

UPPER KOOTENAY ECOSYSTEM ENHANCEMENT PLAN (UKEEP)

5-Year Program Review



Final Report

Prepared for



Fish and Wildlife Compensation Program
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EXECUTIVE SUMMARY

The Upper Kootenay Ecosystem Enhancement Plan (UKEEP) was a five-year partnership agreement between the Fish and Wildlife Compensation Program (FWCP) and the Columbia Basin Trust (CBT) to fund fish and wildlife projects in the Upper Kootenay River watershed in response to concerns regarding the impacts of the Libby Dam in Montana and the Koocanusa Reservoir on fish and wildlife. The UKEEP program funded projects from 1 April 2014 (FY15), to 31 March 2020 (FY20). This desktop program review summarizes projects funded under UKEEP from Fiscal Year 2014-15 (FY15) to Fiscal Year 2019-20 (FY20) to assist in 1) gauging progress towards achieving UKEEP Action Plan priorities; 2) identifying knowledge gaps within the program period that will inform potential future conservation actions in the Upper Kootenay River watershed; and 3) to identify priorities and recommendations for future investments. The program review was not an evaluation of individual project effectiveness or “biological auditing” of specific projects.

Overall, the Columbia Basin Trust committed \$3 million to be used for the UKEEP over five years, of which, \$2,836,065 had been spent as of 31 October 2019. Funds spent included project dollars (89%), program administration costs (10%), and communication costs (1%). All administration and communication costs were associated with on-the-ground-delivery of the plan. A total of \$2,536,492 was invested in projects; \$939,054 of which targeted fish and \$1,597,438 targeted wildlife. Five projects were funded in FY20 with uncommitted available funds (\$405,617; one fish, four wildlife). Note that FY20 projects were ongoing at the time of the review and some values were not available for inclusion in the detailed program results.

A total of 64 UKEEP projects were funded during the five-year program; 23 were fish-related and 41 pertained to wildlife. All projects primarily aligned with one of the four ecosystem action plans (Lakes, Streams, Wetland and Riparian Areas, Upland and Dryland Areas) or with a Species of Interest, and several aligned with more than one action plan. Thirty-four of the 74 actions, from the four ecosystem action plans, were addressed at least once during the program, including Priority 1, 2, and 3 rated actions. Most projects were Species-based (n=25) or Habitat-based (n=19).

From FY15 to FY20, the Lakes Action Plan had a total of five primarily aligned projects (8% of all 64 UKEEP projects), resulting in \$190,294 of funds invested, 8% of the UKEEP project funding. All projects targeted Koocanusa Reservoir, with the minor exception of McNair South Lake, which was included in a secondarily aligned project. Six of the 18 lakes actions were addressed (33%), including 71% of the Priority 1 actions. Forty percent of the primarily aligned lakes projects were Research and Information Acquisition based and 60% were primarily Species-based. Burbot, a focal fish species, was the only Species of Interest targeted (Kokanee and Westslope Cutthroat Trout were targeted by projects that secondarily aligned with the Lakes Action Plan); no wildlife species were studied under the Lakes Action Plan. Key metrics included the production of an Upper Kootenay Burbot Conservation Strategy, an abundance and distribution assessment of Koocanusa Burbot, and completion of foreshore inventory and mapping of Koocanusa Reservoir.

From FY15 to FY20, the Streams Action Plan had a total of 18 primarily aligned projects (28% of all 64 UKEEP projects), resulting in \$748,760 of funds invested, 30% of the total UKEEP project funding. Projects targeted 12 of 15 priority streams (80%) and nine of 15 actions (60%), including 80% of the Priority 1 actions. Thirty-nine percent of the primarily aligned streams projects were Research and Information Acquisition, 11% were Habitat-based, 22% were Species-based and 28% were Monitoring and Evaluation. Three focal fish species, Bull Trout, Kokanee, and Westslope Cutthroat Trout (WCT) were targeted by projects that primarily aligned with streams actions (Burbot was targeted by projects that secondarily aligned with the Streams Action Plan); no wildlife species were studied by Streams Action Plan projects. Key metrics included restoration of connectivity of creek habitat, stream bank restoration, proposed

Wildlife Habitat Areas to support trout conservation, assessment of hybridization levels of WCT with Rainbow Trout, and species-specific monitoring (e.g., Kokanee abundance, Bull Trout).

From FY15 to FY20, the Wetland and Riparian Areas Action Plan had a total of five primarily aligned projects (8% of all 64 UKEEP projects), resulting in \$226,191 of funds invested and 9% of the total UKEEP project funding. Nine of 22 wetland actions were addressed (41%), including 50% of the Priority 1 actions. Of the primarily aligned wetland projects, 40% were Research and Information Acquisition and 60% were Habitat-based. Wildlife Species of Interest targeted by wetland projects included six species of amphibian, including one recovery species (Northern Leopard Frog); no fish species were studied by Wetland and Riparian Areas Action Plan projects. Key metrics for the Wetland and Riparian Areas Action Plan included two wetland restoration projects (approximately 18 hectares restored), ~38 hectares of invasive plant treatments, native plant additions, and a riparian habitat assessment tool (including 33 wetlands assessed).

From FY15 to FY20, the Upland and Dryland Areas Action Plan had a total of 30 primarily aligned projects (47% of all 64 UKEEP projects), resulting in \$1,170,754 of funds invested, 46% of the total UKEEP project funding. Projects targeted 10 of 19 actions (53%), including 82% of the Priority 1 actions. Of the primarily aligned upland projects, 50% were Species-based, 46% were Habitat-based and 4% were Monitoring and Evaluation. Seventeen upland-associated focal and inventory wildlife species and two recovery wildlife species (American Badger, Lewis' Woodpecker) were targeted by upland projects. Key metrics included several hundred hectares of habitat restored, development of ecosystem restoration plans that targeted Mule Deer and Long-billed Curlew, species-specific projects (e.g., remote camera wildlife monitoring, Mule Deer, Elk, and Bighorn Sheep studies), invasive species monitoring, and resolving access management issues.

From FY15 to FY20, the Species of Interest Action Plan had a total of six primarily aligned projects (9% of all 64 UKEEP projects), resulting in \$200,491 of funds invested, 8% of the total UKEEP funding. Overall, because this plan was species-based rather than ecosystem-based, a total of 41 projects aligned with a Species of Interest listed in the plan. UKEEP projects targeted 25 species (four fish, 21 wildlife): three recovery, 17 focal, and five inventory species. There were no priority actions for Species of Interest, however, 50% of projects were Species-based and 50% were Research and Information Acquisition. Key investments were made for Westslope Cutthroat Trout, Burbot, Kokanee, Mule Deer, Elk, Bighorn Sheep, amphibians (including Northern Leopard Frog), American Badger, Wolverine, Long-billed Curlew, and a two-year remote camera wildlife monitoring study, which targeted many medium and large mammal species (e.g., ungulates, carnivores).

Intended action outcomes included increased understanding of species and their habitat and improved ecological function of each ecosystem (latter more so for wildlife projects), and to a lesser extent, improved coordination with regulatory and management activities and sustainable use (more so for fish projects). Stakeholder concerns addressed included monitoring Species of Interest, conserving habitat for Species of Interest, invasive species monitoring, and to a lesser extent, access and recreation management and enhancing habitat connectivity.

In summary, the UKEEP program was successful in meeting its objectives by funding projects that aimed to conserve and enhance fish and wildlife in the Upper Kootenay River watershed. Each of the four ecosystem action plans were addressed during the program, but to varying degrees, which resulted in certain actions being met and others going unattained. Key program successes include contributions to all subobjective targets, intended action outcomes and stakeholder concerns, as well as significant habitat-based and species-specific achievements.

Program gaps identified included low proportional funding to lakes, wetland and Species of Interest projects (i.e., low number of projects), many actions unaddressed for Wetland and Riparian Areas and Lakes Action Plans, no Land Securement projects, few Monitoring and Evaluation type projects for all ecosystems, and few Habitat-based projects pertaining to fish. Three recovery species were not addressed and no wildlife species primarily dependent of lakes and streams habitat were targeted.

Several recommendations are presented to allow for regional programs and initiatives to address these key knowledge gaps. Many UKEEP Actions were carried over to the updated 2019 FWCP Columbia Region Action Plans and will be part of future project investment criteria for the East Kootenay Region. These include a focus on lakes, wetland and riparian areas, and Species of Interest, the carryover of Priority 1 actions from all plans, Land Securement and Monitoring and Evaluation type work for all ecosystems (Note: the Columbia Basin Trust supports Land Securement through other initiatives), Habitat-based and Research and Information Acquisition type work for fish and wildlife, respectively, and the development of species-specific actions targeting those species of special importance (i.e., recovery species) and other species gaps (i.e., wildlife species dependent on aquatic habitat).

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1 INTRODUCTION

In southeastern BC, there have been long-standing concerns regarding the impacts of the Libby Dam in Montana and the Koochanusa Reservoir on fish and wildlife. No fish and wildlife compensation program existed that was connected to the historical footprint impacts of Koochanusa Reservoir in Canada, since there was no water licence issued by the Province of BC, associated with the Libby Dam. To address this gap, plus the growing pressures from human activities and community input received at processes related to the Columbia River Treaty, the Columbia Region of the Fish and Wildlife Compensation Program (FWCP) partnered with the Columbia Basin Trust (CBT) in 2013 to develop the Upper Kootenay Ecosystem Enhancement Plan (UKEEP) [program](#)¹. This five-year initiative (FY15-FY19) was aimed at implementing a fish and wildlife program targeting the Upper Kootenay River watershed, including the Koochanusa River to help conserve, restore and enhance fish and wildlife and their habitats and support sustainable use in the plan area by focusing on ecosystems (i.e., habitats for Species of Interest). Five additional projects were funded in FY20 with unallocated funds; therefore, this program review covers all projects funded over a six-year period (FY15 to FY20). The Columbia Basin Trust contributed \$3 million in funding to the program, which was administered by the FWCP Columbia Region. All administration and communication costs were associated with on-the-ground-delivery of the plan.

The UKEEP program outlined component-specific action plans, each with priority actions (Appendix 1) aimed at achieving conservation, restoration, enhancement, and sustainable use objectives. All fish and wildlife projects approved under the plan aligned with conservation priorities in the region (Figure 1). The UKEEP was comprised of five stand-alone Actions Plans, including: Lakes Action Plan, Streams Action Plan, Wetland and Riparian Areas Action Plan, Upland and Dryland Areas Action Plan, and Species of Interest Action Plan. Given the fundamental linkage between the action plans and the projects that were funded and delivered, it is important to understand how the funded projects addressed action plan priorities. As such, this program review was conducted to report on the alignment of projects funded from 1 April 2014 to 31 March 2020, with the objectives and priority actions identified in the UKEEP. The scope of work for this review consisted of a desktop analysis of available project documentation to determine how well the projects achieved the priority actions, program objectives, and stakeholder concerns.

1.1 UKEEP Framework

The UKEEP incorporated community and science-based input into the development of its action plans to conserve, restore and enhance fish, wildlife and their habitats and support their sustainable use in the Plan area. Local stakeholders, residents, community biologists and First Nations identified conservation concerns and potential solutions for the area that were integrated into the program objectives and priority actions. The overall UKEEP vision was:

“thriving fish and wildlife in sustainable functioning watersheds supported by actions of engaged citizens”

1.1.1 Objectives, Subobjectives, Measures, and Targets

Each of the four ecosystem action plans (i.e., Lakes, Streams, Wetland, Upland) were developed to achieve three program objectives, incorporating the goals of both the FWCP program and Columbia Basin Trust (see Appendix 2). Nested within the broad objectives are subobjectives linked to specific actions within each of the stand-alone ecosystem and/or Species of Interest Action Plans. These provide the details necessary to translate policy into actions through the evaluation of specific metrics (i.e., measures). Measures are specific values that indicate the degree to which desired future conditions have been achieved, which are either qualitative or quantitative. Finally, targets are the values of measurable items

¹ fwcp.ca/upper-kootenay-ecosystem-enhancement-plan-ukeep

that indicate the attainment of a desired condition. Targets may be expressed as a single value or as a range to acknowledge the inherent variability of ecosystems.

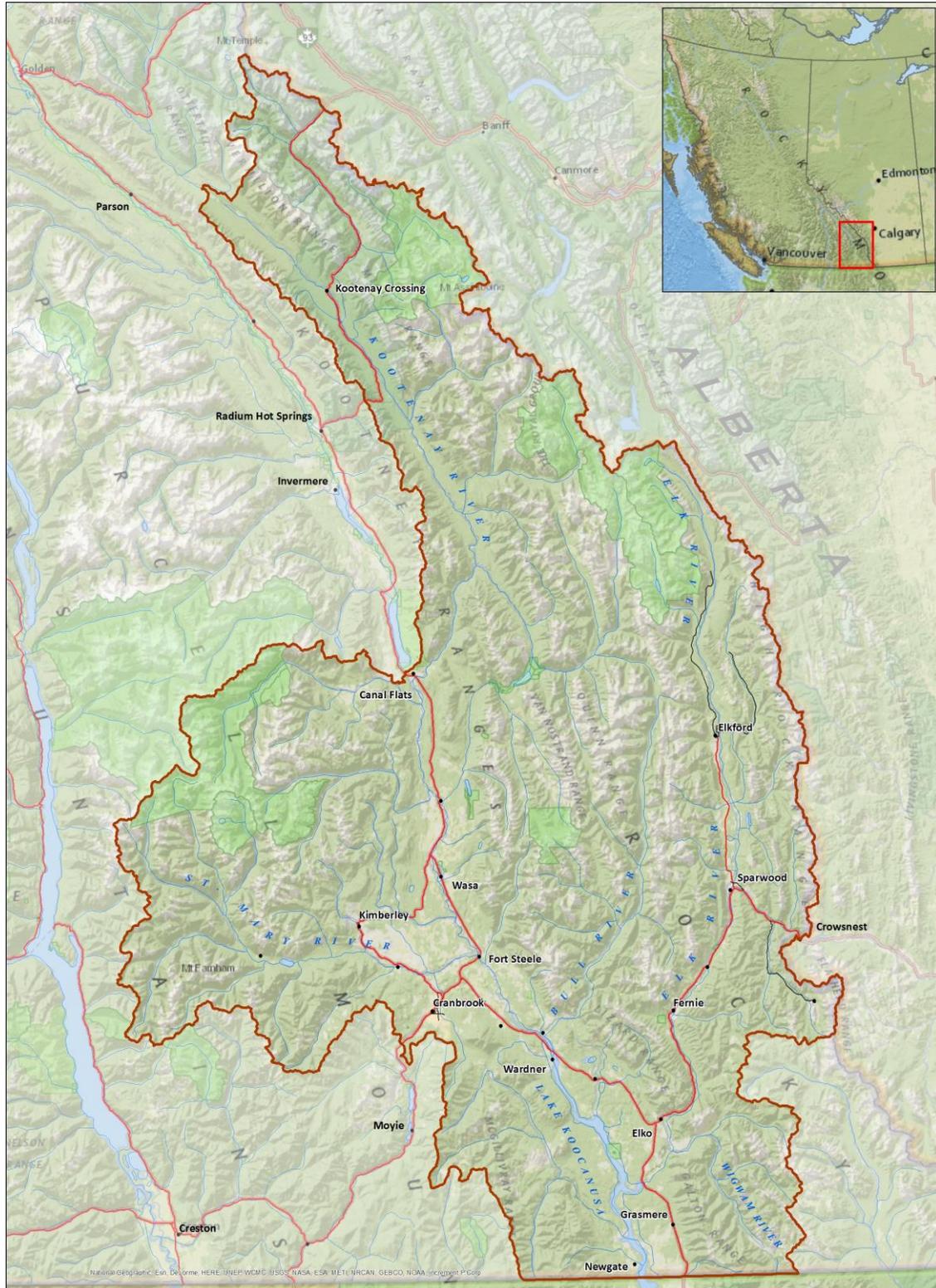


Figure 1. The Upper Kootenay Ecosystem Enhancement Plan area. Light green areas highlight national and provincial parks.

1.1.2 Action Plans

The four stand-alone ecosystem plans and one Species of Interest plan target the Upper Kootenay River watershed region, in the southeastern portion of British Columbia. The specific scope of each plan is summarized in Table 1.

Table 1. Summary of Ecosystem Action Plans within UKEEP.

Action Plan	Description	Priority Areas / Recovery Species
Lakes	There are approximately 1,738 lakes and one large reservoir, Koochanusa Reservoir, in the Upper Kootenay River watershed. Lakes include both high and low elevation bodies of water between 1 and 1,000 ha. There are no lakes greater than 1,000 ha in the area. This action plan presents objectives, measures, and targets, and 18 actions required to meet the targets.	<ul style="list-style-type: none"> • Koochanusa Reservoir • Other lakes in plan area
Streams	Streams refer to natural watercourses with flowing water, including the Kootenay River. This action plan presents objectives, measures, and targets and 15 actions for an initial set of 15 streams.	<ul style="list-style-type: none"> • Kootenay River mainstem from its headwaters to Koochanusa Reservoir • Vermillion River • Cross River • Palliser River • White River • Findlay Creek • Lussier River • Skookumchuck Creek • St. Mary River • Wildhorse River • Bull River • Sand Creek • Elk River • Wigwam River • Gold Creek
Wetland and Riparian Areas (referred to as Wetland herein)	Riparian areas are defined as the area adjacent to a body of water (i.e., stream or lake) that is influenced by water. A wetland is an area of land whose soil is saturated with moisture either permanently or seasonally. This action plan presents objectives, measures, and targets, and 25 actions required to meet the targets.	<ul style="list-style-type: none"> • Koochanusa Reservoir inundated: <ul style="list-style-type: none"> ○ ~1,072 ha of wetlands ○ ~2,193 ha of floodplains ○ Other upland wetlands in the plan area
Upland and Dryland Areas (referred to as Upland herein)	Upland areas are ecosystems that are found above the influence of periodic or permanent flooding. This action plan presents objectives, measures, and targets, and 19 actions required to meet the targets.	<ul style="list-style-type: none"> • No priority upland habitats specified in UKEEP (likely similar to FWCP Columbia Region habitats)
Species of Interest	Species of Interest are defined as species of conservation concern (including species at risk) or other regionally important species for management planning processes. This action plan presents objectives, measures, and targets for three categories of species: Recovery, Focal and Inventory.	<ul style="list-style-type: none"> • Recovery Species: <ul style="list-style-type: none"> ○ American Badger ○ Mountain Caribou ○ Lewis' Woodpecker ○ Northern Leopard Frog ○ Western Screech-owl ○ Williamson's Sapsucker

1.1.3 Actions and Action Categories

A number of concerns and potential solutions identified by stakeholders and others during the development of the UKEEP apply to each of the four ecosystem types. Actions that address these concerns are considered priorities and include:

- invasive species monitoring/management (both terrestrial and aquatic);
- access and recreation management;
- enhancing habitat connectivity;
- conserving and enhancing important habitat for Species of Interest; and
- monitoring trends, abundance, and distribution of Species of Interest.

Actions were organized into five action categories (Table 2) and assigned a relative priority rating on a scale of 1 to 3 to guide investment efforts.

Table 2. Number of UKEEP actions, by action category and subcategory (e.g., task/type). The numbers under the total column represent the number of individual actions for each action category combined for UKEEP Action Plans. The numbers by Priority Rating represent the total number of priority-rated actions by action category for all action plans.

Action Category	Examples of Action Types/Tasks	UKEEP Action Plans			
		Total # Actions	# of Actions by Priority Rating		
			#1	#2	#3
Research & Information Acquisition	<ul style="list-style-type: none"> • Inventory and Analysis • Assessments • Integrated Planning 	13	6	5	2
Habitat-based	<ul style="list-style-type: none"> • Habitat Creation • Habitat Restoration/Enhancement • Restore Connectivity 	32	23	5	4
Land Securement	<ul style="list-style-type: none"> • Habitat Acquisition • Habitat Stewardship 	4	1	3	0
Species-based	<ul style="list-style-type: none"> • Translocations/Reintroduction 	13	11	2	0
Monitoring & Evaluation	<ul style="list-style-type: none"> • Trend Monitoring • Evaluation 	12	3	4	5

2 METHODS

The FWCP Columbia Region (and CBT) requested a program review of the UKEEP projects funded from 1 April 2014 to 31 March 2020 to report on the alignment of projects funded with the program objectives and priority actions identified in the UKEEP Action Plans.

Specific objectives of the program review were to:

1. Compile and complete a desktop evaluation of UKEEP funded projects, regardless of delivery method (i.e., open projects, directed projects, or negotiating long-term agreements), from Fiscal Years 2014-15 (FY15) to 2019-20 (FY20);
2. Review and synthesize the results, findings, and outcomes from UKEEP funded projects, including recommendations for future investments; and
3. Identify key program successes (i.e., metrics) and knowledge gaps where UKEEP Action Plan priorities were achieved or not implemented by the suite of projects delivered from FY15 to FY20.

To achieve the specific objectives of the program review, funded projects were reviewed by their capability to meet priority objectives of the UKEEP and to understand how funded projects addressed action plans (including priority actions) for the Upper Kootenay River Watershed Region. The review consisted of a desktop analysis of available project reports to determine how funded projects addressed the priority actions. This was accomplished by achieving a number of steps, which are described below.

The program review was completed under the following assumptions:

1. All final reports for UKEEP funded projects would be provided to LGL Limited;
2. The program review would be a comprehensive and inclusive look into how action plan priorities were addressed; and
3. An evaluation of individual project effectiveness or “biological auditing” of specific projects would not be considered given the number of projects to review and the associated time and budget constraints.

Project Documentation Compilation – At the onset of the project, the UKEEP was reviewed to set the stage for the program review by outlining UKEEP objectives and priority actions so that funded projects could be linked and prioritized. A component of this step involved the summarizing and standardizing of the following information:

- a) Priority actions, from all action plans, were compiled into a master document (see Appendix 1).
- b) Sub-objectives for each action plan were summarized for each relevant Results section (see Appendix 2).
- c) Targets, where applicable, were reported as metrics (e.g., number of hectares restored, number of enhancements) in the relevant Results sections of this report (also see Appendix 2).

In total, to complete this program review, 64 fish and wildlife projects were reviewed (Table 3). Documents were classified by fiscal year, fund category (i.e., fish or wildlife) and specific project information including project code, project title, lead applicant name (i.e., proponent), funding (UKEEP contribution and total project cost), Grant type (Large, Small, or Seed), proponent type (e.g., consultant, NGO), listed primary action plan, type of project, list of priority actions, and URL (i.e., link to final report). Detailed information for UKEEP projects was acquired from project-specific final reports and annual Quick Reference tables.

Table 3. Number of UKEEP projects funded by FWCP Columbia from 1 April 2014 to 31 March 2020.

Fiscal Year	# of Projects Funded	
	Fish	Wildlife
2014-15 (FY15)	0	1
2015-16 (FY16)	6	8
2016-17 (FY17)	6	9
2017-18 (FY18)	5	8
2018-19 (FY19)	5	11
2019-20 (FY20)	1	4
Subtotal	23	41
Program Total	64	

Two projects from FY19 were still in progress at the time of program review and an additional five projects were funded in FY20 with uncommitted available funds (Table 4). These projects were included in all summaries where possible, and a note was made if specific information was missing from the detailed analyses in the body of the results (i.e., questionnaire responses could not be completed).

Table 4. UKEEP projects still in progress during the program review from FY15 to FY20.

Year	Project Code	Project Name	Project Duration
FY19	UKE-F19-W-2709	Earl Ranch Wetland Restoration Project	Project extended Mar 2020
FY19	UKE-F19-F-2682	Westslope Cutthroat Trout Hybridization Evaluation	Project extended to Dec 2019
FY20	UKE-F20-F-3149-DCA	Koocanusa Kokanee Enumeration (2019-20)	Additional funds for FY20
FY20	COL-F20-W-3041	Invasive Plant Management on Bighorn Sheep Winter Ranges	Additional funds for FY20
FY20	COL-F20-W-3057	Tobacco Plains Grassland and Open Forest Restoration	Additional funds for FY20
FY20	COL-F20-W-3070	Elk Valley Elk Project (2019-20)	Additional funds for FY20
FY20	COL-F20-W-3101	Invasive Plant Management and Restoration of Protected Areas	Additional funds for FY20

Project Database – A 54-point questionnaire was developed to align projects with action plans and priority actions using clear responses, definitions, and rationale. The questionnaire provided the direction to review and summarize projects with respect to addressing priority actions within the various action plans. Questions ranged from general details, such as project identification and name, to specific details, including action plan(s) alignment, action categories and specific priority actions addressed.

Project Review – All available project reports were reviewed, and the responses were entered as data into a shared Google form (built from the 54-point questionnaire). This included the cataloguing of key details from each report, such as action plan, action category and priority action that each project addressed. Data validation and quality control checks were completed throughout the review process. Several projects aligned with multiple action plans, categories, and actions; therefore, a primary action plan and action number was assigned (Proponent-designated or LGL-designated), and secondary associations were noted for the analysis component. Action alignment was determined to be primary (e.g., one primary action only) or secondary (e.g., other actions that clearly aligned). Note: project information could not be completed for certain questions if the information was not clearly outlined in final reports (e.g., community engagement).

Funding Summaries – Information from the project Financial Statement Forms (e.g., Quick Reference sheets) was entered to summarize the allocation of funding by various category types (e.g., action plans, priority actions). Financial information for projects were reported as “approximate” or “estimated” values

based on the total amount of Board-approved funds for each project (and may vary from the actual funds spent by projects). The results of this exercise are displayed in tabular and graphical formats to clearly show how UKEEP funding was allocated across the years, action plans, action categories and specific actions.

Key Program Metrics and Knowledge Gap Summary – Once all project information was entered in the Google form, the compiled data was imported into Microsoft Excel and a series of queries were conducted to identify which priority actions were addressed (and conversely not addressed) and key metrics for the overall program and individual action plans. The primary goals of this gap analysis were to summarise relevant information for individual action plans (i.e., what was completed during the five-year program) and provide a summary of information for all projects funded between FY15 and FY20. The gap analysis focused on Action categories, Priority Actions and Species of Interest. In identifying information gaps during the five-year program, it was acknowledged that other initiatives implemented around the Columbia Region, such as FWCP Columbia projects, BC Hydro’s Water Use Plans and/or Columbia Basin Trust’s Environment Program, may have also addressed information gaps.

Discussion and Recommendations – A written assessment of the findings of this program review is presented in the in the final sections of this report, including a specific assessment that focuses on:

- Identifying the key project outcomes (e.g., actions and priorities addressed, key metrics) from FY15 to FY20;
- Identifying key program success and targets reached;
- Identifying action plan priorities that were not addressed through the suite of projects delivered from FY15 to FY20; and
- Regional priority considerations for future investments.

Individual action plan knowledge gaps are presented in the respective sections of the discussion, followed by overall knowledge gaps identified for the five-year UKEEP program (FY15 to FY20) review period. Recommendations to address these gaps are presented at the end of the discussion, with the intention that the FWCP Columbia Region can incorporate this information into its program.

3 RESULTS

The results of the UKEEP program review are largely presented by ecosystem action plans in the subsections that follow. However, several program-wide results are presented below to set the context of the overall review.

3.1 UKEEP Program Summary

3.1.1 Project Delivery and Financial Summary

Overall, the Columbia Basin Trust committed \$3 million of funds to be used for the UKEEP over five years, of which, \$2,836,065 had been spent as of 31 October 2019 (Table 5). Funds spent included program administration costs (10%), communication costs (1%), and project dollars (89%). Administration and communication dollars are not included in the remainder of the project summaries (i.e., summaries focus on actual project dollar amounts), as these costs were associated with delivery of the plan.

Table 5. Total actual UKEEP funds allocated from FY15 to FY20. FY14 is included in table to show initial start up administration and communication costs; FY20 funds are as of 31 October 2019.

Fiscal Year	Administration		Communications		Projects		Total
	Actuals	%	Actuals	%	Actuals	%	Actuals
2013-14 (FY14)	\$ 53,368	89%	\$ 6,384	11%	\$ -	0%	\$ 59,752
2014-15 (FY15)	\$ 114,129	80%	\$ 1,932	1%	\$ 27,102	19%	\$ 143,164
2015-16 (FY16)	\$ 18,564	5%	\$ 667	0%	\$ 390,664	95%	\$ 409,894
2016-17 (FY17)	\$ 20,042	4%	\$ 4,098	1%	\$ 522,623	96%	\$ 546,763
2017-18 (FY18)	\$ 27,467	5%	\$ 5,339	1%	\$ 553,693	94%	\$ 586,498
2018-19 (FY19)	\$ 30,159	4%	\$ 3,750	1%	\$ 636,795	95%	\$ 670,704
2019-20 (FY20)	\$ 13,349	3%	\$ 325	0%	\$ 405,617	97%	\$ 419,291
Total	\$ 277,079	10%	\$ 22,494	1%	\$ 2,536,492	89%	\$ 2,836,065

From FY15 to FY20, 64 fish and wildlife projects were funded through the UKEEP (Figure 2), the majority were wildlife-related (23 fish and 41 wildlife projects), totalling an estimated \$2,536,492 of UKEEP Subcommittee approved funds (Table 6). Five projects (1 fish and 4 wildlife), totalling \$405,617 were funded in FY20 with unallocated funds at the program's end.

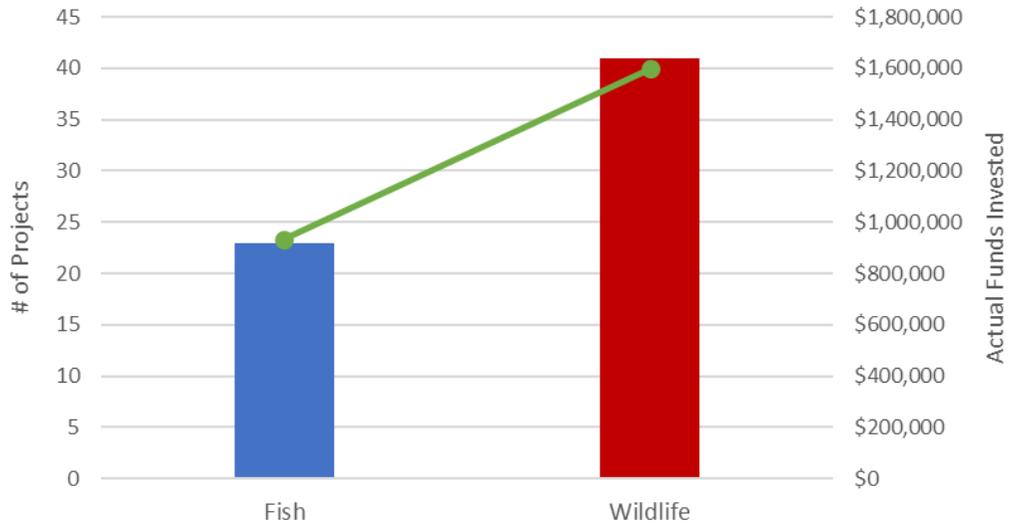


Figure 2. Number of fish and wildlife projects (bars), and associated investment amounts (green marker/line), funded through the UKEEP between 1 April 2014 and 31 March 2020.

All fish projects primarily aligned with the Lakes and Streams Action Plans and all wildlife projects primarily aligned with the Upland, Wetland, or Species of Interest Action Plans. Funding allocations varied by action plan (Table 6; Figure 3), with the majority of investments addressing actions under the Upland Action Plan, followed by the Streams, Species of Interest, Wetland, and Lakes Action Plans.

Table 6. Total UKEEP funds invested by action plan from FY15 to FY20. Funding allocations are by primary action plan outlined in Quick Reference files, except FY20 for which action plan was unspecified.

Action Plan	# of Projects and Funds Invested					
	Fish		Wildlife		Overall	
	#	Funds	#	Funds	#	Funds
Lakes	5	\$ 190,294	0	\$ 0	5	\$ 190,294
Streams	18	\$ 748,760	0	\$ 0	18	\$ 748,760
Wetland (and Riparian Areas)	0	\$ 0	5	\$ 226,191	5	\$ 226,191
Upland (and Dryland Areas)	0	\$ 0	30	\$ 1,170,754	30	\$ 1,170,754
Species of Interest	0	\$ 0	6	\$ 200,491	6	\$ 200,491
Total Funds	23	\$ 939,054	41	\$ 1,597,438	64	\$ 2,536,492

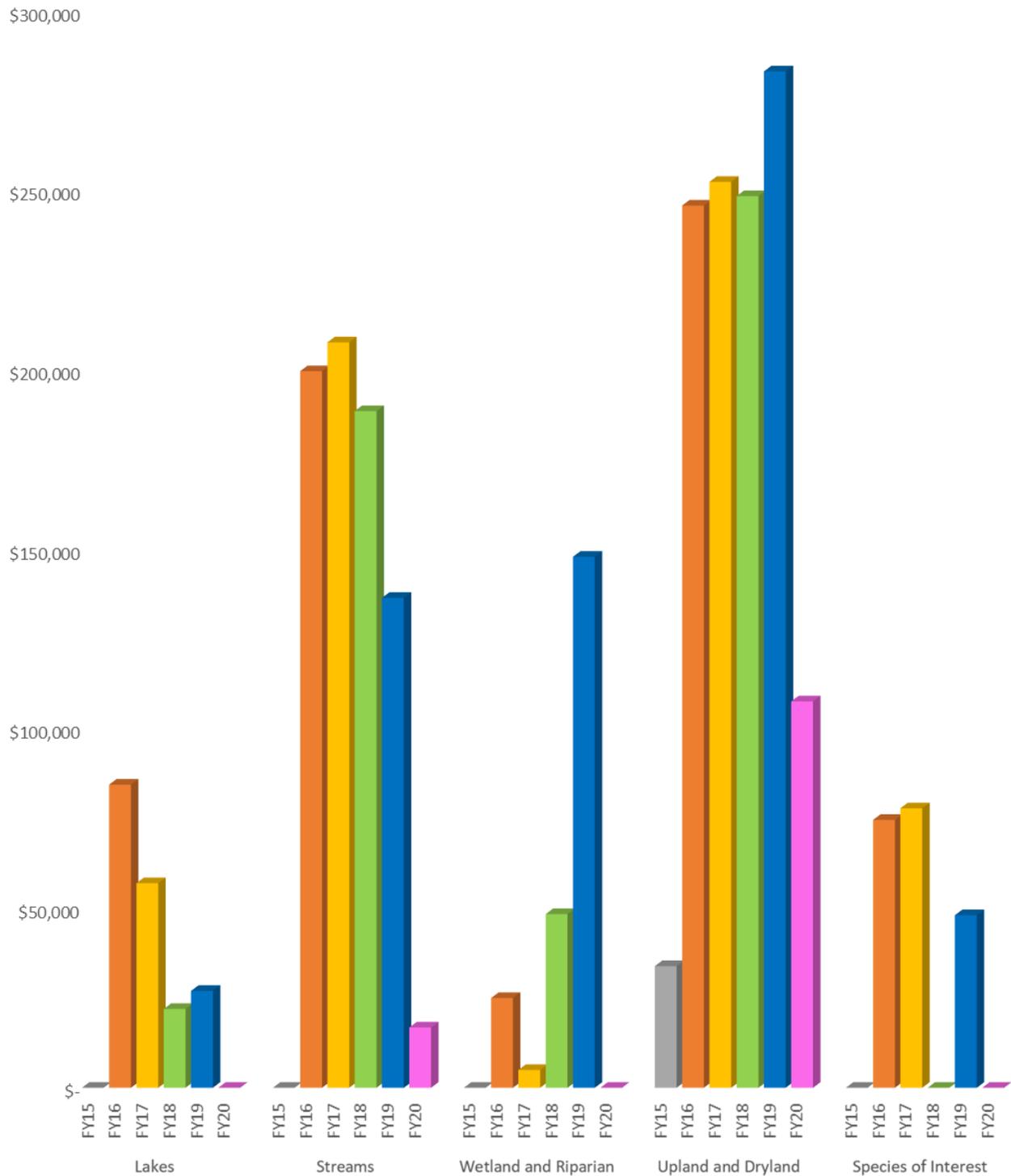


Figure 3. UKEEP investment by action plan between 1 April 2015 and 31 March 2020. Fiscal years are denoted by colour.

UKEEP projects were typically led by non-government organizations (n=22), the Province (n=21), consultants (n=19), and First Nations (n=2), including both single year (n=19) or multi-year (n=45) studies (Figure 4). Projects often included some sort of collaboration of multiple parties and funding (n=51; e.g., government, NGOs, consultant scientists). Projects were predominantly large grants (>\$20,000), with only two small grant projects (<\$20,000) and three seed grant projects (\$5,000) (Figure 5).

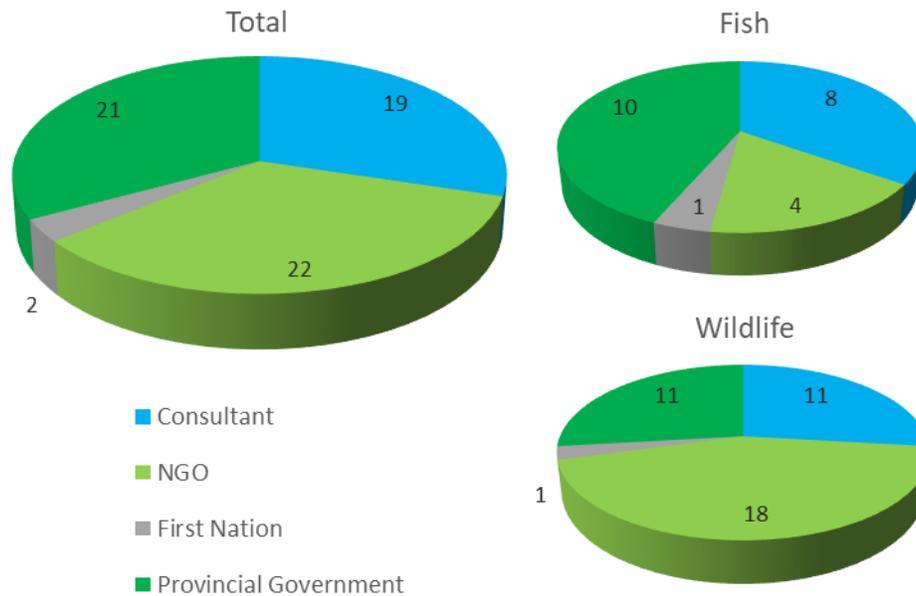


Figure 4. UKEEP projects by proponent type between FY15 and FY20. Numbers in chart represent number of projects. NGO=non-government organization or society.

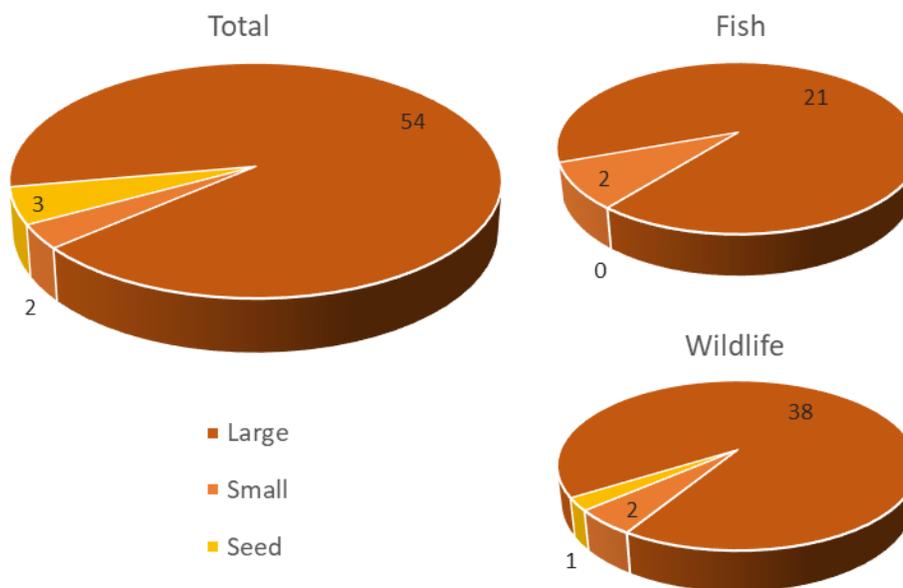


Figure 5. UKEEP projects by grant type funded between FY15 and FY20. Numbers in chart represent number of projects.

3.1.2 Program Objectives Summary

UKEEP had three overall program objectives and associated subobjectives to conserve, restore and enhance fish, wildlife and their habitats and support their sustainable use in the Plan area. Actions for each of the four ecosystem action plans were designed to achieve these objectives for the Upper Kootenay River region through various outcomes, while also incorporating various stakeholder concerns and solutions.

Projects typically addressed one or more of the program objectives; most projects addressed the objective to restore and enhance habitats and Species of Interest (Objective 2; Figure 6). Over fifty percent of the projects addressed conserving productivity and diversity of ecosystems (Objective 1) and roughly ten percent of projects addressed opportunities to improve sustainable use (Objective 3).

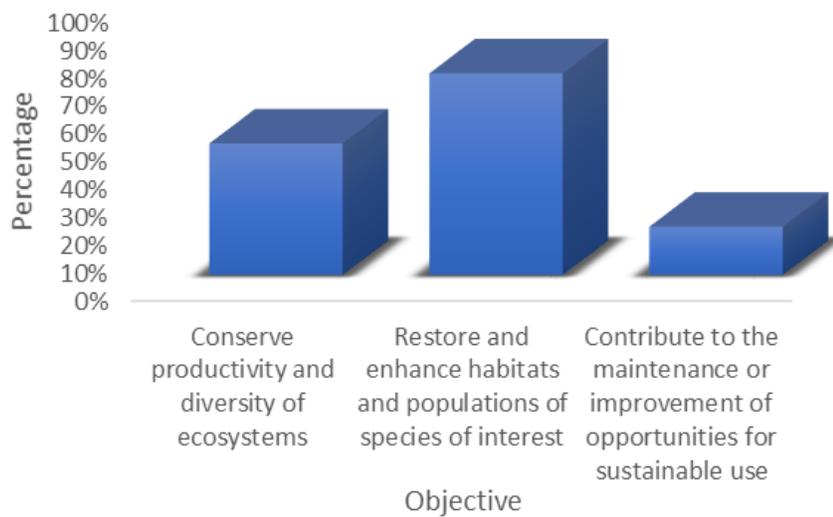


Figure 6. Proportion of UKEEP projects that addressed program objectives from FY15 to FY20.

Each program objective had between one to three subobjectives that UKEEP projects aligned with; all program subobjectives were addressed at least once during the 5-year period and often projects aligned with more than one subobjective (Table 7). Projects aligned most with subobjectives involving Species of Interest, including monitoring (1b), restoring/enhancing habitat (2a), and supporting species populations (2b).

Table 7. UKEEP subobjectives addressed by fish and wildlife projects from FY15 to FY20. Projects often addressed more than one subobjective = total column values add up to greater than 64 projects.

UKEEP Subobjective	# of Projects		
	Fish	Wildlife	Total
1a. Identify and conserve important habitat for Species of Interest	8	3	11
1b. Characterize and monitor the status of Species of Interest	12	19	31
1c. Support efforts to prevent introduction of invasive species	1	3	4
2a. Restore and enhance important habitat for Species of Interest	9	18	27
2b. Support SOI population recovery/maintenance	7	9	16
2c. Control of established invasive species	4	11	15
3a. Contribute data to help inform decision making on sustainable use targets for resources	6	6	12
3b. Support public education and awareness regarding threats and challenges to ecosystems, which will motivate ecologically-informed decisions and actions	3	2	5

UKEEP projects addressed targets associated with all program objectives and subobjectives (Table 8). Wildlife targets were largely focused on Species of Interest, including increasing baseline knowledge (1b) and/or improvement of habitat (2a) for species, as well as controlling and preventing the spread of invasive species (2c). Fish targets were achieved for most subobjectives, less for invasive species, and notably some projects targeted improvements to sustainability (3a, 3b).

Table 8. UKEEP targets achieved by fish and wildlife projects from FY15 to FY20. Projects often addressed more than one subobjective = total column values add up to greater than 64 projects.

Subobjective	Target	# of Projects		
		Fish	Wildlife	Total
1a	Increase in availability of important habitat for Species of Interest protected against human impacts.	4	1	5
1b	The establishment or improvement of baseline knowledge of the status of Species of Interest.	11	17	28
1c	No new established invasive species.	0	2	2
2a	Increased area of restored/enhanced habitat that improves productivity.	3	14	17
2b	Improvement in abundance and distribution of Species of Interest populations due to recovery efforts.	3	1	4
2c	Decrease in abundance and distribution of invasive species due to control efforts.	1	12	13
3a	Resource use does not affect the sustainability of Species of Interest populations.	2	1	3
3b	Reduced incidence of negative impacts caused by humans due to ecologically-informed decisions and actions as a result of increased awareness of the public of threats and challenges to ecosystems.	3	1	4

3.1.3 Program Metrics Summary

3.1.3.1 Action Outcomes and Stakeholder Concerns

UKEEP projects also addressed one or more of the action outcomes and stakeholder concerns outlined at the outset of the 5-year program (Table 9). Species of Interest ranked high in the number of project outcomes for both fish and wildlife projects, as well as improving/enhancing ecological function of ecosystems (e.g., on-the-ground habitat results). Most projects addressed stakeholder concerns involving Species of Interest, conserving/enhancing habitat, and invasive species control.

Table 9. UKEEP project outcomes and stakeholder concerns addressed by fish and wildlife projects from FY15 to FY20. Projects often addressed more than one outcome or concern = total column adds up to greater than 64 projects.

Action Outcome Addressed	# of Projects		
	Fish	Wildlife	Total
Increased understanding of Species of Interest and their habitat, as well as options to conserve, restore, and enhance species and their habitats	21	21	42
Improved ecological function of each ecosystem through on-the-ground habitat improvements, Species of Interest recovery and maintenance, and management of invasive species	5	24	29
Improved opportunities for and/or maintained sustainable use	6	1	7
Improved coordination with existing regulatory and management activities in the Plan area	7	4	11
Stakeholder Concern Addressed	Fish	Wildlife	Total
Invasive species monitoring/management (both terrestrial and aquatic)	5	13	18
Access and recreation management	5	4	9
Enhancing habitat connectivity	1	4	5
Conserving and enhancing important habitat for Species of Interest	12	15	27
Monitoring trends, abundance, and distribution of Species of Interest	15	22	37

3.1.3.2 Key UKEEP Program Metrics

A total of 64 projects were funded for the UKEEP program from FY15 to FY20, with 57 final reports produced, two reports scheduled for submission in March 2020 (e.g., deadline extensions) and five additional studies funded in 2020 with extra unallocated funds (still in progress). UKEEP projects resulted in several key metrics for all action categories, other than Land Securement for which no actions were addressed (Table 10).

Key Program Metrics and Outcomes include:

1. Significant habitat enhancement/restoration projects involving on-the-ground habitat results for:
 - Streams: ~50 meters of streambank restored; connectivity restored to a minimum of 90 kilometers stream habitat;
 - Wetland (and Riparian Areas): two wetland restoration projects (one ongoing project), 17 hectares of enhanced and created wetland habitat at Earl Ranch, 40 hectares of land treated for invasive species, planting of native plants, and wetland enhancements (e.g., topsoil and large woody debris additions) at Wilson Lake, 33 wetland/riparian habitat assessments; and
 - Upland (and Dryland Areas): ~1,100 hectares of habitat restored involving on-the-ground habitat results such as ~300 hectares of land treated for invasive species, ~825 hectares of forest habitat thinned to open range forest standards, and planting of native plant species;

2. Mapping of 160 kilometers of shoreline habitat (sensitive habitat inventory mapping on Kooconusa Reservoir);
3. Multiple species-based or Species of Interest projects including:
 - a five-year Kokanee enumeration project;
 - a five-year Elk Valley Elk population study;
 - a five-year Kootenay Mule Deer Monitoring project
 - a four-year Bighorn Sheep restoration and population study;
 - a four-year Westslope Cutthroat Trout hybridization study;
 - a three-year Bull Trout monitoring program;
 - a two-year remote camera wildlife monitoring study;
 - Northern Leopard Frog reintroduction population monitoring;
 - ecosystem restoration plans for Long-billed Curlew and Mule Deer;
 - Burbot enumeration study and conservation strategy; and
 - Wildlife Habitat Area recommendations for Bull Trout and Westslope Cutthroat Trout conservation;
4. Sustainability and access management issues (e.g., trail decommissioning, signs, discussions with recreation users);
5. Nearly 60 percent of UKEEP projects included a community engagement component; and
6. Effectiveness monitoring of previous habitat work (e.g., ecosystem restoration monitoring Waldo North).

Table 10. Key metrics for UKEEP projects relating to program objectives, action outcomes and stakeholder concerns from FY15 to FY20.

Action Category	Key Program Metrics	Key UKEEP Projects (primary aligned)	Target and Outcomes
Research & Information Acquisition	<ul style="list-style-type: none"> • 13 primary aligned projects • 4 secondary aligned projects • 9 assessment, 9 inventory projects • 3 primary actions addressed (3 secondary) • Metrics (# of project): <ul style="list-style-type: none"> ○ Future planning (n=14) ○ Updated/new baseline information (n=9) ○ Identified habitat follow up (n=2) 	<ul style="list-style-type: none"> • Wildhorse River Bull Trout Population Inventory and Recovery • Kocanusa Reservoir Sensitive Habitat Inventory Mapping • Creation of WHAs for Bull Trout in the Upper Kootenay River / Conservation of Trout Habitat in the East Kootenay Region • High Resolution Conductivity and Temperature Project • Upper Kootenay Amphibian Monitoring Project • Tracking Long-billed Curlews in the Lower Columbia Valley • Wolverine Harvest Sustainability in the Kootenay Region • Rehabilitating Joseph Creek: a Community Initiative 	<p>Key targets:</p> <ul style="list-style-type: none"> ○ The establishment or improvement of baseline knowledge of the status of Species of Interest. ○ Reduced incidence of negative impacts caused by humans due to ecologically informed decisions and actions as a result of increased awareness of the public of threats and challenges to stream ecosystems. <p>Key outcome: Increased understanding of Species of Interest and their habitat, as well as options to conserve, restore and enhance species and their habitats.</p>
Habitat-based	<ul style="list-style-type: none"> • 19 primary aligned projects • 10 secondary aligned projects • 8 primary actions addressed (8 secondary) • 24 restoration/enhancement projects, 6 habitat connectivity projects, 2 habitat protection projects • Metrics (# of project): <ul style="list-style-type: none"> ○ On-the-ground action (n=20) ○ Baseline info (n=9) ○ Contributes to connectivity (n=6) ○ Feasibility study (n=1) • 1,180 ha habitat restored overall: <ul style="list-style-type: none"> ○ ~365 ha invasives removed ○ 2 wetland restoration projects (18 ha) ○ ~869 ha forest thinned ○ 66 km of trails planted ○ 50 m length stream bank restored ○ 1 bridge, 1 culvert restored 	<ul style="list-style-type: none"> • Upper Kootenay Stream Crossing Remediation • Alexander Creek Streamside Restoration • Tobacco Plains Ecological Restoration • Strauss Road Grassland Ecosystem Restoration • Invasive Plant Management & Restoration of Protected Areas • Sheep Pasture Grassland Ecosystem Restoration • Upper Kootenay Small Wetlands at Risk Restoration Project • Ta Ta Creek Badger Habitat Enhancement • Kocanusa Habitat Restoration: Cumulative Recreation Impacts • Earl Ranch Wetland Restoration Project • Elk Valley Wilson Lake Wetlands Enhancement • Kootenay Mule Deer Survival Monitoring • Whitebark Pine Restoration in the Kootenay – Columbia • Wycliffe Corridor Grasslands Ecosystem Restoration 	<p>Key targets:</p> <ul style="list-style-type: none"> ○ Increased area of restored/enhanced habitat that improves ecosystem productivity. ○ Decrease in abundance and distribution of invasive species due to control efforts. <p>Key outcome: Improved ecological function of each ecosystem through on-the-ground habitat improvements, Species of Interest recovery and maintenance, and management of invasive species.</p>

Action Category	Key Program Metrics	Key UKEEP Projects (primary aligned)	Target and Outcomes
Species-based	<ul style="list-style-type: none"> • 26 primary aligned projects • 2 secondary aligned projects • 5 primary actions addressed (8 secondary) • 11 inventory projects, 9 invasive species projects, 4 monitoring projects, 2 translocation projects, 2 conservation strategies, 1 assessment project • Key species studied: <ul style="list-style-type: none"> ○ Westslope Cutthroat Trout ○ Burbot ○ Bull Trout ○ Kokanee ○ Northern Leopard Frog ○ Bighorn Sheep ○ Elk ○ Mule Deer ○ Ungulates & Carnivores 	<ul style="list-style-type: none"> • Westslope Cutthroat Trout Hybridization Evaluation • Upper Kootenay Burbot Conservation Strategy • Kooconusa Burbot Enumeration • East Kootenay Urban Mule Deer Translocation Trial • Kootenay Mule Deer Monitoring • Kootenay Remote Camera Wildlife Monitoring • Elk Valley Elk Project • Tobacco Plains Ecological Restoration • Invasive Plant Management & Restoration of Protected Areas • Invasive Plant Management on Bighorn Sheep Winter Ranges • Monitoring a Reintroduced Population of Northern Leopard Frogs 	<p>Key targets:</p> <ul style="list-style-type: none"> ○ The establishment or improvement of baseline knowledge of the status of Species of Interest. ○ Reduced incidence of negative impacts caused by humans due to ecologically informed decisions and actions as a result of increased awareness of the public of threats and challenges to stream ecosystems. ○ Decrease in abundance and distribution of invasive species due to control efforts. <p>Key outcome: Increased understanding of Species of Interest and their habitat, as well as options to conserve, restore and enhance species and their habitats, Species of Interest recovery and maintenance, and management of invasive species.</p>
Monitoring & Evaluation	<ul style="list-style-type: none"> • 6 primary aligned projects • 15 secondary aligned projects • 2 primary actions addressed (5 secondary) • 11 trend monitoring projects, 6 evaluation projects, 8 other projects (determining distribution and biosampling) • Metrics (# of project): <ul style="list-style-type: none"> ○ Invasive plant species monitoring (n=3) ○ Additional monitoring recommended (n=15) 	<ul style="list-style-type: none"> • Kooconusa Kokanee Enumeration • Waldo North Ecosystem Restoration Maintenance & Assessment 	<p>Key target:</p> <ul style="list-style-type: none"> ○ The establishment or improvement of baseline knowledge of the status of Species of Interest. <p>Key outcome: Improved ecological function of each ecosystem through on-the-ground habitat improvements, Species of Interest recovery and maintenance, and management of invasive species.</p>

3.1.3.3 Community Engagement

Nearly 60% of UKEEP projects involved a community engagement component including a variety of groups/activities such as First Nation involvement, public events and outreach, community volunteers (~95 volunteers), and hunting/fishing community involvement (Figure 7). Project communication with the community also included information such as brochures/newsletters (n=8), media releases/interviews (n=10), signage (n=6), and conferences or meetings (n=5).

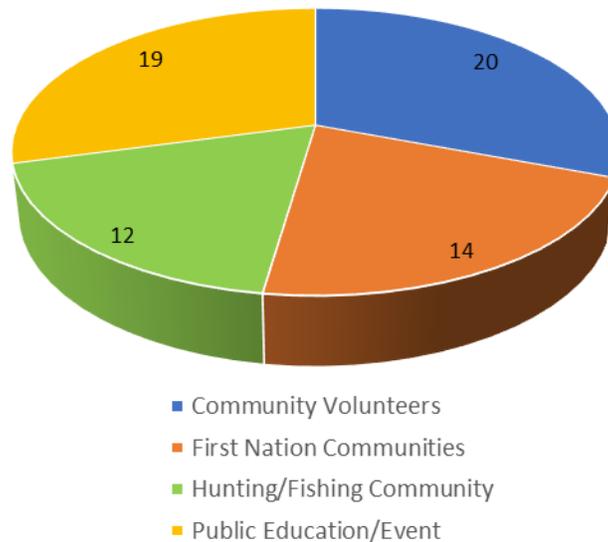


Figure 7. Type of community engagement in UKEEP projects from FY15 to FY20. Numbers in chart represent number of projects. Some overlap may occur between community volunteers and hunting/fishing community.

3.2 UKEEP Action Plan Summaries

All four ecosystem-based action plans and the species-based action plan were addressed between FY15 and FY20 under the UKEEP program: Lakes, Streams, Wetland (and Riparian Areas), Upland (and Dryland Areas) and Species of Interest. Most projects primarily aligned with the Upland Action Plan and the Streams Action Plan and most projects secondarily aligned with the Species of Interest Action Plan (Figure 8). Fish projects primarily addressed priority actions from the Lakes and Streams Action Plans and wildlife projects primarily addressed actions from the Upland and Wetland Action Plans as well as subobjectives from the Species of Interest Action Plan (Figure 9).

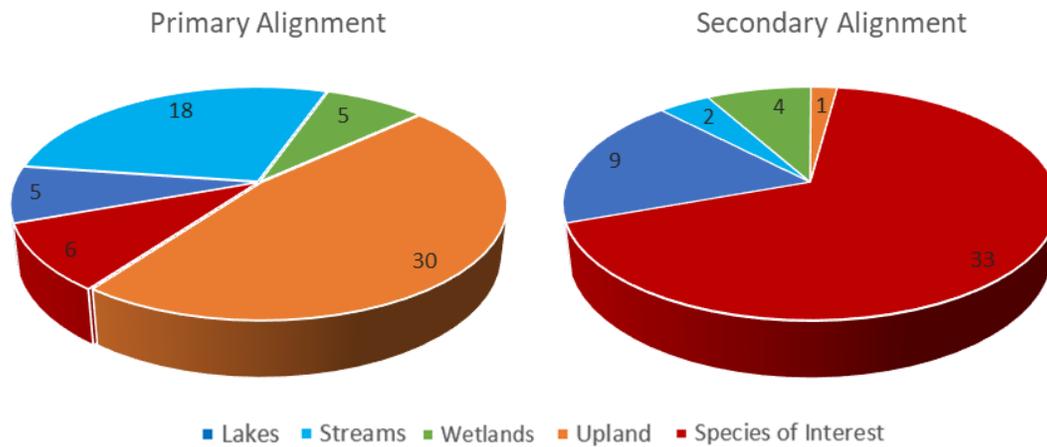


Figure 8. Primary and secondary action plan alignment for UKEEP projects from FY15 to FY20.

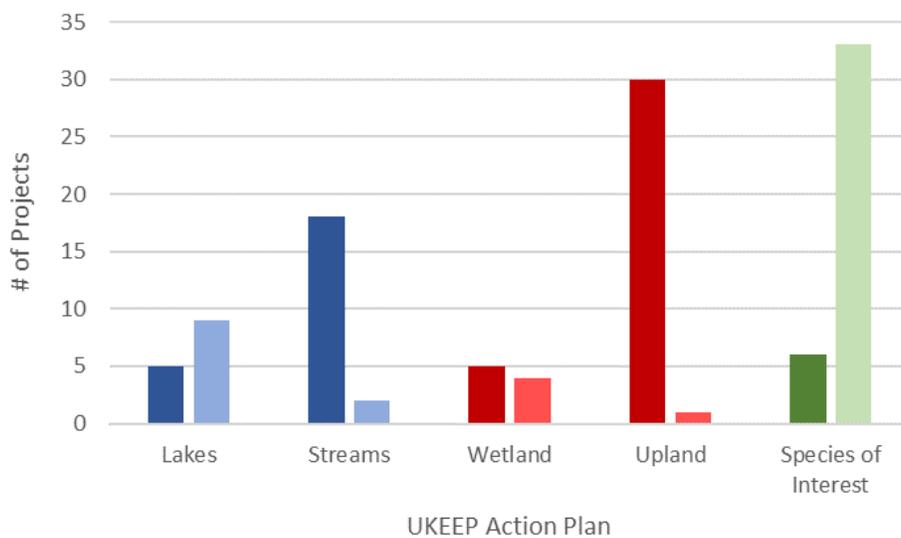


Figure 9. Number of fish and wildlife projects broken down by the primary UKEEP Action Plans that were addressed from FY15 to FY20. Darker bars on left (blue=fish, red=wildlife, green=Species of Interest) indicate primary action plan alignment, lighter bars on right indicate secondary action plan alignment.

Seventy-four priority actions were identified in the four UKEEP ecosystem action plans. Throughout the program’s five-year term, 34 of these priority actions were addressed by projects, 30 of which were priority one. Upland projects addressed the most actions (n=10), followed by streams and wetland (n=9 each), and lakes (n=6) (Figure 10; see Appendix 1 for complete list of actions). Four wildlife projects were not associated with a priority action, but instead aligned with the Species of Interest Action Plan, which had no Actions associated with it.

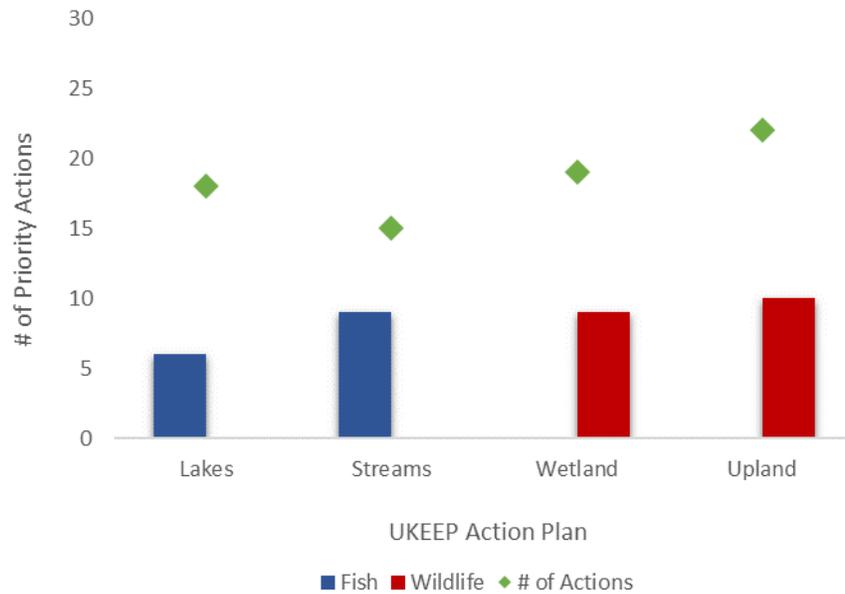


Figure 10. Number of priority actions (green diamonds) outlined by UKEEP Action Plans and the number of priority actions that were addressed by 64 funded UKEEP projects from FY15 to FY20.

Of the 64 UKEEP projects, 40% aligned with the Species-based action category, 30% primarily aligned with the Habitat-based, 20% with Research and Information Acquisition, 9% with Monitoring and Evaluation, and no projects primarily aligned with Land Securement actions (Figure 11). Wildlife projects were predominantly Species-based (n=18) or Habitat-based (n=17) and fish projects were primarily Research and Information Acquisition (n=9) or Species-based (n=7).

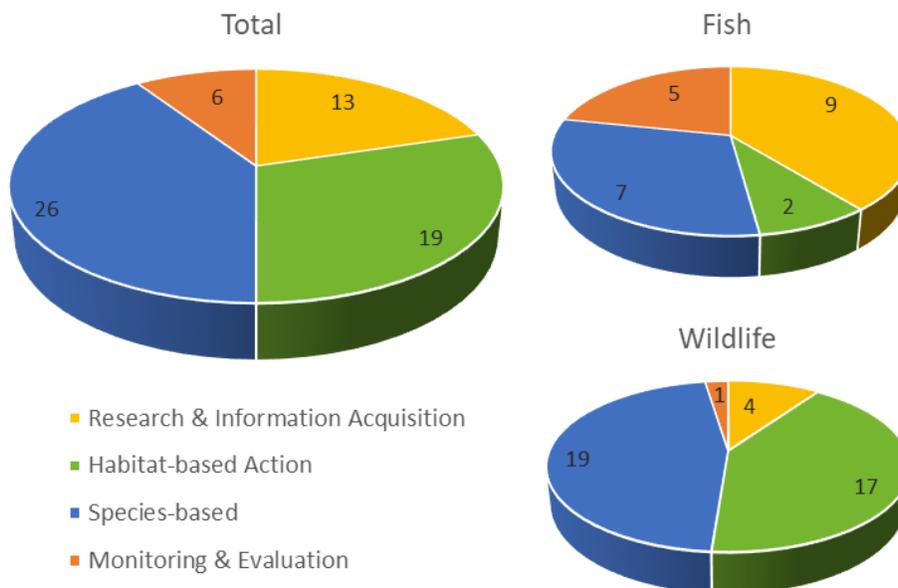


Figure 11. Action categories for UKEEP projects from FY15 to FY20.

Key results are presented for each of the ecosystem action plans and additional information on the Species of Interest Action Plan are presented below.

3.2.1 Lakes Action Plan

From FY15 to FY20, five fish projects totaling \$190,294 of UKEEP Board-approved funds primarily aligned with the Lakes Action Plan (Table 11). Two of the five projects aligned with both the UKEEP Species of Interest Action Plan and with the Streams Action Plan and one of the five projects aligned only with the Species of Interest Action Plan. In addition to these primarily aligned projects, nine other projects also aligned with the Lakes Action Plan; however, these were primarily aligned with the Streams Action Plan.

Table 11. Projects and funding for UKEEP Lakes Action Plan from FY15 to FY20.

Project Delivery	UKEEP Funds in Direct Alignment with Lakes Projects		
	# of Projects	UKEEP \$	Total Project \$
Fish	5	\$190,294	\$294,590
Wildlife	0	\$0	\$0
Total	5	\$190,294	\$294,590

The multi-year (large grant) project, **Koocanusa Sensitive Habitat Inventory Mapping**, accounted for two of the projects; one in FY16 (Phase 1) and the second in FY17 (Phase 2). This project, which occurred on the Koocanusa Reservoir, was led by a non-government organization, and amounted to \$102,803 of UKEEP approved funds. Both phases of the project primarily aligned with the Research and Information Acquisition action category and addressed a Priority 1 rated action in the Lakes Action Plan, Action #1.

Two other projects comprised the multi-year (large grant) project, **Upper Kootenay Burbot Conservation Strategy**, and occurred in FY18 and FY19 in the Koocanusa Reservoir (and upper Kootenay River watershed). This project was led by the Ministry of Forests, Lands, Natural Resource Operations and Rural Development (MFLRORD), and amounted to \$48,904 of UKEEP funds. Both years of the project primarily aligned with the Species-based action category and primarily addressed Action #11 which was rated Priority 1. In addition, this multi-year project also addressed Lakes Action #1 (Research and Information Acquisition, as mentioned above) and secondarily aligned with the Streams Action Plan (Action #1 and 10) and the Species of Interest Action Plan.

The final project, **Koocanusa Burbot Enumeration**, occurred in FY16 in the Koocanusa Reservoir, was led by a consultant and amounted to \$38,587 of UKEEP funds. This project primarily aligned with the Species-based action category and addressed Action #12. This project secondarily aligned with the Species of Interest Action Plan as well. In addition, three other lakes' actions (Action #13, 14, and 17) were addressed by nine fish projects that primarily aligned with the Streams Action Plan (Table 13).

All primary aligned lakes' projects addressed UKEEP Objective 2: *Restore and enhance lake habitats and populations of species of interest*; while 60% of the projects addressed Objective 1: *Conserve productivity and diversity of lake ecosystems in the Plan Area*; and 40% of the projects addressed Objective 3: *Contribute to the maintenance or improvement of opportunities for sustainable use, including harvesting*. Projects primarily addressed subobjectives relating to conserving and restoring habitat for Species of Interest, monitoring Species of Interest and supporting their recovery, and helping decision making for sustainable use targets (Table 12). Community engagement was a component of all primary aligned lakes projects other than **Koocanusa Burbot Enumeration**, including First Nations involvement, public education / events, and local stakeholders' input.

Table 12. UKEEP subobjectives addressed by lakes projects from FY15 to FY20.

UKEEP Subobjective	# of Projects
1a. Identify and conserve important habitat for Species of Interest	2
1b. Characterize and monitor the status of Species of Interest	1
1c. Support efforts to prevent introduction of invasive species	
2a. Restore and enhance important habitat for Species of Interest	2
2b. Support SOI population recovery/maintenance	3
2c. Control of established invasive species	
3a. Contribute data to help inform decision making on sustainable use targets for resources	2
3b. Support public education and awareness regarding threats and challenges to ecosystems, which will motivate ecologically-informed decisions and actions	

3.2.1.1 Action Alignment

There are 18 priority actions under the UKEEP Lakes Action Plan. In total, six priority actions were addressed by fish projects from FY15 to FY20 (Table 13; see Appendix 1 for complete list of actions). Action alignment occurred (primary or otherwise) 24 times. During the program, lakes projects were only conducted in the Koocanusa Reservoir, apart from McNair South Lake which was listed as one project site of the streams project **Evaluation of Current Westslope Cutthroat Trout Hybridization Levels in the Upper Kootenay Drainage** (FY16). Three actions were listed as the primary action by projects (Action #1, 11, and 12), three other actions were addressed (Action #13, 14, and 17), but not identified as the primary action, and 12 actions were not addressed by any project (Action #2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 16, and 18).

Table 13. Lakes actions addressed by UKEEP fish projects from FY15 to FY20. Numbers in table represent the number of projects aligned with the action (certain projects address multiple actions). Coloured squares indicate priority rating for actions: #1 (dark green), #2 (light green), #3 (blue), and primary action alignment (pink).

#	Action Category	Lakes Actions	Rank	# of Projects	Directed or Open
1	Research & Information Acquisition	Review and map land use activities and existing information on condition and limitations of lake habitats used by lacustrine and adfluvial Species of Interest to identify and prioritize focal lake habitats. Describe past and present management actions (e.g., land use planning, zoning, setbacks) and identify data gaps.	1	4	Open
11	Species-based	Inventory, review, and synthesize existing information on lacustrine and adfluvial Species of Interest in the Plan area, including past and present management actions and identify data gaps. Integrate with historic information. This action can be completed concurrently with Action #12.	1	2	Directed / Open
12	Species-based	Collect biological information to address data gaps and define status of lacustrine and adfluvial Species of Interest populations. Integrate with historic information. This action can be completed concurrently with Action #11.	1	1	Directed / Open
13	Species-based	Support the development of invasive species monitoring and rapid response plans. Identify areas where invasive species are likely to establish or have already established.	1	4	Open
14	Species-based	Conduct risk assessments of established Rainbow Trout populations and stocking programs with regard to hybridization with Westslope Cutthroat Trout.	1	4	Directed
17	Monitoring & Evaluation	Monitor the status and trends of lacustrine and adfluvial Species of Interest populations (i.e., Westslope Cutthroat Trout, Kokanee, Rainbow Trout). Collect genetic data at the same time.	3	9	Directed

3.2.1.2 Action Categories

Lakes projects addressed actions in three action categories (Table 14): Research and Information Acquisition (n=4), Species-based (n=11) and Monitoring and Evaluation (n=9). All Research and Information Acquisition and Species-based actions were rated Priority 1, while all Monitoring and Evaluation actions were rated Priority 3. Habitat-based or Land Securement Actions from the Lakes Action Plan were not addressed during the five-year program. Of the five primary aligned lakes projects, 40% were primarily aligned with the Research and Information Acquisition category (n=2), and 60% with the Species-based category (n=3) (Figure 12).

Table 14. Action alignment (primary or otherwise) by action category and priority action score for UKEEP lakes projects from FY15 to FY20. Coloured squares indicate priority rating for actions: #1 (dark green), #2 (light green), and #3 (light blue).

Action Category	Priority Action Score			Total
	1	2	3	
Research & Information Acquisition	4	0	0	4
Habitat-based Actions	0	0	0	0
Species-based Actions	11	0	0	11
Land Securement	0	0	0	0
Monitoring & Evaluation	0	0	9	9
Total	15	0	9	24

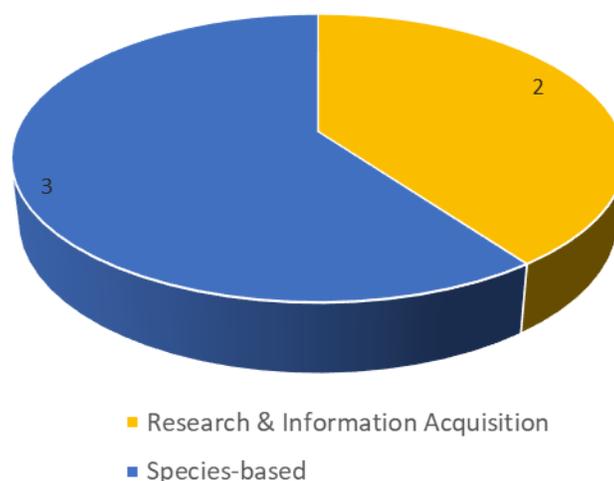


Figure 12. Action categories for UKEEP lakes projects from FY15 to FY20.

UKEEP lakes projects are summarized by specific action categories below, including the presentation of primary action alignment, types of projects, and key metrics produced from FY15 to FY20.

3.2.1.2.1 Research and Information Acquisition Actions

Five of the priority actions in the Lakes Action Plan are within the Research and Information Acquisition category, and of these, one action was addressed by four projects that primarily aligned with the Lakes Action Plan, Action #1 (Table 15). Four Research and Information Acquisition actions were not addressed during the program (Action #2, 3, 4, and 5).

Table 15. Research and Information Acquisition actions addressed by UKEEP lakes projects from FY15 to FY20. Numbers in table represent the number of projects aligned with the action (certain projects address multiple actions). Coloured squares indicate priority rating for actions: #1 (dark green), #2 (light green), #3 (blue), and primary action alignment (pink).

#	Action Category	Lakes Actions	Rank	# of Projects	Directed or Open
1	Research & Information Acquisition	Review and map land use activities and existing information on condition and limitations of lake habitats used by lacustrine and adfluvial Species of Interest to identify and prioritize focal lake habitats. Describe past and present management actions (e.g., land use planning, zoning, setbacks) and identify data gaps.	1	4	Open

All four projects were assessment projects. No inventory or integrated planning projects were completed. Key metrics (i.e., final product) from these projects resulted in future planning for species or ecosystem (n=4) or new information that advanced knowledge of the species, ecosystem, or focal area (n=2) (Table 16).

Table 16. Key metrics for Lakes Action Plan Research and Information Acquisition UKEEP projects from FY15 to FY20.

Result Type	Key Projects
New information that advances knowledge of species, ecosystem, or focal area	<ul style="list-style-type: none"> • Koocanusa Sensitive Habitat Inventory Mapping
Future planning for species or ecosystem	<ul style="list-style-type: none"> • Koocanusa Sensitive Habitat Inventory Mapping • Upper Kootenay Burbot Conservation Strategy

3.2.1.2.2 Habitat-based Actions

Five of the priority actions in the Lakes Action Plan are within the Habitat-based category; however, there were no Habitat-based projects for the UKEEP Lakes Action Plan from FY15 to FY19. Hence, none of the habitat-based actions were addressed (Action #6, 7, 8, 9, and 10).

3.2.1.2.3 Species-based Actions

Four of the priority actions in the Lakes Action Plan are within the Species-based category, and of these, two actions were addressed by three projects which primarily aligned with the Lakes Action Plan (Action #11 and 12) (Table 17). Two projects which addressed Species-based Action #12 were part of the multi-year project **Upper Kootenay Burbot Conservation Strategy**, and **Koocanusa Burbot Enumeration** was the single project which addressed Species-based Action #11. Both projects targeted Burbot, the former resulted in the development of a conservation strategy and the latter resulted in an assessment of abundance, distribution, and movement.

The remaining two Species-based actions (Action #13 and 14) from the Lakes Action Plan were addressed by four projects that primarily aligned with the Streams Action Plan (**Westslope Cutthroat Trout Hybridization Evaluation**, a multi-year project).

Table 17. Species-based actions addressed by UKEEP streams projects from FY15 to FY20. Numbers in table represent the number of projects aligned with the action (certain projects address multiple actions). Coloured squares indicate priority rating for actions: #1 (dark green), #2 (light green), #3 (blue), and primary action alignment (pink).

#	Action Category	Lakes Actions	Rank	# of Projects	Directed or Open
11	Species-based	Inventory, review, and synthesize existing information on lacustrine and adfluvial Species of Interest in the Plan area, including past and present management actions and identify data gaps. Integrate with historic information. This action can be completed concurrently with Action #12.	1	2	Directed / Open
12	Species-based	Collect biological information to address data gaps and define status of lacustrine and adfluvial Species of Interest populations. Integrate with historic information. This action can be completed concurrently with Action #11.	1	1	Directed / Open
13	Species-based	Support the development of invasive species monitoring and rapid response plans. Identify areas where invasive species are likely to establish or have already established.	1	4	Open
14	Species-based	Conduct risk assessments of established Rainbow Trout populations and stocking programs with regard to hybridization with Westslope Cutthroat Trout.	1	4	Directed

3.2.1.2.4 Land Securement Actions

One priority action in the UKEEP Lakes Action Plan is within the Land Securement category (Action # 15); however, there were no Land Securement projects for this plan from FY15 to FY20.

3.2.1.2.5 Monitoring and Evaluation Actions

Three priority actions in the Lakes Action Plan are within the Monitoring and Evaluation category; none of these actions were addressed by projects that primarily aligned with the Lakes Action Plan. One action (Action #17) was addressed by two multi-year projects that primarily aligned with the Streams Action Plan (**Westslope Cutthroat Trout Hybridization Evaluation** and **Koocanusa Kokanee Enumeration**) (Table 18).

Table 18. Monitoring and Evaluation actions addressed by UKEEP lakes projects from FY15 to FY20. Numbers in table represent the number of projects aligned with the action (certain projects address multiple actions). Coloured squares indicate priority rating for actions: #1 (dark green), #2 (light green), #3 (blue).

#	Action Category	Lakes Actions	Rank	# of Projects	Directed or Open
17	Monitoring & Evaluation	Monitor the status and trends of lacustrine and adfluvial Species of Interest populations (i.e., Westslope Cutthroat Trout, Kokanee, Rainbow Trout). Collect genetic data at the same time.	3	9	Directed

3.2.1.3 Multi-year Projects and Funding Succession

Four of the five projects that primarily aligned with the UKEEP Lakes Action Plan were multi-year (Table 19). These were comprised of two multi-year projects, which each occurred for two consecutive years and addressed the same actions and action categories each year. As a result, funding succession did not occur.

Table 19. Summary of multi-year UKEEP projects primarily aligned with the Lakes Action Plan from FY15 to FY20. X indicates which fiscal years individual project tasks occurred.

Project Name	Fiscal Year (FY)					
	15	16	17	18	19	20
Koocanusa Sensitive Habitat Inventory Mapping		X	X			
Upper Kootenay Burbot Conservation Strategy				X	X	

3.2.1.4 Species of Interest

In total, three of the five projects that primarily aligned with the Lakes Action Plan targeted a single focal species in the UKEEP Species of Interest Action plan, Burbot (**Upper Kootenay Burbot Conservation Strategy** [multi-year] and **Koocanusa Burbot Enumeration**).

3.2.1.5 UKEEP Targets

All primarily aligned lakes projects contributed to targets associated with subobjectives within the UKEEP Lakes Action Plan. Targets addressed included 1a: *Increase in availability of important habitat for Species of Interest protected against human impacts*; 1b: *The establishment or improvement of baseline knowledge of the status of Species of Interest*; 2b: *Improvement in abundance and distribution of Species of Interest*; and 3a: *Lake resource use does not affect the sustainability of Species of Interest populations* (Table 20).

Table 20. Summary of Lakes Action Plan targets addressed by UKEEP projects from FY15 to FY20.

Subobjective	Target Set by UKEEP Program	Targets Achieved by UKEEP Program
1a: Identify and conserve important habitat for Species of Interest	Increase in availability of important habitat for Species of Interest protected against human impacts.	<ul style="list-style-type: none"> • Koocanusa Sensitive Habitat Inventory Mapping (foreshore inventory and mapping, fish and wildlife habitat assessment, aquatic habitat index, shoreline guidance document)
1b: Characterize and monitor the status of Species of Interest	The establishment or improvement of baseline knowledge of the status of Species of Interest.	<ul style="list-style-type: none"> • Koocanusa Burbot Enumeration (abundance, distribution and movement during winter assessed)
2b: Support SOI population recovery/maintenance	Improvement in abundance and distribution of Species of Interest	<ul style="list-style-type: none"> • Upper Kootenay Burbot Conservation Strategy developed
3a: Contribute data to help inform decision making on sustainable use targets for resources	Lake resource use does not affect the sustainability of Species of Interest populations.	<ul style="list-style-type: none"> • Koocanusa Sensitive Habitat Inventory Mapping (foreshore inventory and mapping, fish and wildlife habitat assessment, aquatic habitat index, shoreline guidance document)

3.2.2 Streams Action Plan

From FY15 to FY20, 18 UKEEP projects primarily aligned with the Streams Action Plan. All were fish related projects that amounted to \$748,760 of UKEEP approved funds (Table 21). Sixteen of the 18 projects aligned with the UKEEP Species of Interest Action Plan and of those, nine also aligned with the Lakes Action Plan. In addition to these primarily aligned projects, two other projects also aligned with the Streams Action Plan; however, these were primarily aligned with the Lakes Action Plan. One project (**Koocanusa Kokanee Enumeration [FY20]**) was still in progress at the time of the review and had remaining funds to be spent after 31 October 2019.

Table 21. Projects and funding for UKEEP Streams Action Plan from FY15 to FY20.

Project Delivery	UKEEP Funds in Direct Alignment with Streams Projects		
	# of Projects	UKEEP \$	Total Project \$
Fish	18	\$748,760	\$1,497,748
Wildlife	0	\$0	\$0
Total	18	\$748,760	\$1,497,748

Most primarily aligned UKEEP streams projects, 89%, addressed UKEEP Objective 1: *Conserve productivity and diversity of stream ecosystems in the Plan Area* while 61% addressed Objective 2: *Restore and enhance stream habitats and populations of Species of Interest* and 28% of projects addressed Objective 3: *Contribute to the maintenance or improvement of opportunities for sustainable use, including harvesting*. Projects primarily addressed subobjectives relating to conserving and restoring habitat for Species of Interest, monitoring Species of Interest and supporting their recovery, and helping decision making for sustainable use targets. Fewer projects addressed subobjectives related to invasive species and supporting public education regarding threats to ecosystems (Table 22). Community engagement was a component of five primary aligned streams projects from FY15 to FY20, including First Nations involvement, public education/public events, community volunteers, and involvement from the hunting/fishing community.

Table 22. UKEEP subobjectives addressed by streams projects from FY15 to FY20.

UKEEP Subobjective	# of Projects
1a. Identify and conserve important habitat for Species of Interest	13
1b. Characterize and monitor the status of Species of Interest	14
1c. Support efforts to prevent introduction of invasive species	1
2a. Restore and enhance important habitat for Species of Interest	9
2b. Support SOI population recovery/maintenance	8
2c. Control of established invasive species	4
3a. Contribute data to help inform decision making on sustainable use targets for resources	7
3b. Support public education and awareness regarding threats and challenges to ecosystems, which will motivate ecologically-informed decisions and actions	3

Projects that primarily aligned with the Streams Action Plan were led by government (n=8), consultants (n=7), non-government organizations (n=2) and First Nations (n=1). Most projects were large grant (n=16) and two were seed projects (**Creation of WHAs for Bull Trout in the Upper Kootenay River** and **Rehabilitating Joseph Creek: a Community Initiative**). Most projects were multi-year (n=14) with the exception of the four single year projects **High Resolution Conductivity and Temperature Project**, **Upper Kootenay Stream Crossing Remediation**, **Alexander Creek Streamside Restoration & Community Education** and **Rehabilitating Joseph Creek: a Community Initiative**.

Priority streams studied from FY15 to FY20 included Gold Creek, Wigwam River, Elk River, Sand Creek, Bull River, Wildhorse River, St. Mary River, Skookumchuck Creek, Lussier River, Findlay Creek, White River, and Kootenay River mainstem (headwaters to Kooanus Reservoir) (Figure 13); also, the projects **Westslope Cutthroat Trout Hybridization Evaluation** and **Upper Kootenay Burbot Conservation Strategy** (latter project is secondarily aligned with the Streams Action Plan) addressed streams in the Upper Kootenay Watershed (when specific priority streams were listed for these projects they were included by stream in Figure 13). Other priority streams, specifically the Vermillion River, Cross River, and Palliser River, were not the focus of any projects during the five-year program.

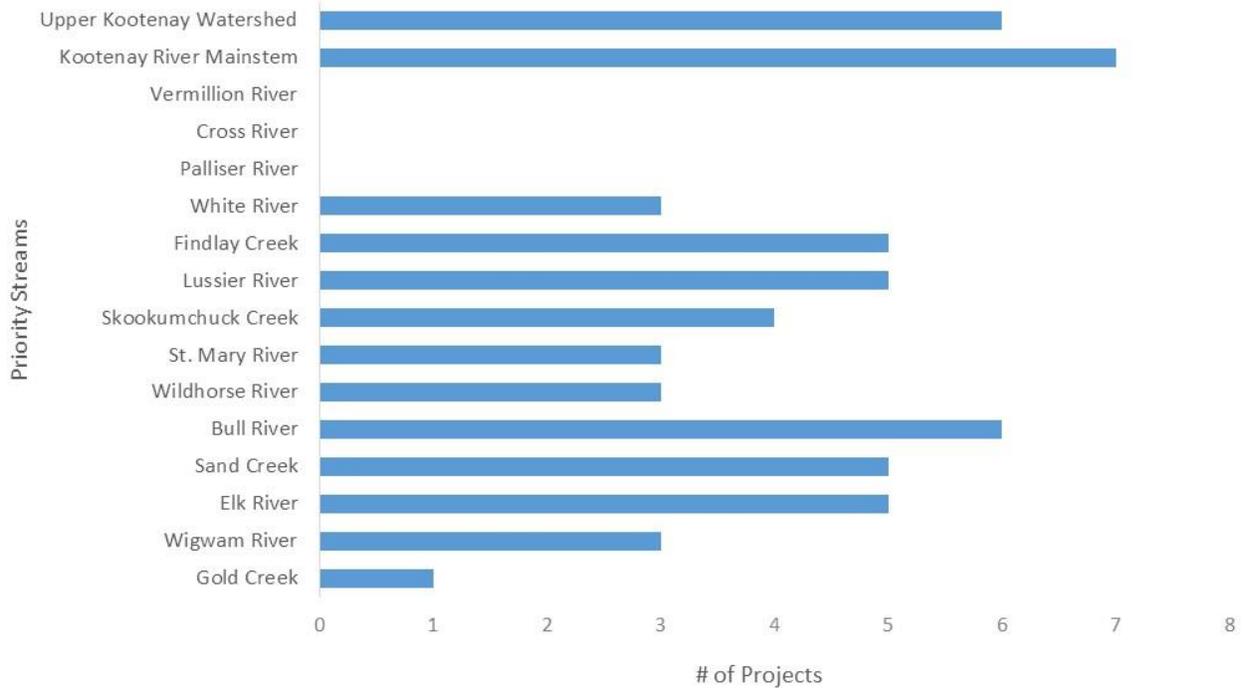


Figure 13. Total number of projects which occurred on UKEEP priority streams from FY15 to FY20. Note individual projects may occur on several priority streams.

3.2.2.1 Action Alignment

There are 15 priority actions within the Streams Action Plan; nine of which were addressed by fish projects from FY15 to FY20 (Table 23; see Appendix 1 for complete list of actions). Action alignment occurred 43 times (primary or otherwise), most of which were Priority 1 rated actions. Two projects aligned with a Priority 2 rated action (Action #10). The occurrences for priority streams in rank order were Kootenay River mainstem (headwaters to Koocanusa Reservoir) (n=7), Bull River (n=6), Elk River, Sand Creek, Lussier River, and Findlay Creek (n=5), Skookumchuck Creek (n=4), White River, St. Mary River, Wildhorse River, and Wigwam River (n=3), and Gold Creek (n=1). As mentioned previously, projects also occurred in the Upper Kootenay Watershed (n=6) and when specific priority streams were listed for these projects they were included in this analysis. Five actions were listed as the primary action by projects (Action #2, 4, 5, 9, and 13), four other actions were addressed (Action #1, 7, 8, and 10), but not identified as the primary action, and six actions were not addressed by any project (Action #3, 6, 11, 12, 14, and 15).

Table 23. Streams actions addressed by UKEEP fish and wildlife projects from FY15 to FY20. Numbers in table represent the number of projects aligned with the action (certain projects address multiple actions). Coloured squares indicate priority rating for actions: #1 (dark green), #2 (light green), #3 (blue), and primary action alignment (pink).

#	Action Category	Streams Actions	Rank	# of Projects	Directed or Open
1	Research & Information Acquisition	Review and map land use activities and existing information on condition and limitations of stream habitats used by fluvial and adfluvial Species of Interest to identify and prioritize critical stream habitats. Describe past and present management actions (i.e., land use planning, zoning, setbacks) and identify data gaps.	1	3	Open
2	Research & Information Acquisition	Inventory and prioritize potential stream habitat conservation/restoration/enhancement opportunities for Species of Interest.	1	7	Open
4	Habitat-based	Implement habitat-based actions to conserve, restore, and enhance water flow, stream geomorphology, and water quality on priority streams. Ensure alignment with relevant actions for other ecosystems. Examples include stream stewardship, channel restoration, erosion control, increased connectivity (i.e., culvert replacement).	1	4	Open
5	Habitat-based	Implement habitat-based actions to conserve, restore, and enhance spawning, rearing, overwintering, and foraging habitat for Species of Interest. Focus on culvert replacement. Ensure alignment with relevant actions for other ecosystems (e.g., include re-establishment of connection with lake/wetland habitat, addition of aquatic vegetation or artificial structures to improve cover and habitat complexity and placement of suitable spawning substrate).	1	3	Open
7	Habitat-based	Support education and outreach for public awareness of threats and challenges of stream ecosystems. Threats include consequences of unauthorized introductions of invasive species and impacts from recreational use (particularly watercraft use). Examples include educational signage and stewardship.	1	3	Open
8	Species-based	Support the development of invasive species monitoring and rapid response plan. Identify areas where invasive species are likely to establish.	1	4	Open
9	Species-based	Conduct risk assessments of established Rainbow Trout populations and stocking programs with regard to hybridization with Westslope Cutthroat Trout.	1	4	Directed
10	Species-based	Inventory, review, and synthesize existing information on fluvial and adfluvial Species of Interest in the Plan area, including past and present management actions and identify data gaps. Integrate with historic information. This action can be completed concurrently with Action #11.	2	2	Directed
13	Monitoring & Evaluation	Monitor the status and trends of fluvial and adfluvial Species of Interest populations (e.g., Westslope Cutthroat Trout, Kokanee, Rainbow Trout, Bull Trout). Collect genetic data at the same time.	1	13	Directed

3.2.2.2 Action Alignment within Action Categories

Streams projects addressed actions in four action categories (Table 24): Research and Information Acquisition (n=10), Habitat-based (n=10), Species-based (n=10) and Monitoring and Evaluation (n=13). All Research and Information Acquisition, Habitat-based and Monitoring and Evaluation actions addressed were rated Priority 1 while both Priority 1 (n=8) and Priority 2 (n=2) Species-based actions were addressed. No Land Securement actions were addressed during the five-year program. Of the 18 primary aligned streams projects, 39% were primarily aligned with the Research and Information Acquisition

category (n=7), 11% with the Habitat-based category (n=2), 22% with the Species-based category (n=4), and 28% with the Monitoring and Evaluation category (n=5) (Figure 14).

Table 24. Action alignment (primary or otherwise) by action category and priority action score for UKEEP streams projects from FY15 to FY20. Coloured squares indicate priority rating for actions: #1 (dark green), #2 (light green), #3 (blue).

Action Category	Priority Action Score			Total
	1	2	3	
Research & Information Acquisition	10	0	0	10
Habitat-based Actions	10	0	0	10
Species-based Actions	8	2	0	10
Land Securement	0	0	0	0
Monitoring & Evaluation	13	0	0	13
Total	41	2	0	43

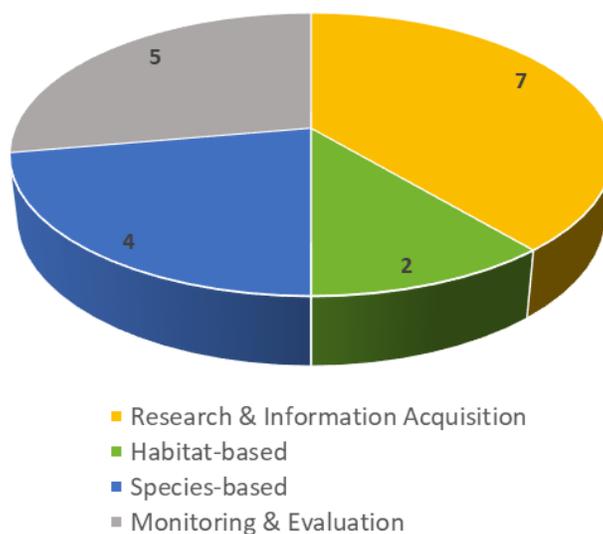


Figure 14. Action categories for UKEEP streams projects from FY15 to FY20.

UKEEP streams projects are summarized by specific action categories below, including the presentation of primary action alignment, types of projects, and key metrics produced from FY15 to FY20.

3.2.2.2.1 Research and Information Acquisition Actions

Three priority actions in the Streams Action Plan are within the Research and Information Acquisition category, two of which were addressed (Table 25). Action #2 was addressed as a primary action by seven projects (**Wildhorse River Bull Trout Population Inventory and Recovery [multi-year]**, **Creation of WHAs for Bull Trout in the Upper Kootenay River**, **Conservation of Trout Habitat in the East Kootenay Region**, **High Resolution Conductivity and Temperature Project**, and **Rehabilitating Joseph Creek: a Community Initiative**) while Action #1 was addressed as a secondary action by one streams project (**Rehabilitating Joseph Creek: a Community Initiative**) and one multi-year lakes project (**Upper Kootenay Burbot Conservation Strategy**).

Table 25. Research and Information Acquisition actions addressed by UKEEP streams projects from FY15 to FY20. Numbers in table represent the number of projects aligned with the action (certain projects address multiple actions). Coloured squares indicate priority rating for actions: #1 (dark green), #2 (light green), #3 (blue), and primary action alignment (pink).

#	Action Category	Streams Actions	Rank	# of Projects	Directed or Open
1	Research & Information Acquisition	Review and map land use activities and existing information on condition and limitations of stream habitats used by fluvial and adfluvial Species of Interest to identify and prioritize critical stream habitats. Describe past and present management actions (i.e., land use planning, zoning, setbacks) and identify data gaps.	1	3	Open
2	Research & Information Acquisition	Inventory and prioritize potential stream habitat conservation/ restoration/ enhancement opportunities for Species of Interest.	1	7	Open

Research and Information Acquisition tasks were either inventory (n=4) or assessments (n=4) (Figure 15). Key metrics (i.e., final product) from these projects resulted in future planning for species or ecosystem (n=7), new information that advanced knowledge of the species, ecosystem or focal area (n=4) or Habitat-based follow up is required (n=1) (Table 26).

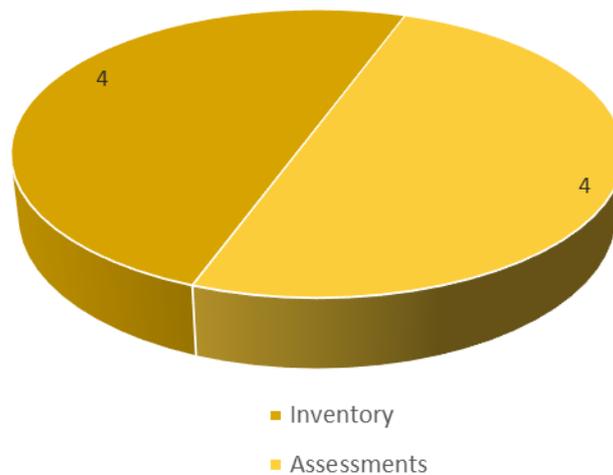


Figure 15. Type of Research and Information Acquisition projects for UKEEP Streams Action Plan from FY15 to FY20.

Table 26. Key metrics for Research and Information Acquisition UKEEP streams projects from FY15 to FY20.

Result Type	Key Projects
New information that advances knowledge of species, ecosystem, or focal area	<ul style="list-style-type: none"> • High Resolution Conductivity and Temperature Project • Wildhorse River Bull Trout Population Inventory and Recovery
Future planning for species or ecosystem	<ul style="list-style-type: none"> • High Resolution Conductivity and Temperature Project • Conservation of Trout Habitat in the East Kootenay Region • Creation of WHAs for Bull Trout in the Upper Kootenay River (~174 km stream length total) • Wildhorse River Bull Trout Population Inventory and Recovery • Rehabilitating Joseph Creek: a Community Initiative
Habitat-based follow up is required	<ul style="list-style-type: none"> • Rehabilitating Joseph Creek: a Community Initiative

3.2.2.2.2 Habitat-based Actions

There are four Habitat-based priority actions in the Streams Action Plan, three of which were addressed from FY15 to FY20 (Action #4, 5, and 7) (Table 27; see Appendix 1 for the complete list of streams actions). Action #4 was the most frequently addressed (n=4) Habitat-based action by projects such as **Alexander Creek Streamside Restoration & Community Education**, **Upper Kootenay Stream Crossing Remediation**, **Conservation of Trout Habitat in the East Kootenay Region** and **Creation of WHAs for Bull Trout in the Upper Kootenay River**. The remaining two Habitat-based actions were each addressed three times.

Table 27. Habitat-based actions addressed by UKEEP streams projects from FY15 to FY20. Numbers in table represent the number of projects aligned with the action (certain projects address multiple actions). Coloured squares indicate priority rating for actions: #1 (dark green), #2 (light green), #3 (blue), and primary action alignment (pink).

#	Action Category	Streams Actions	Rank	# of Projects	Directed or Open
4	Habitat-based	Implement habitat-based actions to conserve, restore, and enhance water flow, stream geomorphology, and water quality on priority streams. Ensure alignment with relevant actions for other ecosystems. Examples include stream stewardship, channel restoration, erosion control, increased connectivity (i.e., culvert replacement).	1	4	Open
5	Habitat-based	Implement habitat-based actions to conserve, restore, and enhance spawning, rearing, overwintering, and foraging habitat for Species of Interest. Focus on culvert replacement. Ensure alignment with relevant actions for other ecosystems (e.g., include re-establishment of connection with lake/wetland habitat, addition of aquatic vegetation or artificial structures to improve cover and habitat complexity and placement of suitable spawning substrate).	1	3	Open
7	Habitat-based	Support education and outreach for public awareness of threats and challenges of stream ecosystems. Threats include consequences of unauthorized introductions of invasive species and impacts from recreational use (particularly watercraft use). Examples include educational signage and stewardship.	1	3	Open

Habitat-based projects were habitat restoration or enhancement (n=4), other (habitat protection) (n=2) or restore / maintain connectivity (n=1) (Figure 16; Table 28). The stage of tasks completed were baseline surveys (n=4), actual on-the-ground tasks (n=2), which included connectivity of a minimum of 90 km of stream habitat (**Upper Kootenay Stream Crossing Remediation**) and 50 m of restored stream bank (**Alexander Creek Streamside Restoration and Community Education**), contributing to connectivity (n=1)

and other (n=2) (a feasibility study to assess creation of Wildlife Habitat Areas [WHA] and Habitat Protection Plan to designate WHAs for **Creation of WHAs for Bull Trout in the Upper Kootenay River**).

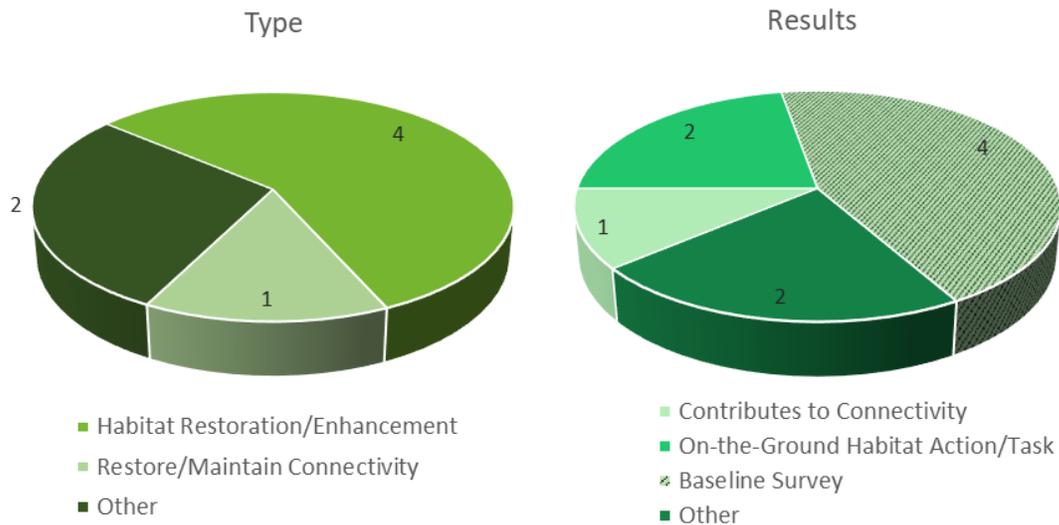


Figure 16. Type of Habitat-based projects (left) and categories of results (right) of Habitat-based projects for UKEEP Streams Action Plan FWCP Columbia from FY15 to FY20.

Table 28. Overall Habitat-based action metrics for projects associated with UKEEP Streams Action Plan from FY15 to FY20.

On-the-ground Action	Project Name	Metric
Habitat Restoration	Alexander Creek Streamside Restoration & Community Education (FY17)	~50 m stream bank restored (bioengineering with native riparian vegetation, 600+ cuttings)
Restore Ecosystem Connectivity	Upper Kootenay Stream Crossing Remediation (FY16)	Connectivity restored to upper reaches of Caven Creek (minimum of 90 km) with bridge replacement (one culvert, one bridge added)

3.2.2.2.3 Species-based Actions

Four of the priority actions in the Streams Action Plan are within the Species-based category, and of these, three actions were addressed (Table 29). Action #9 was the primary action addressed four times by the multi-year project **Westslope Cutthroat Trout Hybridization Evaluation** which assessed hybridization levels of Westslope Cutthroat Trout with introduced Rainbow Trout; Action #8 was also addressed by this project. Action #10 was addressed by the multi-year lakes project **Upper Kootenay Burbot Conservation Strategy** which resulted in the development of a conservation strategy.

Table 29. Species-based actions addressed by UKEEP streams projects from FY15 to FY20. Numbers in table represent the number of projects aligned with the action (certain projects address multiple actions). Coloured squares indicate priority rating for actions: #1 (dark green), #2 (light green), #3 (blue), and primary action alignment (pink).

#	Action Category	Streams Actions	Rank	# of Projects	Directed or Open
8	Species-based	Support the development of invasive species monitoring and rapid response plan. Identify areas where invasive species are likely to establish.	1	4	Open
9	Species-based	Conduct risk assessments of established Rainbow Trout populations and stocking programs with regard to hybridization with Westslope Cutthroat Trout.	1	3	Directed
10	Species-based	Inventory, review, and synthesize existing information on fluvial and adfluvial Species of Interest in the Plan area, including past and present management actions and identify data gaps. Integrate with historic information. This action can be completed concurrently with Action #11.	2	2	Directed

3.2.2.2.4 Land Securement Actions

One priority action in the Streams Action Plan is within the Land Securement category (Action #12); however, there were no Land Securement projects for the Streams Action Plan from FY15 to FY20.

3.2.2.2.5 Monitoring and Evaluation Actions

Three priority actions in the Streams Action Plan are within the Monitoring and Evaluation category, only one of which was addressed (Table 30). Action #13 was addressed five times as a primary action by the multi-year project **Koocanusa Kokanee Enumeration** and again as a secondary action by eight additional streams projects (**Upper Kootenay Stream Crossing Remediation**, **Westslope Cutthroat Trout Hybridization Evaluation** and **Wildhorse River Bull Trout Population Inventory and Recovery**; latter two are multi-year projects). Trend monitoring was conducted for eight Monitoring and Evaluation type projects as well as other tasks such as determining species distribution (**Westslope Cutthroat Trout Hybridization Evaluation**) (Figure 17).

Table 30. Monitoring and Evaluation actions addressed by UKEEP streams projects from FY15 to FY20. Numbers in table represent the number of projects aligned with the action (certain projects address multiple actions). Coloured squares indicate priority rating for actions: #1 (dark green), #2 (light green), #3 (blue), and primary action alignment (pink).

#	Action Category	Streams Actions	Rank	# of Projects	Directed or Open
13	Monitoring & Evaluation	Monitor the status and trends of fluvial and adfluvial Species of Interest populations (e.g., Westslope Cutthroat Trout, Kokanee, Rainbow Trout, Bull Trout). Collect genetic data at the same time.	1	13	Directed

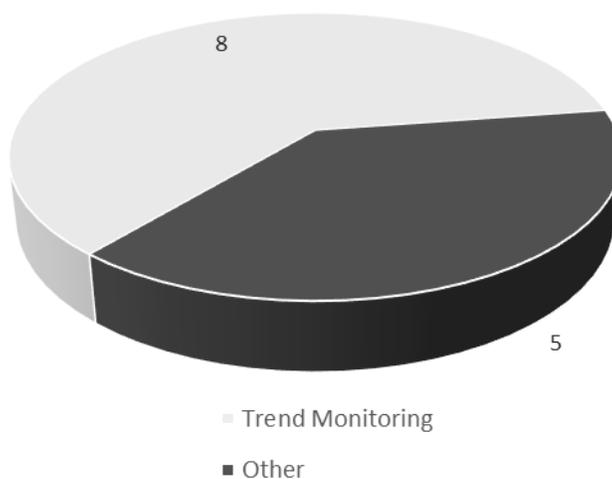


Figure 17. Categories of results of Monitoring and Evaluation projects for UKEEP Streams Action Plan FWCP Columbia from FY15 to FY20.

3.2.2.3 Multi-year Projects and Funding Succession

Fourteen of 18 primarily aligned streams projects were multi-year (Table 31). Four multi-year projects addressed the same actions and action categories for each year of the project; hence funding succession did not occur. Note the FY19 report for **Westslope Cutthroat Trout Hybridization Evaluation** and FY20 report for **Koocanusa Kokanee Enumeration** were not complete at the time of this review but it is assumed the same actions and action categories were addressed as previous years.

Table 31. Summary of multi-year UKEEP projects primarily aligned with the Streams Action Plan from FY15 to FY20. X indicates which fiscal years individual project tasks occurred.

Project Name	Fiscal Year (FY)					
	15	16	17	18	19	20
Westslope Cutthroat Trout Hybridization Evaluation		X	X	X	X	
Creation of WHAs for Bull Trout in the Upper Kootenay River / Conservation of Trout Habitat in the East Kootenay Region			X	X		
Wildhorse River Bull Trout Population Inventory and Recovery			X	X	X	
Koocanusa Kokanee Enumeration		X	X	X	X	X

3.2.2.4 Species of Interest

Sixteen of the 18 projects that primarily aligned with the Streams Action Plan targeted fish species in the Species of Interest Action Plan; 12 projects targeted a single species, Bull Trout (**Wildhorse River Bull Trout Population Inventory and Recovery**), Kokanee (**Koocanusa Kokanee Enumeration**) or Westslope Cutthroat Trout (WCT) (**Westslope Cutthroat Trout Hybridization Evaluation** targeted WCT while assessing hybridization levels with introduced Rainbow Trout [RT]), while the remaining four projects targeted multiple species, Westslope Cutthroat Trout and Bull Trout (**High Resolution Conductivity and Temperature Project, Upper Kootenay Stream Crossing Remediation, and Creation of WHAs for Bull Trout in the Upper Kootenay River / Conservation of Trout Habitat in the East Kootenay Region**). All species targeted by projects that aligned with the Streams Plan were focal species (Figure 18).

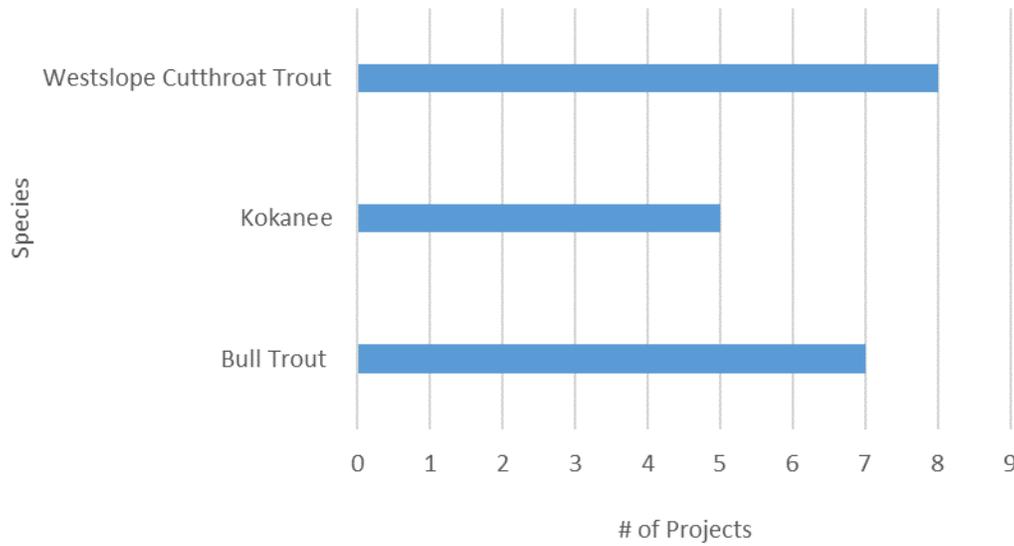


Figure 18. Species of Interest targeted by UKEEP primarily aligned streams projects from FY15 to FY20.

3.2.2.5 UKEEP Targets

The vast majority (n=17) of primarily aligned streams projects contributed to targets associated with subobjectives within the Streams Action Plan. Targets addressed included 1a: *Increase in availability of important habitat for Species of Interest protected against human impacts*; 1b: *The establishment or improvement of baseline knowledge of the status of Species of Interest*; 2a: *Increased area of restored/enhanced habitat that improves stream productivity*; 2b: *Improvement in abundance and distribution of Species of Interest*; 2c: *Decrease in abundance and distribution of invasive species due to control efforts* and 3b: *Reduced incidence of negative impacts caused by humans due to ecologically-informed decisions and actions as a result of increased awareness of the public threats and challenges to stream ecosystems* (Table 32).

Table 32. Summary of UKEEP Streams Action Plan targets addressed by UKEEP projects from FY15 to FY20.

Subobjective	Target Set by UKEEP Program	Targets Achieved by UKEEP Program
1a: Identify and conserve important habitat for Species of Interest	Increase in availability of important habitat for Species of Interest protected against human impacts.	<ul style="list-style-type: none"> • Creation of WHAs for Bull Trout in the Upper Kootenay River / Conservation of Trout Habitat in the East Kootenay Region (proposed Wildlife Habitat Areas would provide protection for ~160 km of stream habitat)
1b: Characterize and monitor the status of Species of Interest	The establishment or improvement of baseline knowledge of the status of Species of Interest.	<ul style="list-style-type: none"> • Upper Kootenay Stream Crossing Remediation (connectivity restored to upper reaches of Caven Creek (minimum of 90 km) with bridge replacement) • Westslope Cutthroat Trout Hybridization Evaluation (determining current hybridization levels from interbreeding between introduced RT and native WCT) • Koocanusa Kokanee Enumeration (spawning abundance assessed) • Wildhorse River Bull Trout Population Inventory and Recovery (enumeration fence to monitor annual trends)
2a: Restore and enhance important habitat for Species of Interest	Increased area of restored/enhanced habitat that improves stream productivity.	<ul style="list-style-type: none"> • Upper Kootenay Stream Crossing Remediation (connectivity restored to upper reaches of Caven Creek (minimum of 90 km) with bridge replacement) • Alexander Creek Streamside Restoration & Community Education (~50 m long creek bank stabilized with bioengineering with native riparian vegetation) • Rehabilitating Joseph Creek: a Community Initiative (review of baseline conditions and data gaps identified to support stream restoration strategy)
2b: Support SOI population recovery/maintenance	Improvement in abundance and distribution of Species of Interest.	<ul style="list-style-type: none"> • Upper Kootenay Stream Crossing Remediation (connectivity restored to upper reaches of Caven Creek (minimum of 90 km) with bridge replacement)
2c: Control of established invasive species	Decrease in abundance and distribution of invasive species due to control efforts.	<ul style="list-style-type: none"> • Upper Kootenay Stream Crossing Remediation (decision on lower culvert crossing replacement on Wickman Creek dictated by results of genetic hybridization study)
3b: Support public education and awareness regarding threats and challenges to ecosystems, which will motivate ecologically informed decisions and actions	Reduced incidence of negative impacts caused by humans due to ecologically informed decisions and actions as a result of increased awareness of the public threats and challenges to stream ecosystems.	<ul style="list-style-type: none"> • Wildhorse River Bull Trout Population Inventory and Recovery (education and outreach to local recreational users regarding negative impacts of their instream works, signs posted)

3.2.3 Wetland and Riparian Areas Action Plan

From FY15 to FY20, five wildlife projects totaling \$226,192 of approved funds, primarily aligned with the Wetland (and Riparian Areas) Action Plan (Table 33). Four of the projects were large grants (>\$20,000) and one was a seed grant (\$5,000). In addition to these primarily aligned projects, three other projects aligned with the Wetland Action Plan; however, these were primarily aligned with other ecosystem-based action plans (Upland [n=2] and Species of Interest Action Plan [n=1]). One project (**Earl Ranch Wetland Restoration Project**) was still in progress at the time of the review and had remaining funds to be spent after 31 October 2019.

Table 33. Projects and funding for UKEEP Wetland (and Riparian Areas) Action Plan from FY15 to FY20.

Project Delivery	UKEEP Funds in Direct Alignment with Wetland & Riparian Areas Projects		
	# of Projects	UKEEP \$	Total Project \$
Fish	0	\$0	\$0
Wildlife	5	\$226,192	\$336,309
Total	5	\$226,192	\$336,309

Projects were led by consultants (n=2) or non-government organizations (n=3); including both single year (n=2) or multi-year (n=3) studies. Two projects involved collaborative efforts between consultants, NGOs, the Province and First Nations. Three projects involved community engagement in the form of: Ktunaxa First Nation community support and engagement, community volunteers (~75 volunteers), and one public event.

Three projects addressed Objective 1 (*conserve productivity and diversity of ecosystems in the plan area*) and two projects addressed Objective 2 (*restore and enhance habitats and populations of Species of Interest*). Projects primarily addressed subobjectives related to habitat restoration, invasive species, and monitoring of species (Table 34).

Table 34. UKEEP subobjectives addressed by wetland projects from FY15 to FY20. Projects often addressed more than one subobjective = total column adds up to greater than 5 projects.

UKEEP Subobjective	# of Projects
1a. Identify and conserve important habitat for Species of Interest	3
1b. Characterize and monitor the status of Species of Interest	1
1c. Support efforts to prevent introduction of invasive species	1
2a. Restore and enhance important habitat for Species of Interest	2
2b. Support SOI population recovery/maintenance	1
2c. Control of established invasive species	1
3a. Contribute data to help inform decision making on sustainable use targets for resources	
3b. Support public education and awareness regarding threats and challenges to ecosystems, which will motivate ecologically-informed decisions and actions	1

3.2.3.1 Action Alignment

There are 22 priority actions under the Wetland Action Plan, nine of which were addressed by projects (Table 35; see Appendix 1 for complete list of actions). Four actions were identified as the primary action (all Priority 1); five actions had secondary alignment, and 13 actions were not addressed by any projects.

Table 35. Wetland actions addressed by UKEEP projects from FY15 to FY20. Numbers in table represent the number of projects aligned with the action (certain projects address multiple actions). Coloured squares indicate priority rating for actions: #1 (dark green), #2 (light green), #3 (light blue), and primary action alignment (pink).

#	Action Category	Wetland and Riparian Areas Actions	Rank	# of Projects	Directed or Open
2	Research & Information Acquisition	Conduct/compile a biophysical inventory of the wetland and riparian areas and identify data gaps. This work is currently being completed in the Elk Valley focal Area but is required for the rest of the Plan area. This action can be completed concurrently with Action #1 & 3.	1	2	Directed
3	Research & Information Acquisition	Assess habitat to identify condition and prioritize focal wetland and riparian conservation/restoration/enhancement opportunities. This work is currently being completed in the Elk Valley focal Area but is required for the rest of the Plan area. This action can be completed concurrently with Action #1 & 2.	1	2	Directed
7	Habitat-based	Explore opportunities to work with managing partners to maintain the productivity of managed wetlands (e.g., Bummers Flats).	1	2	Open
11	Habitat-based	Restore riparian grass sites to native species composition to improve function.	1	1	Open
12	Habitat-based	Support work that seeks to resolve access and recreation management issues that affect conservation/restoration/enhancement objectives (e.g., increase signage and education, 'Access Guardian' program).	1	2	Open
14	Habitat-based	Improve cross-valley habitat linkages for wide-ranging carnivores (e.g., grizzly bears), ungulates, amphibians, and reptiles.	1	1	Open
18	Species-based	Support the development of invasive species monitoring and rapid response plans. Identify areas where invasive species are likely to establish or have already established.	1	4	Open
19	Species-based	Conduct baseline waterfowl, migratory shorebird, and other Species of Interest surveys. Integrate with historic information.	1	1	Open
25	Monitoring & Evaluation	Collect baseline data and/or monitor wetland and riparian habitats to evaluate climate change impacts.	3	1	Open

3.2.3.2 Action Category

Wetland projects were primarily Research and Information Acquisition, Habitat-based and Species-based; however, when secondarily aligned projects were included, wetland projects also addressed one action in the Monitoring and Evaluation category (Table 36; Figure 19). Priority 1 rated actions were most common. No Land Securement actions were addressed during the five-year program.

Table 36. Action alignment (primary or otherwise) by action category and priority action score for UKEEP wetland projects from FY15 to FY20. Coloured squares indicate priority rating for actions: #1 (dark green), #2 (light green), and #3 (light blue).

Action Category	Priority Action Score			Total
	1	2	3	
Research and Information Acquisition	4	0	0	4
Habitat-based Actions	6	0	0	6
Species-based Actions	5	0	0	5
Land Securement	0	0	0	0
Monitoring and Evaluation	0	0	1	1
Total	15	0	1	16

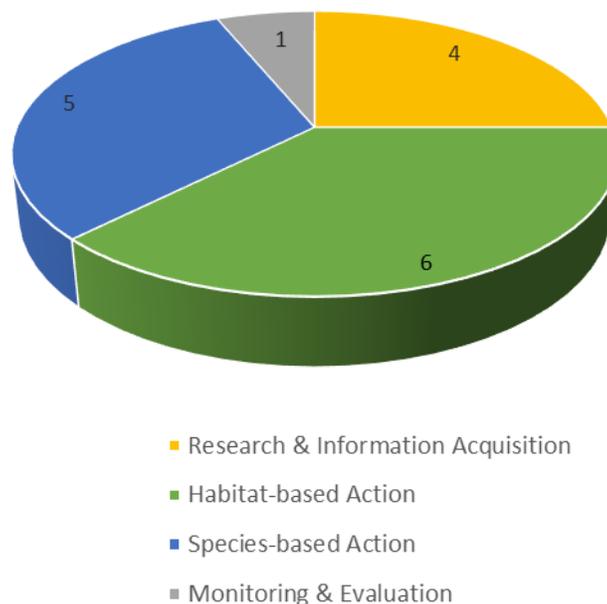


Figure 19. Action categories for UKEEP wetland projects from FY15 to FY20.

Wetland projects are summarized by specific action categories below, including the presentation of primary action alignment, types of projects, and key metrics produced from FY15 to FY20.

3.2.3.2.1 Research and Information Acquisition Actions

Four of the 22 priority actions in the Wetland Action Plan are Research and Information Acquisition; two of which were addressed. The two-year **Upper Kootenay (Small) Wetlands-at-Risk Restoration Project** addressed both actions, with Action #3 the primary action for assessing/prioritizing wetland habitat for future restoration opportunities (Table 37).

Table 37. Research and Information Acquisition actions addressed by UKEEP wetland projects from FY15 to FY20. Coloured squares indicate priority rating for actions: #1 (dark green), #2 (light green), #3 (blue), and primary action alignment (pink).

#	Action Category	Wetland and Riparian Areas Actions	Rank	Projects
2	Research & Information Acquisition	Conduct/compile a biophysical inventory of the wetland and riparian areas and identify data gaps. This work is currently being completed in the Elk Valley Focal Area but is required for the rest of the Plan area. This action can be completed concurrently with Action #1 & 3.	1	<ul style="list-style-type: none"> Upper Kootenay (Small) Wetlands at Risk Restoration Project (FY17-FY18)
3	Research & Information Acquisition	Assess habitat to identify condition and prioritize Focal wetland and riparian conservation/ restoration/ enhancement opportunities. This work is currently being completed in the Elk Valley Focal Area but is required for the rest of the Plan area. This action can be completed concurrently with Action #1 & 2.	1	<ul style="list-style-type: none"> Upper Kootenay (Small) Wetlands at Risk Restoration Project (FY17-FY18)

Research and Information Acquisition actions were inventory/analysis based (n=2), assessment (n=2), and integrated planning (n=2) (Figure 20). Research findings from the **Upper Kootenay (Small) Wetlands-at-Risk Restoration Project** included a rapid assessment tool for wetlands/riparian areas, inventory of 33 wetlands in the Upper Kootenay area and recommendations for future habitat-based follow-up (Table 38).

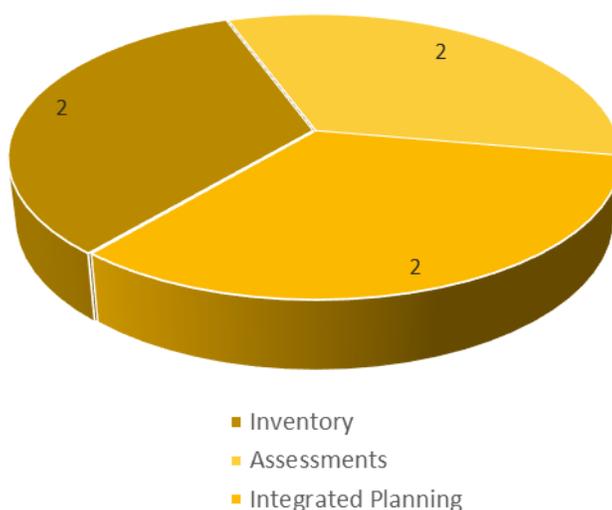


Figure 20. Type of Research and Information Acquisition projects for Wetland Action Plan from FY15 to FY20.

Table 38. Key metrics for Research and Information Acquisition UKEEP wetland projects from FY15 to FY20.

Result Type	Key Projects and Metrics
New information that advances knowledge of species, ecosystem, or area	<ul style="list-style-type: none"> • Upper Kootenay (Small) Wetlands at Risk Restoration Project <ul style="list-style-type: none"> ○ Inventory: rapid wetland assessment tool (33 wetlands assessed) ○ Future planning for restoration of wetlands in Upper Kootenay Region

3.2.3.2.2 Habitat-based Actions

Nine of the 22 priority actions in the Wetland Action Plan are Habitat-based (see Appendix 1 for complete list of actions); four of which were addressed. **Earl Ranch Wetland Restoration Project** included the restoration of riparian grass sites and aligned with Action #11. The project **Koocanusa Habitat Restoration**, which involved work relating to access management, primarily aligned with Action #12 (Table 39) and secondarily aligned with Action #7 and 14. **Elk Valley Wilson Lake Wetlands Enhancement** aligned with the habitat-based category for wetland restoration.

Table 39. Habitat-based actions addressed by UKEEP wetland projects from FY15 to FY20. Coloured squares indicate priority rating for actions: #1 (dark green), #2 (light green), #3 (light blue), and primary action alignment (pink).

#	Action Category	Wetland and Riparian Areas Actions	Rank	Projects
7	Habitat-based	Explore opportunities to work with managing partners to maintain the productivity of managed wetlands (e.g., Bummers Flats).	1	<ul style="list-style-type: none"> Upper Kootenay Wetlands at Risk Restoration Project (FY17-FY18)
11	Habitat-based	Restore riparian grass sites to native species composition to improve function.	1	<ul style="list-style-type: none"> Earl Ranch Wetland Restoration Project (FY19)
12	Habitat-based	Support work that seeks to resolve access and recreation management issues that affect conservation/restoration/enhancement objectives (e.g., increase signage and education, 'Access Guardian' program).	1	<ul style="list-style-type: none"> Upper Kootenay Wetlands at Risk Restoration Project (FY17-FY18) Koocanusa Habitat Restoration (FY19)
14	Habitat-based	Improve cross-valley habitat linkages for wide-ranging carnivores (e.g., grizzly bears), ungulates, amphibians, and reptiles.	1	<ul style="list-style-type: none"> Earl Ranch Wetland Restoration Project (FY19)

Habitat-based projects were all habitat restoration/enhancement (n=4; Figure 21) and involved on-the-ground habitat results such as riparian grass restoration (**Earl Ranch Wetland Restoration Project**), treatment for invasive species (~40 hectares treated; **Upper Kootenay-Management and Restoration of Invasive Plants in Protected Areas, Koocanusa Habitat Restoration**), planting of native plants (400 live stakes) and top soil/large woody debris additions for the **Elk Valley Wilson Lake Wetlands Enhancement** (Table 40).

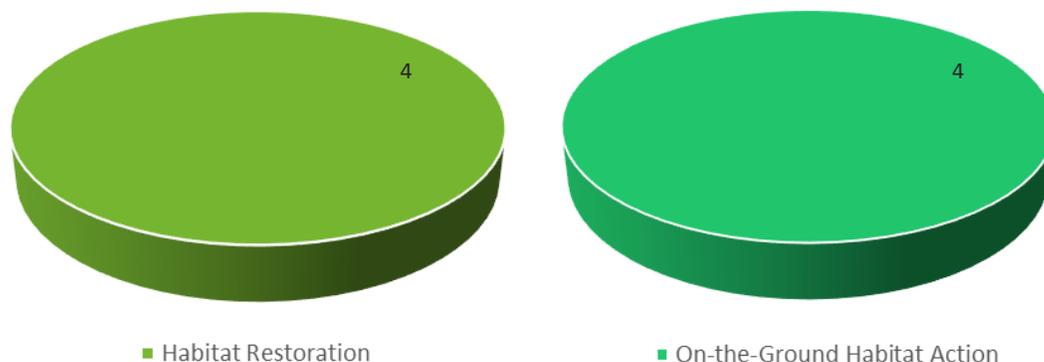


Figure 21. Type of Habitat-based action projects for UKEEP Wetland Action Plan from FY15 to FY20.

Table 40. Overall Habitat-based action metrics for projects associated with UKEEP Wetland Action Plan from FY15 to FY20.

On-the-ground Action	Project Name	Metric
Habitat Enhancements	Koocanusa Habitat Restoration: Cumulative Recreation Impacts (FY19)	Native plants, access management signs
Habitat Enhancements	Elk Valley Wilson Lake Wetlands Enhancement (FY19)	400 live stakes planted over 1.31 ha, native plants, re-distribution of topsoil, coarse woody debris additions
Invasive Plant Removal	Upper Kootenay-Management and Restoration of Invasive Plants in Protected Areas (FY16, FY19, FY20)	~37 ha, 116 sites
Wetland Restoration	Earl Ranch Wetland Restoration Project (FY19)	17 ha of riparian grass restoration, native plants

3.2.3.2.3 Species-based Actions

There are two Species-based actions identified in the Wetland Action Plan, both of which were addressed (Table 41).

Table 41. Species-based actions addressed by UKEEP wetland projects from FY15 to FY20. Coloured squares indicate priority rating for actions: #1 (dark green), #2 (light green), #3 (light blue), and primary action alignment (pink).

#	Action Category	Wetland and Riparian Areas Actions	Rank	Projects
18	Species-based	Support the development of invasive species monitoring and rapid response plans. Identify areas where invasive species are likely to establish or have already established.	1	<ul style="list-style-type: none"> Invasive Plant Management & Restoration of Protected Areas (FY16, FY19, FY20)
19	Species-based	Conduct baseline waterfowl, migratory shorebird, and other Species of Interest surveys. Integrate with historic information.	1	<ul style="list-style-type: none"> Monitoring a Reintroduced Population of Northern Leopard Frogs (FY19)

The **Upper Kootenay Invasive Plant Management & Restoration of Protected Areas** projects were primarily aligned with Action #18, however, as these projects involved the removal of invasive plants, the metrics were included in the Habitat-based category.

The **Monitoring a Reintroduced Population of Northern Leopard Frogs** project aligned with Action #19, as there was no action to evaluate or monitor the results of species-based actions (e.g., translocations). This project monitored a re-introduced population of Northern Leopard Frogs in Bummer’s Flats (north of Cranbrook, BC) and contributed to the establishment or improvement of baseline knowledge on the status of Species of Interest, the increased understanding of Species of Interest and their habitat, as well as options to conserve, restore and enhance species and their habitats.

3.2.3.2.4 Land Securement Actions

There were no projects associated with the single UKEEP Wetland Land Securement Action from FY15 to FY20.

3.2.3.2.5 Monitoring and Evaluation Actions

There are two priority actions in the Monitoring and Evaluation category in the Wetland Action Plan, one of which was secondarily addressed by the **Upper Kootenay Wetlands at Risk Restoration Project** (Table 42). This project involved wetland inventory/assessments including the development of a rapid assessment tool that could be used to monitor changes to wetlands and riparian areas in relation to climate change.

Table 42. Monitoring and Evaluation addressed by UKEEP wetland projects from FY15 to FY20. Coloured squares indicate priority rating for actions: #1 (dark green), #2 (light green), #3 (light blue), and primary action alignment (pink).

#	Action Category	Wetland and Riparian Areas Actions	Rank	Project
25	Monitoring & Evaluation	Collect baseline data and/or monitor wetland and riparian habitats to evaluate climate change impacts.	3	<ul style="list-style-type: none"> Upper Kootenay Wetlands at Risk Restoration Project (FY17-FY18)

3.2.3.3 Multi-year Projects and Funding Succession

Only one wetland project was multi-year (seed grant followed by a large grant; Table 43). In addition, the **Earl Ranch Wetland Restoration*** project was multi-year (previous years funded by the FWCP Columbia Region); although this project was still in progress during the program review period and has continued into FY20.

Table 43. Summary of multi-year UKEEP projects primarily aligned with Wetland Action Plan from FY15 to FY20. * denotes previous years of funding from FWCP Columbia Region.

Project Name	Fiscal Year (FY)					
	15	16	17	18	19	20
Upper Kootenay Wetlands at Risk Restoration Project			X	X		
Earl Ranch Wetland Restoration Project			*	*	X	X

3.2.3.4 Species of Interest

In total, two of the four projects that primarily aligned with the Wetland Action Plan targeted species in the UKEEP Species of Interest Action plan. The two-year **Upper Kootenay Wetlands at Risk Restoration Project** inventoried five focal and inventory amphibian species during wetland assessments and the **Monitoring a Reintroduced Population of Northern Leopard Frogs** project targeted a recovery wildlife Species of Interest.

3.2.3.5 UKEEP Targets

Targets for the Wetland Action Plan were developed for UKEEP objectives and subobjectives. Projects from FY15 to FY20 covered seven of the eight sub-objectives including restoring habitat, invasive species removal, Species of Interest monitoring in wetland habitats, and helping to resolve access management issues (Table 44; Appendix 2).

Table 44. Wetland Action Plan subobjectives and targets reached for UKEEP projects from FY15 to FY20.

Subobjective	Target Set by UKEEP Program	Targets Achieved by UKEEP Program
1a. Identify and conserve important habitat for Species of Interest	Increase in availability of important habitat for Species of Interest protected against human impacts.	<ul style="list-style-type: none"> • 33 wetlands assessed for human-impact using rapid assessment tool (integrated planning)
1b. Characterize and monitor the status of Species of Interest	The establishment or improvement of baseline knowledge of the status of Species of Interest.	<ul style="list-style-type: none"> • Monitoring of re-introduced Northern Leopard Frogs in Bummers Flats
1c. Support efforts to prevent introduction of invasive species	No new established invasive species.	<ul style="list-style-type: none"> • ~37 ha invasive plant removal from 116 sites (Invasive Plant Management & Restoration of Protected Areas)
2a. Restore and enhance important habitat for Species of Interest	Increased area of restored/enhanced habitat that improves productivity.	<ul style="list-style-type: none"> • Native plants (Kooconusa habitat restoration) • 17 ha of floodplain/riparian grass restoration (Earl Ranch Wetland Restoration Project) • Native plants/live stakes, topsoil, coarse-woody debris additions (Elk Valley Wilson Lake Wetlands Enhancement)
2b. Support SOI population recovery/maintenance	Improvement in abundance and distribution of Species of Interest populations due to recovery efforts.	<ul style="list-style-type: none"> • Monitoring of re-introduced Northern Leopard Frogs in Bummers Flats
2c. Control of established invasive species	Decrease in abundance and distribution of invasive species due to control efforts.	<ul style="list-style-type: none"> • ~37 ha invasive plant removal from 116 sites (Invasive Plant Management & Restoration of Protected Areas)
3a. Contribute data to help inform decision making on sustainable use targets for resources	Resource use does not affect the sustainability of Species of Interest populations.	N/A
3b. Support public education and awareness regarding threats and challenges to ecosystems, which will motivate ecologically informed decisions and actions	Reduced incidence of negative impacts caused by humans due to ecologically informed decisions and actions as a result of increased awareness of the public of threats and challenges to ecosystems.	<ul style="list-style-type: none"> • Access management: 93 trailheads, 66 km of trails decommissioned, posted signs (Kooconusa Habitat Restoration)

3.2.4 Upland and Dryland Areas Action Plan

From FY15 to FY20, 30 wildlife projects primarily aligned with the Upland (and Dryland Areas) Action Plan, which totalled approximately \$1,170,754 of approved funds (Table 45). All wildlife projects were large grants (>\$20,000). No fisheries projects aligned with the Upland Action Plan under UKEEP. In addition to these projects, one other project, which primarily aligned with the Species of Interest Action Plan, aligned with Upland Action Plan.

Table 45. Projects and funding for UKEEP Upland (and Dryland Areas) Action Plan from FY15 to FY20.

Project Delivery	UKEEP Funds in Direct Alignment with Upland Projects		
	# of Projects	UKEEP \$	Total Project \$
Fish	0	\$0	\$0
Wildlife	30	\$1,170,754	\$3,251,654
Total	30	\$1,170,754	\$3,251,654

Projects were led by non-government organizations (n=14), the Province (n=10), consultants (n=5) or First Nations (n=1); including both single year (n=7) or multi-year (n=23) studies. Twenty-two projects involved collaborative efforts between consultants, NGOs, the Province, First Nations, and community members. Twenty-one projects involved community engagement in the form of: Ktunaxa First Nation community support and engagement (n=5, including presentation to the Ktunaxa General Assembly), community volunteers (n=8, ~150 volunteers), hunting and fishing community engagement (n=4), and 11 public events (including open houses and site visits). Communication with communities also included media releases (n=9), information such as brochures/newsletters (n=3), workshops or courses (n=3) and signage (n=3).

Most projects, 87%, addressed UKEEP Objective 2: *Restore and enhance habitats and populations of Species of Interest*. Nearly 40% of projects addressed Objective 1: *Conserve productivity and diversity of ecosystems in the Plan Area* and 23% of projects addressed Objective 3: *Contribute to the maintenance or improvement of opportunities for sustainable use, including harvesting*. Projects primarily addressed subobjectives relating to monitoring of Species of Interest, restoration/enhancement of habitat, and control of invasive species (Table 46).

Table 46. UKEEP subobjectives addressed by projects under the Upland Action Plan from FY15 to FY20. Projects often addressed more than one subobjective = total column adds up to greater than 24 projects.

UKEEP Subobjective	# of Projects
1a. Identify and conserve important habitat for Species of Interest	1
1b. Characterize and monitor the status of Species of Interest	18
1c. Support efforts to prevent introduction of invasive species	3
2a. Restore and enhance important habitat for Species of Interest	15
2b. Support SOI population recovery/maintenance	8
2c. Control of established invasive species	10
3a. Contribute data to help inform decision making on sustainable use targets for resources	8
3b. Support public education and awareness regarding threats and challenges to ecosystems, which will motivate ecologically-informed decisions and actions	2

3.2.4.1 Action Alignment

There are 19 priority actions within the UKEEP Upland Action Plan, 10 of which had project alignment (Table 47; see Appendix 1 for complete list of actions). Seven actions were listed as the primary action (all Priority 1); another three actions had secondary alignment, and nine actions were not addressed by any project. Habitat-based Action #2, which supported restoration efforts, was the most frequently addressed action, followed by Action #12, which related to the inventory of ungulates, and Action #14 which addressed invasive species control.

Table 47. Upland actions addressed by UKEEP projects from FY15 to FY20. Numbers in table represent the number of projects aligned with the action (certain projects address multiple actions). Coloured squares indicate priority rating for actions: #1 (dark green), #2 (light green), #3 (light blue), and primary action alignment (pink).

#	Action Category	Upland and Dryland Area Actions	Rank	# of Projects	Directed or Open
2	Habitat-based	Support ecosystem restoration (ER) in the Plan area. Contribute to re-evaluation and refinement of criteria developed to prioritize suitable ER areas and to determine effectiveness in increasing desirable plant species.	1	12	Open
3	Habitat-based	Support work towards conservation and improvement of important connectivity habitat (i.e., corridors, including high elevation) for wide-ranging animals (e.g., carnivores and ungulates).	1	5	Open
4	Habitat-based	Support recruitment and management of cavity nests and wildlife trees (i.e., identifying and mapping cavity nests and wildlife trees, developing guidelines, maintaining existing cavity nests and wildlife trees, creating artificial cavities, snags, and additional wildlife trees).	1	1	Open
5	Habitat-based	Support work that seeks to resolve access and recreation management issues that affect conservation/restoration/enhancement objectives (e.g., increase signage and education, 'Access Guardian' program).	1	1	Open
8	Habitat-based	Support Whitebark Pine restoration efforts.	1	1	Open
12	Species-based	Support ongoing winter ungulate inventories (both aerial and ground) in order to estimate trends in population size, age, and sex ratios, as well as level of use in target areas. Integrate with historic information. Additionally, telemetry studies will provide information on movement routes, timing of movement and sources of mortality.	1	11	Directed
13	Species-based	Support the development of invasive species monitoring and rapid response plans. Identify areas where invasive species are likely to establish or have already established.	1	2	Open
14	Species-based	Support the control of invasive plant species (i.e., remove or reduce) prior to habitat restoration treatments.	1	10	Open
16	Monitoring & Evaluation	Monitor and assess ER work in restoring open range and open forest ecosystems, including ungulate winter range. Determine habitat response and influence on ungulate populations.	1	4	Open
18	Monitoring & Evaluation	Evaluate results of habitat-based actions. Ensure invasive plant species distribution and abundance does not increase.	2	2	Directed

3.2.4.2 Action Alignment within Action Categories

Upland projects addressed actions in three action categories (Table 48; Figure 22). Of the 30 projects, 50% were primarily aligned with the Species-based category (n=15 projects), 46% with Habitat-based (n=14 projects), and 4% with the Monitoring and Evaluation category (n=1 project). Priority 1 rated actions were the most common. There were no Research and Information Acquisition, Land Securement, or Priority 3 rated actions addressed during the program review period. Action alignment occurred most frequently with Species-based actions (n=23), followed by Habitat-based actions (n=20).

Table 48. Action alignment (primary or otherwise) by action category and priority action score for UKEEP upland projects from FY15 to FY20. Coloured squares indicate priority rating for actions: #1 (dark green), #2 (light green), #3 (blue).

Action Category	Priority Action Score			Total
	1	2	3	
Research & Information Acquisition	0	0	0	0
Habitat-based Actions	20	0	0	20
Species-based Actions	23	0	0	23
Land Securement	0	0	0	0
Monitoring & Evaluation	4	2	0	6
Total	47	2	0	43

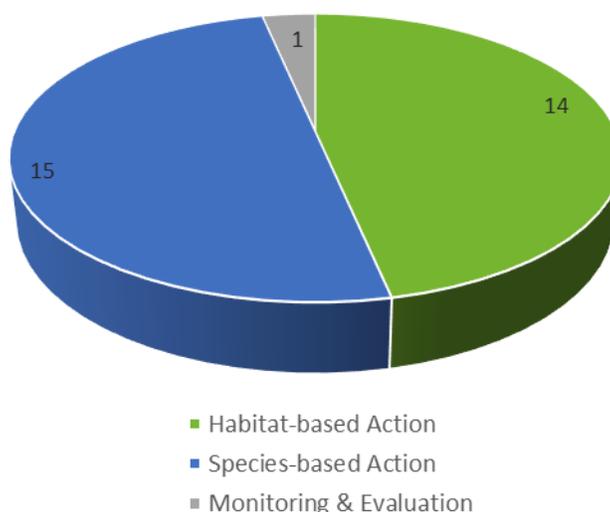


Figure 22. Action categories for UKEEP upland projects from FY15 to FY20.

Upland projects are summarized by specific action categories below, including the presentation of primary action alignment, types of projects, and key metrics produced from FY15 to FY20.

3.2.4.2.1 Research and Information Acquisition Actions

There were no projects associated with the single UKEEP Upland Research and Information Acquisition Action from FY15 to FY20. One multi-year project (**Kootenay Mule Deer Monitoring**) aligned with Research and Information Acquisition category, as it was an inventory-based project; however, there was no specific action alignment within the Upland Action Plan and was instead linked to a Species-based action for ungulate inventory.

3.2.4.2.2 Habitat-based Actions

Five of the 10 priority Habitat-based actions in the Upland Action Plan were addressed by projects, with primary alignment occurring 19 times (Table 49). Five actions were not addressed (#6, 7, 9, 10, 11; see Appendix 1 for complete list of Upland Actions). Action #2 for ecosystem restoration (n=12) and Action #3 for improving connectivity (n=5) were the most frequent actions addressed. There was action overlap for invasive plant control projects between Habitat-based Action #3 and Species-based Action #13 and 14

(projects that primarily aligned with Species-based action are reported below in the Species-based Action Category section).

Table 49. Habitat-based actions addressed by UKEEP upland projects from FY15 to FY20. Coloured squares indicate priority rating for actions: #1 (dark green), #2 (light green), #3 (light blue), and primary action alignment (pink). ER=ecosystem restoration, HE=habitat enhancement.

#	Action Category	Upland and Dryland Area Actions	Rank	Projects
2	Habitat-based	Support ecosystem restoration (ER) in the Plan area. Contribute to re-evaluation and refinement of criteria developed to prioritize suitable ER areas and to determine effectiveness in increasing desirable plant species.	1	<ul style="list-style-type: none"> • Invasive Plant Management & Restoration • Tobacco Plains ER • Strauss Road ER • Sheep Mountain-Cutts Road ER • Wycliffe Corridor ER • Ta Ta Creek Badger Habitat Enhancement • Koocanusa Habitat Restoration
3	Habitat-based	Support work towards conservation and improvement of important connectivity habitat (i.e., corridors, including high elevation) for wide-ranging animals (e.g., carnivores and ungulates).	1	<ul style="list-style-type: none"> • Kootenay Mule Deer Monitoring • Kootenay Remote Camera Wildlife Monitoring
4	Habitat-based	Support recruitment and management of cavity nests and wildlife trees (i.e., identifying and mapping cavity nests and wildlife trees, developing guidelines, maintaining existing cavity nests and wildlife trees, creating artificial cavities, snags, and additional wildlife trees).	1	<ul style="list-style-type: none"> • Tobacco Plains Ecological Restoration
5	Habitat-based	Support work that seeks to resolve access and recreation management issues that affect conservation/restoration/enhancement objectives (e.g., increase signage and education, 'Access Guardian' program).	1	<ul style="list-style-type: none"> • Koocanusa Habitat Restoration: Cumulative Recreation Impacts
8	Habitat-based	Support Whitebark Pine restoration efforts.	1	<ul style="list-style-type: none"> • Whitebark Pine Restoration in the Kootenay Region

Habitat-based projects typically involved habitat restoration (n=16, includes three invasive species removal Species-based projects) or habitat connectivity (n=4) efforts, including invasive plant control, thinning and slash/pile burning, planting of native species, wildlife enhancements, or resolving access management issues (Figure 23). Most projects addressed Priority Action #2: *Support ecosystem restoration (ER) in the Plan area. Contribute to re-evaluation and refinement of criteria developed to prioritize suitable ER areas and to determine effectiveness in increasing desirable plant species.* These projects varied from small slash/burn treatments at specific sites to larger, multi-year ecosystem restoration efforts involving planning, on-the-ground habitat treatments, and post-treatment monitoring (see the Monitoring and Evaluation section below), as well as contributing to connectivity and access management issues.

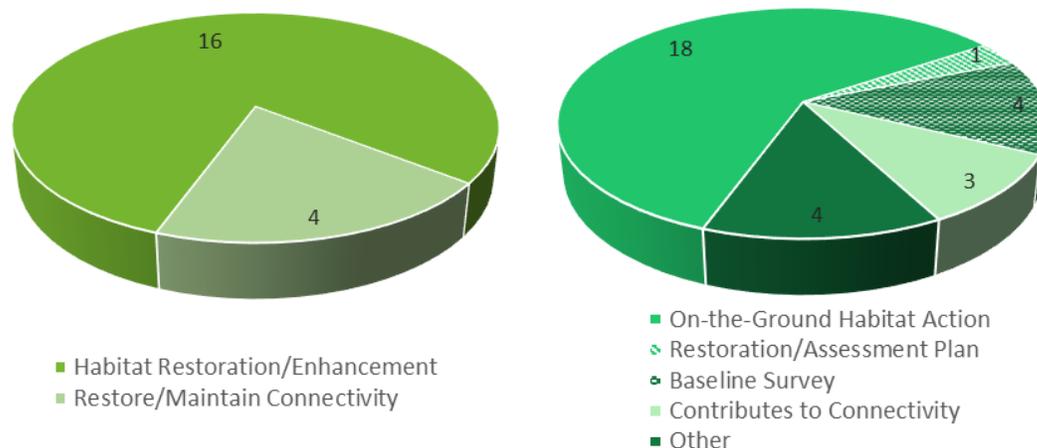


Figure 23. Type of Habitat-based action projects for UKEEP Upland Action Plan from FY15 to FY20.

Habitat-based activities made up 67% of the total upland projects across the action categories and resulted in many successful on-the-ground outcomes in the Upper Kootenay River/East Kootenay area. Key habitat-based metrics included ~1,100 hectares of habitat restored (including removal of invasive plants), various wildlife habitat enhancements (e.g., badger habitat), ecosystem restoration plans, and other on-the-ground habitat outcomes (Table 50). There was some overlap for invasive plant control projects between Habitat-based and Species-based actions; however, metrics for invasive species are reported here. Three additional invasive species projects were funded in FY20, but metrics were not available at the time of the program review.

Table 50. Overall Habitat-based action/activity metrics for projects associated with Upland Action Plan from FY15 to FY20.

Habitat Action Category	Action Example	Project Name	Metric
Habitat Restoration	Goat grazing	<ul style="list-style-type: none"> Tobacco Plains Ecological Restoration 	13 ha
Habitat Restoration	Slash/pile burn treatments	<ul style="list-style-type: none"> Tobacco Plains Ecological Restoration Sheep Pasture Grassland Ecosystem Restoration Wycliffe Corridor Grasslands Ecosystem Restoration 	~225 ha
Habitat Restoration	Forest thinning	<ul style="list-style-type: none"> Tobacco Plains Ecological Restoration Strauss Road Grassland Ecosystem Restoration Sheep Mtn-Cutts Road Grassland Ecosystem Restoration Ta Ta Creek Badger Habitat Enhancement 	~600 ha
Habitat Restoration	Native plants	<ul style="list-style-type: none"> Whitebark Pine Restoration in the Kootenay Region Koocanusa Habitat Restoration 	5,310 seedlings planted 66 km trails re-seeded
Invasives Removed	Invasive plant removal	<ul style="list-style-type: none"> Invasive Plant Management & Restoration Koocanusa Habitat Restoration <p>*Several projects also addressing Species-based Actions for invasive plant removal/control/monitoring</p>	~274 ha
Habitat Connectivity	Baseline surveys for future habitat action	<ul style="list-style-type: none"> Kootenay Mule Deer Survival Monitoring Waldo North Ecosystem Restoration Kootenay Remote Camera Wildlife Monitoring 	~80 collared deer Invasive plants 88 wildlife cameras

Habitat Action Category	Action Example	Project Name	Metric
Species-based Habitat Actions	Ecosystem restoration plans	<ul style="list-style-type: none"> Tobacco Plains Ecological Restoration (habitat restoration plan for Long-billed Curlew) Kootenay Mule Deer Survival Monitoring 	1 ER plan 1 ER assessment
Access Management	Trail deactivation, signs, access control	<ul style="list-style-type: none"> Koocanusa Habitat Restoration 	66 km trails, 93 trailheads, signage

Table 51 presents all upland projects with a habitat restoration component (e.g., on-the-ground habitat actions) and post-treatment monitoring from FY15 to FY20, specifically highlighting the number of hectares restored by study site (Note: some values unavailable for FY20 as these were ongoing projects at the time of review).

Table 51. UKEEP upland habitat restoration activities from FY15 to FY20. Codes for activities: HR=habitat restoration, ER=ecosystem restoration, INV=invasive plant removal, THIN=thinning to open forest standards, BASE=baseline survey, SLASH=slashing/mulching, PB=pile burning, GG=goat grazing for invasives, MON=monitoring. *Metrics not included for FY20.

Project	Size (ha)	FY16	FY17	FY18	FY19	FY20*
Ta Ta Creek Badger HR	408.0			THIN		
Waldo North ER	N/A			BASE		
Wycliffe Grasslands ER	52.7	SLASH/PB				
Tobacco Plains ER	89.1	INV/SLASH/ PB/MON	INV/MON	INV/THIN/GG/ MON	INV/PB/THIN/ GG/MON	INV*
Strauss Rd/Gold Creek HR	61.8		THIN			
Sheep Mountain Grassland ER	261.0	THIN/SLASH/ PB	SLASH/PB/ MON			
Bighorn Sheep Invasives Bull River/Wigwam Flats	328.0			INV/NP	INV/NP/MON	INV*
East Kootenay Invasive Plant Restoration	275.0		INV		INV/MON	INV*
Koocanusa HR	66 km				NP	
Kootenay Mule Deer Project	N/A				BASE	
Whitebark Pine Restoration	12.6				NP	

3.2.4.2.3 Species-based Actions

All three of the priority Species-based actions in the Upland Action Plan were addressed by projects, with primary alignment occurring 21 times (Table 52). Action #12 for ungulate inventory and Action #14 for invasive plant control were the most frequently addressed actions.

Table 52. Species-based actions addressed by UKEEP upland projects from FY15 to FY20. Coloured squares indicate priority rating for actions: #1 (dark green), #2 (light green), #3 (light blue), and primary action alignment (pink). ER=ecosystem restoration, HE=habitat enhancement.

#	Action Category	Upland and Dryland Area Actions	Rank	Projects
12	Species-based	Support ongoing winter ungulate inventories (both aerial and ground) in order to estimate trends in population size, age, and sex ratios, as well as level of use in target areas. Integrate with historic information. Additionally, telemetry studies will provide information on movement routes, timing of movement and sources of mortality.	1	<ul style="list-style-type: none"> • Kootenay Mule Deer Project • Kootenay Remote Camera Wildlife Monitoring • Elk Valley Elk Project • Invasive Plant Management on Bighorn Sheep Winter Ranges
13	Species-based	Support the development of invasive species monitoring and rapid response plans. Identify areas where invasive species are likely to establish or have already established.	1	<ul style="list-style-type: none"> • Invasive Plant Management on Bighorn Sheep Winter Ranges
14	Species-based	Support the control of invasive plant species (i.e., remove or reduce) prior to habitat restoration treatments.	1	<ul style="list-style-type: none"> • Invasive Plant Management on Bighorn Sheep Winter Ranges <p>*Other invasive plant projects included in Habitat-based section</p>

Upland ungulate projects aligned most closely with Species-based Action #12. Despite being a “directed” action, alignment was assigned in cases where no action was specified in the final report or only the Upland Action Plan was primarily aligned with a project. The following projects all conducted species-based ungulate inventory under the Upland Action Plan.

- **Kootenay Mule Deer Monitoring Project (FY15-FY16)**
- **Elk Valley Elk Project (FY16-FY20)**
- **Kootenay Remote Camera Wildlife Monitoring (FY18)**
- **Invasive Plant Management on Bighorn Sheep Winter Ranges (FY19-FY20)**

3.2.4.2.4 Land Securement Actions

There were no projects associated with the single UKEEP Upland Land Securement Action from FY15 to FY20.

3.2.4.2.5 Monitoring and Evaluation Actions

Two of the four priority Monitoring and Evaluation actions in the Upland Action Plan were addressed by UKEEP projects (Table 53). Primary alignment occurred once with Action #16 for monitoring of previous ecosystem restoration work (**Waldo North Ecosystem Restoration Maintenance & Assessment**).

Table 53. Monitoring and Evaluation upland actions addressed by UKEEP projects from FY15 to FY20. Coloured squares indicate priority rating for actions: #1 (dark green), #2 (light green), #3 (light blue), and primary action alignment (pink).

#	Action Category	Upland and Dryland Area Actions	Rank	Projects
16	Monitoring & Evaluation	Monitor and assess ER work in restoring open range and open forest ecosystems, including ungulate winter range. Determine habitat response and influence on ungulate populations.	1	<ul style="list-style-type: none"> • Waldo North Ecosystem Restoration Maintenance & Assessment (FY18) • Kootenay Mule Deer Survival Monitoring (FY16-FY19)
18	Monitoring & Evaluation	Evaluate results of habitat-based actions. Ensure invasive plant species distribution and abundance does not increase.	2	<ul style="list-style-type: none"> • Tobacco Plains Grassland and Open Forest Restoration (FY19)

Monitoring and Evaluation projects assessed or monitored the effectiveness of previously conducted habitat-based activities including post-treatment thinning/slashing and invasive plant treatments (Figure 24; Table 54). In addition, the **Kootenay Mule Deer Survival Monitoring** project was classified as trend monitoring of collared Mule Deer over a three-year period.

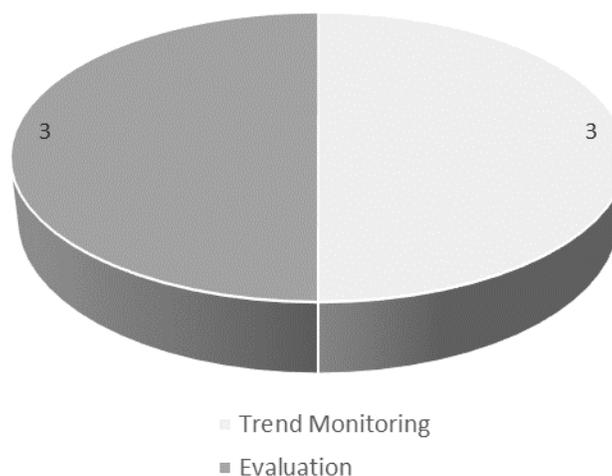


Figure 24. Types of Upland Monitoring and Evaluation activities for UKEEP projects completed from FY15 to FY20.

Table 54. Monitoring and Evaluation projects for Upland Action Plan from FY15 to FY20.

Result Type	Key Projects
Effectiveness Monitoring	<ul style="list-style-type: none"> Waldo North Ecosystem Restoration Maintenance & Assessment Tobacco Plains Grassland and Open Forest Restoration
Ungulate (Trend) Monitoring	<ul style="list-style-type: none"> Kootenay Mule Deer Survival Monitoring

3.2.4.3 Multi-year Projects and Funding Succession for Action Categories

Many upland projects were multi-year (70%; Table 55); typically, these projects addressed Habitat-based actions followed by a Monitoring and Evaluation action (or monitoring of previous year’s work within a Habitat-based project). One project, **Waldo North Ecosystem Restoration**, was a monitoring project of a previous FWCP Columbia Region project (FY15). Four additional upland projects occurred in FY20, all of which were multi-year projects.

Table 55. Summary of multi-year UKEEP projects primarily aligned with Upland Action Plan from FY15 to FY20. * denotes a project previously funded by FWCP Columbia Region in prior years.

Project Name	Fiscal Year (FY)					
	15	16	17	18	19	20
Waldo North Ecosystem Restoration Maintenance & Assessment*				X		
Kootenay Mule Deer (Survival) Monitoring	X	X	X	X	X	
Tobacco Plains Grassland and Open Forest Restoration		X	X	X	X	X
Elk Valley Elk Project				X	X	X
Invasive Plant Management & Restoration of Protected Areas*			X		X	X
Invasive Plant Management on Bighorn Sheep Winter Ranges				X	X	X
Kootenay Remote Camera Wildlife Monitoring				X	X	
Sheep Pasture/Sheep Mtn-Cutts Grassland Ecosystem Restoration		X	X			

3.2.4.4 Species of Interest

Sixteen upland projects targeted wildlife species listed in the Species of Interest Action Plan; 14 single species projects and three projects targeting multiple species. All of these projects identified with an upland priority action, as well as listed a Species of Interest whose primary habitat is upland and dryland (Figure 25). Two projects listed plant species as the target (Whitebark Pine, Spalding’s Campion), and two Species of Interest Action Plan aligned projects (**Kootenay Remote Camera Wildlife Monitoring, Wolverine Harvest Sustainability in the Kootenay Region**) listed ungulates/carnivores, and wolverine as the primary target species.

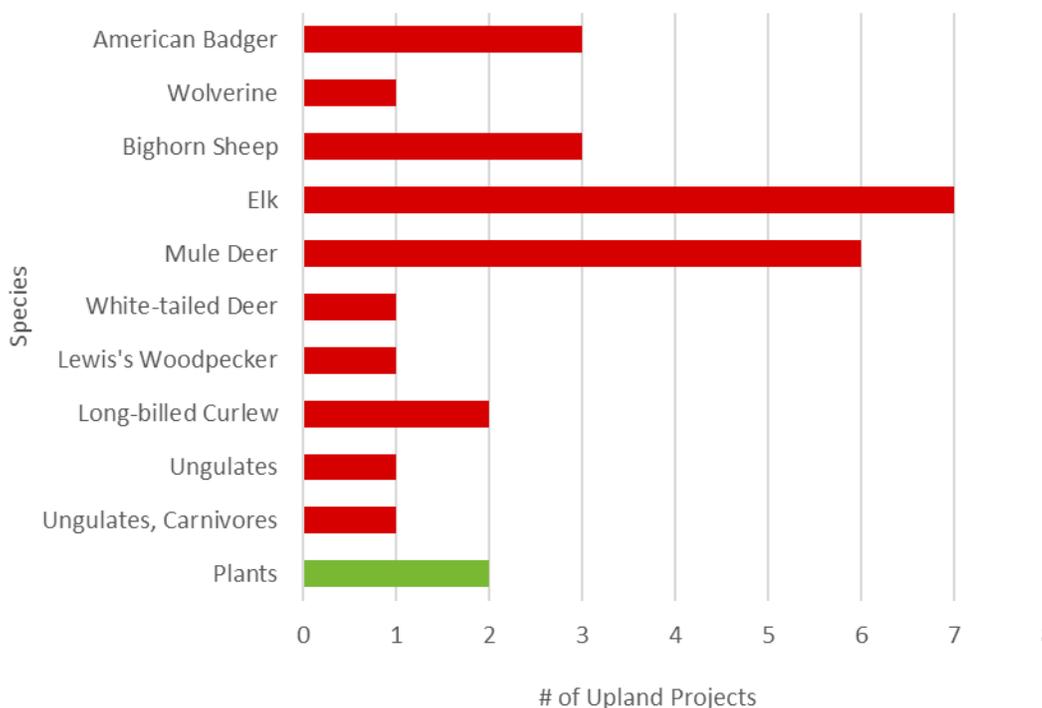


Figure 25. Number of UKEEP upland projects addressing a species associated with upland habitats from FY15 to FY20. Green = plant target species.

Projects with species primarily associated with upland and dryland habitats were largely recovery or focal species (Figure 26). Two of the six UKEEP recovery species were studied (American Badger, Lewis’ Woodpecker). Elk and Bighorn Sheep were both studied by multi-year projects (**Elk Valley Elk Project** and **Invasive Plant Management on Bighorn Sheep Winter Ranges**) and several other focal and inventory species (captured under ungulates/carnivores) were targeted by the **Kootenay Remote Camera Wildlife Monitoring** project including Grizzly Bear, Moose, Cougar, Grey Wolf, American Marten, American Black Bear, and Canada Lynx (see Species of Interest Action Plan results).

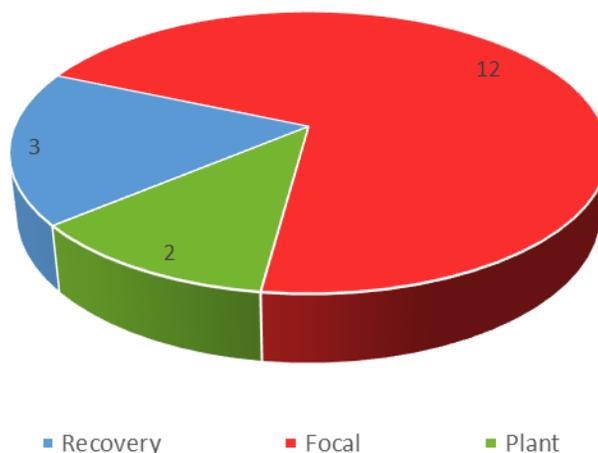


Figure 26. Species of Interest category for UKEEP upland projects from FY15 to FY20.

3.2.4.5 Targets

Targets for upland areas were developed for UKEEP objectives and subobjectives, and projects from FY15 to FY20 covered all eight sub-objectives including Species of Interest work, restoring habitat, invasive species removal, and helping to resolve access management issues (Table 56; Appendix 2). Most projects were associated with sub-objectives 1b and 2a (29% and 50%, respectively), both of which are related to Species of Interest including characterizing/monitoring populations and restoration of habitat for species.

Table 56. Upland Action Plan subobjectives and targets reached for UKEEP projects from FY15 to FY20.

Subobjective	Target Set by UKEEP Program	Targets Achieved by UKEEP Program
1a. Identify and conserve important habitat for Species of Interest	Increase in availability of important habitat for Species of Interest protected against human impacts.	<ul style="list-style-type: none"> • 1 ecosystem restoration assessment for Mule Deer connectivity habitat • 1 habitat restoration plan for Long-billed Curlew • 88 remote cameras for wildlife observations
1b. Characterize and monitor the status of Species of Interest	The establishment or improvement of baseline knowledge of the status of Species of Interest.	<ul style="list-style-type: none"> • Monitoring of Mule Deer survivorship • Wolverine Harvest Sustainability in the Kootenay Region • 88 remote cameras for wildlife observations • Elk survivorship and movements • Bighorn Sheep inventory

Subobjective	Target Set by UKEEP Program	Targets Achieved by UKEEP Program
1c. Support efforts to prevent introduction of invasive species	No new established invasive species.	<ul style="list-style-type: none"> • ~297 ha invasive plant removal • 66 km trails examined for invasive species
2a. Restore and enhance important habitat for Species of Interest	Increased area of restored/enhanced habitat that improves productivity.	<ul style="list-style-type: none"> • ~825 ha thinned to open forest standards (including slash/pile burning) • Native plants (5,310 Whitebark Pine seedlings, rye seeding)
2b. Support SOI population recovery/maintenance	Improvement in abundance and distribution of Species of Interest populations due to recovery efforts.	<ul style="list-style-type: none"> • Monitoring of Mule Deer survivorship • Elk survivorship and movements • Bighorn Sheep inventory and habitat
2c. Control of established invasive species	Decrease in abundance and distribution of invasive species due to control efforts.	<ul style="list-style-type: none"> • ~297 ha invasive plant removal • Waldo North Ecosystem Restoration Monitoring
3a. Contribute data to help inform decision making on sustainable use targets for resources	Resource use does not affect the sustainability of Species of Interest populations.	<ul style="list-style-type: none"> • Wolverine Harvest Sustainability in the Kootenay Region
3b. Support public education and awareness regarding threats and challenges to ecosystems, which will motivate ecologically informed decisions and actions	Reduced incidence of negative impacts caused by humans due to ecologically informed decisions and actions as a result of increased awareness of the public of threats and challenges to ecosystems.	<ul style="list-style-type: none"> • Access management: 93 trailheads, 66 km of trails decommissioned, posted signs (Kooconusa habitat restoration)

3.2.5 Species of Interest Action Plan

From FY15 to FY20, approximately \$200,491 of approved funds were invested in six projects that primarily aligned with the Species of Interest Action Plan (Table 57). In addition, 35 other projects secondarily aligned with the Species of Interest Action Plan; however, they were primarily aligned with other ecosystem-based action plans, including Upland (n=16), Streams (n=16), and Lakes (n=3) (Figure 27).

Table 57. UKEEP projects that aligned with the Species of Interest Action Plan from FY15 to FY20.

Project Delivery	UKEEP Funds in Direct Alignment with Species of Interest Projects		
	# of Projects	UKEEP \$	Total Project \$
Fish	0	\$0	\$0
Wildlife	6	\$200,491	\$622,764
Total	6	\$200,491	\$622,764

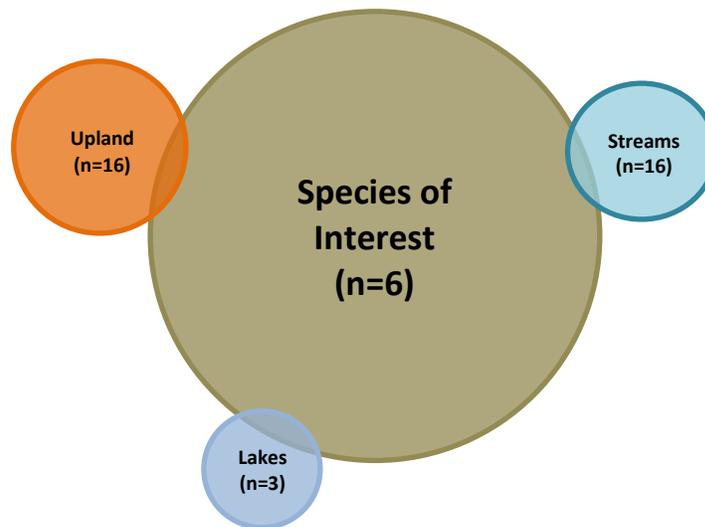


Figure 27. UKEEP projects with primary alignment with Species of Interest Action Plan (brown), and secondary alignment with Species of Interest Action Plan, but primary alignment with Upland Action Plan (orange), Streams Action Plan (turquoise), and Lakes Action Plan (blue) from FY15 to FY20.

Species of Interest-based projects (i.e., projects targeting species listed in the Species of Interest Action Plan) were all large grants (>\$20,000), led by consultants (n=4), the Province (n=1), or non-government organizations (n=1); and included both single year (n=4) or multi-year (n=2) studies. Three of the Species projects involved collaborative efforts between consultants, NGOs, the Province, and community members. Five projects involved community engagement in the form of: community volunteers (n=4, ~90 volunteers), hunting and fishing community engagement (n=1), one public event, and a web-based community wildlife documentation site (e.g., E-bird).

Most UKEEP Species of Interest projects, 90%, addressed Objective 1: *Conserve productivity and diversity of ecosystems in the Plan Area* and Objective 2: *Restore and enhance habitats and populations of Species of Interest*, and one project involving Wolverine harvest sustainability addressed Objective 3: *Contribute to the maintenance or improvement of opportunities for sustainable use, including harvesting*. Projects primarily addressed subobjectives relating to characterizing/monitoring and supporting population recovery of species (Table 58).

Table 58. UKEEP subobjectives addressed by Species of Interest projects from FY15 to FY20. Projects often addressed more than one subobjective = total column values add up to greater than six projects.

UKEEP Subobjective	# of Projects
1a. Identify and conserve important habitat for Species of Interest	
1b. Characterize and monitor the status of Species of Interest	6
1c. Support efforts to prevent introduction of invasive species	
2a. Restore and enhance important habitat for Species of Interest	
2b. Support SOI population recovery/maintenance	2
2c. Control of established invasive species	
3a. Contribute data to help inform decision making on sustainable use targets for resources	1
3b. Support public education and awareness regarding threats and challenges to ecosystems, which will motivate ecologically-informed decisions and actions	

3.2.5.1 Action Category

Species of Interest projects primarily aligned with both Research and Information Acquisition (50%) and Species-based (50%) action categories (Figure 28). When considering both primary and secondary aligned projects (i.e., any project that aligned with the Species of Interest Action Plan), four action categories were addressed. Research and Information Acquisition projects conducted inventories for focal species including inventory/monitoring of amphibians (FY16), Wolverine (FY17), and Long-billed Curlew (FY17). Species-based projects included translocation/inventory of urban Mule Deer (FY16), monitoring of previous Northern Leopard Frog translocated populations (FY19), and remote camera wildlife inventory (FY18, FY19).

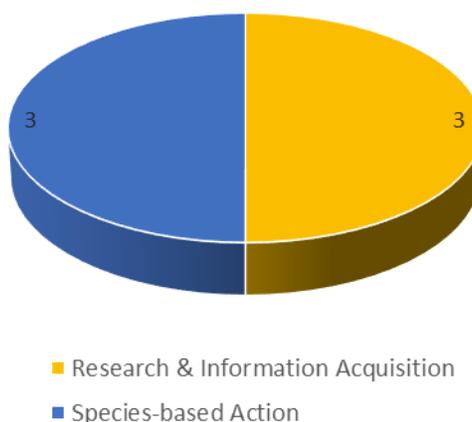


Figure 28. Action categories for UKEEP Species of Interest projects from FY15 to FY20.

3.2.5.2 Species

The Species of Interest Action Plan had no specific actions, and instead focused on three categories of species: *Recovery*, *Focal*, and *Inventory* (each category is discussed in more detail below; Figure 29). The total number of Species of Interest studied from FY15 to FY20 was 25: four fish and 21 wildlife. American Badger, Northern Leopard Frog, and Lewis’s Woodpecker were the three recovery species studied. Elk, Mule Deer, Bighorn Sheep, and Westslope Cutthroat Trout were the predominant focal species studied

(Figure 30). Two “other” species (Rainbow Trout and Yellow Perch) were additionally listed in two multi-year fish projects.

Several studies targeted groups of animals (n=10) rather than a single species (n=33). One project studied “amphibians” as a group including five pond-breeding species, of which two (Western Toad, Columbia Spotted Frog) are focal species. Four separate projects studied “ungulates” as a group including several focal species such as Bighorn Sheep, Elk, Moose, White-tailed and Mule Deer, and two remote camera wildlife monitoring studies looked at “carnivores” as a group including focal and inventory species such as Grizzly Bear, Canada Lynx, Wolverine, and Grey Wolf.

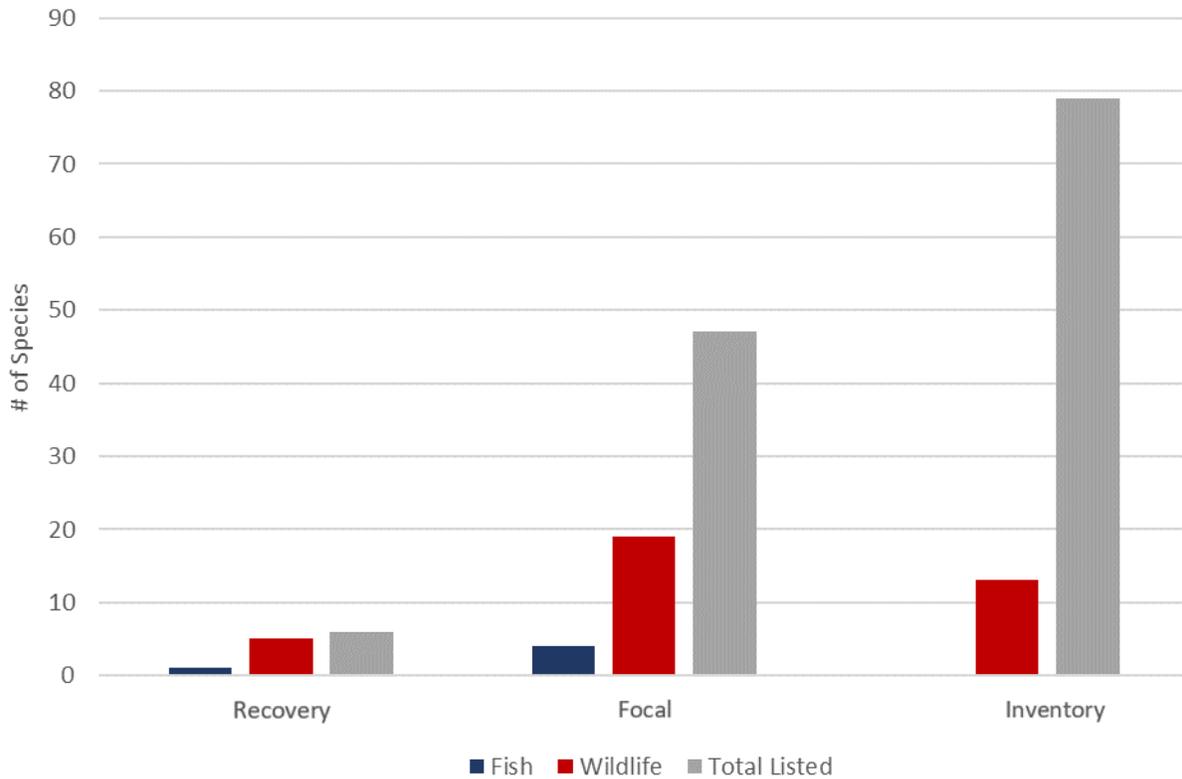


Figure 29. Total number of species addressed for fish and wildlife UKEEP projects compared to the total number of listed species by species category in the Species of Interest Action Plan from FY15 to FY20.

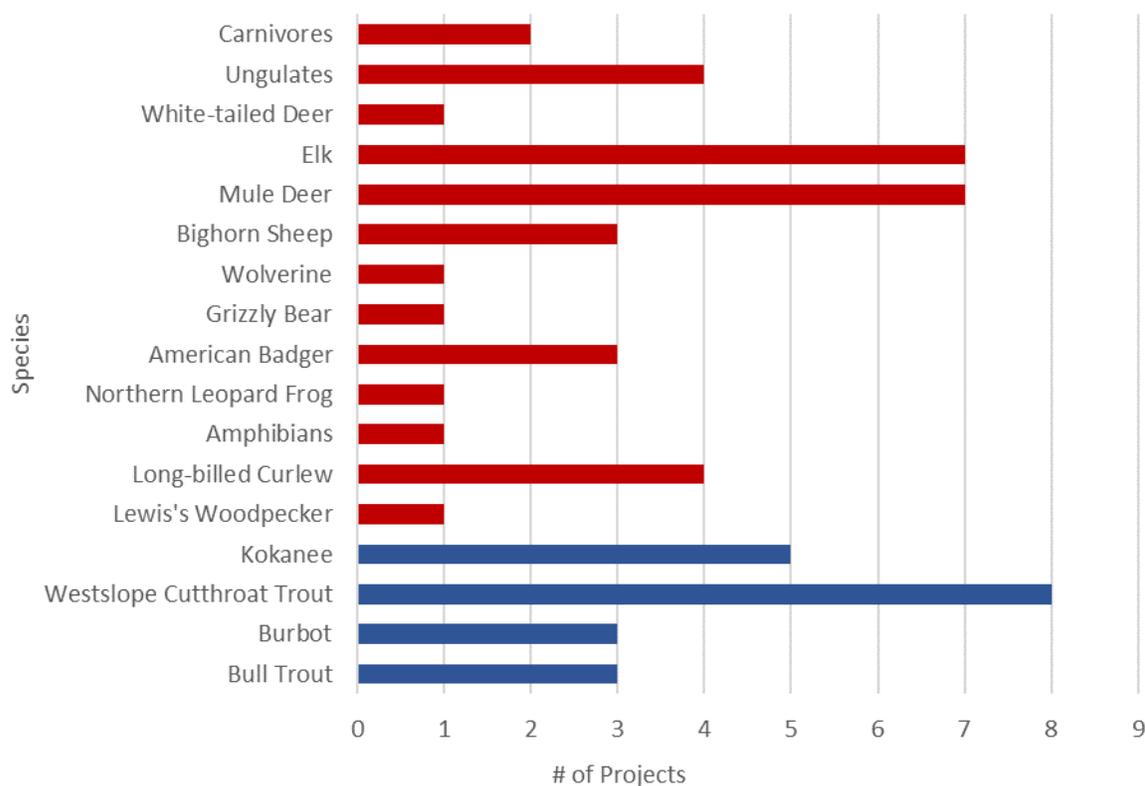


Figure 30. Species of Interest (fish=blue, wildlife=red) targeted by UKEEP projects from FY15 to FY20.

3.2.5.2.1 Recovery Species

Recovery species are those of highest priority and conservation concern that have been adversely impacted by dam and reservoir activities/operations. These species have formally been classified as either threatened or endangered by the Province or Canada, and recovery plans are either in place or under development by Federal or Provincial management agencies. UKEEP outlined six recovery Species of Interest, three of which were addressed by projects during the five-year program (Table 59).

Table 59. UKEEP projects targeting recovery species from FY15 to FY20.

Focal Species	Project Name	Action Plan	Action Category	Key Metric
American Badger	<ul style="list-style-type: none"> Ta Ta Creek Badger Habitat Enhancement Sheep Pasture Grassland Ecosystem Restoration Tobacco Plains Grassland and Open Forest Restoration 	Upland and Dryland	Habitat-based	<ul style="list-style-type: none"> 408 ha of forest thinned to open forest range conditions for badgers Habitat restoration in badger habitat (170 ha) Habitat restoration in badger habitat (FY20 – hectares not specified)
Northern Leopard Frog	<ul style="list-style-type: none"> Monitoring a reintroduced population of Northern Leopard Frogs 	Species of Interest/ Wetland and Riparian Areas	Species-based	<ul style="list-style-type: none"> One season post-translocation monitoring of a re-introduced population of recovery species, Northern Leopard Frog
Lewis’s Woodpecker	<ul style="list-style-type: none"> Tobacco Plains Ecological Restoration 	Upland and Dryland	Research & Information Acquisition	<ul style="list-style-type: none"> Nest inventories while conducting other habitat-based activities

3.2.5.2.2 Focal Species

Fish Focal Species

The Species of Interest Action Plan lists five fish focal species; four of which were studied from FY15 to FY20. Table 60 outlines projects that targeted Bull Trout, Burbot, Kokanee, and Westslope Cutthroat Trout including key metrics or results of the studies.

Table 60. UKEEP projects targeting focal fish species from FY15 to FY20.

Focal Species	Project Name	Action Plan	Action Category	Key Metric
Bull Trout	<ul style="list-style-type: none"> High Resolution Conductivity and Temperature Project Conservation of Trout Habitat in the East Kootenay Region Wild Horse River Bull Trout Population Inventory and Recovery 	Streams	Research & Information Acquisition	<ul style="list-style-type: none"> Identified aspects of redd site selection Proposed WHAs (~174 km stream length) in Upper Kootenay River drainage to support long-term trout conservation Population monitoring, critical habitat identified
Burbot	<ul style="list-style-type: none"> Upper Kootenay Burbot Conservation Strategy Koocanusa Burbot Enumeration 	Lakes	Species-based	<ul style="list-style-type: none"> Conservation strategy Abundance, distribution, movement assessment
Kokanee	<ul style="list-style-type: none"> Koocanusa Kokanee Enumeration 	Streams	Monitoring & Evaluation	<ul style="list-style-type: none"> Abundance assessment
Westslope Cutthroat Trout	<ul style="list-style-type: none"> High Resolution Conductivity and Temperature Project Upper Kootenay Stream Crossing Remediation Westslope Cutthroat Trout Hybridization Evaluation Conservation of Trout Habitat in the East Kootenay Region 	Streams	Research & Information Acquisition Habitat-based Species-based Research & Information Acquisition	<ul style="list-style-type: none"> Identified aspects of redd site selection Connectivity restored to upper reaches of Caven Creek (minimum of 90 km) Assessment of hybridization levels with introduced Rainbow Trout in Upper Kootenay Watershed Proposed WHAs (~174 km stream length) in Upper Kootenay River drainage to support long-term trout conservation

Wildlife Focal Species

The Species of Interest Action Plan lists 42 wildlife focal species; 13 of which were studied from FY15 to FY20. Table 61 outlines projects that targeted focal wildlife species including key metrics or results of the studies.

Table 61. UKEEP projects targeting focal wildlife species from FY15 to FY20.

Focal Species	Project Name	Action Plan	Action Category	Key Metric
Amphibians: <ul style="list-style-type: none"> Western Toad Columbia Spotted Frog 	<ul style="list-style-type: none"> Upper Kootenay Wetlands at Risk Restoration Project 	Wetland	Research & Information Acquisition	<ul style="list-style-type: none"> Amphibian inventory Rapid wetland assessment tool (33 wetlands assessed) Future planning for restoration of wetlands in Upper Kootenay Region
Wolverine	<ul style="list-style-type: none"> Wolverine Harvest Sustainability in the Kootenay Region 	Species of Interest	Research & Information Acquisition	<ul style="list-style-type: none"> 51 confirmed wolverine visits at 57 sites in Elk and Flathead Valleys 1,311 hair samples
Carnivores: <ul style="list-style-type: none"> Grizzly Bear Grey Wolf Cougar American Marten 	<ul style="list-style-type: none"> Kootenay Remote Camera Wildlife Monitoring 	Upland/ Dryland	Species-based	<ul style="list-style-type: none"> 88 remote cameras placed in various East Kootenay habitats
Big Horn Sheep	<ul style="list-style-type: none"> Invasive Plant Management on Bighorn Sheep Winter Ranges 	Upland/ Dryland	Habitat-based	<ul style="list-style-type: none"> Inventory of Bighorn Sheep populations 228 ha of Bighorn Sheep habitat treated for invasive plants and 28 ha of rye seeded
Mule Deer	<ul style="list-style-type: none"> East Kootenay Urban Mule Deer Translocation Trial Kootenay Mule Deer Monitoring 	Upland/ Dryland	Monitoring & Evaluation	<ul style="list-style-type: none"> Translocation Mule Deer Study Inventory of Mule Deer populations Radio-collaring of deer as baseline data for connectivity
Elk	<ul style="list-style-type: none"> Elk Valley Elk Project 	Upland/ Dryland	Species-based	<ul style="list-style-type: none"> Identify and monitor Elk populations (recruitment, survival, and movements)
Ungulates: <ul style="list-style-type: none"> Elk Moose Mule Deer White-tailed Deer Bighorn Sheep 	<ul style="list-style-type: none"> Kootenay Remote Camera Wildlife Monitoring Sheep Pasture Grassland Ecosystem Restoration 	Species of Interest Upland/ Dryland	Research & Information Acquisition Habitat-based	<ul style="list-style-type: none"> 88 remote cameras placed in various East Kootenay habitats Habitat restoration in ungulate habitat (170 ha)
Long-billed Curlew	<ul style="list-style-type: none"> Tracking Long-billed Curlews in the Lower Columbia Valley Tobacco Plains Ecological Restoration 	Species of Interest Upland/ Dryland	Research & Information Acquisition Habitat-based	<ul style="list-style-type: none"> 6 nest sites identified; 5 birds banded for migration study Habitat Restoration Plan for Long-billed Curlew Habitat restoration in Long-billed Curlew habitat

Amphibians: The **Upper Kootenay Wetlands at Risk Restoration Project** primarily aligned with the Wetland Action Plan and Research and Information Actions, but also with Species of Interest Action Plan for focal amphibian species, Western Toad and Columbia Spotted Frog. Activities for this project included amphibian inventories and the development of a rapid assessment tool for wetlands and riparian areas in human-impacted East Kootenay landscapes.

Carnivores: Several Species of Interest Action Plan projects focused on carnivores included Wolverine, Grizzly Bear, and Grey Wolf. Wolverines were the target species of a Research and Information Acquisition project (**Wolverine Harvest Sustainability in the Kootenay Region**) aimed at studying population abundance/connectivity and contributing data towards harvest sustainability targets. Grizzly Bear,

Cougar, and Grey Wolf were target large mammal species as part of **Kootenay Remote Camera Wildlife Monitoring** study in FY17-FY20.

Ungulates: Only two projects targeted ungulate species that primarily aligned with the Species of Interest Action Plan: **East Kootenay Urban Mule Deer Translocation Trial** and **Kootenay Remote Camera Wildlife Monitoring**. Other UKEEP contributions towards focal ungulate focused on Bighorn Sheep, Elk, Moose, Mule Deer, and White-tailed Deer.

- The **Elk Valley Elk Project** was a five-year study examining Elk movements and survivorship.
- Bighorn Sheep inventory occurred as part of the **Invasive Plant Management and Restoration Project on Bighorn Sheep Winter Ranges** project.
- Mule Deer were targeted under two separate projects: **Kootenay Mule Deer Monitoring** (extensive 5-year study) and **East Kootenay Urban Mule Deer Translocation Trial**.
- Ungulates including deer species, Elk, and Moose were inventoried as part of the **Kootenay Remote Camera Wildlife Monitoring** study in FY17-FY20.
- Most other projects were addressed at the Habitat-based level (e.g., ecosystem restoration in ungulate habitat) in upland habitats (associated with *Action #2: Support ecosystem restoration (ER) in the Plan area. Contribute to re-evaluation and refinement of criteria developed to prioritize suitable ER areas and to determine effectiveness in increasing desirable plant species*).

3.2.5.2.3 Inventory Species

A single fish inventory species is included in the Species of Interest Action Plan (Torrent Sculpin); however, no projects studied this species during the UKEEP Program. Five inventory wildlife species were part of studies targeting other focal species groups such as amphibians and carnivores. These studies were inventory-type projects (Table 62).

Table 62. UKEEP projects targeting inventory species from FY15 to FY20.

Inventory Species	Project Name	Action Plan	Action Category	Key Metric
Amphibians spp. • Wood Frog • Coeur d’Alene Salamander • Pacific Chorus Frog	• Upper Kootenay Wetlands at Risk Restoration Project	Wetland	Research & Information Acquisition	<ul style="list-style-type: none"> • Inventory: rapid wetland assessment tool (33 wetlands assessed) • Future planning for restoration of wetlands in Upper Kootenay Region
Carnivore spp. • American Black Bear • Canada Lynx	• Kootenay Remote Camera Wildlife Monitoring	Species of Interest	Species-based	<ul style="list-style-type: none"> • 88 remote cameras placed in various East Kootenay habitats

3.2.5.3 Targets

Targets for the Species of Interest Action Plan were developed for UKEEP objectives and subobjectives, and projects from FY15 to FY20 covered seven of eight sub-objectives including species inventory and monitoring, restoring habitat for species, and harvest sustainability issues (Table 63; Appendix 2). Most projects were associated with sub-objectives 1b and 2b (70% and 20%, respectively), both of which were related to Species of Interest including characterizing/monitoring populations and supporting species recovery.

Table 63. Species of Interest Action Plan subobjectives and targets reached for UKEEP projects from FY15 to FY20.

Subobjective	Target Set by UKEEP Program	Targets Achieved by UKEEP Program
1a. Identify and conserve important habitat for Species of Interest	Increase in availability of important habitat for Species of Interest protected against human impacts.	<ul style="list-style-type: none"> • 1 ecosystem restoration assessment for Mule Deer connectivity habitat • 1 habitat restoration plan for Long-billed Curlew • 33 rapid wetland assessments • 88 remote cameras for wildlife observations
1b. Characterize and monitor the status of Species of Interest	The establishment or improvement of baseline knowledge of the status of Species of Interest.	<ul style="list-style-type: none"> • Monitoring of Mule Deer survivorship • Wolverine Harvest Sustainability in the Kootenay Region • Long-billed Curlew nesting sites • 88 remote cameras for wildlife observations
1c. Support efforts to prevent introduction of invasive species	No new established invasive species.	<ul style="list-style-type: none"> • 228 ha of Bighorn Sheep habitat treated for invasive plants and 28 ha of rye seeded
2a. Restore and enhance important habitat for Species of Interest	Increased area of restored/enhanced habitat that improves productivity.	<ul style="list-style-type: none"> • Ungulate habitat restoration (170 ha) • Badger habitat restoration (578 ha)
2b. Support SOI population recovery/maintenance	Improvement in abundance and distribution of Species of Interest populations due to recovery efforts.	<ul style="list-style-type: none"> • Monitoring of Mule Deer survivorship • Monitoring of Northern Leopard Frog • Translocation Mule Deer Study
2c. Control of established invasive species	Decrease in abundance and distribution of invasive species due to control efforts.	<ul style="list-style-type: none"> • 228 ha of Bighorn Sheep habitat treated for invasive plants and 28 ha of rye seeded
3a. Contribute data to help inform decision making on sustainable use targets for resources	Resource use does not affect the sustainability of Species of Interest populations.	<ul style="list-style-type: none"> • Wolverine Harvest Sustainability in the Kootenay Region
3b. Support public education and awareness regarding threats and challenges to ecosystems, which will motivate ecologically informed decisions and actions	Reduced incidence of negative impacts caused by humans due to ecologically informed decisions and actions as a result of increased awareness of the public of threats and challenges to ecosystems.	N/A

4 DISCUSSION

From FY15 to FY20, UKEEP was successful in meeting its program objectives of conservation and sustainable use by funding projects that conserved and enhanced fish and wildlife in the Upper Kootenay River watershed. Many conservation and sustainable use goals are ongoing in the East Kootenay Region and some UKEEP actions were incorporated into the updated FWCP 2019 Action Plans. Further, knowledge gaps and recommendations identified in this review could be adopted by many other organizations working toward conservation and enhancement of fish and wildlife in the East Kootenay Region. Key program results, metrics, and knowledge gaps are highlighted below.

4.1.1 Lakes Action Plan

From FY15 to FY20, five fish projects primarily aligned with the UKEEP Lakes Action Plan (14 total projects when secondary alignment is included). A total of \$190,294 was spent on projects that primarily aligned with the Lakes Action Plan, which represented 8% of the total UKEEP project funding spent from FY15 to FY20 (\$2,536,492).

Of the five projects that primarily aligned with the Lakes Action Plan, 40% were Research and Information Acquisition based and 60% were Species-based. Six of the 18 lakes actions were addressed, Koocanusa Reservoir was the only habitat targeted (McNair South Lake was included in a secondarily aligned project). Burbot, a focal fish species, was the only species targeted by a lakes project. Kokanee and Westslope Cutthroat Trout, also focal species, were targeted by projects that secondarily aligned with the Lakes Action Plan.

4.1.1.1 Key Successes/Metrics

Key program successes for the Lakes Action Plan include:

1. The production of an Upper Kootenay Burbot Conservation Strategy aimed at restoring and maintaining a viable native Burbot population within the upper Kootenay River, its tributaries, and lakes;
2. An abundance, distribution, and movement assessment of Burbot in Koocanusa Reservoir; and
3. The completion of foreshore inventory and mapping of Koocanusa Reservoir and a shoreline guidance document.

4.1.1.2 Knowledge Gaps and Future Recommendations

Key program knowledge gaps for the Lakes Action Plan include:

1. Proportionally the UKEEP funding of projects that were primarily aligned with the Lakes Action Plan was low (8% of total UKEEP project funds).
2. Koocanusa Reservoir was the only reservoir or lake targeted by primarily aligned lakes projects. Future compensation planning should determine if other regional lakes should be considered priority.
3. Several actions, 12 of 18, or 66%, were not addressed during the program. Unaddressed actions could be considered in future conservation or compensation planning for the East Kootenay Region.
4. There were no Habitat-based or Land Securement projects; however, both FWCP and CBT support Land Securement through other initiatives. Two of the Habitat-based actions were rated Priority 1; these actions should be considered in the future.

5. Many fish and wildlife Species of Interest dependent on lake habitat were not targeted during the program. Only Burbot was specifically targeted by lakes projects while Kokanee and Westslope Cutthroat Trout were targeted by streams projects that secondarily aligned with the Lakes Action Plan. Lakes are deemed the highest priority habitat for many focal and inventory species, such as Bull Trout and Western Painted Turtle, so future work could focus on these species that were not addressed by UKEEP.

4.1.2 Streams Action Plan

From FY15 to FY20, 18 projects primarily aligned with the Streams Action Plan (20 total projects when secondary alignment is included) and one project remains ongoing. All streams projects were focused on fish. A total of \$748,760 was spent on projects that primarily aligned with the Streams Action Plan, which represented 30% of the total UKEEP project funding (\$2,536,492).

Of the 18 projects that primarily aligned with the Streams Action Plan, 39% were Research and Information Acquisition, 11% were Habitat-based, 22% were Species-based and 28% were Monitoring and Evaluation. Nine of 15 actions and 12 of 15 priority streams were addressed by projects. Three focal fish species listed in the Species of Interest Action Plan, Bull Trout, Kokanee, and Westslope Cutthroat Trout, were targeted by 16 of the primarily aligned streams projects. Burbot, also a focal fish species, was targeted by projects that secondarily aligned with the Streams Action Plan.

4.1.2.1 Key Successes/Metrics

Key program successes for the Streams Action Plan include:

1. Restoration of connectivity to the upper reaches of Caven Creek within the Gold Creek system (minimum 90 km of habitat now available);
2. Stream bank restoration of Alexander Creek within the Elk River system (approximately 50 m in length);
3. Proposed WHAs in the Upper Kootenay River drainage to support long-term conservation of Bull Trout and Westslope Cutthroat Trout (approximately 174 km stream length proposed);
4. An assessment of hybridization levels of Westslope Cutthroat Trout with introduced Rainbow Trout in the Upper Kootenay Watershed;
5. An assessment of spawning abundance of Kokanee in the Upper Kootenay River; and
6. Monitoring of the Wild Horse River Bull Trout population and identification of critical habitat.

4.1.2.2 Knowledge Gaps and Future Recommendations

Key program knowledge gaps for the Streams Action Plan include:

1. Three of the 15 priority streams from the Streams Action Plan were not targeted (Vermillion River, Cross River, and Palliser River).
2. Several actions, six of 15, or 40%, were not addressed during the program. Those unaddressed actions could be considered in any future conservation or compensation planning for the East Kootenay Region.
3. There were no Land Securement type projects funded through the UKEEP program; however, both FWCP and CBT support Land Securement through other initiatives.
4. No focal and inventory wildlife Species of Interest dependent on streams habitat were targeted during the program (e.g., Bank Swallow, Harlequin Duck, Belted Kingfisher). Future projects in the region could focus on these species.

4.1.3 Wetland and Riparian Areas Action Plan

From FY15 to FY20, five projects primarily aligned with the UKEEP Wetland (and Riparian Areas) Action Plan (eight total projects when secondary alignment is included); all wetland projects were focused on wildlife and/or wildlife habitat. A total of \$226,192 was spent on projects that primarily aligned with the Wetland Action Plan. In all this represented 9% of the total UKEEP project funding (\$2,536,492).

Of the five projects that primarily aligned with the Wetland Action Plan, 40% were Research and Information Acquisition and 60% were Habitat-based. Nine of 22 actions were addressed. Northern Leopard Frog, a recovery wildlife species, was targeted by one project that secondarily aligned with the Wetland Action Plan. Likewise, two focal and three inventory wildlife species (amphibians) were targeted by another project aligned the Wetland Action Plan.

4.1.3.1 Key Successes/Metrics

Key program successes for the Wetland (and Riparian Areas) Action Plan include:

1. Riparian assessments for 33 wetlands in the Upper Kootenay River watershed area, specifically examining human-impacts to these small wetlands;
2. Habitat restoration involving on-the-ground habitat results such as 40 hectares of land treated for invasive species, planting of native plants (400 live stakes), and wetland enhancements such as topsoil and large woody debris additions;
3. Ongoing riparian wetland restoration project (17 hectares) at Earl Ranch (FY19); and
4. Inventory of five focal/inventory amphibian species and monitoring of a reintroduced Northern Leopard population (recovery species) at Bummers Flats.

4.1.3.2 Knowledge Gaps and Future Recommendations

Key knowledge gaps for the Wetland and Riparian Areas Action Plan include:

1. Proportionally the UKEEP funding of projects that were primarily aligned with the Wetland Action Plan was low (9% of total UKEEP project funds).
2. Several actions, 13 of 22, or 59%, were not addressed during the program. Those unaddressed actions could be considered in any future conservation or compensation planning for the East Kootenay Region.
3. Most notably, there was no action for “wetland restoration” in the UKEEP Wetland and Riparian Areas Action Plan similar to the FWCP Columbia Wetland Action (e.g., restore and create wetland and riparian area habitat in this focal area, where feasible to address impacted, degraded, or lost habitat). This likely contributed to the lack of funded Wetland projects during the program.
4. There were no Land Securement type projects funded through the UKEEP program; however, both FWCP and CBT support Land Securement through other initiatives.
5. Low number of focal and inventory wildlife Species of Interest dependent on wetland and riparian habitat were targeted during the program (e.g., waterfowl, bats, Bank Swallow, Great Blue Heron, Western Painted Turtle, Moose). Future projects in the region could focus on these species.

4.1.4 Upland and Dryland Areas Action Plan

From FY15 to FY20, 30 projects primarily aligned with the UKEEP Upland (and Dryland Areas) Action Plan (31 total projects when secondary alignment is included); all upland projects were focused on wildlife and/or wildlife habitat. A total of \$1,170,754 was spent on projects that primarily aligned with the Upland and Dryland Areas Action Plan. In all this represented 46% of the total UKEEP project funding (\$2,536,492).

Of the 30 projects that were primarily aligned with the Upland Action Plan, 50% were within the Species-based category, 46% were within the Habitat-based category, and 4% were within the Monitoring and Evaluation category. Ten of the 19 upland actions were addressed. Two of the six recovery species (American Badger, Lewis' Woodpecker) were targeted by four projects that primarily aligned with the Upland Action Plan. Eight upland-associated focal/inventory wildlife species (e.g., ungulates, carnivores, Long-billed Curlew) were targeted by 18 of the primarily aligned upland projects.

4.1.4.1 Key Successes/Metrics

Key program successes for the Upland (and Dryland Areas) Action Plan include:

1. Approximately, ~1,100 hectares of habitat restored involving on-the-ground habitat actions such as ~300 hectares of land treated for invasive species, ~825 hectares of forest habitat thinned to open range forest standards (including slash/pile burning), and planting of native plants (5,300 Whitebark Pine seedlings, native plants);
2. Habitat restoration for recovery species, American Badger;
3. Two ecosystem restoration plans were developed that targeted Mule Deer and Long-billed Curlew;
4. Several species-based projects, including a two-year remote camera wildlife monitoring study, a five-year Kootenay Mule Deer Monitoring project, a five-year Elk Valley Elk population study, and a three-year Bighorn Sheep restoration and population study;
5. Monitoring of previous habitat restoration work (e.g., invasive plant monitoring) at Waldo North area; and
6. Access management in the Kooconusa area (upland and riparian areas) including 66 km of trails decommissioned (treated for invasive plants, reseeded, and closed) and posted signs.

4.1.4.2 Knowledge Gaps and Future Recommendations

Key program knowledge gaps for the Upland (and Dryland Areas) Action Plan include:

1. Several actions, 9 of 19, or 47%, were not addressed during the program. Those unaddressed actions could be considered in any future conservation or compensation planning for the East Kootenay Region.
2. No Research and Information Acquisition type projects occurred during the program. There were no Land Securement type projects funded through the UKEEP program; however, both FWCP and CBT support Land Securement through other initiatives.
3. Relatively low numbers of focal and inventory wildlife Species of Interest dependent on upland and dryland habitat were targeted during the program (e.g., bats, tree cavity nesting species [Flammulated Owl, Williamson's Sapsucker], songbirds). Future projects in the region could focus on these species.

4.1.5 Species of Interest Action Plan

From FY15 to FY20, six projects primarily aligned with the UKEEP Species of Action Plan (41 total projects when secondary alignment is included); all primarily aligned projects were focused on wildlife and/or wildlife habitat. A total of \$200,491 was spent on projects that primarily aligned with the Species of Action Plan. In all this represented 8% of the total UKEEP project funding (\$2,536,492).

A total of 25 species were targeted (four fish and 21 wildlife species): three recovery, 17 focal, and five inventory species. Of the six projects that were primarily aligned with the Species of Interest Action Plan, the primary action categories were 50% Species-based and 50% Research and Information Acquisition.

4.1.5.1 Key Successes/Metrics

Key program successes for the Species of Interest Action Plan include:

1. Key investments made for Westslope Cutthroat Trout, Burbot, Kokanee, Mule Deer, Elk, Bighorn Sheep, amphibians (including Northern Leopard Frog), American Badger, Wolverine, Long-billed Curlew, and a two-year remote camera wildlife monitoring study, which targeted many medium and large mammal species (e.g., ungulates, carnivores).

4.1.5.2 Knowledge Gaps and Future Recommendations

Key program knowledge gaps for the Species of Action Plan include:

1. Proportionally the UKEEP funding of projects that were primarily aligned with the Species of Interest Action Plan was low (8% of total UKEEP project funds).
2. The Species of Interest Action Plan did not identify specific Priority Actions associated with this plan, meaning there was a lack of specific direction to assist in achieving the expected outcomes of the plan;
3. No investments were made for three recovery species: Mountain Caribou, Western Screech-owl and Williamson's Sapsucker; and
4. Seventeen of 47 focal species were addressed, and five of out of 78 inventory species were targeted. This number was relatively low for inventory species and future projects in the region could focus on these species.

5 CONCLUSIONS AND RECOMMENDATIONS

5.1 Program Successes

Overall, the UKEEP program was very successful in reaching its goal to conserve, restore and enhance fish, wildlife and their habitats and supported their sustainable use in the Plan area.

Overall UKEEP program successes include:

1. All action plans were addressed with most projects aligning with Streams and Upland and Dryland Areas Action Plans.
2. All three UKEEP objectives were addressed: 1) conserve productivity and diversity of ecosystems (addressed by 47% of projects), 2) restore and enhance habitats and populations of Species of Interest (72%), and 3) contribute to the maintenance or improvement of opportunities for sustainable use (17%).
3. All UKEEP subobjectives were addressed:
 - 1a) Identify and conserve important habitat for Species of Interest (n=11);
 - 1b) Characterize and monitor the status of Species of Interest (n=31);
 - 1c) Support efforts to prevent introduction of invasive species (n=4);
 - 2a) Restore and enhance important habitat for Species of Interest (n=27);
 - 2b) Support Species of Interest population recovery/maintenance (n=16);
 - 2c) Control of established invasive species (n=15);
 - 3a) Contribute data to help inform decision making on sustainable use targets for resources (n=12); and
 - 3b) Support public education and awareness regarding threats and challenges to ecosystems, which will motivate ecologically-informed decisions and actions (n=5).
4. More than half the actions per plan were addressed for both the Streams and Upland and Dryland Action Plans (60% and 53% respectively). Overall, 68% of all Priority 1 rated actions were addressed by UKEEP projects.
5. All targets associated with program objectives and subobjectives were addressed:
 - 1a) Increase in availability of important habitat for Species of Interest protected against human impacts (n=5);
 - 1b) The establishment or improvement of baseline knowledge of the status of Species of Interest (n=28);
 - 1c) No new established invasive species (n=2);
 - 2a) Increased area of restored/enhanced habitat that improves productivity (n=17),
 - 2b) Improvement in abundance and distribution of Species of Interest populations due to recovery efforts (n=4);
 - 2c) Decrease in abundance and distribution of invasive species due to control efforts (n=13);
 - 3a) Resource use does not affect the sustainability of Species of Interest populations (n=3); and
 - 3b) Reduced incidence of negative impacts caused by humans due to ecologically-informed decisions and actions as a result of increased awareness of the public of threats and challenges to ecosystems (n=4).

6. All intended action outcomes for UKEEP were addressed: an increased understanding of species and their habitat (n=42), improved ecological function of each ecosystem (n=29), improved coordination with regulatory and management activities (n=11), and sustainable use (n=7).
7. All general types of stakeholder concerns identified during the development of UKEEP were addressed: monitoring Species of Interest (n=37), conserving habitat for Species of Interest (n=27), invasive species monitoring (n=18), access and recreation management (n=9), and enhancing habitat connectivity (n=5).
8. Nearly 60% of all projects included a community engagement component, including First Nation involvement, public education and events, community volunteers, and the involvement from members of the hunting and fishing community.
9. Significant habitat-based achievements occurred, such as habitat restoration, connectivity restored, invasive species removal, and habitat mapping.
10. UKEEP projects targeted 25 fish and wildlife species, including three recovery species (American Badger, Northern Leopard Frog, and Lewis's Woodpecker), as well as 17 focal and five inventory species. Several multi-year projects for Kokanee, Westslope Cutthroat Trout, Elk, Mule Deer, and Bighorn Sheep occurred within the UKEEP program.

5.2 Knowledge Gaps

Overall Knowledge Gaps for UKEEP include:

1. Proportionally, the UKEEP funding of primary aligned Lakes, Wetland and Riparian Areas and Species of interest projects was low; 8%, 9%, and 8%, respectively of total project funding.
2. Although the number of UKEEP actions addressed is listed above as a program success for the Streams and Upland and Dryland Actions Plans, considerably less actions were addressed for the Wetland and Riparian Areas and Lakes Action Plans (41% and 33%, respectively). Forty-six percent of all UKEEP program actions were addressed during the review period by projects. Many actions that were unaddressed during the UKEEP program have been carried over to the 2019 FWCP Columbia Region Action Plans, in particular the unaddressed Priority 1 actions from all UKEEP Action Plans.
3. Land Securement actions were not addressed for any of the UKEEP Action Plans even though all four ecosystem type plans had either a Priority 1 (Streams) or Priority 2 (Lakes, Wetland and Riparian Areas, Upland and Dryland) action in this category.
4. There were few Monitoring and Evaluation projects for all action plans, as well as proportionally fewer Habitat-based projects for fish (Lakes and Streams Action Plans) and fewer Research and Information Acquisition projects for wildlife (Wetland and Riparian Areas and Upland and Dryland Action Plans).
5. Three recovery species were not targeted during the UKEEP program, Caribou, Western Screech-owl and Williamson's Sapsucker. No focal and inventory wildlife Species of Interest primarily dependent on lakes and streams habitat were targeted during the program (e.g., Western Painted Turtle, Bank Swallow, Harlequin Duck, Belted Kingfisher).

5.3 Recommendations

Overall Recommendations for the UKEEP program include:

1. Given lakes, wetland and riparian areas, and Species of Interest projects received less funding proportionally, future funding and projects in the Upper Kootenay region could focus on these habitats and species.

2. Although no Land Securement projects occurred during the UKEEP program (i.e., no Land Securement actions were addressed), both FWCP and CBT support Land Securement through other initiatives; hence Land Securement could remain a prioritized focus of future funding and projects in the Upper Kootenay region.
3. Since the proportion of Monitoring and Evaluation projects was low for all action plans, as Habitat-based projects were for fish projects and Research and Information Acquisition type projects were for wildlife, a portion of future funding and projects in the Upper Kootenay Region could focus on these action categories.
4. There were no species-specific actions in UKEEP. The development of species-specific projects for future conservation work in the region could allow for particular species deemed of special importance to the Upper Kootenay region to be prioritized, such as the three recovery species which were not targeted during the UKEEP program (Caribou, Western Screech-owl, and Williamson's Sapsucker).
5. Future species-specific projects could target focal wildlife Species of Interest that are primarily dependent on lakes, streams, and wetland habitat.

6 APPENDICES

6.1 Appendix 1

Table A-1. UKEEP Action Plans and Actions. Coloured squares indicate priority ranking for actions: #1 (dark green), #2 (light green), and #3 (light blue).

FWCP Action #	Objective	Action	Rationale & Expected Outcome	Rank	Implementation Approach
Lakes					
Research and Information Actions					
1	1a	Review and map land use activities and existing information on condition and limitations of lake habitats used by lacustrine and adfluvial Species of Interest to identify and prioritize focal lake habitats. Describe past and present management actions (e.g. land use planning, zoning, setbacks) and identify data gaps.	The review of existing information on lacustrine habitat is necessary to identify threats, prioritize and establish targets for future conservation/ restoration/ enhancement activities, and avoid duplication of effort. Expected outcome: inform management plans, inform Actions #3 & 15, and identify lakes that require Species of Interest/habitat assessment.	1	Open
	2a				
	3a				
2	2a	Assess feasibility (i.e. assess current nutrient levels, cost-benefit analysis) of nutrient additions to Kooacanusa Reservoir to improve productivity.	Nutrient sink reported in Kooacanusa Reservoir (Woods 1982, Snyder and Minshall 1996). If found feasible, results will inform development of a nutrient addition program.	2	Open
3	1a	Inventory and prioritize potential lake habitat conservation/ restoration/ enhancement opportunities for Species of Interest using information collected from Action #1.	Future conservation/ restoration/ enhancement strategies will focus on important habitat for Species of Interest. Expected outcome: a list of potential projects for individual lakes, which will help address or mitigate negative impacts and limiting factors to habitat; inform Action #15.	2	Open
	2a				
4 ^a	3a	Conduct creel surveys to monitor catch, effort, and estimate angling-related mortality of lacustrine and adfluvial Species of Interest.	Catch, effort, and angling-related mortality information will inform suitability of sustainable use targets. Expected outcome: better estimation of angling-related mortality.	2	Directed
5 ^a	3a	Conduct aerial overview survey of angling pressure for select (index) water bodies to estimate angling-related mortality of lacustrine and adfluvial Species of Interest. Complement aerial surveys with ground verification by creel surveys.	Catch, effort, and angling-related mortality information will inform suitability of sustainable use targets. Expected outcome: better estimation of angling-related mortality.	3	Directed

Table A-1 Continued

FWCP Action #	Objective	Action	Rationale & Expected Outcome	Rank	Implementation Approach
Lakes					
Habitat-based Actions					
6 ^a	1a	Support work that seeks to resolve access and recreation management issues that affect conservation/ restoration/ enhancement objectives (e.g. increase signage and education, 'Access Guardian' program).	The rapid expansion in road networks and recreational water craft use has resulted in a dramatic increase in public access and use of lakes. This increase negatively impacts sensitive fish and wildlife populations and their habitats and exacerbates the spread of invasive species. Expected outcome: decrease in negative impacts related to access and recreational use.	1	Open
	2a				
	3b				
7 ^a	3b	Support education and outreach for public awareness of threats and challenges of lake ecosystems. Threats include consequences of unauthorized introductions of invasive species and impacts from recreational use (particularly watercraft use). (Examples include support for implementation of mandatory boat washes, educational signage, and stewardship).	Impacts and threats to lakes related to human activities, such as spread of invasive species and irresponsible watercraft use can be mitigated by better education. Expected outcome: better awareness of the public, which will change behaviours responsible for negative impacts.	1	Open
8	1a	Implement habitat-based actions to conserve/ restore/ enhance water levels and water quality. Ensure alignment with relevant actions for other ecosystems. (e.g. removal/reduction of sources of pollution (i.e. agricultural run-off, septic systems) and improved connection to streams/wetlands).	The protection of water resources is a critical conservation value for healthy lake ecosystems. Expected outcome: improvement of water resources and inform development of management plans (where applicable).	2	Open
	2a				
9	1a	Implement habitat-based actions to conserve, restore, and enhance shorelines of lakes. Ensure alignment with relevant actions for other ecosystems (e.g. re-vegetation and/or erosion control projects).	Shoreline areas are an integral part of lake ecosystems and therefore the protection of riparian areas is critical for the support of Species of Interest populations. Expected outcome: improved shoreline habitat and inform development of management plans (where applicable). Pilot studies should explore ecologically friendly techniques for shoreline stabilization (e.g. alternatives to riprap).	2	Open
	2a				

Table A-1 Continued

FWCP Action #	Objective	Action	Rationale & Expected Outcome	Rank	Implementation Approach
Lakes					
Habitat-based Actions					
10 ^b	1a	Implement habitat-based actions to conserve, restore, and enhance spawning, rearing, overwintering, and foraging habitat for Species of Interest. Ensure alignment with relevant actions for other ecosystems. (e.g. re-establishment of connection with stream/wetland habitat, addition of aquatic vegetation or artificial structures to improve cover and habitat complexity and placement of suitable spawning substrate).	The protection of lake habitat is critical for the support of lacustrine and adfluvial Species of Interest populations. Expected outcome: improved lake habitat.	3	Open
	2a				
Species-based Actions					
11	1b	Inventory, review, and synthesize existing information on lacustrine and adfluvial Species of Interest in the Plan area, including past and present management actions and identify data gaps. Integrate with historic information. This action can be completed concurrently with Action #12.	The review of existing abundance, distribution, age, and size information on lacustrine/adfluvial Species of Interest will inform management plans addressing specific issues affecting individual lakes. Expected outcome: identification of high risk populations, which will help inform next steps/Action #12.	1	Directed / Open
	2b				
12	1b	Collect biological information to address data gaps and define status of lacustrine and adfluvial Species of Interest populations. Integrate with historic information. This action can be completed concurrently with Action #11.	Addressing data gaps will enable a better depiction of the status of Species of Interest populations in the watershed. Expected outcome: abundance, distribution, age and size information on lacustrine/adfluvial Species of Interest from poorly studied populations to inform management plans.	1	Directed / Open
	2b				
13 ^a	1c	Support the development of invasive species monitoring and rapid response plans. Identify areas where invasive species are likely to establish or have already established.	Invasive species compete with native species and present a threat to the conservation of Species of Interest. Expected outcome: better understanding of the distribution of invasive species in the Plan area and the ability to respond quickly to new infestations.	1	Open
	2c				
14	2b, 2c	Conduct risk assessments of established Rainbow Trout populations and stocking programs with regard to hybridization with Westslope Cutthroat Trout.	Rainbow Trout genetic introgression has been identified as one of the main threats to native Westslope Cutthroat Populations. Expected outcome: identification of high risk populations, which will help inform next steps/priority actions.	1	Directed

Table A-1 Continued

FWCP Action #	Objective	Action	Rationale & Expected Outcome	Rank	Implementation Approach
Lakes					
Land Securement					
15	1a	Protect critical lake habitats identified in Actions #1 and/or 3 through covenant and stewardship opportunities. Properties adjacent to existing protected properties, and those that protect Recovery and Focal Species should be the priority.	Multi-stakeholder cooperation is required to secure high-value lands that are under threat. Expected outcome: securement of critical lake habitat.	2	Directed
Monitoring and Evaluation					
16	1a	Evaluate results of habitat-based actions.	To measure success of conservation/ restoration/ enhancement efforts. Expected outcome: inform future habitat-based actions, develop schedules and budgets for habitat targets.	2	Directed
	2a				
17 ^a	1b	Monitor the status and trends of lacustrine and adfluvial Species of Interest populations (i.e. Westslope Cutthroat Trout, Kokanee, Rainbow Trout). Collect genetic data at the same time.	To identify changes in populations, which would inform requirement for new management actions and to measure success of conservation/ restoration/ enhancement efforts. Expected outcome: inform future actions; identification of changes to threats.	3	Directed
	2b				
18	1a	Collect baseline data and/or monitor lake habitats to evaluate climate change impacts.	Changes in climate are anticipated to affect water levels and quantity conditions as well as riparian vegetation growth and productivity. Expected outcome: prediction of climate change impacts, their severity and means to improve habitat resiliency in response to climate change.	3	Open
	2a				
	3a				

Table A-1 Continued

FWCP Action #	Objective	Action	Rationale & Expected Outcome	Rank	Implementation Approach
STREAMS					
Research and Information Acquisition					
1	1a	Review and map land use activities and existing information on condition and limitations of stream habitats used by fluvial and adfluvial Species of Interest to identify and prioritize critical stream habitats. Describe past and present management actions (i.e. land use planning, zoning, setbacks) and identify data gaps.	The review of existing information on stream habitat is necessary to identify threats, prioritize future conservation/ restoration/ enhancement strategies and avoid duplication of effort. Expected outcome: inform development/revision of management plans to address specific issues affecting individual streams and their tributaries, inform Actions #2 & 12, and identify streams that require Species of Interest/habitat assessment.	1	Open
	2a				
2 ^b	1a	Inventory and prioritize potential stream habitat conservation/ restoration/ enhancement opportunities for Species of Interest.	Conservation/ restoration/ enhancement strategies will focus on important habitat for Species of Interest. Expected outcome: a list of potential projects for individual streams, which will help address or mitigate negative impacts and limiting factors to stream habitat; inform Action #12.	1	Open
	2a				
3 ^a	3a	Conduct creel surveys to monitor catch, effort, and estimate angling-related mortality of fluvial and adfluvial Species of Interest.	Catch, effort, and angling-related mortality information will inform suitability of sustainable use targets. Expected outcome: better estimation of angling-related mortality.	2	Directed
Habitat-based Actions					
4 ^b	1a	Implement habitat-based actions to conserve, restore, and enhance water flow, stream geomorphology, and water quality on priority streams. Ensure alignment with relevant actions for other ecosystems. Examples include stream stewardship, channel restoration, erosion control, increased connectivity (i.e. culvert replacement).	The protection of water resources is a critical conservation value for healthy stream ecosystems. Expected outcome: improvement of water resources and inform development of management plans (where applicable). Pilot studies should explore ecologically friendly techniques (e.g. alternatives to riprap).	1	Open
	2a				

Table A-1 Continued

FWCP Action #	Objective	Action	Rationale & Expected Outcome	Rank	Implementation Approach
STREAMS					
Habitat-based Actions					
5 ^b	1a	Implement habitat-based actions to conserve, restore, and enhance spawning, rearing, overwintering, and foraging habitat for Species of Interest. Focus on culvert replacement. Ensure alignment with relevant actions for other ecosystems (e.g. include re-establishment of connection with lake/wetland habitat, addition of aquatic vegetation or artificial structures to improve cover and habitat complexity and placement of suitable spawning substrate).	The protection of instream habitat is critical for the support of Species of Interest populations. Culvert replacement is a cost-effective way to enhance habitat and ensure habitat connectivity. Expected outcome: improved instream habitat.	1	Open
	2a				
6	1a	Support work that seeks to resolve access and recreation management issues that affect conservation/ restoration/ enhancement objectives (e.g. increase signage and education, 'Access Guardian' program).	The rapid expansion in road networks and recreational water craft use has resulted in a dramatic increase in public access and use of streams. This increase negatively impacts sensitive fish and wildlife populations and their habitats and exacerbates the spread of invasive species. Expected outcome: decrease in negative impacts related to access and recreational use.	1	Open
	2a				
	3b				
7	3b	Support education and outreach for public awareness of threats and challenges of stream ecosystems. Threats include consequences of unauthorized introductions of invasive species and impacts from recreational use (particularly water craft use). Examples include educational signage and stewardship.	Impacts and threats to streams related to human activities, such as spread of invasive species and irresponsible recreational use, can be mitigated by better education. Expected outcome: better awareness of the public, which will change behaviours responsible for negative impacts.	1	Open
Species-based Actions					
8 ^a	1c	Support the development of invasive species monitoring and rapid response plan. Identify areas where invasive species are likely to establish.	The outcome of this action will be a better understanding of the distribution of invasive species in the Plan area and the ability to respond quickly to new infestations.	1	Open
	2c				

Table A-1 Continued

FWCP Action #	Objective	Action	Rationale & Expected Outcome	Rank	Implementation Approach
STREAMS					
Species-based Actions					
9	2b, 2c	Conduct risk assessments of established Rainbow Trout populations and stocking programs with regard to hybridization with Westslope Cutthroat Trout.	Rainbow Trout genetic introgression has been identified as one of the main threats to native Westslope Cutthroat Populations. Expected outcome: identification of high risk populations, which will help inform next steps/priority actions.	1	Directed
10	1b	Inventory, review, and synthesize existing information on fluvial and adfluvial Species of Interest in the Plan area, including past and present management actions and identify data gaps. Integrate with historic information. This action can be completed concurrently with Action #11.	The review of existing abundance, distribution, age and size information on fluvial/adfluvial Species of Interest will inform management plans addressing specific issues affecting individual streams. Expected outcome: identification of high risk populations, which will help inform next steps/Action #11.	2	Directed
	2b				
11 ^a	1b	Collect biological information to address data gaps and define status of <u>fluvial and adfluvial Species of Interest</u> populations. Integrate with historic information. This action can be completed concurrently with Action #10.	Addressing data gaps will enable a better depiction of the status of Species of Interest populations in the watershed. Expected outcome: abundance, distribution, age and size information on fluvial/adfluvial Species of Interest from poorly studied populations to inform management plans.	2	Directed
	2b				
Land Securement					
12 ^b	1a	Protect critical stream habitats identified in Action #1 and/or 2 through covenant and stewardship opportunities. Properties adjacent to existing protected properties, and those that protect Recovery and Focal Species should be the priority.	Multi-stakeholder cooperation is required to secure high-value areas that are under threat. Expected outcome: securement of critical lake habitat.	1	Directed

Table A-1 Continued

FWCP Action #	Objective	Action	Rationale & Expected Outcome	Rank	Implementation Approach
STREAMS					
Monitoring & Evaluation					
13 ^a	1b	Monitor the status and trends of <u>fluvial and adfluvial Species of Interest</u> populations (e.g. Westslope Cutthroat Trout, Kokanee, Rainbow Trout, Bull Trout). Collect genetic data at the same time.	To identify changes in populations which would inform requirement for new management actions and to measure success of conservation/ restoration/ enhancement efforts. Expected outcome: inform future actions; identification of changes to threats.	1	Directed
	2b				
14 ^b	1a	Evaluate results of habitat-based actions.	To measure success of conservation/ restoration/ enhancement efforts. Expected outcome: inform future habitat-based actions, develop schedules and budgets for habitat targets.	2	Directed
	2a				
15	1a	Collect baseline data and/or monitor stream habitats to evaluate climate change impacts.	Changes in climate are anticipated to affect water levels and quantity conditions as well as riparian vegetation growth and productivity. Expected outcome: prediction of climate change impacts, their severity and means to improve habitat resiliency in response to climate change.	3	Open
	2a				
	3a				

Table A-1 Continued

FWCP Action #	Objective	Action	Rationale & Expected Outcome	Rank	Implementation Approach
Wetland and Riparian Areas					
Research and Information Acquisition					
1 ^b	1a	Determine abundance, distribution, and category of wetland and riparian habitat, using LIDAR and/or available information from the Southern Rocky Mountain Management Plan (SRMMP) where possible. Identify data gaps. This work is currently being completed in the Elk Valley Focal Area through the Columbia Riparian/Wetland Action Plan but is required for the rest of the Plan area, which is poorly mapped. This action can be completed concurrently with Action #2 & 3.	Assessing wetland and riparian habitat is necessary to identify threats, prioritize and establish targets for conservation/ restoration/ enhancement activities and avoid duplication of effort. Expected outcome: inform management plans, inform Actions #2, 3 & 19, and identify wetlands/riparian areas that require habitat assessment.	1	Directed
	2a				
	3a				
2 ^b	1a	Conduct/compile a biophysical inventory of the wetland and riparian areas and identify data gaps. This work is currently being completed in the Elk Valley Focal Area but is required for the rest of the Plan area. This action can be completed concurrently with Action #1 & 3.	Assessing wetland and riparian habitat is necessary to identify threats, prioritize and establish targets for conservation/ restoration/ enhancement activities and avoid duplication of effort. Expected outcome: inform management plans, inform Actions #3 & 19 and identify wetlands/riparian areas that require habitat assessment.	1	Directed
	2a				
	3a				
3 ^b	1a	Assess habitat to identify condition and prioritize focal wetland and riparian conservation/ restoration/ enhancement opportunities. This work is currently being completed in the Elk Valley Focal Area but is required for the rest of the Plan area. This action can be completed concurrently with Action #1 & 2.	Future conservation/ restoration/ enhancement strategies will center on focal habitat. Consider small wetlands, which provide important habitat but are often missed because of their size. Expected outcome: a list of potential projects for individual wetland and riparian areas, which will help address or mitigate negative impacts and limiting factors to habitat; inform Action #19.	1	Directed
	2a				
4 ^b	1a	Conduct an overview of existing wetland/riparian stewardship groups to identify work completed and underway and the capacity/interest of these groups for additional projects. This work is currently being completed in the Elk Valley Focal Area but is required for the rest of the Plan area.	Complex arrangement of existing stewardship groups to be unravelled to ensure that duplication of effort does not occur. Need to develop partnerships and local support for this work. Expected outcome: understanding of stewardship work underway and potential for partnerships.	3	Directed
	2a				
	3b				

Table A-1 Continued

FWCP Action #	Objective	Action	Rationale & Expected Outcome	Rank	Implementation Approach
Wetland and Riparian Areas					
Habitat-based Actions					
5 ^b	1a	Identify and map high-value wildlife trees in wetland and riparian environments.	Information can be used for wildlife tree stewardship and protection. Expected outcome: inform management plans and understanding of priority wildlife trees that require protection.	1	Open
	2a				
	3a				
6 ^b	2a	Evaluate and implement options to improve habitat connectivity across roadways and along streams for amphibians and reptiles.	Movement between habitats, across provincial/international borders and transportation routes (e.g. major highways) is often disrupted. Expected outcome: improved connectivity.	1	Open
7 ^b	2a	Explore opportunities to work with managing partners to maintain the productivity of managed wetlands (e.g. Bummers Flats).	Managed wetlands require periodic treatment to maintain productivity.	1	Open
8 ^b	1a	Where ecologically significant habitats exist, support initiatives (e.g. Grassland and Rangeland Enhancement Program, GREP) to find management solutions (e.g. working with range agreement holders and private landowners to purchase and deploy permanent and/or portable fencing and water systems).	Although agriculture provides benefits to wildlife by maintaining large tracts of non-urbanized land, overgrazing and uncontrolled access by domestic stock can generate significant habitat damage resulting in soil compaction, introduction of invasive species and indirect impacts on wildlife (e.g. reduced ungulate winter range quality). Expected outcome: decreased impact of cattle grazing on habitat.	1	Open
	2a				
9 ^b	1a	Implement educational stewardship program on streambank and wetland clearing.	Riparian vegetation is being lost due to private land clearing. Expected outcome: better awareness of impacts of streambank and wetland clearing, including bank stability.	1	Open
	2a				
	3b				
10 ^b	1a	Explore opportunities to work with partners to manage recruitment of cottonwood stands. Evaluate influence of upland/riparian/wetland habitat on cottonwood stands and Species of Interest.	Cottonwood recruitment/persistence within the drawdown zones or habitats that do not receive seasonal flooding have been significantly degraded in some areas. Expected outcome: improved cottonwood habitat and Species of Interest populations that depend on them.	1	Open
	2a				

Table A-1 Continued

FWCP Action #	Objective	Action	Rationale & Expected Outcome	Rank	Implementation Approach
Wetland and Riparian Areas					
Habitat-based Actions					
11 ^b	2a	Restore riparian grass sites to native species composition to improve function.	Some grassland habitats are composed of non-native grasses that enable invasive plant encroachment when disturbed. Expected outcome: restoration of native grasses and improved function.	1	Open
12 ^a	1a	Support work that seeks to resolve access and recreation management issues that affect conservation/ restoration/ enhancement objectives (e.g. increase signage and education, 'Access Guardian' program).	The rapid expansion in road networks and off-road vehicle use has resulted in a dramatic increase in public use of lands. This increase negatively impacts sensitive fish and wildlife populations and their habitats and exacerbates the spread of invasive species. Expected outcome: decrease in negative impacts related to access and recreational use.	1	Open
	2a				
	3b				
13	3b	Support education and outreach for public awareness of threats and challenges of wetland and riparian ecosystems. Threats include consequences of unauthorized introductions of invasive species and impacts from recreational use. Examples include educational signage and stewardship.	Impacts and threats to wetland and riparian areas related to human activities, such as spread of invasive species and irresponsible recreational use can be mitigated by better education. Expected outcome: better awareness of the public, which will change behaviours responsible for negative impacts.	1	Open
14 ^b	1a	Improve cross-valley habitat linkages for wide-ranging carnivores (e.g. grizzly bears), ungulates, amphibians and reptiles.	Bottomland riparian habitats can provide important linkages across valleys. Expected outcome: improved connectivity.	1	Open
	2a				
15 ^b	1a	Integrate restoration of fish rearing and spawning habitat (Burbot, Westslope Cutthroat Trout, Bull Trout, and Kokanee) with wetland and riparian conservation/ restoration/ enhancement (e.g. re-establishment of connection with stream/lake habitat, addition of aquatic vegetation or artificial structures to improve cover and habitat complexity and placement of suitable spawning substrate).	Development in wetland/riparian areas has reduced and/or affected access to rearing and spawning habitat for fish. Expected outcome: improved fish habitat in alignment with wetland and riparian conservation/ restoration/ enhancement efforts.	2	Open
	2a				

Table A-1 Continued

FWCP Action #	Objective	Action	Rationale & Expected Outcome	Rank	Implementation Approach
Wetland and Riparian Areas					
Habitat-based Actions					
16 ^b	1a	Conduct an inventory and assessment of spruce stands within wetlands. Evaluate influence of upland/ riparian/ wetland habitat on spruce stands and Species of Interest.	A limited number of larger tributaries provide suitable site conditions for spruce stands. These stands are unique due to their elevation and juxtaposition with the wetlands. Expected outcome: better knowledge of spruce stands, their ecological role and risks.	3	Open
	2a				
17 ^b	2a	Assess drawdown zones value as spring foraging habitat for ungulates and as habitat for other species.	Drawdown zones may provide resources for Species of Interest, particularly with enhancement. Expected outcome: understanding of the potential for Species of Interest use of enhanced drawdown zones.	3	Open
Species-based Actions					
18 ^a	1c	Support the development of invasive species monitoring and rapid response plans. Identify areas where invasive species are likely to establish or have already established.	Invasive plants threaten the productivity of native wetland and riparian ecosystems (e.g. Eurasian Watermilfoil, Spotted and Diffuse Knapweed, Dalmatian and Yellow Toadflax, Common Tansy, Perennial Pepperweed, Orange Hawkweed, Purple Loosestrife, Leafy Spurge, and Yellow Perch). Expected outcome: better understanding of the distribution of invasive species in the Plan area and the ability to respond quickly to new infestations.	1	Open
	2c				
19 ^b	1b	Conduct baseline waterfowl, migratory shorebird and other Species of Interest surveys. Integrate with historic information.	Use and trend information is required to assess the importance of the Plan area wetlands. Expected outcome: better understanding of the status of Species of Interest.	1	Open

Table A-1 Continued

FWCP Action #	Objective	Action	Rationale & Expected Outcome	Rank	Implementation Approach
Wetland and Riparian Areas					
Land Securement					
20 ^b	1a	Protect critical wetland and riparian habitats identified in Actions #1, 2, and/or 3 through covenant and stewardship opportunities. Properties adjacent to existing protected properties, and those that protect Recovery and Focal Species should be priority.	Multi-stakeholder cooperation is required to secure high-value lands that are under threat. Expected outcome: securement of critical wetland and riparian habitat.	2	Directed
Monitoring and Evaluation					
21 ^b	1a	Evaluate results of habitat-based actions.	To measure success of conservation/ restoration/ enhancement efforts. Expected outcome: inform future habitat-based actions, develop schedules and budgets for habitat targets.	1	Directed
	2a				
	2a				
25	1a	Collect baseline data and/or monitor wetland and riparian habitats to evaluate climate change impacts.	Changes in climate are anticipated to affect water levels and quantity conditions as well as riparian vegetation growth and productivity. Expected outcome: prediction of climate change impacts, their severity and means to improve habitat resiliency in response to climate change.	3	Open
	2a				

Table A-1 Continued

FWCP Action #	Objective	Action	Rationale & Expected Outcome	Rank	Implementation Approach
Upland and Dryland Areas					
Research and Information Acquisition					
1 ^b	2a	Support research that helps develop ER techniques for NDT3/ NDT4 (Daniels et al., 2011) and other habitat types, such as pocket grasslands, riparian forests and mesic sites. Examples include improvements to prescribed burning, slashing, piling, pile burning and seeding techniques.	Allows replication of naturally functioning processes or similar outcomes using alternate techniques. Expected outcome: improved mid- to high-elevation habitat and movement corridors; improved ER techniques for Program area.	2	Open

Table A-1 Continued

FWCP Action #	Objective	Action	Rationale & Expected Outcome	Rank	Implementation Approach
Upland and Dryland Areas					
Habitat-based Actions					
2 ^b	2a	Support ecosystem restoration (ER) in the Plan area. Contribute to re-evaluation and refinement of criteria developed to prioritize suitable ER areas and to determine effectiveness in increasing desirable plant species.	Considerable ER knowledge and management has been developed in the Plan area that align with Program objectives. Expected outcome: improvement in upland and dryland habitat; improvement in selecting ER areas and treatment techniques.	1	Open
3 ^b	1a	Support work towards conservation and improvement of important connectivity habitat (i.e. corridors, including high elevation) for wide-ranging animals (e.g. carnivores and ungulates).	Movement between mountain ranges and drainages, across provincial/international borders and transportation routes (e.g. major highways) is often disrupted. Expected outcome: improved connectivity.	1	Open
	2a				
	2a				
4 ^b	1a	Support recruitment and management of cavity nests and wildlife trees (i.e. identifying and mapping cavity nests and wildlife trees, developing guidelines, maintaining existing cavity nests and wildlife trees, creating artificial cavities, snags, and additional wildlife trees).	Many Species of Interest depend on cavity nests and wildlife trees for habitat. Expected outcome: increase in important cavity nest and wildlife tree habitat.	1	Open
	2a				
5 ^{a,b}	1a	Support work that seeks to resolve access and recreation management issues that affect conservation/ restoration/ enhancement objectives (e.g. increase signage and education, 'Access Guardian' program).	The rapid expansion in road networks and off-road vehicle use has resulted in a dramatic increase in public use of lands. This increase negatively impacts sensitive wildlife populations and their habitats, and exacerbates the spread of invasive species. Expected outcome: decrease in negative impacts related to access and recreational use.	1	Open
	2a				
	3b				
6	3b	Support education and outreach for public awareness of threats and challenges of upland and dryland ecosystems. Threats include consequences of unauthorized introductions of invasive species and impacts from recreational use. Examples include educational signage and stewardship.	Impacts and threats to upland and dryland areas related to human activities, such as spread of invasive species and irresponsible recreational use, can be mitigated by better education. Expected outcome: better awareness of the public, which will change behaviours responsible for negative impacts.	1	Open

Table A-1 Continued

FWCP Action #	Objective	Action	Rationale & Expected Outcome	Rank	Implementation Approach
Upland and Dryland Areas					
Habitat-based Actions					
7	1a	Identify, maintain, and recruit stands or individual trees of large diameter Western Larch, Ponderosa pine and Douglas fir in NDT3 and NDT4 zones. Prioritize stands that may become Old Growth Management Areas (OGMAs).	Large diameter tree species provide important habitat for various wildlife species (e.g. Williamson's Sapsucker) and are rare on the landscape. Expected outcome: improvement in dryland and upland habitat.	1	Open
	2a				
8	2a	Support Whitebark Pine restoration efforts.	Whitebark Pine is listed as Endangered under the Species At Risk Act (SARA) and is the focus of international recovery efforts. Whitebark Pine habitats support a suite of unique, high elevation species. Expected outcome: improved Whitebark Pine habitat.	1	Open
9 ^a	1a	Support efforts to identify, manage and recruit mature and old upland and dryland ecosystems, particularly in grasslands and OGMAs.	The ecology of old growth forests is complex and contiguous blocks are rare in the area. Expected outcome: improvement in dryland and upland habitat.	2	Open
	2a				
10 ^a	1a	Where ecologically significant habitats exist, support initiatives (e.g. Grassland and Rangeland Enhancement Program, GREP) to protect the habitat and associated species. Examples include working with range agreement holders and private landowners to purchase and deploy permanent and/or portable fencing and water systems.	Although agriculture provides benefits to wildlife by maintaining large tracts of non-urbanized land, poorly managed grazing and uncontrolled access by domestic stock can generate significant habitat impacts such as soil compaction, introduction of invasive species, reduced ungulate winter range quantity and quality. Expected outcome: improved habitat due to improved management of domestic stock.	2	Open
	2a				
11 ^{a,b}	2a	Develop a collaborative framework to identify enhancement opportunities in pocket grasslands, riparian forests, mesic sites and NDT3/NDT4 zones based on approved Ungulate Winter Range guidelines developed for forest licensees.	Opportunities exist for working with forest licensees to enhance ungulate winter range, as well as habitat connectivity and ER. Expected outcome: improvement in upland and dryland habitat.	3	Directed

Table A-1 Continued

FWCP Action #	Objective	Action	Rationale & Expected Outcome	Rank	Implementation Approach
Upland and Dryland Areas					
Species-based Actions					
12 ^b	1b	Support ongoing winter ungulate inventories (both aerial and ground) in order to estimate trends in population size, age and sex ratios, as well as level of use in target areas. Integrate with historic information. Additionally, telemetry studies will provide information on movement routes, timing of movement and sources of mortality.	Ungulate inventories and telemetry studies can help evaluate the effectiveness of habitat treatments, identification of sites that may need treatment and aid in determining which ungulate species are increasing and/or decreasing within specific geographical areas. Expected outcome: inform habitat-based actions for ungulates and status of ungulates.	1	Directed
	2b				
	3a				
13 ^a	1c	Support the development of invasive species monitoring and rapid response plans. Identify areas where invasive species are likely to establish or have already established.	Invasive plants can reduce the productivity of important upland and dryland habitats. Expected outcome: better understanding of the distribution of invasive species in the r area and the ability to respond quickly to new infestations.	1	Open
	2c				
14 ^{a,b}	2c	Support the control of invasive plant species (i.e. remove or reduce) prior to habitat restoration treatments.	Removal or reduction in invasive species abundance prior to habitat restoration treatments will help minimize the spread of invasive species post-treatment. Expected outcome: improvement in ER efforts due to reduced impact of invasive species.	1	Open
Land Securement					
15 ^b	1a	Protect critical upland and dryland habitats through covenant and stewardship opportunities. Properties adjacent to existing protected properties and those that protect Recovery and Focal Species should be the priority.	Multi-stakeholder cooperation is required to secure high-value lands that are under threat. Expected outcome: securement of critical upland and dryland habitats.	2	Directed

Table A-1 Continued

FWCP Action #	Objective	Action	Rationale & Expected Outcome	Rank	Implementation Approach
Upland and Dryland Areas					
Monitoring and Evaluation					
16	2a	Monitor and assess ER work in restoring open range and open forest ecosystems, including ungulate winter range. Determine habitat response and influence on ungulate populations.	The effectiveness of ER treatments can be measured by monitoring subsequent species responses (e.g. ungulates, bunch grasses). Expected outcome: inform future ER actions, develop schedules and budgets for habitat targets.	1	Open
17 ^b	2a	Test the Ecosystem Scorecard that was developed by the FWCP to assess the potential impacts of restoration treatment based on pre-treatment vegetation abundance, composition and distribution.	This tool will help in ER planning to determine desired future conditions for sites targeted for restoration. Expected outcome: better ER planning.	2	Directed
18 ^b	2a	Evaluate results of habitat-based actions. Ensure invasive plant species distribution and abundance does not increase.	To measure success of conservation/ restoration/ enhancement efforts. Expected outcome: inform future habitat-based actions, develop schedules and budgets for habitat targets.	2	Directed
19	1a	Collect baseline data and/or monitor upland and dryland habitats to evaluate climate change impacts.	Changes in climate are anticipated to affect upland and dryland productivity. Expected outcome: prediction of climate change impacts, their severity and means to improve habitat resiliency in response to climate change.	3	Open
	2a				

a Actions that are traditionally out of FWCP scope as they directly overlap with core activities of government, non-government agencies, and/or programs.

b Actions that overlap with Columbia Basin Action Plan.

6.2 Appendix 2

Table B-1. Overall UKEEP Objectives, Action Plan Sub-objectives, Performance Measures, and Targets.

FWCP UKEEP Objectives	Subobjective	Performance Measure	Target
Lakes Action Plan			
1 Conserve productivity and diversity of lake ecosystems in the Plan area	a. Identify and conserve important habitat for Species of Interest	Area of conserved habitat	Increase in availability of important habitat for Species of Interest protected against human impacts
	b. Characterize and monitor the status of Species of Interest	Knowledge of the status of Species of Interest	The establishment or improvement of baseline knowledge of the status of Species of Interest
	c. Support efforts to prevent introduction of invasive species	Establishment/spread of invasive species in new areas	No new established invasive species
2 Restore and enhance lake habitats and populations of Species of Interest	a. Restore and enhance important habitat for Species of Interest	Area of restored/enhanced habitat	Increased area of restored/enhanced habitat that improves lake productivity
	b. Support Species of Interest population recovery/maintenance	Natural recruitment of Species of Interest populations	Improvement in abundance and distribution of Species of Interest populations due to recovery efforts
	c. Control of established invasive species	Abundance and distribution of invasive species	Decrease in abundance and distribution of invasive species due to control efforts
3 Contribute to the maintenance or improvement of opportunities for sustainable use, including harvesting	a. Contribute data to help inform decision making on sustainable use targets for resources	Habitat that supports Species of Interest populations and abundance of Species of Interest populations	Lake resource use does not affect the sustainability of Species of Interest populations
	b. Support public education and awareness regarding threats and challenges to lake ecosystems, which will motivate ecologically-informed decisions and actions	Awareness of the public of threats and challenges to lake ecosystems	Reduced incidence of negative impacts caused by humans due to ecologically-informed decisions and actions as a result of increased awareness of the public of threats and challenges to lake ecosystems

Table B-2 Continued

FWCP UKEEP Objectives	Subobjective	Performance Measure	Target
Streams Action Plan			
1 Conserve productivity and diversity of stream ecosystems in the Plan area	a. Identify and conserve important habitat for Species of Interest	Area of conserved habitat	Increase in availability of important habitat for Species of Interest protected against human impacts
	b. Characterize and monitor the status of Species of Interest	Knowledge of the status of Species of Interest	The establishment or improvement of baseline knowledge of the status of Species of Interest
	c. Support efforts to prevent introduction of invasive species	Establishment/spread of new invasive species	No new established invasive species
2 Restore and enhance stream habitat and populations of Species of Interest	a. Restore and enhance important habitat for Species of Interest	Area of restored/enhanced habitat	Increased area of restored/enhanced habitat that improves stream productivity
	b. Support Species of Interest population recovery/maintenance	Natural recruitment of Species of Interest populations	Improvement in abundance and distribution of Species of Interest populations due to recovery efforts
	c. Control of established invasive species	Abundance and distribution of invasive species	Decrease in abundance and distribution of invasive species due to control efforts
3 Contribute to the maintenance or improvement of opportunities for sustainable use, including harvesting	a. Contribute data to help inform decision making on sustainable use targets for resources	Habitat that supports Species of Interest populations and abundance of Species of Interest populations	Stream resource use does not affect the sustainability of Species of Interest populations
	b. Support public education and awareness regarding threats and challenges to stream ecosystems, which will motivate ecologically-informed decisions and actions	Awareness of the public of threats and challenges to stream ecosystems	Reduced incidence of negative impacts caused by humans due to ecologically-informed decisions and actions as a result of increased awareness of the public of threats and challenges to stream ecosystems

Table B-2 Continued

FWCP Objectives	Subobjective	Performance Measure	Target
Wetland and Riparian Area Action Plan			
1 Conserve productivity and diversity of wetland and riparian ecosystems in the Plan area	a. Identify and conserve important habitat for Species of Interest	Area of conserved habitat	Increase in availability of important habitat for Species of Interest conserved from human impacts
	b. Characterize and monitor the status of Species of Interest	Knowledge of the status of Species of Interest	The establishment or improvement of baseline knowledge of the status of Species of Interest
	c. Support efforts to prevent introduction of invasive species	Establishment of new invasive species	No new established invasive species
2 Restore and enhance wetland and riparian habitat and populations of Species of Interest	a. Restore and enhance important habitat for Species of Interest	Area of restored/enhanced habitat	Increased area of restored/enhanced habitat that improves riparian/wetland area productivity
	b. Support Species of Interest population recovery/maintenance	Natural recruitment of Species of Interest populations	Improvement in abundance and distribution of Species of Interest populations due to recovery efforts
	c. Control of established invasive species	Abundance and distribution of invasive species	Decrease in abundance and distribution of invasive species due to control efforts
3 Contribute to the maintenance or improvement of opportunities for sustainable use, including harvesting	a. Contribute data to help inform decision making on sustainable use targets for resources	Habitat that supports Species of Interest populations and abundance of Species of Interest populations	Riparian/wetland area resource use does not affect sustainability of Species of Interest populations
	b. Support public education and awareness regarding threats and challenges to wetland and riparian ecosystems, which will motivate ecologically-informed decisions and actions	Awareness of the public of threats and challenges to wetland and riparian ecosystems	Reduced incidence of negative impacts caused by humans due to increased awareness of the public of threats and challenges to wetland and riparian ecosystems

Table B-2 Continued

FWCP Objectives	Subobjective	Performance Measure	Target
Upland/Dryland Action Plan			
1 Conserve productivity and diversity of upland and dryland ecosystems in the Plan area	a. Identify and conserve important habitat for Species of Interest	Area of conserved habitat	Increase in availability of important habitat for Species of Interest conserved from human impacts
	b. Characterize and monitor the status of Species of Interest	Knowledge of the status of Species of Interest	The establishment or improvement of baseline knowledge of the status of Species of Interest
	c. Support efforts to prevent introduction of invasive species	Establishment of new invasive species	No new established invasive species
2 Restore and enhance upland and dryland habitat and populations of Species of Interest	a. Restore and enhance important habitat for Species of Interest	Area of restored/enhanced habitat	Increased area of restored/enhanced habitat that improves upland/dryland area productivity
	b. Support Species of Interest population recovery/maintenance	Natural recruitment of Species of Interest populations	Improvement in abundance and distribution of Species of Interest populations due to recovery efforts
	c. Control of established invasive species	Abundance and distribution of invasive species	Decrease in abundance and distribution of invasive species due to control efforts
3 Contribute to the maintenance or improvement of opportunities for sustainable use, including harvesting	a. Contribute data to help inform decision making on sustainable use targets for resources	Habitat that supports Species of Interest populations and abundance of Species of Interest populations	Upland/dryland area resource use does not affect the sustainability of Species of Interest populations
	b. Support public education and awareness regarding threats and challenges to upland and dryland ecosystems, which will motivate ecologically-informed decisions and actions	Awareness of the public of threats and challenges to upland and dryland ecosystems	Reduced incidence of negative impacts caused by humans due to increased awareness of the public of threats and challenges to upland and dryland ecosystems

Table B-2 Continued

FWCP Objectives	Subobjective	Performance Measure	Target	
Species of Interest Action Plan				
1	Conserve productivity and diversity of ecosystems in the Plan area	a. Identify and conserve important habitat for Species of Interest b. Characterize and monitor the status of Species of Interest	Area of conserved Species of Interest habitat Knowledge of the status of Species of Interest	Increase in availability of important habitat for Species of Interest conserved from human impacts The establishment or improvement of baseline knowledge of the status of Species of Interest
	2	Restore and enhance habitat and populations of Species of Interest	a. Restore and enhance important habitat for Species of Interest b. Support Species of Interest population recovery/maintenance	Area of restored/enhanced Species of Interest habitat Natural recruitment of Species of Interest populations
3		Contribute to the maintenance or improvement of opportunities for sustainable use, including harvesting	a. Contribute data to help inform decision making on sustainable use targets for resources b. Support public education and awareness regarding threats and challenges to Species of Interest, which will motivate ecologically-informed decisions and actions	Habitat that supports Species of Interest populations and abundance of Species of Interest populations Awareness of the public of threats and challenges to Species of Interest