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COLUMBIA REGION: RIVERS & RIPARIAN AREAS ACTION PLAN

August 21, 2019 (V1)

The Fish & Wildlife Compensation Program is a partnership between BC Hydro, the Province of B.C., Fisheries and Oceans Canada, First Nations, and Public Stakeholders to conserve and enhance fish and wildlife in watersheds impacted by BC Hydro dams.

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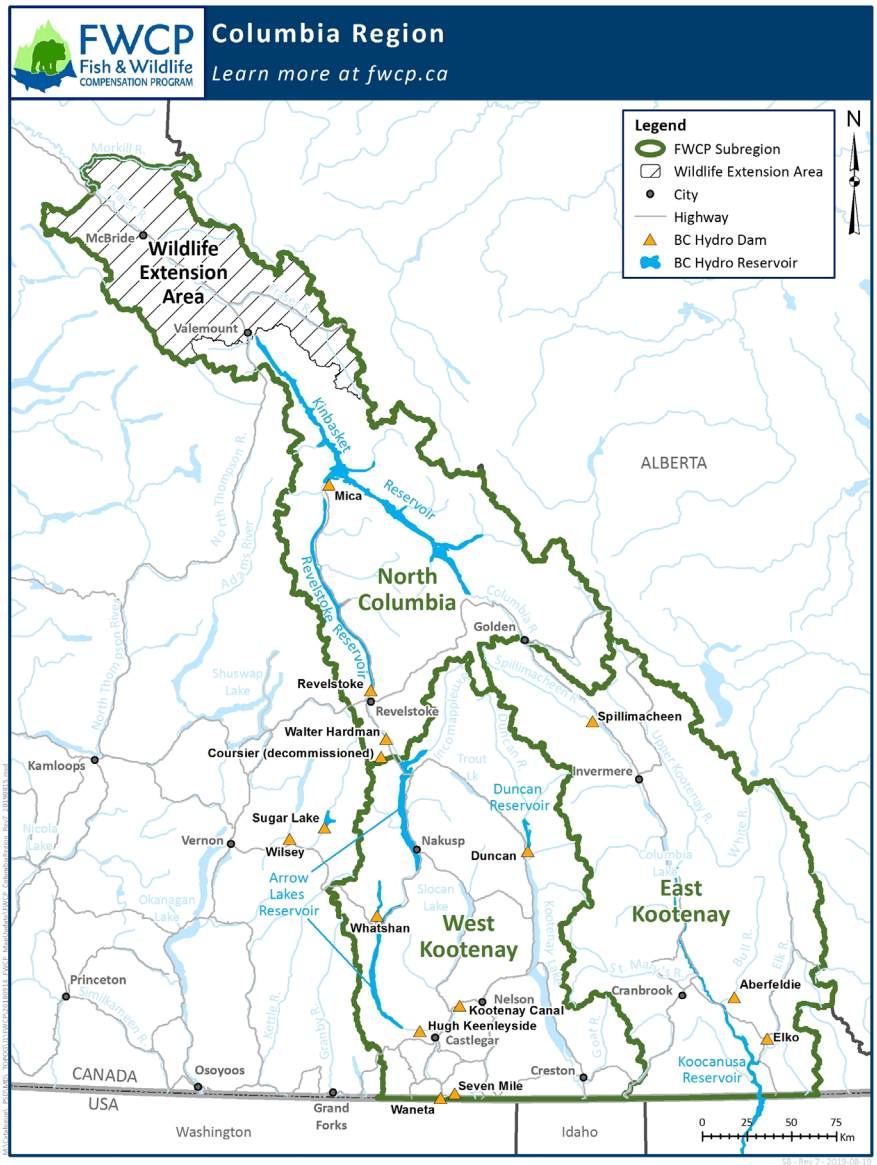

The Fish & Wildlife Compensation Program is conserving and enhancing fish and wildlife in watersheds impacted by construction of BC Hydro dams in the Columbia Region, including four major hydroelectric dams built before 1984, two water storage dams that don't generate power, and seven smaller hydroelectric dams. Learn more at bchydro.com/energy-in-bc/operations/our-facilities/columbia.html.
Cover photos clockwise from left: Westslope Cutthroat Trout, B. Meunier; Harlequin Duck, i-Stock,-P. Williams; Burbot, iStock-Scubaluna; juvenile Upper Columbia River White Sturgeon, A. Glass; Duncan River, R. Clarke.

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The Fish & Wildlife Compensation Program (FWCP) is a partnership between BC Hydro, the Province of B.C., Fisheries and Oceans Canada, First Nations, and Public Stakeholders to conserve and enhance fish and wildlife in watersheds impacted by BC Hydro dams. The FWCP funds projects within its mandate to conserve and enhance fish and wildlife in the Columbia Region ecosystems.

Learn more about the FWCP, projects underway now, and how you can apply for a grant at fwcp.ca. Subscribe to our free email updates and annual newsletter at fwcp.ca/subscribe. Contact us anytime at fwcp@bchydro.com.

EXECUTIVE SUMMARY

Rivers & Riparian Areas Action Plan

The Fish & Wildlife Compensation Program (FWCP) is a partnership between BC Hydro, the Province of B.C., Fisheries and Oceans Canada (DFO), First Nations, and Public Stakeholders to conserve and enhance fish and wildlife impacted by BC Hydro dams. This Action Plan builds on the FWCP's strategic objectives and is an update to the previous *FWCP Streams Action Plan*. The Action Plan was developed with input from BC Hydro, DFO, the Province of B.C., participating First Nations, and local communities. It specifies Priority Actions that will conserve, restore, and enhance fish and wildlife species and their rivers and riparian habitats in the Columbia Region.

Priority Actions are in the Action Tables at the end of this document. The Priority Actions are intended to support the FWCP's strategic objectives of conservation, sustainable use, and community engagement. Actions fall into one or more of the following Action Categories for rivers and riparian area ecosystems and associated species of interest:

- **Research and Information Acquisition** – These actions will collect information necessary to evaluate, review, and implement subsequent rivers and riparian area conservation, restoration, and enhancement actions. Examples include inventory, conservation, and restoration planning and other activities to address data gaps and fulfill information needs to complete other actions.
- **Habitat-based Actions** – These actions will conserve, restore, and enhance rivers and riparian habitats. Examples include habitat creation, restoration, and enhancement; enhancing habitat connectivity, such as tributary access; and invasive species prevention.
- **Monitoring and Evaluation** – These actions will monitor and evaluate rivers and riparian area projects supported by the FWCP to understand the effectiveness of habitat- or species-based actions.
- **Land Securement** – These actions will contribute to investigating and prioritizing land securement for conservation purposes.
- **Species-based Actions** – These actions will alleviate limiting factors for species that utilize rivers and riparian habitats. Examples include restoration planning and species-specific habitat restoration and initiatives.

This Action Plan sets out Priority Actions for the FWCP that will guide funding decisions for FWCP projects in rivers and riparian ecosystems of the Columbia Region. The focus of the next five-year period will be Priority Actions identified for fish and wildlife species within all rivers and streams in the FWCP Columbia Region (including but not limited to remaining river fragments along the Columbia and Kootenay Rivers mainstem up to the upper basin headwater tributaries). Projects on fish and wildlife that utilize tributaries of reservoirs and large lakes are eligible for actions in this ecosystem plan, as well as actions in the Reservoirs & Large Lakes Ecosystem Plan.

Priority species of interest for river and riparian ecosystems includes three recovery species, White Sturgeon, Western Screech-Owl, and Yellow-breasted Chat, as well as many focal and inventory species.

This Action Plan, and specifically the Action Tables, sets out FWCP priorities for investments in compensation activities within rivers and riparian area habitats. However, actions may not translate into funded projects. FWCP funding limitations require priority-setting across the Columbia Region's ecosystems and species of interest. The process of selecting which actions will be implemented in any given year will occur during the annual grant intake and project selection cycle. See fwcp.ca for more information.

Introduction to the FWCP

The Fish & Wildlife Compensation Program (FWCP) is a partnership between BC Hydro, the Province of B.C., Fisheries and Oceans Canada, First Nations, and Public Stakeholders to conserve and enhance fish and wildlife in watersheds impacted by construction of BC Hydro dams. The FWCP is funded annually by BC Hydro and directs those funds toward projects that address Priority Actions across its three regions. BC Hydro has water licence obligations in its Columbia and Peace Regions and has made voluntary commitments to address the impacts of dams in the Coastal Region. BC Hydro fulfills the applicable obligations through the work of the FWCP.

Introduction to this Action Plan

This Action Plan provides important background information about river and riparian habitats in the Columbia Region, including hydro development projects by BC Hydro, and conservation and enhancement projects funded by the FWCP. This Action Plan outlines our Priority Actions for fish and wildlife eligible for an FWCP Grant.

Learn more about the FWCP, projects underway now, and how you can apply for a grant at fwcp.ca. Anyone interested in applying for an FWCP grant should review our Priority Actions (see Action Tables) and develop a grant application that aligns with a Priority Action(s). Contact us to discuss our grants, Priority Actions, and how we can help you develop your grant application.

Subscribe to our free email updates and annual newsletter at fwcp.ca/subscribe and we will keep you posted about our grants and the projects we fund. Contact us anytime at fwcp@bchydro.com or learn more at fwcp.ca.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION AND BACKGROUND

FWCP Introduction

The FWCP Action Plans provide strategic direction for each region based on the unique priorities, compensation opportunities, and commitments in the region, and they reflect the FWCP's vision and mission. The Action Plans describe the strategies and Priority Actions to support FWCP objectives of conservation, sustainable use, and community engagement. Please refer to the Columbia Region Overview and Action Plan document for more information on the process that was followed to develop Action Plans in 2018–2019. Actions Plans have been developed for Reservoirs & Large Lakes; Small Lakes; Rivers & Riparian Areas; Wetlands & Riparian Areas; and Upland & Dryland; some actions may be complementary across the different plans.

This Rivers & Riparian Areas Action Plan sets out priorities for the FWCP to guide projects within the FWCP Columbia geographic area in support of fish and wildlife. The plan builds on the FWCP's strategic objectives and the FWCP Columbia Region Overview and Action Plan document. The structure of this Rivers & Riparian Areas Action Plan is shown in Figure 1.

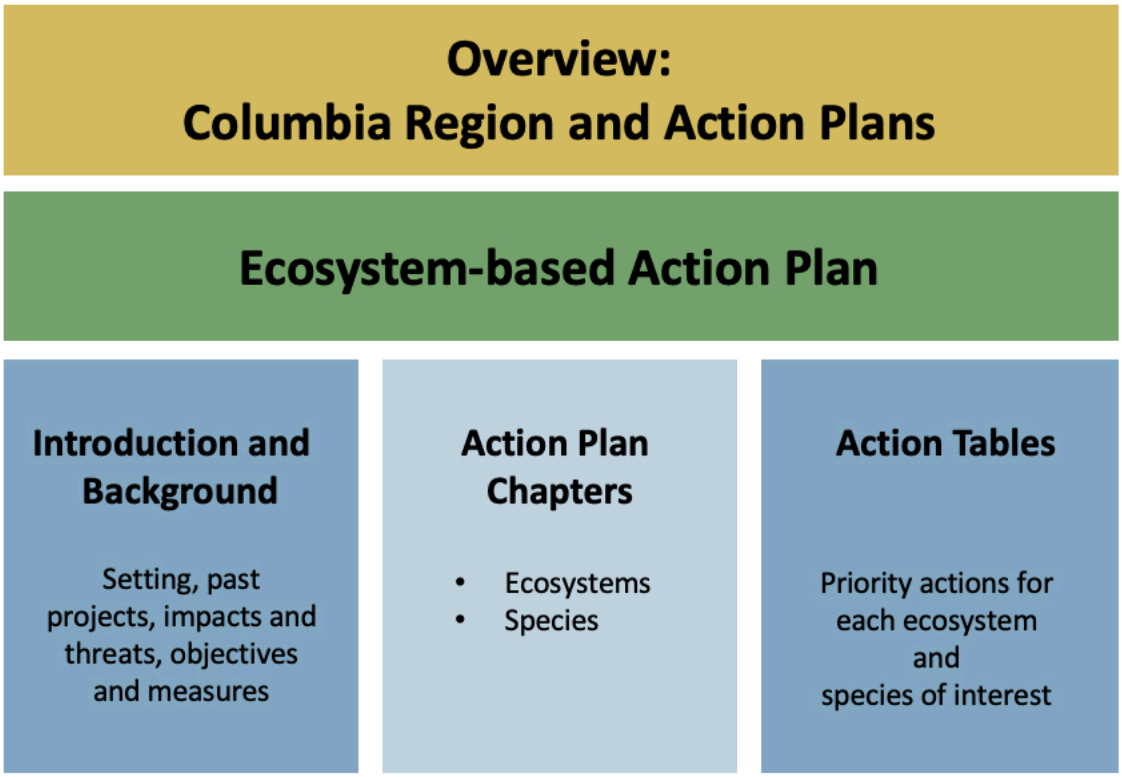

Figure 1: Overview and Action Plan document structure.

The strategic objectives and the Priority Actions described herein have been developed with input from the Province of B.C., Fisheries and Oceans Canada (DFO), BC Hydro, First Nations, and local stakeholders. See Overview document for details of the 2018–2019 engagement process.

It is important to understand; however, that planning priorities within Action Plans may not translate immediately into funded projects. Limited funding requires that priority-setting be developed across the FWCP as a whole, not just within Action Plans. The process of selecting which actions will be implemented in any given year will occur during the annual implementation planning cycle.

Rivers & Riparian Areas Introduction

The development of BC Hydro dams and reservoirs in the Columbia Region resulted in the inundation of river and riparian area habitat (primarily valley bottom, low gradient). The larger reservoirs that have taken their place are fundamentally different than natural river habitat, resulting in direct and indirect impacts to a number of fish and wildlife species. These habitats also support a variety of consumptive and non-consumptive sustainable use activities by First Nations and the public. By making investments in rivers and riparian areas, the FWCP contributes to improving the status of priority species by improving the habitats on which many of the species depend.

Setting

Since the original habitats have been lost permanently, the FWCP will invest in enhancement and protection of remaining river fragments, as well as other rivers and riparian areas in the program area that are not directly impacted, but where habitat improvement/enhancement opportunities exist. Actions in this plan can apply to all rivers and riparian areas in the region, including tributaries of reservoirs and large lakes regions (Figure 2).

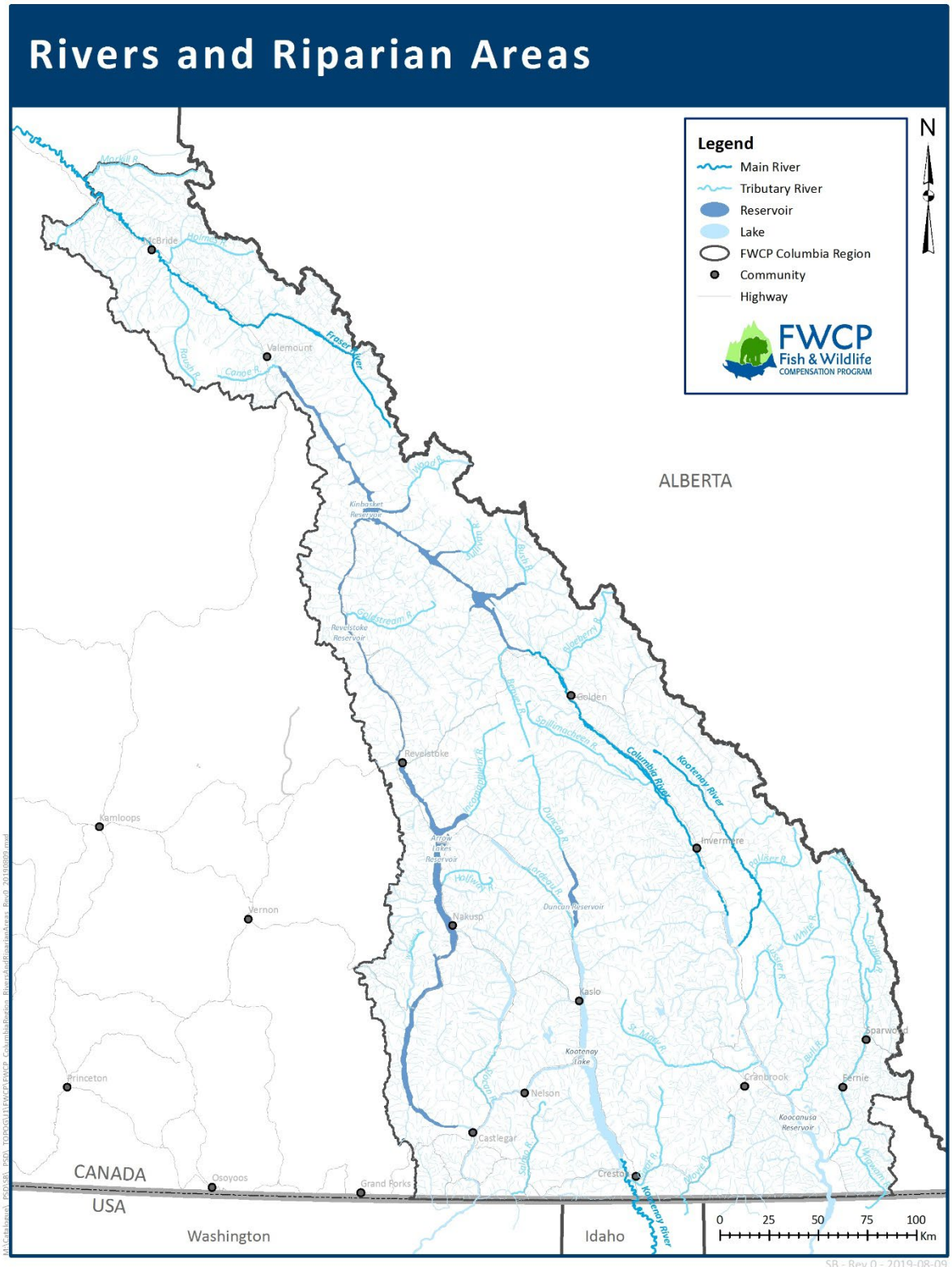

Figure 2: Rivers in the Columbia Region.

Footprint Impacts and Threats

Hydro-related Impacts

As part of the Columbia Dam Impact Study, Thorley (2008) estimated losses and gains of different aquatic habitats. He estimated that more than 1,050 km of river habitat was inundated by reservoirs in the Columbia Region. Additional to this total are 381 km of inundated, mostly low order stream habitat that was estimated through GIS analysis (Thorley 2008). These streams were not identified on pre-construction maps, but were inferred from present-day mapping. Thorley separated total stream losses into categories defined by combinations of stream order, elevation, and stream gradient. Most of the inundated streams were low to moderate elevation (i.e. 300–1,000 m) and low gradient (i.e. <3% slope), which is perhaps not surprising since most of the dams are on rivers in valley bottoms. Habitat losses (including Koocanusa Reservoir) were 231 km for stream order 1–2, 199 km for stream order 3–5, 301 km for stream order 6–7, and 469 km for stream order 8–9.

Non-hydro Impacts

Non-hydro impacts occur on rivers that are not within the BC Hydro footprint area. These impacts include historic and ongoing effects of logging, mining, and land use changes from agriculture, urbanization, and other developments. Such effects vary substantially among locations within the Columbia Region. The establishment of invasive species is also a concern on rivers throughout the entire Columbia Region.

Limiting Factors

Limiting factors likely vary among species, trophic levels, and locations. Limiting factors for fish likely include biotic factors like predation and competition, and abiotic factors like habitat quantity and quality, access to habitats (i.e. passage), summer and winter water temperatures, flow regime, nutrient levels, and length of the growing season. Many rivers and streams in the Columbia Region are naturally low productivity (oligotrophic) systems. The limiting factors include natural and human-induced aspects, and the latter include both hydropower and other developments. Sheer availability of physical river and riparian habitat does not limit opportunities for the program to undertake work in these ecosystems.

Knowledge Status and Gaps

General trends in habitat loss and alteration from BC Hydro facilities have been assessed as part of the Columbia Dam Impacts Study (e.g. Thorley 2008 and references therein). Other region-wide trends in the abundance, distribution, and productivity of rivers and the species dependent on them, have not been compiled. Significant changes have included loss of river and riparian habitat from reservoir creation and the alteration of river and riparian habitat from flow regulation. Land development has resulted in the loss of riparian and instream habitat and invasive species have placed stressors on river systems, causing losses in aquatic and riparian productivity from hydrology changes.

Previously Implemented FWCP Projects

The FWCP has supported projects in rivers and riparian areas ecosystems for several years. A full list of the reports from projects undertaken to date is available online at fwcp.ca/results. Work undertaken during recent project years (2013 to 2017), since the last round of Action Plan updates, included:

- stream enhancements;
- fish surveys and assessments; and
- development of sustainability plans.

Proportionally, the FWCP investments of rivers and riparian areas projects (formerly Streams) has been relatively low; 2% of total project investments between 2013 and 2017. Nineteen projects during this strategic review period primarily addressed stream actions, which amounted to over $500,000 of FWCP investments. Although only about 60% of the actions in this plan were addressed, high-priority rivers that were previously studied included the Salmo River, Columbia River downstream of Keenleyside Dam, Slocan River, and Elk River. Two projects occurred on the Arrow Lakes Tributary

Deer Creek: the Columbia Region Fish Passage Data Analysis addressed rivers throughout the region, and the Closed Loop Stream Enhancement included several rivers and streams throughout the West Kootenays in addition to the Salmo River and Slocan Watershed. No projects during the review period focused on the Kootenay River mainstem downstream of Kootenay Lake, Kootenay River mainstem upstream of Kootenay Lake, Goat River, Palliser River, White River, Bull River, Wigwam River, St. Mary River, and Skookumchuck Creek; all of which were listed as priority streams in the previous *FWCP Streams Action Plan*. Only one project included a focus on the Akolkolex River: the mid-Columbia Ecosystem Enhancement Project. The East Kootenay and North Columbia Regions were not well-studied by previously funded projects.

Bull Trout, Kokanee, insectivorous Rainbow Trout, piscivorous Rainbow Trout, Westslope Cutthroat Trout, and White Sturgeon were all species of interest that were addressed by projects within this Action Plan.

RIVERS & RIPARIAN AREAS ACTION PLAN OBJECTIVES

Clear and realistic objectives are necessary to guide information acquisition and prioritize actions. Priority actions and information needs will change as both improvements to the system are realized and information is gained. The current Action Plan reflects the information available and values expressed by FWCP partners.

The Rivers & Riparian Areas Action Plan has four objectives, which are high-level statements of desired future conditions (outcomes), consistent with FWCP strategic objectives, partner mandates, and policies. Each objective has associated sub-objectives, which provide more specific direction on desired future conditions, including detailed performance measures that can direct specific projects. Priority Actions in the Action Tables align with the objectives and sub-objectives.

Objectives and Measures

The following objectives have been developed to define the scope of the Rivers & Riparian Areas Action Plan. While the objectives are expected to remain stable over time, the projects funded may evolve as priorities shift or new information becomes available.

Rivers and Riparian Areas Action Plan

Strategic Objectives	Objectives	Sub-objectives	Performance Measures
Conservation	Maintain productive and diverse ecosystems	Protect or identify threatened rivers and riparian areas.	Hectares (or linear kilometres) of rivers and riparian area habitats available/improved for species of interest.
		Improve productivity of rivers and riparian area habitats.	Use of rivers and riparian area habitats by species of interest.
		Reduce threats to rivers and riparian area habitats.	Ecosystem restoration plans developed (or updated) for priority areas and/or specific sites.
	Maintain or improve the status of species of interest	Improve the distribution, abundance and/or trend of species of interest.	Viable populations of species of interest in rivers and riparian areas habitats.
		Characterize and monitor the status of species of interest.	Increased knowledge of the status of species of interest (i.e. baseline data).
Sustainable Use	Maintain or improve opportunities for sustainable use	Support actions addressing conservation of species and ecosystems to help inform decision making on sustainable use activities, including culturally important resources.	Viable populations of a range of species that will support hunting, fishing, trapping, wildlife viewing, etc.
Community Engagement	Maintain and improve opportunities for community engagement	Build, maintain and improve relationships with Indigenous communities and local stakeholders and support conservation and sustainable use projects that increase awareness regarding threats and challenges to rivers and riparian areas ecosystems.	Engagement of Indigenous communities and local stakeholders in FWCP-funded projects in rivers and riparian areas that support healthy fish and wildlife populations and ecosystems (e.g. local volunteers, sharing results, raising awareness of FWCP projects, hosting events).

Figure 3: Rivers & Riparian Areas Action Plan objectives and measures.

ACTION PLAN CHAPTERS

The Action Tables in this document identify FWCP Priority Actions to conserve and enhance fish and wildlife in river and riparian area ecosystems in the Columbia Region. See Overview document for additional information on Action Table format and funding application process.

Priority Actions are organized by cross plan actions, ecosystem, and species of interest, and by action type: Research and Information Acquisition, Habitat-based Actions, Monitoring and Evaluation, Land Securement, and Species-based Actions. Actions are assigned a priority ranking from 1 (highest priority) to 3 (lowest priority). All rivers and streams within the Columbia Region are eligible for FWCP investments over the next five years.

Species of interest for rivers and riparian areas are outlined in this Action Plan. There are three priority recovery species of interest (listed below) as well as focal and inventory species of interest associated with river and riparian area habitats for the Columbia Region:

1. White Sturgeon
2. Western Screech-Owl
3. Yellow-breasted Chat

Cross Plan Actions

Several broad cross plan actions are relevant to two or more Action Plans but are not readily nested under any particular sub-objective. Projects that address these actions will require the consideration of multiple ecosystems.

Rivers & Riparian Areas Ecosystems

The Rivers & Riparian Areas Action Plan re-affirms the primary importance of investing in rivers and riparian area habitat for their associated species of interest as the primary near-term means to offset the losses of overall aquatic productivity in the FWCP Columbia Region due to impoundment and BC Hydro activities. As an ecosystem-based plan, there is a focus on habitat-based actions, such as restoration or creation of new habitat. Additional work is required to undertake detailed planning of these actions, some of which will be completed as part of the research and information-acquisition steps. Rivers & Riparian Areas ecosystem actions address:

- development of regional rivers plans;
- monitoring of high-elevation habitat and cold-water refugia;
- prevention and control of invasive species;
- river and riparian area habitat restoration and creation;
- connectivity to tributary habitat; and
- protection and stewardship of river and riparian area habitats.

Priority Habitats

For the purpose of this Action Plan, rivers and riparian areas that could be the focus of FWCP actions are defined as:

- All rivers and streams in the FWCP Columbia Region (including but not limited to remaining river fragments along the Columbia and Kootenay Rivers mainstem up to the upper basin headwater tributaries);
- Riparian areas associated with rivers and streams (including but not limited to floodplain ecosystems and riparian habitats directly adjacent to rivers that differ from upland habitat); and
- Tributaries of reservoirs and large lakes are also eligible for actions in this ecosystem plan (including but not limited to Upper Columbia River, Drimmie Creek, and Kaslo River).

Species of Interest in Rivers & Riparian Areas

Species of interest in river and riparian area ecosystems are species or guilds that are important to communities or are of conservation concern but may not be adequately addressed by ecosystem-based actions. These include some species at risk (SAR) or species used for food or cultural purposes.

The FWCP uses three general categories of species of interest: recovery, focal, and inventory.

Recovery Species	Recovery species are those of highest priority and conservation concern that have been adversely impacted by dam construction and/or operation. These species have formally been classified as either threatened or endangered by Canada or B.C., and recovery and/or management plans are either in place or under development by Federal or Provincial management agencies. Actions for recovery species are directly coordinated with recovery strategies and plans.
Focal Species	Focal species have a strong linkage to dam footprint impacts and are of regional interest. Actions proposed for species in this category should be developed in the context of restoring/improving/enhancing suitable habitats in the relevant ecosystems. Focal species with a high conservation concern (i.e. species at risk) may be considered a higher priority for actions.
Inventory Species	Inventory species have also been affected by dams, but detailed inventory and/or trend monitoring is required to support the development of more detailed actions. Actions proposed for species in this category should aim to provide the basis for future compensation actions. Inventory species with a high conservation concern (i.e. species at risk) may be considered a higher priority for actions.

Recovery Species

There are three recovery species of interest (Table 1) associated with rivers and riparian areas for the Columbia Region. Actions for these species align with Federal and/or Provincial recovery strategies and management plans.

White Sturgeon (*Acipenser transmontanus*)

White Sturgeon is the largest, longest-lived freshwater fish species in North America (Scott and Crossman 1973). Within Canada, White Sturgeon occur only in British Columbia and are divided into six populations, based on geography and genetics: the lower, mid, and upper Fraser River, Nechako River, Columbia River, and Kootenay River. All populations were assessed as endangered by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), but only the latter four are legally listed under the Federal Species at Risk Act. In the Columbia Region, White Sturgeon occur in the Kootenay and Columbia Rivers.

Kootenay River — The Kootenay River population of White Sturgeon extends from Kootenai Falls, Montana, located 50 km below Libby Dam, downstream through Kootenay Lake to Corra Linn Dam on the lower West Arm of Kootenay Lake, British Columbia. A natural barrier at Bonnington Falls downstream of Kootenay Lake has isolated the Kootenay River White Sturgeon from other populations in the Columbia River basin since the end of the Pleistocene, approximately 10,000 years ago (Northcote 1973). Spawning habitat is located in the US, whereas much of the adult and juvenile rearing habitat is located in the Canadian portion of Kootenay River plus Kootenay Lake (e.g. Kootenay delta and tributary creek mouths). Small remnant populations of White Sturgeon are known to occur upstream of Duncan Dam and in Slocan Lake; however, recovery of these populations has been deemed infeasible and the Federal White Sturgeon Recovery Strategy does not consider those demographically isolated population components (Fisheries and Oceans Canada 2014).

Columbia River — White Sturgeon historically had access from the ocean all the way to Columbia Lake in the upper Columbia and Shoshone Falls in the upper Snake River. Distribution was probably concentrated in areas of favourable habitat. Significant concentrations of White Sturgeon were reported during the early 1900s in the mainstem downstream from Castlegar, the lower Kootenay River, Arrow Lakes, Big Eddy near Revelstoke, and the present site of Mica Dam

(Prince 2001). At least two significant populations remain in the Upper Columbia River and other remnant populations consisting of a few individuals occur, or are suspected, throughout other portions of the historic range. The largest population resides in the free-flowing transboundary reach between Hugh L. Keenleyside Dam and Roosevelt Reservoir. A second significant subpopulation of White Sturgeon currently inhabits Arrow Lakes Reservoir (ALR), upstream of HLK. The occurrence of this subpopulation may simply reflect splitting of a larger population by the construction of HLK. Abundance in this subpopulation is substantially lower than in the reach from HLK to FDR. Adult sturgeon have not been collected during investigations in Kinbasket Reservoir, Revelstoke Reservoir, or Trout Lake (RL&L Environmental Services Ltd. 1996a, 1996b, 2000), despite repeated efforts.

The FWCP has supported White Sturgeon aquaculture in the Upper Columbia River. One action is presented for White Sturgeon to support strategies and initiatives outlined in the Federal recovery strategy and draft Action Plan for the species in Canada.

Western Screech-Owl (*Megascops kennicottii macfarlanei*)

Western Screech-Owls are non-migratory raptors and recovery planning is led by the Province of B.C. (Western Screech-Owl Recovery Team 2008). Population size in BC is estimated at 50–200 individuals. The centre of the species distribution is in the southern Okanagan. Approximately 20% of the known detection sites of this species occur in the Columbia Region and these locations are confined to the southernmost portions of the East and West Kootenay sub-regions (Hausleitner et al. 2015).

This sub-species of Screech-Owl occur year-round in low-elevation riparian habitat in the southern interior of BC. Mature cottonwood habitat is consistently identified as the core-nesting habitat for this species, and they will often forage in surrounding upland habitat (e.g. coniferous habitat, meadows).

The FWCP has supported work on this species since 2003. Work completed to date includes inventory, radio telemetry, stewardship, Wildlife Habitat Area submissions, and wildlife tree restoration for cavity-nesting species. One action is presented for Western Screech-Owl to support strategies and initiatives outlined in the Provincial recovery strategies (B.C. Ministry of Environment 2016). Ecosystem actions presented in this plan, as well as in the Wetlands & Riparian Areas Action Plan, will also benefit Western Screech-Owl.

Yellow-breasted Chat (*Icteria virens auricollis*)

The Yellow-breasted Chat is widespread throughout the United States and central Mexico, but its distribution in Canada is restricted to southern BC, Alberta, Saskatchewan, and Ontario (Gebauer 2004). In BC, breeding Yellow-breasted Chats are found only in the extreme south Okanagan and Similkameen Valleys (Campbell et al. 2001) and at two sites in the Columbia Basin (Machmer and Ogle 2006). In addition, singing males are occasionally reported from Creston (Gebauer 2004) and Revelstoke Reach (B.C. CDC 2019). The BC population is likely 200 pairs (B.C. CDC 2019).

Yellow-breasted Chats nest in riparian habitats and adjacent upland shrub and are highly dependent on riparian conditions. Loss of riparian habitat is the main threat to the species. Pesticide spraying, predation, and nest parasitism by Brown-headed Cowbirds (*Molothrus ater*) may be significant problems (Gebauer 2004). In the Pend d'Oreille River area, chats breed in upland shrub habitats near Waneta Reservoir and associated transmission line rights of way.

One action is presented for Yellow-breasted Chat to support strategies and initiatives outlined in the Federal and Provincial recovery strategies (Environment and Climate Change Canada 2016). Ecosystem actions presented in this plan, as well as in the Wetlands & Riparian Areas Action Plan, will also benefit Yellow-breasted Chat.

Focal Species

Focal species have been identified and prioritized by the FWCP Columbia Region using the Species Rating and Database Tool (Fish & Wildlife Compensation Program 2011) and the following steps:

1. Identifying species that have known habitat-based or species-based actions that could be implemented immediately (i.e. where the species distribution, abundance, and limiting factors are sufficiently understood); and
2. Removing species that are not of a high local or conservation concern, as defined by consultation and by the British Columbia Conservation Framework, and/or those that were not ranked high in the Columbia Basin dam impacts studies (e.g. Manley and Krebs 2009).

Table 2 lists the focal species cross-referenced with the priority (dark green) and supporting (light green) ecosystem Action Plans. The FWCP considers projects targeting focal species and their habitats as priorities for consideration where clear habitat-, land-, or species-based actions are available for implementation.

Inventory Species

Inventory species are those for which inventory/data acquisition is the primary compensation action identified by the FWCP and in the Columbia Basin dam impacts reports (e.g. Manley and Krebs 2009). Table 3 lists the inventory species that are primarily associated with rivers and riparian areas and that have been identified as highly impacted by dam construction or operation. Before further actions are developed and implemented for these species, some baseline inventory work is required to determine their distribution and abundance and/or trend within the Columbia Region.

The FWCP considers projects targeting inventory species as priorities for consideration where clear outcomes leading to habitat-, land-, or species-based actions are practically achievable. Projects are prioritized during the annual operational planning cycle.

Culturally Important Species

Culturally important plant and animal species occur in the Columbia Region and are a recognized component of river and riparian area ecosystem function and resiliency, as well as a part of a holistic approach to current and future fish and wildlife compensation actions. First Nations should be consulted where projects overlap with identified culturally important species. FWCP-funded work for culturally important river and riparian area species may occur under cross plan actions, or as part of other ecosystem or species actions in this plan.

Invasive Species

The FWCP Columbia Region supports work that prevents and/or controls the spread and effects of invasive species that have the potential to negatively impact projects previously supported by the FWCP, such as restoration sites and/or conservation properties. Any work to address invasive species should be completed in collaboration with the Province of B.C. and regional invasive species councils and societies as appropriate. Invasive species priority and watch lists vary by region, location, and year; therefore, grant applicants should refer to the appropriate regional and/or Provincial organization when developing funding applications.

Table 1: Recovery species of interest associated with rivers & riparian areas in the Columbia Region. *This list is based on species that are of highest priority and conservation concern and have been adversely impacted by dam construction and/or operation. Coloured cells represent the ordered relationship between species and the ecosystem-based action plans: ✔ with dark green = primary habitat, light green = supporting habitat.*

Fish Wildlife	Guild	Common Name	Species Name	Federal	Provincial	Rivers & Riparian	Reservoirs & Large Lakes	Small Lakes	Wetlands & Riparian	Upland & Dryland
Fish	Fish - Sturgeon	White Sturgeon	*Acipenser transmontanus*	Endangered	Red-listed	✔	✔			
Wildlife	Bird - Raptor	Western Screech-Owl	*Megascops kennicottii macfarlanei*	Threatened	Blue-listed	✔			✔	
Wildlife	Bird - Songbird	Yellow-breasted Chat	*Icteria virens auricollis*	Endangered	Red-listed	✔			✔	

Table 2: Focal species of interest associated with rivers & riparian areas in the Columbia Region. *The list is based on species for which there are habitat-based or species-based actions that can be implemented immediately (i.e. where the species distribution, abundance, and limiting factors are sufficiently understood) and dam impacts are known to be high. Coloured cells represent the ordered relationship between species and the ecosystem-based action plans: ✔ with dark green = primary habitat, light green = supporting habitat.*

Fish Wildlife	Guild	Common Name	Species Name	Federal	Provincial	Rivers & Riparian	Reservoirs & Large Lakes	Small Lakes	Wetlands & Riparian	Upland & Dryland
Fish	Fish - Benthic	Burbot	*Lota lota*		Yellow-listed		✔			
Fish	Fish - Benthic	Burbot (Kootenay Lake)	*Lota lota, pop 1.*		Red-listed		✔			
Fish	Fish - Benthic	Mountain Sucker	*Catostomus platyrhynchus*	Special Concern	Blue-listed	✔				
Fish	Fish - Insectivorous	Rainbow Trout (insectivorous-Fluvial)	*Oncorhynchus mykiss*		Yellow-listed	✔				
Fish	Fish - Insectivorous	Rainbow Trout (insectivorous-LL)	*Oncorhynchus mykiss*		Yellow-listed		✔			
Fish	Fish - Insectivorous	Rainbow Trout (insectivorous-SL)	*Oncorhynchus mykiss*		Yellow-listed			✔		
Fish	Fish - Insectivorous	Westslope Cutthroat Trout	*Oncorhynchus clarkii lewisi*	Special Concern	Blue-listed	✔				
Fish	Fish - Piscivorous	Bull Trout	*Salvelinus confluentus*	Special Concern	Blue-listed		✔			
Fish	Fish - Piscivorous	Rainbow Trout (piscivorous-LL)	*Oncorhynchus mykiss*		Yellow-listed		✔			
Fish	Fish - Plankton	Kokanee	*Oncorhynchus nerka*		No Status		✔			
Wildlife	Amphibian	Columbia Spotted Frog	*Rana luteiventris*	Not at Risk	Yellow-listed				✔	
Wildlife	Bird - Aerial Insectivore	Vaux's Swift	*Chaetura vauxi*		Yellow-listed				✔	
Wildlife	Bird - Raptor	Osprey	*Pandion haliaetus*		Yellow-listed				✔	
Wildlife	Bird - Wader	Great Blue Heron	*Ardea herodias herodias*		Blue-listed				✔	
Wildlife	Bird - Water	Common Loon	*Gavia immer*	Not at Risk	Yellow-listed			✔		
Wildlife	Bird - Water	Harlequin Duck	*Histrionicus histrionicus*		Yellow-listed	✔				
Wildlife	Mammal - Bat	Northern Myotis	*Myotis septentrionalis*	Endangered	Blue-listed					✔
Wildlife	Mammal - Bat	Townsends Big-eared Bat	*Corynorhinus townsendii*		Blue-listed					✔
Wildlife	Mammal - Carnivore	Grizzly Bear	*Ursus arctos*	Special Concern	Blue-listed					✔

Table 3: Inventory species of interest associated with rivers & riparian areas in the Columbia Region. *The list is based on species for which dam impacts are known to be high, but baseline information is required before habitat- or species-based action can be implemented. Coloured cells represent the ordered relationship between species and the ecosystem-based action plans: ✔ with dark green = primary habitat, light green = supporting habitat.*

Fish Wildlife	Guild	Common Name	Species Name	Federal	Provincial	Rivers & Riparian	Reservoirs & Large Lakes	Small Lakes	Wetlands & Riparian	Upland & Dryland
Fish	Fish - Benthic	Columbia (Mottled) Sculpin	*Cottus hubbsi*	Special Concern	Blue-listed	✔				
Fish	Fish - Benthic	Leopard Dace	*Rhinichthys falcatus*		Yellow-listed	✔				
Fish	Fish - Benthic	Shorthead Sculpin	*Cottus confusus*	Special Concern	Blue-listed	✔				
Fish	Fish - Benthic	Slimy Sculpin	*Cottus cognatus*		Yellow-listed	✔				
Fish	Fish - Benthic	Torrent Sculpin	*Cottus rhotheus*		Yellow-listed	✔				
Fish	Fish - Benthic	Prickly Sculpin	*Cottus asper*		Yellow-listed		✔			
Fish	Fish - Benthic	Umatilla Dace	*Rhinichthys umatilla*	Threatened	Red-listed	✔				
Fish	Fish - Insectivorous	Mountain Whitefish	*Prosopium williamsoni*		Yellow-listed		✔			
Fish	Fish - Insectivorous	Pygmy Whitefish	*Prosopium coulterii*	Not at Risk	Yellow-listed		✔			
Wildlife	Amphibian	Coeur d'Alene Salamander	*Plethodon idahoensis*	Special Concern	Yellow-listed	✔				
Wildlife	Bird - Aerial Insectivore	Bank Swallow	*Riparia riparia*	Threatened	Yellow-listed	✔				
Wildlife	Bird - Aerial Insectivore	Black Swift	*Cypseloides niger*	Endangered	Blue-listed	✔			✔	
Wildlife	Bird - Aerial Insectivore	Cliff Swallow	*Petrochelidon pyrrhonota*		Yellow-listed				✔	
Wildlife	Bird - Aerial Insectivore	Tree Swallow	*Tachycineta bicolor*		Yellow-listed				✔	
Wildlife	Bird - Aerial Insectivore	Violet-green Swallow	*Tachycineta thalassina*		Yellow-listed				✔	
Wildlife	Bird - Raptor	Bald Eagle	*Haliaeetus leucocephalus*	Not at Risk	Yellow-listed		✔			
Wildlife	Bird - Shorebird	Herring Gull	*Larus argentatus*		Yellow-listed				✔	
Wildlife	Bird - Songbird	Alder Flycatcher	*Empidonax alnorum*		Yellow-listed				✔	
Wildlife	Bird - Songbird	American Dipper	*Cinclus mexicanus*		Yellow-listed	✔				
Wildlife	Bird - Wader	Sora	*Porzana carolina*		Yellow-listed				✔	
Wildlife	Bird - Water	Barrow's Goldeneye	*Bucephala islandica*		Yellow-listed			✔		
Wildlife	Bird - Water	Belted Kingfisher	*Megaceryle alcyon*		Yellow-listed	✔				
Wildlife	Bird - Water	Blue-winged Teal	*Spatula discors*		Yellow-listed				✔	
Wildlife	Bird - Water	Bufflehead	*Bucephala albeola*		Yellow-listed			✔		
Wildlife	Bird - Water	Canvasback	*Aythya valisineria*		Yellow-listed				✔	
Wildlife	Bird - Water	Common Goldeneye	*Bucephala clangula*		Yellow-listed			✔		
Wildlife	Bird - Water	Hooded Merganser	*Lophodytes cucullatus*		Yellow-listed				✔	
Wildlife	Bird - Water	Lesser Scaup	*Aythya affinis*		Yellow-listed				✔	
Wildlife	Bird - Water	Northern Pintail	*Anas acuta*		Yellow-listed				✔	
Wildlife	Bird - Water	Red-necked Grebe	*Podiceps grisegena*	Not at Risk	Yellow-listed				✔	
Wildlife	Bird - Water	Ring-necked Duck	*Aythya collaris*		Yellow-listed				✔	
Wildlife	Bird - Water	Wood Duck	*Aix sponsa*		Yellow-listed				✔	
Wildlife	Mammal - Bat	Long-eared Myotis	*Myotis evotis*		Yellow-listed					✔
Wildlife	Mammal - Bat	Long-legged Myotis	*Myotis volans*		Yellow-listed					✔
Wildlife	Mammal - Carnivore	North American River Otter	*Lontra canadensis*		Yellow-listed	✔				
Wildlife	Mammal - Rodent	American Beaver	*Castor canadensis*		Yellow-listed				✔	

ACTION TABLES

These Action Tables identify the FWCP's Priority Actions to conserve and enhance fish and wildlife in watersheds impacted by BC Hydro dams in rivers and riparian areas in the Columbia Region. Actions identified as **OPEN** (see Delivery Approach column) **are eligible for a grant**. When completing your online grant application, you will be required to identify a Priority Action(s) that best aligns with your project idea. A high-quality grant application will clearly demonstrate alignment with Priority Action(s) in an Action Table. Actions identified as **DIRECTED only** are not eligible for a grant. These are projects that our Regional Boards will direct through the appropriate procurement process (e.g. a request for proposal). Please **do not** submit a grant application for a **DIRECTED only** project. Actions identified as **DIRECTED / OPEN are eligible for a grant** or may be projects that our Regional Boards will direct through the appropriate procurement process. Contact us if you are unsure.

Cross Plan Actions

Several broad cross plan actions are relevant to all Action Plans and will require the consideration of multiple ecosystems.

CROSS ECOSYSTEM PLAN ACTIONS							Version:AUG2019	
Action #	**Action Type**	**Priority Action Short Description**	**Priority**	**Priority Area**	**Target Species**	**Priority Action**	**Intended Outcome**	**Delivery Approach**
1	Research and Information Acquisition	**COLRRA.CXP.RI.01.01 Indigenous knowledge and values, develop framework-P1**	**1**	All Action Plan Priority Areas	Fish and Wildlife	Develop a framework for incorporating Indigenous knowledge and values into FWCP projects.	Collaboration with Indigenous peoples relating to FWCP projects.	Directed
2	Habitat-based	**COLRRA.CXP.HB.02.01 Indigenous knowledge and values, incorporate base on framework-P1**				Incorporate Indigenous knowledge and values into FWCP projects based on framework developed in Action #1.		Directed / Open
3	Research and Information Acquisition	**COLRRA.CXP.RI.03.01 Climate change strategy-P1**	**1**	All Action Plan Priority Areas	Fish and Wildlife	Develop a framework for the FWCP Columbia Region to incorporate elements of climate change into actions (e.g. research, habitat restoration, land securement and/or monitoring of fish and wildlife populations, ecosystems or habitats).	Increased understanding of climate change impacts on fish and wildlife in the Columbia Region and how FWCP can help support on-the-ground action (e.g. development and implementation of resiliency plans, land securement initiatives, restoration).	Directed
4	Research and Information Acquisition	**COLRRA.CXP.RI.04.01 Responding to emergent issues-P2**	**2**	All Action Plan Priority Areas	Fish and Wildlife	Support project work relating to urgent and emerging issues for the Columbia Region (e.g. emergent diseases, cumulative effects, imminent species declines).	Allows the FWCP to support appropriate organizations and/or support initiatives aimed at emergent issues.	Directed

Continued: Cross Ecosystem Plan Actions

CROSS ECOSYSTEM PLAN ACTIONS							Version:AUG2019	
Action #	**Action Type**	**Priority Action Short Description**	**Priority**	**Priority Area**	**Target Species**	**Priority Action**	**Intended Outcome**	**Delivery Approach**
5	Research and Information Acquisition	**COLRRA.CXP.RI.05.02 Culturally important resources-P1**	**1**	All Action Plan Priority Areas	Fish and Wildlife	Work with appropriate Indigenous groups and organizations to conduct research and inventory to improve the understanding of culturally important plants and animals.	Conservation and increased understanding of culturally important species.	Directed / Open
6	Habitat-based	**COLRRA.CXP.HB.06.01 Connectivity habitat-P1**	**1**	All Action Plan Priority Areas	Fish and Wildlife	Support work towards conservation, improvement of important connectivity habitat and land securement (i.e. linkage areas, including high elevation) both within an ecosystem type (i.e. reservoirs and spawning tributaries, riparian areas) and across ecosystem types (i.e. valley bottoms to montane habitats) for fish and wildlife species (e.g. wide-ranging species, transboundary species, rare species).	Conservation and improvement of connectivity habitats.	Directed / Open

Rivers & Riparian Areas Ecosystem Actions

RIVERS AND RIPARIAN AREAS ACTION TABLE - ECOSYSTEMS							Version:AUG2019	
Action #	**Action Type**	**Priority Action Short Description**	**Priority**	**Priority Area**	**Target Species**	**Priority Action**	**Intended Outcome**	**Delivery Approach**
7	Research and Information Acquisition	**COLRRA.ECO.RI.07.01 Develop regional rivers plans-P1**	**1**	All Rivers and Streams	Fish and Wildlife	Develop a regional rivers plan for priority rivers where a plan does not currently exist. The plan should assess limiting factors, describe opportunities for FWCP investment, guide future work in these rivers with specific actions and targets, and describe how results should be monitored. The plan should also develop future priorities by laying out tasks to do similar evaluations on other rivers in the project area; the greatest opportunities may be in the East Kootenay region.	Detailed plan which includes limiting factors, opportunities for FWCP investment, guide of future work with specific actions and targets, and description of results monitoring.	Directed / Open
8	Research and Information Acquisition	**COLRRA.ECO.RI.08.01 Baseline monitoring of water temperature and quality-P2**	**2**	All Rivers and Streams	Fish	Collect baseline data and/or monitor hydrology of high elevation habitat and cold water refugia otherwise unaddressed as related to fish habitat needs and climate change (e.g. water temperature, water flows, geomorphology, water quality).	Data set of critical high elevation and cold water refugia habitat which allows for trend monitoring.	Open
9	Research and Information Acquisition	**COLRRA.ECO.RI.09.01 Nutrient restoration-P1**	**1**	All Rivers and Streams	Aquatic Species	Evaluate efficacy and cost/benefits of nutrient restoration for river and stream habitats. Evaluation would include consideration of land use, a literature review of all types of nutrient restoration techniques (i.e. application of liquid and pelletized fertilization treatments and traditional methods such as carcass returns) and an effectiveness review of past FWCP nutrient restoration projects.	Cost/benefits of using nutrients as a tool for river and stream restoration documented, and recommended approaches / options for future nutrient restoration projects summarized.	Directed
10	Habitat-based	**COLRRA.ECO.HB.10.01 Prevention and control of invasive species-P1**	**1**	All Rivers and Streams	Aquatic Invasive Species	Contribute to the prevention and control of high priority aquatic invasive species that have the potential to negatively impact FWCP project investments in collaboration with the Province of B.C. and regional invasive species councils and societies as appropriate.	▪ Protection of FWCP investments against invasive species establishment and spread. ▪ Prevention of the introduction and spread of aquatic and terrestrial invasive species.	Open

Continued: Ecosystems Action Table

RIVERS AND RIPARIAN AREAS ACTION TABLE - ECOSYSTEMS							Version:AUG2019	
Action #	**Action Type**	**Priority Action Short Description**	**Priority**	**Priority Area**	**Target Species**	**Priority Action**	**Intended Outcome**	**Delivery Approach**
11	Habitat-based	**COLRRA.ECO.HB.11.01 Restore and create river habitat for water flow, stream geomorphology and water quality-P1**	**1**	All Rivers and Streams	Fish and Wildlife	Restore and create river and riparian area habitat to conserve and enhance water flow, stream geomorphology, and water quality of those habitats. Habitat-based actions may include, reconnection of isolated habitats (e.g. culvert additions and replacements), bank stabilization and riparian revegetation, channel restoration, construction of aquatic structures (e.g. large woody debris), flow restoration, road deactivation and stabilization, erosion control, nutrient enrichment, construction of spawning channels. May include projects identified in Action #7.	Creation and restoration of river and riparian area habitat.	Open
12	Habitat-based	**COLRRA.ECO.HB.12.01 Habitat complexing and large woody debris addition-P1**	**1**	Salmo River, Slocan River, Upper Kootenay River Tributaries	Fish	Undertake habitat complexing on priority rivers that are limited by large woody debris (LWD) recruitment and a low incidence of pool habitat. May include adding LWD structures to provide refuge habitats for fish during low water periods in late summer and winter (e.g. deep pools with cover from predators).	Habitat complexing to help determine and address limiting factors.	Open
13	Habitat-based	**COLRRA.ECO.HB.13.01 Tributary access-P1**	**1**	Columbia River Downstream of Keenleyside Dam	Fish	Ensure access to smaller tributaries that provide spawning and juvenile rearing habitats, examples include maintaining fish access at typical water levels and/or removal of debris at the confluence of tributaries.	Increased use of spawning and juvenile rearing habitats previously unavailable.	Open
14	Habitat-based	**COLRRA.ECO.HB.14.01 Cottonwood stand restoration/ recruitment-P1**	**1**	All Rivers and Streams	Fish and Wildlife	Manage recruitment and restoration of important cottonwood stands (those that benefit multiple species), including exploring opportunities to work with partners to establish methodology and prioritize action. Evaluate the influence of upland/wetland riparian/river habitat on cottonwood stands. Coordinate efforts with Wetlands and Riparian Areas Action #10 and #15.	▪ Improved cottonwood habitat and fish and wildlife populations that depend on them. ▪ Strengthened and expanded partnerships and collaborations and enhanced river and riparian areas.	Directed / Open
15	Habitat-based	**COLRRA.ECO.HB.15.01 Restore riparian vegetation and stabilize erosion-P1**	**1**	All Rivers and Streams	Fish and Wildlife	Restore river riparian vegetation and stabilize areas of severe erosion for the benefit of several aquatic and terrestrial species.	Restored and newly available habitat for various species.	Open

Continued: Ecosystems Action Table

RIVERS AND RIPARIAN AREAS ACTION TABLE - ECOSYSTEMS							Version:AUG2019	
Action #	**Action Type**	**Priority Action Short Description**	**Priority**	**Priority Area**	**Target Species**	**Priority Action**	**Intended Outcome**	**Delivery Approach**
16	Monitoring and Evaluation	**COLRRA.ECO.ME.16.01 Effectiveness monitoring of past projects-P1**	**1**	All Rivers and Streams	Fish and Wildlife	Monitor and evaluate the effectiveness of previous FWCP rivers and riparian areas ecosystems projects (for monitoring of species see Action #27 below). Include an approach for adaptive management, information sharing and collaboration among agencies and the public stakeholders to increase the efficacy of conservation action. May include projects identified in Action #7.	Future actions are effective and documented.	Directed / Open
17	Land Securement	**COLRRA.ECO.LS.17.01 Secure river habitats-P1**	**1**	All Rivers and Streams	Fish and Wildlife	Investigate and prioritize land securement and stewardship opportunities to conserve and protect river and riparian habitats. Collaborate with existing stewardship programs. May implement land securement activities as identified and prioritized in Action #7.	Conservation of river and riparian habitat (including aquatic habitat when feasible).	Directed / Open

Rivers & Riparian Areas Species of Interest Actions

RIVERS AND RIPARIAN AREAS ACTION TABLE - SPECIES OF INTEREST							Version:AUG2019	
Action #	**Action Type**	**Priority Action Short Description**	**Priority**	**Priority Area**	**Target Species**	**Priority Action**	**Intended Outcome**	**Delivery Approach**
18	Species-based	**COLRRA.SOI.SB.18.01 White Sturgeon Conservation-P1**	**1**	Columbia River Downstream of Keenleyside Dam	White Sturgeon	Support strategies and initiatives outlined in the SARA Recovery Strategy for White Sturgeon that relate to compensation for dam impacts. Where possible, link project work to the connectivity of this species across ecosystems and collaborate with recovery team specialists.	Recovery of White Sturgeon.	Directed / Open
19	Species-based	**COLRRA.SOI.SB.19.01 Western Screech-Owl Conservation-P1**	**1**	Riparian Areas	Western Screech-Owl	Support strategies and initiatives outlined in the BC Recovery Plan for Western Screech-Owl that relate to compensation for dam impacts. Where possible, link project work to the connectivity of this species across ecosystems and collaborate with recovery team specialists.	Recovery of Western Screech-Owl.	Directed / Open
20	Species-based	**COLRRA.SOI.SB.20.01 Yellow-breasted Chat Conservation-P1**	**1**	Pend d'Oreille Riparian Areas	Yellow-breasted Chat	Support strategies and initiatives outlined in the SARA Recovery Strategy for Yellow-breasted Chat that relate to compensation for dam impacts. Where possible, link project work to the connectivity of this species across ecosystems and collaborate with recovery team specialists.	Recovery of Yellow-breasted Chat.	Directed / Open
21	Species-based	**COLRRA.SOI.SB.21.01 Focal and Inventory species projects for species at risk-P2**	**2**	All Rivers and Streams	Species at Risk	Support surveys, restoration and/or other compensation-related activities for 'focal' and 'inventory' species not covered in other Actions. A clear link must be made between dam impacts and proposed projects.	▪ Changes to species presence are monitored and inform future conservation/compensation actions. ▪ Improved habitat for fish and wildlife species.	Open
		COLRRA.SOI.SB.21.02 Focal and Inventory species projects for other fish & wildlife-P3	**3**		Other Fish and Wildlife			
22	Species-based	**COLRRA.SOI.SB.22.01 Waterbird habitat enhancement-P2**	**2**	All Rivers and Streams	Wildlife	Identify important breeding areas for waterbirds (e.g. Harlequin Duck, American Dipper, Cliff Swallows, Black Swift) and explore options for habitat enhancement/protection.	Conservation and compensation actions for breeding birds associated with rivers and riverine riparian habitats.	Open

Continued: Species of Interest Action Table

RIVERS AND RIPARIAN AREAS ACTION TABLE - SPECIES OF INTEREST							Version:AUG2019	
Action #	**Action Type**	**Priority Action Short Description**	**Priority**	**Priority Area**	**Target Species**	**Priority Action**	**Intended Outcome**	**Delivery Approach**
23	Species-based	**COLRRA.SOI.SB.23.01 Burbot conservation and restoration-P2**	**2**	All Rivers and Streams	Burbot	Support strategies and initiatives to compensate for Burbot losses as a result of dam impacts.	Conservation and enhancement of Burbot populations.	Directed / Open
24	Species-based	**COLRRA.SOI.SB.24.01 Support for BC bat initiatives-P1**	**1**	All Rivers and Streams	Bats	Support the conservation of bat species present in the Columbia Region. Examples include baseline data knowledge gaps (including monitoring/inventory), White-nose Syndrome response, habitat protection and restoration, and outreach and stewardship.	Conservation and protection of bat species and their habitats.	Open
25	Habitat-based	**COLRRA.SOI.HB.25.01 Restore fish passage in streams-P1**	**1**	All Rivers and Streams	Fish	Support improvements to anthropocentric-obstructions to fish passage (e.g. perched culverts). Fish passage restoration projects should consider and demonstrate the four phased approach (Fish Passage Assessment, Habitat Confirmation, Design, Remediation) as outlined in the "Fish Passage Strategic Approach: Protocol for Prioritizing Sites for Fish Passage Remediation". This action could ultimately lead to the removal, restoration or replacement of existing culverts. Proponents are encouraged to reference previous fish passage prioritization work as outlined in "Columbia Basin Fish Passage Data Analysis", previously supported by FWCP, and seek partnerships in project implementation.	▪ Increased use of previously unavailable spawning and juvenile rearing habitats. ▪ Creation and restoration of aquatic habitat. ▪ Increased habitat availability for fish species within the Columbia Region.	Directed / Open
26	Habitat-based	**COLRRA.SOI.HB.26.01 Westslope Cutthroat Trout habitat-P1**	**1**	Upper Kootenay River Tributaries and Upper Columbia River and Tributaries	Westslope Cutthroat Trout	Undertake habitat restoration aimed at increasing Westslope Cutthroat Trout populations.	Increasing populations of Westslope Cutthroat Trout.	Open
27	Monitoring and Evaluation	**COLRRA.SOI.ME.27.01 Monitor fish and wildlife use of created/restored habitats-P2**	**2**	All Rivers and Streams	Fish and Wildlife	Monitor fish and wildlife species use of improved river and riparian area habitat that was created or restored with support from the FWCP (i.e. past projects).	▪ Improved awareness of species use and effectiveness of restoration actions. ▪ Improved knowledge of bird species to inform conservation actions.	Open

Continued: Species of Interest Action Table

RIVERS AND RIPARIAN AREAS ACTION TABLE - SPECIES OF INTEREST							Version:AUG2019	
Action #	**Action Type**	**Priority Action Short Description**	**Priority**	**Priority Area**	**Target Species**	**Priority Action**	**Intended Outcome**	**Delivery Approach**
28	Monitoring and Evaluation	**COLRRA.SOI.ME.28.01 Invertebrate monitoring-P3**	**3**	All Rivers and Streams	Invertebrates	Support inventory/monitoring of river and riparian-associated invertebrate groups to increase knowledge of community structure and act as an indicator of productivity and ecosystem health/function in areas related to FWCP compensation activities.	Evaluation of the effect of restoration activities on invertebrate community structure.	Open

REFERENCES

B.C. Conservation Data Centre. 2019. BC species and ecosystems explorer. B.C. Ministry of Environment, Victoria, BC. Available: http://a100.gov.bc.ca/pub/eswp (accessed June 26, 2019).

B.C. Ministry of Environment. 2016. Recovery plan for the Western Screech-Owl, *macfarlanei* subspecies (*Megascops kennicottii macfarlanei*) in British Columbia. B.C. Ministry of Environment, Victoria, BC. 27 pp.

Campbell, R. W., N. K. Dawe, I. McTaggart-Cowan, J. M. Cooper, G. W. Kaiser, A. C. Stewart, and M. C. E. McNall. 2001. The birds of British Columbia, Volume 4: passerines, wood-warblers through old world sparrows. B.C. Ministry of Environment, Lands and Parks, Victoria, BC, and Canadian Wildlife Service, Delta, BC.

Environment and Climate Change Canada. 2016. Recovery strategy for the Yellow-breasted Chat *auricollis* subspecies (*Icteria virens auricollis*) (Southern Mountain population) in Canada. Species at Risk Act Recovery Strategy Series. Environment and Climate Change Canada, Ottawa. v + 31 pp.

Fish & Wildlife Compensation Program. 2011. FWCP: Columbia Species Rating and Database Tool. Background report to accompany the Excel™-based tool.

Fisheries and Oceans Canada. 2014. Recovery strategy for White Sturgeon *(Acipenser transmontanus*) in Canada [Final]. *In* Species at Risk Act Recovery Strategy Series. Ottawa: Fisheries and Oceans Canada. 252 pp.

Gebauer, M. 2004. Yellow-breasted Chat. Accounts and measures for managing Identified Wildlife – Accounts V. 2004. B.C. Ministry of Environment, Victoria, BC.

Hausleitner, D., J. Dulisse, and I. Manley. 2015. Seasonal and sex-biased survival of adult interior Western Screech-Owls (*Megascops kennicottii macfarlanei*) in southeast British Columbia. Northwestern Naturalist. 96:205–211.

Manley, I., and J. Krebs. 2009. Wildlife impacts due to BC Hydro dams in the Columbia Basin. Fish & Wildlife Compensation Program, Nelson, BC.

Northcote, T. C. 1973. Some impacts of man on Kootenay Lake and its salmonids. Great Lakes Fishery Commission, Technical Report 2, Ann Arbor, MI.

Prince, A. 2001. Local knowledge of Columbia River fisheries in British Columbia, Canada. Prepared for: Columbia-Kootenay Fisheries Renewal Partnership, Cranbrook, BC, by Westslope Fisheries, Cranbrook, BC. 50 p. + 1 app.

RL&L Environmental Services Ltd. 1996a. The distribution and status of white sturgeon in isolated waterbodies within the Columbia River Basin in B.C. 1995 Study Results. Report to: B.C. Ministry of Environment, Lands and Parks.

RL&L Environmental Services Ltd. 1996b. Columbia River white sturgeon investigations – 1995 study results. Prepared for: BC Hydro, Kootenay Generation, Vancouver, BC, and B.C. Ministry of Environment, Lands and Parks, Nelson Region, Nelson, BC. RL&L Report No. 377F: 94 p. + 6 app.

RL&L Environmental Services Ltd. 2000. A summary of white sturgeon investigations in isolated water bodies within the Columbia River Basin in B.C. 1995 to 1999. Report to: B.C. Ministry of Environment, Lands and Parks.

Scott, W. B. and E. J. Crossman. 1973. Freshwater fishes of Canada. Bulletin of the Fisheries Research Board of Canada 184.

Thorley, J. L. 2008. Aquatic habitat losses and gains due to BC Hydro dams in the Columbia Basin. Prepared for Fish & Wildlife Compensation Program – Columbia Basin, Nelson BC.

Western Screech-Owl Recovery Team. 2008. Recovery strategy for the Western Screech-Owl, *macfarlanei* subspecies (*Megascops kennicottii macfarlanei*) in British Columbia. Prepared for the B.C. Ministry of Environment, Victoria, BC. 14 pp.

GLOSSARY

Abiotic: Non-living chemical and physical parts of the environment that affect living organisms and the functioning of ecosystems.

Action Plan: The Fish & Wildlife Compensation Program has identified conservation priorities for fish and wildlife in each of its three regions and these are reflected in a series of Action Plans. The priorities and plans vary by region.

Best Management Practices (BMPs): In British Columbia, BMPs are science-based recommendations and guidelines that ensure projects or activities meet the necessary legislation, regulations, and policies and are planned and carried out in a manner that considers the consequences to the environment.

Biotic: Any living component that affects another organism or shapes the ecosystem.

Blue List Species: Any species that is of special concern.

Committee on the Status of Endangered Wildlife in Canada (COSEWIC): An independent advisory panel to the Minister of Environment and Climate Change Canada that meets twice a year to identify and assess the status of wildlife species at risk of extinction. Members are wildlife biology experts from academia, government, non-governmental organizations, and the private sector responsible for designating wildlife species in danger of disappearing from Canada.

Cross Plan Action: An action that is relevant to two or more Action Plans and requires the consideration of multiple ecosystems.

Delivery Approach: Priority Actions identified as "Open" are eligible for a grant. Actions identified as "Directed" are not eligible for a grant. These are projects that the FWCP Regional Boards will direct through the appropriate procurement process (e.g. a request for proposal). Actions identified as "Directed / Open" are eligible for a grant or may be projects directed by the FWCP Regional Boards through the appropriate procurement process.

Ecosystem Restoration (ER): The process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed.

Endangered Species: A fish or wildlife species that is facing imminent extirpation or extinction.

Fish & Wildlife Compensation Program (FWCP): FWCP is a partnership between BC Hydro, Fisheries and Oceans Canada, the Province of B.C., First Nations, and Public Stakeholders to conserve and enhance fish and wildlife impacted by the construction of BC Hydro dams.

Floodplain: An area of low-lying ground adjacent to a river, formed mainly of river sediments and subject to flooding.

Focal Species: Defined by the FWCP Columbia Region as species that have strong linkages to dam footprint impacts and are of regional interest.

Footprint Impacts: The permanent loss of habitat associated with the dam and related infrastructure, including the permanently flooded habitat (below the drawdown zone) resulting from reservoir creation.

Indigenous Knowledge (IK): The United Nations Educational, Scientific and Cultural Organization refers to IK as the "understandings, skills and philosophies developed by societies with long histories of interaction with their natural surroundings."

Invasive Species: An organism (plant, animal, fungus, or bacterium) that is not native and has negative effects on our economy, our environment, or our health. Invasive species can spread rapidly to new areas and will often out-compete native species as there are no predators or diseases to keep them under control.

Inventory Species: Defined by the FWCP Columbia Region as species that have been affected by dams, but detailed inventory and/or trend monitoring is still required.

Lacustrine: Relating to or associated with lakes.

Lake: A naturally occurring body of water deeper than 2 m, classified by FWCP Columbia as small (less than 1,000 hectares) or large (greater than 1,000 hectares).

Large Woody Debris (LWD): Logs, sticks, branches, and other wood that fall into streams and rivers and can influence the hydrology and shape of a stream channel as well as other ecological processes.

Oligotrophic: Having a deficiency of plant nutrients that is usually accompanied by an abundance of dissolved oxygen.

Priority Areas: Habitats, areas, or ecosystems that have been outlined for each Action Plan and include areas that are deemed as a priority for FWCP Open or Directed projects.

Recovery Species: Defined by the FWCP Columbia Region as species of highest priority and conservation concern that have been adversely impacted by dam construction and/or operation. These species have formally been classified as either threatened or endangered by Canada or B.C., and recovery and/or management plans are either in place or under development by Federal or Provincial management agencies.

Red List Species: Any species that is at risk of being lost (extirpated, endangered, or threatened).

Reservoir: A body of water formed by damming a river or stream. Water is held back by the dam and is allowed to fall to generate electricity when it is needed.

Riparian Habitat: Is defined as an area adjacent to a river, stream, wetland, or lake that differs from the surrounding uplands in the diversity of plant and animals found and in the overall productivity of the site.

Riverine: Relating to or situated on a river or riverbank.

Species of Interest: Defined by the FWCP as a specific fish and wildlife species of conservation concern (including species at risk) or other regionally important species for compensation or conservation planning process that have been affected by hydro-power development footprint impacts.

Species at Risk (SAR): Specific fish and wildlife species that have been listed by the Provincial (B.C. Conservation Data Centre) or Federal authorities (COSEWIC, SARA) to be of conservation concern for the Columbia Region.

Species at Risk Act (SARA): Proclaimed in 2003, SARA is Government of Canada legislation designed to prevent wildlife species in Canada from disappearing; to provide for the recovery of wildlife species that are extirpated (no longer exist in the wild in Canada), endangered, or threatened as a result of human activity; and to manage species of special concern to prevent them from becoming endangered or threatened.

Species of Special Concern: A fish or wildlife species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.

Strategic Objectives: These objectives support meeting both BC Hydro's water licence conditions in the Peace and Columbia Regions, and its commitment and intent when voluntarily establishing the program in the Coastal Region in partnership with the Province of B.C. and DFO. The strategic objectives address conservation, sustainable use, and community engagement goals.

Threatened Species: A fish or wildlife species that is likely to become an endangered species if nothing is done to reverse the factors leading to its extirpation or extinction.

Tributary: A stream or river that flows into a larger stream or mainstem of a river or a lake. Tributaries and the main stem river drain the surrounding drainage basin of its surface water and groundwater.

Wetland: An area of land where the soil is saturated with moisture either permanently or seasonally and where water occurs on the surface (e.g. marshes, bogs, and swamps).

Wildlife Extension Area (WEA): The FWCP recognizes that opportunities for fish and wildlife habitat enhancement within the Canoe Arm drainage of the Kinbasket Reservoir are extremely limited and better opportunities may exist in the upper drainage of the Fraser River near Valemount. The Columbia Region boundary includes a portion of the Fraser River drainage (i.e. the wildlife extension area) for wildlife projects only. The Policy Committee approved the WEA in 1996.

The Wildlife Extension Area includes the area north of Valemount, extending east to the Alberta border, including Mount Robson Provincial Park, and west to north of McBride.

Yellow List Species: Any species that are apparently secure and not at risk of extinction.