To be submitted directly in Section #6 Open Science:
http://open.canada.ca/en/commitment/06-open-science

There are four deliverables in the Open Science section:
1. Develop and publish a government-wide Open Science Implementation Plan with specific activities and milestones
2. Establish a one-stop search for publications and data resulting from federal scientific activities.
3. Develop inventories of federal scientific data and initiate the public release of data.
4. Publish and maintain a consolidated online list of peer-reviewed articles by Government of Canada scientists dating back to 2012.

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Thank you for the opportunity to comment on the progress of the Open Government activities. As an organization representing Canada's major research libraries, the Canadian Association of Research Libraries (CARL) has a strong interest in the Open Science aspect of Open Government, although we also laud the government's efforts to improve access and transparency across all areas of government.

Open Science is a global trend that aims to ensure that publicly funded research results, including publications and data, are shared and made available free-of-charge to the world. CARL supports Canada's Science, Technology and Innovation Strategy 2014, which includes a section promoting open science through the facilitation of "open access to publications and related data resulting from federally-funded research in order to accelerate research, drive innovation and benefit the economy"[1]. CARL concurs with the vision that open science, including improved research data management, will maximize the public's investment in research and lead to greater utility and impact of research.

Research Publications

To that end, CARL strongly urges the Federal Government to adopt requirements and services that allow federal scientists to make all of their publications available to the Canadian public and the world (as has already been done by Canada's Federal Funding Agencies through the Tri-Agency Open Access Policy on Publications [2]). Although a search facility and inventories (deliverables 2,3 and 4) are important to ensure the visibility and awareness of scientific publications, the government must also adopt measures that ensure that the publications are not behind subscription paywalls of journals.

There are two ways of providing open access to publications: through depositing a version of a published article into an open access repository and through publishing in an open access journal. Most journals support one of these paths towards open access, meaning that the vast majority of Canadian scientists are able to make their peer-reviewed publications freely

available. In order to ensure that the Canadian public, industry and other researchers have access to the results of federal government science, the government should adopt a policy that requires all scientists to make their publications open access upon or shortly after publication. At the same time, the government should maintain open access repositories that ensure the articles published in subscription-based journals are made openly available. This type of repository software is available in open source and does not require a significant resource commitment.

Research Data

Another valuable and important output of federal government research is the underlying data on which research findings are based. However, to share and reuse data, they must be created and maintained in a manner consistent with the goals of long-term preservation and discoverability. This involves active data management throughout the life-cycle of the data, beginning at the time they are first envisioned. A crucial aspect to creating data with long-lasting usability is to ensure that the accompanying documentation is standards-based, independently understandable[1], user accessible, and comprehensive. Furthermore, the production of standardized, high-quality metadata is necessary to facilitate the discovery of datasets. Metadata identifying the context under which the data were produced and describing the variables or content within the data are essential.

As part of the Open Science Action Plan, we recommend that the federal government include requirements for data management plans (DMPs) for the data and metadata produced through research. DMPs help organize the research process and provide consistent guidelines for handling data, making the research more efficient. They can also significantly reduce the time and money needed to provide long-term access.

In addition, the federal government should continue to invest in the services and infrastructure to support long term access to the research datasets produced through publicly funded research. As noted in a recent report published by the Tri-agencies, "although there are many gaps and barriers, the environment for policy adoption for RDM in Canada is improving and Canada made significant progress since the OECD declaration in 2004. There have been both bottom-up and top-down efforts to advance RDM infrastructure and expertise in Canada. Further targeted government investment and incentives could accelerate these advances." [3] We would very much welcome improved mechanisms for funding and supporting long term research data management as part of the federal government's strategy for Open Science.

We see the transformation, strengthening, and support for research data management in Canada to be highly dependent on rewarding and incentivizing collaborative initiatives among the diverse stakeholders. While the task of RDM is too great for any single stakeholder, Canada

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[1] This is an Open Archival Information System (OAIS) principle described by the Consultative Committee for Space Data Systems in Reference Model for an Open Archival System: Recommended Practice, http://public.ccsds.org/publications/archive/650x0m2.pdf.

can achieve world-class digital research infrastructure through organizations working collaboratively on agreed upon goals. In addition, the sustainability of this infrastructure will require funding that is directed at horizontal investments rather than today's funding formulas, which tend to favour vertical, piecemeal, short-term projects. Internationally, Australia, United Kingdom, Netherlands, and the European Union are investing in such horizontal infrastructures to support leading-edge research in those regions. [4] For Canada to remain competitive in the global research environment, we must also invest in this type of infrastructure.

Through the Portage Network [5], CARL is investing in the development of a library-based research data management network in Canada. A strategic, collaborative approach to developing Canada's research infrastructure will ensure long-term sustainability and accessibility of the system, and thus support the broader aim of the Government of Canada "to maximize access to federally funded scientific research to encourage greater collaboration and engagement with the scientific community, the private sector, and the public"[6]. Research data produced through the federal science departments has value for the academic sector, industry, and the public and vice versa. Thus a cohesive data management infrastructure in Canada should avoid community-based silos and enable the discovery and interoperable uses of datasets from different stakeholder groups. The Portage Network is willing to collaborate with stakeholders in research data management to ensure interoperability of data and metadata. For example, Portage would welcome a partnership under the Open Science Action Plan to develop a common discovery layer for research data that incorporates metadata practices and search tools.

To be submitted to section 11. Open Information Core Commitment
"http://open.canada.ca/en/commitment/11-open-information-core-commitment

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The Canadian Association of Research Libraries (CARL) has a number of comments about Deliverable #2, "Develop and launch a virtual library on the new government-wide open government portal."

CARL strongly supports the goal "to provide access to all information collections throughout the Government of Canada". Access to federal government information is critical to support democratic and transparent governance. The existing portal is a good start, but the scope of the collections available through the virtual library is still unclear and the search options are limited. For example, does the virtual library provide access to web content that is being harvested by Library and Archives Canada, Statistics Canada publications, or the scientific publications of government researchers? CARL strongly encourages the government to be as inclusive as

possible in terms of the content in the virtual library, and be transparent about the scope of collections available.

Open licenses are important to enable greater usability of government information, therefore, CARL believes that all Crown material should be subject to Canada's Open Government License [1].