





## Message from the board chair

Welcome to our annual report covering the key highlights, decisions, and expenditures for the fiscal year 2020 (F20), from April 1, 2019, to March 31, 2020, in our Columbia Region.

The year saw the delivery of 38 fish and wildlife projects approved by our Columbia Region board. The 28 wildlife and 10 fish projects represent a total project investment of approximately \$5.75 million.

In late 2019, an independent, third-party evaluation and financial audit as required by our governance manual was completed. The audit, which looked at each of our three regions, was conducted by Ference and Co. and resulted in nine recommendations to refine, support, and strengthen our approach to conserving and enhancing fish and wildlife in watersheds impacted by BC Hydro dams.

The summary and final reports, which include the auditor's recommendations, were [posted to fwcp.ca](https://fwcp.ca) in October 2019, and our regional boards began work to respond to the recommendations. Since receiving the final report in fall 2019, we have prioritized the recommendations and developed actions to address each one.

We recognize some recommendations will build on each other and a staged, strategic approach is required. As a result, several recommendations have been prioritized for immediate action and progress is underway. Others will be addressed in sequence, as we balance progress on the audit recommendations with the ongoing delivery of fish and wildlife projects in our three regions.

We are committed to reporting on our progress and will provide annual updates for addressing all recommendations in our annual reports starting in 2021. Contact our program manager or regional manager anytime if you have questions.

Thank you to the many stewardship groups, consultants, First Nations, agencies, and others who apply for grants and do the projects to help us work toward our vision of thriving fish and wildlife populations in watersheds that are functioning and sustainable. We couldn't do it without you and the support of our board, technical committees, and staff.

Sincerely,



Trevor Oussoren  
FWCP Columbia Region Board Co-Chair



John Krebs  
FWCP Columbia Region Board Co-Chair

Cover: The Okanagan Nation Alliance created an inventory of rare old-growth ecosystems adjacent to the Kinbasket Reservoir in F20. As part of the work, core samples were taken from old-growth western redcedar, spruce, Douglas fir, subalpine fir, western hemlock, and black cottonwood. (COL-F20-W-3118). Photo: D. Adama, LGL Ltd.



Annual reports are also  
available for our Peace  
and Coastal regions at  
**[fwcp.ca](https://fwcp.ca)**.

# 1.0 Organizational overview

## 1.1 INTRODUCTION

With annual funding from BC Hydro, the Fish & Wildlife Compensation Program (FWCP) conserves and enhances fish and wildlife in 31 watersheds impacted by existing BC Hydro dams. The FWCP directs those funds toward priority actions across its three regions (Coastal, Columbia, and Peace) to fulfill its mission and work toward its vision of thriving fish and wildlife populations in watersheds that are functioning and sustainable.

BC Hydro has water licence obligations in the Columbia and Peace regions, and has made voluntary commitments to address the impacts of dams in the Coastal Region. BC Hydro fulfills the applicable obligations through the work of the FWCP. BC Hydro works in equal partnership with the Province of B.C., Fisheries and Oceans Canada (DFO), First Nations, and public stakeholders by participating on FWCP's regional boards.

The FWCP is governed through a framework that recognizes the regulatory accountabilities of agency partners (BC Hydro, the Province of B.C., and DFO), and ensures active participation and input from First Nations and public stakeholders. Independent board members in each region review, evaluate, and approve funding for all projects. Our boards include representatives from each of our FWCP partners: BC Hydro, the Province of B.C., First Nations, and public stakeholders, and—in our Coastal Region—Fisheries and Oceans Canada. When it comes to decision-making, input from each board member is given equal consideration through collaborative discussion. Learn more at [fwcp.ca/our-story](http://fwcp.ca/our-story).

Combined, our three regional boards have the following number of representatives:

- First Nations—15
- Public stakeholders—9
- BC Hydro—5
- Provincial government—5
- Federal government—1

Board representation by region is shown in Figure 1.1 below. In F20, the boards approved approximately \$9.2 million for 97 fish and wildlife projects.

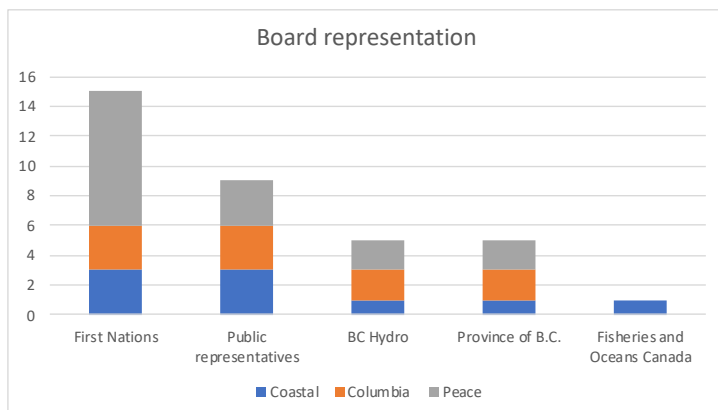


Figure 1.1: Board representation across all three FWCP regions

Since 1988, BC Hydro has provided approximately \$185 million to the FWCP to compensate for dam impacts, and the FWCP has funded more than 2,000 projects across its three regions.

The FWCP's Columbia Region was established in 1995 to compensate for fish and wildlife populations affected by the construction of BC Hydro dams in Canada's portion of the Columbia Basin (Figure 1.2).

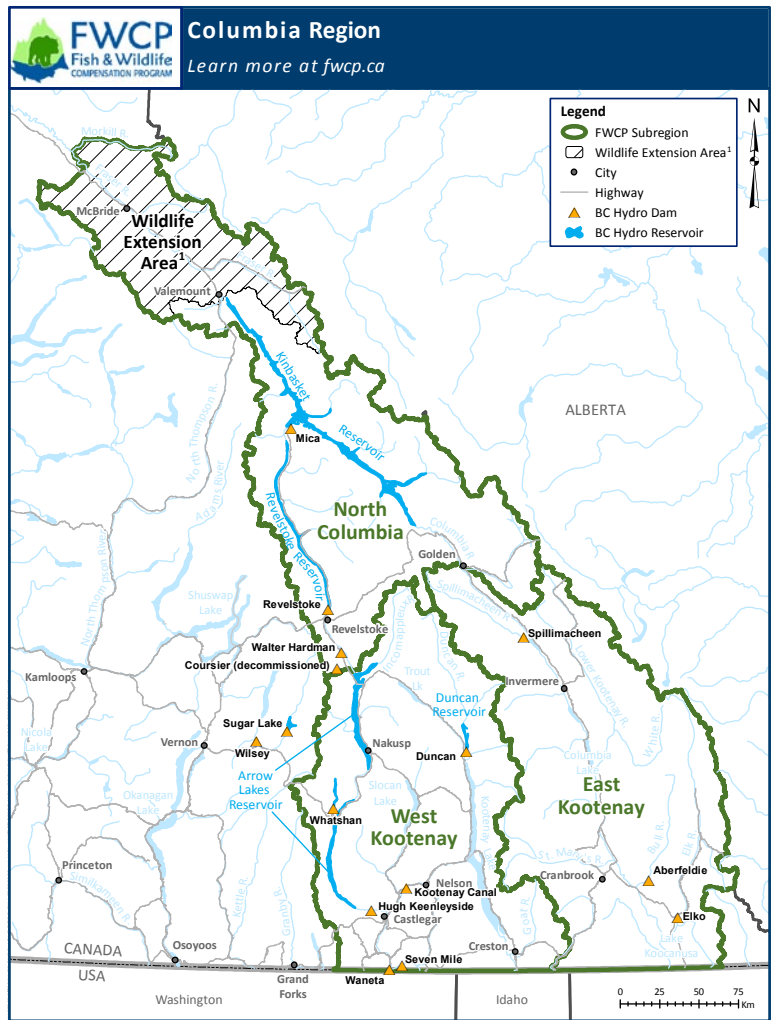


Figure 1.2: Map of the FWCP's Columbia Region

## 2.0 Our strategic approach

### 2.1 VISION AND MISSION

Our vision is for thriving fish and wildlife populations in watersheds that are functioning and sustainable, and our mission is to compensate for fish, wildlife, and their supporting habitats in watersheds impacted by BC Hydro owned and operated generation facilities.

We take a forward-looking, ecosystem-based approach that defines the desired outcomes and takes actions to restore, enhance, and conserve priority species and their habitats. The FWCP's strategic objectives are:

#### Conservation

Maintain or improve the status of species or ecosystems of concern.

Maintain or improve the integrity and productivity of ecosystems and habitats.

#### Sustainable use

Maintain or improve opportunities for sustainable use, including harvesting and other uses. Harvesting includes First Nations, recreational, sport, and commercial harvests. Other uses may include cultural, medicinal, or non-consumptive uses.

#### Community engagement

Build and maintain relationships with stakeholders and Indigenous communities. This objective stems from BC Hydro's social responsibility policy and the Province of B.C.'s shared stewardship objective.

More details can be found on these objectives in our [governance manual](#).

### 2.2 ACTION PLANS

Our action plans guide FWCP investments in fish and wildlife projects, and are referenced annually by our regional boards to track progress toward implementation, set annual priorities, and guide decision-making in setting out and approving the annual operating plan for each region. Actions in our action plans are eligible for FWCP funding and align with our vision, mission, and geographic scope.

Our Columbia Region action plans were updated during 2019 with local input from First Nations, stakeholders, and public stakeholders, and can be viewed at [fwcp.ca/region/columbia-region/](https://fwcp.ca/region/columbia-region/). The previous action plans, spanning the years 2012 to 2019, have been archived for reference and are at [fwcp.ca/archived-action-plans/](https://fwcp.ca/archived-action-plans/).



ʔaq'am recorded over 700 wildlife trees as part of an ecosystem restoration project in the East Kootenay. The First Nation community started a five-year project to turn a dense Douglas-fir forest into open range and open forest to benefit flammulated owls, long-billed curlews, Lewis's woodpeckers (above), common nighthawks, and yellow badgers. (COL-F20-W-3026). Photo: iStock

## 3.0 Board and committee members

### FWCP Columbia Region board 2019–2020

The board guides our work and is responsible for approving our Columbia Region projects and budget. In addition to funding projects through our annual grants, the board may choose to direct projects and approve funding to address regional priorities. The Columbia Region board members during F20 were:

<b>Trevor Oussoren, Co-chair</b>	BC Hydro
<b>John Krebs, Co-chair</b>	Ministry of Forests, Lands, Natural Resources and Rural Development (FLNR)
<b>David Tesch/Damien Joly</b>	Ministry of Environment and Climate Change Strategy (MOE&CCS)
<b>Kim Cox</b>	BC Hydro
<b>Misun Kang</b>	Ktunaxa Nation Council
<b>Mark Thomas</b>	Secwepemc Nation
<b>Howie Wright</b>	Okanagan Nation Alliance
<b>Moss Giasson</b>	Public
<b>Rob Neil</b>	Public
<b>Wendy Booth</b>	Public

### Technical committees

The board is supported by two technical committees, one for wildlife projects, and one for fish projects. The primary roles of the technical committees are: to provide a technical advisory role, including fair and objective technical review, evaluation, and ranking of fish and wildlife project proposals; support the development of strategic plans; assist in the development and oversight of directed projects; and to provide advice on the effective implementation of action plans.

### Fish technical committee

<b>Karen Bray, Chair</b>	BC Hydro
<b>Will Warnock</b>	FLNR
<b>Tyler Weir</b>	FLNR
<b>James Crossman</b>	BC Hydro
<b>Michael Zimmer</b>	Okanagan Nation Alliance
<b>Vacant</b>	Ktunaxa Nation Council
<b>Vacant</b>	Secwepemc Nation

### Wildlife technical committee

<b>Lindsay Anderson, Chair</b>	FLNR
<b>Tom Appleby</b>	BC Hydro
<b>Cathy Conroy</b>	Ktunaxa Nation Council
<b>David DeRosa</b>	Okanagan Nation Alliance
<b>Patrick Stent</b>	FLNR
<b>Vacant</b>	Secwepemc Nation

### Policy committee

The policy committee provides oversight on a range of fish and wildlife-related issues. The F20 policy committee members were:

**Cheryl Webb/Brian Fanos**, Regional Director Pacific Region, Fisheries and Oceans Canada

**Jennifer McGuire**, Assistant Deputy Minister, B.C. Ministry of Environment & Climate Change Strategy

**Karen Popoff**, Director, Environment, BC Hydro

In each region, program management and operations were implemented by a region manager, and supported by Trevor Oussoren, FWCP program manager; Crystal Klym, team lead; and Lorraine Ens, business coordinator. In our FWCP Columbia Region during F20, Crystal Klym was also our dedicated region manager.



Our 10-member Columbia Region board consists of three First Nations, three public representatives, and two representatives each from BC Hydro and the Province of B.C., pictured here in Invermere in October 2019. From left: Rob Neil, Kim Cox, Moss Giasson, Misun Kang, Wendy Booth, John Krebs, and Trevor Oussoren. Missing: Damien Joly, Howie Wright, and Mark Thomas.



# 4.0 Project funding and grants

## 4.1 PROVINCIAL PROJECT FUNDING

In F20, 97 projects were approved for a total FWCP contribution of approximately \$9.2 million. The total value of these projects—including leveraged funding from other organizations and in-kind resources—was \$12.8 million.

Final reports for all FWCP-funded projects are loaded onto [Ecocat](#) or [SIWE](#) provincial databases, and searchable spreadsheets of reports for each FWCP region are available at [fwcp.ca/results/](#). Due to the COVID-19 pandemic in early 2020, there were delays in completing some projects and final reports.

## 4.2 COLUMBIA REGION PROJECT FUNDING

In our Columbia Region, the FWCP supports the delivery of fish and wildlife projects in a variety of ways, including grant applications, long-term agreements, and directed projects.

### Grant applications

FWCP’s annual grant intake opens each summer and closes in late fall. All grant applications go through a three-stage review process—for more details visit our FAQs at [fwcp.ca/apply-for-funding/](#).

In F20, a total of 51 grant applications were received and our Columbia Region board approved 25 projects for a total funding contribution of \$1.126 million. First Nations, stewardship groups, consultants, and agencies are leading the 20 wildlife projects (approximately \$999,000) and five fish projects (approximately \$127,000) that will help conserve and enhance fish and wildlife in watersheds impacted by BC Hydro dams.

### Annual and ongoing projects

In F20, our Columbia Region board approved a total funding contribution of nearly \$4.624 million to support the implementation of 13 annual and ongoing fish and wildlife projects. These projects are typically comprised of multiple sub-projects and activities and are delivered with support from the Province of B.C. through a letter of agreement and other regional partners through contracts and contribution agreements.

For F20, there were five annual and ongoing fish projects for approximately \$2.376 million in funding. These were adding nutrients to both Kootenay Lake and Arrow Lakes Reservoir as part of the Nutrient Restoration Program, Columbia River white sturgeon recovery, and operations at both Hill Creek (north of Nakusp) and Meadow Creek spawning channels.

For wildlife, there were eight projects for nearly \$2.248 million in FWCP funding. These were: stewardship of conservation lands, enhancing upland and dryland species in the East and West Kootenay, enhancing non-game habitat, caribou recovery, northern leopard frog recovery, restoring and enhancing wetlands, and land securement.

### Directed projects

Our Columbia Region board did not fund any directed projects in F20.

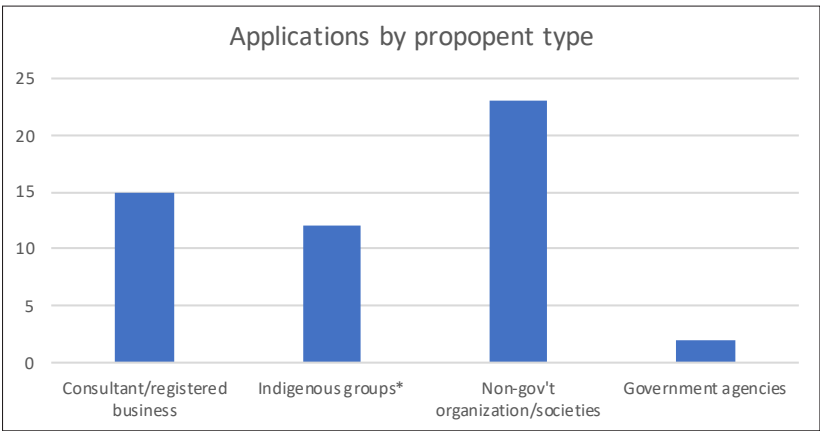


Figure 4.1: Applications received for F20 by proponent type

\*Includes Indigenous-owned businesses and Indigenous organizations

## Community Engagement Grant

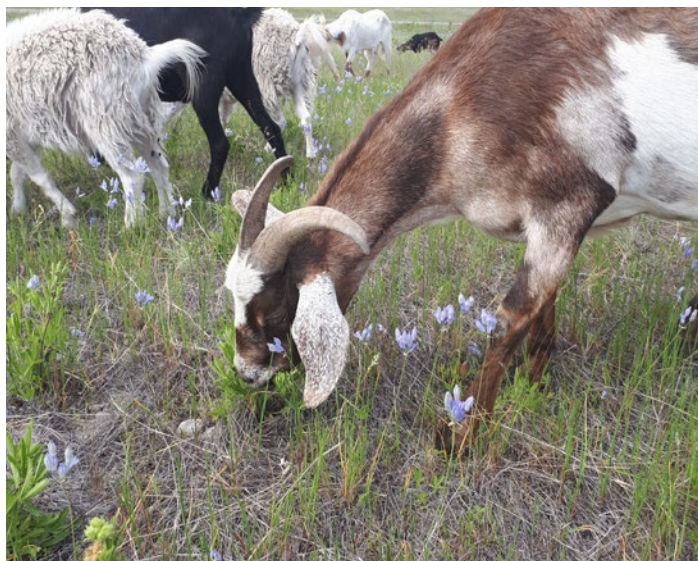
The goal of the Community Engagement Grant (CEG) is to provide an opportunity for FWCP stakeholders and First Nations to apply for a small grant to support their conservation and enhancement work that aligns with our action plans. Our Columbia Region manager approved 14 CEG applications and fully allocated the \$7,500 available. Projects included creating a 3D wetland model, installing riparian signage near Rossland, hosting an invasive plant inventory workshop in Revelstoke, holding a wetland presentation in the Slocan Valley, developing signage and brochures for a wetland management area near Canal Flats, and invasive weed removal and native species planting near Sparwood.

A full list of CEGs approved for F20 is shown in the table below.

Table 4.1: Community Engagement Grants provided in the Columbia Region for F20

Applicant	Project title	Approved funds
Columbia Lake Stewardship Soc.	Columbia Lake Ecosystem Outreach and Education	\$1,000
Elk River Alliance	Weeds Out of Our Wetland	\$1,000
WINGS	WINGS 2019 - Go and Explore	\$500
Rossland Summit School	RSS Bio Blitz	\$500
Friends of Kootenay Lake	Friends of Kootenay Lake Annual Kootenay Lake Summit	\$500
Valhalla Foundation of Ecology	Snk'Mip Marsh Sanctuary Wetland Restoration Project: Community Liason	\$500
EKISC	Sinclair Creek Restoration	\$1,000
CKISS	Play Clean Go - Love Your Trails Day	\$500
CSISS	Invasive Plant Inventory Workshop	\$500
Isaac Ecological (3x region)	BC-Alberta Bat Conservation Planning Workshop	\$500
BC Wildlife Federation (COL and COA)	BCWF Youth Camp Conservation Projects	\$250
CBEEN	Enquiring Voices Environmental Education Gathering	\$250
Rossland Streamkeepers	Riparian Signage	\$300
Rossland Soc. For Enviro Action	3D Model Cambridge Wetland Violin Lake	\$200

## 4.3 COLUMBIA REGION PROJECT HIGHLIGHTS



Nearly 200 goats were used to graze on invasive sulphur cinquefoil on eight hectares of rangeland on the Tobacco Plains Indian Reserve. Following two grazing treatments, above-ground biomass and the number of seed heads were reduced by 93% and 99%, respectively. (COL-F20-W-3070). Photo: M. Juckers.



Surveys assessing amphibians and their habitat were conducted at 50 sites in the Robson Valley near Valemount, creating the first long-term population trend data in some areas. Amphibians including western toad, Columbia spotted frog, wood frog (above), and long-toed salamander were detected at 34 of the 50 sites. (COLF20-W-3075). Photo: K. Tuttle





A five-year project to fill data gaps about elk in the Elk Valley was completed. Seventy-eight adult cows were radio-collared and monitored, providing over 76,000 point locations and collating more than 160 elk-years of migration and survival data. (COL-F20-W-3070). Photo: iStock



Habitat improvement at Murphy Creek spawning channel included planting native shrubs in 2019. Ninety-seven percent of more than 100 plants have survived thanks to regular watering. (COL-F20-F-3073 COL). Photo: Trail Wildlife Association



Nearly 20 hectares of ungulate overwintering and range areas were restored on the Marion Creek Benchlands, west of Columbia Lake. Hand-slashing improved the habitat for federally listed Endangered badgers, provincially Threatened Lewis's woodpeckers, as well as elk and mule deer. (COL-F20-W-3058). Photo: Nature Conservancy of Canada



## 5.0 Financial report

Annual funding is allocated by our Columbia Region board toward fish and wildlife projects, administration, and communications (e.g., salaries; safety, board, and technical committee expenses; communications support; advertising). These allocations form the annual operating plan. Any unallocated funds are carried forward, i.e., “unspent surplus dollars”, and are available for future spending.

Our FWCP Columbia Region board approved an F20 budget of approximately \$6.292 million and utilized 100% of its annual funding from BC Hydro—which for F20 was just under \$5.025 million. This, together with unspent funds from previous years of \$3.372 million, resulted in available funds of approximately \$8.397 million.

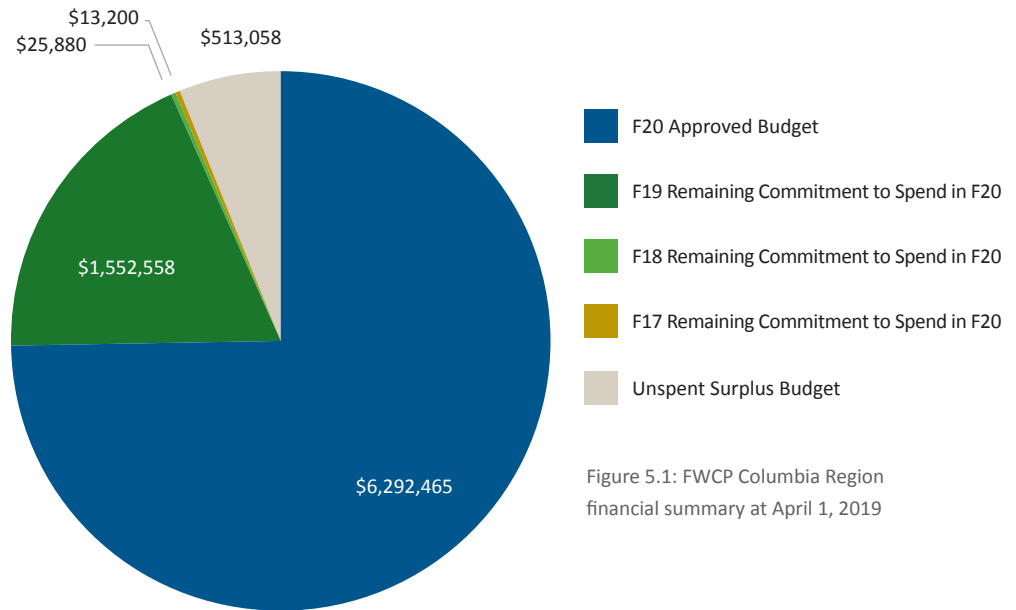


Figure 5.1: FWCP Columbia Region financial summary at April 1, 2019

Figure 5.1 (above) shows this total of just over \$8.397 million in the FWCP Columbia Region account as of April 1, 2019. This comprises the approved budget of approximately \$6.292 million, plus an unspent surplus of approximately \$0.513 million and prior year funding commitments remaining of approximately \$13,000, \$26,000, and \$1.553 million for F17, F18, and F19, respectively.

Figure 5.2 (below, left) illustrates the approved F20 budget as of April 1, 2019. Funding for wildlife projects made up 41% of the budget, and fish projects 40%. A further 10% of the budget was allocated for land securement initiatives. Administrative costs made up approximately 6% of the total budget, including regional manager salary and expenses; costs to support the updating of the Columbia Region actions plans; office-related expenditures; support staff, board, and technical committee costs; fees associated with uploading reports to the provincial data warehouses; and maintenance and refinements to our grant management system. The remaining allocation was for communications, for approximately 3% of the annual budget.

Figure 5.3 (below, right) shows the approved projects for F20 by project type. Nearly 73% of projects were either habitat- or species-based.

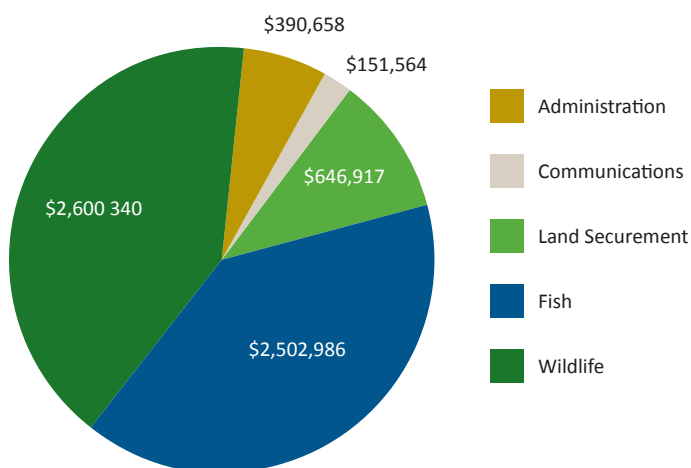


Figure 5.2: Breakdown of approved Columbia Region budget at April 1, 2019

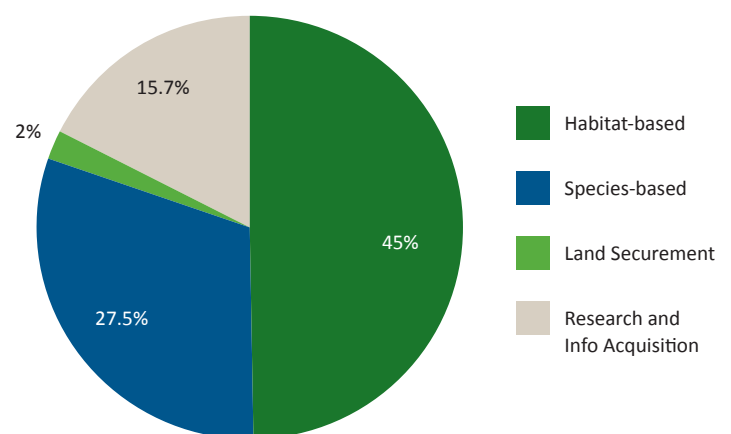


Figure 5.3: Breakdown of approved F20 Columbia Region budget by project type

The FWCP encourages grant applicants to seek additional funding sources (e.g., other funding agencies, in-kind contributions) to leverage FWCP funding contributions. Demonstration that funds have been leveraged for a project is a consideration for the board's decision-making. In F20, the FWCP funding allocation for grant-based projects was \$1.126 million. The total value of the projects was just under \$2.78 million as a result of financial partnerships and in-kind contributions. In other words, for every \$1 dollar invested by FWCP, others contributed nearly \$1.5, greatly increasing the value of the FWCP's investment overall.

FWCP Columbia Region expenditures up to March 31, 2020, are shown in Table 5.1. This reflects a "snapshot" in time of actual and planned payments made related to F20 projects. At the end of the fiscal year, approximately \$3.854 million of the F20 budget had been spent, while \$2.292 million remained as an F20 commitment to spend in F21, just over \$165,000 of which will go into the "unspent surplus funds."

Table 5.1: Program expenditures to March 31, 2020

Fund category	F20 approved budget	Paid up to Mar. 2020	Planned payments <sup>1</sup>	Unspent funds <sup>2</sup>
Administration	\$390,658	\$280,963	\$59,019	\$50,676
Communciations	\$151,564	\$118,332	\$35,210	\$1,978
Land securement	\$646,917	\$476,154	\$170,763	\$0
Fish	\$2,502,986	\$1,654,602	\$841,944	\$6,440
Wildlife	\$2,600,340	\$1,305,523	\$1,184,725	\$110,093
<b>TOTAL</b>	<b>\$6,292,465</b>	<b>\$3,835,537</b>	<b>\$2,291,661</b>	<b>\$165,231</b>

Note 1: Planned payments represents expected invoices for approved, ongoing projects that have not yet submitted final reports by March 31, 2020

Note 2: Unspent funds are carried forward and available for next fiscal year

In addition, the balance of prior year funding commitments anticipated to be spent in F21 was \$83,601 from F19 and \$1,250 from F18, resulting in an unspent surplus of just over \$1.118 million (Figure 5.4, below).

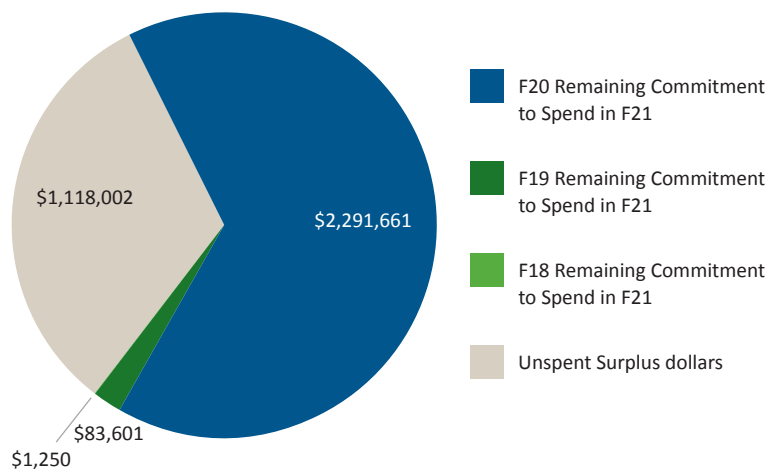


Figure 5.4: Financial summary of FWCP Columbia Region, as of March 31, 2020 (end of fiscal year).

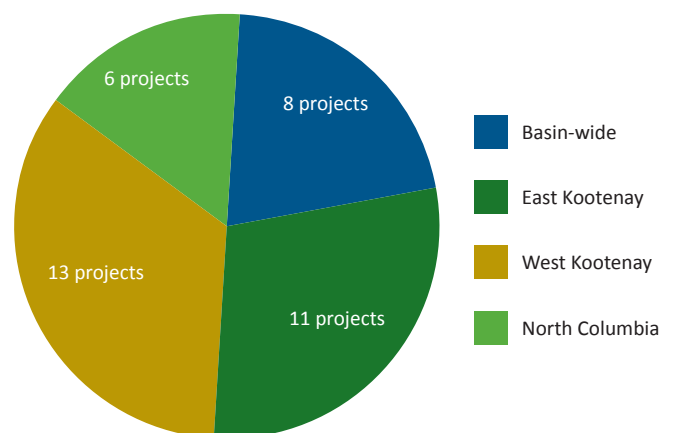


Figure 5.5: Number of approved projects by sub-region.



## 6.0 F20 projects

Table 6.1 provides a listing of 2019–2020 fish and wildlife projects approved for funding. Funding identified in the following tables may vary from the approved budget, as of April 1, 2019, due to project budget increases or decreases as projects progressed throughout the fiscal year. Final reports for all projects are posted to the appropriate provincial databases once available. Visit [fwcp.ca/results](http://fwcp.ca/results) for an updated list of all available final reports.

Table 6.1: 2019–2020 projects

Project ID, project lead, FWCP \$s, and sub-region	Project title and description	Outcomes
COL-F20-F-3006-DCA, Ministry of Forests, Lands, Natural Resource Operations and Rural Development, \$749,736, West Kootenay	<b>Arrow Lakes Reservoir Nutrient Restoration Program</b> To address nutrient losses in Arrow Lakes Reservoir as a result of the construction of the Mica and Revelstoke dams, this program takes a bottom-up approach with the addition of nutrients (nitrogen and phosphorus in the form of liquid agricultural-grade fertilizer). This supports phytoplankton populations that are suitable for the production of daphnia, a main food source for kokanee.	<b>Nutrient Restoration Program Arrow Lakes Reservoir: kokanee spawner abundance higher in 2019</b> In 2019, 40.5 metric tonnes (MT) of phosphorus and 248.8 MT of nitrogen were added to Arrow Lakes Reservoir. Since 2016, approximately 40 MT of phosphorus from fertilizer have been added every year. Secchi results showed that the water in both Upper Arrow Lake and Lower Arrow Lake was more turbid in 2019 than previous years, and yet total phytoplankton abundance was lower than the long-term mean for all basins—a surprising result considering the increased turbidity and consistent nutrient additions. Daphnia biomass was lower than average, which may be attributable to lower than average summer temperatures. Mysid density increased in 2019 from the previous year, but it remains within the range of the long-term average. Kokanee spawner abundance was higher in 2019 than 2018, while in-lake kokanee abundance was lower than average, which could be attributed to an environmental variable. Bull trout condition factor was lower in 2019 than 2018, but it remains higher than the pre-nutrient addition era.
COL-F20-F-3007-DCA, Ministry of Forests, Lands, Natural Resource Operations and Rural Development, \$1,060,612, West Kootenay	<b>Kootenay Lake Nutrient Restoration Program: North Arm</b> To address nutrient losses in Kootenay Lake as a result of the construction of the Duncan and Libby dams, this program takes a bottom-up approach with the addition of nitrogen and phosphorus. Nitrogen and phosphorus are added in the form of liquid agricultural-grade fertilizer to support phytoplankton populations that are suitable for the production of daphnia, a main food source for kokanee.	<b>Nutrient Restoration Program Kootenay Lake: increased survival of one- and two-year-old kokanee</b> The biomass of daphnia, the preferred food source of kokanee, was higher in the North Arm of Kootenay Lake in 2019 than the long-term trends. The daphnia biomass has been high since the decrease in kokanee—the reduced predation pressure on zooplankton has allowed both the biomass to increase as well as the size of individual daphnia. Average mysid densities have increased slightly from the long-term average. Kokanee spawner abundance has increased (though it is well below the long-term average), and the survival of in-lake one-to-two-year-olds has also increased, indicating an improvement in kokanee recovery. High discharge events in the fall of 2019 resulted in the delay or cancellation of bull trout redd counts.
COL-F20-F-3008-DCA, Ministry of Forests, Lands, Natural Resource Operations and Rural Development, \$158,327, West Kootenay	<b>F20 Hill Creek Spawning Channel Maintenance and Monitoring</b> This project supports ongoing operations, maintenance, and monitoring at the Hill Creek spawning channel, including kokanee fry emigration; rainbow trout redd counts and fry emergence; adult kokanee size, fecundity, and escapement; overwintering egg survival; and water quality at the spawning channel. The spawning channel was built as compensation for spawning habitat lost due to the construction of the Revelstoke Dam, and it now provides additional spawning habitat for kokanee and rainbow trout from Arrow Lakes Reservoir.	<b>Hill Creek spawning channel: 1320,000 kokanee spawners in channel</b> In spring 2019, kokanee fry production in Hill Creek spawning channel was estimated at 3.26 million for the spawning channel and 3.4 million in total, assuming 5% egg-fry survival below the channel. In the spawning channel, egg-to-fry survival was 58% (it has exceeded 50% since 2006). Rainbow trout spawning in the channel took place from May 23 to June 6, 2019. A total of 114 redds were counted over that period, of which 30 were large (piscivore) redds greater than 2 m <sup>2</sup> . No other predation occurred in 2018 and 2019. The adult kokanee run in fall 2019 was estimated at 129,766: 63,030 were admitted to the channel, 16,530 spawned downstream of the channel, 45,206 were used for egg collection by the Freshwater Fisheries Society of BC, and 5,000 were given to First Nations. Potential egg deposition in the channel is 6.3 million. The average size of spawners remained small, at just over 22 cm, and fecundity averaged 242 eggs.

Project ID, project lead, FWCP \$s, and sub-region	Project title and description	Outcomes
COL-F20-F-3009-DCA, Ministry of Forests, Lands, Natural Resource Operations and Rural Development, \$199,858, West Kootenay	<b>Funding Meadow Creek Spawning Channel on Kootenay Lake</b> This project supports ongoing operations, maintenance, and monitoring at the Meadow Creek spawning channel. The channel provides spawning habitat for a large proportion of Kootenay Lake kokanee, which are the primary prey species for both bull trout and Gerrard rainbow trout. BC Hydro built the spawning channel in 1967, to compensate for natural kokanee habitat lost due to the construction of the Duncan Dam.	<b>Meadow Creek spawning channel: 12.4 million eggs in the system</b> In spring 2019, kokanee fry production in Meadow Creek was estimated at 4.98 million for the spawning channel, including the stocked eggs, and 5.05 million in total for Meadow Creek, assuming 5% egg-fry survival below the channel. The egg-to-fry survival of wild eggs in the channel was estimated at 61.5%. The Meadow Creek kokanee run in fall 2019 was estimated at 32,686, of which 19,400 came into the channel and 13,286 spawned downstream of the channel. Potential egg deposition from natural spawning was estimated at 5.9 million in channel, and 10 million in total, including below the channel in Meadow Creek. Another 2.4 million eyed-eggs from Hill Creek and Whatshan Lake were planted in the upper part of the channel, as a component of FLNRD's resource management kokanee recovery. The number of eggs in the system is approximately 12.4 million.
COL-F20-F-3055, Salmo Watershed Streamkeepers Society, \$15,125, West Kootenay	<b>Salmo River Watershed Bull Trout Spawner Escapement 2019</b> This project will continue bull trout redd counts in known spawning areas of the Salmo River, adding to long-term trend monitoring for this Blue-listed species. This project aligns with guidance from a trans-boundary Watershed Planning Team that calls for using bull trout for continued monitoring of this population. Conservation biology guidelines for bull trout require 50–100 individuals to minimize inbreeding effects. Since 2010, the spawning population has been below 100.	<b>Salmo River Watershed bull trout: 60 redds surveyed</b> Seven areas in the Salmo River Watershed were surveyed in 2019, and counts totalled 60 redds and an escapement estimate of 131 individuals. Analysis of redd count data suggests that the number of spawning bull trout in the Salmo River Watershed (including South Salmo River) was less than 100 individuals in seven consecutive years (2007–2015), but has exceeded 100 individuals in the last four years (2016–2019). Analyses of the long-term effectiveness of the population level and the effects of nutrient addition in Sheep Creek were also performed. These surveys were instrumental in assessing the Salmo River bull trout population, which is in a precarious status and designated as C1-High Risk. As a response, the Salmo Watershed Streamkeepers Society has implemented a number of restoration projects and a recreational angling awareness campaign.
COL-F20-F-3073, Okanagan Nation Alliance, \$17,089, West Kootenay	<b>Murphy Creek Spawning Channel Maintenance and Monitoring</b> The Murphy Creek spawning channel has been an important rainbow trout enhancement project on the lower Columbia River since it was developed in the mid-1980s. This project will continue monitoring and maintainance at this spawning channel, including rainbow trout spawner monitoring, water temperature monitoring, spawning channel maintenance (debris removal, adding gravel, removing sediment), and habitat enhancement (riparian planting). Continued maintenance of the spawning channel is imperative to its efficacy in providing spawning habitat for rainbow trout in this lower Columbia River tributary.	<b>Murphy Creek spawning channel: 225 m maintained, monitored, and native plants added to riparian areas</b> Approximately 225 m along the Murphy Creek spawning channel have been maintained and monitored. A total of 33 rainbow trout spawners were counted in the channel through seven surveys conducted from April 18 to June 20, 2019. Escapement was estimated at 21 individuals. Forty plants, comprising of eight native plant species, were planted on the upper banks adjacent to the settling pond. Plant survivorship surveys indicate a high survival rate of planted species on site.
COL-F20-F-3098, Okanagan Nation Alliance, \$9,762, West Kootenay	<b>Development of Murphy Creek Spawning Channel Management Plan</b> This project will develop a management plan for the Murphy Creek spawning channel to guide the long-term maintenance of the channel to further support local rainbow trout.	<b>Murphy Creek spawning channel: new management plan guides operations</b> A management plan was created to provide continuity in operations at the Murphy Creek spawning channel. The plan will help new volunteers and others involved in operations at the spawning channel build on the lessons learned and provide clear guidance on how to effectively operate the channel as long-time volunteers step back from their roles. The plan supports, encourages, and promotes community stewardship and education opportunities at Murphy Creek.
COL-F20-F-3106, Okanagan Nation Alliance, \$45,620, West Kootenay	<b>Murphy Creek Spawning Channel Intake Restoration</b> This project will restore existing intakes at the Murphy Creek spawning channel, which have been impacted by erosion and undercutting.	Project in progress. Final report pending.



Project ID, project lead, FWCP \$s, and sub-region	Project title and description	Outcomes
COL-F20-F-3119, Blue Lake Forest Education Society, \$34,633, East Kootenay	<b>Joseph Creek Water Analysis and Phase One Fishery Action Plan</b> This project will restore and enhance fish habitats and ecosystem functions on Joseph Creek, including the development, implementation, monitoring, and evaluation of an integrated habitat plan. This project also encompasses education and outreach initiatives that focus on best practices for habitat enhancement work and working in and about streams.	<b>Work continues to restore Joseph Creek: data collection underway</b> The purpose of this project is to restore and enhance fish habitats and ecosystem function on Joseph Creek. Eleven temperature loggers were installed in Joseph Creek in 2019, and downloads occurred in October and April. The loggers will continue to be monitored and data will be downloaded three times a year for approximately three years. A database for the loggers and the hydrometric stations has been developed, and an invasive management plan for Idlewild Lake and Joseph Creek has been completed, in coordination with the City of Cranbrook. Fish identification and education documents have been completed, along with a city-wide Joseph Creek education newsletter. Local students planted peninsula and wetland areas with native plants and protected them from deer; 9.2 m <sup>2</sup> of riparian area was prepped, planted, and seeded; and approximately 0.5 ha of wetland was planted.
COL-F20-F-3127-DCA, Freshwater Fisheries Society of BC, \$110,000, West Kootenay	<b>Helping Recover Upper Columbia White Sturgeon</b> Implemented through BC Hydro's White Sturgeon Management Plan, under the Columbia River Water Use Plan, this project is contributing to the White Sturgeon Conservation Aquaculture Program in the Canadian portion of the Columbia River Basin.	<b>200 wild-origin juvenile white sturgeon were released into the lower Columbia River</b> In the spring of 2020, 200 wild-origin juvenile white sturgeon released into the lower Columbia River. For more information please visit: <a href="https://www.bchydro.com/about/sustainability/conservation/water_use_planning/southern_interior/columbia_river/columbia-sturgeon.html">https://www.bchydro.com/about/sustainability/conservation/water_use_planning/southern_interior/columbia_river/columbia-sturgeon.html</a> .
COL-F20-F-3149-DCA, Vast Resource Solutions Inc. \$41,970, East Kootenay	<b>Koocanusa Reservoir Kokanee Enumeration</b> Spawning kokanee are enumerated from a helicopter in seven index streams upstream of Koocanusa Reservoir. Results from the study are summarized in a yearly report distributed to fisheries managers across the region to advise on current trends in the population.	Project in progress. Final report pending.
COL-F20-W-2946, Kingbird Biological Consultants Ltd., \$7,035, North Columbia	<b>Monitoring Riparian Restoration Efforts in Revelstoke</b> This project will assess the multi-year survival of live stakes planted in areas dominated by reed canary grass. The project will also assess the effectiveness of this approach to shade out the grass and allow native species to establish in riparian habitats in the drawdown zone near the Revelstoke Dam. The restoration sites will provide habitat for several species, including the yellow warbler and silver-haired bat, and will support diverse plant and animal communities. Riparian habitats are rare in the middle and lower Columbia River.	<b>Riparian restoration efforts monitored in Revelstoke</b> More than 1,100 plants that were planted to support riparian restoration in riparian areas in the drawdown zone near Revelstoke were monitored in 2019: 495 live stakes planted in 2017, plus 24 shrubs and 625 stakes planted in 2014. Survival ranged from 0–67%. Even when survival was low, however, those plants that did survive were robust and contributed to wildlife habitat.
COL-F20-W-3011-DCA, Ministry of Forests, Lands, Natural Resource Operations and Rural Development, \$391,824, Basin-wide	<b>Land Management Operations in Conservation Lands</b> This project focuses on the coordination, oversight, and implementation of land stewardship activities associated with conservation-held lands.	<b>Conservation areas: Guardian Watch Program initiated and invasive species removed</b> All species of invasive plants in the Duncan/Lardeau conservation area that occur in areas shaded from taller vegetation were found to have diminished in abundance since 2016. Spotted knapweed and reed canary grass in open areas, however, did not diminish in abundance. The overall density of burdock decreased, while the overall distribution remained unchanged. A local crew completed a total of 123 person days of burdock removal. Over 60 days, the invasive species crew mapped 20 invasive species at eight conservation areas and four ecological restoration units over 212 ha and treated 22.5 ha. A reduction in density of several invasive species was noted. A First Nations Guardian Watch Program was initiated and contributed 24 days of monitoring and education in conservation areas, as well as the survey and removal of invasive species. Soil disturbing activities were reduced as a result of updated signage in Broadwater and Deer Park conservation areas.

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COL-F20-W-3012-DCA, Ministry of Forests, Lands, Natural Resource Operations and Rural Development, \$210,063, West Kootenay	<b>West Kootenay Ecosystem Enhancement</b> This project focuses on the oversight, coordination, and implementation of upland and dryland ecosystem restoration activities in the West Kootenay, including prescription development; slashing, piling, prescribed burn planning, and burning; and post-burn monitoring and reporting.	<b>West Kootenay ecological restoration: sites mapped and treated</b> Seven sites for future ecological restoration (ER) projects have been delineated and mapped in the West Kootenay. Prescribed burn plans were prepared for two ER units: Van Houten Creek (220 ha) and Deer Park Mountain (450 ha), although no burns were completed. Post-treatment monitoring was completed in two ER units: Sunshine Creek (four plots) and Twobit Creek #1 (three plots). Pre-treatment monitoring was completed at one ER unit (Van Houten) and three control plots were monitored. Post-treatment assessments of invasive species were conducted in five ER units. Backpack herbicide treatments of invasive species were conducted in one ER unit, while mechanical treatments along the forest service road were conducted in five ER units. Annual spotlight deer counts were conducted in the Pend d'Oreille, with the highest nightly counts being 135 deer and 23 elk. One additional 103-ha site at Deer Park conservation area adjacent to private land was identified for treatment. Restoration prescriptions were completed for three ER units (Broadwater South, Broadwater North, and Deer Park Mountain) totalling 44.3 ha.
COL-F20-W-3013-DCA, Ministry of Forests, Lands, Natural Resource Operations and Rural Development, \$345,949, East Kootenay	<b>East Kootenay Ecosystem Enhancement</b> This project focuses on the oversight, coordination, and implementation of restoration activities in the East Kootenay, including prescription development; slashing, piling, and masticating; burn planning and burning; and post-burn monitoring and reporting.	<b>East Kootenay ecological restoration: prescribed burns, invasive treatment, planting, and monitoring</b> Many restoration efforts were undertaken in the East Kootenay, including a 300-ha prescribed burn in Sulphur Creek that achieved approx. 30% (100 ha) coverage; over 300 piles were burned and the sites seeded across 21 ha in East Columbia Lake; 60 ha of invasive weed treatment in the Lizard and Galton ranges; 300 ha of Stand Management Prescription (SMP) development; 100 ha of future slashing for a Forsyth Creek SMP amendment; the planting and monitoring of 80-plus wildlife trees; and vegetation monitoring in Forsyth Creek, Lizard West, and Supply Creek.
COL-F20-W-3014-DCA, Ministry of Forests, Lands, Natural Resource Operations and Rural Development, \$181,674, Basin-wide	<b>Non-game Habitat Enhancement</b> Non-game enhancement focuses on habitat features that are critical for the reproduction and survival of non-game species, such as roosting, denning, and nesting habitat. These habitat features require ongoing monitoring and maintenance to continue to benefit the species they were designed for.	<b>Non-game habitat enhancement: monitoring and outreach</b> Nine bat roosts monitored; 600 m of badger fencing replaced; 48 old Lewis's woodpecker nests monitored, and 15 active nests documented; 443 adult western toads individually marked, and 622 m of new permanent toad fencing installed; Toadfest attended by approximately 500 people, and 21,305 toadlets moved; 99% of turtle nests laid in 2018 at Elizabeth Lake were unsuccessful primarily due to predation, and only 13 of the 673 eggs laid in 2018 hatched in 2019; Argenta turtle nests from 2018 had 65% hatching success in 2019, and one successful nest was documented in 2019; and 24 Vaux's swift nest boxes were monitored with one successful nest documented.
COL-F20-W-3015-DCA, Ministry of Forests, Lands, Natural Resource Operations and Rural Development, \$105,199, Basin-wide	<b>Caribou Recovery</b> A multi-agency effort, led by the Province of B.C., to recover threatened caribou sub-populations is underway. In 2019–2020, actions funded by the FWCP include: Central Selkirk caribou, cougar, and wolf mortality investigations; wolf pack-size determinations in the Central Selkirk; participation in caribou census and collaring; predator track surveys in the Central Selkirks; and a survey of moose in the Revelstoke sub-unit.	<b>Supporting caribou recovery: censuses and predator surveys done</b> Caribou recovery efforts in 2019 included caribou censuses in the Central Selkirk area and the North Columbia. A predator track survey and wolf-pack size determination in the Central Selkirk detected eight wolves in four separate packs. No Revelstoke moose sub-unit survey occurred, and there were no mortality investigations for Central Selkirk caribou, wolves, or cougars.
COL-F20-W-3016-DCA, Ministry of Forests, Lands, Natural Resource Operations and Rural Development, \$191,324, West Kootenay	<b>Northern Leopard Frog Recovery</b> This project involves the inventory monitoring and stewardship of the Endangered northern leopard frog population at the Creston Valley Wildlife Management Area. This population is the majority of remaining northern leopard frogs in BC, and serves as the source population for re-introductions and captive assurance populations at the Vancouver Aquarium and Calgary Zoo.	<b>Supporting endangered northern leopard frogs: 2,317 tadpoles released</b> Seven northern leopard frog egg masses were detected in the Creston Valley. Breeding was detected in ponds four and five of the Six Mile Slough. Of the 183 detections—165 in Duck Lake and 18 at Six Mile Slough—there were 144 males, four females, and 14 unknowns. A total of 112 frogs were PIT tagged in 2019. Ninety buccal samples were collected, 2,317 tadpoles were translocated from Creston to Brisco, and 1,810 tadpoles were head-started at the Calgary Zoo prior to release at Brisco.



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COL-F20-W-3017-DCA, Ministry of Forests, Lands, Natural Resource Operations and Rural Development, \$167,866, Basin-wide	<b>Wetland and Riparian Enhancement</b> The goal of this project is to deliver wetland restoration work, continue to develop new projects, and monitor completed projects. This involves identifying candidate restoration sites; compiling background information; conducting a pre-treatment inventory of sites; completing restoration plans with a wetland specialist; and developing partnerships, permits, and budgets to implement restoration projects.	<b>Pre- and post-treatment monitoring completed for wetland and riparian enhancement</b> Pre-treatment monitoring has been completed for wetland and riparian enhancement at six sites in the Six Mile Slough. Post-treatment monitoring has been completed at the DL570 wetland complex and six restored wetlands in the Creston Valley Wildlife Management Area. Wetland restoration planning was completed at Burges James Gadsden Provincial Park.
COL-F20-W-3018-DCA, FWCP, \$646,917, Basin-wide	<b>Land Securement</b> This project will designate funds for high-priority land securement projects identified in coordination and collaboration with Kootenay Conservation Program's Securement Committees. Land securement is critical action for habitat protection and conservation in the Columbia.	<b>69,000 ha secured over the last 12 years</b> Over the last twelve years, working with a variety of partners across the province, the FWCP has contributed ~\$7.2 million in funding to secure more than 69,000 ha of conservation land in BC. In 2019-20 (F20), the FWCP Columbia Region board approved a funding contribution of \$488,000 to support the Nature Conservancy of Canada's Kootenay River Ranch Expansion Securement Project (COL-F20-W-3249-DCA). Located in the Upper Columbia and Kootenay Valleys approximately 15 km south of Canal Flats, the Kootenay River Ranch Expansion project aims to secure two separate parcels totalling 257.8 hectares (637 acres) of open forest and grassland south of Columbia Lake. For a detailed summary of land securement activities (i.e., property assessments and evaluations) see the Kootenay Conservation Program's final report for project no. COL-F20-W-3145-DCA.
COL-F20-W-3025, Goldeneye Ecological Services, \$14,382, North Columbia	<b>Columbia Wetlands Marsh Bird Monitoring Project</b> The third and final year of this project includes the continued collection of baseline data for 37 FWCP bird species of interest, as well as repeated visual and aural marsh bird surveys at 65 survey stations in the Columbia Wetlands. This will make it possible to estimate marsh bird population numbers and identify significant habitat types used for breeding. This data is needed prior to making management recommendations and actions. The outreach component of this project will lead to habitat-based actions (e.g. the installation of nesting boxes), and will build on relationships with landowners, who have the greatest ability to affect wetland waterfowl values on the landscape.	<b>Columbia Wetlands Marsh Bird Monitoring Project data supports future conservation</b> During the Columbia Wetlands Marsh Bird Monitoring Project, the sora was the most frequently observed focal species and produced the highest abundance estimates at 3,234 individuals. Four species of emergent vegetation were strongly associated with presence of focal marsh birds. Ten volunteers participated in the project, and landowner outreach took place through the installation of five nest boxes. Project data was used to make revisions to the Columbia Wetlands Wildlife Management Area Management Plan and to develop the Columbia Wetlands Conservation Action Framework 2020–2025. A total of 31 Species at Risk occurrences were used to update the Regional District of East Kootenay's Steamboat-Jubilee Mountain Official Community Plan, and data helped identify environmentally sensitive areas and development permit areas. The project's data are being used to help identify the location of biodiversity hot spots and riparian wildlife corridors in the Columbia Wetlands, and to nominate the Columbia Wetlands into the Important Bird and Biodiversity Areas program. Further, details on two specific private land parcels were provided to land trust organizations for potential land acquisition.
COL-F20-W-3026, AQAM, \$78,600, East Kootenay	<b>ʔaąam Ecosystem Enhancement Project</b> This project will restore a natural ponderosa pine ecosystem and enhance a wildlife corridor/linkage, while managing for ecosystem threats, including wildfire and invasive plants. This project will benefit several species, including long-billed curlew, Lewis's woodpecker, flammulated owl, common nighthawk, yellow badger, Williamson's sapsucker, and little brown bat. It may also benefit scarlet gaura, scarlet globe mallow, prairie gold bean, hairstem ground smoke, and flat-top broomrape.	<b>522 ha prescribed forest-thinning treatment in ʔaąam Ecosystem Enhancement Project</b> The ʔaąam Ecosystem Enhancement Project is aimed at enhancing a natural ponderosa pine ecosystem. This project delineated a total of 161 ha as an archaeological no-work zone. Twelve Species at Risk were surveyed (six present, two inconclusive, and four absent), 32 vegetation field plots were established and evaluated for baseline conditions, 725 high and very-high value wildlife trees and 13 patches were identified for conservation, 3 km of roadways and 2 ha of habitat were identified for invasive species treatment, and 522 ha were prescribed for forest-thinning treatment.
COL-F20-W-3027, Alberta Biodiversity Monitoring Institute, \$41,180, North Columbia	<b>Monitoring White-tailed Deer in the Columbia Mountains</b> This project will evaluate factors influencing white-tailed deer populations in the Columbia Mountains. This data will be used to analyze the efficacy of white-tailed deer reductions. The vast majority of caribou herds in Western Canada are declining. Intense human intervention has been successful in stabilizing three herds, yet only one has shown growth. Understanding and monitoring additional limiting factors that may be preventing population growth is critical for effective adaptive management and recovery.	<b>11 deer outfitted with GPS collars</b> In year one of the Monitoring White-tailed Deer in the Columbia Mountains project, four white-tailed deer does were captured and fitted with GPS collars. An additional three mule deer does were, incidentally, outfitted with GPS collars, because white-tailed deer are still relatively rare on the landscape. In year two of the project, seven additional white-tailed deer were captured and fitted with GPS collars. One white-tailed deer fawn and three mule deer fawns were outfitted with expandable VHF collars, which were donated by the Revelstoke Caribou Rearing in the Wild project.

Project ID, project lead, FWCP \$s, and sub-region	Project title and description	Outcomes
COL-F20-W-3039, Goldeneye Ecological Services, \$6,139, North Columbia	<b>Reflection Lake Restoration Project</b> The focus of this three-year project is on-the-ground restoration to return Reflection Lake, near Golden, to the hemi-marsh condition and increase breeding bird habitat. This project provides hands-on opportunities for students and builds relationships with First Nations who use cattails for traditional cultural purposes, such as basket-weaving. This project will benefit the provincially Blue-listed eared grebe, and other wetland and riparian species, including sora, Virginia rail, pied-billed grebe, wood duck, and hooded merganser. Ideal marsh bird breeding habitat is found in wetlands with a well-interspersed fifty-fifty vegetative cover and open water. Cattail monocultures are not well used by birds.	<b>Managing cattails near Golden: Ktunaxa knowledge keeper teaches cattail basket weaving</b> Four 10x12-foot patches of dense cattail leaf growth at Reflection Lake have been hand removed using loppers. The plan was to dig out rhizome/root structures from all test plots, but this proved very challenging and impossible at two of the test plots due to water hazards. Sixteen College of the Rockies students took part in the experimental cattail manipulation through hands-on involvement. A workshop was organized with a Ktunaxa knowledge keeper, who taught eight Indigenous community members how to harvest cattail, cure it, and use the cattails for basket weaving—a lost cultural tradition. Three other community volunteers and three Metis were also involved with the restoration project and cattail removal.
COL-F20-W-3041, Ministry of Forests, Lands, Natural Resource Operations and Rural Development, \$22,000, East Kootenay	<b>Invasive Plant Management on Bighorn Sheep Winter Ranges</b> This project will implement a cooperative management and treatment strategy to reduce invasive plant coverage and improve the compromised quality of low-elevation bighorn sheep winter ranges near the Wigwam Flats and Bull River. These grasslands are becoming inundated with invasive plants, such as yellow hawkweed, St. John's wort, and sulphur cinquefoil. Approximately 300 bighorn sheep use these grassland ecosystems and without a comprehensive invasive plant management program, the continued rapid loss of forage quality and quantity will ultimately result in bighorn sheep population decline.	<b>Bighorn sheep winter ranges treated for invasive plants</b> In May and June of 2019, a total of 49 ha were surveyed for invasive plants in Bull River and 29 ha in Wigwam Flats, including access roads. At Columbia Lake East, the East Kootenay Invasive Special Council treated a total of 0.5 ha with the use of an ATV. In April 2019, 400 kg of fertilizer was applied in 4.9 ha of Bull River Treatment units 1 and 2. In Wigwam Flats, 325 kg was applied in 8.7 ha of Wigwam Flats Treatment (WWT) units 1 and 6. In November 2019, bare ground areas of the Red Barn field (approximately 4 ha) were seeded with a mix of 80% fall rye, 10% sheep fescue, and 10% orchard grass (150 kg). In Wigwam Flats, approximately 1 ha of WWT1 and 8 ha of WWT5 were seeded with same seed mix (75 kg). In spring 2019, vegetation sampling was conducted (post-treatment) on 32 plots in Bull River and 20 plots in Wigwam Flats.
COL-F20-W-3043, Birchdale Ecological, \$39,900, Basin-wide	<b>Kootenay Connect: Riparian Wildlife Climate Change Corridors</b> The Kootenay Connect project will identify and develop conservation strategies to establish, recognize, protect, and improve management for landscape connectivity and 12 important wildlife corridors across the Columbia Basin. This project will integrate data about large carnivores (grizzly bears), ungulates, and many other wildlife species with large riparian-wetland complexes that link critical habitat and landscape features at a regional scale. Research shows riparian-wetland systems are biodiversity hotspots and climate refugia that also act as wildlife linkages across human-settled valleys. The project team will work with key stakeholders with interests in private and public lands to develop a mosaic of conservation activities, strategies, and solutions.	<b>Conservation planning underway for four wildlife corridors</b> Local experts, independent biologists, government biologists, First Nations, environmental non-governmental organizations, industry, and regional planners were consulted through a series of workshops to gather insight and specific advice on conservation threats and opportunities within each of the four corridors that the Kootenay Connect: Riparian Wildlife Climate Change Corridors project focused on in 2019. These workshops are the underpinning of the Kootenay Connect technical report. This project is an organizational and planning effort, the direct on-the-ground outcomes will come in other phases.
COL-F20-W-3049, Central Kootenay Invasive Species Society, \$42,131, West Kootenay	<b>Northern Leopard Frog Preservation and American Bullfrog Control</b> This project aims to conduct a comprehensive and targeted surveillance and eradication program on American bullfrogs. The intent of this project is to protect the productivity of the wetland ecosystem and habitats required by Endangered northern leopard frogs from the highly invasive American bullfrog. Eradicating bullfrogs will enhance potential pond habitat for northern leopard frogs, as bullfrogs are an obligate aquatic species that occupies lakes, ponds, swamps, bogs, backwaters, reservoirs, marshes, streams, irrigation ponds, and ditches. In addition, bullfrog tadpoles are considered to be “ecosystem engineers,” altering the biomass, structure, and composition of algal communities.	<b>Increased presence of invasive American bullfrogs detected</b> Two full-time field crews consisting of staff and contractors from the Ministry of Forests, Lands, Natural Resource Operations and Rural Development; the Central Kootenay Invasive Species Council; and Yaqan Nukiy Lower Kootenay Band conducted extensive surveillance and eradication activities in the Creston Valley (Kootenay River) between May and October of 2019, with peak effort and detections between May and August. With increased survey effort, detections of American bullfrog occupancy increased in 2019: five new sites were identified, with bullfrogs in all life stages and in unexpectedly high densities. Bullfrogs were observed at several new locations that are farther north, and therefore closer to northern leopard frog critical habitat, than previously observed. A total of 1,466 bullfrogs were euthanized and removed from the Kootenay River Valley between Copeland, Idaho, and Creston. Overall catch-per-unit effort during bullfrog eradication efforts was approximately 1.27 euthanized bullfrogs per hour of crew effort.

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COL-F20-W-3050, British Columbia Wildlife Federation, \$291,200, Basin-wide	<p><b>Advancing Wetland Stewardship and Restoration in the Kootenay Region</b></p> <p>This project will restore wetland habitat near Rossland, Kimberly, and Creston to aid listed species, support First Nations, and increase landscape connectivity. Past restoration projects will also receive enhancements to increase biodiversity. This project will benefit several species, including western painted turtle, American badger, grizzly bear, sandhill crane, elk, barn swallow, short-eared owl, common nighthawk, little brown bat, great blue heron, northern leopard frog, western toad, and a variety of other amphibians and waterfowl. A wetlandkeepers workshop will train participants on wetland stewardship, classification, and health assessment, and build capacity of stewardship groups, volunteers, First Nations, government staff, and others to protect, enhance, and restore wetlands. Participants will receive hands-on training at active restoration sites and a comprehensive evaluation will review the value of past wetland restoration for wildlife, to inform future restoration works.</p>	<p><b>Wetland stewardship and restoration training advanced in the Kootenays; over 83 ha restored</b></p> <p>Twenty-two participants were trained in wetland restoration and stewardship techniques during a Wetlands Institute session in Rossland and Creston, which included training at two newly completed active wetland restoration project sites. Twenty participants were trained in wetland conservation and stewardship during a wetlandkeepers workshop in Rossland. Four sites were restored: two in the Creston Valley (Yaqaan Nukiy Floodplain Restoration, 42 ha, and Hunting Grounds Wetland Restoration, 37.48 ha), and two elsewhere in the region (King George VI Provincial Park in Rossland, 1.98 ha, and Sparrowhawk Farms in Kimberley, 2.49 ha). Phase 2 of the Comprehensive Wetland Assessment was completed. Bird, amphibian, and mammal surveys were conducted at seven restored wetland sites and four reference sites in the West Kootenay, some of which were in the Creston Valley and Duncan-Lardeau areas.</p>
COL-F20-W-3051, Wildlife Conservation Society Canada, \$54,593, Basin-wide	<p><b>Establishing and Monitoring Bat Abundance and Diversity</b></p> <p>This project will use the standardized North American bat monitoring protocol to establish baseline diversity and relative abundance of bats, and it will also monitor trends in BC. The project will also locate and monitor bat hibernacula, as white-nose syndrome (WNS) kills bats during hibernation. Acoustics and mark-recapture techniques will be used, and citizens will be engaged through collaborations with local stewardship groups and cavers (BatCaver.org). Bats play important roles in the ecosystem and economy (e.g. bats reduce the need for pesticides). The ecological fall-out from a mass bat die-offs due to white-nose syndrome is not yet understood, but changes in insect communities could have far-reaching implications.</p>	<p><b>200 underground bat detectors deployed</b></p> <p>NABat (North American Bat Monitoring Program): Sampling for was conducted at 13 grid cells in the FWCP Columbia region in 2019-2020, which includes one additional grid cell added this year. The overall provincial sample consisted of 51 grid cells. This Columbia Basin NABat effort engaged nine grid cell leaders, eight volunteers, and ~44 hours of volunteer work. To date, roughly 80 bat detectors have been deployed in winter in the Columbia Basin by the BatCaver program to identify and monitor hibernacula, of which 28 have so far been found to be used by bats in winter. BatCaver: In 2019-20 efforts engaged two volunteers contributing ~32 hours of labour to survey a unique high elevation cave near Trout Lake. These Columbia Basin sites contribute to the overall provincial effort, in which &gt;200 underground bat detectors have been deployed as part of this program. Five sentinel roost sites were monitored in 2019.</p>
COL-F20-W-3052, Akisqnuq First Nation, \$95,500, East Kootenay	<p><b>Akisqnuq Habitat Restoration</b></p> <p>This project will use fire-maintained ecosystem restoration on the Akisqnuq First Nation Reserve to compensate for habitat losses. Activities, as recommended in the Akisqnuq Wildlife Habitat Restoration Plan, include site-specific prescriptions, pre-burn slashing, slash-pile burning, chipping, mulching, pruning, and maintaining wildlife trees with no-treatment buffer zones. This project will benefit many species, including badger, Rocky Mountain bighorn sheep, flammulated owl, rubber boas, Lewis's woodpecker, elk, mule deer, white-tailed deer, cougar, black bear, and wolf.</p>	<p>Project in progress. Final report pending.</p>
COL-F20-W-3057, Keefer Ecological Services Ltd., \$59,872, East Kootenay	<p><b>Tobacco Plains Grassland and Open Forest Restoration</b></p> <p>This project will: 1) help control invasive plants in grasslands and open forests on Tobacco Plains Indian Reserve and will improve habitat for multiple species, including ungulates; 2) support the recovery of rare and threatened species; 3) improve habitat connectivity with Crown land; and 4) engage First Nations and community members in land stewardship. Now in year five of a proposed five-year collaboration between Keefer Ecological Services Ltd. and Tobacco Plains Indian Band, this project will continue treatment and monitoring to restore grassland and open forest habitat.</p>	<p><b>Restoration of Tobacco Plains: invasive plants treatments continue</b></p> <p>In the Tobacco Plains Indian Reserve, herbicide has been applied to 1.9 ha of open forest infested with leafy spurge, to approximately 6.78 km of roadside to control the spread of spotted knapweed, and to approximately 2.8 ha of open forest and forest to control the spread and expansion of orange hawkweed. Approximately 0.32 ha of land was sprayed with herbicide at the Roosville Cemetery to control spotted knapweed. A 1.11-ha area was treated with herbicide to manage infestations of Canada thistle, bull thistle, yellow hawkweed, and hound's tongue, which emerged following forest thinning efforts in 2018. After blueweed was identified at the Tobacco Plains Indian Band's sawmill, the plant was manually removed and the area was sprayed with herbicide. A field bindweed infestation re-emerged in 2019. The patch was less than 0.25 m<sup>2</sup> and herbicide was applied to continue management efforts. Targeted goat grazing was implemented on 8 ha of rangeland on the Tobacco Plains Indian Reserve and on a field site in Wycliffe to manage sulphur cinquefoil.</p>



Project ID, project lead, FWCP \$s, and sub-region	Project title and description	Outcomes
COL-F20-W-3058, Nature Conservancy of Canada, \$22,000, East Kootenay	<p><b>Marion Creek Benchlands Forest Restoration Project</b></p> <p>The goal of this project is to improve the structure and resiliency of forests on the Marion Creek Benchlands conservation property, and enhance similar work that is planned on adjacent lands. The restoration of open forest structure in areas where forest in-growth and encroachment have occurred will improve critical habitat for species at risk, reduce the risk of catastrophic fire, and enhance the resiliency of imperilled Rocky Mountain Douglas fir systems in the face of changing climate. The extreme wildfire seasons of 2017 and 2018 are not isolated events—they represent part of a global trend of increasing mega-fires with tremendous social, ecological, and economic costs. Now more than ever, it is essential that our forests are resilient to habitat-shifting and potentially catastrophic wildfires.</p>	<p><b>Marion Creek Benchlands: 18.3 ha restored</b></p> <p>Three units in the Marion Creek Benchlands, totalling 18.3 ha, have been restored through prescription and hand-slashing treatments. A large unit that will be treated by volunteers in either the fall of 2020 or spring 2021 was identified.</p>
COL-F20-W-3070, Sparwood Fish and Wildlife Association, \$27,600, East Kootenay	<p><b>Elk Valley Elk Project 2019–2020</b></p> <p>The purpose of the final year of this five-year project is to study elk migration patterns and survival, and to provide information to help make informed wildlife management decisions. Elk in the Elk Valley appear to have changed migration patterns in recent years, resulting in a redistribution of elk during the summer and fall. The productivity and survival of non-migratory and migratory elk may diverge, contributing to differences in abundance. Non-migratory elk tend to be more readily involved in agricultural conflicts and may contribute to overgrazing on some ranges.</p>	<p><b>78 elk collared in Elk Valley</b></p> <p>In this project, a total of 78 cow elk were collared and 77,500 collar locations were detected in the Elk Valley: 74 (45%) were residents, 84 (51%) were migrants, and three (2%) were nomadic. Three (2%) long-distance dispersals were detected. Among migratory elk, 57% were classified as standard migrants, 39% were elevational migrants. A total of 24 mortalities were detected (nine migrant, 11 resident, four unknown migratory status). Humans caused 54% of mortalities, predominantly through vehicle and train strikes. Predation was verified in only three (13%) of mortalities, divided among wolves, cougars, and grizzly bears. Apparent starvation/old age caused three deaths, and a massive internal infection caused another. Ages estimated from tooth cementum analysis from nine elk mortalities was high, with a mean of 14 years (range 9–19 years). The percentage of fat content in bone marrow indicated starvation or nutritional stress in five of the eight individuals. Average survival rates were 0.835 for residents and 0.901 for migrants.</p>
COL-F20-W-3075, LGL Limited Environmental Research Associates Ltd., \$51,811, North Columbia	<p><b>Robson Valley Amphibian Survey and Habitat Assessment</b></p> <p>This project will monitor amphibian occupancy and riparian habitat integrity at a representative sample of wetlands within the Robson Valley. The project will benefit Columbia spotted frog, western toad, wood frog, long-toed salamander, Pacific chorus frog, and other wetland-dependent wildlife. Baseline inventories will be conducted in previously unstudied areas to fill in existing knowledge gaps and to provide a basis for future population monitoring. Sites with amphibian inventory data will be resurveyed for changes, trends, and ongoing information gaps. The result will be the first long-term population trend data for several amphibian sites in the Robson Valley, site-specific data on riparian health that can be used to measure changes in amphibian habitat over time and reference wetland and riparian conditions; and new information on riparian restoration and securement opportunities in the Robson Valley.</p>	<p><b>48 amphibian and riparian habitat sites near Valemount surveyed</b></p> <p>Surveys assessing amphibians and riparian habitat were conducted at 48 sites in the Robson and Canoe valleys near Valemount, creating the first long-term population trend data in some areas. Amphibians—including western toad, Columbia spotted frog, wood frog, and long-toed salamander—were detected at 34 of the 48 sites, with 21 of those sites containing two or more species. Wetland health was also assessed to establish benchmarks and identify restoration opportunities. Thirty-one riparian reaches were studied, with 23 categorized as “healthy,” six as “healthy with problems,” and two as “unhealthy.” These scores will be used to identify wetlands in the Robson Valley for future protection, restoration, or enhancement. Recommendations for future work were made for 24 of the 31 sites visited, with some sites garnering multiple suggestions for additional research, habitat enhancement or restoration, securement, and/or future monitoring.</p>
COL-F20-W-3080, Rocky Mountain Trench Natural Resource Society, \$60,500, East Kootenay	<p><b>Sheep Mountain Ecosystem Restoration Project</b></p> <p>The project will restore 42 hectares of historic open forest and range grassland habitat for wildlife use. Species benefiting from the proposed treatments include sheep, elk, deer, badgers, and Lewis’s woodpecker. Encroachment from Douglas fir and yellow pine have significantly reduced prime forage grounds for wildlife. The goal of this project is to reduce this in-growth using a combination of mechanical and hand treatments.</p>	<p>Project in progress. Final report pending.</p>

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COL-F20-W-3093, LGL Limited Environmental Research Associates Ltd., \$4,998, East Kootenay	<b>Inventory and Project Development for Wiseman Lakes Fen</b> This Seed Grant project will support the following activities: 1) a baseline botanical inventory and wetland integrity assessment of Wiseman Lakes near Golden; and 2) the development of an ecological and social rationale, and a roadmap for protecting this valuable habitat. Information collected will be used to convey information about the site's values and to develop a proposal for securing or protecting this site. Wiseman Lakes is a regionally unique, biodiverse, and largely intact upslope wetland (fen) situated on Crown land 230 m above the Columbia River, near Donald. This fen is known to support at least two provincially rare plants, including one Red-listed (SH) aquatic plant, as well as populations of Columbia spotted frog.	<b>Survey of Wiseman Lakes fen yields 152 plant taxa and recommendations for future work</b> This seed grant project for a botanical/wetland inventory of Wiseman Lakes and associated fen was conducted in July 2019 and yielded a comprehensive plant species list and a classification of the wetland. Species lists for birds, bats, and amphibians were also compiled based on the best available information, and current threats to the habitat were described. The inventory includes a total of 152 plant taxa representing 104 different genera, including records for three provincially listed rare plants. The overall species assemblage was unusual and is possibly unique in the province. It was determined, however, that the wetland complex is currently under year-around pressure from commercial and recreational ATV and snowmobile operators, and evidence of recent disturbance related to motorized recreational activities was documented with photos during site visits. Based on these results, a conservation rationale for the habitat was developed, and recommendations were made for future work.
COL-F20-W-3097, Pandion Ecological Research Ltd., \$19,999, West Kootenay	<b>Inventory and Stewardship of Salmo Watershed Harlequin Ducks</b> This project involves a re-survey of harlequin duck adults/broods (following up on 1999 and 2009 surveys) and the development of site-specific habitat management, restoration, and stewardship actions for implementation at priority sites in the Salmo River Watershed. This watershed supports a significant population of harlequins, as confirmed in previous FWCP inventories. A significant, measured decline during a 2009 re-survey coincided with watershed stressors (e.g. recreational corridor use, Crown/private logging, commercial rafting, etc.) and more stressors are planned. This project provides community outreach, engagement, updated population estimates, and site-specific data for the successful implementation of stewardship/restoration actions with watershed landowners, managers, and users.	Project in progress. Final report pending.
COL-F20-W-3101, East Kootenay Invasive Species Council, \$30,000, East Kootenay	<b>Invasive Plant Management and Restoration of Protected Areas</b> This multi-year project aims to retain functional and sustainable ecosystems in protected areas of the East Kootenay by mitigating the impacts of invasive species. Species that will benefit include mule deer, white-tailed deer, elk, bighorn sheep, and moose, in addition to other fire-maintained, grassland, and open forest habitat species. Benefits include the reduction of propagule pressure from neighbouring invasive species populations, wildlife habitat conservation, long-term cost savings through collaborative invasive species management action, and the restoration of degraded areas with native plant species.	<b>East Kootenay: 130 invasive plant treatments completed</b> Contractors and East Kootenay Invasive Species Council (EKISC) staff completed 130 invasive plant treatments across 12 project areas, covering 35.56 ha. At treatment locations, post-treatment efficacy and completion monitoring by EKISC staff indicate that invasive species are responding favourably to herbicide application and treatments are complete. On average, treatments had a combined efficacy and completion score of 88.5%. In 2019, neither contractors nor EKISC staff observed Priority 1 plants in the project areas. Although they did not visit all project areas, they can still see this as a positive result of the overall invasive plant management for the IPMRPA project and adjacent areas, as they are not seeing new introductions of high-priority invasive species.
COL-F20-W-3118, Okanagan Nation Alliance, \$29,956, North Columbia	<b>Exceptional Old-growth and Deciduous Forests: North Columbia</b> This project will fill data gaps on exceptional old-growth coniferous and cottonwood forests. These forest types will be mapped with an emphasis on low-elevation Interior Cedar-Hemlock (ICH) forests between Valemount and Donald. An index of old-growth values (similar to Holt and Mackillop 2006) will be used to rank old-growth coniferous forests in the ICH adjacent to Kinbasket Reservoir. A similar index will be applied to cottonwood forests in the Red- and/or Blue-listed Fm01, Fm02, and Fm04 site associations. A list of species-based conservation and restoration projects will be developed. An evaluation of the occurrence and distribution of exceptional old-growth forests remaining after reservoir development has not occurred in the Kinbasket unit.	<b>100 ha of old-growth forest identified for protection</b> Approximately 100 ha of exceptional old-growth forest was identified for protection.

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COL-F20-W-3145-DCA, The Nature Trust of British Columbia, \$40,000, Basin-wide	<b>Kootenay Conservation Program Land Acquisition &amp; Base Support F20</b> Kootenay Conservation Program focuses efforts on securement and stewardship of high value conservation lands coupled with building the capacity of, and serving as a network for, 80+ partner organizations. It acts as a one stop shop for securement activities including coordination of land trust partners through the Securement Committee, facilitate coordination and collaboration amongst Stewardship Committee partners.	<b>KCP receives major grant, and delivers stewardship and networking activities</b> FWCP funding enabled the Kootenay Conservation Program (KCP) to complete six property evaluations and three property appraisal reports. The base funding also enabled KCP to: receive a Canada Nature Fund grant for Kootenay Connect from Environment and Climate Change Canada (a four year project to enhance, restore, and manage important valley bottom habitats to support the recovery of 16 listed species at risk); host Conservation Action Forums in Fernie and Creston; promote the Stewardship Solutions landowner outreach hub; revise the KCP Stewardship Framework with new priorities to reflect the Stewardship Solutions Toolkit; and provide professional development and networking opportunities at its annual gathering.
COL-F20-W-3146-DCA, Nature Conservancy of Canada, \$30,000, Basin-wide	<b>Nature Conservancy of Canada Land Stewardship Activities F20</b> The Nature Conservancy of Canada plans to implement restoration activities on the Kootenay River Ranch with the goal to restore degraded areas that were once used as slash pile burn areas and log landings during past forestry activities, and return them to healthy, functional plant communities that support habitat for wildlife.	<b>East Kootenay conservation lands: 11+ ha treated for invasive plants</b> A total of ten conservation properties in the East Kootenay owned and managed by the Nature Conservancy of Canada received invasive plant treatments: 85 invasive plant sites, totalling 11.27 ha, were treated and monitored, and 15 volunteers were engaged in a weed pull event at Cherry Meadows. Three ha of historic forestry landings and 230 m of redundant roadbeds connecting the landings were restored. A volunteer spent three days seeding restored landings with native grass.
COL-F20-W-3147-DCA, The Nature Trust of British Columbia, \$15,000, East Kootenay	<b>Nature Trust of British Columbia Land Stewardship Activities F20</b> Through the employment of a Conservation Youth Crew during the field season, The Nature Trust of BC focuses its work on stewardship, operations and maintenance projects that maintain and enhance biodiversity and wildlife values on many conservation properties. This project also has the added benefit of providing crew members with the ability to network with conservation experts, gain job related skills and increase their knowledge of regional land conservation practices, issues and opportunities.	<b>Conservation lands treated for invasive plants, 1,000 live stakes planted</b> Two crew members were hired and trained in six official courses to help fulfill a number of land-stewardship activities in 2019. A total of 25 conservation properties were visited for assessment, repair, restoration, enhancement, or management. Approximately 27 km of boundary fence was assessed and repaired. Approximately 42 ha of conservation land was mechanically treated for invasive plants, including close to 40 ha at Bummers Flats, which were treated for a sparse purple loosestrife infestation. Seven trembling aspen stand enclosure cages were repaired and monitored through 28 photo-monitoring plots. Approximately 1,000 riparian live stakes were planted on conservation properties owned by the Nature Trust of BC and the Ministry of Forests, Lands, Natural Resource Operations and Rural Development, alongside other valuable conservation land-management and enhancement activities.
COL-F20-W-3249-DCA, Nature Conservancy of Canada, \$488,000, East Kootenay	<b>Kootenay River Ranch Expansion Securement Project</b> Approximately 15 km south of Canal Flats, the Kootenay River Ranch Expansion project aims to secure two separate parcels totalling 257.8 ha of open forest and grassland south of Columbia Lake. The parcels directly border Nature Conservancy of Canada's Kootenay River Ranch conservation area (1,340 ha) and the Griffiths Nature Reserve (covenant) to the south. Once the securement projects are complete, the collective area under conservation would total 1,711 ha.	<b>Over 250 ha secured for conservation south of Columbia Lake</b> In 2020, the Nature Conservancy of Canada's Kootenay River Ranch Expansion Project secured two separate parcels totalling 257.8 ha of imperiled dry open forest and grassland ecosystems south of Columbia Lake.