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CANADIAN GEOSPATIAL DATA INFRASTRUCTURE INFORMATION PRODUCT 57e

DISSEMINATION OF OPEN GEOSPATIAL DATA UNDER THE OPEN GOVERNMENT LICENCE-CANADA THROUGH OCAP® PRINCIPLES

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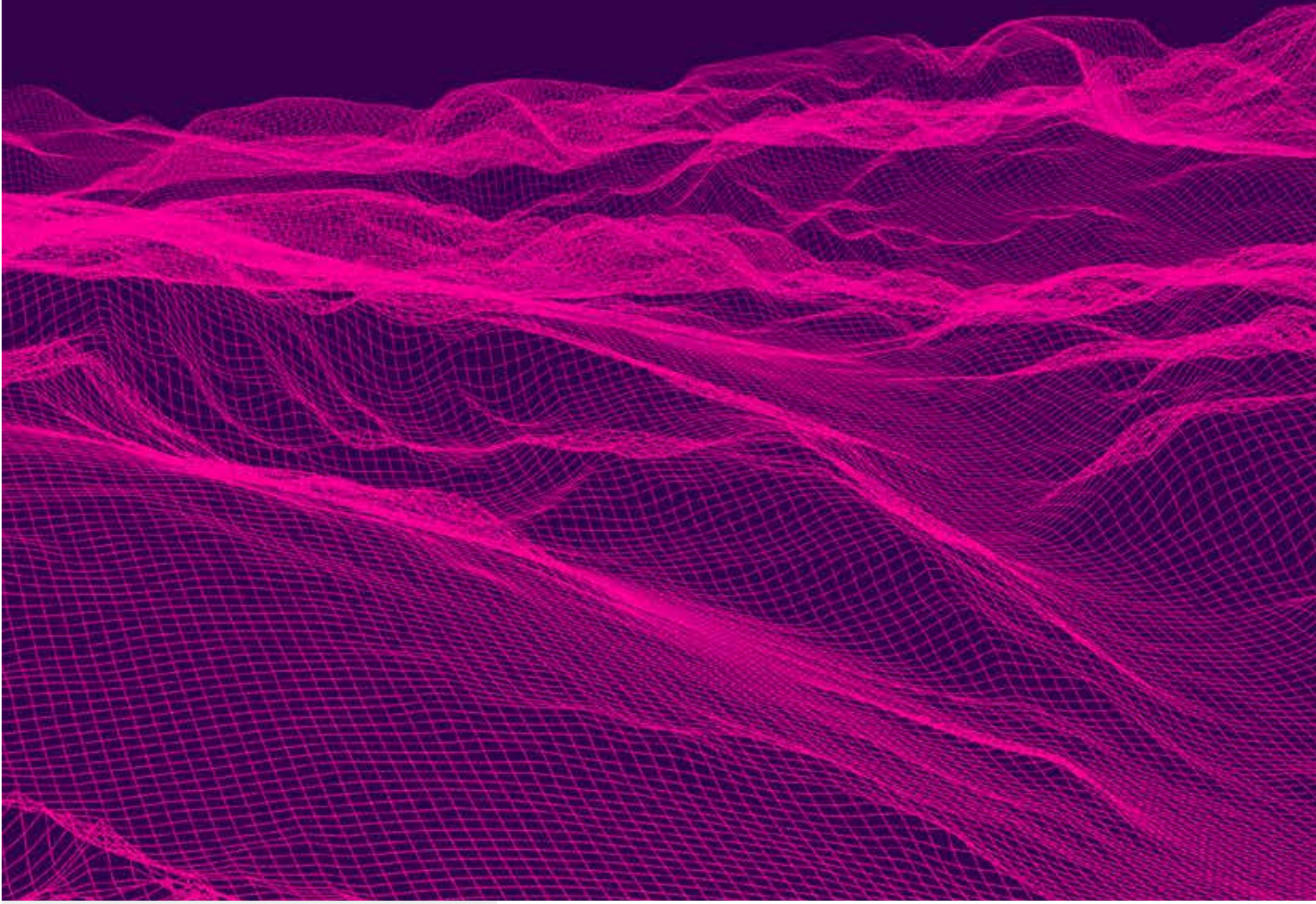
2019

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Permanent link: <https://doi.org/10.4095/314977>

Canada



OPEN DATA REPORT

2019

Dissemination of Open Geospatial Data
under the Open Government Licence-
Canada through OCAP® Principles

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EXECUTIVE SUMMARY

Open government has gained momentum over the years. At the heart of open government are the ideas of transparency, accountability, and participation. As an international leader in open government, the Government of Canada has committed to open government to foster greater openness and accountability, enhance citizen engagement, drive economic opportunities, and create a more cost-effective, efficient, and responsive government.

The evolution of open government in Canada developed with open data. In 2013, the Government of Canada launched the second-generation Open Government Portal to support the delivery of data that is produced, collected, and used by federal departments and agencies. However, data collection, use, and ownership disseminated under open government data require careful consideration to balance opportunities and risks. This is particularly true within the context of Indigenous Peoples.

The Government of Canada acknowledges the impact some of its policies and laws have had on Indigenous Peoples. The Government of Canada has committed to a renewed, Nation-to-Nation relationship with Indigenous Nations, based on recognition of rights, respect, cooperation, and partnership. The *2018-2020 National Action Plan on Open Government* outlines its commitment to directly engaging with Indigenous Nations to understand the implications of open data on Indigenous Peoples.

Open government presents an opportunity to ensure that government decision-making includes Indigenous perspectives, values, and lived experiences in policies, laws, and decisions that impact Indigenous Peoples. As the Government of Canada moves towards establishing and maintaining a mutually respectful relationship between Indigenous and non-Indigenous peoples, open government represents an essential site for reconciliation. It allows for significant co-creation and co-implementation, encouraging Indigenous Nations to define culturally relevant and appropriate approaches to engagement on open government initiatives.

Open data plays a vital role in open government. To effectively leverage the value of open government data to all stakeholders, there is a growing dialogue to include Indigenous data into open government initiatives. The Government of Canada is committed to engaging with Indigenous Nations to understand how Indigenous Peoples can benefit from and contribute to open government data. The integration of Indigenous data into open government data initiatives requires careful consideration. Ultimately, there is a need to balance Indigenous data sovereignty—an Indigenous Nation's right and jurisdiction over their data—and open government data. The Government of Canada's dual commitment to reconciliation and open government presents an opportunity to support Indigenous data sovereignty.

Indigenous Peoples have historically had little control over data collection initiatives. Indigenous data sovereignty expresses the inherent right and jurisdiction of an Indigenous Nation to control the collection, ownership, and application of its data. Therefore, the movement towards open government and open government data initiatives has direct implications on Indigenous data sovereignty.

Due to the increased spatial dimension of open government data, open geospatial data provides a unique location to explore the opportunities and challenges of opening Indigenous data. The objective of this report is to understand the benefits, limitations, and contradictions of First Nations geospatial data within an open data regime. Specifically, the research aims to examine how, or if, the Government of Canada can observe OCAP® (Ownership, Access, Control, and Possession) principles while disseminating First Nations geospatial data under Open Government Licence-Canada.

The implication of Indigenous data released under the Open Government Licence-Canada is complex and multifaceted. There are significant challenges to releasing First Nations geospatial data as open data. The following key findings illustrate the inherent contradictions of including First Nation geospatial data with open government data initiatives.

Key Findings

- **Variability in approaches to data.** OCAP® and Open Government Licence-Canada serve different purposes for different stakeholders. OCAP® provides an opportunity for First Nations to express their unique worldview and protocols in relation to data governance. The Open Government Licence-Canada is a copyright licence for works released by the Government of Canada. Yet, OCAP® principles can provide a First Nation the necessary data governance approach to release open geospatial under the Open Government Licence-Canada by addressing why, how, and by whom data is collected, applied, and disseminated.
- **Data as a Valuable Resource.** First Nation open geospatial data must consider the historical and cultural context of data collection activities, where data were regularly extracted from First Nations. In many ways, data collection activities harmed First Nations while benefiting external actors. Indigenous data sovereignty is a direct reaction to externally-driven data collection efforts. OCAP® principles express a First Nation's inherent right and jurisdiction over its data. When First Nation geospatial data is released under the Open Government Licence-Canada, First Nations lose control over how their data is accessed shared, used, and stored, resulting in a loss of sovereignty over data.
- **Lack of Digital Infrastructure and Geospatial Capacity.** First Nations often have an unequal capacity to create, access, and disseminate geospatial data. Two factors contribute to this issue: (1) First Nations represent a large portion of the broadband underserved or unserved population in Canada, and (2) Many First Nations have insufficient funding, hardware, software, or support for geospatial capacity development. The compounding effect of these two factors produces an environment where First Nations struggle to collect, use, and manage geospatial data. Therefore, First Nations are unable to participate despite the possible benefits associated with open geospatial data.
- **First Nations Data and the Data Commons.** First Nations have different concepts of intellectual property that inform data ownership, privatization, and proprietorship. First Nations data-sharing is governed by unique customary laws and protocol, whereas Canadian intellectual property frameworks are subject to Western legal frameworks. When a First Nation opens its geospatial

data under the Open Government Licence-Canada, it risks First Nations lose control over data use, access, and management, which can be in contravention of local data-sharing customary laws and protocols.

However, despite the apparent incongruities, OCAP® can provide a foundation to support First Nation open geospatial data released under the Open Government Licence-Canada through the development of First Nation ethical data-sharing standards. The way forward requires ongoing approaches to address the critical barriers that prevent First Nations from opening geospatial data, while supporting and Indigenous data sovereignty.

GLOSSARY

Big Data: Big data refers to large, complex datasets characterized by such a high volume, velocity, and variety that it requires specific analytical methods and technology to analyze or extract information from.

Data Governance: Data Governance is a collection of practices, processes, and protocols that ensure the formal management of data assets within an organization.

Data Management: Data management includes policies, practices, processes, and protocols involved in data collection, conversion, representation, analysis, storage, and dissemination.

Data Repatriation: Data repatriation refers to the return of data to its original source.

Data Sovereignty: Data sovereignty refers to the understanding that data is subject to the laws and governance structures of the nation within which it is stored.

Digital Divide: The Digital Divide represents the growing socio-economic inequality with regards to access to information and communication technologies.

Free, Prior, and Informed Consent: Free, Prior and Informed Consent (Article 32(2) of UNDRIP) is the requirement for governments to consult and cooperate in good faith with Indigenous Peoples to all proposed projects that may affect their lands or territories and other resources.

Indigenous Data Sovereignty: Indigenous data sovereignty expresses the inherent right and jurisdiction of an Indigenous Nation to control the collection, ownership, and application of its own data. Data are subject to the laws of the Indigenous Nation from which it is collected.

Indigenous Knowledge: Indigenous Knowledge is holistic and often encompasses interrelationships between diverse phenomena across biological, physical, cultural and spiritual systems.

Informed Consent: Informed consent is an ethical and legal requirement for research involving participants.

Internet and Communication Technologies: Information and communications technology refers to technologies used to transmit data and communication.

Interoperability: Interoperability refers to the capacity of systems and services that create, exchange, and consume data to follow specific standards for contents, context, and meaning of that data.

Jurisdiction: Jurisdiction infers that Indigenous data is subject to the right of an Indigenous Nation to govern the collection, ownership, and application of its own data.

Open Data: Open data is data that can be freely used, re-used and redistributed by anyone—subject only, at most, to the requirement to attribute and sharealike.

Open Government: Open government directs governments and agencies to take specific actions to implement the principles of accountability, transparency, participation, and collaboration.

Open Data License: Open Data licenses explain the conditions under which data may be used.

Self-Determination: Self-determination embodies the right for all peoples to determine their own cultural, economic, and social development.

Sovereignty: The authority of a governing body in all decision-making processes state, without interference from external bodies.

Socio-Spatial: The relationship and interaction between social and spatial processes.

ACRONYMS

CCMEO: Canada Centre for Mapping and Earth Observation

CIRA: Canadian Internet Registration Authority

ELOKA: Exchange for Local Observation and Knowledge of the Arctic

FNIGC: First Nations Information Governance Centre

ICT: Internet Communication Technology

OCAP®: Ownership, Control, Access, Possession

OGL-C: Open Government License-Canada

RHS: Regional Longitudinal Health Survey

1.0 INTRODUCTION

The world is witnessing a 'data revolution.'¹ New internet communication technologies (ICTs) are driving the exponential growth in the volume and types of data, creating unmatched opportunities to inform and transform society. Moreover, ICTs are reconfiguring the production, circulation, and interpretation of data, producing the 'big data' phenomenon.² Governments, companies, researchers, and civil society organizations are unlocking these opportunities, adapting and innovating within the new world of data.³ A range of stakeholders support big data, one of which is government.⁴

Governments are using data as fuel to develop new collaborations and partnerships through Open government. An Open government makes government accessible to stakeholders. Transparency, integrity, accountability, and citizen participation are at the heart of open government initiatives and strategies. Open government provides access to information, empowers stakeholders to hold the government accountable, and fosters stakeholder participation in public policy deliberations. Openness supports improvement of public service delivery, increases government legitimacy, and encourages stakeholders to collaborate with their government while monitoring its performance.⁵

Open data—data that can be freely used, modified, and shared by anyone for any purpose—is an integral part of open government. Opening government data has the potential to achieve a wide variety of social, economic, and political goals.⁶ For example, Open Government data can help catalyze government-wide priorities, such as resource management, skills and employment development, environmental protection, infrastructure improvement, and open science.

The Government of Canada is an international leader in open government.⁷ The Government of Canada's commitment to open government is an effort to foster greater openness and accountability, enhance citizen engagement, drive economic opportunities, and create a more cost-effective, efficient,

¹ Organisation for Economic Co-operation and Development, *Open Government Data Report: Enhancing Policy Maturity for Sustainable Impact* (Paris: OECD Publishing, 2018), <https://doi.org/10.1787/9789264305847-en>.

² R. Kitchin, 'From Mathematical to Post-Representational Understandings of Cartography: Forty Years of Mapping Theory and Praxis in Progress in Human Geography', *Progress in Human Geography*, 1 December 2014, <https://doi.org/10.1177/0309132514562946>.

³ Independent Expert Advisory Group Secretariat, 'A World That Counts: Mobilising the Data Revolution for Sustainable Development', 2014.

⁴ Amy Conroy and Teresa Scassa, 'Promoting Transparency While Protecting Privacy in Open Government in Canada', *Alberta Law Review*, 2015, 32.

⁵ World Justice Project, 'Open Government Index™ 2015 Report' (Washington, D.C., 2015).

⁶ Conroy and Scassa, 'Promoting Transparency While Protecting Privacy in Open Government in Canada'.

⁷ World Wide Web Foundation, *Open Data Barometer: Leaders Edition* (Washington, DC: World Wide Web Foundation, 2018).

and responsive government.⁸ However, data collection, use, and ownership disseminated under open government data requires careful consideration in order to balance opportunities and risks. This is particularly true within the context of Indigenous Peoples.

The Government of Canada acknowledges the great harm some of its policies and laws have had on Indigenous Peoples.⁹ The Government of Canada has committed to a renewed, Nation-to-Nation relationship with Indigenous Nations, based on recognition of rights, respect, cooperation, and partnership. Open Government provides a way to ensure policy and legal processes represent and are informed by Indigenous voices. The *2018-2020 National Action Plan on Open Government* outlines activities to further reconciliation.¹⁰ Open Government presents an opportunity to ensure that government decisions express a reconciliatory approach by including Indigenous perspectives, values, and lived experiences.

Open data plays a vital role in open government. To effectively leverage the value of open data to all stakeholders, there is a growing dialogue to include Indigenous data into open government initiatives. The Government of Canada is engaging with Indigenous Nations to understand how Indigenous Peoples can benefit from and contribute to Open Government data. For example, in 2017, the Treasury Board of Canada Secretariat and Indigenous and Northern Affairs Canada the “Indigenous Perspectives on Open Data.” The integration of Indigenous data into open government data initiatives requires careful consideration.¹¹ There is a need to balance the growing demand of open government initiatives and Indigenous data sovereignty—the inherent right of First Nations, Inuit, and Métis to govern the collection, ownership, and application of its data.¹² The Government of Canada’s dual commitment to reconciliation and open government presents a timely opportunity to support Indigenous self-determination, sovereignty, and development.

The Indigenous data ecosystem is vast. We do not attempt to assess all facets of Indigenous data comprehensively, such as health and population. Instead, we focus on Indigenous geospatial data. Due

⁸ Canada and Treasury Board, *Canada’s 2018-2020 National Action Plan on Open Government* (Ottawa: Treasury Board of Canada Secretariat, 2018), http://publications.gc.ca/collections/collection_2019/sct-tbs/BT22-130-2018-eng.pdf.

⁹ Canada and Treasury Board, *Canada’s 2018-2020 National Action Plan on Open Government*; Truth and Reconciliation Commission of Canada, *Honouring the Truth, Reconciling for the Future: Summary of the Final Report of the Truth and Reconciliation Commission of Canada.*, 2015, http://epe.lac-bac.gc.ca/100/201/301/weekly_acquisition_lists/2015/w15-24-F-E.html/collections/collection_2015/trc/IR4-7-2015-eng.pdf.

¹⁰ The Government of Canada’s *Third Biennial Plan to the Open Government Partnership*, Commitment 20: Enable Open Dialogue and Open Policy Making promotes engagement with First Nations, Inuit, and Métis to ensure that open government principles and practices support meaningful engagement and reflect the renewed nation-to-nation/Inuit-to-Crown/government-to-government relationships

¹¹ McMahon, Smith, and Whiteduck, ‘Reclaiming Geospatial Data and GIS Design for Indigenous-Led Telecommunications Policy Advocacy: A Process Discussion of Mapping Broadband Availability in Remote and Northern Regions of Canada’, *Journal of Information Policy* 7 (2017): 423, <https://doi.org/10.5325/jinfopoli.7.2017.0423>.

¹² Tahu Kukutai and John Taylor, eds., *Indigenous Data Sovereignty: Toward an Agenda*, Research Monograph (Australian National University. Centre for Aboriginal Economic Policy Research), No. 38 (Canberra, Australia, 2016), <http://proxy.cm.umoncton.ca/login?url=http://www.jstor.org/stable/10.2307/j.ctt1q1crgf>.

to the increased spatial dimension of open government data, geospatial data provides a unique frame to explore the benefits and limitations of Indigenous open data. We use descriptive and analytical research to determine the ethical and reconciliatory tensions between the Open Government License-Canada and OCAP[®]¹³ (Ownership, Control, Access, and Possession) principles for Indigenous geospatial data.

OCAP[®] is a set of First Nation data sovereignty principles. OCAP[®] emerged from a legacy of harmful and intrusive research relationships between First Nations and non-First Nation researchers, government, and external institutions. It provides a guide for First Nations to create a data governance model to address why, how, and by whom data is collected, applied, and disseminated. OCAP[®] is self-determination applied to a First Nation's collective data, information, and knowledge.

The Open Government License-Canada is a copyright license for Crown Copyright works published by the Government of Canada. The OGL-C removes restrictions on the reuse of published Government of Canada information data and aligns with international best practices. The OGL-C grants anyone to use, incorporate, sublicense, modify, develop, and distribute the data. Further, it allows the user to manufacture and distribute derivative products.

This report aims to produce an understanding of First Nations Principles of OCAP[®] (Ownership, Control, Access, and Possession) and present recommendations on how, or if, the Government of Canada can observe OCAP[®] principles while disseminating Indigenous geospatial data under Open Government License-Canada (OGL-C). Our research relies primarily on desktop research, focusing on academic and grey literature, with specific concentration on possible intersections between open data, OCAP[®] and Indigenous data sovereignty.

The report is structured as follows. **Section 2** introduces the concept of OCAP[®] (ownership, control, access, and protection) principles as an ethical data standard. We organized the examination of OCAP[®] principles into three themes: (1) the general principles that define OCAP[®]; (2) the similar and different features between OCAP[®] principles and Open Government Licences-Canada; and (3) the contradictory features between OCAP[®] principles and Open Government Licences-Canada. **Section 3** examines the adoption of OCAP[®] principles to promote Indigenous data sovereignty in Canada, while also clarifying ongoing barriers for Indigenous Nations that preclude greater self-determination through data sovereignty, with a specific focus on geospatial data. **Section 4** provides several OCAP[®] principle case studies that offer recent examples of the distribution of Indigenous geospatial data within open data

¹³ OCAP[®] is a registered trademark of the First Nations Information Governance Centre (FNIGC). Visit the First Nations Information Governance Centre website for more information on OCAP[®]: www.FNIGC.ca/OCAP.

frameworks that respect OCAP® principles. **Section 5** provides recommendations for best practices to promote and sustain ethical geospatial data standards that adhere to OCAP® principles. **Section 6** provides a conclusion on the intersection of OCAP® principles and open government license principles that permit the Government of Canada to facilitate a reconciliatory approach to generate high-resolution geospatial data in partnership with Indigenous Nations.

1.1 LIMITATIONS

- To maintain continuity with First Nations Information Governance Centre's (FNIGC) OCAP® principles, our analysis will reiterate OCAP® as a First Nations' expression of data sovereignty manifested through the lens of First Nations epistemological, ontological, axiological, and legal values. This report should not be construed to represent all Indigenous Nations in Canada, despite insights and propositions that are relevant and applicable to Inuit and Métis Nations. Inuit and Métis ethical data governance models merit their own investigation.
- The report focuses on open geospatial data. No inferences or conclusions in application to other types of First Nations data released under the OGL-C.
- The report seeks to explore a broad stroke view of Indigenous data sovereignty, OCAP®, and open geospatial data. It does not examine any particular legislative and regulatory contexts involving privacy, access to information, and intellectual property rights.

2.0 INDIGENOUS DATA SOVEREIGNTY: OCAP® PRINCIPLES

Data sovereignty, data governance, and Nation-rebuilding go hand-in-hand. Indigenous Nations, like all communities, need relevant data for evidence-based policy and decision-making.¹⁴ However, Indigenous Peoples have historically had little control over data collection initiatives.¹⁵ Moreover, Indigenous Peoples have been the subject of irrelevant research project initiatives by non-Indigenous peoples from universities, government, and industry. According to the Royal Commission on Aboriginal Peoples:

*The gathering of information and its subsequent use are inherently political. In the past, Aboriginal people have not been consulted about what information should be collected, who should gather that information, who should maintain it, and who should have access to it. The information gathered may or may not have been relevant to the questions, priorities, and concerns of Aboriginal peoples.*¹⁶

Consequently, research reflected the values and priorities of external entities. Accordingly, are creating data governance approaches that reflect First Nations needs and priorities.

2.1 INDIGENOUS DATA SOVEREIGNTY

Indigenous Nations are increasingly exercising Indigenous data sovereignty. Indigenous Nations are developing mechanisms to protect and control their data.¹⁷ It offers a way for data to contribute to First Nations' self-determination and sovereignty.

The following detail the multifaceted elements of Indigenous data sovereignty:

- Indigenous Nations' data includes any "facts, knowledge, or information about the Nation, and its citizens, lands, resources, programs, and communities;"¹⁸

¹⁴ Tahu Kukutai and John Taylor, 'Data Sovereignty for Indigenous Peoples: Current Practice and Future Needs', in *Indigenous Data Sovereignty: Toward an Agenda*, ed. Tahu Kukutai and John Taylor, Research Monograph (Australian National University, Centre for Aboriginal Economic Policy Research), No. 38 (Canberra, Australia, 2016), 1–22, <http://proxy.cm.umoncton.ca/login?url=http://www.jstor.org/stable/10.2307/j.ctt1q1crgf>.

¹⁵ Jeanette Steffler, 'The Indigenous Data Landscape in Canada: An Overview', *Aboriginal Policy Studies* 5, no. 2 (31 January 2016), <https://doi.org/10.5663/aps.v5i2.26992>.

¹⁶ Canada Royal Commission on Aboriginal Peoples, *Report of the Royal Commission on Aboriginal Peoples*, vol. 3 (Ottawa: Canada Communication Group, 1996), 498.

¹⁷ Kukutai and Taylor, *Indigenous Data Sovereignty*.

¹⁸ Stephanie Carroll Rainie, Desi Rodriguez-Lonebear, and Andrew Martinez, 'Policy Brief (Version 2): Data Governance for Native Nation Rebuilding' (Tucson, AZ: Native Nations Institute, 2017).

- Supports Indigenous sovereignty and self-determination, reflecting the needs and priorities of Indigenous Peoples;
- Indigenous Nations are meaningfully involved and consulted in all aspects of research on them;
- Research must reflect an Indigenous perspective, worldview, ethics, values, and protocols;
- The inherent right and jurisdiction of each Indigenous Nation to control the collection, ownership, and application of its data;
- Data are subject to the Nation's laws and governance structures; and
- Indigenous data sovereignty varies across Nations and does not reflect a pan-Indigenous data governance model; however, the inherent and inalienable rights and interests of Indigenous Peoples relating to the collection, ownership, and application of data about their members, ways of life, lands, and resources underpins Indigenous data sovereignty models.

2.2 OCAP® (OWNERSHIP, CONTROL, ACCESS, AND POSSESSION)

OCAP® (Ownership, Control, Access, and Possession) is a set of principles to inform First Nations data governance (**Table 1.** describes OCAP® principles in detail). OCAP® emerged from a backdrop of harmful and intrusive research relationships between First Nations and external entities in Canada.¹⁹

OCAP® was shaped in response to the following issues experienced by First Nations:²⁰

- Research is primarily driven by external entities;
- External entities control data collection, use, dissemination, and ownership;
- Research often lacks respectful relationships between First Nations and researchers;
- Research often forgoes free, prior, and informed consent (FPIC);
- Research does not include Indigenous perspectives, values, protocols, and/or worldview;
- Data is often inconsistent, irrelevant, and poor quality;
- When data is taken out of context, it can lead to data being misused or misinterpreted; and
- Research often fails to reflect Indigenous needs and priorities.

OCAP® originated from the National Steering Committee of the First Nations and Inuit Regional Longitudinal Health Survey (RHS) in 1998.²¹ Since its creation, OCAP® is the *de facto* ethical standard for First Nations-led research principles.²² OCAP® is a protocol for ethical research that protects First

¹⁹ First Nations Information Governance Centre, 'Ownership, Control, Access and Possession (OCAP™): The Path to First Nations Information Governance', 23 May 2014, <https://ezproxy.kpu.ca:2443/login?url=http://www.deslibris.ca/ID/10095457>.

²⁰ First Nations Information Governance Centre; First Nations Information Governance Centre, 'Pathways to First Nations' Data and Information Sovereignty', in *Indigenous Data Sovereignty: Toward an Agenda*, ed. Tahu Kukutai and John Taylor, Research Monograph (Australian National University. Centre for Aboriginal Economic Policy Research), No. 38 (Canberra, Australia, 2016), 139–55, <http://proxy.cm.umoncton.ca/login?url=http://www.jstor.org/stable/10.2307/j.ctt1q1crgf>; Brian Schnarch, 'Ownership, Control, Access, and Possession (OCAP) or Self-Determination Applied to Research', 2004, 16; Assembly of First Nations and Assembly of First Nations Health and Social Secretariat, *OCAP, Ownership, Control, Access and Possession First Nations Inherent Right to Govern First Nations Data* (Ottawa, Ontario: AFN Health and Social Secretariat, 2007), http://books.scholarsportal.info/viewdoc.html?id=/ebooks/ebooks0/gibson_cppc/2010-08-06/1/10248482; Jodi Bruhn, 'Identifying Useful Approaches to the Governance of Indigenous Data', *International Indigenous Policy Journal* 5, no. 2 (April 2014), <https://doi.org/10.18584/iipj.2014.5.2.5>.

²¹ First Nations Information Governance Centre, 'Ownership, Control, Access and Possession (OCAP™)'.

²² First Nations Information Governance Centre.

Nations from harmful, insensitive, and exclusive research relationships. Further, it provides First Nations an opportunity to express their unique worldview and protocols related to ideas of privacy and information governance currently not protected by Canadian privacy laws.²³ OCAP® is framed to reflect a First Nations’ view of jurisdiction and collective rights.²⁴ It is grounded in the expression of self-determination applied to collective data, information, and knowledge.²⁵ OCAP® has increasingly spread across Canada. OCAP® is unique to each First Nation or region. Therefore, OCAP® is not a ‘doctrine’ or a ‘prescription.’ It is a set of living, evolving and intertwined principles that have to consider the historical and cultural context of research in each First Nation.

Table 1: OCAP Components

OCAP® Principle	Definition
Ownership	The principle of ownership refers to the relationship of a First Nations community to its cultural knowledge, data, and information. This principle states that a community or group owns information collectively in the same way that an individual owns his or her personal information.
Control	The aspirations and rights of First Nations to maintain and regain control of all aspects of their lives and institutions include research and information. This principle asserts that First Nations, their communities and representative bodies are within their rights in seeking to control research and information management processes which impact them.
Access	First Nations people must have access to information and data about themselves and their communities, regardless of where these are currently held. This principle also refers to the right of First Nations communities and organizations to manage and make decisions regarding access to their collective information.
Possession	Although not a condition of ownership, possession of data is a mechanism by which ownership can be asserted and protected. When data owned by one party are in possession of another, there is a risk of a data breach or misuse of data. This is particularly important when trust is lacking between the owner and possessor.

Source: First Nations Information Governance Centre, 2014

²³ The Alberta First Nations Information Governance Centre, ‘Ownership, Control, Access, and Possession’ (The Alberta First Nations Information Governance Centre, n.d.).

²⁴ First Nations Information Governance Centre, ‘Ownership, Control, Access and Possession (OCAP™)’.

²⁵ First Nations Information Governance Centre, ‘Pathways to First Nations’ Data and Information Sovereignty’.

OCAP® creates opportunities to meet the immediate needs and priorities of First Nations. It allows First Nations to be custodians of their own data. In doing so, OCAP® enhances First Nations' resources to facilitate Nation-building while maintaining legitimacy and accountability for First Nations' government and administration.

OCAP® can benefit First Nations in the following ways:

- Restore trust in research projects through transparency and accountability;
- Enhance participation in culturally relevant and appropriate research;
- Promote research activities that incorporate and are driven by First Nations' values, worldview, ethics, and customary law;
- Contribute to community empowerment and self-determination through meaningful capacity building;
- Facilitate a 'do no harm' principle through inclusive research; and
- Produce relevant and useful analysis that can contribute to social, economic, and political goals.

2.3 OCAP® TRADEMARK

OCAP® is a registered trademark. The FNIGC holds the registered trademark for the OCAP® name and logo. The process began in 2011 as a measure to ensure the integrity of the OCAP® name and logo. In 2015, the Canadian Intellectual Property Office (CIPO) granted FNIGC the registered trademark status to the OCAP® name and logo. When the OCAP® name or logo is used in a publication, the following citation is required: "OCAP® is a registered trademark of the First Nations Information Governance Centre (FNIGC)" and include a reference to the FNIGC website (www.FNIGC.ca/OCAP) for the reader to fully understand OCAP® principles."

3.0 TOWARDS A SITUATED APPROACH: OCAP® AND OPEN GOVERNMENT LICENCES

A primary goal of the Government of Canada's Open Government is to support a seamless end-user experience. Government data is often disaggregated and under a multitude of licensing arrangements. Accordingly, in 2013, the Government of Canada approved and adopted the Open Government Licence-Canada (OGL-C)—a common licence for all open data.²⁶ The OGL-C allows users “copy, modify, publish, translate, adapt, distribute or otherwise use the Information in any medium, mode or format for any lawful purpose.”²⁷ Correspondingly, the end-user has to acknowledge the source of information by including an attribution statement specified by the Information Provider(s) and, where possible, provide a link to the OGL-C.

3.1 INDIGENOUS DATA SOVEREIGNTY AND OPEN GEOSPATIAL DATA

Open geospatial data is an essential part of the Government of Canada's open government. The Canada Centre for Mapping and Earth Observation (CCMEO) at Natural Resources Canada is responsible for gathering, storing, processing, and delivering spatially referenced or location-based information about the country. Geospatial data is used to produce Canada's base maps and in GIS (Geographic Information System) applications and other systems using spatially referenced data. Government geospatial data are distributed online via web services under OGL-C. Geospatial datasets are accessible to the public via the Government of Canada's [Open Maps web portal](#).

The implications of First Nations geospatial data released under the OGL-C are complex and multifaceted. This is in part due to the numerous situations where First Nations geospatial data could be released under the OGL-C. For example, First Nations geospatial data can be released through a variety of open data initiatives, such resource development, housing and infrastructure, socio-economic, and health projects. Therefore, there is a need to address how First Nations geospatial data released under the OGL-C impacts First Nation ownership, security, privacy, and confidentiality.

The Government of Canada must continue to support open geospatial data policies, procedures, and infrastructures and at the same time, encourage and support a clear First Nations data sovereignty framework. Such an approach would ensure opportunities for First Nations' voices to be meaningfully

²⁶ Canada and Treasury Board, *Canada's 2018-2020 National Action Plan on Open Government*.

²⁷ Government of Canada, 'Open Government Licence - Canada', 2017, <https://open.canada.ca/en/open-government-licence-canada>.

included in open geospatial government data initiatives. Therefore, it is imperative to include First Nations as co-creators and co-collaborators on open geospatial initiatives.

The following analysis investigates the risks and opportunities posed by including First Nation geospatial data within open government data initiatives. Specifically, we explore the intersections of First Nation geospatial data, OCAP[®] principles, and the OGL-C.

3.2 OCAP[®] AND OPEN GOVERNMENT LICENCES: SIMILARITIES AND DIFFERENCES

The growth of open government data, portals, and initiatives must consider the potential risks and opportunities to First Nations. As a starting point, it is necessary to compare the purposes of OCAP[®] and the OGL-C. At its most basic, OCAP[®] and the OGL-C serve distinctly different purposes.

Open Government Licence-Canada: A licensing framework designed to provide public bodies across Canada with a consistent means to licence their information. The OGL-C grants a worldwide, royalty-free, perpetual, non-exclusive licence to use the information, including for commercial purposes.²⁸ The OGL-C removes restrictions on the reuse of published Government of Canada information (data, info, websites, and publications), aligning better with international best practices for open data licensing.

OCAP[®] (Ownership, Control, Access, and Possession): A First Nations framework for data governance. OCAP[®] is an ethical research standard for conducting research on, or with, First Nations. OCAP[®] provides a First Nation data governance framework for the use and distribution of data in a way that brings benefit to the community while minimizing harm. OCAP[®] principles guide and empower First Nations to decide why, how, and by whom information is collected, applied, and disseminated.

OCAP[®] and OGL-C serve different purposes for different stakeholders. OCAP[®] provides an opportunity for First Nations to express their unique worldview and protocols in relation to data governance. OGL-C is a copyright licence for works released by the Government of Canada. The movement to release First Nations open geospatial data has direct implications on First Nations data sovereignty. The following outlines the similarities and differences between OCAP[®] and OGL-C within an open geospatial data context.

²⁸ Government of Canada.

Similarities:

- **Ownership:** OCAP® and OGL-C have somewhat similar ownership overlaps in principle. The ownership principle affirms that a First Nations owns information collectively in the same way that an individual owns their personal information. Data released under the OGL-C requires users to acknowledge the source of the Information by including any attribution statement specified by the Information Provider(s) and, where possible, provide a link to this licence.”²⁹ When geospatial data is voluntarily released within an open geospatial data initiative, geospatial data contributors maintain ownership of their data and make it openly accessible through an open data licence. Therefore, when a First Nation contributes data under the OGL-C, users are required to acknowledge the data source by including any attribution statement specified by the Information Provider(s) and, where possible, provide a link to this licence.

Differences:

- **Ownership:** Despite the attribution granted to the contributor under the OGL-C, First Nations’ geospatial data ownership depends heavily on social and cultural norms. In many First Nations, the key rules governing geospatial data are those set and enforced by the community itself. In contrast, the OGL-C establishes the terms and conditions governing open data. The OGL-C does not create ownership rights; they transfer rights from one party to another. This means that ownership through copyrights and database rights do not belong to a data contributor. They are owned by the entity that invests in the data selection, aggregation, or arrangement of the data.
- **Control:** Geospatial data released under the OGL-C diminishes the ability for First Nations to regulate user access. Owners’ control over the use and management of First Nation geospatial data is diminished, as users can copy, modify, publish, translate, adapt, distribute or otherwise use the Information in any medium, mode or format for any lawful purpose.
- **Access:** OCAP® and OGL-C differ in terms of access. The access principle refers to the need for First Nations to have access to all data about them. Further, it also refers to the First Nation’s right to decide who can access data. First Nations have limited access to GIS technology, broadband connectivity, and geospatial capacity skills required to use and publish open data. These barriers cause an unequal distribution of access to open geospatial data resources for First Nations across the country. While the intent / objective of open government / open data is to provide access to government data including geospatial data, many First Nations are not able to do so. Furthermore, First Nations data released under OGL-C constrains Nations’ ability to regulate data access and dissemination, as it grants users a worldwide, royalty-free, perpetual, non-exclusive licence to use the information.
- **Possession:** The possession principle contrasts and conflicts when First Nations data is released under the OGL-C. OCAP® promotes direct stewardship of data—a mechanism to assert data protection and control. Geospatial data released under the OGL-C licence exacerbates the loss of control over who possesses First Nations data. As a result, a First Nation cannot control how their data is applied and disseminated.

3.3 OCAP® AND OPEN GOVERNMENT LICENCE: CONTRADICTIONS

This section further explores the contradictions between OCAP® and OGL-C outlined above in Section 3.2. It outlines specific barriers for First Nations data released under the OGL-C and offers potential

²⁹ Government of Canada.

opportunities for First Nations and the Government Canada to cooperate towards data-sharing while adhering to OCAP®.

3.3.1 Data as a Strategic Resource

Data are a valuable resource for First Nations. First Nations require high-quality data to design, monitor, and evaluate programs and policies. The Royal Commission on Aboriginal Peoples report noted the need for Indigenous-led data collection to support Indigenous governance goals and aspirations:

For Aboriginal people, knowing how political, demographic, social and economic changes will affect their nations and having in place data collection vehicles that provide a community and national level aggregate picture will be essential to Aboriginal government implementation and planning processes.³⁰

Data collection must support First Nations needs and priorities. OCAP® principles provide First Nations a data governance framework that promotes appropriate geospatial data management. First Nations can express their values related to community privacy and information governance through the principles of ownership, control, access, and possession.

Barrier: First Nation open geospatial data must consider the historical and cultural context of data collection activities, where data were regularly extracted from First Nations. In many ways, data collection was as much a political as a logistical exercise, where data was used to cause harm First Nations while benefiting external actors. Indigenous data sovereignty is a direct reaction to externally-driven data collection efforts. Indigenous data sovereignty entails important questions: Who is collecting data? What is the content of the data? What is the purpose of the data? Who owns, and by extensive controls access, to the data? Where is the data stored?

OCAP® ensures First Nations' inherent right and jurisdiction over their data. If First Nations release geospatial data under the OGL-C, they lose control over how their data is used, analyzed, and stored. Fundamentally, this undermines the capacity for a First Nation to assert self-determination and sovereignty over its data. It is particularly relevant when geospatial data is monetized and made increasingly valuable, especially within the context of natural resource development.

Opportunity: Open geospatial data can create opportunities for First Nations. There is an increasing interest to develop research partnerships to develop geospatial research that supports and reflect First

³⁰ Canada Royal Commission on Aboriginal Peoples, *Report of the Royal Commission on Aboriginal Peoples*, 3:349.

Nations' needs and priorities.³¹ For example, open geospatial data can contribute to environmental monitoring, land use planning, and resource management. Taken at face value, OCAP® principles conflict with released under the OGL-C, as OCAP® was developed in response to the government-controlled approach to the RHS. However, OCAP® emerged from a Nation-to-Nation context between First Nations and the Government of Canada through data-sharing agreements.³² Data-sharing agreements provided a foundation to support First Nations and government policies and projects that contribute to the health and well-being of First Nations.

Data exists on a spectrum, ranging from closed to shared to open. The data spectrum can be useful to determine how to proceed with opening First Nations geospatial data under the OGL-C (see figure 1.). There is a limit to opening up First Nations geospatial data, as some data for a variety of reasons, is confidential or highly culturally sensitive. However, OCAP® principles can support First Nations create different levels of access that are in keeping with cultural protocols and ethics. A First Nations data sovereignty approach allows First Nations to be co-creators and co-collaborates in open geospatial data, controlling and owning what is mapped, how it is mapped, who does the mapping, and access tiers for sensitive geospatial data. In doing so, it can create a powerful platform for First Nations' voices to be included in open government geospatial data.

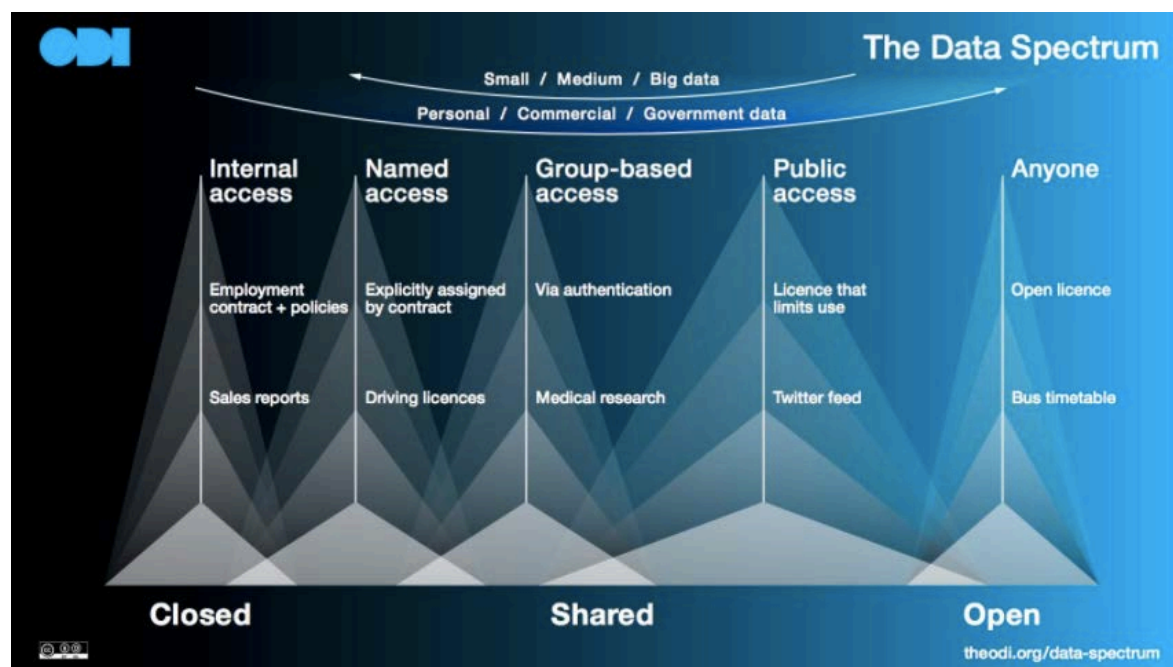


Figure 1: The Data Spectrum (Open Data Institute)

³¹ For example, [Mackenzie DataStream](#), [Exchange for Local Observation and Knowledge of the Arctic](#), [eNuk](#), [First Story](#), and [Mappingback](#) are collaborative research partnerships between Indigenous Peoples, government agencies, and industry.

³² Bruhn, 'Identifying Useful Approaches to the Governance of Indigenous Data'.

3.3.2 Lack of Digital Infrastructure and Geospatial Capacity

First Nations are increasingly using geospatial technologies. Many First Nations have built thriving, innovative lands and resources departments, adopting and integrating geospatial tools and technologies. Through geospatial capacity developments, First Nations have created and used geospatial data to represent various use and occupancy patterns, traditional ecological knowledge, sacred sites, and place names. Such efforts are vital to ensure that geospatial data is used to support First Nations self-determination, sovereignty, and development.

OCAP® principles have an important role to play in First Nations geospatial capacity development. OCAP® promotes research initiatives that are First Nations controlled and led. In doing so, OCAP® fosters a sense of ownership and responsibility that requires internal geospatial capacity.

Barrier: Open geospatial data is only as useful as the ability of First Nations to access, assess, and respond to it. For many First Nations, the “digital divide” remains a critical barrier that prevents them from benefiting from and contributing to open geospatial data initiatives. In this context, the digital divide represents the unequal capacity to create, access, and disseminate geospatial data through GIS applications.³³ Two critical factors contribute to the digital divide: lack of digital infrastructure and capacity limitations.

In 2016, the Government of Canada declared access to broadband internet a fundamental right for all citizens. The Government allocated \$500 million to the Connect to Innovate program in the 2016 budget.³⁴ In 2019, the Government of Canada’s announced its commitment to set a national target, in which 95 per cent of Canadian homes and businesses will have access to internet speeds of at least 50/10 Mbps by 2026 and 100 per cent by 2030, no matter where they are located in the country. Budget 2019 proposes a plan that would deliver \$5 billion to \$6 billion in new investments in rural broadband.³⁵

Currently, the Canadian Internet Registration Authority (CIRA) estimates that approximately 18% of the population in Canada has limited or non-existent connectivity, and many communities are without cellular access. First Nations represent a large portion of the broadband underserved or unserved

³³ Mohammad Reza Hanafizadeh, Payam Hanafizadeh, and Erik Bohlin, ‘Digital Divide and E-Readiness: Trends and Gaps’, *International Journal of E-Adoption (IJE)* 5, no. 3 (1 July 2013): 30–75, <https://doi.org/10.4018/ijea.2013070103>.

³⁴ Department of Finance Canada, *Growing the Middle Class: Budget 2016* (Ottawa, ON: Government of Canada, 2016).

³⁵ Department of Finance Canada, *Investing in the Middle Class: Budget 2019* (Ottawa, ON: Government of Canada, 2019).

population.^{36,37} Many First Nations are located in remote areas. In these areas, limited bandwidth, sporadic internet connections, and lack service providers lead to expensive, and often inaccessible, broadband services.³⁸

Geospatial capacity remains a crucial issue, compounding issues related to digital infrastructure. Many First Nations experience insufficient funding, hardware, software, or support for geospatial capacity development, and they struggle to collect, use, and manage geospatial data and information and often are dependent on external support. Despite being in a period of abundant geospatial technologies and data, many First Nations face complex challenges to develop geospatial capacity, specifically lacking human, financial, and technological resources. Consequently, it reduces their ability to collect, analyze, and manage data successfully.

Opportunity: Dialogue around First Nation open geospatial data, rooted in OCAP® principles, has gained momentum. Capacity building and OCAP® are intertwined.³⁹ OCAP® promotes First Nations-led and -controlled research. Enhanced data sovereignty means taking on significant responsibility to collect, own, manage, analyse and maintain data. This requires significant resources, including equipment and additional staffing. The Government of Canada can take a role in facilitating the flow of the necessary human, financial, and technical resources to First Nations to develop the necessary infrastructure, skills, and capacity to benefit to open data. Developing internal and external OCAP® compliant strategies would support First Nations needs and priorities, while also supporting the capacity to benefit from, and contribute to, open geospatial data initiatives.

3.3.3 First Nations Data and the Data Commons

Open data are viewed as a single, unified form of knowledge in the public domain. However, First Nations have different concepts of intellectual property that inform data ownership, privatization, and proprietorship.⁴⁰ First Nations data are dynamic and culturally distinct, collectively authored, incrementally created since time immemorial. First Nations data is inalienably tied to land and territory, shaped by cosmology, spirituality, and cultural identity. Whether hunting, trapping, gathering, burials, or travel routes, Indigenous knowledge is rooted in land-based socio-spatial relationships. Localized

³⁶ McMahon, Smith, and Whiteduck, 'Reclaiming Geospatial Data and GIS Design for Indigenous-Led Telecommunications Policy Advocacy'.

³⁷ Accurate and robust data on First Nations' access to broadband in northern and remote regions is current unavailable (Smith et al. 2017).

³⁸ Rob McMahon, 'From Digital Divides to the First Mile: Indigenous Peoples and the Network Society in Canada', 2014, 25.

³⁹ Schnarch, 'Ownership, Control, Access, and Possession (OCAP) or Self-Determination Applied to Research'.

⁴⁰ Jane Anderson, 'Options for the Future Protection of GRTKTCEs: The Traditional Knowledge Licenses and Labels Initiative', no. 1 (2012): 10.

data sovereignty frameworks are grounded in social norms, protocols, and institutions, rooted in concepts of stewardship and guardianship.⁴¹

Canadian intellectual property frameworks promote a Western cultural interpretation of knowledge, ownership, authorship, and property.⁴² As a result, Indigenous Knowledge systems are often transformed and taken out of context through division, abstraction, and simplification in order to render them more legible and subject to specific Western legal frameworks.

Barrier: First Nations experience a multitude of data governance issues, especially when dealing with external stakeholders. For example, First Nations experience an increasing number of referrals and consultation requests regarding natural resource management projects. It is likely that data released under the OGL-C might exacerbate these issues, as it may lead to wider dissemination and access to First Nations geospatial data. As a result, the OGL-C may eliminate barriers to access open government data, but current licencing frameworks, such as the OGL-C, contributes to a range of unresolved issues about the relationship between First Nations geospatial data and open licences.

As a result, it creates particular challenges for opening First Nations data under the OGL-C. If First Nations data is released under the OGL-C, First Nations lose control over how their data is used, accessed, and managed. Further, when decontextualized from the location that makes data meaningful, it prompts concerns over the misappropriation, misrepresentation, and oversimplification of data. Attention is currently absent from the different needs and concerns regarding ownership, access, control, and possession of First Nations geospatial data and the contextual conditions that govern its circulation. Here, not all First Nations geospatial data is considered 'common' or 'public.'

Opportunity: The sensitivity of First Nations data is complex and layered. OCAP® can reconcile some of the tensions between data sovereignty and open geospatial data. First Nations data-sharing is dependent on local cultural protocols and customary law, alongside internal data governance structures, digital infrastructure, and capacity. OCAP® ensures that First Nations have appropriate practices to be stewards of their own information. A First Nation is the only one that can define how, when, and which geospatial data can be released under the OGL-C. Therefore, A primary concern when considering OCAP® and OGL-C should be the following question: Who benefits from opening First Nations geospatial data? Therefore, there is a need to include a First Nations' perspective on open data licence discourse. Current licensing frameworks do not respond to the diversity of issues experienced by First Nations. It is worth investigating a potential range of First Nations-specific open data licences. These should be developed in collaboration with First Nations and respond to their needs and priorities. When

⁴¹ Jane Anderson, 'Indigenous/Traditional Knowledge and Intellectual Property', Issues Paper (Durham, North Carolina: Duke University School of Law, Center for the Study of the Public Domain, 2010).

⁴² Anderson.

First Nations are engaged and consulted, it can foster an environment of partnership and collaboration from a Nation-to-Nation context.

4.0 OCAP® IN PRACTICE

OCAP® asserts First Nations have the inherent right and jurisdiction over data collection, application, and dissemination. As OCAP® is context dependent and unique to each First Nation or region, it has created new and meaningful opportunities for Indigenous Nations to co-create and co-collaborate on data collection activities that prioritize their needs and interests.

4.1 EXCHANGE FOR LOCAL OBSERVATIONS AND KNOWLEDGE OF THE ARCTIC: COLLABORATION THROUGH DATA MANAGEMENT

The *Exchange for Local Observation and Knowledge of the Arctic* (ELOKA) is a data management service provider. Arctic communities (Indigenous and non-Indigenous) are increasingly involved in, and taking control of, research. ELOKA partners with Indigenous communities, non-Indigenous communities, researchers, and other organizations to create and support web-based products that facilitate the collection, preservation, exchange, and use of local observations and Indigenous knowledge in the Arctic. ELOKA has created an enabling approach for Indigenous Peoples and researchers to collaborate and develop community-based research to understand recent Arctic and socio-environmental changes through community-based monitoring initiatives. Research contributions have developed a number of important products, such community-based atlases documenting important places and databases where Arctic residents can share sea ice, weather and wildlife observations. These contribute significantly to understanding recent environmental change in the arctic.

A key challenge for Local and Indigenous Knowledge research is developing appropriate data management methods. Data must be ethically and respectfully recorded, stored, and represented. Further, the management and distribution of data to other stakeholders, such as researchers, government, and non-governmental organizations, requires compliance with local data-sharing protocols.

ELOKA promotes data sovereignty by adhering to established ethical data management standards for community engagement in research and for the protection of Indigenous Knowledge. ELOKA supports OCAP® principles by working with Indigenous Nations to develop data repositories that are inclusive of local knowledge in ways that are respectful of its distinctive forms as well as the social norms that govern its use and sharing. Dependent on the specific data-sharing agreement with the Indigenous Nation, data is disseminated at different levels to different users.

In terms of access, ELOKA bridges the gap between Indigenous Nations and researchers. It ensures that ethical research guidelines and protocols are respected and maintained by researchers. ELOKA mediates data access requests and requires researchers to conform with the data sovereignty principles attached to the dataset. Furthermore, they ensure that Local and Indigenous Knowledge and scientific expertise are complementary and integrated in a meaningful, respectful way. ELOKA's OCAP® compliant data practices create a space for research to be community-driven, where Indigenous Nations have the right to control what type of data is collected, how data is collected, how it will be used, who can access it, and who distribute it.

While there is no single ethical standard guideline, the following elements underpin ELOKA ethical data management principles:

- Indigenous Nations as co-creators and co-collaborators in data initiatives;
- Data-sharing and user agreements to be informed by the Indigenous Nation's customs, laws, and social norms;
- Data collection, use, and disclosure is controlled by the Indigenous Nation;
- Indigenous Nations control access to local observations and data contained in a respective database;
- Indigenous Nations decide what data can be widely available and what data is sensitive; and
- Data and information must be taken in context.

Lessons learned:

- Data collection, use, distribution, and analysis is based on ongoing collaborative, community-based initiatives;
- The confidentiality and sensitivity of Indigenous Knowledge requires data management, sharing and access principles based on Indigenous Nation protocols, ethics, and customary law;
- Indigenous Nations retain control over who can access data, how data are analyzed, forms of data, and how data is managed; and
- Understand Indigenous Nations as sovereign bodies, thereby promoting Indigenous data sovereignty.

4.2 MACKENZIE DATASTREAM: COMMUNITY-BASED WATER MONITORING

The Mackenzie River and its tributaries form the largest river basin in Canada.

The Mackenzie River Basin represents an essential source for water resources for communities in the Northwest Territories, Canada. The Mackenzie River Basin (1.7 million square kilometers that drains 20 percent of Canada's land mass) is impacted by a number of stressors including climate change as well as land cover changes and pollution from industrial development. Further climate change and urban development are affecting water quality and ecosystem health at the basin level. Yet, in order to develop policies for water management in the Mackenzie River Basin, it is necessary to have water quality data.

Mackenzie DataStream is an innovative platform that supports community-based monitoring water programs in the Mackenzie River Basin that launched in 2016. Mackenzie DataStream was developed through a collaboration between The Gordon Foundation and the Government of the Northwest Territories. Mackenzie DataStream is a web-based, open access platform for water quality data in the Mackenzie River Basin. DataStream’s mission is to promote knowledge sharing and advance collaborative, evidence-based decision-making between Indigenous Nations, government, and researchers throughout the Mackenzie River Basin to cultivate an openly accessible regional, watershed-level database.

“By making data open, we open up greater possibilities for it to be used in decision-making and stewardship efforts. This is especially important when we are talking about water, which is constantly moving through watersheds and where we all share a responsibility for taking care of it” (Carolyn DuBois, Water Program Manager, The Gordon Foundation).

Mackenzie DataStream currently contains data collected by 24 communities—both Indigenous and non-Indigenous—who monitor over 70 water quality parameters. DataStream provides a free, accessible infrastructure that assists stakeholders to manage, visualize, and share water quality data.

Due to the scale and importance of the Mackenzie River Basin to communities, enormous amounts of data are collected from various stakeholders and programs, including community-based monitoring programs. Mackenzie DataStream aims to ensure data is as openly accessible as possible, which involves minimizing or eliminating barriers to data access. As a result, the current and long-term success of DataStream depends on the development of appropriate policies and practices for data management.

DataStream data management policies and practices are informed by international and national best practices for culturally appropriate and ethical data stewardship principles. Specifically, the DataStream Data Policy draws from the following organizations:⁴³

- Organization for Economic Co-operation and Development (OECD)
- Polar Knowledge Canada (formerly the Canadian High Arctic Research Station)
- International Arctic Science Committee
- Convention on Biodiversity (Article 8)
- Canadian Tri-council policy on research
- First Nations Principles of OCAP®

⁴³ DataStream, ‘DataStream: Overview of Data Policy and Terms’ (DataStream, 2018).

The DataStream data principles set the foundational values and concepts for how data is managed and guides the governance and operation of DataStream as it evolves. Ethically open access, data quality, interoperability, and security and sustainability underpin DataStream’s Data Policy.⁴⁴ Importantly, DataStream data management policies and practices are rooted in OCAP® principles. Data contributors maintain ownership over their datasets, making it accessible to external stakeholders, such as government and academia, through an open data licence. DataStream uses Open Data Commons licences to determine intellectual property rights over data and databases. Contributors publish data using one of the following open licences: Attribution Licence (ODC-By) V1.0⁴⁵ or Public Domain Dedication and License (PDDL).⁴⁶

1. **Attribution License (ODC-By) V1.0:** You are free to share, copy, distribute, use, modify, transform, build upon, and produce works from the data as long as you attribute any public use of the data, or works produced from the data, in the manner specified in the license. For any use or redistribution of the data, or works produced from it, you must make clear to others the license of the data and keep intact any notices on the original data.
2. **Public Domain Dedication and License (PDDL):** This licence places the data in the public domain (waiving all rights). The PDDL imposes no restrictions on your use of the PDDL licensed data. You are free to share, copy, distribute, use, modify, transform, build upon, and produce works from the data

The data and databases can be shared with an open data licence because the datasets do not contain any information of a sensitive nature. However, DataStream does provide a possible exemption from the open data licence for data that are sensitive, but it must be justified and requested in a dataset-specific Data Management Plan.

Lessons Learned:

- Projects that include community-based data must be community-led, whereby the community guides the research goals and outcomes need and priorities;
- Indigenous Nations can benefit from the collection, use, and distribution of data through open access databases. Access to the database ensures protection against data loss, access to information on baseline conditions, as well as contributing to and benefiting from research conducted in the region. Additionally, benefits and impacts of research are scaled up through sharing data and collaboration;

⁴⁴ DataStream.

⁴⁵ Visit the Open Data Commons website for more information on Open Data Commons Attribution License (ODC-By) v1.0 (<https://opendatacommons.org/licenses/by/1-0/index.html>).

⁴⁶ Visit the Open Data Commons website for more information on Open Data Commons Public Domain Dedication and License (PDDL) (<https://opendatacommons.org/licenses/pddl/1-0/index.html>).

- Open Data Commons Attribution License V1.0 can provide a possible avenue to facilitate Indigenous Nations to maintain ownership over their data while allowing users to freely share, modify, and use this database subject only to the attribution requirement; and
- Genuine collaboration must extend beyond a public goal or objective; it requires all stakeholders be involved at every stage of the collaborative process—to build a common objective, process, and outcome—to develop a shared sense of ownership.

5.0 OPEN GEOSPATIAL DATA: BEST PRACTICES

The following best practices provide a framework to respect the OCAP® principles for the dissemination of First Nations geospatial data under the OGL-C. There are immense opportunities for collaboration and partnerships. The best practices are informed by the following guiding principles:

- Renewed Nation-to-Nation relationship through respect and cooperation;
- Indigenous data sovereignty that supports First Nations control over their data; and
- First Nations needs and priorities for open data.

Guiding Best Practices

1. **Commit to Nation-to-Nation partnerships.** Maintain a renewed, Nation-to-Nation relationship with Indigenous Peoples based on recognition, rights, respect, co-operation and partnership in terms of open data and open government.
2. **Assert rights over data.** Affirm First Nations' inherent rights and jurisdiction over their data through supporting and adhering to OCAP® principles, creating a partnership based on respect, responsibility, and reciprocity.
3. **OCAP® compliant.** Work with the First Nations Information Governance Centre to develop OCAP®-certified open geospatial data.
4. **Ethical data guidelines.** Establish and implement ethical data guidelines that address geospatial data released under the OGL-C. OCAP® principles serve as a foundational and necessary step to support First Nation open geospatial data.
5. **OCAP® training.** Require all staff working with First Nations geospatial data to take the First Nations Information Governance Centre eLearning course "The Fundamentals of OCAP®."
6. **Voluntary participation.** Indigenous data collection or sharing initiatives need to be informed by free, prior, and informed consent principles.
7. **Substantive engagement and consultation.** First Nations must be centrally involved in developing appropriate frameworks surrounding access and use of their geospatial data. Meaningful engagement and consultation between Indigenous Nations and the Government of Canada require the following practices:
 - Involve First Nations in every stage to develop trusting relationships;
 - Ensure First Nations or third-party controls geospatial data repositories, with First Nations deciding data access;
 - Use of data-sharing agreements between First Nations and the government bodies outlining the nature of data solicited from specific sources, including data generation,

data storage, curation and analysis, data dissemination, and the reuse of Indigenous open data;

- Establish an environment that focuses on cultural safety, focusing on local Indigenous Knowledge protocols, ethical guidelines, and customary law;
 - Negotiate collaborative data sharing and licensing agreements at the inception of the project; and
 - Avoid an over-generalized, *pan-Indigenous* set of data ethics; instead, collaboration should begin with relationship building and dialogue about how to proceed in a way that benefits individual Indigenous Nations.
8. **Relationship building.** Build relationships with First Nations and organizations to directly engage with First Nations rights holders to develop meaningful open government initiatives that support First Nations needs and priorities.
 9. **First Nations research.** Support First Nations and organizations to develop First Nations-led and -controlled research to reflect their interests, values, and priorities.
 10. **Develop an Indigenous Knowledge data governance model.** First Nation data is a fundamental part of data partnerships. It should be considered at every stage of an open data initiative. The sensitivity of First Nations data needs a dedicated data governance model to define the access, use, and management of data.
 11. **Capacity development.** Promote and empower First Nations through geospatial capacity development. This would allow under-resourced First Nations to control research initiatives that represent their needs and priorities and advance reconciliation.
 12. **Enhance broadband infrastructure and ICTs systems.** Increase the capacity of broadband infrastructure and Internet communication technologies to promote universal access to open data initiatives.
 13. **Data repatriation.** Provide policy and legal support to repatriate First Nations data across federal departments and agencies.
 14. **Risk assessment.** Conduct an open data risk assessment, with a primary focus on First Nations data, as some datasets carry inherent risks to individual and collective privacy.

6.0 CONCLUSION

This report places the emerging discussion surrounding First Nations open geospatial data in the broader site of Indigenous data sovereignty. Indigenous data sovereignty gives rise to a wide-ranging set of issues. It encompasses the ethical dimensions around data collection, access, use, ownership, and storage. Further, it entails practical considerations about how Indigenous data should be used in the context of research.

OCAP[®] (ownership, control, access, and possession) emerged as a response to research challenges experienced by First Nations. OCAP[®] supports the necessary protocols, procedures, policies, and programs for the pursuit of self-determination and sovereignty through data governance. It implies that First Nations have not only the jurisdiction and inherent right over data, but also the capacity to produce First Nations-led and -controlled research. In doing so, it provides a road map to support a renewed Nation-to-Nation relationship through respect and cooperation.

Open Government is about greater openness and accountability, strengthening democracy and citizen participation, and driving innovation and economic opportunities for all Canadians. Open government is a way to ensure government decision-making processes represent Indigenous voices through collaboration and cooperation. To effectively leverage the value of open data to all stakeholders, there is a need to include Indigenous data into open government initiatives. Open geospatial data particularly relevant, as it is connected to broader nation-building activities.

First Nations open data presents significant opportunities and challenges for open government data initiatives. Opening First Nations geospatial data has the potential to contribute to First Nations needs and priorities. However, open geospatial data is accompanied by a complex array of concerns underpinned by historical uses and misuses of data.

OCAP[®] provides a foundation to support First Nation open geospatial data released under the OGL-C through the development of ethical data standards. Yet, there is a need to balance the growing need of open government data and Indigenous data sovereignty. The Government of Canada's dual commitment to reconciliation and open government presents a timely opportunity to support Indigenous data sovereignty. The way forward requires co-creation and co-implementation, encouraging First Nations, Inuit, and Métis rights holders to define their own approaches to engagement on open government data issues.

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