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FISH AND WILDLIFE COMPENSATION PROGRAM

JORDAN WATERSHED

WATERSHED PLAN

FINAL DRAFT

The FWCP is a partnership of:

BC hydro FOR GENERATIONS

BRITISH COLUMBIA

Canada

Fisheries and Oceans Canada

Pêches et Océans Canada

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Jordan River Watershed Plan

1 INTRODUCTION

This Jordan River Watershed Plan sets forth the strategic direction for the Fish and Wildlife Compensation Program: Coastal Region.

It begins by briefly outlining the vision, principles, policy context and strategic objectives that form the foundation of the FWCP. A description of the Jordan River setting includes an overview of the hydro-electric facilities and footprint impacts created by those facilities. The plan describes the development of strategic objectives for FCWP, the creation of priorities for the Jordan watershed and outlines priority actions and projects for the system.

1.1 FISH AND WILDLIFE COMPENSATION PROGRAM

The Fish and Wildlife Compensation Program (FWCP): Coastal Region evolved from its origin as the Bridge-Coastal Restoration Program (BCRP), a program initiated voluntarily by BC Hydro in 1999 to restore fish and wildlife resources that were adversely affected by the original footprint of the development of hydroelectric facilities in the Bridge-Coastal generation area. Footprint impacts include historical effects on fish and wildlife that have occurred as a result of reservoir creation, watercourse diversions and the construction of dam structures.

In 2009, the program developed a strategic framework that guides overall planning for compensation investments (MacDonald, 2009). The framework has guided the development of strategic plans for each watershed within the FWCP program area, which are in turn informing action plans and projects that focus on specific priorities within each watershed (Figure 1).

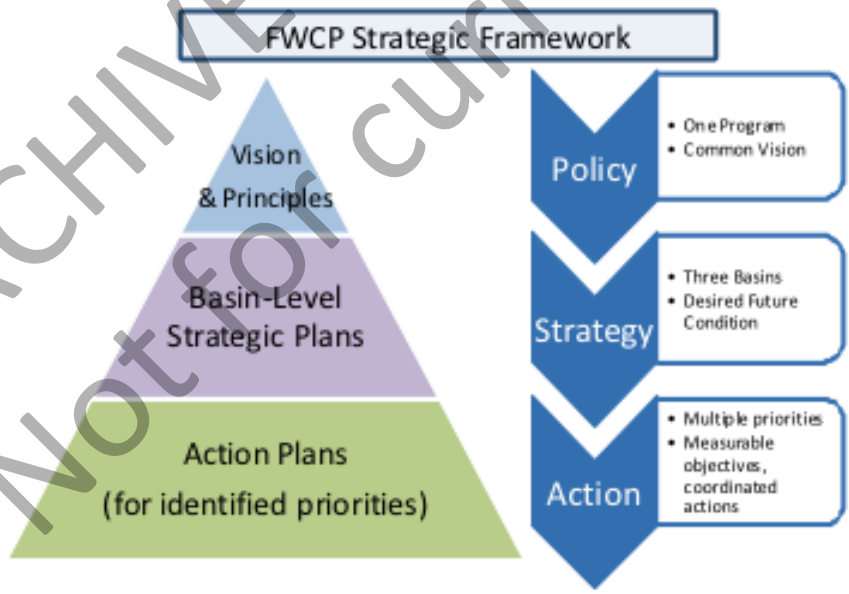

Figure 1: Relationship between the FWCP Strategic Framework, policy, strategy and action.

Delivery of the program as a whole is guided by a vision, set of principles and policy priorities as developed by the program's partners.

VISION

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

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

PRINCIPLES

Approach - The program has a forward-looking, ecosystem-based approach that defines the desired outcomes and takes actions to restore, enhance and conserve priority species and their habitats.

Decision Making - The program efficiently uses its resources and works with its partners to make informed and consensus-built decisions that enable the delivery of effective, meaningful and measurable projects that are supported by the impacted communities.

Geographic Scope - Within the watersheds, basins and ranges of the populations of species affected by generation facilities owned and operated by BC Hydro.

Objectives - The program defines and delivers on compensation objectives that reflect the partnership's collective goals, and that align with local provincial and federal fish and wildlife conservation and management objectives in the areas where we work.

Delivery - The program strives to be a high performing organization with skilled and motivated staff and partners delivering efficient, effective and accountable projects.

PARTNERS

The program is a partnership between BC Hydro, the BC Ministry of Environment, Fisheries and Oceans Canada, First Nations and public stakeholders. Our goal is to have engagement and participation of all the partners in priority setting, approval, review and delivery of the program.

POLICY CONTEXT

The FWCP addresses the policy requirements and social commitments to compensate for impacts to fish and wildlife associated with the development of BCH's generating facilities. The core responsibilities of the agencies are:

Ministry of Environment

The Ministry of Environment manages and delivers a wide range of programs and services that support the Province's environmental and economic goals[1]. The Ministry encourages environmental stewardship, develops innovative partnerships, engages First Nations, stakeholders and the public and actively promotes the sustainable use of British Columbia's environmental resources. Within this broader context, the Ministry has a number of responsibilities that are particularly relevant to the development and implementation of actions under the FWCP including:

- Management and conservation of the province's biodiversity;
- Protection of fish, wildlife, species-at-risk and their habitats;
- Protection and restoration of BC's watersheds; and,
- Provision and management of fish and wildlife-based recreation.

[1] http://www.bcbudget.gov.bc.ca/2010/sp/pdf/ministry/env.pdf (MOE Service Plan)

A number of policies and plans guide the Ministry in delivering on these goals and objectives. The **Conservation Framework**[2] is British Columbia's approach for maintaining the rich biodiversity of the province, providing a set of science-based tools and prioritized actions for conserving species and ecosystems in B.C. **Program Plans for Freshwater Fisheries, Wildlife and Ecosystems**[3] articulate a clear set of strategies supported by actions to achieve both conservation-based outcomes and the provision of recreational opportunity.**Recovery Strategies and Management Plans** have been developed to guide the maintenance, recovery and/or use of specific species and ecosystems. These plans may include specific performance measures and targets.

Fisheries and Oceans Canada

Under the ***Fisheries Act***, DFO is the primary agency responsible for conserving and managing Canada's fisheries, including pacific salmon. It does so through management and monitoring of fisheries, protection of fish habitat, and pollution prevention. The **Policy for the Management of Fish Habitat** (1986) has an overall objective of 'net gain' of fish habitat and helps guide the implementation of fish habitat protection through collaboration with relevant provincial agencies. The ***Species at Risk Act*** mandates protection of geographically and genetically distinct populations. The principle goal of the **Wild Salmon Policy**[4] and is "to restore and maintain healthy and diverse salmon populations and their habitats for the benefit and enjoyment of the people of Canada in perpetuity". This achieved through safeguarding genetic diversity, maintaining ecosystem integrity and managing for sustainable fisheries.

BC Hydro

As a Crown Corporation, BC Hydro is committed to producing, acquiring and delivering electricity in an environmentally, socially and financially responsible manner,[5] through managing impacts from its operations, and weighing environmental values with social and economic interests. Where negative impacts cannot be avoided, it will work to mitigate or offset them, enhance affected habitat and sustain resources over the long term. As part of its water licenses to operate its facilities, BC Hydro is required to undertake compensation programs in different regions of the province. Through the compensation program, it is committed to developing positive projects, such as investments to improve fish stocks, and building relationships to encourage stakeholder and aboriginal community engagement, particularly where their input can contribute to better decisions.

PROGRAM DELIVERY

The overall vision and common principles drive the FWCP program and projects, and provide a foundation for determining strategic priorities at the watershed level (Watershed Plans) which, for the smaller basins, are developed into actions and projects. The bulk of projects undertaken in small basins by the FWCP will be delivered under Watershed Plans that lay out a suite of key actions to achieve specific goals associated with species and ecosystems. Actions could include research, implementation activities, monitoring and evaluation activities, and communication mechanisms. Applicants are encouraged to use the Watershed Plans to develop projects that meet the overall objectives of the FWCP program. Technical Committees, staff and the management board will reference the plans to ensure that the highest priority projects are invested in.

A portion of the FWCP program activities will include small-scale, short-duration strategic projects that target specific issues identified by program partners or others (e.g., community members). These could include projects not yet identified in any Watershed Plan, as well as lower priority items that require timely response in order to take advantage of an investment or partnership opportunity.

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[2] http://www.env.gov.bc.ca/conservationframework/

[3] http://www.env.gov.bc.ca/esd/

[4] Canada's Policy for Conservation of Wild Pacific Salmon, 2005.

[5] BC Hydro Social Responsibility Policy.

PROJECT INVESTMENT CRITERIA

At the level of individual project investment and implementation decisions, the FWCP applies the following criteria to further define its role and actions within defined program areas:

- FWCP does:
  - Fund actions to create, restore, or otherwise improve the function of ecosystems that have been impacted by BC Hydro activities;
  - Fund actions to create, restore, or otherwise improve the function of alternate ecosystems that provide a better opportunity for investment;
  - Participate as a team member in species of interest planning;
  - Fund specific management actions for species of interest as identified by recovery teams and action/implementation groups;
  - Fund baseline inventory that contributes to the development of habitat or species based actions within Watershed Plans;
  - Fund monitoring programs designed to measure the effectiveness of FWCP funded habitat and species actions; and,
  - Contribute to all aspects of managing co-operatively managed conservation lands.
- FWCP does not:
  - Fund core activities of government or non-government agencies or programs;
  - Lead the development of species recovery goals;
  - Fund, co-ordinate or lead National Recovery Teams for species at risk;
  - Develop policy related to land or wildlife management;
  - Administer government regulations;
  - Engage in enforcement and compliance activities, except in relation to co-operatively managed conservation lands; and,
  - Fund programs designed exclusively to address government harvest objectives.

2 JORDAN WATERSHED[6]

2.1 SETTING

The Jordan system is situated in the southern portion of Vancouver Island approximately 50km northwest of Victoria. Form its headwaters, the Jordan River flows southwest between the Sooke Hills and Seymour Mountain to the Pacific Ocean. Almost halfway along it is joined by Bear Creek and then flows into the Jordan Diversion Reservoir which discharges into the Elliott Headpond. Most flow is diverted for power; however, 0.25 m^2/s is discharged into the natural channel of the Jordan.[7] The Jordan Drainage basin above Elliott Dam is approximately 144 km^2. Elevations within the Jordan River basin range from 300 to 1000 m. Precipitation is dominated by pacific air masses meeting west-facing mountains and can lead to prolonged rain periods. Heavy precipitation occurs between October and April with an average of 500mm in November. Inflows also occur due to snowmelt from May to July.

Hydro facilities were first constructed in 1917, and currently consist of a series of dams and diversion reservoirs. The most upstream of which is Bear Creek Dam, whose reservoir is not actively managed and behaves as a natural lake with water flowing over the spillway. The Jordan Diversion Dam is approximately 2.5km downstream of the Bear Creek Dam. It impounds a reservoir of 1800 ha with normal operating levels between 367 and 386 m, which correspond to approximately 3.5 days operation. Bear Creek flows into the Jordan Reservoir. 1.6 km below the Jordan Dam is the Elliott Dam and Headpond. The Elliott Headpond has a small storage capacity and diverts water to the powerhouse through a 7.2 km tunnel where there is a single 170 MW capacity turbine.

The amount of inflow received in the basin limits the generating ability of the system.

[6] More details of the watershed can be found at: http://www.bchydro.com/bcrp/about/strategic_plan.html
[7] See description in the Jordan River Water Use Plan (BC Hydro, 2003).

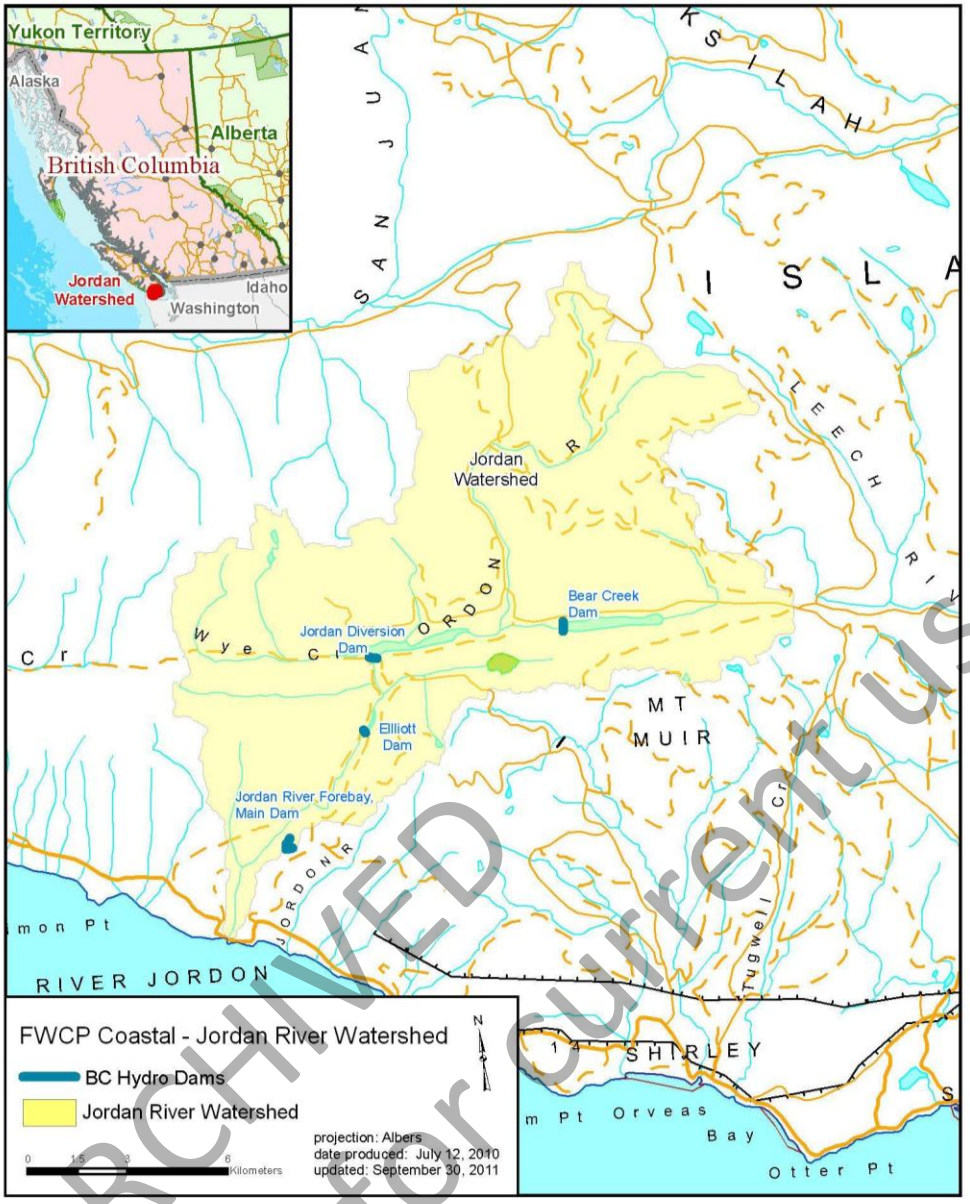

Figure 2: Jordan Watershed

The Jordan system lies within the traditional territories of T'Sou-ke, Pacheedaht and Ditidaht First Nations. There are no major communities near the system.

2.2 FOOTPRINT ISSUES

Fish and wildlife habitat and species have been significantly altered due to the construction of the dams, the development of hydro-power, and alterations in the hydraulic regimes of the systems. The following summary of the primary footprint impacts is derived from:

- Bridge-Coastal Restoration Program: Strategic Plan, Volume 2: Watershed Plans, Chapter 5: Jordan River (December 2000);
- Jordan River Water Use Plan Consultative Committee Report (February 2002); and
- Findings in the Community Workshop (Sooke, 3 February 2011).

Inundation: Reservoir impoundment covers 193 ha of land, riparian areas and forest. Shallow reservoirs experiencing drawdown have reduced water quality by retaining anoxic bottom layers.

Habitat loss: Loss 57 ha of riparian habitat, 7 km of mainstem, 4 km of tributary, and 15 ha of channel habitat. Drawdowns at Bear and Diversion reservoirs have reduced fish access to tributaries. The dam has reduced recruitment of large woody debris and gravel downstream.

Migration barriers: Elliott Dam and Diversion Dam blocked movement of resident fish within the upper system.

New Habitat: Diversion reservoir has created new habitat for resident trout. FWCP funds have created wetlands in the Diversion reservoir.

Spills: Periodic spills scour gravel below dam and transport fine sediments to spawning habitat in lower mainstem.

Altered Flow Regime: Periodic large spills and low level outlet at dam may cause sedimentation of spawning habitat in the mainstem.

Diversions: A high portion of the water is diverted out of the river at Elliott dam.

Entrainment: Magnitude of entrainment mortality and injury is unknown. It would affect only reservoir species as there is no anadromous passage above Elliott.

2.3 FWCP ACCOMPLISHMENTS TO DATE

Since 1999 the Bridge Coastal Restoration Program has invested approximately $400,000 in the Jordan River watershed.

Restoration work includes:

- Integrated wildlife restoration plan.
- Construction of wetlands on Diversion Reservoir.

Research work includes:

- Distribution of Red-legged frogs in Jordan watershed.
- Pink Salmon incubation study.
- Pink salmon transplant feasibility study (Guimond, 2005).

3 STRATEGIC OBJECTIVES FOR FWCP

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

Conservation and sustainable use are core objectives for both the Ministry of Environment and Fisheries and Oceans. Conservation is addressed in terms of maintaining specific species or habitats both in terms of their importance for diversity (including genetic diversity), as well as their importance for ecosystem functions, integrity and productivity. For example, a species such as White Sturgeon may be important in terms of species diversity, while Pileated Woodpeckers may be important for maintaining ecosystem functioning and integrity by creating habitat for other species. Sustainable use incorporates the human interest in utilizing species for sustenance, commercial, recreational, or cultural purposes. Consequently, species such as coho, moose or bald eagles (wildlife viewing) could be considered important from a sustainable use perspective.

Community engagement is a core objective for BC Hydro under the compensation program and is driven by its social responsibility policy. It also reflects the 'shared stewardship' goal of the Ministry of Environment. It reflects the importance of incorporating local values and interests in determining and implementing projects.

The FWCP strategic objectives are therefore:

Conservation

- **Maintain or improve the status of species or ecosystems of concern**.
  This focuses on the conservation goals for ecosystems, habitats or ecological communities, and specific species. Priorities may be identified through the provincial Conservation Framework, or at the Conservation Unit level under the federal Wild Salmon Policy. Conservation priorities may also be identified at the watershed level based on local conditions.

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

Sustainable Use

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

Community Engagement

- **Build and maintain relationships with stakeholders and aboriginal communities.**
  This objective stems from BCH's social responsibility policy and MOE's shared stewardship objective. This recognizes the importance of engaging aboriginal communities, local stakeholders, and other interest groups to contribute toward making good decisions and delivering effective projects.

4 PRIORITIES

4.1 INTRODUCTION

Across the FWCP as a whole, the general process of identifying priority action plans and projects involves three steps:

Step 1 – Identification (Candidate Priority Species and Ecosystems)

The first step involves identifying and prioritizing the species and ecosystems against the core strategic objectives, and how they have been impacted by footprint issues associated with hydro-power generation.

Step 2 – Preliminary Planning

This step consists of reviewing the identified priorities with consideration to identifying candidate action plans and projects. It may involve grouping species or ecosystems together for coordinated action. Key considerations include: addressing limiting factors, exploring the opportunity for multiple benefits, addressing any specific local threats, the practicality of implementing actions, and the plan's consistency with existing agency programs.

Step 3 - Prioritization

This step consists of a final prioritization of candidate action plans and projects (and their priority areas) according to cost effectiveness and technical feasibility criteria:

- **Technical Feasibility**. – The program should generally seek out investments that are the most technically feasibility. Considerations generally include the use of proven methods and availability of technical resources. Innovative approaches should be considered but they must have a credible technical foundation and reasonable expectation of success. The potential interrelationship with system operations and programs being implemented by the Water License Requirements program must also be considered.
- **Cost Effectiveness**. – The program should generally seek out investments that are the most cost effective. This includes issues or actions which may benefit multiple species, areas where there is an opportunity to leverage additional funds for activities, issues where previous work has been conducted and incremental expenditure may have substantive benefits, actions that are closely related to on the ground actions with measurable impacts, amongst others.

4.2 PRIORITY SETTING IN THE COASTAL REGION

In the Coastal region of the FWCP, Step 1 involved a review of existing Watershed Restoration Plans, interviews with agency staff, a series of community workshops and a final evaluation.

In 2000, specific restoration objectives were originally articulated in the Watershed Restoration Plans.[8] These plans contain details of the major footprint impacts, objectives and limiting factors for productivity and have guided the work of the FWCP Coastal for the past decade.

In the case of the Jordan River watershed, priorities for FWCP Coastal were further reviewed and updated in 2010 through consultation with BC Hydro, Fisheries and Oceans Canada (DFO), and Ministry of Environment (MOE). This resulted in a list of priority tables for fish and wildlife species in

[8] Watershed Restoration Plans may be obtained at the FWCP website: http://www.bchydro.com/bcrp/about/strategic_plan.html

the Jordon River watershed (Appendix A). Draft plans and priorities were reviewed with local First Nations and community groups at a workshop in Sooke (3 February, 2011).

4.3 PRIORITY TOPICS

The following topics have been identified as priority candidates for development into future FWCP Coastal project proposals. It is important to understand, however, that planning priorities may not translate immediately into funded projects. Limited program funding requires that priority-setting has to also be developed across the program as a whole. The process of selecting which projects will be implemented in any given year will occur during the annual implementation planning cycle.

1 – RE-INTRODUCTION OF PINK SALMON

Rationale

The Jordan River was seriously impacted by industrial activity including forestry, mining, and hydroelectric development. These activities have led to a decline of salmon and sea-run cutthroat in the river, and a demise of pink salmon (Bridge Coastal Restoration Program, 2000). A specific impact is the degradation of water quality largely attributed to past mining activities in the area. However, preliminary testing of pink and coho incubation in the Jordan River has shown that water quality to re-establish pink salmon runs may exist (Guimond, 2005), and that intra-gravel oxygen levels and incubation survival are good in available "pocket spawning" sites (Bridge Coastal Restoration Program, 2000).

Focus

- Review the water quality assessments that have been completed through the Water Use Planning monitoring study JORMON#2 and the FWCP Coastal project 04.Jo.01
- Develop and implement a water quality study that will fill in gaps from the previous studies, specifically characterizing water quality in the system during salmonid use periods.
- Develop and implement plan to reintroduce pink salmon to the Jordan River. The plan would include:
    - Onsite incubation of pink eggs,
    - Address both odd and even year pink salmon runs.
    - Development of strategy to address stranding downstream of tailrace and improvement of spawning habitat above the tailrace.

Expected outcome

- Detailed plan for water quality monitoring and its implementation over several years.
- Detailed plan for salmonid (pink) reintroduction once water quality monitoring has been completed.
- Medium term: natural returns of pink salmon.

2 – MULTIPLE FISH SPECIES HABITAT RESTORATION.

Rationale

There is now a larger fish flow in the lower river due to decisions made in the Jordan Water Use Plan (WUP). Assessments of salmonid and trout spawning and habitat use are being completed through the Water License Requirements (WLR) Program during the 2006-2012 period. Once those studies are complete a review of the data gathered should be completed to identify the potential for habitat enhancement between the Elliott Dam and the powerhouse on the lower Jordan

River and between the powerhouse and the first set of falls (for pink, chum and coho). Increasing summer habitat capacity in the canyon (for species such as rainbow), as well as potential sites for channel creation should also be considered.

Focus

- Review results of WLR studies, specifically JORMON#2 and JORMON#3 that monitors salmonid and trout spawning in the Lower Jordan River.
- Improve habitat Lower Jordan River between the powerhouse and the falls for multi-species benefit.

Expected outcome

- Further development of a plan that details and prioritizes opportunities in the Lower Jordan River.

3 – DIVERSION RESERVOIR PRODUCTIVITY

Rationale

Rainbow and cutthroat trout reside in the three reservoirs of the Jordan River (Elliott, Diversion, and Bear Creek Reservoirs). These reservoirs have been stocked with these species by MOE since 1985, producing a partially self sustaining population of fish. MOE has a goal to maintain reservoir productivity instead of continual stocking. The Jordan Water Use Plan (BC Hydro, 2003) introduced operating constraints to decrease daily and seasonal Diversion Reservoir fluctuation. It is hypothesized this operation will allow the establishment of a more effective littoral zone, directly benefitting rainbow trout. This will be studied through the Jordan WLR Program from 2006-2012.

Focus

- Review results of WLR studies, specifically JORMON#4
- Assess and prioritize opportunities for additional productivity improvements (e.g. littoral or drawdown area restoration).

Expected outcome

- Improved understanding of the project opportunities and priorities in the Jordan system reservoirs (Elliott, Diversion, and Bear Creek).

4 – RIPARIAN, WETLAND, AND OLD-GROWTH

4.1 – HABITAT MAPPING

Rationale

Riparian and wetland areas have been heavily impacted by the creation of dams, and continue to be under threat in many remaining areas. These areas are the limiting factor for critical life stages of many species, both aquatic and terrestrial. Riparian and wetland areas are both diverse and biologically rich and thus considered as highly valuable from an overall ecological standpoint. Additionally, old-growth habitats are some of the most biologically rich areas within a watershed.

To date, FWCP has not significantly funded study and/ restoration of riparian, wetland or old growth areas in the Jordan system. At this point it is a priority to assess opportunities and implement restoration actions in areas with high restoration potential.

Through the FWCP priority-setting process, several general species groups (amphibians, water birds, and bats) were considered first-priority representatives of the wetland and riparian community in terms of where to focus investment. Because there is little up-to-date information

for these particular species in the watershed, the most immediate focus is to complete mapping and/or inventory that informs next steps (restoration, management, etc). Habitat mapping would help screen for habitats that might support species at risk, including owls, water shrew, amphibians and certain birds. Follow-up inventories of specific species would be better directed with a habitat mapping base as a foundation. Forestry companies with current tenure in the Jordan Basin (e.g., Timberwest) are a possible source of currently available habitat mapping.

Focus

- Conduct habitat mapping of potential areas for restoration. Determine possible habitats for amphibians, include mapping of old large riparian trees and old growth that could be used by cavity nesters (birds and bats).

Expected outcome

- Prioritized areas to conduct field work for species identification and for conservation and restoration.
- Restoration opportunities identified and assessed.

4.2 – INVENTORY OF AMPHIBIANS

Rationale

In general, amphibians have been heavily impacted by the construction and operation of hydro power facilities. Work as already been done on the red-legged frog. An inventory was conducted in 2004 and the construction of wetlands was completed in 2010 on the Diversion Reservoir. There is merit to continue to enhance the watershed for amphibians, and monitor the effectiveness of previously constructed wetlands. There are a number of potential species that have been identified or that could occur in the Jordan River (Table 1).

.[9]

Table 1: Potential Amphibians, Reptiles and Turtles in the Jordan watershed

Amphibian, reptile, turtle	COSEWIC	CF Rating
Northwestern Salamander	NAR (May 1999)	5,1,3
Western Toad	SC (Nov 2002)	3,2,4
Rubber Boa	SC (May 2003)	5,1,3
Western Redback Salamander		5,3,4
Common Ensatina	NAR (May 1999)	6,2,4
Northern Red-legged Frog	SC (Nov 2004)	3,1,2

Focus

- Monitor the effects of the work to date on red-legged frogs and long-toed salamander.

[9] From BC Species Explorer search of Capital Regional District, http://a100.gov.bc.ca/pub/eswp/

- Conduct field inventory for western toad and painted turtle.
- Develop recommendations for further restoration work that benefits multiple species.

Expected outcome

- Evaluation of restoration activities.
- Identified areas to conduct additional inventory.
- Confirmation of presence or non-presence of target species.
- Action recommendations for restoration.

4.3 – INVENTORY OF RIPARIAN AND WATER BIRDS

Rationale

In general, water fowl, heron and other water birds have been heavily impacted by the construction and operation of hydroelectric facilities. Herons in particular are now also under threat from bald eagle predation. An inventory would help develop an understanding around their breeding, population and distribution in the area and develop opportunities for restoration (e.g., salt marsh or estuaries). Other birds surveyed as appropriate to gain more baseline data. Table 2 shows potential wetlands and riparian bird species.

.[10]

Table 2: Potential Riparian and Wetland Birds in the Jordan watershed

Riparian and wetland birds	COSEWIC	CF Rating
Great Blue Heron	SC (Mar 2008)	3,6,1
Short-eared Owl	SC (Mar 2008)	6,2,3
American Bitten		5,2,3
Marbled Murrelet	T (Nov 2000)	1,2,2
Olive-sided Flycatcher	T (Nov 2007)	5,2,3
Peregrine Falcon (*pealei)*	SC (Apr 2007)	2,1,2
Northern Pygmy owl (*swarthi*)		1,3,3
Western Screech owl (*kennicotti*)	SC (May 2002)	3,1,2
Barn owl	T (Nov 2010)	6,2,3
Vesper Sparrow (*affinis*)	E (Arp 2006)	4,6,1

[10] From BC Species Explorer search of Capital Regional District (with CF listing of 3 or higher), http://a100.gov.bc.ca/pub/eswp/

Focus

- Conduct field inventory for water fowl and riparian and wetland birds, and develop recommended actions for restoration.

Expected outcome

- Identified presence of priority species.
- Action recommendations for restoration or management.

4.4 – INVENTORY OF BATS

Rationale

Some bat species have been affected by the loss of habitat due to the loss of large riparian trees for roosts. They are an important species from both a conservation and ecosystem functioning perspective. There is very little information regarding bats in the area.

Focus

- Conduct field inventory for bats, (in particular Townsend's Big Eared and Keen's Myotis bats) and develop recommended actions for restoration.

Expected outcome

- Identified presence of priority species.
- Action recommendations for restoration or management

5 – UNGULATE MONITORING AND POPULATION AUGMENTATION

Rationale

Roosevelt elk are important to both First Nations and local community members. There appears to be an increase of elk use in the populated areas around the Jordan River Watershed. However, there is a potential for augmenting the population residing in the Jordan watershed (including Jordan Meadows) by transplanting elk (this has had success elsewhere) and developing a harvestable population. Black-tailed deer are also important for a local harvesting perspective from both First Nations and non-First Nations (generally from Victoria).

Focus

- The focus will be on monitoring of elk and deer populations and habitat.
- Assessing the possibility of transplanting elk.
- Assessing second growth harvesting of forests to ensure adequate habitat for deer.
- Recommend opportunities for restoration.

Expected outcome

- Improved understanding of trends in population and distribution, and limiting factors.
- Action recommendations for restoration.

PROJECT 6 – ESTUARY ENHANCEMENT

Rationale

The Jordan River estuary has been heavily impacted by forestry, mining, and hydroelectric projects. These activities have lead to the decline of salt marsh and estuary habitat in the Jordan River area. As of 2010 the Coastal Regional District has been in negotiations with Western Forest Products to

purchase key pieces of land in the estuary. Once the land purchases are secure, habitat enhancement plans should be created for these areas. There is also local community interest in the Jordan River estuary as a possible restoration sites with multispecies benefit. This is an opportunity to enhance community engagement.

Focus

- Identify any other potential property purchases in the Jordan River Estuary area.
- Assess the current land acquisitions for restoration potential.
- Recommend restoration opportunities.

Expected Outcome

- Land securement in the Jordan River Estuary.
- Action recommendations for restoration or management.

5 REFERENCES

BC Hydro. 2004. Consultative Committee Report and draft Water Use Plan submitted to the Comptroller of Water Rights in February 2002. Executive Summary available at: http://www.bchydro.com/etc/medialib/internet/documents/environment/pdf/wup_jordan_river_executive_summary_pdf.Par.0001.File.wup_jordan_river_executive_summary.pdf.

Bridge-Coastal Restoration Program. 2000 Strategic Plan, Volume 2, Watershed Plans, Chapter 5: Jordan River. Available at: http://www.bchydro.com/bcrp/about/strategic_plan.html

Guimond, E. 2005. Jordan River Pink Salmon Transplant Feasibility Study. Report for Fisheries and Oceans Canada, 2005.

MacDonald, A. 2009. Fish & Wildlife Compensation Program: Executive Summary. Report for BC Hydro, Vancouver, BC.

APPENDIX A – PRIORITY TABLES

The following are the priority tables developed through consultation with the Ministry of Environment and the Department of Fisheries and Oceans in the summer and autumn of 2010. The tables represent the agencies' priorities for different species and what activities should be undertaken for them, they were reviewed by a community workshop in Sooke (3 February 2011).

FISH

Species	Priority	Comments
U/S of Elliot Dam		
All resident species	**medium**	**No Targets provided**
	high	Ongoing WUP operations directed at improving reservoir productivity
	low	No restoration activity recommended at this time
Elliot Dam d/s to lower falls (1.2 km above river mouth)		
All species	**low**	**No Targets provided**
	low	Steep gradient, no restoration recommended
Lower Jordan River		
Cutthroat Trout	**high**	Development of multi-species habitat in the river between the powerhouse and the falls
Pink Salmon	**high**	Target of 3000 spawners
	high	Develop and implement plan to reintroduce pink salmon to the Jordan River. The plan would include onsite incubation of pink eggs, development of strategy to address stranding d/s of tailrace and improvement of spawning habitat above the tailrace.

2- WILDLIFE

MAMMALS

Species	FWCP Priority	CF Rank	Comments
American Water Shrew (brooksi)	**High**	1,6,2	Need inventory. Have been found in Pacific Rim Park.
Bats	**High**	1	General bat surveys needed, there are opportunities for restoration (bat boxes) if they are found. Townsend's big-eared bat and Keen's Myotis are two species of interest in the Jordan.
Vancouver Island Ermine (anguinae ssp.)	**Medium**	2,2,3	Inventory and genetic analysis needed.
Roosevelt Elk	**High**	3,2,3	There is a lack of population and distribution data. The Jordan River Basin is possibly a good candidate for elk transplant. There is a very high interest from FN and non-FNs to establish a harvestable population in this area; transplant feasibility assessment required.
Black-tailed Deer	**High**	6,6,6	Good management needed of second growth harvesting to ensure suitable habitats for deer (following IWIFR handbook). Important area for hunting due to ease of access for FNs and non-FN hunters from Victoria area. Good candidate area to apply IWIFR handbook recommendations to conduct a habitat assessment to determine the relative abundance of key habitat requirements (forage, cover, winter habitat) in a watershed with various age classes of managed forest.
Black Bear	**Medium**	6,6,6	Second growth harvesting may be impacting den supply. Important game species. Good candidate area to assess the feasibility of artificial den structures to replace declining levels of natural den site availability in watersheds with various age classes of managed forest.

BIRDS

BCR=Bird Conservation Region (CWS)
PCJV=Pacific Coast Joint Venture (CWS)
NAWMP=North American Waterfowl Management Plan (CWS)
PIF=Partners in Flight (CWS)

Species	FWCP Priority	CF Rank	Comments
Great Blue Heron (fannini ssp.)	**High**	3,6,1	Species impacted by loss of nesting and foraging habitats due to hydroelectric development. Loss of habitat and predation by Bald Eagles are high magnitude threats. Need inventory and protection of nest sites. A priority species in BCR 5.

Species	FWCP Priority	CF Rank	Comments
Green Heron	**Low**	6,6,4	MOE interested in sightings. A priority species in BCR 5.
Harlequin Duck	**Low**	4,1,3	Population data: no trend (NAWMP). A priority species for PCJV and BCR 5 (CWS). A species that is definitely impacted by hydroelectric development.
Bald Eagle	**Low**	6,6,6	MOE has done an inventory of Bald Eagles on the west side of the island. A priority landbird species in BCR 5 for CWS.
Northern Goshawk (laingi ssp.)	**Medium**	1,6,1	A priority landbird species in BCR 5 for CWS. Priority is inventory for nests and, if found, WHA designation.
Peregrine Falcon (pealei ssp.)	**Low**	2,1,2	Not a high priority, occasionally pass through, non-nesting. A priority landbird species in BCR 5 for CWS.
Gyrfalcon (non-breeding)	**Low**	6,6,4	Not a high priority, occasionally pass through, non-nesting. Population trend: low vulnerability (PIF) but a priority species in BCR 5.
Marbled Murrelet	**Medium**	1,1,2	MOE needs to use new methodology (low level aerial surveys) to find whether there is any suitable habitat left for MAMU. If there is, there is a need to establish OGMAs and WHAs. A priority species in BCR 5.
Western Screech Owl	**High**	6,2,4	Identified at the workshop
Northern Pygmy-Owl (swarthi ssp.)	**High**	1,3,3	A priority landbird species in BCR 5 for CWS. Needs inventory. MOE believes they are present and would want to establish WHAs but need surveys first. Inventory for western screech-owls (look for habitat first through TEM) and saw-whet owls at the same time.
Band-tailed pigeon	**Medium**	5,2,3	Need inventory and identification and protection of mineral licks. A priority species in BCR 5.
Purple Martin	**Low**	6,6,3	A priority species in BCR 5. Threat: loss of nest sites.

AMPHIBIANS, REPTILES AND TURTLES

Species	FWCP Priority	CF Rank	Comments
Red-Legged Frog	**High**	3,1,2	BCRP funded a project on this species in the Jordan 2004 and construction of wetlands in 2007. Priorities: expand the inventory area and carry out the recommendations for restoration in the project report.
Western Toad	**Medium**	3,2,4	Declining population, need to determine presence as there is evidence of breeding. Need overall amphibian surveys. Most recent FWCP work has confirmed evidence of one individual; a malformed adult toad.

Species	FWCP Priority	CF Rank	Comments
Painted Turtle (Pacific coast)	**High**	4,6,2	There could be this species present, but an inventory is needed to identify and determine relevant opportunities.

HABITATS-PLANTS

Species	FWCP Priority	CF Rank	Comments
Habitat mapping	**High**		Would be very useful to have TEM mapping in order to identify the habitats that might support SAR such as marbled murrelets, western screech-owls, saw-whet owls, rare plants, American water shrew etc.
Scouler's corydalis	**Low**	3,3,3	In IWMS. Needs inventory.
Rare plants	**Medium**		TEM mapping would help identify the potential for rare plant communities.