Genome Canada

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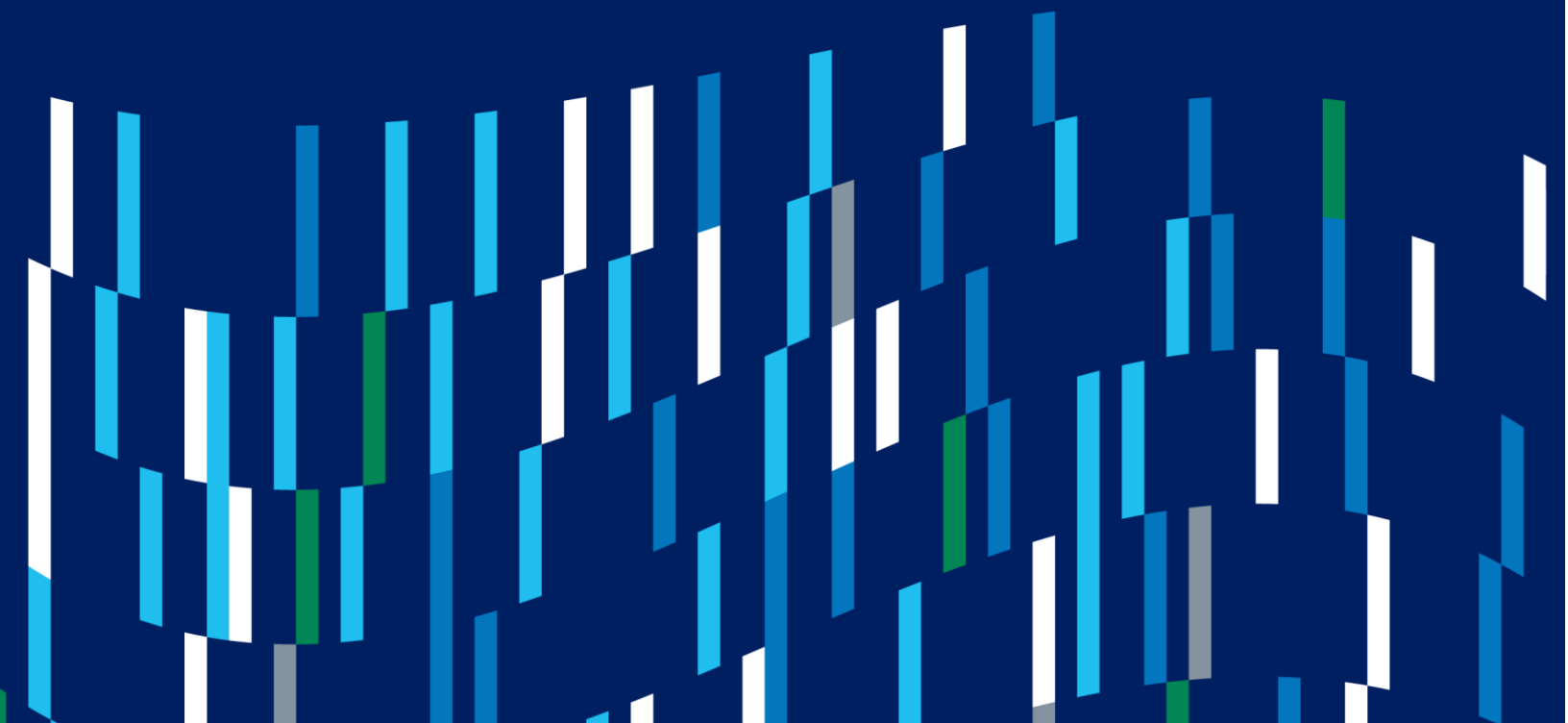
Enabling Canada's Bio Revolution in Natural Resources Management: Funding Opportunity



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Enabling Canada's Bio Revolution in Natural Resources Management

Genome Canada's latest mission-driven initiative will build the foundations for world-leading, data-driven natural resources systems and environmental resilience.

Funding opportunity

Overview

Canada's natural resources, and the vast genetic diversity that underpins them, are central to the country's economic prosperity, environmental resilience and long-term competitiveness. Natural resources systems, including forestry, wild fisheries, mining and critical minerals, energy, freshwater systems and biodiversity-based sectors, are facing unprecedented pressure from climate change, biodiversity loss, accelerating global competition and economic volatility. At the same time, decision-makers across these sectors are being asked to act faster, manage greater uncertainty and deliver better outcomes with less margin for error.

The opportunity: We are in the midst of a bio-revolution, fuelled by rapid advances in genomic[1] sequencing speed and scale, alongside artificial intelligence (AI) technologies that make it possible to analyze and train on vast volumes of genomic data. High-quality, standardized genomic and natural resources data enable earlier detection of ecological change and more adaptive, evidence-based management. Countries and industries that can integrate these capabilities into natural resources management and biodiversity protection will set the global standard, growing their economies while building environmental resilience for the long-term. They will also be best positioned to protect their populations and ecosystems from emerging biological threats, turning natural resources investments into sovereign and reliable national security assets.

The challenge: These 21st century capabilities remain severely underused across Canada. The country's natural resources-based genomics data landscape is fragmented, inconsistently governed and often inaccessible, limiting advanced analysis and constraining impact at scale. These challenges are further compounded by historical inequities and the longstanding under-recognition of Indigenous rights over Indigenous data, resulting in gaps in governance and oversight that are necessary to support Indigenous data sovereignty and enable responsible, equitable, and trusted data use.

Genome Canada has heard clearly from partners and stakeholders across sectors and regions that several key barriers prevent the country from maximizing the value of its vast and diverse natural resources while supporting environmental resilience (explore the **key insights that shaped the initiative**):

- non-standardized genomic data and associated metadata
- the absence or lack of clear governance frameworks
- barriers to responsible data sharing

[1] The term genomics is defined in this funding opportunity as the comprehensive study, using high throughput technologies, of the genetic information of a cell or organism and its functions. The definition also includes related disciples such as epigenomics, metabolomics, proteomics, transcriptomics, bioinformatics and engineering biology as long as the link to genetic information is clear.

- the absence of coordinated national infrastructure

Our solution: Genome Canada's latest mission-driven research initiative (hereafter, referred to as the "natural resources initiative") will lay the foundations for a generational transformation in Canadian natural resources systems and biodiversity management. Through a coordinated portfolio of research investments, new governance infrastructure and national collaborations, the natural resources initiative will help Canada harness the cutting-edge technologies and high-value, sovereign and responsibly managed data needed to address urgent economic and environmental challenges, and to build long-term prosperity and competitiveness.

The initiative will **enable earlier detection of ecological change, more adaptive resource management and more effective regulatory and stewardship** decisions. It will **grow a coordinated, interoperable and responsibly governed natural resources genomics data ecosystem** that supports next generation resource management and environmental protection while respecting and investing in First Nations, Inuit and Métis (hereafter referred to as Indigenous) data governance and sovereignty. And it will intentionally align targeted investments in research and data generation with infrastructure-building and governance to **transform disparate datasets into trusted, accessible, interoperable, AI-ready large-scale assets** that can be used by communities, regulators, researchers, industry and technology developers from coast-to-coast-to-coast in ways that respect data sovereignty and community authority.

The foundations established through the natural resources initiative are intended to unlock future waves of data generation, coordination and collaboration—creating the conditions for sustained productivity, economic growth and environmental resilience across Canada's natural resource sectors.

Key outcomes:

Improving data access, coordination and interoperability: The initiative aims to strengthen coordination and interoperability across Canada's natural resources genomics data landscape through common standards, shared infrastructure and responsible data stewardship. A national genomics data hub will lead the development and coordinated use of datasets, enabling cross-sector analysis and long-term value while reducing fragmentation across sectors and regions.

Responsible governance and uptake: Technical solutions alone are not enough to deliver impact at scale. Clear governance frameworks, fit-for-purpose policy alignment and attention to social, ethical and legal considerations are essential to ensure that genomic data can be used responsibly and effectively. These priorities will be embedded in the initiative's delivery streams to support practical governance and capacity-building, to clarify roles and responsibilities, and address barriers to uptake—helping decision-makers, communities and companies translate high-quality data into timely, trusted action. In particular, the initiative recognizes the importance of Indigenous-defined data governance. Indigenous communities will retain full ownership and control over their data, including decisions regarding stewardship, access, sharing and future use. This approach ensures that Indigenous data will be managed on community-defined terms and in alignment with principles such as OCAP®, OCAS, Inuit self-determination and the CARE Principles for Indigenous Data Governance. By prioritizing Indigenous-led governance, the initiative supports responsible stewardship and upholds the sovereignty and authority of Indigenous communities over their data.

AI-ready by default: The initiative will ensure data generated and coordinated through its research investments are AI-ready from the outset. By embedding AI-readiness into data standards and infrastructure, the initiative will enable advanced analysis, predictive modeling of ecosystem changes and decision-support tools that translate complex biological information into actionable insight. This positions Canada to fully leverage AI in natural resources management and biodiversity protection as these technologies continue to advance.

OBJECTIVES OF THE INITIATIVE

- Improve natural resources systems monitoring, environmental resilience and regulatory efficiency.
- Support the development of accessible and usable genomic data resources, including a national hub, that can support natural resources research and decision-making across Canada.
- Optimize the re-use of data through adherence to FAIR (findable, accessible, interoperable and reusable) principles and support coordination across genomics, natural resources and biodiversity data initiatives.
- Support the development and integration of AI-enabled analytical tools across datasets to enhance discovery, forecasting and real-time decision-making capabilities.
- Support development of Indigenous-led governance frameworks that operationalize distinctions-based Indigenous data governance principles, including the First Nations principles of Ownership, Control, Access, and Possession (OCAP®); the Métis principles of Ownership, Control, Access, and Stewardship (OCAS); the National Inuit Strategy on Research and Inuit-specific approaches to data governance grounded in Inuit self-determination; the CARE Principles for Indigenous Data Governance (Collective Benefit, Authority to Control, Responsibility, and Ethics); and the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP).
- Improve alignment with international initiatives in genomics, natural resources and biodiversity.
- Create a sustainable community of practice around natural resources genomics, governance and data coordination.

Genome Canada intends to work in close partnership with the regional Genome Centres and a broad community of stakeholders including industry, government, academia and Indigenous leaders and communities, to ensure the portfolio of investments in the natural resources initiative delivers meaningful outcomes through research and innovation projects, as well as long-term impacts through the development of coordinated data infrastructure and governance.

Impact and benefits to Indigenous Peoples and Canada

The expected impacts of this initiative are substantial. In the near term, targeted research investments in critical natural resources systems, combined with responsibly governed and, where appropriate, coordinated data infrastructure, will support more effective biodiversity monitoring, regulatory efficiency and sustainable resource management. These are areas where Canada must continue to strengthen its capabilities to remain competitive in a rapidly changing global economy.

High-quality genomic and natural resources data underpin the advanced analytics needed for climate adaptation, environmental protection and threat detection. Developing and maintaining

these capabilities as sovereign, secure Canadian infrastructure will be critical to emergency preparedness, ecological monitoring and rapid response to emerging bio-based threats.

For the long-term, strengthened natural resources data capacity and coordinated infrastructure will lay the foundation for Canadian researchers, technology developers and industry to accelerate innovation in biobased products, environmental technologies and AI-driven decision-making tools. Over time, the coordinated, interoperable datasets generated through the initiative will become a durable national asset that can be reused, combined and analyzed across sectors and regions—enabling stronger baseline understanding of ecosystems, faster detection of change, and improved forecasting and scenario planning under climate and economic uncertainty. This infrastructure will also reduce duplication of effort and lower barriers to entry for new users, supporting sustained collaboration across governments, Indigenous rightsholders and communities, academia, and the private sector. By enabling long-term data stewardship, standardization and accessibility, the initiative is expected to strengthen Canada's competitiveness in the global bioeconomy, support the creation and scaling of Canadian-made decision-support tools, and create pathways for ongoing skills development and capacity in genomics, data science and responsible governance that persist beyond the initial funding period.

By supporting Indigenous data stewardship and the development of governance frameworks for natural resources data, the initiative will contribute to trusted, effective approaches to data use across sectors and decision-making contexts. More broadly, it will support the responsible integration of genomics into policy, regulation and community-level decision-making.

Together the investments made through the natural resources initiative create an opportunity to strengthen Canada's leadership in the sustainable bioeconomy, biodiversity genomics and environmental stewardship. By equipping regulators, industry, researchers, Indigenous rightsholders and communities across the country with data and tools that support real-world decision, the initiative can unlock new opportunities for innovation and economic development while improving ecosystem and environmental resilience.

Funding streams

The natural resources initiative is expected to include an investment of $50 million over three years from Genome Canada and its partners—with $25 million in Government of Canada investment through Genome Canada. The initiative portfolio is comprised of three integrated activity streams:

STREAM 1 – DRIVER PROJECTS

Driver projects are stand-alone, mission-driven, impact-focused research investments designed to address challenges faced in Canada's natural resources systems, such as improving biodiversity monitoring, enhancing regulatory efficiency, developing sustainable resource management strategies, strengthening climate adaptation, and protecting critical ecosystems. These projects may also focus on addressing emerging biological threats, advancing environmental technologies, and supporting Indigenous-led stewardship initiatives. The aim of this portfolio of projects is to advance understanding of genomics within Canada's natural resources and apply it across forestry, energy, wild fisheries, mining and critical minerals, freshwater and biodiversity-related sectors. They will produce high-quality, standardized, AI-ready genomic datasets and encourage collaboration between academia, industry, government and Indigenous partners where appropriate to project objectives. Genomics in society activities will be included to share knowledge and promote adoption of genomics in natural resources.

Indigenous-led driver projects will be led by and for First Nations, Inuit and Métis communities and governments, with Indigenous-defined data governance and decision rights over the full data lifecycle (including whether, when, how and with whom data is shared), consistent with applicable principles (e.g., OCAP®, OCAS), CARE and UNDRIP.

STREAM 2 – NATIONAL GENOMICS DATA HUB

The initiative will establish a national genomics data hub in natural resources that provides standards and infrastructure needed for long-term impact. The hub will serve as a coordinating platform to support and steward data generated by the Stream 1 driver projects, enabling the development and use of a common, findable and usable national genomic data resource focused on genetic diversity across Canada's natural resources systems. In practice, the hub will offer shared data and metadata standards, support coordination and interoperability with genomics and natural resources data initiatives and develop tools and workflows that can enable AI-readiness for datasets. It will also enable and be consistent with Indigenous data governance frameworks to facilitate the connection of Indigenous data infrastructures, where appropriate and on community-defined terms. Through training, templates and user support the hub will strengthen uptake and increase the long-term value and international alignment of publicly funded natural resources genomics data assets. The hub will not be responsible for storing or sharing data. A national databank will be implemented separately.

STREAM 3 – INDIGENOUS DATA GOVERNANCE FRAMEWORKS

The natural resources initiative will facilitate the development of Indigenous-led, distinctions-based governance frameworks, co-developed with relevant rights holders. These frameworks will develop concrete tools and resources by which Indigenous genomic and environmental data, knowledge and assets are owned, accessed, utilized, shared and ultimately stewarded within, and where appropriate, beyond the initiative. Through collaborative partnerships with Indigenous rightsholders, these projects will integrate data sovereignty principles for First Nations, Métis and Inuit communities. This approach is consistent with established frameworks such as OCAP®, OCAS, CARE, and UNDRIP, promoting ethical governance that is culturally rooted and community defined. Indigenous rightsholders retain full authority to make decisions regarding the use of their data, ensuring the preservation of their rights and responsibilities.

The frameworks should incorporate guiding principles rooted in Indigenous data sovereignty and operating principles that recognize how Indigenous communities interact with the species, water and lands involved in the research. These projects will include engagement frameworks and practical tools to help researchers, data stewards and other stakeholders apply the guidelines effectively.

Across the three streams, the initiative will align investments in data governance, data generation and data usability and access to build a coherent, trusted natural resources genomics data ecosystem that supports real-world decision-making while respecting Indigenous authority. Together, the streams ensure that Indigenous governance tools inform how data is generated and stewarded, and that infrastructure and processes enable appropriate access and reuse consistent with applicable governance conditions.

Governance

Genome Canada is responsible for the stewardship and success of the natural resources initiative. To manage its governance effectively, Genome Canada will undertake the following:

- Creation of a sustainable community of practice around natural resources, Indigenous governance and data coordination that will provide guidance and coordination support at the initiative level and with other national, regional and provincial initiatives. The community of practice will include, at a minimum, project leaders, researchers and representatives from Indigenous communities, as well as other partners to ensure diverse perspectives and shared leadership.
- Establish a Governance and Review Committee (GRC) composed of arm's length national and international experts and leaders who will provide recommendations and advice to Genome Canada to support the execution of the initiative. The GRC, who is in advisory capacity, will bring together expertise in natural resources research and innovation, Indigenous governance, portfolio management, policy development, GE^{3}LS[2] and large-scale data asset management.
- Establish sub-committees of the GRC as needed to facilitate focused and detailed discussions on specific topics (e.g., on data solutions, Indigenous-led governance, ethics), leveraging the expertise of GRC members and additional external experts.
- Receive the GRC's funding recommendations. The GRC evaluations of project progress will also advise Genome Canada, the Genome Centres and other partners on the direction and management of projects, including modifying or cancelling project funding if necessary. Genome Canada's Board of Directors will retain responsibility for all decisions regarding the allocation of funds administered by Genome Canada on behalf of the Government of Canada.
- Ensure—in collaboration with the regional Genome Centres—that the initiative complies with the terms of the Genome Canada agreement with the federal government, reflects provincial priorities and provides information and data that will allow for the ongoing management of funded projects, including the assessment of progress, performance metrics and financial reporting.
- Work with partners to share best practices and co-operate on provincial, national and global natural resources data-sharing initiatives.

Additional committees or working groups may be established to provide advice and guidance on key initiative activities. These groups could comprise members of the project teams as well as external advisors with the required expertise.

IDEA and Indigenous truth, reconciliation and engagement

Genome Canada is committed to creating a diverse and inclusive environment and ensuring equitable participation by people who live with diverse visual, motor, auditory, learning and cognitive abilities. We are acting on the evidence that achieving a more equitable, diverse and inclusive Canadian research enterprise is essential to creating the excellent, innovative and impactful research needed to advance knowledge and understanding and respond to local, national and global challenges.

Genome Canada encourages partners and applicants to increase the inclusion and advancement of equity-deserving and under-represented communities in leadership positions to

[2] The acronym GE^{3}LS stands for genomics and its ethical, environmental, economic, legal and social aspects. However, it should be understood broadly as research into the implications of genomics in society from the perspective of the social sciences and humanities. Therefore, it is not strictly limited to the disciplines that comprise the acronym, but rather encompasses all those that rely on quantitative and qualitative methodologies to investigate the implications of genomics in society and to inform applications, practices and policies.

enhance excellence in research and training. These communities can include Indigenous Peoples, people of African descent, members of other racialized groups, women, persons with disabilities, members of 2SLGBTQ+ communities and early-career researchers. Inclusion, diversity, equity and accessibility (IDEA) should be key considerations for team management and composition.

Genome Canada is committed to Indigenous truth, reconciliation and engagement, as well as upholding the right of self-determination as set out in the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP). This commitment is reflected through our support for Indigenous data governance principles acknowledging the essential role that data plays in fostering Indigenous innovation, self-determination and self-governance.

Historically, research done with Indigenous communities, on Indigenous lands and/or incorporating Indigenous knowledge has been under-recognized, under-valued, under-funded and often conducted in a culturally insensitive and harmful manner. Genome Canada recognizes that Indigenous communities have unique approaches to research that are rooted in their unique experiences, relationships and worldview with the natural world.

Research projects that address issues of relevance to Indigenous Peoples are expected to include a plan to engage First Nations, Métis and Inuit communities, in the continuum of research from design, practice to knowledge mobilization. The plan should specify how Indigenous groups will participate on the research team and/or as users of the research, as well as how Indigenous knowledge systems will co-exist with, and complement, the project's other activities. Projects involving Indigenous research should be conducted with sensitivity and only after carefully considering who will conduct the research and why and how. The research should be conducted in line with **the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans Chapter 9: Research Involving the First Nations, Inuit and Métis Peoples of Canada,** and include:

- First Nations principles of ownership, control, access and possession (**OCAP®**).
- Métis data governance guided by the OCAS principles (Ownership, Control, Access, and Stewardship), originally articulated by the Métis Nation of Ontario and subsequently adopted and adapted by Métis governments across the Métis Nation.
- Inuit-specific approaches guided by Inuit *Qaujimajatuqangit* principles, the Inuit system of knowledge, values and ways of knowing that has sustained Inuit for generations and continues to inform governance, decision-making and stewardship.

Portfolio considerations

Given the scope and ambition of the natural resources initiative, projects will be assessed and managed as an integrated portfolio to ensure collective impact that is greater than the sum of individual investments.

Below is a set of considerations that will be used by the initiative's GRC to assess, monitor and guide the initiative at a strategic, portfolio-wide level. Please note, these portfolio considerations are not project evaluation criteria, which are specified in the appendix associated with each specific stream of funding.

Impact and benefits to Canada

- Improved capacity to detect ecological change, monitor biodiversity, and identify emerging biological threats—supporting climate resilience, emergency preparedness, and place-based/community-led outcomes.

- Demonstrated, sustained benefits through Indigenous knowledge systems and Indigenous-led stewardship, aligned with Indigenous priorities and place-based observation.
- Durable national benefit through trusted, responsibly governed data assets and stewardship practices (including Indigenous data sovereignty where applicable) that enable reuse and decision-support beyond individual projects.

Indigenous partnerships and data sovereignty

- Substantive Indigenous leadership and partnerships that are early, ongoing and appropriately resourced.
- Operationalized Indigenous data sovereignty, including Indigenous-defined decision rights for access, use, reuse, sharing, and withdrawal—supported by practical Indigenous-led governance tools (e.g., guidelines, consent/access pathways, governance tags, enforcement mechanisms, and benefit-sharing) aligned with OCAP®, OCAS, Inuit-specific approaches, CARE, and UNDRIP (as applicable).
- Meaningful participation and integration of Indigenous perspectives, approaches and knowledge systems in natural resources systems stewardship.

Value creation and utility

- High-quality, standardized, AI-ready datasets and metadata that are demonstrably usable beyond the originating project (where governance permits).
- A balanced portfolio of outputs (data assets, governance tools, infrastructure services, and capacity/training resources) that together increase real-world utility.
- Evidence of reuse potential at scale (e.g., interoperability, documentation, defined use cases, and readiness for cross-project synthesis).

Representation and equity

- Balanced representation across natural resource systems and key sectors (e.g., forestry, fisheries, energy, mining and critical minerals, freshwater, biodiversity).
- Coverage of diverse Canadian regions and ecosystems, including north/remote contexts where appropriate.
- Equitable distribution of benefits and participation, including Indigenous communities.

Research and innovation excellence

- Novel and rigorous approaches (scientific, technical, participatory and governance-related) that advance the state of the art in natural resources genomics and data use.
- Interdisciplinary and cross-sector collaboration that increases the portfolio's collective learning and reduces duplicated effort.
- Adaptive capacity to respond to emerging science, policy, or technology changes over the initiative's lifetime (e.g., standards evolution, AI methods, regulatory needs).

Data infrastructure and ecosystem development

- Infrastructure and services that measurably reduce barriers to access, discovery and reuse for diverse users (including Indigenous communities, researchers and policymakers), consistent with governance conditions.
- Clear operating model, maintenance commitments, and scalable architecture (roles, resourcing, decision rights) that support persistence beyond the initial funding period and accommodate evolving standards and user needs.
- Portfolio-wide standards, curation, and support functions that strengthen Canadian capability in data management, interoperability, and Indigenous data governance implementation.

The natural resources initiative portfolio will prioritize projects that make a case for creating short-term impact that can benefit Canada's natural resources systems.

Given the portfolio considerations listed above, we encourage the regional Genome Centres and their applicants to consult each other, and with Genome Canada, to maximize potential synergies, minimize duplication and overlap, and maximize potential impact and benefits for communities, Indigenous rightsholders and broader Canadian systems.

Application process

The application requirements, submissions details and evaluation criteria for each of the three funding streams are outlined in:
Appendix 1 – Stream 1 – Driver projects
Appendix 2 – Stream 2 – National genomics data hub
Appendix 3 – Stream 3 – Indigenous data governance frameworks

The evaluation processes may be adjusted where warranted by the complexity or number of applications received or by other relevant factors. Any changes will be communicated through Genome Canada's website and the Genome Centres.

Timeline

June, 2026	Genome Canada releases 'Enabling Canada's Bio Revolution in Natural Resources Management' funding opportunity
Stream 1 – Driver projects	
August, 2026	Application process begins
December, 2026	Genome Canada informs Genome Centres, partners and the broader community of funding decisions.
March 31, 2027	Projects begin
Stream 2 – National genomics data hub	
August, 2026	Application process begins
December, 2026	Genome Canada informs regional Genome Centres, partners and the broader community of funding decisions.
April 1, 2027	Project begins
Stream 3 – Indigenous data governance frameworks	
December, 2026	Application process begins
March, 2027	Genome Canada informs regional Genome Centres, partners and the broader community of funding decisions.
July 1, 2027	Projects begin

Project management and oversight

All funded projects must adhere to Genome Canada's **Guidelines for Funding**.

All funded projects must meet the conditions of funding within 3 months of issue of the notice of award.

Each project team must have human and financial resources allocated to the budget to successfully manage the funded project, including coordination of administrative and reporting

requirements and help ensure coordination across the portfolio, to support portfolio cross-cutting activities, and to inform and develop portfolio-relevant activities.

Project reporting will take the form of regular progress reports as well as a final report following project completion. Requests for no-cost extensions will not be considered.

The GRC and GRC sub-committees will ensure cohesive and coordinated oversight of the projects within the portfolio, providing recommendations to Genome Canada.

As projects progress, Genome Canada will host collaborative engagements in ongoing knowledge mobilization and alignment discussions so emerging lessons and practical tools can inform implementation and strengthen the initiative more broadly. Other mechanisms may also be put into place to ensure that partners and project teams working on relevant funded projects in the portfolio regularly connect and that the group is collectively enabled to support the goals of the initiative.

Project teams are also required to participate in the initiative's community of practice to exchange learnings, provide guidance and support coordination within the natural resources initiative and inform other national, regional, provincial or Indigenous initiatives.

Contact

Please contact your regional Genome Centre programs team for guidance on eligibility, co-funding and timelines. Genome Canada program staff can provide additional details upon request.

Appendix 1: Stream 1 – Driver projects

Driver projects are multi-partner, mission-driven research collaborations that address priority questions in Canada's natural resources systems through the generation, coordination and use of high-quality natural resources genomics data. Within Stream 1, projects may be advanced through two pathways: (1) projects involving data collection on lands, waters, species, or ecosystems subject to Indigenous stewardship wherein the Administrative Project Leader must be a representative formally mandated by the relevant Indigenous governing authority and be affiliated with an Indigenous organization or government and (2) projects not subject to Indigenous stewardship. Both pathways contribute to a coordinated national portfolio that advances biodiversity conservation, sustainable resource management, regulatory decision-making and innovation.

Across both pathways, driver projects are expected to apply genomics to answer clearly articulated, user-relevant research questions (e.g., for regulators, Indigenous rightsholders and communities, industry and resource managers) and to demonstrate how responsibly governed, AI-ready data can improve decisions and outcomes. Projects should include appropriate partnerships, knowledge mobilization, and Genomics in Society (GE^3LS) activities to support responsible innovation and practical uptake.

RESEARCH INTO THE IMPLICATIONS OF GENOMICS IN SOCIETY

Genomics and its applications have the potential to make significant social and economic impacts. As such, all driver projects must undertake research into the application and implications of genomics in society—specifically, GE^3LS (genomics and its ethical, environmental, economic, legal and social aspects).

The GE^3LS research supported by the driver projects should investigate aspects of responsible innovation, such as key factors that may facilitate or hinder the effective translation of research and uptake of genomic-based applications. GE^3LS research deliverables should inform and help implement changes in practices or policies related to the use of genomics research and innovation; drive the adoption, uptake, scale and spread of the innovation; and/or enhance the understanding of the implications of genomics in society more broadly.

The GE^3LS research must also address salient factors that will impact the advancement and application of the project's genomics research and must be aligned with and complementary to the overall project and initiative goals. The portfolio review will consider GE^3LS research across the driver projects to ensure cohesion and avoid duplication.

REQUIRED ACTIVITIES

- Contribute to advancing the understanding and application of genomics in biodiversity and natural resources contexts with the intention of improving sustainability, productivity, competitiveness and/or innovation.
- Generate high-quality, standardized genomics datasets based in natural resources. This may include, but is not limited, to environmental DNA (eDNA), metagenomics, population genomics, environmental DNA assays and integrated environmental metadata.
- Embed GE^3LS considerations to support trusted data governance, responsible AI enablement and the development of tools and standards that reflect societal values, community and place-based benefits and Indigenous data sovereignty.
- Ensure that Indigenous data, if applicable, is governed under Indigenous-defined terms, including community-approved decisions regarding access, use, reuse, sharing, and

withdrawal, consistent with Indigenous data governance principles (e.g., OCAP®, OCAS) and in alignment with CARE principles and UNDRIP.

IMPACT AND BENEFITS TO INDIGENOUS STEWARDSHIP AND CANADA

At the conclusion of the natural resources initiative, driver projects are expected to demonstrate:

- Progress on natural resources research impacts for Indigenous communities, including community-prioritized evidence to support stewardship and decision-making and strengthened capacity to lead, conduct, interpret and apply genomics research on community-defined terms.
- Progress on scientific research questions relevant to Canada's natural resources.
- Generation of high-quality, standardized datasets.
- Ongoing collaboration and integration with the national genomics data hub and Indigenous data governance projects.
- Evidence of data use, synthesis or cross-sector application.
- Tangible contributions to biodiversity conservation, sustainable resource management, regulatory efficiency or innovation.
- Strengthened capacity to steward natural resources in a changing environment.

ELIGIBLE INSTITUTIONS

Genome Canada funding can be awarded to individuals affiliated with the following organizations in addition to those listed in Genome Canada's **Guidelines for Funding**.

- An Indigenous organization and/or government.
- A start-up company, defined as an early-stage company that is developing an innovative product, service or technology and is working to bring it to market. The company is still establishing its business model, customer base and growth pathway and is focused on innovation and scalability rather than routine service delivery. The company must be incorporated in Canada and operating primarily in Canada.

FUNDING AVAILABLE AND TERM

- Up to $19 million is available from Genome Canada.
- Genome Canada's minimum contribution to an approved project is $1 million and the maximum contribution is $2 million.
- A minimum 1:1 co-funding ratio is required.
- Funding is for a term of up to three years.
- Applicants can request up to a total of 20 per cent of Genome Canada funds to flow to start-up companies to fund research, including GE^{3}LS activities.

ELIGIBILITY CRITERIA

- All projects involving research conducted on Indigenous lands, waters, species or ecosystems are subject to Indigenous stewardship.
    - The research must be supported by the relevant Indigenous governing authority.
    - The Administrative Project Leader must be a representative formally mandated by that authority. This leadership and support structure ensures that the Indigenous community retains authority over the research and full jurisdiction over the data lifecycle, including decisions regarding stewardship, access, use, reuse, sharing, withdrawal and future use, in alignment with Indigenous data sovereignty principles; and

    - The project must store all data generated locally until an Indigenous-defined governance model is available and sharing of data has been agreed upon by relevant Indigenous authorities.
- Any data and metadata that are not governed under Indigenous authority must be shared with the national genomics data hub (Stream 2) for curation and stewardship, building the foundation for a coordinated, interoperable genomics data ecosystem. Data will reside in a national databank hosted on dedicated Canadian infrastructure compliant with applicable privacy laws and policies. Any access to or sharing of data via the hub/databank will be enabled through a dedicated Genome Canada established data access compliance process.
- Each project leader must comply with the applicable laws and regulations with respect to protecting access to project-level information.
- Driver projects must include partner(s) to facilitate the downstream use and/or impact of the research.
- Each project team must include an individual responsible for project and data management (including Indigenous data, if applicable).
- Driver projects must include large-scale genomic sequencing efforts and data generation.
- Samples collected must originate from within Canada. Previously collected samples and data are eligible for inclusion in the driver projects, however the minimum metadata (Table 1) must be available.
- GE^{3}LS research must be embedded in the project plan to inform and implement changes in practices or policies related to the use of natural resources genomics research and innovation; drive the adoption, uptake, scale and spread of the innovation; and/or enhance the understanding of the implications of genomics in society more broadly.
- Minimum metadata must be generated for all datasets, including a core set of harmonized descriptors, to support dataset development and future discovery, provenance and potential future reuse (see Table 1). For projects involving data collection on lands, waters, species or ecosystems subject to Indigenous stewardship, this minimum metadata requirement does not constitute consent to data access or sharing.
- Genomic data and associated metadata in addition to those described in Table 1 must conform, to the degree possible, to international standards and best practices.

Applicants are encouraged to include additional metadata, sequencing approaches (e.g., long-read sequencing, metabolomics) and multi-omics data that may enhance Canada's ability to perform downstream research activities focused on advancing the utility of genomic data and accelerating the development of natural resources data standards and tools.

Table 1. Core set of metadata descriptors.

Category	**Field Name**	**Priority**	**Description / Expected Value**	**Purpose for AI & Interoperability**
General			Core metadata fields that identify and describe each dataset.	Provides foundational identifiers and context needed to enable downstream analysis.
	datasetID (DwC)	Mandatory	Unique DOI or UUID for the project.	Ensures traceability and FAIR alignment.
	eventDate (DwC)	Mandatory	Date/time of collection (ISO 8601).	Temporal alignment for climate/trend modeling.

	scientificName (DwC)	Mandatory	Full scientific name of the target organism.	Biological alignment across datasets.
	env_broad_scale (MIxS)	Mandatory	Broad biome (e.g., [ENVO:01000174] Forest).	Cross-sector filtering and AI-based inference.
	seq_meth (MIxS)	Mandatory	Sequencing platform (e.g., PacBio, Oxford Nanopore, Illumina).	Enables AI to correct for technology-specific bias.
	data_type (MIxS)	Mandatory	Data type (e.g., eDNA, DNA barcoding, metagenome, WGS)	Supports pipeline selection, filtering and cross-dataset analysis.
	governance_tag (Custom)	Mandatory	Controlled governance designation (e.g., Indigenous-governed; OCAP® aligned; OCAS aligned; Inuit data governance; Local Contexts Label applied; Open; Controlled access; Restricted). .	Signals the governance conditions that determine stewardship, access and reuse.
	Indigenous_stewardship (Custom)	Mandatory	Yes/No – whether the sample was collected on Indigenous lands, waters, species or ecosystems subject to Indigenous stewardship	Triggers governance-aware handling and routing of records.
Location			For sample collection all datasets must provide either exact GPS coordinates or, where precise disclosure is not appropriate, as generalized / masked coordinates or another recognized spatial unit.	Supports spatial discovery, ecological interpretation and fit-for-purpose spatial analysis.
	location_precision (Custom)	Mandatory	Indicates whether location is exact, generalized, masked, or represented by a recognized spatial unit.	Makes spatial disclosure transparent and supports fit-for-purpose use of sensitive location data.
	decimalLatitude (DwC)	Conditional	Geographic latitude in decimal degrees.	Spatial alignment and GIS mapping.
	decimalLongitude (DwC)	Conditional	Geographic longitude in decimal degrees.	Spatial alignment and GIS mapping.
	location_reference_unit (Custom)	Conditional	Name or identifier of the recognized spatial unit used when exact coordinates are not shared (e.g., 10 km grid cell, watershed, ecozone, range).	Preserves spatial interpretability where exact coordinates are restricted.

Sector packages			Specific fields per Driver Project type:	Enables domain-specific predictive modeling
Soil & agriculture	soil_type (MIxS)	Conditional	Classification (e.g., Podzol, Chernozem).	Predicts soil health and carbon sequestration.
	ph (MIxS)	Conditional	Soil pH value.	Key variable for microbial diversity analytics.
Water & fisheries	depth_m (MIxS)	Conditional	Water depth in meters.	Essential for 3D biodiversity forecasting.
	temp (MIxS)	Conditional	Water temperature at time of sampling.	Critical for climate risk and pathogen detection.
Plant & forestry	cultivar_ecotype (MIxS)	Conditional	Specific genetic strain or ecotype name.	Tracks resilience in commercial/natural forests.
	observed_biotic (MIxS)	Conditional	Symbiotic/parasitic links (e.g., mycorrhizal).	Maps ecosystem-level interactions for AI.
Indigenous name	indigenous_name (Custom)	Conditional	Community-provided Indigenous name(s) for the flora or fauna, where applicable and shared on community-defined terms.	Supports culturally respectful labeling, discovery and interpretation where governance permits.
Access, provenance and AI-readiness			Metadata fields that document how data were generated, governed, stored, accessed and prepared for computational reuse and advanced analytics.	Supports reproducibility, access control and the consistent preparation of datasets for AI-enabled discovery, modeling and reuse.
	target_gene (MIxS)	Mandatory	Target marker, locus or sequencing target (e.g., 16S, COI, WGS).	Supports method-specific analysis and comparability across datasets.
	sop (MIxS)	Mandatory	Reference to the standard operating procedure or protocol used.	Supports reproducibility, quality assessment and method comparability.
	data_access_level (GA4 GH)	Mandatory	Open / Registered / Controlled / Restricted.	Supports automated enforcement of access conditions; must align with governance tag and applicable authority.
	repository_ref	Mandatory	Repository or archive where the data are deposited (e.g., ENA, NCBI, GBIF, Institutional.	Supports discovery, provenance and federated indexing.

Additional details will be developed and provided by the Stream 2 national genomic data hub regarding the data schema.

Acronyms used in table above include: Darwin Core (DwC), Minimum Information about any (x) Sequence (MIxS), Global Alliance for Genomics and Health (GA4GH), Digital Object Identifier (DOI), Universally Unique Identifier (UUID), International Organization for Standardization (ISO), Environment Ontology (ENVO), Cytochrome c Oxidase I (COI), Whole Genome Sequencing (WGS), European Nucleotide Archive (ENA), National Center for Biotechnology Information (NCBI), Global Biodiversity Information Facility (GBIF), and Geographic Information Systems (GIS).

APPLICATION PROCESS

Genome Canada requires applicants to submit both an LOI and, later in the process, a full proposal.

Letter of intent

Each applicant will use a brief letter of intent (LOI) to indicate their interest in applying for Genome Canada funding. The LOI will enable an eligibility check by Genome Canada to ensure the LOI meets the requirements of the funding stream.

For the LOI**,** applicants will be asked to provide a brief summary of the following.

- The proposed research plan, including embedded GE^{3}LS research and data management strategy.
- Impact and benefits to Indigenous Peoples and Canada.
- Project leaders and their areas of expertise.
- Budget and co-funding plan.

Applicants will also be asked to confirm that they meet the eligibility requirements of the funding stream.

Applicants who are deemed eligible will be invited to submit a full proposal.

Full proposal

Full proposals must address the evaluation criteria for individual projects established for Stream 1, including quality of the research proposal and project plan, data management strategy, impact and benefits to Indigenous stewardship and Canada, and project management and financial competency. The projects considered the most meritorious will be considered for inclusion in the portfolio.

A technical review of the proposals received will be completed by a panel of international, diverse and independent experts. It is expected that the technical review will be completed as an independent, at-home review.

Full proposals will then be reviewed and discussed by the initiative's GRC. The technical reviews will be used, in part, to assess whether the applications meet the initiative's objectives and will add value to the portfolio of projects and contribute to the expected outcomes and impacts.

EVALUATION CRITERIA

Genome Canada uses a rigorous, independent peer review process to assess the merit of proposals and to ensure that sound management and financial practices are implemented.

Full proposals will be reviewed using criteria from the following categories:

- Project plan
- Data management strategy
- Impact and benefits for Indigenous Peoples
- Impact and benefits for Canada
- Management and finance

These criteria are intended to support both individual project assessment and portfolio-level decision-making.

Project plan

- How well-defined and actionable is the project plan in terms of governance, management and the strategic realization of project activities? To what extent does the project present a clear and realistic timeline, with specific milestones and deliverables that are achievable within the proposed time frame?
- How well does the proposed methodology align with the project's objectives, demonstrating sound scientific and technical approaches to achieving the desired outcomes? Are the sampling, sequencing, QA/QC and data generation pipelines appropriate and aligned with intended uses?
- Does the plan include a comprehensive risk management strategy that anticipates potential challenges and outlines mitigation measures to ensure project success?
- Does the GE^{3}LS component address key ethical, legal, social, and governance factors influencing adoption and responsible use of genomics in natural resources? How well is GE^{3}LS research integrated with and complementary to the overall project, strengthening viability, trust, and uptake?
- For Indigenous projects, have Indigenous leadership and communities been engaged—and will they continue to be meaningfully engaged—in shaping the research objectives, methods and project-level governance? Does the proposal integrate Indigenous knowledge systems in a respectful and appropriate manner?
- For projects not led by Indigenous communities, where Indigenous lands, waters, species, ecosystems, knowledge, or data may be implicated, does the proposal demonstrate an appropriate plan for engagement, governance recognition and distinctions-based consideration of Indigenous rights, interests and data conditions?

Data management strategy

- Are the plans for data generation, management, analysis and quality assurance robust, coherent and achievable within the proposed scope, budget, and timeline? Are quality assurance/quality control, validation, versioning, and documentation plans clearly articulated and appropriate? Are the expected data products clearly defined and appropriate to project objectives and governance requirements?
- Is the data management plan appropriate to project objectives and governance conditions?
- Does the proposal demonstrate compliance with mandatory metadata, including Indigenous metadata where applicable, and data governance requirements, including:
    - use of persistent identifiers and standardized metadata (at minimum use of descriptors outlined in Table 1); and
    - data structures that support interoperability, machine readability, and AI-enabled analysis?
- Is there an appropriate and proportionate approach to assessing AI-readiness of data outputs?

Impact and benefits for Indigenous Peoples

- To what extent are the intended impacts for Indigenous stewardship clearly articulated by the relevant Indigenous authority, grounded in local priorities and connected to tangible stewardship decisions and actions?
- How well does the proposal reflect the specific ecological, cultural, and governance context of the place(s) involved, including seasonal cycles, local indicators and stewardship responsibilities?
- Does the proposal respectfully integrate Indigenous ways of knowing (e.g., oral histories, land-based observation, Indigenous knowledge systems) alongside genomic science, with clear methods for knowledge bridging validated by the community?
- Are the outputs (e.g., indicators, dashboards, maps, reports, protocols) designed for community use, interpretable by intended users, and fit-for-purpose for Indigenous stewardship and governance decision-making (including uncertainty and limitations)?
- To what extent does the project build sustained capacity within the Indigenous authorities (e.g., training, employment, governance capacity, data literacy, infrastructure) to lead, conduct, interpret and apply the research during and beyond the funding period?
- Are responsibilities, consent processes and benefit-sharing mechanisms clearly defined and acceptable to the community, including plans for returning results, community review and long-term stewardship of knowledge and data on community-defined terms?

Impact and benefits to Canada

- Does the proposal address clearly articulated, high-priority research questions that are directly relevant to Canada's natural resource systems?
- To what extent does the proposal demonstrate innovation, through novel questions, approaches (including Indigenous knowledge and approaches if applicable), technologies, or applications of genomics?
- How significant and realistic are the anticipated environmental, social, economic, and/or policy benefits for Canada, including Indigenous communities?
- Does the project have the potential to create value for industry and/or Indigenous communities by fostering partnership, advancing technologies, improving communities' socio-economic wellbeing or opening new market opportunities?
- Is there a credible benefits-realization pathway linking deliverables to adoption, use, and measurable outcomes, with clear timelines and accountabilities? Are knowledge mobilization and plans for uptake strong, with clear value propositions and pathways to use? Have potential barriers to adoption, including policy, regulatory, governance or IP considerations been addressed? Will users and partners be meaningfully engaged in the project and in realizing benefits?

Management and finance

- Is the budget reasonable and proportional to the project's activities, considering the level of effort required?
- Are the proposed expenditures thoroughly documented, transparent and compliant with funding guidelines?
- To what extent does the proposal include robust mechanisms for ongoing fiscal oversight, ensuring that project expenditures will be closely monitored and managed effectively throughout the project's duration?
- To what extent is the proposed co-funding plan well documented, eligible and feasible?
- Does the proposed co-funding plan clearly support the project's objectives?
- How likely is it that the project will be able to secure at least 75 per cent of the co-funding for eligible costs before the deadline for the release of funds?

- How well does the management plan address project governance, personnel accountabilities and decision-making processes? Are the project leaders equipped with a robust management structure to effectively oversee the project? Does the project team demonstrate the necessary expertise and capacity, including genomics, Indigenous data management, data science, domain knowledge and user-focused capabilities?
- How well does the project support trainees and early-career researchers, where appropriate?
- Are there concrete plans to ensure that inclusion, diversity, equity and accessibility (IDEA) principles are central to team management and composition?
- Are there concrete plans to ensure management, oversight, resourcing and accountability provide appropriate support for Indigenous participation and decision-making and are consistent with Indigenous data governance principles (e.g., OCAP®, OCAS) and in alignment with CARE principles and UNDRIP.

Appendix 2. Stream 2 – National genomics data hub

The national genomics data hub is the enabling infrastructure of the natural resources initiative. Its purpose is to ensure that natural resources-based genomic data generated across funded Stream 1 driver projects are discoverable, interoperable, trusted and usable in aggregate, enabling evidence-based decision-making, AI-enabled analytics and long-term national value.

The hub will function as the coordinating and stewardship layer for the initiative's data ecosystem. It will not replace existing repositories or conduct primary research; rather, it will develop tools, standards and templates that will enable the future connection, harmonization and enabling of AI integration for the data generated through the Stream 1 driver projects. To ensure coherence across the initiative, the hub will also work closely with Indigenous communities to operationalize and implement (where appropriate) the Indigenous-led governance tools and frameworks developed through Stream 3 (e.g., governance tags, engagement frameworks, and consent/access pathways) within its infrastructure and workflows.

REQUIRED ACTIVITIES

The national genomics data hub must undertake the following activities.

Metadata registry and discovery

- Develop and maintain a searchable national catalogue of datasets for the data generated by Stream 1 driver projects.
- Enable discovery by geography, species, data type, Indigenous communities and governance conditions.

Data harmonization and interoperability

- Implement mapping and crosswalks across relevant standards (e.g., DwC, MIxS, GA4GH).
- Enable datasets to be comparable and usable in aggregate.

Data curation and quality assurance

- Support validation, enrichment and FAIR/AI-readiness assessment of datasets.
- Enable provenance standards that support Indigenous authority and permissions.
- Enable monitoring of compliance at the portfolio level.

Data deposition

- Support the deposition of data to a national databank

AI-enablement and integration

- Support programmatic access (e.g., Application Programming Interfaces (APIs)).
- Enable integration with analytics, modeling and AI workflows.
- Enable clear rights recognition standards (public domain, licenses, labels).

Indigenous stewardship and governance

- Implement capacity support, data standards and infrastructure that enable Indigenous stewardship and governance within the hub in alignment with Stream 3 Indigenous governance frameworks.
- Support connection and interoperability with Indigenous data infrastructures on community-defined terms and consistent with applicable Indigenous data governance frameworks.

Training and support

- Develop guidance, templates and tools for funded projects that can be handed over to another organization should it be required to ensure long-term sustainability of the data as a national asset. The organization will be determined by Genome Canada.
- Develop onboarding support and consistent adoption of standards and workflows.

- Collaborate and engage with projects funded through Streams 1 and 3 to operationalize Indigenous governance requirements, including implementing engagement frameworks, consent pathways, governance tags, metadata practices and other practical tools developed through Stream 3 at the dataset level, while building the guidance, capacity, standards and infrastructure needed to support Indigenous stewardship and governance within hub infrastructure and workflows.

IMPACT AND BENEFITS TO INDIGENOUS STEWARDSHIP AND CANADA

By the conclusion of the project, the national genomics data hub in natural resources is expected to demonstrate the following.

- Consistent application of common metadata and governance frameworks for participating projects, with response for project-specific and community-defined variations.
- Measurable improvement in data interoperability and AI-readiness.
- A plan for the operational integration of Indigenous data governance and stewardship.
- A functioning, trusted national discovery layer for natural resources genomics data.
- Early evidence of data reuse, cross-project synthesis or downstream uptake.

ELIGIBLE INSTITUTIONS

Genome Canada funding can be awarded to individuals affiliated with an Indigenous organization and/or government, or with an organization listed in Genome Canada's **Guidelines for Funding**.

FUNDING AVAILABLE AND TERM

- Up to $5 million is available from Genome Canada.
- A minimum 1:1 co-funding ratio is required.
- One hub project is expected to be funded.
- Funding is for a term of up to three years.

ELIGIBILITY CRITERIA

- The project team must include relevant expertise in:
    - Data coordination and standardization
    - Analytics and data-use enablement
    - Data governance and management
    - Natural resources sciences
    - Indigenous data governance
- The project must agree to develop tools and resources to support data sharing and coordination with Stream 1 driver projects to deposit data to a national databank and integrate Stream 3 Indigenous data governance frameworks.

APPLICATION PROCESS

Genome Canada requires applicants to submit both an LOI and, later in the process, a full proposal.

Letter of intent

Applicants will submit a letter of intent (LOI) to indicate their interest in applying for Genome Canada funding under the natural resources initiative. The LOI will enable an eligibility check by Genome Canada to ensure the LOI meets the eligible criteria of the funding stream. In the LOI, applicants will be required to briefly describe:

- Project overview
- Project leaders and their areas of expertise
- Budget and co-funding plan

Applicants who are deemed eligible will be invited to submit a full proposal.

Full proposal
Full proposals must address the evaluation criteria for individual projects established for Stream 2—that is, a detailed implementation plan for the required activities, a data management strategy, impact and benefits to Indigenous stewardship and Canada, and project management and financial competency. The project considered the most meritorious will be considered for inclusion in the portfolio.

A technical review of the proposals received will be completed by a panel of international, diverse and independent experts. It is expected that the technical review will be completed as an independent, at-home review.

The initiative GRC will then meet in-person to interview representatives from each proposal and make recommendations for funding. The technical reviews will be used, in part, to assess which of the national genomic data hub applications best meets the initiative's objectives and will add value to the initiative portfolio.

EVALUATION CRITERIA

Genome Canada uses a rigorous, independent peer review process to assess the merit of proposals and to ensure that sound management and financial practices are implemented.

Full proposals will be reviewed using criteria from the following categories:

- Implementation plan for required activities
- Data management strategy
- Impact and benefits to Indigenous stewardship and Canada
- Management and finance

These criteria are intended to support both individual project assessment and portfolio-level decision-making.

Implementation plan for required activities

- To what extent does the proposal present a clear, coherent and achievable plan to deliver required activities, including a national metadata registry and discovery, data harmonization and interoperability, data curation and quality assurance, data deposition AI-enablement and integration, Indigenous stewardship and governance, as well as training and support?
- Does the proposed approach support the deposition of genomic data and metadata into a national databank (with a Genome Canada approved partner), including training, onboarding and support for funded projects?
- Does the proposal include privacy and security threat modeling and risk management?
- Does the proposal demonstrate strong alignment with relevant national and international data standards (e.g., DwC, MIxS, GA4GH, ENVO), and how effectively will these

standards be implemented to ensure data is findable, accessible, interoperable and reusable (FAIR)?
- How robust, scalable and fit-for-purpose is the proposed technical architecture for managing heterogeneous datasets across natural resource sectors?
- Does the proposal include the following Indigenous data governance principles, controls and guidelines?
    - The practical respect of OCAP®, OCAS, CARE, and UNDRIP-aligned principles.
    - Dataset-level consent, governance tags and tiered access controls.
    - Readiness to operationalize Indigenous-led governance guidelines.
- Does the proposal demonstrate the ability to actively support Stream 1 driver projects, including alignment across the portfolio and ongoing coordination with Stream 3 Indigenous governance frameworks?

Data management strategy

- Does the proposal demonstrate a credible approach to ensuring datasets will be maintained in a format that are AI-ready and analytically actionable, including programmatic access (e.g., APIs) and support for advanced analytics and modeling?
- Does the proposed hub enable cross-project synthesis and reuse of data across multiple projects, sectors and regions?
- Does the proposal articulate clear pathways for transforming coordinated data assets into actionable insights, such as analytics, visualization tools or decision-support applications?
- Does the proposal describe mechanisms to assess, monitor and report on FAIRness and AI-readiness across the portfolio?
- Does the proposal demonstrate an approach to Indigenous data stewardship through the implementation of Indigenous governance tags and relevant data standards?
- Will the proposed hub support portfolio-level visibility, including identifying data readiness, gaps, alignment issues and opportunities for cross-project integration?

Impact and benefits to Indigenous stewardship and Canada

- Are the hub outputs (e.g., catalogues, metadata tools, dashboards, protocols, templates, and guidance) designed for uptake, interpretable by intended users and fit-for-purpose for Indigenous stewardship and governance decision-making, including discovery, access and reuse under community-defined conditions?
- Does the hub build sustained capacity, standards, training and infrastructure for Indigenous stewardship and governance during and beyond the funding period, including support for implementation by funded projects and interoperability with Indigenous data infrastructures where appropriate?
- Are responsibilities, consent processes, governance tags and benefit-sharing mechanisms clearly defined and operationalized within hub workflows, including plans for community review and long-term stewardship of knowledge and data on community-defined terms?
- Is there a credible pathway for the hub’s deliverables to support adoption, coordination and measurable downstream use, with clear timelines and accountabilities? Are onboarding, knowledge mobilization and support for uptake strong, with clear value propositions for funded driver projects, Indigenous communities and other users?

Management and finance

- Is the budget reasonable and proportional to the hub's goals, considering the level of effort required?

- Are the proposed expenditures thoroughly documented, transparent and compliant with funding guidelines?
- To what extent does the proposal include robust mechanisms for ongoing fiscal oversight, ensuring that project expenditures will be closely monitored and managed effectively throughout the project's duration?
- Is the proposed co-funding plan well documented, eligible and feasible?
- Are the proposed management and governance structures appropriate and effective, with clear roles, accountabilities, and decision-making processes? How well does the project support trainees and early-career researchers, where appropriate? Are there concrete plans to ensure that inclusion, diversity, equity and accessibility (IDEA) principles are central to team management and composition?

Appendix 3. Stream 3 – Indigenous data governance frameworks

Stream 3 supports the creation of Indigenous-led, distinctions-based governance frameworks—co-developed with relevant rights-holders—that will guide genomic research in Canada's natural resources sectors. The goal of this funding stream is to generate practical, implementable tools and resources for genomic research in natural resources that are grounded in Indigenous ways of knowing and being, developed in partnerships with First Nations, Métis and Inuit peoples. The resulting frameworks will inform how genomic and Indigenous natural resources data will be managed to ensure respect of Indigenous data sovereignty and governance conditions across the natural resources initiative.

Through collaborative partnerships with Indigenous rightsholders, these projects will integrate First Nations, Métis and Inuit data sovereignty principles in ways that are consistent with established approaches, such as OCAP®, OCAS, CARE and UNDRIP. The resulting governance frameworks are expected to define practical, distinctions-based guidance and resources—setting out how Indigenous genomic and environmental data, knowledge and related assets are owned, accessed, used, shared and stewarded—at project level and in ways that can inform institutional policies and practices and support broader uptake across the Canadian ecosystem. Indigenous rightsholders retain full authority to make decisions regarding the use of their data, ensuring the preservation of their rights and responsibilities.

The Indigenous data governance frameworks are intended to include guiding principles and operating practices that reflect Indigenous relationships with species, water and lands involved in the research. They will include an engagement framework and other implementable tools (e.g., templates, decision pathways, consent and access processes, governance tags and stewardship guidance) to support researchers and data stewards across the full project lifecycle—from initial design and data collection through to access decisions, reuse, and archiving—while enabling consistent application within institutions and, where appropriate, across Canada's natural resources genomics data ecosystem.

REQUIRED ACTIVITIES

- Clear, practical and accessible tools and resources for genomics research in natural resources will be developed for how Indigenous data can be accessed, used and shared.
- Frameworks must be written in accessible language and be suitable for use by Indigenous communities, researchers, data stewards, funders and partners.
- Frameworks developed must clearly articulate how OCAP®, OCAS, Inuit data governance principles (as applicable) and UNDRIP are respected, including:
    - collective rights and community ownership and authority over data;
    - governance at dataset, project, organizational, and system levels; and
    - enforcement, accountability and dispute resolution mechanisms.
- Frameworks must articulate approaches to fair and equitable benefit sharing, including non-commercial and commercial contexts. This may include knowledge return, capacity building, stewardship support, economic participation, or other benefits defined by Indigenous partners.
- Ethical, legal and culturally grounded approaches are used that are aligned with the unique rights, governance systems and knowledge systems of Indigenous communities.

- Projects must establish Indigenous-led oversight structures that ensure Indigenous rightsholders exercise genuine authority over data governance decisions, including access, use, sharing and future applications of data.
- Frameworks must be structured to operate at multiple levels: individual project level (covering design, consent, data collection and sharing decisions), organizational level (covering institutional responsibilities and governance accountability), and systems level (covering interoperability with national data infrastructure, long-term stewardship, and alignment with broader Indigenous data ecosystems in Canada and internationally).
- Frameworks must include an engagement outline that specifies who researchers should engage with, at what stage of a project, and how. This should distinguish between engagement appropriate at the design stage, the data collection stage, the analysis stage, and the dissemination and archiving stage.
- Frameworks must include practical tools that can be adopted directly by researchers and data stewards: at minimum, an engagement checklist, a consent pathway template appropriate for different community governance structures, and a benefit-sharing framework that covers both non-commercial and commercial contexts.

ELIGIBLE INSTITUTIONS

Genome Canada funding can be awarded to individuals affiliated with an Indigenous organization and/or government, or with an organization listed in Genome Canada's **Guidelines for Funding**.

FUNDING AVAILABLE AND TERM

- Up to $3 million is available from Genome Canada for Stream 3.
- Genome Canada's minimum contribution to an approved project is $500,000 and the maximum contribution is $1 million.
- Co-funding is not a requirement of this funding stream but is encouraged where it supports community priorities and does not compromise Indigenous-led oversight.
- Funding is for a term of up to three years.

ELIGIBILITY

- Projects must demonstrate that Indigenous communities (First Nations, Métis and/or Inuit) have been meaningfully engaged in scoping the work prior to application. Evidence of this engagement, such as records of community meetings and/or other nation-appropriate consultation processes, must be included in the LOI, in addition to a letter of support from an Indigenous partner organization.
- Project leaders and team members must be affiliated with an eligible institution.
- Projects are expected to support capacity building for Indigenous communities and organizations, as well as learning for researchers and institutions, to enable sustained implementation of Indigenous-led governance beyond the funding period.
- Activities must be directly aligned with the objective of developing Indigenous data governance guidelines for genomic research in natural resources.

APPLICATION PROCESS

Genome Canada requires applicants to submit both an LOI and, later in the process, a full proposal.

Letter of intent

Applicants will submit a letter of intent (LOI) to indicate their interest in applying for Genome Canada funding under the natural resources initiative. The LOI will enable an eligibility check by Genome Canada to ensure the LOI meets the eligible criteria of the funding stream. Applicants will be asked to briefly describe:

- Proposed guidelines.
- Summary of community engagement conducted to date, including which Indigenous nations or communities were engaged, in what form, and how that engagement shaped the proposed scope.
- Budget summary.

Applicants who are deemed eligible will be invited to submit a full proposal.

Full proposal

Full proposals must address the required activities for the funding stream as well as the management and financial details. The main sections in the application form:

- Co-development plan.
- Scope of guidelines.
- Impact and benefits for Indigenous communities.
- Indigenous leadership and governance.
- Management and finance.

A review of the proposals received will be completed by a small panel of international, diverse and independent experts. It is expected that the review will be completed as an independent, at-home review.

All full proposals with then be reviewed and discussed by the GRC and supported by additional experts in Indigenous governance. The reviews will be used, in part, to assess which of the applications best meet the initiative's objectives and will add value to the initiative portfolio.

EVALUATION CRITERIA

Genome Canada uses a rigorous, independent peer review process to assess the merit of proposals and to ensure that sound management and financial practices are implemented.

Full proposals will be reviewed using the following criteria:

Co-development plan

- To what extent does the plan demonstrate genuine Indigenous leadership, with Indigenous rightsholders exercising decision-making authority over the development process?
- Are the proposed partnerships with Indigenous communities, organizations, or governments appropriate, formalized and based on mutual respect and shared goals?
- Is the co-development methodology culturally appropriate, distinctions-based, and aligned with Indigenous research protocols and governance principles (OCAP®, OCAS, CARE, UNDRIP)?
- Are the timeline, resources, and milestones realistic and achievable? Does the plan adequately resource Indigenous community participation?
- Does the plan include meaningful, sustained engagement with Indigenous communities, with appropriate protocols, capacity support, and knowledge-holder compensation?

Scope of guidelines

- Does the proposed scope adequately address all required content areas, including governance principles, benefit-sharing, enforcement mechanisms and culturally grounded approaches?
- Is the proposed approach to developing guidelines likely to result in practical, accessible tools suitable for diverse users (Indigenous communities, researchers, funders, data stewards)?
- How effectively does the proposed scope operationalize distinctions-based Indigenous data sovereignty principles and ensure Indigenous decision-making authority?
- Will the proposed guidelines be applicable across diverse natural resource contexts while respecting community-specific governance needs?
- How well does the proposed guidelines scope align with the broader natural resources initiative goals, including compatibility with the national genomics data hub and driver projects?
- Does the proposal include a plan to develop practical, implementable tools, such as engagement checklists, consent templates, and tiered access protocols, that researchers, funders and data stewards can apply without requiring specialized legal or governance expertise?
- Does the proposal address how guidelines will be structured to operate at project, organizational and systems levels, and how they will be integrated into the national genomics data hub's governance and access controls?

Impact and benefits for Indigenous communities

- Does the project demonstrate clear pathways for benefits to accrue to Indigenous communities, as defined by those communities?
- Will the project strengthen Indigenous capacity for data governance, research oversight, and stewardship of genomic and environmental data?
- Is there a clear plan for Indigenous ownership, maintenance and evolution of the guidelines beyond the project term?
- How does the project advance Indigenous self-determination, reconciliation and implementation of UNDRIP principles?

Indigenous leadership and governance

- Are Indigenous individuals, communities or organizations leading the project, and do they have appropriate governance authority?
- Does the team possess expertise in Indigenous data governance, genomics research ethics, GE³LS, legal frameworks and natural resource sectors relevant to the guidelines scope?
- Does the team demonstrate capacity for ethical, respectful collaboration across Indigenous communities, researchers and institutions?
- Are appropriate Indigenous oversight or advisory structures in place to ensure accountability and community authority throughout the project?

Management and finance

- How realistic and achievable are the proposed work plan, milestones and timelines?
- Is the budget reasonable and proportional to the project's goals, considering the level of effort required? Are the proposed expenditures thoroughly documented, transparent and compliant with funding guidelines?

- To what extent does the proposal include robust mechanisms for ongoing fiscal oversight, ensuring that project expenditures will be closely monitored and managed effectively throughout the project's duration?
- Are the proposed management and governance structures appropriate and effective, with clear roles, accountabilities and decision-making processes? How well does the project support trainees and early-career researchers, where appropriate? Are there concrete plans to ensure that inclusion, diversity, equity and accessibility (IDEA) principles are central to team management and composition?