# Table of Contents

1  Introduction.................................................................................................................. 2

1.1  Fish and Wildlife Compensation Program............................................................... 2

Vision................................................................................................................................. 3

Principles............................................................................................................................. 3

Partners............................................................................................................................... 3

Policy Context..................................................................................................................... 3

Program Delivery .............................................................................................................. 4

Project Investment Criteria ............................................................................................ 5

2  Shuswap Watershed....................................................................................................... 6

2.1  Setting.......................................................................................................................... 6

2.2  Footprint issues .......................................................................................................... 7

2.3  FWCP Accomplishments to date ............................................................................. 8

3  Strategic Objectives for FWCP .................................................................................. 9

4  Priorities........................................................................................................................ 10

4.1  Introduction ............................................................................................................... 10

4.2  Priority setting in the Coastal Region ..................................................................... 10

4.3  Priority action plan summaries .............................................................................. 12

  Salmonid Action Plan .................................................................................................... 12

  Riparian and Wetlands Action Plan ........................................................................... 13

  Species of Interest Action Plan .................................................................................. 14

5  References .................................................................................................................... 15

APPENDIX A ...................................................................................................................... 16

  Habitat ............................................................................................................................ 16

  fish ................................................................................................................................. 17

  Birds .............................................................................................................................. 21

  Amphibians, reptiles and turtles .................................................................................. 22

# Table of Figures and Tables

Figure 1: Relationship between the FWCP Strategic Framework, basin strategic plans and action plans. ....... 2

Figure 2. The Shuswap River hydropower project............................................................................ 7
1 INTRODUCTION

This Shuswap 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 Shuswap setting includes an overview of the hydroelectric 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 Shuswap 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).

![Diagram of FWCP Strategic Framework]

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 goals. 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.

A number of policies and plans guide the Ministry in delivering on these goals and objectives. The Conservation Framework 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 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 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, 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.

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

---

2 http://www.env.gov.bc.ca/conservationframework/
3 http://www.env.gov.bc.ca/esd/
5 BC Hydro Social Responsibility Policy.
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 SHUSWAP WATERSHED

2.1 SETTING

The middle Shuswap River is located upstream of Shuswap Falls in the dry interior of British Columbia, near the town of Lumby (Figure 2). The basin area above Shuswap Falls is 1969 km², with elevations ranging from 450 m to 2680 m. The Shuswap River basin is climatically within the southern interior region of BC, which is affected by both continental and modified maritime conditions. Temperatures are also affected by continental air from the south (warm) and from the north (cold). Runoff is dominated by snow melt from the surrounding mountains. The November to January period has the highest precipitation, with an average of 120 mm/month, and as much as 250 mm/month (BC Hydro, 2005).

The Shuswap River project was completed in 1929 by West Canadian Hydroelectric Corporation. The project consists of two dams, Peers Dam, which impounds the Sugar Lake Reservoir, and Wilsey Dam at Shuswap Falls. The dams are separated by 31 km and power is generated only at Wilsey Dam. The project is run-of-river, with very little storage.

The Shuswap River watershed is in the Shuswap Nation territory. The closest provincial park is on Shuswap Lake some 80 km downstream of Wilsey Dam, and the largest nearby communities are Lumby, Enderby and Armstrong. There is a small community that resides on Sugar Lake.

6 More details of the watershed can be found at: http://www.bchydro.com/bcrp/projects/watersheds.html
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 Shuswap River Area and is based on:

- Bridge-Coastal Restoration Program: Strategic Plan, Volume 2: Watershed Plans, Chapter 12: Shuswap River (December 2000);
- Shuswap River Water Use Plan Consultative Committee Report (December, 2003); and
- Findings in the Community Workshop (Vernon, 18 May, 2010).

Inundation: Reservoir impoundment expanded the existing Sugar Lake from 1,564ha to 2,217ha.

Habitat loss: The reservoir flooded 23 km of shore line, 653 ha of grasslands and woodlands, as well as 7km of mainstem (65 ha of channel habitat) and 4 km of tributary and riparian areas. Dams have stopped gravel recruitment downstream thus reducing available spawning habitat, as well as Large Woody Debris for rearing.
**Migration barriers:** The original Shuswap Falls were a partial barrier to anadromous fish, however the construction of Wiley Dam blocked all access upstream for Chinook, sockeye and coho. Moreover, Sugar Lake Dam also prohibited access from the river above the dam.

**Nutrient loss:** Productivity decline below Sugar Lake as dam prohibited carcasses to be washed into river.

**New Habitat:** There was a gain of some 653 ha of reservoir habitat, however, the littoral area is less productive due to fluctuating reservoir levels.

**Fluctuating Reservoir:** The reservoir fluctuates some 7m reducing littoral productivity. The shore line was expanded from 25km to 39km.

**Altered Flow Regime.** Rapid flow alterations may affect benthic insect populations, and has stranded fish and dewatered eggs. However, management efforts have reduced the effect on kokanee spawning.

**Entrainment.** The magnitude of entrainment is unknown.

### 2.3 FWCP ACCOMPLISHMENTS TO DATE

Over the past decade the Bridge Coastal Restoration Program has invested approximately $ 1.08 million in the Shuswap watershed.

**Restoration work includes:**

- Shuswap side channels and riparian gravel recruitment.
- Duteau Smolt pond creation.
- Proctor and Ireland creeks channel creation.
- Maltman off-channel pond development.
- Improvement of juvenile passage at Duteau Creek weir.
- Lower Creighton Creek Restoration project.
- Habitat complexing in Bessette Creek.
- Bank stabilization and riparian fencing.
- Shuswap and Bessette Creek riparian planting and protection.

**Conservation and enhancement work includes:**

- Huwer groundwater complex – to increase water provision for fish habitat.

**Research work includes:**

- Fish passage assessment.
- Herptile and avian habitat assessment.
- Fish population survey in Middle Shuswap and Sugar Lake.
- Ecosystem sensitive mapping, SEI and TRIM.
- Western Screech owl distribution study.
- Bat inventory study.
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 feasible. 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. 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 and 2010 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 series of open

---

7 Watershed Restoration Plans may be obtained at the FWCP website: [http://www.bchydro.com/bcrp/projects/watersheds.html](http://www.bchydro.com/bcrp/projects/watersheds.html)
houses to allow First Nations, public stakeholders, and interested parties to comment and elaborate on the priorities.

The results from the Shuswap Watershed workshop are summarized in Appendix A, highlighting the species, habitats, and specific activities as priorities for further work. On the aquatic side, Chinook and coho are the highest priority salmon species, where channel and restoration work downstream of Wilsey dam is a high priority. The highest priority activity, however, was related to fish passage around Wilsey dam. This would benefit a number of other species, including both Kokanee and Rainbow trout which are also high priority species. Restoration work in Duteau and Bessette creeks were identified as important activities. Assessing habitat and use in the reach between the dams as well as in Sugar Lake and its tributaries.

There are several species of interest including grizzly bear, mountain goats, Western Screech owl, bobolinks, Western Painted turtles. The latter is of particular interest as there is specific migration path for the turtles adjacent to BC Hydro lands. Other species are priorities for sustainable use such as moose and mule deer. Riparian and wetlands habitats are particularly important, and include many ecological communities and species at risk. Grasslands are also viewed as an important habitat that lacked protection in the Okanagan.

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 Shuswap 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.
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 Shuswap River Watershed provide broad support to the FWCP strategic sustainable use objective.

The three priority action plans for the Shuswap River system are summarized below. The full plans can be accessed on the FWCP website.8

SALMONID ACTION PLAN

Rationale

Salmonid species in general have been heavily impacted by the creation of dams and hydroelectric facilities in the Shuswap system. Limiting factors for salmonids in the Shuswap watershed are generally related to habitat availability. Consequently, fish passage to provide greater spawning opportunities above Wilsey dam and enhancing spawning near and around Duteau and Bessette creeks are considered priority actions. Research to better understand the limiting factors affecting Rainbow trout and monitoring for kokanee are also a priority. This overall action plan for salmonids includes integrated habitat restoration planning and analysis to determine actions that provide the most benefit to multiple species.

The bulk of money spent in the Shuswap system to-date has been towards restoration and enhancement activities of channels and tributaries. Consequently, a fish passage assessment is a priority and subsequently new habitat and restoration activities should focus on opportunities in habitats upstream of Wilsey Dam. Fish passage at Wilsey might open up opportunities for sockeye, which are currently a low priority due to limited restoration potential.

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 for Wilsey 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 implications of increased fish passage in the Salmon and Quinsam in the Rivers.

8 http://www.bchydro.com/about/our_commitment/compensation_programs.html
Rational

Protected riparian and wetland areas are limited in the area, most of the land adjacent to the Shuswap River is privately owned. Old cottonwoods and adjacent woodlands are important to support nests and cavities, etc. There is highly valuable wildlife habitat with a high restoration potential. Wetlands and riparian are among the most ecologically diverse and important habitats supporting such species as Western Painted Turtle, Western Screech Owl, Western Toad etc.

There has been limited work with respect to restoration or protection of riparian areas or wetlands in the Shuswap. However many of these areas have been identified and could be restored or conserved with education programs for private landowners or placed under covenants.

A key area of focus could be on the use of BC Hydro lands for covenants and conservation, particularly the older cottonwoods and flood plain around the BC Hydro Picnic area (West of Cherryville). The riparian lands between Cherryville and Wilsey Dam are for operational use and are thus not for sale. There is the potential that they be placed into Trust or covenants. BC Hydro lands can be designated as recreational so some discussion should occur as to whether they could be used as an “area managed for environment stewardship”, or something similar.

The protection of the back channels and riparian area would also have a benefit for fish. Particularly, if fish passage around Wilsey dam is achieved. Also, there may be an opportunity to protect wetlands and riparian areas around Sugar Lake where development and cabins may threaten existing areas.

Developing a Riparian-Wetlands strategy is very important and would need to take into consideration:

i. The overall area, including the private lands adjacent.
ii. Land owner contact and involvement.
iii. Local government to support protected area issues on a larger scale.

The BC Hydro lands would act as a central catalyst for obtaining covenants on adjacent lands. Covenants have been used successfully in the Shuswap and they appear to have some influence.

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). In particular areas around Sugar Lake and the riparian areas between Sugar Lake, Wilsey dam and Mabel Lake.

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. particularly on adjacent lands upstream of Wilsey dam which are private and those belonging to BC Hydro.

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

4. Identify and undertake key actions for currently known locations of importance, e.g., the area near Picnic Area and the Dairy Farm where there is a known crossing area for painted turtles.

Expected outcome

- Identification and prioritization of locations and potential future actions for conservation, protection, restoration and creation of wetland and riparian habitats
- Increased riparian and wetland protected.
SPECIES OF INTEREST ACTION PLAN

Rationale

Species of conservation concern are a priority for all agencies and partners. The Middle Shuswap portion (Mable Lake to above Sugar Lake) of the Shuswap River watershed is unique in that it has a hot and dry climate that is more characteristic of the nearby Okanagan Valley. As such it hosts a wide array of amphibians, reptiles, birds, and mammals that are not found elsewhere within the watershed.

In the past, the FWCP has invested in projects supporting inventory of Western Screech Owls which has identified a number of other species, as well as bat surveys. Painted turtles have been identified and higher in the watershed (around Sugar Lake) there are nesting osprey, elk, mountain goats, caribou and grizzly bear.

To build on previous efforts, more information is needed regarding how effective past efforts have been. More knowledge is needed regarding which species exist, in which habitats, and the opportunities available for their protection. Also, needed is a strategy for evaluation and monitoring that will support the ongoing process of renewing species plans and priorities in the Shuswap River system.

Focus

1. Build upon the past efforts associated with the identified FWCP priority species of concern in the Campbell River watershed.
2. 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.
5 REFERENCES


BC Hydro. 2008. Fish passage decision framework for BC Hydro facilities.


APPENDIX A

List of potential opportunities for fish and wildlife

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 Vernon (18 May, 2010) 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.

HABITAT

<table>
<thead>
<tr>
<th>Habitat</th>
<th>FWCP Rank</th>
<th>Comments</th>
</tr>
</thead>
</table>
| Riparian Habitat                    | 5 (Very High) | Very important for all the community – BC Hydro lands can form a core area for catalyzing protection on adjacent private lands.  
Priority projects:  
Stewardship  
Ground-truthing the existing SEI mapping                                                                 |
| Wetland                             | 5 (Very High) | Very important for all the community – BC Hydro lands can form a core area for catalyzing protection on adjacent private lands.  
Priority projects:  
Private land stewardship                                                                                                                                       |
| At-risk ecological communities      | 4 (High)  | western redcedar- Douglas-fir / red-osier dogwood (IDFmw1/05) ecological community is blue-listed  
Douglas-fir / pinegrass / red-stemmed feathermoss (IDFmw1/04)  
Douglas-fir - western redcedar / falsebox (IDFmw1/01)  
Participants discussed this and felt that many of the ecological communities would be covered by riparian areas. Confirmation should be given however to the mapping that has been done.  
Participants discussed this and felt that many of the ecological communities would be covered by riparian areas. Confirmation should be given however to the mapping that has been done.  
Priority should possibly be given a 5  
Priority projects:  
Private land stewardship  
Ground-truthing the existing SEI mapping to confirm locations of at-risk ecological communities                                                                 |
| Rare plants                         | 3 (Medium) | Priority projects:  
Inventory                                                                                                                                                                                                                                                                                                                               |
<p>| Grassland                           | high      | There are very few protected areas in the Okanagan region, and grasslands are important for numerous species for both foraging and habitat. For instance the western screech owl forages in grasslands.                                                                                                       |</p>
<table>
<thead>
<tr>
<th>Species</th>
<th>FWCP Rank</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wilsey D/S</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chinook Salmon</td>
<td>high</td>
<td>Target of 10,000 spawners in Middle Shuswap River.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fish passage above Wilsey including assessments of spawning habitat,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>water quality and flow regime.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>There was strong support to re-invigorate a comprehensive process of</td>
</tr>
<tr>
<td></td>
<td></td>
<td>investigation regarding the opportunity to provide fish passage above</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wilsey dam.</td>
</tr>
<tr>
<td>Coho</td>
<td>high</td>
<td>Target to be 1000 smolts/km</td>
</tr>
<tr>
<td></td>
<td>very high</td>
<td>Fish passage at Wilsey. No information to suggest that coho did not</td>
</tr>
<tr>
<td></td>
<td></td>
<td>migrate above Wilsey historically.</td>
</tr>
<tr>
<td></td>
<td>high</td>
<td>Assessment of groundwater channel opportunities d/s of Wilsey, and</td>
</tr>
<tr>
<td></td>
<td></td>
<td>linked to the broader need for water management plans to be developed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>for tributaries</td>
</tr>
<tr>
<td></td>
<td>high</td>
<td>Assessment of success of previously built side-channel projects.</td>
</tr>
<tr>
<td></td>
<td>high</td>
<td>Passage to tributaries (removal of failed culverts etc.)</td>
</tr>
<tr>
<td></td>
<td>low</td>
<td>Other projects directed specifically at chum. Proposed chinook projects</td>
</tr>
<tr>
<td></td>
<td></td>
<td>will benefit chum spawning.</td>
</tr>
<tr>
<td>Sockeye</td>
<td>low</td>
<td>Interim target set at 75000 spawners in Middle Shuswap</td>
</tr>
<tr>
<td></td>
<td>low</td>
<td>Restoration opportunities are limited and a low priority.</td>
</tr>
<tr>
<td>Pink</td>
<td>low</td>
<td>No target, no project proposed</td>
</tr>
<tr>
<td>All salmon species</td>
<td>high</td>
<td>Bank stabilization (fencing, armouring, re-vegetation projects) and</td>
</tr>
<tr>
<td></td>
<td></td>
<td>There was strong support for the development of Water Management Plans</td>
</tr>
<tr>
<td></td>
<td></td>
<td>in the Duteau and Bessette as part of the evolution of the HCTF Project</td>
</tr>
<tr>
<td></td>
<td></td>
<td>which is funding studies described under Rainbow Trout</td>
</tr>
<tr>
<td>Rainbow Trout</td>
<td>high</td>
<td>Target to be determined from current HCTF Project. MoE identifies</td>
</tr>
<tr>
<td></td>
<td></td>
<td>rainbow trout as the highest priority for Shuswap River.</td>
</tr>
<tr>
<td>Species</td>
<td>FWCP Rank</td>
<td>Comments</td>
</tr>
<tr>
<td>------------------</td>
<td>-----------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>Very high</td>
<td>Assess factors limiting rainbow trout production =&gt; harvest levels, decreased food supply (kokanee) and trib. Juvenile production. The distinction of focus on both piscivorous and insectivorous rainbow trout was noted.</td>
</tr>
<tr>
<td>Kokanee</td>
<td>high</td>
<td>Interim target set at 70k adults in Middle Shuswap and Bessette Creek.</td>
</tr>
<tr>
<td></td>
<td>Very high</td>
<td>Establish long-term (sustainable) monitoring for stocks (e.g. spawner escapement).</td>
</tr>
<tr>
<td></td>
<td>high</td>
<td>Develop/improve side-channel across from Huwer Farm</td>
</tr>
<tr>
<td>Multiple species</td>
<td>high</td>
<td>Water management plan for the Bessette and Duteau tributary systems</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Water Use Plan priorities</td>
</tr>
<tr>
<td></td>
<td></td>
<td>BCRP investment priorities</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Targets</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Establish long-term (sustainable) monitoring plan for rainbow trout, including adult escapement and juvenile production.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Address concerns regarding outplanting of coho into Bessette and impacts on rainbow.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ensure adequate fish passage to tributaries (removal of failed culverts etc.)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ensure connectivity.</td>
</tr>
<tr>
<td>Species</td>
<td>FWCP Rank</td>
<td>Comments</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-----------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Wilsey – Peers Reach</td>
<td></td>
<td>Assessment of habitat availability in mainstem and in Cherry and Ferry Creeks needed to identify priority restoration areas. Also, use for rainbow trout and other species in the Wilsey-Peers.</td>
</tr>
<tr>
<td>All species (rainbow, mountain whitefish, bull trout)</td>
<td>high</td>
<td>Fish passage above Wilsey would likely restore access for rainbow and other species.</td>
</tr>
<tr>
<td>Sugar lake and tributaries</td>
<td></td>
<td>Assessment of existing habitat use and availability of habitats necessary to identify future restoration opportunities</td>
</tr>
<tr>
<td>Species</td>
<td>FWCP Rank</td>
<td>Comments</td>
</tr>
<tr>
<td>--------------------------</td>
<td>-----------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| Grizzly Bear             | 4 (High)  | • COSEWIC Special Concern  
• Just opened hunt towards Sugar Lake (part of unit 8-23 and 8-24). Target harvest 1 or 2 per year.  
Priority projects:  
• Population inventory through hair sampling (DNA) |
| Badger                   | 2 (Low)   | • species would benefit from projects that decrease forest ingrowth and private land stewardship activities  
• No priority projects  
• It is a 1 for goal 3, the problem is that specific investment opportunities have not been identified. Some care should be given to assessing this before suggesting that there are no projects to do. |
| Townsend’s big-eared bat | 3 (Medium)| Priority projects:  
• Inventory is particularly important.  
• Stewardship (roost sites) |
| White-tail deer          | 2 (Low)   | • Populations healthy, no priority projects |
| Moose                    | 2-3       | • According to MOE surveys, moose winter upstream of Sugar Lake and on the lower slopes below Sugar Lake  
• They seem not to be as predominant as they once were. There is concern that increasing moose promotes wolves, wolves prey on caribou.  
Priority projects:  
• Winter range enhancement potential, with better idea of winter habitat characteristics |
| Mule deer                | 4 (High)  | • Hunters feels that population has declined  
• Byers range: south facing slope, some areas proposed for winter range enhancement  
• The winter range in South Fork - east of Cherryville has enhancement potential (but out of funding area?)  
Cherryville has seen a general increase in populations. They should not be considered a priority for FWCP funding.  
Priority projects:  
• Winter range enhancement  
• Migration corridors may be an issue and could be looked at. |
<table>
<thead>
<tr>
<th>Wildlife</th>
<th>Rank</th>
<th>Comments</th>
</tr>
</thead>
</table>
| Mountain caribou| 3 (medium) | • Small population (only 5), no management effort  
• Issue with logging, stewardship with logging companies, some key areas are protected  
• Project should be inventory and clarifying numbers and populations  
• FN feel these are very important and should have a priority 5. Others feel a 3 is appropriate. |
| Elk             | 2 (Low) | • Colonizing the Shuswap valley on their own  
• Lots of interest in them, not currently hunted  
Priority projects:  
• Inventory needed |
| Mountain goats  | 4 (High) | • East side Sugar Lake, MOE has done a lot of inventory there  
• Sitkum Creek is the most populated winter range. MOF and MOE started winter range enhancement  
• No hunting of them right now, population too low.  
Priority projects:  
• Continue winter range burning  
• There is a provincial strategy that needs to be reviewed when looking at mountain goats |

**BIRDS**

<table>
<thead>
<tr>
<th>Species</th>
<th>FWCP Rank</th>
<th>Comments</th>
</tr>
</thead>
</table>
| Flammulated owls   | 3 Medium   | • priority focal species representing dry woodland landbirds for CWS (http://www.pifbcyukon.org/3c.html)  
• priority 3 as they have interaction with other species making them ecologically important  
Priority projects:  
• Inventory |
| Western Screech-Owl| 5 (Very High) | • COSEWIC endangered, priority focal species representing riparian landbirds for CWS  
Priority projects:  
• Continue stewardship work  
• Follow-up monitoring to follow trends and have a better idea about behaviour and what limiting factors could be affected by BCRP.  
• Go through Recovery Strategy and use the approaches recommended to meet recovery objectives (e.g., secure nesting habitat and adjacent foraging habitat at priority sites) |
Great Blue Heron  
3 Medium  
- There are some rookeries in the general area, but they may be outside the “area of interest”  
- Low priority if only feeding area, high if there is a rookery  
- Projects would identify rookeries and determined if they could find their way into some action plan

Bobolinks  
4 (High)  
- Moved onto COSEWIC threatened list April 2010  
- Priority focal species representing grassland landbirds for CWS  
- The life cycle of the Bobolinks makes it difficult to really do much in the way of protection - grasslands are important, but more important are farmer’s hay fields. They lay their eggs and nest in the long grass – when harvested they are wrecked.

Priority projects:  
- Habitat protection  
- Priority projects: inventory  
- A possible action may be on a yearly basis make known to farmers the status of the breeding season so that they harvest a little later.

Bald Eagle  
2 (Low)  
- Not a high priority to MOE

Osprey  
1 (Very Low)  
- Not a high priority to MOE, populations seem to be increasing

**AMPHIBIANS, REPTILES AND TURTLES**

<table>
<thead>
<tr>
<th>Species</th>
<th>FWCP Rank</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rubber boas</td>
<td>3 (Medium)</td>
<td>Not a high priority to MOE</td>
</tr>
<tr>
<td>Skinks</td>
<td>3 (Medium)</td>
<td>Priority projects:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Inventory</td>
</tr>
<tr>
<td>Alligator lizards</td>
<td>1 (Very Low)</td>
<td>- Gather sightings</td>
</tr>
</tbody>
</table>
| Western Toad     | 4 (High) | There is a general concern for the health of amphibians all over, and in particular frogs and toads  
Priority projects:  
- Inventory  
- Ongoing long-term monitoring  
- Monitoring for die-offs |
Painted Turtles (NEW) 4

Inventory and protection around the canoe launch and the diary farm. Perhaps culvert for crossing road etc. These are on or adjacent to BCH Lands and should receive special attention soon.

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

<table>
<thead>
<tr>
<th>Wildlife Species at Risk</th>
<th>COSEWIC</th>
<th>CF Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mammals</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>American Badger, <em>jeffersonii</em> subspecies</td>
<td>Endangered</td>
<td>6,6,1</td>
</tr>
<tr>
<td>Grizzly Bear</td>
<td>Special Concern</td>
<td>3,2,3</td>
</tr>
<tr>
<td>Mountain Caribou (southern mountain)</td>
<td>Threatened</td>
<td>2,6,2</td>
</tr>
<tr>
<td>Townsend’s Big-Eared Bat</td>
<td></td>
<td>5,2,3</td>
</tr>
<tr>
<td><strong>Birds</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Barn Swallow</td>
<td></td>
<td>6,2,3</td>
</tr>
<tr>
<td>Bobolink</td>
<td>Threatened</td>
<td>6,2,3</td>
</tr>
<tr>
<td>Flammulated Owl</td>
<td>Special concern</td>
<td>5,2,3</td>
</tr>
<tr>
<td>Great Blue Heron, <em>herodias</em> subspecies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Western Screech-Owl, <em>kennicottii</em> subspecies</td>
<td>Special Concern</td>
<td>3,1,2</td>
</tr>
<tr>
<td><strong>Amphibians and reptiles</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rubber Boa</td>
<td>Special Concern</td>
<td>5,1,3</td>
</tr>
<tr>
<td>Western Painted Turtle, Rocky Mtn. population</td>
<td>Special Concern</td>
<td>6,2,3</td>
</tr>
<tr>
<td>Western Skink</td>
<td>Special Concern</td>
<td>6,1,2</td>
</tr>
<tr>
<td>Western Toad</td>
<td>Special Concern</td>
<td>3,2,4</td>
</tr>
</tbody>
</table>