



Environment and
Climate Change Canada

Environnement et
Changement climatique Canada

SCIENCE AT ECCC

DM Transition

September 2023



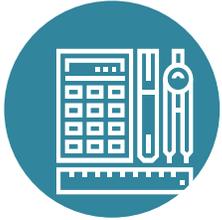
Environment and Climate Change Canada's **50th anniversary**
50^e anniversaire d'Environnement et Changement climatique Canada

Meteorological Service of Canada's **150th anniversary**
150^e anniversaire du Service météorologique du Canada



Canada 

CONTEXT & MANDATE



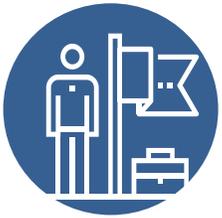
Providing the Evidence Base



Harnessing New Discoveries



Leveraging World-Class Talent



Positioning Canada as a World Leader

- Environmental challenges are often complex, multi-faceted and evolving
 - Increasingly, the intersections between climate change and other environmental issues – like extreme weather, pollution, species decline, biodiversity loss, and threats to the sustainability of freshwater and other natural resources – are having daily effects on the health and well-being of Canadians and their environment
- Science is critical to making informed decisions related to environmental risks and problems
 - From regulators trying to determine the effectiveness of measures reducing emissions to Canadians and their families, who depend on federal government science and monitoring for air quality and climate emergency warnings
- ECCC is the lead organization for environmental science advice and its science addresses the most pressing environmental issues
 - Science and Technology Branch (STB) provides scientific knowledge, data and tools to deliver on the department’s legislative obligations and enable its policies, programs and services to provide a clean, safe and sustainable environment for Canadians
 - STB mobilizes knowledge and collaborates on science matters, both across the Canadian innovation system and internationally

SCIENCE SUPPORTS ECCC RESPONSIBILITIES AND PRIORITIES

- STB conducts research, monitoring, modelling and analysis of pollutant processes, climate processes (including Arctic climate processes), air quality, wildlife, ecosystems, aquatic ecosystems, water quality, chemicals of concern, toxic substances, contaminated sites, plastics and cumulative effects
 - Supports delivery of essential ECCC operations and services, such as weather forecasting, the Air Quality Health Index, the UV index, Ice Services, Climate Services, and environmental emergencies
 - Informs environment and climate legislation, regulations and policy development and tracks progress on achieving targets (e.g., responsible for Greenhouse Gas and Air Pollutant Inventories, assessing effectiveness of programs to reduce air pollution and acid rain)
 - Enables program delivery and policy development (e.g., Chemicals Management Plan, Plastics Agenda, Oil Sands Monitoring Program, Freshwater Action Plan, species at risk recovery strategies and action plans, impact assessments)
 - Supports regulatory enforcement actions by providing defensible scientific evidence, developing accredited testing methods and tools, testifying on non-compliance cases, and monitoring and surveillance of chemicals of concern
- STB undertakes scientific collaboration and knowledge mobilization nationally and internationally with multilateral institutions, government departments and agencies, academics, and Indigenous partners

STB'S UNIQUE ROLE

- In some areas, STB has the **only capabilities or mandate in the country** to do the research required, such as:
 - STB's Canadian Centre for Climate Modelling and Analysis developed Canada's only climate model
 - Environmental modelling (hydrology, ocean, sea ice, atmospheric processes) to support Canada's weather and environmental prediction services
 - National-scale and long-term air, water, soil, and wildlife monitoring programs
- STB research and monitoring contribute to **key international science initiatives**, reinforcing Canada's credibility and reputation as a science leader, including:
 - Arctic Council/Arctic Monitoring and Assessment Programme (AMAP)
 - Global Atmospheric Watch Programme for black carbon and aerosol reporting
 - Great Lakes Water Quality Agreement
 - Intergovernmental Panel on Climate Change (IPCC)
 - Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES)
 - Target 7 (reducing pesticides risks) of the Kunming-Montreal Global Biodiversity Framework
 - UNFCCC National Inventory Report
 - World Climate Research Program Coupled Model Intercomparison Project (CMIP)

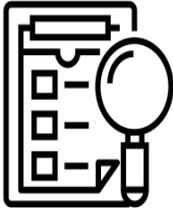
A DIVERSIFIED, SCIENTIFIC WORK FORCE



- **~1,500 FTEs in 34 offices** across Canada
- **Productive relationships** with many research institutions, including in academia
- **~800 peer-reviewed publications annually**, most including at least one collaborator
- **~64%** of peer-reviewed publications are **open access**
- **~\$225M annual budget**

EXAMPLES OF HOW SCIENCE INFORMS ECCC RESPONSIBILITIES AND PRIORITIES

1) Supports legislation, regulations and policy development



- **Canada's Changing Climate Report** informed and motivated domestic mitigation policy and the development of the National Adaptation Strategy
- Under the Chemicals Management Plan, the **Science Assessment of Plastics** informed the potential ban of six single-use plastic items, including the development of regulations

2) Delivers essential public good services



- STB **monitoring and modelling** helps Canadians:
- make informed decisions about pollution impacts (e.g., **Air Quality Health Index**, the UV index, water quality monitoring)
 - protect themselves against extreme and **hazardous weather** (e.g., predictive tools to inform fire and weather risk prediction and alerts, innovation for national weather model, and emergency response)

(3) Delivers and enables programs



- Leads the estimation of Canada's GHG emissions and produces the Annual **National Inventory Report** on GHGs to the United Nations Framework Convention on Climate Change
- Collaborates with Alberta on the **Oil Sands Monitoring Program** to understand the effects of oil sands development on the environment and assess cumulative effects

(4) Supporting Reconciliation and Indigenous economic growth, prosperity, and well-being



- Undertakes and facilitates Indigenous science
- Conducts water quality monitoring in traditional shellfish harvesting areas of Indigenous communities
- Conducts research projects on contaminants and their impacts on Northern communities

INDIGENOUS SCIENCE AT ECCC

Applying an **Indigenous lens** to ECCC science, policy, and programs is essential to effectively taking action on climate change and adaptation in Canada

- Indigenous science is a **distinct, time-tested, and methodological knowledge system** that provides a **long-term, wholistic approach** and can enhance and complement western science
- The establishment of the Indigenous Science Division (ISD) at STB is part of the federal government's commitment to **walk the path of reconciliation** and follows a call to action from the Truth and Reconciliation Commission of Canada that Indigenous ways of knowing be included in both government and academia
- The mandate of ISD is to **bridge, braid, and weave Indigenous science with western science approaches** to inform and enhance decision-making



COLLABORATION ALIGNS CAPACITY AND LEVERAGES WORLD-CLASS SCIENCE



- **Federal cooperation**, including with Granting Councils, maximizes the use of government resources and external expertise, and the impact of science on environmental issues that matter to Canadians
- ECCC has strong external science relationships and innovative governance models (e.g., co-management of the oil sands monitoring program)
 - From 2020-2023, ECCC provided over **\$35 million in Grants and Contributions funding to academics**
 - ECCC's Departmental Science Advisor (DSA) and the network of federal DSAs are key in strengthening connections with academia
- **Internationally**, ECCC collaborates on complex international and national issues and advances science diplomacy through formal science relationships and global science, technology, and innovation agreements with partner countries
- **Key partners** include: SBDAs, academia, provinces and territories, Indigenous communities, regional climate consortia, environmental non-governmental organizations (ENGOs), other countries, and international organizations

ECCC'S SCIENCE IS RESPONSIVE TO EMERGING CHALLENGES AND OPPORTUNITIES

- Policy challenges are becoming more complex, and the pace of innovation is increasing
- Interdisciplinary research and integrated science are needed to offer comprehensive solutions (e.g., climate change, biodiversity loss, natural climate solutions, plastic pollution, cumulative effects)

In response, ECCC's science is:



Advancing Reconciliation

Drawing on Indigenous knowledge and leadership in co-developing and co-delivering science programs (e.g., Inuit Field Training Program)



Improving Science Communication

Providing access to scientists and engaging directly with Canadians in innovative ways (e.g. Canada's Changing Climate Report, Canadian Centre for Climate Services)



Modernizing

Creating a world-class network of federal laboratories to support collaboration and scientific excellence through the Laboratories Canada initiative

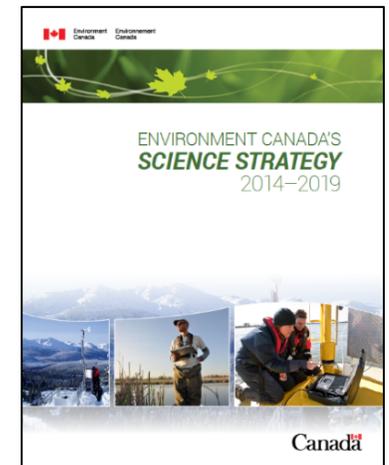


Ensuring Scientific Integrity

Implementing the Policy on Scientific Integrity, including provisions in collective agreements and ECCC's Departmental Science Advisor

DEVELOPING A SCIENCE ROADMAP

- **ECCC's continued leadership** on foundational science to deliver Government's environmental protection priorities will be important for achieving goals and monitoring our progress
- STB is working to ensure science continues to align with ECCC priorities over the next five to 10 years
- The department's **Science Strategy** (2014-2019) is being updated
 - Aim to set and guide ECCC's next science vision, with cross-cutting science goals, priorities and core values
 - Will have clear links to the **Departmental Results Framework**
- Key to the Science Strategy, ECCC is advancing, in tandem, a Science Advice Governance Framework to facilitate strategic discussions of science advice and information needs, direction-setting, and triage of priorities



ECCC WILL CONTINUE TO ADVANCE SCIENCE IN PRIORITY AND EMERGING AREAS

Biodiversity, wildlife and habitat research & monitoring



Develop and apply innovative monitoring and research tools to support federal project reviews and improve outcomes for biodiversity and wildlife, including ecosystem assessments, species at risk and migratory birds. Considering the application and implications of genomics.

Climate Change



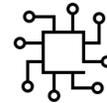
Continuously improve GHG emission tracking and reporting working to incorporate atmospheric observations into emissions inventories. Advance knowledge of climate and earth systems, including impacts on Arctic environment, natural carbon cycle and releases (e.g., permafrost, wetlands).

Water research & monitoring



Undertaking monitoring of water quality and aquatic ecosystem health. Conduct research on freshwater science and provide laboratory support, including specialized chemical, biological, toxicological, and genomic analyses.

Modelling & Prediction Capacity



To support monitoring and continued evolution of modeling and predicting (e.g., earth systems, weather events, air and water quality, biodiversity, and long-term climate trends) across time, space, and environmental domains. Application of evolving technologies (e.g., Artificial Intelligence) and analytical tools to integrate across multiple datasets

Modernizing Risk Assessment



Address issues of concern identified by critical, integrated and optimized science. Leverage new approaches to inform prioritization of risk assessment of chemicals. Better understand impacts on disproportionately impacted populations and environments.

Geoengineering



Understanding the implications of geoengineering – broad set of methods and technologies that aim to deliberately alter the climate system – in the Canadian context as growing interest domestically and internationally.