessible, locally relevant messages
- They can support residents in navigating NPRI, provincial portals, and real-time sensor tools
- Partnerships across government, industry, academia, and communities can strengthen right-to-know and trust

Questions and Discussion

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Thank You

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