

Report on Data Activities in Canada 2006

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

The following report on data activities in Canada was prepared in conjunction with the 25th General Assembly of CODATA¹ at Beijing, China in October 2006. To obtain further details on individual items or to submit information on other Canadian data activities for inclusion in the next report (September 2008) please contact:

Le rapport ci-joint, qui fait état des activités du Canada en matière de données, a été préparé conjointement avec la 25^e assemblée générale de CODATA, à Beijing, Chine, en octobre 2006. 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 2008), veuillez communiquer avec:

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

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CONTENTS

I.	Aerospace (A. Jablonski)	Page 1
II.	Astrophysics (H. Dabkowska)	Page 3
III.	Biology (Archived Entry)	Page 4
IV.	Biology – Ecology (G. Newton)	Page 5
V.	Biology – Genetics (D. Clark)	Page 7
VI.	Biology – Genomics, Proteomics (D. Clark)	Page 8
VII.	Biology – Taxonomy (G. Baillargeon) 11	Page
VIII.	Biomedicine (D. Clark) 11	Page
IX.	Chemistry (G. Amow) 12	Page
X.	Climatology (T. Yip) 13	Page
XI.	Crystallography (G. Amow) 14	Page
XII.	Environment (T. Yip) 14	Page
XIII.	Geomagnetics (Archived Entry) 19	Page
XIV.	Geoscience – Environment, Hazards (S. Smith) 19	Page
XV.	Geospacial (P. Budkewisch) 20	Page
XVI.	Oceanography (Archived Entry) 20	Page

XVII.	Thermodynamics (J. Sangster) 21	Page
XVIII.	Water Quantity (T. Yip) 22	Page
XIX.	Canadian National Committee for CODATA 23	Page

25th General Assembly of CODATA, China, October 2006

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 in Section XIX.

I. **Aerospace** (A. Jablonski)

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, space environment, atmospheric environment, space life sciences, microgravity sciences and planetary exploitation. 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 (CISSET) advises both NRC and CSA on COSPAR issues. Communication between the CNC/COSPAR, and NRC is managed by the NRC's International Relations Office. The CNC is made up 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)
- The 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 <http://www.space.gc.ca>.

CSA has published a 2000 COSPAR Report entitled Space Science Research in Canada 1998-1999, ed. T. Hughes and A.M. Jablonski, Ottawa 2000. This report presents a cross-section of space research activities in Canada.

<http://www.space.gc.ca>

2. **Space astronomy**

The Canadian Astronomy Data Center (CADC) established in 1984 collects data from the Hubble Space Telescope (HST) and an innovative way of presenting raw and also calibrated files has been developed and is widely used.

<http://cadcwww.hia.nrc.ca/>

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-ira.nrc-cnrc.gc.ca/>

4. Space environment

The Canadian Auroral Network for the OPEN Program Unified Study (CANOPUS) is a network of automatic data collection stations located in west central Canada. CANOPUS was designed as an integrated part of the Global Geospace Science Mission (CGS) organized by NASA as part of the International Solar-Terrestrial Physics Program (ISTP). CANOPUS web site is supported by the CSA and is <http://www.space.gc.ca/asc/eng/sciences/canopus.asp> and serves the Canadian and international space physics communities.

Natural Resources Canada is one of the Government departments collaborating closely with the CSA in the area of the space environment. Both agencies support a newly developed web site on space weather: <http://www.spaceweather.ca>. This web site has been developed and is maintained by the Geophysical Laboratory, Geological Survey of Canada.

Canada also participates in the international Super Dual Auroral Radar Network (SuperDARN). Substantial funding has been provided for SuperDARN by Canada (NSERC, CSA), the United States, France, Great Britain, Japan, South Africa, Australia, and Italy. The Institute of Space and Atmospheric Sciences, University of Saskatchewan team controls the Saskatoon radar, whose partner is U.S.-run radar at Kapuskasing, Ontario, Canada. The Canadian SuperDARN database is available at the web site: <http://radar2.usask.ca/about.html>

5. Atmospheric Environment

Canadian instrument WINDII (Wind Imaging Interferometer) data are archived at the NASA Goddard Distributed Active Archive Center (DAAC) at <http://disc.sci.gsfc.nasa.gov/data/dataset/UARS/WINDII/> WINDII was launched on NASA's Upper Atmosphere Research Satellite (UARS) on September 12, 1991 and is still operating on orbit. It is a joint project supported by the Canadian space Agency (CSA) and the Centre National d'Etudes Spatiales of France (CNES). WINDII is a field-widened, thermally stabilized, phase-stepping, Doppler Michelson interferometer. Vertical profiles of the atmosphere are viewed at the limb with a CCD camera placed behind the interferometer.

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 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 μm and 4.7 μm , it measures carbon monoxide (CO) and methane (CH_4) in the troposphere using both thermal emission and solar reflection techniques.

The Canadian instrument OSIRIS (Optical Spectrograph Infrared Imaging System) was launched on the Swedish Odin spacecraft on February 28, 2001. OSIRIS is an infrared imager to measure the oxygen infrared atmospheric bands. The tomographic analysis will also provide global information on airglow structures that are related to gravity waves and turbulence processes. OSIRIS data are not publicly available at the moment. <http://daac.gsfc.nasa.gov/data/dataset/UARS/>

6. Space technologies

The Canadian space Agency's technology development programs support Canadian industry in developing specific niche technologies, establishing links with foreign firms and assessing international markets. Information about these programs is available at CSA's web site: <http://www.space.gc.ca>

7. Space 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://ice-glaces.ec.gc.ca/App/WsvPageDsp.cfm?ID=1&Lang=eng&Clear=true>), 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.space.gc.ca>.

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://www.nrcan.gc.ca/cfs/index_e.html) 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)

Global Observation of Forest Cover (GOFC) is a CEOS IGOS project led by Canada (http://ccrs.nrcan.gc.ca/org/programs/gofc_e.php) 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 Cryspheric 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) (http://www.msc-smc.ec.gc.ca/index_e.cfm). 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://www.pc.gc.ca/index_e.asp) This is a fully automated system to collect continuous, remote CO₂ 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.

II. Astrophysics (H. Dabkowska)

1. Canadian Astronomy Data Center (CADC)

The Canadian Astronomy Data Centre (CADC) continues to be the role model in data activities in astronomy. It was established in 1984, and successfully handles the data produced by Canadian astronomers, facilitating the exchange of raw and re-calibrated data.

For data from the Hubble Space Telescope (hst) an innovative way of presenting raw and calibrated files

was developed and is widely used.

The other accessible data collections are:

- i) Canada-France-Hawaii Telescope (CFHT) archive
- ii) James Clerk Maxwell Telescope (JCMT) archive
- iii) Digital Sky Survey (more than 300 CDs)
- iv) IRAS HCON (Infrared Sky Atlas)
- v) and the Canadian Galactic Plane Survey (on 4 CDs).

To further international collaboration, the CADC web site offers easy access to astronomical data from other countries.

<http://cadcwww.hia.nrc.ca/>

III. Biology (Archived Entry)

1. Organelle Genome Database (GOBASE)

GOBASE is a taxonomically broad organelle genome database that organizes and integrates diverse data related to organelles. The current version focuses on the mitochondrial subset of data.

<http://megasun.bch.umontreal.ca/gobase/gobase.html>

2. 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.usda.gov/>

3. 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.

<http://sis.agr.gc.ca/brd/ccc/>

4. 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 isoates 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.

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

5. Cystic Fibrosis Mutation Database

The information contained in this database is compiled with information collected by the Cystic fibrosis Genetic Analysis Consortium.

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

6. The Androgen receptor mutations database WWW Server

This resource contains a database of Androgen Receptor gene mutation, mutation maps and links to the references and the related EMBL site.

<http://ww2.mcgill.ca/androgendb/>

7. Canadian Bioinformatics Resource (CBR)

CBR is a national facility dedicated to providing Canadian researchers with convenient, effective access to biotechnology-related databases and bioinformatics software tools. CBR is the national EMBnet (European Molecular Biology Network) node for Canada and a member of Asia Pacific Bionet. Not only does CBR provide access to over 70 databases, it offers a complete set of software tools.

<http://cbr-rbc.nrc-cnrc.gc.ca/>

8. 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/>

9. Sulfolobus Solfataricus Genome Data

The Sulfolobus solfataricus genome-sequencing project, a collaboration among seven laboratories worldwide: three Canadian (W. Ford Doolittle, Dalhousie University; Robert Charlebois, University of Ottawa; Mark Ragan, NRC-IMB) and four European (Roger Garrett, University of Copenhagen; John van der Oost, Wageningen Agricultural University; Michel Dugué, Université Paris-Sud; Ib Groot Clausen, Novo Nordisk, Copenhagen) has been completely finished.

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

10. Organelle Genome Megasequencing Program (OGMP)

The OGMP is an interdisciplinary collaboration of seven Canadian research groups from Eastern Canada, each of which is interested in molecular evolution, mainly focusing on mitochondria, plastids and bacteria. This collaborative project, supported by the Canadian Genome Analysis and Technology Program (CGAT), concentrates on organelle phylogeny and includes the establishment of a centralized sequencing facility (the Megasequencing Unit) that serves as the major research hub. The "Megasequencing Unit" is located at the University of Montreal. The OGMP bioinformatics division is responsible for the data handling and analysis. The sequences of mitochondrial genomes from the "Megasequencing Unit" will be made available to the scientific community through GenBank and GOBASE.

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

11. Fungal Mitochondrial Genome Project (FMGP)

FMGP, a project of B. B. Lang's research group (Department of Biochemistry, University of Montreal), is supported by the Medical Research Council of Canada (MRC). The goal of the FMGP is to sequence complete mitochondrial genomes from all major fungal lineages, to resolve the fungal branch of the 'tree of life' and to investigate mitochondrial gene expression, introns and mobile elements. The web pages of the FMGP include extensive information on subjects such as general organismal information, gene map, complete sequence, phylogeny, etc.

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

IV. Biology – Ecology (G. Newton)

1. Genome Database (GDB)

The Genome Database was established at John 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. Wilson Disease Mutation Database

The Wilson Disease Mutation Database is a database collected by Susan Kenney and Dr. Diane W. Cox at the Department of Medical Genetics, University of Alberta.

<http://www.uofa-medical-genetics.org/wilson/index.php>

7. 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/>

8. 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

9. 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

10. 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>

11. 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

12. 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

13. Pesticide, Herbicide, Metal Contaminants, Synergistic Toxicity in Soil Database

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

V. Biology – Genetics (D. Clark)

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

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/>

VI. Biology – Genomics, Proteomics (D. Clark)

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 (eg. 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.

<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

BioGRID 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. Sinorhizobium meliloti strain 1021 Genome Project

An international consortium, including investigators from McMaster University, has completed the sequence of the three replicons comprising the genome of *Sinorhizobium meliloti*, one of the best known nitrogen-fixing bacteria.

<http://histone.toulouse.inra.fr/bioinfo/annotation/iANT/bacteria/rhime/index.html>

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://megasun.bch.umontreal.ca/gobase/>

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* GFP:promoter 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. Canadian Bioinformatics Resource (CBR)

CBR provides the research community with free, registered access to a wide variety of bioinformatics tools and databases. Computer servers provide high speed searches of genome sequence databases using BLAST and many other search tools. CBR serves as a Canadian mirror site for many international bioinformatics resources. Terminated as of September 30, 2005, but the website is still active and providing some services during the transition.

http://cbr-rbc.nrc-cnrc.gc.ca/index_e.php

17. The 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>

18. Fungal Mitochondrial Genome(FMGP)

FMGP is a project of B. Franz Lang's research group. It is supported by Joyce Longcore, M. Mollicone and Donald Barr, who 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>

19. 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

20. 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/>

VII. Biology – Taxonomy (G. Baillargeon)

1. 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), 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=plqlt&p_lang=

http://www.cbif.gc.ca/pls/bb/bcin_specs.portal?p_ifx=cbif

2. 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

VIII. Biomedicine (D. Clark)

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

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/fas/intro_en.html

IX. Chemistry (G. Amow)

1. LOGKOW - 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, QC - james.sangster@mail.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, ON
<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, SK - 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 polyaromatic 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, SK - mezey@sask.usask.ca

7. TerraTox™ Data Bases by Terra Base Inc.

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

- ✍ TerraTox™- Explorer - Physico chemical properties and toxicity endpoints for almost 100 species of aquatic and terrestrial organisms and more than 15,000 substances.
- ✍ TerraTox™ - HIV-1 - The HIV-1 database contains well over 5000 individual chemicals with measured anti-HIV-1 data.
- ✍ TerraTox™ - 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™ - 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™ - 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, QC.

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, ON, and Prof. Francine Denizeau, Département de Chimie, Université du Québec à Montréal, QC

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

X. Climatology (T. Yip)

1. The 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

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

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

XI. Crystallography (G. Amow)

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 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, will be available in April 2001.

<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)

XII. Environment (T. 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

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)

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/fluran, metals, SO₂, NO_x, VO_C, O₂, O₃, TSP.

Environment Canada, Atmospheric Environment Branch (william.moores@ec.gc.ca)

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)

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@ec.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

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

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 Downsvew.

Environment Canada, Atmospheric Environment Service
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

18. Forest Bird Monitoring Program

The Ontario Forest Bird Monitoring Program (FBMP) is a volunteer-based 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/birds/trends/disclaimer_e.cfm

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, phyto-benthos 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), *Alosa 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 (see item #25 above).

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>

XIII. Geomagnetism (Archived Entry)

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>

XIV. Geoscience - Environment, Hazards (S. Smith)

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

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://gsc.nrcan.gc.ca/permafrost/database_e.php

The Geological Survey of Canada maintains national permafrost thickness and temperature databases. Permafrost temperature data are available on-line and work is currently underway to make other permafrost related data sets more accessible. These databases provide baseline information that are useful for climate change studies, for planning northern development and for environmental impact assessment.

<http://gsc.nrcan.gc.ca/permafrost/gtnp/>

CRYSYS (Cryospheric System in Canada) 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/>

XV. Geospatial (P. Budkewitsch)

1. Geospatial

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

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.

XVI. Oceanography (Archived Entry)

1. Marine Environmental Data Service (MEDS)

The Marine Environmental Data Service - MEDS (Ottawa, Ontario, Canada) MEDS (http://www.meds-sdmm.dfo-mpo.gc.ca/meds/Home_e.htm) 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, MEDS 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. MEDS 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 MEDS 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

2. 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>

3. 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 at http://www.mar.dfo-mpo.gc.ca/science/ocean/database/data_query.html

4. 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/>

5. 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

XVII. Thermodynamics (J. Sangster)

1. Facility for the Analysis of Chemical Thermodynamics (F*A*C*T)

F*A*C*T 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.). F*A*C*T is available for use with Windows.

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

2. University Research Programs

Prof. A. E. Mather (University of Alberta) measures vapour-liquid equilibria and enthalpies of reaction and solution for acid gases in aqueous solution of polar organic solvents (application in gas purification). He has contributed to the IUPAC Solubility Data Series in compilation and assessment of data for CO₂ in water and non-aqueous systems.

(Alan.Mather@ualberta.ca)

Prof. P. Englezos (University of British Columbia) measures gas hydrate phase equilibria involving methane, CO₂, hydrocarbons and nitrogen. Measurements also include the solubility of calcium carbonate in the presence of absorbed substances.

(engelezos@interchange.ubc.ca)

Prof. P.R. Tremaine (University of Guelph, Ontario) measures thermodynamic and spectroscopic properties of aqueous ions, complexes and non-electrolytes over an extended range of conditions up to and including the near-critical regime. These properties are sensitive to solvation effects and are being used at memorial and elsewhere to develop semi-theoretical "equations of state" for modelling the behaviour of aqueous solutes in systems of geochemical and industrial interest.

(tremaine@uoguelph.ca)

3. 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>

XVIII. Water Quantity (T. 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.

http://www.wsc.ec.gc.ca/products/hydat/main_e.cfm?cname=hydat_e.cfm

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

XIX. 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 (CISTI). Dr. Marc Roussel, Dr. D.R. Fraser Taylor and Ms. Tsoi Yip joined as new members and Dr. Gisele Amow, Mr. John Broome, Dr. Paul Budkewitsch, Prof. Roxanne de la Sablonnière, Mr. Alex Jablonski, Mr. Jean-Paul Lauzon, Dr. John R. Manuel and Dr. Gordon Wood joined as observers. Current membership, along with rapporteur responsibilities for this report, is shown in the following table:

Chairman	Rapporteur - Section	Email address
Prof. Michel Sabourin		michel.sabourin@umontreal.ca
Members		
Dr. Denise Clark	Biology - Genetics, Genomics, Proteomics & Biomedecine	clarkd@unb.ca
Dr. Hanna Dabkowska	Astrophysics	dabkoh@mcmaster.ca
Dr. Marc Roussel		roussel@uleth.ca
Dr. D.R. Fraser Taylor		fraser_taylor@carleton.ca
Ms. Tsoi Yip	Climatology, Environment, Meteorology & Water Quantity	tsoi.yip@ec.gc.ca
Observers & CNC Representatives		
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M. Guy Baillargeon	Biology – Informatics & Taxonomy	baillarg@agr.gc.ca

Mr. John Broome		broome@nrcan.gc.ca
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Mrs. Mary Zborowski (Executive Secretary)		mary.zborowski@nrc-cnrc.gc.ca

The Committee continued its responsibility for distributing the CODATA Newsletter to over 400 addresses in Canada. CISTI, as the Secretariat for the Committee, has the distinction of hosting the main web site for CODATA which links to all the other CODATA activities world wide and includes electronic versions of the Newsletter, Handbook, various reports, etc. <http://www.codata.org/>