



Message from the Board Co-Chairs

On behalf of the Fish & Wildlife Compensation Program's (FWCP) Columbia Board, we invite you to read our Annual Report for Fiscal Year 2018 (F18), covering the period April 1, 2017 to March 31, 2018. In partnership with BC Hydro, the Province of B.C., Fisheries and Oceans Canada, First Nations and Public Stakeholders, the FWCP is dedicated to conserving and enhancing fish and wildlife in watersheds impacted by BC Hydro Dams.

FWCP projects are funded and delivered through our annual grant application process, long-term agreements, contracts and partnerships. The Board may also choose to direct projects and approve funding to address Action Plan and other regional priorities.

In F18, 35 fish and wildlife projects were approved, by the FWCP Columbia Board for a total FWCP investment of approximately \$5 million. Of these projects, 21 were conditionally approved through our annual grant application process to support the restoration and enhancement of fish and wildlife and their habitats. We are always pleased to see the amount of in-kind and volunteer support, as well as other funding contributions, used to deliver successful projects. The total value (including in-kind resources, other funding sources, etc.) of the grant-based projects supported in F18 was approximately \$2.1 million, with an FWCP investment of nearly \$600,000.

In addition to the aforementioned fish and wildlife projects, FWCP offers Community Engagement Grants, which provides an opportunity for our stakeholders (e.g. environmental groups, rod and gun clubs, non-profits, stewardship organizations, government, and First Nations) to apply for small amounts of funding (up to \$1,000 maximum) to support their conservation and enhancement work. In F18, we were able to support 12 initiatives including, but not limited to, the Elk River Watershed Clean-up (Elk River Alliance), Robson Community School Wetland Project (Castlegar and District Wildlife Association), and Cranberry Marsh Community Weed Pull for Canada Thistle (Northwest Invasive Plant Council).

We would like to take this opportunity to offer our grateful appreciation to Doug Johnson, who stepped down in May 2017, after nearly a decade on our Columbia Board as a BC Hydro representative. Thank you Doug for your many years of commitment, guidance, and input to our organization! Replacing Doug as one of two BC Hydro representatives on the Board, is Kim Cox. Kim has been with BC Hydro since 1995 and currently manages a team of environmental experts in the Southern Interior/Columbia Region. We also wish to extend a warm welcome to our new Public Representative Rob Neil, who was selected after a rigorous recruitment process to replace Grant Trower, who stepped down in March 2017. Rob is a conservation biologist, with more than four decades of experience working with fish, wildlife, and habitat-related issues. Welcome Kim and Rob!

First Nations continue to play an important part in our decision-making process. The Ktunaxa and Secwepemc Nations, and the Okanagan Nation Alliance, each have representatives on our Board, and we'd like to thank them for their active participation in the Program.

And finally, we wish to thank all the dedicated applicants, proponents, contractors, and Program and project partners who work hard each year to successfully implement projects to help us achieve our vision of thriving fish and wildlife populations, in healthy and sustainable ecosystems.

Sincerely,



John Krebs
FWCP Columbia, Board Co-Chair



Trevor Oussoren
FWCP Columbia, Board Co-Chair

400 hectares of habitat for the Red-listed American Badger have been restored in the East Kootenay with the help of FWCP funding.
Photo: R. Klafki.

1. Organizational Overview

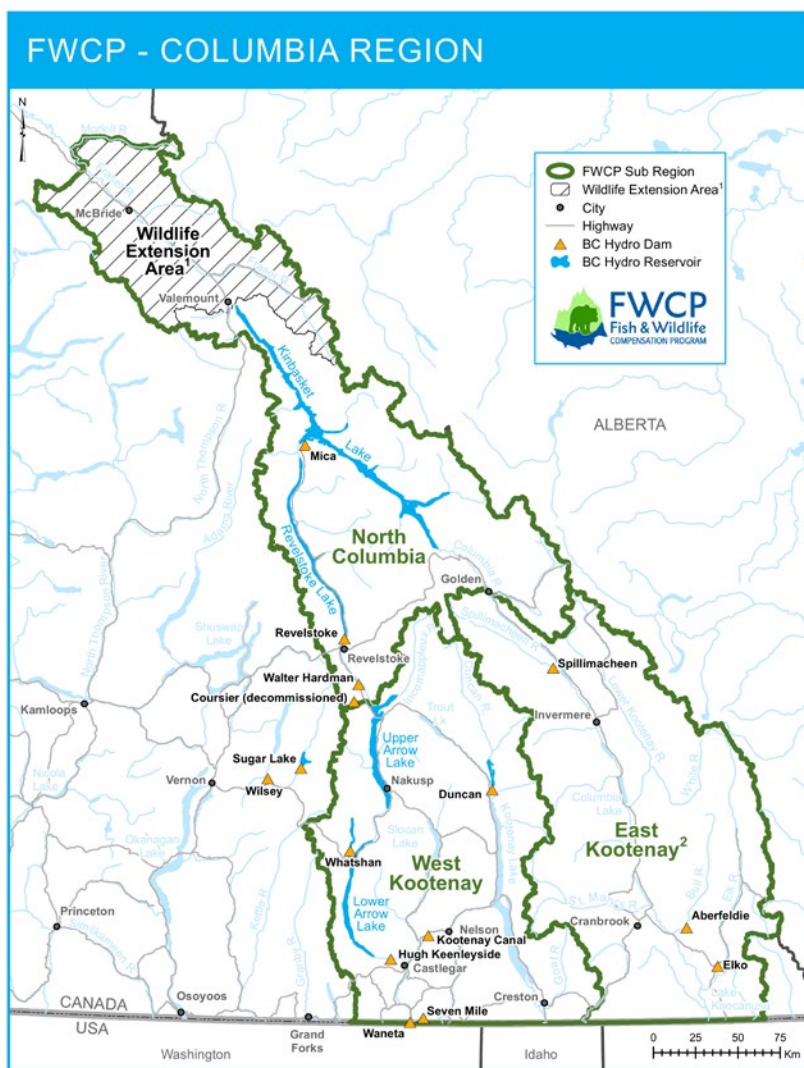
INTRODUCTION

The Fish and Wildlife Compensation Program (FWCP) was established to compensate for the impacts resulting from the construction of BC Hydro dams by conserving and enhancing fish and wildlife in the Coastal, Columbia and Peace regions of British Columbia. FWCP operates as a partnership between BC Hydro, the Province of B.C., Fisheries and Oceans Canada (DFO), First Nations, and Public Stakeholders.

FWCP has invested nearly \$160 million and delivered more than 1,850 projects since 1988 that increase understanding, and conserve and enhance fish, wildlife and their supporting habitats impacted by existing BC Hydro generation facilities. Our three regional Boards approved more than \$9.4 million for 102 fish and wildlife projects to be implemented in F18.

The FWCP operates in three regions across the province of B.C. In the Columbia and Peace Regions, FWCP operates to meet fish and wildlife conditions in BC Hydro's water licences. In the Coastal Region, the FWCP's work is a voluntary initiative. The FWCP in the 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 1.1). This program merged already-existing compensation programs for Arrow, Duncan, Mica, Seven-Mile, and Revelstoke facilities, which have water licence conditions related to fish and wildlife compensation.

This Annual Report provides an overview of FWCP's activities in the Columbia Region for Fiscal Year 2018 (F18), covering the period April 1, 2017 to March 31, 2018. It includes an overview of financial performance, project funding summary and alignment of the year's work with strategic objectives.



¹ Wildlife Extension Area: The Upper Fraser area was added to the Program based on limited opportunities for wildlife compensation projects in the Canoe Reach.
² The Upper Kootenay Ecosystem Enhancement Plan (UKEEP) is within the East Kootenay.

Figure 1.1 Map of the FWCP Columbia Region

GOVERNANCE

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. Specifically, each region has a Board to provide local oversight to the planning and implementation of the FWCP at the regional level, and to make local decisions on strategic priorities and on FWCP annual expenditures and investments. The FWCP Governance Manual can be found on our website at fwcp.ca.

Our work in the Columbia Region was guided by a Board of 10 members representing First Nations, Public Stakeholders, the Province of B.C., and BC Hydro. In June 2017, we welcomed Rob Neil as the new Public Representative, replacing Grant Trower who stepped down at the end of March 2017. A Public Representative recruitment process was initiated in February 2018 to fill Dave White's position upon the completion of his term in March 2019. Our goal is to have this vacancy filled in the spring of 2019.

The F18 Board Members were:

First Nation Representatives:

Misun Kang, Ktunaxa Nation
Adam Neil, Secwepemc Nation
Howie Wright, Okanagan Nation Alliance

Public Representatives:

David White
Rob Neil
Rick Morley

Agency Representatives:

David Tesch, Ministry of Environment and Climate Change Strategy
Kim Cox, BC Hydro
Trevor Oussoren, BC Hydro (Board Co-Chair)
John Krebs, Ministry of Forests, Lands, Natural Resource Operations and Rural Development (FLNR) (Board Co-Chair)

The Board reports to the Policy Committee, representing the federal and provincial government regulators (DFO and the Province), as well

as BC Hydro, which exists to allow the agencies to provide oversight on a range of fish and wildlife-related issues relevant to BC Hydro including, but not limited to, the FWCP.

The F18 Policy Committee Members were:

Karen Popoff, Director of Environment, BC Hydro
Kaaren Lewis / Jennifer McGuire, Assistant Deputy Minister, B.C. Ministry of Environment
Cheryl Webb, Regional Director Pacific Region, Fisheries and Oceans Canada

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. The F18 Fish and Wildlife Technical Committee Members were:

Fish Technical Committee Members:

Karen Bray, BC Hydro (Chair)
Jeff Burrows, FLNR
Tyler Weir, FLNR
Guy Martel, BC Hydro
Michael Zimmer, Okanagan Nation Alliance
Will Warnock, Ktunaxa Nation

Wildlife Technical Committee Members:

Tara Szkorupa, FLNR (Chair)
Lindsay Anderson, FLNR
Tom Appleby, BC Hydro
Cailyn Glasser, Okanagan Nation Alliance
Cathy Conroy, Ktunaxa Nation

In each region, program management and operations are implemented

by a full-time Region Manager who administers all aspects of program delivery. For F18, the Region Manager in the Columbia Region was Crystal Klym. For all three FWCP regions, the Program Administrator was Lorraine Ens and the overall Program Manager was Trevor Oussoren. Through a Letter of Agreement, FLNR supported the implementation of a number of annual and ongoing fish and wildlife projects under the direction of Eva Schindler, Team Leader.



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. From left: Rick Morley, Howie Wright, Misun Kang, Dave White, Kim Cox, John Krebs, Rob Neil, Trevor Oussoren, and David Tesch. Missing: Adam Neil

2.0 FWCP's Strategic Framework

We use a strategic framework to guide overall planning for compensation investments. The framework (Figure 2.1) has guided the development of strategic plans (Section 3.0) for each basin or watershed within the FWCP program area, which in turn inform Action Plans that focus on specific priority actions.

VISION

Thriving fish and wildlife populations in watersheds that are functioning and sustainable.

- An effective program will support the maintenance of healthy fish and wildlife populations in basins significantly altered by hydroelectric development. Actions taken should satisfy both the conservation and sustainable-use objectives and, where possible, restore ecosystem function, making species more resilient to emerging pressures, such as climate change.

MISSION

The FWCP compensates for the impacts to fish, wildlife and their supporting habitats affected by BC Hydro-owned and operated generation facilities.

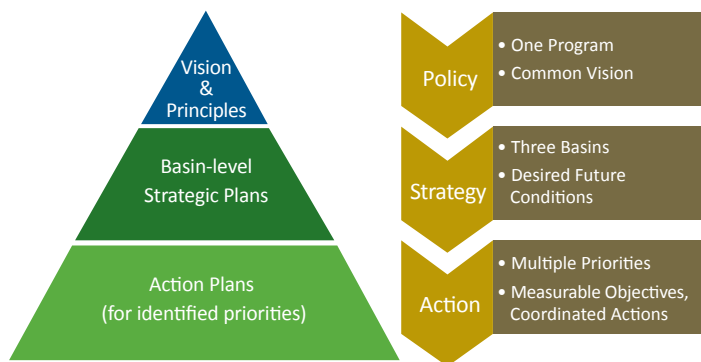


Figure 2.1
Relationship between FWCP's Strategic Framework,
Basin-level Strategic Plans and Action Plans.



Aerial view of wetland creation at Cherry Creek in the East Kootenay by The Nature Trust of B.C. Photo: Doug Newbigging.

3.0 FWCP Strategic Objectives and Strategic Plans

3.1 STRATEGIC OBJECTIVES

The strategic objectives for the Fish and Wildlife Compensation Program reflect a synthesis of the core objectives and mandates of partner agencies as they relate to mitigating impacts associated with hydro-power generation in British Columbia:

Conservation

- Maintain or improve the status of species or ecosystems of concern.
- Maintain or improve the integrity and productivity of ecosystems and habitats. This addresses the concept of ecosystem integrity, resiliency, and the functional elements of ecosystems, including efforts to optimize productive capacity.

Sustainable Use

Maintain or improve opportunities for sustainable use, including harvesting and other uses. This objective focuses on our role in restoring or enhancing the abundance of priority species, and in providing information to resource management decision-makers related to providing opportunities for harvesting and other uses. Harvesting includes First Nations, recreational, and commercial harvests. Other uses may include cultural, medicinal, or non-consumptive uses, such as wildlife-viewing.

Community Engagement

Build and maintain relationships with stakeholders and Indigenous communities. This objective stems from BC Hydro’s social responsibility policy, the provincial Ministry of Environment & Climate Change Strategy’s shared stewardship goal, and the approach of Fisheries and Oceans Canada’s Stewardship and Community Involvement Program. This recognizes the importance of engaging with Indigenous communities, local stakeholders, and other interest groups to contribute toward making good decisions and delivering effective projects.

3.2 STRATEGIC PLANS

The Columbia Basin Plan sets forth the strategic direction for the FWCP in the Columbia Region. It includes the vision, principles, policy context and strategic objectives that form the foundation of the FWCP, as well as a short description of the Columbia Basin landscape and an overview of the hydro-electric facilities and footprint impacts created by those facilities. Action Plans identify priority actions for the restoration, conservation and enhancement of fish and wildlife and their habitats in the Columbia Region.

Taken together, the Basin Plan and accompanying Action Plans present the FWCP priorities for investments in compensation activities within the Columbia Basin. All fish and wildlife projects approved by the Board, regardless of delivery method, must align with the Basin and Action Plan strategic objectives and priority actions.

Action Plans:

- | | |
|-------------------------------|----------------------------|
| • Large Lakes Action Plan; | • Streams Action Plan; |
| • Small Lakes Action Plan; | • Species of Interest |
| • Riparian and Wetland | Action Plan; and |
| Action Plan; | • Upper Kootenay Ecosystem |
| • Upland/Dryland Action Plan; | Enhancement Plan (UKEEP) |

Action Plans were originally developed in June 2012 with the exception of UKEEP, which was finalized in August 2014 and revised in June 2016. The Riparian and Wetlands Action Plan was revised in September 2014 based on input received from stakeholders, and replaced the earlier (June 2012) version. A minor update was made to Table 1 of the Upland/Dryland Action Plan in June 2016. These plans, together with the Five Year Core Fisheries Program Plan 2014-2018, are considered living documents that are reviewed and refined on an ongoing basis, as determined by the regional Board. Columbia Basin and Actions Plans are available at fwcp.ca.

4.0 Report on performance

4.1 RESULTS OF THE 2017–18 GRANT APPLICATION INTAKE

The FWCP undertakes a call for grant applications each year in the fall. The applications are submitted and managed online through the FWCP's Grant Management System (GMS). The GMS has improved administrative efficiency, enhanced data-collection and reporting, and has helped automate some of the application review process.

In the Peace Region, prior to applications being submitted, project proposal ideas must go through the mandatory Notice of Intent (NOI) process. This process allows regional First Nations to speak directly to grant applicants for geographically relevant projects, and ensure they are fully aware of the proposed project activities. This process allows for early dialogue with First Nations prior to the grant application deadline and may lead to opportunities for First Nations participation in the proposed project.

All grant applications received go through a three-stage review process. This consists of a review by:

- the Regional Manager to ensure they are complete and in alignment with a priority action in one of the FWCP Columbia Action Plans;
- the Fish or Wildlife Technical Committee to determine technical merit; and
- the FWCP Columbia Board¹.

In total, 52 grant applications were received through the F18 grant intake process with a request of over \$1.9 million. Of these submissions, 30 grants were conditionally approved and 28² were delivered for a total FWCP investment of nearly \$1.0 million and a total project value of approximately \$3.1 million. First Nations, stewardship groups, consultants, and agencies led the 8 fish and 20 wildlife projects that will help conserve and enhance fish and wildlife in watershed impacted by BC Hydro dams. Nine of the approved grants were delivered through the Upper Kootenay Ecosystem Enhancement Plan (UKEEP).

A summary of F18 Board-approved fish and wildlife projects, including FWCP funding amounts, is provided in Table 4.2.

4.2 FINANCIAL REPORT

The FWCP is funded by BC Hydro through a notional fund that is indexed to the Consumer Price Index (CPI). For F18, spanning the time period of April 1, 2017 to March 31, 2018, BC Hydro provided \$4.837 million to the FWCP Columbia Region³. Unspent surplus dollars (uncommitted dollars) at the end of F17 totaled \$1.25 million which resulted in a total of up to \$6.087 million available to be utilized in the Columbia Region in F18.

Each year, annual funding is allocated by our Columbia Region Board toward fish and wildlife projects and other program costs. In F18, these other costs included administrative costs (e.g. salaries, travel and expenses, office expenses, and committee costs) and communications costs (e.g. communications support and advertising). Any unallocated funds are carried forward ("unspent surplus dollars") and available for future spending.

Similarly, not all allocated "committed" funds are expended by the end of a given fiscal year, due to the seasonal nature of some field-based projects. The unspent committed funds (e.g., "F17 remaining commitment to spend in F18") are the difference between the committed funds and what has actually been spent. These committed funds are carried forward and remain available for spending on the respective committed projects to ensure payment in full. All committed funds are associated with the fiscal year in which the spending was approved, and tracked separately.

As of April 1, 2017, the FWCP Columbia Board approved a F18 budget of \$5.751 million. In addition, there were prior year funding commitments of \$1.94 million from F17, \$52,000 from F16, \$17,000 from F15, leaving an uncommitted surplus of \$336,000, as shown in Figure 4.1.

¹ There is a Subcommittee of the FWCP Columbia Board that reviews and approves the UKEEP projects, which also includes a representative from the Columbia Basin Trust (The Trust).

² Two Columbia grants were cancelled.

³ The FWCP administers UKEEP projects through a funding partnership with the Columbia Basin Trust (the Trust), which has provided \$3 million over three-to-five years. Please see Section 4.3 for the F18 UKEEP financial report.

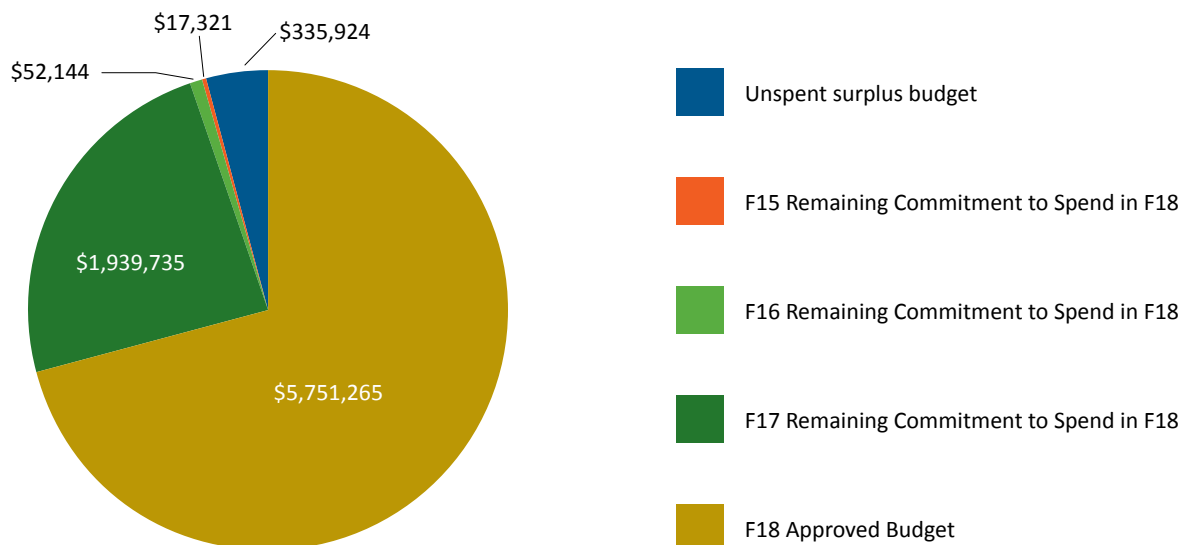


Figure 4.1: Financial Summary of FWCP Columbia Region as of April 1, 2017

The F18 budget of almost \$5.8 million went primarily towards projects related to fish and wildlife conservation, restoration and enhancement projects. In F18, the Board set aside a contingency fund to cover potential unforeseen expenses related to regional priorities and projects. Figure 4.2 illustrates the approved F18 budget at the start of the fiscal year. A complete project list for F18 is found starting on page 12.

Administrative and communications costs made up approximately 5% and 2% of the total budget, respectively.

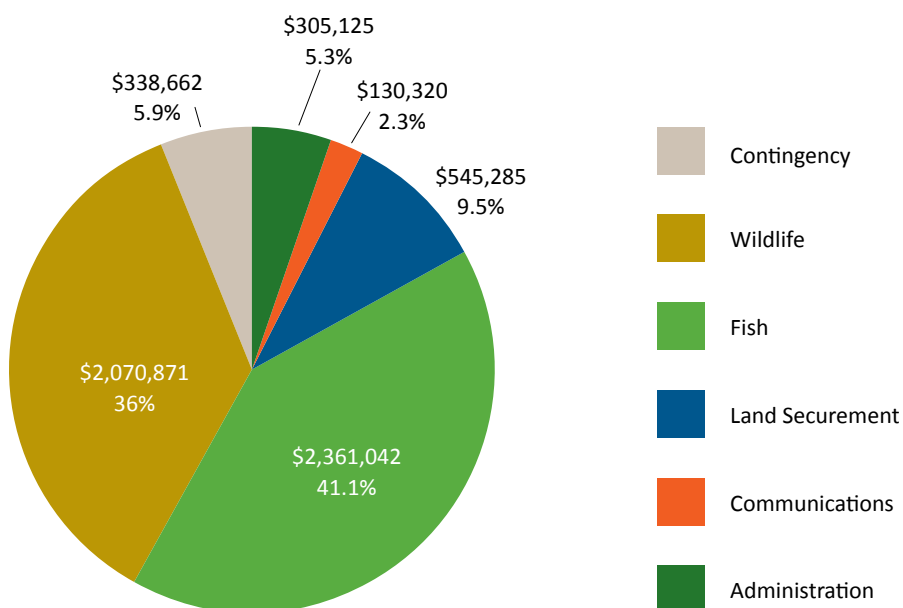


Figure 4.2: Breakdown of approved budget at April 1, 2017

A summary of planned and realized expenditures at the end of F18 by major budget category is provided in Table 4.1. This represents a “snapshot” in time of actual expenditures, as these values will change over the following months, as F18 approved projects become finalized and final payments are issued. Each year, allocated project funding is not fully paid by year-end due to the seasonal nature of field-based projects and the fact that some project proponents are unable to submit their final project reports for approval by fiscal year-end. The F18 allocated funds not yet paid out by March 31, 2018 are labelled “Planned” in Table 4.1.

In addition, it is not uncommon for projects to be completed under-budget (“Unspent” in Table 4.1). Any funds not spent during the fiscal year will be carried forward as unspent surplus budget and made available for future spending. If additional projects remaining in the “Planned” category come in under-budget, the unspent amount for F18 may increase.

As shown in Table 4.1 below, the F18 Board approved budget for FWCP Columbia included approximately \$2.071 million for wildlife-related projects, \$2.361 million for fish-related projects, \$545,000 for land securement projects, \$435,000 for administration and communication support, and \$339,000 for contingency. Actual and planned expenditures related to these project envelopes are also shown.

Table 4.1: F18 budget status as of March 31, 2018

Fund Category	F18 Approved Budget	Paid up to March 31, 2018	Planned payments ¹	Unspent Funds ²
Contingency	\$338,622	\$0	\$0	\$338,622
Wildlife	\$2,070,871	\$885,349	\$778,307	\$407,215
Fish	\$2,361,042	\$1,851,364	\$106,038	\$403,640
Land Securement	\$545,285	\$389,902	\$155,383	0
Communications	\$130,320	\$97,168	\$20,150	\$13,002
Administration	\$305,125	\$245,820	\$55,632	\$3,673
TOTAL	\$5,751,265	\$3,469,603	\$1,115,510	\$1,166,152

Note¹: Planned payments represent expected invoices for approved, ongoing projects that have not yet submitted final reports by March 31.

Note²: Unspent funds are carried forward and available for future spending.

Totals do not include the F18 approved UKEEP budget. Please see Section 4.3 for details.

At the end of F18 (March 31, 2018), \$3.469 million of the F18 budget had been spent, while \$1.115 million remained as an F18 commitment to spend in F19. In addition, the status of prior year funding commitments anticipated to be spent in F19 was \$137,000 from F17, \$5,400 from F16, and \$3,800 in F15, resulting in an expected unspent surplus of \$2.113 million, which will be allocated to future fish and wildlife projects.

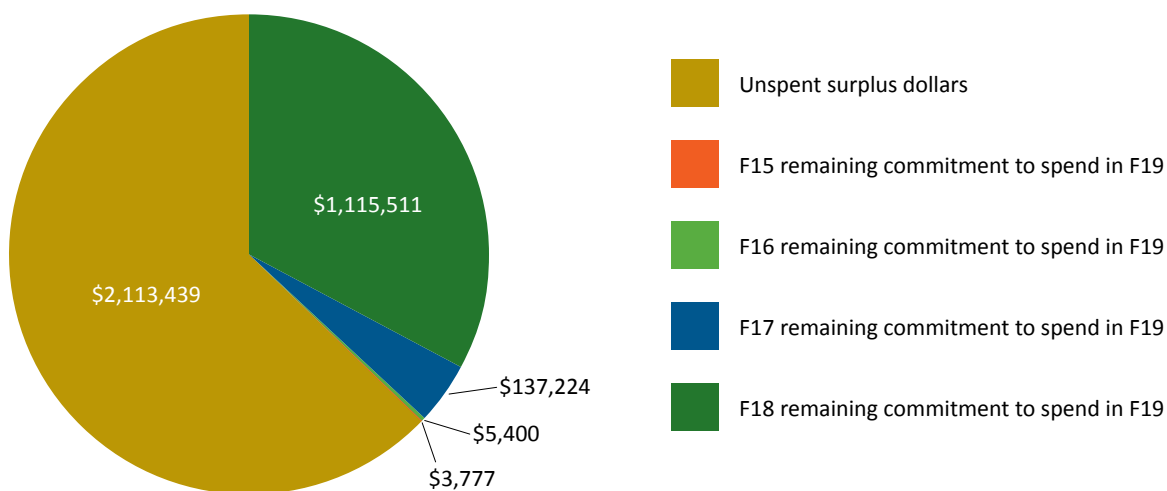


Figure 4.3: FWCP Columbia Region financial summary at March 31, 2018 (end of year)

4.3 SUMMARY: UPPER KOOTENAY ECOSYSTEM ENHANCEMENT PLAN (UKEEP)

The FWCP administers UKEEP projects through a funding partnership with Columbia Basin Trust (the Trust), which has provided \$3 million over five years. It was developed with technical and community input and helps conserve and enhance fish, wildlife and ecosystems in the Upper Kootenay River watershed, including the Koocanusa Reservoir. UKEEP was jointly announced by the Trust and FWCP in 2013. F18 was the third full year of projects being funded under UKEEP.

In F18, nine grant applications (three fish, six wildlife) were approved by the UKEEP Subcommittee for a total UKEEP contribution of \$396,658 and a total project value of \$940,876. Projects supported through the grant application process ranged from grassland and stream restoration to Mule Deer survival monitoring. In addition, four directed projects (two fish, two wildlife) were approved for a total UKEEP contribution of approximately \$129,870 and a total project value of \$246,755. These directed projects included the Koocanusa Kokanee Enumeration project, Elk Valley Elk Project, Upper Kootenay Burbot Conservation Strategy, and Kootenay Remote Camera Wildlife Monitoring. The full list of UKEEP projects is shown in Table 4.3.

4.4 STRATEGIC PLAN ACCOUNTABILITY AND F18 PROJECTS

As noted in Section 3.2, alignment with the strategic objectives and priority actions identified in the Basin and Action Plans is a key consideration for the Technical Review Committees and Board during the project evaluation and selection process.

Tables 4.2, 4.3 and 4.4 provide a listing of 2017—2018 fish and wildlife projects approved for funding in F18, including alignment with Action Plan priorities. Funding identified in the following tables may vary from the approved budget as of April 1, 2017, 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/search for an updated list of all available final reports.

4.5 F18 PROJECTS

Table 4.2: 2017–2018 Projects

Project ID	2017–2018 Grant-Based Fish Projects	Project Lead	FWCP Funding	Project Type	Action Plan Alignment	Sub-Region	Project Outcomes
COL-F18-F-2261	<p>Supporting Bull Trout in Sheep Creek</p> <p><i>Sheep Cr Fertilization: The Food for Fish Enhancement Project</i> The Sheep Creek Fertilization Project (SCFP) uses liquid agricultural phosphate/nitrate to provide a nutrient base for food-web enhancement. The SCFP originated as a BC Hydro compensatory project for 7 Mile Unit 4 upgrades. Shaped by a before-after-control-impact experiment (Sheep Cr/S. Salmo R.), SCFP successfully creates larger/more fish, especially project target Bull Trout (Decker, 2010). The SCFP is a state-of-the-art, solar-driven, precise injection system. The fertilizer promotes periphyton growth that feeds invertebrates, which feed fish. Long-term Bull Trout redd monitoring in the Salmo River shows consistent Bull Trout spawning in Sheep Creek and decline in previously strong unfertilized spawning areas.</p>	Salmo Watershed Streamkeepers Society	\$30,000	Habitat Based Actions	Streams Action Plan	West Kootenay	In 2017, low-level fertilization treatment was applied to Sheep Creek for a 106 day window during summer/early fall growing season (Jul 6-Oct 19). Liquid agricultural grade fertilizers, urea-ammonium nitrate (N- P2O5- K2; 32-0-0) and ammonium polyphosphate (N- P2O5- K2O; 10-34-0) were used as sources of nitrogen and phosphorus. These fertilizers were applied to Sheep Creek at the single nutrient release point. Liquid fertilizer samples were analyzed and application rates were adjusted accordingly to ensure target concentrations were met.
COL-F18-F-2372	<p>Improving knowledge of Bull Trout in Whatshan Reservoir</p> <p><i>Whatshan Reservoir Bull Trout Risk Assessment</i> This project is aimed at tracking the number of spawning piscivorous Bull Trout that inhabit Whatshan Reservoir and spawn in Fife Creek—the primary tributary of the Upper Whatshan River. Results from Year 1 (2016) of this project revealed the spawning numbers are relatively low, with their distribution limited by fish passage barriers located low on Fife Creek. Tentative information on the distribution of spawners has been determined, and surveys of redd numbers will be completed by mid-October. Three years of redd surveys are recommended to provide a reasonable assessment of “base case” spawner numbers. A more detailed assessment of the barriers is recommended during 2017.</p>	Redfish Consulting Ltd.	\$8,496	Species-Based Actions	Large Lakes	West Kootenay	<p>Reconnaissance surveys in mid-September and early October were conducted to determine if spawning Bull Trout were present in the Upper Whatshan River and Fife Creek, the main tributary of the river. During Kokanee surveys in September, a few pre-spawners were observed upstream of the FFSBC Kokanee fish fence located where the river flows into the reservoir. By the end of September, no pre-spawning Bull Trout were observed in the river, as they evidently had moved upstream into Fife Creek. A reconnaissance survey was also conducted on sections of the river to determine if Bull Trout could ascend a small barrier just upstream of the confluence with Fife Creek. The suspected barrier was deemed to not be a problem. No Bull Trout were observed during this reconnaissance. The initial survey(s) of Bull Trout redds was conducted on October 7, 2017. The survey this year determined a fish barrier on Fife Creek 3.0 km upstream of the confluence with the Upper Whatshan River. A total of 22 redds were observed in the accessible portion (3.0 km) of Fife Creek and six redds in the 125 m of accessible stream in North Fife Creek. Using a biostandard of 2.6 fish/km of stream indicates only about 73 Bull Trout spawned during 2017.</p> <p>A redd survey was also conducted on portions of the Upper Whatshan River upstream of the confluence with Fife Creek. Despite surveying sites that appeared to be Bull Trout spawning habitat, no spawners or redds were observed.</p> <p>Similar redd survey results in 2017 to those in 2016 leads to the conclusion that most likely fewer than 100 spawners spawn in Fife Creek and North Fife Creek. Restoration work involving barrier removal on Fife Creek could increase the amount of spawning habitat for Bull Trout. The small size of the spawning population should be noted with caution and a size limit regulation for the fishery is recommended.</p>

Project ID	2017–2018 Grant-Based Fish Projects	Project Lead	FWCP Funding	Project Type	Action Plan Alignment	Sub-Region	Project Outcomes
COL-F18-F-2373	Restoring fish populations in Whatshan Reservoir <i>Whatshan Reservoir Nutrient Restoration</i>	Redfish Consulting Ltd.	\$5,000	Species-Based Actions	Large Lakes	West Kootenay	Project cancelled
COL-F18-F-2376	Supporting Gerrard Rainbow Trout in Lardeau River <i>Gerrard Rainbow Trout Stock Productivity at Low Abundance</i> The project will obtain recruitment information at low-stock abundance, that is critical in defining important biological reference points for the conservation and management of Gerrard Rainbow Trout on Kootenay Lake. Data will provide important information on the maximum reproductive rate, which can only be obtained when stock abundance is low. As in previous years, a six-person crew will conduct nighttime snorkel surveys on the Duncan River, as part of this funding, to estimate the abundance of age 1 juvenile Gerrard Rainbow Trout in the Duncan River. The data will be combined with information obtained from the Lardeau River to provide whole river estimates and annual production of age 1 juvenile Gerrard Rainbow Trout.	Ministry of Forests Lands and Natural Resource Operations	\$12,788	Research and information acquisition	Large Lakes	West Kootenay	<p>This project has utilized nighttime snorkel methods since 2006, to assess Gerrard juvenile abundance on the Lardeau and Duncan rivers. Starting in 2011, increased sampling efforts have improved precision, thus reducing uncertainty in abundance estimates. Surveys conducted in the spring of 2017 covered approximately 27% of the Lardeau River and 12% of the Duncan River, a substantial increase from 2016. In 2017, age one abundance for the Lardeau and Duncan rivers was estimated to be 41,807 (95% CRI 29,500-60,031). The analysis also revised last year's estimates downward, from 40,000 to 27,000, (approx.) age fish. Spawner escapements at Gerrard using an area under the curve (AUC) from daily counts have provided an index of abundance since 1961. The 2017 juvenile recruitment estimates are the progeny from the 2016 spawn of Gerrard Rainbow Trout, which was estimated to be 162 AUC, well under the record high observed in 2012, of over 1,500 AUC. Data analysis fitted a Beverton Holt stock-recruit (SR) curve for Gerrard Rainbow Trout based on river recruit and spawner data. Preliminary results of the stock-recruit relationship suggest no appreciable increase in recruitment in juvenile abundance, as spawner abundance increased above 500 AUC. This relationship also suggests that most of the density dependent mortality in the early life stages occurs prior to age one. With the exception of 2005, average annual recruitment is estimated to be approximately 89,000, age one juveniles.</p>

Project ID	2017–2018 Grant-Based Fish Projects	Project Lead	FWCP Funding	Project Type	Action Plan Alignment	Sub-Region	Project Outcomes
COL-F18-F-2443	<p>Responding to invasive aquatic species in West Kootenay</p> <p><i>Protecting Our Waters from Aquatic Invasive Species, Phase 4</i></p> <p>This project aims to ensure productive and biologically diverse aquatic ecosystems within the Central/West Kootenay region. This will be achieved through surveying and monitoring for new incursions of highly invasive aquatic invasive species; collaborating with partners to engage in Early Detection and Rapid Response Plans should certain high-priority species be detected; monitoring changes in composition, density, and distribution of existing infestations of aquatic invasive plants and undertaking management activities where feasible; and increasing education and awareness about aquatic invasive species, and providing solutions on how to prevent their introduction and spread.</p>	Central Kootenay Invasive Species Society	\$23,500	Research and information acquisition	Large Lakes	West Kootenay	<p>Full littoral surveys for invasive plants were conducted on Bear, Box, Cottonwood, Fish, Rosebud, Nancy Greene, and Summit lakes, and points were sampled on Whatshan, Slocan, Lower Arrow, and Duncan lakes. These surveys resulted in no riparian, nor aquatic, invasive plants found. On Erie Lake, previously treated patches of fragrant waterlily (<i>Nymphaea odorata</i>) and Yellow Flag Iris (<i>Iris pseudacorus</i>) were found to be reduced. At Champion Pond (Mel Deanna), of two previously treated patches of <i>N. odorata</i>, no plants were detected at one site, and the area and density of plants at the other site was found to be reduced. Watercress (<i>Nasturtium officinale</i>) was confirmed to be growing sporadically on the shoreline of Kootenay Lake, near Boswell. Aside from this one occurrence of <i>N. officinale</i>, no previously undetected species of aquatic invasive plants were detected at other sampling points on Kootenay Lake. Surveys for zebra and quagga mussels (<i>Dreissena polymorpha</i> and <i>D. rostriformis bugenis</i>) were conducted at 35 sites on 17 waterbodies, resulting in the collection of 87 plankton samples. These samples were analyzed at a certified lab, using cross-polarized light microscopy to detect any presence of invasive mussel veligers (larvae). Artificial settlement substrates were deployed and monitored at five locations throughout the region, to detect the presence of juvenile and adult invasive mussels. Of the 87 analyzed plankton samples, no veligers were detected. Similarly, no juvenile nor adult mussels were present on any of the substrates.</p>

Fish Project total: \$120,072

Project ID	2017–2018 Grant-Based Wildlife Projects	Project Lead	Funding	Project Type	Action Plan Alignment	Sub-Region	Project Outcomes
COL-F18-W-2456	<p>Protecting Grizzlies by learning about huckleberries</p> <p><i>Predicting grizzly bear food - Huckleberries, Columbia Basin</i></p> <p>This project will expand our previous project, which accurately predicted Grizzly Bears’ most important regional food resource—huckleberries—across most of the Columbia Basin. In the previous two years, an accurate predictive model for huckleberry patches important to Grizzly Bears in the south Selkirk and Purcell mountains was developed. This project will expand that model into the East Kootenay and North Columbia, the Central Purcells, Selkirks, the Valhalla and Granby ranges. The huckleberry patch model is already being used by resource managers to plan timber harvests and protect important berry patches through access controls. There is a strong demand for this model to be expanded regionally for these same purposes.</p>	Birchdale Ecological	\$26,090	Habitat-Based Actions	Species of Interest	Basin-Wide	In 2017, 338 potential huckleberry patch sites were visited across the northern portion of Kootenay Region Four, between the Alberta border and the Okanagan. Of those sites, 242 were actual huckleberry sites, while 96 were not. Results were combined with the previous two years sampling efforts in the focal area (512 sites visited) to remodel huckleberry patches across the southern portion of the Kootenay region.
COL-F18-W-2458	<p>Preparing for Whitenose Syndrome in Columbia Region</p> <p><i>Establishing and monitoring bat abundance and diversity</i></p> <p>Whitenose Syndrome (WNS), the fungal disease that is devastating eastern bat populations, is now on the West Coast. The cascade of ecological fallout from mass bat die-offs as WNS spreads across the west is not yet known, but changes in insect densities could have far-reaching ecological implications. This will employ the standardized protocol of the North American Bat Monitoring Program to establish baseline diversity and relative abundance of bats, and monitor trends pre- (and possibly post-) WNS outbreak—identified as a high-priority action item in the FWCP-sponsored “BCBAT Action Plan.” Also of a high priority, we will continue to locate and monitor bat hibernacula, because WNS kills bats while they hibernate.</p>	Wildlife Conservation Society Canada	\$54,219	Research and Information Acquisition	Species of Interest Action Plan	Basin-Wide	This project is implementing the NABat monitoring program and, in doing so, local citizens/biologists are being trained in bat monitoring techniques. Nine of the 22 NABat grid cells being monitored in B.C. in 2017 are in the Columbia Basin. Bats at four key/sentinel roost sites (summer and winter) are also being monitored to obtain baseline data prior to the arrival of WNS. Bat detectors are being deployed underground in mines and caves to identify sites of overwintering bats.
COL-F18-W-2501	<p>Studying declining bird species in Columbia Region</p> <p><i>Aerial Insectivorous Birds Inventory & Research - Kootenays</i></p> <p>Studying declining bird species in Columbia Region</p> <p>Aerial Insectivorous Birds Inventory & Research - Kootenays</p> <p>This Seed project will scope, plan, and prepare a research strategy and large grant application for the 2018 breeding bird field season. A literature search will be conducted of current information on the decline of aerial insectivorous bird species throughout North America, and specifically, in the Columbia Basin. The scoping aspect will identify gaps in knowledge about habitat requirements and inventory needs for aerial insectivorous bird species in the Columbia Basin, and will examine the feasibility and/or scope of specific project components that could be included in the large grant application submitted in 2017.</p>	Nupqu Development Corporation	\$5,000	Species-Based Actions	Species of Interest	Basin-Wide	Project in-progress (anticipated completion date October 31, 2018).

Project ID	2017–2018 Grant-Based Wildlife Projects	Project Lead	Funding	Project Type	Action Plan Alignment	Sub-Region	Project Outcomes
COL-F18-W-2379	<p>Restoring riparian and wetland habitat in East Kootenay</p> <p><i>Elk Valley Wetland Creation and Restoration—Hosmer</i></p> <p>In 2015, the Nature Conservancy of Canada (NCC) worked with wetland specialists to design wetland restoration projects at the Wilson Lake gravel site near Hosmer, British Columbia. The NCC would like to move forward with the project to restore portions of the existing gravel pit and adjoining Wilson Lake that are not being actively mined. These areas may be restored to provide riparian and wetland ecosystems that would support a diversity of waterfowl, wetland birds, reptiles, and amphibians. Restoration techniques would improve habitat for a variety of other upland species, including badgers and Grizzly Bears. A component of the project is to work with partners to implement an educational stewardship and interpretive program on the importance of riparian and wetland ecosystems in the Elk Valley.</p>	The Nature Conservancy of Canada	\$58,734	Habitat-Based Actions	Riparian and Wetlands Action Plan	East Kootenay	The wetland creation and restoration project took place from April 11, 2017 to March 31, 2018, on the Elk River Heritage Conservation Area, north of Hosmer in the Elk Valley. These areas are being restored to provide riparian and wetland ecosystems that support a diversity of waterfowl, shorebird species, reptiles and amphibians. Restoration techniques improve habitat for the rare badger, Grizzly Bear, Townsend's Big-eared Bat, Western Painted Turtle, and Western Toad. The heavy equipment construction began on October 23, 2017, and was completed on November 7, 2017. Four-large wetlands were built from the previously mined area, as part of the restoration project. Restored wetlands and associated riparian and upland areas totaled 4.9 ha in size. The restored sites were seeded with a native riparian grass mix above the high water mark and planted with live Cottonwood stakes between October 31 and November 7, 2017. In addition, NCC worked with partners (Elk River Alliance) to implement an educational interpretive program on the importance of riparian and wetland ecosystems in the Elk Valley, and their critical role, particularly in attenuating floods and providing wildlife habitat.
COL-F18-W-2399	<p>Surveying birds in Columbia Wetlands</p> <p><i>Columbia Wetlands Marsh Bird Monitoring Project (CWMBMP)</i></p> <p>Elusive, inconspicuous marsh birds are difficult to detect; population status and habitat use for these birds are not well known. This project addresses information deficiencies by using a well-developed protocol to collect baseline data for 38 Priority 1 FWCP inventory species. This project conducts repeated marsh bird surveys at 50 survey stations in the Columbia Wetlands (within the Canadian Intermountain Joint Venture region) over three years, to estimate abundance and distribution, and identify significant habitat units used for breeding. Data from the CWMBMP is needed before making management recommendations and prior to implementing compensation actions (e.g., enhanced bird nesting opportunities), thus increasing the carrying capacity of the wetlands for species of conservation concern.</p>	Goldeneye Ecological Services	\$5,000	Research and Information Acquisition	Riparian and wetlands	East Kootenay	SEED funding was secured in 2017 to scout potential survey stations and determine the feasibility of conducting repeatable marsh bird surveys in remote areas of the wetlands using kayaks and involving volunteers. Four kayaking routes were established, and a total of 174 marsh bird surveys were conducted at 61 surveys stations in the Columbia River Valley. The three-year compilation of baseline inventory data acquired from the CWMBMP will assist in estimating marsh bird population numbers in the Columbia Wetlands, assess target species abundance and distribution, and identify significant breeding areas in the wetlands. Data from the CWMBMP will be a critical support structure, assisting the formulation of management recommendations for habitat-based conservation projects (e.g. nesting platforms or boxes, landowner outreach leading to habitat enhancement or restoration), to be implemented in the years 2018-2020.

Project ID	2017–2018 Grant-Based Wildlife Projects	Project Lead	Funding	Project Type	Action Plan Alignment	Sub-Region	Project Outcomes
COL-F18-W-2449	<p>Supporting wetlands in West Kootenay</p> <p><i>Supporting wetlands in West Kootenay</i></p> <p>Advancing Wetland Stewardship & Restoration The BC Wildlife Federation (BCWF) will build the capacity of Kootenay residents (including local stewardship groups, volunteers, educators, First Nations, government employees, and environmental professionals) to protect, enhance, and construct wetlands through the delivery of a Wetlands Institute Workshop in 2017. The workshop will provide hands-on training to participants through the restoration of wetlands in the Columbia Region. Sites include wetlands at Turtle Lake (Crownland- Mt. Findlay Region) and Gyppo Logging Basin (Crown land -Mt. Findlay Region). The BCWF will also enhance a wetland that was created in Salmo as part of a 2013 Wetlands Institute project (W-F14-19), by planting a diversity of native species, and creating 2 ha of shallow-water habitat on private land in Meadow Creek.</p>	British Columbia Wildlife Federation	\$116,900	Habitat-based Actions	Riparian and wetlands	East Kootenay	Project in-progress (anticipated completion date November 30, 2018).
COL-F18-W-2493	<p>Studying Grizzly mortality in Elk Valley</p> <p><i>Rates & mechanisms of grizzly bear mortality in Elk Valley</i></p> <p>Radiotelemetry will be used to identify the rates and causes of Grizzly Bear mortality in a population of bears that declined by 40% in the last eight years. The study is focused on the lower Elk, Kootenay, and Bull River drainages, where human settlement, resource extraction, and hydroelectric reservoirs occur in Grizzly Bear habitat, impacting connectivity and contributing to high mortality. Currently, the degree of mortality under-reporting is unknown and suspected to be high, and these uncertainties compromise the science-based conservation of Grizzly Bears locally and provincially. This project builds on a large body of research and previously collected data to provide recommendations for pressing conservation concerns and to engage the community in Grizzly Bear conservation.</p>	Ministry of Forests, Lands, and Natural Resource Operations	\$25,750	Monitoring and Evaluation	Species of Interest	East Kootenay	<p>Since 2016, 30 male and female grizzly bears have been collared, spanning ages three- to 13-years-old. During that time, seven collared bear mortalities have been documented , plus two other mortalities of previously collared animals. Of the seven bears killed while monitored, three were killed due to human-wildlife conflict (one in Elkford, two on farms), and four were killed due to locomotive strikes (two by cars, one by a train, one either a car or train). All three of the human-wildlife conflict mortalities were reported, whereas only one of the four locomotive strikes were reported, confirming the suspicion that many bears are killed, but not reported in this area. Annual survival rates for bears living in the Elk Valley are amongst the lowest in North America (0.66, 95 % CI: 0.44-0.87). Progress has been made in starting to reduce attractants and negative effects for bears in the Elk Valley. Data collected has been used to 1) inform the need for electric fencing around a mink farm north of Sparwood, anticipated to be installed in summer 2018; 2) reduce bear-trapper conflicts, whereby bears are having their feet caught in conibear traps and losing toes. The Province has been about this and the project suggested a shortening of the fur trapping season to reduce overlap with bears emerging from the den; 3) propose a tree-replacement program to the Elkford Urban Wildlife Committee, to reduce the crab apple attractants in their community; and 4) look at bear crossing and mortality zones along the highway to inform mitigation measures for connectivity, by FLNR/MOT.</p>

Project ID	2017–2018 Grant-Based Wildlife Projects	Project Lead	Funding	Project Type	Action Plan Alignment	Sub-Region	Project Outcomes
COL-F18-W-2378	Testing floating habitat for loons in Kinbasket Reservoir <i>Monitoring loon nest platforms in Staubert Lake and Bush Arm</i> Common Loon (<i>Gavia immer</i>) populations have likely been impacted in the Columbia Region, and across BC, due to reservoir creation and habitat loss. As loons face increasing threats to population stability, enhancing loon habitat through providing floating nest platforms may help compensate for past habitat losses, and lead to increased nesting success. Artificial nest platforms are known to improve nesting success in small lakes in eastern North America. In 2016, we installed three artificial floating nest platforms, one in each of three small lakes—Staubert (Hwy 31), and 2 lakes in Bush Arm north of Donald by Kinbasket Lake—and monitored the nesting success of loons before the platforms were available. Monitoring in 2017 will assess the use of platforms and the nesting success of loons in small lakes.	Kingbird Biological Consultants Ltd.	\$8,090	Monitoring and Evaluation	Species of Interest	North Columbia	In 2016, Common Loon use of lakes and their nesting success was monitored, to determine where to install platforms. This resulted in three Biohaven® artificial floating nest platforms being installed, one in each of three small natural lakes in the Columbia Mountains. Effectiveness monitoring was recommended to determine if the habitat treatments were beneficial. Year one of monitoring occurred in 2017, to determine if Common Loons use the nesting platforms, and to monitor the success of Common Loons nesting in these and other nearby lakes (e.g. Blackwater Lake). No platforms were used by loons for nesting in 2017, the first year that platforms were available to the loons, so no immediate benefits to reproductive success were obtained. However, it can take several years for loons to begin using new platforms. Three Common Loon nesting attempts were observed, on Staubert, Blackwater, and Aid Lake. Two nests hatched three young; one of these young (from Aid Lake) survived to juvenile stage (half adult size).
COL-F18-W-2381	Supporting caribou recovery in North Columbia <i>Revelstoke Caribou Maternity Pen</i> Mountain Caribou are listed as endangered by the Province of BC and threatened by the federal Species at Risk Act. Several caribou sub-populations are declining at a rate that will likely result in extirpation in the near future (Wittmer et al., 2010), largely because of excessive predation (Wittmer et al., 2005b) due to altered predator-prey dynamics resulting from habitat change. This five-year year pilot project will determine if maternal penning can improve the survival of calves and adults in the Columbia Mountains ecosystem by protecting them in a secure enclosure for four months until calves are larger and more capable of avoiding predation. If successful, this tool will be used to increase the size of the Columbia North Caribou sub-population.	Revelstoke Caribou Rearing in the Wild Society	\$77,807	Species-based Actions	Species of Interest	North Columbia	In March 2017, 12 adult cows and 1 bull were transported to the maternity pen. Eleven of the cows were pregnant (92%), 10 live calves were born (one was stillborn) and one died shortly after birth. Nine calves plus 13 adults were released from the pen in July 2017. By March 2018, four of 11 calves were alive (0.364), and one cow died in an avalanche. This level of calf survival amounts to a net contribution of 0.26 penned calves over the wild calf population.
COL-F18-W-2475	Supporting recovery of Northern Leopard Frog near Golden <i>Moberly Marsh Restoration Plan</i>	LGL Limited Environmental Research Associates Ltd.	\$17,597	Habitat-Based Actions	Riparian and Wetlands	North Columbia	Project cancelled

Project ID	2017–2018 Grant-Based Wildlife Projects	Project Lead	Funding	Project Type	Action Plan Alignment	Sub-Region	Project Outcomes
COL-F18-W-2494	<p>Supporting high-elevation beaver habitat</p> <p><i>Beaver Influenced Wetlands on the Columbia West Bench</i> This seed project will develop a study to collect and analyze the data necessary to identify potential conservation and restoration opportunities for higher elevation beaver-influenced wetlands on the west bench of the Upper Columbia River in the Golden region. The beaver (<i>Castor canadensis</i>) is a keystone species that can create and maintain extensive series of ponds, marshes, and meadows in areas where there may otherwise be an incised mountain stream. The ponds trap significant quantities of sediment over time, regulate water flow downstream, and increase surrounding water tables. These habitats are complex wetlands that host many other species and contribute immensely to local biodiversity. Their importance may increase in the future with predicted warming, drying trends in the Columbia Valley.</p>	A.L. Ecologic	\$17,597	Habitat-based Actions	Riparian and Wetlands	North Columbia	Final report in progress.
COL-F18-W-2405	<p>Assessing wetland species in West Kootenay</p> <p><i>Evaluating wetland restoration: Invertebrate Assessment Tool</i> The goal of this project is to track restoration recovery of FWCP-funded sites using quantitative measures of wetland stress and biological health as indicators. The Wetland Invertebrate Assessment Tool (W-F16-10) is an innovative technique using Canadian Aquatic Biomonitoring Methods (CABIN) for wetlands. The benefits of the project include a biologically based technique that will monitor restoration recovery in a multiyear context at two FWCP-funded restoration sites: Crooked Horn Farm (COL-F17W-1438) and Meadow Creek (The Nature Trust lands). A secondary goal is to strengthen the environmental restoration work at the FWCP-funded Crooked Horn Farm with small enhancements and community involvement on nearby private land.</p>	Slocan Solutions Society	\$20,000	Monitoring and Evaluation	Riparian and Wetlands	West Kootenay	This project developed initial quantitative bench marks to track wetland recovery that can be used to assess wetlands in the Columbia Basin to make management decisions about restoration and conservation. In addition, the project identified candidate sites that can be used as a comparison to restored wetland sites and provide preliminary data on tracking recovery time to reach bench marks following restoration.
COL-F18-W-2442	<p>Responding to invasive American Bullfrogs</p> <p><i>Northern Leopard Frog Preservation American Bullfrog Control</i> The American Bullfrog (<i>Rana catesbeiana</i>) is an aggressive invasive species. It is a voracious predator that has the ability to out-compete native species and upset the ecological balance of our native ecosystems. The Central Kootenay Invasive Species Society (CKISS), the Northern Leopard Frog Recovery Team, and the Province of B.C., are very concerned about this species, as there are confirmed infestations within the Kootenay Boundary region. These populations are a direct threat to the survival of a variety of species at risk, such as Northern Leopard Frog and the Western Painted Turtle. The CKISS and its partners are working to reduce the threat of this species through eradication efforts and continued surveillance throughout the region.</p>	Central Kootenay Invasive Species Society	\$20,000	Habitat-Based Actions	Riparian and Wetlands	West Kootenay	There is currently one known breeding population of bullfrogs in the Pend D'Oreille and eradication efforts have been conducted on this population since 2015. In the Creston Valley, surveillance activities to detect bullfrog presence consisted of acoustic, visual, and environmental DNA methods. Positive detection of 36 bullfrogs in various locations throughout the valley occurred, as a result of visual surveillance in 2017. Bullfrog presence was not confirmed by means of acoustic nor environmental DNA methods. In addition, the comprehensive education and outreach program that was delivered by CKISS directly reached over 8,500 people, providing bullfrog information and “Don’t Let it Loose” campaign messaging, at 26 public and targeted events, presentations, and exhibits. CKISS also maintains a very active online presence, using our website, Facebook, Twitter, and e-newsletters to engage with the public. All of these avenues, in addition to mass media, were employed to promote bullfrog awareness and reporting, as well as “Don’t Let it Loose” messaging.

Project ID	2017–2018 Grant-Based Wildlife Projects	Project Lead	Funding	Project Type	Action Plan Alignment	Sub-Region	Project Outcomes
COL-F18-W-2470	<p>Conserving at-risk reptiles near Trail</p> <p><i>Lower Columbia Reptile at Risk Conservation Project</i></p> <p>This is the fifth year of a project that targets a snake species at risk, the North American Racer, in the Lower Columbia. The project will document summer and winter habitat use in order to conserve racers and other reptiles at risk in the area. Last season, an outdoor education event - Critter Day - was held at Beaver Creek Provincial Park. This successful event highlighted the importance of the local ecosystem and the unique species that live there. This season, Critter Day will be held once again, and also a one-day educational symposium for local land managers. Similarly, this symposium will highlight the importance of the local ecosystem and the unique species that live there.</p>	Jakob Dulisse Consulting	\$15,350	Research & Information Acquisition	Upland and Dryland	West Kootenay	Over a five-year period (2013-2017), a total of 32 North American Racers and two Northern Rubber Boas have been captured and radio-tracked, which has resulted in the discovery of a total of 14 hibernacula so far. Almost all hibernacula are located on warm, rocky slopes with good sun exposure and shrub cover, but one unusual site is located on a flat, heavily forested area, with no rock. Of these hibernacula, several are likely communal (i.e. used by more than one individual snake or snake species per year) and several are re-used from year-to-year. This highlights the importance of these sites. In May 2017, the second outdoor public educational event at Beaver Creek Provincial Park, called "Critter Day," was hosted by a number of partner organizations. This successful event focused on the unique species and ecosystems found in the Lower Columbia area, and was attended by approximately 560 people. A door-to-door outreach strategy was also initiated to educate local residents who live in sensitive reptile habitat. A total of 91 racer brochures were distributed to occupants on 81 properties and the reception was generally very positive.
COL-F18-W-2491	<p>Enhancing wetlands in West Kootenay</p> <p><i>Holmberg Wetland Enhancement</i></p> <p>This Seed project will explore the feasibility of enhancing existing wetlands in a 0.81-ha section of the Holmberg property. The area is currently part of a working farm and is used by cattle for shade and water. Future potential work may involve fencing the area to exclude cattle, then enhancing the degraded wetlands. The primary objective of the project, if feasible, is to improve the existing wetlands and incorporate three constructed ponds to increase habitat types and complexity.</p>	Misty Ridges Contracting Ltd	\$5,000	Habitat-Based Actions	Riparian and Wetlands	West Kootenay	This SEED project final report describes the proposed project, the existing site conditions, and provides the submitted Section 11 application.

Wildlife Project Total: \$460,537

Project ID	2017–2018 Annual and Ongoing Wildlife Projects	Project Lead	FWCP Funding	Project Type	Action Plan Alignment	Sub-Region	Project Outcomes
—	<p>Enhancing non-game habitats</p> <p><i>Non Game Enhancement</i></p> <p>Non-game enhancement projects focus on critical habitat features that are important for species reproduction and survival, such as roosting, denning, and nesting habitat.</p>	Ministry of Forests, Lands and Natural Resource Operations	\$173,716	Habitat-Based Actions	Upland and Dryland Areas Action Plan	Basin-Wide	<p>A portable bat roost was constructed and installed in the Newgate area. One badger crossing structure was maintained, which includes approximately 600 m of fence and two culverts. Four successful Loon pairs were found to be using the nesting islands previously installed at Whatshan Reservoir, resulting in a nesting success increase from 29 % to 80 %. Seven Lewis's Woodpecker nest trees were confirmed and 15 previously known nest trees were assessed. The Summit Lake Western Toad project continued with approximately 2.5 km of fencing maintained, 384 new tags implanted, 59 recaptures, and 11 highway surveys, resulting in the observation of 22 live and 51 dead toads. The annual "ToadFest" event was held at Summit Lake Provincial Park on August 29 and 30, 2017. The 19th year of Elizabeth Lake Western Painted Turtle nest site monitoring and maintenance occurred in 2017. Emergence was documented for 88 known nests laid in 2016. A total of 1009 eggs were laid and 620 hatchlings emerged. The highest number of eggs per nest was 19 (n = two) and the lowest number of eggs per nest was four (n = one). There were three fall (2016) emergences, the highest counts since the site has been monitored. There were no marked nests predated. Similar monitoring occurred at the Western Painted Turtle nesting area, near Argenta, where 17 nests were found in spring 2017. Monitoring was completed at 23 Vaux Swift nest boxes; however, no nests were documented.</p>
—	<p>Conservation land stewardship activities</p> <p><i>FWCP Land Management Operations</i></p> <p>This project focuses on the coordination, oversight, and implementation of land stewardship activities associated with conservation-held lands.</p>	Ministry of Forests, Lands and Natural Resource Operations	\$314,128	Habitat-Based Actions	Species of Interest	Basin-Wide	<p>In the Duncan-Lardeau, a local five-person crew mechanically treated 217 ha of burdock on conservation lands. Previous years' restoration work was monitored at three conservation properties, maintenance of planting cones was completed, and burdock locations were assessed and mapped on DL 570 and DL 881 properties. In the Lower Columbia/ Lower Arrow, approximately 595 km of roads, trails, fields, and forest was surveyed, in 98 conservation parcels and adjacent areas. In total, 414 invasive species infestations were mapped, and approximately 309 infestations (or 179,000m2) was treated. Nineteen biological control sites were monitored and two new releases were completed. In collaboration with the Trail Wildlife Association, 1.5 km of road was restored at Fort Shepherd. Eighty-nine wildlife trees were created on nine conservation properties in the Columbia Region. Final reports are in progress for land management and stewardship activities completed by The Nature Trust of BC (TNTBC) and the Nature Conservancy of Canada (NCC).</p>

Project ID	2017–2018 Annual and Ongoing Wildlife Projects	Project Lead	FWCP Funding	Project Type	Action Plan Alignment	Sub-Region	Project Outcomes
—	Supporting Caribou recovery <i>Caribou Recovery</i> A multi-agency effort led by the Ministry of Forests, Lands and Natural Resource Operations (FLNRO)/Ministry of Environment (MOE) to recover threatened caribou sub-populations is underway. Actions funded by the FWCP this year include: South Selkirk and South Purcell caribou/cougar/wolf mortality investigations and wolf pack size determinations; participation in caribou census and collaring; predator track survey in South Selkirks or Central Selkirks; and a survey of moose in the Revelstoke sub-unit.	Ministry of Forests, Lands and Natural Resource Operations	\$105,199	Species-Based Actions	Species of Interest	Basin-Wide	South Selkirk Caribou/wolf mortalities were investigated, and pack size determination, completed in winter 2017-2018, found 14 wolves in six separate groups. The Caribou census was completed and three animals were collared in the South Selkirks. Sixteen wolves in six separate packs were recorded. The Revelstoke “Mini-Moose Survey” resulted in the classification of 110 moose, which is a 12% increase from 2016. Calves per 100 cows were 65, the highest ever recorded in B.C. Bulls per 100 cows were 43, up from 33 last year.
—	Restoring and enhancing wetlands <i>Wetland</i> The goal of this project is to deliver wetland restoration work, continue to develop new projects, and monitor completed projects. This involves work to identify candidate restoration sites, compile background information, pre-treatment inventory of sites, complete restoration plans working with a wetland specialist, and develop the partnerships, permits, and budgets for the implementation of the restoration projects.	Ministry of Forests, Lands and Natural Resource Operations	\$221,070	Habitat-Based Actions	Riparian and Wetlands Action Plan	Basin-Wide	Monitoring of constructed wetlands occurred at both the Creston Valley Wildlife Management Area (CVWMA) East Duck Lake (EDL) and Old Goat Channel (OGC) wetlands, and the TNTBC DL 881 Wetland Complex in Meadow Creek. Each site was monitored on six visits from April to October. Temperature was documented by Hobo temperature loggers, water levels monitored by installed staff gauges, and photo plots captured to show landscape change over time. Amphibian occupancy surveys showed breeding of four key amphibian species at the TNTBC DL 881 constructed wetlands. There was documented breeding of Pacific Tree Frog in the CVWMA EDL and OGC constructed wetlands, as well as five Northern Leopard Frogs observed foraging and making use of these wetlands with one of these observations being a recapture in two differing pool locations. There were approximately 24 wildlife species observed visually or by scats and tracks, at each constructed wetland site. As well, invasive species were identified and mapped for both wetland complex sites. Wetland restoration was completed at Cherry Creek (10.7 ha), Cherry Meadows (5.49 ha), DL570 Meadow Creek (19 wetlands totalling 3.2 ha), Findlay Turtle Lake (0.11 ha), and Hoodoos (0.49 ha). Restoration plans were completed for Earl Ranch (17 ha of wetland), Moberly Marsh (seven wetlands totalling four ha), Silvertip Ranch (four ha of wet-meadow and ephemeral wetlands), and Yaqan Nukiy Wetlands (24 large wetlands totalling over 14.5 ha).
—	Securing high priority lands for conservation purposes <i>Land Acquisition (Details TBC)</i> The construction of BC Hydro dams resulted in the loss of important valley bottom wildlife habitat. Land securement is one of the FWCP’s primary compensation actions. Funding is designated for high-priority securements that are developed through the FWCP’s involvement with the Kootenay Conservation Program, the Nature Trust of BC, and the Nature Conservancy of Canada.	Fish & Wildlife Compensation Program	\$545,285	Habitat-Based Actions	Species of Interest	Basin-Wide	The FWCP Columbia Board approved funding to support the securement of three conservation properties in 2017, including the Nature Conservancy of Canada’s (NCC) Anne Hicks Conservation Area (12 ha) and Morrissey Meadows conservation property (43 ha). Funding for the Valhalla Foundation for Ecology and Social Justice’s purchase of the Snk’mip Marsh Nature Preserve (14 ha) at the head of Slocan Lake was also provided. Together, these projects secured 69 ha of high value habitat in the North Columbia (Anne Hicks), East Kootenay (Morrissey), and West Kootenay (Snk’mip). With funding from the FWCP, the Kootenay Conservation Program (KCP) continued to coordinate communication between land trust organizations in the region and completed four property evaluations and two property appraisal reports.

Project ID	2017–2018 Annual and Ongoing Wildlife Projects	Project Lead	FWCP Funding	Project Type	Action Plan Alignment	Sub-Region	Project Outcomes
—	Supporting Northern Leopard Frog recovery <i>Northern Leopard Frog Recovery</i> This project involves the inventory monitoring and stewardship of the Northern Leopard Frog population at the Creston Valley Wildlife Management Area (CVWMA). This population hosts the majority of the remaining Leopard Frogs in BC, and serves as the source population for re-introductions and a captive assurance population.	Ministry of Forests, Lands and Natural Resource Operations	\$195,384	Species-Based Actions	Species of Interest	East and West Kootenay	The 2017 Northern Leopard Frog survey results include: 58 NCS, totalling 125.5 hours; 27 egg mass surveys, totalling 209 hours; 40 road surveys, totalling 178 hours; 64 VES surveys, totalling 127 hours; seven egg masses observed; and 104 frogs PIT-tagged (11 adults, five juveniles, and 88 young-of-year). Due to the low number of egg masses observed at Creston Valley Wildlife Management Area (CVWMA), tadpoles were not transferred from the CVWMA.
—	Enhancing East Kootenay ecosystems <i>East Kootenay Enhancement</i> This project focuses on the oversight, coordination, and implementation of restoration activities in the East Kootenay, including prescription development; slashing, piling, and burning; masticating; burn-planning and burning; and post-burn monitoring and reporting.	Ministry of Forests, Lands and Natural Resource Operations	\$388,400	Habitat-Based Actions	Upland and Dryland Areas Action Plan	East Kootenay	Prescribed burning was completed by Akisqnuq First Nation on 15.71 ha of previously thinned forest of units OR1B, OR1C1, and OR1C4. In addition, 10 ha of slashing, piling, and pruning of unit OR2B1 was completed, all in accordance with the Wildlife Habitat Restoration Plan. Approximately 30 ha of slashing and piling occurred in Premier East. Invasive species treatments were completed on Lizard Range (approximately 30 ha) and Galton Range (approximately 38 ha). Approximately 80 wildlife trees were created and monitored. Stand Management Prescriptions (SMPs) were completed for the White Bull Elk project area. No invasive species were found at the Estella site, during post-restoration monitoring activities.
—	Enhancing West Kootenay ecosystems <i>West Kootenay Enhancement</i> This project focuses on the oversight, coordination, and implementation of restoration activities in the West Kootenay, including prescription development; slashing, piling, and burning; masticating; burn-planning and burning; and post-burn monitoring and reporting.	Ministry of Forests, Lands and Natural Resource Operations	\$204,264	Habitat-Based Actions	Upland and Dryland Areas Action Plan	West Kootenay	Seven sites have been identified for future ecological restoration (ER) projects along the Lower Arrow reservoir (Gladstone Creek North and South, Hutchison Creek, Johnstone Creek, Syringa Creek, Van Houten Creek, and Octopus Creek). Prescribed burning was completed on 15 ha of habitat at Twobit on April 26, 2018. Monitoring was completed at Grey Wolf South (year two, post-burn), Sunshine Creek (year one, post-burn); Syringa Park Marina (year one, post-slashing). Seven burn piles were seeded in Tulip North (spring 2017) and invasive plant treatments were completed in three ER units. Approximately 12 km of road adjacent to ER units was also treated for invasive plants to reduce the risk of spread to restoration sites. Spotlight counts were completed in spring 2017, a peak count of 209 deer was recorded. An ER prescription was completed for 14 ha at the Broadwater conservation property.
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Annual and Ongoing Wildlife Projects Total: \$2,147,446

Project ID	2017–2018 Annual and Ongoing Fish Projects	Project Lead	FWCP Funding	Project Type	Action Plan Alignment	Sub-Region	Project Outcomes
—	Restoring nutrients in Arrow Lakes Reservoir <i>Arrow Lake Reservoir Nutrient Restoration</i> To address the nutrient losses in Arrow Lakes Reservoir as a result of the construction of the Hugh Keenleyside, Mica, and Revelstoke dams. A bottom-up approach is taken with the addition of nutrients (nitrogen and phosphorus 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.	Ministry of Forests, Lands and Natural Resource Operations	\$806,740	Habitat-Based Actions	Large Lakes Action Plan	West Kootenay	Final report in progress.
—	Restoring nutrients in Kootenay Lake <i>Kootenay Lake Nutrient Restoration</i> This project includes the coordination, oversight, and implementation of nutrient additions to the North Arm of Kootenay Lake, and the associated monitoring and reporting. Nutrient additions (nitrogen and phosphorus in the form of liquid agricultural grade fertilizer) support phytoplankton populations that are suitable for the production of Daphnia, a main food source for Kokanee.	Ministry of Forests, Lands and Natural Resource Operations	\$878,664	Habitat-Based Actions	Large Lakes Action Plan	West Kootenay	Final report in progress.
—	Supporting Hill Creek spawning channel <i>Hill Creek Spawning Channel</i> The Hill Creek spawning channel was built as compensation for the construction of Revelstoke Dam. It provides spawning habitat for Kokanee and Rainbow Trout from Arrow Lakes Reservoir. This project supports ongoing operations, maintenance, and monitoring at the channel, including Kokanee fry emigration, Rainbow Trout redd counts and fry emergence, adult Kokanee size, fecundity and escapement, overwinter egg survival, and water quality.	Ministry of Forests, Lands and Natural Resource Operations	\$183,827	Species-Based Actions	Large Lakes Action Plan	West Kootenay	2017 results include: an egg to fry survival of 57 % (spring 2017); 2.6 million Kokanee fry produced from the channel; a channel egg deposition of 5.3 million; and a spawner return of 261,972 (47,762 spawned in channel, 74,356 spawned downstream, and 139,854 were used for egg collections by the Freshwater Fisheries Society of BC, in support of Kootenay Lake recovery). Recorded Kokanee size was 225 mm (range of 192-320 mm) and fecundity was 235 eggs/female (range of 156-360 eggs). Settling pond and spawning channel cleaning was completed in August 2017. Gravel was added where needed in the channel and lock bars for fish gates were repaired. Kokanee otolith ages were received (53% age 2+; 47% age 3+; < 1% age 4+). Final report in progress.
—	Supporting Upper Columbia River Sturgeon recovery <i>Upper Columbia Sturgeon</i> The objectives of this conservation aquaculture program are to: 1) prevent extirpation, and 2) retain the genetic diversity of the existing wild stock in supplemental progeny.	Freshwater Fisheries Society of BC	\$120,000	Species-Based Actions	Species of Interest	West Kootenay	Wild origin progeny were successfully collected and transferred to the hatchery. A total of 400, 200-gram juvenile White Sturgeon were released in early May 2018. These fish were released at two locations on the Lower Columbia River, near the cities of Castlegar and Trail.

Annual and Ongoing Fish Projects Total: \$2,182,448

Project ID	2017—2018 Grant-Based Directed Fish Projects	Project Lead	FWCP Funding	Project Type	Action Plan Alignment	Sub-Region	Project Outcomes
—	Placeholder for priority Board directed fish projects <i>Placeholder</i> Details TBC These funds have been set aside by the Board to support work that is a priority within the FWCP Columbia Actions Plans. Details have yet to be determined.	TBD	\$50,000	TBD	TBD	Basin-wide	A directed fish project was not implemented in 2017—2018. Funds to be allocated next fiscal.

Directed Fish Projects Total: \$50,000

2017—2018 Directed and Ongoing Fish Projects Total: \$2,232,448

Project ID	2017 -2018 UKEEP Grant-Based Fish Projects	Project Lead	FWCP Funding	Project Type	Action Plan Alignment	Sub-Region	Project Outcomes
UKE-F18-F-2440	Conserving spawning habitat for at-risk salmonids <i>Conservation of trout habitat in the East Kootenay region</i> This project aims to conserve and improve the quality of critical spawning sites and early juvenile rearing habitat for two at-risk salmonid species (Westslope Cutthroat Trout and Bull Trout) in the Upper Kootenay and Flathead watersheds. This project will prioritize key trout habitat that has been impacted by anthropogenic activities, and will inventory and assess habitat quality in newly proposed/established Wildlife Habitat Areas (WHAs). Furthermore, a subset of proposed/established WHAs will receive enhancement/restoration treatments. Annual monitoring/assessments of protected areas and restoration/enhancement treatments will indicate the level of success in improving habitat quality/resilience and allow for ongoing evaluation and progress.	Ministry of Forests, Lands and Natural Resource Operations	\$19,800	Habitat-Based Actions	Research and Information Acquisition	Upper Kootenay River Watershed	Project in progress (anticipated completion date March 31, 2019).
UKE-F18-F-2461	Studying Westslope Cutthroat Trout hybridization <i>Westslope Cutthroat Trout Hybridization Evaluation</i> This is year three of a five-year project aimed at determining the extent of Westslope Cutthroat Trout (WCT) hybridization with Rainbow Trout in the Upper Kootenay drainage. Tissue samples will be collected and genetically analyzed at the University of Montana. Results will identify hybridization in individuals and populations and guide actions to conserve WCT. This project has four broad objectives: 1) Fill data gaps on current levels of hybridization in the Upper Kootenay Watershed, which is this species' largest remaining stronghold; 2) Identify WCT populations that are a pure strain for high-priority conservation; 3) Compare hybridization over time; and 4) Monitor hybridization prior to and after actions are taken to remove sources of hybridization.	Ministry of Forests, Lands and Natural Resource Operations	\$90,500	Species-Based Actions	UKEEP Streams	Upper Kootenay River Watershed	A total of 919 samples were genotyped using SNPs in 2017-18, bringing the total number of samples genotyped for this project to 1847. Over 583 genetic samples were collected from June 1, 2017 to October 31, 2017, throughout the B.C. WCT distribution, of which 428 were from the Upper Kootenay drainage. Samples were sent to the Montana Genetics Conservation Lab (MGCL) for genotyping using RAD Capture (Rapture). Full genetic results from samples collected in 2017 were not available when writing this report and will be included in the 2018-19 report. Of the genotyped populations to-date, the Upper St. Mary, Upper Fording, Greenhills, Forsyth, Grave, Harmer, Morrissey, Weary, Upper Gold, Upper Lodgepole, and the Upper Elk, populations showed no evidence of hybridization. The continued collection and genotyping of fish samples will augment data analysis and provide a current picture of hybridization.

Project ID	2017 -2018 UKEEP Grant-Based Fish Projects	Project Lead	FWCP Funding	Project Type	Action Plan Alignment	Sub-Region	Project Outcomes
UKE-F18-F-2480	<p>Supporting Bull Trout in the Wildhorse River</p> <p>Wildhorse River Bull Trout Population Inventory and Recovery</p> <p>The Wildhorse River is a historically important system for Upper Kootenay River Bull Trout, which has been adversely impacted by hydraulic mining, timber harvest, and intensive recreational use, particularly in the lower reaches. This project will estimate use, abundance, migration timing, and biological data of Wildhorse River Bull Trout; identify critical spawning and rearing habitats; estimate limiting factors to population recovery; directly mitigate recreational impacts by implementing an education plan; work with government agencies to deal with in-stream works; initiate a multistakeholder stewardship model for the Wildhorse River; and conduct a preliminary restoration prescription to inform future projects aimed at re-establishing natural morphology and channel connectivity.</p>	Ministry of Forests, Lands and Natural Resource Operations	\$50,685	Research and Information Acquisition	UKEEP Streams	Upper Kootenay River Watershed	In 2017, 191 fish were captured in the enumeration fence, including 160 Bull Trout, 10 Westslope Cutthroat Trout, 16 Mountain Whitefish, and five Rainbow Trout. All Bull Trout were weighed, measured, assessed for recapture, and tagged before being released. The seven distinct spawning indexes established in 2016 were re-assessed for spawning activity. The 2017 redd count assessment yielded a total of 133 Bull Trout redds. The system was broken down into areas containing habitat critical to Bull Trout spawning, and areas recommended for future restoration efforts. A total of five educational signs were installed in areas of concern along the lower reaches of the Wild Horse River, where instream recreation is having a negative impact on the aquatic community. Fisheries staff conducted numerous visits to these problem areas, resulting in many educational discussions with stream users. A Wild Horse River Stream Stewardship Group had a meeting in the spring of 2017 where issues, ideas, and action items were gathered for future efforts.

UKEEP Grant-Based Fish Projects Total: \$160,985

Project ID	2017—2018 UKEEP Grant-Based Wildlife Projects	Project Lead	FWCP Funding	Project Type	Action Plan Alignment	Sub-Region	Project Outcomes
UKE-F18-W-2404	<p>Managing invasive plants in East Kootenay grasslands</p> <p><i>Tobacco Plains Grassland and Open Forest Restoration</i> Invasive plant control on grassland and open forest habitat on Tobacco Plains Indian Reserve (TPIR) will improve habitat for multiple species, including ungulates; support rare and threatened species recovery; improve habitat connectivity with surrounding provincial crown land; and engage First Nations and community members in land stewardship participation and awareness. This is year three of a proposed five-year project collaboration between Keefer Ecological Services Ltd. (KES) and Tobacco Plains Indian Band (TPIB). Year one identified distribution and density of invasive plant infestations on TPIR and steps for invasive-plant management. Year two involved treating and monitoring 5 ha of infested land, and year three will continue treatment and monitoring to restore grassland and open forest habitat.</p>	Keefer Ecological Services Ltd	\$53,972	Species-Based Actions	UKEEP Upland and Dryland	Upper Kootenay River Watershed	Efforts in 2017 focused on continued recovery of grassland and open forest habitat through invasive plant management, including herbicide application and targeted goat grazing, as well as forest thinning. Invasive plant treatment and/or monitoring was completed for leafy spurge (<i>Euphorbia esula</i>), orange hawkweed (<i>Hieracium aurantiacum</i>), Spotted knapweed (<i>Centaurea stoebe</i>), and field bindweed (<i>Convolvulus arvensis</i>). Targeted goat grazing was conducted for the second consecutive year within a grassland area known as the "golf course" on the reserve to manage the invasive plant sulphur cinquefoil (<i>Potentilla recta</i>). Forest thinning efforts continued for the fourth consecutive year in the southern reach of the reserve. In 2017, thinning efforts focused on the ecological restoration treatment units CATHCFLY 14-10 and CATCHFLY 14-17. Approximately 6.90 ha and 3.54 ha of land was thinned in CATCHFLY 14-10 and CATCHFLY 14-17 respectively, totalling a thinned area of 10.44 ha.

Project ID	2017—2018 UKEEP Grant-Based Wildlife Projects	Project Lead	FWCP Funding	Project Type	Action Plan Alignment	Sub-Region	Project Outcomes
UKE-F18-W-2416	<p>Supporting East Kootenay Mule Deer</p> <p><i>Kootenay Mule Deer Survival Monitoring</i></p> <p>The Ministry of Forests, Lands and Natural Resource Operations (MFLNRO) initiated a five-year Mule Deer monitoring project to assess factors limiting population growth and recommend actions to increase abundance. Project spin-offs will support the restoration of Mule Deer habitat in the Upper Kootenay area, where the FWCP has invested substantial funding in Ecosystem Restoration (ER). GPS collar data will be used to identify Mule Deer migration routes, assess use of ER sites, and identify important habitats for ER planning, which will occur in year five.</p>	Ministry of Forests, Lands and Natural Resource Operations	\$14,300	Species-Based Actions	UKEEP Upland and Dryland	Upper Kootenay River Watershed	Since 2014-15, 136 GPS collars have been deployed on adult female mule deer in four study areas (Grasmere [MU 4-02], Newgate [MU 4-03], Dutch-Findlay [MU 4-26], and West Kootenay [MUs 4-08, 4-09 and 4-15]). There have been 73,715 monitoring days and 52 mortalities to-date. Cause of mortality included 23 cougar kills, nine wolf kills, four vehicle collisions, two unknown predator kills, two unlicensed hunting, two health-related mortalities, one natural mortality (avalanche), and seven unknown mortalities. Preliminary survival rates for Year four (May 2017 – April 2017) are 0.66 for MU 4-26, 0.85 in MU 4-02 and 0.84 in MU 4-03. Survival rates will likely decrease with the pulse of mortality expected in the early spring. Fawn recruitment surveys were completed in late March 2017 to estimate overwinter fawn survival in MUs 4-02, 4-03 and 4-26, where collars are deployed. A total of 584 Mule Deer (151 fawns, 426 adults, and seven unclassified) were observed. The fawn-to-adult ratio was 35:100 and consistent across the four study areas.
UKE-F18-W-2417	<p>Restoring East Kootenay ecosystems</p> <p><i>Waldo North Ecosystem Restoration Maintenance & Assessment</i></p> <p>The purpose of the project is to undertake a retrospective assessment and to develop a maintenance plan for ecosystem restoration on the Waldo North project area, based on a reconnaissance that was undertaken in 2016 and a detailed proposal that was prepared for the Trench Society and will guide the project (Allen, J. and G. Tipper, March 21, 2016). The project will answer the numerous questions posed in the proposal by gathering information and by conducting field surveys, utilizing accepted field methodologies. The project's final report will provide a path forward for ecosystem restoration on the Waldo North area, including prescriptions for priority areas to be treated in the first two years, and will have broader application to ecosystem restoration throughout the Rocky Mountain Trench.</p>	Rocky Mountain Trench Natural Resource Society	\$25,147	Habitat-Based Actions	UKEEP Upland and Dryland	Upper Kootenay River Watershed	This project provides a retrospective assessment of ecosystem restoration (ER) undertaken on the Waldo North project area and presents a maintenance plan for the same area, along with recommendations for future action, some of which apply geographically more broadly.

Project ID	2017—2018 UKEEP Grant-Based Wildlife Projects	Project Lead	FWCP Funding	Project Type	Action Plan Alignment	Sub-Region	Project Outcomes
UKE-F18-W-2425	<p>Managing East Kootenay invasive plants to support Bighorn Sheep</p> <p><i>Invasive plant management on bighorn sheep winter ranges</i></p> <p>Invasive plants are compromising the quality of low-elevation Bighorn Sheep winter ranges, particularly in Wigwam Flats and Bull River. Approximately 350 Bighorn Sheep utilize Wigwam Flats and Bull River grassland ecosystems during the late fall, winter, and early spring. These grasslands are becoming inundated with invasive plants, such as yellow hawkweed, St. John's wort, and sulphur cinquefoil. Without a comprehensive invasive plant management program, the continued rapid loss of forage quality and quantity will ultimately result in Bighorn Sheep population decline. This project will implement a cooperative management/treatment strategy to improve the existing compromised quality of these ranges and reduce invasive plant coverage.</p>	Ministry of Forests, Lands and Natural Resource Operations	\$20,000	Habitat-Based Actions	UKEEP Upland and Dryland	Upper Kootenay River Watershed	Vegetation sampling was conducted (pre-treatment) on 23 plots in Bull River and 17 plots in Wigwam Flats, during spring 2017. Vegetation sampling method used: 5 x 0.5 m radius circular plots at each permanent plot location; one plot in centre and one plot in each of the four cardinal directions with each plot five metres away from the plot centre (Phillips 2018). Of the 23 plots sampled in Bull River, sulphur Cinquefoil and hawkweed had the highest average overall cover (8.2% and 7.1%, respectively). At Bull River, Saint John's Wort had the lowest percent cover (0.03%). Of the 17 plots sampled at Wigwam Flats, hawkweed and St. John's Wort had the highest average overall cover (4.3% and 2.4%, respectively). Cheatgrass had the lowest percent cover (0.2%) at Wigwam Flats. The vegetation sampling results appears to underrepresent the amount of St. John's Wort on the landscape within Wigwam Flats. A total of 51.5 ha was covered by foot or ATV in Wigwam Flats. A total of 16.6 L of Milestone was applied using ATV and 0.89 L by backpack sprayer at Wigwam Flats. The amount of herbicide mix used per area covered in Wigwam Flats was 10237.5 L (FLNRO data 2017; EKISC 2018). During seeding in late September 2017 in Bull River, approximately 15 ha were partially seeded with a fall rye/annual rye mix. A total of 1250 lbs (568 kg) of seed were hand-seeded into treatment units BR1 and BR2, and low slope of BR3. In late October 2017, a total of 13 ha (900 lbs) were seeded in the BC Hydro lot (TU 1) and conservation lands (TU 6) in Wigwam Flats, using the same seed blend as Bull River.
UKE-F18-W-2479	<p>Assessing wetland health in East Kootenay</p> <p><i>Upper Kootenay Wetlands at Risk Restoration Project</i></p> <p>This project will test a rapid wetland health assessment field technique in range areas of the East Kootenay. These rapid assessment methods (Hansen et al., 2000) have been developed through decades of field research in Montana and are achievable with minimal training. Rapid wetland health assessments are the first step toward simple restoration efforts, such as exclusion fencing, off-site watering, treatment of invasive plants, and the restoration of water levels through mechanical methods. Smaller, more isolated wetlands in the driest habitat are likely the most critical for species and ecosystem health (and for cattle watering), and so these will be emphasized.</p>	Jakob Dulisse Consulting	\$50,149	Habitat-Based Actions	UKEEP Wetland	Upper Kootenay River Watershed	Project in progress.

Project ID	2017—2018 UKEEP Grant-Based Wildlife Projects	Project Lead	FWCP Funding	Project Type	Action Plan Alignment	Sub-Region	Project Outcomes
UKE-F18-W-2490	<p>Restoring habitat for at-risk East Kootenay badgers</p> <p><i>Ta Ta Creek Badger Habitat Enhancement</i></p> <p>This project aims to restore and enhance critical habitat for the Yellow Badger in the East Kootenay. Yellow Badger (<i>Taxidea taxus jeffersoni</i>) is red-listed provincially and is endangered under the federal Species At Risk Act. The project units are in the middle of a major badger population centre in the east Kootenays. Yellow Badgers face many threats, including grassland loss and degradation, urbanization, destruction of denning habitat, invasive species, human disturbance, and road mortality. The project ultimately aims to implement a habitat improvement/restoration program benefiting the Yellow Badger. Our objective is to restore grasslands and open forests to conserve the quality and resilience of important habitat for the Yellow Badger in the Rocky Mountain Trench of British Columbia.</p>	Rocky Mountain Trench Natural Resource Society	\$72,105	Habitat-Based Actions	UKEEP Upland and Dryland	Upper Kootenay River Watershed	Project activities included the thinning of dense forest stands to restore grassland and open forest ecosystems in preparation for prescribed burning of the sites to ensure vegetative response. 408 hectares of important badger habitat was improved by small excess conifer tree slashing in preparation for prescribed burning.

UKEEP Grant-Based Wildlife Projects Total: **\$235,673**

Project ID	2017 -2018 UKEEP Fish and Wildlife Directed Projects	Project Lead	FWCP Funding	Project Type	Action Plan Alignment	Sub-Region	Project Outcomes
UKE-F18-F-2534-DCA	<p>Studying Kokanee spawners in East Kootenay</p> <p><i>Aerial Enumeration of Kokanee Spawners</i></p> <p>Aerial enumeration of spawning Kokanee will be conducted in the fall of 2017 using similar methods as the 2012-16 study. Age data will be collected as part of the study to determine age-at-maturity in the population. The project will provide a yearly estimate of population abundance and age-at-maturity, and the results will help inform requirements for new management actions, and measure the success of conservation/restoration/enhancement efforts.</p>	VAST Resource Solutions Ltd	\$39,380	Monitoring and Evaluation	UKEEP—Streams Action Plan	Upper Kootenay River Watershed	A total of 102,670 spawning Kokanee were observed at seven index streams. Although a sizable increase compared to 2016 (17.5%), the 2017 return remained relatively small compared to historical records since 1996. This result follows the trend of decreasing biomass in the population identified in previous surveys. At comparable density, Kootenay Kokanee appear to be smaller in recent years than they were historically. The population dynamics of the Kootenay Kokanee population over the past six years have been punctuated by wide inter-annual variation in abundance and biomass. An overall declining trend is becoming apparent, both in terms of population abundance and biomass. It is unclear whether this trend is part of a natural population dynamic driven by density-dependent growth and predation, or the result of adverse effects from unidentified environmental stressors. Expanded monitoring efforts should be pursued to inform management decisions and drive management actions, to ensure long-term population sustainability.
UKE-F18-F-2681-DCA	<p>Developing a Conservation Strategy for Burbot</p> <p>Upper Kootenay Burbot Conservation Strategy This project will develop a conservation strategy for burbot in the Upper Kootenay watershed. Objectives will include reviewing and summarizing past research, monitoring and local knowledge on burbot populations and recommending options for population recovery.</p>	Ministry of Forests, Lands and Natural Resource Operations	\$22,000	Species-Based Actions	UKEEP - Lakes Action Plan	Upper Kootenay River Watershed	Final report in progress.

Project ID	2017 -2018 UKEEP Fish and Wildlife Directed Projects	Project Lead	FWCP Funding	Project Type	Action Plan Alignment	Sub-Region	Project Outcomes
UKE-F18-F-2535-DCA	<p>Monitoring East Kootenay wildlife with a remote camera</p> <p><i>Kootenay Remote Camera Wildlife Monitoring</i></p> <p>FLNRO will use a remote camera wildlife for this monitoring project in the southeast part of the region, covering Wildlife Management Units (MU) 4-01 (Flathead), 4-02 (Wigwam), 4-23 (Elk Valley), and 4-22 (Bull River). The purpose is to monitor trends for multiple ungulate and large carnivore species using a relatively cost-effective method, and by involving the public in citizen science.</p>	Ministry of Forests, Lands and Natural Resource Operations	\$31,990	Species-Based Actions	UKEEP - Upland and Dryland Action Plan	Upper Kootenay River Watershed	In 2017, an additional 32 cameras were deployed in the Elk Valley (MU 4-23). Cameras are deployed at locations to maximize the probability of detecting wildlife, such as narrow valleys, pinch points, creek forks, mineral licks and Grizzly Bear rub trees. Discrete events are classified based on species, sex, and age classes, using the image classification software TimeLapse. To-date, images from the first year in the Flathead-Wigwam have been classified and summarized. Images from the second year in the Flathead-Wigwam and Elk Valley will be classified in the spring of 2018. Preliminary results on densities and occupancies of different species will be available in 2019, two years after data collection. In total, 1,394 events were captured on 28 cameras between July 20 and November 18, 2016, in the Flathead-Wigwam. Most of those events were White-tailed Deer (361 events, 581 animals), followed by Mule Deer (198 events, 415 animals), moose (147 events, 202 animals), and elk (98 events, 209 animals).
UKE-F18-W-2589-DCA	<p>Examining elk movements and survival in the Elk Valley</p> <p><i>Elk Valley Elk Project</i></p> <p>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. Productivity and survival of non-migratory and migratory elk may differ, contributing to differences in the abundance of individuals following these differing migration strategies. Non-migratory elk tend to more readily be involved in agricultural conflicts and may contribute to overgrazing on some ranges. In response, the Sparwood Fish & Wildlife Assoc. obtained funding to initiate a 5-6 year study examining elk movements and survival in the Elk Valley. The results of this study will provide information to help make informed wildlife management decisions.</p>	Sparwood Fish and Wildlife Association	\$36,500	Species-Based Actions	UKEEP - Upland and Dryland Action Plan	Upper Kootenay River Watershed	<p>During March 2017, an additional seven GPS collars were deployed on cow elk with satellite uplink capability designed for long-term survey and survival studies. The collars were deployed using helicopter net-gunning within winter range in the Elk Valley. Elk captured in winter 2018 were in better condition compared with 2017. Since the start of the study, a total of 78 cow elk have been collared and there are currently 46 collars functioning on elk. Four of the collars appear to have gone offline. There have been 13 non-capture-related mortalities: three vehicle-elk collisions; one due to a train hit; three likely predation; two unknown natural mortalities; one starvation/old age, one elk died from an impacted gut after getting into feed hay; and two from accidents (fence entanglement and getting stuck in a landfill slough).</p> <p>Spring carryover recruitment counts were conducted on three routes in the Elk Valley during April and May 2017. Calf ratios varied widely among routes and averaged 25 calves to 100 adults, lower than the 38 calves to 100 adults, detected in spring 2016. Roughly one-quarter to one-third of the collared cow elk migrated out of the valley bottoms and mine properties into higher elevation habitats during 2016. Two dispersals have been detected; a young cow moved 150 km to the Kananaskis valley, east of Canmore, during summer 2016 and another young cow moved 50 km from near Elkview Operations, over the Continental Divide into the Old Man River Valley in Alberta, in October 2017.</p>

UKEEP Directed Project Total: \$129,870

UKEEP Project Total : \$526,528

2017—2018 PROJECT SPEND TOTAL: \$5,487,031

