

researchNS

RNS THREE-YEAR OPERATING AND IMPLEMENTATION PLAN

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A: Introduction: Purpose of 3-year plan

The *Research Nova Scotia Corporation Funding Regulations*, section 4.6 (b), requires RNS to submit “an updated 3-year operating plan” as part of its semi-annual report to the Minister of Advanced Education due at the end of November of each year.

The plan details the key RNS operations that provide focus to the priority areas, mechanisms and intended outcomes we will pursue as we fulfill our missions.

This plan covers the fiscal years **2023-24**, **2024-25**, and **2025-26**. The first year of activities and operations are defined in greater detail: we have selected those for which we have a relatively high degree of certainty in our intentions and allocated resources. The second and third years provide a higher-level overview, and connect our activities in the coming year to further impacts as we pursue our strategy.

Each year, RNS updates the three-year plan as part of our semi-annual reporting due to Advanced Education, reflecting on what was accomplished and learned in the preceding year, developing a workplan for the coming year, updating our ambitions based on the situation at that time, and adding a new year to the plan submitted the previous year. This rolling three-year plan will allow the Department, partners and stakeholders to prepare for coming opportunities and identify potential trends and risks that RNS should consider.

Research typically operates with a long-term perspective, from planning to execution to availability of results. Continuously looking ahead over three years ensures that we maintain our focus on the delivery of results to Nova Scotians, while providing the longer-term focus the research community needs.

This plan includes:

- Trends in research needs and opportunities;
- The activities we will undertake in Years 1-3 to address the trends;
- The operations, programs and research support mechanisms we will pursue to fulfill our mandate in Years 1-3.

This plan was approved by the Board of Directors on 21 November 2022.

B: Strategic Framework

With a mandate to support, organize and coordinate the funding of research, Research Nova Scotia has pursued a strategic approach to research investment for three key reasons.

1. The regulations require that we develop and implement a strategic approach to support the research community and align funded research activity with Provincial priorities.
2. The limits of our funds and the breadth of research expertise throughout Nova Scotia compel a deliberate and focused strategy.
3. We operate with the further regulatory instruction of ensuring that our research produces opportunities and outcomes to advance the key priorities.

It is not enough to do research in important areas: we must pursue research that produces tangible value for society. Public funds must be invested carefully, and with the certainty that we are selecting the projects, people and infrastructure acquisitions that represent the best possible opportunities for Nova Scotia.

RNS has emphasized an intentional approach to harnessing research capacity for the benefit of Nova Scotia. We adopted our mission-oriented research strategy in 2020 to give shape and definition to provincial priorities and to provide a framework to guide research we support.

A missions-based strategy starts with what we want to accomplish, and then identifies the resources, projects, research capacity and partners needed to address the challenge. A “mission” in this sense goes beyond the organization’s tagline or vision statement, and instead encompasses specific, targeted, intentional and urgent outcomes for which research can play a role. RNS’s missions strategy, as illustrated in Figure 1, is an outcomes framework, within which we situate any activity or project we support. Achievements, not categories, are our focus.



Figure 1: <https://researchns.ca/our-missions/>

The matrix consists of four mission areas (the columns), representing the broad priorities of the province and our legislation. Four cross-cutting themes (the rows) represent the changes needed to effect transformation, creating sixteen discrete missions to improve the lives and livelihoods of Nova Scotians.

Achieving the missions is complex and bigger than research alone; RNS does not control Nova Scotia's ability to succeed in each. Rather, the missions provide greater clarity to the research community on the types of research and outcomes that provincial research investments will seek, and points partners and stakeholders to the areas in which RNS intends to collaborate. Structured in this way, research that is consistent with this mission framework will contribute to achieving these outcomes.

There is good, valuable and necessary research taking place across Nova Scotia that does not fit within the missions: RNS understands that this work is important, but in most cases it is not a fit for the limited public funding available. RNS strives to invest only in those projects, people and equipment purchases that will tangibly benefit Nova Scotia's economy, environment, health and wellbeing. If extraordinary opportunities in research arise that a) will significantly benefit Nova Scotia and b) fall outside the missions as currently defined, RNS will consider support on a case-by-case basis, if funding allows and the opportunity is clearly integral to achieving provincial priorities.

C: Research Trends: Needs and Opportunities

Using our missions matrix as the foundation, Research Nova Scotia works with the Province and provincial departments, other government levels, like-minded research and innovation organizations, uptake organizations such as industry partners and not-for-profits, and the research providers across the postsecondary and health authority research systems to identify priorities, provincial and community needs, and possible opportunities for Nova Scotia. We also canvass our colleagues at provincial and federal research support organizations across the country, and review and anticipate societal trends locally, nationally and internationally.

Examining these trends and opportunities points RNS towards the most urgent priorities for Nova Scotia.¹ RNS pursues focal areas that share the following characteristics:

- The issue is a priority for Nova Scotia (urgent, important, salient, recognizably affecting Nova Scotians);
- Research could play a role in resolving the issue (and not repackaging existing information, duplicating other areas of work such as program evaluation, or addressing a need better managed by policy or market solutions);
- Nova Scotia has the research expertise, resources and interest in undertaking the research; (or, if not, there is a strong case for beginning to build the capacity or for investing in research outside of Nova Scotia to address it); and
- RNS is the right organization to invest in the research (there is no existing organization that is the clear champion; or, if there is, we can be a valuable supporting partner to their work).

This refinement process helps to select those areas where RNS can invest the time, money and energy to effect real transformation through research. Research today, if selected and supported well, will help inform policy decisions and support industry to get Nova Scotia to its future goals in economic growth, sustainability and environmental stewardship, health resilience, and improved quality of life for all regions, demographics and backgrounds.

Key Trends for Nova Scotia

RNS has identified the following key trends for Nova Scotia, meeting the above criteria. We continue to anticipate trends and update our situation analysis throughout the year as we implement our strategy and workplan. RNS will continue to engage with Government departments, industry and community leaders, and uptake organizations to identify changing and emerging trends, needs and opportunities as we update our operating plan each year.

¹ There are highly important and urgent priorities facing the province for which research would not be useful: for example, policy issues where the gap is funding not information, implementation questions that evaluate a specific program or action, or challenges where the answer is already in-market. Equally, funding research that re-states known evidence without contributing useful, useable information to the uptake actors will not help to solve a problem.

We have assigned mechanisms and activities to each of the key trend areas, to help marshal Nova Scotia's research capacity in service of these priorities. More detail on each activity is collated in the appendix. While RNS intends to leave room to pursue new ideas as they develop, the following represents our best estimates of the areas requiring our attention in the coming years, and the ways in which RNS can address them through programming, initiatives and partnerships.

As RNS continues to track and prepare for new and emerging trends, for which research could play part of the solution, we will update the corresponding activities to best address the most urgent needs of Nova Scotia.

Overarching Trends:

Trends that affect multiple mission areas and sectors, and which require a holistic view to address.

Population growth: Nova Scotia has an ambitious population growth goal of 2 million people by 2060.² Achieving this goal will require a whole-of-society effort including broad economic development and community growth, immigration, workforce development and retention, affordable housing and transportation, healthcare system resilience, and quality of life research.

Opportunities for RNS:

- Pursue a cross-sectoral research agenda and research questions that support population growth, including transportation, housing, attachment, and job creation
- Support workforce attraction through investment in research and innovation centres of excellence, turning Nova Scotia into a magnet for highly qualified personnel and innovative companies alike.

Entrepreneurship, innovation and increasing connections between research and industry: With an emphasis on growing the economy and real-world applications for research, connecting early (discovery) and applied research to economic outcomes is essential.

Opportunities for RNS:

- Working with the new streamlined Invest Nova Scotia as well as the NS Health Innovation Hub and health authorities, universities and NSCC to help strengthen the innovation pipeline
- Supporting early-stage research with the potential to move up Technology Readiness Levels.³

Community resilience and opportunity: Nova Scotia's communities, large and small, face increasing challenges from a changing climate and severe weather, volatile international crises, supply chain and trade interruptions, rising inflation and costs of living and doing business, and demographic changes.

² https://novascotia.ca/exec_council/letters-2021/ministerial-mandate-letter-2021-LSI.pdf

³ <https://ised-isde.canada.ca/site/clean-growth-hub/en/technology-readiness-level-trl-assessment-tool>

Opportunities for RNS:

- Supporting research that pulls from best practices around the world, tests a range of policy intervention hypotheses, and identifies those areas where we can strengthen communities' infrastructure, economies and social networks
- Investing in community-led research driving improved outcomes for all regions of Nova Scotia.

By Mission Area:

Sustainable Bioeconomy: Nova Scotia's goals around increasing local food consumption as well as export growth require the sustainability and future-proofing of traditional industries – agrifood, fisheries, forestry and other natural resource development – through improved processes and management practices, increased innovations, new markets, or workforce attraction and retention.

Opportunities for RNS:

- Investing in innovations in agrifoods, forest products, nutraceuticals, aquaculture and other bioeconomy applications
- Exploring nature-based solutions applied in new and unusual ways to address challenges in other sectors such as protein availability, plastic alternatives, biohacking and life sciences innovation, logistics and urban planning, and new drug development
- Continuing to implement the Forestry Research Agenda in support of Nova Scotia's forestry sector.

Climate Change Adaptation and Resilience: Hydrogen, renewable energy, and energy storage are high priorities for Nova Scotia in the face of rising energy prices, international climate action, geopolitical changes, and provincial emissions commitments. Sea-level rise, climate change resilience planning, and carbon sequestration are other important areas to support with the province's research capacity.

Opportunities for RNS:

- Adding hydrogen research to the growing research and innovation centre of excellence around energy storage and renewables
- Increasing attention to logistical interruptions and infrastructure resilience, nature-based solutions and engineering for coastal communities, and building resilience for coastal, near-shore and resource-based industries such as agrifoods
- Examining carbon mapping, carbon valuation and carbon capture as potential revenue sources for the province as well as aiding in meeting Nova Scotia's emissions goals.

Healthy People and Healthcare Systems: Nova Scotia's healthcare system is focused on real-world improvements such as reduction in surgical wait times, as well as systems improvements like access to primary health providers. "Aging well", aging in community, and aging with dignity are also vital for Nova Scotia's healthcare system.

Opportunities for RNS:

- Supporting the Nova Scotia Health Innovation Hub in their research and implementation initiatives in this area
- Working with the Department of Seniors and Long-term Care to support provincial efforts
- Operating programming that supports the goals of the Department of Health and Wellness and increases the talent pool for Nova Scotian health researchers and professionals.

Improved Quality of Life for Nova Scotians: Equitable growth enables access to employment opportunities, social programming, affordable housing and living, and services like high-speed internet in the community people choose. Other quality of life priorities include improved mental health, and poverty and its complexities, under which falls affordable housing, transportation, systemic or generational barriers to economic growth, regional disparity, race-based discrimination and challenges, and child poverty.

Opportunities for RNS:

- Working with partners like Engage Nova Scotia on quality of life research to help understand the complexities of rural and urban populations
- Partnering with the Office of Mental Health and Addictions, as well as other relevant departmental units and organizations, to invest in mental health research
- Working with municipalities and provincial departments to support implementation research around affordable housing, transportation, child poverty, and equitable growth.

Other Emerging Trend(s)

Trends that recently emerged but are rapidly growing in importance for Nova Scotia.

Sovereignty, defence and ocean technology: Canada has an increased focus on national defence and security, including Arctic and oceans security, cyber security, and defence technologies. Nova Scotia's ocean and advanced technology expertise can support Canadian defence goals.

Opportunities for RNS:

- Supporting Nova Scotia's ocean tech sector, particularly in sensors, ocean communication, harsh environment operations, advanced materials, and improved systems like batteries.
- Investing in advanced materials and clean technologies research like improved batteries to support the development of next-generation vehicles, bring us closer to net zero, and strengthen Canada's capabilities for remote/unmanned vehicles and logistical planning.

Systems automation, AI and digital technology: Nova Scotia is keen to improve productivity across manufacturing and industrial sectors through technological and digital advancement, machine learning and AI, and increased systems refinement.

Opportunities for RNS:

- Tying in ICT, Big Data, and the computing research sector could support AI and productivity innovations, healthcare delivery, cybersecurity, increased community resilience and planning capacity, and strengthen agrifood industries.

Initiatives to Serve Priorities

Simply identifying and communicating trends with the research community is not enough to ensure we achieve progress. The distributed and complex nature of the research ecosystem throughout Nova Scotia, and the ways in which research is identified, funded and mobilized, requires a higher degree of coordination to realize results. Keeping focused on areas of greatest strategic value ensures that RNS continues to support Nova Scotia with the most effective research.

The Research Nova Scotia mission-oriented strategy emphasizes outcomes rather than subject areas. In the same vein, research supported through the following initiatives must contribute to outcomes producing benefits to Nova Scotia, including improved understanding and decision-making ability, better implementation of policies and programs, greater innovation and economic growth, increased adaptation and resilience, and better healthcare, wellbeing and quality of life. Where partners are already known or anticipated, they are indicated in the Year 1 column.

Each year builds upon the work undertaken in the previous year. For example, if RNS undertakes a research agenda in Year 1, the activities of Year 2 will seek to implement the research agenda by convening projects that address key questions or test ideas raised in the first initiative. Or a Call for Problems, in which industry partners share the pain points where research could help, can then lead to an industry-partnered Challenge or proof-of-concept competition to apply research expertise to find ways to solve the problems.

In some trend areas, it may be most effective to develop a discrete program operated in partnership with other organizations and departments responsible for that sector. This is the model RNS pursued in 2021-22 with forestry, in partnership with the Forestry Innovation Transition Trust. The result of the research agenda was a three-year forestry research program, funded by FITT and operated through RNS as a separate program in addition to our core research activities. Forestry will continue to be a significant expenditure of resources and energy for RNS as we fully implement the research program.

Going a step further, there may be complex, multidisciplinary and multisectoral challenges facing Nova Scotia that require concerted, decisive and deliberate action to realize. As we develop new and innovative approaches to research with public benefit, RNS will develop a model to pursue large-scale, resource-intensive and audacious missions through focused research efforts, including setting up mission-focused institutes, creating time-limited mission-driven spinouts, or establishing dedicated mission teams pursuing the results with the greatest potential to drive change for Nova Scotia.

Table 1: Activities to Address Key Trends

Priority Areas	Y1	Y2	Y3
1. Population growth	- Establish research agenda to reach population goals	- Convene projects addressing key questions	- Convene projects; - Fund research on implementation of programs/policies
2. Entrepreneurship & innovation	- Solicit inventory of problems from startup community; - Run innovation challenges with NS Health Hub and/or Invest NS	- Apply research expertise in “problem-hacking” startup community problems	- Seek new innovations through Call for Proposals - Strengthen innovation pipeline through project transitions
3. Community resilience and opportunity for all	- Fund implementation reviews as new programs unroll	- Test concepts with small-scale grants and community projects	- Convene projects on most promising ideas
4. Sustainable bioeconomy: Local food consumption, transition of resource-based industries	- Solicit inventory of problems from traditional industries; - Convene projects addressing key questions in forestry	- Test concepts with small-scale grants; - Convene projects solving industry problems	- Support additional investments in high-potential ideas; - Seek new ideas through Call for Proposals; - Convene projects
5. Climate: Renewables, energy storage, carbon, resilience	- Run waste diversion challenge (Divert NS); - Test climate concepts with small-scale grants	- Support additional investments in high-potential ideas; - Convene projects in priority areas (e.g. carbon, hydrogen, energy storage)	- Apply research expertise to “problem-hacking” climate policy, implementation and innovation problems
6. Health: Systems improvement, disease prevention, aging well, innovation support	- Establish research agenda to support province’s Continuing Care systems - Convene projects on key health questions	- Test concepts with small-scale health system innovation grants - Convene projects on key health questions	- Convene projects on most promising ideas - Strengthen innovation pipeline with NS Health Innovation Hub
7. Quality of life: Mental health, equitable growth, community 'belonging'	- Fund research on implementation of poverty programs (Davis Pier) - Test concepts in improving Quality of Life (Engage NS)	- Convene projects on most promising poverty interventions, mental health improvements, and quality of life	- Fund research on implementation of programming in priority areas
8. Emerging: Defence/ocean sensing/cyber security; AI/automation	- Solicit inventory of problems, and AI opportunities, from industry (COVE, Perennia, other?)	- Apply research expertise in “problem-hacking” defence, oceans, industry AI adoption problems - Run innovation and Big Data challenges	- Strengthen innovation pipeline through project transitions and early-stage support

Research Nova Scotia's focus in 2023-24 will be operating initiatives launched in 2022-23, developing new activities, and laying the groundwork for new approaches in Years 2 and 3. Some examples of the initiatives that will achieve progress in these trend areas are highlighted below in more detail, with a full list located in the appendix.

Research Agendas: Research agendas develop a comprehensive set of questions and research mechanisms that, if investigated, will measurably support the growth and success of a particular sector or mission. Building on the success of the [Forestry Research Agenda](#), RNS has identified two subjects suitable for possible research agendas in Year 1. Population growth is a strong possible research agenda candidate, as the multidisciplinary and multisectoral approach required to achieve Nova Scotia's ambitious population goals could benefit from a coordinated research approach. Continuing Care is a fit for a possible research agenda due to the coordination required to balance the research demand placed upon community-based programs and long-term care homes and the interest of the health system in improving care.

Call for Problems: To solicit an inventory of the pain points in a particular sector, industry or community, RNS intends to explore Calls for *Problems*. While Calls for Proposals are common in the research and consulting communities, a Call for Problems focuses instead on the needs facing a particular sector or industry. By first soliciting the barriers to growth or areas of concern facing sections of Nova Scotia's economy, health care system or society, RNS can then seek and convene the research and partners to address the problems. This approach is particularly well-suited to entrepreneurship, the bioeconomy, and emerging trends like AI and security.

Convened Projects: RNS continues to engage heavily with the research community to convene projects with specific, urgent and salient goals for the province. Building on RNS's experience in convening projects to address COVID-19 questions, this will continue to be an important activity area for the organization across the coming three years. Key subject areas ready for convened projects include precision agriculture and aquaculture, specific disease and systems questions affecting healthcare, and a variety of projects in forestry tackling economic, ecological and societal research questions.

Implementation Science: There is valuable information to be gained when examining why programs succeed or fail, and understanding how policies and other interventions affect the intended beneficiaries. RNS is launching an implementation science initiative partnered with Davis Pier's Pier Labs to better understand the uptake of poverty initiatives in Nova Scotia, and test interventions to improve outcomes. Going beyond program evaluation, this area of research seeks learnings that can improve other programs and apply beyond one particular sector or department.

Further detail on other planned activity types is included in the Appendix.

D: RNS Activities and Focus Areas

RNS undertakes activities in support of the mandate to support, organize and coordinate the funding of research in Nova Scotia. Our approach is to ensure that RNS's activities progress toward results, building deliberately on each new year's worth of knowledge. We do not run programs or repeated initiatives without considering how to refine and improve upon the previous iteration. All programming supports our objectives to strengthen Nova Scotia's research capacity, grow the highly qualified workforce, improve salience and relevance of research in addressing key priorities, and increase the province's reputation as an innovative, vibrant and prosperous place.

In considering the role of RNS within research in Nova Scotia, there are three broad ways in which we fulfill our mandate. The first, uncovering solutions to Nova Scotia's problems, is discussed in the previous section and in Table 1, with an emphasis on intentional, mission-focused research that leads to tangible benefits. The second and third areas covered below in more detail link to Table 2, which demonstrates how activities will develop and continue to improve through Years 1-3.

The research endeavour requires more partners and actors beyond what RNS can reasonably undertake alone. The following is our best assessment of those areas most needing support, with the greatest potential for benefit, and in which RNS is best placed to undertake the work. We will continue to assess and refine our role in research, innovation and the public sector as we pursue new opportunities, forge new partnerships, and identify new gaps.

Role of Research, and RNS, in the Provincial Ecosystem

RNS undertakes activities in three focal areas to support the province through the research endeavour.

Research Nova Scotia is improving the value, resilience and usefulness of research, by--

1. *Uncovering the best solutions to NS's biggest problems:*

- RNS works to ensure salience and relevance of research by co-creating and connecting to uptake organizations, users and stakeholders
- RNS convenes and develops project teams, initiatives and programming directly tied to outcomes that support provincial needs
- RNS is focusing research on problems that face Nova Scotia through research agendas, targeted calls, challenges, convened initiatives
- RNS is developing new research models – bringing together researchers and experts from across institutions, government and industry to solve big challenges
- RNS aims to strengthen the innovation pipeline, by investing in research that supports the work of the NS Health Innovation Hub and the new Invest Nova Scotia.

2. *Investing in the people with the ideas and expertise to get things done:*

- RNS offers programs that help ensure students and new researchers have the skills, training, opportunities and work experiences to become a strong future workforce

- RNS supports provincial efforts to attract the best and brightest across sectors and grow the population through innovation clusters, highly paid and qualified personnel opportunities, and research centres
- RNS offers support to researchers in developing the skills they need to succeed in competitive grant processes to strengthen Nova Scotia's research capacity.

3. Ensuring Nova Scotia has the tools we need to invest in research that makes a difference:

- RNS is working with institutions and researchers to connect infrastructure asks with provincial priorities, and working to ensure provincial public investment is put to work for Nova Scotian needs
- RNS supports Nova Scotian research endeavours in attracting investments to achieve provincial goals, including federal competitions and international partnerships
- We are the conduit for research to happen beyond university labs, getting into communities and sectors that need the results
- RNS represents Nova Scotian interests to national and international partners, funders and governments.

To fulfil the responsibilities to support a strong, functioning and results-driven research endeavour in Nova Scotia, RNS has identified a suite of activities and mechanisms through which to deliver results that matter to the province.

In some cases, such as Scotia Scholars and New Health Investigators Grants, RNS works directly with a department (the Department of Health and Wellness) to deliver targeted programming addressing specific departmental priorities. We will continue delivering these programs so long as they are effective and support the needs of DHW. We will also seek opportunities to expand programs, where appropriate, to address additional subject areas with other departments and sectors.

Other initiatives, such as our matched funding offerings, will develop and change over time to continue to progress to a missions-focused model. With increasing levels of intervention and engagement earlier in the funding process, each year RNS will be increasingly confident in and knowledgeable of CFI matches' suitability in achieving Nova Scotian priorities.

RNS will continue to collaborate with provincial, regional, national and international partners to increase the capacity and reach of activities and research results. Over the three years, RNS will also pursue innovative and alternate funding models that will best meet the needs of the province while diversifying our funding sources and recipients, leveraging our provincial funds to attract research investments from across Canada and around the world.

In all activities and operations, we will continue to pursue the solutions and results that Nova Scotia needs to ensure a strong economy, healthy environment, resilient healthcare system, and improved quality of life.

Table 2: Activities to support research effectiveness in Nova Scotia

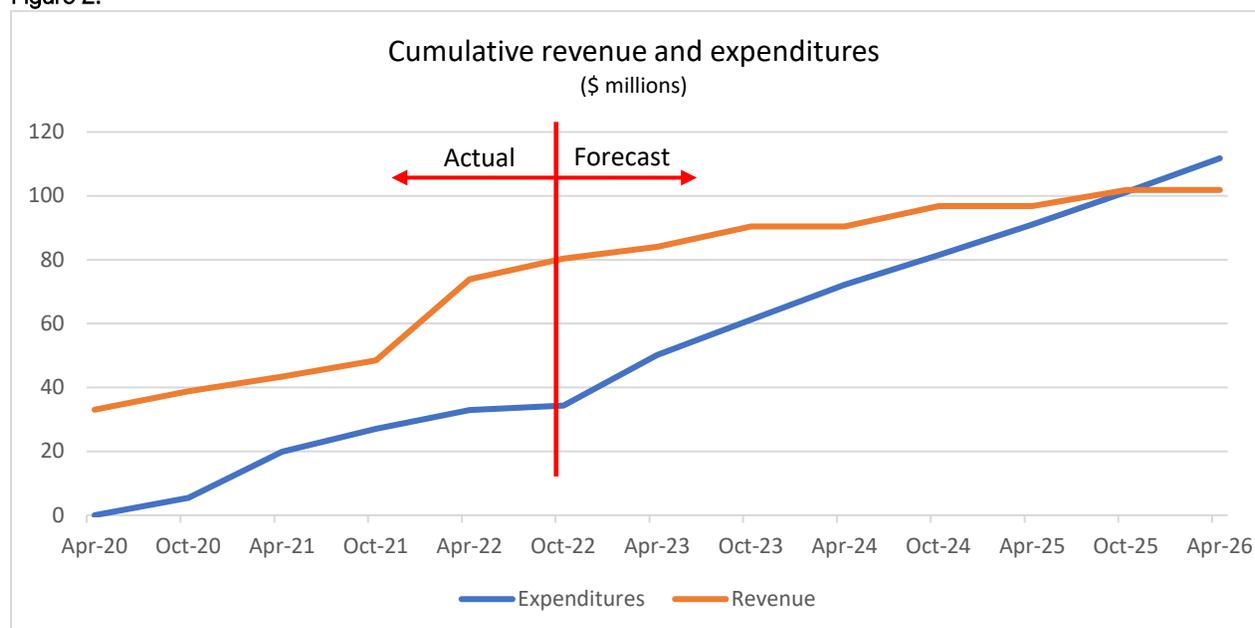
RNS Role	Activities and Mechanisms	Y1	Y2	Y3
<i>Developing and supporting the people who can help find the answers</i>	Funding programs for key workforce		Prioritize key workforce for add-on or student grants	Launch funding programs targeting key workforce
	Scotia Scholars (current – in partnership with DHW)	Deliver Scotia Scholars (current)	Deliver Scotia Scholars (current)	Deliver Scotia Scholars (current)
	New Health Investigators Grant (in partnership with DHW)	Deliver NHIG	Deliver NHIG	Deliver NHIG
	Scotia Scholars (expanded to other disciplines)		Scotia Scholars (expanded)	Scotia Scholars (expanded)
	Competitive Edge	Roll out ongoing support	Refine and adapt	Refine and adapt
	Supporting networks and building collaborations	Research Showcase to promote inter-institutional collaboration, as well as introduce researchers and industry	Mission-focused research showcases with industry and researchers	International research event with industry, partners and researchers in key sectors showcasing NS
	Scholars At Risk		Launch Scholars At Risk	Refine and adapt
	Mitacs partnership to deliver internships and postdoctoral fellow funding	Initiate Mitacs partnership	Continue Mitacs partnerships	Continue Mitacs partnerships
<i>Ensuring NS has the tools we need to do the work</i>	Develop mission-driven “flagship” initiative	Develop and trial focused mission initiative on an urgent, complex mission (e.g. Sea level rise and community adaptation)	Refine and adapt mission-focused initiatives with increased international investment; identify new candidates for spin-out	Expand mission-focused initiatives to tackle additional challenges
	Develop innovative funding approaches (crowdfunding, lottery, mission-focused research organization)	Lay groundwork for new kinds of funding	Develop and trial innovative funding models	Refine and expand

	Leveraged funding support (NS-developed, seeking other partners)	Support leverage/match requests with early intervention	Increased intervention and co-creation of applications	Only co-created, mission-focused grants eligible for match
	CFI matching (supporting success in national infrastructure competitions with matched funds)	Continue to match CFI (with early intervention)	Increased intervention and engagement on applications	Only mission-focused grants eligible for match
	Organizational-level funding pursuit to diversify funding sources	Participate in international partnered initiatives where appropriate	Seek philanthropic and int'l partners for RNS initiatives (e.g. Weston Family Foundation)	Pursue organizational funding from philanthropic and int'l partners

Appendix A: Fiscal Outlook

The RNS fiscal outlook presents best estimates of revenue and expenditure projections for research investments (Research Opportunity Fund) for 2023/24 through to 2025/26. Detailed notes below provide the forecasting assumptions, and interpretation comments provide insight on the outlook's implications.

Figure 2:



Notes to Figure 2:

1. Revenues and expenditures are presented in half-year increments, to match the time period for the semi-annual reports.
2. All figures prior to 1 Oct 2022 are actuals, based on the preceding six semi-annual reports.
3. The figure begins with the opening balance as of 1 April 2020.
4. All revenue sources are included: Unrestricted contributions to the ROF from AE (full discretion on expenditures within definition of ROF, from both the \$2 million annual allocation and the one-time contribution of \$25 million in March 2022); funding originating from DHW (restricted to specified health-related expenditures, equal to \$3 million p.a.); trust residuals received (EMR Trust and Patient Enrollment Trust); third-party funds received that are matched to specific project expenditures (e.g. ACOA; COVID-19 Response Council; Forestry Innovation Transition Trust agreement 1; Office of Mental Health and Addictions); third-party funds received and expended on projects consistent with funds' designation (e.g. Forestry Innovation Transition Trust agreement 2).
5. All expenditures associated with the diverse revenue sources listed in Note 4 are included. Where funding expenditure commitments are designated for future years (e.g. FITT agreement 2) expenditures are forecast in the same time period as revenue is received.

6. The figure 2 fiscal outlook represents a Base Case scenario, where both revenues and expenditures in the future are consistent with patterns from actuals from the 2.5 years of RNS operations from April 2020.:
 - a. Revenue forecast assumes an ongoing annual commitment of \$5 million from AE, which is consistent with the actuals.
 - b. The expenditure forecast for 2023/24 for \$22.2 million is based on projections presented in the finance table of the April 2022 to Sept 2022 semi-annual report, and is split evenly between the two halves of the year.
 - c. The expenditure forecast for 2024/25 and 2025/26 applies the average half-year actual expenditures from April 2020 through September 2022, adding 5% for each successive time period to account for growth, inflation and contingency.

Revenue opportunities

The RNS legislation created the Research Opportunities Fund (ROF) from which research funds that are received are deployed in service of research that aligns with government priorities. The ROF enables RNS to support research initiatives, early-career healthcare researchers, research equipment purchases, and regional and national coalitions and partnerships.

An annual provincial contribution to RNS (“core funding”) comes through Advanced Education (AE): \$2 million for research that advances provincial priorities but not otherwise restricted, and; \$3 million restricted to health research and programming. This funding is supplemented by provincial trust residuals, third-party contracts and federal funds. Research funds for RNS are received in a blend of types:

Unrestricted: only the regulatory restrictions on use apply – funds must further the objectives of the Corporation and support inclusive economic growth, a healthy population, and/or a strong healthcare system. Example: \$2 million unrestricted annual core funding ROF contribution from AE.

Restricted: some degree of direction or restriction from the funds’ source is imposed on how they are to be used. The degree of restriction is variable. Example: \$1.3 million trust residual to be devoted to “healthcare innovation”.

Directed: specific instructions or requirements of use apply, as dictated by the funding source. RNS must satisfy these requirements to spend the funds. Example: \$2.5 million from COVID-19 Response Council for two approved projects.

Since inception, RNS has progressively diversified its revenue sources. This approach depends on supporting research of a subject matter or of a mechanism that attracts the contribution of the third party. This has two effects:

1. The reliance on the core funding from AE decreases.
2. The profile of the research organized, coordinated and supported by RNS by definition is tuned to align with the mandates of the contributing organization. By and large, funds devoted to matching federal grants (e.g. CFI) must be sourced from the core (unrestricted) funding envelope unless the specifics of the investment align with the conditions of the restricted or directed funding source.

In 2020/21 RNS received the residuals from two terminating provincial trusts. RNS is aware of two additional potential trust residuals as revenue sources:

1. When FITT was established with a \$50 million fund, the terms included “If at the date of termination of the Trust [March 31, 2030] any Trust Property remains, the Trustees shall pay the Trust Property to such research institutions, research enterprises (such as Research Nova Scotia) or any recognized post secondary institutions who, in the determination of the Trustees are actively engaged in research and development in the Forestry or Bioeconomy sector to conduct research and development for benefit of the Forestry and Bioeconomy sector in Nova Scotia.”
2. The March 2020 establishment of the COVID-19 Response Council (NSCRC) directed that if at the end of the Term “there are residual funds remaining from the Final Contribution [\$100 million], such funds shall be paid by Dalhousie to Research Nova Scotia”.

Neither are included in the fiscal outlook for the following reasons:

1. The FITT wind-up in 2030 is beyond the planning horizon of this three-year operating plan. Since the Trust is not able to make new funding commitments after 31 March 2025, RNS will learn at that point if any funds are likely to be available in 2030. However, RNS is not the only potential recipient, and with 2.5 years remaining for the Trust to make funding commitments, RNS has been advised that the Trust anticipates committing the full \$50 million by 2025.
2. The NSCRC includes \$34.7 million held in cash by the Trust, pledged as security for loan guarantees. The guarantees are held until April 2026, which is the outer limit of this fiscal outlook. If it appears that some or all of these funds will be made available, future fiscal outlooks will be adjusted accordingly. As for the balance of the Trust, RNS has been advised that these funds have been mostly committed and are not likely to be a revenue source. Finally, the funding arrangement for the NSCRC can be amended by agreement by both parties, which may affect the amount and/or RNS as a potential recipient.

Interpretation and commentary

In the base case, the cumulative anticipated expenditures exceed the forecast revenues in the first half of 2025.

For planning purposes, given that research funding applications and planning typically have a 12 to 18 month development period, the operating impact for the base case would begin in April 2024.

Under the base case, RNS has operating certainty for the next 18 months – revenue in hand and revenue reasonably assumed to eventuate is sufficient to implement the three-year operating plan.

Significant increases in expenditure – such as a large investment in research in response to a significant risk (e.g. pandemic; climate impacts, etc.) or opportunity (e.g. economic diversification) – extend beyond the base case scenario and are outside the base case planning assumptions. Similarly, a significantly higher demand from unexpected success in federal competitions (e.g. CFI Innovation Fund) is not assumed for the base case; however, this scenario did occur in 2021.

Access to core funding is essential to successfully tapping into third party revenue sources. Where RNS has been successful in negotiating third party revenue contributions to RNS to support research in Nova Scotia, it has been on the basis of an RNS contribution from own-source revenue.

Without exception, this approach has been successful when the truest form of the mission-oriented model is applied: a focus on outcomes to society first (pursuit of an opportunity or mitigation of a risk), and building a research contribution in support. Third party contributions become possible when RNS is able to demonstrate that:

- the research the RNS will support with the funds will help deliver on the mandate of the partner organization, and
- RNS is a professional, accountable and transparent organization, able to effectively select, monitor and report on projects and their funding

Operating Costs

RNS receives an annual allocation of \$1.796 million to cover operating costs (including salary and all administrative overhead). There are no other viable sources of such funds.

This annual allocation has been sufficient to cover operating costs, with RNS applying stringent cost controls to ensure efficient use of public funds. Prudence alone may be insufficient for future years:

- With over 70% of all operating costs attributable to wages and salary, in a significant inflationary environment, the expectations are high for salary increases to maintain parity.
- RNS has trimmed staff to manage the salary envelope, where the business case was weak to maintain that capacity. As a result, while RNS is now very lean, we have little capacity to absorb the impact of routine adjustments (e.g. parental leave; long term illness). Nor are we capable of taking on significant additional work areas.
- As partnered work and the implementation of the mission model grows, more staff effort is required. It is this form of work that takes time, and as we continue to build the most effective research support system possible, we need to continue to invest in our staff and bring in new capability.
- The past three years have operated under pandemic restrictions, with virtually no travel, conferences, professional development, sponsorship or many outward-facing activities. The cost increases associated with virtual work (e.g. IT equipment) are well below the cost savings from this revised mode of business. If expectations return for RNS to resume and grow its external presence, costs in this category will increase.

Operating costs for 2023/24 are forecast in the semi-annual report to be \$1.85 million, marginally above the \$1.796 allocation from AE. This will be risk-managed, and the approximately \$50k deficit will be monitored through the year and brought to zero by year end.

Appendix B: Definitions

Research Nova Scotia is continually seeking the best practices and most effective methods to implement in pursuit of our missions. The following list describes mechanisms that RNS intends to pursue over the coming three years to improve Nova Scotia's research capacity, increase the effectiveness of public investments in research, and ensure we are exploring the most innovative solutions for societal problems.

Research Agendas: Research agendas develop a comprehensive set of questions and research mechanisms that, if investigated, will measurably support the growth and success of a particular sector or mission. Building on the success of the [Forestry Research Agenda](#), RNS has identified two subjects suitable for possible research agendas in Year 1. Population growth is a strong possible research agenda candidate, as the multidisciplinary and multisectoral approach required to achieve Nova Scotia's ambitious population goals could benefit from a coordinated research approach. Continuing Care is a fit for a possible research agenda due to the coordination required to balance the research demand placed upon community-based programs and long-term care homes and the interest of the health system in improving care.

Call for Problems: Calls for Proposals are common in the research and consulting communities; a Call for Problems focuses instead on the needs facing a particular sector or industry. By first soliciting the barriers to growth or areas of concern facing sections of Nova Scotia's economy, health care system or society, RNS can then seek the research and partners to address the problems. This approach is particularly well-suited to entrepreneurship, the bioeconomy, and emerging trends like AI and security.

Implementation Science: There is valuable information to be gained when examining why programs succeed or fail, and understanding how policies and other interventions affect the intended beneficiaries. RNS is launching an implementation science initiative partnered with Davis Pier's Pier Labs to better understand the uptake of poverty initiatives in Nova Scotia, and test interventions to improve outcomes. Going beyond program evaluation, this area of research seeks learnings that can improve other programs and apply beyond one particular sector or department.

Convened Projects: RNS continues to engage heavily with the research community to convene projects with specific, urgent and salient goals for the province. Building on RNS's experience in convening projects to address COVID-19 questions, this will continue to be an important activity area for the organization across the coming three years. Key subject areas ready for convened projects include precision agriculture and aquaculture, specific disease and systems questions affecting healthcare, and a variety of projects in forestry tackling economic, ecological and societal research questions.

Challenge Prizes: A challenge prize is a competitive program that encourages research teams to pursue a variety of solutions for a specific problem. The prize is competitive, with the winning team receiving a research prize (which often supports the implementation of the winning idea). Challenges help to promote creativity and can be effective in mobilizing researchers toward a single purpose; a well-known example is the [X Prize](#).

Small-scale projects: Small-scale grants enable researchers to gather data, test the application of a concept, and shore up innovative theories before moving into a larger grant proposal process. By

funding short-term projects with rapid turnaround, RNS can support a portfolio of ideas before investing in those with greater potential. Small-scale projects enable greater nimbleness and flexibility in research, and help prepare researchers for success in bigger, more complex programs.

Proof-of-concept: A proof-of-concept grant is similar to a small-scale project grant, but with a particular focus on testing an idea before moving into the innovation pipeline (or other uptake process). When researchers uncover ideas with potential for commercialization or application, it may be necessary to test the idea further before pursuing further investment. A proof-of-concept grant can help to provide a small, risk-free opportunity to develop the idea into a viable concept.

Problem-hacking: Similar to hackathons, problem-hacking applies research capacity (whether through events or time-bound initiatives) to problems facing industry or community organizations. Multidisciplinary teams rapidly consider a variety of solutions and attempt to apply these ideas in new and innovative ways. Problem-hacking could be used to consider AI applications in a specific sector, to come up with new approaches to persistent problems in healthcare, or help entrepreneurs look at a challenge from all angles.

Follow-on grants: RNS monitors past research investments to select those with potential for incremental or follow-on funding to take results to the next level. Recipients of follow-on grants may be looking to prototype an idea, test results in different environments, take findings to new partners, and explore pathways to bigger impact. A follow-on grant enables RNS to make sure research investments are achieving their greatest potential.

Call for Proposals: A Call for Proposals solicits research ideas, along with methodologies and budgets, from researchers in pursuit of a specific topic, sector, discipline or mission. While RNS has not used CFPs often since inception, a CFP focused on specific mission outcomes may help to uncover interesting ideas in the research community that could benefit the province. CFPs are generally competitive processes that require a scientific merit review and ranking to select the recipients. CFPs may be collaborative with other partners or RNS-only.

Strange Solutions: A type of Call for Proposals, “Strange Solutions” would encourage off-the-wall ideas from one sector that can solve a problem in another sector through weird or unusual applications of technology and innovation. For example, using mushrooms to create biodegradable packaging, or applying forestry by-product to apple orchard pests.

Innovation pipeline: Nova Scotia offers a range of programs and investment opportunities for entrepreneurs and startups, as well as incubators and accelerators to help move great ideas from academia into the business community. RNS is well positioned to support research at earlier stages with the potential to move into this innovation pipeline, collaborating more closely with the Nova Scotia Health Innovation Hub, the new Invest Nova Scotia and government departments to focus on the ideas with the greatest potential for growth.

Funding programs for key workforce: RNS is developing possible mechanisms to identify and support students in priority workforce areas to strengthen the labour force pipeline from Nova Scotian universities.

Scotia Scholars: RNS supports students at the undergraduate and graduate level in pursuing research on topics of particular interest to the province. The current Scotia Scholars program is

operated in partnership with the Department of Health and Wellness, with students undertaking research into healthcare systems improvements, social determinants of health, health innovations, and other areas identified by DHW. RNS is working to expand the Scotia Scholars program into other subject areas where appropriate.

New Health Investigators Grant: RNS partners with the Department of Health and Wellness to support early-career researchers studying important areas of health research in Nova Scotia. Each year, RNS works closely with DHW to select the priority areas for the coming competition to strengthen Nova Scotia's health research capacity.

Competitive Edge: RNS supports researchers in acquiring the professional development and skills needed to succeed in national and international funding competitions, improve career progression, and better understand the full scope of the research endeavour. The Competitive Edge program covers topics including peer review processes, grant writing, research communication, and strategic planning and evaluation.

Supporting networks and building collaborations: RNS is working to support researchers in building their networks, particularly after the disruptions caused by the COVID-19 pandemic. Through showcases, in-person collaboration events, and activities designed to facilitate greater interaction between industry and academia, RNS seeks to increase meaningful partnerships that yield stronger, more useful research.

Scholars At Risk: RNS is working to develop a Scholars At Risk program in collaboration with partners like EduNova or the Royal Society of Canada. This program would support researchers or students fleeing violent and unstable regimes as refugees, and enable highly qualified personnel to resume their research at Nova Scotian institutions. The program will build on our learnings from implementing the Ukrainian Emergency Relief program, and leverage the Royal Society's developing SAR initiative.

Mitacs partnership to deliver internships and postdoctoral fellow funding: RNS is exploring partnerships with like-minded organizations also engaged in research support, such as [Mitacs](#). Pursuing collaborations increases RNS's capacity to implement and fund research fellowships and internships, and increase the participation of researchers and highly qualified personnel in industry and the community.

Missions-focused initiatives: Building on new models emerging from research hubs in the U.S., RNS is exploring the possible development of missions-focused research spinoffs. These organizations or discrete initiatives deploy a startup mentality to pursuing research and innovation missions, with the goal of solving humanity's greatest challenges.

Develop innovative funding approaches: RNS pursues innovative, non-traditional and alternative funding approaches to do more with less, address new problems in different ways, and consider the best possible use of public funds to generate measurable benefit to Nova Scotians. This might include considering mechanisms like crowdfunding and crowdsourcing; to tap into the power of the public to identify and support research; employing lottery systems to choose among equally strong applications to reduce bias; and pursuing other mission-focused models to focus on specific, articulated mission outcomes.

Leveraged funding support (NS-developed, seeking other partners for funding): RNS supports research teams and institutions that identify key projects, programs and equipment needed to address Nova Scotian priorities, and then seek additional funding to augment the provincial/RNS component. Leveraged funding differs from matched funding in that the origin of the initiative and its funding are driven out of Nova Scotia's needs and capacity, and then additional federal programs or partners come to the table.

CFI matching (supporting success in national infrastructure competitions with matched funds): The Canada Foundation for Innovation is a federal research funding organization that funds the purchase of research equipment and infrastructure, usually up to 40%. CFI grants require matching funds, which are often sourced from provincial research organizations as matches. CFI grants purchase expensive equipment like microscopes, ocean gliders, state-of-the-art MRIs, as well as helping to fit out lab space and collaboration centres. RNS engages with researchers and the research office to determine the fit with RNS missions and the benefit each purchase will have on Nova Scotia.