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FISH AND WILDLIFE
COMPENSATION PROGRAM

PUNTLEDGE RIVER WATERSHED

WATERSHED PLAN

FINAL DRAFT

The FWCP is a partnership of:



Canada



Fisheries and Oceans
Canada

Pêches et Océans
Canada

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Puntledge Watershed Plan

1 INTRODUCTION

This Puntledge 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 Puntledge River setting includes an overview of the hydro-electric facilities and footprint impacts created by those facilities.

The priority setting process is described, followed by a short direction-setting synopsis of a set of priority Action Plans. Taken together, this Watershed Plan and the accompanying Action Plans present the FWCP: Coastal priorities for investments in compensation activities within the Puntledge River Watershed.

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 that focus on specific priorities within each watershed (Figure 1).

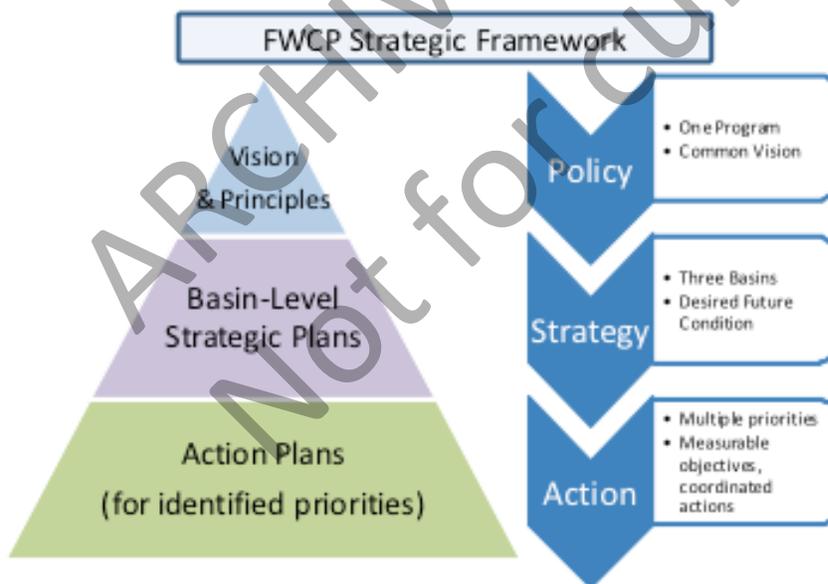


Figure 1: Relationship between the FWCP Strategic Framework, basin strategic plans and action plans.

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 goals¹. 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;

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

- 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.

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 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 are developed into Action Plans. The bulk of projects undertaken by the FWCP will be delivered under Action 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 and Action 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.

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.

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 action plans, as well as lower priority Action Plan items that require timely response in order to take advantage of a investment or partnership opportunity.

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 Action 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 PUNTLIDGE WATERSHED⁶

2.1 SETTING

Puntledge River basin lies on the eastern side of the Vancouver Island Mountain Range approximately midway along the length of the island (Figure 2). The basin is very rugged with mountain peaks rising to 2134 m. It typically receives considerable snow pack and glaciers cover approximately 4 km² of the basin and are located above 1310 m.

The Puntledge River and the Cruikshank River feed Comox Lake from the SW, the latter contributing a mean annual inflow of 18 m³/sec of glacial melt. Most of the lake is surrounded by relatively steep terrain except for the northeast end where the terrain is relatively low and flat. The Puntledge system experiences a 'spill-over' effect from systems moving off the Pacific and heavy rains occur from October through March. The hydrology is predominantly dominated by spring snow melt and fall and winter storms. The average precipitation in November is 300mm, but can be as high as 550mm.

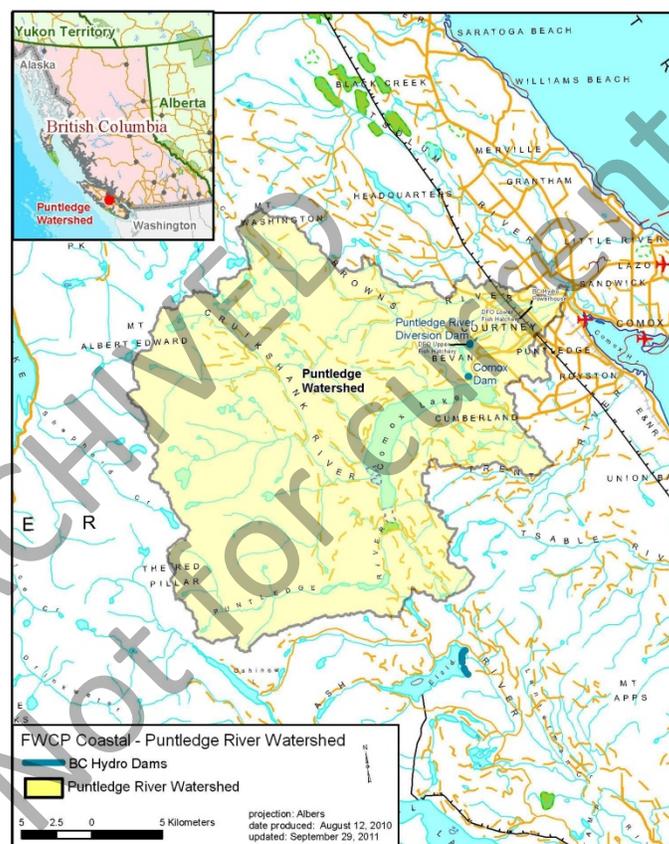


Figure 2. The Puntledge hydropower project.

⁶ More details of the watershed can be found at the FWCP website:

<http://www.bchydro.com/bcrp/projects/watersheds.html>

Hydroelectric development includes a storage dam at the outlet of Comox Lake and a diversion dam downstream (Figure 2). Water is carried by an overland penstock to a powerhouse on the lower Puntledge River. The project was first developed in 1912. In 1953-56 the dams and powerhouse were redeveloped and Comox Lake storage was increased.

The Puntledge hydroelectric facilities are in the asserted traditional use areas of the Comox First Nation, Sliammon First Nation, and Homalco First Nation. The main population centres are Courtney and Comox. The head waters of both the Puntledge and Cruikshank Rivers are in Strathcona Provincial Park.

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 section deals with impacts throughout the Puntledge River Area and is based on:

- Bridge-Coastal Restoration Program: Strategic Plan, Volume 2: Watershed Plans, Chapter 3: Puntledge River (December 2000),
- the WUP Consultative Committee Report - (December 2003), and
- findings in the Community Workshop (Courtenay, 14 March, 2008).

Inundation: Reservoir impoundment raised the elevation of Comox Lake by about 8 m. The reservoir area measures 2,118 hectares, after flooding 250 hectares of land: a 13% increase in area from the original lake. The reservoir shoreline length is now 41 km.

Habitat loss: Comox reservoir flooded 1 km of mainstream channel and 2.1 km of lower tributary channel, as well as the channel associated riparian zones including coniferous, deciduous, and wetland habitats. Comox Dam reconstruction sluiced a large volume of sediment, which degraded the spawning habitat downstream. Dams have reduced large woody debris (LWD) recruitment downstream. Puntledge Dam has reduced gravel recruitment downstream. Periodic spills have scoured gravel and diminished the spawning habitat capacity in the mainstream. Fluctuations in reservoir levels limit the establishment of riparian and/or aquatic vegetation in drawdown area.

Flooding caused the loss of 133 ha of coniferous forested slopes to the reservoir and 117 ha of riverine and riparian habitats & associated wildlife at reservoir ends. There was further loss of habitat at Comox and Puntledge Diversion Dam sites. Habitat change along 5 km of the penstock Right of Way (ROW) has caused the loss of coniferous forest.

Migration barriers: Original Comox dam had no fishway. The blockage has severely affected stocks adapted to lake tributaries. The efficiency of the current fishway is dependent upon reservoir elevation. Summer Chinook may be injured in the tailrace. The above ground penstock is 5km long and presents a direct barrier for the movement of large mammals which must pass under the structure.

New Habitat: Due to high turbine mortality and loss of spawning area a compensatory spawning channel was built near the Puntledge Dam headpond. Habitat change along 5 km of the penstock Right of Way (ROW) has caused the creation of shore habitat, and increase in habitat diversity.

Altered Flow Regime. Low flow velocities have reduced the effectiveness of spawning areas, and may expose smolts and adults to increased predation during migrations. Reduced flows and a changed flow regime in 14 km of Puntledge River has had unknown effects on aquatic wildlife and unknown effects on estuarine habitats and wildlife.

Diversions. The diversion has altered the flow regime and habitat along the mainstream between the Diversion Dam and the Powerhouse.

Entrainment. There is generally a high mortality associated with fish passing through the turbines at the powerhouse.

2.3 FWCP ACCOMPLISHMENTS TO DATE

Over the past decade the Bridge Coastal Restoration Program has invested approximately \$1.6 million in the Puntledge watershed. Since 2000, approximately 6900m² of spawning habitat has been created and 8600m² of spawning and rearing habitat has been created.

Restoration work includes:

- Jack creek restoration and habitat creation, Powerline and Powerhouse Puntledge River Side Channel habitat creation.
- Fish and spawning habitat restoration, including spawning gravel for summer Chinook and steelhead.
- Bull Island and Forbidden Plateau side-channels.

Conservation and enhancement work includes:

- Steelhead living gene bank program.
- Chinook captive brood program.
- Stotan Falls fish passage improvements.

Research work includes:

- Multi-year summer and fall Chinook run-timing and migration behaviour through DNA, video, telemetry studies.
- Chinook spawning behaviour.

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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 and those of Fisheries and Oceans' Stewardship and Community Involvement program. 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, MOE's shared stewardship goal and the approach of DFO's Stewardship and Community Involvement Program. 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 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. 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 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.⁷ 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.

Priorities for FWCP Coastal were reviewed in 2009 through a multi-stage process involving BC Hydro, Fisheries and Oceans Canada (DFO), Canadian Wildlife Service (CWS), Ministry of Environment (MOE), local First Nations, and local communities. Initial priority setting was developed through consultation with agency staff. These were then reviewed and discussed at a

⁷ Watershed Restoration Plans may be obtained at the FWCP website:

<http://www.bchydro.com/bcrp/projects/watersheds.html>

series of open houses to allow First Nations, public stakeholders, and interested parties to comment and elaborate on the priorities.

The results from the Puntledge Watershed workshop are summarized in Appendix A, highlighting the species, habitats, and specific activities as priorities for further work. On the aquatic side, summer Chinook and pink salmon, steelhead and cutthroat trout were viewed as the highest priority fish species, while fish passage and addressing predation were seen as key issues.

Species at Risk were also identified as priorities, in particular the need to improve the overall understanding of which species exist in the watershed, and to identify appropriate actions to conserve them. Roosevelt elk and the Vancouver Island marmot were identified as high priority species, and as such an interest in upland areas emerged. Other ecosystems identified included riparian and wetlands, the estuary, old growth areas (though few exist), and Gerry oak habitat.

The priorities emerging from the workshops were subsequently reviewed by BCH and Agency staff in relation to how well they addressed the strategic objectives, the extent to which species were impacted by footprint impacts, and what activities could provide multiple benefits to multiple species. The resulting direction for the Puntledge River Watershed is to focus the next five year period on the development and implementation of three priority *Action Plans* for priority topic areas: Salmonids, Riparian / Wetlands and Species of Interest. Management of the estuary was identified for future action plan development.

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4.3 PRIORITY ACTION PLAN SUMMARIES

The Salmonid and Riparian / Wetlands Action Plans focus on overall ecosystems in support of multiple fish and wildlife species. The objectives and sub-objectives within these two plans reflect the overall ecosystem focus, and the plans include primarily habitat-based actions, supported as required by research/information acquisition, assessments and monitoring/evaluation actions.

The Species of Interest Action Plan focuses on species of conservation concern (including species-at-risk) or other regionally important species for management planning process. The objectives, sub-objectives and actions within this plan reflect this focus on individual species.

All three priority action plans in the Puntledge River Watershed provide broad support to the FWCP strategic sustainable use objective.

The three priority action plans for the Puntledge River system are summarized below. The full plans can be accessed on the FWCP website ([provide](#)).

SALMONID ACTION PLAN

Rationale

Salmonid species have been heavily impacted by the creation of dams and hydroelectric facilities in the Puntledge system. Limiting factors for salmonids in the Puntledge watershed vary among species and include useable habitat, access to habitats (i.e., passage), and predation. This overall action plan for salmonids includes integrated habitat restoration planning and analysis to determine actions that provide the most benefit to multiple species.

Conservation priorities for salmonids include summer and fall Chinook and steelhead, the latter being an extreme conservation concern. Summer run Chinook and steelhead above Comox Dam were relatively unique, there being only one other summer Chinook run on Vancouver Island. Both resident and anadromous cutthroat are present, though little known about their abundance and trends.

The bulk of money spent in the Puntledge system to-date has been towards enhancement activities, conservation and research of salmonid species on the Puntledge River mainstem. Consequently, new habitat and restoration activities should focus on opportunities in habitats upstream of Comox Dam, including enhancing fish passage, and to consider projects in nearby systems such as the Tsolum River which are outside the footprint area, but which represent the potential for large cost effective gains in habitat. .

Focus

1. Assessment of the effectiveness of existing habitat enhancements in terms of adult returns and escapement.
2. Implementation of habitat restoration actions for priority areas, including off channel opportunities, gravel placement etc.
3. Assessment of fish passage opportunities at the Comox Dam.

Expected outcome

- Improved habitat capacity and productivity in multiple stream systems.
- Sustained abundance of anadromous and resident salmonid populations at target levels over time.
- Improved targets for both habitat capacity (pre-development) and abundance for all salmonid species.
- Improved understanding of the effects of predation.

- Improved access to Comox Lake.

SPECIES AT RISK ACTION PLAN

Rationale

'Species of interest' are defined as species of conservation concern (including species-at-risk) or other regionally important species.

Species at Risk are a priority for all agencies and partners. Some Species at Risk, such as the Vancouver Island Marmot, are known to exist in the Puntledge Watershed. Their habitats have been fairly well identified through work in the adjacent Campbell River watershed. Less is known about other SAR species however. In particular, there is a lack of information and knowledge regarding which may potentially exist and what opportunities are available to protect them.

To date no money has been spent on wildlife activities in the Puntledge.

Information is therefore needed regarding what species exist and in what habitats, the opportunities available for protection. Also, needed is a strategy for evaluation and monitoring that will support the ongoing process of renewing species plans and priorities in the Puntledge River system.

Focus

1. Conduct mapping and prioritization of activities for additional species of concern.

Expected outcome

- Improved knowledge and status of FWCP priority species of concern.
- Improved habitat mapping for species of concern.
- Identification and prioritization of species, locations and potential future actions for conservation and protection.

RIPARIAN AND WETLANDS ACTION PLAN

Rationale

Riparian and wetland areas have been heavily impacted by the creation of dams, and continue to be severely degraded in the remaining areas. They are the limiting factor for many species, including fish, which depend upon them, either for the majority of their lifecycles or for key periods such breeding. Riparian and wetland areas are extremely diverse and biologically rich and are considered as highly valuable from an ecological stand point.

To date, FWCP has not funded restoration of riparian areas or wetlands in the Puntledge. However, these areas have a high restoration potential and would benefit from restoration activities. The highest priority in terms of benefits to wildlife would be inventory and conservation of habitats, in particular riparian and wetlands (BC Hydro 2008).

Focus

1. Mapping of current wetlands and riparian areas, and categorization of areas into healthy and functioning systems (Category 1), and degraded or sub-optimal areas that would benefit from restoration (Category 2).
2. Assessment of opportunities for securement (conservation) and protection (from potential degradation) of Category 1 areas. This includes assessment of legal status, ownership, land use, etc.

3. Assessment of opportunities to enhance and restore Category 2 areas, with a subsequent view to conserve and protect them.

Expected outcome

- Identification and prioritization of locations and potential future actions for conservation, protection, restoration and creation of wetland and riparian habitats.

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APPENDIX A

The following list of species, ecosystems and actions were identified by agencies, First Nations and communities as being the top priorities for activities under the FWCP program. Following initial input from agencies, a multi-stakeholder workshop was held in Courtney (14 March, 2008) to identify priorities. Two breakout groups, for fish and wildlife, identified priorities which were reviewed in plenary to allow all participants to comment on the findings.

List of potential opportunities for fish and wildlife

HABITAT

Habitat	FWCP Rank	Comments
Wetland / Estuary / Riparian habitat	high	
Old-growth forest	high	
Garry Oak	medium	

FISH

Species	FWCP Rank	Comments
Limiting factor - Seals	high	Agencies acknowledge that seals have an impact on salmonids. Stakeholders asserted that control is an important component of recovery efforts.
Summer Chinook Salmon	high	DFO identifies summer chinook as the highest restoration priority for Puntledge River.
Pink Salmon	high	DFO identifies pink salmon as the second highest restoration priority for Puntledge River.
Steelhead	high	MoE identifies winter steelhead as the highest restoration priority for Puntledge River. Puntledge river is currently at less than 10% of target adult steelhead capacity. While MoE still places a high priority on the recovery of summer steelhead, it acknowledges most restoration activities will have little benefit for summer steelhead at this time.
Cutthroat Trout	high	MoE identifies cutthroat trout as the second highest priority for Puntledge River.
Fish Passage	high	Fish passage to Comox Lake is critical for summer chinook and summer steelhead. Historically, both species used the lake and upper tributaries, but they currently use the upper Puntledge system. There are fish passage issues, specifically at the Comox dam. Previous

Species	FWCP Rank	Comments
		issues with the design of the fishway seem to have been addressed. Current issues are related to the extreme conditions that occur when the flow out of Comox Lake is so low that the fishway is inoperable and flow is restricted to the main flow gates. DFO advises that under these conditions, chinook and steelhead adults will probably still be able to access the lake under the main gates.
Fish Passage (cont'd)		MoE expresses concern that existing infrastructure (i.e., tailrace, diversion dam, Comox Dam) may be interfering with upstream migration, and feels a review of these structures' associated issues is a high priority.
Coho Salmon	medium	
Rainbow Trout	low	
Fall Chinook	low	As identified in the discussion on summer chinook, DFO believes that significant restoration works have already been undertaken to benefit chinook, and that further physical works at this time are of low priority.
Sockeye Salmon	low	DFO acknowledges that there is a small sockeye population in the Puntledge River, but has very little information on this species. It does not have a target escapement for sockeye and has not identified any restoration strategies over the short term. Sockeye is considered a low priority.
Chum Salmon	low	DFO has not identified chum as a priority; restoration works specifically targeting chum salmon should be considered a low priority.
Dolly Varden	low	MoE has confirmed the presence of Dolly Varden, however targeted restoration are considered a low priority at this time.
Kokanee	low	Kokanee are present in Comox Lake, but little information is available concerning population size or impacts. Kokanee is considered a low priority at this time.
Morrison Creek Lamprey	low	The only Species at Risk Act (SARA) listed species in the Puntledge Watershed is the Morrison Creek lamprey, which is a rare form of the Western Brook lamprey. SARA lists Morrison Creek lamprey as endangered. This unique species remains in freshwater for its entire life cycle. The main impacts on Morrison Creek lamprey appear to be related to land use encroachments and highway development; they are not related to BC Hydro footprint impacts. It is unlikely that BC Hydro related restoration activities (unless conducted within the Morrison Creek watershed) will affect this species. MoE wants to ensure that any restoration projects take potential impacts on this endangered species into account. Listed in the following Species at Risk appendix.

MAMMALS

Species	FWCP Rank	Comments
Species At Risk in general (SAR)	high	All wildlife agencies consider SAR a high priority (see the following appendix for list of SAR that occur or could occur in the Puntledge River watershed). Species at Risk covered in the following appendix.
Roosevelt Elk	high	MOE's Region 1 Fish and Wildlife section identified that the populations and habitat for Roosevelt elk are their highest priority for most watersheds on Vancouver Island. Useful projects would include population study and habitat suitability modelling of the Cruickshank River Population; habitat restoration; land acquisition; and preserving riparian habitats.
VI Marmot	high	Puntledge River watershed is within the species' historical range. Listed in the following Species at Risk appendix.

Species	FWCP Rank	Comments
Riverine and SARA-listed bird species	medium	Species at Risk covered in the following appendix.
Grouse species	low	Management interest is high but restoration potential is low.
Marbled Murrelet	low	Listed in the following Species at Risk appendix.

Wildlife Species at Risk that Occur or Could Occur in the Puntledge River watershed

	COSEWIC	CF-Rank
Amphibians		
Red-legged Frog	Special Concern	3,1,2
Western Toad	Special Concern	3,2,4
Mammals		
American Water Shrew, brooksi subspecies		1,6,2
Ermine, anguinae subspecies		2,2,3
Roosevelt Elk		3,2,3
Townsend's Big-eared Bat		5,2,3
Trowbridge's Shrew		6,2,3
Vancouver Island Marmot	Endangered	1,6,1
Fish		
Western Brook Lamprey (Morrison Creek)	Endangered	1,6,1
Birds		
American Bittern		5,2,3
Band-tailed Pigeon		5,2,3
Barn Owl	Special Concern	6,2,3
Barn Swallow		6,2,3
Great Blue Heron, fannini subspecies	Special Concern	3,6,1
Green Heron		6,6,4
Marbled Murrelet	Threatened	1,6,1

Northern Goshawk, laingi subspecies	Threatened	1,6,1
Peregrine Falcon, anatum subspecies	Special Concern	5,6,2
Pine Grosbeak, carlottae subspecies		5,6,6
Purple Martin		6,6,3
Short-eared Owl	Special Concern	6,2,3
Western Screech-Owl, kennicottii subspecies	Special Concern	3,1,2
White-tailed Ptarmigan, saxatilis subspecies	Special Concern	2,4,4

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