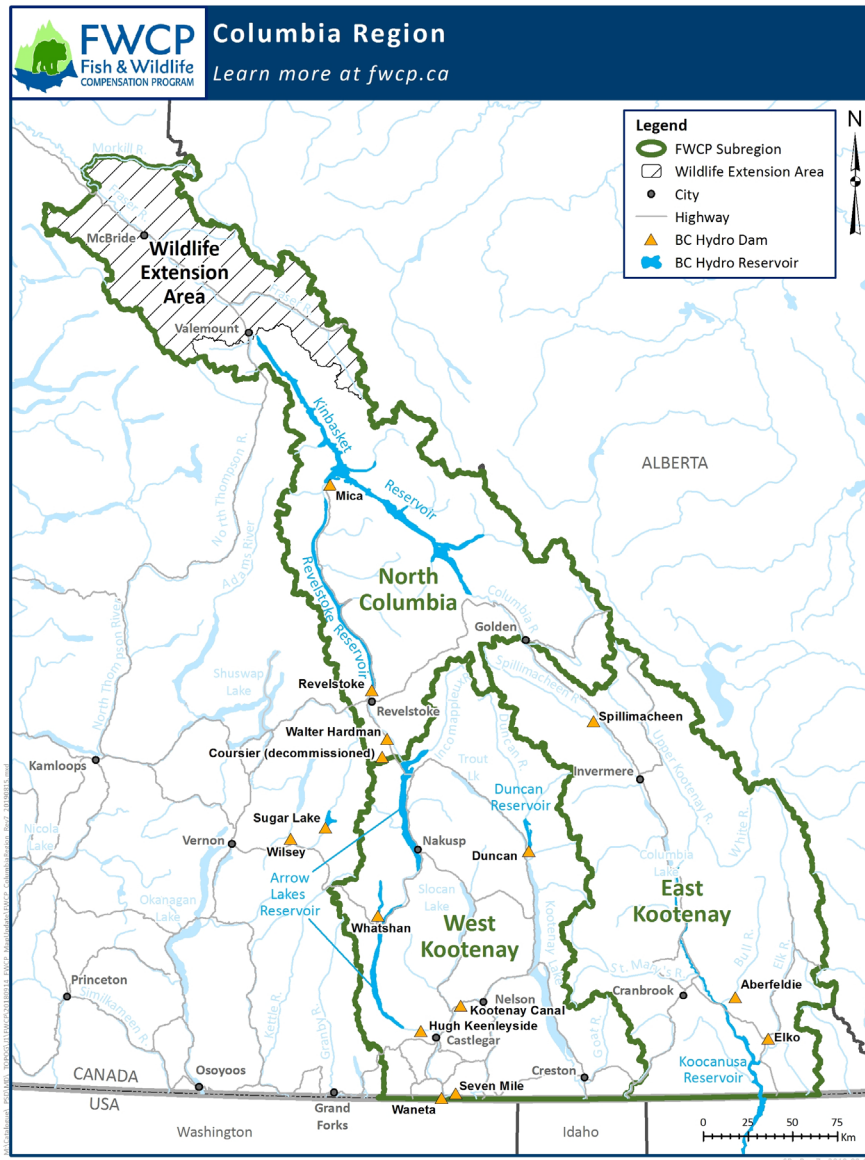




COLUMBIA REGION: SMALL LAKES ACTION PLAN

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.



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: Western Painted Turtle, B. Meunier; Wood Duck, iStock-H. Collins; Little Brown Bat, C. Lausen; Western Toad, FWCP, Beaver Lake Recreation Site, D. Reiben.



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

Small Lakes 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 Small Lakes Action Plan* (2012). 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 small lake 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 small lake ecosystems and associated species of interest:

- **Research and Information Acquisition** – These actions will collect information necessary to evaluate, review, and implement subsequent small lake 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 small lake habitats. Examples include habitat creation, restoration, and enhancement; enhancing habitat connectivity; and invasive species prevention.
- **Monitoring and Evaluation** – These actions will monitor and evaluate small lake 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 and stewardship opportunities for conservation purposes.
- **Species-based Actions** – These actions will alleviate limiting factors for small lake species. Examples include restoration planning and contributing to actions identified in both Provincial management and Action Plans.

This Action Plan sets out Priority Actions for the FWCP that will guide funding decisions for FWCP projects in small lake ecosystems in the Columbia Region. The focus of the next five-year period will be Priority Actions identified for fish and aquatic habitats in all lakes <1,000 hectares in the FWCP Columbia Region (including but not limited to Yellowhead, Summit, Moyie, and Whiteswan Lakes). Priority species of interest for small lake ecosystems include several focal and inventory species.

This Action Plan, and specifically the [Action Tables](#), sets out FWCP priorities for investments in compensation activities within small lake 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 small lake habitat 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.

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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 & Action Plan document for more information on the process that was followed to develop Action Plans in 2018–2019. Action 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 Small Lakes Action Plan sets out priorities for the FWCP to guide projects on small lakes 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 & Action Plan document. The structure of this Small Lakes Action Plan is shown in Figure 1.

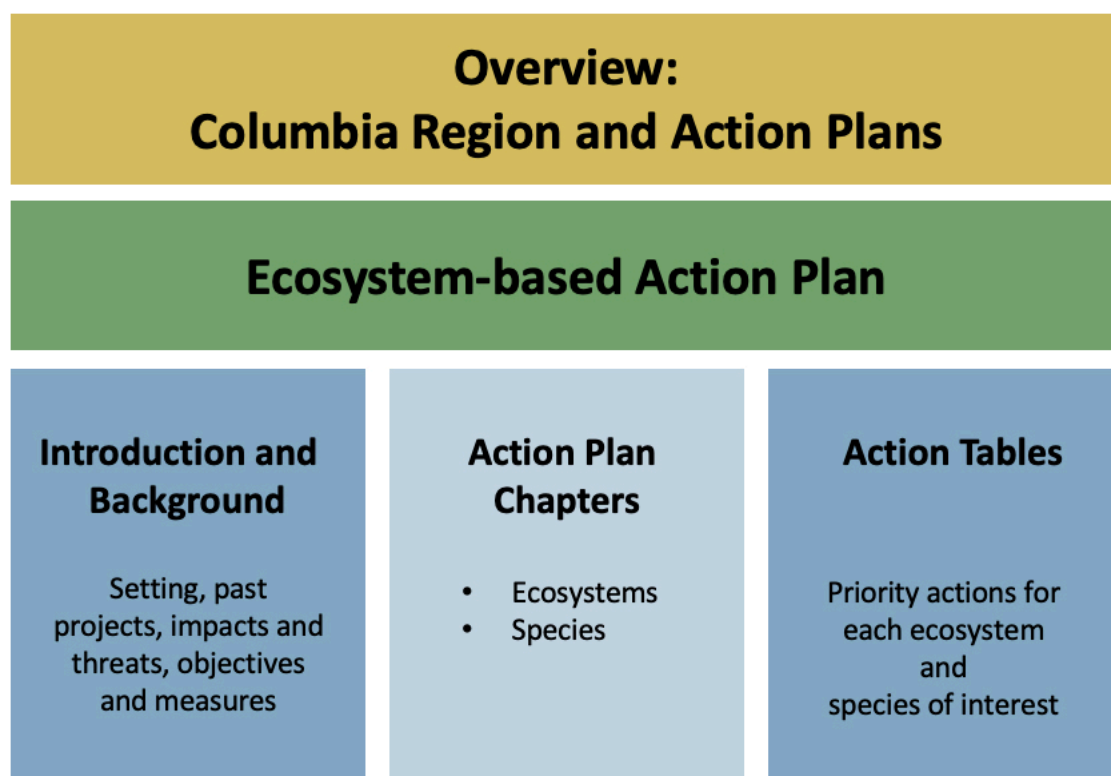


Figure 1: Overview and Action Plan document structure.

The 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 program 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.

Small Lakes Introduction

Small lakes support many fish and wildlife species in the province. They provide important habitat for nesting and migrating birds; rearing and foraging habitat for fish, amphibians, reptiles, and aquatic mammals; and surrounding riparian habitats are critical to many species of wildlife. Small lakes also play an important role in BC's economy, supporting 70% of freshwater angling activities, which is equivalent to approximately \$350 million annually.

Setting

Small lakes are defined as less than 1,000 hectares. To address historic impacts within the Columbia Region, the FWCP will invest in enhancement and protection of naturally occurring small lakes in the region (Figure 2).

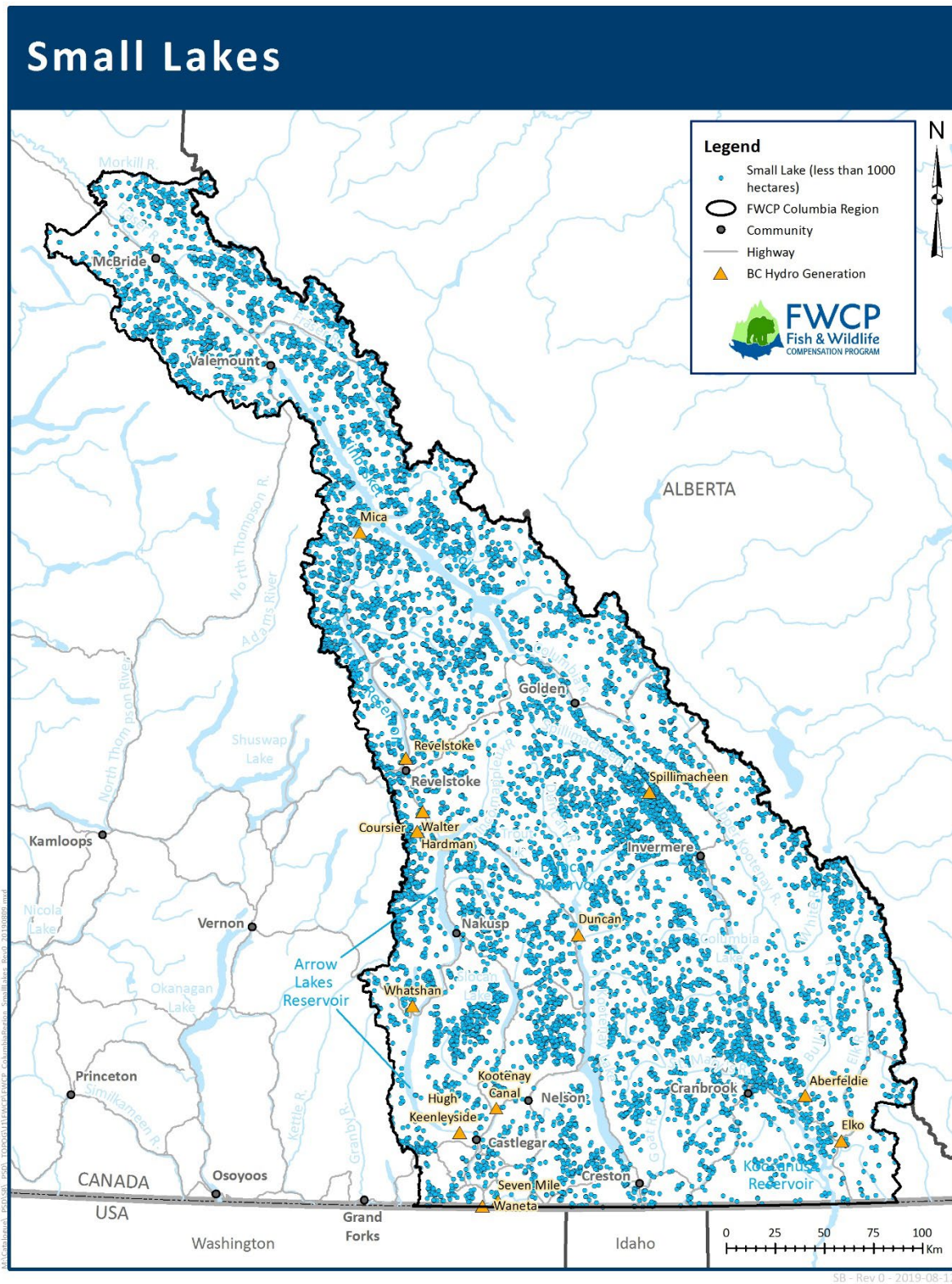


Figure 2: Small Lakes in the Columbia Region (for illustrative purposes).

Footprint Impacts and Threats

Hydro-related Impacts

As part of the Columbia Dam Footprint Impact Study, Thorley (2008) estimated a total of 700 hectares of small lake habitat was inundated by reservoirs at various BC Hydro dams in the Columbia Region. Headponds and reservoirs associated with smaller hydro development projects (e.g. Spillimacheen, Walter Hardman, Whatshan) created a little over half that amount, though it is recognized that reservoir habitat is generally less productive than natural lake habitat as a result of altered flows, loss of connectivity and productivity, and unstable littoral habitat. The amount of small lake habitat lost from the region is therefore somewhere between 300 and 700 hectares. The small lake habitats that were lost tended to be productive and relatively accessible in comparison to the higher elevation lakes that remain.

Many of the wildlife species associated with small lakes are dependent on specific habitat features. For example, grebes nest in shallow waters 0.2–1.0 m deep with emergent vegetation, Western Painted Turtles overwinter in shallow oxygen-rich waters, and Western Toads lay their eggs and the tadpoles rear in shallow areas with emergent vegetation. Other important habitat features include wildlife trees on lake shorelines, islands in small lakes, and overall productivity.

Non-hydro Impacts

Lake-edge habitat is vulnerable to changes in lake levels, shoreline development, and disturbance from some recreation activities. Aquatic invasive species, like Eurasian water milfoil, introduced fish, bullfrogs, or Zebra and Quagga mussels, pose serious threats to habitat quality, biodiversity, and overall ecological integrity of small lakes. Additional threats may occur from upland development, forestry, or mining impacts.

Limiting Factors

Limiting factors vary among species, trophic levels, and locations. Most lakes in the Columbia Region are naturally low productivity (oligotrophic) systems. Limiting factors for fish and wildlife include biotic factors like predation and competition, which may include effects of invasive species and harvest. Abiotic factors are also important, like habitat quantity and quality, access to habitats (e.g. passage in tributary streams), summer and winter water temperatures, water levels, nutrient levels, length of the growing season, and various natural and human-induced disturbances.

Knowledge Status and Gaps

Throughout the Columbia Region, trends in the abundance, distribution, and productivity of small lakes and the species dependent on them have not been compiled (other than those directly affected by BC Hydro's footprint). Concerns in the region include loss of riparian and foreshore habitat from land development, and deterioration in productivity from hydrology changes (e.g. effects from reduced precipitation) and stressors, such as invasive species.

Previously Implemented FWCP Projects

The FWCP has supported projects in small lake ecosystems within the Columbia Region since 1994. A full list of the reports from projects undertaken to date is available online at fwcp.ca/results. Below is a brief summary of the work undertaken during recent project years (2013 to 2017), since the last round of Action Plan updates.

- habitat creation and enhancements;
- removal of invasive species; and
- restoration of connectivity habitat for Western Toads.

Proportionally, FWCP funding of small lakes projects has been relatively low: 2% of total project support. Only 14 projects during the strategic review period primarily addressed small lake actions, which amounted to over \$400,000 of FWCP investments. Annual and ongoing projects were related to non-game enhancement programs that primarily targeted Western Toads at Summit Lake and Western Painted Turtles at Elizabeth Lake. These projects contributed to long-term datasets, ecosystem restoration (e.g. nesting habitat, invasive plants removed), habitat enhancement, and/or monitoring projects (e.g. monitoring wildlife use of restored or enhanced habitat). Grant projects primarily addressed invasive species. Focal species addressed by small lake actions were all wildlife (Western Toad, Western Painted Turtle, and Common Loon). Small lakes are an important ecosystem type for fish species such as Rainbow Trout (insectivorous-SL); however, very few small lakes projects were completed that addressed fish species, fish habitat, or fish-related actions.

SMALL LAKE ACTION PLAN OBJECTIVES

Clear and realistic objectives are necessary to guide information acquisition and prioritize actions. Priority Actions and information needs will change as 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 Small Lakes 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 Small Lakes Action Plan (Figure 3). While the objectives are expected to remain stable over time, the projects funded may evolve as priorities shift, or new information becomes available.

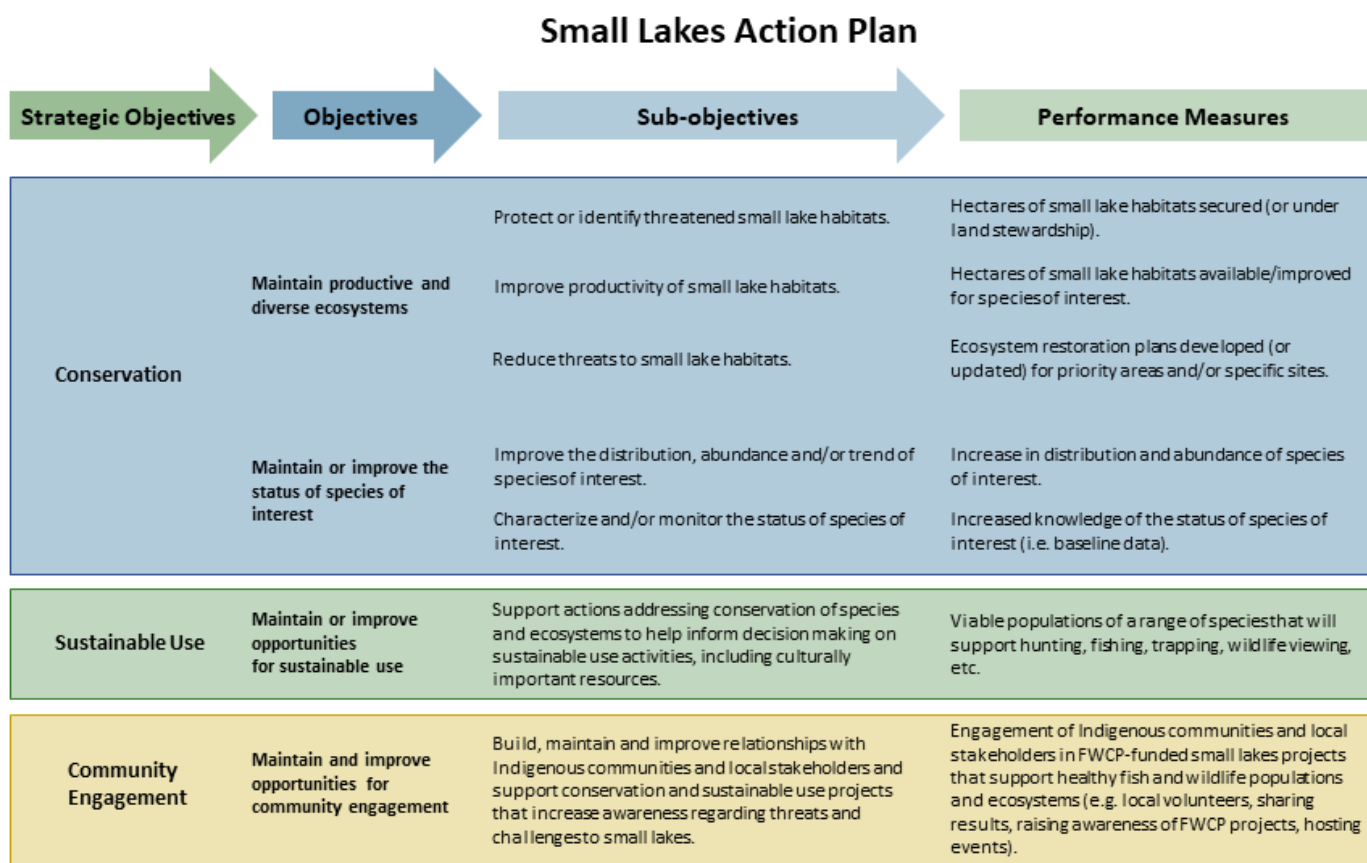


Figure 3: Small Lakes Action Plan objectives and measures.

ACTION PLAN CHAPTERS

The [Action Tables](#) in this document identify FWCP Priority Actions to conserve and enhance fish and wildlife in small lake 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, 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 water bodies <1,000 hectares in size are eligible for FWCP investments over the next five years.

Species of interest for small lakes are outlined in this Action Plan. There are no priority recovery species of interest covered in the Small Lakes Action Plan, but several focal and inventory species of interest utilize small lake habitats.

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.

Small Lake Ecosystems

The Small Lakes Action Plan re-affirms the primary importance of investing in natural small lakes habitat for their priority species 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. Small lake ecosystem actions address:

- development of ecosystem restoration plans;
- inventory of habitat condition and the status of fish populations;
- prevention and control of invasive species;
- conservation and restoration of shallow water habitats;
- connectivity between stream and lake habitat;
- spawning and rearing habitat enhancement for fish;
- creation of habitat features for wildlife; and
- protection and stewardship of small lake habitat.

Priority Habitats

For the purpose of this Action Plan we define two types of small lake that could be the focus of FWCP actions:

- **Natural small lake, with high species-conservation value** – These are representative of a largely intact ecosystem with natural disturbances, native fish species are dominant, no ongoing stocking and low angling pressure – essentially, a wild lake with high fish and wildlife values. The primary actions envisioned for this category would be land securement (e.g. property purchase, conservation covenants, and access management).
- **Natural small lake, with high potential for sustainable use (e.g. angling and/or wildlife viewing) with modest FWCP investment** – These are representative of a largely intact ecosystem with a natural disturbance regime, good access for anglers, and where native fish species are dominant. This set of lakes is distinguished from those noted above by having limiting factors that have been identified and can be addressed in a cost-effective manner to maintain or substantially improve angling or other sustainable uses. Limiting factors may be low winter oxygen, high summer temperature, limited spawning area, or other factors.

Other small lakes in the region that are not recognized within these categories may be lower productivity systems or are otherwise inappropriate for investing in conservation and sustainable use at this time.

Species of Interest in Small Lake Ecosystems

Species of interest in small lake 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.

Species that would benefit most from FWCP investment and that also depend on small lakes more than any other type of habitat are presented below. These are the species that have been heavily impacted by dam footprint on small lakes and for which there is a regional conservation concern and/or high local interest. Actions are presented that will directly benefit species that utilize small lakes. In addition, small lakes may also represent supporting habitat; that is, these species occur in small lakes, but they occur more often or are more dependent on one or more other habitat types. Actions taken on small lakes may benefit these species, but actions on their primary habitat are likely to provide greater benefit.

Recovery Species

There are currently no Actions for recovery species in the Small Lakes Action Plan. Northern Leopard Frog uses small lakes as a supporting habitat in some areas in the Columbia Region (Table 1).

Focal Species

Focal species have been identified and prioritized by 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 impact reports (e.g. Manley and Krebs 2009). Table 3 lists the inventory species that are primarily associated with small lakes, which 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 small lake 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 small lake 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 small lakes 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	Small Lakes	Reservoirs & Large Lakes	Rivers & Riparian	Wetlands & Riparian	Upland & Dryland
Wildlife	Amphibian	Northern Leopard Frog	<i>Lithobates pipiens</i>	Endangered	Red-listed				✓	

Table 2: Focal species of interest associated with small lakes 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	Small Lakes	Reservoirs & Large Lakes	Rivers & Riparian	Wetlands & Riparian	Upland & Dryland
Fish	Fish - Benthic	Burbot	<i>Lota lota</i>		Yellow-listed		✓			
Fish	Fish - Insectivorous	Rainbow Trout (insectivorous-SL)	<i>Oncorhynchus mykiss</i>		Yellow-listed	✓				
Fish	Fish - Insectivorous	Westslope Cutthroat Trout	<i>Oncorhynchus clarkii lewisi</i>	Special Concern	Blue-listed			✓		
Fish	Fish - Piscivorous	Bull Trout	<i>Salvelinus confluentus</i>	Special Concern	Blue-listed		✓			
Wildlife	Amphibian	Columbia Spotted Frog	<i>Rana luteiventris</i>	Not at Risk	Yellow-listed				✓	
Wildlife	Amphibian	Western Toad	<i>Anaxyrus boreas</i>	Special Concern	Yellow-listed	✓			✓	
Wildlife	Bird - Aerial Insectivore	Vaux's Swift	<i>Chaetura vauxi</i>		Yellow-listed				✓	
Wildlife	Bird - Raptor	Osprey	<i>Pandion haliaetus</i>		Yellow-listed				✓	
Wildlife	Bird - Shorebird	Spotted Sandpiper	<i>Actitis macularius</i>		Yellow-listed	✓				
Wildlife	Bird - Wader	Great Blue Heron	<i>Ardea herodias herodias</i>		Blue-listed				✓	
Wildlife	Bird - Water	American White Pelican	<i>Pelecanus erythrorhynchos</i>		Red-listed	✓				
Wildlife	Bird - Water	Common Loon	<i>Gavia immer</i>	Not at Risk	Yellow-listed	✓				
Wildlife	Bird - Water	Western Grebe	<i>Aechmophorus occidentalis</i>	Special Concern	Red-listed	✓				
Wildlife	Mammal - Bat	Northern Myotis	<i>Myotis septentrionalis</i>	Endangered	Blue-listed					✓
Wildlife	Mammal - Bat	Silver-haired Bat	<i>Lasionycteris noctivagans</i>		Yellow-listed					✓
Wildlife	Mammal - Bat	Townsend's Big-eared Bat	<i>Corynorhinus townsendii</i>		Blue-listed					✓
Wildlife	Reptile	Western Painted Turtle	<i>Chrysemys picta bellii</i>	Special Concern	Blue-listed	✓			✓	

Table 3: Inventory species of interest associated with small lakes 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	Small Lakes	Reservoirs & Large Lakes	Rivers & Riparian	Wetlands & Riparian	Upland & Dryland
Fish	Fish - Benthic	Columbia (Mottled) Sculpin	<i>Cottus hubbsi</i>	Special Concern	Blue-listed			✓		
Fish	Fish - Benthic	Torrent Sculpin	<i>Cottus rhotheus</i>		Yellow-listed			✓		
Fish	Fish - Benthic	Prickly Sculpin	<i>Cottus asper</i>		Yellow-listed		✓			
Fish	Fish - Insectivorous	Mountain Whitefish	<i>Prosopium williamsoni</i>		Yellow-listed		✓			
Fish	Fish - Insectivorous	Pygmy Whitefish	<i>Prosopium coulterii</i>	Not at Risk	Yellow-listed		✓			
Wildlife	Bird - Aerial Insectivore	Bank Swallow	<i>Riparia riparia</i>	Threatened	Yellow-listed			✓		
Wildlife	Bird - Aerial Insectivore	Cliff Swallow	<i>Petrochelidon pyrrhonota</i>		Yellow-listed				✓	
Wildlife	Bird - Aerial Insectivore	Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>		Yellow-listed				✓	
Wildlife	Bird - Aerial Insectivore	Tree Swallow	<i>Tachycineta bicolor</i>		Yellow-listed				✓	
Wildlife	Bird - Aerial Insectivore	Violet-green Swallow	<i>Tachycineta thalassina</i>		Yellow-listed				✓	
Wildlife	Bird - Gull	Ring-billed Gull	<i>Larus delawarensis</i>		Yellow-listed	✓				
Wildlife	Bird - Shorebird	Forster's Tern	<i>Sterna forsteri</i>	Data Deficient	Red-listed	✓				
Wildlife	Bird - Shorebird	Herring Gull	<i>Larus argentatus</i>		Yellow-listed				✓	
Wildlife	Bird - Shorebird	Killdeer	<i>Charadrius vociferus</i>		Yellow-listed	✓				
Wildlife	Bird - Wader	Sora	<i>Porzana carolina</i>		Yellow-listed				✓	
Wildlife	Bird - Wader	Virginia Rail	<i>Rallus limicola</i>		Yellow-listed				✓	
Wildlife	Bird - Water	American Coot	<i>Fulica americana</i>		Yellow-listed				✓	
Wildlife	Bird - Water	Barrow's Goldeneye	<i>Bucephala islandica</i>		Yellow-listed	✓				
Wildlife	Bird - Water	Belted Kingfisher	<i>Megaceryle alcyon</i>		Yellow-listed			✓		
Wildlife	Bird - Water	Blue-winged Teal	<i>Spatula discors</i>		Yellow-listed				✓	
Wildlife	Bird - Water	Bufflehead	<i>Bucephala albeola</i>		Yellow-listed	✓				
Wildlife	Bird - Water	Canvasback	<i>Aythya valisineria</i>		Yellow-listed				✓	
Wildlife	Bird - Water	Common Goldeneye	<i>Bucephala clangula</i>		Yellow-listed	✓				
Wildlife	Bird - Water	Eared Grebe	<i>Podiceps nigricollis</i>		Blue-listed				✓	
Wildlife	Bird - Water	Hooded Merganser	<i>Lophodytes cucullatus</i>		Yellow-listed				✓	
Wildlife	Bird - Water	Horned Grebe	<i>Podiceps auritus</i>	Special Concern	Yellow-listed				✓	
Wildlife	Bird - Water	Lesser Scaup	<i>Aythya affinis</i>		Yellow-listed				✓	
Wildlife	Bird - Water	Northern Pintail	<i>Anas acuta</i>		Yellow-listed				✓	
Wildlife	Bird - Water	Pied-billed Grebe	<i>Podilymbus podiceps</i>		Yellow-listed				✓	
Wildlife	Bird - Water	Redhead	<i>Aythya americana</i>		Yellow-listed				✓	
Wildlife	Bird - Water	Red-necked Grebe	<i>Podiceps grisegena</i>	Not at Risk	Yellow-listed				✓	
Wildlife	Bird - Water	Ring-necked Duck	<i>Aythya collaris</i>		Yellow-listed				✓	
Wildlife	Bird - Water	Wood Duck	<i>Aix sponsa</i>		Yellow-listed				✓	

Table 3 Continued

Fish Wildlife	Guild	Common Name	Species Name	Federal	Provincial	Small Lakes	Reservoirs & Large Lakes	Rivers & Riparian	Wetlands & Riparian	Upland & Dryland
Wildlife	Mammal - Bat	Big Brown Bat	<i>Eptesicus fuscus</i>		Yellow-listed					✓
Wildlife	Mammal - Bat	Eastern Red Bat	<i>Lasiurus borealis</i>		Unknown					✓
Wildlife	Mammal - Bat	Fringed Myotis	<i>Myotis thysanodes</i>	Data Deficient	Blue-listed					✓
Wildlife	Mammal - Bat	Little Brown Myotis	<i>Myotis lucifungus</i>	Endangered	Yellow-listed					✓
Wildlife	Mammal - Bat	Long-eared Myotis	<i>Myotis evotis</i>		Yellow-listed					✓
Wildlife	Mammal - Bat	Long-legged Myotis	<i>Myotis volans</i>		Yellow-listed					✓
Wildlife	Mammal - Carnivore	North American River Otter	<i>Lontra canadensis</i>		Yellow-listed			✓		
Wildlife	Mammal - Rodent	American Beaver	<i>Castor canadensis</i>		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 small lake ecosystems 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	COLSLK.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	COLSLK.CXP.HB.02.01 Indigenous knowledge and values, incorporate based 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	COLSLK.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	COLSLK.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	COLSLK.CXP.RI.05.01 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	COLSLK.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

Small Lake Ecosystem Actions

SMALL LAKES 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	COLSLK.ECO.RI.07.01 Ecosystem Restoration Plans-P1	1	All Small Lakes	Fish	Support the development of ecosystem restoration (ER) plans for high priority and/or ecologically significant small lake habitats in the Columbia Region.	ER plans that clearly articulate opportunities for on-the-ground restoration and assess limiting factors, describe opportunities for FWCP investment, guide future work in these areas with specific actions and targets, and describe how results should be monitored.	Directed
8	Research and Information Acquisition	COLSLK.ECO.RI.08.01 Baseline habitat and fish population assessments-P3	3	All Small Lakes	Fish	Conduct an inventory and baseline habitat/fish population assessment of small lakes to assess limiting factors and enhancement opportunities (excludes stocked lakes). Inventory may include invertebrate surveys and water quality (e.g. water temperature, water levels, water quality).	Identification of limiting factors to fish populations and identification of enhancement opportunities to address these factors.	Open
9	Habitat-based	COLSLK.ECO.HB.09.01 Prevention and control of invasive species-P1	1	All Small Lakes	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.	<ul style="list-style-type: none"> Protection of FWCP investments against invasive species establishment and spread. Prevention of the introduction and spread of aquatic invasive species. 	Directed / Open
10	Habitat-based	COLSLK.ECO.HB.10.01 Conservation and restoration of shallow water habitats-P2	2	All Small Lakes	Fish and Wildlife	Identify/conservate/protect/restore/enhance littoral lake and riparian habitats.	Conservation, protection and/or restoration of lake and riparian habitats.	Open
11	Habitat-based	COLSLK.ECO.HB.11.01 Connectivity to stream habitat-P1	1	All Small Lakes	Fish	Re-establish connectivity between small lake and stream habitat by way of culvert replacement, flow augmentation, gravel placement, etc.	Renewed availability of stream habitat that was previously unavailable.	Open
12	Habitat-based	COLSLK.ECO.HB.12.01 Creation / enhancement of fish and wildlife habitat-P1	1	All Small Lakes	Fish and Wildlife	Where deemed limiting to high priority and/or ecologically significant small lake fish and wildlife populations, create or restore habitat elements.	New, restored or enhanced habitats.	Open

Continued: Ecosystems Action Table

SMALL LAKES ACTION TABLE - ECOSYSTEMS							Version:AUG2019	
Action #	Action Type	Priority Action Short Description	Priority	Priority Area	Target Species	Priority Action	Intended Outcome	Delivery Approach
13	Monitoring and Evaluation	COLSLK.ECO.ME.13.01 Effectiveness monitoring of past projects-P2	2	All Small Lakes	Fish and Wildlife	Monitor and evaluate the effectiveness of previous FWCP small lakes ecosystems projects (for monitoring of species see Action #21 below). Include an approach for adaptive management, information sharing and collaboration among agencies and the public stakeholders to increase the efficacy of conservation action.	Ensuring habitat-based actions are functioning as intended.	Directed / Open
14	Land Securement	COLSLK.ECO.LS.14.01 Shoreline stewardship program-P2	2	All Small Lakes	Fish and Wildlife	Support the implementation of a shoreline stewardship program. Note that some existing stewardship programs are in place and may be expanded or used as good models.	Implementation of shoreline stewardship program.	Open
15	Land Securement	COLSLK.ECO.LS.15.01 Secure small lake habitat-P1	1	All Small Lakes	Fish and Wildlife	Investigate and prioritize land securement and stewardship opportunities to conserve and protect small lake habitats. Collaborate with existing stewardship programs.	Conservation of small lake habitat (including aquatic habitat when feasible).	Directed / Open

Small Lake Species of Interest Actions

SMALL LAKES 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
16	Species-based	COLSLK.SOI.SP.16.01 Focal and Inventory species projects for species at risk-P2	2	All Small Lakes	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.	<ul style="list-style-type: none"> Changes to species presence are monitored and inform future conservation/compensation actions. Improved habitat for fish and wildlife species. 	Open
		COLSLK.SOI.SP.16.02 Focal and Inventory species projects for other fish and wildlife-P3	3		Other Fish and Wildlife			
17	Species-based	COLSLK.SOI.SP.17.01 Western Painted Turtle populations-P2	2	All Small Lakes	Western Painted Turtle	Contribute to action items and priorities as identified in the Management Plan for the Western Painted Turtle in British Columbia.	Conservation and protection of Western Painted Turtles and their habitats.	Directed / Open
18	Species-based	COLSLK.SOI.SP.18.01 Support for BC bat initiatives-P1	1	All Small Lakes	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
19	Research and Information Acquisition	COLSLK.SOI.RI.19.01 Waterbird surveys-P2	2	All Small Lakes	Waterbirds	Conduct breeding waterbird surveys and/or productivity surveys where knowledge gaps exist for focal/inventory species.	Conservation and protection of waterbirds.	Open
20	Habitat-based	COLSLK.SOI.HB.20.01 Connectivity of breeding and overwintering sites for Western Toad populations-P1	1	All Small Lakes	Western Toad	Maintain/enhance Western Toad populations in small lakes by working with the Province of B.C., partners and public to improve connectivity between breeding and overwintering sites.	Conservation of Western Toad populations and improved habitat through restoration and enhancement.	Directed / Open
21	Monitoring and Evaluation	COLSLK.SOI.ME.21.01 Monitor fish and wildlife use of created/restored habitats-P2	2	All Small Lakes	Fish and Wildlife	Monitor fish and wildlife species use of improved small lake habitat that was created or restored with support from the FWCP (i.e. past projects).	<ul style="list-style-type: none"> Improved awareness of species use and of effectiveness of restoration actions. Improved knowledge of bird species will inform conservation actions. 	Open

Continued: Species of Interest Action Table

SMALL LAKES 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
22	Monitoring and Evaluation	COLSLK.SOI.ME.22.01 Invertebrate monitoring-P3	3	All Small Lakes	Invertebrates	Support inventory/monitoring of small lake-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

- Fish & Wildlife Compensation Program. 2011. FWCP: Columbia Species Rating and Database Tool. Background report to accompany the ExcelTM-based tool.
- Manley, I., and J. Krebs. 2009. Wildlife impacts due to BC Hydro dams in the Columbia Basin. Fish & Wildlife Compensation Program, Nelson, BC.
- 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.

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.

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.

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 (UNESCO) 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.

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).

Littoral: Part of a lake or river that is close to the shore. The littoral zone typically extends from the high water mark, which is rarely inundated, to shoreline areas that are permanently submerged.

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).

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 identified for compensation or a 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 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.

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.