

Research Program Strategic Plan 2021 – 2024



Ministry of
Forests, Lands, Natural
Resource Operations
and Rural Development





Research Program Strategic Plan 2021 – 2024



Ministry of
Forests, Lands, Natural
Resource Operations
and Rural Development

TABLE OF CONTENTS

EXECUTIVE SUMMARY	3
1 MESSAGE FROM THE CHIEF FORESTER, ASSISTANT DEPUTY MINISTER.....	4
2 INTRODUCTION	5
2.1 Vision, Mission, and Values.....	6
3 GOVERNANCE FRAMEWORK.....	6
3.1 Establishing Priorities	6
3.2 Delivery Structure	7
3.3 Partnerships and Collaboration.....	8
4 STRATEGIC GOALS AND INITIATIVES FOR THE RESEARCH PROGRAM.....	8
Goal 1—Maintain Excellence in Applied Research.....	9
Goal 2—Sustain an Effective and Proactive Research Culture	9
Goal 3—Reinforce Research Knowledge Management and Extension Services.....	10
5 FOCUS OF PROVINCIAL RESEARCH	11
5.1 Ecosystem Stewardship	11
5.2 Ecosystem Health and Disturbance	11
5.3 Water	12
5.4 Species and Habitats.....	12
5.5 Timber Supply	13
5.6 Bio-economy	13
6 OPERATING BUDGET 2021/22 – 2023/24.....	14
APPENDIX 1—SOME EXAMPLES OF EXISTING PARTNERSHIPS	15

Executive Summary

The Ministry of Forests, Lands, Natural Resource Operations and Rural Development (FLNRORD) plays a significant role in stewardship and authorizations of the Province's Crown land and natural and cultural resources. Overseeing a land base of 94.8 million hectares, the Ministry manages forests, water, fish, wildlife, ranges, and land-based resources, which provide social, economic, and environmental benefits to British Columbians. Resource management decisions are extremely complex due to the ecologically diverse landscape, varied topography and climate, and First Nations considerations, as well as changing environmental, social, and economic factors.

In 2011, the Ministry committed to an integrated Research Program, and has implemented an "Outcome-based" model that better reflects and responds to the complex array of integrated resource management functions and priorities delivered by the Ministry.

The Program is organized into six research portfolios: Ecosystem Stewardship; Ecosystem Health and Disturbance; Water; Species and Habitats; Timber Supply; and Bio-economy. Each portfolio is led by an interdisciplinary team of research scientists embedded within the operations of the Ministry, which represents both regional and provincial-level research needs.

This organizational structure is intended to be responsive to existing and emerging research needs, providing a direct linkage between research scientists and staff involved in decision-making, policy development, and resource management practices.

As a result, the Ministry's Research Program is well-positioned to provide timely, relevant, high-quality, science-based information to support these complex resource management decisions and policies.

The Program will focus on three key goals:

- 1) Maintain Excellence in Applied Research
- 2) Sustain an Effective and Proactive Research Culture
- 3) Reinforce Research Knowledge Management and Extension Services

Over the next three years the Research Program will work with partners within and outside government to deliver these important goals.

1 | Message from the Chief Forester, Assistant Deputy Minister

It was 1921 when the British Columbia Forest Branch hired the first research scientist, J.L. Alexander, to study forest regeneration, growth and yield, and fire protection. Over the past 100 years, the Research Program has broadened to address the full spectrum of forest values.

In recognition of the long history of high-quality research to inform forestry policies and practices, the Research Program was the recipient of the 2019 Canadian Forest Management Group Achievement Award offered by the Canadian Institute of Forestry (CIF).

Today, the Program has more than 70 researchers supporting the sustainable management of British Columbia's natural resources. Research Program staff have achieved much over the past century, but many significant challenges remain to be tackled.

By focussing on climate change research and its associated impacts such as increased wildfires, pests, and pathogens, the Research Program consistently delivers sound science that helps guide the sustainable management of our natural resources. Land-based research, together with traditional ecological knowledge, allows us to properly sustain British Columbia ecosystems now, and for generations to come.

British Columbia's investment in research has given us a wealth of knowledge and a deeper understanding of our natural resources. This three-year strategic plan continues to ensure that the scientific knowledge generated by the Research Program remains the foundation for managing and protecting our natural resources.

Research has a remarkable history in our province, and, thanks to the contribution of our researchers, I am confident that the best scientific knowledge will guide us into the future.

Diane Nicholls, RPF
Chief Forester, Assistant Deputy Minister

2 | Introduction

Working in partnership with Provincial agencies that comprise the natural resource sector, the Ministry of Forests, Lands, Natural Resource Operations and Rural Development (FLNRORD) plays a significant role for stewardship and authorizations of the Province's Crown land and natural and cultural resources. Overseeing a landbase of 94.8 million hectares, the Ministry sustainably manages forest, range, mineral, and land-based resources. It supports activities that benefit British Columbians socially, economically, and environmentally, and facilitates public access to a wide range of activities such as hunting, fishing, and recreation.

The Ministry delivers its mandate in the context of Government strategic priorities, as identified in the Province of British Columbia Strategic Plan, the Minister's Mandate Letter, and the Ministry's Service Plan.

With its wide variability in topography and climate, British Columbia is a very ecologically diverse landscape. New and changing environmental, social, and economic factors add to the complexity of resource management. These include the cumulative effects of resource use and development, and the risks associated with population pressure and climate change to natural resources, First Nations values, and public safety concerns such as erosion, flood, drought, and wildfire.

In 2011, the Ministry committed to an integrated Research Program (the Program) to provide credible, evidence-based information for durable resource management decisions that support environmental sustainability.

The purpose of the Program is to:

- Provide timely research information to operational decision-makers, policy-makers, practitioners, and other users across the Ministry.
- Align Program services and investments to support Ministry priorities.
- Identify and proactively examine emerging issues and future research needs.

This Strategic Plan provides an overview of the Research Program, and sets out the Program's goals, objectives, and key initiatives and activities for the next three years.

British Columbia's natural resource sector includes agencies responsible for management of the Province's natural resources including land, forests, range, fish and wildlife, water, environment, minerals, energy, and agriculture resources. These agencies work together to support integrated, sustainable resource management.



A history of scientific research and innovation

The need for a formal Research Program to support resource management in British Columbia was recognized as early as 1927 when the Research Division was established under the British Columbia Forest Service. In the ensuing nine decades, high-quality research has supported British Columbia in becoming recognized as a world leader in natural resource management and stewardship.



2.1 | Vision, Mission, and Values

OUR VISION	Resource Management decisions in the Ministry of Forests, Lands, Natural Resource Operations and Rural Development are supported by science and research developed by the Program.
MISSION	To provide innovative solutions to natural resource sector challenges in British Columbia through research, science, data, and extension.
VALUES	<p>Relevance—providing timely and relevant information to our clients.</p> <p>Excellence—delivering the highest quality in applied research and science.</p> <p>Innovation—finding creative solutions to address complex issues and testing new concepts and ideas.</p> <p>Collaboration—connecting practitioners, policy-makers, and decision-makers with researchers and partners to leverage our capacity.</p>

3 | Governance Framework

The Ministry's research model embeds researchers in Divisions and Regions for better integration of multiple research disciplines, and to make research as operationally relevant as possible. This model is responsive to existing and emerging research needs, and supports the complex questions decision-makers are dealing with on the landbase. Integration of researchers across organization levels and geographic locations ensures an efficient and direct link to both operations and policy to better serve Government's provincial land-management vision. The Chief Forester, in partnership with the Ministry Executive, sets the strategic direction and overall governance of the Program.

3.1 | Establishing Priorities

The Ministry's Research Oversight Committee (ROC) oversees the Research Program, and identifies knowledge gaps, research priorities, and emerging issues to focus and optimize research investment within FLNRORD. The ROC is comprised of representatives from both regional and provincial operations groups. Core functions of the ROC include:

- Supporting Executive in championing the importance and role of research and science.
- Providing guidance and strategic direction to the Research Portfolios.
- Identifying research priorities and needs.
- Defining funding priorities and opportunities.
- Evaluating funding proposals and allocations among Research Program portfolios.
- Addressing issues such as research standards, data management, research scientist classification, extension, and publications, which impact both short- and long-term delivery of Ministry research.

The process for setting priorities for natural resource research requires balancing immediate and emerging issues with mid-term (one to five) scientific needs, and strategic questions that require study over longer-term horizons (more than 5 years). Identifying research needs and establishing priorities (Figure 1) are complex activities due to the scale of operations and scope of the Ministry's mandate, and these needs and priorities are constantly being reviewed and refined.



Figure 1. The process for identifying research needs and priorities within the Research Program.

3.2 | Delivery Structure

Research scientists are embedded within the operations of the Ministry at both provincial and regional levels. This organizational structure is responsive to existing and emerging research needs, and provides an efficient and direct link to Ministry staff involved in operational decision-making, policy development, and resource management practices.

The Research Program responds to the complex array of integrated resource management functions and priorities delivered by the Ministry at the provincial, regional, and district levels. There are six Research Portfolios: Ecosystem Stewardship; Ecosystem Health and Disturbance; Water; Species and Habitats; Timber Supply; and Bio-economy. Each Portfolio is led by an interdisciplinary team that represents regional and provincial-level research needs. Within each research portfolio, there are specific research initiatives that help to focus work. Understanding and managing in the context of projected climate change is integral within all six Research Portfolios.

Long-term research

Although some research priorities shift over time, long-term data and scientific information are critical for decision-making tools to answer complex resource management questions. For example, since 1928, re-measurement of long-term experimental plots has provided reliable data for development and validation of prediction systems and decision tools used for timber supply analysis, silviculture investment, long-term forest management planning, and emerging issues such as climate change and carbon budget.



What is a “Research Portfolio”?

The Research Program is divided into six Research Portfolios that represent the main disciplines of research. Each Portfolio team is composed of interdisciplinary members representing regional and provincial research interests to optimize research investments and scientific results.



The core functions of each portfolio team include:

- Supporting ROC in identifying research priorities and initiatives for each research portfolio.
- Liaising with and guiding provincial researchers to:
 - Identify projects that address the priorities of each portfolio;
 - Foster integration of research disciplines within and among portfolios; and
 - Report on the accomplishments of the portfolio.
- Building partnerships and collaborations.

3.3 | Partnerships and Collaboration

Collaboration and partnerships that span disciplinary and institutional boundaries are important for addressing the complex problems associated with sustainable resource management in British Columbia. Historical partnerships with other provincial and federal agencies, academic and other research institutions, First Nations, and innovative industry leaders have proven highly effective, and essential in areas where government research expertise, knowledge, and capacity are limited. Appendix 1 provides some examples of current partnerships, and illustrates the scope and breadth of collaboration, including a strong connection with the British Columbia Ministry of Environment and Climate Change Strategy.

4 | Strategic Goals and Initiatives for the Research Program

The Research Program has multiple goals and initiatives that are foundational to achieving the Program’s overall vision: to support the Ministry’s goal for sustainable natural resource management. Key Activities to support delivery and the overall effectiveness of the Research Program have been identified under each Program Goal.

The three Goals focus on maintaining high-quality research and science, and managing our information and knowledge to support decision- and policy-makers. ROC will monitor progress under these Goals, and report out on an annual basis.

Goal 1 – Maintain Excellence in Applied Research

Outcomes	The Research Program is valued as a trusted provider of scientific information to support sustainable resource management decisions and policy development
Objectives	<ul style="list-style-type: none"> • To continue to strengthen the profile of the Research Program through: <ul style="list-style-type: none"> – a responsive governance model that provides clear oversight and direction; – a streamlined process to clarify and set priorities for research activities; – targeted communication of results to policy and decision-makers to increase awareness and knowledge of the Program; – clear linkages of research results and advisory services with end-users; and – regular reports on the status and progress of the Program
Key Initiatives	<ul style="list-style-type: none"> • Maintain a streamlined governance structure to provide clarity around roles and responsibilities of management teams and research scientists • Maintain a planning process, supported by FLNRORD Operations, that aligns research with current and emerging business and scientific priorities • Create a plan to communicate the Program and results to key stakeholders (e.g., Regional Management Teams) • Regularly assess and improve the Ministry framework for integration of scientific information into resource management policy and decisions • Maintain a system to monitor and report on Program progress
Key Activities	<ul style="list-style-type: none"> • Regularly review and refine the governance model with clear roles, responsibilities, and engagement of management teams and research scientists • Maintain and update the planning tools that establish clear criteria to align research activities with Ministry needs and priorities • Develop and implement a Stakeholder Communication Plan • Implement the science-policy framework developed by the Mitacs¹ • Conduct a tri-annual survey to evaluate the level of satisfaction with research delivery • Host, with partner agencies, a research symposium for policy and decision-makers • Maintain and update a system for monitoring and reporting on the status of the Program and research activities <p>¹Mitacs is a not for profit national Canadian research organization that builds partnerships among academia, industry, and government.</p>

Goal 2 – Sustain an Effective and Proactive Research Culture

Outcomes	The Research Program is delivered by well-educated, experienced, and respected research professionals
Objectives	<ul style="list-style-type: none"> • To sustain the correct complement of research scientists with the expertise to meet Provincial and Regional research needs • To leverage external expertise, when required, to address research information gaps and increase the overall value of scientific outcomes and impacts
Key Initiatives	<ul style="list-style-type: none"> • Establish a recruitment, retention, and succession strategy to maintain expertise across the Province and mitigate the risk of knowledge and information loss • Support new Ministry research scientists • Provide opportunities to exchange research science knowledge to: <ul style="list-style-type: none"> – raise awareness of mandates; – identify common challenges; – promote collaboration towards solutions; and – strengthen linkages and networks

Key Activities	<ul style="list-style-type: none"> • Implement the Research Scientist Achievement Review Framework to recognize and retain the Ministry's research expertise • Provide clear evidence on the importance of filling vacant research positions and identify potential areas of research expertise of critical importance that are not currently represented in the Program • Work with partner agencies to foster development and recruitment of student research scientists • Develop an orientation package for new research scientists including a "<i>Knowledge Management 101</i>" for the Research Program, with how-to's and information locations • Become the champion for an intra-governmental round table with the various research groups across Ministries to increase awareness and collaborations • Pursue opportunities and partnerships with other agencies such as universities and the Canadian Forest Service to leverage expertise and address issues that are of mutual interest and benefit • Enhance collaborations with First Nations through requests for feedback on research and information priorities, joint planning and conducting of research, and effective sharing of key research findings
----------------	--

Goal 3 – Reinforce Research Knowledge Management and Extension Services

Outcomes	Research information is managed as a high-value asset and is readily available to resource managers to aid in decision-making, policy development, and updates to practices
Objectives	<ul style="list-style-type: none"> • To maintain and refine knowledge management processes and standards to preserve the integrity and accessibility of knowledge assets • To maintain and refine high-quality extension services and products for practitioners and decision-makers
Key Initiatives	<ul style="list-style-type: none"> • Co-ordinate knowledge management services that provide accessibility to research and science information, including: <ul style="list-style-type: none"> – archiving, standards development, and retrieval; – protection of research assets (e.g., intellectual property and long-term research installations); and – maintaining access to critical numbers of knowledge-management staff in partner agencies. • Standardize processes to establish, manage, and protect research trials • Standardize extension processes, including peer-review, to ensure high-quality extension products • Use new technologies and tools to communicate research results
Key Activities	<ul style="list-style-type: none"> • Maintain and refine, with partners, a strategy to store, retrieve, and protect research data, information, and assets • Review and update processes and standards for establishing research trials, protecting Ministry Research Program assets, and archiving information • Review and update extension processes and procedures • Continue to share research results via journal and magazine articles (e.g., ABCFP magazine), newsletters (e.g., DIRT), Research Talks, and Webinars • Facilitate the creation of guidebooks for best management practices of high-priority topics

5 | Focus of Provincial Research

The Research Program's six Research Portfolios are described below. In addition to these areas of research, the Ministry has a very active Forest Genetics program that is focussed on maintaining forest genetic diversity. The production of tree seed selected for faster growth, pest resistance, and better wood quality will benefit our future forests and communities under the current climatic changes.

5.1 | Ecosystem Stewardship

Ecosystem Stewardship supports management decisions that maintain or enhance ecosystem services, in the context of increasing climate and socio-ecological uncertainty.

Strategic Importance	Improved ecological knowledge for sustainable delivery of ecosystem services
Research Themes	<ul style="list-style-type: none">• Determine the vulnerability of ecosystems to resource development and climate change• Foster ecosystem resilience and adaptive capacity through management• Build adaptive capacity by providing flexible tools and comprehensive information to support management and decision-making

5.2 | Ecosystem Health and Disturbance

Ecosystem Health and Disturbance investigates the spatial and temporal distribution of disturbances from insect and disease outbreaks, wildfire, climate shift, and anthropogenic activities. Research is directed at understanding and predicting the effects of these disturbances on terrestrial resource values, to improve our ability to mitigate these impacts, and maintain current and future ecosystem values.

Strategic Importance	Identified and quantified risks and reduced impacts on terrestrial ecosystem values from biotic and abiotic disturbances and management practices
Research Themes	<ul style="list-style-type: none">• Determine the factors and processes that cause natural and anthropogenic disturbances• Determine the impacts of disturbances on resource values• Inform management practices to reduce the risk and impacts of disturbances





5.3 | Water

The Water portfolio supports sustainable water allocations and public safety, which are currently at risk because of resource use and climate stressors such as droughts and atmospheric rivers (e.g., El Niño). These risks are increased because of knowledge gaps associated with the water resource, such as environmental flow needs and aquifer characterization.

Strategic Importance	Improved hydrologic, geomorphic, and aquatic ecosystem knowledge for sustainable resource stewardship and informed public safety
Research Themes	<ul style="list-style-type: none"> • Develop predictive tools and guidance on changes to water quality, quantity, and timing caused by climate change, surface development, range use, and cumulative effects • Test, improve, and develop predictive tools for in-stream flow requirements to maintain aquatic ecosystem health • Develop tools for predicting landslides, floods, and sediment supply, and the impacts of wildfires on post-fire erosion and flooding

5.4 | Species and Habitats

The Species and Habitats portfolio investigates the protection, conservation, and management of terrestrial and aquatic species, populations, and habitats that are being challenged by climate change and the cumulative effects of resource use.

Strategic Importance	Improved conservation and management of fish and wildlife populations and habitats, locally and provincially
Research Themes	<ul style="list-style-type: none"> • Understand the environmental and biophysical factors that promote biological diversity, including species, communities, and habitats, on the landscape • Inform management of harvested fish and wildlife populations and their habitats, locally and provincially • Understand the factors that cause the decline and limit the recovery of species and communities at risk in British Columbia

5.5 | Timber Supply

The Timber Supply portfolio supports the establishment and stewardship of forests, and the maintenance of timber supply in order to support the economy and those communities that are challenged by the current and projected impacts of climate change.

Strategic Importance	Increased volume and value of timber and fibre
Research Themes	<ul style="list-style-type: none">• Develop and improve existing resource models to better estimate timber supply and range productivity and to support integrated decision-making• Develop innovative and improved management practices that enhance timber supply and range productivity while managing for carbon sequestration, reducing impacts of negative factors, maintaining site productivity, and supporting other values• Enhance and conserve forest genetic resources that maintain or enhance timber supply and site productivity¹



5.6 | Bio-economy

The Bio-economy portfolio supports the government and industry's needs to reduce investment uncertainty associated with new technology, to support climate-change mitigation, and to understand the potential influence of other jurisdictions on the demand for British Columbia products.

Strategic Importance	Information and enhanced knowledge of alternative forest resources and products, including carbon, in support of Bio-economy and climate-focussed forest management initiatives
Research Themes	<ul style="list-style-type: none">• Understand socio-economic trade-offs of alternative forest management strategies under climate change including dollar value and qualitative indicators• Improve modelling capacity for forest carbon under a changing climate• Assess assumptions about the greenhouse-gas benefits of substituting wood products for others

¹More detailed information is captured in Forest Genetics Council Strategic Plan



6 | Operating Budget 2021/22 – 2023/24

Research Portfolio (Intended Outcomes)	2021/22 \$	2022/23 \$	2023/24 \$
Ecosystem Stewardship	534,336	–	–
Ecosystem Health and Disturbance	434,592	–	–
Water Management	823,284	–	–
Species and Habitats	835,811	–	–
Timber Supply	697,123	–	–
Bio-economy ¹	45,496	–	–
Research Management and Oversight	129,358	–	–
Total	3,500,000	3,675,000²	3,850,000²

¹ \$2.2M of additional funding is provided to FPIInnovations for applied research into Bio-economy sector development and industry operational research

² Estimated

Appendix 1 – Some Examples of Existing Partnerships

Provincial Ministries and Agencies	Ministry of Environment and Climate Change Strategy; BC Hydro; BC Oil and Gas Commission; BC Parks; Climate Action Secretariat; Conservation Data Centre Forestry; Innovation Investment; British Columbia Timber Sales; Cordilleran Geoscience; Ministry of Agriculture; Ministry of Energy, Mines and Low Carbon Innovation; Ministry of Indigenous Relations and Reconciliation; Ministry of Transportation and Infrastructure; Alberta Ministry of Environment and Parks; Alberta Geological Survey
Municipal	Union of BC Municipalities; Various municipalities; Various regional districts (e.g., Capital Regional District)
Federal	Canadian Centre for Remote Sensing; Canadian Forest Service (Pacific Forestry Centre); Department of Fisheries and Oceans; Environment and Climate Change; Geological Survey of Canada; Parks Canada; Water Survey of Canada
Academic Institutions	Carleton University; College of New Caledonia; Okanagan College; Queens University; Royal Roads University; Selkirk College; Simon Fraser University; Thompson Rivers University; University of Alberta; University of British Columbia; University of Calgary; University of Northern British Columbia; University of Ottawa; University of Victoria; University of Western Ontario; Vancouver Island University
Non-governmental Institutions and Organizations	Babine Watershed Monitoring Trust; BC Conservation Foundation; Columbia Basin Trust; B.C. Wildlife Federation; Bulkley Valley Research Centre; Columbia Mountains Institute; Fish and Wildlife Compensation Program; Fluvial Systems Research – FSR; Forest Enhancement Society of BC; B.C. Forest Genetics Council; Fraser Basin Council; Geoscience BC; Habitat Conservation Trust Foundation; Ground Truth Trekking, Alaska; Hakai Institute; Institute for Polar and Marine Research; Interfor Mosaic Forest Management; Mitacs; Nature Conservancy of Canada; Nechako Environmental Watershed Stewardship Round Table; Northern Spotted Owl Population Team; Okanagan Basin Water Board; Okanagan Nation Alliance; Pacific Climate Impacts Consortium; Pacific Institute for Climate Solutions; Regional Conservation Programs (e.g., South Coast Conservation Program); Skeena Watershed Conservation Coalition; Species at Risk Recovery and Implementation Team (e.g., Garry Oak Ecosystems Recovery Team); Species Working Groups (e.g., BC Bat Action Team); San Juan Roundtable (First Nations, forest land owners and licensees, DFO, FLNRORD, BCTS, community groups, and local people); Sunshine Coast Community Forest; Terrace Museum; The John Prince Research Forest; The Pacific Climate Impacts Consortium; The Western Association of Fish and Wildlife Agencies
First Nations	Various
Industry and Private Sector	ESSA Technologies Ltd.; BA Blackwell & Associates; Canfor Corporation; Caslys; Conifex Timber Inc.; Ecora Engineering and Resources Group; FP Innovations; Gorman Bros. Lumber Co. Ltd.; Grylloblatta Ecological consulting; Hatfield; Kalesnikoff Lumber Co; PlanetLabs; Seepanee Ecological Consulting; Sinclair Group Forest Products Ltd.; Stand Management Cooperative; Teck Resources; Tolko Industries Ltd.; West Fraser Forest Products; Western Forest Products; Weyerhaeuser Co. Ltd.; Mosaic Forest Management; International Forest Products
International	Great Northern Landscape Conservation Cooperative; International Union of Forest Research Organizations; North Pacific Landscape Conservation Cooperative; Geological Survey of Norway; USDA Forest Service; Aachen University; Alaska Coastal Rainforest Center, University of Alaska-Southeast; KTH University (Sweden); Michigan Tech University; Montana State University; Oregon State University; University of Colorado; University of Idaho; University of Melbourne; University of Nevada; University of Oslo; University of Southern California; University of Utrecht







Research Program Strategic Plan 2021 – 2024



Ministry of
Forests, Lands, Natural
Resource Operations
and Rural Development