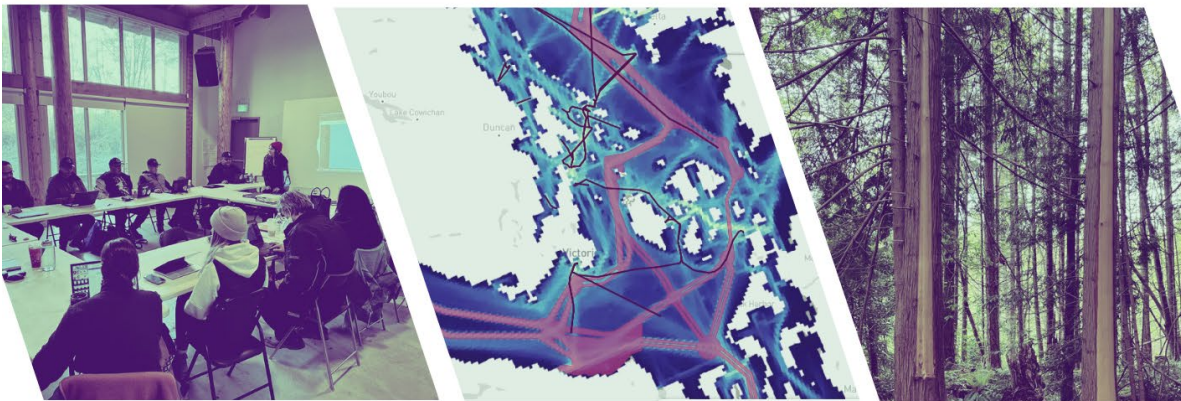# INDIGENOUS DATA SOVEREIGNTY: A LITERATURE REVIEW

Providing information and tools to advance data sovereignty planning and partnerships

Prepared for:

Island Marine Aquatic Working Group (IMAWG)
Q'ul-lhanumutsun Aquatic Resources Society (QARS)
Department of Fisheries and Oceans Canada (DFO)

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Indigenous Data Sovereignty: A Literature Review.

Executive Summary

This literature review synthesizes existing insights, frameworks, and best practices concerning Indigenous Data Sovereignty (IDS), emphasizing its significance within resource management contexts in Canada. Developed in response to collaborative workshops involving the Island Marine Aquatic Working Group (IMAWG), Q'ul-lhanumutsun Aquatic Resources Society (QARS), and Fisheries and Oceans Canada (DFO), the report provides foundational knowledge and practical guidance to support communities in asserting control over their data governance processes.

IDS embodies the collective right of Indigenous Nations to govern data about their communities, territories, and knowledge systems. This right is integral to Indigenous self-determination and nation-building efforts. Despite being recognized internationally through frameworks such as the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), and nationally through the principles of Ownership, Control, Access, and Possession (OCAP®), the mechanisms for implementing IDS effectively remain in development. The literature stresses the need for Indigenous data governance that is not only technically robust but culturally aligned, ethically responsible, and responsive to community priorities.

The report outlines three interconnected phases crucial to effective Indigenous data governance: Information Gathering, Information Management, and Information Access and Sharing. Across these phases, core principles emerge consistently, including trust, transparency, accountability, respect, and collective benefit. Principles like OCAP®, CARE (Collective benefit, Authority to control, Responsibility, Ethics), and FAIR (Findable, Accessible, Interoperable, Reusable) provide complementary guidance on relational, ethical, and technical dimensions of data governance.

Indigenous Data Sovereignty: A Literature Review.

Indigenous Nations across Canada have been advancing IDS through diverse strategies, including developing research protocols, data-sharing agreements, and governance bodies. However, significant gaps remain, particularly regarding reconciling collective data governance rights with individual privacy protections, an issue the literature identifies as needing urgent attention.

Ultimately, the literature emphasizes IDS as a dynamic, evolving journey that requires ongoing collaboration, capacity-building, and experimentation. By strengthening Indigenous governance over data, communities are actively reshaping research practices and data stewardship to better reflect Indigenous priorities, cultural values, and sovereign rights.

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Introduction

Indigenous Data Sovereignty (IDS) refers to the rights of Indigenous Nations to govern the data that pertains to their members, lands, unique knowledge systems, and governance. Often described as a form of "digital sovereignty," IDS encompasses control over how data is gathered, stored, interpreted, and shared—especially when that data relates to Indigenous Rights, interests, and territories. The term underscores frequent assertions by Indigenous Peoples that digital representations of their lives and knowledge should remain under their jurisdiction, aligned with broader goals of self-determination and Nationhood.

This review of literature related to IDS in Canadian resource management settings is shaped by highlights and critical insights that emerged from the workshop series with Island Marine Aquatic Working Group (IMAWG), Q'ul-lhanumutsun Aquatic Resources Society (QARS), and Fisheries and Oceans Canada (DFO). Through this series we heard directly from the experiences of individuals working with and for Indigenous Data endpoints of the values, challenges and information needed to advance IDS. This review and synthesis of materials is a response to what we heard, and is intended to advance IDS through providing this educational resource.

More broadly, this report aims to equip communities and practitioners with the conceptual and practical tools necessary to assert data sovereignty in applied resource governance contexts.

Throughout the report, we have compiled key information, existing frameworks, and best practices, to support communities in developing their own data governance approaches.

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Definitions

Clarifying definitions is not merely semantic; it is central to representation and power. Definitions are a form of power and control that shape what becomes visible and valued in environmental governance. Clear, shared definitions of terms are essential to address the tensions that arise between Indigenous and non-Indigenous frameworks, ensuring that Indigenous Knowledge systems and governance practices are not misrepresented or marginalized.

A recurring theme across both the reviewed literature and concerns raised during the workshop series is that definitions of Indigenous Knowledge are heavily influenced by context and positionality. This point was underscored in the final report of Canada's 1996 Royal Commission on Aboriginal Peoples, which highlighted challenges in harmonizing scientific language used in environmental management—such as "wildlife management" or "population"—with equivalent concepts meaningful to Indigenous communities. The Commission emphasized that successful integration of Indigenous Knowledge into co-management frameworks hinges on developing definitions and terms collaboratively, ensuring shared understanding tailored to the local context.[1]

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[1] Royal Commission on Aboriginal Peoples. (1996) *Report of the Royal Commission on Aboriginal Peoples: Volume 2: Restructuring the Relationship.* Canada Communication Group. https://data2.archives.ca/e/e448/e011188230-02.pdf (esp. Chapter 4).

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For the purposes of this report, we provide some ways that Indigenous Knowledge and Indigenous Data are defined.

Indigenous Knowledge

Battiste (2014) provides the following description of Indigenous Knowledge.

> Indigenous Knowledge represents a complex and dynamic capacity of knowing, a knowledge that results from knowing one's ecological environment, the skills and knowledge derived from that place, knowledge of the animals and plants and their patterns within that space, and the vital skills and talents necessary to survive and sustain themselves within that environment. It is a knowledge that requires constant vigor to observe carefully, to offer those in story and interactions, and to maintain appropriate relationships with all things and peoples in it. [...] Indigenous Knowledge, then, is a dynamic knowledge constantly in use as well as in flux or change.[2]

Indigenous Knowledge has often been mistakenly viewed as primarily historical or static, perhaps due to misunderstandings around the term "traditional". But, as the Standing Committee on Science and Research states in its report, "there is in fact a living body of

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[2] Battiste, M. (2014). Research ethics for protecting Indigenous Knowledge and heritage: Institutional and researcher responsibilities. In N. K. Denzin, Y. S. Lincoln, & L. T. Smith (Eds.), *Handbook of critical and indigenous methodologies* (pp. 497–509). SAGE Publications. p.5.

knowledge, evolving practices, and diverse practitioners involved in Indigenous science to this day.[3]

The following excerpt from Carroll et al. (2019) summarizes another important theme found throughout the material reviewed – and an issue widely noted as a leading challenge for the conceptualizing and implementing effective Indigenous Data governance strategies – namely, the collectively-held or interdependent nature of Indigenous Knowledge.

> While the acquisition and transmission of knowledge by individuals is necessary to support the collective base, Indigenous Data systems rely on shared responsibilities to ensure that Indigenous ways of knowing, being, and doing are transmitted from one generation to the next. Within this context, knowledge belongs to the collective and is fundamental to who Indigenous Nations are as peoples. Similarly, data that inform Indigenous ways of knowing are also collectively held. While individuals hold knowledge (stories, songs, knowledge of special relationships with the natural world), they have roles and responsibilities to the collective to steward this knowledge.[4]

Indigenous Data

Rainie et al. (2019) define Indigenous Data broadly as "data in a wide variety of formats inclusive of digital data and data as knowledge and information," encompassing "data,

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[3] Bradford, V. (Chair). (2024). *Incorporating Indigenous knowledge and science in Canadian research and policy development* (Report of the Standing Committee on Science and Research, 44th Parliament, 1st Session). House of Commons, Canada. p.10-11. https://www.ourcommons.ca/Content/Committee/441/SRSR/Reports/RP12966622/srsrrp06/srsrrp06-e.pdf

[4] Carroll, S. R., Rodriguez-Lonebear, D., & Martinez, A. (2019). Indigenous data governance: Strategies from United States Native Nations. *Data Science Journal, 18*(1), Article 31, 1–15. https://doi.org/10.5334/dsj-2019-031 p. 2.

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information, and knowledge about Indigenous individuals, collectives, entities, lifeways, cultures, lands, and resources."[5] The Indigenous Innovation Initiative (2021) further specifies that Indigenous Data includes information "from or about any Indigenous person or their community, territory or nation," including cultural expressions such as languages, customs, and intellectual property.[6] Kukutai & Taylor (2016) refine this further by emphasizing the impact of Indigenous Data on "the collective rights and interests of Indigenous peoples," underscoring its inherently communal nature.[7] This aligns with the US Indigenous Data Sovereignty Network (USIDSN) (2020), which stresses that Indigenous Data are integral for exercising self-determination, affirming Indigenous epistemologies, and fulfilling collective responsibilities; it is integral for "decision-making; the exercise of collective rights to self-determination; the affirmation and application of Indigenous epistemologies; and fulfilling responsibilities to Indigenous Peoples, nations, communities, and human, spiritual, and non-human relations."[8] Carroll et al. 2019 provide the following historical context for the concept of Indigenous Data.

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[5] Rainie, S. C., Kukutai, T., Walter, M., Figueroa-Rodríguez, O. L., Walker, J., & Axelsson, P. (2019). Indigenous data sovereignty. In T. Davies, S. B. Walker, M. Rubinstein, & F. Perini (Eds.), *The state of open data: Histories and horizons* (pp. 300–319). African Minds; International Development Research Centre. https://doi.org/10.47622/9781928331957 p. 301.

[6] Indigenous Innovation Initiative. (2021). *Indigenous knowledges and data governance protocols*. Indigenous Innovation Initiative.

[7] Kukutai, T., & Taylor, J. (Eds.). (2016). *Indigenous data sovereignty: Toward an agenda* (CAEPR Research Monograph No. 38). ANU Press. https://doi.org/10.22459/CAEPR38.11.2016

[8] United States Indigenous Data Sovereignty Network. (2020). *Principles of Indigenous data governance.* https://usindigenousdata.org/

> Many Indigenous Knowledge systems were based on generations of data gathering through observation and experience that then informed Indigenous practices, protocols, and ways of interacting with other people and with the natural world. The translation of knowledge into data was similarly evident. Indigenous Data were recorded in oral histories, stories, winter counts, calendar sticks, totem poles, and other instruments that stored information for the benefit of the entire community.[9]

Similarly, USIDSN (2020) indicates that Indigenous Data include "knowledge and information about Indigenous Peoples in any format, including cultural heritage embedded in languages, knowledges, practices, technologies, natural resources, waters, and territories."[10] The Indigenous Innovation Initiative (2021) also reminds researchers that, like Indigenous Knowledge, "Indigenous data are also relational and reciprocal, and need to be reflected and be held by the community as a collective, and are equally as important to pass down through generations."[11]

The Global Indigenous Data Alliance (GIDA) (2022) emphasizes that Indigenous Data governance is grounded in Indigenous values of collective benefit, authority to control, responsibility, and ethics (CARE). GIDA further distinguishes between three categories of Indigenous data: data about Indigenous peoples and nations (including demographics and

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[9] Carroll, S. R., Rodriguez-Lonebear, D., & Martinez, A. (2019). Indigenous data governance: Strategies from United States Native Nations. *Data Science Journal, 18*(1), 31. https://doi.org/10.5334/dsj-2019-031 p. 2.

[10] United States Indigenous Data Sovereignty Network. (2020). *Principles of Indigenous data governance.* https://usindigenousdata.org/ p. 1.

[11] Indigenous Innovation Initiative. (2021). *Indigenous knowledges and data governance protocols.* Indigenous Innovation Initiative.

health data), data from Indigenous communities and lands (such as biodiversity and environmental data), and data for Indigenous peoples (including data used to support self-determination and governance).[12]

Indigenous Research

The Canadian House of Commons Standing Committee on Science and Research report entitled *Incorporating Indigenous Knowledge and Science in Canadian Research and Policy Development* paraphrases the Tri-Agency Reference Group for the Appropriate Review of Indigenous Research to define Indigenous research as "research conducted by, grounded in, or engaged with, First Nations, Inuit or Métis communities, societies or individuals and their wisdom, cultures, experiences or knowledge systems, as expressed in their dynamic forms, past and present."[13] Walter and Suina (2019) state that Indigenous research methodologies "make visible within the research process what is meaningful and logical in Indigenous understanding of ourselves and the world" by approaching and undertaking research processes and practices that are shaped by and apply "Indigenous worldviews, perspectives, values and lived experience as their central

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[12] Global Indigenous Data Alliance. (2022). *Indigenous data sovereignty and governance principles.* https://static1.squarespace.com/static/5d3799de845604000199cd24/t/637acfbec86a122d68b0f317/1668992965093/Final_Attribution_NonCommercial_NoDerivatives_4_International.pdf

[13] Bradford, V. (Chair). (2024). *Incorporating Indigenous knowledge and science in Canadian research and policy development* (Report of the Standing Committee on Science and Research, 44th Parliament, 1st Session). House of Commons, Canada. p.9.
https://www.ourcommons.ca/Content/Committee/441/SRSR/Reports/RP12966622/srsrrp06/srsrrp06-e.pdf

axis."[14] This framing underscores why Indigenous Data governance must similarly adopt methodologies and practices designed specifically from Indigenous perspectives.

Indigenous Data Sovereignty: Overview

WHAT IS INDIGENOUS DATA SOVEREIGNTY?

Indigenous Data Sovereignty is a framework of principles and practices asserting Indigenous Peoples' inherent right to govern the collection, ownership, and use of their data. It is both an advocacy movement and a practical governance approach intended to uphold Indigenous self-determination, especially in contexts increasingly dominated by data-driven policy and decision-making, such as where data sets are increasingly shared and combined to enable "machine learning" and artificial intelligence.[15]

As suggested above, Indigenous Data Sovereignty is a relatively new concept that has developed to denote the need for Indigenous people to own and control the data created about and/or with them. It describes the rights of Indigenous people to determine what types of data are gathered about them and their lives, territories, and resources, and to control how these

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[14] Walter, M., & Suina, M. (2019). Indigenous data, Indigenous methodologies and Indigenous data sovereignty. *International Journal of Social Research Methodology, 22*(3), 233–243. p. 234. https://doi.org/10.1080/13645579.2019.1597484

[15] Tsosie, R. (2019). Tribal data governance and informational privacy: Constructing "Indigenous data sovereignty" (*Arizona Legal Studies Discussion Paper No. 19-19*). University of Arizona, James E. Rogers College of Law. p. 242.

data are collected, governed, and used.[16] To paraphrase McCartney et al. (2022), IDS refers to the individual and collective right of Indigenous people to control data from and about them.[17] Importantly, it is also "a tool for the advancement of Indigenous resurgence."[18]

Indigenous people have always gathered, protected, and governed their own knowledge and information.[19] As Lovett et al. (2019) asserts, "data gathering and preservation existed in most, if not all, Indigenous cultures in the form of art and pictorial calendars, chants, songs, the recitation of genealogies and other cultural practices that have been passed on across

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[16] Lovett, R., Lee, V., Kukutai, T., Cormack, D., Rainie, S. C., & Walker, J. (2019). Good data practices for Indigenous data sovereignty and governance. In A. Daly, S. K. Devitt, & M. Mann (Eds.), *Good data* (pp. 26–36). Institute of Network Cultures. p.26.

[17] McCartney, A. M., Anderson, J., Liggins, L., Hudson, M. L., Anderson, M. Z., TeAika, B., Geary, J., Cook-Deegan, R., Patei, H. R., & Phillippy, A. M. (2022). Balancing openness with Indigenous data sovereignty: An opportunity to leave no one behind in the journey to sequence all of life. *Proceedings of the National Academy of Sciences of the United States of America (PNAS), 119*(4), p. 3. e2115860119. https://doi.org/10.1073/pnas.2115860119

[18] Oguamanam, C. (2019). *Indigenous data sovereignty: Retooling Indigenous resurgence for development* (CIGI Papers No. 234). Centre for International Governance Innovation. https://www.cigionline.org/publications/indigenous-data-sovereignty-retooling-indigenous-resurgence-development/

[19] Rhodes, K. L., Echo-Hawk, A., Lewis, J. P., Cresci, V. L., Satter, D. E., & Dillard, D. A. (2024). Centering data sovereignty, tribal values, and practices for equity in American Indian and Alaska Native public health systems. *Public Health Reports, 139*(Suppl. 1), 10S–15S. https://doi.org/10.1177/00333549231217245 p. 10S.

generations."[20] But many of these practices were disrupted by colonization, and throughout much of the post-colonial era the data gathered about Indigenous people has often been collected through extractive approaches typified by research conducted *on* Indigenous communities without their consent or participation and applied in manners that reinforced colonial structures.[21] Indeed, the movement towards IDS comes from similar motivations to the movement among Indigenous communities to repatriate other forms of both tangible and intangible property from non-Indigenous institutions, such as museums and universities, as an assertion of their inherent rights. IDS aligns closely with concepts of data justice and the

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[20] Lovett, R., Lee, V., Kukutai, T., Cormack, D., Rainie, S. C., & Walker, J. (2019). Good data practices for Indigenous data sovereignty and governance. In A. Daly, S. K. Devitt, & M. Mann (Eds.), *Good data* (pp. 26–36). Institute of Network Cultures. p. 27. https://networkcultures.org/wp-content/uploads/2019/03/Good_Data.pdf;

Carroll, S. R., Rodriguez-Lonebear, D., & Martinez, A. (2019). Indigenous data governance: Strategies from United States Native Nations. *Data Science Journal, 18*(31), 1–15. p. 2 https://doi.org/10.5334/dsj-2019-031

[21] See, for example: Smith, L. T. (1999). *Decolonizing Methodologies: Research and Indigenous Peoples.* London, UK & New York, NY: Zed Books; Kovach, M. (2009). *Indigenous Methodologies: Characteristics, Conversations, and Contexts.* Toronto: University of Toronto Press;

Tuck, E., & Yang, K. W. (2014). "R-words: Refusing research". In D. Paris & M. T. Winn (Eds.), *Humanizing Research: Decolonizing Qualitative Inquiry with Youth and Communities* (pp. 223–248). SAGE: Thousand Oaks, CA; Rainie, S. C., et al. (2019). *The State of Open Data: Histories and Horizons* (pp. 300–319). African Minds: Cape Town;

Rhodes, K. L., et al. (2024). *Public Health Reports*, *139*(1_suppl), 10S–15S.

broader project of decolonization, emphasizing that data practices must actively dismantle rather than perpetuate colonial structures.[22]

Gathering and using information are often inherently political activities. A legacy of focusing these activities on data about Indigenous people without consulting on what information should be collected, who should collect it, how and where it should be managed, and who should have access to it has fostered a climate of distrust and resistance in many communities.[23] IDS is a response to such poor research and data practices and reflects an initiative to develop and implement better practices that embed and support the self-determination and wellbeing of Indigenous communities. The GIDA (2022) defines Indigenous Data Sovereignty as "the *right* of Indigenous Peoples and nations to govern the collection, ownership, and application of their own data," which they assert "derives from inherent rights to govern peoples, land, and resources" (emphasis in original).[24]

Open North (2017) enumerates the following key problems with the ways colonial governments have approached Indigenous Data that have given rise to the IDS movement.

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[22] Kukutai, T., & Cormack, D. (2019). Mana motuhake ā-raraunga: Datafication and social science research in Aotearoa. *Kōtuitui: New Zealand Journal of Social Sciences Online, 14*(2), 201–208. https://doi.org/10.1080/1177083X.2019.1648304

[23] Royal Commission on Aboriginal Peoples. (1996). *Report of the Royal Commission on Aboriginal Peoples* (Vol. 3: *Gathering Strength*, p. 4). Canada Communication Group; Oguamanam, C. (2019). *Indigenous data sovereignty: Retooling Indigenous resurgence for development* (CIGI Papers No. 234, p. 4). Centre for International Governance Innovation.

[24] Global Indigenous Data Alliance (GIDA). (2022). *Indigenous data sovereignty and governance* [PDF]. Global Indigenous Data Alliance. https://www.gida-global.org/publications

1. Methods and approaches used to gather, analyze and share data on Indigenous communities has reinforced systemic oppression, barriers and unequal power relations.

2. Data on Indigenous communities has typically been collected and interpreted through a lens of inherent lack, with a focus on statistics that reflect disadvantage and negative stereotyping.

3. Data on Indigenous communities collected by nation state institutions has been of little use to Indigenous communities, further distancing Nations from the information.

4. Data on Indigenous communities collected by the nation state government has been assumed to be owned and therefore controlled by said government;

5. With a lack of meaningful Nation-to-Nation dialogue about data sovereignty.[25]

Key voices in the evolving definition and discourse of IDS emphasize that it is rooted in Indigenous Rights, governance authority, and ownership of information. The First Nations Information Governance Centre (FNIGC), for example, states that "First Nations data sovereignty is an element of their inherent, Treaty, and constitutional rights to self-determination and self-government. First Nations data sovereignty means First Nations data is governed by First Nations laws"[26] Indigenous scholars Walter and Suina (2019) state simply that "Indigenous self-

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[25] Open North & British Columbia First Nations Data Governance Initiative. (2017). *Decolonizing data: Indigenous data sovereignty primer* [PDF]. p. 3. https://www.opennorth.ca/publications/decolonizing-data/

[26] First Nations Information Governance Centre. (2022). *Discussion paper: Exploration of the impact of Canada's information management regime on First Nations' data sovereignty* (p. 1). https://fnigc.ca/wp-content/uploads/2022/09/FNIGC_Discussion_Paper_IM_Regime_Data_Sovereignty_EN.pdf#:~:text=First%20Nations%20data%20sovereignty%20is,Data

determination relies on data self-determination."[27] The Assembly of First Nations (AFN) Chiefs-in-Assembly asserts flatly that "First Nations living in Canada maintain ownership and control over data that relates to their peoples."[28]

IDS has developed as part of what Snipp (2016) describes as "the explosive growth of information" driven by the internet and mobile technology.[29] This growth has coincided with several other key factors. First, the evolving counterbalance to historically extractive data practices that reinforced colonial policies. Second, a growing awareness that better data about Indigenous people and their interests and concerns are necessary to guide all sorts of decision-making.[30] Third, even as Indigenous communities have advocated for community-led and co-developed research models to improve Indigenous Data they have begun to face increasing

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[27] Walter, M., & Suina, M. (2019). Indigenous data, Indigenous methodologies and Indigenous data sovereignty. *International Journal of Social Research Methodology, 22*(3), 233–243. (p. 236). https://doi.org/10.1080/13645579.2019.1597484

[28] Assembly of First Nations. (2018). *Special Chiefs Assembly: Resolution No. 92/2018.* https://www.afn.ca/wp-content/uploads/2019/01/Combined-Final-2018-December-SCA-Resolutions_EN.pdf#:~:text=H,First%20Nations%20Information%20Governance%20Centre

[29] Snipp, C. M. (2016). What does data sovereignty imply? *In T. Kukutai & J. Taylor (Eds.), Indigenous data sovereignty: Toward an agenda* (pp. 39–56). ANU Press. p. 39. https://doi.org/10.22459/CAEPR38.11.2016

[30] The First Nations Information Governance Centre. (2019). First Nations data sovereignty in Canada. *Statistical Journal of the IAOS, 35*(1), 47–69. https://doi.org/10.3233/SJI-180478;

Lovett, R., Lee, V., Kukutai, T., Cormack, D., Carroll, S. R., & Walker, J. (2019). Good data practices for Indigenous data sovereignty and governance. In A. Daly, S. K. Devitt, & M. Mann (Eds.), *Good data* (pp. 26–36). Institute of Network Cultures. pp. 29, 35. https://networkcultures.org/wp-content/uploads/2019/01/Good_Data.pdf

pressure from the open data movement with its emphasis on free, accessible, and machine-readable data.[31]

While the broader international definition of data sovereignty refers to digital data being governed by national laws where data is physically stored, the Global Indigenous Data Alliance emphasizes that Indigenous Data Sovereignty specifically refers to Indigenous Peoples' inherent right to govern their data according to their own laws, values, and cultural contexts.[32]

The available literature is unanimous that IDS is part of the larger project of decolonizing methodologies, which posits that data can perpetuate colonial power unless governed by Indigenous protocols.[33] It is also part of the ongoing movement away from a focus on the privacy and data control of individuals towards an emphasis on collective, community, and/or

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[31] Open Data Charter. (2015). *International open data charter.* https://opendatacharter.net/principles; Open Knowledge Foundation. (n.d.). *Open data handbook.* https://opendatahandbook.org

[32] Global Indigenous Data Alliance (GIDA). (2022). *Indigenous data sovereignty and governance.* https://www.gida-global.org/indigenous-data-sovereignty-governance;

Lovett, R., Lee, V., Kukutai, T., Cormack, D., Rainie, S. C., & Walker, J. (2019). Good data practices for Indigenous data sovereignty and governance. In A. Daly, S. K. Devitt, & M. Mann (Eds.), *Good data* (pp. 26–36). Institute of Network Cultures; Snipp, C. M. (2016). What does data sovereignty imply: What does it look like? In T. Kukutai & J. Taylor (Eds.), *Indigenous data sovereignty: Toward an agenda* (pp. 39–56). ANU Press. (p. 39).

Rainie, S. C., Kukutai, T., Walter, M., Figueroa-Rodriguez, L., Walker, J., & Axelsson, P. (2019). Indigenous data sovereignty. In T. Davies, S. Walker, M. Rubinstein, & F. Perini (Eds.), *The state of open data: Histories and horizons* (pp. 300–319). African Minds. (p. 300).

[33] Smith, L. T. (1999). *Decolonizing methodologies: Research and Indigenous peoples.* Zed Books.

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Nation-held interests and ownership of knowledge and data in keeping with traditional Indigenous protocols regarding the same.[34] As Hudson et al. (2023) states:

> Indigenous concerns about misappropriation of traditional knowledge and Indigenous Data grow as the research environment promotes data diversity, facilitates data centralization, encourages data sharing, enables data linkage, and generates pathways that enable the commercialization of data. As the research data environment becomes increasingly oriented toward open access there is a need to ensure that data systems and practices operate in a manner consistent with the Indigenous aspirations for data sovereignty and research sovereignty.[35]

Smith (2016) suggests that effective governance of Indigenous Data and the collection of data for effective Indigenous governance are emerging from the IDS movement as the "twin capabilities fundamental to underwriting the daily exercise of indigenous self-determination and sovereignty for the social good."[36]

One of the most common themes in the material reviewed for this report was that Indigenous Data governance should be seen as the key to ensuring IDS. No governance, no sovereignty. It is through Indigenous Data governance that the principles of IDS are enacted, and it is in the practice of Indigenous Data governance that these principles are applied. Therefore, the bulk of

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[34] Walter, M., & Andersen, C. (2013). *Indigenous statistics: A quantitative research methodology*. Left Coast Press.

[35] Hudson, M., Carroll, S. R., Anderson, J., Blackwater, D., Cordova-Marks, F. M., Cummins, J., David-Chavez, D., Fernandez, A., Garba, I., Hiraldo, D., Jager, M. B., Jennings, L. L., Martinez, A., Sterling, R., Walker, J. D., & Rowe, R. K. (2023). Indigenous Peoples' rights in data: A contribution toward Indigenous research sovereignty. *Frontiers in Research Metrics and Analytics, 8*, 1173805. https://doi.org/10.3389/frma.2023.1173805 (p. 6).

[36] Smith, D. E. (2016). Governing data and data for governance: The everyday practice of Indigenous sovereignty. In T. Kukutai & J. Taylor (Eds.), *Indigenous data sovereignty: Toward an agenda* (pp. 117–135). ANU Press. (p. 119).

this report is dedicated to discussing the insights and recommendations into Indigenous Data governance found throughout the IDS literature reviewed. First, however, we will focus on what the available literature widely indicates are the foundational principles of IDS.

Ownership, Control, Access, Possession (OCAP®)

The available literature locates the dawn of the contemporary concept and discourse of IDS in the development of what is widely known as the OCAP® model in the late 1990s.[37] OCAP® stands for ownership, control, access, and possession. These principles were first introduced and developed during a brainstorming session involving Canadian First Nations health

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[37] Lovett, R., Lee, V., Kukutai, T., Cormack, D., Carroll, S. R., & Walker, J. (2019). Good data practices for Indigenous data sovereignty and governance. In A. Daly, S. K. Devitt, & M. Mann (Eds.), *Good data* (pp. 26–36). Institute of Network Cultures. p. 29; Oguamanam, C. (2019). Indigenous data sovereignty: Retooling Indigenous resurgence for development. *CIGI Papers*, (234), 1–14. Centre for International Governance Innovation. (p. 6);

Rainie, S. C., Kukutai, T., Walter, M., Figueroa-Rodriguez, L., Walker, J., & Axelsson, P. (2019). Indigenous data sovereignty. In T. Walker, S. Rubinstein, & F. Perini (Eds.), *The state of open data: Histories and horizons* (pp. 300–319). African Minds. (p.311);

Walter, M., & Suina, M. (2019). Indigenous data, Indigenous methodologies and Indigenous data sovereignty. *International Journal of Social Research Methodology*, 22(3), p. 233–243.

Rowe, R. K., Bull, J. R., & Walker, J. D. (2020). Indigenous self-determination and data governance in the Canadian policy context. In M. Walter, T. Kukutai, S. R. Carroll, & D. Rodriguez-Lonebear (Eds.), *Indigenous data sovereignty and policy* (pp. 81–98). Routledge. (p. 88);

Wilks, J., Kennedy, G., & Drew, N. (2018). Indigenous data sovereignty in higher education. *Australian Universities' Review*, 60(2), 4–14. (p. 5)

representatives and have gone on to become the leading standard for Indigenous self-determination in research.[38] As the material reviewed for this report broadly indicates, understanding the principles of OCAP® is central to understanding the issues, challenges, and recommendations related to IDS. Below we provide a brief overview of each principle of OCAP® and its relevance to IDS.

> **Ownership** refers to the relationship of First Nations to their 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** affirms that First Nations, their communities, and representative bodies are within their rights to seek control over all aspects of research and information management processes that impact them. First Nations control of research can include all stages of a particular research project-from start to finish. The principle extends to the control of resources and review processes, the planning process, management of the information and so on.

> **Access** refers to the fact that First Nations must have access to information and data about themselves and their communities regardless of where it is held. The principle of access also refers to the right of First Nations' communities and organizations to manage and make decisions regarding access to their collective information. This may be achieved, in practice, through standardized, formal protocols.

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[38]Schnarch, B. (2004). Ownership, control, access, and possession (OCAP) or self-determination applied to research. *Journal of Aboriginal Health*, *1*(1), 80–95. The article states: "The original acronym has been attributed to Cathryn George, a member of the committee representing the Association of Iroquois and Allied Indians." (p. 80)

> **Possession** or stewardship is more concrete [than ownership]: it refers to the physical control of data. Possession is the mechanism by which ownership can be asserted and protected.[39]

Though not formal legislation, OCAP® has become an internationally recognized standard guiding ethical research and data management involving First Nations. OCAP® principles are often embedded in legally binding Data Sharing Agreements, Memoranda of Understanding (MOUs), and research ethics approvals, ensuring communities retain meaningful authority over their information.

These principles are understood and intended to ensure Indigenous communities retain total authority over how their information can be collected, stored, interpreted, used, or shared. Though not legislation, OCAP® functions as a *de facto* standard that many researchers, governments, and organizations operating in Canada are expected to follow when working with First Nations data. Canadian research funding agencies and ethics boards, for example, often require that projects involving First Nations demonstrate adherence to OCAP® or similar community-approved protocols.

In effect, OCAP® operates as an internationally recognized framework that supports Indigenous Data rights. It is easy to see how these principles also underpin the concept of IDS. Indeed, many First Nations communities now incorporate OCAP® language into legally binding *Data Sharing Agreements* and research MOUs to frame and state the Nation's retention of ownership and control over all applicable data.

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[39] First Nations Information Governance Centre. (2025). *The First Nations principles of OCAP®*. https://fnigc.ca/ocap-training/

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The First Nations Information Governance Centre (FNIGC) continues to expand OCAP® education through tools such as *Pathways to First Nations Data Sovereignty*, which support communities in developing governance protocols aligned with First Nations ethics and legal orders.[40]

Recommended Reading: Notable Reports and Primers

Indigenous Data Sovereignty: Retooling Indigenous Resurgence for Development by Chidi Oguamanam offers a comprehensive yet condensed overview of the historical, philosophical, and practical underpinnings of IDS as a concept. As the paper, published by the Centre for International Governance Innovation, states, it focuses on "the historical contexts, including the triggers and the processes, behind the growing relevance of Indigenous Data Sovereignty."[41]

Decolonizing Data: Indigenous Data Sovereignty Primer is an influential 2017 report that outlines "Ten Key Principles" and "Five Driving Values" of IDS.[42] This primer was developed through collaboration between a civic tech non-profit called Open North and the British Columbia First Nations' Data Governance Initiative (BCFNDGI), a gesture of bridgebuilding between Indigenous communities and open data practitioners. The report highlights the tension and necessary

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[40] First Nations Information Governance Centre. (2021). *Pathways to First Nations data sovereignty: A collection of resources and tools for governance*.

[41] Oguamanam, C. (2019). Indigenous data sovereignty: Retooling Indigenous resurgence for development. *CIGI Papers*, (234), 1–14. Centre for International Governance Innovation. (p. 2).

[42] Open North & British Columbia First Nations Data Governance Initiative. (2017). *Decolonizing data: Indigenous data sovereignty primer* (pp. 4–5). https://www.opennorth.ca/publications/decolonizing-data

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balance between open data initiatives and Indigenous Data principles, advocating for approaches that *decolonize* data by ensuring Indigenous ownership and interpretation of their data.

The chapter entitled "Indigenous Data Sovereignty" from the book *The State of Open Data* also addresses and explores these tensions, and offers an effective overview of the emergence, history, and principles of IDS. This chapter also provides case studies and corresponding recommendations the authors intend to illuminate the path forward to resolving the tensions described.[43]

The CARE Principles for Indigenous Data Governance by Carroll et al. provides an introduction to the important concepts of CARE and FAIR, which are central to understanding and enacting contemporary IDS. It also provides a brief and readable overview of the history and emergence of the IDS movement. Carroll et al. (2021) propose a data stewardship maturity model that embeds CARE alongside FAIR principles, offering a practical guide for institutions and communities seeking to ethically manage Indigenous Data.[44]

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[43] Rainie, S. C., Kukutai, T., Walter, M., Rigueroa-Rodriguez, L., Walker, J., & Axelsson, P. (2019). Indigenous data sovereignty. In T. Davies, S. Walker, M. Rubinstein, & F. Perini (Eds.), *The state of open data: Histories and horizons* (pp. 300–319). African Minds.

[44] Carroll, S. R., Herczog, E., Hudson, M., Russell, K., & Stall, S. (2021). Operationalizing the CARE and FAIR principles for Indigenous data futures. *Scientific Data, 8*(108). https://doi.org/10.1038/s41597-021-00892-0

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The First Nations Information Governance Centre (FNIGC) is considered the "flagbearer of Indigenous Data Governance,"[45] and regularly publishes valuable papers and guidelines related to applying the principles of IDS. The FNIGC's *First Nations Data Governance Strategy*, for example, is discussed in the Information Management section. The Centre is also the steward of OCAP® and its guideline documents, such as *Barriers and Levers for Implementing OCAP®*, are key references for practical guidance on implementing Indigenous Data Governance.

Indigenous Data Governance

This section defines Indigenous Data Governance, underscoring its importance as the central mechanism for achieving IDS.

THE KEY TO INDIGENOUS DATA SOVEREIGNTY

Lovett et al. (2019) defines data governance as "power and authority over the design, ownership, access to and use of data."[46] Smith 2016 elucidates several important distinctions between such a conventional conception of data governance and the concept of Indigenous Data Governance.

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[45] Kukutai, T., Campbell-Kamariera, K., Mead, A., Mikaere, K., Moses, C., Whitehead, J., & Cormack, D. (2023). *Māori data governance model: Te Kāhui Raraunga* (p. 5).

[46] Lovett, R., Lee, V., Kukutai, T., Cormack, D., Rainie, S. C., & Walker, J. (2019). Good data practices for Indigenous data sovereignty and governance. In A. Daly, S. K. Devitt, & M. Mann (Eds.), *Good data* (pp. 26–36). Institute of Network Cultures. (p. 27)

> Contrary to contemporary Western conceptualisations of corporate governance and 'big data' management systems, indigenous Peoples' governance or stewardship of data is not simply about the data. It is about the people who provide and govern an asset that happens to be data. From this perspective, arrangements for the governance of data tend to be assessed by indigenous peoples according to whether they satisfy the spirit and intent of reproducing their culturally based systems of knowledge, alongside delivering on their planning, service-delivery and development aspirations.[47]

The definition provided by Carroll et al. (2019) might be seen as a sort of synthesis of these two preceding definitions.

> Indigenous Data Governance is the act of harnessing tribal cultures, values, principles, and mechanisms — Indigenous ways of knowing and doing — and applying them to the management and control of an Indigenous Nation's data ecosystem.[48]

Hudson et al. (2023) provide a similar definition with slightly different emphasis and phrasing, describing Indigenous Data Governance as "the ability to organize and control data in relation to a collective identity."[49]

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[47] Smith, D. E. (2016). Governing data and data for governance: The everyday practice of Indigenous sovereignty. In T. Kukutai & J. Taylor (Eds.), *Indigenous data sovereignty: Toward an agenda* (pp. 117–135). ANU Press. (p. 130)

[48] Carroll, S. R., Rodriguez-Lonebear, D., & Martinez, A. (2019). Indigenous data governance: Strategies from United States Native Nations. *Data Science Journal, 18*(1), 31. https://doi.org/10.5334/dsj-2019-031 (p. 5)

[49] Hudson, M., Carroll, S. R., Anderson, J., Blackwater, D., Cordova-Marks, F. M., Cummins, J., David-Chavez, D., Fernandez, A., Garba, I., Hiraldo, D., Jager, M. B., Jennings, L. L., Martinez, A., Sterling, R., Walker, J. D., & Rowe, R. K. (2023). Indigenous Peoples' rights in data: A contribution toward Indigenous research sovereignty. *Frontiers in Research Metrics and Analytics, 8*, 1173805. https://doi.org/10.3389/frma.2023.1173805 (p. 3)

Cannon et al. (2024) emphasize that taking care of data is inseparable from taking care of knowledge and place—particularly in contexts such as Indigenous salmon governance—highlighting how data practices must remain accountable to Indigenous laws, land-based ethics, and responsibilities to more-than-human relations.[50]

The available literature makes clear that Indigenous Data Governance is the central challenge of IDS. The material reviewed places both at the heart of the "Nation rebuilding" movement, which is essentially the push from Indigenous Nations and communities to develop and assert their capacity "to make and implement strategic decisions about their own affairs."[51] It is easy to see how IDS is central to this movement, and that IDS is enacted through Indigenous Data Governance. Therefore, the literature considered suggests, effective Indigenous Data Governance is central to rebuilding Indigenous communities and Nations on their own terms "in the continued wake of colonization."[52] For these reasons we have chosen to frame this review

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[50] Cannon, S. E., Moore, J. W., Adams, M. S., Degai, T., Griggs, E., Griggs, J., Marsden, T., Reid, A. J., Sainsbury, N., Stirling, K. M., Yee, A. A., Barnes, S., Benson, R., Burrows, D., Chamberlin, G. R., Charley, B., Dick, D., Duncan, A. T., Liddle, M. K., Paulo, M., Prince, N. P., Scotnicki, C., Speck, K., Squakin, J., van der Minne, C., Walkus, J., West, K., Wilson, K. B., & the Indigenous Data Sovereignty Workshop Collective. (2024). Taking care of knowledge, taking care of salmon: Towards Indigenous data sovereignty in an era of climate change and cumulative effects. *FACETS, 9*(1), 1–21. https://doi.org/10.1139/facets-2023-0135

[51] Carroll, S. R., Rodriguez-Lonebear, D., & Martinez, A. (2019). Indigenous data governance: Strategies from United States Native Nations. *Data Science Journal, 18*(1), Article 31. https://doi.org/10.5334/dsj-2019-031 (p.4).

[52] ibid: (p. 4).

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of the literature related to Indigenous Data Sovereignty as a report on that literature's insights and observations into Indigenous Data Governance.

Figure 1: Image from Carroll et al. (2019)

The material reviewed consistently stresses that proper Indigenous Data Governance begins at or even before the start of an Indigenous research project and extends for as long as the Indigenous Data generated continues to exist. In this way the term Indigenous Data Governance describes a sort of ongoing process or continuum that includes multiple phases. Broadly, these phases can be the information gathering, information storage and management, and the information access and sharing phases.

For these reasons we have broken our discussion of the findings from our review of the literature related to IDS into three sections:

1. Information Gathering: Indigenous Data Governance Part I
2. Information Managing: Indigenous Data Governance Part II
3. Information Access & Sharing: Indigenous Data Governance Part III

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Conventionally, each of these phases may be understood to be distinct and discrete, and may even involve separate personnel, budgets, and administration. That is precisely why we present them here as interconnected parts of the unifying concept of Indigenous Data Governance. The available literature is clear that effective Indigenous Data Governance requires and comprises activities implemented during all three stages, and that policies required to guide and support these activities must apply to and be implemented during all three stages. In short, IDS means effective Indigenous Data Governance, which involves integrated control and authority over information gathering, managing, access and sharing. As Garba et al. (2023) indicates, enacting Indigenous Data Governance requires incorporating IDS principles into all "relevant features of research infrastructure such as project applications, contracting, IRB review, researcher training, metadata fields, data management and repository policies, funding requirements, and community engagement"[53] – and based on the literature reviewed, in our opinion this list should be considered indicative but not exhaustive.

Information Gathering: Indigenous Data Governance Part I

Information gathering refers to what many might think of as the research phase of a project. It involves collecting and producing knowledge and information by obtaining and analyzing data.

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[53] Garba, I., Sterling, R., Plevel, R., Carson, W., Cordova-Marks, F. M., Cummins, J., Curley, C., David-Chavez, D., Fernandez, A., Hiraldo, D., Hiratsuka, V., Hudson, M., Jäger, M. B., Jennings, L. L., Martinez, A., Yracheta, J., Garrison, N. A., & Carroll, S. R. (2023). Indigenous peoples and research: Self-determination in research governance. *Frontiers in Research Metrics and Analytics, 8*, Article 1272318. https://doi.org/10.3389/frma.2023.1272318 (p. 7).

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In resource management settings this can include conducting monitoring activities, interviews, surveys, workshops, etc. This is the phase during which data is accumulated and potentially separated from its possessors and context, causing immediate implications for its ownership, security, storage, handling, and potential use.

TRUST, RELATIONSHIPS, AND COMMUNITY INVOLVEMENT

Trust and meaningful community involvement are foundational to Indigenous Data Governance. As recent federal policy research emphasizes, trust must be earned through sustained and reciprocal relationships rather than one-off consultations and be built in advance of a project.[54] This process is rooted in Indigenous research paradigms that prioritize relational accountability, as Wilson (2008) outlines, where the axiology and epistemology are built upon relationships and where knowledge is not owned by individuals but shared through relational responsibilities.[55]

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[54] Bradford, L. (2024). *Incorporating Indigenous knowledge and science in Canadian research and policy development: Report of the Standing Committee on Science and Research.* House of Commons, Canada. https://www.ourcommons.ca/Content/Committee/441/SRSR/Reports/RP12773436/srsrrp02/srsrrp02-e.pdf

[55] Wilson, S. (2008). *Research is ceremony: Indigenous research methods.* Fernwood Publishing. p.77

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Building strong data relationships also requires transparency, consistency, and attention to community-identified priorities.[56] [57] Ortenzi et al. (2025) emphasize that trust is not just an outcome but a condition of ethical research and governance—one that is cultivated through clear agreements on data use, long-term engagement, and a demonstrated commitment to community benefit.[58]

Meaningful involvement must go beyond token consultation to support co-development of research goals, data collection processes, and governance mechanisms. As Cannon et al. (2024) note, involvement in these processes affirms Indigenous Rights and allows communities to shape the narratives, interpretations, and decisions that affect them.[59] This requires humility on the part of researchers and institutions, and an orientation toward listening, shared decision-making, and community timelines rather than externally imposed deliverables.

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[56] McCartney, S., Wong, T., & Deegan, S. (2021). *Principles of Indigenous data governance for the First Nations principles of OCAP® and OCAS.* Ontario Federation of Indigenous Friendship Centres;

[56] Battiste, M. (2014). *Research ethics for protecting Indigenous knowledge and heritage: Institutional and researcher responsibilities.* SAGE Publications. (p.5).

[58] Ortenzi, K. M., Flowers, V. L., Pamak, C., Saunders, M., Schmidt, J. O., & Bailey, M. (2025). Good data relations key to Indigenous research sovereignty: A case study from Nunatsiavut. *Ambio, 54*, 256–269. (p. 267)

[59] Cannon, S. E., et al & the Indigenous Data Sovereignty Workshop Collective. (2024). Taking care of knowledge, taking care of salmon: Towards Indigenous data sovereignty in an era of climate change and cumulative effects. *FACETS, 9*(1), 1–21. https://doi.org/10.1139/facets-2023-0135

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Critically, participation must also be understood as political and rights-affirming. As Walter and Suina (2019) argue, data governance is not merely a technical exercise but a tool for Indigenous self-determination. It affirms the authority of Indigenous Peoples to decide how they are represented, how their knowledge is used, and how their sovereignty is enacted in data relations.[60] Snipp (2016) likewise emphasizes that control over information is inseparable from broader political and social power, and that Indigenous Data Governance must actively dismantle the colonial legacies embedded in conventional research structures.[61]

RESPECT

Battiste (2014) stresses the need for researchers to demonstrate respect for relevant protocols and laws concerning the control and protection of Indigenous Knowledge by involving its holders and custodians directly in research projects.[62] Smith (2016) agrees that understanding and recognizing that certain individuals and subgroups may hold responsibility for and authority over the distribution of specific types of knowledge can be critical to demonstrating the respect necessary to establish the relationships, trust, and perceived legitimacy require to

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[60] Walter, M., & Suina, M. (2019). Indigenous data, Indigenous methodologies and Indigenous data sovereignty. *International Journal of Social Research Methodology, 22*(3), 233–243. https://doi.org/10.1080/13645579.2019.1596075

[61] Snipp, C. M. (2016). What does data sovereignty imply: What does it look like? In T. Kukutai & J. Taylor (Eds.), *Indigenous data sovereignty: Toward an agenda* (pp. 39–56). ANU Press. https://doi.org/10.22459/CAEPR38.11.2016.03

[62] Battiste, Marie. 2014. Research Ethics for Protecting Indigenous Knowledge and Heritage: Institutional and Researcher Responsibilities. SAGE Publications Inc.: Thousand Oaks. (p.14).

support Indigenous research.[63] Hiraldo et al. (2021) and McCartney et al. (2022) recommend that Indigenous Nations and communities develop their own Indigenous research and data governance policies outlining requirements and expectations related to these and other issues. Specifying and clarifying the approaches, behaviors, and protocols that connote respect can help to ensure it is properly demonstrated.[64]

The recommendation that Indigenous communities establish their own research review boards to ensure researchers conduct and projects are respectful is also common throughout the material reviewed. Snipp (2016) states that community review boards can help to ensure, for example, that local intellectual property rights are respected, that research is not exploitative,

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[63] Smith, D. E. (2016). Governing data and data for governance: The everyday practice of Indigenous sovereignty. In T. Kukutai & J. Taylor (Eds.), *Indigenous data sovereignty: Toward an agenda* (pp. 117–135). ANU Press. https://doi.org/10.22459/CAEPR38.11.2016.06 (p. 128)

[64] Hiraldo, D., Carroll, S. R., David-Chavez, D. M., Jager, M. B., & Jorgensen, M. (n.d.). *Policy brief: Native nation rebuilding for tribal research and data governance* (p. 5). Native Nations Institute, University of Arizona. (p. 5);

McCartney, A. M., Anderson, J., Liggins, L., Hudson, M. L., Anderson, M. Z., Te Aika, B., Geary, J., Cook-Deegan, R., Patei, H. R., & Phillippy, A. M. (2022). Balancing openness with Indigenous data sovereignty: An opportunity to leave no one behind in the journey to sequence all of life. *Proceedings of the National Academy of Sciences*, *119*(4), e2115860119. https://doi.org/10.1073/pnas.2115860119

and that other ethical breaches are averted. He suggests such boards can even be established on a per project basis if appropriate or helpful.[65]

RESPONSIBILITY AND ACCOUNTABILITY

The available research is clear that researchers must be accountable to Indigenous communities for how their knowledge is used, with an emphasis on empowerment rather than extraction. This includes the need to be aware of and warn Indigenous people about any threats to their communities, culture, or knowledge that may be cause by or arise as a result of the research being conducted.[66]

The Indigenous Innovation Initiative provides a list of responsibilities that researchers should accept and be held accountable for in order to support IDS. We provide this list in its entirety below, phrased as it was published as a pledge.

When creating or collecting Indigenous Knowledge or data, we will:

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[65] Snipp, C. M. (2016). What does data sovereignty imply: What does it look like? In T. Kukutai & J. Taylor (Eds.), *Indigenous data sovereignty: Toward an agenda* (pp. 39–56). ANU Press. https://doi.org/10.22459/CAEPR38.11.2016.03. p. 53.

[66] Battiste, M. (2014). *Research ethics for protecting Indigenous knowledge and heritage: Institutional and researcher responsibilities* (p. 14). Thousand Oaks, CA: SAGE Publications; McCartney, A. M., Anderson, J., Liggins, L., Hudson, M. L., Anderson, M. Z., Te Aika, B., Geary, J., Cook-Deegan, R., Patei, H. R., & Phillippy, A. M. (2022). Balancing openness with Indigenous data sovereignty: An opportunity to leave no one behind in the journey to sequence all of life. *Proceedings of the National Academy of Sciences*, *119*(4), e2115860119. https://doi.org/10.1073/pnas.2115860119

» Establish meaningful relationships with language speakers, Elders, Knowledge Keepers and those responsible for Knowledges and data governance.

» Ensure free, prior, informed and ongoing consent is received from all required people, using processes that are in local languages and that provide time for people to consider the risks and benefits of sharing their Knowledges or data.

» Honour requests to stop or change what we are collecting, how, when or why

» Engage in additional written or verbal agreements or commitments, if requested, to outline other Protocols to be followed.

» Collect relevant information that mutually benefits the Indigenous Innovation Initiative and the community, using approaches that are rooted in local Values, Principles, Natural and Common Laws and Protocols and that protect privacy.

» Engage inclusively and diversely, including women, men, Two Spirit, queer, trans and gender diverse youth, Elders, Knowledge Keepers and lived experience leaders.

» Have Knowledge Keepers participate in or lead this work, including developing and implementing the methods or tools that will be used to create or collect Indigenous Knowledges and data.

» Have open lines of communication and share this information back with the community quickly and in a way that is most accessible and useful.

» Provide respectful honoraria and/or financial support, for example for travel, food or childcare, to respect and honour this exchange, local expertise and the time and effort required to follow local Protocols.

» Continually re-invest any financial or other benefits that we receive because of the Knowledges or data that we create or collect, back into the communities we support through the projects and programs that we fund.[67]

Garba et al. (2023) reinforces some of these themes with its observation that Indigenous research participants have the right to review data and findings in order to raise concerns and/or request corrections, and researchers have a corresponding responsibility to address both

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[67] Indigenous Innovation Initiative. (2021). *Indigenous knowledges and data governance protocols*. Toronto, ON: Indigenous Innovation Initiative.

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as appropriate.[68] Reid (2020) appears to take this a step further opining that "the researcher must be prepared to change/revise/redo *or destroy* any or all part(s) of their project should the priorities of the community change."[69] To paraphrase Garba et al. (2023), it is a key exercise of Indigenous Data Governance and sovereignty for the Indigenous people and community involved to hold ultimate decision-making on approvals respecting research projects.

RELEVANCE

Rainie et al. (2017) points out that a lot or even most data publicly available to Indigenous communities is irrelevant to their decision-making needs because it was gathered by and for "outsiders."[70] To address and correct this problem, research should be designed to deliver data, knowledge, information, and output that are relevant to the needs and priorities of the communities involved. The available literature holds that Indigenous research must serve the Indigenous participants collective interests, support revitalization and cultural vitality, and be

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[68] Garba, I., Sterling, R., Plevel, R., Carson, W., Cordova-Marks, F. M., Cummins, J., Curley, C., David-Chavez, D., Fernandez, A., Hiraldo, D., Hiratsuka, V., Hudson, M., Jäger, M. B., Jennings, L. L., Martinez, A., Yracheta, J., Garrison, N. A., & Carroll, S. R. (2023). Indigenous peoples and research: Self-determination in research governance. *Frontiers in Research Metrics and Analytics, 8*, Article 1272318. https://doi.org/10.3389/frma.2023.1272318 (p. 4)

[69] Reid, B. (2020). Positionality and research: "Two-Eyed Seeing" with a rural Ktaqmkuk Mi'kmaw community. *International Journal of Qualitative Methods, 19*, 1–12. (p. 10).

[70] Rainie, Stephanie Carroll; Schultz, Jennifer Lee; Briggs, Eileen; Riggs, Patricia; Palmanteer-Holder, Rainie, S. C., Schultz, J. L., Briggs, E., Riggs, P., & Palmanteer-Holder, N. L. (2017). Data as a strategic resource: Self-determinative governance and the data challenge for Indigenous nations in the United States. *The International Indigenous Policy Journal, 8*(2), Article 1. https://doi.org/10.18584/iipj.2017.8.2.1 (p. 3)

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based on understanding local contexts and traditions. In fact, Reid (2020) cautions researchers to understand that if, at any time, the research being conducted is no longer of interest or relevance to the community "it is no longer appropriate to continue with the project."[71]

BENEFIT

In addition to ensuring that research involving Indigenous people addresses their needs and priorities, Battiste (2014) recommends that researchers help communities understand their research design, relevant conventions, and other issues and aspects related to properly interpreting and potentially applying the outcomes to ensure that the communities are able to comprehend how and where the research produced can be used for their benefit.[72] Walter and Suina (2019) provide a similar recommendation to build understanding of and comfort with research methods because, as they state, "demystifying western scientific research methodologies and methods is critical to disrupt the academic institutional monopoly on research/evaluation and to create a local understanding of research and data for tribal-driven approaches to quantitative data to truly emerge."[73]

[71] Reid, B. (2020). Positionality and research: "Two-Eyed Seeing" with a rural Ktaqmkuk Mi'kmaw community. *International Journal of Qualitative Methods, 19*, 1–12. (p. 10)

[72] Battiste, M. (2014). *Research ethics for protecting Indigenous knowledge and heritage: Institutional and researcher responsibilities.* Thousand Oaks, CA: SAGE Publications Inc. (p. 14).

[73] Walter, M., & Suina, M. (2019). Indigenous data, Indigenous methodologies and Indigenous data sovereignty. *International Journal of Social Research Methodology, 22*(3), 233–243. (p. 240)

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McCartney et al. (2022) suggests that, furthermore, outcomes should be disseminated in local Indigenous languages so that their value and benefits are effectively translated into and understandable within the appropriate context. They assert that what they call such "joint dissemination of research outcomes" can be critical to effectively communicating mutual benefit and highly beneficial to demonstrating respect and maintaining trust.[74] Reid (2020) provides the example of his research project that "emerged within an academic thesis but also has been presented orally" as appropriate in collaboration with a community Elder.[75]

BEST PRACTICES

The available literature recommends that as soon as a research project has been designed and mutually agreed upon by the research team and the community(ies) involved, "the roles, rights, and responsibilities of both the researcher and the community should be set out in a research agreement prior to any activities taking place," including recruiting participants.[76]

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[74] McCartney, A. M., Anderson, J., Liggins, L., Hudson, M. L., Anderson, M. Z., Te Aika, B., Geary, J., Cook-Deegan, R., Patei, H. R., & Phillippy, A. M. (2022). Balancing openness with Indigenous data sovereignty: An opportunity to leave no one behind in the journey to sequence all of life. *Proceedings of the National Academy of Sciences (PNAS), 119*(4), e2115860119. https://doi.org/10.1073/pnas.2115860119 (p. 5)

[75] Reid, B. (2020). Positionality and research: "Two-Eyed Seeing" with a rural Ktaqmkuk Mi'kmaw community. *International Journal of Qualitative Methods, 19*, 1–12. (p. 10)

[76] Warren-Mears, V. (2012). *Principles and models for data sharing agreements with American Indian/Alaska Native communities*. National Congress of American Indians Policy Research Center.

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> Agreements typically set out the purpose of the research and detail mutual responsibilities in:
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> » project design, data collection and management;
> » analysis and interpretation;
> » credit due to knowledge holders (eg. authorship of publications);
> » protection (and non-disclosure) or restricted knowledge;
> » sharing of benefits or royalties flowing from intellectual property where applicable;
> » production of reports;
> » co-authorship;
> » dissemination of results;
> » conflict resolutions process [...]
>
> Research agreements can also include provisions for new tribal review of reports and manuscripts prior to publication, or limits on the release of and access to research results.[77]

Some Indigenous communities have adapted standard research consent forms to include and reflect traditional and/or community-oriented consent provisions and protocols. For example, an adapted consent form template might provide a statement such as the following one for participants to sign:

> I consent for my information to be used only for the purposes explained to me. I understand that [Community/Nation Name] will retain ownership of all data collected.

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https://static1.squarespace.com/static/58e9b10f9de4bb8d1fb5ebbc/t/592a6d81bebafb216b51a61b/1495952772545/Principles%2Band%2BModels%2Bfor%2BData%2BSharing%2BAgreements.pdf

[77] *ibid.* Formatting added.

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Some First Nations ethics review boards, such as the Mi'kmaw Ethics Watch at Cape Breton University, provide template language making it clear that – in addition to *not* belonging to the researcher – all data gathered or produced through research projects remain a collectively-held community resource. In our experience, such templates are not widely published, but the principles they enshrine are easily adopted to form part of the toolkit Indigenous communities can use to manage and govern their data and IDS.

INDIGENOUS RESEARCH FRAMEWORKS

OCAP ®

As noted earlier, the OCAP® principles—Ownership, Control, Access, and Possession—have become a foundational framework for Indigenous Data Governance in Canada. OCAP® affirms that First Nations

- » **Own** their information collectively,
- » **Control** all aspects of data collection, use, and dissemination,
- » Have **Access** to data about themselves, and,
- » Maintain **Possession** or physical stewardship of their data.[78]

In practice, these principles mean that any research or data initiative involving First Nations must align with community-identified priorities, and that communities retain decision-making authority over how data are interpreted, stored, and used. OCAP® has become widely

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[78] First Nations Information Governance Centre. (n.d.). *The First Nations principles of OCAP®*. Retrieved from https://fnigc.ca/ocap-training/

recognized as a best practice model in Indigenous information governance and is regarded as "a tool to support strong information governance on the path to First Nations data sovereignty".[79]

CARE

Alongside OCAP®, global frameworks also guide ethical Indigenous Data Governance. The *CARE Principles for Indigenous Data Governance*, developed in 2019 by the Global Indigenous Data Alliance (GIDA), emphasize a people- and purpose-centered approach.[80] CARE stands for:

» **Collective Benefit** – ensuring data supports the well-being of Indigenous Peoples,
» **Authority to Control** – affirming the rights of Indigenous communities to govern the use of their data,
» **Responsibility** – demanding accountability and respect in data stewardship, and
» **Ethics** – centering Indigenous-defined values and protocols in all data activities.

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[79] ibid

[80] The First Nations Information Governance Centre. (2019). First Nations data sovereignty in Canada. *Statistical Journal of the IAOS, 35*(1), 47–69. https://doi.org/10.3233/SJI-180478; Lovett, R., Lee, V., Kukutai, T., Cormack, D., Carroll Rainie, S., & Walker, J. (2019). Good data practices for Indigenous data sovereignty and governance. In A. Daly, S. K. Devitt, & M. Mann (Eds.), *Good data* (pp. 26–36). Institute of Network Cultures. http://networkcultures.org/wp-content/uploads/2019/01/Good_Data.pdf (p. 29,35)

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CARE complements data-sharing initiatives like the FAIR Principles (Findable, Accessible, Interoperable, Reusable) by adding essential layers of relationality, governance, and cultural responsibility rooted in Indigenous worldviews.[81]

A northern example of these principles in action is the Inuit-led governance of research in Nunavut. The Nunavut Agreement—the Inuit land claim—established a legally binding framework that empowers Nunavut Tunngavik Inc. (NTI), the Inuit representative organization, to oversee all research and data processes affecting Inuit in the territory. NTI has since developed policies ensuring research is Inuit-led or approved and reflects Inuit values.[82]

Culturally-Aligned Protocols and Indigenous Research Governance

Across Canada, many Indigenous Nations have developed community-specific research protocols to ensure data governance aligns with their laws, ethics, and values. These protocols guide data access, collection, and sharing; articulate expectations for community engagement and benefit; and define culturally appropriate research conduct.

[81] Carroll, S. R., Garba, I., Figueroa-Rodríguez, O. L., Holbrook, J., Lovett, R., Materechera, S., Parsons, M., Raseroka, K., Rodriguez-Lonebear, D., Rowe, R., Sara, R., Walker, J. D., Anderson, J., & Hudson, M. (2020). The CARE Principles for Indigenous Data Governance. *Data Science Journal, 19*, 43, 1–12. https://doi.org/10.5334/dsj-2020-043

[82] Nunavut Tunngavik Incorporated. (n.d.). *About NTI.* Retrieved June 30, 2025, from https://www.tunngavik.com/en/about/

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» The Secwépemc Nation's Research Ethics Guidelines require community approval for any research involving Secwépemc members. The guidelines assert that intellectual property remains with participants and outline 11 research principles alongside expectations for respectful researcher conduct.[83]

» Research involving Mi'kmaw communities or cultural knowledge must follow protocols set by the Mi'kmaw Ethics Watch (MEW). Established by the Sante' Mawio'mi (Grand Council) in 1999 and now overseen by the Union of Nova Scotia Mi'kmaq, MEW ensures that studies respect Mi'kmaw language, spiritual knowledge, informed and prior consent, and community ownership of research outcomes.[84]

» The Nunatsiavut Government in Labrador (Inuit) has implemented a formal research application process. Researchers must apply for approval through a community-led committee before conducting work on Inuit land or with Inuit knowledge—a process in place for over a decade.[85]

» In the Northwest Territories, researchers are legally required to obtain a license under the *Scientists Act* (RSNWT 1988, c. S-4), which mandates engagement with Indigenous governments and organizations.[86] Applicants must also secure ethical approval from a Tri-Council-accredited Research Ethics Board and address any concerns raised during community consultation.

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[83] Gottfriedson, A., & Matthew, M. (n.d.). *The Secwépemc Nation research ethics guidelines*. Secwépemc Nation. Unpublished manuscript.

[84]Cape Breton University. (n.d.). *Mi'kmaw Ethics Watch*. Retrieved June 30, 2025, from https://www.cbu.ca/indigenous-initiatives/mikmaw-ethics-watch/

[85] See https://nunatsiavut.com/research-applications/

[86]Government of the Northwest Territories. (1988). *Scientists Act, RSNWT 1988, c. S-4.* Retrieved from https://www.justice.gov.nt.ca/en/files/legislation/scientists/scientists.a.pdf

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Two-Eyed Seeing

The Two-Eyed Seeing research framework is introduced in Peltier (2018) and expounded upon in Reid (2020). The concept is described as a synthesis of Indigenous research methodology and participatory action research (PAR) intended to enable researchers to conduct research in a "good and authentic way" by co-creating knowledge with Indigenous communities.[87] Both articles provide discussion of their practical application of Two-Eyed Seeing in academic research projects.

Peltier (2018) explains that the phrase Two-Eyed Seeing comes from Mi'kmaw Elder Albert Marshall, who describes it as the ability to "see from one eye with the strengths of Indigenous ways of knowing, and to see from the other eye with the strengths of Western ways of knowing, and to use both of these eyes together."[88] Peltier (2018) describes how, in order to accomplish this, the researcher sought to adapt PAR to an Indigenous research context. They state:

> PAR prioritizes a collective process in promoting action through empowerment of marginalized groups. In research with Indigenous Peoples, community members become engaged in the design and delivery of research as equal partners rather than merely as participants. From a PAR approach, the lived experience and knowledge of Indigenous

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[87] Peltier, C. (2018). An application of Two-Eyed Seeing: Indigenous research methods with participatory action research. *International Journal of Qualitative Methods, 17*, 1–12. https://doi.org/10.1177/1609406918812346 (p. 1)

[88] *Ibid.* (p.2).

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> Peoples is honored, there is an aim of creating social transformation, and power over the research process is shared.[89]

Both Peltier (2018) and Reid (2020) lay out research project designs driven by consistent and ongoing involvement from community members, "from initiating 'kitchen table' visits on the relevance of the research topic to making decisions on the best way to interpret and disseminate stories [ie. findings]."[90] Through this community involvement, the researchers were able to ensure the focus of these projects were self-determined by the community, developed and established through community engagement, prioritized community capacity building in their implementation, and supported community empowerments through their results. Peltier (2018) provides the following model to illustrate the framework.
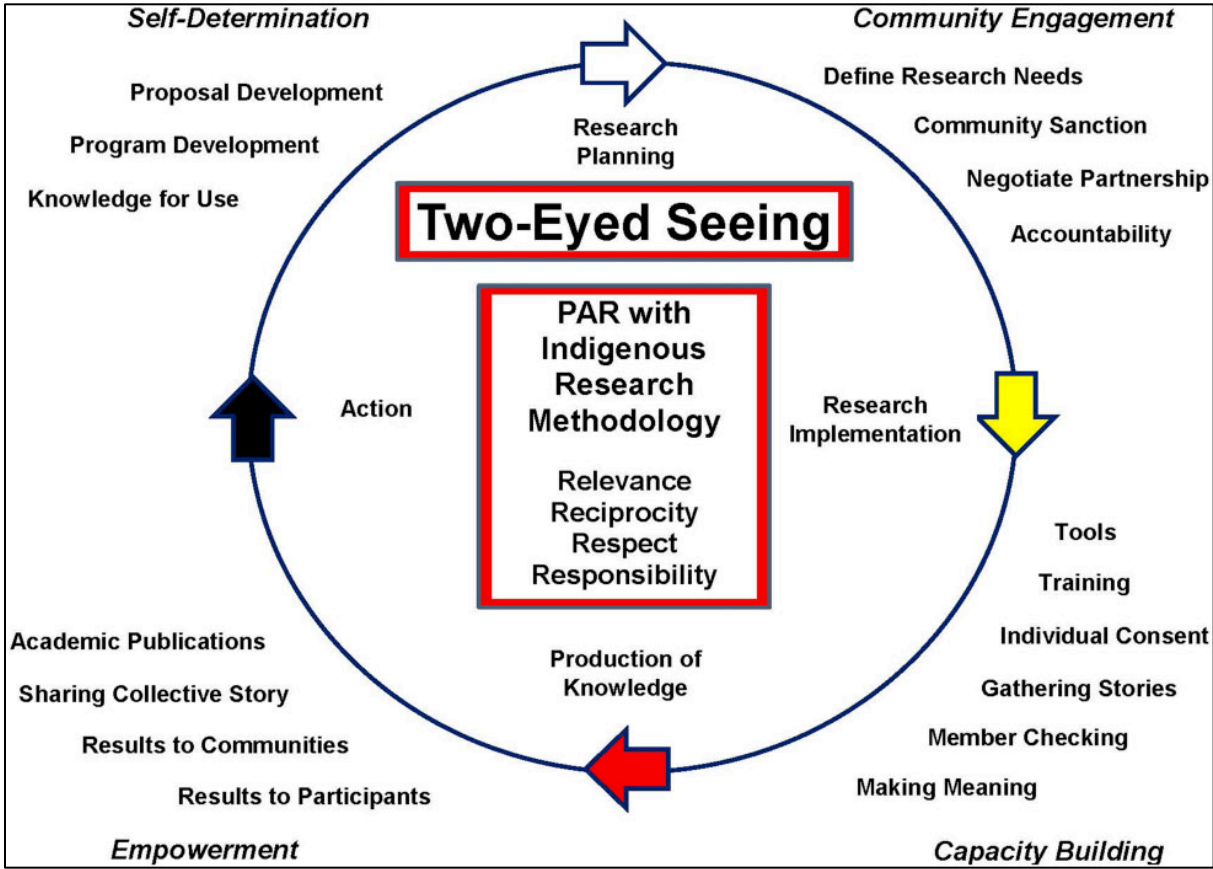
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[89] *Ibid.* (p. 4).

[90] *Ibid.*

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Figure 2: Two-Eyed Seeing research model from Peltier 2018[91]

[91] *Ibid.*

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Information Management: Indigenous Data Governance Part II

Information management refers to the active stewardship and oversight of data through culturally-grounded policies and practices, extending from initial data collection onward. Data governance is often misunderstood as merely a technical function of information management—something that begins after data is collected, with a focus on storage, access, and administration. However, within the context of Indigenous Data Governance, this view is incomplete. Effective Indigenous Data Governance begins before any data is gathered. It requires that policies, protocols, and decision-making processes be in place from the outset, guiding whether and how data should be collected, by whom, and for whose benefit. In this way, governance is not a back-end task but a foundational, front-end framework.

RESPECT

IDS requires that external parties defer to Indigenous communities on all decisions involving how their data are gathered, stored, accessed, and shared. The available literature cautions researchers to understand that the diversity amongst Indigenous people extends to protocols,

priorities, particularities for data governance. This means that researchers should avoid making any assumptions about preferred approaches to data management.[92]

In fact, Rainie et al. (2017) warns that "technical issues and logistics too often overwhelm the way data is discussed."[93] They note that focusing on such "nuts and bolts" considerations "without first deeply considering culture, values, and Indigenous nation goals puts the cart before the horse."[94] Respect can and must be demonstrated by ensuring that Indigenous Data is governed in accordance with community wishes and requirements.

As with Indigenous research, the available literature includes recommendations for Indigenous communities to develop policies capable of guiding data managers to implement respectful data governance. Indigenous governments can "help ensure that researchers honor tribal sovereignty by developing their own data governance policies." Developing community or Nation level data governance policies and practices can be an effective way to articulate to

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[92] Cannon, S. E., Moore, J. W., Adams, M. S., Degai, T., Griggs, E., Griggs, J., Marsden, T., Reid, A. J., Sainsbury, N., Stirling, K. M., Barnes, A. A. Y. S., Benson, R., Burrows, D., Chamberlin, G. R., Charley, B., Dick, D., Duncan, A. T., Liddle, K. K. M., Paul, M., Prince, N. P., Scotnicki, C., Speck, K., Squakin, J., Van Der Minne, C., Walkus, K., Wilson, K. B., & the Indigenous Data Sovereignty Workshop Collective. (2024). Taking care of knowledge, taking care of salmon: Towards Indigenous data sovereignty in an era of climate change and cumulative effects. *FACETS, 9*, 2–21. https://doi.org/10.1139/facets-2023-0135

[93] Rainie, S. C., Schultz, J. L., Briggs, E., Riggs, P., & Palmanteer-Holder, N. L. (2017)**.** Data as a strategic resource: Self-determinative governance and the data challenge for Indigenous nations in the United States. *The International Indigenous Policy Journal, 8*(2), 10.18584/iipj.2017.8.2.1 (p.6)

[94] *Ibid.* (p.6).

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researchers and community members" the appropriate methods by which to collect, store, analyze, and use data and, as a result, the appropriate way to conduct research."[95]

RELATIONSHIPS

Simply put, as it is by Carroll et al. (2019), as with Indigenous research, relationships are at the core of Indigenous Data Governance. This is an ethical requirement because, "Indigenous peoples and nations are more than mere stakeholders; as sovereign polities, they are *rightsholders* with the right to govern data about their peoples, lands, and resources, choosing what when, how, and how much control to exert."[96] But it is also an operational imperative tied to the centrality of principles such as trust, respect, relevance, and community involvement in achieving IDS.

Bruhn (2019) assessed nine separate international Indigenous Data Governance initiatives to identify useful approaches to implementing such undertakings. First among her findings was that regardless of the model pursued, "trust-building as well as frequent contact among the parties appears to be key to addressing the legal, policy, and capacity challenges that will

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[95] Hiraldo, D., Carroll, S. R., David-Chavez, D. M., Jager, M. B., & Jorgensen, M. (n.d.). *Policy brief: Native nation rebuilding for tribal research and data governance* (p. 5). Native Nations Institute, University of Arizona.

[96] Carroll, S. R., Rodriguez-Lonebear, D., & Martinez, A. (2019). Indigenous data governance: Strategies from United States Native Nations. *Data Science Journal, 18*(1), 31. https://doi.org/10.5334/dsj-2019-031 (p. 7)

certainly arise."[97] She also noted that central to all of the initiatives she examined was that staff at every organization involved "noted their priority to ensure that communities gain access to and have a voice in the governance of the data concerning them."[98]

RESPONSIBILITY AND ACCOUNTABILITY

A core best practice in Indigenous Data Governance is the assertion of community control over all data and data management at every stage of its lifespan. As Lovett et al. (2019) explain, proper and legitimate data governance is an integral element of a project from the moment of the project's inception, through the data gathering, analysis and reporting phases, and continuing for as long as the data does after the project's completion. Indigenous Peoples' ownership and control of this governance process is central to their autonomy.[99] Walter and Suina (2019) forcefully echoes these sentiments.

> Data sovereignty is practiced through Indigenous Data Governance, which assert Indigenous interests in relation to data. The primary vehicle is Indigenous decision-making across the data ecosystem; from data conception to control of access to and usage

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[97] Bruhn, J. (2014). Identifying useful approaches to the governance of Indigenous data. *The International Indigenous Policy Journal, 5*(2), Article 5, 1–28. https://doi.org/10.18584/iipj.2014.5.2.5 (p. 25)

[98] *Ibid.* (p. 26).

[99] Lovett, R., Lee, V., Kukutai, T., Cormack, D., Rainie, S. C., & Walker, J. (2019). Good data practices for Indigenous data sovereignty and governance. In A. Daly, S. K. Devitt, & M. Mann (Eds.), *Good data* (pp. 26–36). Institute of Network Cultures. (p. 27)

of data. Indigenous decision-making is a prerequisite for ensuring Indigenous Data reflects Indigenous priorities, values, culture, lifeworlds and diversity.[100]

Scholars emphasize that in order to support IDS, Indigenous Data Governance must ensure that Indigenous Data cannot simply be treated as just another subset of *open data*.[101] Indeed, Rainie et al. (2019) holds that the central concepts and tenets of IDS exist in opposition to dominant practices and assumptions in the open data movement.[102] They warn that when researchers, agency staff, and others gather Indigenous Knowledge in digital form and then govern it according to the principles of open data – or "enter it into open data arenas" – without the specific consent of the Indigenous people involved, "the result is the co-opting of Indigenous Knowledge and the removal of Indigenous Peoples from data governance processes."[103]

Carroll et al. (2019) provides a list of recommended actions to be taken by Indigenous communities and by stakeholders in IDS in order to enable Indigenous Data Governance. Indigenous people, they recommend, should develop community-specific data governance

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[100] Walter, M., & Suina, M. (2019). Indigenous data, Indigenous methodologies and Indigenous data sovereignty. *International Journal of Social Research Methodology, 22*(3), 233–243. (p. 237) https://doi.org/10.1080/13645579.2019.1596075.

[101] ibid; Rainie, S. C., Kukutai, T., Walter, M., Rigueroa-Rodriguez, L., Walker, J., & Axelsson, P. (2019). Indigenous data sovereignty. In T. Walker, S. Rubinstein, & F. Perini (Eds.), *The state of open data: Histories and horizons* (pp. 300–319). African Minds. (p. 301)

[102] *Ibid.* (p.300).

[103] *Ibid.* (p.301)

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principles, policies, and procedures.[104] Garba et al. (2023) echo this, suggesting that Indigenous communities should also "ensure that existing governance [policies and] documents are updated regularly to respond to changing technologies and data practices."[105]

With respect to the "stakeholders," in Indigenous Data Governance, Carroll et al. (2019) advises they should undertake to do the following:[106]

- » Acknowledge Indigenous Data Sovereignty as a global objective.
- » Build an Indigenous Data Sovereignty framework that specifies the relationships among data processes such as collection, storage, and analysis.
- » Create intertribal institutions dedicated to data leadership and building data infrastructure and support for tribes.
- » Establish data governance mechanisms that non-tribal governments, organizations, corporations, and researchers can use to support Indigenous Data Sovereignty.
- » Explore the complexities of individual and collective rights in relation to Indigenous Data Sovereignty.

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[104] Carroll, S. R., Rodriguez-Lonebear, D., & Martinez, A. (2019). Indigenous data governance: Strategies from United States Native Nations. *Data Science Journal, 18*(1), 31. https://doi.org/10.5334/dsj-2019-031, (p. 11)

[105] Garba, I., Sterling, R., Plevel, R., Carson, W., Cordova-Marks, F. M., Cummins, J., Curley, C., David-Chavez, D., Fernandez, A., Hiraldo, D., Hiratsuka, V., Hudson, M., Jager, M. B., Jennings, L. L., Martinez, A., Yracheta, J., Garrison, N. A., & Carroll, S. R. (2023). Indigenous Peoples and research: Self-determination in research governance. *Frontiers in Research Metrics and Analytics, 8*, 1272318. https://doi.org/10.3389/frma.2023.1272318 (p. 7)

[106] Note that Carroll et al. 2019 was written for an American context; we interpret the term "tribe" to be synonymous with First Nation or Indigenous community.

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» Explore the relationships among ethics, law, data governance in relation to Indigenous Sata Sovereignty.
» Grow financial investment in Indigenous Data infrastructure and capability.
» Identify common principles of Indigenous Data governance.
» Incorporate Indigenous Data Sovereignty rights into all rightsholders' and stakeholders' data policies.
» Promote adoption and implementation of common principles of Indigenous data governance by tribes, governments, organizations, corporations, and researchers [...]
» Recruit and Invest in data warriors (Indigenous professionals and community members who are skilled at creating, collecting, and managing data).
» Share strategies, resources, and best practices.
» Strengthen domestic and international Indigenous Data Sovereignty and Indigenous data governance connections among Native nations and Indigenous peoples.[107]

RELEVANCE

Smith (2016) provides a detailed list of principles and practices that she concludes should guide the design and implementation of all Indigenous Data governance policies and programs. She indicates that to support legitimate Indigenous Data governance these propositions must form a framework that:

» Sets and enforces agreed standards, culturally informed definitions and classification systems for data production, ownership, analysis and administration.

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[107] Carroll, S. R., Rodriguez-Lonebear, D., & Martinez, A. (2019). Indigenous data governance: Strategies from United States Native Nations. *Data Science Journal, 18*(31), 1–15. https://doi.org/10.5334/dsj-2019-031 (p. 11)

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» Develops and enforces agreed rules, policies and processes around access, dissemination, monitoring, management and review of data, including what kinds of data will not be collected or will have restricted access.
» Identifies and publicises clear cultural rules and protocols with respect to indigenous intellectual property rights, which outline the consents required to access and use high-value cultural information that has been collated.
» Sets out a management structure for data that clarifies the roles, responsibilities and accountabilities of people charged with collecting, analysing, maintaining and communicating data. This includes leaders, executive committees, managers and community members.
» Puts in place user-friendly technologies and infrastructure and member-focused data platforms that include building the capabilities of members to access, interpret, use and maintain their own data.
» Ensures governance arrangements for repatriating and protecting indigenous Data property rights are based on the principle of self-determination.[108]

BENEFIT

Smith (2016) is cogent and eloquent on the need for Indigenous Data Governance to benefit the Indigenous people doing the governing and the forms those benefits should take.

> Critical functions of governance therefore are the collection and analysis of relevant packages of information that can be communicated effectively to governing bodies, leaders, group members, organisations and external stakeholders. Strong governance creates checks and balances to ensure that data collection supports the priorities of a group or organisation, implements agreed standards for data quality control and works to

[108]Smith, D. E. (2016). Governing data and data for governance: The everyday practice of Indigenous sovereignty. In T. Kukutai & J. Taylor (Eds.), *Indigenous data sovereignty: Toward an agenda* (pp. 117–135). Canberra, AU: ANU Press. https://doi.org/10.22459/CAEPR38.11.2016.07130-131. (p.130-131)

ensure data are available in a timely way. Ineffective governance of data can lead to uninformed decision-making, low participation by membership, project failures, loss of reputation and credibility and missed development opportunities. The clear conclusion is that nations, communities and organisations need practically effective governance arrangements to collect and convert relevant and meaningful information into sensible advice and options.[109]

With respect to collective benefit, Smith (2016) also suggests that the very act of attempting to enact Indigenous Data Sovereignty through the design and implementation of Indigenous Data governance frameworks and the collection, management, and control of Indigenous Data "contributes to constructing self-determination as a current practice rather than an ephemeral future goal."[110]

EXISTING FRAMEWORKS & POLICIES

FAIR

 While OCAP® and CARE offer essential frameworks for understanding the relational and ethical responsibilities of data governance, they do not directly engage with the technical or infrastructural dimensions of data stewardship. This is where the FAIR principles become relevant. Designed to enhance the management and long-term utility of digital data, FAIR stands for Findable, Accessible, Interoperable, and Reusable. These principles support

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[109] *ibid.* (p. 130).

[110] *ibid.* (p. 132).

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consistency in how data is documented, stored, and shared—ensuring that datasets remain usable and meaningful across time, disciplines, and users, including both people and machines.

FAIR was originally articulated in 2016 by a diverse group of researchers and organizations (the FORCE11 community). Here's a short overview of what each principal entails:

  » **Findable**: Data and accompanying metadata should be thoroughly described and indexed so that both humans and machines can easily locate them.
  » **Accessible**: Once found, data should be retrievable through clearly defined access protocols, whether openly available or protected by secure, documented restrictions.
  » **Interoperable**: Data should be formatted using standardized structures and accompanied by contextual metadata to allow integration across different systems and tools.
  » **Reusable**: To support future use, data should be well-documented, clearly licensed, and include information on methods and provenance.[111]

The FAIR framework is often paired with CARE—Collective benefit, Authority to control, Responsibility, and Ethics—because while FAIR emphasizes technical consistency and discoverability, CARE serves to mitigate challenges that FAIR may impose in an Indigenous context, thus ensuring that data governance reflects community values, cultural protocols, and Indigenous Rights. Together with OCAP®, these principles offer a complementary set of tools for designing data systems that are both ethically grounded and functionally effective. Integrating FAIR with Indigenous governance frameworks enables data stewardship that

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[111] Wilkinson, M. D., Dumontier, M., Aalbersberg, I. J., Appleton, G., Axton, M., Baak, A., Blomberg, N., Boiten, J.-W., da Silva Santos, L. B., Bourne, P. E., Bouwman, J., Brookes, A. J., Clark, T., Crosas, M., Dillo, I., Dumon, O., Edmunds, S., Evelo, C. T., Finkers, R., … Mons, B. (2016). The FAIR Guiding Principles for scientific data management and stewardship. *Scientific Data, 3*, 160018. https://doi.org/10.1038/sdata.2016.18

respects sovereignty while meeting the demands of contemporary research and information systems.

Recent work by Carroll et al. further translates IDS principles into concrete tools and governance models. Carroll et al. (2021) propose a data stewardship "maturity model" that embeds CARE alongside FAIR across institutional workflows—data use planning, metadata creation, and policy review. Meanwhile, Carroll et al. (2022) show how tribal research codes and IRBs in the U.S. operationalize CARE at the community level, offering practical examples of Indigenous-led governance mechanisms. These studies underscore the movement from theory to implementation, affirming how IDS values can shape not only policy ambitions but also everyday data practices.

United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP)

Oguamanam (2019) states bluntly that:

> [t]he mainstreaming of Indigenous information or data as a tool for Indigenous resurgence aims to ensure the realization of UNDRIP as the principal organizing target of Indigenous data sovereignty. In other words, an enduring objective of Indigenous data sovereignty is the advancement of the rights enunciated in UNDRIP.[112]

The United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) affirms the rights that form the foundation of Indigenous Peoples' data sovereignty. Article 31 recognizes the

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[112] Oguamanam, C. (2019). *Indigenous data sovereignty: Retooling Indigenous resurgence for development* (p. 10). Centre for International Governance Innovation. https://www.cigionline.org/publications/indigenous-data-sovereignty-retooling-indigenous-resurgence-development/

right of Indigenous Peoples to "maintain, control, protect and develop" their cultural heritage, traditional knowledge, and traditional cultural expressions—rights that are widely understood to include governance over data and intellectual property.[113] This article is widely understood to include authority over data related to Indigenous Knowledge and intellectual property. Article 19 further upholds the principle of Free, Prior, and Informed Consent (FPIC), which applies to decisions about data collection, use, and governance.

Canada formally endorsed UNDRIP in 2016 and passed the UNDRIP *Act* in 2021, committing to harmonize federal laws with the Declaration. In practice, this has begun to influence data-related agreements and protocols. Indigenous leaders, for instance, cite UNDRIP to assert that any databases containing Indigenous Knowledge require Indigenous governance and consent. Governments are increasingly including Indigenous Data provisions in agreements—for example, in co-management frameworks that affirm rights to control knowledge, or in education partnerships that safeguard student data. As both a legal and ethical framework, UNDRIP strengthens the legitimacy of Indigenous Data Sovereignty (IDS) claims and provides a foundation in international human rights law for contesting violations of Indigenous Data rights.

UNDRIP provides a human rights-based policy framework that supports IDS and legitimizes legal claims when Indigenous Data Rights are not upheld.

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[113] United Nations General Assembly. (2007, September 13). *United Nations Declaration on the Rights of Indigenous Peoples*, A/RES/61/295. Adopted by the General Assembly on 13 September 2007. Retrieved from https://www.un.org/development/desa/indigenouspeoples/publications/un-declaration-on-the-rights-of-indigenous-peoples.html

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UNDRIP Action Plan Commitments

The United Nations Declaration on the Rights of Indigenous Peoples Act Action Plan (2023) outlines Canada's approach to implementing UNDRIP in collaboration with Indigenous Peoples, setting out tangible measures to advance Indigenous rights, self-determination, and data sovereignty.

Among its many commitments, the *Action Plan* includes specific measures related to data and knowledge governance—both of which are essential to the realization of Indigenous Data Sovereignty.

Measure 30: Supporting Indigenous Data Sovereignty

Measure 30 of the *UNDRIP Act Action Plan: Ajuinnata* outlines a clear federal commitment to advance IDS. It calls for:

- » Legislative, regulatory, and policy tools to support Indigenous-led data governance;
- » Strengthening the capacity of First Nations, Inuit, and Métis communities to control, collect, manage, and protect their own data;
- » Supporting Indigenous-led data collection and management for claims, decision-making, and genealogy;
- » Enabling respectful and streamlined access to federal datasets while upholding Indigenous jurisdiction and individual privacy. [114]

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[114] Canada. Department of Justice. UN Declaration on the Rights of Indigenous Peoples Act Implementation Secretariat. (2023). *United Nations Declaration on the Rights of Indigenous Peoples Act action plan: Ajuinnata* (Publication No. J2-585/2023E-PDF). Government of Canada Publications. Retrieved from https://www.publications.gc.ca/pub?id=9.924282&sl=0

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Measure 40: Incorporating Indigenous Knowledge

Measure 40 addresses the need to recognize Indigenous Knowledge as a distinct and authoritative knowledge system in environmental governance. Specifically, it includes commitments to:

» Ensure that Indigenous Knowledge informs decision-making processes in areas such as fisheries, marine safety, habitat protection, and conservation.
» Treat Indigenous Knowledge with the same respect and weight as other knowledge systems in regulatory and scientific assessments.
» Embed Indigenous worldviews into environmental decision-making, thereby advancing Indigenous sovereignty over their territories and reinforcing the principles of IDS.[115]

Last, the CARE Principles for Indigenous Data governance explicitly link their framework to the rights affirmed in UNDRIP, helping bridge international open data movements with Indigenous Rights.

First Nations Data Governance Strategy (FNDGS)

The *First Nations Data Governance Strategy* (FNDGS) provides a framework for large-scale, nationwide implementation of Indigenous Data governance. It was produced by Canada's FNIGC in 2020 in response to direction issued through the Federal Budget of 2018. This means funding to develop the FNDGS was provided by the Federal government, and while this policy roadmap is not a law, the Government's support for its development is representative of the broader shift towards IDS.

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[115] *ibid* (p. 32)

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The Strategy lays out a "collective vision" for a network of semi-autonomous regional First Nations-led information governance centres capable of "meeting the [data] needs and priorities of the communities and Nations they serve, while being coordinated and integrated at the national level in order to meet common needs such as data standardization and interoperability."[116] FNIGC 2020 elucidates the guiding principles for the FNDGS, which include the following:

- » Community-driven and Nation-based
- » OCAP®
- » Relationships
- » Transparency and Accountability
- » Quality Community-Drive Standards and Indicators
- » Nation (Re)Building
- » Equity and Capacity
- » Effective Technology and Policy.[117]

The document also provides an overview of and strategic objectives for the pillars required to support the Strategy's implementation. These include: First Nations Data Governance; First Nations Data Access and Repatriation; First Nations Data Collection, Discovery, and Gap Bridging; First Nations Data Management; and more. We consider its attempts to indicate the interdependence and prerequisite relationships amongst such pillars illuminating and instructive.

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[116]First Nations Information Governance Centre (FNIGC). (2020). *A First Nations data governance strategy* (p. 10). https://fnigc.ca/wp-content/uploads/2020/09/FNIGC_FNDGS_report_EN.pdf

[117] *Ibid.(*p. 46-50).

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United States Indigenous Data Sovereignty Network (USIDSN)

The USIDSN published its *Principles of Indigenous Data Governance* in 2020 after several years of workshopping by attendees at "a variety of Indigenous and mainstream data, policy, and governance gatherings."[118] The principles as outlined provide a sort of high-level checklist that could be followed to ensure the concepts and tenets required to implement effective Indigenous Data governance that supports IDS are present and applied within data governance policies or programs. The five USIDSN principles are summarized below.

1. Inherent sovereignty – The inherent sovereignty of Indigenous Peoples and their nations are the foundation of Indigenous Peoples' ownership, control, and access with respect to data, information, and knowledge about their communities, peoples, lands, resources, and genetic information. [...]

2. Indigenous Knowledge – Indigenous Data governance honors Indigenous Knowledge systems, asserting the collective nature of such knowledge; providing the basis for relationships among humans and non-human worlds; and defining obligations and ways of knowing. [...]

3. Ethics – Indigenous Peoples, nations, and communities must determine what ethical behavior looks like across Indigenous Data lifecycles (design, collection, access, analysis, reporting, storage, protection, use, and reuse of Indigenous Data) and throughout data ecosystems (digital infrastructures, analytics, and applications). [...]

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[118]United States Indigenous Data Sovereignty Network (USIDSN). (2020). *Principles of Indigenous Data Governance* (p. 4). In *Indigenous Data Governance Brief*. Retrieved from https://usindigenousdatanetwork.org/wp-content/uploads/2024/10/Indigenous-Data-Governance-Brief-FINAL.pdf

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4. Intergenerational collective well-being – Indigenous values concerning the collective well-being of Indigenous Nations and their peoples must be reflected in Indigenous Data lifecycles and across data ecosystems. [...]

5. Relationships – Relationships with Indigenous Peoples, nations, and communities form the foundation for equitable data governance that serves the rights and interests of Indigenous Peoples.[119]

USIDSN 2020 also enumerates key supporting factors and considerations that underpin each of these principles.

Federal and Institutional Policies

Canadian federal agencies are increasingly incorporating Indigenous Data Sovereignty (IDS) into their policies. A key example is the Tri-Agency Research Data Management Policy, which requires researchers working with Indigenous Data to co-develop data management plans with the Indigenous communities involved.[120]

The Tri-Agency—which includes Canada's three main research funding bodies—explicitly affirms the importance of Indigenous Data Sovereignty. It stipulates that research data management strategies must be created in partnership with Indigenous communities, in

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[119] *ibid.*

[120] Tri-Agency (CIHR, NSERC, & SSHRC). (2021). *Tri-Agency research data management policy.* Government of Canada. https://science.gc.ca/site/science/en/interagency-research-funding/policies-and-guidelines/research-data-management/tri-agency-research-data-management-policy

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alignment with the CARE principles. While the policy is not legally binding, it places a contractual obligation on funding recipients to uphold Indigenous Data governance practices.

Other federal departments, such as Indigenous Services Canada and Statistics Canada, are also developing frameworks to support Indigenous Data governance. For example, Statistics Canada's Indigenous Statistical Capacity Development Initiative includes negotiated data governance protocols with First Nations and other Indigenous organizations to support data sharing while preserving community control.

At the provincial level, some jurisdictions—such as British Columbia—have pledged to implement UNDRIP and are currently reviewing their data and information laws to better recognize Indigenous Data rights. In the health sector, legislative changes are beginning to reflect these shifts as well. For instance, some provinces are establishing legal provisions that permit data sharing with Indigenous governments acting as the primary data custodians, acknowledging their jurisdiction over community-specific data.

INFRASTRUCTURE AND REGIONAL DATA HUBS

The literature on IDS frequently acknowledges that for an organization to enact policies of IDS, the operation of an information management system (also referred to as a data/knowledge hub/portal) is often required. Specific advice on systems appears less frequently, however.

It is important to note that data hubs are not independent tools that run in isolation – they exist to dovetail with and support the operational processes of the organization. It is vital to understand and elaborate on these processes prior to selecting or building a data hub. Investing in this early discovery phase has several advantages:

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> » provides time for brainstorming and relationship-building that leads to a consensus on the purpose of the data hub;
> » leads to considerable cost-savings downstream by avoiding rework due to lack of clarity in requirements; and
> » demonstrates the operational feasibility of the data hub (e.g. the costs, staffing requirements, data sources, etc.).

Every organization's needs and operational nuances are different; however, we present here the typical general activities of a data hub team that operates within an organization, including as part of a software subscription or contract:

> » **Steer and manage data hub activities** including collaborating with organizational leadership to ensure that the data hub continues to drive value for the users; managing the build and operation of the data hub; and coordinating with partner communities, government departments, and other knowledge holders.
> » **Setup and administer physical and digital infrastructure** including identifying and procuring hardware and software; selecting, procuring and administering the data hub vendor system and other third-party software and services; and providing general hardware and software infrastructure support and staff IT support.
> » **Configure and maintain data hub tools** including dashboards related to research and monitoring targets and indicators; public and private data portals for accessing data hub content; mobile apps for users to report observations directly to the data hub; and, the website that brings together all the data hub content (e.g. maps, dashboards, public and private data portals, search engines, multimedia) and other organizational web communications.
> » **Maintain data hub content** including preparing and ingesting data holdings; creating plain-language and other translations where needed; updating data hub content related to research and monitoring activity updates; performing quality assurance on monitoring data; and preparing content in the form of spatial datasets, tabular data, documents, interactive maps, multimedia files, and related metadata.
> » **Engage and support communities on Traditional Knowledge** sharing including understanding the concerns and interests of each community; designing and adapting the data hub to respect and support community's rights and title; and, preparing and verifying Traditional Knowledge for use in the data hub.

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> » **Support data hub users** including administering user accounts; providing technical support to users; providing software training to advanced users; and continuously assessing user needs and usage of the data hub.

The above list illuminates the complexity of creating a data hub that truly aligns with and supports organizational goals. Organizations have several ways to build out the skills needed to tackle this complexity.[121]

> » **Develop** – Professional development steers existing staff into new roles
> » **Acquire** – New staff are hired to fill new roles
> » **Partner** – Job duties are shared with staff in partner organizations
> » **Outsource** – Contractors provide a scalable source of skills and resources

In practice, organizations blend these options to suit their present needs and evolve their approach over time as needs change. The four options provide different degrees of speed and control over the implementation, freedom to customize to operational requirements, and risk to operational sustainability.

Another important consideration for the implementation of a data hub is the choice between an on-premises installation versus a cloud-based solution. On-premises solutions include software that an organization installs and operates on their own internal digital infrastructure. This approach can work well for organizations with a highly capable and engaged IT team; however, it's vital to understand that the organization will have to develop core expertise in human-centric design, information security and compliance, and modern data standards and tools, and

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[121] Kwan, A., Schroeck, M., & Kawamura, J. (2019). *Architecting an operating model: A platform for accelerating digital transformation*. Deloitte Insights. https://www2.deloitte.com/us/en/insights/topics/digital-transformation/architecting-an-operating-model.html

will need the availability to support users as and when needed. Alternatively, a cloud-based solution operates on third-party web infrastructure. This avoids the need to install, configure, and maintain complex software packages allowing the organization to focus on their core objectives.

Information Access & Sharing: Indigenous Data Governance Part III

The information access and sharing phase might be considered the ongoing administration and control of Indigenous Data under effective Indigenous Data governance. But like information management, this third phase of Indigenous Data governance is led and regulated by policies and principles implemented *in order for* phase one, information gathering, to begin. Information access and sharing involve the protocols and ongoing responsibilities ensuring that data is made available, used, and shared according to explicit community consent and guidelines.

CONSENT AND PROTOCOLS

Consent is a vital element of Indigenous Data governance required to ensure that data practices align with the community's values and rights. The available literature is clear that effective Indigenous Data governance relies upon consent to guide and enable control and use of all Indigenous Data. Carroll et al. (2021) opine that consent can be assured through the implementation of the CARE principles, which requires "engagement with people to address the cultural, ethical, legal, and social dimensions associated with the intended uses of the

dataset.“[122] This engagement, of course, must begin at the project outset before or during the information gathering phase, which itself must begin with the enactment of implementation of the informed consent process. These actions taken at the beginning of a project are necessary to provide the requisite guidance for the ongoing actions to be performed even after the project is finished – a perfect illustration of the way in which effective Indigenous Data governance is a continuous process not a project stage.

Indigenous Knowledge often comes with specific restrictions on how it can be shared or interpreted, and Indigenous Data may be gathered to meet specific agreed-upon ends and then remain available in the sense that it continues to exist in storage somewhere. Kukutai et al. (2023) expands on the complications and considerations this can lead to.

> Consent relating to data collection and use/reuse is an ongoing and negotiated process rather than a check-box exercise that occurs at a single point in time. […] Group and collective consent aligns with collective rights, as affirmed in UNDRIP. The right or responsibility to give consent does not only rest with an individual, but sits more broadly with a collective. In many situations such as research ethics scenarios, consent is conceptualised as time bound. Data is increasingly stored for long periods of time (or indefinitely), meaning that consent in perpetuity may become more common. However, changes to consent when people move between life stages – such as when a child

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[122]Carroll, S. R., Herczog, E., Hudson, M., Russell, K., & Stall, S. (2021). Operationalizing the CARE and FAIR Principles for Indigenous data futures. *Scientific Data, 8*, 108. https://doi.org/10.1038/s41597-021-00892-0 (p. 5).

> becomes old enough to legally consent for their own data, or when a person passes away – need to be actively addressed.[123]

Carroll et al. (2021) suggests that one way to ensure consent for any possible future uses of Indigenous Data could come in the form of machine-readable metadata attached to Indigenous Data that detail provenance and signal decision points, such as the need for permission and consent, during the data management phase.[124]

As described by the Arctic Research Foundation, "Inuit-determined data management" refers to data governance that is guided by Inuit values, priorities, and authority, ensuring that data are shared only when it supports and benefits Inuit communities.[125] This approach places decision-making power with the community, including determining how different types of data—ranging from traditional knowledge to health information—are handled. For example, data containing sacred or sensitive knowledge may be restricted to select community members, while

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[123] Kukutai, T., Campbell-Kamariera, K., Mead, A., Mikaere, K., Moses, C., Whitehead, J., & Cormack, D. (2023). *Te Kāhui Raraunga Māori data governance model*. Te Kāhui Raraunga. p. 43. https://www.kahuiraraunga.io/assets/documents/Maori-Data-Governance-Model-Te-Kahui-Raraunga.pdf

[124] Carroll, S. R., Herczog, E., Hudson, M., Russell, K., & Stall, S. (2021). Operationalizing the CARE and FAIR Principles for Indigenous data futures. *Scientific Data, 8*(1), 108. https://doi.org/10.1038/s41597-021-00892-0 (p.4).

See also Hudson, M., Carroll, S. R., Anderson, J., Blackwater, D., Cordova-Marks, F. M., Cummins, J., David-Chavez, D., Fernandez, A., Garba, I., Hiraldo, D., Jager, M. B., Jennings, L. L., Martinez, A., Sterling, R., & Walker, J. D., Rowe, R. K. (2023). Indigenous Peoples' Rights in Data: A contribution toward Indigenous Research Sovereignty. *Frontiers in Research Metrics and Analytics, 8*, 1173805. https://doi.org/10.3389/frma.2023.1173805.

[125] Nowosad, D. (n.d.). *Upholding Inuit data sovereignty in Nunavut*. Arctic Focus, Arctic Research Foundation. https://www.arcticfocus.org/stories/upholding-inuit-data-sovereignty-nunavut/

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environmental data may be kept confidential to prevent external exploitation. Upholding these community-defined protocols is increasingly recognized as a critical best practice among researchers and government agencies engaging with Indigenous Data governance.

AGREEMENTS AND ACCOUNTABILITY

Ortenzie et al. (2025) provides a list of recommendations for individual researchers or research teams with respect to ensuring community access to data gathered through Indigenous research. Though written primarily for researchers within academic research institutions, we consider this set of proposed responsibilities illustrative and have paraphrased it below:

1. Learn the principles of [Indigenous] data governance where you conduct your research;
2. Write research agreements that stipulate data management and ownership;
3. Include Indigenous ethics approval information in the methodology of your peer-reviewed journal articles and provenance and ownership of Indigenous Data in the metadata;
4. Write a research group data policy that includes plans for returning the data and results [to the community];
5. Include returning data and results [to the community] in research funding proposals;
6. Don't wait until the study is published to return data and results [to the community];

7. Don't call it "your" data.[126]

Recommendation number five above refers to the need to include the cost of returning data gathered in and with the community to its origin. This speaks to the need to conceive of ensuring ongoing community access to and possession of their data as an essential element of a research project, not a separate task to be undertaken after the project is complete.

When it comes to data sharing, Hudson et al. (2023) advises that the onus is on data managers and users to ensure that Indigenous People's collectively held rights – such as consent, benefit, privacy, etc. – are protected: "Whether or not the community has the capacity to fully exercise those rights, the data users should acknowledge and make space for those rights to be realized."[127]

Indigenous communities do not need to start from scratch each time they engage in data access negotiations or research partnerships. A growing—though still dispersed—collection of templates and models exists to support community rights and the implementation of Indigenous Data Sovereignty (IDS). Drawing from and adapting these existing resources can

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[126] Ortenzi, K. M., Flowers, V. L., Pamak, C., Saunders, M., Schmidt, J. O., & Bailey, M. (2025). Good data relations key to Indigenous research sovereignty: A case study from Nunatsiavut. *Ambio, 54*(2), 264–269. https://doi.org/10.1007/s13280-024-01925-w

[127] Hudson, M., et al. (2023). Indigenous peoples' rights in data: A contribution toward Indigenous research sovereignty. *Frontiers in Research Metrics and Analytics, 8*, 1173805: 5. https://doi.org/10.3389/frma.2023.1173805

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promote consistency with broader frameworks such as OCAP®, while also saving time, energy, and capacity in developing context-specific agreements and protocols.

These templates are meant to be flexible and should be adapted to reflect each community's distinct priorities, concerns, and governance systems. Some communities may choose to develop their own agreements by combining elements from multiple sources. Others may modify the format or purpose of an agreement entirely. For instance, an Indigenous government might base a Memorandum of Understanding (MOU) on key principles found in data-sharing or research agreements that already align with OCAP®, CARE, or other IDS frameworks.

Hudson et al. (2023) notes that data sharing agreements should include frameworks to ensure that any benefits derived from the sharing of Indigenous Data must also be fairly and equitably shared with the appropriate Indigenous community(ies) and people.[128]

Data Sharing Agreement Templates and Frameworks

The Assembly of First Nations Quebec and Labrador (AFNQL) produced the widely cited Data Sharing Agreement Template (Data Sharing Agreement Template) in 2014.[129] This model agreement provides clauses that First Nations communities can use when entering partnerships or research projects. The template essentially operationalizes OCAP® principles in contract form with clauses covering a variety of essential elements including:

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[128] *ibid.*

[129] Assembly of First Nations Quebec and Labrador. (2014). *Data sharing agreement template – Ethics Hub de l'éthique.* https://ethicshub.ca/en/data-sharing-agreement-template

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» Defining the ownership of data
» Conditions for access
» Requirements for reporting back results
» Restrictions on further sharing

For researchers preferring to follow a framework to craft their own templates, the Alberta First Nations Information Governance Centre (AFNIGC) published the *Framework for a Data Sharing Agreement* (Framework for a Data Sharing Agreement) in 2024. Yao (2024) states that the AFNIGC's goal for the framework is to "help determine First Nation priorities in data governance while working in partnership with government, universities, researchers, and other organizations."[130]

Practically speaking, the AFNIGC framework is a set of questions communities can answer to produce an Indigenous Data sharing agreement tailored to suit any and every specific scenario. The framework also outlines multiple provisions that communities can select to include in the text of their agreements according to scenario and context. In this way the framework can help communities customize different agreements for partnering with a government versus a university, or for situations in which data will be linked with external datasets versus held exclusively by the community, etc.

Traditional/Indigenous Knowledge Agreements

Specialized data-sharing agreements have been developed for contexts involving Indigenous Traditional Knowledge (TK), such as the inclusion of Nations' TK in impact assessments. In

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[130] Yao, C., & Alberta First Nations Information Governance Centre. (2024). *Framework for a data sharing agreement.* https://afnigc.ca/wp-content/uploads/2024/06/Data-Sharing-Agreement-Full-2024.pdf

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Nunavut, for example, data-sharing agreements based on traditional Inuit governance structures are required for any research activities involving Inuit Qaujimaningit (or Inuit TK). These agreements are designed to ensure that all IQ remains under Inuit control and that copies of any data are transferred to Inuit organizations.

Similarly, the Government of Northwest Territories requires an Indigenous Knowledge data-sharing agreement as a condition of funding for any research project that incorporates Dene or Inuvialuit Knowledge.[131] The Government provides links to a comprehensive list of existing templates developed and used by Indigenous groups in the NWT in an appendix entitled Indigenous Knowledge Data Sharing Agreements.

All the agreements listed were designed to ensure that TK provided by communities is documented according to clear terms defining aspects, including:

» Who owns that knowledge;
» How the knowledge can be used (often only for the specific project covered by the agreement);
» How the knowledge will be returned to the knowledge-holder/community or stored.

Mobilizing Indigenous Knowledge in Resource Management Settings

A valuable source of adaptable templates is found withing the *Mobilizing Indigenous Knowledge in Resource Management Settings: A Practical Guide*, developed by Trailmark in partnership with

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[131]Government of the Northwest Territories – CIMP. (2008). *Appendix F: Indigenous Knowledge data-sharing agreement* [Template]. NWT Discovery Portal.
https://nwtdiscoveryportal.enr.gov.nt.ca/geoportaldocuments/Appendix%20F%20IK%20Data%20Sharing%20Agreement.pdf

the Łutsel K'e Dene First Nation (LKDFN). This guide serves as a practical resource for both Indigenous communities and government agencies involved in the collection or use of Indigenous Knowledge.

In addition to offering guidance on respectful and effective methods for engaging Indigenous Knowledge in resource management, the guide addresses key aspects of data sovereignty and governance. To support strong IDS practices, it includes a suite of customizable templates that communities can tailor to their specific needs. These include:

- » Knowledge Sharing Protocol and Data Management Plan;
- » Informed Consent;
- » Data Sharing Agreement;
- » Data Request Form;
- » Research Request Form;
- » Briefing Notes Template (for communication with Chief and Council).[132]

Unlike other examples in this section, which are drawn from finalized agreements used by specific parties, the templates in this guide are intentionally generic. They are designed to be modified by communities to reflect their own governance structures, cultural values, and data priorities.

The guide also includes a set of guiding questions to support communities in identifying and articulating IDS considerations at the outset of new research projects and partnerships.

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[132] Keats, B., Wong, T., Evans, M., & Michel, H. (2021). *Mobilizing Indigenous Knowledge in resource management settings: A practical guide.* Trailmark Systems Inc. https://cbmtoolkit.trailmarksys.com/

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In Closing

The literature reveals a consistent call for practical models to implement Indigenous Data Sovereignty (IDS)—in other words, for effective Indigenous Data governance. IDS is widely understood as a collective right: the right of Indigenous Nations to govern data about their peoples, lands, and resources. Yet, as Bruhn (2014) notes, "existing federal and provincial laws protect individual privacy but do not acknowledge, let alone protect, communal or collective privacy."[133] While international standards such as OCAP® and UNDRIP affirm these collective rights, the legal and institutional mechanisms needed to uphold them are still in development.

The implications of IDS for open data and big data are significant. They include recognizing collective rights in data linkage, sharing, and use; protecting data that describe or compare Indigenous Nations; and affirming collective rights to privacy and confidentiality.[134] These issues cannot be addressed through frameworks centered solely on individual rights.

At the same time, the literature is largely silent on how individual rights—such as personal privacy, autonomy, and consent—fit within IDS frameworks. There is a notable asymmetry: state law is oriented toward individual privacy and intellectual property, while IDS discourse is grounded in collective authority. Future work in this area must explore how to balance collective governance with the rights of individuals, especially in cases where personal data,

[133] Bruhn, J. (2014). Identifying useful approaches to the governance of Indigenous data. *The International Indigenous Policy Journal, 5*(2), Article 5. https://doi.org/10.18584/iipj.2014.5.2.5

[134] Reid, B. (2020). Positionality and research: "Two-Eyed Seeing" with a rural Ktaqmkuk Mi'kmaw community. *International Journal of Qualitative Methods, 19*, 1–12. https://doi.org/10.1177/1609406920910841

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oral histories, or health information are involved. Addressing this gap will strengthen IDS frameworks and help bridge legal and cultural paradigms.

Strengthening Indigenous Data governance also requires targeted investments in community capacity. As Oguamanam (2019) emphasizes, building Indigenous capacity is critical for implementing IDS through areas such as needs assessment, data governance, interpretation, arbitration, ethics, IP, and grant administration.[135] These needs can be met through sustained education, policy development, and strategic partnerships.

Despite ongoing challenges, the literature reflects a widespread sense of momentum. Indigenous Nations across Canada and beyond are advancing IDS at different paces by developing their own research protocols, review boards, data-sharing agreements, and repositories. These tools, both new and traditional, are being revisited, reused, and refined in the service of community-defined goals.[136]

The need for ongoing experimentation and adaptation is a nearly universal theme. As Carroll et al. (2019) write, "reclaiming Indigenous Data sovereignty is a journey, not a destination."[137]

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[135] Oguamanam, C. (2019). *Indigenous data sovereignty: Retooling Indigenous resurgence for development* (CIGI Papers No. 234). Centre for International Governance Innovation. https://www.cigionline.org/publications/indigenous-data-sovereignty-retooling-indigenous-resurgence-development/

[136] Carroll, S. R., Rodriguez-Lonebear, D., & Martinez, A. (2019). Indigenous data governance: Strategies from United States Native Nations. *Data Science Journal*, *18*(31), 1–15. https://doi.org/10.5334/dsj-2019-031 (p. 11)

[137] *ibid.*

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Optimistically, the rise of IDS is helping to reshape open data principles to more fully respect the rights and jurisdiction of Indigenous Peoples.[138]

We close with a quote that reflects the spirit and direction of the work ahead:

> Indigenous Peoples and organizations are partnering with scholars across the country to advance community engagement processes that lead to improved Indigenous Data governance. The ripple effects of Indigenous Peoples asserting our inherent rights over our data has expanded beyond the First Nations' Principles of OCAP® within a space that has largely been dominated by settler worldviews. It has expanded to incorporate Indigenous-led and Indigenous-based research protocols, Indigenous jurisdictional control and a growing momentum toward best practices for how to conduct research using First Nations, Inuit and Métis data.[139]

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[138] Rainie, S. C., Kukutai, T., Walter, M., Rigueroa-Rodriguez, L., Walker, J., & Axelsson, P. (2019). Indigenous data sovereignty. In T. Walker, S. Rubinstein, & F. Perini (Eds.), *The state of open data: Histories and horizons* (pp. 300–319). African Minds. https://doi.org/10.5281/zenodo.2677823 (p. 300).

[139] Rowe, R. K., Bull, J. R., & Walker, J. D. (2020). Indigenous self-determination and data governance in the Canadian policy context. In M. Walter, T. Kukutai, S. R. Carroll, & D. Rodriguez-Lonebear (Eds.), *Indigenous data sovereignty and policy* (pp. 81–98). Routledge. https://doi.org/10.4324/9780429273957 (p. 90)