



**RESOURCE  
PLANNING &  
ASSESSMENT  
BRANCH**

# **LAND BASED INVESTMENT STRATEGY 2019-20 ANNUAL REPORT**



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

# TABLE OF CONTENTS

<b>Land Based Investment Strategy .....</b>	<b>3</b>
Overview .....	3
Project Delivery Participants .....	5
Annual Planning .....	6
<b>1. Office of the Chief Forester and Regionally Delivered Categories .....</b>	<b>7</b>
1.1 Forests for Tomorrow – Current Reforestation .....	9
1.2 Forests for Tomorrow – Timber Supply Mitigation .....	9
1.3 Forest Health .....	12
1.4 Tree Improvement .....	13
1.5 Forest Inventory .....	14
1.6 Visual Resource Management .....	15
<b>2. Stewardship-Related Categories .....</b>	<b>16</b>
2.1 Water Quality .....	17
2.2 Inventory – Ecosystem-Based Management .....	19
2.3 Fish Passage Remediation .....	21
2.4 Fish Inventory .....	22
2.5 Range – Ecosystem Restoration .....	23
2.6 Range – Enhancement .....	25
2.7 Range – Invasive Species .....	26
2.8 Wildlife Inventory .....	27
2.9 Wildlife – Species at Risk .....	31
2.10 Wildlife – Habitat .....	33
2.11 Recreation Sites and Trails .....	35
2.12 Ministry of Environment – Data Warehouse .....	36
2.13 LBIS Stewardship/Cumulative Effects and Integrated Monitoring .....	37
<b>Appendix .....</b>	<b>40</b>
FLNRORD Road Map .....	40
Allocation Process .....	41

# LAND BASED INVESTMENT STRATEGY

## Overview

British Columbia's Land Based Investment Strategy (LBIS), through the Ministry of Forests, Lands and Natural Resource Operations and Rural Development (FLNRORD), 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 FLNRORD mandate and support the sustainable management of key environmental values. Its investment in a broad range of on-the-ground activities throughout British Columbia (B.C.) helps to strengthen rural communities.

The purpose of LBIS is to guide ongoing resource investments and short-term targeted investments in British Columbia's natural resources to realize environmental sustainability and economic prosperity. Effective and efficient delivery of this investment strategy will provide economic and social benefits to British Columbians through the realization of increased timber supplies, increased forest and range values, wildlife biodiversity, and recreational opportunities. In addition, investment may increase carbon sequestration, mitigate climate change impacts on our forests, water, and wildlife.

The goals of LBIS are to:

- Strategically direct funding to the highest priorities among a broad range of potential investment options across the natural resource sector.
- Actively manage natural resources to maintain and enhance their value.
- Mitigate impacts from catastrophic disturbances to the economic, social, and environmental benefits of natural resources.
- Act on strategic priorities to enable the use of B.C.'s natural resources and contribute to the achievement of economic, social, and environmental objectives of government.

The need to deliver coordinated stewardship activities efficiently, across the provincial landbase, aligned with regional stewardship priorities and existing funding streams resulted in the creation of the current LBIS in 2010.

Initially, investments were directed towards twelve categories with timber supply and forest health as primary areas of focus. To address emerging stewardship priorities on the land base, additional categories were integrated into the program over subsequent years.



In 2019-20, LBIS administered approximately \$75 million in funding across 19 categories in support of environmental stewardship and forest economy activities<sup>1</sup>:

Investment Category	Allocation 2019-20
Forests for Tomorrow – Current Reforestation	\$39,376,000
Forests for Tomorrow – Timber Supply Mitigation	\$9,260,000
Forest Health	\$6,035,000
Tree Improvement	\$2,500,000
Forest Inventory	\$8,130,000
Visual Resource Management	\$200,000
Inventory – Ecosystem-based Management	\$600,000
Water Quality	\$350,000
Fish Passage Remediation	\$1,000,000
Fish Inventory	\$200,000
Range – Ecosystem Restoration	\$750,000
Range – Enhancement	\$750,000
Invasive Species	\$715,000
Wildlife Inventory – Wildlife	\$1,600,000
Wildlife – Species at Risk	\$1,000,000
Wildlife – Habitat	\$600,000
Recreation Sites and Trails	\$650,000
Data Warehouse	\$200,000
LBIS – Stewardship & Performance	\$924,000
<b>Allocation Total</b>	<b>\$74,840,000</b>

Administration of LBIS is coordinated through the Resource Planning and Assessment Branch within the Resource Stewardship Division (RSD) of FLNRORD. The program is managed collaboratively by the Office of the Chief Forester (OCF), Regional Operations and the Resource Stewardship Division. Corporate support is provided by the Corporate Services for the Natural Resource Sector.

<sup>1</sup> More information on LBIS Investment Category goals and activities are available on the LBIS homepage, found at: <https://www2.gov.bc.ca/gov/content/environment/natural-resource-stewardship/land-based-investment>

## Project Delivery Participants

Program delivery involves a wide range of areas within FLNRORD and partner ministries, including:

- Recreation, Sites and Trails
- Species at Risk Recovery
- Fish and Aquatic Habitat
- Wildlife and Habitat
- Range
- Environmental Sustainability and Strategic Policy Division from the Ministry of the Environment

LBIS investments support projects that involve many organizations outside of the provincial government, including Indigenous Communities, governments of neighbouring jurisdictions, non-governmental organizations, businesses, and the academic community.

Halfway River First Nation	Kalamalka Fly-Fishers
Gitanyow First Nation	Skeena Hunter Advisory Committee members and area guide outfitters
Kitsumkalum First Nation	Grouse Mountain Refuge for Endangered Wildlife (Veterinary Care)
Metlakatla First Nation	Bird Studies Canada
Kitselas First Nation	Oliver Mountain Advisory Group
Gitgaat First Nation	
Stolo First Nation	B.C. Conservation Data Centre
Gitanyow Fisheries Authority	Old Growth Working Group
Okanagan Nation Alliance	Wildlife managers in neighbouring jurisdictions:
Tsilhqot'in Nation	NWT, Yukon and Alberta
Gitxsan First Nation	Fisheries and Oceans Canada
Haida Nation	Conservation Officer Service
Kaska First Nation	Oceola Fish and Game Club
Leidli T'enneh First Nation	British Columbia Wildlife Federation
Northern Secwepemc te Qelmuw	BC Ministry of Transportation and Infrastructure
	Parks Canada
West Boundary Community Forest	Environment Canada
Pacific Salmon Foundation	U.S. Fish and Wildlife Service
Habitat Conservation Trust Foundation	Washington and Idaho Wildlife Staff
Ministry of Environment	
Kootenay River Guardian Program	Innergex
Pacific Institute of Climate Solutions	Canfor
Whitebark Pine Ecosystem Foundation	BC Hydro
Guide Outfitters Association of B.C.	Calgary Zoo
British Columbia Wild Sheep Society	Vancouver Aquarium
Fish and Wildlife Compensation Program	NLF Recovery Team
Forest Genetic Council	Interfor
The Wild Sheep Society of British	
Kootenay Conservation Program	The University of British Columbia
Okanagan and Similkameen Invasive Species Society	The University of Northern British Columbia
District Range Program	University of Idaho
BC Conservation Foundation	Quest University
The Natural Sciences and Engineering Research Council (NSERC)	Laurentian University
Wild Sheep Society	
Freshwater Fisheries Society of B.C.	

## Annual Planning

The annual investment planning process prioritizes allocation of funds to support targeted investments in natural resource stewardship activities. LBIS administrative oversight falls to the ADM for the Resource Stewardship division.

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, FLNRORD Mandate and Road Map (see [Appendix](#)), and other specific government commitments. Funding criteria for 2019-20 also included consideration of:

1. Mandate commitments or actions directly related to key Ministry stewardship priorities
2. Risk if not funding an activity has a high likelihood of resulting in unfavorable economic, ecological, or legal implications
3. Indigenous commitments to collaborative design, economic benefit, or cultural significance
4. Alternative methods of achieving Initiative/ project objective

Within mandate and service plan commitments, the Ministry has goals relating to resource stewardship activities that are integral to ensuring the sustainable management of forest, wildlife, water, and other land-based resources. These include:

- silviculture, forest health, and tree improvement
- priority fish-passage remediation projects
- invasive species targets for forest and range resources
- ungulate protection measures
- other resource stewardship activities that are integral to ensuring the sustainable management of forest, wildlife, water, and other land-based resources

See the [Appendix](#) for an outline of the LBIS allocation process.





# 1. OFFICE OF THE CHIEF FORESTER AND REGIONALLY DELIVERED CATEGORIES

Category	Allocation
FFT - Reforestation	\$39,376,000
FFT - Timber Supply Mitigation	\$9,260,000
Forest Health	\$6,035,000
Tree Improvement	\$2,500,000
Forest Inventory	\$8,130,000
Visual Resource Management	\$200,000

## Forests for Tomorrow

The Forests For Tomorrow (FFT) Program was established in 2005 to respond to catastrophic wildfires and the mountain pine beetle epidemic. The program works to restore healthy forests and to mitigate the impacts wildfire and insect outbreaks while also creating economic opportunities for forestry and bioenergy production. These actions help to keep carbon out of the atmosphere and store more carbon in B.C.'s forests.

Recognized globally as a world leader in sustainable forest management, British Columbia has the largest and most diverse public forests in Canada. With about 95% of its forests being publicly owned, the government of British Columbia is responsible for the sustainable management of this rich diversity of timber, water, wildlife, recreation, and other values. One way the government achieves sustainability is through ensuring that a comprehensive reforestation program is in place to effectively restore healthy resilient forests in a timely manner.

## FFT Accomplishments in 2019-20

Large areas of community forests that were burnt in the 2017 and 2018 wildfires were surveyed and treatment plans were developed for replanting young stands. Over 4 million trees were ordered to help with replanting Community Forest Areas in spring 2020 and 2021.

A generally moist summer on the coast and in the interior helped considerably with efforts to plant over 25 million seedlings around the province. The moist weather, especially in the central interior, ensured no major fires developed and as a result the planting season could run its full course. The summer survey season led to another large sowing request in the fall through FFT with 26 million trees being ordered, part of another very large provincial sowing request of almost 300 million to be planted in spring 2021.

FFT also helped to advance the incremental salvage of wood from the 2017 and 2018 wildfires through both the BC Timber Sales-led Innovative Timber Sale Licence Initiative and the district-led Licence to Cut program. Low value burnt fibre that otherwise would have been lost was salvaged and the sites prepared for reforestation.

	2019-20 Results
<b>FFT Surveys</b>	174,210 Ha
<b>TSM Fertilization</b>	18,717 Ha
<b>FFT Planting</b>	15,990 Ha
<b>FFT Seedlings</b>	26,158,825
<b>FFT Pruning</b>	24 Ha
<b>FFT Site Preparation</b>	7,370 Ha
<b>TSM Spacing</b>	403 Ha
<b>s108 Planting</b>	2,539
<b>s108 Seedlings</b>	3,451,002
<b>s108 Surveyed</b>	3,754
<b>Current Reforestation Funding</b>	\$ 39,730,000
<b>Timber Supply Mitigation Funding</b>	\$ 9,250,000

Note: 1 hectare (Ha) is 10,000 m<sup>2</sup>

## S108

*Forest and Range Practices Act (FRPA)* section 108 is a provision where the Government may fund extra expense or waive obligation.

## TSM: Terrain Stability Mapping

- Terrain Stability Mapping (TSM) contains polygons with key and amalgamated attributes derived from the Resource Inventory Standards Committee standard attributes. TSM uses air photo interpretation and select field checking to divide the landscape into units using the Terrain Classification System for British Columbia and stability criteria.



## 1.1 Forests for Tomorrow – Current Reforestation

Reforestation investment is aimed at improving the future timber supply and addressing risks to other forest values through the re-establishment of young forests on land that would otherwise remain underproductive. The program focus is land primarily within the timber-harvesting land base, yet outside of forest industry obligations.

Program emphasis is on surveying, site preparation, and tree planting. These treatments are being guided by strategic-level program planning, seed supply planning, silviculture strategies, and timber supply analyses. Upfront overview surveys and program planning will formulate a clear and full picture of a cost-effective program and budget profile.

## 1.2 Forests for Tomorrow – Timber Supply Mitigation

Investments in timber supply mitigation are focused on mitigating impacts on mid-term timber supply caused by catastrophic disturbance in the Interior, or constrained timber of the Coastal, Northwest, and Southeast areas of the province. Mitigation is administered through a program of stand treatments with planning by regional and district staff in conjunction with licensees. Delivery is carried out by various agents utilizing the following government standards: surveys, spacing, fertilization, and pruning.

FFT delivery also relies on major licensees, small tenure holders, First Nations, and consultant support. Silviculture contractors provide thousands of person days of work to deliver the needed activities on the ground. The FFT program works with the BC Forest Safety Council and WorksafeBC to ensure work safety.

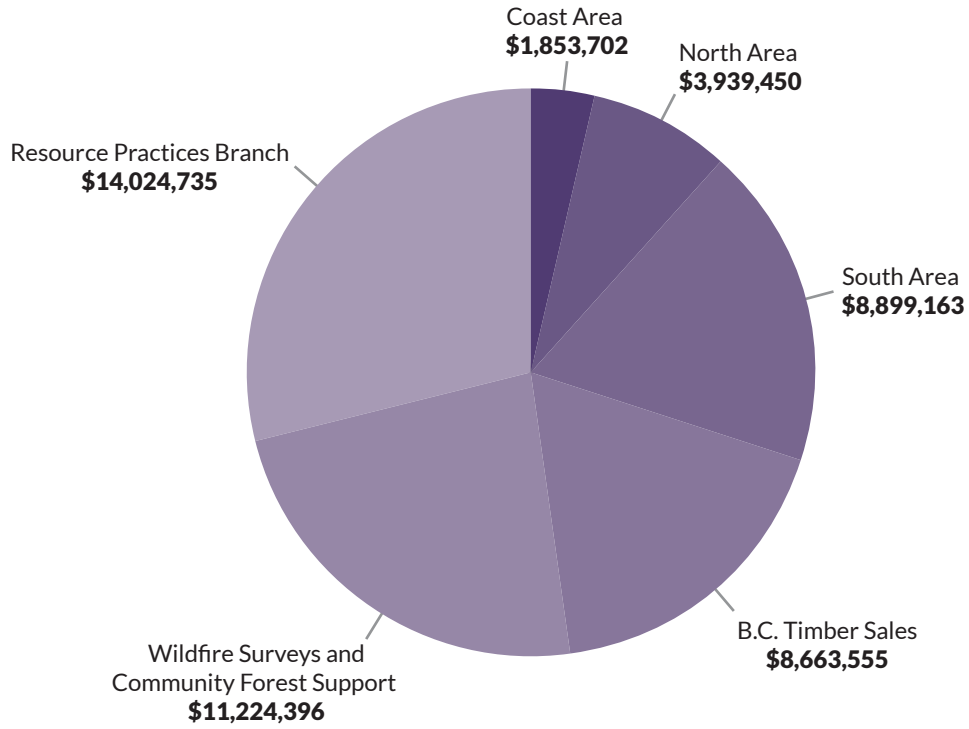
By establishing and maintaining healthy resilient forests, a secure future will be provided for rural communities as well as delivering a wide range of benefits to all British Columbians.

FFT also provides Community Forests support opportunities in areas such as recreation, wildlife, and watershed management for communities and contribute to a more diversified forest economy.

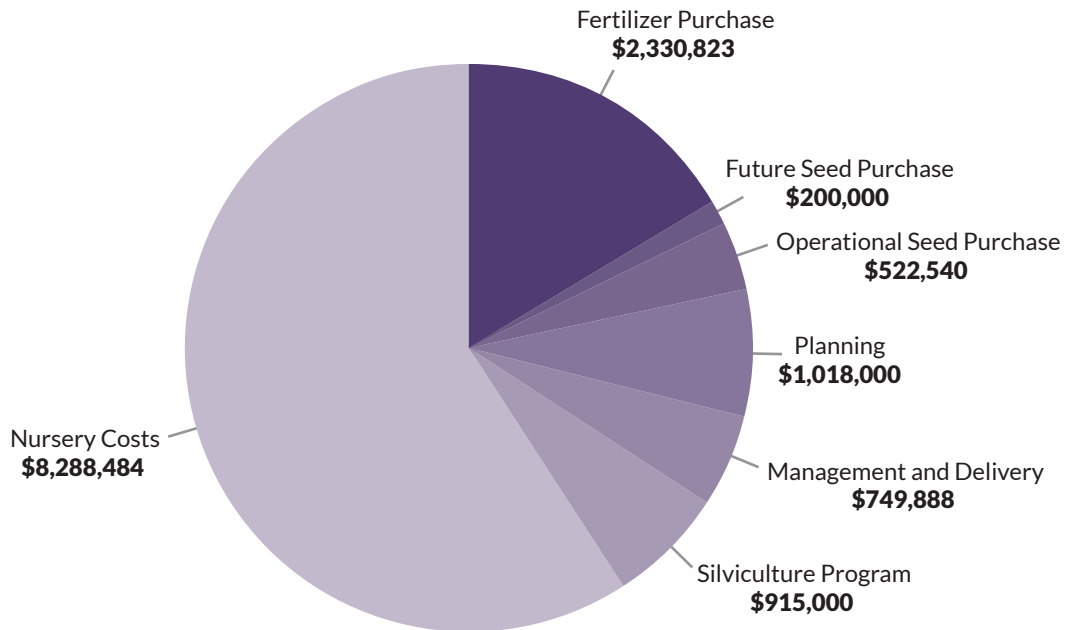
The goals of the Community Forest Program are to:

- provide long-term opportunities for achieving a range of community objectives, values, and priorities
- diversify the use of and benefits derived from the community forest agreement area
- provide social and economic benefits to British Columbia

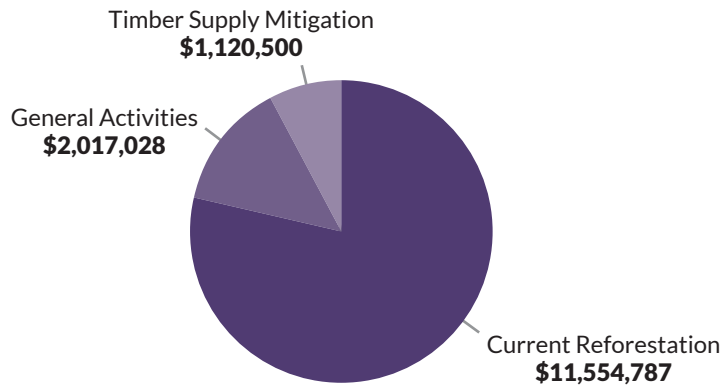
### FFT Allocation Distribution



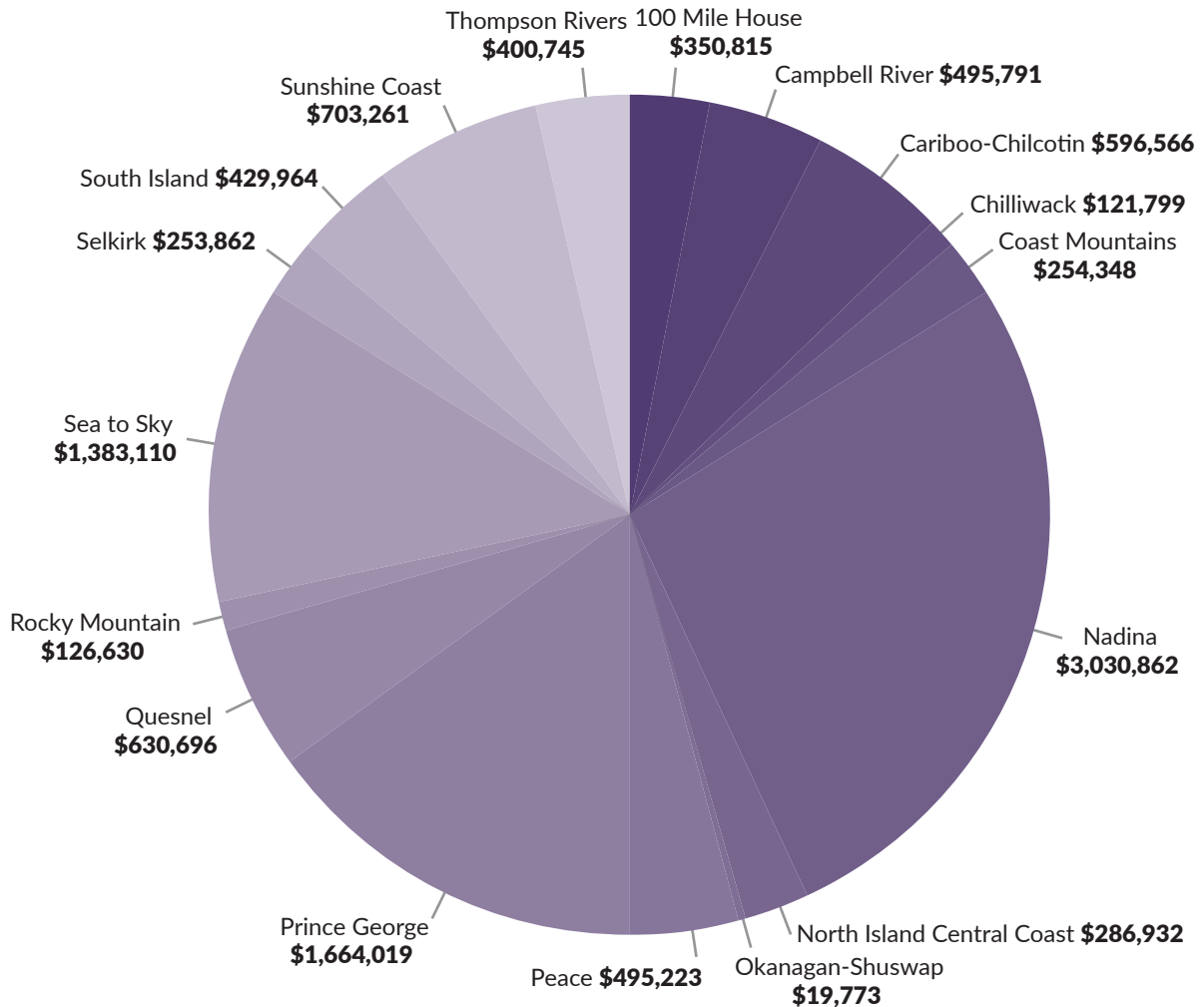
### Resource Practices Branch



### FFT – North/Coast/South Activities



### Wildfire Surveys, Fertilization, and Community Forest Support

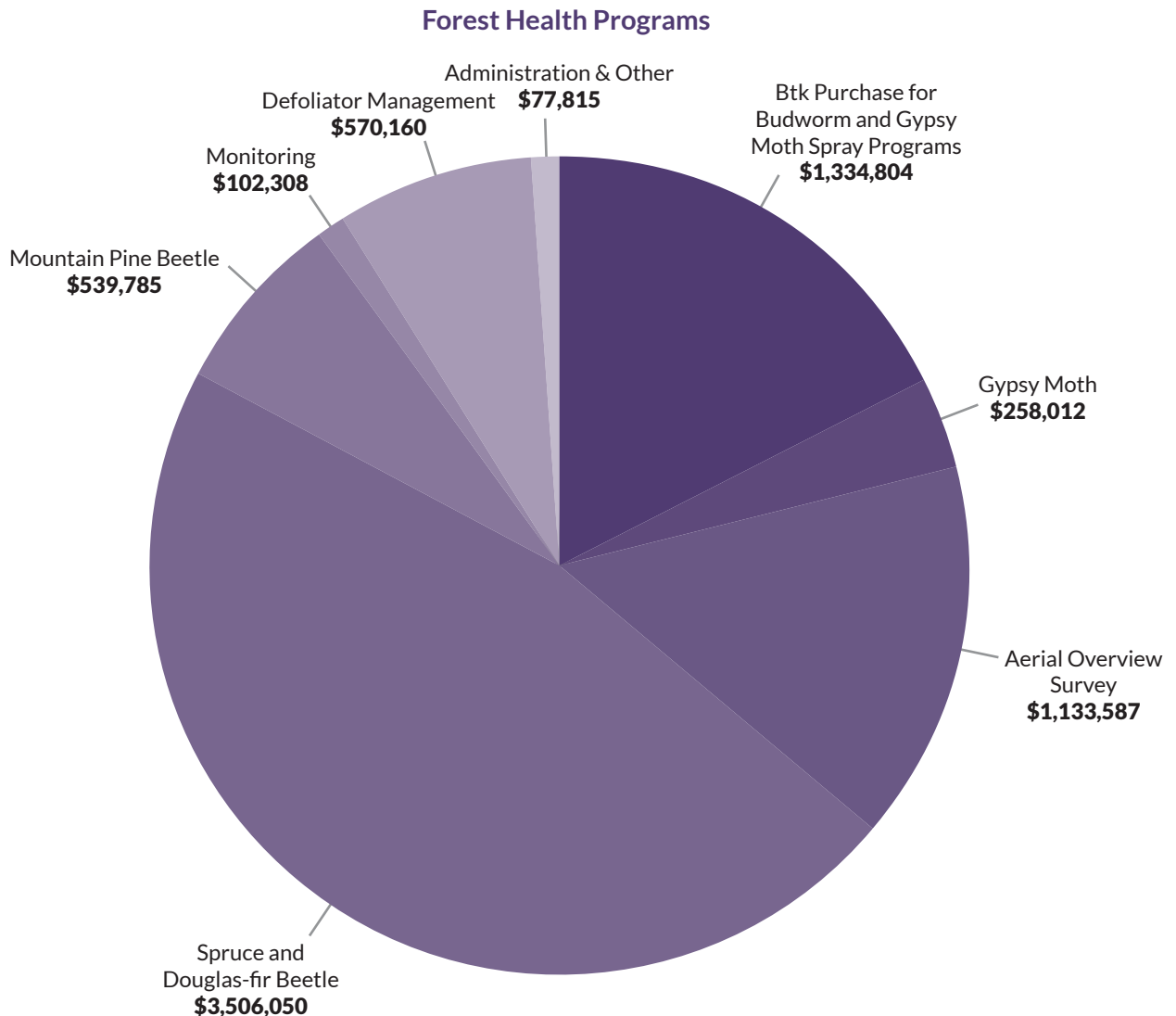


## 1.3 Forest Health

The objective of the Forest Health Program is to protect and manage B.C.'s forest resources from the impacts of a wide range of forest health factors. These include bark beetles, defoliators, pathogens, animal damage, and 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 detection and forest health risk mitigation activities, and the establishment of best management practices to minimize damage.

### Activities and Highlights

- Aerial and limited ground surveys were conducted in districts to support efforts to slow the spread of Spruce and Douglas-fir Beetle and reduce impacts to timber supply.
- Specialized surveys to monitor black army cutworm, Swiss Needle Cast, and other forest health agents were completed. The results of which were summarized in the 2019 Provincial aerial overview survey (AOS) report and presented to FFT staff.



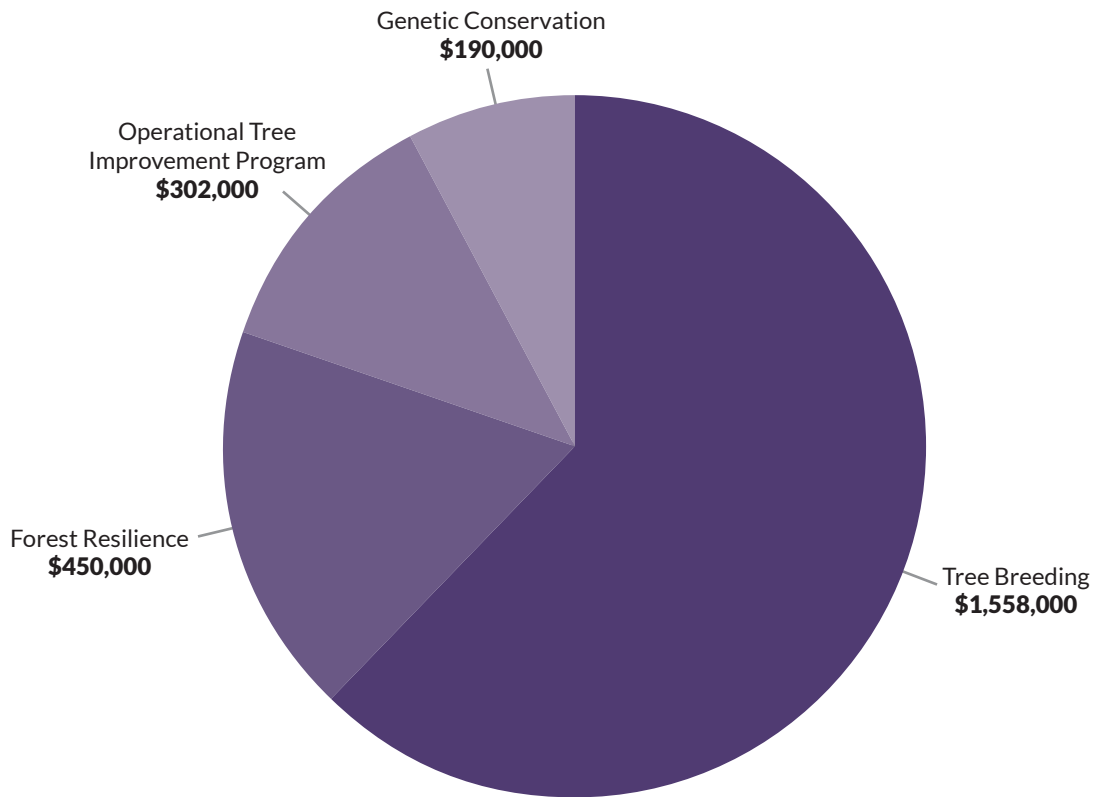
## 1.4 Tree Improvement

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 Genetic Council (FGC)<sup>2</sup>. The FGC coordinates the tree improvement and genetic resource management activities of FLNRORD, forest industry, universities, Canadian Forest Service, and smaller forest-sector companies. FGC’s goal is to adequately maintain the genetic diversity of indigenous tree species in B.C. 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.

### Activities and Highlights

- Supplying tree seed for the reforestation of Crown lands
- Conducting tree breeding and forest genetics research to improve the health, resilience, productivity, and value of regenerated forests
- Conserving forest genetic resources
- Maintaining the provincial genetic resource management framework

**Tree Improvement Programs**



<sup>2</sup> <https://forestgeneticsbc.ca/>

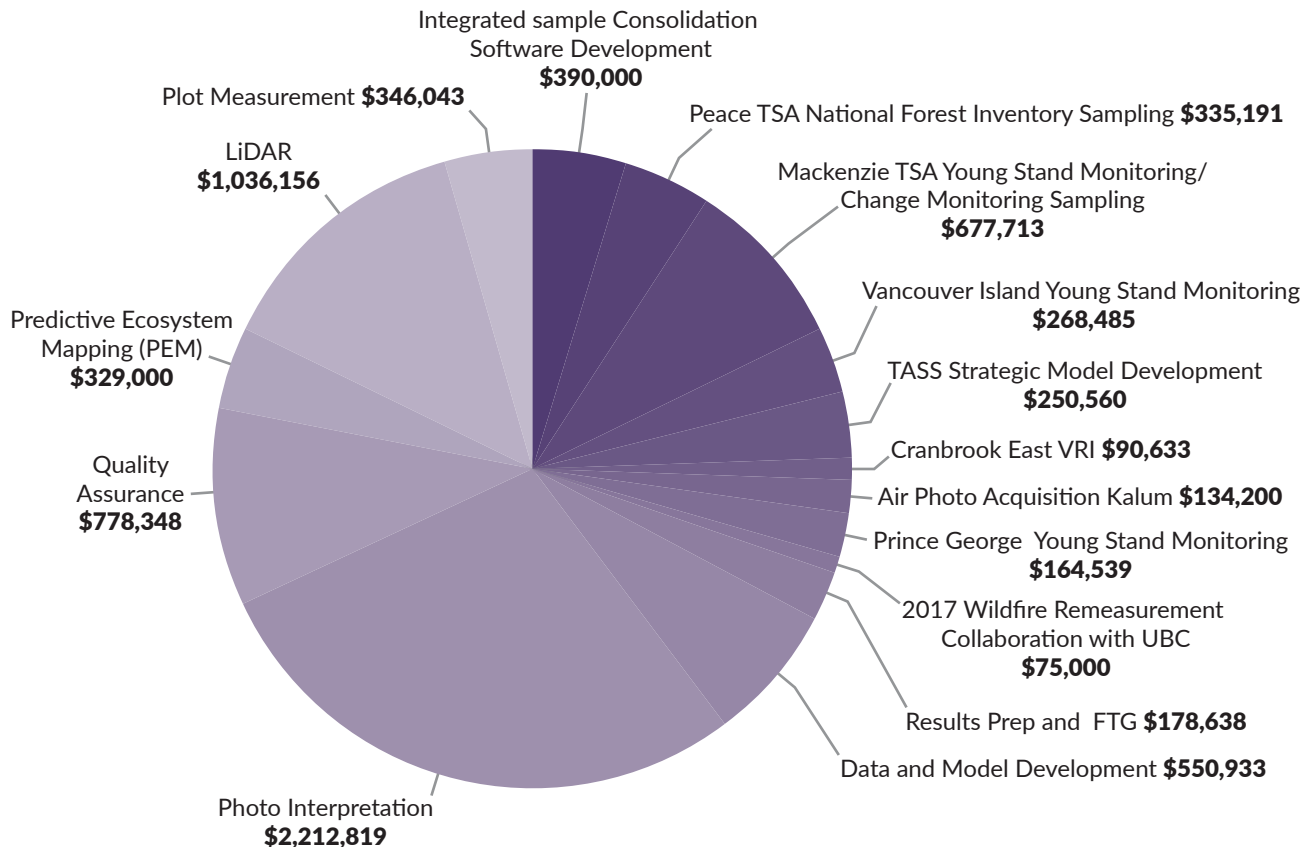
## 1.5 Forest Inventory

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

### Activities and Highlights

- The collection, management, and dissemination of forest inventory information for British Columbia
- The development of stand growth and yield models. Stand growth models and forest inventory information are essential to stewardship of the forest resource in B.C. This work provides the major source (and in many cases is the sole provider) of these tools and data sets in B.C.
- Providing 839,000 ha of LiDAR acquired in dry belt Douglas-fir forests in the Cariboo and high-resolution digital imagery flown in the Kalum Timber Supply Area (TSA) in preparation for re-inventory
- The collection of up-to-date information to make improvements to growth modelling tools, improvements in the ability to simulate the impacts of pine stem rusts, genetic tree improvement, and the growth of natural and managed stands from ground plot and survey data

**Forest Inventory Programs**



### LiDAR: Laser imaging, detection, and ranging

- LiDAR is a method for measuring distances (ranging) by illuminating the target with laser light and measuring the time the reflection of the light takes to return to the sensor. Differences in laser return times and

wavelengths can then be used to make digital 3-D representations of the target. It has terrestrial, airborne, and mobile applications.

### FTG: Free to Grow

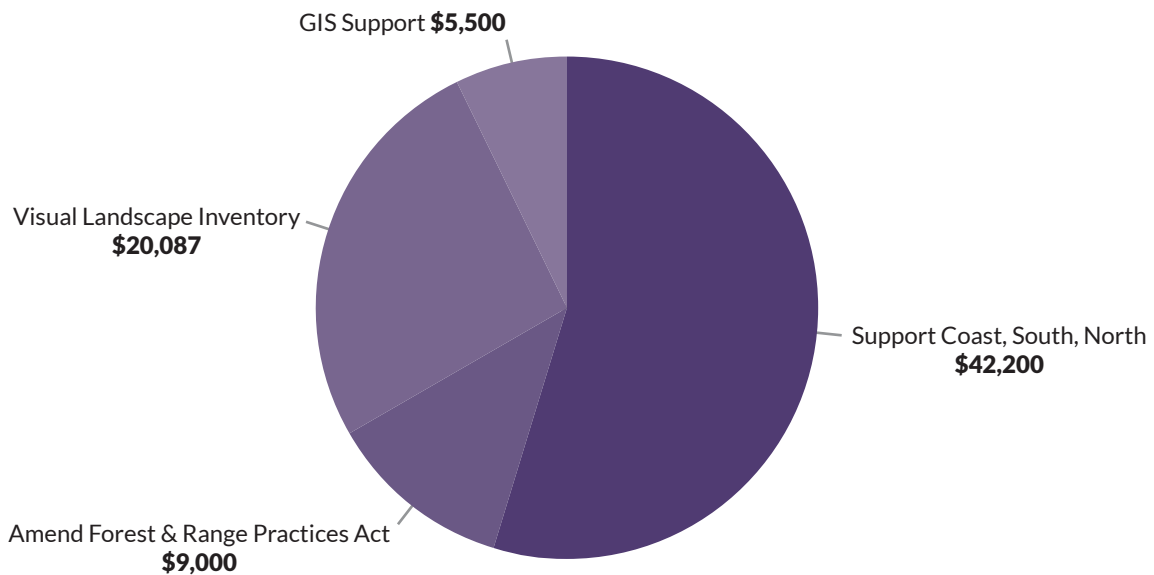
- Stands that meet stocking, height, and growth rate and are judged to be essentially free from competing vegetation.

## 1.6 Visual Resource Management

A fundamental goal of Visual Resource Management is to protect the visual character of B.C.'s visually-sensitive forested landscapes. Scenic landscapes are highly valued by B.C. residents, and visual perception research indicates that unaltered landscapes are generally preferred. Well-designed forest landscapes give the public confidence that B.C.'s natural resources are being managed responsibly. Scenic areas are also vital for outdoor recreation and

tourism experiences. Under FRPA, Visual Quality Objectives have been established for 14.5 million ha of the province's most scenic and visible landscapes. Visual Quality is one of eleven core values to be managed and protected under FRPA. The Forest Planning and Practices Regulation defines five categories of alteration: preservation, retention, partial retention, modification, and maximum modification.

**Visual Resource Management Programs**





## 2. STEWARDSHIP-RELATED CATEGORIES

Wildlife and environmental stewardship allocations are managed separately from the OCF allocations. Funds are allocated to 13 categories and then divided amongst divisions and areas within FLNRORD in order to deliver projects on the ground. Some of the projects are delivered by regional operations in the North, South, and Coastal areas while others are delivered by the Integrated Resource Operations Division and the Resource Stewardship Division.

Stewardship Categories	Allocation
Water Quality	\$350,000
Inventory – Ecosystem-Based Management	\$600,000
Fish Passage Remediation	\$1,000,000
Fish Inventory	\$200,00
Range – Ecosystem Restoration	\$750,000
Range – Enhancement	\$750,000
Range – Invasive Species	\$715,000
Wildlife Inventory – Wildlife	\$1,600,000
Wildlife – Species at Risk (SAR)	\$1,000,000
Wildlife – Habitat (GAR)	\$600,000
Recreation Sites and Trails	\$650,000
MOE Data Warehouse	\$200,000
LBIS Stewardship / Cumulative Effects & Integrated Monitoring	\$924,000



## 2.1 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
- regulation of groundwater use
- regulation of scarcity
- to improve security, water use efficiency, and conservation
- measurement and reporting
- the enabling of a range of approaches to governance

The process of watershed evaluation is done using a two-tiered monitoring system. Tier 1 involves monitoring broad scale habitat inventory data

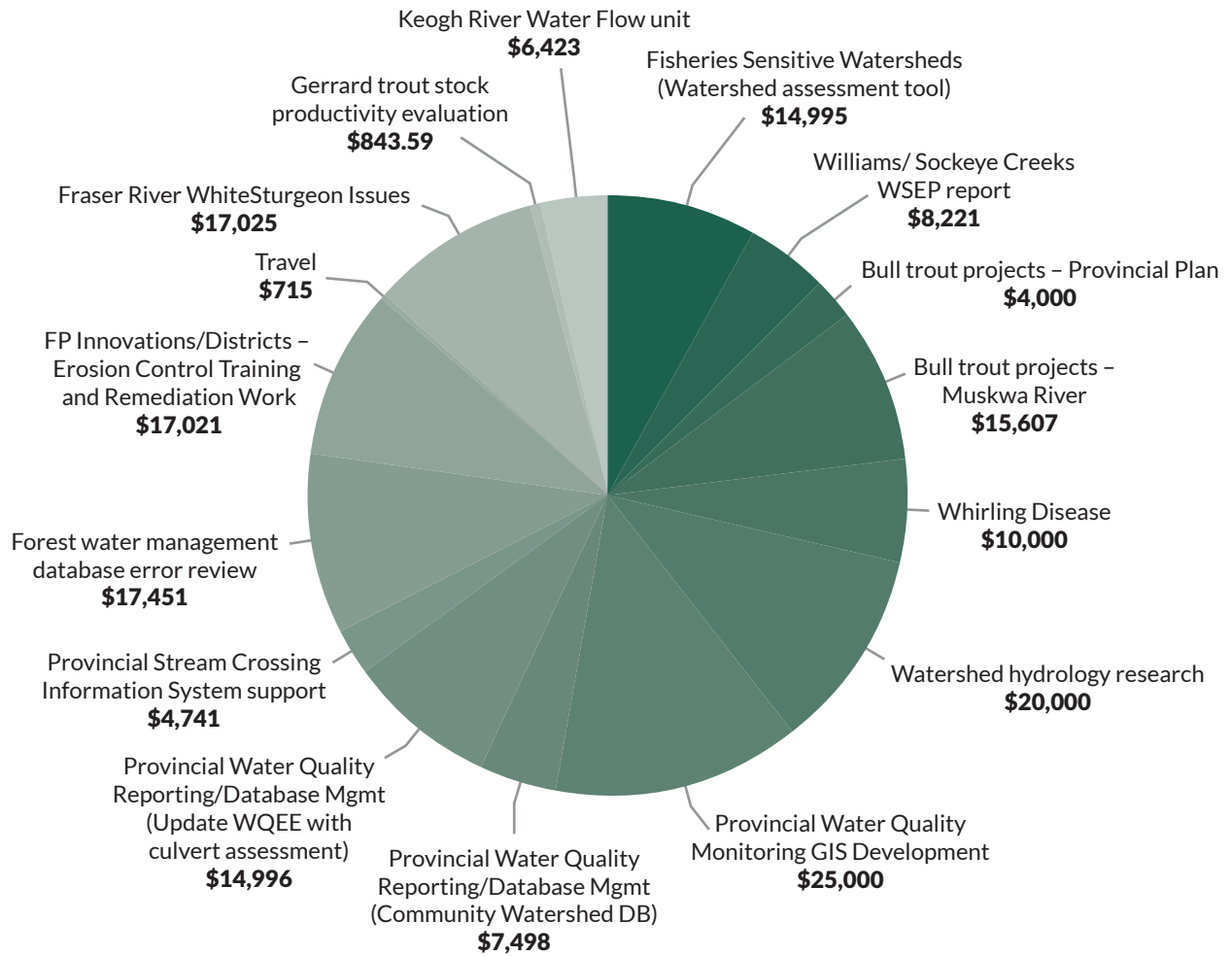
through available geographic information system (GIS) layers. Tier 2 incorporates field-based surveys that would be undertaken on individual watersheds to assess actual function and condition on the ground.

Information from Tier 1 monitoring is intended to provide a broad-based assessment of the potential “risk” of impaired watershed condition across provincial watersheds. Tier 1 monitoring is like the approach used within the province’s earlier air-photo interpretation-based Watershed Assessment Procedures (WAP) but modified to accommodate the use of more widely available provincial-scale GIS layers

In 2019-20, important updates were made to the Watershed Status Evaluation Protocols. Revisions to the Tier 1 document included the development of a natural disturbance (e.g. fire and insects) modifier, and several years of field experience and refinements to sampling methods were incorporated into the final Tier 2 protocol.



### Water Quality Programs



## 2.2 Inventory – Ecosystem-Based Management

Terrestrial Ecosystem Mapping (TEM) is a Resource Information Standard Committee (RISC) standard approach to stratifying the landscape into map units according to ecological features including climate, physiography, surficial material, bedrock, geology, soil, and vegetation. TEM 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.

The TEM activities in the Great Bear Rainforest and Haida Gwaii support government to government commitments for implementation of land use objective orders for ecosystem integrity

and human well-being under ecosystem-based management (EBM). Planning and acquisition of the inventory and its derivative products are undertaken with Indigenous partners across the Great Bear Rainforest and Haida Gwaii in support of reconciliation commitments and collaborative resource management objectives. These tools are used within the context of EBM, for example, setting and meeting old forest representation targets for landscape reserve planning, estimating productivity and economic value of the managed forest land base, ranking and conserving red- and blue-listed ecological communities, and managing habitat for focal wildlife species.



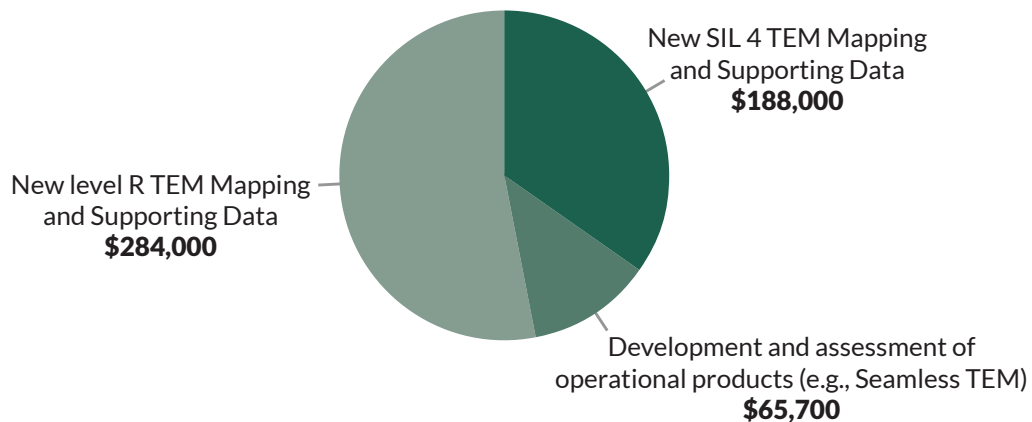
## Program Achievements – Great Bear Rainforest

- New Terrestrial Ecosystem Mapping (TEM) of 193,000 ha
- Update of 519,696 ha of (pre-RISC standard) TEM to current standards
- Acquisition of LiDAR for inventory refinement and operational extension. This data was integrated into the FAIB provincial LiDAR acquisition strategy
- Updates to seamless TEM incorporating previous year’s mapping and processing for operational use with Land Use Plan Objectives
- Collaboration with Indigenous communities and the Ministry of Environment and Climate Change Strategy (MOE) on identification of Area of Interest, sampling design, mapping, and refinement and validation of inventory
- Data contributions to biogeoclimatic mapping and classification updates for priority coast units
- Support for the FLNRORD Conservation Data Centre in ecological community status ranking
- Provincial standards development for mapping structural stage to TEM – supports land use planning, landscape productivity analyses, listed community conservation, reserve design

## Program Achievements – Haida Gwaii

- New Terrestrial Ecosystem Mapping of 48,639 ha completing the Naikoon land unit (LU)
- Update of 32,303 ha of (pre-land use objectives order) TEM to current standards in the Ian Lake LU
- Pre-typing of 112,016 ha to prepare for field verification in the Renell LU (39,898 ha) and Otun (72,118 ha) LU
- Haida Nation-FLNRORD-MOE collaboration on identification of Area of Interest, sampling design, mapping, and refinement and validation of inventory.
- Data contributions to biogeoclimatic mapping and classification updates for priority Coast units
- Support for the FLNRORD Conservation Data Centre in ecological community status ranking
- Provincial standards development for mapping structural stage to TEM – supports land use planning, landscape productivity analyses, listed community conservation; reserve design

### Ecosystem-Based Management Programs



## 2.3 Fish Passage Remediation

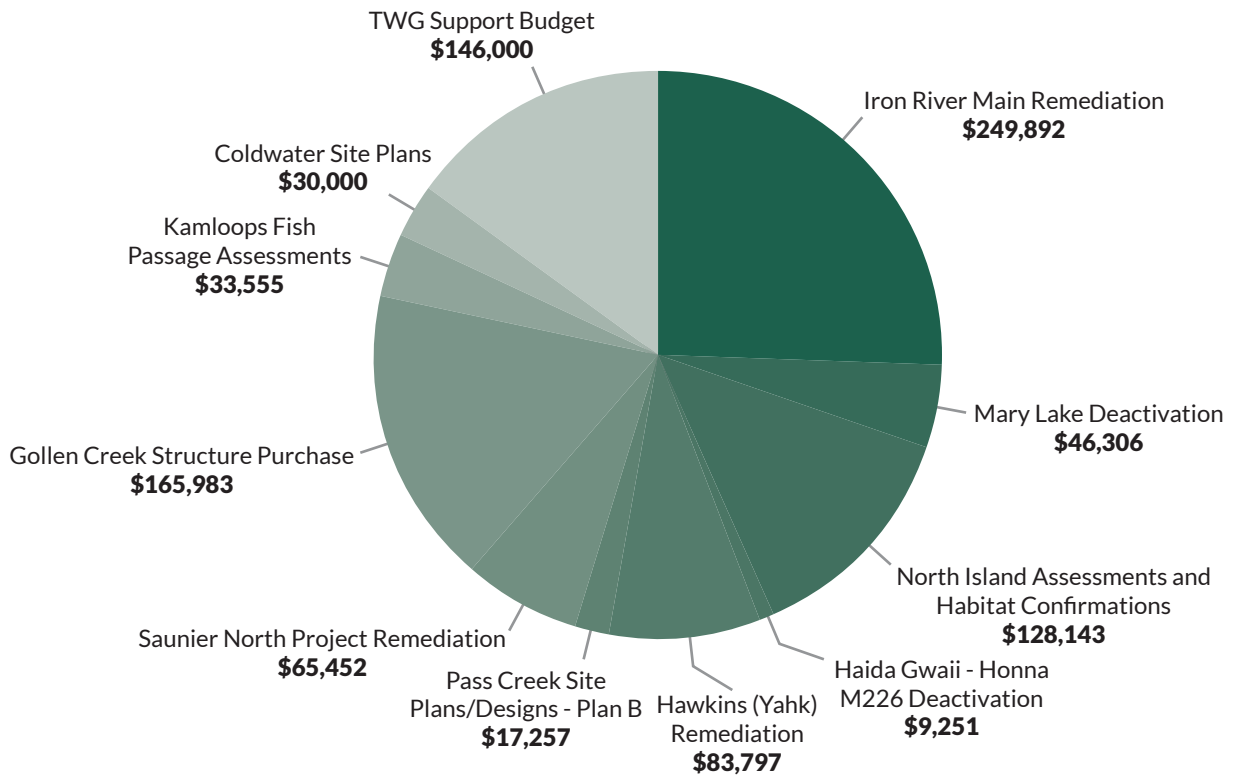
The fish passage program is focused on remediating stream crossings that impede freshwater fish migration. Road stream crossings on fish streams can be barriers to the movement of juvenile and adult fish. Free movement for all life-stages of fish is important, allowing them access to the appropriate habitats for rearing and spawning. Most fish passage problems in B.C. are associated with closed-bottom structures (culverts).

Remediation of these structures often involves replacing these 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.

### Program Achievements

- A 90-foot composite bridge was installed on the Iron River main road despite significant challenges related to the discovery of clay where footings were to be installed, resulting in extensive excavation, hauling, and placement of gravel fill.
- Restoration and remediation plans were developed for Burman River and Loveland Bay, the latter in concert with Ministry of Transportation and Infrastructure. A bridge was purchased for the Burman River crossing with installation expected in the next fiscal year.
- In partnership with the Canadian Wildlife Federation, two culverts that created barriers to fish passage are to be replaced in 2020-21 by bridges that have been prefabricated.

Fish Passage Remediation Programs



## 2.4 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 undertaken 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.

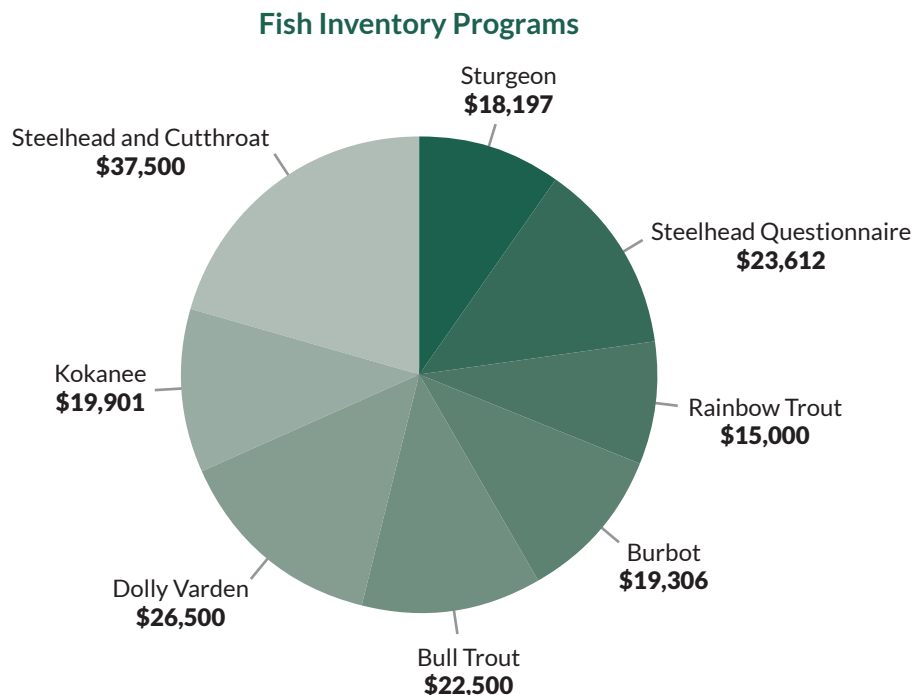
The intent of having a central repository for fish data and information is to facilitate the storage and access of data and results required for making informed management decisions and improving conservation efforts.

### Program Achievements

The 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 assist in management decisions and regulation changes.

Engaging Indigenous communities in the fish inventory project enhances opportunities to better manage a species of shared interest. FLNRNORD engaged with the Leidli T'enneh First Nation on prioritization of tributaries to the Upper Fraser River for bull trout. There is also ongoing collaboration with the Okanagan Nation Alliance to adjust recreational exploitation rates to account for First Nation's needs and the management of Wood Lake kokanee stocks, as well as extensive work with the Cowichan Tribes on a number of fish habitat and fisheries assessment initiatives within this watershed.



## 2.5 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 area, 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 Area the focus is guided by regionally based strategic plans, and therefore the projects address a variety of priority ecosystem functions.

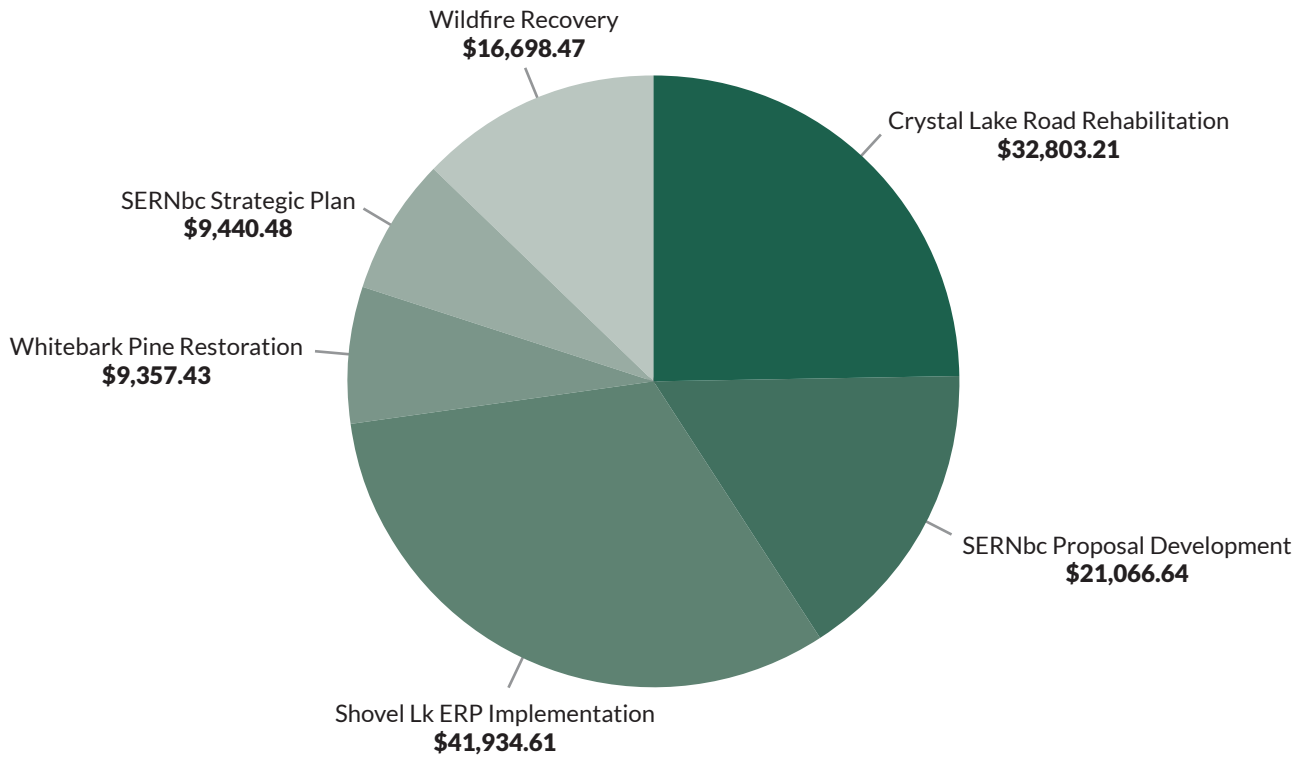
In both the South and North Areas, leveraged program funding, shared goals with other programs, indigenous communities, and stakeholders is common. The projects from this past year varied in scope and included managing deadfall on caribou migration routes, identifying carbon planting project areas, and collaborating on a joint federal – provincial – academia – environmental groups (ENGOS) in Whitebark Pine research and restoration initiatives.

### Program Achievements

- During 2019-20, mechanized treatments occurred on 1,586 ha, however only 530 ha of prescribed fire was able to be applied due to weather conditions.
- Restoration of ingrown open forests and native grassland ecosystems were treated by operational planning, mechanically reducing stem density, and by invasive plant treatments to create landscapes more resilient to climate change impacts.
- 7 strategic plans were updated. Currently the ecosystem restoration program has 19,396 ha of signed prescriptions and/or burn plans.
- Support the establishment of relationships to support cooperative ecosystem restoration projects, with the local Resource District, BC Wildfire Service, licensees, resource management staff, and various NGOs.



### Ecosystem Restoration Programs





## 2.6 Range – Enhancement

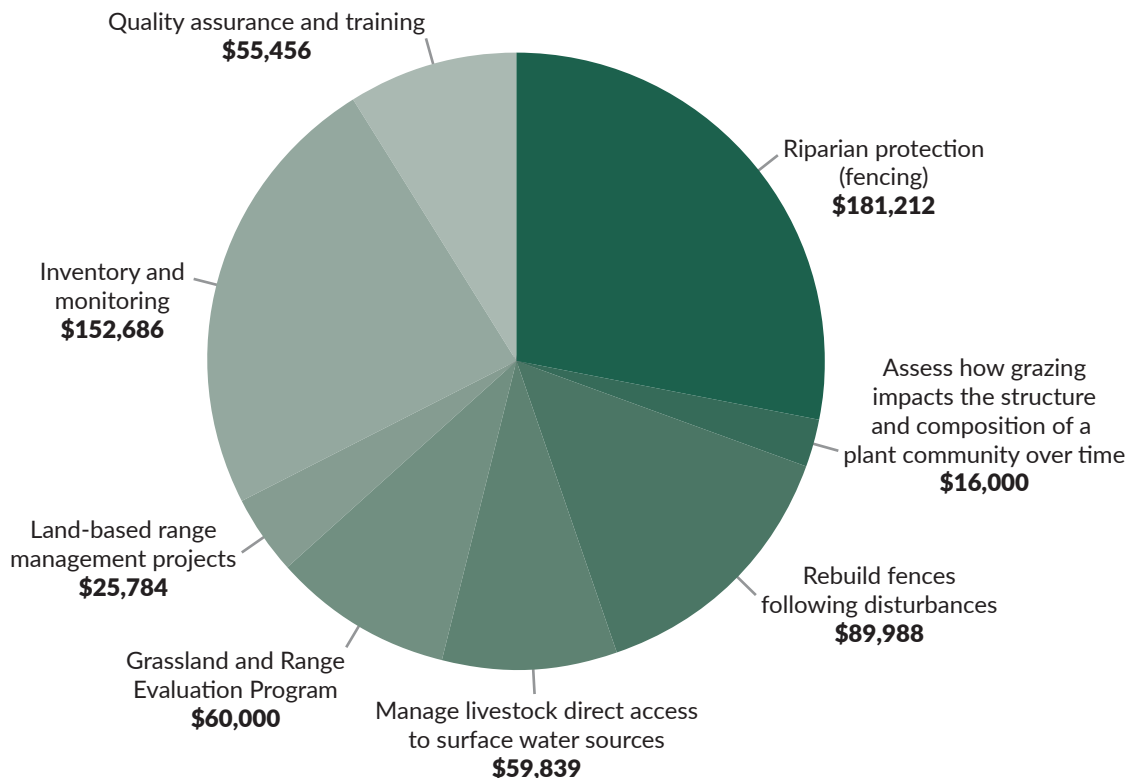
The Range Program focuses on ensuring healthy and sustainably managed rangelands to support the interests and activities of clients, stakeholders, and partners. Parties with an interest in the management of B.C. rangelands include the ranching industry, guide outfitters, Indigenous communities, government and non-government agencies, wildlife, recreationalists, and the public at large. Sustainable management is achieved through many processes including ecological monitoring activities, controlling the establishment and spread of invasive plant species, advocating for sustainable range management practices, developing policy and legislation, and assisting in the restoration of degraded rangeland. Funding from LBI focuses on the restoration of rangeland areas impacted by

catastrophic disturbance such as mountain pine beetle, wildfire, and drought.

### Program Achievements

- Containment fences to keep livestock from roaded areas and to keep the public safe on highways
- Reconstruction of fence infrastructure following extreme blowdown events
- Development of off-stream watering to protect riparian, fisheries, habitat, and aquatic ecosystem
- Construct fences, water developments, carry out invasive plant treatments, and range restoration projects

### Enhancement Programs



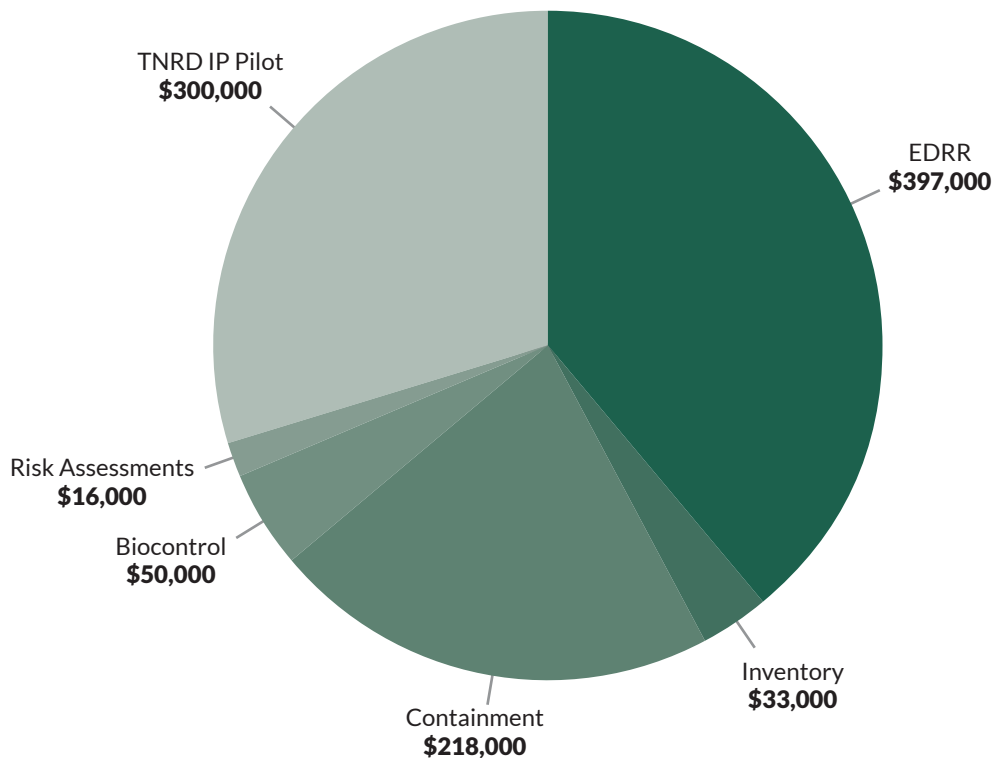
## 2.7 Range – Invasive Species

Invasive species are the second biggest threat to at-risk species and ecosystems in B.C. 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, conduct surveys, inventory, risk assessments, treatments, monitoring, 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.

### Program Achievements

- Prevented new invasive plant species, and those with limited prevalence, from establishing and expanding in B.C. through the implementation of the *Invasive Species Early Detection and Rapid Response (EDRR) Plan*.<sup>3</sup>
- Invasive aquatic plant surveys completed on 25 high risk waterbodies across B.C.
- Reduced impacts of invasive plant species with available biological control agents through redistribution and monitoring of bioagents.

**Invasive Species Programs**



<sup>3</sup> <https://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/invasive-species/edrr>

## 2.8 Wildlife Inventory

Wildlife Species Inventory data and information includes surveys undertaken to determine the presence or abundance of a wildlife species. Wildlife species inventories include mammals, birds, amphibians, reptiles, insects, and plants, as well as their habitats. The Province collects, stores, and provides access to data and information on all wildlife species in B.C.

Wildlife species data and information includes counts, population parameter estimates, biological samples, animal capture locations, telemetry, habitat features, associated reports, maps, spatial files, and vegetation inventories. Having a central repository for wildlife species inventory data and information facilitates storage and access to the information required for making informed management decisions and supports improved conservation efforts.

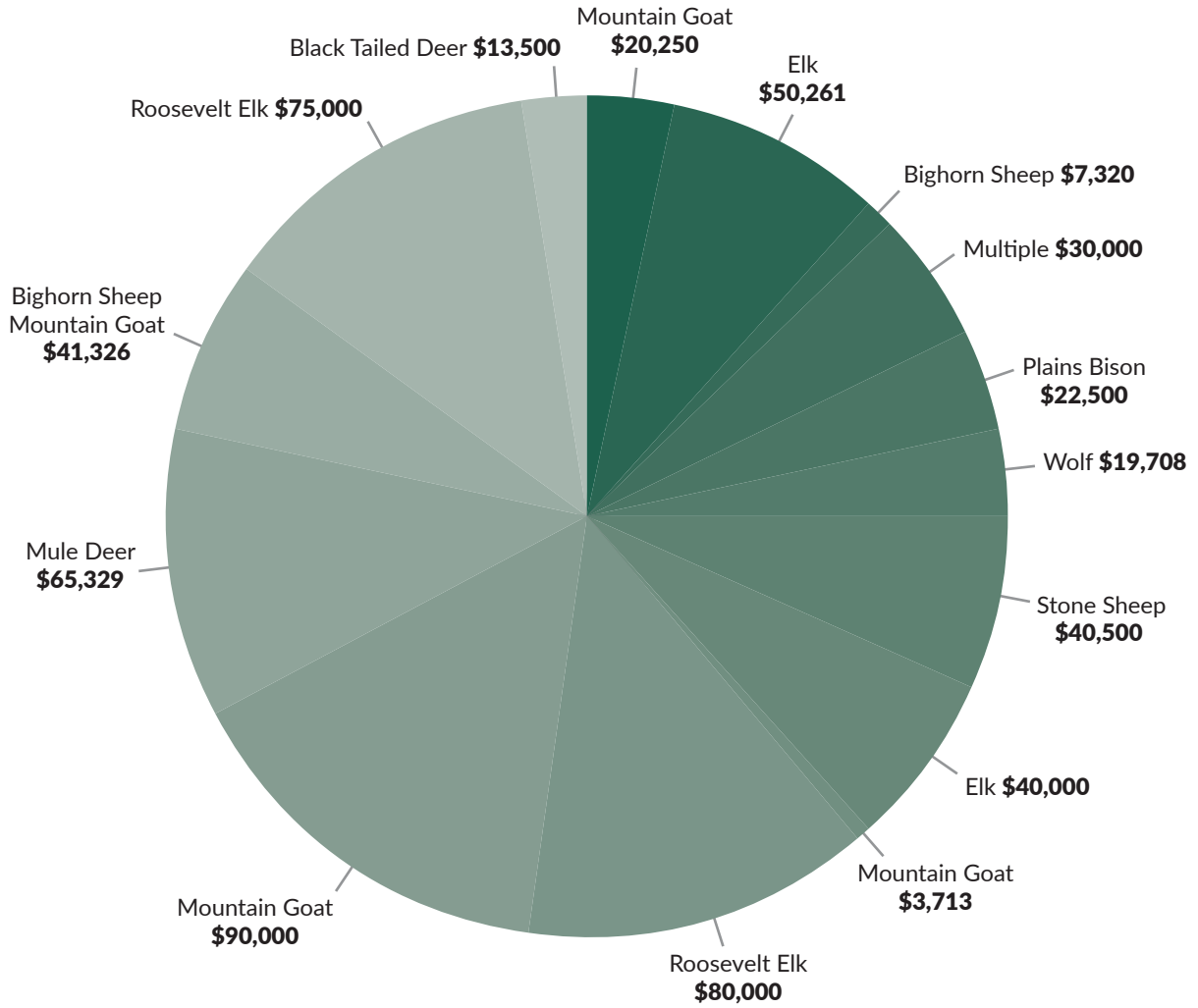
### Program Achievements

The East Kootenay elk monitoring project deployed 30 elk collars to learn about factors affecting survival on the west of Columbia Lake. This data was subsequently used in academic research investigating elk survival and migration in the East Kootenays. Population trend information is needed to set appropriate harvest levels to ensure Indigenous harvest needs are met. Indigenous communities were engaged to participate in field work components of this project.

South Coast mountain goat projects completed inventory flights to estimate population size and sex/age class distribution in a goat population unit. The data from the project was used to inform harvest allocation and recreation management decisions. A survey also informed a subset of Goat Winter Range polygons with high recreational disturbance.



### Wildlife Inventory Programs



## Moose-Specific Projects

Moose are not only an iconic animal in British Columbia; indigenous communities rely on moose for social, ceremonial, and sustenance purposes, and they also provide sustenance and recreational opportunities to both resident and visiting hunters. Hunting opportunities provide important social opportunities and economic benefits through tourism and guide outfitting.

Ministry staff work closely with Indigenous communities to undertake surveys, research, and assessments of moose health to inform decision-making. In 2019-20, the Ministry's investments in moose projects for moose enhancement included population inventory, habitat designation, habitat enhancement, and assessment of species interactions. The Ministry's moose research project started in 2013 and continues to provide important information for moose management.

Moose calf survival was confirmed to be an important factor in population trends as this mortality rate appears to be the main contributing factor to population decline. The Ministry is investigating multiple factors influencing the high mortality rates and will use the telemetry and habitat results to better inform management decisions and project investments. Ministry staff continue to communicate and work closely with Indigenous communities and regional and provincial wildlife stakeholders on program delivery and status of the moose enhancement program and research.

## Program Achievements

This highest Provincial Priority will determine both moose calf survival and moose population trends with changing climate conditions. Calf survival is the most important factor influencing moose population declines.

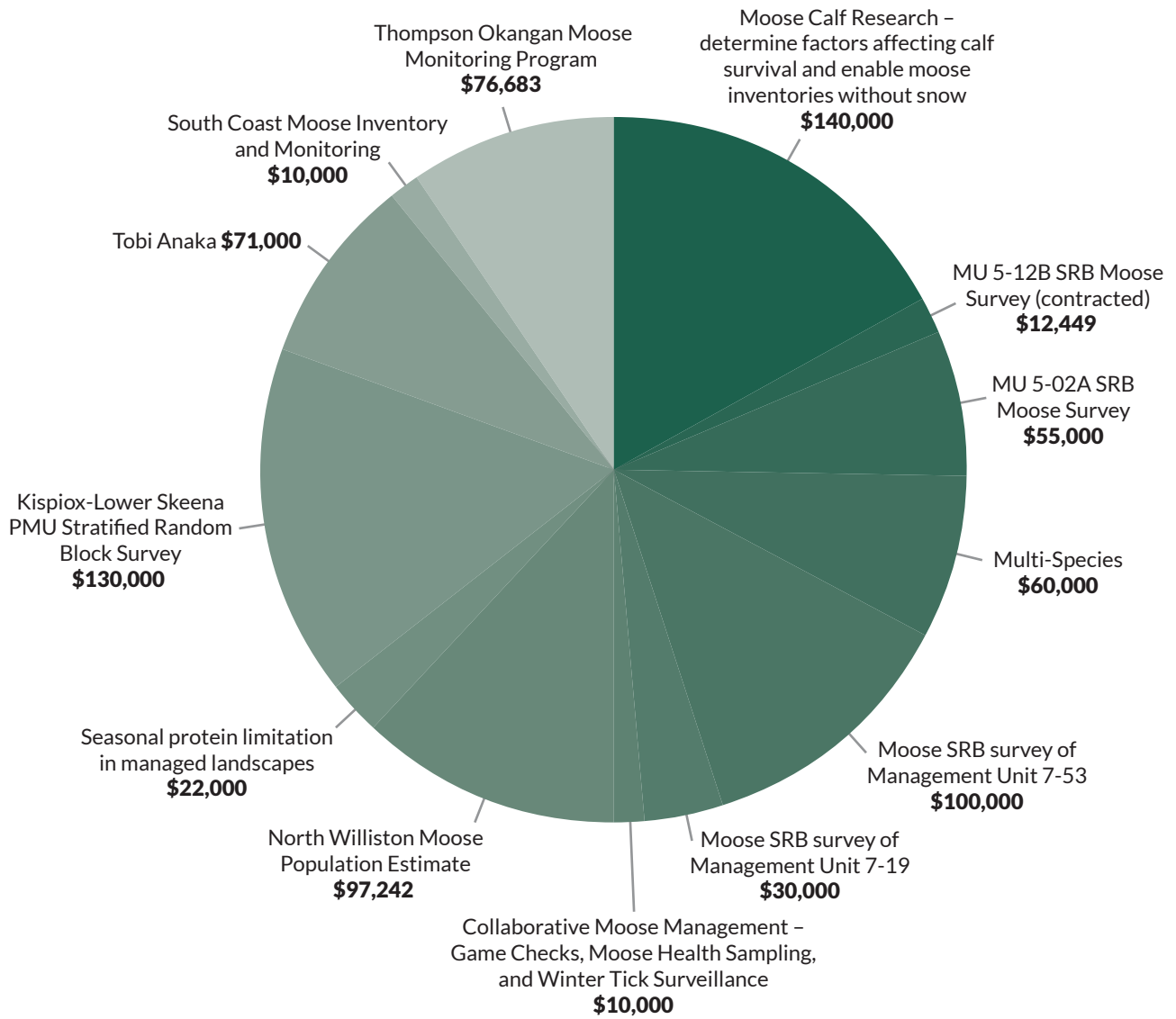
Forty 8-month old moose calves over two study areas were radio-collared in total. Collaring these calves will enable meeting 2 key objectives;

- determining factors affecting calf survival
- determining population trends

These ongoing projects will be conducted in the Thompson Okanagan and Omineca regions and can be extrapolated provincially. This information will also be used by a collaborating PhD student working on moose calf survival.

In 2019-20, FLNRORD, B.C. Conservation Officer Service, along with Kaska First Nation members, gathered data that will provide valuable population and demographic information to help guide moose management within an area in Fort Nelson that had not been surveyed in recent history.

### Moose Project Spending



## 2.9 Wildlife – Species at Risk

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

### Program Achievements

#### Spotted Owl

The Spotted Owl recovery project supported captive breeding efforts (artificial incubation, hand rearing, facility operations) of 8 breeding pairs. Young produced were eligible for release in spring 2020. The project also supported Barred Owl removal. Removal of Barred Owls from active Spotted Owl territories and at 2020 release locations will help support Spotted Owl recovery as the invasive Barred Owl competes for habitat. This project fully aligns with the Spotted Owl Recovery Action Plan and Federal Recovery Strategy.

Partners for this project included: Fish and Wildlife Compensation Program; Grouse Mountain Refuge for Endangered Wildlife (Veterinary Care); BC Hydro, Innergex, and other independent Power producers; BC Conservation Foundation; and independent donors.

#### White Sturgeon

Nechako White Sturgeon have been in the Nechako watershed for centuries and maybe as long as 10,000 years, yet within the last 100 years – the normal life span of a sturgeon – along with the number of Nechako White Sturgeon, has dropped significantly, and the group has become endangered.

Juvenile White Sturgeon survival and habitat tracking information is vital to supporting the refinement of hatchery outputs and understanding the effectiveness and limitations around recovery efforts. Survival data is required to support hatchery breeding plans and outputs to ensure downstream risks are mitigated.

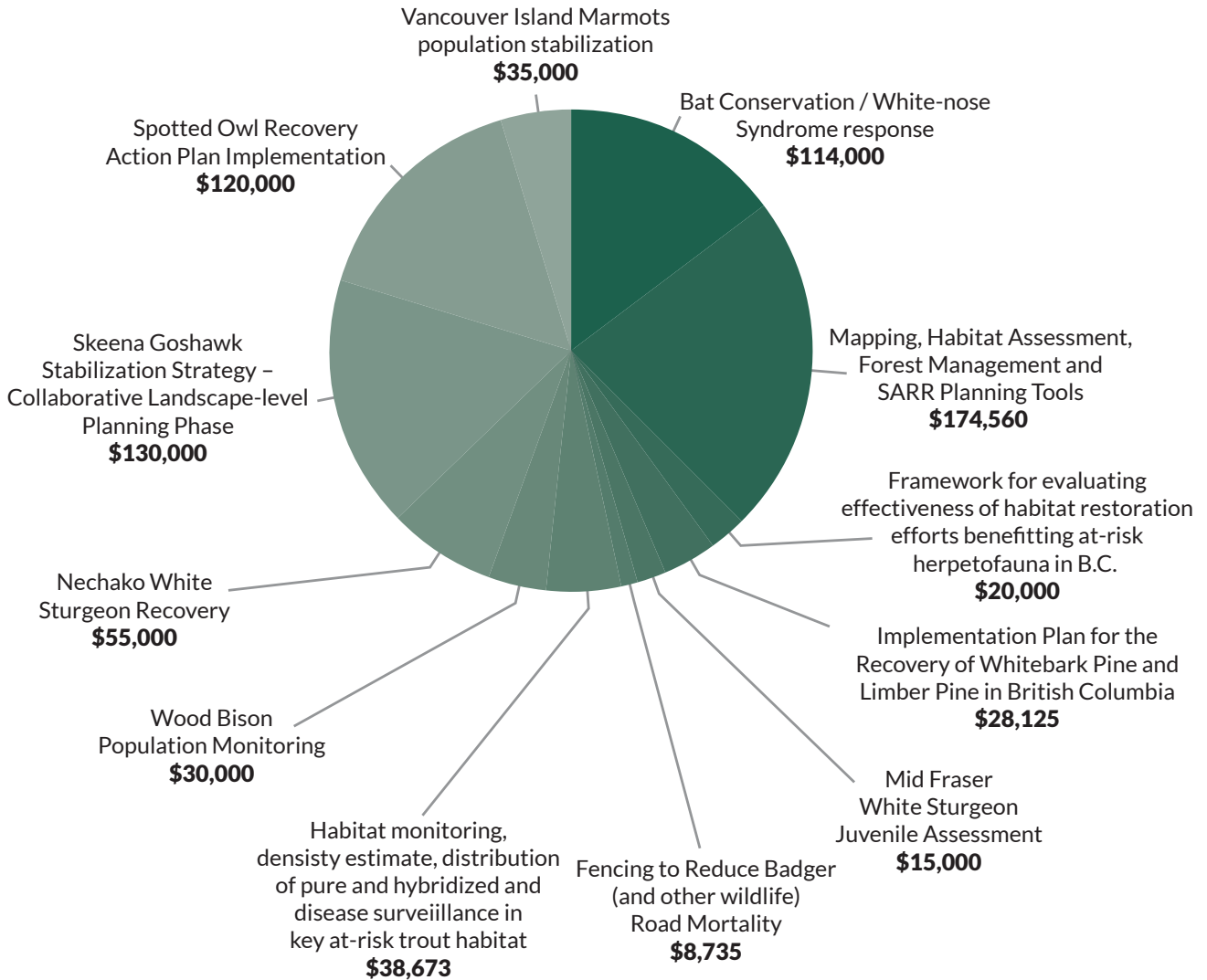
The information gathered from the Nechako White Sturgeon Recovery Initiative (NWSRI) project helps the Technical Working Group (comprised of: fisheries, habitat and river geomorphology scientists and researchers, as well as First Nations fisheries managers and government representatives) to better understand the spawning behaviours and locations adult Nechako White Sturgeon use within the Nechako River. This information is used to help inform habitat restoration projects with the goal to improve in-river survival of eggs to year-old sturgeon, as well as to understand the behavior of sturgeon in relation to the river characteristics. More information can be found in the 2019-20 NWSRI Annual Report.

#### Implementation Plan for the Recovery of Whitebark Pine and Limber Pine in British Columbia

The provincial Whitebark Pine and Limber Pine implementation plan will align with the Federal Recovery Strategy for Whitebark Pine where appropriate and will be developed in partnership with regions and First Nations communities.

Whitebark Pine is a keystone species occurring in sub-alpine and alpine environments. The seeds from Whitebark are an important food source for Grizzly Bears and a variety of other species. Whitebark Pine and Limber Pine management links to caribou and grizzly bear management and the implementation plan will take a multi-species management approach where possible.

### Species at Risk Programs





## 2.10 Wildlife – Habitat

Some wildlife species are sensitive to human activity. Key habitat areas are spatially located and have prescribed measures to ensure that wildlife habitat and population objectives are achieved. The tools in the Government Action Regulation (GAR) are used to legally designate habitat protection. GAR addresses planning and implementation of strategies to facilitate the management of wildlife species identified in FRPA.

### Summary of Habitat Protection Projects

- Tsilhqot'in Nation partnership in evaluating wildfire impact on blue-listed species
- Analysis of foraging and breeding habitats for the northern goshawk
- Identification of Temperature Sensitive Streams for steelhead, bull trout, rainbow trout, coho, chinook, and sockeye salmon
- Enhancing ungulate winter ranges through silviculture programs and Indigenous community engagement
- Assessments of Cariboo and Cottonwood River watersheds
- Haida Gwaii monitoring plan

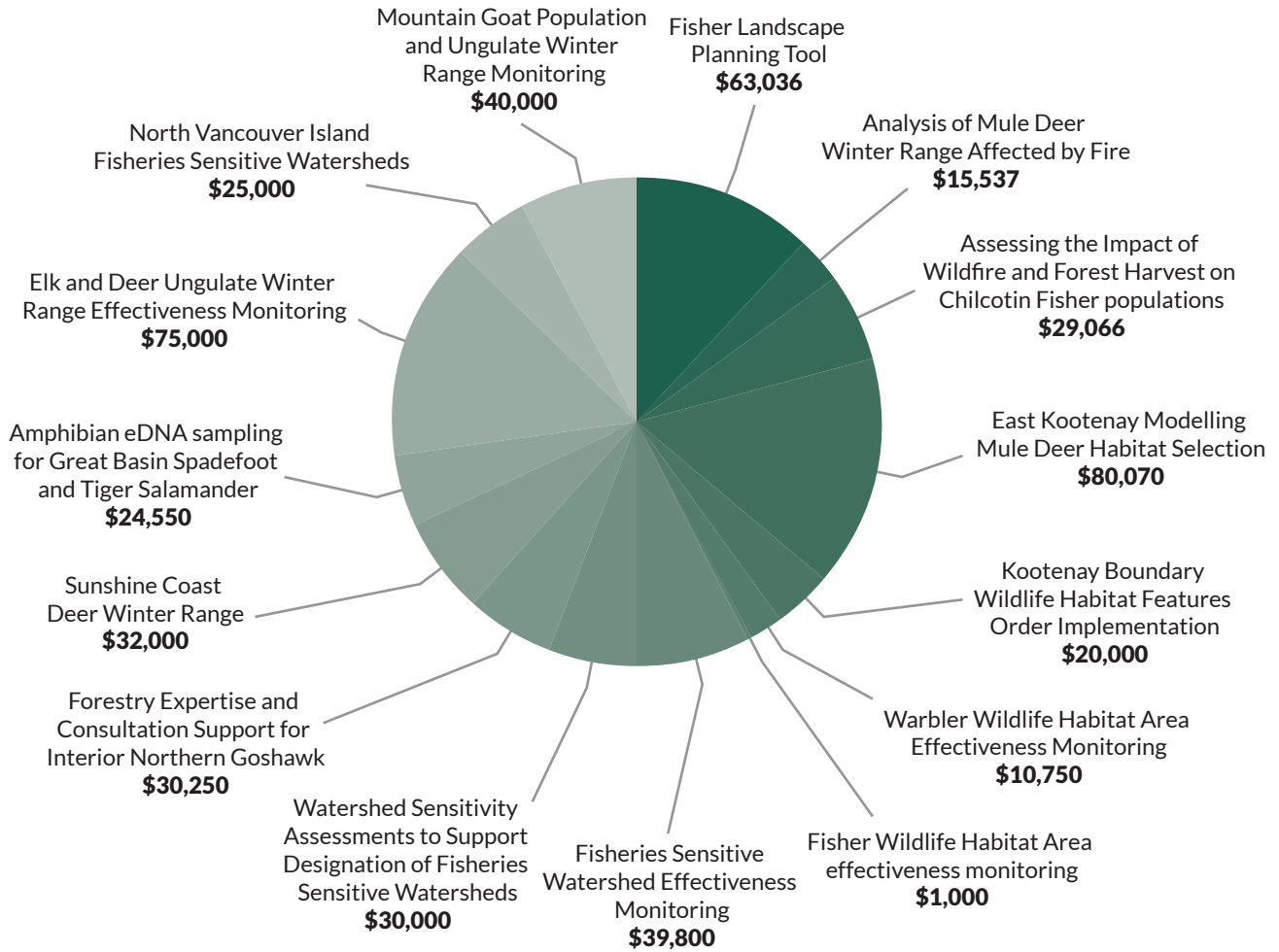
### Program Achievements

Significant improvements have been made to spatial modeling of ungulate winter range as a result of collaboration from Indigenous communities, NGOs, forest consultants, and FLRNORD.

Further evaluation of wildfire impacted Mule Deer Winter Range (MDWR) in the Cariboo Chilcotin. Information gathered during evaluation was used to confirm priority recovery areas that will be or have been surveyed for Douglas-fir planting and to verify areas that have been salvage harvested. Information gathered was also used to evaluate effectiveness of remaining MDWR habitat and identify additional long-term management needed in these areas to maintain local deer populations over winter.

Monitoring of Fisher (furbearing member of the weasel family) population size and use of disturbed habitats in the Cariboo Region through DNA mark and recapture. This project was completed in collaboration with the local Tsideldel First Nation, whose community members have been hired to assist in data collection and field work. Conservation of Fisher and an updated inventory was identified as a shared goal through discussions with both the Tsilhqot'in Nation, and the Northern Secwepemc te Qelmucw.

### Habitat (GAR) Programs



## 2.11 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 LBIS Program determines priority projects through 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, use can be optimized for recreation and other socio-economic benefits.

### Program Achievements

Recreation sites and trails in the Columbia Basin in Southeastern B.C. are getting a helping hand from

an enthusiastic group of recreation youth crews. The youth crews are part of a strategic effort to focus recreation site and trail investments on improving the condition of existing sites and trails within the Basin, many of which are facing increasing pressure from high public demand.

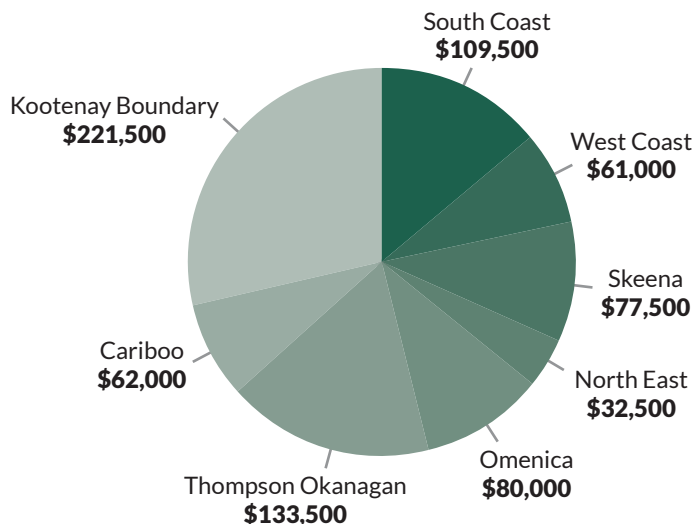
### 918 km of Trails

Recreation Trails are used for many different purposes (hiking, horseback riding, mountain biking, ATV riding, cross-country skiing, and snowmobiling). The types of trails available can range from rustic, single-track paths through dense forest to wide-tracked rail trails with high quality tread surfaces.

### 220 Recreation Sites

Recreation Sites provide a rustic camping experience. Generally located in remote areas and accessed by gravel forestry roads, recreation sites provide basic facilities, such as fire-rings, picnic tables, outhouses, and, where appropriate, boat-launching ramps.

**Trail and Site Maintenance by Area**

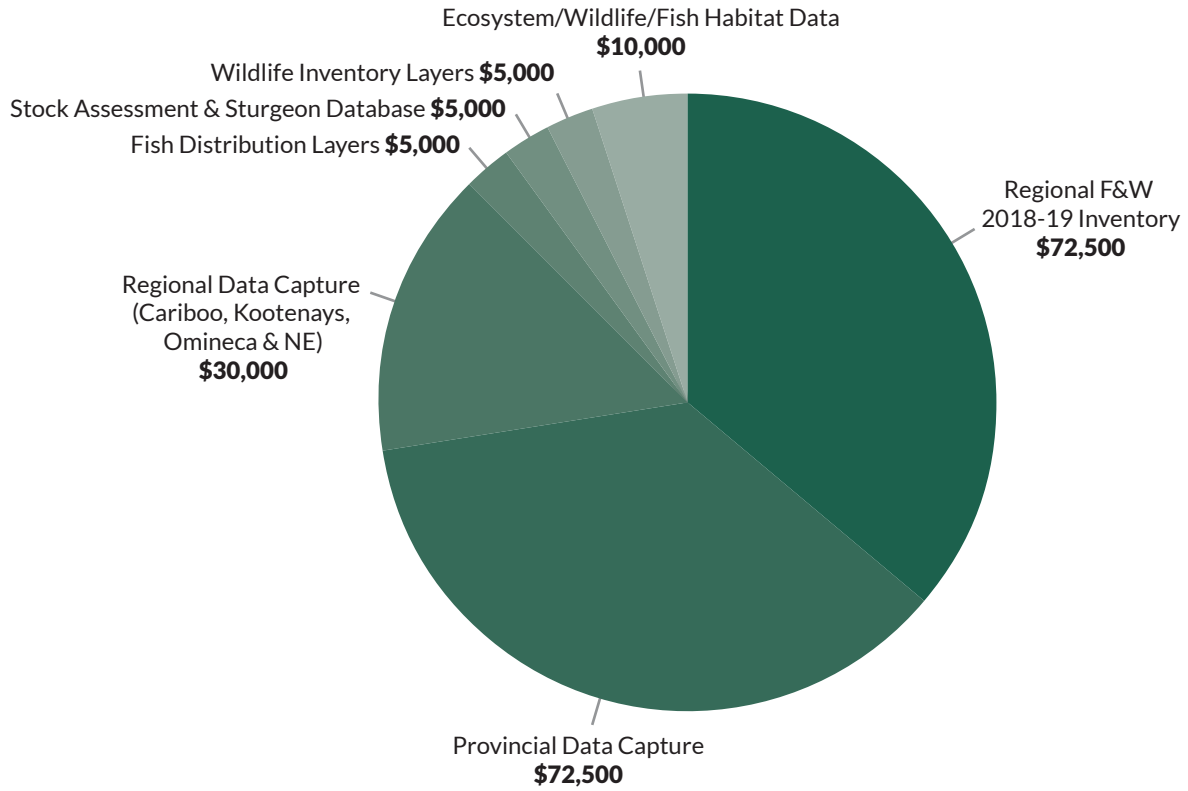


## 2.12 Ministry of Environment – Data Warehouse

Working with the Environmental Sustainability and Strategic Policy Division of MOE, backlogged program data is compiled, catalogued, cleaned, and

loaded into a designated LBIS repository. Data is both regional and provincial, and covers fish, wildlife, and habitat sources.

### Data Warehousing Programs



## 2.13 LBIS Stewardship/Cumulative Effects and Integrated Monitoring

LBIS oversight involves ensuring operational and financial efficiency managed through comprehensive planning, budgeting, delivery, reporting, and monitoring to effectively deliver the program. Provincial, regional, and district staff fill several key roles to inform decisions but ultimately, the LBIS team is responsible for fund management.

A strategic review of LBIS was conducted by Tom Lee Management Consultants throughout the 2019-20 program year. This strategic review was completed to ensure LBIS remains aligned with FLNRORD strategic priorities, is effective and efficient in its delivery, and is positioned to respond

to emerging stewardship priorities and resource stewardship commitments. Recommendations from the strategic review will be evaluated in 2020-21.

### Strategic Review Priorities

- Assessing if the Land Based Investment Strategy's goals, strategies, and the overall delivery model are delivering projects in an efficient, cost-effective, and timely manner
- Identifying areas of LBIS that can be enhanced in terms of program accountability, transparency, effectiveness, efficiency, and relevance, where possible



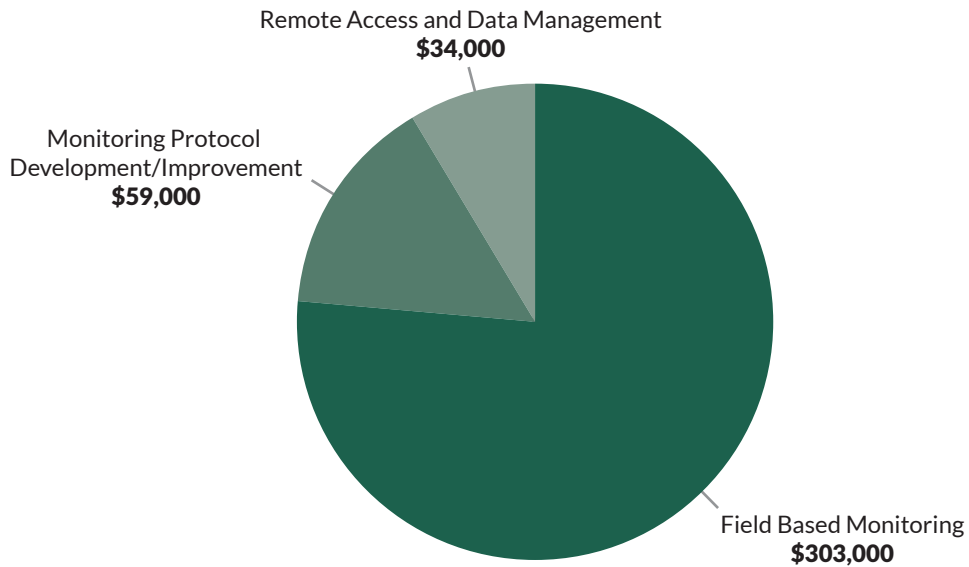
## Resource Stewardship Monitoring

Resource stewardship monitoring is science-based field monitoring that supports the credible evaluation of the conditions and trends of resource values, and the effectiveness of resource practices in achieving government's objectives for resource management and conservation. Monitoring data is analyzed and reported to inform natural resource planning and decision-making and supports updates to Provincial policy and legislation.

Monitoring activities completed in 2019-20 include:

- the development of a new monitoring protocol for karst and improvements to wetland and stand level biodiversity protocols
- field monitoring to collect 190 samples across 8 Districts for riparian, water quality, visual quality and cultural heritage resources and for targeted watershed assessments
- joint sampling the 22 Indigenous communities

### Monitoring Spending

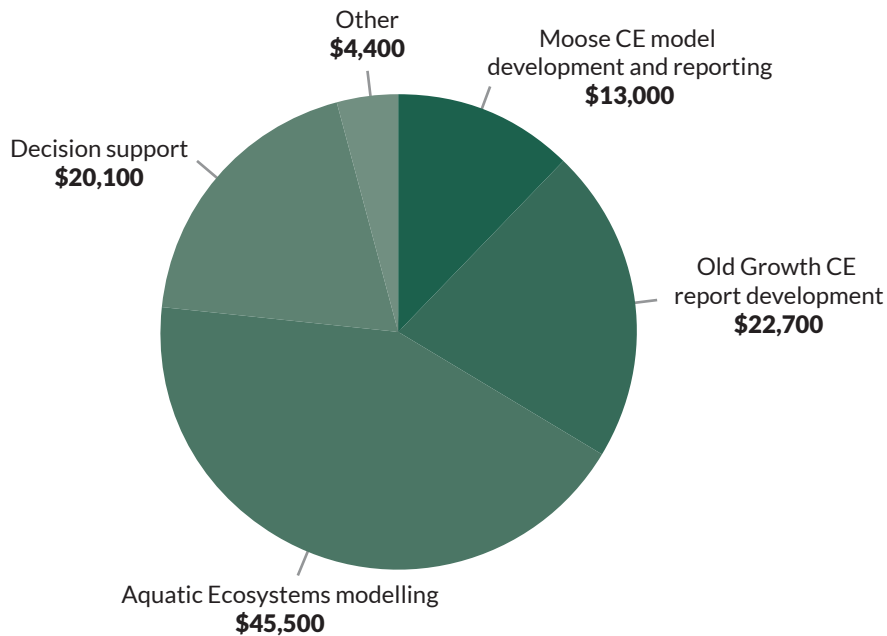


## Cumulative Effects Assessment

Cumulative Effects (CE) 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.


In 2019-20, activities were focused on modelling to support the aquatic ecosystems assessments, assessing and reporting on the current condition of moose and old growth forest, and on developing guidance and decision support tools.

### Cumulative Effects Spending



# APPENDIX

## FLNRORD Road Map

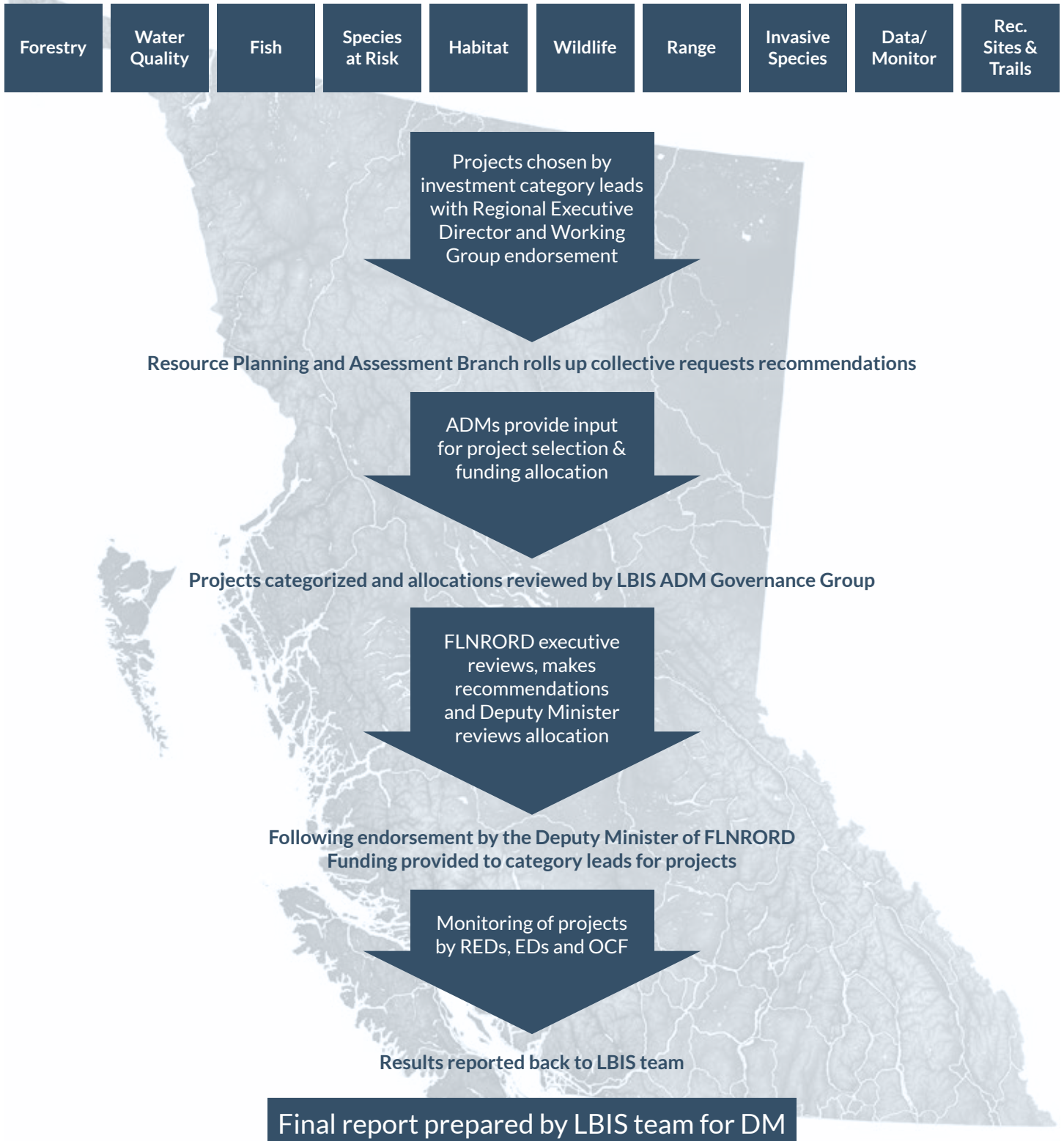
 <b>STRATEGIC ROADMAP – MINISTRY OF FORESTS, LANDS, NATURAL RESOURCE OPERATIONS AND RURAL DEVELOPMENT</b>						
<b>OUR VISION</b>   Stewardship of the Province's Crown land and resources that reflects the diverse values and interests of all British Columbians.						December 2017
<b>OUR MISSION</b>   We make, support and advise on stewardship decisions for B.C.'s land and resources and deliver services to provide environmental, economic, cultural and social benefits for all British Columbians. Our work supports a sustainable economy in all parts of the province and provides a foundation for true and lasting reconciliation with indigenous people.						
<b>OUR PEOPLE, OUR ORGANIZATION</b>   Our ministry's foundation is people and organizational excellence. We rely on having the right people, processes, decisions, information and systems to ensure an integrated approach to delivering our services. As our business evolves, we need to focus on diversity and inclusion and ensure an agile and flexible approach is in place for managing and deploying these critical resources. We take care of our people by focusing on learning, development, leadership, succession management and safety. We strive to attract, recruit and support employees who are innovative, skilled and passionate about their work and the public service.						
GOALS	1. EXCELLENCE IN DELIVERY OF OUR BUSINESS	2. SUSTAINABLE NATURAL RESOURCE MANAGEMENT	3. RECONCILIATION WITH INDIGENOUS PEOPLE	4. RESILIENCE TO NATURAL HAZARDS IN A CHANGING CLIMATE	5. REVITALIZING FORESTS AND THE FOREST SECTOR	6. RURAL DEVELOPMENT AND RESILIENCE
	OBJECTIVES	Public confidence and trust in the stewardship of British Columbia's natural resources.	Increased level of partnership with Indigenous people in the work of the Ministry. Increased participation by Indigenous people in the natural resource economy. Increased confidence of Indigenous people in the stewardship of natural resources.	Public safety, property, and natural and cultural resources protected from hazards, including wildfire, flood, drought and landslide.	A forest sector that builds on the strengths of the primary manufacturing sector. Increased domestic manufacturing that supports workers and rural economies through the emergence of new technologies, products, and markets. Increased investment in forests that provide economic, social and environmental benefits for British Columbians.	Thriving rural communities – indigenous and non-indigenous – that enable residents to achieve their desired objectives for themselves and future generations.
STRATEGIES	1.1 Deliver core business. 1.2 Ensure worker safety through the Safety Management Program and Safety Accord Forest Enterprise (SAFE certification). 1.3 Advance the NR Transformation and continuously improve business processes. 1.4 Continuously improve internal and external client service.	2.1 Modernize land-use planning to sustain important ecosystem components and processes. 2.2 Improve wildlife management and habitat conservation. 2.3 Report on key stewardship values through cumulative effects value assessments and integrated monitoring. 2.4 Implement recovery actions for species at risk, including woodland caribou, northern goshawk and marbled murrelet. 2.5 Fully implement the <i>Water Sustainability Act</i> . 2.6 Review professional reliance.* 2.7 Develop endangered species legislation.* 2.8 Implement a comprehensive climate-action strategy.*	3.1 Support negotiation and implement government to government agreements. 3.2 Review programs and policies to identify areas for advancement of the UNDRIP, TRC calls to action and results of the Tsilhqot'in decision. 3.3 Lead development of a cross ministry Collaborative Stewardship Framework. 3.4 Continuously improve consultation and engagement with Indigenous people to ensure durable decisions, and consistency with legal obligations. 3.5 Review and update revenue sharing opportunities (in partnership with MIRR). 3.6 Support First Nations cultural heritage, including preservation and protection.	4.1 Proactively and collaboratively manage hazards, including prevention, preparedness, mitigation and recovery. 4.2. Improve programs, policies and regulations to support wildfire prevention and mitigation, including implementation of recommendations of after-action reviews of the 2017 wildfire season. 4.3 Implement the Canadian Wildland Fire Strategy.	5.1 Expand investments in reforestation and forest treatments to mitigate and adapt to climate change. 5.2 Work with other ministers to ensure public projects prioritize the use of B.C. wood. 5.3 Address regulatory and capital barriers hampering the growth of engineered wood production. 5.4 Develop a strategy to create more jobs by processing more logs in B.C. 5.5 Work for a fair deal for B.C. wood products in softwood lumber negotiations with the United States. 5.6 Review policies and processes to encourage the use of residual fibre and prevent unnecessary slash pile burning.*	6.1 Coordinate land-based and socio-economic recovery from the 2017 wildfire and freshet season including community engagement, and provide rapid response to other economic disruptions. 6.2 Develop the framework and key themes for a Rural Development Strategy. 6.3 Provide on-the-ground support to build economic development capacity across rural BC. 6.4 Distribute the 2017/18 Rural Dividend Funds and develop options regarding the future of the fund. 6.5 Advance bio-economy opportunities for rural communities. 6.6 Engage with First Nation to advance specific opportunities for First Nations rural communities.

**OUR VALUES: COURAGE · TEAMWORK · PASSION · SERVICE · CURIOSITY · ACCOUNTABILITY · INTEGRITY**



## Allocation Process

### LAND BASED INVESTMENT STRATEGY POTENTIAL PROJECTS



Stages	Actions Taken
<b>Pre-Planning</b>	Before the fiscal year begins, investment category teams develop proposals outlining specific projects for funding. LBIS funds are not required to be the sole funding source for candidate projects and program areas are encouraged to leverage base funding through other available programs.
<b>Allocation Decision-Making</b>	RSD staff ensures that proposed projects align with LBIS core principles and works with Ministry Executive to make funding recommendations to the Deputy Minister. Working with Ministry executive, the Deputy Minister makes the final decision on investment category allocations.
<b>ADM Project Approvals</b>	Highest-priority projects are funded first in line with LBIS criteria, and funding is only provided to well-defined projects with clear deliverables. Clear direction is given to recipients of LBIS funds. This includes expectations around quarterly reporting requirements and guidelines for transferring funds.
<b>Allocation Monitoring and Assessment</b>	Project management and contract administration is carried out by each investment category and LBIS staff ensures allocation letter procedures are followed. A limited transfer of funds between projects may be allowed to provide flexibility in the delivery of primarily field-based activities. In the event of surplus funds nearing year end, resources may be re-allocated to other LBIS projects and funding priorities.



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