# Supplementary information tables: 2018-19 Departmental Plan

**National Research Council Canada** 

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## 2018–19 Departmental Sustainable Development Strategy

March 2018

## Context for the Departmental Sustainable Development Strategy

Although the National Research Council of Canada (NRC) is not bound by the <u>Federal Sustainable</u>

<u>Development Act</u> and is not required to develop a full departmental sustainable development strategy,

NRC adheres to the principles of the FSDS by implementing the Policy on Green Procurement.

The <u>Policy on Green Procurement</u> supports the Government of Canada's effort to promote environmental stewardship. In keeping with the objectives of the policy, NRC supports sustainable development by integrating environmental performance considerations into the decision-making process for property management through the actions described in the "FSDS goal: low-carbon government" table in section 2, below. In addition, NRC will sustain its on-going best-practices in green procurement. They include:

- ensuring that the annual performance evaluations of all procurement personnel includes considerations of green procurement and low-carbon economy;
- consistently using green consolidated procurement instruments issued by Public Services and Procurement Canada and Shared Services Canada, including Standing Offer Agreements and Supply Arrangement Agreements;
- ensuring that all procurement personnel have completed the Public Service Green Procurement course and that the importance of green procurement is continually reinforced by functional managers across NRC;
- ensuring that all janitorial contracts specify the use of products, equipment and processes that minimize the environmental impact; and
- optimizing the use of NRC's ground vehicle fleet through analysis of data from installed telematics global positioning systems in all NRC vehicles.

## 2. Commitments for NRC

FSDS goal: low-carbon government

FSDS target	FSDS contributing action	Corresponding departmental action(s)	Starting points where available and performance indicators for departmental actions	Programs where the departmental actions will occur
Reduce Greenhouse Gas (GHG) emissions from federal government buildings and fleets by 40% below 2005 levels by 2030, with an aspiration to achieve it by 2025.	Support the transition to a low-carbon economy through the launch of a NRC wide low-carbon strategy.	As part of NRC's Low-Carbon Initiative, which was launched in 2017, NRC will reduce emissions through awareness, energy management, space rationalization and energy retrofit projects.	<ul> <li>Awareness program launched by May 2018.</li> <li>Energy retrofit of NRC's Saskatoon facility launched by May 2018.</li> <li>Energy retrofit feasibility studies completed at three NRC sites by May 2018.</li> <li>Carbon reduction roadmap developed by August 2018.</li> <li>NRC energy data submitted to Centre for Greening Government by September 2018.</li> </ul>	Awareness program will be across all NRC research centres and branches. Energy retrofit projects across NRC portfolio of buildings managed by Internal Services.

## 3. Integrating sustainable development

NRC's organizational and reporting structure ensures compliance with the Cabinet Directive on the Environmental Assessment of Policy, Plan and Program Proposals. Within the Health, Safety and Environment Branch is a centre of expertise that undertakes a preliminary evaluation to identify the potential for important environmental effects of a proposal, prior to its submission to an individual minister or Cabinet for approval. Should the potential for significant environmental impacts be identified, positive or negative, a Strategic Environmental Assessment (SEA) is carried out.

NRC will continue to ensure that its decision-making process includes consideration of FSDS goals and targets through its Strategic Environmental Assessment (SEA) process. A SEA for policy, plan or program proposals includes an analysis of the impacts of the given proposal on the environment, including on FSDS goals and targets.

Statements on the results of NRC's assessments are made public when an initiative that has undergone a detailed SEA is announced (<a href="http://www.ic.gc.ca/eic/site/sea-ees.nsf/eng/ey00016.html">http://www.ic.gc.ca/eic/site/sea-ees.nsf/eng/ey00016.html</a>). The purpose of the public statement is to demonstrate that the environmental effects, including the impacts on achieving the FSDS goals and targets, of the approved policy, plan or program have been considered during proposal development and decision-making.

## Details on transfer payment programs of \$5 million or more

Name of transfer payment program	International Astronomical Observatories Program
Start date	1978
End date	Ongoing
Type of transfer payment	Contribution
Type of appropriation	Estimates
Fiscal year for terms and conditions	2015-16
Link to department's Program Inve0ntory	Core Responsibility: Science and Innovation Program: Herzberg Astronomy & Astrophysics

Description	Astronomy is a global science. The increasing cost of leading-edge observatories and the scarcity of ideal observation sites have led to a greater focus on international collaboration for large-scale astronomy projects which lead to advances in our knowledge and understanding of the universe.  NRC, in collaboration with other international bodies, provides financial contributions to support the management and operations of offshore ground-based observatories and their related facilities, including the Canada-France-Hawaii Telescope (CFHT), the twin telescopes of the Gemini Observatory and the Atacama Large Millimeter Array (ALMA). NRC participates in the oversight and direction of these facilities and their research capabilities. NRC also represents Canada in the Square Kilometre Array (SKA) consortium for the pre-construction phase of the telescope. In 2015, Canada joined the international partnership to participate in the Thirty Metre Telescope (TMT). NRC, on behalf of Canada, provides both financial and in-kind contributions.  International agreements governing these observatories are long-term commitments that specify contributions to support preconstruction design and development, construction, operation and maintenance, capital improvements (e.g., development of new astronomical instruments and other facility upgrades) and decommissioning of the international ground-based observatories and their related facilities. In addition, they include commitments to support the university-based user communities to ensure a fair and progressive use of these observatories. NRC participates in the governance of these international facilities on behalf of the Canadian astronomy research community and provides appropriate support, including sophisticated data management services and instrumentation. Through NRC's financial and in-kind contributions, the Canadian astronomy community is assured merit-based access to these facilities with appropriate support.
Expected results	<ul> <li>Canadian astronomers have access to leading-edge facilities and technology.</li> <li>Qualified students and post-doctoral researchers have access to facilities to advance their training.</li> <li>Canada plays a prominent role in international scientific endeavours.</li> <li>Scientific benefit of telescopes to the Canadian and the global community is maximized through progressive science programs using leading-edge instrumentation.</li> <li>Canadian industry has opportunities to participate in advanced scientific projects and opportunities to benefit from contracts and technology development.</li> </ul>
Fiscal year of last completed evaluation	2016-17
Decision following the results of last evaluation	Continuation
Fiscal year of planned completion of next evaluation	2021-22

General targeted recipient groups	Foreign States, intergovernmental organizations or corporations that operate international observatories that have entered into agreements with Canada (NRC) to support costs related to ground-based astronomical observatories. In the case of intergovernmental organizations, Canada and one or more foreign states are members. An eligible recipient can be a Canadian Crown Corporation or other delivery partner.
Initiatives to engage applicants and recipients	NRC manages observatories established or maintained by the Government of Canada for the benefit of the Canadian astronomy research community, aligning its contributions to the priorities of the community's Long Range Plan for Astronomy and Astrophysics. NRC participates on the Boards which oversee the observatories to ensure that the science directions and programs of the facilities reflect Canadian strengths and interests. In addition, NRC ensures that these activities increase opportunities for Canadian researchers and firms to develop relevant instrumentation for the observatories. To carry out its roles effectively, NRC provides current information about each observatory to research community-based committees of scientists which provide expert advice on observatory operations and development. NRC provides extensive support to the user community through numerous services extending from administering the time allocation process for Canadian researchers through to delivery of science-ready data (through its Canadian Astronomy Data Centre).

## Planning information (dollars)

Type of transfer payment	2017–18 Forecast spending	2018–19 Planned spending	2019–20 Planned spending	2020-21 Planned spending
Total grants	0	0	0	0
Total contributions	20,219,299	134,588,229	25,418,393	21,903,501
Total other types of transfer payments	0	0	0	0
Total program	20,219,299	134,588,229	25,418,393	21,903,501

The variance between the 2017-18 Forecast and the 2018-19 Planned Spending is due mainly to a reprofile request that was submitted by NRC for the 2018-19 Annual Reference Level Update. Due to project activity delays associated with Canada's contribution to the TMT, NRC reprofiled \$76.1M from 2017-18 to 2018-19, in addition to \$4.1M of TMT funding, which was lapsed in 2016-17. The remaining variance is caused by the revised funding profile of Canada's Participation in the Construction and Commissioning of the International Thirty Meter Telescope Observatory.

Name of transfer payment program	TRIUMF	
Start date	April 1, 1977	
End date	Ongoing	
Type of transfer payment	Contribution	
Type of appropriation	Estimates	
Fiscal year for terms and conditions	2015-16	
Strategic Outcome	R&D infrastructure for an innovative and knowledge-based economy	
Link to department's Program Inventory	Core Responsibility: Science and Innovation Program: TRIUMF	
Description	TRIUMF is Canada's national laboratory for nuclear and particle physics, and accelerator-based science. The laboratory is one of Canada's key investments in large-scale research infrastructure. It provides world-class facilities for research in sub-atomic physics, accelerator science, life sciences and materials science. A consortium of 20 Canadian universities (12 full members and 8 associate members) owns and operates TRIUMF. TRIUMF receives its federal funding through NRC in five-year allocations via a contribution agreement. NRC plays an important oversight and stewardship role for TRIUMF on behalf of the Government of Canada. The NRC manages the Advisory Committee on TRIUMF (ACOT) and heads the Agency Committee on TRIUMF (ACT). Both ACT and ACOT engage in extended discussions with TRIUMF's management, ensuring that optimal investments are made on behalf of Canada's research community. In addition, representatives from the NRC are ex officio members of TRIUMF's Board of Management and Audit Committee. TRIUMF was allocated \$267.3M in Budget 2014 and 2015 for base operations over the 2015 – 2020 period. Recipients are not required to repay funds obtained under this transfer payment program.	
Expected results	repay funds obtained under this transfer payment program.  TRIUMF will support the Canadian and international particle and nuclear physics community in alignment with the 2017-2021 Canadian Subatomic Physics Long Range Plan, as well as the laboratory's next Five-Year Plan (2020-2025), which is expected to be released in Fall 2018. Expected results are:  • World-class science across TRIUMF's core programs.  • Progress in completing the ARIEL facility, which will produce rare isotopes for science, business, and medicine.  • Availability of global talent, and continued support for international research collaborations and partnerships.  • Increased industry and community linkages for economic and societal benefit delivered to Canada.  • Increased operational efficiency.	

Fiscal year of last completed evaluation	2013-14
Decision following the results of last evaluation	Continuation
Fiscal year of planned completion of next evaluation	2018-19
General targeted recipient groups	Non-profit organizations (TRIUMF)
Initiatives to engage applicants and recipients	NRC chairs the Agency Committee on TRIUMF (ACT), which includes the federal agencies that fund and oversee activities at TRIUMF, providing TRIUMF management the opportunity to present progress and discuss future directions for the facility.
	NRC also manages the Advisory Committee on TRIUMF (ACOT), composed of international experts within disciplines that span the research and technology activities of TRIUMF. ACOT reports its findings to NRC and TRIUMF senior management twice annually, making recommendations on programs and management as well as reporting on the scientific and technological achievements of TRIUMF programs and facilities. Observer representatives from the National Sciences and Engineering Research Council of Canada (NSERC), the Canadian Institute of Nuclear Physics, and the Canadian Institute of Particle Physics ensure that TRIUMF's directions are well aligned with the research community's needs and that TRIUMF is working with all constituencies across the Canadian subatomic physics community. The Committee considers all aspects of the TRIUMF program, with a particular emphasis on science and technological issues to ensure the relevance, impact, and world-class standing of TRIUMF's activities
	Through NRC activities in ACT and ACOT, NRC maintains a close relationship with TRIUMF. Dialogue ensures that Government of Canada investments are optimal, and that NRC meets the needs of its recipient as well as provide a vehicle for feedback on the transfer payment management process.
	TRIUMF has about 405 staff and students supported via the NRC contribution agreement. An additional 122 positions are supported through other sources for specific designated purposes, including temporary funds to operate new capital infrastructure. In total, TRIUMF provides training for more than 200 undergraduate, graduate students, and postdoctoral fellows per year. TRIUMF has numerous programs aimed at young people, students, teachers, and the general public to ensure that as many as possible share the wonder of discovery and experience the excitement generated by one of Canada's premier laboratories. In addition, TRIUMF offers a suite of programs to aide in the growth and development of professional skills for its graduate students and postdocs.

## Planning information (dollars)

Type of transfer payment	2017–18 Forecast spending	2018–19 Planned spending	2019–20 Planned spending	2020-21 Planned spending
Total grants	0	0	0	0
Total contributions	54,572,800	55,262,800	55,162,800	19,277,000
Total other types of transfer payments	0	0	0	0
Total program	54,572,800	55,262,800	55,162,800	19,277,000

NRC's continuing funding for TRIUMF is \$19.3M. As announced in Budget 2014, NRC received \$125.9M over 5 years (\$25.2M annually from 2015-16 to 2019-20) in additional funding for contributions to TRIUMF. Furthermore, as announced in Budget 2015, NRC received an additional \$44.9M over 5 years (\$5.9M in 2015-16, \$8.8M in 2016-17, \$9.7M in 2017-18, \$10.3M in 2018-19 and \$10.2M in 2019-20) in additional funding for contributions to TRIUMF. In addition, NRC also received \$0.4M annually over 5 years (2015-16 to 2019-20) from the Natural Sciences and Engineering Research Council for contributions to TRIUMF. All this funding is sunsetting in 2019-20. All figures presented in the table includes the sunsetting funding.

Name of transfer payment program	Industrial Research Assistance Program (IRAP)
Start date	April 1, 2013
End date	Ongoing
Type of transfer payment	Contribution
Type of appropriation	Estimates
Fiscal year for terms and conditions	2012-13
Strategic Outcome	Canadian businesses prosper from innovative technologies
Link to department's	Core Responsibility: Science and Innovation
Program Inventory	Program: Industrial Research Assistance Program (IRAP)
Description	The Program contributes to the growth and prosperity of Canadian small and-medium sized enterprises (SMEs) by stimulating innovation, adoption and/or commercialization of technology-based products, services, or processes in Canada. This is done through: 1) technical and related business advice and networking facilitated by a cross-Canada network of field professional staff; 2) cost-shared merit-based contributions; and 3) contributions supporting employment of post-secondary graduates. This Program uses funding from the following transfer payments: Contributions to Firms; Contributions to Organizations; and Youth Employment Program (YEP).  NRC IRAP supports the placement of graduates in SMEs through its participation in the delivery of YEP sponsored by Employment and Social Development Canada's Youth Employment Strategy (YES).  Recipients are not required to repay funds obtained under this transfer payment program.
Expected results	<ul> <li>Stimulation of innovation in small and medium-sized enterprises (SMEs) in Canada.</li> <li>Increased growth of innovative SMEs and creation of wealth for Canada</li> <li>See the Main portion of NRC's Departmental Plan for additional plans pertaining to NRC-IRAP.</li> </ul>
Fiscal year of last completed evaluation	2017-18
Decision following the results of last evaluation	Continuation

Fiscal year of planned completion of next evaluation	2022-23
General targeted recipient groups	Industry-related — For-profit businesses (SMEs) and Non-profit Organizations
Initiatives to engage applicants and recipients	NRC IRAP is a national program managed on a regional basis with over 240 Industrial Technology Advisors (ITAs) located in approximately 100 communities across the country, who provide customized advice to technologically innovative small and medium-sized enterprises (SMEs). ITAs are engaged with client SMEs throughout the entire contribution management process, from building project proposals through to project completion.  At the end of their funded project, recipients are required to complete an online Post-Project Report. This assessment captures information on the recipient's experience with NRC IRAP and, along with published service standards, is used by the program to develop continuous program improvements.
	NRC IRAP has an Advisory Board composed of 10 to 12 members from the industry sector and industry associations. This Board provides advice to NRC IRAP management and brings an external perspective on the strategic directions and management of the program.
	NRC IRAP is actively engaged with Treasury Board Secretariat Grants and Contributions Reform. Participation in workshops and constant alignment with recent Treasury Board Secretariat policy and guidelines has enabled the program to steadily move toward principles such as a Recipient Engagement Strategy.

## Planning information (dollars)

Type of transfer payment	2017–18 Forecast spending	2018–19 Planned spending	2019–20 Planned spending	2020–21 Planned spending
Total grants	0	0	0	0
Total contributions	187,014,000	187,014,000	177,014,000	177,014,000
Total other types of transfer payments	0	0	0	0
Total program	187,014,000	187,014,000	177,014,000	177,014,000

This table includes \$20.0M as announced in Budget 2017 (\$10.0M in 2017-18 included forecast spending and \$10.0M in 2018-19 planned spending). The funding, under the Renewed Youth Employment Strategy, has the objective to deliver one thousand jobs for youth in each fiscal year for a total of two thousand jobs over the two years.

Name of transfer payment program	Canada Accelerator and Incubator Program (CAIP)
Start date	October 1, 2013
End date	March 31, 2019
Type of transfer payment	Contribution
Type of appropriation	Estimates
Fiscal year for terms and conditions	2013-14
Strategic Outcome	Canadian businesses prosper from innovative technologies
Link to department's Program	Core Responsibility: Science and Innovation
Inventory	Program: Industrial Research Assistance Program (IRAP)
Description	The CAIP is a 5-year non-repayable contribution program, aimed at establishing a critical mass of outstanding business incubators and accelerators that can develop innovative, high-growth firms, which themselves represent superior early-stage investment opportunities.
Expected results	Early-stage firms have access to innovation support services.
	Early-stage firms improve investment readiness.
	Wealth creation in Canada.
Fiscal year of last completed evaluation	2016-17
Decision following the results of last evaluation	Continue and pursue identified opportunities to strengthen program delivery
Fiscal year of planned completion of next evaluation	2018-19
General targeted recipient groups	Non-profit Organizations
Initiatives to engage applicants and recipients	CAIP supports SMEs' access to best-in-class business accelerators and incubators with the goal of helping these organizations expand their overall service offerings. Organizations were selected based on CAIP specific eligibility criteria and selection guidelines. CAIP is a direct result of extensive consultations, undertaken by Finance Canada in 2012, which revealed that, in addition to the availability of venture capital, entrepreneurs also require access to specialized innovation resources to succeed.

## Planning information (dollars)

Type of transfer payment	2017–18 Forecast spending	2018–19 Planned spending	2019–20 Planned spending	2020-21 Planned spending
Total grants	0	0	0	0
Total contributions	24,195,885	17,095,791	0	0
Total other types of transfer payments	0	0	0	0
Total program	24,195,885	17,095,791	0	0

The decrease in 2018-19 Planned Spending is explained by the sunsetting of the program in 2018-19.

## Disclosure of transfer payment programs under \$5 million

Name of transfer payment program	International Affiliations Program
End date	N/A
Type of transfer payment	Grant
Type of appropriation	Estimates
Link to department's Program Inventory	International Affiliations
Main objective	Canada's membership in international S&T organizations promotes international market-oriented research and innovation, networking, advocacy, leadership and benchmarking opportunities as well as access to research and benchmarking possibilities, enabling Canadian science, technology, and industry to remain competitive.
Planned spending for 2018-19 (dollars)	560,000
Fiscal year of last completed evaluation	2015-16
Fiscal year of planned completion of next evaluation (if applicable)	Not applicable
General targeted recipient groups	International organizations and foreign countries. (Foreign recipients which are international scientific and technological (S&T) organizations having two or more states as members. As well, non-foreign recipients are non-governmental Canadian delegates who attend related meetings hosted by these foreign recipients).

Name of transfer payment program	Assessed Contribution to the Bureau International des Poids et Mesures (BIPM)
End date	N/A
Type of transfer payment	Contribution
Type of appropriation	Estimates
Link to department's Program Inventory	Measurement Science and Standards
Main objective	By representing Canada on the international metrology stage through its affiliation with the BIPM, NRC is able to more effectively and efficiently respond to NRC's mandated responsibility for maintenance of national measurement standards, as articulated in the NRC Act and the Weights and Measures Act.
Planned spending for 2018-19 (dollars)	659,000
Fiscal year of last completed evaluation	2015-16
Fiscal year of planned completion of next evaluation (if applicable)	Not applicable
General targeted recipient groups	International organizations and foreign countries. (Bureau international des poids et mesures (BIPM) is an annual assessed contribution reflecting Canada's status as a State Party to the Metre Convention Treaty since 1907).

## Horizontal initiatives

Name of horizontal initiative	Genomics R&D Initiative (GRDI)
Lead department	National Research Council Canada (NRC)
Federal partner organizations	Agriculture and Agri-Food Canada (AAFC), Canadian Food Inspection Agency (CFIA), Fisheries and Oceans Canada (DFO), Environment and Climate Change Canada (ECCC), Health Canada (HC), National Research Council Canada (NRC), Natural Resources Canada (NRCan), Public Health Agency of Canada (PHAC). Canadian Institutes for Health Research (CIHR) received a onetime allocation in 1999-2000.
Non-federal and non-governmental partner(s)	Not applicable
Start date of the horizontal initiative	April 1999, renewed in 2002-03, 2005-06, 2008-09, 2011-12, and 2014-15
End date of the horizontal initiative	March 2019
Description of the horizontal initiative	The Genomics R&D Initiative (GRDI) supports genomics research inside federal government laboratories. It focuses on mandates and priorities of participating departments and agencies. Research supported by the GRDI covers areas such as health care, food safety and global food security, sound management of natural resources, a sustainable and competitive agriculture sector, and environmental protection, with collaboration with university and private sectors. Since the implementation of the GRDI in 1999, participating departments and agencies have built a solid genomics research capacity and have gone a long way to deliver on the Initiative's stated objectives, as confirmed by two independent evaluations (2006 and 2011) and an audit by the Office of the Comptroller General (2012). Additional information may be found on the GRDI web site.
Governance structures	An interdepartmental Assistant Deputy Minister (ADM) Coordinating Committee (CC) has been established to oversee collective management and coordination of the federal GRDI. It is chaired by the lead agency (NRC) with membership at the ADM-level from each of the organizations receiving funding and guest representatives from Industry Canada and Genome Canada. It is responsible for the overall strategic direction for the GRDI and approval of investment priorities. It ensures that effective priority setting mechanisms are established within departments and agencies, and that government objectives and priorities are addressed. The Committee also ensures that common management principles are implemented and collaborations between organizations are pursued wherever relevant and possible. It typically meets three times a year at the call of the Chair, more often when warranted by specific needs for decision-making.  An Interdepartmental Working Group (WG) supports the work of the committee. It is chaired by the lead agency (NRC) with membership at the

	Director level from all participating departments/agencies, and Industry Canada. The mandate of the WG is to provide recommendations and strategic advice to the ADM CC regarding strategic priority setting and overall management of the GRDI. The WG is responsible for providing direction to GRDI program activities related to operational delivery, implementation planning and investment priority setting. The WG also supports evaluation and reporting requirements related to the Initiative. It meets about every two months, more often when warranted by specific needs for recommendations and advice, as well as to develop and approve the GRDI Annual Performance Report.  A Coordination Function, housed at NRC, provides GRDI-wide program coordination, communication, networking and outreach support. This includes support to the ADM CC and the GRDI WG, transparent and effective communication to departments of the planning cycle, process requirements, financial administration and other project management requirements, and support for interdepartmental shared project planning and implementation. This function is also responsible for conducting studies and analyses to serve as input to determination of GRDI-wide research priorities, and providing management and administration support, as well as support for performance management, reporting, evaluation, and communications.
Total federal funding allocated (start to end date) (dollars)	393,300,000
Total federal planned spending to date (dollars)	353,500,000
Total federal actual spending to date (dollars)	352,106,000
Date of last renewal of the horizontal initiative	2014-04-03
Total federal funding allocated at the last renewal and source of funding (dollars)	\$42,100,000 as announced in Budget 2013
Additional federal funding received after the last renewal (dollars)	Not applicable
Funding contributed by non-federal and non-governmental partners (dollars)	Not applicable

Fiscal year of	2021-22
planned completion of next evaluation	
Shared outcome of federal partners	The GRDI Horizontal Performance Measurement Strategy was updated for Phase VI. The updated version covers fiscal years 2014-2015 to 2018-2019 and formalizes the roles and responsibilities of the eight departments and agencies involved in the Initiative to support effective monitoring and evaluation activities. It presents three intermediate outcomes:  1) Federal science departments and agencies are positioned as genomics research leaders;  2) Research results are used to inform government regulatory, policy, and/or resource management decisions; and  3) Research results are used by stakeholders to support innovation in Canada; contributing to the Government of Canada Outcomes: Healthy Canadians; Strong economic growth; An innovative and knowledge-based economy; and A clean and healthy environment.
Performance indicator(s)	GDRI is managed using a comprehensive performance measurement framework to gauge progress towards the above 3 shared outcomes.  Examples of performance indicators include:
	1) Scientific production and impact in genomics 2) Case analysis of examples where risk assessment, regulatory, policy, and resource management decisions have been informed by GRDI research (federal, provincial, municipal) 3) Case analysis of examples where innovative tools and processes have been adopted in Canada based upon GRDI research
Target(s)	Targets for the above examples are:
	On par or better than other genomics researchers in Canada     Positive impact based on qualitative case study analysis     Positive impact based on qualitative case study analysis
Expected outcome or result of non-federal and non-governmental partners	Not applicable
Name of theme	Not applicable
Planning highlights	Fiscal year 2018-19 is the fifth year of GRDI Phase VI. Phase VI seeks to: 1) address shared priorities through horizontal integration and effective collaborations around interdepartmental projects; and 2) support the priorities, policies and mandates of government through concerted high calibre genomics research in areas where federal laboratories have distinct roles and competencies. The development of interdepartmental projects, while continuing to invest in mandated research, was initiated under Phase V and proved to be an effective mechanism to ensure continued relevance and impact of the GRDI for Canadians. The overall risk related to the funding and delivery of the GRDI program was evaluated during the planning stages of the 2010 GRDI evaluation, and was found to be medium-low.

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Supplementary information tables: 2018-19 Departmental Plan

Planning information Planning summary

All monetary amounts are expressed in dollars.

Federal organizations	Link to department's Program Inventory	Horizontal initiative activities	Total federal allocation (from start to end date) (dollars)	2018–19 Planned spending (dollars)	2018–19 Expected results	2018–19 Performance indicators	2018–19 Targets	Date to achieve target
AAFC	Science, Innovation, Adoption and Sustainability	Canadian Crop Genomics Initiative (CCGI)	108,500,000	4,440,000	ER1 Note 1	PI1	<u>T1</u>	03/2019
CFIA	Food Safety Program, Animal Health and Zoonotics Program, Plant Resources Program	GRDI	3,600,000	720,000	ER2 Note 2	PI2.1 PI2.2	T2.1 T2.2	03/2019
DFO	Biotechnology and Genomics	National Aquatic Biotechnology and Genomics R&D Strategy	16,495,000	720,000	ER3 Note 3N	PI3	<u>T3</u>	03/2019
ECCC	Climate Change and Clean Air	Strategic Technology Applications of Genomics in the Environment (STAGE)	18,550,000	800,000	ER4 Note 4	PI4	<u>T4</u>	
НС	Canadian Health System Policy Health Care System Analysis and Policy	GRDI	53,123,617	105,905	ER5 Note5	<u>PI5</u>	<u>T5</u>	03/2019

CIHR	N/A	N/A	500,000	0	Note 10 N/A	<u>PI0.2</u> N/A	<u>T10.2</u> N/A	N/A
PHAC	Public Health Infrastructure	GRDI	13,100,000	1,600,000	ER10	<u>PI0.1</u>	<u>T10.1</u>	03/2019
NRCan	Innovation for New Products and Processes	GRDI	36,100,000	1,600,000	ER9 Note9	PI9	<u>T9</u>	03/2019
		Shared Priorities	28,855,000	3,980,000	ER8 Note8	<u>PI8</u>	<u>T8</u>	
	Human Health Therapeutics				ER7 Note 7	<u>PI7.2</u>	<u>T7.2</u>	
NRC	Aquatic and Crop Resource Development	GRDI	108,500,000	4,440,000	ER6 Note 6	<u>Pl6</u> <u>Pl7.1</u>	<u>T6</u> <u>T7.1</u>	03/2019
	Environmental Risks to Health Health Impacts of Chemicals	GRDI	2,909,880	594,546				
	Food Safety and Nutrition Food Safety	GRDI	930,461	122,619				
	Health Products Biologics & Radiopharmaceuticals	GRDI	2,136,042	776,930				

Supplementary information tables: 2018-19 Departmental Plan

#### **AAFC**

ER1: Using genomics to improve the value of Canadian crops and agri-products

PI1: Number of scientific outputs generated in the form of scientific papers

T1: 30, previously 45 for AAFC plus NRC combined

Note 1: GRDI investments at AAFC will focus on the priorities outlined in the Canadian Crop Genomics Initiative. They will be leveraged to enable industry to take advantage of new innovative opportunities. Activities will fall under three broad themes: 1) Biodiversity, gene mining and functional analysis: to develop value-added traits (e.g. seed quality) for the highly competitive marketplace, enhancing the resiliency of Canada's crop production in the face of potentially catastrophic abiotic and biotic stresses and to maximize profitability for the sector. 2) Bioinformatics and physical tools: ensuring that scientists can maximize the opportunities presented by genomics-based research (e.g. identification and characterization of genes coding for desirable traits related to seed quality or disease resistance). 3) Improved access to biological materials and data sets: to enhance the efficiency of plant breeding to lay the scientific foundation for major advances in the development and delivery of priority traits identified by industry (e.g. disease resistance).

#### **CFIA**

ER2: Using genomics for food safety, animal health and plant protection

PI2.1: Number of standard operating procedures/tools developed and/or transferred to end users to support risk management strategies

T2.1: More standard operating procedures/tools developed and/or transferred to end-users than reported in 2017-18.

PI2.2: Number of scientific outputs generated in the form of publications, presentations and contributions to databases to support evidence-based regulatory, policy or resource management decisions

T2.2: More scientific outputs generated than in 2017-18

Note 2: Funds from GRDI will be targeted to increase the genomics capability within CFIA to support on-site diagnostic tools and surveillance capabilities. Specifically, GRDI activities will focus on three areas: 1) Food Safety: to better support CFIA in the areas of compliance testing, source attribution and risk profiling, enabling enforcement of Health Canada standards. 2) Plant Resources: to enable early detection and rapid response, and inform regulatory decision-making for regulated plant pests and plant commodities within the

agricultural and forestry sectors. 3) Animal Health: to support management of public health risks associated with the transmission of zoonotic diseases and reportable and emerging animal diseases.

### **DFO**

ER3: Genomics knowledge and advice for the management of fisheries and oceans

PI3: Percentage of GRDI projects that provided genomics knowledge and advice to decision makers

T3: 80%

Note 3: Genomics-enabled research within DFO will continue to be aligned within the following themes: 1) Protecting fish and marine mammal species and enabling sustainable harvesting: to develop and apply leading-edge genomics tools to accurately identify species, farmed/wild interactions, populations and stocks for fisheries management and the conservation of vulnerable stocks, species at risk, and aquatic biodiversity. 2) Safeguarding Canadian fish and seafood products: to develop innovative genomics techniques to detect, monitor and minimize the impact of pathogens (e.g. Infectious Salmon Anemia virus) in order to safeguard the health of Canada's aquatic resources and our export markets for fish and seafood products. 3) Maintaining healthy and productive aquatic ecosystems: to develop and apply new genomics tools to monitor, mitigate and restore aquatic ecosystems including detecting aquatic invasive species for rapid management responses, understanding responses and adaptation of aquatic species to stressors such as climate change, and understanding population structure and connectivity to help define marine protected areas. The Departmental target is to respond to 80% of client requested genomics projects.

### **ECCC**

ER4: Genomics-based tools and technologies for responsible decision-making

PI4: The percentage of GRDI projects that demonstrate knowledge transfer of genomics-based tools and technologies to end users or decision-makers

T4: 70%

Note 4: EC will continue to deliver its GRDI funding under the STAGE program, in the following areas: 1) Chemical and biological risk assessment: to establish toxicology end points for microorganisms, chemicals of concern, and emerging stressor; and to predict the mode of action of chemicals of concern and their effects on organisms; 2) Wildlife conservation: to understand how genes are interacting in flora and fauna in response to environmental conditions and to track disease in wildlife; 3) Environmental monitoring: to develop indicators (e.g., gene expression profiles for key species) of ecosystem health in priority ecosystems (e.g., Great Lakes and St. Lawrence) and to track pathogen sources; and 4) Compliance and Enforcement: to analyze flora and fauna for individual species identification, parentage determination and ascertaining geographic origin. This work will enable the delivery of EC's obligation under the Fisheries Act and the Canadian Environmental Protection Act, and programs including the Chemicals Management Plan.

#### HC

ER5: Genomic knowledge for the Canadian health regulatory system

PI5: Percentage of targeted knowledge transfer activities accomplished related to genomic research (e.g., client meetings, poster/conference presentations, and peer-reviewed publications)

T5: 100%

Note 5: Genomics research will continue to focus on four priority investment areas to strengthen HC's regulatory role: 1) Supporting regulatory knowledge on therapeutics and biologics: to inform and support regulatory decisions throughout the biotherapeutic product life-cycle. Specifically, HC will continue with research projects on vaccines and emerging stem cell based projects. During 2018-19, HC stem cell research will identify molecules that can be used to monitor the safety and effectiveness of mesenchymal stem cell based products. In addition, vaccine research projects will be developing a list of immune cell markers that can be used to improve current methods for monitoring the efficacy and safety of Respiratory Syncytial Virus vaccines. 2) Supporting regulatory knowledge on food safety and nutrition: enabling detection and characterization of food-borne micro-organisms; characterization of health effects of food contaminants, allergens, nutrients, novel foods/food ingredients, and pre- and pro-biotics; and development of markers of health status and disease (e.g. cancer, diabetes, obesity, allergies and cardiovascular disease) in the context of nutrition, micro-organisms, allergens and food contaminant exposure. 3) Protecting human health from potential adverse effects of environmental contaminants, radiation, consumer products and

pesticides. 4) Research on socio-ethical impacts of genomics technologies, outputs and products: approaches for responsible integration of genomics for societal benefit, taking into account ethical, legal and socio-economic considerations.

### **NRC**

ER6: Using genomics to significantly increase Canada's share of global wheat production

PI6: Number of scientific outputs generated in the form of scientific papers

T6: 17

Note 6: NRC will continue to support the Canadian Wheat Improvement Program in the areas of tolerance to disease and abiotic stress, genomics-assisted breeding, and seed development. This program is NRC's contribution to the Canadian Wheat Alliance, a large-scale research alliance to improve the yield, sustainability, and profitability of Canadian wheat for the benefit of Canadian farmers and the economy. The Alliance also includes major contributions by AAFC, the University of Saskatchewan, and the Province of Saskatchewan.

ER7: Commercially-relevant advances in genomics R&D related to human health

PI7.1: New Intellectual Property assets: number of invention reports

T7.1: 5

PI7.2: Enabling technologies transferred to industry: number of new licences

T7.2: 10

Note 7: GRDI investments in NRC will be made in program areas that require genomics to help industry and government tackle strategic national priorities (e.g. strong economic growth, healthy Canadians, innovative and knowledge-based economy) through mission-oriented research and technology deployment. GRDI's human health-related focus will support NRC's Biologics and Subsequent Entry Biologics program. This program was approved for implementation by NRC's Senior Executive Committee after undergoing a rigorous program approval and implementation process.

Supplementary information tables: 2018-19 Departmental Plan

ER8: Concerted interdepartmental research along shared priorities and common goals on issues that are beyond the mandates of single departments

PI8: Percentage of projects disseminating results to identified end users

T8: 100%

Note 8: Two shared priority projects will continue their activities in 2018-2019. The Antimicrobial Resistance project will develop a greater understanding of the critical activities that contribute to the development of antimicrobial resistance and critical exposure pathways by which antimicrobial bacteria reach humans, which could then be used to help validate economically sustainable technologies, practices, and policies to mitigate the development of antimicrobial resistance; it is a component of the Federal Action Plan for Antimicrobial Resistance and Use in Canada. The Metagenomic-Based Ecosystem Biomonitoring (EcoBiomics) project will develop advanced genomics tools to monitor the water quality of rivers and lakes, assess the biodiversity of freshwater invertebrates and microorganisms, evaluate the health of soil essential to the productivity of agricultural and forestry systems across Canada, and investigate land remediation for the oil and mining sectors. The main impact of this project will be to support environmental responsibility, secure market access for resource products and improve social license for economic development in Canada.

#### **NRCan**

ER9: Genomic knowledge for forest generation and protection

PI9: Number of new products and processes resulting from NRCan information

T9: 5

Note 9: The Canadian Forest Service of NRCan will focus on accelerating the translation of accumulated genomics knowledge into applications in support of Canada's forest sector competitiveness, including: 1) Forest generation: the development of innovative genomic applications will result in accelerated production of higher quality fibre, translating into economic and environmental benefits for Canada. 2) Forest protection: the development of innovative genomic diagnostic tools will enable rapid detection and management of invasive insects and diseases, which threaten the health and ecological integrity of Canadian forests, the forest sector and forest communities.

#### **PHAC**

ER10: Genomics knowledge to strengthen public health programs and activities related to infectious and chronic disease

PI10.1: Percent of clients indicating overall satisfaction with laboratory reference services as "satisfied" or "very satisfied"

T10.1: 90%

PI10.2: Number of citations to agency laboratory research publication to demonstrate knowledge transfer uptake

T10.2: 1800

Note 10: The genomic study of pathogens and their traits associated with infectious diseases generate rapid and cost effective new approaches to disease surveillance, prevention, and control (e.g. molecular tools to better identify organisms associated with disease outbreaks). GRDI research activities at PHAC apply "-omics" technologies to generate new knowledge to support public health decision making, and to create new tools to enhance disease prevention and control. These technologies are providing methods to enhance: 1) the prevention and control of priority pathogens; 2) the response to antimicrobial resistant pathogens; 3) infectious disease surveillance; and 4) public health security measures. The knowledge generated from genomic approaches is supporting more detailed risk analyses, as well as the identification and development of new intervention points for the control and prevention of infectious diseases.

## Gender-based analysis plus

Governance structures	<ul> <li>NRC is formalizing its GBA+ framework, accountability and reporting mechanism for implementation in 2018-19. In particular:</li> <li>A Responsibility Centre for GBA+ is being established in NRC's Policy and Governance division. Therein two existing resources have been trained in the subject and are undertaking policy analysis for NRC initiatives seeking approval/endorsement/funding from departments in the core administration;</li> <li>NRC Vice-Presidents will be accountable for the inclusion and implementation of GBA+ commitments in NRC programs as part of NRC's operational planning process in 2018-19; and</li> <li>A tracking and reporting mechanism for GBA+ commitments and their implementation by NRC programs will be established.</li> </ul>
Human Resources	0.2 full-time equivalents
Planned Initiatives	NRC initiative targeted to increase the percentage of women in STEM careers through the hiring of more women in post-doctoral positions.

## Planned evaluation coverage over the next five fiscal years

Planned evaluation coverage, 2018-19 to 2022-23

Note: all references to program spending refer to planned spending for the 2018–19 fiscal year only and not cumulative spending over 5 years.

Program Name	Last evaluation	Evaluations planned in the next 5 years	Fiscal year of approval	2018–19 Program spending covered by the planned evaluation (dollars)	2018–19 Program spending covered by all planned evaluations (dollars)	2018–19 Total program spending (dollars)
Aerospace	Evaluation of NRC's Institute for Aerospace Research, 2011- 12	Evaluation of the NRC's Aerospace Research Centre	2019-20	\$46,366,083	\$46,366,083	\$46,366,083
Aquatic & Crop Resource Development	Evaluation of NRC Crop and Resource Development, 2016-17	Evaluation of the NRC's Aquatic and Crop Resource Development Research Centre	2021-22	\$21,633,431	\$21,633,431	\$21,633,431

	Horizontal Evaluation of the Genomics R&D Initiative, 2016-17	Evaluation of the Genomics R&D Initiative <sup>†</sup>	2021-22	\$5,144,620	\$5,144,620	\$5,144,620
Automotive & Surface	Evaluation of the NRC Centre for Surface Transportation Technology, 2013-14	Evaluation of the NRC's Automotive and Surface Transportation Research Centre	2020-21	\$35,136,074	\$35,136,074	\$35,136,074
Transportation	Not applicable	Evaluation of the NRC's Advanced Manufacturing Program	2022-23	\$1,700,000	\$1,700,000	\$1,700,000
Business Management Support (Enabling)	Not applicable	Enabling Services	Enabling Functions are not evaluated	\$16,400,000	\$16,400,000	\$16,400,000
	Evaluation of NRC Construction Portfolio, 2013-14	Evaluation of the NRC's Construction Research Centre	2020-21	\$22,346,801	\$22,346,801	\$22,346,801
Construction	Horizontal Evaluation of the Clean Air Agenda, 2015-16	Horizontal Evaluation of the Addressing Air Pollution Initiative†	2020-21	\$2,000,000	\$2,000,000	\$2,000,000

Design & Fabrication Services (Enabling)	Not applicable	Evaluation of the NRC's Design and Fabrication Services	2020-21	\$12,970,545	\$12,970,545	\$12,970,545
Energy, Mining & Environment	Not applicable	Evaluation of the NRC's Energy, Mining and Environment Research Centre	2018-19	\$21,609,314	\$21,609,314	\$21,609,314
Herzberg Astronomy & Astrophysics	Evaluation of the NRC Herzberg Astronomy and Astrophysics Portfolio, 2016-17	Evaluation of the NRC's Herzberg Astronomy and Astrophysics Research Centre	2021-22	\$156,717,132	\$156,717,132	\$156,717,132
Human Health Therapeutics	Evaluation NRC Human Health Therapeutics, 2014-15	Evaluation of the NRC's Human Health Therapeutics Research Centre	2019-20	\$35,906,763	\$35,906,763	\$35,906,763
	Horizontal Evaluation of the Genomics R&D Initiative, 2016-17	Evaluation of the Genomics R&D Initiative †	2021-22	\$2,803,860	\$2,803,860	\$2,803,860
Industrial Research Assistance Program. <sup>1</sup>	Evaluation of the Canada Accelerator and Incubator Program (CAIP), 2016-17	Evaluation of the NRC's Canadian Accelerator Incubator Program (CAIP)	2018-19	\$17,095,791	\$17,095,791	\$17,095,791

<sup>&</sup>lt;sup>1</sup> Excludes Youth Employment Strategy

	Summative Evaluation of the Horizontal Youth Employment Strategy, 2012-13	Evaluation of the Youth Employment Strategy <sup>†</sup>	2019-20	\$15,000,000	\$15,000,000	\$15,000,000
	Evaluation of the Industrial Research Assistance Program (IRAP), 2017-18	Evaluation of the NRC's Industrial Research Assistance Program	2022-23	\$239,776,070	\$239,776,070	\$239,776,070
Information & Communications Technologies 23	Interactive Language Technologies Group, a subset of the Information and Communications Technologies Subprogram, 2016-17.	Evaluation of the NRC's Digital Technologies Research Centre	2018-19	\$9,201,468	\$9,201,468	\$9,201,468
	Not applicable	Evaluation of the NRC's Advanced Electronics and Photonics Research Centre	2022-23	\$23,248,321	\$23,248,321	\$23,248,321

 $<sup>^2 \ \</sup>text{Excludes funding to support the Preservation and Revitalization of Indigenous Languages and Cultures}$ 

<sup>&</sup>lt;sup>3</sup> Revisions anticipated in 2018-19 to reflect the program split into Advanced Electronics and Photonics (AEP) and Digital Technologies.

International <sup>4</sup> Affiliations (Enabling)	2015-16	Not applicable	Not evaluated – G&C program under \$5M	\$560,000	\$560,000	\$560,000
Measurement Science & Standards	Evaluation of NRC Measurement Science and Standards, 2015- 16	Evaluation of the NRC's Measurement Science and Standards Research Centre	2020-21	\$23,878,787	\$23,878,787	\$23,878,787
Medical Devices	Not applicable	Evaluation of the NRC's Medical Devices Research Centre. <sup>5</sup>	2019-20	\$8,585,629	\$8,585,629	\$8,585,629
	Horizontal Evaluation of the Genomics R&D Initiative, 2016-17	Evaluation of the Genomics R&D Initiative †	2021-22	\$471,520	\$471,520	\$471,520
National Institute for Nanotechnology	Evaluation of the National Institute for Nanotechnology, 2015-16	Evaluation of the NRC's Nanotechnology Research Centre	2020-21	\$8,200,000	\$8,200,000	\$8,200,000

 $<sup>^{4}</sup>$  This evaluation is being carried out at the request of senior management to assist in their decision-making needs

<sup>&</sup>lt;sup>5</sup> Excludes funding for Genomics R&D Initiative

National Science Library (Enabling).6	Not applicable	Evaluation of the NRC's National Science Library	2019-20	\$15,500,000	\$15,500,000	\$15,500,000
Ocean, Coastal & River Engineering	Evaluation NRC Ocean, Coastal and River Engineering (OCRE) Portfolio, 2016-17	Evaluation of the NRC's Ocean, Coastal and River Engineering Research Centre	2021-22	\$13,818,247	\$13,818,247	\$13,818,247
Special Purpose Real Property (Enabling)	Not applicable	Not applicable	Enabling Functions are not evaluated	\$74,228,970	\$74,228,970	\$74,228,970
Security & Disruptive Technologies	Evaluation of the NRC's Security and Disruptive Technologies Research Centre, 2017-18	Evaluation of the NRC's Security and Disruptive Technologies Research Centre	2022-23	\$12,283,650	\$12,283,650	\$12,283,650
Research Information Technology Platforms	Not applicable	Not applicable	Enabling services are not evaluated	\$9,700,000	\$9,700,000	\$9,700,000
TRIUMF	Evaluation of NRC's Contribution to TRIUMF, 2013-14	Evaluation of the NRC's Contribution to TRIUMF	2018-19	\$55,262,800	\$55,262,800	\$55,262,800

 $<sup>^{6}</sup>$  This evaluation is being carried out at the request of senior management to assist in their decision-making needs

Internal Services	Horizontal Evaluation of the Federal Contaminated Sites Action Plan, 2013-14. <sup>7</sup>	Horizontal Evaluation of the Federal Contaminated Sites Action Plan <sup>†</sup>	2018-19	The funding from TBS for this Horizontal Initiative is sunsetting in 2017-18.	The funding from TBS for this Horizontal Initiative is sunsetting in 2017-18.	The funding from TBS for this Horizontal Initiative is sunsetting in 2017-18.
Internal Services	Not applicable	Not applicable	Not applicable	Not applicable	\$119,473,705	\$119,473,705
Total	Not applicable	Not applicable	Not applicable	Not applicable	\$1,027,019,581	\$1,027,019,581

<sup>&</sup>lt;sup>7</sup> Although internal services are typically not evaluated, funding received as part of the horizontal FCSAP will be evaluated as per an identified Treasury Board requirement

## Upcoming internal audits for the coming fiscal year

Title of internal audit	Area being audited	Status	Expected completion date
Advisory Project – Accounting verification framework	Corporate Financial and Administrative Practices	Planned	June 2018
Audit of IRAP Recipient Audit Framework	Industrial Research Assistance Program (Transfer Payment Program)	Planned	June 2018
Audit of Business Continuity	Security Management and Corporate Administrative Practices	Planned	December 2018
Audit of Major Capital Projects	Corporate Financial and Administrative Practices	Planned	June 2018
Audit of Business Development	Corporate Financial and Administrative Practices	Planned	December 2018
Advisory Project – NRC's Investment Planning Process	Corporate Financial and Administrative Practices	Planned	March 2019
Audit of IT Governance Governance and Resource Management		Planned	March 2019

**End Notes** 

<sup>&</sup>lt;sup>i</sup> GRDI, http://grdi-irdg.collaboration.gc.ca/