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FISH AND WILDLIFE
COMPENSATION PROGRAM

MIDDLE SHUSWAP WATERSHED

SPECIES OF INTEREST ACTION PLAN

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Shuswap River Species of Interest Action Plan

1 INTRODUCTION

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 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).

This Species of Interest Action Plan sets out priorities for the Fish and Wildlife Compensation Program to guide projects in the Shuswap River project area, which for the purposes of this planning document also includes the watershed above Mable Lake. As many species of interest, such as bears, may have ranges that extend beyond the watershed boundaries, the action plan may also consider actions in areas beyond the Shuswap River project area.

The plan focuses on species of conservation concern (including species-at-risk) or other regionally important species for management planning process. The plan builds on the FWCP's strategic objectives and the Shuswap River Watershed Plan (FWCP, 2011). Action plans have also been developed for riparian and wetland areas and salmonids; and some actions may be complementary across the different plans.

The actions and priorities outlined in this plan have been identified 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 priorities were developed through consultation with agency staff. These priorities were then reviewed and discussed at a workshop¹ to allow First Nations, public stakeholders, and interested parties to comment and elaborate on the priorities. In addition to mapping and inventory of species of concern in general, priority species included in this plan are:

- Mountain goat
- Grizzly bear
- Mule deer

¹ Vernon, B.C. (18 May, 2010)

- Western Screech-owl
- Bobolink
- Western toad
- Western painted turtle

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

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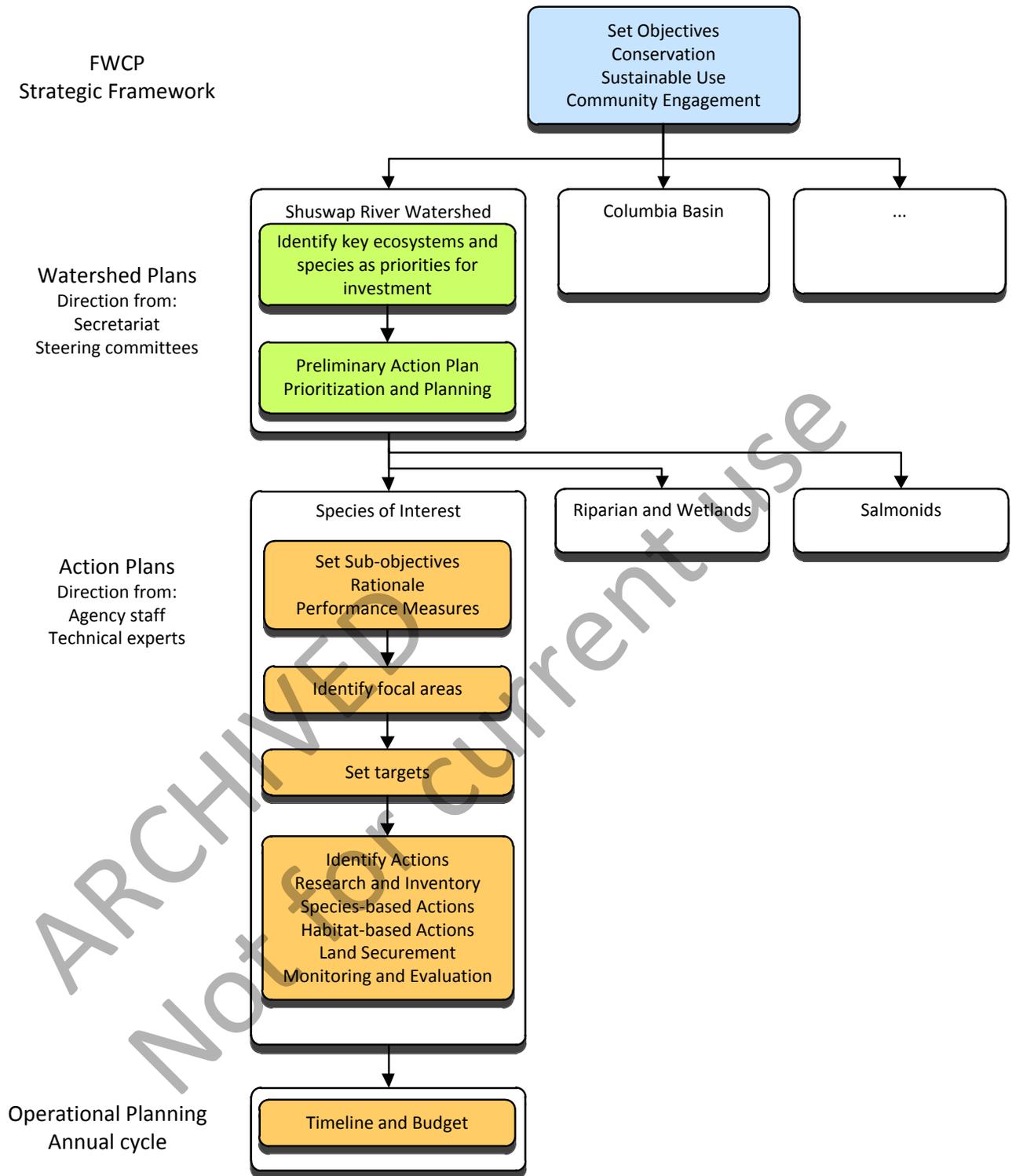


Figure 1: Relationship between the Species of Interest Action Plan and higher level planning and objectives.

2 OVERVIEW CONTEXT

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 1,969 km², with elevations ranging from 450 m to 2,680 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).

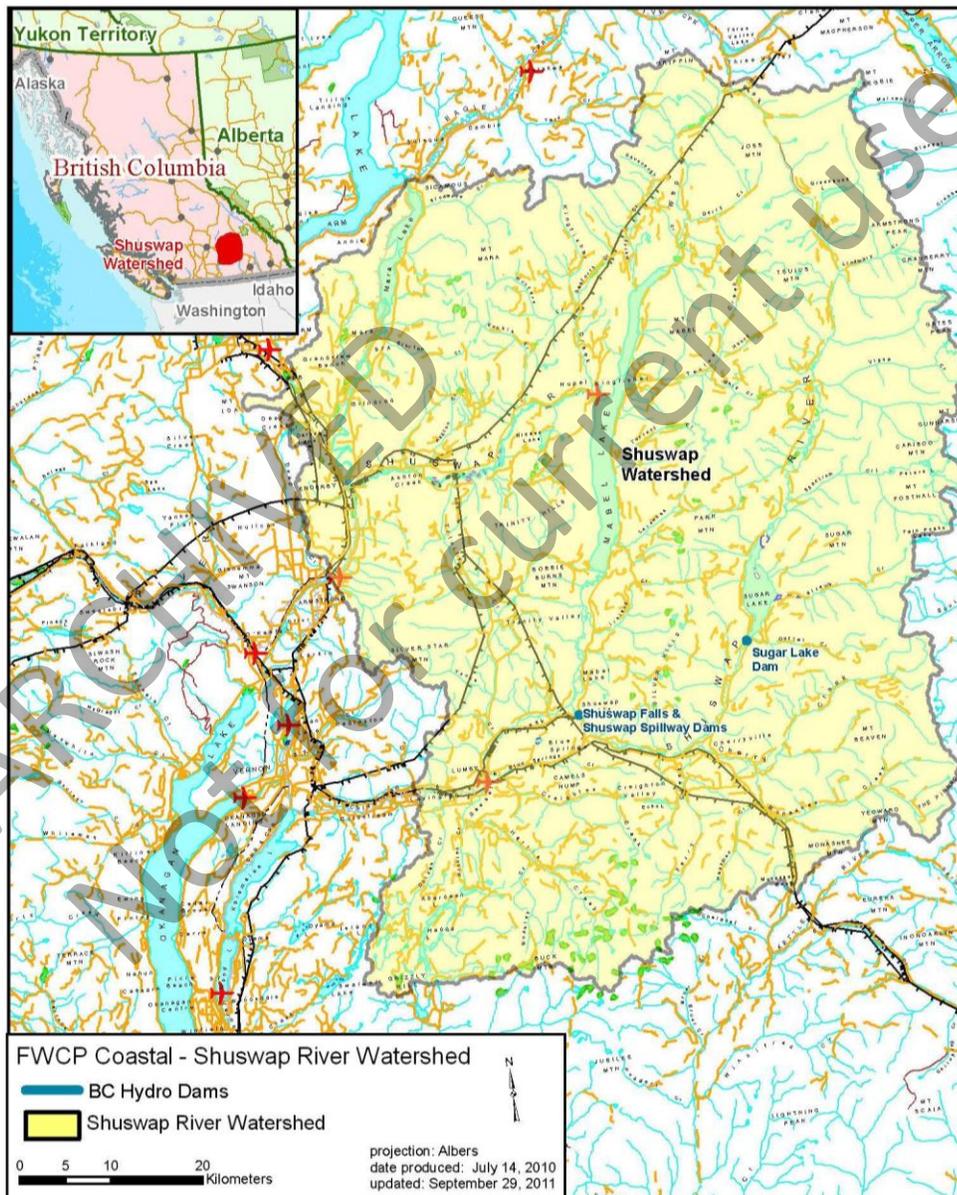


Figure 2: The Shuswap River hydropower project.

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.

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.

2.1 IMPACTS AND THREATS

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 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).

Hydro-related Impacts — The impacts that occurred are based on location in the watershed as follows:

Peers Dam and Sugar Lake Reservoir.

1. The dam flooded 7 km of mainstem and 4 km of tributary channels, as well as their associated riparian areas.
2. The dam inundated 1,564 ha of lake habitat including a spawning area at Sugar Lake outlet, and 653 ha of riparian and upland habitat.
3. Drawdown of Sugar Lake Reservoir (7 m) reduces littoral productivity and connection to riparian areas.
4. Peers Dam footprint caused a loss of instream, riparian and upland habitats.
5. Peers Dam blocked migration of resident river species and may have blocked migration of anadromous fish as well.
6. Entrainment occurs at Peers Dam, but effects are unquantified.

Shuswap River between Peers and Wilsey dams.

7. Rapid flow alterations are thought to have negatively affected benthic insect production.
8. Peers Dam reduced recruitment of gravel and large woody debris to this section of the Shuswap River.
9. Loss of carcasses at the lake outlet spawning area have reduced nutrient inputs to the river.
10. TGP may be elevated by spills at Peers Dam, but magnitude is unknown.
11. Wilsey Dam headpond flooded about 1 km of mainstem Shuswap River habitat.

Wilsey Dam and Downstream

12. Wilsey Dam footprint led to loss of instream, riparian and upland habitats.
13. Wilsey dam blocked access for anadromous salmonids (Chinook, sockeye and possibly coho) to at least 20 km of spawning and rearing habitat above Shuswap Falls, as well as blocking resident river species.
14. Wilsey Dam reduced recruitment of gravel and large woody debris to this section of the Shuswap River, most notably downstream to Bessette Creek.
15. Diversion to the powerhouse dewaterers 180 m of stream channel immediately downstream of Wilsey Dam during low flows.
16. Dredging of the headpond at Wilsey Dam has caused downstream siltation and degrading of water quality through increased BOD. Sand deposition in the headpond may have improved spawning habitat.
17. TGP may be elevated by spills at Wilsey Dam, but magnitude is unknown.
18. Entrainment occurs at Wilsey Dam, but effects are unquantified.
19. Altered flow regime has contributed to stranding of fish and dewatering of incubating eggs.

Non-Hydro Impacts — Other impacts on fish populations in the Shuswap River watershed include historic effects of fish harvest, logging, public access and road construction. The slides in the Fraser River at Hells Gate in 1913 and 1914 negatively affected anadromous fish passage into the Shuswap watershed. Fish passage at Hells Gate was established in 1945 and extended in 1956; however, fish stocks took a long time to recover. Urban development has not been a significant factor in the area.

2.2 LIMITING FACTORS

The limiting factors for species of interest are dependent upon the specific species of interest. Suitable and productive habitat is, in general, a key limiting factor for most species. Species are therefore greatly impacted by activities affecting habitat and its associated food supply.

The factors are summarized here.

Loss of Habitat: Loss of riparian and wetland habitats has occurred in flooded valley bottoms. Potential effects include availability of habitat for amphibians, water shrews and other small mammals and their predators, foraging and overwintering habitat for ungulates, and breeding habitat for some species of neo-tropical migrants.

Habitat Alterations: Altered flow regime has changed riparian and wetland habitats, either increasing the period or extent of inundation or drying. This leads to changes in the composition and structure of the ecological community, precipitating changes in the suitability of the habitat for wildlife. Potential effects on wildlife include changes to habitat quality and quantity for species, including a lack of seasonal nesting sites, a lack of snags and for cavity nesters, or potential structures for raptors, etc. Also, the lack of riparian vegetation in drawdown zones affects ungulates, furbearers, small mammals and several species of passerines including some neo-tropical migrants.

Wildlife Migration: Structures, reservoirs and diversions can create impediments to wildlife movement.

2.3 TRENDS AND KNOWLEDGE STATUS

SPECIES

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.

Historic wildlife data for the area is limited. Grizzly bears and caribou were known to occur in the Sugar Lake area and elk were spotted, but rarely. A complete list of species is beyond the scope of this report but other wildlife includes rare birds, mule deer and mountain goat populations, rare carnivores such as badgers, furbearers, bats, salamanders, frogs, toads, snakes and lizards.

Table 1 shows a list of potential species of conservation concern which could occur in the Shuswap River watershed. It is based on species with CF² ratings of 1-2 for any goal known to occur in both the Okanagan Forest District and the North Okanagan Regional District.³

Priority species for FWCP investment were based on the results of interviews and workshops with agency staff and stakeholders (see the *Shuswap Watershed Plan*).

Note that while fish are reported in Table 1 they are addressed in the Shuswap River Salmonid Action Plan.

A comprehensive inventory of the species present in the in the Shuswap River system does not exist. However, FWCP investment in the Shuswap River watershed has provided some baseline information on the occurrence of several wildlife species. A research project on endangered Western Screech-owls documented nesting pairs of Screech-owls along the river between Cherryville and Mabel Lake. Flammulated Owls, Great Blue Herons, and Bald Eagles have also been documented in the valley. A bat survey documented a Townsend's big-eared bat roost on private land. American badgers, western toads and painted turtles are all Species-at-risk that are known to occur in the valley. Higher up in the watershed, around Sugar Lake reservoir, nesting ospreys occur, as do elk, mountain goats, caribou and grizzly bears.

KNOWLEDGE GAPS

While some mapping has been done for owls, bats and amphibians, in most cases there is limited knowledge regarding the population and distribution of species at risk or of conservation concern, the specific factors limiting their populations.

² Conservation Framework (CF) Goals are 1- contribute to global efforts for species & ecosystem conservation;2- prevent species & ecosystems from becoming at risk;3- Maintain the diversity of native species & ecosystems. They are rated between 1-6, where 1 is high priority and 6 is low priority.

³ The search was performed using the Provincial Conservation Data Base at <http://www.env.gov.bc.ca/atrisk/toolintro.html>

Table 1: Species of conservation concern which are likely to be present in the Shuswap River Watershed (This is based on species with a CF rating of 1 or 2 for Okanagan Forest District and the North Okanagan Regional District). High priorities for FWCP in

Animal	COSEWIC	CF List	FWCP Priority	Comments
Mammals				
Townsend's Big-eared Bat		5,2,3	Low	Wetland; terrestrial. Known to exist in the watershed. Protection of hibernacula and roosts through private land stewardship is important.
Hoary Bat		6,2,4		
Spotted Bat	SC (May 2004)	5,2,3		Wetland; terrestrial
Wolverine	SC (May 2003)	3,2,3		
Wolverine, <i>luscus</i> subspecies	SC (May 2003)	3,2,3		Terrestrial
Fisher		4,6,2		Wetland; terrestrial
Bighorn Sheep		4,3,4		Wetland; terrestrial
Mountain Goats		4,1,3	High	East side of Sugar Lake has a population and MOE has conducted inventory. Sitkum Creek is the most populated winter range. MOF and MOE have started winter range enhancement No hunting of them right now, population too low. Low population, slow reproductive rates and range contraction are a concern. Projects: Continue winter range burning There is a provincial strategy that needs to be reviewed when looking at mountain goats
Great Basin Pocket Mouse		4,6,2		Terrestrial
Caribou (southern mountain)	T (May 2000)	2,6,2	Medium	Terrestrial. Small population (only 5), no management effort. Not considered to be heavily impacted by hydro development in general. Habitat changes with logging, improved access for people (recreation),

population)

extensive fires and increased predation are responsible for decline in population. 9 animals transplanted in 1985.
 Protection of old forests and stewardship with timber companies suggested.
 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.

Western Harvest Mouse	SC (Apr 2007)	6,6,2		Wetland; terrestrial
Merriam's Shrew		6,6,1		Terrestrial
Preble's Shrew		3,6,1		Wetland; terrestrial
Northern Bog Lemming, <i>artemisiae</i> subspecies		1,6,3		Wetland; terrestrial
American Badger	E (May 2000)	6,6,1	Low	Terrestrial. Species would benefit from projects that decrease forest in-growth and private land stewardship activities It is a 1 for CF goal 3; however that specific investment opportunities are limited and have not been identified.
Grizzly Bear	SC (May 2002)	3,2,3	High	Wetland; riparian; terrestrial. Just opened hunt towards Sugar Lake (part of unit 8-23 and 8-24). Target harvest 1 or 2 per year. Projects: Population inventory through hair sampling (DNA) might be medium priority.
Moose		6,6,6	Low-medium	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.
Mule deer		6,6,6	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. Projects: 1) Winter range enhancement 2) Migration corridors may be an

issue and could be looked at.

Elk		6,6,6	Low	Colonizing the Shuswap valley on their own. Lots of interest in them, though not currently hunted. Projects: 1) Inventory needed 2) Enhancing winter range would be beneficial.
Birds				
Western Screech-Owl, <i>macfarlanei</i> subspecies	E (May 2002)	4,6,1	V High	Wetland; terrestrial. priority focal species representing riparian land birds for CWS. There is a regionally significant population on the Shuswap. Projects: 1) Continue stewardship work 2) Follow-up monitoring to follow trends and have a better idea about behaviour and what limiting factors could be affected by BCRP. 3) 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)
Flammulated Owl	SC (Apr 2010)	5,2,3	Medium	Terrestrial. priority focal species representing dry woodland land birds for CWS (http://www.pifbcyukon.org/3c.html) They have interaction with other species making them ecologically important Projects: Inventory – as no formal surveys have taken place
Lewis's Woodpecker	T (Apr 2010)	3,6,2		Wetland; terrestrial
Long-billed Curlew	SC (Nov 2002)	4,2,3		Estuarine; wetland; terrestrial
Great Blue Heron, <i>fannini</i> subspecies	SC (Mar 2008)	3,6,1	Medium	Estuarine; lake; wetland; riparian; terrestrial 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
Williamson's Sapsucker, <i>thyroideus</i> subspecies	E (May 2005)	4,6,2		Terrestrial
Brewer's		5,6,2		Terrestrial

Sparrow, <i>breweri</i> subspecies				
Barn Swallow ⁴		6,2,3		
Barn Owl	T (Nov 2010)	6,2,3		Wetland;terrestrial
Bobolink	T (April 2010)	6,2,3	High	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. Projects: 1) Habitat protection 2) Priority projects: inventory 3) 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		6,6,6	Low	
Osprey		6,6,6	Low	Population seems to be increasing.
Amphibians, reptiles and turtles				
Gopher Snake, <i>deserticola</i> subspecies	T (May 2002)	6,6,2		Lake; wetland; riparian; terrestrial
Western Skink	SC (May 2002)	6,1,2	Medium	Wetland; terrestrial. Project: Inventory,
Columbia Spotted Frog	NAR (May 2000)	3,2,4		
Great Basin Spadefoot	T (Apr 2007)	6,1,2		Wetland; riparian; terrestrial
Rubber Boa	SC (May 2003)	5,1,3	Medium	

⁴ Not found in search of CF listings, but noted as present in workshop.

Western Toad ⁵	SC	3,2,4	High	Once common and abundant. Projects: 1) Inventory 2) Ongoing long-term monitoring 3) Monitoring for die-offs
Western Painted Turtle (<i>Rocky mtn</i> subspecies)	E/SC (Apr 2006)	6,2,3	High	Inventory and protection around Canoe Launch and the Dairy Farm is needed. Possibly a culvert for crossing road would enhance survival. These are on or adjacent to BCH Lands and should receive special attention soon.
Fish				
Chiselmouth	NAR (May 2003)	4,2,3		Lake, riverine

⁵ In the workshop it was emphasized that there is a general concern for the health of amphibians all over, and in particular frogs and toads.

3 ACTION PLAN OBJECTIVES, MEASURES AND TARGETS

Clear and realistic management objectives are necessary to guide information acquisition and prioritize management actions. Priority actions and information needs will change as both improvements to the system are realized and information is gained. The current plan reflects the information available and values expressed by stakeholders (FWCP partners, First Nations and local communities) through reports, interviews and regional workshops held between 2009 and 2011.

3.1 OBJECTIVE SETTING

The following terminology is used in this report.

Objectives:	Objectives are high-level statements of desired future conditions (outcomes), consistent with FWCP partner mandates and policies.
Sub-objectives and Status Indicators:	Sub-objectives are detailed statements of desired future conditions within objectives, from which status indicators can be derived and alternative management actions evaluated. Sub-objectives and indicators provide the details necessary to translate policy into actions and to evaluate their consequences. They may be arranged hierarchically within objectives, and usually indicate conditions necessary to attain the objective to which they refer.
Measures:	Measures are specific metrics whose values indicate the degree to which desired future conditions have been achieved. They can be either qualitative or quantitative. There is a preference to develop the latter where possible for ease of monitoring.
Targets:	Targets are the values of measurable items that indicate the attainment of a desired condition. In the current context these may be expressed as a single value or as a range to acknowledge the inherent variability of ecosystems.
Actions:	Management actions, plans or policies for achieving the objectives.

Objectives are the “ends” or the outcomes we ultimately care about. Actions are the “means,” or the things we do to achieve them. This report focuses on describing the actions required to achieve the objectives in relation to species of interest. Complementary actions may also be identified in the separate Salmonid and Riparian and Wetland Action Plans.

3.2 OBJECTIVES, MEASURES AND TARGETS

There are two management objectives for the Shuswap River system as a whole.

Objective 1: Maintain or improve the status of species of interest in the system.

Rationale — There is a high priority placed on improving the population and distribution of species of concern that are found within the Shuswap River system. Limiting factors for species of concern may be specific in nature, such as a lack of suitable nesting sites, or may be broader in scope. Consequently, action to improve the status of species may include improvements in the habitat and ecosystems they depend upon.

Measure — Measures may differ between species in term of success due to the nature of the species. For example heron may be relatively easy to measure the absolute number and their distribution, while screech owls are more difficult and might require a different quantifier, such as ha of habitat suitable for breeding.

Targets — Specific targets will be developed for specific species focused projects.

Objective 2: Maintain or improve opportunities for sustainable use.

Rationale — Several species of interest are the focus of sustainable use activities by First Nations and non-first nations people. For example some species are hunted, while bird and wildlife viewing is also a popular recreational use in the watershed. Consequently, any actions aimed at achieving the above objectives indirectly support this sustainable use objective. Although there are no direct actions aimed at improving sustainable use at this time, it is conceivable that projects aimed at generally improving opportunities for sustainable use activities could be identified by the program partners in the future.

Measures and Targets — There are no specific measures or targets required at this time aside from those associated with the above objectives.

As part of their overall management responsibilities, MOE periodically collects information regarding abundance trends, hunter reports, catch per unit effort (CPUE) and number of hunting licences sold in the region.

4 ACTION PLANNING

4.1 OVERVIEW OF PLAN

Management for species of interest ultimately rests with the provincial and federal environment Ministries, but FWCP contributes resources towards planning and implementation of management actions that benefit species within its program area, usually based on the outcomes of multi-agency planning processes. FWCP's mandate limits its involvement in species of interest management to activities that meet FWCP objectives.

The Action Plan has several individual actions for each species, which are presented in Section 4.2. Some actions support multiple sub-objectives, which in turn support multiple objectives. Figure 3 provides an overview of the link between actions and objectives.

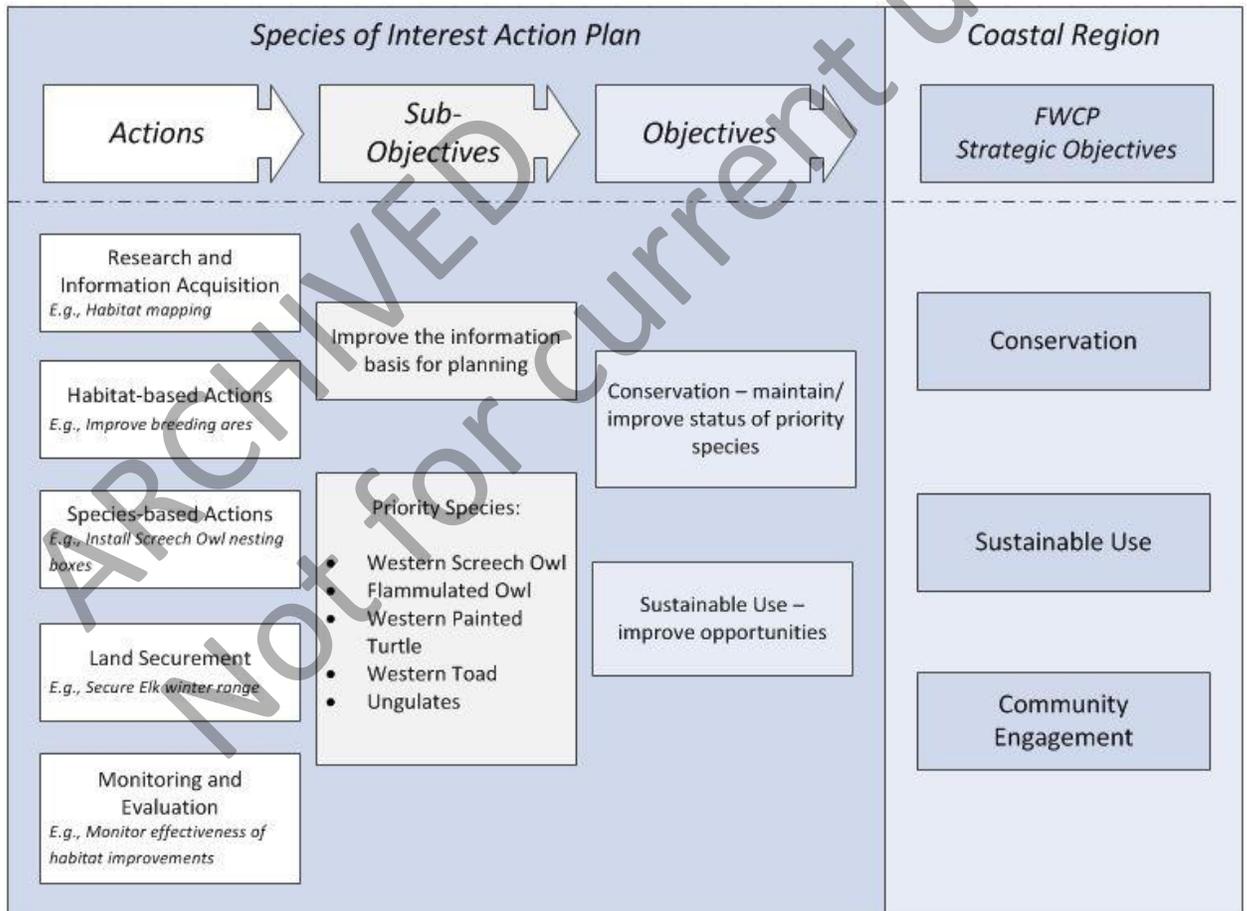


Figure 3: Relationship between actions, sub-objectives and objectives in this Species of Interest Action Plan and the FWCP strategic objectives in the Shuswap River Watershed Plan.

4.2 COMPONENTS

The FWCP is most interested in receiving proposals to address the high-priority species listed in Table 1:

- Mountain goat
- Grizzly bear
- Mule deer
- Western Screech-owl
- Bobolink
- Western toad
- Western painted turtle

Specific actions have been proposed in this watershed for Western Screech-owl and mule deer. The species-focussed actions are aimed at mitigating key limiting factors. Where actions address habitat limitations they do so in relation to specific factors affecting a specific species. There may of course be additional benefits for other species that depend upon the habitat in question. Many species of concern are related to streams, wetlands and riparian areas. In implementing actions under the Species of Interest Plan close coordination should be maintained with actions under the Riparian and Wetlands Plan and the Salmonid Action Plan to ensure compatibility and to develop synergies.

Actions are organized under five broad categories: Research and Information Acquisition, Habitat-based Actions, Species-based Actions, Land Securement and Monitoring and Evaluation. Also provided are priority ratings to guide investment planning efforts.

INVENTORY AND ACTION DEVELOPMENT

Tables of actions have yet to be developed for several high-priority species. For these, proposals that address inventory requirements as well as the development and implementation of management actions are encouraged.

WESTERN SCREECH OWL

Rationale — Western screech owls are of conservation concern (COSWIC-Special Concern / CF-3,1,2). Inventory has already occurred. A small nest box project has been undertaken. Knowledge about the success of the nest box program would assist other similar programs.

Measure — The measure will be related the abundance and distribution of the species.

Targets — To be determined.

#	Action	Rationale	Priority
Research and information acquisition			
1	Inventory may still be needed in some areas	Not all of the system has been fully inventoried.	2
Species-based actions			
Habitat-based actions			
2	Education of private land stewardship	There are nesting sites on private land.	1
Evaluation and monitoring			
3	Population monitoring and evaluation of nest box program.	The effectiveness of nesting boxes is not known and will provide knowledge for future programs.	2

MULE DEER

Rationale — Mule deer are important from both a conservation and sustainable use point of view. Mule deer have likely declined. They are of particular interest to First Nations and the Ministry of Environment. Work has been undertaken in the past to improve their populations and there are possibilities to enhance their winter range further.

Measure — The measure will be related the abundance and distribution of the species.

Targets — To be determined.

#	Action	Rationale	Priority
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#	Action	Rationale	Priority
Research and information acquisition			
1	Population and distribution monitoring in relation to winter ranges.	Accurate trend information is lacking.	1
Species-based actions			
Habitat-based actions			
2	Winter range enhancement	There are opportunities for enhancement in Byers Range and in the drainages of Sugar Lake.	1
Land Securement			
Evaluation and monitoring			

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