

2024

Sarnia Area Environmental Health Project

Community Report: Summary
of Key Findings

This report has been prepared by the staff of the Environmental Sciences and Standards Division of the Ontario Ministry of the Environment, Conservation and Parks.

Acknowledgements

In 2020, MECP launched the Sarnia Area Environmental Health Project. The geographic scope of the Project focuses on the area around Sarnia to Corunna, which encompass the ancestral, traditional, and contemporary territories of the Anishinaabeg people. We would like to extend our gratitude in particular to the Aamjiwnaang First Nation leadership, staff and community for their perspectives which have been instrumental in the development of the Project. Their commitment to improving local air quality benefits all people who live, work, and share these lands. We also would like to recognize the contributions and support of Walpole Island First Nation and Kettle and Stony Point First Nation, and to acknowledge their connection to these lands.

We would also like to thank all our project partners for their invaluable contributions, which have been integral to the success of the Sarnia Area Environmental Health Project. Your support and input have made a significant difference and we look forward to our continued partnerships to help address the issues highlighted in this report, to protect Ontario's air for healthier communities.

- Aamjiwnaang First Nation
- Canadian Fuels Association
- Chemistry Industry Association of Canada
- City of Sarnia
- County of Lambton
- Indigenous Services Canada
- Health Canada
- Indigenous Affairs Ontario
- Kettle and Stony Point First Nation
- Kris Lee - Community Representative
- Lambton Public Health
- Public Health Ontario
- Sarnia-Lambton Environmental Association
- St. Clair Township
- Victims of Chemical Valley
- Walpole Island First Nation
- Toronto Metropolitan University- Dr. Liberda's Lab

Background:

The Sarnia Area Environmental Health Project (SAEHP) was launched in 2020, with the aim to help address concerns of Sarnia area communities about air pollution, and other environmental stressors from local industries in the area. The project helped enhance understanding of the links between the environment and health in the community, with a focus on assessing exposures to chemicals in air.

The Ministry of the Environment, Conservation and Parks (MECP) worked closely with provincial and federal government departments, health agencies and First Nations to develop the SAEHP, and was also guided by previous foundational work of the Lambton Community Health Study Board as well as input from local stakeholders, such as municipalities and industrial associations.

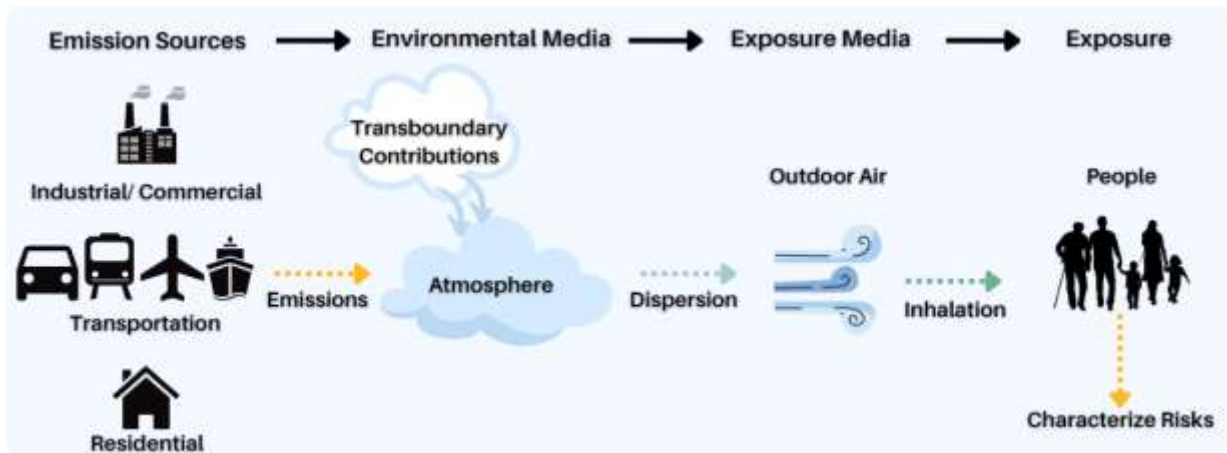
In collaboration with project partners, the SAEHP was scoped and developed to focus on the three following components:

1. Air Exposure Review: Assessment of community exposures to chemicals in outdoor air, and associated health risks.
2. Environmental Stressors Review: Characterization of how industrial operations impact quality of life in nearby residential areas.
3. Plants Study: Comparison study of chemicals in medicinal plants growing in Aamjiwnaang First Nation and another First Nation community.

Here are the key findings identified from the three components of this project:

1) Air quality

Air Exposure Review: an assessment of risks to human health from exposure to chemicals in the environment.



Study question: Are residents' exposures to chemicals in air high enough to be of concern to human health?

The Air Exposure Review was led by a team of environmental consultants: Intrinsic, CanNorth, and 4 Directions of Conservation. With community feedback, the consultants evaluated air quality information for hundreds of air pollutants released by local facilities and identified priority chemicals for further assessment. Measured and/or modelled air concentrations were compared to established health-based benchmark values, and people's potential exposures to chemicals were assessed, to evaluate the health risks associated with each chemical,

Outdoor air quality poses a health risk in some neighbourhoods of the broader Sarnia area. The Air Exposure Review found that:

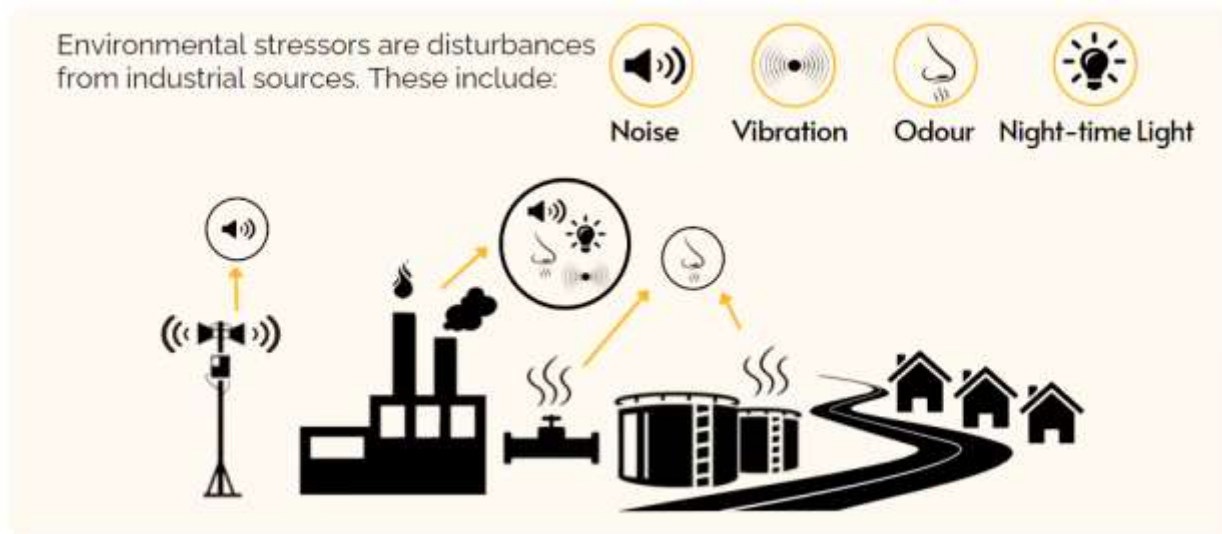
- A.** Elevated health risks have been identified for three chemicals—sulfur dioxide, fine particulate matter, and benzene.
- B.** The area with highest cancer risk from air pollution is the north area of Aamjiwnaang First Nation. Benzene, a chemical associated with blood cancer risk, is the key chemical identified through this analysis. Benzene levels are elevated in comparison to other communities, even those with similar petrochemical industries. More should be done to reduce benzene

emissions, especially in the industrial area adjacent to Aamjiwnaang and south Sarnia.

- C. Some industrial processes and flaring events, which result in elevated releases of sulphur dioxide, can cause respiratory irritation in downwind neighbourhoods. People with asthma or other health conditions are most susceptible to impacts when exposed to a plume of sulphur dioxide. Minimizing the emissions from key sources of sulphur dioxide in the Sarnia area can reduce the health risks.
- D. Like many regions of southwestern Ontario, fine particulate is the key contaminant that is linked to health risks from air pollution and is largely due to transboundary sources. These fine particles may **pose a health risk to** people with underlying respiratory conditions. Occasionally there are bad air days (smog events) across southwestern Ontario, when ozone and nitrogen dioxide are also elevated. Actions are needed to reduce transboundary air pollutants impacting Sarnia from across the region, including the United States.
- E. There are data gaps for some chemicals emitted in Sarnia, notably cobalt and formaldehyde, which should be looked at more closely.
- F. Other air pollutants evaluated are not occurring at concentrations that would pose a health risk in the Sarnia area.

For more details on the approach and findings of the Air Exposure Review, please see the Air Exposure Review Community Report and the detailed technical report (Sarnia Area Environmental Health Project: Air Exposure Review Technical Report 2023) on the [Sarnia Area Environmental Health Project](#) website.

2) Environmental Stressors



Study question: How is quality of life impacted by disturbances from industrial operations, and what communications and other initiatives could reduce associated stress?

The Environmental Stressors Review aimed to characterize the impact of industrial operations (noise, vibration, odour, and night-time light) on the quality of life in nearby residential areas. To better understand the impacts of stressors, various sources of information were reviewed, including: incidents reported by the public to the MECP Spills Action Centre, public reports, government reports, documentaries, academic articles, an Aamjiwnaang First Nation community experience survey, and concerns raised at community engagement sessions.

Industrial activities and incidents are impacting quality of life in some neighbourhoods, particularly those in closest proximity to heavy industry. Based on a review of information available to the Ministry, we have heard that:

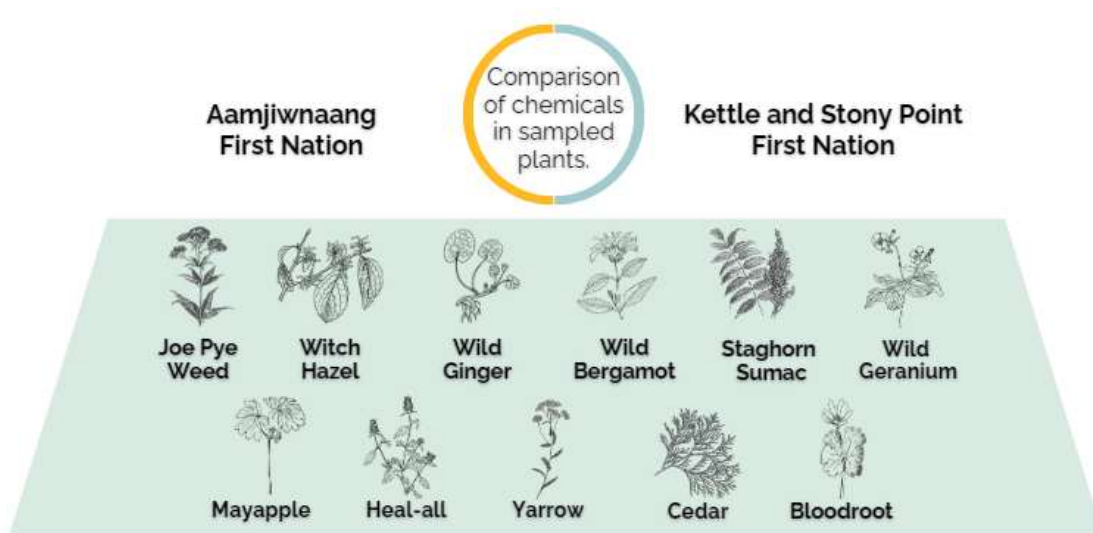
Physical, mental, and even spiritual health are impacted by environmental stressors and trauma from past industrial events contributes to the stress experienced. Residents shared that they were impacted by industrial odours, noise, vibration, and night-time light.

- A. In neighbourhoods close to industry, some people experience physical symptoms (such as nausea) from odours, and sleep disturbance from industrial noises. Odour and noise are the most cited concerns in the Sarnia area, based on incidents reported by the public to the Ministry.
- B. Flaring impacts neighbours. Flaring incidents can cause all the types of stressors we examined. More intense or longer-lasting flaring incidents tend to be more disruptive. When people have previously been impacted by major industrial incidents, they may find flaring incidents more upsetting.
- C. Where you live within Sarnia shapes your experience of industrial disturbances. Those who live closest to major industry are most impacted.
- D. Incident notification systems have improved in recent years. For example, many industries provide more consistent and timely information. But there is room for further improvement. We heard a need for raising community awareness of available notification systems, improving the information shared, and explaining the causes of incidents (and how similar events will be prevented in future).

For more details on the Environmental Stressors Review, please see the Sarnia Area Environmental Health Project's Environmental Stressors Community Report available on the [Sarnia Area Environmental Health Project](#) website.

3) Medicinal plants

Plants Study: to help address questions from Aamjiwnaang First Nation about whether plant medicines are safe to harvest in their community, a comparative study was undertaken to determine if chemicals found in plants in Aamjiwnaang First Nation are different from a First Nation distant from industry (i.e. Kettle and Stony Point).



Study question: Do medicinal plants growing in Aamjiwnaang First Nation have different levels of any chemicals of concern, compared to the same plants growing in Kettle and Stony Point?

Community input was used to select the 11 medicinal plants assessed in the Plants Study. In order to help answer community questions about whether local plants contain elevated levels of any air pollutants, this study compared the levels of chemicals in plants from Aamjiwnaang and those from Kettle and Stony Point. The results of this study add to our understanding of medicinal plants, and Aamjiwnaang First Nation may continue to pursue additional studies to better understand the impact of pollution on local plants.

This study looked at common air pollutants in medicinal plants harvested in both First Nation communities. When compared to plants distant from heavy industry,

the study found no evidence of toxic air pollutants building up in plants harvested in Aamjiwnaang First Nation and identified no health concerns.

- A. Plant tissues collected at Aamjiwnaang First Nation and Kettle and Stony Point had similarly low concentrations of chemicals when tested for in a lab.
- B. Only one compound, tungsten, was found at higher levels in Aamjiwnaang First Nation plants compared to Kettle and Stony Point, but levels were low in the plants from both communities. No specific health effects have been associated with exposure to tungsten in humans (Agency for Toxic Substances and Disease Registry).
- C. The study researchers did not identify any health concerns from the study results.

This study applied western scientific approaches to address a question from the community. The detailed data and report from this work was provided by Dr. Eric Liberda of Toronto Metropolitan University to staff and leadership in the two participating First Nations. Additional details may be published in future as peer-reviewed scientific literature.

For more information on the project, and final reports, please visit the Sarnia Area Environmental Health Project website at cleanairsarniaandarea.com