

# Report on Data Activities in Canada 2010

Prepared by  
The Canadian National Committee for CODATA (CNC/CODATA)

The following report on data activities in Canada was prepared in conjunction with the 27<sup>th</sup> General Assembly of CODATA<sup>1</sup> at Stellenbosch, South Africa in October 2010. To obtain further details on individual items or to submit information on other Canadian data activities for inclusion in the next report (September 2012) please contact:

Le rapport ci-joint, qui fait état des activités du Canada en matière de données, a été préparé conjointement avec la 27<sup>e</sup> assemblée générale de CODATA, à Stellenbosch (Afrique de sud) en octobre 2010. Pour obtenir de plus amples renseignements sur des points particuliers ou pour soumettre de l'information sur d'autres activités canadiennes sur les données aux fins d'insertion dans le prochain rapport (septembre 2012), veuillez communiquer avec:

Secretariat, CNC/CODATA  
NRC-CISTI, Building M-58, Room E141  
National Research Council Canada  
Montreal Road  
Ottawa, Ontario K1A 0R6  
<http://www.codata.org/canada/>  
<http://cisti-icist.nrc-cnrc.gc.ca>

Secrétariat CNC/CODATA  
ICIST-CNRC, Édifice M-58, pièce E141  
Conseil national de recherches Canada  
Chemin Montréal  
Ottawa (Ontario) K1A 0R6  
<http://www.codata.org/canada/>  
<http://cisti-icist.nrc-cnrc.gc.ca>

Telephone: (613) 990-1054  
Fax: (613) 941-0986  
Internet: [codata@nrc-cnrc.gc.ca](mailto:codata@nrc-cnrc.gc.ca)

Téléphone : (613) 990-1054  
Télécopieur : (613) 941-0986  
Internet : [codata@nrc-cnrc.gc.ca](mailto:codata@nrc-cnrc.gc.ca)

This report is available online at  
<http://www.codata.org/canada/DAC/>  
ISSN: 1918-3046 Print  
ISSN: 1918-3054 Online  
Editor: Mary Zborowski

Ce rapport est accessible en ligne au  
<http://www.codata.org/canada/DAC/>  
ISSN : 1918-3062 Imprimé  
ISSN : 1918-3070 En ligne  
Rédactrice en chef : Mary Zborowski

(For a copy of the report in French, please contact the Secretariat.)

(Pour obtenir la version française du rapport, veuillez communiquer avec le Secrétariat.)

## CONTENTS

---

I.	Aerospace (John R. Manuel)	1
II.	Astrophysics (Mary Zborowski)	4
III.	Behavioural Sciences (Roxane de la Sablonnière)	4
IV.	Biochemistry (Marc Roussel)	6
V.	Biology (Marc Roussel)	6
VI.	Biology - Ecology (Glen Newton)	6
VII.	Biology - Genetics (Christian Blouin)	8
VIII.	Biology - Genomics, Proteomics (Christian Blouin)	9
IX.	Biology - Informatics (Mary Zborowski)	11
X.	Biology - Taxonomy (Mary Zborowski)	11
XI.	Biomedicine (Christian Blouin)	13
XII.	Chemistry (Mary Zborowski)	13
XIII.	Climatology (Tsoi Yip)	15
XIV.	Crystallography (Mary Zborowski)	15
XV.	Environment (Tsoi Yip)	15
XVI.	Forestry (Mary Zborowski)	20
XVII.	Geology (Paul Budkewitsch)	22
XVIII.	Geomagnetics (Paul Budkewitsch)	23
XIX.	Geophysics (Paul Budkewitsch)	23
XX.	Geoscience (John Broome)	23
XXI.	Geoscience - Environment, Hazards (Mary Zborowski)	24
XXII.	Geospatial (John Broome)	25
XXIII.	Health Sciences (Mary Zborowski)	27
XXIV.	Materials Property Data (Mary Zborowski)	28
XXV.	Meteorology (Tsoi Yip)	28
XXVI.	Oceanography (Robert Branton)	29
XXVII.	Oceanography, Hydrology (Mary Zborowski)	30
XXVIII.	Physics (Mary Zborowski)	30

XXIX.	Thermodynamics (James Sangster)	30
XXX.	Water Quantity (Tsoi Yip)	31
XXXI.	Canadian National Committee for CODATA	31

# 27<sup>th</sup> General Assembly of CODATA, South Africa, October 2010

## Report on Data Activities in Canada

Activities in Canada, as known to the Canadian National Committee for CODATA (CNC/CODATA), are reported below in the categories shown. Further information may be obtained either from the contact information appearing in conjunction with most items or from the rapporteurs listed.

### I. Aerospace (John R. Manuel)

#### 1. Space Sciences

Canadian Space Agency (CSA) provides the framework for the peaceful use and development of space to meet Canada's social and economic needs, and to develop an internationally competitive space industry. Space sciences activities are supported in 6 areas: space astronomy, solar-terrestrial sciences, atmospheric sciences, space life sciences, microgravity sciences and planetary exploration. National Research Council Canada (NRC) is the national adhering member of the International Committee on Space Research (COSPAR). However, in 1993, NRC and the CSA agreed that the CSA would be responsible for the Canadian Committee (CNC) for COSPAR. Since then, COSPAR obligations have been shared between the two agencies. The National Research Council's Advisory Committee on International Science, Engineering and Technology (CISET) advises both NRC and CSA on COSPAR issues. The NRC's International Relations Office manages communication between the CNC/COSPAR, and NRC. The CNC is comprised of the existing advisory committees to the Space Science Program of the CSA. Dr. David J. W. Kendall of the CSA is the Canadian Representative to COSPAR Council.

The following advisory committees comprise the CNC/COSPAR:

- Space and Atmospheric Environment Advisory Committee (SAEAC)
- Joint Committee on Space Astronomy (JCSA)
- Life Sciences Advisory Committee (LSAC)
- Microgravity Sciences Advisory Committee (MSAC)
- Canadian Advisory Committee on Scientific Utilization of Space Station (CACSUSS)

Their membership lists are available at the CSA web site.

CSA has published a report to COSPAR entitled Space Science Research in Canada 2004-2005: [http://www.asc-csa.gc.ca/pdf/CSA\\_COSPAR\\_REPORT\\_E.pdf](http://www.asc-csa.gc.ca/pdf/CSA_COSPAR_REPORT_E.pdf). The report presents a cross-section of space research activities in Canada. <http://www.asc-csa.gc.ca/eng/sciences/committees.asp>

#### 2. Space Astronomy

The Canadian Astronomy Data Centre was established in 1984 and processes, distributes, and archives data collections from Hubble Space Telescope, the Far Ultraviolet Spectroscopic Explorer, the MOST stellar microvariability satellite, and the BLAST balloon-borne sub-millimetre telescope. (See also the entry under Astrophysics.)

<http://cadwww.dao.nrc.ca/cadc/>

#### 3. Aerospace

Aeronautical programs are major activities of the Institute for Aerospace Research, National Research Council Canada. Information about these programs is available via the NRC's web site at

<http://www.nrc.gc.ca/> and <http://iar.nrc.gc.ca>  
<http://iar-ira.nrc-cnrc.gc.ca/>

#### 4. Solar-Terrestrial Sciences

Canada has major solar-terrestrial projects underway both on the ground and in space. The Enhanced Polar Outflow Probe (e-POP) is a set of eight instruments that will fly on a Canadian-built small satellite CASSIOPE (CASCade demonstrator, Smallsat bus, and IONospheric Polar Explorer). To be launched in 2009, they will examine charged and neutral particles flowing upwards from the ionosphere into the magnetosphere. One major goal of this research is to determine the role this outflow plays in geomagnetic storms and "space weather." <http://mertensiana.phys.ucalgary.ca/>

Meanwhile, on the ground, a team of scientists from universities and government research organizations have established the Canadian GeoSpace Monitoring (CGSM) network - an array of radio, magnetic and optical instruments stretching across Canada that advance knowledge about the solar-terrestrial relationship and its role in space weather.

An extension of the CANOPUS program operating since 1989, CGSM combines ten projects into a national program, and is the most comprehensive array of its kind in the world. It will play a key role in the International Living With a Star (ILWS) program, collecting information to complement and validate that gathered by a large fleet of international research satellites launched as part of ILWS between 2005 and 2015. <http://cgsm.ca/>

A team of Canadian researchers will operate another ground-based network as a key component of THEMIS, a NASA-led study of auroral substorms that also includes a network of five satellites. In addition to providing ground-based observations, the Canadian team has developed innovative new software to store and manage the enormous amounts of data the study will generate. <http://aurora.phys.ucalgary.ca/themis/>

Canada is participating in a European study of Earth's geomagnetic field and how it changes over time. Canada will supply the Electric Field Instrument (EFI) to the ESA-led Swarm mission. This is another example of CSA's efforts to make Canadian industry a leading supplier of space-borne systems. <http://www.esa.int/esaLP/LPswarm.html>  
<http://www.asc-csa.gc.ca/eng/sciences/relation.asp>

## 5. Atmospheric Sciences

Canadian instrument MOPITT (Measurements Of Pollution in The Troposphere) data are archived at the NASA Langley DAAC and available from [http://eosweb.larc.nasa.gov/PRODOCS/mopitt/table\\_mopitt.html](http://eosweb.larc.nasa.gov/PRODOCS/mopitt/table_mopitt.html). MOPITT was launched on the US Terra satellite on December 18, 2002. MOPITT is a gas-correlation infrared radiometer operating on nadir mode. Using infrared wavelengths at 2.4  $\mu\text{m}$  and 4.7  $\mu\text{m}$ , it measures carbon monoxide (CO) and methane (CH<sub>4</sub>) in the troposphere using both thermal emission and solar reflection techniques.

The Canadian instrument OSIRIS, which is onboard the Swedish satellite Odin, has been fully operational since November 2001 and continues to measure global ozone profiles from the upper troposphere to the lower mesosphere, 7 km to 60 km. The instrument, measures limb radiance profiles of scattered sunlight from 270 nm to 810 nm. The profiles, which are constrained to the sunlit section of the orbit, have a height resolution varying between 1 and 2 km and are spaced between 3 and 8 degrees along the satellite track, depending upon the mode of operation. The OSIRIS Level 2 ozone product is a valuable resource for studying UTLS transport, and in particular, the flux of ozone across the tropopause. Unlike many other limb profiling instruments, OSIRIS has both sufficient sensitivity and spatial-temporal coverage to measure global ozone transport across the tropopause on a weekly or even daily basis. The OSIRIS Level 1 radiance measurements as well as the OSIRIS level 2 ozone, NO<sub>2</sub> and aerosol products have been invaluable for the algorithm development associated with the OMPS instrument on the NPOESS Preparatory Project. The Odin mission is an international collaboration between Sweden, Canada, Finland and France and was officially designated an ESA Third Party Mission in 2007. The OSIRIS team is led by principal investigators from the University of Saskatchewan and the data are available from their website <http://osirus.usask.ca/>. The OSIRIS data are also freely available through an ESA portal at <http://eopi.esa.int/esa/esa>.

SCISAT, also known as the Atmospheric Chemistry Experiment (ACE), is a Canadian Space Agency small satellite mission for remote sensing of the Earth's atmosphere using solar occultation. The satellite was launched on 12 August 2003 and continues to function perfectly. The primary mission goal is to improve our understanding of the chemical and dynamical processes that control the distribution of ozone in the stratosphere and upper troposphere, particularly in the Arctic. The high precision and accuracy of solar occultation makes SCISAT useful for monitoring changes in atmospheric composition and the validation of other satellite instruments. The satellite carries two instruments. A high resolution (0.02  $\text{cm}^{-1}$ ) infrared Fourier transform spectrometer (FTS) operating from 2 to 13 microns (750-4400  $\text{cm}^{-1}$ ) is measuring the vertical distribution of trace gases, particles and temperature. This provides vertical profiles of atmospheric constituents including essentially all of the major species associated with ozone chemistry. Aerosols and clouds are monitored using the extinction of solar radiation at 1.02 and 0.525 microns as measured by two filtered imagers. The vertical resolution of the FTS is about 3-4 km from the cloud tops

up to about 150 km. Peter Bernath of the University of Waterloo is the principal investigator. A dual optical spectrograph called MAESTRO (Measurement of Aerosol Extinction in the Stratosphere and Troposphere Retrieved by Occultation) covers the 400-1030 nm spectral region and measures primarily ozone, nitrogen dioxide and aerosol/cloud extinction. It has a vertical resolution of about 1-2 km. Tom McElroy of Environment Canada is the principal investigator. ACE data are freely available from the University of Waterloo website <http://www.ace.uwaterloo.ca/>. SCISAT was designated an ESA Third Party Mission in 2005. ACE data are freely available through an ESA portal at <http://eopi.esa.int/esa/esa>.  
<http://www.asc-csa.gc.ca/eng/sciences/atmosphere.asp>

## **6. Space Technologies**

The Space Technologies Branch of the Canadian Space Agency is responsible for the overall planning, development and implementation of space technology R&D and Applications programs and for providing expert engineering support to advance Canadian space capacities.

The Branch ensures that state-of-the-art engineering support in specific payload and spacecraft disciplines and at the engineering, technology and systems level is maintained and available to the Agency's projects and programs.

Space Technologies performs concepts studies and the pre-development of new missions in Satellite Communications and Earth Observation - with the exception of Atmospheric Sciences missions which are the responsibility of the Space Science Branch. Space Technologies is also responsible for new technology-driven missions in Space Exploration. Space Technologies is responsible for projects that it sponsors in Phases 0 and A, and supports projects in all phases. Space Technologies also develops spacecraft and generic technologies required for all missions and programs of the Agency.

The Branch leads the planning and execution of technology and applications development contracting-out programs such as the Space Technology Development Program, the Earth Observation Applications Development Program and the Government Related Initiatives Program and manages and coordinates Canada's participation in the programs of the European Space Agency.

The Space Technologies Branch is accountable for providing agency-wide corporate leadership in managing intellectual property, commercialization and applications programs, in the transfer and diffusion of technology and in the management of spectrum frequencies for space.

As the government's centre of technical expertise on space systems and technologies and their applications, Space Technologies supports Research & Development activities in industry, in academia and in CSA's own facilities to maintain a world-class space expertise in Canada; STB ensures that critical technologies and applications are available for future missions; STB provides expert systems engineering and technical support to space projects; STB develops applications of space-based services; and STB maximizes the benefits of innovation through management of intellectual property and commercialization.  
<http://www.asc-csa.gc.ca>

## **7. Earth Observation**

Launched in 1995, RADARSAT-1 is a prominent demonstration of Canadian capabilities in EO. Canada Centre for Remote Sensing (CCRS) operates two satellite telemetry ground stations that provide North American reception coverage: the Prince Albert Satellite Station in Prince Albert, Saskatchewan, and the Gatineau Satellite Station located in Cantley, Quebec. Operating in a multi-mission environment, these stations receive Earth observation data from several satellites. They have created an archive in excess of 270 Terabytes of EO data. Certain data sets are delivered in near real time to support applications such as ice monitoring by the Canadian Ice Service (<http://www.ice-glaces.ec.gc.ca>), since 1991, and forest fire monitoring and mapping by the Canadian Forest Service, since 1999. These stations serve also as Canadian ground segment component of RADARSAT-1 operation. The RADARSAT-1 program office maintains a central database cataloguing details all image data acquiring, whether data were down linked in Canada or to any RADARSAT-1 ground station in the world. Presently, access to this database is available through the network of the RADARSAT-1 order desk system. It will be soon available to all customers through the CSA web site [http://www.asc-csa.gc.ca/eng/satellites/radarsat1/order\\_data.asp](http://www.asc-csa.gc.ca/eng/satellites/radarsat1/order_data.asp).

The Canadian Earth Observation Network (CEONet) provides users with real-time Internet access to RADARSAT-1 and other remote sensing satellite databases. The Radarsat International Inc. (RSI) RADARSAT-1 catalogue and searchable database are available from anywhere in the world through

CEONet. CEONet can be accessed by visiting <http://www.ccrs.nrcan.gc.ca>.

The Canadian Forest Service (CFS) (<http://cfs.nrcan.gc.ca/>) of Natural Resources Canada has developed an intelligent system for remote sensing data from satellites and aircraft with geographic information and field data. The project is called System of Experts for Intelligent Data management (SEIDAM). This project began as part of NASA's Applied Information Systems Research Program.

CCRS in collaboration with the Ontario Geological Survey has developed a satellite-based terrain mapping program ([http://www.mndm.gov.on.ca/mndm/mines/ogs/Default\\_e.asp](http://www.mndm.gov.on.ca/mndm/mines/ogs/Default_e.asp)).

Global Observation of Forest Cover (GOFC) is a CEOS IGOS project led by Canada. The purpose of this project is to increase international cooperation in the integration and use of data from multiple EO satellites and in-situ data, for mapping and monitoring of the Earth's forests. The CSA and CCRS provide the GOFC Project Office. Its web site has been in operation since March 1999.

Use of the Cryospheric system to Monitor Global Change in Canada (CRYSYS) is an Interdisciplinary Science Investigation (IDS) in the NASA Earth Observing System Program. CRYSYS is hosted and funded by Canadian agencies and universities, and led by Environment Canada's Meteorological Service of Canada (MSC). The CRYSYS uses remote sensing, modelling, field studies and data integration to improve monitoring of the state of the cryosphere over Canada.

Another program is called BERMS (Boreal Ecosystem Research and Monitoring Sites) and is a joint venture of MSC, CFS and Parks Canada (<http://berms.ccrp.ec.gc.ca/>). This is a fully automated system to collect continuous, remote CO<sub>2</sub> flux measurements, and real-time, climate measurements through the forest canopy.

There are other applications of remote EO data and the above list represents a cross-section of different available applications and associated databases only.  
<http://www.asc-csa.gc.ca/eng/observation/default.asp>

## **II. Astrophysics (Mary Zborowski)**

### **1. Canadian Astronomy Data Center (CADC)**

The Canadian Astronomy Data Centre (CADC) at the Herzberg Institute of Astrophysics, National Research Council Canada, is the largest astronomy data centre of its kind in the world with data collections amounting to 325 Terabytes in 2008. CADC hosts data collections from space science missions (Hubble Space Telescope, FUSE, MOST, BLAST) and from ground-based facilities (Gemini Observatories, the Canada-France-Hawaii Telescope, the James Clerk Maxwell Telescope, the Canadian Galactic Plane Survey, and the MACHO project).

In 2007 CADC delivered approximately 1 Terabyte of data per week to users in Canada and 80 other countries. CADC also ingested approximately 1 Terabyte per week of new data into its collections. In total the CADC served data to an estimated 1900 astronomers in 2007.

Astrophysics data management is based on a vigorous international community of data providers and managers. The CADC and the Canadian Virtual Observatory project play an important role in the International Virtual Observatory Alliance whose goals is the integration of astrophysics data resources and services into a seamless worldwide network designed to support research in astrophysics.  
<http://cadcwww.hia.nrc.ca/>

## **III. Behavioural Sciences (Roxane de la Sablonnière)**

### **1. CANSIM**

CANSIM is Statistics Canada's key socio-economic database. Updated daily, CANSIM provides fast and easy access to a large range of the latest and most up-to-date statistics available in Canada. (infostats@statcan.ca) CANSIM sends the power of information directly to your screen.  
[http://cansim2.statcan.ca/cgi-win/cnsmcgi.exe?CANSIMFile=CII/CII\\_1\\_E.HTM&RootDir=CII/&LANG=E](http://cansim2.statcan.ca/cgi-win/cnsmcgi.exe?CANSIMFile=CII/CII_1_E.HTM&RootDir=CII/&LANG=E)

## **2. World Value Survey - Canada**

The World Value Survey is a survey that has been, principally under the supervision of R. Inglehart, repeatedly distributed internationally. This survey evaluates the values that are predominant in societies around the world, and aims to study sociocultural and political changes. On the World Value Survey Internet page are found data and results from surveys that have been distributed in Canada, at various times in the past.

<http://www.worldvaluessurvey.org>

## **3. Databank of Official Statistics on Québec**

This databank, placed online by the Institut de la statistique du Québec in 2003, gives access to official statistics provided by different Quebec government agencies. Statistics on an important number of aspects of the society can be found in this databank, from demography to education. In order to simplify access to data, all statistics found in tables can be exported as Excel files.

<http://www.bdso.gouv.qc.ca>

## **4. Eco-Health Québec**

This software, available on the web, was created by France (IRDES) and Québec (MSSS, INSPQ, and ISQ) during the Observatoire franco-québécois de la santé et de la solidarité. Eco-Health gives access to a wide variety of indicators concerning people's health across the province of Quebec. Many social and psychological themes are central in this software. For example, psychological distress and social adaptation are subjects on which statistics can be found.

[http://www.msss.gouv.qc.ca/statistiques/stats\\_sss/index.php?id=143,248,0,0,1,0](http://www.msss.gouv.qc.ca/statistiques/stats_sss/index.php?id=143,248,0,0,1,0)

## **5. Citizenship and Immigration Canada**

This site offers access to analytical research reports and statistical information on citizenship and immigration trends. Citizenship and Immigration Canada's strategic research program furthers our understanding of the impact of immigration on Canadian society.

<http://www.cic.gc.ca/english/resources/menu-research-stats.asp>

## **6. Stats & Facts - Canadian Council on Social Development**

The Canadian Council on Social Development provides, on this website, access to statistical data in the social field. Principal subjects on which statistics are available are education, family, and health.

<http://www.ccsd.ca/factsheets/>

## **7. UNESCO Institute for Statistics - Canada**

This Internet site from the Unesco gives access to statistical information concerning a wide range of domains related to the Canadian society. Statistics can be found on education, literacy, science, technology, and communication.

[http://stats.uis.unesco.org/unesco/TableViewer/document.aspx?ReportId=198&IF\\_Language=eng&BR\\_Country](http://stats.uis.unesco.org/unesco/TableViewer/document.aspx?ReportId=198&IF_Language=eng&BR_Country)

## **8. The Research Data Centres Program**

The Research Data Centres Program gives access, under certain conditions, to statistical databases from surveys that have been distributed in Canada concerning various social and psychological themes. Immigration, work, young people and mental health are some of the subjects for which data sets are available. This program is an initiative of Statistics Canada, the Social Sciences and Humanities Research Council and University consortia and enables the development of a common view of the Canadian social environment.

<http://statcan.ca/english/rdc/index.htm>

## **9. Pan American Health Organization - Canada**

The Regional Core Health Data Initiative was launched in 1995 by the Pan American Health Organization (a Regional Office of the World Health Organization - WHO) in order to monitor the health situation in America. This project provides access to large amounts of data collected annually on the health and socio-economic status of Canadians. It also identifies groups in the population that have greater needs, on an empirical basis.

[http://new.paho.org/can/index.php?option=com\\_frontpage&Itemid=1](http://new.paho.org/can/index.php?option=com_frontpage&Itemid=1)

## **10. Toronto Region Research Alliance (TRRA)**

Founded in 2005, TRRA is a non-profit organization supported principally by the Ontario and Canadian Federal Government. The organization's website highlights manufacturing, science, environment, energy and communications in both Canada and Ontario. It also provides access to reports and databases relative to these sectors.

<http://www.trra.ca/en/reports/CanONStats.asp?mid=1324>

## **IV. Biochemistry (Marc Roussel)**

### **1. Project CyberCell**

The CyberCell databases include a variety of biochemical data for Escherichia coli strain K12, including proteomic (including structural), genomic and metabolic data (metabolites, enzyme rate parameters, etc.). These databases can be queried from a single search engine.

<http://redpoll.pharmacy.ualberta.ca/CCDB>

## **V. Biology (Marc Roussel)**

### **1. Integrated Taxonomic Information system (ITIS)**

A comprehensive online resource for biological names of importance to North America, ITIS is an international attempt by the United States, Canada and Mexico to build the first comprehensive, standardized reference for the scientific names of the flora and fauna of importance for North America. ITIS focuses on the biota of North America and surrounding oceans, but also includes world treatments of selected groups such as birds, mammals, fish, amphibians, reptiles, mollusks, corals and others.

<http://www.itis.gov/>

### **2. CIAR Program in Evolutionary Biology (CIAR-PEB)**

The Canadian Institute for Advanced Research (CIAR) supports a network of researchers across Canada as well as in other countries. The goal of the Program in Evolutionary Biology (CIAR-PEB) is to use the comparative database of genome sequences, to which this project will contribute, for developing concepts of genome, cell and population evolution, and for constructing algorithms for molecular structure/function analysis which may be later applied to problems in biotechnology, microbial diversity and genetic/genome technology. The CIAR-PEB Home Page contains information about its programs and activities as well as providing links to world-wide molecular Evolution and Computational Biology resources.

<http://megasun.bch.umontreal.ca/ciar/>

## **VI. Biology - Ecology (Glen Newton)**

### **1. Genome Database (GDB)**

The Genome Database was established at Johns Hopkins University in Baltimore, Maryland, USA in 1990, and is the official central repository for genomic mapping data resulting from the Human Genome Initiative. In the Spring of 1999, the Bioinformatics Supercomputing Centre (BiSC) at the Hospital for Sick Children in Toronto, Ontario, assumed the management of GDB. The Human Genome Initiative is a worldwide research effort to analyze the structure of human DNA and determine the location and sequence of the estimated 100,000 human genes. In support of this project, GDB stores and curates data generated worldwide by those researchers engaged in the mapping effort of the Human Genome Project (HGP).

<http://www.gdb.org/>

### **2. BC Species and Ecosystems Explorer**

BC Species Explorer is the source for authoritative conservation information on more than 6,000 plants and animals in British Columbia. It provides in-depth information on rare and endangered species, but includes common plants and animals. The Ministry of Sustainable Resource Management supports it.

<http://www.env.gov.bc.ca/atrisk/toolintro.html>

### **3. Species Lists and Rare Species data collection**

The Species Lists and Rare Species data collection is part of the Atlantic Canada Conservation Data Centre (AC CDC). The AD CDC aims to be an authoritative and reliable source for comprehensive, accurate and objective information on Atlantic Canada's natural heritage, with principal focus on the species and ecological communities in our region that are globally, nationally or provincially rare in occurrence and, in some cases, endangered at one or more of these levels.

<http://www.accdc.com/>

### **4. Arab Genetic Disease Database**

The Arab Genetic Disease Database (AGDDB) is a comprehensive repository of clinical and molecular data on genetic diseases occurring in Arab populations. The data is curated by the Arab Genetic Disease Consortium, headed by Dr. Ahmad S. Teebi of the Toronto Hospital for Sick Children.

<http://www.agddb.org/>

### **5. Genome Sequence Centre**

The Genome Sequence Centre, Vancouver, BC is constructing a BAC-based fingerprint map of the bovine genome. This effort is funded jointly by the United States Department of Agriculture (USDA) and the Alberta Science and Research Authority (ASRA). The resulting map will be an important resource for the field of bovine genomics. The goal is to generate a total of 280,000 whole-clone HindIII fingerprints from the BAC library RPCI-42 constructed by P. de Jong from the Holstein Bull white blood cell DAN, and a second library to be constructed from Hereford DNA British Columbia Genome Science Centre.

<http://www.bcgsc.ca/lab/mapping/bovine>

### **6. Calcium Sensing Receptor Locus Mutation Database**

The Calcium Sensing Receptor Locus Mutation Database includes mutation, genotype/phenotype, clinical, In Vitro and author searches of the database. It also includes a facility for researchers to submit mutation data. DeBelle Laboratory and C.R.Scriver Biochemical Genetics Unit, McGill University.

<http://www.casrdb.mcgill.ca/> and <http://www.medgen.mcgill.ca/>

### **7. GRIN-CA**

GRIN-CA taxonomic data provide the structure and nomenclature for the accessions of the Canadian National Plant Germplasm System (NPGS). Many plants (35,000 taxa, 13,000 genera) are included in GRIN-CA taxonomy, especially economic plants. Agriculture and Agri-Food Canada.

[http://pgrc3.agr.gc.ca/tax/index\\_e.html](http://pgrc3.agr.gc.ca/tax/index_e.html)

### **8. Bacillus thuringiensis Toxin Specificity Database**

Bacillus thuringiensis Toxin Specificity Database includes published data on insecticidal activity of toxins that are included in the List of Bt delta-endotoxin genes maintained by Neil Crickmore on behalf of the delta-endotoxin nomenclature committee. Canadian Forestry Service, Natural Resources Canada.

[http://www.glfc.cfs.nrcan.gc.ca/science/research/netintro99\\_e.html](http://www.glfc.cfs.nrcan.gc.ca/science/research/netintro99_e.html)

### **9. Canadian Poisonous Plants Information System**

The Canadian Poisonous Plants Information System presents data on plants that cause poisoning in livestock, pets, and humans. The plants include native, introduced, and cultivated outdoor plants as well as indoor plants that are found in Canada. Some food and herbal plants that may cause potential poisoning problems are also included. Agriculture and Agri-Food Canada.

<http://sis.agr.gc.ca/pls/pp/poison>

### **10. Ontario Natural Heritage Information Centre (NHIC)**

The Ontario Natural Heritage Information Centre (NHIC) compiles, maintains and provides information on rare, threatened and endangered species and spaces in Ontario. This information is stored in a central repository composed of computerized databases, map files and an information library, which are accessible for conservation applications, land use development planning, park management, etc. Ministry of Natural Resources, Ontario.

[http://nhic.mnr.gov.on.ca/nhic\\_cfm](http://nhic.mnr.gov.on.ca/nhic_cfm)

### **11. Canadian Bird Trends**

Canadian Bird Trends is a retrieval system that provides information on Canadian bird species including population trends and taxonomy, with links to range maps and life history information, and national

conservation designations. Population trends are derived from Breeding Bird Survey in Canada (BBS) data and are updated on an annual basis. Canadian Wildlife Service, Environment Canada.

[http://www.cws-scf.ec.gc.ca/mgbc/trends/default\\_e.cfm](http://www.cws-scf.ec.gc.ca/mgbc/trends/default_e.cfm)

## **12. Pesticide, Herbicide, Metal Contaminants, Synergistic Toxicity in Soil Database**

A database of pesticide and herbicide activities in the presence of metal contaminants, affecting the soil - plant root system interface is maintained and under further development by Professor P.M. Huang of the University of Saskatchewan. This database is explored in similarity studies, to enhance the predictability of adverse effects of new pesticides and herbicides entering the market and for suggestions of potential modifications.

Professor P. Ming Huang, Department of Soil Science, University of Saskatchewan, Saskatoon, Saskatchewan - [huangp@sask.usask.ca](mailto:huangp@sask.usask.ca)

## **VII. Biology – Genetics (Christian Blouin)**

### **1. HumGen**

HumGen is an international database on the social, ethical and legal aspects of human genetics. It is based at the University of Montreal. It has a search engine for finding documents on a variety of topics, including hereditary cancer, stem cells, population genetics, and intellectual property.

[http://www.humgen.umontreal.ca/int/index\\_lang.cfm?lang=1](http://www.humgen.umontreal.ca/int/index_lang.cfm?lang=1)

### **2. The Lafora Progressive Myoclonus Epilepsy Mutation and Polymorphism Database**

The Lafora Progressive Myoclonus Epilepsy Mutation and Polymorphism Database is hosted by The Centre for Applied Genomics at the Hospital for Sick Children in Toronto. Lafora disease is the most severe teenage-onset progressive

<http://projects.tcag.ca/lafora/>

### **3. Autism Chromosome Rearrangement Database**

The Autism-related chromosome rearrangement database is a collection of hand curated breakpoints and other genomic features, related to autism, taken from publicly available literature: databases and unpublished data. It is housed by The Centre for Applied Genomics at the Hospital for Sick Children in Toronto.

<http://projects.tcag.ca/autism/>

### **4. Wilson Disease Mutation Database**

The Wilson Disease Mutation Database is available at the University of Alberta Department of Medical Genetics. The database is available as a spreadsheet file that can be downloaded from the website.

<http://www.medicalgenetics.med.ualberta.ca/wilson/index.php>

### **5. Cystic Fibrosis Mutation Database**

This database is based at the Hospital for Sick Children in Toronto. It was initiated by the Cystic Fibrosis Genetic Analysis Consortium in 1989. The database was created to provide CF researchers and other related professionals with up to date information about individual mutations in the CFTR gene.

<http://www.genet.sickkids.on.ca/cftr/>

### **6. Phenylalanine Hydroxylase Locus Knowledgebase**

Phenylalanine Hydroxylase Locus Knowledgebase (PAHdb) is a relational database for mutations in the human phenylalanine hydroxylase gene (symbol PAH). Phenotypes at the levels of protein, metabolites and organism are described, as well as mutations within populations and haplotypes.

Hyperphenylalaninemia (HPA) is the genetic disorder caused by PAH enzyme deficiency.

<http://www.pahdb.mcgill.ca/>

### **7. Canine Inherited Disorders Database**

The Canine Inherited Disorders Database was established to reduce the incidence of inherited disorders in dogs by providing information to owners and breeders, and to facilitate the best management possible of these conditions by providing current information to veterinarians. This database is a joint initiative of

the Sir James Dunn Animal Welfare Centre at the Atlantic Veterinary College, University of Prince Edward Island, and the Canadian Veterinary Medical Association.

<http://www.upei.ca/~cidd/intro.htm>

#### **8. Androgen Receptor Mutations Database**

Housed by the Lady Davis Institute for Medical Research in Montreal, Quebec, the Androgen Receptor Mutations Database is available in pdf format for download and in searchable form through a link to the EMBL-European Bioinformatics Institute.

<http://www.androgendb.mcgill.ca/>

#### **9. HEXdb - GM2 Gangliosidase Database Web Site**

A biochemical genetics web site dedicated to serving HEXA, HEXB and GM2A data, maintained by the DeBelle laboratory at the McGill University Health Centre. Established in 2003.

fkaplan@debelle.mcgill.ca

<http://www.hexdb.mcgill.ca/>

### **VIII. Biology – Genomics, Proteomics (Christian Blouin)**

#### **1. The Chromosome 7 Annotation Project**

Based at the Centre for Applied Genomics at the Hospital for Sick Children in Toronto, the Chromosome 7 Annotation Project "Contains the most up to date collation of sequence, gene, and other annotations from all databases (e.g. Celera published, NCBI, Ensembl, RIKEN, UCSC) as well as unpublished data".

<http://www.chr7.org/>

#### **2. BIND - Biomolecular Interaction Network Database**

BIND is a primary biological database, archiving biomolecular interaction, complex and pathway information for all taxonomies and is freely available through a web interface or via FTP. It can be used to discover interaction networks, perform comparative analysis of pathways, and generate information for kinetic simulations, for example. BIND can be searched using simple Author, text, or accession queries. The BINDblast search tool allows for more complex searches and comparative analyses.

BIND continues to grow with the addition of individual submissions as well as interaction data from the PDB and a number of large-scale interaction and complex mapping experiments using yeast two hybrid, mass spectrometry, genetic interactions, and phage display. Continued input from users has helped further mature the BIND data specification to v3.0, which now includes the ability to store detailed information about genetic interactions. The BIND data specification is available as ASN.1 and XML DTD. BIND is now hosted by Unleashed Informatics, and is directed by Chris Hogue of Mt. Sinai Hospital as part of the Blueprint Initiative. An open access version of the database is available.

<http://www.unleashedinformatics.com/index.php?pg=products&refer=bind>

#### **3. Database of Genomic Variants**

Hosted by the Centre for Applied Genomics at the Hospital for Sick Children in Toronto, this database is a curated catalogue of large-scale variation in the human genome. First described in 2004.

<http://projects.tcag.ca/variation/>

#### **4. Pseudomonas Genome Database V2**

*Pseudomonas aeruginosa* is a soil-dwelling bacterium that is a major source of infection for individuals with cystic fibrosis, burns, cancer, and other immune system-compromised states. This database is in the form of a searchable website for genome sequence data and annotations generated by *Pseudomonas* researchers, primarily at University of British Columbia and Simon Fraser University.

<http://v2.pseudomonas.com/index.jsp>

#### **5. BioGRID - General Repository for Interaction Datasets**

GRID is housed by Mount Sinai Hospital and Mike Tyers is the Primary Investigator. A uniform interface for searching yeast, fly, and worm protein-protein interaction databases. The interactions can be visualized with Osprey, a Network Visualization System software.

<http://www.thebiogrid.org/>

## 6. Barcode of life

The Barcode of Life Data Systems (BOLD) is an online workbench that aids collection, management, analysis, and use of DNA barcodes. It consists of 3 components (MAS, IDS, and ECS) that each address the needs of various groups in the barcoding community. This initiative is led by the Biodiversity Institute of Ontario.

<http://www.barcodinglife.org/>

## 7. *Sulfolobus solfataricus* P2 complete genome sequencing project

A Canadian/European Union effort, the *Sulfolobus solfataricus* genome sequence was completed in 2001. The database can be searched using an interactive map. Entire sequence and annotation datasets are available for searching and downloading. *Sulfolobus solfataricus* is a model organism for the study of crenarchaeal biology.

<http://www-archbac.u-psud.fr/projects/sulfolobus/>

## 8. GOBASE - The Organelle Genome Database

GOBASE is a taxonomically broad organelle genome database that organizes and integrates diverse data related to mitochondria and chloroplasts. In its next phase, GOBASE will also include information on representative bacteria that are thought to be specifically related to the bacterial ancestors of mitochondria and chloroplasts.

<http://gobase.bcm.umontreal.ca/>

## 9. Human Genome Segmental Duplication Database

The Human Genome Segmental Duplication Database is run by The Centre for Applied Genomics at the Hospital for Sick Children in Toronto. The data presented is based on the analysis of the July 2003 Assembly of the Human Genome, and can be queried using key words or the BLAST search tool.

<http://projects.tcag.ca/humandup/>

## 10. Non-Human Segmental Duplication Database

Contains information about segmental duplications in the genomes of chimpanzee, mouse, and rat. Hosted by the Centre for Applied Genomics at the Hospital for Sick Children, Toronto.

<http://projects.tcag.ca/xenodup/>

## 11. International Hapmap Project

The International HapMap Project is a partnership of scientists and funding agencies from Canada, China, Japan, Nigeria, the United Kingdom and the United States to develop a public resource that will help researchers find genes associated with human disease and response to pharmaceuticals. Data can be browsed or bulk-downloaded.

<http://www.hapmap.org/>

## 12. The *Pseudomonas* Genome Project

*Pseudomonas aeruginosa* is a Gram-negative bacterium that grows in soil, marshes, and coastal marine habitats. It is also found on plant and animal tissues, including people with cystic fibrosis, burn victims, individuals with cancer. The database is a result of a collaboration among researchers in United States and Canada, including the Cystic Fibrosis Foundation, the University of Washington Genome Center, Pathogenesis Corporation, and *Pseudomonas aeruginosa* Community Annotation Project (PseudoCAP).

The complete sequence of the genome of *P. aeruginosa* strain PAO1 was determined in a collaboration among the Cystic Fibrosis Foundation, the University of Washington Genome Center and PathoGenesis Corporation. The largest bacterial genome sequenced to date when published, the 6.3-Mbp genome contains 5570 predicted genes on one chromosome. Genome annotation was carried out by PathoGenesis scientists and by scientists in the *Pseudomonas aeruginosa* Community Annotation Project (PseudoCAP). This work was published in *Nature*, Stover et al. 406:959-964 (2000).

<http://www.pseudomonas.com/>

## 13. Expression Profiles for *C. elegans* promoter::GFP Fusions

Housed at the Michael Smith Genome Sciences Centre in BC, the expression profiles of various green fluorescent protein-promoter fusions for the nematode *Caenorhabditis elegans* can be searched by gene name, expression profile or can be browsed.

<http://elegans.bcgsc.ca/perl/eprofile/index>

#### **14. ExPASy (Expert Protein Analysis System) Proteomics Server**

ExPASy is mirrored at the Canadian Bioinformatics Resource at NRC in Halifax as well as several other international sites. It is the primary site for the SwissProt and TrEMBL protein sequence databases and the Prosite sequence domain database. It also houses a variety of protein sequence analysis tools.

<http://ca.expasy.org>

#### **15. Viral Bioinformatics Resource Center**

Houses access to viral genome data and tools for comparative genomic analyses. A major database is VOCs (Virus Orthologous Clusters), with built-in tools for retrieval and analysis of genes, gene families, and genomes of different virus families. Run by Dr. Chris Upton of the Biochemistry and Microbiology Department at the University of Victoria.

<http://athena.bioc.uvic.ca/index.php>

#### **16. Organelle Genome Megasequencing Program (OGMP)**

The Organelle Genome Megasequencing Program (OGMP) is an interdisciplinary collaboration involving ten research groups, predominantly in Eastern Canada, each of which is interested in molecular evolution of mitochondria, plastids and bacteria. The focus of this collaborative effort is on organelle phylogeny. A centralized sequencing facility, the Sequencing Unit, serves as the major research hub and is located at the Université de Montréal (UdeM), Biochemistry Department.

<http://megasun.bch.umontreal.ca/ogmp>

#### **17. Fungal Mitochondrial Genome Project (FMGP)**

FMGP is a project of B. Franz Lang's research group. It is supported by Joyce Longcore, M. Mollicone and Donald Barr, who have been very helpful in defining representatives of the most important fungal lineages, and have supplied many strains used in this study. J. Longcore has further contributed organismal and ultrastructural information for these webpages.

The goals of FMGP are to (i) sequence complete mitochondrial genomes from all major fungal lineages, (ii) infer a robust fungal phylogeny, (iii) define the origin of the fungi, their protistan ancestors, and their specific phylogenetic link to the animals, (iv) investigate mitochondrial gene expression, introns, RNase P RNA structures, mobile elements.

<http://megasun.bch.umontreal.ca/People/lang/FMGP/FMGP.html>

#### **18. Protist EST Program (PEP)**

PEP is a large-scale interdisciplinary, and collaborative research project, involving six Canadian universities in five provinces. It is financed by Genome-Canada and managed by Genome-Atlantic and Génome Québec. PEP aims at the exploration of the diversity of eukaryotic genomes in a systematic, comprehensive and integrated way. The focus is on unicellular microbial eukaryotes, known as protists. Protistan eukaryotes comprise more than a dozen major lineages that, together, encompass more evolutionary, ecological and probably biochemical diversity than the multicellular kingdoms of animals, plants and fungi combined. PEP is a unique endeavor in that it is the first phylogenetically-broad genomic investigation of protists.

[http://megasun.bch.umontreal.ca/pepdb/pep\\_main.html](http://megasun.bch.umontreal.ca/pepdb/pep_main.html)

#### **19. Genome Sciences Centre (GSC)**

The Genome Sciences Centre is affiliated with the BC Cancer Agency and is located in Vancouver, BC. Databases related to research activities are housed at the GSC. These include functional genomics, physical mapping, and sequencing. Bioinformatics tools developed at the GSC are also available.

<http://www.bcgsc.bc.ca/>

### **IX. Biology – Informatics (Mary Zborowski)**

### **X. Biology – Taxonomy (Mary Zborowski)**

#### **1. Mycotox file**

The Mycotox file is a list of fungi that have been reported to produce toxic metabolites, or metabolites closely related chemically to such toxins. Citations to the articles which describe these findings are also

included. It is intended for use by mycologists and chemists and assumes a working knowledge of mycology and/or natural product chemistry by its users.

This data set is updated regularly and has been available by Dr. A. Taylor. It is not available in print form. Inquiries, or offers to collaborate on this project, may be directed to Dr. Taylor through the Secretariat of the Canadian National Committee for CODATA (CNC/CODATA).

<http://www.codata.org/canada/mycotox/>

## **2. Biological Observations, Specimens and Collections (BiOSC) Gateway**

The BiOSC Gateway is a prototype search engine dedicated to biological specimens and observational records available through distributed biodiversity networks such as The Species Analyst (TSA), the World Information Network on Biodiversity (REMIB) and the European Natural History Specimen Information Network (ENHSIN). Similar to regular Internet search engines (e.g. Altavista, Google, etc.) that provide access to standard hypertext documents, BiOSC harvests biological names found in collections on the Internet and connects users to the distributed primary data sources. Actual records are returned directly from data holders to end-users in real time. In addition, those records provided with geographic coordinates (longitude and latitude) are dynamically mapped and users can query the source of individual dots on a world map. The BiOSC Gateway provides access to millions of individual records and is coupled with the Canadian multilingual version of the Integrated Taxonomic Information System (ITIS - [http://www.cbif.gc.ca/pls/itisca/taxaget?p\\_ifx=cbif](http://www.cbif.gc.ca/pls/itisca/taxaget?p_ifx=cbif)), enabling users to search for primary data using common name, scientific names or synonyms.

[http://www.cbif.gc.ca/pls/bb/bcin\\_specs.portal?p\\_format=&p\\_ifx=plgt&p\\_lang=](http://www.cbif.gc.ca/pls/bb/bcin_specs.portal?p_format=&p_ifx=plgt&p_lang=)

[http://www.cbif.gc.ca/pls/bb/bcin\\_specs.portal?p\\_ifx=cbif](http://www.cbif.gc.ca/pls/bb/bcin_specs.portal?p_ifx=cbif)

## **3. Canadian Biodiversity Information Facility (CBIF)**

As a member of the Global Biodiversity Information Facility (GBIF), Canada is exploring new ways to improve the organization, exchange, correlation, and availability of primary data on biological species of interest to Canadians. By enhancing access to these data, CBIF provides a valuable resource that supports a wide range of social and economic decisions including efforts to conserve our biodiversity in healthy ecosystems, use our biological resources in sustainable ways and monitor and control pests and diseases.

[http://www.cbif.gc.ca/home\\_e.php](http://www.cbif.gc.ca/home_e.php)

## **4. Canadian Collection of Fungal Cultures**

The Canadian Collection of Fungal cultures (CCFC) currently holds 10,500 strains of fungal cultures representing about 2,500 species. The collection originated as an amalgamation of individual research collections and now serves as the primary repository for fungal cultures in the Agriculture and Agri-Food Canada research branch and accepts patent strains. It functions as a gene bank for this microbial resource and provides pure cultures to scientists in agriculture, forestry, medicine, private industry and biotechnology. Many species held in the collection are unique, and a number are new to science.

The CCFC website is being updated (previously <http://sis.agr.gc.ca/brd/ccc/>). Until this effort is complete, clients requiring cultures may contact Carolyn Babcock, Curator, CCFC, Agriculture and AgriFood Canada, [babcockc@agr.gc.ca](mailto:babcockc@agr.gc.ca). (This web resource has not been updated in some time, but the curator of these collections intends to revitalize the web database shortly.)

## **5. Directory of Canadian Culture Collections**

Information was collected on the numbers of collections, diversity, availability, funding and methods of preservation used. Three types of collections emerged. A few collections were large in terms of taxa and isolates held. Others contained few species but represented important national or international collections of characterized strains. Most of these collections received institutional support for facilities and operations. Those remaining could be characterized as working collections of individual researchers.

These were maintained with program budgets or from academic research grants. (This web resource has not been updated in some time, but the curator of these collections intends to revitalize the web database shortly.)

<http://res.agr.ca/brd/ccc/ccfcdire/ccfcdire.html>

## XI. Biomedicine (Christian Blouin)

### 1. CADRMP Adverse Reaction Database

The Adverse Reaction Database was developed by Health Canada's Canadian Adverse Drug Reaction Monitoring Program (CADRMP). It contains information concerning suspected adverse reactions to Canadian marketed health products of pharmaceuticals, biologics (including blood products and therapeutic and diagnostic vaccines), natural health products, and radiopharmaceuticals, as reported to Health Canada through voluntary and mandatory reporting measures.

[http://www.hc-sc.gc.ca/dhp-mps/medeff/databasdon/index\\_e.html](http://www.hc-sc.gc.ca/dhp-mps/medeff/databasdon/index_e.html)

### 2. National Database of FASD and Substance Use During Pregnancy Resources

Database of Canadian resources that have been authored, produced or published in Canada or that have Canadian content but have been published outside of Canada and are currently available to be ordered or purchased from the organization responsible. The subject areas from which documents are selected include prevention, intervention and identification of Fetal Alcohol Spectrum Disorder (FASD) and other perinatal substance exposures, such as illicit drugs and solvents. Resources related to prenatal exposure to tobacco are not included.

<http://www.ccsa.ca/eng/knowledgecentre/ourdatabases/fasd/pages/default.aspx>

### 3. Canadian Center on Substance Abuse

The Canadian Centre on Substance Abuse has a legislated mandate to provide national leadership and evidence-informed analysis and advice to mobilize collaborative efforts to reduce alcohol- and other drug-related harms.

The databases maintained in this site are either "Gray literature" library collection and a series of Canadian directories of professionals, organizations and related programs.

<http://www.ccsa.ca/engknowledgecentre/ourdatabases/fasd/pages/default.aspx>

## XII. Chemistry (Mary Zborowski)

### 1. LOGKOW<sup>®</sup> - Databank on Octanol-Water Partition Coefficients

Dr. James Sangster has maintained and upgraded a databank on octanol-water partition coefficients of a large set of molecules. These molecules are important in a variety of chemical and biochemical fields including human health. In the study of biochemical activities of potential drug molecules as well as environmental toxicants, these data are essential in making comparisons and potential predictions. (Dr. James Sangster, Sangster Research Laboratories, Montreal, Quebec - james.sangster@polymtl.ca)

<http://logkow.cisti.nrc.ca/>

### 2. Data on PAH (polyaromatic hydrocarbon) Aquatic Toxicity

A collection of data on the photochemical activities and aquatic toxicity of polyaromatic hydrocarbons, as well as their photooxidized products is maintained by Prof. Bruce Greenberg and Prof. G. Dixon of the University of Waterloo, Ontario. Data on chemical properties and toxicities recorded in this collection are expected to serve both academia and the chemical industry, providing tools for toxicological risk assessment and environmental action. (Prof. B. Greenberg, Department of Biology, University of Waterloo, Waterloo Ontario)

<http://sciborg.uwaterloo.ca/~greenber/>

### 3. Oil Properties Database

This database is maintained by Environment Canada and contains physical and chemical properties of 431 crude oils and oil products.

<http://www.etc-cte.ec.gc.ca/databases/OilProperties/Default.aspx>

### 4. Chemical Synonyms Database

This database is maintained by Environment Canada and is used to find synonyms of a chemical name and to find the standard IUPAC (International Union of Pure and Applied Chemistry) name for that chemical.

<http://www.etc-cte.ec.gc.ca/databases/ChemicalSynonyms/Default.aspx>

## 5. Functional Group electron density Databank for Carcinogenic Carbonyl Compounds

A functional group electron density database of carcinogenic carbonyl compounds involved in vehicle exhausts is being developed by Dr. Serge Lamy of Health Canada and Professor Paul Mezey of the University of Saskatchewan. (Professor Paul G. Mezey, Department of Chemistry, Department of Mathematics and Statistics, University of Saskatchewan, Saskatoon, Saskatchewan. mezey@sask.usask.ca)

## 6. Halogenated Organic Molecules Electron Density Databank

A molecular shape database for a series of halogenated organic molecules is maintained and upgraded by Professor Paul Mezey of the University of Saskatchewan. The earlier polycyclic aromatic hydrocarbon (PAH) shape database is continuously updated. These shape databases have new applications in the pharmaceutical industry, in new lead search, in toxicological risk assessment within the framework of the CNTC (Canadian Network of Toxicology Centres) Quantitative Risk Assessment project and in pesticide research.

Professor Paul G. Mezey, Department of Chemistry, Department of Mathematics and Statistics, University of Saskatchewan, Saskatoon, Saskatchewan - mezey@sask.usask.ca

## 7. TerraTox<sup>(TM)</sup> Data Bases by Terra Base Inc.

Terra Base Incorporated offers a selection of specialized commercial databases including:

- TerraTox<sup>(TM)</sup> - Explorer - Physico chemical properties and toxicity endpoints for almost 100 species of aquatic and terrestrial organisms and more than 15,000 substances.
- TerraTox<sup>(TM)</sup> - HIV-1 - The HIV-1 database contains well over 5000 individual chemicals with measured anti-HIV-1 data.
- TerraTox<sup>(TM)</sup> - Pesticides - Physico chemical properties and toxicity endpoints for almost 100 species of aquatic and terrestrial organisms and more than 1,500 pesticides, pesticide metabolites and degradation products.
- TerraTox<sup>(TM)</sup> - Steroids-RBA - Quantitative receptor binding assay data for over 2,600 individual chemicals, normalized to 17 beta-estradiol (E20 = 100%), progesterone, testosterone, mibolerone, androgen, and others. For research in health, environment, pharmaceuticals and agriculture.
- TerraTox<sup>(TM)</sup> - Vibrio fischeri - Physico chemical properties and toxicity endpoints for almost 100 species of aquatic and terrestrial organisms and more than 2,000 substances for which measured Vibrio fischeri (formerly Photobacterium phosphoreum) data are available.

TerraBase Inc., 1063 King Street West, Suite 130, Hamilton, ON, L8S 4S3, Canada

<http://www.terrabase-inc.com>

## 8. Hemoglobin Binding Affinity Constants Database

A database on the hemoglobin binding affinity constants of a large series of organic molecules has been maintained and further developed by Prof. Krishnan, Université de Montréal. This database is already being applied for the study of some of the adverse effects of toxic substances. (Professeur Kannan Krishnan, Département de médecine du travail et d'hygiène du milieu, Faculté de médecine, Université de Montréal, Québec.)

## 9. Cadmium and Zinc Uptake by Grain Varieties Databank

A database on the toxicity of various metals, including Cadmium and Zinc, with special emphasis on their uptake by grain varieties, is being maintained and upgraded by the research groups of Prof. Beverly Hale, University of Guelph, Ontario, and Prof. Francine Denizeau, Dép. Chimie, Université du Québec à Montréal, Québec.

## 10. The Canadian National Atmospheric Chemistry (NatChem) Database and Analysis System

The NatChem Database contains air and precipitation chemistry data from many major regional-scale networks in North America. The purpose of the database is to enhance atmospheric research through the archival and analysis of North American air and precipitation chemistry data.

[http://www.msc.ec.gc.ca/natchem/index\\_e.html](http://www.msc.ec.gc.ca/natchem/index_e.html)

### **XIII. Climatology (Tsoi Yip)**

#### **1. National Climate Data and Information Archive**

The National Climate Data and Information Archive, operated and maintained by Environment Canada, contains official climate and weather observations for Canada.

Direct access to climate and weather values in the database is available at Climate Data Online. This site is used to find out what the weather was like on a particular day, for a month, or for a whole year. Data files may be downloaded in CSV or XML format, and there are also customizable charts from the navigation options at the bottom of the daily data page.

[http://www.climate.weatheroffice.ec.gc.ca/climateData/canada\\_e.html](http://www.climate.weatheroffice.ec.gc.ca/climateData/canada_e.html)

The Canadian Climate Normals contain averages and extremes for nearly 1,500 locations across Canada. This site is used to find out about the conditions usually found at a location at different times of the year.

[http://www.climate.weatheroffice.ec.gc.ca/climate\\_normals/index\\_e.html](http://www.climate.weatheroffice.ec.gc.ca/climate_normals/index_e.html)

A range of other products are also available, including obtaining data documentation, country-wide summaries of monthly data, CD-images, or any other additional services and publications. Monthly climate summaries are also available for any historical month.

[http://www.climate.weatheroffice.ec.gc.ca/Welcome\\_e.html](http://www.climate.weatheroffice.ec.gc.ca/Welcome_e.html)

### **XIV. Crystallography (Mary Zborowski)**

#### **1. NRC Metals Crystallographic Database (CRYSTMET)**

CRYSTMET, a database of intermetallic crystal structures, developed and maintained by Toth Information Systems, is now available within the Materials ToolKit computing environment for crystallographic databases. In addition to CRYSTMET, the Inorganic Crystal Structure Database (ICSD) from FIZ-Karlsruhe, Germany, can also be accessed using this environment. For both these databases, in addition to the structure data, the calculated powder patterns are available within Materials ToolKit. A web version of this environment, for intranet use, was made available in April 2001. More information on these crystallographic databases and tools are available.

<http://www.TothCanada.com>

#### **2. Cambridge Structural Database (CSD)**

The CSD is distributed in Canada by Dr. George Ferguson at the University of Guelph. The CSD CD-ROMs are distributed to the sites in mid-April and mid-October each year. Access to the CSD is then available to the group covered by the relevant site-license at each university. (george@angus.chembio.uoguelph.ca)

### **XV. Environment (Tsoi Yip)**

#### **1. IJC Great Lakes Herring Gull Contaminant Monitoring Program**

Herring Gull eggs from several sites throughout the Great Lakes are monitored on an annual basis for a wide variety of organochlorine and heavy metal contaminants in order to assess the biological damage caused by the presence of persistent pollutants in the environment and to assess the effectiveness of efforts to prevent or reduce contamination by toxic chemicals in the Great Lakes basin. The survey has been ongoing since 1972. The data are stored in a LIMS database, accessibly via ACCESS. Environment Canada, Canadian Wildlife Service

[http://www.on.ec.gc.ca/wildlife/factsheets/fs\\_herring\\_gulls-e.html](http://www.on.ec.gc.ca/wildlife/factsheets/fs_herring_gulls-e.html)

#### **2. Contaminants in Eggs of Fish-eating Colonial Birds of the Great Lakes**

This is a study of the contaminant levels in Great Lakes populations of fish-eating birds and their possible biological effects in response to studies that showed lowered productivity, declining population levels and extremely high contaminant levels. The survey has been ongoing at 67 sites in the St. Lawrence Great Lakes (including US locations) monitoring eggs of *Larus argentatus* (herring gull), *Phalacrocorax auritus* (double-crested cormorant), *Sterna caspia* (caspiian tern), *Sterna hirundo* (common tern), *Nycticorax nycticorax* (black\_crowned night heron), *Larus delawarensis* (ring-billed gull), *Sterna forsteri* (Forster's

tern) for organochlorine and heavy metal contaminants. The data are stored in a LIMS database, accessible via ACCESS. This program is conducted in concert with the IJC Herring Gull Monitoring Program.

<http://www.on.ec.gc.ca/search/metadata.cfm?ID=116&Lang=e>

### **3. Canadian Migratory Game Bird National Harvest Survey (NHS) and Species Composition Survey (SCS)**

These surveys are intended to obtain annual information on the total, seasonal and spatial harvest of ducks, geese and other game birds in Canada, on the ecological characteristics of waterfowl harvested in Canada and the hunter activity associated with that harvest. The NHS is based on a questionnaire that asks hunters to provide information on the number, location and timing of their hunting trips and on migratory game birds killed. The SCS asks hunters to send in the wing from each duck killed and the tail feathers from each goose killed along with the hunting details. The survey covers all of Canada divided into 23 zones and has been carried out annually since 1966. The bilingual database currently contains 9,000,000+ records. Environment Canada, Canadian Wildlife Service (helene.levesque@ec.gc.ca)

<http://www.cws-scf.ec.gc.ca/nwrc-cnrf/default.asp?lang=en&n=CFB6F561>

### **4. National Air Pollution Surveillance Network (NAPS)**

Continuous air quality data from major population centres. Continuous gaseous - sulphur dioxide, carbon monoxide, nitrogen dioxide, ozone and soiling index: total suspended particulates - mass, lead, sulphate and nitrate: inhalable particulate - coarse, fine particulates and associated metals and ions including sulphate, nitrate and lead, toxics including VOC, PAH, dioxin/furan, metals, SO<sub>2</sub>, NO<sub>x</sub>, VOC, O<sub>2</sub>, O<sub>3</sub>, TSP.

[http://www.msc-smc.ec.gc.ca/natchem/particles/n\\_naps\\_e.html](http://www.msc-smc.ec.gc.ca/natchem/particles/n_naps_e.html)

### **5. Nutrient and Biological Productivity in Atlantic Region Water**

Collects data relating water chemistry to biological production. Includes water temperature, colour; dissolved oxygen, major ions, phosphorous nitrogen, metals. Environment Canada, Canadian Wildlife Service (joi.kerekes@ec.gc.ca)

### **6. Water Related Issues Database**

Includes soil erosion, floods, droughts; contamination, pesticide issues, acid rain; municipa; infrastructure, economic development, water use, waste disposal and conservation. Used to monitor water use and associated problems. Environment Canada, Environmental Conservation Branch. (francine.rousseau@ec.gc.ca)

### **7. National Ecological Monitoring and Assessment Network (EMAN)**

EMAN's aim is to understand the changes occurring in ecosystems by establishing long-term multidisciplinary monitoring programs in conjunction with research, experimentation and with a program of developing national environmental indicators.

EMAN has 4 overall objectives:

- 1) To provide a national perspective on how Canadian ecosystems are being affected by environmental stresses;
- 2) To provide scientific rationale for pollution control and resource management;
- 3) To evaluate and report on the effectiveness of these policies;
- 4) To identify new environmental issues at the earliest possible stage.

Ninety sites are studied across Canada with at least one site in each of 15 terrestrial and 5 marine ecozones. There are 2 databases, one in mSQL and one (metadata) in z39.50. Environment Canada, Indicators, Monitoring and Assessment Branch.

<http://www.eman-rese.ca/eman/>

### **8. Marine Climatological Data**

Database on winds, waves, temperature, ice, icebergs, weather, etc. Includes ice cover, wind speed, wind direction, wave height, wave period, air temperature, sea surface temperature, etc. Environment Canada, Atmospheric Environment Branch. ([stu.porter@ec.gc.ca](mailto:stu.porter@ec.gc.ca))

## **9. Oceanbase**

Ocean dumping data for harbours and dumping sites throughout the Atlantic Region. Includes sediment grain size; carbon, oil and grease, cadmium, mercury, lead, zinc, copper, PCB, DDT, PAH in sediments; locations of dredging and dumping operations. Environment Canada, Environmental Protection Branch. (adrian.macdonald@ed.gc.ca)

## **10. Toxic Chemicals Database (NAQUADAT)**

Database on toxic chemicals in water, sediments and fish in the Atlantic Provinces. Includes PCB, PAH, chlorophenols and other organic contaminants in water, sediments and fish. Used to monitor ambient concentrations of toxic chemicals. Environment Canada, Environmental conservation Branch. (hugh.o'neill@ec.gc.ca)

## **11. Climate**

Climate data are used to meet many needs: climate change detection, development and input to Global Climate Models (GCMs), environmental assessments, building codes, hydro-meteorological applications (flood forecasting and flow regulation), and to meet International Commitments for data such as the Global Climate Observing System (GCOS) and Reference Climate Stations. Data are collected on precipitation, humidity, pressure, rate of rainfall, evaporation, snow depth (point and survey), wind speed and direction, hours of sunshine, soil (temp and moisture), ice thickness, freeze-up/break-up dates for inland and coastal waters. Environment Canada, Atmospheric Environment Service.

[http://climate.weatheroffice.ec.gc.ca/climateData/canada\\_e.html](http://climate.weatheroffice.ec.gc.ca/climateData/canada_e.html)

## **12. Hydrometric Database (Water Quantity)**

Hydrometric data are used to meet a broad range of needs: environmental assessment, sustainable development of the resource, climate change impacts, aquatic and ecosystem health, water supply management, (e.g. apportionment, irrigation) flood prediction and control, engineering design (e.g. dams, bridges), etc. to support Federal Water Policy, Canada Water Act, Federal-Provincial Water Quantity Cost-Share Agreement, Boundary Water Treaty Act and International Rivers Improvement Act. Data on water level, discharge, water velocity, freeze-up/break-up dates, ice thickness and water temperature are currently collected from 2,650 stations across Canada. Environment Canada, Atmospheric Environment Service.

[http://www.wsc.ec.gc.ca/products/main\\_e.cfm?cname=products\\_e.cfm](http://www.wsc.ec.gc.ca/products/main_e.cfm?cname=products_e.cfm)

## **13. Sediment**

Sediment data (suspended sediment concentration, suspended sediment particle size, turbidity, bed material particle size, bed load) from 315 stations are used to meet a variety of needs: contaminant transport, environmental assessments, regulations, loading to reservoirs, lakes and oceans, dredging and in-stream mining, erosion control, river engineering, etc. This database is integrated with the hydrometric program. Environment Canada maintains the national database (HYDAT), which houses the sediment data, and the SEDEX metadata database in Downsview. Environment Canada, Atmospheric Environment Service.

[http://www.wsc.ec.gc.ca/products/main\\_e.cfm?cname=products\\_e.cfm](http://www.wsc.ec.gc.ca/products/main_e.cfm?cname=products_e.cfm)

## **14. Industrial Water Use Survey**

Water Use Databases containing data on water and sewage, intake, discharge, recirculation, intake treatment and discharge treatment (with category details) as well as cost components for water acquisition, re-circulation and both intake and discharge treatment for the four sectors surveyed: manufacturing, mineral extraction, thermal power and hydro power for the major water-using industrial (SIC) groups selected for each survey (about 7000 in each survey year universe). The maintenance of an Access database (NAWUDAT) of the past four completed surveys will be updated with the addition of the 1996 data. Background descriptions and information are available for each survey upon request. Data are available for Canada, region, province, city, town or basin etc., identified by Statistics Canada Standard Geographic Codes and Water Survey Hydrometric Codes. Summary data at the aggregate level are available upon request. Summary tables and Survey summary publication are prepared by Environmental Economics Branch (P&C). Environment Canada, Environmental Economics Branch.

(dave.scharf@ec.gc.ca)

### **15. CWS Seabird Egg Monitoring Program**

The seabird egg contaminant monitoring program was established by the Canadian Wildlife Service (CWS) to provide an index to contamination of the marine ecosystem and possible implications for seabird health. The program is divided into three components: Atlantic, Pacific and Arctic. Collection of eggs as an index to contamination was chosen as a non-intrusive way of obtaining information for an ongoing survey. The objective is to determine if levels of organochlorine and metal contaminants in seabird eggs are representative of the marine environment of Canada. The data are stored in LIMS (computerized Laboratory Inventory Management System). Some data are published in scientific literature. Unpublished data are available upon request.

Neil Burgess (Atlantic), Environment Canada, Canadian Wildlife Service, P.O. Box 1590, Sackville NB E0A 3C0, Neil.Burgess@ec.gc.ca

J.E.Elliott (Pacific), RR1, 5421 Robertson Road, Delta BC V4K 3N2, john.elliott@ec.gc.ca

Dr. Birgit Braune (Arctic), CWS/NWRC, 100 Gamelin Boulevard, Hull QC K1A 0H3  
birgit.braune@ec.gc.ca

### **16. National Survey of Contaminants in Waterfowl**

Safety of waterfowl and other wild foods for consumption is a major concern of native peoples and hunters. Environment Canada is expected to have information on levels of contaminants in migratory game birds and other edible wildlife of federal interest. A review of toxic chemical residues in Canadian game birds revealed that there are very few data prior to 1988. Elevated levels of some chemical compounds have, however, been found in waterfowl from certain areas. A national survey of contaminants in waterfowl was conducted between 1988 and 1995. The objective of the project is to provide a comprehensive database on contaminants in waterfowl collected from across Canada to health Canada so that the risk to human health of eating those waterfowl may be assessed. The data are stored in LIMS (computerized Laboratory Inventory management System) and in QuattroPro and Excel data files and are published in CWS Tech. Report No. 326. Environment Canada, Canadian Wildlife Service.

(birgit.braune@ec.gc.ca)

<http://www.cws-scf.ec.gc.ca/publications/AbstractTemplate.cfm?lang=e&id=326>

### **17. Municipal Water Use Database (MUD)**

There is an increasing emphasis on correlating environmental impacts and health effects across Canada and therefore a need for a relational database containing water use data, accessible by governments and the public. The database consists of basic municipal population as well as water and sewage flow information from 1355 Canadian municipalities. It also includes simple raw data summations. Some water use groups, water treatment and wastewater treatment types, and effluent data are available as well.

Environment Canada, Environmental Economics Branch. (dave.lacelle@ec.gc.ca)

[http://www.ec.gc.ca/water/en/manage/use/e\\_data.htm](http://www.ec.gc.ca/water/en/manage/use/e_data.htm)

### **18. Forest Bird Monitoring Program**

The Ontario Forest Bird Monitoring Program (FBMP) is a volunteer-bases program whose goals are:

- 1) compile a habitat-specific baseline inventory of forest songbirds;
- 2) describe changes over time in relation to habitat and landscape;
- 3) understand population trends for forest birds.

Data are collected at 298 sites from large, mature forests throughout Ontario and a few sites in Saskatchewan and New Brunswick. Environment Canada, Canadian Wildlife Service

<http://www.on.ec.gc.ca/search/metadata.cfm?ID=428&Lang=e>

### **19. Great Lakes Open Lakes Surveillance Program**

A coordinated surveillance and monitoring program that monitors throughout the Great Lakes. Lakes are sampled on a rotational basis to provide water quality trend information and to describe and quantify cause (loads) and effect (water quality) relationships to help understand how the Great Lakes physical, biological and chemical systems operate. Data collected include temperature, major ions, conductivity and pH, alkalinity, conductivity, colour, turbidity, transparency, residues, secchi depth, depth, ammonia, carbon, chloride, dissolved oxygen, nitrogen, phosphorous, sulphates, nutrients, metals, organochlorines bacteria zooplankton and phytoplankton counts and biomass. Environment Canada, Ontario Region

<http://www.on.ec.gc.ca/search/metadata.cfm?ID=106&Lang=e>

## **20. Environmental Effects Monitoring (EEM)**

Required under the Pulp and Paper Effluent Regulations to determine if pulp and paper effluents are causing effects in the aquatic environment, and thereby to determine the adequacy of the regulation in protecting fish, fish habitat and the use of fisheries resources. Each pulp and paper mill or off-site treatment facility (OSTF) in Canada covered by the regulation must monitor fish populations and benthic invertebrate communities at sites exposed to effluent and compare the results to sites not exposed to effluent in order to determine if the effluent is causing an effect on the aquatic environment. Some 123 pulp and paper mills and off-site treatment facilities across Canada are monitored for depth, velocity, dissolved oxygen, conductivity, resin acids, chloride, nutrients, chloroform sulphate, nitrate/nitrite, phosphorous, metals, organochlorines biological characteristics and toxicity. Pulp and Paper Mill Environmental Effects Monitoring, National EEM Office (Ed.Porter@ec.gc.ca)

## **21. Breeding Bird Survey in Canada (BBS)**

Conducted in cooperation with the US Breeding Bird Survey, this program collects information on the distribution and abundance of breeding birds across Canada. Over 170 species are monitored in Canada. Environment Canada, Canadian Wildlife Service

<http://www.cws-scf.ec.gc.ca/nwrc-cnrf/default.asp?lang=en&n=416B57CA>

## **22. CWS Long Range Transport of Air Pollutants (LRTAP) Biomonitoring Program**

The CWS LRTAP Biomonitoring Program aims to document the rate, nature and scope of biological recovery in aquatic ecosystems of eastern Canada following implementation of acid rain controls in Canada and the U.S. by monitoring waterfowl, loons and their habitats in selected regions sensitive to or affected by acid rain. Approximately 640 water bodies in 3 regions in Ontario and one in Nova Scotia are monitored for waterfowl and loon density, broods and young produced, fish status, aquatic pH, alkalinity, conductivity, major ions, dissolved organic carbon, total phosphorus, ammonia, nitrate/nitrite, total nitrogen, some trace metal (subset), water colour, lake size, length, location and depth, riparian habitat features, forest cover types and surficial/bedrock geology. Environment Canada, Canadian Wildlife Service (Don.McNicol@ec.gc.ca)

## **23. The Experimental Lakes Area (ELA) Project Northwestern Ontario Ecosystem Database**

This is a multidisciplinary collection of databases including biological (zooplankton, phytoplankton, benthos and fish), chemical, physical, hydrological and meteorological information about pristine and manipulated lakes, streams, and watersheds in the area. The databases support the whole-lake ecosystem research conducted at the Experimental Lakes Area and a lake size series study (NOLSS) in northwestern Ontario. Over 100 lakes and 50 associated streams in northwestern Ontario are sampled every two weeks to one month. Variables measured include metals, organic chemicals, isotopes, radionuclides, trace metals, stable isotope ratios, radioisotopes, organochlorines, nutrients, major ions, silica, pH, alkalinity, conductivity, chlorophyll, phytoplankton, zoobenthos and zooplankton species and abundance, fish species, age, length, weight, phytobenthos meteorology, physical limnology, hydrology. The data are in an Oracle database. Fisheries and Oceans Canada, Freshwater Institute (kasians@dfo-mpo.gc.ca)

## **24. DFO National LRTAP Biomonitoring Program**

Fish and benthic macroinvertebrates at sites in eastern Canada are sampled annually to monitor the response of sensitive lakes and rivers to expected decreases in sulphate deposition resulting from emission controls. Some 36 lakes and 21 rivers in eastern Canada are covered. Fisheries and Oceans Canada, M.A. Shaw

## **25. National Contaminants Information System (NCIS)**

This is a warehouse of information in an Oracle database on toxic chemicals in freshwater and marine fish, marine mammals, other aquatic and marine organisms and their habitats from the Northwest Territories and southern Canada. Fisheries and Oceans Canada, Freshwater Institute (RowesK@dfo-mpo.gc.ca)

## **26. Great Lakes Fish Contaminants Surveillance Program (GLFCSP)**

GLFCSP is a database on contaminant levels in fish from the Canadian Great Lakes (Ontario, Erie, Huron, Superior) designed to monitor these levels for fisheries management purposes. *Salvelinus namaycush* (lake trout), *Osmerus mordax* (rainbow smelt), *Stizostedion vitreum* (walleye), *Cottus cognatus* (slimy sculpin), *Aosa pseudoharengus* (alewife), and 7 other species, benthic invertebrates and

net plankton are monitored annually at 45 sites on the Great Lakes. The data are stored in NCIS. Fisheries and Oceans Canada (mike.whittle@c-a.dfo.dfo-mpo.x400.gc.ca)

### **27. BC Environmental Monitoring System (EMS)**

The BC Environmental monitoring system contains physical/chemical, biological, bioassay and associated quality assurance data for ambient and discharge monitoring locations in an Oracle database. BC Ministry of Environment (npeppin@epdiv1.gov.bc.ca)

### **28. Ontario Herpetofaunal Summary (OHS)**

The purpose of the OHS is to:

- 1) gather and publish information on distribution of Ontario amphibians and reptiles;
  - 2) to gather and publish information on the ecology and life histories of amphibians and reptiles and;
  - 3) to provide baseline data for futurework and to monitor endangered, threatened and rare species.
- Ongoing since 1984, the database currently contains 80,000+ records.

Ontario Ministry of Natural Resources, WWF Canada, the Canadian Reptile Conservation Society and the Essex Region Conservation Authority, Michael Oldham

### **29. Ontario Sport Fish Contaminant Monitoring Program (OSFCMP)**

The program tests as many angling areas as possible to assess the occurrence, uses, accumulation and trends through time of contaminants in fish. At 1600+ locations in Ontario 20 fish of each type to be tested from each location representative of the greatest potential for accumulation (i.e. larger individuals from species with high lipid content for OC's) are tested for Organochlorines and metals. The Oracle database contains 800,000 (to 1997) and is available on a cost recovery basis. Ontario Ministry of the Environment and Ontario Ministry of Natural Resources

<http://www.ene.gov.on.ca/envision/guide/index.htm>

### **30. The Canadian National Atmospheric Chemistry (NAtChem) Database And Analysis System**

The National Atmospheric Chemistry Database (NAtChem) is a data archival and analysis facility operated by the Meteorological Service of Canada.

The purpose of the NAtChem database is to enhance atmospheric research through the archival and analysis of North American air and precipitation chemistry data. Such research includes investigations into the chemical nature of the atmosphere, atmospheric processes, spatial and temporal patterns, source-receptor relationships and long range transport of air pollutants.

The NAtChem Database contains air and precipitation chemistry data from many major regional-scale networks in North America. To contribute to NAtChem, networks must operate for a period of at least two years, must have wide area coverage, and must have regionally-representative sites (rural and background).

The NAtChem Database consists of 4 smaller databases:

- The NAtChem Particulate Matter Database (NAtChem/PM);
- The NAtChem Precipitation Chemistry Database (NAtChem/Precip);
- The NAtChem Air Toxics Database (NAtChem/Toxics);
- The NAtChem CORE Database (NAtChem/CORE).

[http://www.msc-smc.ec.gc.ca/natchem/index\\_e.html](http://www.msc-smc.ec.gc.ca/natchem/index_e.html)

## **XVI. Forestry (Mary Zborowski)**

### **1. System of Agents for Forest Observation Research with Advanced Hierarchies (SAFORAH)**

SAFORAH is a distributed network of data storage facilities presented as a single archive that enables users to upload and download remote sensing data. It is built with advanced grid computing technology. The SAFORAH data grid currently connects four regional Canadian Forest Service centres, the Environment Canada National Wildlife Research Centre, and the University of Victoria Department of Physics' petabyte data store. There are currently more than 2200 Landsat remote sensing images (3 TB) which are housed at the University of Victoria data storage facility. Registered users query the metadata, download or upload data with the CUDOS web portal (Catalogue and User Ordering System – CUDOS).

<http://www.saforah.org/>

## **2. Compendium of Canadian Forestry Statistics**

The Compendium of Canadian Forestry Statistics is a selection of statistical forestry data published annually. The Compendium has been available on-line since 1997. Before 1997, it was produced as a printed publication annually beginning in 1992.

The Compendium has nine components, each of which presents statistical information compiled from the National Forestry Database. Data are displayed for each jurisdiction in Canada as well as at the national level. Graphs representing the data are also presented.

[http://nfdp.ccfm.org/compendium/index\\_e.php](http://nfdp.ccfm.org/compendium/index_e.php)

## **3. National Forestry Database Program (NFDP)**

The Canadian Council of Forest Ministers (CCFM) created the National Forestry Database Program (NFDP) in 1990 with the following objectives:

- To describe forest management and its impact on the forest resource;
- To develop a public information program based on the database;
- To provide reliable, timely information to the provincial and federal policy processes.

The Program is a partnership between the federal government and provincial and territorial governments. The Canadian Forest Service (CFS) at Natural Resources Canada, which developed and maintains the database, has responsibility for disseminating national forestry statistics.

The National Forestry Database is used to compile national statistics. Most of the data are provided by the provincial or territorial resource management organizations. Federal land data are provided by the responsible federal departments and compiled by the CFS.

[http://nfdp.ccfm.org/index\\_e.php](http://nfdp.ccfm.org/index_e.php)

## **4. REGEN: A Program for Reporting Regeneration Results**

The Canadian Council of Forest Ministers mandated the National Forestry Database Program (NFDP) in 1990 to establish a database describing forest management activities in Canada. Soon after, the NFDP identified a need to develop a convention for measuring, analyzing, and reporting national forest regeneration statistics. The issue was viewed as a question of stewardship – specifically, were forestry practices in Canada ensuring satisfactory regeneration of harvested lands? REGEN was developed to report on forest regeneration activities and conditions on harvested lands. The data presented on this Web site were provided by the provincial and territorial agencies responsible for the management of forest resources in their jurisdictions.

[http://nfdp.ccfm.org/regen/index\\_e.php](http://nfdp.ccfm.org/regen/index_e.php)

## **5. Canada's National Forest Inventory (Canfi) - Data Summaries**

Canada is recognized world wide as a leader in forest management and is steward to a vast and diverse forest. Credible forest information synthesized from a wide variety of sources enables Canada to demonstrate to the world that its forest sector is economically viable, environmentally responsible and socially accountable.

To meet the needs of forest managers and policy makers, the Canadian Forest Service compiles Canada's national forest inventory by collecting data from provincial, territorial and other forest management inventories. The information collected is used at home and around the world. National inventories were compiled in 1981, 1986, 1991, and 2001. CanFI 2001 is the most recent inventory collected for Canada.

[http://nfi.cfs.nrcan.gc.ca/canfi/data/index\\_e.html](http://nfi.cfs.nrcan.gc.ca/canfi/data/index_e.html)

## **6. Canadian Wildland Fire Information System - Large Fire Database**

The Large Fire Database (LFDB) is a compilation of forest fire data from all Canadian agencies, including provinces, territories, and Parks Canada. The data set includes only fires greater than 200 hectares in final size; these represent only a few percent of all fires but account for most of the area burned (usually more than 97%). Therefore, the LFDB can be used for spatial and temporal analyses of landscape-scale fire impacts. For information on smaller fires (up to 200 ha in final size), please contact individual fire agencies.

Links to other agencies can be found through the Canadian Interagency Forest Fire Centre (CIFFC, <http://www.ciffc.ca/links.htm>).  
[http://cwfis.cfs.nrcan.gc.ca/en/historical/ha\\_lfdb\\_maps\\_e.php](http://cwfis.cfs.nrcan.gc.ca/en/historical/ha_lfdb_maps_e.php)

## **7. National Forest Fire Situation Report - Weekly Fire Statistics**

The National Forest Fire Situation Report provides a summary of current and historical fire activity.

New interactive map feature: Zoom in to check for forest fires near your community and zoom out to see the national situation using our new near-real time interactive map.

<http://fire.cfs.nrcan.gc.ca/firereport/report-rapport-eng.php>

## **8. BioSIM: Pest management planning decision support**

BioSIM is an integrated environment that provides seasonal simulation models with geographically specific temperature input, either historical or forecast. BioSIM controls the execution of simulations and can extract information from model outputs for presentation or further analysis.

BioSIM assembles weather data for simulations at each of a large set of locations, from 3 geographically-referenced databases. The Normals database contains long-term mean and extreme monthly minimum and maximum temperatures and precipitation. Five-day forecasts are contained in a separate database. Current observed daily weather data are contained in a Real Time database. BioSIM selects the "best" sources of weather data for each point in the location list, adjusts the data for differences in elevation, latitude and longitude, and restores stochastic variation to long-term averages (normals). The weather time series sent to the simulation model is composed of real-time data whenever available (or requested), 5-day forecasts for short-term prediction (when available), and normals for prediction over the longer term or to fill gaps in observed weather.

<http://scf.nrcan.gc.ca/factsheets/biosim>

## **9. British Columbia Natural Disturbance Database**

BC Forest Fire Records

Since 1920 the B.C. Ministry of Forests have completed a fire report on each wildfire actioned that includes information such as location, date of ignition, probable cause, final size, and a unique fire number identifier. Maps are prepared for fires greater than 20 hectares. Much of the significant information from 1950 to present has been transferred to an electronic database. A central fire atlas was created in the 1920s whereby fire boundaries and fire ID number were transferred to a set of base maps. Wildfires greater than 5 ha are also recorded on forest cover maps. The fire reports and atlas are a record of the fires actioned by the BC Ministry of Forests - small fires that were not discovered or fires in remote areas that were not actioned are not included. Also fires that occurred in the Railway Belt until 1930 and in national parks up to present day are not included.

BC Forest Insect Infestation Records

The Canadian Forest Service began to survey forest insect outbreaks in the early 1900's.

The spatial database includes records of outbreaks for the 60 damage agents in the following list including 9 bark beetles (red), 25 defoliators (green), 9 other insects (purple), 12 diseases (brown) and 4 other animal and climatic agents (blue). It should be recognized that these are maps of outbreaks that were surveyed, not a complete outbreak history. Records are less complete for remote areas in early years before aerial surveys; for agents that caused minor damage or damage that is difficult to identify from aerial surveys such as many diseases; or for agents that affect tree species that historically had lower commercial value such as subalpine fir and hardwoods; and in some years when there was less funding available for flying time.

<http://cfs.nrcan.gc.ca/subsite/disturbance/sources>

## **XVII. Geology (Paul Budkewitsch)**

## **XVIII. Geomagnetism (Paul Budkewitsch)**

### **1. Geomagnetic Data**

The National Geomagnetism Program of the GSC maintains the archive of Canadian magnetic observatory data, describing the variations with time in the Earth's magnetic field at points across Canada. This archive of about 7 GB contains high-resolution digital data from 13 observatories for the past 24 years plus historical data back to the time of the International Geophysical Year and earlier. The most recent two years of data are maintained on-line. The database is accessed by researchers and others from all parts of the world. An automatic DRM (data request manager) using electronic mail is in operation, and custom requests can be handled using Internet ftp. Descriptive material on data acquisition, data availability, and conditions of access can be found at the website. Data can be viewed in graphical form on the Web without restriction.

<http://www.geolab.nrcan.gc.ca>

## **XIX. Geophysics (Paul Budkewitsch)**

## **XX. Geoscience (John Broome)**

### **1. Geoscience Data Repository**

The Geoscience Data Repository (GDR) is a collection of Earth Sciences Sector geoscience databases that is managed and accessed by a series of Information Services (GDRIS). The aim of the GDR is to standardize corporate databases and make them interoperable in order to increase the discovery, access and use of the geoscience information that the Sector has been mandated to collect and maintain.

The GDR is designed so that the data sets it contains for the applications of today will continue to be useful for the applications of tomorrow. This is accomplished by allowing the loading, discovery and access of these data sets through a suite of standard Web enabled services that allow for the easy integration of the GDR information into new applications.

<http://gdr.nrcan.gc.ca>

### **2. MIRAGE: Map Image Rendering Database for GEoscience**

MIRAGE makes ESS paper Geoscience maps accessible through the Internet. This was accomplished by scanning thousands of paper maps and linking these images to their metadata records. Users can now search this metadata to discover geoscience maps that they can view and download.

<http://gdr.nrcan.gc.ca/mirage/>

### **3. Digital Geoscience Maps**

The Geological Survey of Canada (GSC) has published about 400 maps digitally over the past 15 years. The geological polygons for approximately 250 of these maps are currently being made available to find, preview, and download as ESRI shape files through this map search tool. The remaining geological polygons will be available in the coming months.

<http://gdr.nrcan.gc.ca/digimap/>

### **4. National Geochemical Reconnaissance (NGR) Data**

The National Geochemical Reconnaissance (NGR) geochemical data sets listed below are available, free of charge, for viewing and downloading using the mapping application. The data can be reprojected to your specifications and downloaded in many standard formats.

[http://gdr.nrcan.gc.ca/geochem\\_nrg/](http://gdr.nrcan.gc.ca/geochem_nrg/)

### **5. Canadian Geochemical Surveys**

This Web site presents an overview of geochemical surveys carried out across Canada since the 1950s. The catalogue of surveys currently contains over 800 entries, including the majority of surveys carried out by the Geological Survey of Canada and a significant number of surveys carried out by Provincial and Territorial agencies. The catalogue contains a basic description of each survey, with links to related publications and online resources. In addition, raw geochemical data are available for over 65 surveys, in a standardised format, as both KML files and Excel spreadsheets.

<http://gdr.nrcan.gc.ca/geochem/>

## **6. Mineral Deposit Databases and Syntheses of Major Mineral Deposit Types in Canada**

Economic mineral deposits are natural accumulations of one or more useful minerals that may provide society with metallic or non-metallic raw materials. The Geological Survey of Canada has been conducting scientific studies and compiling databases for major metallic mineral deposits on Canada-wide and world-wide scale over a three decade period. The latest phase of database compilation has been facilitated by the World Minerals Geoscience Database Project.

<http://gdr.nrcan.gc.ca/minres/>

## **7. Offshore Eastern Canadian Hydrocarbon Wells – BASIN Database**

BASIN contains a wealth of geological, geophysical and engineering information related to many years of petroleum exploration, primarily offshore northern and eastern Canada. BASIN includes both basic and interpreted information for most petroleum industry exploration wells and locational data for a large number of seismic surveys. Basic well data has been gathered from well history and drilling reports while interpretative data such as formation picks, geochemical analysis, age determinations and vitrinite reflection values have been compiled from petroleum industry and government sources.

[http://gdr.nrcan.gc.ca/basin/index\\_e.php](http://gdr.nrcan.gc.ca/basin/index_e.php)

## **8. Canadian Geochronology Knowledgebase**

The compilation represents publicly available reports of geochronological information for Canada. This includes federal, provincial and territorial government publications and reports, university theses, books and journals, as well as unpublished data points released by individual geochronologists. Current coverage is limited to those areas that have been the target of recent past compilation efforts, with other areas and updates being included as they become ready. Every effort is made to report the ages without reinterpreting the original authors intent. However, care has also been taken to highlight the salient features of the data by which the end-user can make initial judgment on the data robustness. Users are cautioned that because of space limitations and the necessary summarization of often complex datasets, that the original publication should be consulted to verify age interpretations and their rationale.

<http://gdr.nrcan.gc.ca/geochron/>

## **9. Physical rock properties database**

The National Rock Properties Database is comprised of two sets of data:

1. In-situ borehole and core sample measurements of the following variables: density, electrical, resistivity, induced polarization (IP), self-potential acoustic velocities (Vp, Vs), natural radioactivity (K, U, Th), magnetic susceptibility, and temperature. These data were collected from borehole geophysical logs and measurement of core samples, acquired since 1980. All of these data are in the searchable database.

2. Laboratory measurements of the following variables from rock samples: density and acoustic velocities (Vp, Vs) These data were acquired from measurements of rock samples collected across Canada. The database currently contains only the data from Ontario samples. Insertion of the remainder of the data is in progress (2006-12-12). As an interim measure, all of these data are provided in a downloadable Excel spreadsheet or CSV file.

<http://gdr.nrcan.gc.ca/rockprop/>

## **XXI. Geoscience – Environment, Hazards (Mary Zborowski)**

### **1. Hazards and Environmental Geosciences**

A number of databases compiled by scientists of the Terrain Sciences Division of the Geological survey of Canada, Natural Resources Canada are now accessible through the Internet. These databases provided key geoscience data that are useful for hazard assessment, environmental impact assessment, land use planning and climate change studies. Included in the collection are the national permafrost database, the Canadian peatland database, the Canadian diatom database, landslide disasters, flood disasters, borehole geophysical logs, the radiocarbon database and eolian sediment transport data. Databases are accessed through interactive maps.

[http://gsc.nrcan.gc.ca/prod\\_e.php](http://gsc.nrcan.gc.ca/prod_e.php)

## **2. Cryospheric Databases**

The Global Terrestrial Network for Permafrost (GTN-P) was established in 1999 by the International Permafrost Association under the Global Climate Observing System of the World Meteorological Organization. The GTN-P is an international network of permafrost observatories designed to provide long-term field observations of active layer and permafrost thermal state. These observations are essential for the evaluation of current permafrost conditions, detection of the terrestrial climate signal in permafrost and its spatial and temporal variability and for the development and validation of climate change models. The Geological Survey of Canada hosts the GTN-P web site and the data management node for the thermal monitoring component.

[http://www.gtnp.org/index\\_e.html](http://www.gtnp.org/index_e.html)

## **3. Ground temperature database for northern Canada**

Publicly available data from published and unpublished sources have been compiled to produce a summary ground temperature database for northern Canada. The majority of the sites in this database are inactive, i.e. there is no ongoing monitoring of ground temperature. Investigations at the sites were undertaken for resource exploration, geotechnical investigations, and scientific research purposes. This database builds upon an unpublished ground temperature database for northern Canada originally developed at the Geological Survey of Canada in the mid 1980s by Young and Judge (1985).

[http://geoscan.ess.nrcan.gc.ca/cgi-](http://geoscan.ess.nrcan.gc.ca/cgi-bin/starfinder/0?path=geoscan.fl&id=fastlink&pass=&format=FLFULL&search=REPNO=3954)

[bin/starfinder/0?path=geoscan.fl&id=fastlink&pass=&format=FLFULL&search=REPNO=3954](http://geoscan.ess.nrcan.gc.ca/cgi-bin/starfinder/0?path=geoscan.fl&id=fastlink&pass=&format=FLFULL&search=REPNO=3954)

[http://gsc.nrcan.gc.ca/permafrost/database\\_e.php](http://gsc.nrcan.gc.ca/permafrost/database_e.php)

## **4. Permafrost Thickness Database**

Publicly available information from published and unpublished sources has been compiled to produce a database of permafrost thickness, distribution and related conditions for northern Canada. The majority of sites in this database are inactive, i.e. there is no ongoing monitoring of permafrost conditions.

Investigations at the sites were undertaken for resource exploration, geotechnical investigations, and scientific research purposes. The database builds upon an unpublished permafrost database for the Canadian permafrost region that was originally developed at the Geological Survey of Canada in the mid 1980s by Young and Judge (1986) and complements the summary ground temperature database for northern Canada (Smith and Burgess, 2000).

[http://geoscan.ess.nrcan.gc.ca/cgi-](http://geoscan.ess.nrcan.gc.ca/cgi-bin/starfinder/0?path=geoscan.fl&id=fastlink&pass=&format=FLFULL&search=REPNO=4173)

[bin/starfinder/0?path=geoscan.fl&id=fastlink&pass=&format=FLFULL&search=REPNO=4173](http://geoscan.ess.nrcan.gc.ca/cgi-bin/starfinder/0?path=geoscan.fl&id=fastlink&pass=&format=FLFULL&search=REPNO=4173)

[http://gsc.nrcan.gc.ca/permafrost/database\\_e.php](http://gsc.nrcan.gc.ca/permafrost/database_e.php)

## **5. CRYSYS (Cryospheric System in Canada)**

CRYSYS is a specialized research group studying the Canadian cryosphere, which includes snow, glaciers, permafrost and lake and sea ice. Information on the state of the Canadian cryosphere is required for supporting the climate change research community, for development and validation of climate and hydrological models and for the making of operational and policy decisions by government. Maps and imagery showing snow cover distribution, sea ice extent and other aspects of the cryosphere may be accessed through the State of the Canadian Cryosphere section of the CRYSYS web site. The Canadian Cryospheric Information Network (CCIN) is currently under development and will act as a central archive and distribution node for Canadian cryospheric data.

<http://www.crysys.uwaterloo.ca/>

## **XXII. Geospatial (John Broome)**

### **1. Geospatial data initiatives**

Data initiatives in Canada are progressing along the path established over the past several years. The federal government has initiated a number of programs to enhance the quality and accuracy of geographic information being captured. Using Global Positioning System (GPS) technology, the digital representation of the major Canadian road network is being updated. Supplemented by similar efforts among provincial and municipal governments as well as private industry, the enhanced representation of the road network is supporting the adjustment of other geographic entities, particularly administrative boundaries that use the network in their definitions.

There have been efforts at all levels of government and in the private industry to document datasets through standard metadata templates. These templates significantly enhance the ability to find data

through data discovery portals. One example is the increased number of datasets that can be discovered and downloaded through the GeoGratis program.

Canadian geospatial data standards and approaches to the discovery and manipulation of data using distributed on-line services are synchronized with the ISO TC211 and Open GIS Consortium (OGS) standards (OGIS). The Canadian government and many Canadian private companies now actively participate in these international and industry standards organizations ensuring Canadian contribution and compliance to these evolving standards.

<http://geogratias.cgdi.gc.ca>

## **2. GeoGratis**

GeoGratis is a portal provided by the Earth Sciences Sector (ESS) of Natural Resources Canada (NRCAN) which provides geospatial data at no cost and without restrictions via your Web browser.

The data will be useful whether you're a novice who needs a geographic map for a presentation, or an expert who wants to overlay a vector layer of digital data on a classified multiband image, with a digital elevation model as a backdrop.

The geospatial data are grouped in collections and are compatible with the most popular geographic information systems (GIS), with image analysis systems and the graphics applications of editing software.

<http://geogratias.cgdi.gc.ca/geogratias/en/index.html>

## **3. The Atlas of Canada**

The Atlas of Canada provides authoritative, current and accessible geographic information products at a national level. Working with partners, the Atlas facilitates the integration and analysis of diverse data in order to increase overall knowledge about Canada.

<http://atlas.nrcan.gc.ca/site/english/index.html>

## **4. CanTopo**

CanTopo is the new generation of topographic maps being produced by NRCAN. This digital cartographic product originates from the best available data sources covering the Canadian territory and offers a quality cartographic product in vector and raster format that complies with international geomatics standards.

CanTopo is a multi-source product generated from the CDB described in the document Cartographic Data Base: Data Product Specifications. Data within the CDB comes mainly from the GeoBase initiative ([www.geobase.ca](http://www.geobase.ca)), NRCAN digital topographic data and data from national initiatives. Data from authoritative sources, such as other government agencies both federal and provincial, are identified, stored, and used.

<http://geogratias.cgdi.gc.ca/geogratias/en/product/search.do?id=A6291EF5-F3FC-A29F-3162-DE4DB19>

## **5. CanMatrix (Print Ready) – Digital Topographic Maps of Canada**

CanMatrix - Print Ready files were produced from topographic maps published by the Government of Canada, and correspond to the National Topographic System (NTS) grid at 1:50 000 and 1:250 000 scales. CanMatrix - Print Ready files contains all of the information shown on the front of the topographic map, and are suitable for high-quality hardcopy printing.

The data in the CanMatrix - Print Ready files come from polychrome or monochrome maps or photomaps. The cartographic legend for the monochrome and photomap product can be found on the front of the map, the cartographic legend for the polychrome map is available in a separated file..

<http://geogratias.cgdi.gc.ca/geogratias/en/product/search.do?id=CB864DC7-25A1-5136-57F4-C095CE1>

## **6. CanVec**

CanVec is a digital cartographic reference product produced by Natural Resources Canada. CanVec originates from the best available data sources covering Canadian territory and offers quality topographic information in vector format that complies with international geomatics standards.

CanVec is a multi-source product coming mainly from the National Topographic Data Base (NTDB), the GeoBase initiative ([www.geobase.ca](http://www.geobase.ca)) and the data update using Landsat 7 imagery coverage. CanVec product contains more than 90 topographic entities thematically organized into 11 distribution themes:

Administrative Boundaries, Buildings and Structures, Energy, Hydrography, Industrial and Commercial Areas, Places of Interest, Relief and Landforms, Toponymy, Transportation, Vegetation and Water Saturated Soils.

CanVec aims to have standardized and actualized representation of topographic phenomenon for the entire Canadian landmass. Various topographic entities coming mainly from the NTDB are not up to date. These entities are included in CanVec product only to answer topographic reference needs.

The CanVec product will be maintained in partnership with the organizations providing the data.

CanVec is scheduled to be published by edition (or release) twice a year. The CanVec product is free and is distributed via GeoGratis portal (<http://www.GeoGratis.gc.ca>) in output file formats GML (Geography Markup Language) and ESRI Shapefile.

<http://geogratis.cgdi.gc.ca/geogratis/en/product/search.do?id=5460AA9D-54CD-8349-C95E-1A4D031>

## **7. National Topographic Data Base (NTDB)**

This collection is static now. Actual users of the National Topographic Data Base (NTDB) should plan to make the transition towards CanVec product. The National Topographic Data Base (NTDB) comprises digital vector data sets that cover the entire Canadian landmass. Geomatics Canada has digitized and structured thousands of topographic maps, creating a complete and uniform product that can be highly useful in a broad range of industries. The NTDB includes features such as watercourses, urban areas, railways, roads, vegetation, and relief.

The organizational unit for the NTDB is the National Topographic System (NTS), based on the North American Datum of 1983 (NAD83). Each file (data set) consists of one NTS unit at either the 1:50,000 or 1:250,000 scale. Furthermore, the data is now available by themes within a file. The ground data is depicted through points, lines, and areas.

<http://geogratis.cgdi.gc.ca/geogratis/en/product/search.do?id=F3D83500-2564-D61E-4F37-FEF860E6DDC0>

## **XXIII. Health Sciences (Mary Zborowski)**

### **1. CARTaGENE**

The CARTaGENE project is headed by Professor Bartha Maria Knoppers, under the scientific direction of Dr. Claude Laberge together with Dr. Paul Burton and Dr. Isabel Fortier. CARTaGENE also benefits from the expertise of an international scientific advisory board. CARTaGENE is a founding member of P<sup>3</sup>G (Public Population Project in Genomics).

Entirely publicly funded, CARTaGENE will be an infrastructure for populations genomics research. This resource could therefore contribute to the development of better diagnosis, treatment and prevention programs for disease.

CARTaGENE seeks to create a resource for the advancement of genetic research, with the aim of improving the health of Quebecers. This public resource will operate under a governance framework and will consist of a databank and a biobank. CARTaGENE will contain environmental, demographic and health data. Its biobank will contain DNA and blood and urine samples.

Access to CARTaGENE will be granted to researchers who are seeking to better understand how genes interact with other genes, with the environment and with lifestyle factors.

<http://www.cartagene.gc.ca/accueil/index.asp?!=e>

### **2. IRIS - Québec (Infostructure de Recherche Intégrée en Santé)**

Currently, for both clinical and health research, researchers must consult vast sets of administrative and clinical data. The multiple steps required to retrieve all the relevant data results in significant delays and inevitably leading to an increase in costs. Moreover, each new project often requires a repetition of these same steps.

One of the objectives of IRIS-Québec is to facilitate access to complete information thereby eliminating

several of the factors which slow down the research process. The infrastructure will make it possible to automate the process of acquiring and storing data from the various sources allowing researchers more direct access. Most importantly, new technologies will be used to ensure that information is obtained using a process that conforms to current ethical standards while ensuring the privacy, confidentiality, and security of personal health information.

IRIS-Quebec is implementing a plan of action that includes three features:

- deployment of a complete and integrated infrastructure;
- creation of a powerful and user-friendly "query" database;
- the development of electronic patients records which will be used both for clinical and research purposes.

[http://www.iris-quebec.ca/pages\\_e/project\\_general.htm](http://www.iris-quebec.ca/pages_e/project_general.htm)

### **3. Population Health and Learning Observatory**

Through an investment from the Canada Foundation for Innovation and the BC Ministry of Advanced Education, the Population Health and Learning Observatory (PHLO) was established to set up a hub for cross-sectoral, longitudinal, population-wide research. In terms of data resources, PHLO seeks, in concert with its Partners and Collaborators, to hold population-wide individual-level data, to develop linkages among these data, and to support research access to these data.

British Columbia is in a unique position internationally to create a powerful hub for population health and related research.

- Through the BC Linked Health Database's 15+ years experience in successfully linking health services data and providing access to data in a privacy-sensitive manner to the research community, a clear proof of concept exists for storing sensitive data and providing researcher access to these data.
- BC's population is large enough that population-wide data can facilitate comparisons of the experience of different population groups, defined for example by age, sex, geography, and income.
- BC was an early investor in population-wide data collection, such as PharmaNet (since 1996) which tracks all prescription drugs dispensed in the province, and the Early Development Instrument (since 1999) which is a measure of child school readiness.
- BC is home to nationally and internationally recognized population health researchers such as Clyde Hertzman, Morris Barer and Bob Evans.

<http://www.phlo.ubc.ca/>

## **XXIV. Materials Property Data (Mary Zborowski)**

## **XXV. Meteorology (Tsoi Yip)**

### **1. Weather data in Canada**

Real-time weather data and information in Canada

[http://www.weatheroffice.gc.ca/canada\\_e.html](http://www.weatheroffice.gc.ca/canada_e.html)

### **2. Historical weather and climate data in Canada**

The National Climate Data and Information Archive, operated and maintained by Environment Canada, contains official climate and weather observations for Canada.

Direct access to climate and weather values in the database is available at Climate Data Online. Use this area to find out what the weather was like on a particular day, for a month, or for a whole year.

New... download data files in CSV or XML format, and try the new customizable charts from the navigation options at the bottom of the daily data page.

The Canadian Climate Normals contain averages and extremes for nearly 1,500 locations across Canada. Use this area to find out about the conditions usually found at a location at different times of the year.

[http://www.climate.weatheroffice.ec.gc.ca/climateData/canada\\_e.html](http://www.climate.weatheroffice.ec.gc.ca/climateData/canada_e.html)

## **XXVI. Oceanography (Robert Branton)**

### **1. OBIS Canada**

OBIS Canada promotes the exploration of biodiversity in Canada's three oceans as well provides marine species data to the International Ocean Biogeographic Information System (OBIS), which is an international federation of organizations and people sharing a vision to make marine biodiversity information freely available on the internet. OBIS is also the data management component of International Census of Marine Life, while OBIS Canada is the data management component of the Canadian Centre for Marine Biodiversity. The goals of OBIS Canada are to provide Canadian marine species information that is: Authoritative - describing specimens using reliable species names and hierarchical classifications; Discoverable - listing data collections and their characteristics in a searchable catalogue system; Accessible - serving data as part of a global geo-referenced ocean information system on marine species; and Interoperable - visualizing and analyzing data from several different sources and disciplines. OBIS Canada carries out all of its work with the help of a Steering Committee, an Implementation Team, and a number of other individuals and organizations.

<http://www.marinebiodiversity.ca/OBISCanada>

### **2. Integrated Science Data Management (ISDM)**

Integrated Science Data Management - ISDM (Ottawa, Ontario, Canada) is a branch of Canada's federal Department of Fisheries and Oceans (DFO) and is the lead organization for archival and dissemination of oceanographic data. In addition to the archival of ocean data collected by DFO programs. Furthermore, ISDM acquires and archives a variety of oceanographic data distributed via GTS, and is the designated archival centre for many of these data. MEDS also acquires through international exchange programs data from programs conducted in ocean areas adjacent to Canada. ISDM is in the process of making its data holdings available on the web, and currently maintains the site for the Atlantic Zone Monitoring Program (<http://www.meds-sdmm.dfo-mpo.gc.ca/zmp/>) which provides near real-time observations for a number of fixed stations and standard sections on the East Coast of Canada as well as a number of long term climatological time series.

In addition to the national data centre, the individual regions also maintain large data holdings and data products specific to their own needs. If ISDM does not have the required information, they will refer enquiries to the appropriate organization below.

[http://www.meds-sdmm.dfo-mpo.gc.ca/meds/home\\_e.htm](http://www.meds-sdmm.dfo-mpo.gc.ca/meds/home_e.htm)

### **3. The Northwest Atlantic Fisheries Centre**

(St. John's, Newfoundland, Canada) provides a number of oceanographic data products and databases as well as data products from individual research programs, including T/S profiles, moored current meter and thermograph time series, and moored and vessel mounted Acoustic Doppler Current Profiler (ADCP) data.

<http://www.aquatic.uoguelph.ca/Human/Research/Webresearchinst/East/NorthwestAFC/nafc.htm>

### **4. Bedford Institute of Oceanography**

The Ocean Science Division provides a number of oceanographic data products and databases as well as data products from individual research programs. Among the databases are Climate (500,000) TS profiles for the NW Atlantic), SST (AVHRR sea surface temperatures since 1981 for the NW Atlantic) and ODI (inventory and monthly time series statistics for moorings of current meters, thermographs and water level gauges in the NW Atlantic). Information and access to these databases are available. [http://www.mar.dfo-mpo.gc.ca/science/ocean/database/data\\_query.html](http://www.mar.dfo-mpo.gc.ca/science/ocean/database/data_query.html)

### **5. Maurice Lamontagne Institute (Mont-Joli, Quebec, Canada)**

The St. Lawrence Observatory provides a number of oceanographic data products specific to the Gulf of St. Lawrence and Estuary. Products include both observational and remotely sensed temperatures, water levels, and numerical models.

<http://www.osl.gc.ca/en/>

### **6. The Institute of Ocean Sciences - Patricia Bay, BC**

The Ocean Science and Productivity Division provides a number of data products including sections from Line P and real-time air and sea temperature, winds, and barometric pressure from an array of buoys off the British Columbia coast.

[http://www-sci.pac.dfo-mpo.gc.ca/sci/facilities/ios\\_e.htm](http://www-sci.pac.dfo-mpo.gc.ca/sci/facilities/ios_e.htm)

### **7. Neptune Canada - North-East Pacific Time-series Undersea Networked Experiments**

The NEPTUNE Canada project (managed by a consortium of 12 Canadian Universities) has laid an 800 km network of electro-optic cable on the seabed over the northern part of the Juan de Fuca tectonic plate, a 200,000 sq km region in the northeast Pacific off the coasts of British Columbia, Washington and Oregon. This tectonic plate is the smallest of the dozen major plates that make up the planet's surface and offers a full range of Earth and ocean processes for us to observe.

The NEPTUNE Canada cable network will feature five or six seafloor "laboratories", or nodes. Through these nodes, land-based scientists will control and monitor sampling instruments, video cameras and remotely operated vehicles as they collect data from the ocean surface to under the seafloor. Instruments will be interactive—scientists will instruct them to respond to events such as storms, plankton blooms, fish migrations, earthquakes, tsunamis, and underwater volcanic eruptions, as they happen.

<http://www.neptunecanada.ca/about-neptune-canada/dmas/>

### **8. VENUS - Victoria Experimental Network Under the Sea**

The VENUS (Victoria Experimental Network Under the Sea) project offers a new way of studying the ocean. VENUS makes use of Internet and telecommunications technology to create a permanent link to monitoring instruments on the seafloor. This gives scientists and the public an ongoing way of monitoring the ocean environment. VENUS delivers real time information from the seafloor via fibre optic cables connected to instruments to the University of Victoria, BC, where they are archived. The primary function of the VENUS observatory and its website is to deliver data, data products, and imagery to both the public and scientific communities to facilitate ocean research.

<http://www.venus.uvic.ca/index.php>

### **9. Ocean Tracking Network (OTN)**

OTN is a global conservation project headquartered at Dalhousie University in Halifax Nova Scotia and a pilot project of the Global Ocean Observing System (GOOS), the marine component of the Global Earth Observing System (GEOS). OTN's main objective is to unite physical oceanographers and animal trackers on a global scale thereby aiding researchers in their ability to examine changes in animal movement and distribution, behaviour and survival rates, as well as relating these parameters to the changing ocean environment. OTN uses both archival tags on the exterior of larger marine animals like sharks or seals and acoustic tags surgically implanted into smaller animals like salmon or crustaceans. Archival tags send data to satellites in space whereas acoustic tags send data to receivers on the ocean floor. Acoustic data is then either collected by recovering the receiver or by downloading to a research vessel using an acoustic modem. Other downloading alternatives being developed include: subsea gliders, business card tagged animals and cabled observatories. All OTN data regardless of how it is collected are to be stored in a central database at Dalhousie University and from there become publicly and freely available on the Internet.

<http://www.oceantrackingnetwork.org>

## **XXVII. Oceanography, Hydrology (Mary Zborowski)**

## **XXVIII. Physics (Mary Zborowski)**

## **XXIX. Thermodynamics (James Sangster)**

### **1. FactSage**

FactSage is a fully integrated Canadian thermochemical database system which couples proven software with self-consistent critically assessed thermodynamic data. It currently contains data on over 5000 chemical substances as well as solution databases representing over 1000 non-ideal multicomponent solutions (oxides, salts, sulfides, alloys, aqueous, etc.). FactSage is available for use with Windows.

<http://www.crct.polymtl.ca>

<http://www.factsage.com>

## 2. NEA Thermochemical Database Project on Tin

Dr. James Sangster is a member of an international team of chemists evaluating thermodynamic data of tin compounds. This is part of a larger ongoing critical review of relevant data, sponsored by the Nuclear Energy Agency (OECD), for the proper design of radioactive waste disposal methods.

(James.Sangster@polymtl.ca)

<http://www.nea.fr/html/dbtdb>

### XXX. Water Quantity (Tsoi Yip)

#### 1. National Water Data Archive (HYDAT/HYDEX Database)

Surface water quantity data has been collected and archived in Canada since the middle of the nineteenth century. Beginning in 1908 this data has been published in a variety of printed formats. Since 1991, most of this data has been available on CD-ROM which has replaced hardcopy data publications.

Cooperative undertakings with other government and non-government agencies have been, and remain, an important part of the activities of Environment Canada's water monitoring and data collection. The main instruments for this purpose are agreements with each province and territory for the cost sharing of water quantity surveys. Leadership is provided by Environment Canada in developing technology, methods and standards while data have been exchanged and stream-gauging operations have been facilitated by the assistance and funding received from numerous organizations.

Much of the information about and data from the water monitoring network resides in centrally managed archive databases residing with the Meteorological Service of Canada in Downsview, Ontario. This information is sent to Downsview from the eight regional offices which collect and compile the basic data.

HYDEX is a relational database that contains inventory information on the various streamflow, water level, and sediment stations (both active and discontinued) in Canada. This database contains information about the stations themselves such as; location, equipment, and type(s) of data collected.

HYDAT is a relational database that contains the actual computed data for the stations listed in HYDEX. These data include: daily and monthly means of flow, water levels and sediment concentrations (for sediment sites). For some sites, peaks and extremes are also recorded. The data are collected by the regional offices and updated in the national database once per year. This update generally occurs in the mid-summer for the previous year (e.g. summer 1996 for 1995 data). Each year, a CD-ROM of selected hydrometric data in Canada is produced and is up-to-date to the previous year.

Lily Fung, Technical Support and Client Services, HYDEX/HYDAT Database, (416) 739-4441

(Lily.Fung@ec.gc.ca)

[http://www.wsc.ec.gc.ca/products/hydat/main\\_e.cfm?cname=archive\\_e.cfm](http://www.wsc.ec.gc.ca/products/hydat/main_e.cfm?cname=archive_e.cfm)

### XXXI. Canadian National Committee for CODATA

The Committee continued to meet annually during this biennium under the sponsorship of the Canada Institute for Scientific and Technical Information (NRC-CISTI). Dr. Robert Marriott, Mr. Glen Newton, Mr. Ernie Boyko and Mr. Bob Branton joined as new members and Ms Jennifer Sokol, Dr. Benoît Pirenne and Ms Wendy Watkins joined as observers. Membership, along with rapporteur responsibilities for this report, is shown in the following table:

Chair	Rapporteur - Section	Email address
Mr. John Broome	Geoscience; Geospatial	broome@nrcan.gc.ca
<b>Members</b>		
Dr. Gisele Amow		gisele.amow@nrc-cnrc.gc.ca
Dr. Christian Blouin	Biology – Genetics; Biology – Genomics, Proteomics; Biomedecine	cblouin@cs.dal.ca
Mr. Robert Branton	Oceanography	rmbranton@dal.ca
Prof. Roxane de la	Behavioural Sciences	roxane.de.la.sablonniere@umontreal.ca

Sablonnière		
Dr. Robert Marriott		rob.marriott@ucalgary.ca
Mr. Glen Newton	Biology – Ecology	netong@acm.org
Dr. Michel Sabourin (ex officio)		michel.sabourin@umontreal.ca
Dr. James Sangster	Thermodynamics	james.Sangster@polymtl.ca
Ms Tsoi Yip	Climatology; Environment; Meteorology; Water Quantity	tsoi.yip@ec.gc.ca
Dr. Gordon Wood (ex officio)		gordon-wood@sympatico.ca
<b>Observers</b>		
Dr. Paul Budkewitsch	Geology; Geomagnetism; Geophysics	paul.budkewitsch@ccrs.nrcan.gc.ca
Mr. Chuck Humphrey		chuck.humphrey@ualberta.ca
Dr. Alexander M. Jablonski		alexander.jablonski@drdc-rddc.gc.ca
Dr. John R. Manuel	Aerospace	john.manuel@space.gc.ca
Dr. Benoît Pirene		bpirene@uvic.ca
Ms Jennifer Sokol		jennifer.sokol@nrcan-rncan.gc.ca
Ms Wendy Watkins		wendy_watkins@carleton.ca
<b>Secretariat</b>		
Ms Mary Zborowski (Executive Secretary)	Astrophysics; Biology – Informatics; Biology – Taxonomy; Chemistry; Crystallography; Forestry; Geoscience – Environment, Hazards; Health Sciences; Materials Property Data; Oceanography, Hydrology; Physics	mary.zborowski@nrc-cnrc.gc.ca

The Committee continued its responsibility for distributing the CODATA Newsletter to over 300 addresses in Canada. NRC-CISTI (<http://cisti-icist.nrc-cnrc.gc.ca>), as the Secretariat for the Committee, has the distinction of hosting the main web site for CODATA (<http://www.codata.org/>) which links to all the other CODATA activities world wide and includes electronic versions of the Newsletter, Handbook, various reports, etc.