



**CANADIAN GEOSPATIAL DATA INFRASTRUCTURE  
INFORMATION PRODUCT 26e**

**Geospatial Data Archiving and Preservation –  
Research and Recommendations Executive Summary**

**GeoConnections  
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**2011**



Natural Resources  
Canada

Ressources naturelles  
Canada

**Canada**

# Executive Summary

## Introduction

This report is written to meet the following objective: conduct research and provide analysis and recommendations on the issue of archiving and preserving CGDI's geospatial data assets, including solutions for perpetual access. The report is based primarily on research of available documents and literature, supplemented by consultations with a primary stakeholder, Library and Archives Canada (LAC). It includes the results of:

- research of legislative requirements for the archiving and preservation of Canada's geospatial data;
- consultation with Library and Archives Canada;
- geospatial data and archiving considerations in Canada's current information management policy;
- an environmental scan of Canadian consultations and reports and Canadian research on digital data archiving and preservation;
- an environmental scan of geospatial data archiving and preservation in Canada and abroad; and
- research of business models for archiving and preservation.

## Research Findings and Analysis

The legislation reviewed illustrates the diversity of types of data, their forms, formats and associated software and systems, how they are managed, the context within which they are created, and how they are considered authentic. The following table summarizes the archiving and preservation obligations inherent in each piece of legislation, as well as any limitations/challenges, relevant to geospatial information.

| Legislation   | Obligations  | Limitations/Challenges   |
|---|--|--|
| <b>Library and Archives of Canada Act</b> (2004, c. 11)         | <ul style="list-style-type: none"><li>• manage data for possible accession</li><li>• no data disposal without written consent</li><li>• submit data collected for the purposes of public opinion research</li><li>• legal deposit of two copies of all publications</li><li>• deposit of data considered to be of documentary heritage</li></ul> | <ul style="list-style-type: none"><li>• how dynamically changing datasets are treated as records</li><li>• treatment of datasets with contributions of multiple producers</li><li>• treatment of dynamic/interactive digital maps created with Web services</li><li>• distributed archiving mechanisms and controls</li><li>• preservation of digital information accessible through Web portals</li></ul> |
| <b>Legal Deposit of Publications Regulations</b> (SOR/2006-337) | <ul style="list-style-type: none"><li>• direction on submission of digital publications</li></ul>  | <ul style="list-style-type: none"><li>•</li></ul>  |

| Legislation  | Obligations   | Limitations/Challenges   |
|--|---|--|
| <b>Copyright Act</b> (R.S., 1985, c. C-42)   | <ul style="list-style-type: none"> <li>data ownership and use rights and responsibilities follow the data into the archive</li> </ul>   | •  |
| <b>Access to Information Act</b> (R.S., 1985, c. A-1)  | <ul style="list-style-type: none"> <li>data access restrictions follow the data into the archive</li> </ul>   | •  |
| <b>Privacy Act</b> (R.S., 1985, c. P-21)   | <ul style="list-style-type: none"> <li>personal information may be disclosed to LAC for archival purposes</li> </ul>  | •  |
| <b>Privacy Regulations</b> (SOR/83-508)  | <ul style="list-style-type: none"> <li>direction on management of personal data when in the Archive</li> </ul>  | <ul style="list-style-type: none"> <li>time limitations on when personal information may be accessed for research or statistical purposes</li> </ul> |
| <b>Personal Information Protection and Electronic Documents Act</b> [2000, c. 5]               | <ul style="list-style-type: none"> <li>unclear</li> </ul>   | •  |
| <b>Canada Evidence Act</b> (R.S., 1985, c. C-5)  | <ul style="list-style-type: none"> <li>establish authenticity of archived data introduced as evidence (solid metadata, change tracking over time, properly operating systems, manage and maintain systems to ensure authenticity of the records they contain – security protocols, access protocols, etc.)</li> </ul> | •  |
| <b>Department of Natural Resources Act</b> (1994, c. 41)                                       | <ul style="list-style-type: none"> <li>create and manage government records, subject to LAC Act provisions</li> </ul>   | •  |
| <b>Resources and Technical Surveys Act</b> (R.S., 1985, c. R-7)                                | <ul style="list-style-type: none"> <li>create and manage government records, subject to LAC Act provisions</li> </ul>   | •  |
| <b>Canada Lands Surveys Act</b> (R.S., 1985, c. L-6)   | <ul style="list-style-type: none"> <li>create and manage government records, subject to LAC Act provisions</li> </ul>   | •  |
| <b>Canada Lands Surveyors Act</b> (1998, c. 14)  | <ul style="list-style-type: none"> <li>create and manage records that may be called into evidence</li> </ul>  | •  |
| <b>Forestry Act</b> (R.S., 1985, c. F-30)  | <ul style="list-style-type: none"> <li>create and manage government records, subject to LAC Act provisions</li> </ul>   | •  |
| <b>Regulations Respecting the Report on the State of Canada's Forests</b> (SOR/95-479)         | <ul style="list-style-type: none"> <li>direction on data requirements for international reporting</li> </ul>  | •  |
| <b>Canada-Newfoundland Atlantic Accord Implementation Act</b> (1987, c. 3)                     | <ul style="list-style-type: none"> <li>create and manage government records, subject to LAC Act provisions</li> <li>create and manage records that may be called into evidence</li> </ul>   | •  |
| <b>Canada-Nova Scotia Offshore Petroleum Resources Accord Implementation Act</b> (1988, c. 28) | <ul style="list-style-type: none"> <li>create and manage government records, subject to LAC Act provisions</li> <li>create and manage records that may be called into evidence</li> </ul>   | •  |
| <b>Canada Oil and Gas Operations Act</b> (R.S., 1985, c. O-7)                                  | <ul style="list-style-type: none"> <li>unclear</li> </ul>   | •  |
| <b>Canada Oil and Gas Geophysical Operations Regulations</b> (SOR/96-117)                      | <ul style="list-style-type: none"> <li>create and manage government records, subject to LAC Act provisions</li> </ul>   | •  |
| <b>Canada Petroleum Resources Act</b> (1985, c. 36 (2nd Supp.))                                | <ul style="list-style-type: none"> <li>create and manage government records, subject to LAC Act provisions</li> </ul>   | •  |
| <b>Energy Efficiency Act</b> (1992, c. 36)   | <ul style="list-style-type: none"> <li>create and manage government records, subject to LAC Act provisions</li> </ul>   | •  |
| <b>Energy Monitoring Act</b> (R.S., 1985, c. E-8)  | <ul style="list-style-type: none"> <li>create and manage government records, subject to LAC Act provisions</li> </ul>   | •  |

| Legislation   | Obligations   | Limitations/Challenges |
|---|---|------------------------|
| <b>National Energy Board Act</b> (R.S., 1985, c. N-7)             | <ul style="list-style-type: none"> <li>• create and manage government records, subject to LAC Act provisions</li> </ul> | •                      |
| <b>National Energy Board Electricity Regulations</b> (SOR/97-130) | <ul style="list-style-type: none"> <li>• create and manage government records, subject to LAC Act provisions</li> </ul> | •                      |
| <b>Northern Pipeline Act</b> (R.S., 1985, c. N-26)                | <ul style="list-style-type: none"> <li>• unclear</li> </ul>   | •                      |
| <b>Nuclear Energy Act</b> (R.S., 1985, c. A-16)                   | <ul style="list-style-type: none"> <li>• unclear</li> </ul>   | •                      |
| <b>Nuclear Fuel Waste Act</b> (2002, c. 23)                       | <ul style="list-style-type: none"> <li>• unclear</li> </ul>   | •                      |
| <b>Nuclear Safety and Control Act</b> (1997, c. 9)                | <ul style="list-style-type: none"> <li>• unclear</li> </ul>   | •                      |
| <b>Uranium Mines and Mills Regulations</b> (SOR/2000-206)         | <ul style="list-style-type: none"> <li>• create and manage government records, subject to LAC Act provisions</li> </ul> | •                      |
| <b>Remote Sensing Space Systems Act</b> (2005, c. 45)             | <ul style="list-style-type: none"> <li>• create and manage government records, subject to LAC Act provisions</li> </ul> | •                      |
| <b>Remote Sensing Space Systems Regulations</b> (SOR/2007-66)     | <ul style="list-style-type: none"> <li>• create and manage government records, subject to LAC Act provisions</li> </ul> | •                      |
| <b>Charts and Nautical Publications Regulations</b> (SOR/95-149)  | <ul style="list-style-type: none"> <li>• create and manage government records, subject to LAC Act provisions</li> </ul> | •                      |

Because of the diverse nature of geospatial and scientific data, it is clear that any geospatial data preservation and management strategy will require the full collaboration of data creators, maintainers and archivists. This is so because some geospatial datasets are very highly regulated and are part of Canadian statutes, which makes them a high priority, but also because it would not be possible for any one archivist to have the full range of specializations and knowledge required to ensure these data are preserved within their scientific context.

The consultation with Library and Archives Canada proved very fruitful and left the overall impression that collaboration with GeoConnections to address the current and emerging challenges of digital geospatial information archiving and preservation would be welcomed. The review with LAC staff of their current definitions, policies, guidelines, frameworks, etc. revealed that positive action is being taken to address new challenges. LAC advised that the TBS guidelines and directives dealing with information management provide good practices that are well aligned with potential accession of digital records by LAC. LAC's *File Format Guidelines for Preservation and Long-term Access* includes recommended formats for geospatial information.

Primary responsibility for information management policy in the Government of Canada lies with the Treasury Board of Canada Secretariat (TBS). TBS policy instruments are not intended to deal specifically with information archiving and preservation, but they are based upon information management life cycle model, which encompasses the disposal or long term preservation of information. The analysis of these documents revealed that there are clear obligations for all government recordkeepers to manage their information as specified by TBS,

and if they do so, the eventual accessioning of such information by LAC for archiving and preservation will be relatively straightforward.

A number of Government of Canada studies, reports and committees have made high level recommendations and suggested strategies for the archiving and preservation of digital data in Canada. Of note is the consensus that:

- a national distributed trusted digital repository or infrastructure or system is required;
- good record management practices should occur when and where data are created;
- institutions should have a data management policy in place; and
- the lack of data discovery mechanisms is a major issue as is data access which includes cost, licensing, and copyright among many other issues.

While there has been very little archival research done in Canada which focuses solely on digital geospatial data (or digital data in general), this has been a topic of discussion for quite some time. The InterPARES research project represents a modest start in addressing these issues. A number of IP2 cases studies and a general study dealing with data portals have been used to explore some of the complexities inherent in digital data generally and geospatial data specifically. This analysis has addressed: the range of geospatial data to be archived and preserved; the limitations of portals from an archiving and preservation perspective; matters related to data quality, including authenticity, accuracy and reliability; and the critical role of metadata.

The environmental scan of digital geospatial data management initiatives in Canada and other key countries with spatial data infrastructure programs yielded only nine (9) Canadian and two (2) international initiatives that are explicitly called an 'archive'. Only one of the Canadian examples appears to be based upon a departmental science strategy, but all except one involve dynamic, ongoing data additions, implying a growing archival challenge. Some of the operational policy instruments that the international initiatives have developed are worthy of consideration for adaptation to Canada. Observations are presented on how well these initiatives align with 10 Principles considered to be core criteria to evaluate and assess digital preservation repositories. While the examples generally meet these criteria, in many cases assumptions are being made, the correctness of which only direct contact with the officials concerned can verify.

## Recommendations

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The following recommendations are based on conclusions drawn from the analysis of the research findings, and are separated into three categories – short, medium and long term.

### Short Term (1-6 months)

That GeoConnections consider the development of a guideline with criteria to help the geospatial information producing community to identify appropriate intervals for the capture of dynamically changing data for archival purposes.

That GeoConnections consider collaborating with recordkeeping officials in Natural Resources Canada's Enterprise IM division on the application of the new Methodology for Recordkeeping to digital geospatial information archiving and preservation within the department.

That GeoConnections consider conducting a thorough assessment of the geospatial archiving and preservation initiatives and tools identified through this project, as a basis for any comprehensive strategy for addressing geospatial information archiving and preservation within the Government of Canada.

### Medium Term (6-18 months)

That GeoConnections consider developing a business model for use by geospatial information producers in integrating archiving and preservation into ongoing information management operational environments, based on detailed investigation of the Integrated Science Data Management (ISDM) and International Polar Year Data and Information Service (IPYDIS) business models.

That GeoConnections consider conducting a thorough assessment of federal geospatial information producers' application of the TBS IM policies, directives and standards, as a basis for any comprehensive strategy for addressing geospatial information archiving and preservation within the Government of Canada.

That GeoConnections consider conducting a thorough review and analysis of all federal legislation that relates to geospatial information to determine the type and extent of data assets that may require archiving and preservation treatment, as a basis for any comprehensive strategy for addressing geospatial information archiving and preservation within the Government of Canada.

That GeoConnections consider leading, in consultation with the key stakeholders and experts, a collaborative effort to develop a geospatial data archiving and preservation policy as part of an overarching geospatial data records management policy based on a lifecycle model.

That GeoConnections consider requesting the Canadian Council of Geomatics (CCOG) to lead efforts to develop and implement geospatial information archiving and preservation policies and practices, and support the CCOG in those efforts.

### **Long Term (18-36 months)**

That GeoConnections consider promoting, within the federal geospatial information producing community, the proactive engagement of Library and Archives Canada's Digital Resource Division, and relevant researchers (e.g., InterPARES), in the development of their digital geospatial information archiving and preservation strategies and plans.

That GeoConnections consider promoting the incorporation, within any future federal-provincial-territorial agreements for the co-creation of digital geospatial datasets, of specific provisions for data archiving and preservation, including the processes for examination and resolution of any associated intellectual property and copyright issues.

That GeoConnections consider creating a single window into all of its geospatial data assets, appraising those data collections in the existing portals for preservation worthiness, and building geospatial data archiving and preservation practices into these technologies and within the institutions that create these data.

That GeoConnections consider making the archiving and preservation of geospatial data a key new thrust of the CGDI and that the processes and practices adopted to create the CGDI be adapted and focused toward the creation of a Geospatial Data Distributed Archive Hub.