



**RESOURCE
PLANNING &
ASSESSMENT
BRANCH**

LAND BASED INVESTMENT STRATEGY 2020-2021 ANNUAL REPORT



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

A photograph of a forest stream flowing over mossy rocks. The water is clear and cascades over several large, dark rocks covered in green moss. The surrounding forest is dense with green trees and ferns, creating a vibrant, natural setting. The stream flows from the upper left towards the lower right of the frame.

TERRITORIAL ACKNOWLEDGEMENT

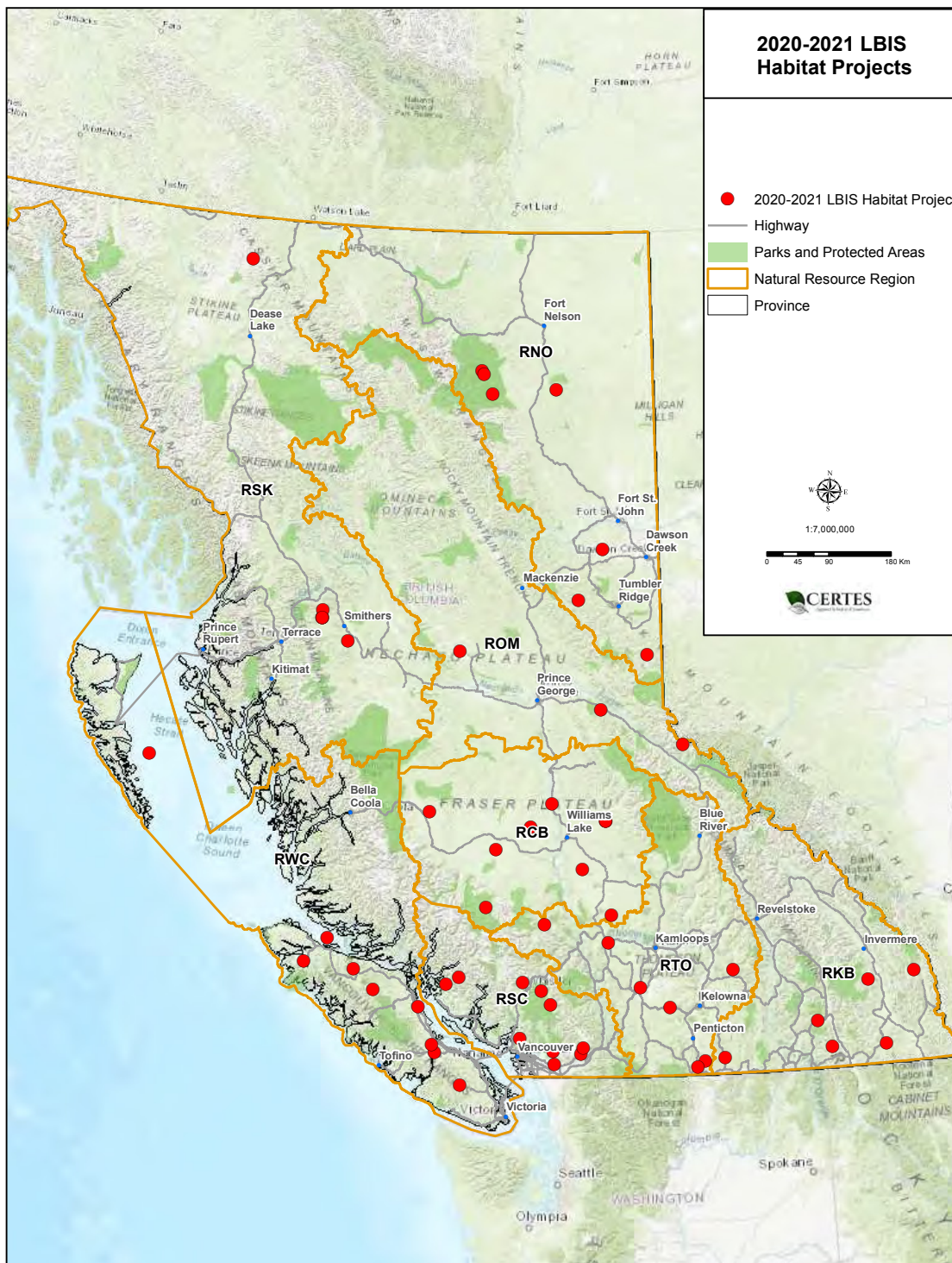
British Columbia's Land Based Investment Strategy (LBIS) serves all areas and regions in B.C., including those located in the traditional territories of Indigenous Peoples. We acknowledge our traditional hosts and honour their welcome and graciousness in sharing stewardship responsibilities for B.C.'s land values and wildlife resources.

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Habitat projects

It is a goal of the Land Based Investment Strategy to spatially report on all activities supported by the program. With this year's report, that goal is closer to being achieved, with the map below highlighting the habitat activities that have received Land Based Investment Strategy funds.



LAND BASED INVESTMENT STRATEGY OVERVIEW

Purpose

The Ministry of Forests, Lands and Natural Resource Operations and Rural Development Land Based Investment Strategy (LBIS) provides strategic guidance for land-based investments and aligns the targets and outputs for eligible activities with Government's goals and objectives. Investments in forest economies and environmental stewardship activities are essential to the ministry's mandate and support the sustainable management of key environmental values. LBIS invests in a broad range of on-the-ground activities to strengthen rural communities and protect the value of current and future natural resources.

LBIS guides ongoing resource investments and short-term targeted investments in the province's natural resources to achieve environmental sustainability and economic prosperity. The effective and efficient delivery of this investment strategy is providing economic and social benefits to British Columbians through increased timber supply, enhanced forest and range values, greater wildlife biodiversity and more recreational opportunities. In addition, these investments may increase carbon sequestration and mitigate the impacts of climate change on our forests, water and wildlife.

Governance

The administration of the LBIS is co-ordinated by the ministry's Resource Planning and Assessment Branch within the Resource Stewardship Division. LBIS is managed collaboratively by the Office of the Chief Forester, Regional Operations and the Resource Stewardship Division. Corporate support is provided by Corporate Services for the Natural Resource Sector.



Fiscal year objectives

LBIS's funding priorities are determined annually and are informed by the strategic direction provided from existing ministry commitments, including the ministry's Service Plan goals and objectives, the ministry's Mandate and Road Map and other specific government commitments. In 2020-2021, these priorities included:

- Working with communities and industry to develop a fair, lasting strategy to create more jobs by processing more logs in B.C. and to renew our forests by expanding investments in reforestation
- Expanding the use of innovative wood products by addressing regulatory and capital barriers hampering the growth of engineered wood production and working with other ministries to ensure public projects prioritize the use of B.C. wood
- Working with the Minister of Indigenous Relations, First Nations and communities to modernize land use planning and sustainably manage B.C.'s ecosystems, rivers, lakes, watersheds and forests, including old growth forest
- Improving wildlife management and habitat conservation and collaborating with stakeholders to develop both short- and long-term strategies to manage B.C.'s wildlife resources

In 2020-2021, LBIS's investment criteria also considered:

- Mandate commitments or actions directly related to key ministry stewardship priorities
- The risk of unfavourable economic, ecological or legal implications if any activity was not funded
- Indigenous commitments to collaborative design, economic benefit or cultural significance
- Alternative methods of achieving initiatives and project objectives

Each year, LBIS re-evaluates investment criteria to ensure the program is effectively meeting the shifting land base and wildlife. Funds are reallocated as needed to make sure priorities are addressed and that LBIS is responding to emerging challenges by delivering on-the-ground activities.

In the 2020-2021 fiscal year, LBIS allocated \$73.3 million across 18 investment categories to deliver hundreds of activities on the land base. See the appendix for allocations and a summary of spending.

Impacts of LBIS's funding investments and alignment with Service Plan goals

This annual report provides a high-level summary of the interconnected impacts of LBIS's land-based investments, broadly grouped in alignment with the ministry's 2021-2022 to 2023-2024 Service Plan goals of providing economic benefits for all British Columbians, supporting strong partnerships with Indigenous Peoples and ensuring sustainable resource management.

Given that managing B.C.'s diverse and dynamic natural landscape requires a holistic view of land-based investment and habitat stewardship, there is considerable overlap between the initiatives highlighted in this report and the Service Plan goals. Many initiatives, for example, involve partnerships with First Nations communities while also supporting other goals such as increasing timber supply, enhancing community resilience and protecting wildlife habitat. Similarly, LBIS-funded initiatives to monitor and map the province's forest inventory are used by decision-makers to make planting decisions, respond to natural disturbances and manage impacted ecosystems.





GOAL 1

PROVIDING ECONOMIC BENEFITS FOR ALL BRITISH COLUMBIANS

The ministry plays an important role in supporting a healthy and sustainable forest sector economy by improving community resilience to the impacts of natural hazards, minimizing waste and supporting economic diversification and growth. The following LBIS-funded initiatives align and overlap with these objectives.

Increasing the use of lower-quality fibre

Increasing the use of lower-quality fibre during primary harvesting operations is a significant priority for the provincial government and forest sector. For example, the provincial government is currently implementing various initiatives to enhance the use of residual fibre left on roadsides and landings within cut blocks that would otherwise be burned.

BC Timber Sales' Innovative Timber Sale Licence (ITSL) Initiative uses low-quality stands for development and auction. However, when

rehabilitation costs are included, some opportunities under this program are uneconomical. In order to make the most of these otherwise uneconomical stands, BC Timber Sales has partnered with the Forests For Tomorrow program to use ITSLs in conjunction with forest rehabilitation activities.

In 2020-2021, this collaboration resulted in over one million cubic metres of low-value wood being sold to support high-paying jobs in rural communities. Over 8,000 hectares of harvested land will then be

reforested with high-value species using select seed to help maintain B.C.'s long-term timber supply. In addition, over 500 hectares of very low-value stands were rehabilitated under the Forestry Licence to Cut process, providing fibre for the bioenergy industry.

The majority of the sales of lower-quality fibre are from wildfire-killed stands and the last of the merchantable stands impacted by the mountain pine beetle outbreak. These stands are predominantly in the Skeena/Burns Lake area and the Cariboo and Thomson-Okanagan regions. Additionally, there is an active program in Prince George and a small but developing program in the Skeena and Coast areas to harvest low-volume and low-value stands.

The Forests For Tomorrow Fibre Recovery Program plays a significant role in enabling low-value fibre to be processed and promptly reforested with healthy resilient trees, which also supports good jobs in mostly rural communities. Without this program, much of this low-value fibre would not be used, resulting in reduced economic activity.

Investment Category Spotlight: **Forests For Tomorrow**

The Forests For Tomorrow program was established in 2005 to respond to the impacts of catastrophic wildfires and the mountain pine beetle epidemic. LBIS supports Forests For Tomorrow programming to restore healthy forests and to mitigate the impacts of wildfire and insect outbreaks while also creating economic opportunities for forestry and bioenergy production. Planning is done by regional and branch staff in conjunction with licensees.

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Select seed for replanting

In British Columbia, research on the natural patterns of tree genetic diversity began in the late 1950s. This growing knowledge base guides replanting efforts, with seed planning zones defined based on patterns of genetic diversity and climate. The goal of B.C.'s tree breeding program is to produce well-adapted, selectively bred seeds or cuttings that will grow into trees with stable and improved volume, growth and quality, while maintaining the genetic diversity found in natural populations. The investment in tree improvement will reduce reforestation costs, increase reforestation success, help sustain timber supplies and yield a positive return on investment. In addition, the tree improvement program will contribute to carbon goals by developing and deploying superior seed that is more likely to thrive and sequester carbon.

In 2020-2021, improved seed was used to sow 182 million seedlings (65 per cent of the provincial total). The improved planting stock is expected to provide an average 21 per cent increase in forest growth when used to reforest harvested and disturbed areas throughout the province.

Investment Category Spotlight: Tree Improvement

Investments in tree improvement enhance the health, productivity and value of young forests throughout the province. Tree improvement in B.C. is guided by the multi-stakeholder Forest Genetics Council of BC (FGC), which co-ordinates the tree improvement and genetic resource management activities of the ministry, the forest industry, universities, the Canadian Forest Service and smaller forest-sector companies. FGC's goal is to adequately maintain the genetic diversity of B.C.'s indigenous tree species. The conservation status for each species is determined by estimating the number and size of representative populations found within protected areas for each biogeoclimatic zone. Genetic conservation activities include genecology research and collecting and storing seed at the provincial Tree Seed Centre.

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Mapping forest inventory

In 2020-2021, the ministry acquired digital aerial photography covering 2.3 million hectares in the Sunshine Coast and Fraser timber supply areas. It also acquired airborne LiDAR imagery covering 500,000 hectares in the Sunshine Coast timber supply area and 1,032,000 hectares in the Kootenay Lake and Cranbrook timber supply areas for upcoming LiDAR-enhanced forest inventory work.

The province has 94 million hectares of forest cover mapping to describe its forest resources. In 2020-2021, 3.9 million hectares of new inventory information was loaded to the forest cover database, including:

- 2.1 million hectares of new inventory
- 1.8 million hectares of forest harvest activity updates
- 13,000 hectares of areas burned in the 2020 wildfire season

This acquisition of photos and LiDAR supports the province's timber supply estimates. The LiDAR purchase in the Kootenay Lake and Cranbrook

Investment Category Spotlight: Forest Inventory

Modern forest management requires research and analysis, forest inventories and stand growth projection modelling. The accumulated data is shared across government and industry to support informed decision-making.

2020-2021 Spending Summary

timber supply areas was a key government input into the Premier's Kootenay Forest Sector Collaborative, which is tasked with recommending to government where efficiencies can be found to improve forestry operations and benefit communities.

Work continued using the LBIS-funded forest inventory purchased from 2019-2020 for central Vancouver Island to categorize old growth forests in response to the province's strategic review of old growth forest management. The work started in 2019 has been instrumental to the province's ability to respond to the increased importance of large and iconic old growth stands to the public.

Monitoring forest health

Monitoring the health of B.C.'s forests is critical to maintaining ecological and economic values. The LBIS Forest Health investment category helps identify the forest health conditions, issues and strategies unique to each timber supply area. These strategies guide forest health investments made by timber supply area members and individuals through Forest Stewardship Plans and the Land Based Investment Strategy.

The annual provincial aerial overview survey is the cornerstone of forest health monitoring in B.C., efficiently recording the location and severity of forest health disturbances that can be seen from the air. In 2020-2021:

- 88% of the forested land base was flown
- Data and reports were distributed to ministry staff, licensees and other interested parties beginning in November 2020, and presentations were given to the executive and other stakeholders
- Spatial data was uploaded to the B.C. Geographic Warehouse by March 2021

- Special aerial surveys were conducted to monitor black army cutworm, Swiss needle cast, dwarf mistletoe and other threats to forest health, and these results were summarized in the publicly available 2020 Provincial Aerial Overview Survey

Investment Category Spotlight: Forest Health

The objective of the Forest Health program is to manage B.C.'s forest resources and protect them from the impacts of a wide range of potential threats, including bark beetles, defoliators, pathogens and animal damage, as well as abiotic threats like post-wildfire damage and drought. The program is responsive to the influence of climate change and invasive species on forests. Funds support risk detection and risk mitigation activities, including the establishment of best management practices to minimize damage.

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GOAL 2

SUPPORTING STRONG PARTNERSHIPS WITH INDIGENOUS PEOPLES

Forests are a source of cultural traditions, spiritual knowledge, traditional foods and revenue for Indigenous communities in B.C. Through existing government initiatives, the ministry works with Indigenous governing bodies to ensure that First Nations' interests, values and principles are factored into natural resource-related policy and program development. The following LBIS-funded activities support this work.

Supporting forest recovery following wildfires

The LBIS-funded Forests For Tomorrow program has worked with First Nations tenure holders to address the devastating impacts of the 2017 and 2018 wildfires and to increase the value of their forests. Over \$4 million was invested in reforestation, juvenile spacing and fertilization activities, with over four million additional seedlings grown for planting in 2021.

The 2018 fires in the Burns Lake area and in the Chinook and Cheslatta community forests significantly impacted both young plantations and mature forest. The Forests For Tomorrow program supported surveying the current forest inventory, as well as clearing sites for reforestation and sowing trees for planting in 2021.

Further south in the Okanagan, fires in 2017 caused widespread damage to the Lower Similkameen Indian Band's community forest. In 2020, over one million seedlings were planted and surveys undertaken to identify stands that can still be salvaged and replanted.

In the Cariboo, the Williams Lake Community Forest (which is a partnership between the City and the Williams Lake Indian Band) carried out an aerial fertilizing operation both within their community forest and in the wider timber supply area that will result in increased timber yields over the next five to 10 years.

Collaborating to manage natural resources

Collaborative investment and planning with First Nations are critical to the success of LBIS as a holistic land-based stewardship program. These activities can be direct, such as increasing timber supply through tree planting in wildfire-affected areas, or indirect, such as resolving resource stewardship issues to enable sustainable resource development and partnerships with Indigenous communities. Wildlife population trend information is incorporated to set

appropriate harvest levels to ensure Indigenous harvest needs are met.

Collaboration with Indigenous communities includes mapping, inventory refinement and sampling an area of interest. Indigenous communities are engaged to participate in field work components of a number of wildlife and habitat stewardship projects across the province.



Partnering to expand recreation opportunities

Recreation Sites and Trails BC uses LBIS funding to support relationship building, economic development and lasting reconciliation with Indigenous Peoples – providing opportunities for partnership, collaboration and engagement in managing B.C.’s natural resources and recreation experiences. Some highlights from the past year include:

- Entering site maintenance contracts with First Nations partners (e.g., Gitanyow First Nation)
- Increasing campground expansions and upgrading facilities in sites managed by First Nations operators
- Developing heritage trails that provide a cultural perspective to outdoor recreation
- Installing cultural signage (Nadine-Skeena)
- Preserving the historical, cultural and unique public recreation opportunities in fire lookouts (such as the Sts’ailes Nation – West Harrison Fire Lookout)

Investment Category Spotlight: Recreation Sites and Trails

Recreation Sites and Trails BC develops, maintains and manages a network of sites and trails to provide safe, quality recreation opportunities for the public. B.C.’s recreation sites and trails are managed through service contracts and partnership agreements with a range of communities, recreation organizations and Indigenous communities. The Recreation Sites and Trails program funded through LBIS determines priority projects using criteria that indicate where opportunity, demand and community support is high. To support long-term sustainability of the sites and trails, priority is given to projects that mitigate risks associated with hazards, and those that are aligned with community, Indigenous and economic interests such as forest licensees. By maintaining the sites and trails, recreation and other socio-economic benefits can be realized.

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Increasing ecosystem resilience through the cultural use of fire

LBIS's Ecosystem Restoration investment category seeks to protect and preserve degraded, damaged or destroyed ecosystems. This includes working with the First Peoples' Cultural Council on a program to better understand climate change impacts on Indigenous cultural heritage resources. The enhanced use of nature-based solutions are potential options for strengthening community and ecosystem resilience and managing climate-related hazards, such as extreme heat and flooding.

Partnerships with First Nations are also building understanding about the importance of the traditional and cultural uses of fire, and the benefits of reviving traditional and cultural burning on the land base as part of wildfire prevention and land management. Integration of traditional knowledge into current practices is supported by reintroducing cultural fire across all types of natural landscapes

to enable First Nations to care for and protect their lands and communities, in particular from wildfire.

Investment Category Spotlight: Ecosystem Restoration

Ecosystem restoration is the process of assisting with the recovery of an ecosystem that has been degraded, damaged or destroyed by re-establishing its structural characteristics, species composition and ecological processes. For example, many ecosystems in B.C. are fire-maintained ecosystems. This means that if natural wildfire is suppressed, it may cause a potential imbalance in grasslands and developed forest ecosystems.

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GOAL 3

ENSURING SUSTAINABLE NATURAL RESOURCE MANAGEMENT

The Ministry endeavors to deliver its stewardship responsibilities in the best interests of B.C.'s citizens. Objectives include protecting wildlife habitat and improving wildlife management, and revitalizing and protecting B.C.'s forests, including strengthening climate change mitigation and adaptation activities.

Enhancing and protecting freshwater fish habitat and fish populations

Working with partners in the Adams River

A three-year project in the Adams River is restoring access to approximately six kilometres of habitat for sockeye, coho and chinook salmon and for resident species such as bull trout, rainbow trout and kokanee. Gollen Creek drains into the Upper Adams River and has historically supported all species found in the

Adams River. However, the lower reach is prone to dewatering in the late summer to early fall, limiting fish access. A habitat assessment, site plan and initial site preparations were completed in 2018-2019, the bridge structure was purchased in 2019-2020 and the bridge was installed in 2020-2021. This project was implemented with the help of the Canadian Wildlife Federation and the consultation and support of the Simpcw First Nation.

Protecting steelhead and sturgeon populations

Steelhead trout, an iconic British Columbia fish, have been in significant decline during recent years. In particular, the Thompson and Chilcotin steelhead runs have reached critically low levels. The governments of Canada and British Columbia are working alongside B.C. First Nations who want to share management responsibilities to conserve, protect and recover wild fish populations. Wild steelhead are critically important to many First Nations in B.C. who have long-standing harvesting and cultural practices related to steelhead fisheries.

The LBIS-funded provincial Steelhead Questionnaire and Analysis is the only province-wide survey of steelhead catch and effort for this high-profile species. It has run annually since 1967, almost unchanged, to capture angler data (residency, watershed-specific catch and effort, and harvest for wild and hatchery populations) for over 400 streams that support steelhead fisheries. This information is used by regional fisheries managers to inform management decisions and regulation changes. Field assessments and data collection are also used to determine requirements for Fisheries Sensitive Watersheds or Wildlife Habitat Area designations within critical habitat.

Nechako white sturgeon are critically endangered and have been listed under Schedule 1 of the federal *Species at Risk Act*. After finding evidence of a significant population decline, the Nechako White Sturgeon Recovery Initiative – a partnership among First Nations, governments and the community – is currently working towards recovery of this population through stewardship, conservation fish culture and habitat research and restoration. LBIS continues to facilitate the recovery initiative, providing survival and monitoring data to inform hatchery planning and guide efforts to mitigate downstream impacts. LBIS Water Quality funds were also used to purchase satellite tags to estimate movement and survival of sturgeon released from the hatchery.

Investment Category Spotlight: Fish Passage

The LBIS-funded Fish Passage Remediation program remediates stream crossings that impede freshwater fish migration. Road stream crossings on fish streams can be barriers to the movement of juvenile and adult fish. Free movement for fish at all life stages is important, allowing them to access appropriate habitats for rearing and spawning. The greatest numbers of identified fish passage challenges in B.C. are associated with closed-bottom structures (culverts). Remediating these structures often involves replacing barriers with properly designed embedded structures or open-bottom structures such as bridges. The four-phase delivery of the fish passage program involves fish passage assessments, habitat confirmation, design, and construction to remediate the stream crossing.

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Investment Category Spotlight: Fish Inventory

Fish data and information can include fish distribution, population status and condition/ capability of supporting habitats for all freshwater fish species in B.C. Much of this information is gathered through fish inventory surveys to determine the presence or abundance of a species and through targeted habitat assessments. The compiled data includes counts, occurrences, inventory results, habitat descriptions, reports, maps and spatial files. A central repository for fish data and information helps facilitate the storage and access of data and results required for making informed management decisions and improving conservation efforts.

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Monitoring water quality in fishery-sensitive watersheds

Water quality conditions can affect communities and individuals in many ways. Drought can lead to reduced water availability for household and business use. Lower streamflows may cause warmer river temperatures, affecting fish and other aquatic life. Low stream flows can also impact groundwater levels.

In 2020-2021, LBIS Water Quality funds were directed towards monitoring several fishery-sensitive watersheds and assessing riparian area habitat.

Investment Category Spotlight: Water Quality

Water quality management encompasses a broad range of aquatic assets and measures to ensure sustainability. Under the *Water Sustainability Act* of 2016, the province identified seven areas to protect water quality:

- protecting stream health and aquatic environments;
- considering water in land use decisions;
- regulating groundwater use;
- regulating scarcity;
- improving security, water use efficiency and conservation;
- measuring and reporting; and,
- enabling a range of approaches to governance.

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Protecting wildlife habitat and species at risk

Effective stewardship of ecosystems and species at risk in B.C. is achieved by collaborating with federal, regional and local partners to develop recovery strategies and deliver implementation plans. The B.C. government is committed to wildlife management and habitat conservation and to collaborating with stakeholders to develop both short- and long-term strategies to manage the province’s wildlife resources. These strategies include:

- Identifying objectives and resources for wildlife management, including scientific data collection, and regional and species-specific objectives to improve the results of wildlife management efforts
- Monitoring ungulate winter ranges and using science-based decision-making and predator management to manage ungulate decline
- Mitigating disturbances to habitat that may result from development and industry
- Increasing habitat protection through restoration efforts, legislative tools, incentives and regulation of industry practices
- Providing opportunities for information sharing and roundtable discussions with Indigenous Peoples, stakeholders, citizens and those with regional and local knowledge, with discussions focusing on delivering projects in an inclusive environment that supports common goals
- Improving the understanding of the economic and cultural value of wildlife and habitat
- Monitoring wildlife management strategies and providing available data to the public

Investment Category Spotlight: Government Actions Regulation

Some wildlife species are sensitive to human activity. The tools in the Government Actions Regulation are used to legally designate habitat protection for wildlife species identified in the *Forest and Range Practices Act*, and prescribed measures ensure that wildlife habitat and population objectives are achieved.

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Investment Category Spotlight: Wildlife Inventory

Wildlife species inventory data and information include any survey undertaken to determine the presence or abundance of a wildlife species. The Province collects, stores and provides access to data and information on all wildlife species in B.C., including mammals, birds, amphibians, reptiles, insects and plants, as well as their habitats. A central repository for wildlife species inventory data and information helps facilitate the storage and access to the information required for making informed management decisions and supports improved conservation efforts.

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In 2020-2021, LBIS funds were also targeted to specific programs in support of species of interest, including:

- *Thompson-Okanagan Bighorn Sheep and Mountain Goat Monitoring Program*: Revised population estimates of bighorn sheep and mountain goat will be used to evaluate current harvesting strategies. Where necessary, hunting opportunities for B.C. residents and non-residents may be adjusted to ensure a sustainable harvest.

- *Moose Inventory and Habitat Assessment:* Through the Thompson-Okanagan moose monitoring program, moose population information is guiding population management and habitat enhancement and protection initiatives. Information is also being incorporated into a cumulative effects modelling framework.

In the northeast region, outdated population estimates were updated in 2021 and accurate habitat ratings were obtained to inform forest practices. The Prophet River First Nation asked the ministry to lead an inventory of a popular hunting area.

- *Goat Winter Range Effectiveness Monitoring:* Regional staff collect winter-occupancy data on goat winter range areas to compare areas where recreation pressure is greatest to areas where recreation is low or absent. This data informs and supports management actions such as area-based or seasonal closures.

- *Skeena Grizzly:* Habitat mapping for high and moderate concern grizzly bear population units are informing wildlife habitat areas and wildlife habitat feature designations, and supporting priority initiatives such as the Skeena Environmental Stewardship Initiative and the Lakes Landscape Planning process.



Investment Category Spotlight: Species at Risk

The effective stewardship of species and species at risk in B.C. is achieved by collaborating with Environment and Climate Change Canada and the B.C. Ministry of Environment and Climate Change Strategy to create recovery strategies and deliver implementation plans. Data collection and analysis, wildlife and habitat management, and stakeholder engagement are undertaken to assist in the recovery of species designated “threatened” or “endangered.”

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Investing in forest carbon projects in support of CleanBC

British Columbia has already experienced and will continue to experience the impacts of climate change. Forests can help mitigate these impacts thanks to their ability to absorb and store carbon dioxide through the process of photosynthesis.

The Forests For Tomorrow program is playing an important role in the ministry’s response to climate change and is directly responsible for delivering a component of our provincial Low Carbon Economy Leadership Fund activity. In 2020-2021, Forests

For Tomorrow projects resulted in a cost recovery to the ministry of \$4.5 million relating to planting 25.5 million trees, 8.9 million more than the previously determined baseline of 16 million. The Forests For Tomorrow program has been steadily increasing its planting program as it focuses on reforesting stands impacted by mountain pine beetle and killed by wildfire. Through the use of select seed, these forest areas will regenerate more quickly than they would naturally and with higher-yielding and faster-growing species.



Improving forest resilience by managing invasive species

Invasive species can diminish timber values, change or displace native habitats and compete with native wildlife for food, water, shelter and space – making them harmful to our fish, wildlife and plant resources. Invasive species are a significant threat to biodiversity and species at risk in B.C., and their range is expanding as a result of climate change. LBIS-funded invasive species projects are therefore linked to the province’s Climate Preparedness and Adaptation Strategy, and risk assessments and prioritization of actions are being updated to reflect this. Without enhanced invasive species prevention and control efforts, there will be increased impacts to B.C.’s food security, economy, ecosystems and human health.

Some invasive plant species are toxic to people and pets (for example, poison hemlock is one of the deadliest plants in North America) and others negatively impact recreational opportunities (such as puncturevine and gorse). Wildfire risk reduction, prescribed burning and ecosystem restoration actions all need to consider existing invasive plant species populations to ensure that these activities do not result in greater negative impacts from invasive plant species.

In 2020-2021, 633 critical invasive plant sites were treated on provincial public lands in the Thompson-Nicola Regional District. Other work this year included treating 546 critical invasive plant sites, conducting an aquatic invasive plant inventory on 16 lakes, continuing work on the Nimpkish River and Victoria Lake knotweed control projects, and continuing control efforts on priority invasive plant species in all resource areas.

Investment Category Spotlight: Range: Invasive Species

Invasive species have harmful socio-economic impacts that include loss of productivity in agriculture, aquaculture and forest industries; damage to infrastructure; hazards to human health and safety; and degradation or loss of recreational areas. The most effective strategies for addressing invasive species are to implement prevention measures; conduct early detection and rapid response activities; conduct surveys, inventories and risk assessments; implement treatments and monitoring programs; and develop new management tools. The Inter-Ministry Invasive Species Working Group and stakeholder partnerships are integral to long-term success in achieving these strategies.

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Protecting scenic values

The *Forest and Range Practices Act* explicitly identifies the requirement to manage and protect scenic values, and LBIS supports the provincial visual resource management program with managing the visual impacts of forestry operations on Crown forest land. The Visual Resource Management program conducts a range of activities to meet the scenic quality expectations of the public and the tourism industry. Forested hillsides are the features usually identified for scenic management as these steep landscapes support a range of natural resource values, some of them crucial to habitat and wildlife unique to B.C.

In 2020-2021, LBIS investments in the Visual Resource Management program resulted in:

- Completion of additional mapping in the Visual Information Management System and spatial analysis for In-SHUCK-ch visual landscape inventory work
- Updates to the visual landscape inventory for the Squamish, Birkenhead and Blackwater forest service roads
- Screening of visual landscape inventory updates for forest landscape planning areas
- Photographic documentation of the marine corridor to Gwaii Haanas National Park Reserve

- Updates to the Visual Resource Management Strategic Plan

Investment Category Spotlight: Visual Resource Management

Since its inception in the 1980s, Visual Resource Management (VRM) has focused on managing the visual impact of forest harvesting on B.C.'s forest landscapes. VRM is unique in the realm of forestry, being guided by extensive social science research that strives to align visual quality with viewer expectations. Under B.C.'s *Forest and Range Practices Act*, visual quality objectives have been established on 14.5 million hectares of the province's most scenic and visible landscapes.

Visuals specialist contractors undertake targeted and high-priority visual projects, including providing subject expertise to Compliance and Enforcement, updating visual data and advising on methods to mitigate the visual impact of forest harvesting on critical landscapes along highway and marine corridors.

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Understanding cumulative impacts on our natural resources

As the demand for natural resources and new development continues to grow, there is an acute need for ongoing assessments of the condition of natural resources and the cumulative impacts of resource development and land use projects.

B.C. implements resource value monitoring and assessment mainly through two LBIS-supported programs:

- the Forest and Range Evaluation Program, which conducts monitoring to assess land-based condition and inform continuous improvement of forest and range practices; and
- the BC Cumulative Effects Framework, which co-ordinates cumulative effects assessments of multiple developments at a regional scale.

This work also supports several government and ministry mandates and initiatives, including updates to the *Forest and Range Practices Act*, land use planning and forest landscape planning, and the government's response to the cumulative impacts of industrial development and First Nations treaty rights.

In addition to fulfilling its core role to assess and report on the cumulative effects of human-caused and natural disturbances on values of concern to B.C. residents, the province's Cumulative Effects Framework supports several provincial government and ministry mandates and initiatives including:

- Old Growth Strategic Review implementation
- Modernized land use planning
- Riparian area, visual quality, and cultural heritage resource sampling in five districts
- First Nations training and joint sampling

Investment Category Spotlight: Stewardship and Performance

Cumulative effects assessments evaluate the conditions and trends of resource values on a landscape scale, with consideration to the effects of all resource development activities and natural disturbances. Assessment results are publicly reported to provide information for resource planning and decision-making across the natural resource sector.

[2020-2021 Spending Summary](#)

Restoring rangelands

Rangelands are a natural ecosystem of grasslands, shrublands, forestlands, wetlands, alpine and deserts that are grazed by domestic livestock such as cattle, sheep and goats. Industry, guide outfitters, hunters and recreationalists can access Crown rangelands. About 80 per cent of rangeland in B.C. is on Crown land. The rest is privately owned.

In 2020-2021, the LBIS-funded Range Remediation program completed 19 water developments, 11 fencing projects and eight other projects that contribute to better livestock management and the health of rangelands and habitat.

These projects will improve rangeland health and allow for better management practices, thereby strengthening rural economies by contributing to a viable and competitive ranching industry in the province. Some of this year's projects included building relationships and trust with First Nations as part of reconciliation.



Investment Category Spotlight: Range: Ecosystem Restoration

Activities delivered under the Ecosystem Restoration category enhance the adaptive capacity of areas that have been degraded, damaged or destroyed. Restoration focuses on establishing the composition, structure, pattern and ecological processes necessary to make terrestrial and aquatic ecosystems sustainable, resilient and healthy under current and future conditions.

In the south of the province, the current priority is the restoration of ingrown open forests and native grassland ecosystems to create landscapes more resilient to climate change impacts. In the north, the focus is guided by regionally based strategic plans and projects that are addressing numerous priority ecosystem functions.

Across the province, leveraged program funding and shared goals with other programs, Indigenous communities and stakeholders is commonplace. Projects delivered in 2020-2021 varied in scope and included managing deadfall on caribou migration routes, identifying carbon planting project areas, and collaborating with representatives from the federal and provincial government, universities and environmental groups in whitebark pine research and restoration initiatives.

2020-2021 Spending Summary

Updating data for ecosystem-based management

In 2020-2021, LBIS-funded Ecosystem Based Management activities incorporated new terrestrial ecosystem mapping for 163,000 hectares and updates to seven existing mapping projects covering 519,000 hectares.

Terrestrial ecosystem mapping activities in the Great Bear Rainforest and Haida Gwaii support government-to-government commitments for implementing land use objectives for ecosystem integrity and human well-being. Data collection will be intensified in the south of the Great Bear Rainforest in 2021/2022 based on 2021 models and newly available LiDAR data for forest attributes.

Investment Category Spotlight: Ecosystem Based Management

Terrestrial ecosystem mapping is a Resources Information Standards Committee approach to stratifying the landscape into map units according to ecological features that include climate, physiography, surficial material, bedrock, geology, soil and vegetation. Terrestrial ecosystem mapping and related spatial databases for Biogeoclimatic Ecosystem Classification site series and their qualifiers provide a standardized, ecological framework for informed, strategic land use planning and resource allocation.

[2020-2021 Spending Summary](#)

Launching the Old Growth Strategic Review

In 2019, the Government of B.C. embarked on a new approach to old forests, commissioning an independent panel to engage British Columbians and collect their views on the importance and future of old growth in the province. In September 2020, the government released the Old Growth

Strategic Review and committed to adopting its 14 recommendations. Much of the background information on forest composition has been made possible by the activities included in the Forest Inventory investment category.



APPENDIX

2020-2021 Allocation table

The 2020-2021 Land Based Investment Strategy allocated \$73.57 million for forest investment, habitat stewardship and wildlife management activities.

Total Allocation

Investment Category	2020-2021 LBIS Allocation
Current Reforestation	\$39,400,000
Timber Supply Mitigation	\$9,000,000
Forest Inventory	\$8,130,000
Tree Improvement	\$2,000,000
Forest Health	\$6,500,000
Visual Resource Management	\$100,000
Fish Inventory	\$500,000
Water Quality	\$500,000
Fish Passage Remediation	\$1,000,000
Species at Risk	\$1,000,000
Wildlife Inventory	\$1,100,000
Government Actions Regulation	\$600,000
Ecosystem Based Management	\$650,000
Range: Remediation	\$400,000
Range: Invasive Species	\$800,000
Range: Ecosystem Restoration	\$200,000
Recreation Sites and Trails	\$760,000
Stewardship and Performance	\$930,000
Total	\$73,570,000

Of the total allocation above, approximately \$412,812 (0.5%) was returned to the ministry and reallocated to address other pressures on the land base. COVID-19 and wildfires complicated the delivery schedule of a number of projects in 2020-2021.

2020-2021 LBIS investment category spending summaries

Forests For Tomorrow

The Forests For Tomorrow Program was established in 2005 to respond to the catastrophic wildfires and mountain pine beetle epidemic. For financial reporting, the Timber Supply Mitigation and Current Reforestation categories are combined.

Activity	Actual Expenditure
Archaeology survey	\$120,000
Brushing	\$764,593
Conifer release	\$35,420
Danger tree assessment and falling	\$52,870
Stand maintenance survey	\$2,300,608
Mountain pine beetle survey	\$281,526
Overstory removal	\$281,526
Planting	\$17,056,508
Seedling and fertilizer purchase	\$11,316,318
Site preparation	\$2,133,797
Wildfire surveys	\$576,588
Planning	\$969,265
Provincial expenditures	\$709,130
Timber supply mitigation	\$4,081,800
Supply surveys	\$704,104
General activities	\$2,182,070
Total	\$43,566,123

Forest Inventory

At the time of reporting, the actual expenditure from the Forest Inventory investment category was not available. As such, allocated activities are presented.

Activity	Allocation
Modern forest management practices such as collecting and maintaining current forest inventories with aerial overview surveys and LiDAR, monitoring stand growth and modelling future yield	\$8,130,000

Tree Improvement

Activity	Actual Expenditure
Genetic conservation	\$185,100
Tree breeding	\$1,336,804
Operational Tree Improvement Program	\$114,400
Forest resilience	\$363,696
Total	\$2,000,000

Forest Health

Activity	Actual Expenditure
Defoliator spray purchase	\$568,326
Gypsy moth	\$222,743
Aerial overview survey	\$1,186,856
Spruce and Douglas-fir beetle	\$1,705,490
Mountain pine beetle	\$1,270,749
Monitoring	\$218,306
Defoliator management	\$567,790
Administration	\$294,740
Total	\$6,035,000

Visual Resource Management

Activity	Actual Expenditure
GIS support to VRM program	\$7,492
Area VRM support	\$43,723
Queen's Printer - copy-editing and formatting	\$2,970
Visual landscape inventory	\$29,650
Total	\$83,835

Fish Inventory

Activity	Actual Expenditure
Horsefly River juvenile assessment	\$6,551
Mid-Fraser white sturgeon juvenile assessment	\$25,000
Alouette Reservoir bull trout	\$8,000
Rocky Mountain Trench burbot assessment	\$10,073
Muskwa bull trout inventory	\$21,000
Nechako white sturgeon recovery - Co-ordinator and juvenile monitoring	\$59,950
Skeena Region integrated fisheries management project	\$38,268
Watershed condition analysis to support south coast fisheries management	\$38,993
Nicola watershed yellow perch monitoring project	\$10,000
Cowichan watershed – Cutthroat and steelhead assessment	\$37,501
Steelhead questionnaire	\$26,524
Okanagan Kokanee genetic monitoring	\$8,950
Freshwater Fisheries Society BC conservation	\$50,000
Fishing synopsis	\$86,765
Total	\$427,575

Water Quality

Activity	Actual Expenditure
Provincial water quality database management	\$14,999
Provincial water quality data collection	\$24,436
Forest road water quality modelling	\$9,772
FSW and Watershed Status Evaluation Protocol implementation	\$1,000
Bonaparte Fishway counter tube reconstruction	\$18,848
Westslope cutthroat trout habitat assessments	\$10,500
Enhanced seasonal forecasting and management tools	\$60,995
Nechako River habitat inventory	\$10,015
Fish friendly infrastructure/ access remediation	\$49,570
Riparian areas protection regulations mobile application	\$42,000
Cattle geofencing pilot project	\$10,000
Chinook chehichic monitoring	\$28,477
Total	\$280,612

Fish Passage

Activity	Actual Expenditure
Burman	\$106,488
Lillooet habitat confirmations	\$31,982
Fish passage innovations culvert assessment training guide	\$16,500
Freeman Meadows	\$68,891
Pass Creek (3 structures)	\$219,611
Additional habitat confirmations (3 sites)	\$20,200
Gollen Creek	\$328,073
Maka-Murray bridge purchase	\$100,000
Fish passage assessment training	\$24,992
Fish passage technical working group support	\$6,394
Geospatial information	\$20,000
Total	\$943,131

Species at Risk

Activity	Actual Expenditure
Owl inventory, occupancy and recovery	\$154,955
Oregon spotted frog and northern leopard frog recovery and analysis	\$49,000
Vancouver Island marmot recovery	\$40,000
Sapsucker best management practices effectiveness monitoring	\$40,312
Collaborative habitat-based SEAR recovery actions	\$60,000*
Snake den and road mortality and mitigation monitoring to inform species management	\$17,974
Whitebark pine assessment and monitoring	\$18,823
Conservation status ranking and mapping of species and ecosystems at risk	\$36,000
Invertebrate inventory	\$15,000
Marbled murrelet and northern goshawk implementation plans	\$491,518
Goshawk habitat mapping, monitoring and outreach	\$52,224
Total	\$975,806

* Actual expenditures for this activity were not available at time of reporting

Wildlife Inventory

Activity	Actual Expenditure
Roosevelt elk inventory and monitoring	\$79,986
Elephant Hill access management program	\$19,809
Mountain goat and bighorn sheep inventory and monitoring	\$245,049
Moose inventory, habitat assessment and monitoring	\$510,000
Stone sheep survey and inventory	\$136,282
Total	\$991,126

Government Actions Regulation

Activity	Actual Expenditure
Ungulate habitat and winter range effectiveness monitoring	\$223,060
Wildlife Habitat Areas effectiveness monitoring and review	\$70,831
Mule deer winter range wildfire recovery strategy and general wildlife measure evaluation of mule deer winter range affected by fire	\$24,000
Assessing the impact of wildfire and forest harvest on Chilcotin fisher population	\$35,000
Flammulated owl inventory	\$10,000
Bat nursery roost effectiveness monitoring	\$48,931
Peace bull trout wildlife habitat area monitoring	\$21,216
Warbler wildlife habitat area monitoring	\$5,061
Williston drainages watershed sensitivity analysis	\$20,000
Skeena priority government action	\$129,805
Total	\$587,904

Ecosystem Based Management

At the time of reporting, the actual expenditure from the Ecosystem Based Management investment category was not available. As such, allocated activities are presented.

Activity	Allocation
Inventory activities to support Ecosystem Based Management	\$650,000
Great Bear Rainforest Land Use Order	
Haida Gwaii Land Use Objectives Order	

Range: Remediation

At the time of reporting, the actual expenditure from the Range: Remediation investment category was not available. As such, allocated activities are presented.

Activity	Allocation
Restoration and protection of range resources to ensure or enhance ecosystem health. Projects will include range developments such as water developments and, fencing streams and pastures to manage livestock access.	\$400,000

Range: Invasive Species

Activity	Actual Expenditure
Invasive plant early detection and rapid response to new invaders	\$209,800
Thompson-Nicola invasive plant pilot continuation	\$245,700
Invasive plant inventory, containment, and biological control	\$332,700
Total	\$788,200

Range: Ecosystem Restoration

At the time of reporting, the actual expenditure from the Range: Ecosystem Restoration investment category was not available. As such, allocated activities are presented.

Activity	Allocation
Forest and Grassland ecosystems restored to an ecologically appropriate condition. Projects will include strategic planning, collaborative meetings, prescription writing, and the development of funding applications to support mechanical treatments, prescribed fire, and monitoring.	\$200,000

Recreation Sites and Trails

Activity	Actual Expenditure
100 Mile – Chilcotin	\$32,500
Cascades	\$29,715
Chilliwack	\$33,597
Columbia – Sushwap	\$40,593
Discovery Coast	\$75,149
Haida Gwaii	\$5,985
Headwaters	\$31,194
Kamloops	\$28,864
Kootenay – Boundary	\$41,000
Nadina – Skeena	\$32,427
North Coast – Kalum – Cassiar	\$32,300
Okanagan	\$39,285
Peace – Fort Nelson	\$31,518
Prince George – Mackenzie	\$32,422
Quesnel – Central Cariboo	\$30,848
Recreation Youth Crews	\$68,343
Rocky Mountain – North	\$20,651
Rocky Mountain – South	\$20,779
Sea to Sky	\$60,578
Sunshine Coast – South Island	\$37,185
Tenquille Trail	\$4,349
Vanderhoof – Fort St. James	\$32,412
Total	\$761,700

Stewardship and Performance

Activity	Actual Expenditure
Resource value monitoring and assessment	\$452,240
Cumulative Effects assessment	\$146,719
LBIS project management	\$172,201
Total	\$771,160



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