



Clean Air Sarnia and Area

Co-Chair – BASES

Co-Chair – Ontario Ministry of Environment Conservation & Parks

Meeting Agenda

Date	Time	Location	Frequency
Tuesday, Aug 18th, 2026	1:00pm – 2:30pm	BASES Boardroom, 1086 Modeland Rd	
Attendance			
Industry and Community Members: Dean Pearson, Cabot; Don Fusco, Chemical Industry Association of Canada; Ian Miron, Ecojustice; Katie Policelli, NOVA; Jennifer Meharey, Suncor; Joseph Lasowski, Arlanxco; Kris Lee, Community Member; Landon Tresise, Canadian Fuels Association; Lori Lucas, Lambton Public Health; Lisa Rekman, NOVA, Manee Vellaippan, Cabot; Lisa Mercier, Jacobs; Michelle Sich, NOVA; Tanya Calver, Imperial Oil; Wendy Cyr, Diamond Petrochemicals; Colin Graf, Community Member; Dana Mitchell, Shell; Nathan VanBelois, Vertex; Jenna Devereaux, Shell; James Kostuk, City of Sarnia			
Aamjiwnaang First Nation: Courtney Jackson, Keisha Walker, Lynn Rosales			
BASES: Kari Chervinsky, Tracy Krull, Jason Vaillant			
MECP: Jennifer Borsellino, Jessica Brown, Michael Harris, Jason Lehouillier, Rachel Melzer, Anisur Rahman, Yushan Su, Jean Van Dusen, Alicia Wilkinson			
ECCC: Valbona Celo, Genevieve Tardif, Craig Palmer, Amandeep Saini, Sumi Wren, Renata Zaremba			

1. Introductions
2. Previous minutes: No minutes from Fall 2025 CASA Website overview meeting
3. Actions from previous meeting
 - None
4. ECCC Presentation: Integrated Chemical Mixtures Project- updates and next steps
 - ECCC provided an updated on the Integrated Chemical Mixtures Project (ICMP) (<https://www.canada.ca/en/environment-climate-change/services/canadian-environmental-protection-act-registry/publications/integrated-chemical-mixtures-project.html>)
 - ECCC will periodically organize flash talks (email Genevieve.Tardif@ec.gc.ca to sign up for flash talks)
 - Presentation slides will be circulated with CASA meeting minutes
 - The link to the hydrodynamic model of the St. Clair River shown in the presentation is in the notes section of the slide deck, which will be circulated
5. MECP updates
 - Monitoring Station Updates: Errnol Gray and Sun Ave
 - The Errnol Gray Sr. air monitoring station has been fully upgraded to a new, state-of-the-art facility with expanded air monitoring capabilities. A ribbon cutting ceremony

CONFIDENTIAL

was held in the spring to celebrate the expansion of the Errnol Gray Sr. air monitoring station and its designation as a Tier 1 station under the federal National Air Pollution Surveillance (NAPS) Program. The ceremony was hosted by Aamjiwnaang First Nation at the air monitoring station, and was attended by community members and leadership from Aamjiwnaang, MECP, and ECCC

- This air monitoring station first began operating in the fall of 2008, in collaboration between Aamjiwnaang, the MECP and ECCC. At the time of its installation, and to today, this air monitoring station remains the only Indigenous community station in Ontario under the federal National Air Pollution Surveillance program
 - The new station includes expanded infrastructure for air monitoring sampling – which includes enhanced particulate matter sampling, PAH, and carbonyls (which includes formaldehyde). The expanded roof space and a larger station footprint allow for additional samplers to be deployed for special studies.
 - Near-real-time data from the Errnol Gray Sr. station continues to be provided on the CASA website
 - In April 2026, the Sun Ave air monitoring station was added to the CASA network. This station is located on the Sun Canadian Pipeline Property, near the Aamjiwnaang Cemetery. This station measures benzene and sulphur dioxide on an hourly basis, with data provided on the CASA website in near-real-time.
 - In the coming weeks, the station will be renamed in honour of an Aamjiwnaang community member.
- Presentation: AQHI, Air Quality Alerts, and Wildfire Smoke
 - The MECP provided a demonstration of the Air Quality Ontario website (<https://www.airqualityontario.com/>), including an overview of the Air Quality Health Index (AQHI) network and Air Quality Alert program, which is based on current and forecasted air quality.
 - The public can subscribe to receive direct email notifications when air quality alerts are issued for their forecast area of interest (e.g. Sarnia-Lambton): [Air Quality Ontario: Email air quality alerts](#)

6. BASES updates

- CASA website tutorial- [Clean Air Sarnia & Area](#)
 - i. Reviewed CASA Classifications, Reporting, Dashboards, Station Dashboards, FAQ, and filtering for monitored variables or MET data on the map.
 - ii. Reviewed the mobile version (including wind arrow direction, when in doubt use the wind rose direction degrees)
- Water monitoring station- planning to add to public website by end of Q3
 - i. Current monitored variables include: Hexane, Chloroform, Cyclohexane, benzene, Toluene, Ethyl Benzene, P-xylene and O-xylene/Styrene
 - ii. Next- Adding F1 (C6-C10) and F2 (C10-C16) components
- Reg 88- SO₂ reduction updates from industry
 - i. Reg enacted in 2022. Establishes a new regulatory framework for reducing Sulphur Dioxide (SO₂) emissions from Ontario's five major petroleum refining and processing facilities.

- ii. Each of the three refineries in Sarnia have implemented:
 - 1. Continuous emissions monitoring systems (CEMS)
 - 2. Community air-monitoring networks through BASES
 - 3. Approved SO₂ minimization plans- posted on Individual Company websites. All companies on track per plans.
 - 4. Quarterly and annual reporting programs- Ongoing. See also company websites.
- iii. SO₂ Minimization plans progress updates:
 - 1. Suncor Sarnia Refinery: Multiple process changes implemented by rerouting process streams and other process improvements. Project to increase Flare gas recovery capacity in progress. To be completed by 2027.
 - 2. Shell Manufacturing Center: Shell plans to construct and install a Wet Gas Scrubber to reduce SO₂ air emissions. This work will be done in two phases – Phase 1 is complete and consisted of preparation work, and phase 2 will be completed at a later time and involves the construction of the wet gas scrubber. Shell continues to progress projects as part of the site's overall SO₂ emission reduction plans.
 - 3. Imperial Oil Sarnia Complex: Construction of flare gas treatment unit in progress. Process changes in Sulphur Recovery Unit during in upcoming Turnaround. Completion by 2027. Construction of Wet Gas scrubber in progress. Completion per plan by 2029.
- iv. Overall, on track for 90% reduction of SO₂ from Sarnia facilities and 80% across the province, with \$1B invested across the Province.

- ECOH (Environmental Open House) -save the date- Wed. Oct.28th, 3-7PM, Sarnia Legion.

7. Aamjiwnaang updates

- Aamjiwnaang has two new air monitoring stations located in their community, which was made possible through an agreement with the MECP under the Ontario Community Environment Fund (OCEF) program.
- Technical support is provided through Vertex Environmental Consulting. The stations have been active for approximately one month.
- Aamjiwnaang now has the DR DAS air data management system, and hopes to bring this online to provide results from the air monitoring stations to the community. AFN will continue to work with BASES on agreements to facilitate including data from the new stations on the CASA website.

8. Round table

- No additional items raised

Integrated Chemical Mixtures Project (ICMP)

August 18, 2026

*Presented by Geneviève Tardif
Science & Technology Branch
Environment and Climate Change Canada
Genevieve.Tardif@ec.gc.ca*



Environment and
Climate Change Canada

Environnement et
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Canada

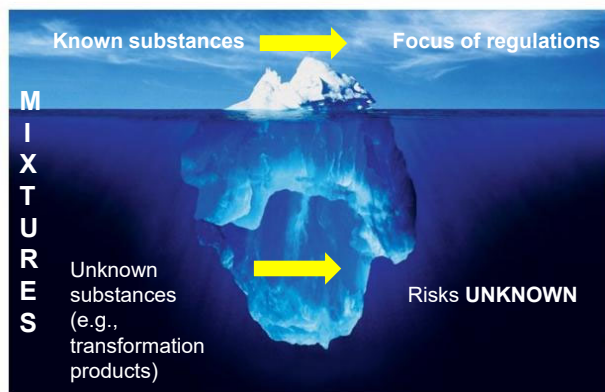
ROADMAP FOR TODAY

- Chemical mixtures and intro to ICMP
- Updates
 - ICMP Approach
 - Research
 - Air
 - Water
 - Wastewater
 - Soil
 - Data Integration
 - Engagement



WHY CHEMICAL MIXTURES ?

- We are used to managing in-commerce chemicals on an individual or structurally-similar group basis
- However, multiple chemicals from many sources make their way to the environment
- Chemical mixtures are composed of known and unknown substances
- Chemicals may behave differently in mixtures than separately
- The potential for risk to the environment from unknown substances is unknown
- **The ICMP aims to better understand chemical mixtures, including unknown substances and their effects on the environment**
- Amendment to the Canadian Environmental Protection Act in 2025 added a requirement to consider cumulative effects when data is available while determining whether a substance is toxic



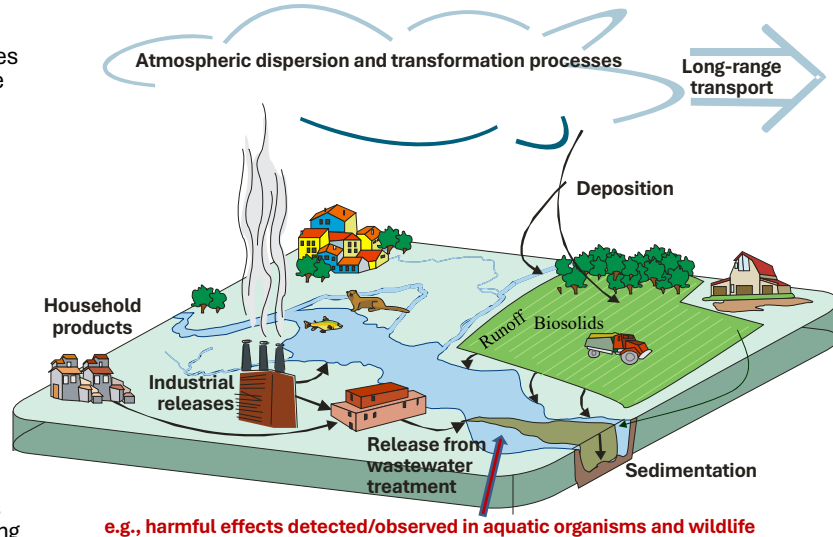
⇒ Knowledge to guide and inform assessment and management actions

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While determining whether a substance is toxic or capable of becoming toxic, available information has to be considered. That may result from exposure to a substance in combination with exposure to other substances.

PURPOSE OF THE PROJECT

- **OBJECTIVE** : identify chemical mixtures, determine if these mixtures have the potential to cause negative effects, determine **sources of chemicals within the mixture**, understand how they **behave** in the environment, and **inform** options to reduce effects/emissions
- **Collaborate** with academics, local First Nations, members of local communities, non-governmental organizations, other levels of government
- **2 regions as pilot project** :
Sarnia-St.Clair River
Brantford-Grand River
- **VISION**: Knowledge on chemical mixtures and their effects is generated from various sites across Canada and informs decision-making

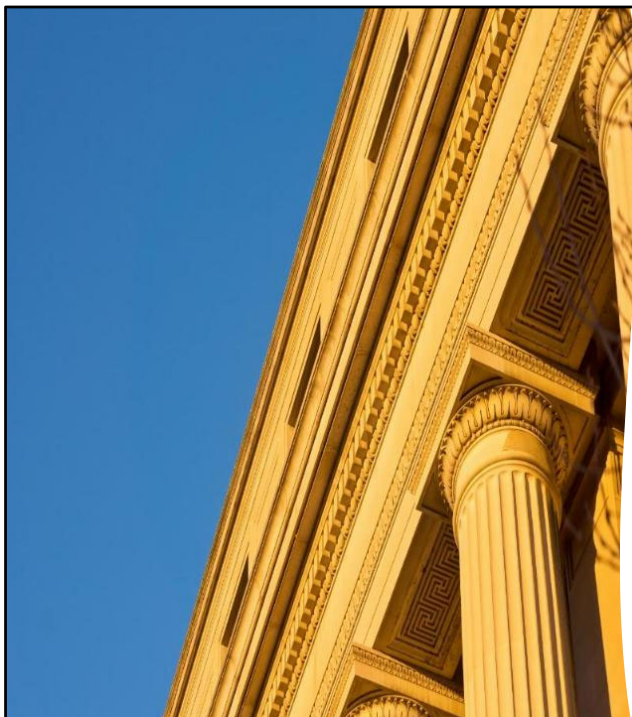


Chemical mixtures are found in all media and their composition changes continuously over time

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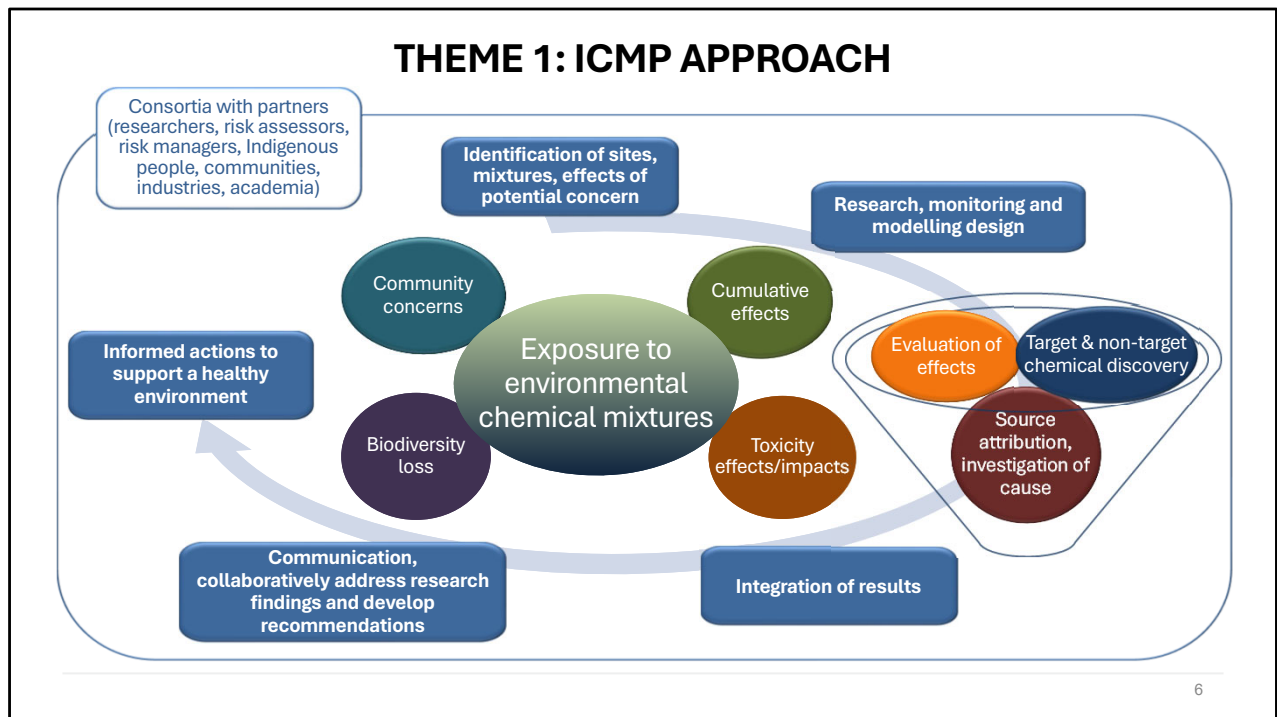
Collaboration is supported through workshops, flash talks, meetings, outreach, citizen project, G&Cs.

Informs decision-making, such as future assessment work



FOUR THEMES

- Proof of concept and development of the approach
- Science knowledge generation
- Impact analysis and informing chemicals management decisions
- Partnership with communities



- Project launched in 2023-2024
- Workplan developed
- Approach flowchart developed
- Coordination meetings ongoing

Actions to protect the right: “actions” could include the development of RM instruments, further information gathering and research, community outreach and additional engagement with provinces/communities where appropriate.

THEME 2: RESEARCH

- **Identifying chemical mixtures** in each environmental compartment
 - water, sediments, soil, air and biota
- **Determining whether and how they contribute** to adversely impacting the environment
- Focus on releases to the environment from **anthropogenic activities**
 - Point Sources: effluents, atmospheric emissions, landfills and leachates
 - Non-point Sources: biosolids, atmospheric emissions, runoff
- Development of new methodologies to inform risk assessment and risk management activities, and to support the implementation of mitigation measures (if needed)

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Characterization of known (targeted analysis) and unknown (non-targeted analysis) of degradation and transformation products, contaminants of environmental mixtures

Evaluation of the impact of chemical mixtures that may enter the aquatic and terrestrial food webs and pose threats to the health and biodiversity of wildlife and

other biota

aquatic receiving environment, aquatic and
terrestrial biota, sediments, soil and air

Non-point source atmospheric emissions could be from traffic, for example.

RESEARCH IN SARNIA - AIR

Linking chemical mixtures in air to indicators of health in Sarnia

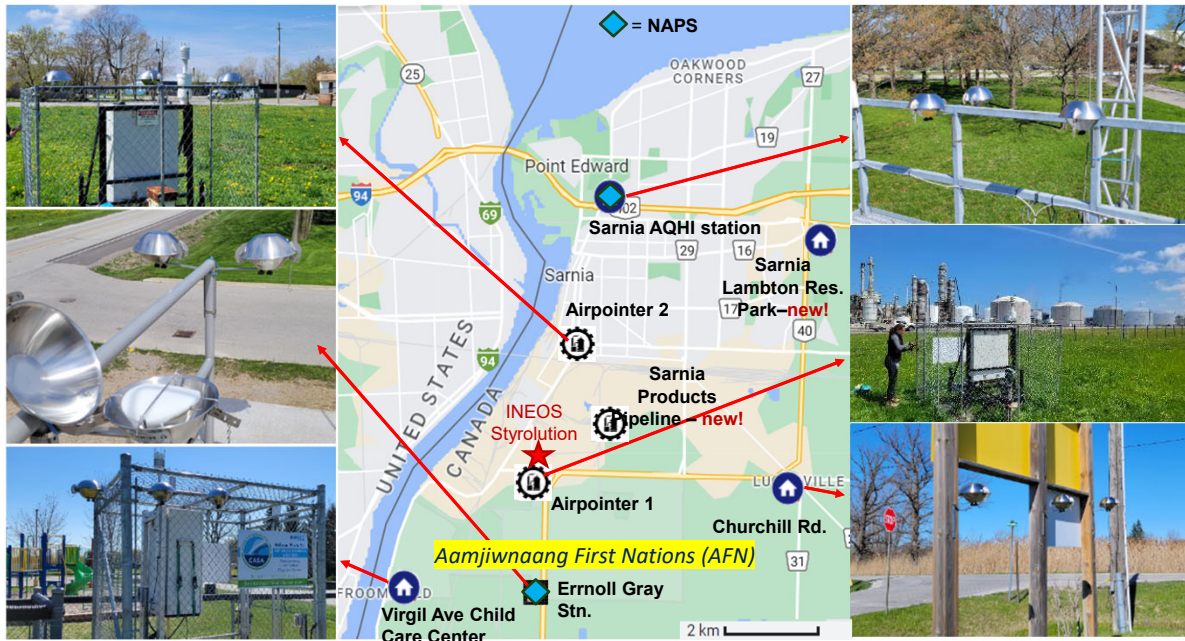
- Discussions with Aamjiwnaang First Nation began in early 2023 through Health Canada's ATOUSA study and passive air sampling; discussions continued as part of ICMP in 2023/24
- Aamjiwnaang, Ontario MECP, and Bluewater Associates for Safety, Environment and Sustainability (BASES) provided advice on sampling sites in Sarnia
- Sampling started in spring 2024 (6 sites) and continued in 2025/26
 - every 3 months from January 2025 to March 2026
 - 5 sampling periods, 9 sites
- This study will address data gaps for known and as of yet unknown substances in air, including an evaluation of toxicity
- 2024 spring samples have been analyzed as a pilot study
- Next steps: Complete analysis of 2025-2026 samples to confirm preliminary results and prioritize hazardous chemicals in the atmosphere for further study



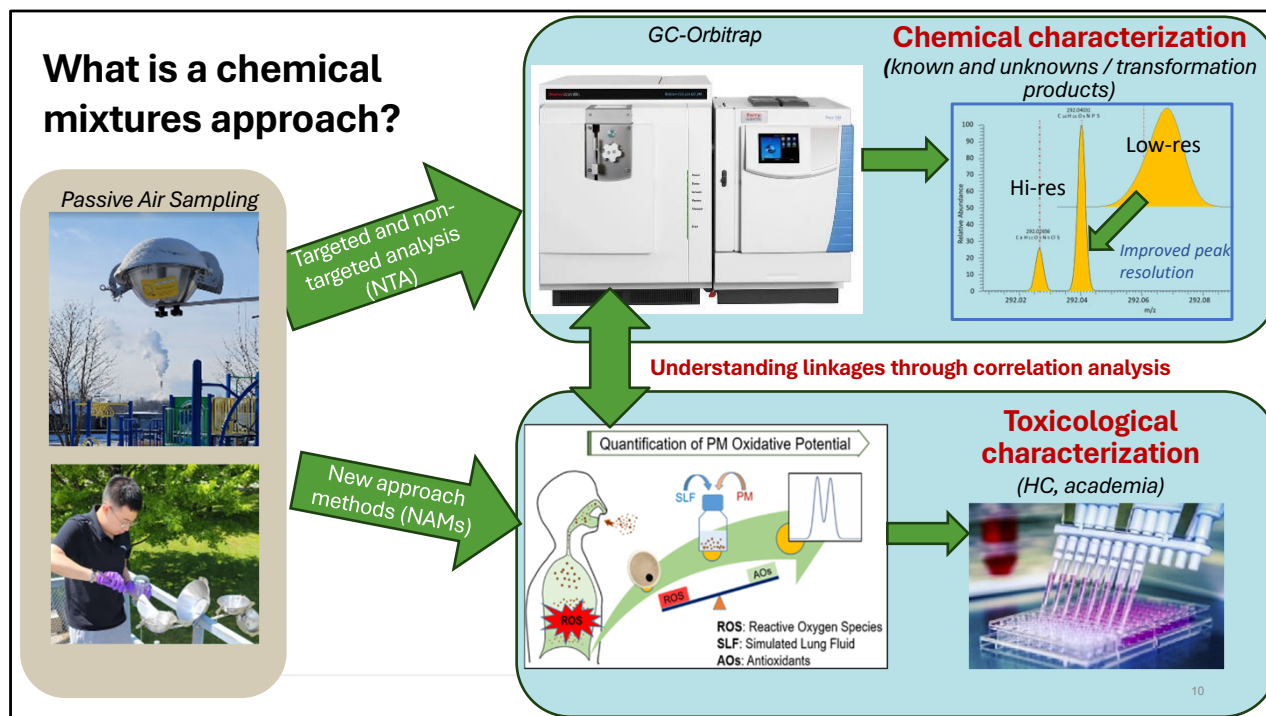
PUF disk type passive air samplers are used globally by ECCC for past 23 years to assess chemicals in air, including health indicators for air (gases+particles)
Samplers provide a time-weighted average of the community's exposure to chemical mixtures in air.

ATOUSA: Assessing Toxicity of Organics in Urban Sectors for Air

Sarnia and area sites: * Started April 2024 and coordinated with AFN, NAPS, MECP, and BASES



In addition to the 8 passive sampling sites shown here where we deployed three replicate samplers at each site, we also worked with Walpole Island First Nation and installed a site on their lands.



There are 2 main components to a chemical mixtures approach. The first is **chemical characterization** – i.e., assessing “what’s in the air” and we’re doing this the conventional way using targeted analysis of priority chemical classes and also by a new way using non-target analysis, where we screen for a broad range of chemicals and unknowns; the high resolution Orbitrap instrument allows us to identify individual components of the many 1000s of chemicals (peaks) present in air; if we were to use conventional analysis using low resolution, these peaks would be grouped together and we wouldn’t be able to discriminate the chemicals.

The second component of the chemical mixtures approach involves **toxicological characterization** – using cell-based assays or chemical assays; and we’re doing this work through collaboration with experts in Health Canada, York University, and Trent University.

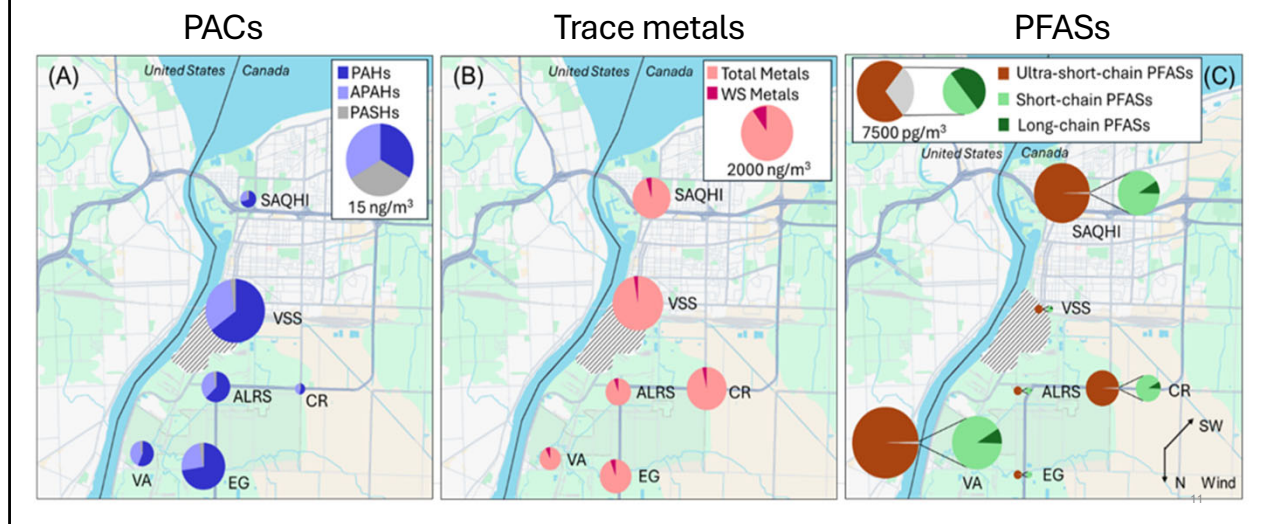
The final step is linking these two components through **correlation analysis**. This is done to tease out which chemicals co-vary and possibly contributing to the toxicity endpoints.

Extra: that is our postdoc Zhen Cheng in the photo changing-out the foam filter passive samplers at the NAPS station in Sarnia this past summer. Zhen was hired because of his PhD experience in China where he applied non-target analysis to ambient air.

PM=particulate matter

Targeted Analysis of Sarnia Air

+200 chemicals identified through NTA



PACs: Polycyclic aromatic compounds

WS: Water soluble fraction

PAHs: Polycyclic aromatic Hydrocarbons

PFASs: Per-and polyfluoroalkyl substances

Further details on **Results panels:**

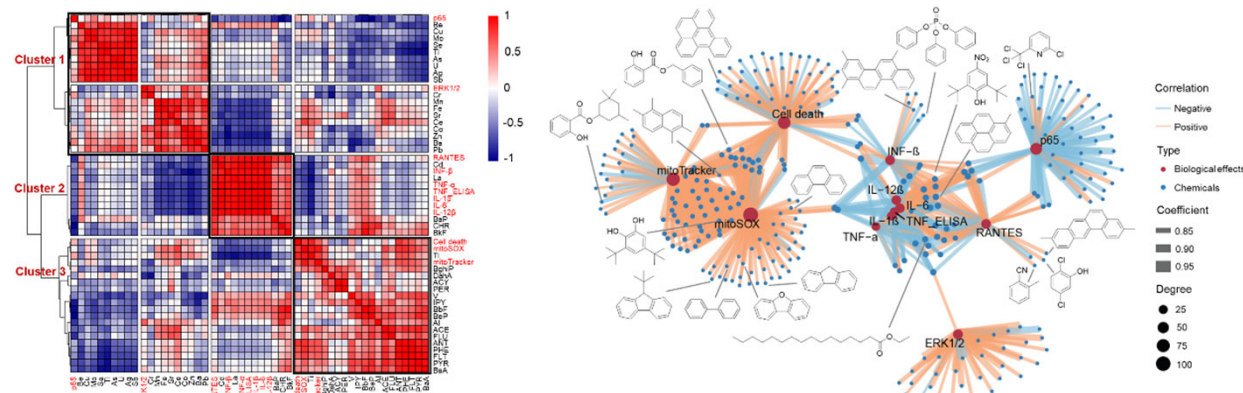
PACs and Trace Metals shown in the first 2 panels are of importance due to their impact on health and are the priority chemicals for our collaboration with Health Canada; PACs are known carcinogens and trace metals contribute to oxidative potential in air (cardiorespiratory health) – and both are associated with industrial sources. PASHs: the sulfur containing ones. PFAS chemicals are associated with numerous forms of toxicity and also have numerous sources to air including chemical industry, residential/recreational sources, agricultural sources too;

The PFAS data includes the ultra short chain compounds (mainly trifluoroacetic acid, TFA) and these are our first measurements of this class in the HAPs lab. Ultra-short chain PFAS are receiving widespread attention currently due to rapidly increasing levels in plant-based foods and concerns related to long-term exposure and health impacts globally.

The PACs and trace metals show a similar spatial pattern and are elevated near at the VSS (Vidal Street Station) site which is most impacted by the main industrial area, while PFAS

show a very different distribution. These differences will be useful when relating to results from the toxicological characterization; these spatial differences in levels of chemical pollutants among sites useful, statistically speaking, in order to tease-out which chemicals are associated with which effects and to improve the power of the correlations; more on that later...

Network Analysis to Prioritize Nontargeted Chemicals



- **Correlation heatmap and network analysis** was applied to screen targeted and nontargeted chemicals associated with 12 biological effects
- Most of identified compounds (associated with biological effects in NTA) are **aromatic compounds**, underscoring the potential health relevance of aromatic compounds in the representative petrochemical industrial region

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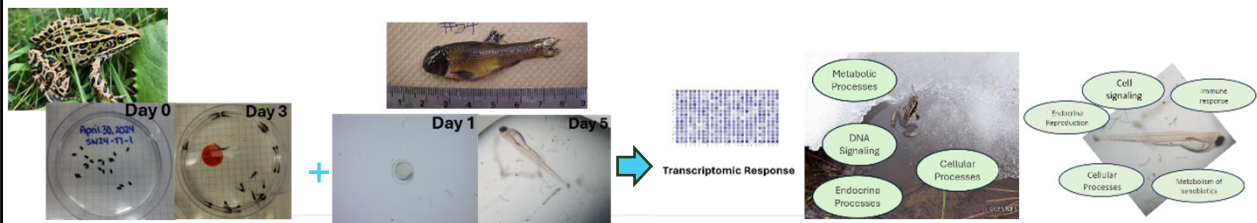
We are employing advanced statistical methods to explore relationships between different biological effects and chemical mixtures in air in Sarnia among the different sites. This will help us to prioritize chemicals and chemical mixtures for further scrutiny.

Biological effects tested at York University
Zhen conducted correlation analysis

RESEARCH IN SARNIA – AIR-WATER INTEGRATION

Assessing the effects of air contaminants on aquatic biota using New Approach Methods (NAMs)

- Linking atmospheric deposition of airborne contaminants, on the landscape, to early-life stage biological effects on frog and fish eggs.
- Sampling completed: Jan-Feb 2026 snow collections from 5 sites (Aamjiwnaang Baseball field, Petrolia, Watford, Aberader, Port Franks)
- Next steps: Chemical analysis (including PFAS) and data interpretation



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RESEARCH IN SARNIA - AIR

Assessing influence of atmospheric deposition mixtures in Sarnia and Brantford on wildlife and linkages to human health

Objective 1: Quantify targeted chemical groups associated with plastics manufacturing and petrochemical industrial activity



Objective 2: Nontargeted analysis (NTA) to define region-specific chemical fingerprints downwind of the petrochemical hub in Sarnia



Objective 3: Comparison of oxidative stress in air samples between regions via cellular assays

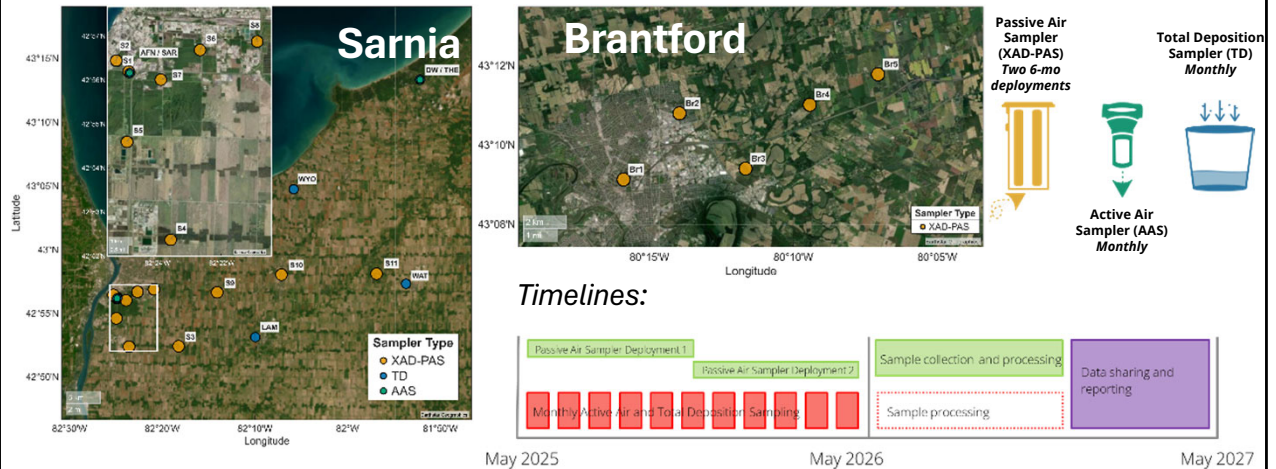


Hayley and Alex after the set-up of the High-Volume Air and Total Deposition Sampler at AFN in May 2025

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Our goal is to investigate *known* and **unknown** chemical pollutant mixtures in air and atmospheric deposition in Sarnia, and how their composition changes in the region.

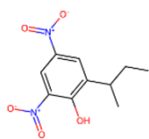
SAMPLING SITES AND TIMELINES



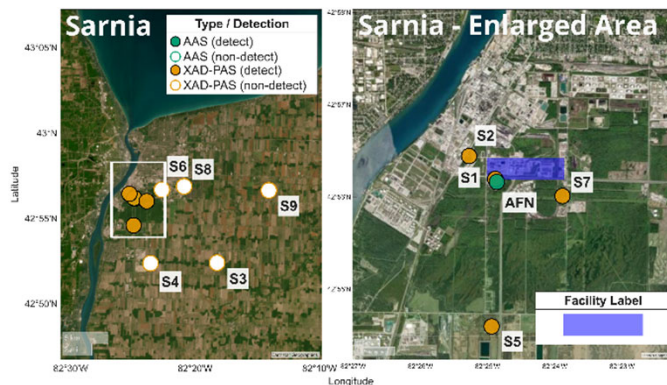
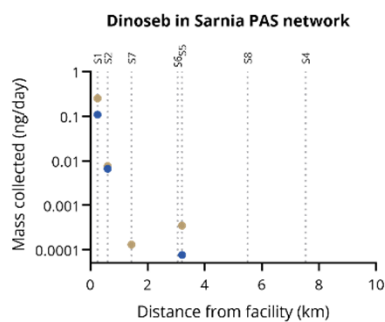
All field work complete as of July 2026
Sample analysis ongoing

EARLY RESULTS:

Dinoseb measured in Sarnia air



Dinoseb is used as polymerization inhibitor preventing the thermally induced polymerisation of styrene



Next steps:

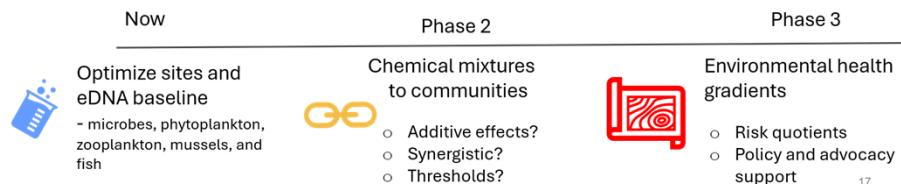
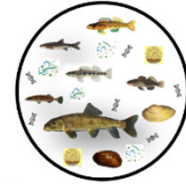
- Continue to analyze samples to quantify **Objective 1** targeted chemicals across all PAS, TD, and AAS (in progress)
- Report compounds found via NTA which are specific to Sarnia and Brantford (in progress)
- Identify trends in oxidative stress cellular assays between PAS sites (in progress)

[Dinoseb - information sheet - Canada.ca](https://www2.gov.bc.ca/gov2/industry/chemicals/dinoseb/dinoseb_information_sheet_Canada.ca)

RESEARCH IN SARNIA - WATER

Monitoring Networks for Chemicals Mixtures and Biodiversity Assessments:

- Using eDNA to develop spatial and temporal estimates of biodiversity (species richness and diversity) and potential impact of the urban/agricultural landscape on the nearshore environment
- Sampling completed: 2024 & 2025 Sarnia: September along St. Clair River corridor
- Aquatic community analysis of the multiple levels of the food web (microbes, phytoplankton, zooplankton, mussels, and fish) is underway
- Early finding: Greater fish diversity observed downstream of Sarnia Bay (to Cathcart Park) and lower diversity at Point Edward and downstream of Port Lambton
- Next steps: Identify relationships between chemical mixtures in the St. Clair River and Telford Creek and aquatic communities



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In aquatic environments eDNA sources are diverse: damaged tissue, skin/scales, metabolic waste

OBJECTIVE : Identify microbes, phytoplankton, zooplankton, mussels, and fish using new non-invasive technology

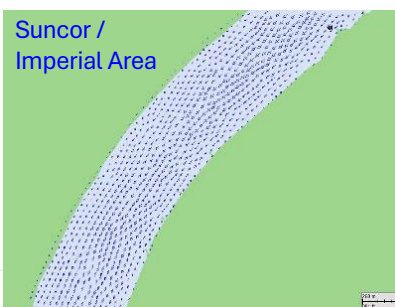
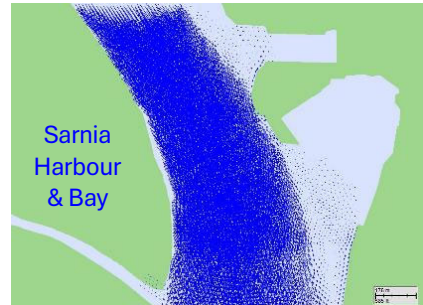
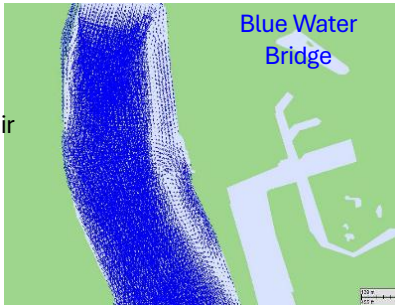
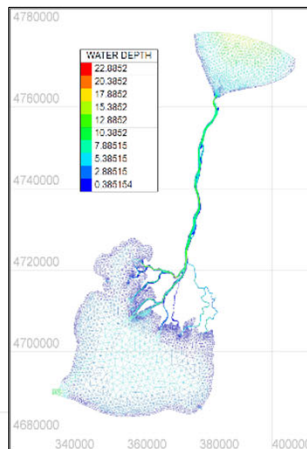
Diversity of species present and distribution of species of concern, or of interest to communities

Aquatic community analysis of the multiple levels of the food web is underway

RESEARCH IN SARNIA – WATER

Chemical Transport and Fate and Behaviour Modelling in St. Clair River/Lake

- Hydrodynamic model of the St. Clair River system completed



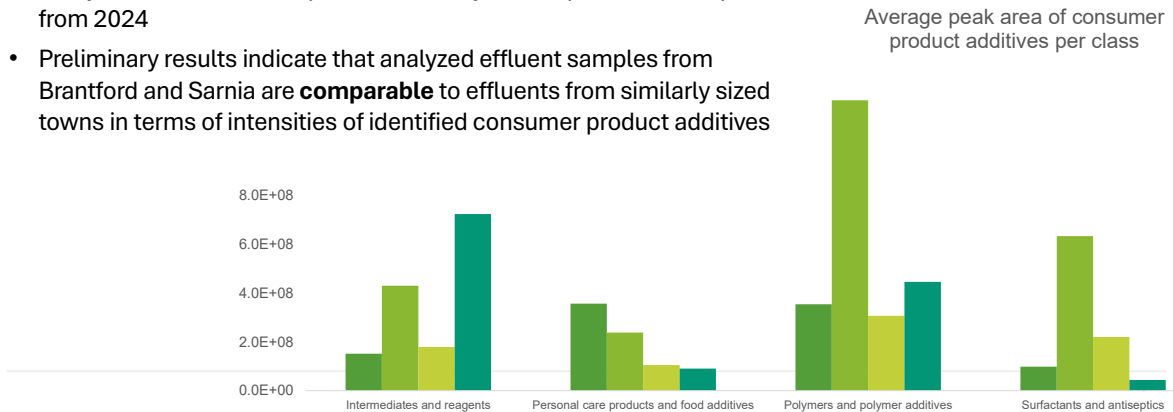
Chemical Transport and Fate and Behaviour Modelling in St. Clair River/Lake

- Phase I: Development of a high resolution 2D hydrodynamic model – From Lakeport on Lake Huron to Gross Pointe on Lake St. Clair: Completed
- Collaboration: National Research Council of Canada - Ocean, Coastal and River Engineering
- Model integrated into NRC's Molodo Platform for ECCC's application (<https://modolo.ca/eccc/scrm/public/>): The **St. Clair River Model** is a web-based application providing access to the **TELEMAC-2D hydrodynamic model** of the St. Clair River system. The tool is designed to support the execution, monitoring, and retrieval of numerical simulations focused on river flow and water-level dynamics.

RESEARCH - WASTEWATER

Target and Non-target analysis of consumer product additives in wastewater effluents

- Sampling from Brantford and Sarnia WWTP completed in 2024 and 2025
- Analytical method development and analysis completed for samples from 2024
- Preliminary results indicate that analyzed effluent samples from Brantford and Sarnia are **comparable** to effluents from similarly sized towns in terms of intensities of identified consumer product additives



Interpretations of NTA data to date generate relative quantitation; here, average peak area are compared across sample groups for prioritization of chemicals, without attempt to link them directly to fixed concentration values

RESEARCH - SOIL

Effects of Sarnia biosolids applied to different soil types over time to soil invertebrates and plants

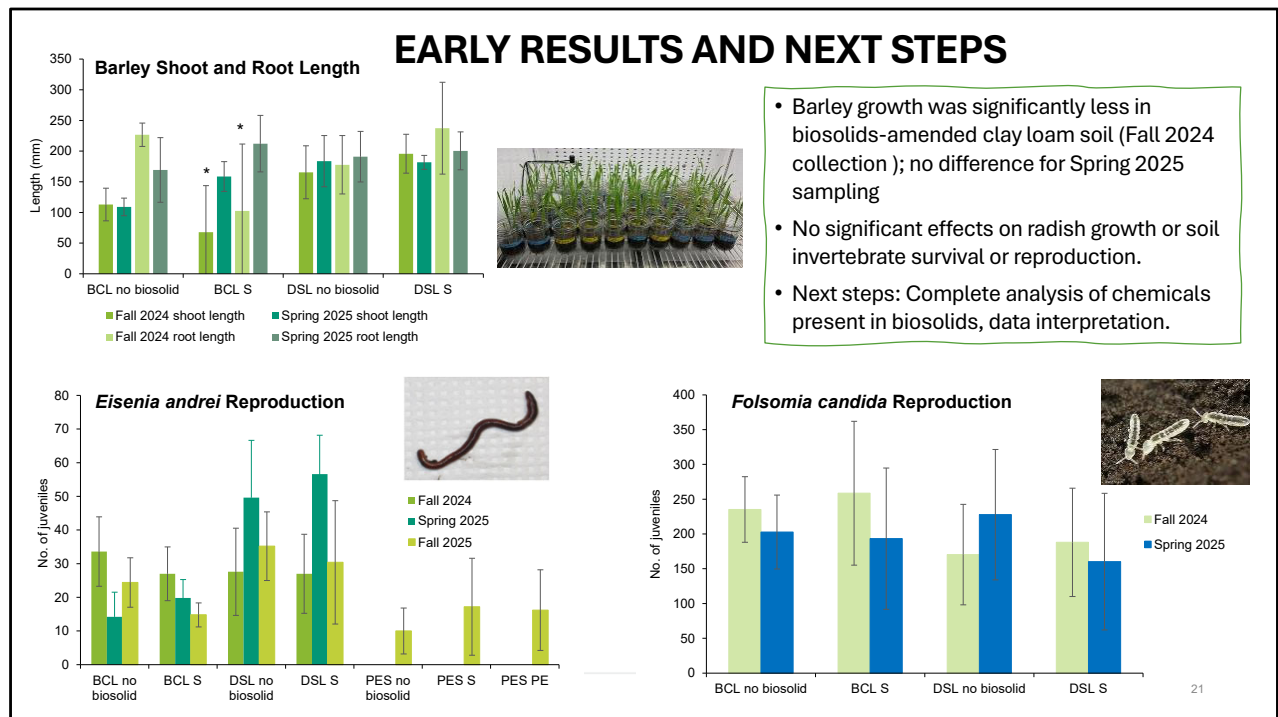
- Evaluate the impact and potential for contaminant transfer from biosolids-amended soil to soil organisms and plants
 - Conduct a series of toxicity tests to examine impacts on organism health (e.g., survival, growth, reproduction and bioaccumulation)
 - Use standardized soil indicators for assessing contaminant effects (e.g., crop plants and soil invertebrates such as earthworms, springtails)
- Evaluate chemical mixtures in biosolids collected from Sarnia and Prince Edward WWTPs
 - Evaluate chemicals present in biosolids (e.g., emerging and new PFAS, metals and waste plastics*)
 - Examine the influence of soil type on bioavailability and toxicity (e.g., sandy versus clay soil)



Schematic of soil toxicity assessments. Organisms are exposed to biosolids-amended soils, incubated, and then assessed based on survival, growth and reproduction. Exposure tests include effects on (from top down) plants (Radish and Barley), springtails and earthworms. Biosolids are amended using Ontario provincial application rates.

*through collaboration with National Research Council

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For the Sarnia biosolid we had collections from 3 time points (Fall 2024, Spring 2025 and Winter 2026). For Point Edward, we had one collection (Summer 2025). We have chemical analysis for PFAS in the biosolids but still need to evaluate all the data together.

BCL= Brant Clay Loam Biosolid-amended control clay loam

DSL = Delhi Sand Loam

S = with Sarnia biosolids amendment

PES = Point Edward Silt Loam

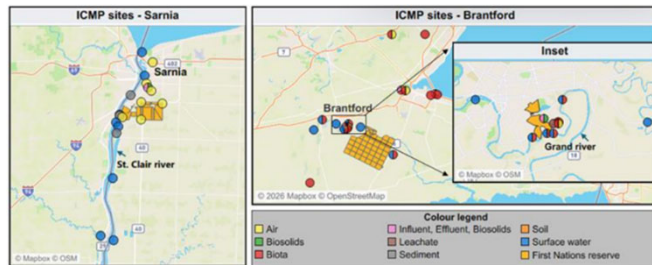
PE = with Point Edward biosolid amendment

You can see there are differences in earthworm reproduction between soil types, but not really between with or without biosolid amendments for these tests.

THEME 3: IMPACT ANALYSIS OR DATA INTEGRATION AND INTERPRETATION

Develop methods, expertise and capacity to inform overall findings and recommendations with regards to chemical mixtures in Sarnia and Brantford

- Data integration dashboard under development. Will support overall interpretation
- RWTH Aachen University project underway “Making sense of monitoring data to improve risk assessment and management of complex chemical mixtures”
- University of Toronto project:
Developing and improving environmental models to connect ICMP outputs with risk assessment and risk management
- Report, communicate findings, collaborate to develop next steps



THEME 4: PARTNERSHIP WITH COMMUNITIES

- Walpole Island Elementary School - demonstration of fish sampling and discussion about research activities
- March 2026 – Participation to the *Aamjiwnaang First Nation - Lighting the 8th Fire Conference March 10-12th*
- ECCC laboratories tours
- Shared research workplan and sought feedback
- ICMP flash-talks (monthly technical talks, everyone invited)
- Webpage on Canada.ca
- Stakeholder meeting, Spring 2027
- WATCH led Citizen science – earthworms as bioindicators of soil health project at Riverview Central School



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WATCH Citizen Science

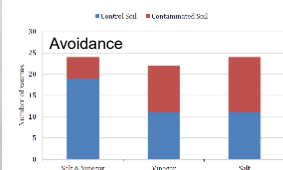
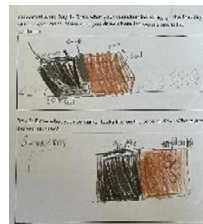
Earthworms as bioindicators of soil health

Project team: Kris Lee & Sherri-Anne Wills
(WATCH citizen science) and Juliska Princz
& Jessica Velicogna (ECCC)

- Outreach to support Ontario Science Curriculum
 - Riverview Central Elementary School, Lambton Kent District School Board
 - Grades 1 & 2 explored hands-on earthworm avoidance behaviour using salt and vinegar as soil contaminants
 - Students prepared and conducted the tests, reporting their observations:
 - Earthworms respond to different stimuli
 - A combination of salt & vinegar yielded the strongest avoidance response when presented a choice with clean soil
 - Concluded that earthworms can be used as indicators of soil quality
- Students gained a deeper understanding of soil ecosystems, environmental monitoring & role of citizen science in environmental stewardship



Students prepared all of the test materials.



Students documented their observations to see what scenarios the earthworms avoided relative to clean soil.

EXPANDED LIST OF PARTNERS AND STAKEHOLDERS

Government of Canada

ECCC:

- STB Indigenous Science Division
 - ECCC Regional Office-Ontario
 - Environmental Protection Branch (LRAD)
- Health Canada
Indigenous Services Canada

Other Levels of Government

Ontario Ministry of the Environment
Grand River Conservation Authority
St. Clair River Conservation Authority
City of Sarnia; Lambton County

Universities

Carleton University
McMaster University
University of Ottawa
Concordia University
University of Toronto
Trent University
York University
University of British Columbia
Université de Sherbrooke
RWTH Aachen University

Indigenous Communities

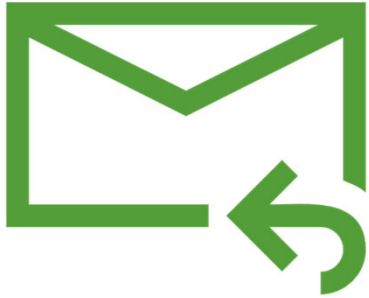
Aamjiwnaang First Nation
Six Nations of the Grand River
Walpole Island First Nation

NGOs

Environmental Defence
WATCH
Clean Air Sarnia & Area

Industry Groups

Bluewater Association for Safety, Environment and Sustainability
Mining Association of Canada



THANK YOU

CONTACT US :
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