# Upper Skagit Watershed Ecosystems Management Plan

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**Prepared For**
**Resource Stewardship,**
**Ministry of Natural Resource Operations**

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**Cover Image**

Hozameen Ridge looking northwest over the Skagit River towards Silvertip Mountain © A.J. Fedoruk

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# EXECUTIVE SUMMARY

The Skagit Watershed of British Columbia is a varied and diverse landscape lying in the transition zone between the wet coast and dry interior of the province. This watershed encompasses considerable topographic relief ranging from the low elevation valley bottom to rocky, glaciated peaks. The result of this variation is a mosaic of habitat types and great species diversity with many species reaching range limits and the broad, glacially-carved valley providing an important north-south travel corridor for species moving through the area. Nearly 70% of the Canadian watershed is protected by Provincial Parks and Protected Areas, and the adjacent area in the U.S.A. is protected within National Park and National Forest lands. Conscientious management of the ecological resources in the watershed should provide for the successful persistence of these values within the Skagit landscape.

This ecosystem management plan builds upon the foundation of the Upper Skagit Fish and Wildlife Management Plan completed by the Ministry of Environment in 2008. The ecosystem plan broadens its scope to include plants, invertebrates and ecological communities, and focuses on the prioritization of resource allocation to meet management objectives. A principal source of funding for work in the Skagit Watershed is the Skagit Environmental Endowment Fund.

The goals of this plan are:

- To identify current and potential ecosystem values within the Skagit Watershed;
- To identify management concerns that threaten current and potential ecosystem values within the Skagit Watershed;
- To provide strategies to address management concerns; and
- To provide and prioritize implementation options that maximizes time, budget and human resource efficiencies.

**Management Concerns and Implementation Strategies**

The plan focuses on prioritized species and ecological communities; those which are red or blue listed by the Conservation Data Centre and/or ranked as 3 or higher under the provincial Conservation Framework. In order to manage for these ecosystem values it is important to understand what species and communities exist in the watershed and their population trends. For this reason, many of the highest priority actions are inventory and monitoring projects. Good baseline data will allow for better informed management decisions.

Action strategies were prioritized based on a number of factors including the value of the outcome to aid in management, number of species addressed, threat level, resources required, related work already completed or in-progress, and opportunities to collaborate or form partnerships with other organizations. Ministry of Natural Resource Operations (MNRO) and Ministry of Environment (MOE) biologists provided their input on ranking the importance of the action strategies. The top priorities for implementation are:

1) Inventory and Monitoring
   - Inventory surveys are needed for taxa with significant knowledge gaps, particularly plants, invertebrates, reptiles and amphibians, and birds.
   - As a keystone species that has suffered a significant decline in the area, inventory work on the Grizzly Bear population is also an important need.
   - Continued monitoring of fish populations in the reservoir and river is needed to aid with management decisions concerning this important fishery. A monitoring cycle is currently in-progress that will be completed in 2011. Some of this work is being done concurrently on both sides of the international border.
   - A multi-year cross-border Wolverine project is also currently in-progress and is scheduled to conclude in 2012.

2) Habitat
   - The completion of terrestrial ecosystem mapping (TEM) for the watershed (already partially completed) would have many benefits including being a useful tool for project and management planning and providing baseline information for climate change. This would be an expensive project, but could be completed over multiple years.
   - A working relationship with Ministry of Transportation and Infrastructure needs to be maintained to address the improvement of grading, culvert and stream channel maintenance practices along the Silver-Skagit Road.
   - The Hope Mountain Centre for Outdoor Learning is monitoring water quality in the Skagit watershed. A relationship with this group can be fostered to share relevant findings from their work.

3) Species Management
   - An augmentation project for Whitebark Pine, a keystone species, is in-progress in E.C. Manning Provincial Park and will require follow-up monitoring
   - The Skagit Watershed has been identified as a preferred location for the release of captive-bred Spotted Owls. A breeding and release facility needs to be constructed and staffed, and Barred Owls removed from the area.
   - The spread of invasive species needs to be prevented, and detected and responded to quickly when it does occur. Invasive plant occurrences have been identified in Skagit Valley Provincial Park and treatment recommendations made that need to be carried out. Signage is needed to remind visitors to never intentionally move wild

organisms and to remind boaters to wash their boats and motors when moving them between bodies of water.

Opportunities for partnerships and collaborations, directed funding, and other prospects to augment resources should be taken into consideration when they arise and may increase the priority ranking of a particular strategy in order to maximize efficiencies.

Conservation in the Skagit faces the challenges of rapidly increasing human population within close proximity to the watershed and the effects of climate change. This plan is intended to be reviewed and updated on a regular basis to reflect achievements, new management concerns and changing priorities.

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## Abbreviations

| | |
|---|---|
| **CABIN** | Canadian Aquatic Biomonitoring Network |
| **CDC** | Conservation Data Centre |
| **CF** | Conservation Framework |
| **CRA** | Cascade Recreation Area |
| **ECMPP** | E.C. Manning Provincial Park |
| **FVRD** | Fraser Valley Regional District |
| **GVRD** | Metro Vancouver (Greater Vancouver Regional District) |
| **HMCOL** | Hope Mountain Centre for Outdoor Learning |
| **MOE** | Ministry of Environment |
| **MNRO** | Ministry of Natural Resource Operations |
| **MOT** | Ministry of Transportation |
| **MWLAP** | Ministry of Water, Land and Air Protection (now MOE) |
| **NOCA** | North Cascades National Park Service Complex |
| **NPS** | US National Park Service |
| **PPA** | Parks and Protected Areas (BC Parks) |
| **SARA** | Federal Species at Risk Act |
| **SEEC** | Skagit Environmental Endowment Commission |
| **SVPP** | Skagit Valley Provincial Park |
| **TSA** | Timber Supply Area |

# 1.0 INTRODUCTION

This plan addresses the ecological integrity of the Skagit River Watershed of southwestern British Columbia. A fish and wildlife management plan was developed by the Ministry of Environment for the Canadian Skagit Watershed in 2008 (Ministry of Environment 2008). This ecosystem management plan builds on the foundation of the fish and wildlife plan, shifting the focus to prioritizing the allocation of funds and resources to meet management goals and expanding the list of taxonomic groups to include plants and invertebrates, as well as ecological communities.

The goals of this plan are:

- To identify current and potential ecosystem values within the Skagit Watershed;
- To identify management concerns that threaten current and potential ecosystem values within the Skagit Watershed;
- To provide strategies to address management concerns; and
- To provide and prioritize implementation options that maximizes time, budget and human resource efficiencies.

The Skagit Watershed has unique opportunities for conservation work thanks to the potential to obtain funding from the Skagit Environmental Endowment Fund. This fund was created in 1984 with the establishment of a treaty between Canada and the United States regarding the flooding of the Skagit Valley by Ross Dam. Money from the fund is dedicated to conservation, recreation and education in the Skagit Watershed upstream of Ross Dam. The fund is administered by the Skagit Environmental Endowment Commission (SEEC), an international commission made up of an equal number of Canadian and American commissioners. Commissioners are appointed by the premier of BC (Canadian) and mayor of Seattle (American). SEEC funds have been used to complete many projects within the Skagit Watershed and have been combined with other sources to help support larger projects.

# 2.0 SITE CONTEXT

## 2.1 Location and Land Tenure

The Skagit River arises near Allison Pass in the Hozameen Range of the North Cascade Mountains of southwestern British Columbia. It flows northwest to its confluence with the Sumallo River where it more than doubles in volume and changes course to the southwest. Below its confluence with the Klesilkwa River, the Skagit widens into a broad U-shaped valley, unique amongst the valleys of southwestern BC, as the river flows southeast to the US border.

Across the border the Skagit passes through a series of three hydroelectric dams, turns west once more, and becomes the second largest river in Washington State before emptying into Puget Sound near Mount Vernon. The three dams and their reservoirs are part of the Skagit Hydroelectric Project operated by Seattle City Light, the public utility providing electricity to the city of Seattle, Washington. The largest and most northerly reservoir, Ross Lake, floods an area of approximately 210 ha of the Skagit Valley in British Columbia when at full pool International Joint Commission 1971). By treaty, the reservoir is kept at approximately full pool between July 1 and September 1; the reservoir falls to well south of the Canadian border during winter draw down.

On the Canadian side of the border, the Skagit Watershed covers an area of approximately 100,000 ha and is located about 170 km east of Vancouver and 25 km southeast of Hope. Approximately 70% of the watershed is contained within Skagit Valley and E.C. Manning Provincial Parks (SVPP and ECMPP) and Cascade Provincial Recreation Area (CRA). Four Ecological Reserves are located within the watershed in Skagit Valley Provincial Park. The Parks and Protected Areas (PPA) are administered by the South Coast Region of BC Parks. Cascade Recreation Area will soon be converted to Class 'A' Provincial Park status as an addition to E.C. Manning (J. Aikman pers. comm. 2011). A smaller portion of the watershed covers Crown land outside the provincial protected areas and a small area in the northwest corner is privately owned land (Fig. 1). The watershed upstream of Ross Dam on the US side of the international boundary is located within Ross Lake National Recreation Area, North Cascades National Park (both part of NOCA, the North Cascades National Park Service Complex) and the Pasayten Wilderness of the Okanogan National Forest. Much of the Skagit Watershed therefore forms an important part of an international complex of contiguous protected wildlands (Fig. 2). It is important that ecological integrity be addressed in the context of the watershed and ecosystem as a whole, regardless of borders, and that responses to management issues be coordinated across the various jurisdictions involved.

The Canadian Skagit Watershed falls within the jurisdiction of several provincial ministries including the Ministry of Environment (MOE), Ministry of Natural Resource Operations (MNRO), and Ministry of Transportation (MOT). Federal interests in the watershed include migratory birds listed under the *Migratory Birds Convention Act*, fish habitat, and threatened or endangered species listed under the *Species at Risk Act* (SARA). Waterfowl are a joint federal/provincial responsibility. Multiple private enterprises also have stakes in the watershed. These include timber companies, mineral tenure holders, the Sunshine Valley recreational resort community, Emil Anderson Construction (road maintenance), a granite quarry, a hunting guide outfitter, several trapline tenures, and a grazing tenure. An alpine ski hill and groomed Nordic trails run by Manning Park Resort are located at the edge of the watershed in ECMPP. Several mineral claims and one private property still exist within SVPP (Armstrong 2007).

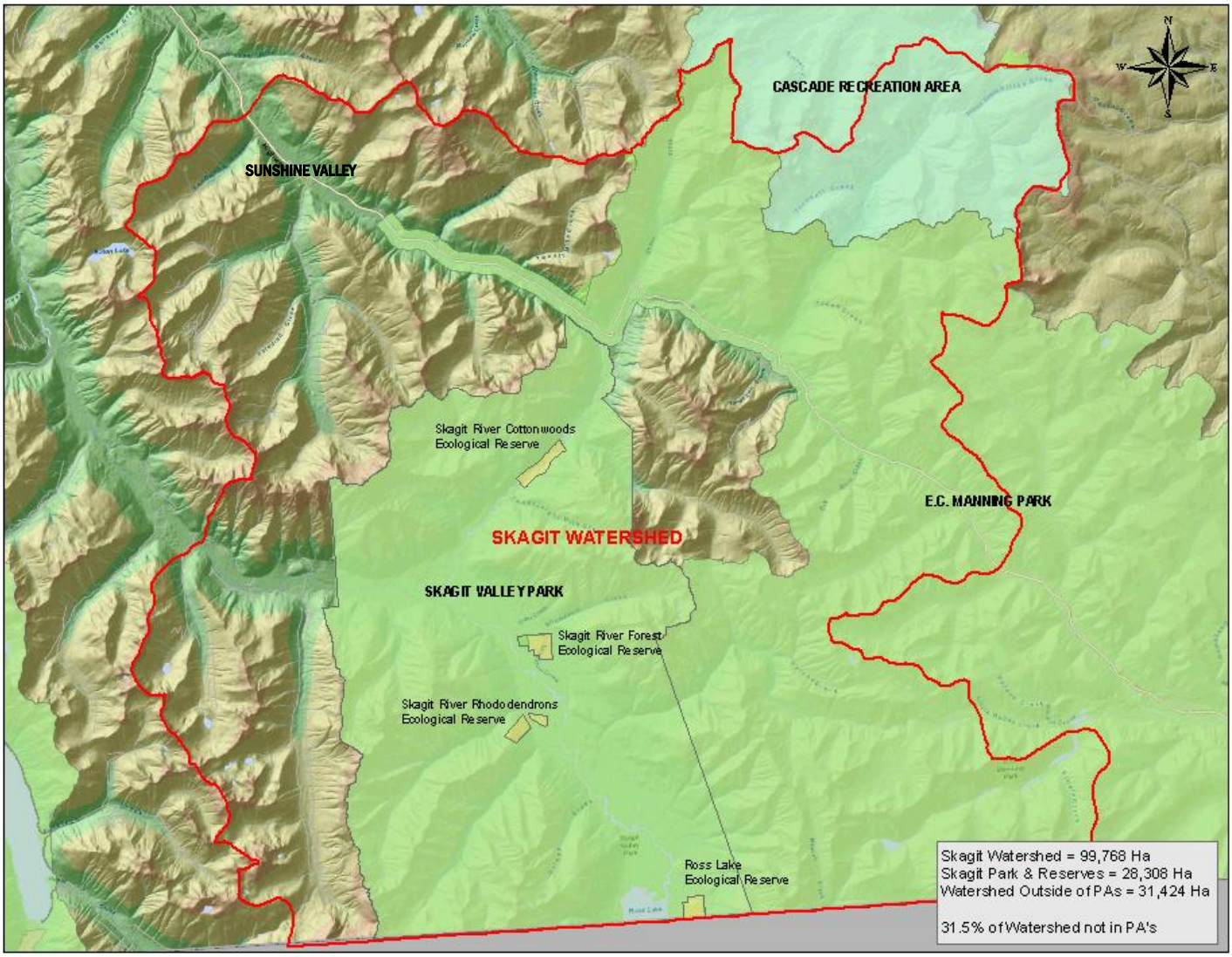



**Figure 1. Skagit River Watershed Land Tenure**

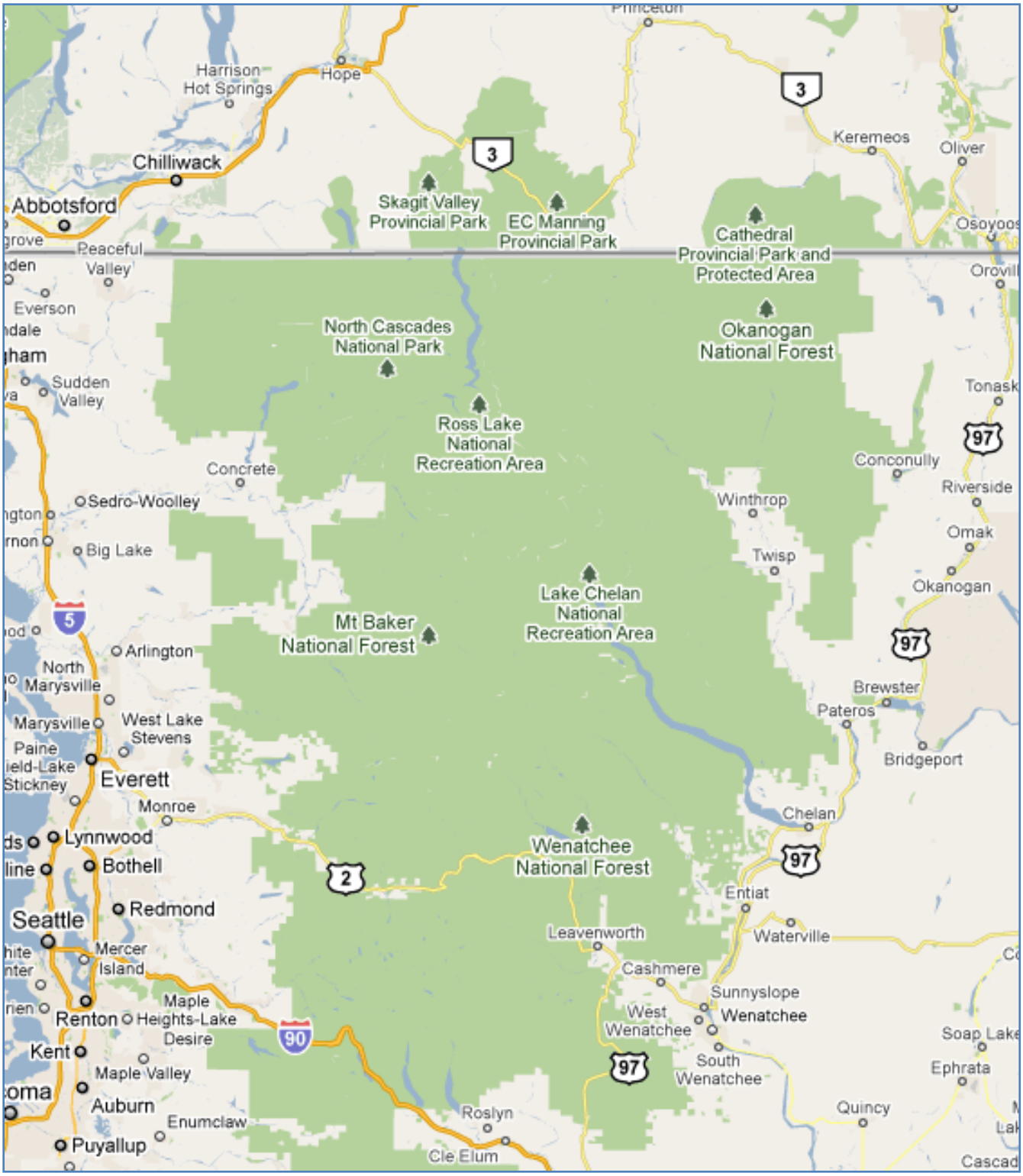



**Figure 2. Cross-border Contiguous Protected Areas**

## 2.2 Biogeography

The Skagit Valley lies between the wet, moderate climate of the western slopes of the North Cascade Mountains and the dry, more extreme climate of their eastern slopes. The Skagit Watershed is a transition zone between these two climate types and their associated biological communities. The overlap of eastern and western species, great variation in elevation from valley bottoms to glaciated peaks, patches of old-growth and variation in local microclimate result in a rich diversity of flora and fauna in the watershed. The north-south orientation of the Skagit also makes this valley an important travel and dispersal route for many species. Six of British Columbia's biogeoclimatic zones are represented within the Skagit Watershed:

- Coastal Western Hemlock (CWH)
- Coastal Mountain-heather Alpine (CMA)
- Interior Mountain-heather Alpine (IMA)
- Interior Douglas-fir (IDF)
- Engelmann Spruce – Subalpine Fir (ESSF)
- Mountain Hemlock (MH)

## 2.3 Watershed Use

***Historical***

Evidence of human use of the Skagit Watershed dates back at least eight thousand years (Friedman and Lindholdt 1993, Bufo Inc. 1997, Mierendorf 2004). Several First Nations have associations with the region, most notably the Stó:lō, the Nlaka'pamux (Thompson), the Upper Similkameen, the Stuwix (Nicola), and the Upper Skagit. Various resources were harvested from the watershed and the area was used as a meeting place between coastal and interior peoples to trade goods (Bufo Inc. 1997, Stó:lō Nation Aboriginal Rights and Title Department 2003, Mierendorf 2004).

European use of the area began with fur trappers. Prospectors travelled through the Skagit Valley to strikes in the interior of BC and Washington from the mid-1800s through the early 1900s (Harris and Hatfield 1982, Fraser *et al.* 1989). A few attempts were made at ranching in the valley, but were short-lived (Bufo Inc. 1997). The construction of Ross Dam in the 1940's led to the clearing of the valley bottom in preparation for flooding Ross Lake Reservoir in the early 1950's and opened up the watershed to logging via the Silver-Skagit Road from Hope. The Hope-Princeton Highway (Highway 3), crossing the northern part of the watershed, was completed in 1948. These roads opened the watershed to increased recreational use.

***Current***

Today, the principal human use for the majority of the upper Skagit Watershed is recreation. Recreational opportunities in BC are focused in the protected areas managed by BC Parks, but

also include areas managed by MNRO and the Fraser Valley Regional District (FVRD). Recreational uses include hiking, wildlife viewing, camping, fishing, boating, hunting, skiing, horseback riding, snowmobiling and using motorized off-road vehicles.

Timber harvest occurs in the watershed on Crown forest land outside the protected areas. A number of mineral claims also exist in the watershed, with activity mostly concentrated in the Silverdaisy area (an area of unprotected Crown land surrounded by SVPP and ECMPP) including the Imperial Metals Giant Copper site. A granite quarry operates just outside the entrance to Skagit Valley Provincial Park. There are three trapline tenures located wholly or partially within the watershed and one guide outfitter territory. A grazing tenure is held for Cascade Recreation Area allowing for a maximum of 278 cows and 12 bulls to graze between Aug. 1 and Sept. 15.

The private residential and resort community of Sunshine Valley is located in the northwest corner of the watershed along the Sumallo River. Expansion of the community and the recreational activities available is currently underway, including increased residential capacity and the development of a recreational vehicle resort.

Provincial road access into the Skagit Watershed is limited to Highway 3 and the unpaved Silver-Skagit road. Smaller roads used for timber and mineral extraction extend from these roadways in some of the unprotected parts of the watershed. Whipsaw Creek Forest Service Road passes through a section of Cascade Recreation Area. Highway 3 is one of the main routes from the Fraser Valley into the interior of the province and experiences high traffic volumes at all times of year. The Silver-Skagit road is in fairly good condition and is generally open three seasons of the year. During winter, most of the Silver-Skagit Road is not maintained and snow usually prevents wheeled traffic. Snowmobile use occurs on the road under these conditions.

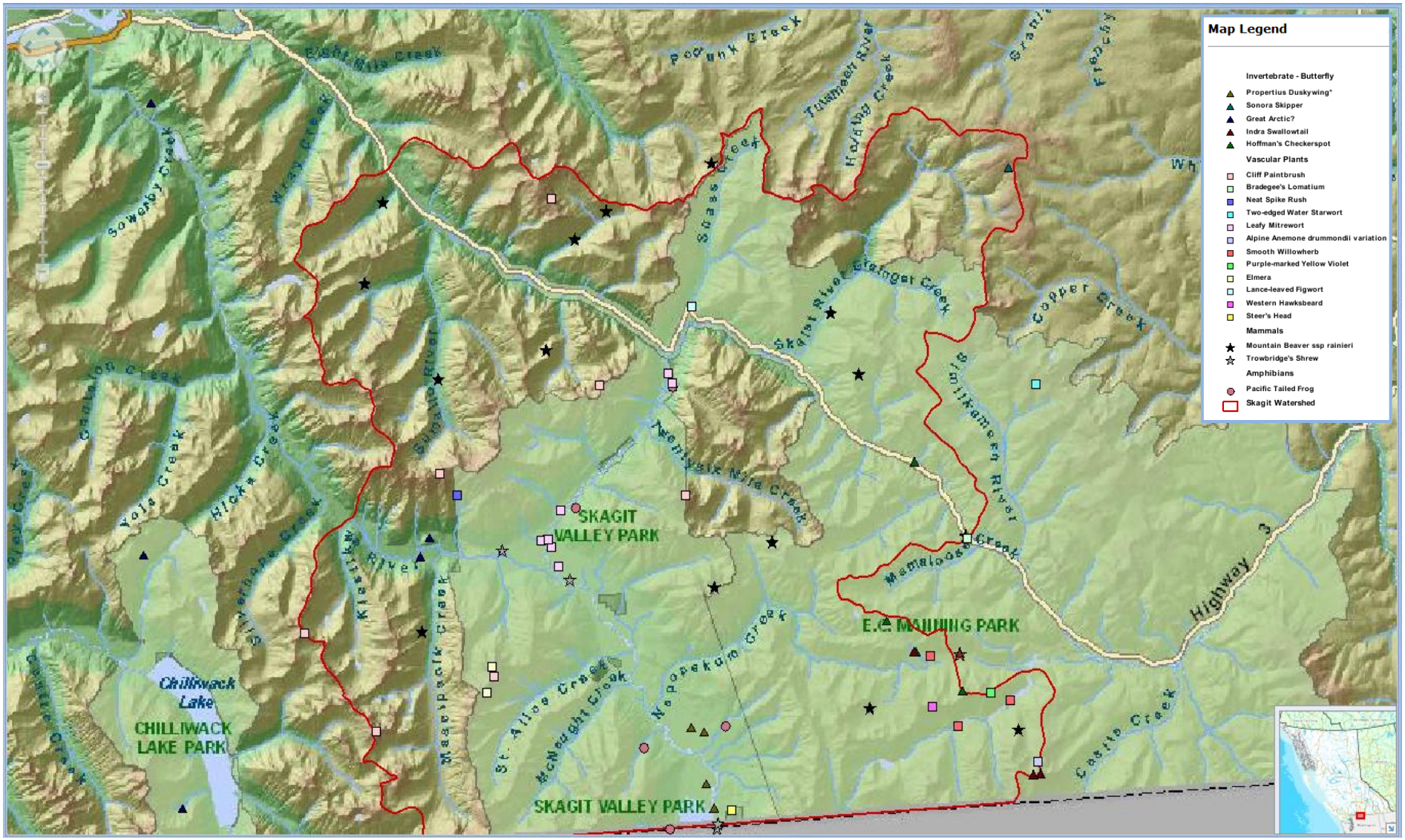
## 3.0 DESCRIPTION AND STATUS OF ECOSYSTEM VALUES

The Skagit Watershed provides important breeding habitats, feeding grounds, wintering ranges and migration routes for the great variety of wildlife that utilizes the area. This region has the highest diversity of trees in the province (B.C.'s Wild Heritage 2000) and more than 200 species of birds have been recorded in the watershed, along with approximately 65 species of mammals, 7 amphibians, 4 reptiles and 6 native species of fish (Knopp 1997, Armstrong 2007). Several invertebrate subspecies unique to the Cascades have recently been recognized and with continued research on invertebrate taxa it is likely that more endemics will be discovered.

This plan will focus on *prioritized species and ecological communities*, defined here as species or communities that are listed as Red or Blue by the Conservation Data Centre (CDC) and/or have a Highest Priority ranking of 3 or higher under the provincial Conservation Framework (CF). Also included are species which are unranked due to insufficient data. An extensive search of reports and records was made to compile a list of prioritized species and ecological communities that have been recorded in the Skagit Watershed. Sources included government reports, CDC records, records compiled by E-Flora BC and E-Fauna BC, personal communications with government biologists and other species specialists, the federal Species at Risk Public Registry, COSEWIC reports, Seattle City Light documents, site-specific field guides and other scientific reports. 133 prioritized species, 60 of which are Red or Blue listed, have been recorded in the Skagit watershed. 7 prioritized ecological communities, all of which are Red or Blue listed, have also been identified in the watershed. The Conservation Framework was used as a tool to help identify additional prioritized species that may potentially exist in the Skagit, based on the biogeoclimatic zones available and the species that have been found in those zones (see Appendix A). Information on species ranges and habitat requirements and the proximity of sightings records were used to determine the likelihood of each potential species inhabiting the Skagit. The likelihood was ranked between 1 and 3 with 1 being the most likely and 3 the least.

Certain prioritized species with occurrence records in the watershed are highlighted below the generalized descriptions of their taxa. These are species for which extra background information is available, for which Skagit-specific concerns or management strategies have been identified or for which specific provincial strategies or concerns could be addressed in the Skagit.

## Figure 3. Confirmed* Occurrence Records of Priority Species Located in the Skagit Watershed



## 3.1 Sensitive Habitats and Habitat Features

### *3.1.1 Ecological Communities at Risk*

Seven red and blue listed ecological communities have been recorded in the Skagit Watershed (Table 1). All of these occurrence records are within provincial parks and protected areas.

**Table 1. Prioritized ecological communities with occurrence records in the Skagit Watershed**

| Scientific Name | Common Name | CDC List | Highest Priority | Goal Assigned |
|---|---|---|---|---|
| *Pinus contorta / Rhododendron macrophyllum* | Lodgepole Pine / Pacific Rhododendron | red | 1 | 1 |
| *Rhododendron macrophyllum / Gaultheria ovatifolia / Cladonia* spp. | Pacific Rhododendron - Western Tea-berry / Clad Lichens | red | 1 | 1 |
| *Thuja plicata - Pseudotsuga menziesii / Acer circinatum* | Western Redcedar - Douglas-fir / Vine Maple | blue | 1 | 1 |
| *Pseudotsuga menziesii - Thuja plicata / Corylus cornuta* | Douglas-fir - Western Redcedar / Beaked Hazelnut | blue | 2 | 2 |
| *Pseudotsuga menziesii - Tsuga heterophylla / Paxistima myrsinites* | Douglas-fir - Western Hemlock / Falsebox | blue | 2 | 2 |
| *Tsuga heterophylla - Abies amabilis / Hylocomium splendens* | Western Hemlock - Amabilis Fir / Step Moss | blue | 1 | 1 |
| *Tsuga heterophylla / Acer circinatum - Paxistima myrsinites* | Western Hemlock / Vine Maple - Falsebox (IDF ww) | blue | 2 | 2 |

### *3.1.2 Wildlife Trees*

Wildlife trees are standing dead or dying trees that provide unique habitat features important to a variety of wildlife species. Wildlife trees that are still living may continue to do so for decades and may stand for decades more after they are dead. Characteristics of these trees include large, often hollow, trunks with large branches. Important features include cavities, loose bark, broken tops, insect prey populations and bare crowns/branches. These trees provide nesting and roosting sites, food resources and perching sites to a wide variety of birds, mammals and invertebrates. Wildlife trees are a limited resource in a forest, resulting in intraspecific and interspecific competition. 66 different wildlife species in British Columbia are known to be significantly dependent on wildlife trees. For many species, the properties provided by these trees cannot be replicated or substituted by another habitat component. For these species, failure to find an appropriate wildlife tree means they may not reproduce and/or may not survive (MOF and MELP 2000, Harris 2001, Stone *et al.* 2002, MOF 2005, Fenger *et al.* 2006). Wildlife trees are often considered a danger because they are dead or dying and are therefore more likely to fall or drop branches. Park Facility Operators are required to conduct yearly hazard tree assessments in campgrounds and other front-country areas of parks and to remove trees from areas where there is high potential for them to cause structural damage or human harm if they were to fall. Wildlife trees may also be removed during logging practices. Priority species in the Skagit Watershed that are dependent on wildlife trees include Vaux's Swift (*Chaetura vauxi*), Western Screech Owl (*Megascops kennicottii*), Lewis' Woodpecker (*Melanerpes lewis*), and various bat species.

## 3.2 Priority Species (*SAR or CF High (1-3)*)

### *3.2.1 Plants*

Non-Vascular Plants

There are 92 prioritized non-vascular species that have been identified as potentially growing in the Skagit Watershed (see Appendix A). It is difficult to predict whether or not to expect the presence of many species. No occurrence records were discovered for this taxon, nor did the literature search uncover any non-vascular plant surveys carried out in the Skagit. It is important that a non-vascular plant specialist participate in future plant surveys of the watershed and that emphasis is placed on identifying members of this taxonomic group.

Vascular Plants

There are 33 vascular prioritized species identified in the Skagit (Table 2), although many of the occurrence records are historic and some populations may no longer be extant. Many more prioritized species have been identified as potential inhabitants of the watershed (Appendix A).

**Table 2. Prioritized plant species with occurrence records in the Skagit Watershed**

| Taxonomic Group | Scientific Name | Common Name | CDC List | COSEWIC | Highest Priority | Goal(s) Assigned |
|---|---|---|---|---|---|---|
| Dicot | *Anemone drummondii* var. *drummondii* | Alpine Anemone *drummondii* variation | Blue | Not Listed | 3 | 3 |
| Dicot | *Brickellia oblongifolia oblongifolia* | Narrow-leaved Brickellia ssp *oblongifolia* | Blue | Not Listed | 3 | 3 |
| Dicot | *Castilleja rupicola* | Cliff Paintbrush | Blue | Threatened | 3 | 1 |
| Dicot | *Cirsium edule* var. *macounii* | Edible Thistle | Yellow | Not Listed | 3 | 1 |
| Dicot | *Claytonia washingtoniana* | Washington Springbeauty | Red | Not Listed | 3 | 1,3 |
| Dicot | *Crepis occidentalis conjuncta* | Western Hawksbeard | Red | Not Listed | 2 | 1 |
| Dicot | *Delphinium glareosum* | Rockslide Larkspur | Red | Not Listed | 2 | 3 |
| Dicot | *Dicentra uniflora* | Steer's Head | Blue | Not Listed | 2 | 3 |
| Dicot | *Draba lonchocarpa* var. *thompsonii* | Lance-fruited Draba | Blue | Not Listed | 3 | 3 |
| Dicot | *Elmera racemosa* var. *racemosa* | Elmera | Blue | Not Listed | 3 | 3 |
| Dicot | *Epilobium glaberrimum fastigiatum* | Smooth Willowherb | Blue | Not Listed | 3 | 3 |
| Dicot | *Epilobium mirabile* | Hairy-stemmed Willowherb | Red | Not Listed | 2 | 3 |
| Dicot | *Hackelia diffusa* | Spreading Stickseed | Blue | Not Listed | 2 | 3 |
| Dicot | *Heuchera micrantha* var. *diversifolia* | Small-flowered Alumroot | Yellow | Not Listed | 3 | 1 |
| Dicot | *Lewisia columbiana* var. *columbiana* | Columbia Lewisia | Blue | Not Listed | 3 | 1,3 |
| Dicot | *Lomatium brandegeei* | Bradegee's Lomatium | Blue | Not Listed | 3 | 1,3 |
| Dicot | *Mitella caulescens* | Leafy Mitrewort | Blue | Not Listed | 2 | 3 |
| Dicot | *Polemonium elegans* | Elegant Jacob's Ladder | Blue | Not Listed | 3 | 3 |
| Dicot | Pyrola elliptica | White Wintergreen | Blue | Not Listed | 3 | 3 |
| Dicot | *Rubus lasiococcus* | Dwarf Bramble | Blue | Not Listed | 2 | 3 |
| Dicot | *Scrophularia lanceolata* | Lance-leaved Figwort | Blue | Not Listed | 2 | 3 |
| Dicot | *Senecio elmeri* | Elmer's Butterweed | Yellow | Not Listed | 3 | 1 |
| Dicot | *Smelowskia ovalis* | Short-fruited Smelowskia | Blue | Not Listed | 3 | 3 |
| Dicot | *Stellaria obtusa* | Blunt-sepaled Starwort | Blue | Not Listed | 2 | 3 |
| Dicot | *Viola purpurea* var. *venosa* | Purple-marked Yellow Violet | Red | Not Listed | 2 | 3 |
| Fern/Fern Ally | *Polystichum kruckebergii* | Kruckeberg's Holly Fern | Blue | Not Listed | 3 | 3 |
| Gymnosperm | *Chamaecyparis nootkatensis* | Yellow-cedar | Yellow | Not Listed | 2 | 2 |
| Gymnosperm | *Pinus albicaulis* | Whitebark Pine | Blue | Endangered | 3 | 2 |
| Monocot | *Carex lenticularis* var. *lenticularis* | Lakeshore Sedge | Red | Not Listed | 3 | 3 |
| Monocot | *Carex rostrata* | Swollen Beaked Sedge | Blue | Not Listed | 3 | 3 |
| Monocot | *Eleocharis nitida* | Neat Spike Rush | Red | Not Listed | 2 | 3 |
| Monocot | *Stenanthium occidentale* | Western Mountainbells | Yellow | Not Listed | 3 | 1 |
| Monocot | *Streptopus lanceolatus* | Rosy Twistedstalk | Yellow | Not Listed | 3 | 1 |

**Whitebark Pine (*Pinus albicaulis*)**

| CDC Blue List | CF Priority 3(Goal 2) | COSEWIC Endangered |
|---|---|---|

Photo by Curtis Bjork

Whitebark Pine is a widespread sub-alpine tree in BC. While it is currently fairly common, extreme infestations of white pine blister rust (*Cronartium ribicola*) introduced from Eurasia a century ago and mountain pine beetle (*Dendroctonus ponderosae*) have weakened and/or killed a large portion of the population in the province. Combined with habitat loss as a result of a warming climate and successional replacement due to fire suppression, a significant decline in reproductive potential is predicted. Expectations are for this species to experience a dramatic reduction in population size. Whitebark Pine is considered to be a keystone species, influencing hydrology patterns through snow accumulation, facilitating the growth of certain other plants, and providing highly nutritious seeds as an important food source to animals such as grizzly bears, squirrels and Clark's nutcrackers (Charleson and Campbell 2008, Penny and Campbell 2008). A research project on Whitebark Pine restoration is currently occurring in E.C. Manning Provincial Park. This project has involved planting seeds in defined areas and growing seedlings for transplanting (Timberline Natural Resource Group 2007).

**Cliff Paintbrush (*Castilleja rupicola*)**

| CDC Blue List | CF Priority 3 (Goal 1) | COSEWIC Threatened | SARA 1 |
|---|---|---|---|

Photo by Jim Riley

This is an alpine species, growing in small populations on mountain tops, with a total population in BC estimated at fewer than 250 plants. 7 of the 18 known occurrences for this species in BC are within the Skagit Watershed. Three of these are within Skagit Valley Provincial Park, the others are on crown land outside of PPA. Direct threats to these populations appear to be low due to the remoteness of their locations; climate change may or may not have a negative impact over the long term (Cliff Paintbrush Recovery Team 2009, Christy *et al*. 2010). *C. rupicola* is a root parasite, but little is known about its host species or the extent of the parasitism. Information is also lacking on microhabitat requirements and pollinator species.

**Western Hawksbeard *conjuncta* subspecies (*Crepis occidentalis conjuncta*)**

| CDC Red List | CF Priority 2 (Goal 1) |
|---|---|

Only three populations of this subspecies are known from BC, one historical and two extant. One extant occurrence is within the Skagit Watershed in ECMPP. Potential habitat, subalpine cliffs and scree slopes, is abundant but remote; there are likely more occurrences than have been reported (Donovan 2008).

### 3.2.2 *Invertebrates*

This large taxonomic group plays many roles within a community and many invertebrates are important for proper ecosystem functioning. A small number of invertebrates have been listed as red or blue by the CDC and prioritized under the goals of the Conservation Framework. The presence of 7 prioritized butterfly species has been confirmed in the Skagit Watershed (Table 3), with several more considered to be potential inhabitants. Butterfly surveys are the only invertebrate surveys that the literature search found for the watershed. Several listed odonate (dragonfly/damselfly) and mollusc species may also be potential residents of the Skagit (see Appendix A). As more invertebrates are considered for listing it is likely that the number of prioritized invertebrate species found in the Skagit will increase.

**Table 3. Prioritized invertebrate species with occurrence records in the Skagit Watershed**

| Taxonomic Group | Scientific Name | Common Name | CDC List | COSEWIC | Highest Priority | Goal(s) Assigned |
|---|---|---|---|---|---|---|
| Butterfly | *Chlosyne hoffmanni* | Hoffman's Checkerspot | Red | Not Listed | 3 | 3 |
| Butterfly | *Erebia vidleri* | Vidler's Alpine | Blue | Not Listed | 2 | 3 |
| Butterfly | *Erynnis propertius** | Propertius Duskywing* | Blue | Not Listed | 2 | 3 |
| Butterfly | *Oeneis nevadensis** | Great Arctic* | Yellow | Not Listed | 2 | 2 |
| Butterfly | *Papilio indra* | Indra Swallowtail | Red | Not Listed | 1 | 3 |
| Butterfly | *Polites sonora* | Sonora Skipper | Red | Special Concern | 1 | 3 |
| Butterfly | *Speyeria hydaspe minor* | Hydaspe Fritillary ssp *minor* | Yellow | Not Listed | Unable to Determine | None |

* Uncertainty or expected changes regarding taxonomy which may impel review of rankings

**Propertius Duskywing (*Erynnis propertius*)**

| CDC Blue List | CF Priority 2 (Goal 3) |
|---|---|

Photo by Jamie Fenneman

The larval host species for this butterfly is known to be Garry Oak in coastal areas, however, Garry Oaks are not found in the Skagit Watershed. Propertius Duskywings encountered in the Skagit were originally believed to be transients (Guppy and Shepard 2001). It is now accepted that the Propertius found in the Skagit are residents. Although the larval host plant for this population has yet to be identified, individuals in the Skagit are almost exclusively associated with microhabitats containing *Ceonothus* sp. (Knopp and Larkin 2003). Based on morphological and behavioural differences, this population, along with other inland populations along the Fraser Canyon, near Pemberton and in the Vedder Crossing area, have been identified as a separate subspecies. This subspecies has not yet been officially named or described (Guppy 2003, Guppy pers. com. 2011). Guppy (2003) suggests that once the new taxonomic classification has been officially established the provincial ranking of the subspecies should be red and COSEWIC should designate it as threatened. Propertius Duskywings have been found in open *Ceonothus* sp. habitats of SVPP, mostly near the Silver-Skagit Road (Knopp and Larkin 2003).

### *3.2.3 Vertebrates*

Fish

The Upper Skagit Watershed is home to two prioritized species of char, Dolly Varden (*Salvelinus malma*) and Bull Trout (*Salvelinus confluentus*) (Table 4). Bull Trout-Dolly Varden hybrids are also present. Angling is a popular activity along the Skagit and Sumallo Rivers, and in Ross Lake Reservoir. The reservoir is managed as a limited retention fishery for Rainbow Trout (*Oncorhynchus mykiss*); char must be released if caught. Fishing on the rivers is catch-and-release for all species.

The trout and char in the Skagit Watershed exhibit varied life history strategies. Some are year-round river residents (fluvial life history); others have an adfluvial life history, growing and maturing in Ross Lake Reservoir and migrating into the Skagit River or other tributaries to spawn (Nelson 2006). These fish may spend many weeks or months in the river system before returning to the reservoir. In this interconnected system, population numbers in the river may be affected by conditions in the reservoir and vice versa. Ross Lake Reservoir straddles the international border, making coordination between Washington and British Columbia essential for successful management of fish stocks. Past cooperation has standardized fishing regulations on the reservoir including: length of open season, catch and size limits, and permitted gear.

Redside Shiners (*Richardsonius balteatus*) are thought to have been introduced into Ross Lake Reservoir a little over a decade ago (E. Connor pers. comm.). These small fish have experienced a dramatic population increase in recent years. While evidence of shiners in the guts of Rainbow Trout indicates that large trout are feeding on the minnows, it is still unclear what impact this addition to the reservoir fish community will ultimately have on the other species in the system. Shiners may present significant competition to young trout for food resources. They may also impact the life history patterns of adfluvial individuals, encouraging large trout and char to spend more time in the reservoir where the shiners are found and less time in the Skagit, Sumallo and other tributaries. This may expose Rainbow Trout to higher mortality from the retention fishery in the reservoir (D. Jesson pers. comm. 2010).

Snorkel surveys of the Skagit River fish populations were completed in September 2009 and 2010. Rainbow Trout numbers were up slightly in 2010 from 2009, but still down slightly from the previous survey done in September 1998. Bull Trout, on the other hand, saw a notable increase between 2009 and 2010, and a dramatic increase of nearly nine times between 1998 and 2010 (Anaka and Scott in prep.).

**Table 4. Prioritized fish species with occurrence records in the Skagit Watershed.**

| Taxonomic Group | Scientific Name | Common Name | CDC List | COSEWIC | Highest Priority | Goal(s) Assigned |
|---|---|---|---|---|---|---|
| Fish | *Salvelinus confluentus* | Bull Trout | Blue | Not Listed | 2 | 1,2 |
| Fish | *Salvelinus malma* | Dolly Varden | Blue | Not Listed | 2 | 2 |

Amphibians and Reptiles

Five amphibian and three reptile prioritized species have been recorded in the Skagit Watershed (Table 5), representing a high percentage of the species in these taxa found in the area. There are also reports of the Northern Red-legged Frog (*Rana aurora*) and Western Skink (*Plestiodon skiltonianus*) as residents of the Skagit Valley (International Joint Commission 1971), but Farr (1986) questions their validity, especially since location data are not provided. The Oregon Spotted Frog (*Rana pretiosa*) and Columbia Spotted Frog (*Rana luteiventris*) were split from each other in the late 1990s (Green *et al*. 1997, Funk *et al*. 2008). Based on distribution maps, *R. luteiventris* is believed to be the species reported in prior records from the Skagit. Dupuis (2001) also considers the Cascade Frog (*Rana cascadae*) to be a possible resident of watershed. There are no records of this species in BC, but the northern limit of its range is in the North Cascades of Washington near the Canadian border and the high elevation habitat used by these frogs is not frequently sampled. See Appendix A for other potential species. The only systematic surveys for herpetiles found in the literature search were for Pacific Tailed Frogs (*Ascaphus truei*) and Pacific Giant Salamanders (*Dicamptodon tenebrosus*); no *Dicamptodon* were found (Farr 1986). A proposal for an amphibian and reptile survey of SVPP was submitted to SEEC by Ascaphus Consulting in 2001 (Dupuis 2001) but did not receive funding. The location of all wetlands in SVPP as determined from aerial photographs was submitted with the proposal.

**Table 5. Prioritized amphibian and reptile species with occurrence records in the Skagit Watershed.**

| Taxonomic Group | Scientific Name | Common Name | CDC List | COSEWIC | Highest Priority | Goal(s) Assigned |
|---|---|---|---|---|---|---|
| Amphibian | *Ambystoma gracile* | Northwestern Salamander | Yellow | Not at Risk | 1 | 2 |
| Amphibian | *Anaxyrus boreas* | Western Toad | Yellow | Special Concern | 2 | 2 |
| Amphibian | *Ascaphus truei* | Pacific Tailed Frog | Blue | Special Concern | 1 | 2 |
| Amphibian | *Ensatina eschscholtzii* | Ensantina | Yellow | Not at Risk | 2 | 2 |
| Amphibian | *Rana luteiventris* | Columbia Spotted Frog | Yellow | Not at Risk | 2 | 2 |
| Reptile | *Charina bottae* | Rubber Boa | Yellow | Special Concern | 1 | 2 |
| Reptile | *Elgaria coerulea* | Northern Alligator Lizard | Yellow | Not at Risk | 3 | 2 |
| Reptile | *Thamnophis ordinoides* | Northwestern Garter Snake | Yellow | Not at Risk | 3 | 2 |

**Pacific Tailed Frog (*Ascaphus truei*)**

| CDC Blue List | CF Priority 1 (Goal 2) | COSEWIC Special Concern | SARA 1 |
|---|---|---|---|

Tailed Frogs have been found in multiple streams in SVPP (Farr 1986, B.C.'s Wild Heritage 2000), but have not been surveyed since 1996. Stream siltation, usually due to road building or clear cutting, has serious negative impacts on reproductive success for this species (Cannings and Westereng 2007).

Photo by Brian Klinkenberg

**Western Toad (*Anaxyrus boreas*)**

| CF Priority 2 (Goal 2) | COSEWIC Special Concern | SARA 1 |
|---|---|---|

Photo by A.J. Fedoruk

Western Toads are locally abundant, but have shown evidence of sharp declines in some populations across western North America, including remote, undisturbed areas. The cause of these declines is unknown (Wind 2008). There is not currently concern for the Skagit population of Western Toads, but no baseline population estimates exist for comparison.

**Rubber Boa (*Charina bottae*)**

| CF Priority 1 (Goal 2) | COSEWIC Special Concern | SARA 1 |
|---|---|---|

This snake has a very low reproductive rate, with late maturity and females that produce only 2-8 offspring at intervals as long as four years. The Rubber Boa is at the northern extent of its range in southern BC and shorter warm seasons here likely have an effect on the growth and reproductive potential of the species. Rubber Boas are fairly widespread throughout a variety of wooded habitats in the southern half of the province, but other than the need for appropriate hibernacula little is known about limiting environmental factors. Downed woody debris is believed to be an important habitat feature (Westereng *et al*. 2007).

Birds

The Skagit Watershed is used by a great variety of birds. Some species are resident year-round; others arrive for breeding during the spring and summer, while still others pass through along their migration routes. Birds have the greatest number of prioritized species which have been recorded in the Skagit (Table 6), representing each of the aforementioned categories. For some of these species, the Skagit is an important part of their range, for others the watershed may only be visited on rare occasions by a few individuals. The focus here will be on species for which the Skagit is more than an accidental visit, although with current information this cannot always be determined. See Appendix A for a list of potential prioritized birds.

There are several prioritized birds of prey and waterfowl that make significant use of the Skagit watershed. Northern Spotted Owls (*Strix occidentalis caurina*) and Harlequin Ducks (*Histrionicus histrionicus*) have received recent attention. In 1991 a songbird survey was completed comparing plots in mature lowland coniferous forests within SVPP to nearby clearcut areas outside the park (Daly 1991). This is the most recent songbird survey completed in this part of the watershed. An annual spring bird blitz in ECMPP is sponsored by the BC Federation of Naturalists and the Hope Mountain Centre for Outdoor Learning (HMCOL). While not as accurate as actual scientific studies, events such as this can provide important information about species presence and long-term trends. Participants in these events are volunteers, but are

often experienced birders with good reliability in species identification. Christmas Bird Counts are carried out across North America and have provided very useful inventory information that has been used to direct conservation efforts. Similar programs are being started for other taxa, such as frogs. The Manning Bird Blitz has happened for the past 27 years (K. Pearce pers. com. 2011). An attempt was made to launch a corresponding blitz in SVPP in 2010, but did not generate enough interest to proceed.

## Table 6. Prioritized bird species with occurrence records in the Skagit Watershed.

| Taxonomic Group | Scientific Name | Common Name | CDC List | COSEWIC | Highest Priority | Goal(s) Assigned |
|---|---|---|---|---|---|---|
| Bird | *Accipiter gentilis atricapillus* | Northern Goshawk | Yellow | Not at Risk | 3 | 2 |
| Bird | *Aechmophorus occidentalis* | Western Grebe | Red | Not Listed | 1 | 3 |
| Bird | *Aegolius funereus* | Boreal Owl | Yellow | Not at Risk | 3 | 2 |
| Bird | *Aix Sponsa* | Wood Duck | Yellow | Not Listed | 1 | 2 |
| Bird | *Anas acuta* | Northern Pintail | Yellow | Not Listed | 2 | 2 |
| Bird | *Ardea herodias fannini* | Great Blue Heron ssp *fannini* | Blue | Special Concern | 1 | 3 |
| Bird | *Asio flammeus* | Short-eared Owl | Blue | Special Concern | 2 | 2 |
| Bird | *Aythya americana* | Redhead | Yellow | Not Listed | 2 | 2 |
| Bird | *Aythya marila* | Greater Scaup | Yellow | Not Listed | 2 | 2 |
| Bird | *Aythya valisineria* | Canvasback | Yellow | Not Listed | 2 | 2 |
| Bird | *Bonasa umbellus* | Ruffed Grouse | Yellow | Not Listed | 2 | 2 |
| Bird | *Bucephala islandica* | Barrow's Goldeneye | Yellow | Not Listed | 1 | 2 |
| Bird | *Butorides virescens* | Green Heron | Blue | Not Listed | 4 | 3 |
| Bird | *Carpodacus purpureus* | Purple Finch | Yellow | Not Listed | 2 | 2 |
| Bird | *Catharus fuscescens* | Veery | Yellow | Not Listed | 2 | 2 |
| Bird | *Catharus ustulatus* | Swainson's Thrush | Yellow | Not Listed | 2 | 2 |
| Bird | *Certhia americana* | Brown Creeper | Yellow | Not Listed | 1 | 2 |
| Bird | *Chaetura vauxi* | Vaux's Swift | Yellow | Not Listed | 2 | 2 |
| Bird | *Charadrius vociferus* | Killdeer | Yellow | Not Listed | 2 | 2 |
| Bird | *Chondestes grammacus* | Lark Sparrow | Red | Not Listed | 2 | 3 |
| Bird | *Chordeiles minor* | Common Nighthawk | Yellow | Threatened | 2 | 2 |
| Bird | *Circus cyaneus* | Northern Harrier | Yellow | Not at Risk | 2 | 2 |
| Bird | *Coccothraustes vespertinus* | Evening Grosbeak | Yellow | Not Listed | 2 | 2 |
| Bird | *Contopus cooperi* | Olive-sided Flycatcher | Blue | Threatened | 2 | 2 |
| Bird | *Contopus sordidulus* | Western Wood-Pewee | Yellow | Not Listed | 2 | 2 |
| Bird | *Cygnus columbianus* | Tundra Swan | Blue | Not Listed | 4 | 3 |
| Bird | *Cypseloides niger* | Black Swift | Yellow | Not Listed | 2 | 2 |
| Bird | *Dendragapus obscurus* | Dusky Grouse (Blue Grouse) | Yellow | Not Listed | 2 | 2 |
| Bird | *Dendroica nigrescens* | Black-throated Gray Warbler | Yellow | Not Listed | 2 | 2 |
| Bird | *Dendroica petechia* | Yellow Warbler | Yellow | Not Listed | 2 | 2 |
| Bird | *Dolichonyx oryzivorus* | Bobolink | Blue | Threatened | 2 | 2 |
| Bird | *Empidonax difficilis* | Pacific-slope Flycatcher | Yellow | Not Listed | 2 | 2 |
| Bird | *Empidonax occidentalis* | Cordilleran Flycatcher | Unknown | Not Listed | NA | None |
| Bird | *Empidonax traillii* | Willow Flycatcher | Yellow | Not Listed | 2 | 2 |
| Bird | *Eremophila alpestris* | Horned Lark | Yellow | Not Listed | 2 | 2 |
| Bird | *Falco peregrinus ssp anatum* | Peregrine Falcon (anatum ssp) | Red | Special Concern | 2 | 3 |
| Bird | *Falco sparverius* | American Kestrel | Yellow | Not Listed | 2 | 2 |
| Bird | *Fulica americana* | American Coot | Yellow | Not at Risk | 2 | 2 |
| Bird | *Glaucidium gnoma* | Northern Pygmy-owl | Yellow | Not Listed | 3 | 2 |
| Bird | *Hirundo rustica* | Barn Swallow | Blue | Not Listed | 2 | 2 |
| Bird | *Histrionicus histrionicus* | Harlequin Duck | Yellow | Not Listed | 1 | 2 |
| Bird | *Larus californicus* | California Gull | Blue | Not Listed | 4 | 3 |
| Bird | *Loxia curvirostra* | Red Crossbill | Yellow | Not Listed | 2 | 2 |
| Bird | *Megaceryle alcyon* | Belted Kingfisher | Yellow | Not Listed | 2 | 2 |
| Bird | *Megascops kennicottii* | Western Screech-Owl | No Status | subspecies listed | 2 | 2 |
| Bird | *Melanerpes lewis* | Lewis' Woodpecker | Red | Threatened | 2 | 3 |
| Bird | *Myadestes townsendi* | Townsend's Solitaire | Yellow | Not Listed | 2 | 2 |
| Bird | *Numenius americanus* | Long-billed Curlew | Blue | Special Concern | 2 | 2 |
| Bird | *Patagioenas fasciata* | Band-tailed Pigeon | Blue | Special Concern | 2 | 2 |
| Bird | *Petrochelidon pyrrhonota* | Cliff Swallow | Yellow | Not Listed | 2 | 2 |
| Bird | *Podilymbus podiceps* | Pied-billed Grebe | Yellow | Not Listed | 2 | 2 |
| Bird | *Poecile rufescens* | Chestnut-backed Chickadee | Yellow | Not Listed | 2 | 2 |
| Bird | *Selasphorus rufus* | Rufous Hummingbird | Yellow | Not Listed | 2 | 2 |
| Bird | *Sphyrapicus thyroideus thyroideus* | Williamson's Sapsucker ssp thyroideus | Red | Endangered | 2 | 3 |
| Bird | *Spinus pinus* | Pine Siskin | Yellow | Not Listed | 2 | 2 |
| Bird | *Stelgidopteryx serripennis* | Northern Rough-winged Swallow | Yellow | Not Listed | 2 | 2 |
| Bird | *Strix occidentalis* | Northern Spotted Owl | Red | Endangered | 2 | 3 |
| Bird | *Sturnella neglecta* | Western Meadowlark | Yellow | Not Listed | 2 | 2 |
| Bird | *Tachycineta bicolor* | Tree Swallow | Yellow | Not Listed | 2 | 2 |
| Bird | *Tachycineta thalassina* | Violet-green Swallow | Yellow | Not Listed | 2 | 2 |
| Bird | *Tyto alba* | Barn Owl | Blue | Special Concern | 2 | 2 |
| Bird | *Vireo olivaceus* | Red-eyed Vireo | Yellow | Not Listed | 2 | 2 |
| Bird | *Wilsonia pusilla* | Wilson's Warbler | Yellow | Not Listed | 2 | 2 |
| Bird | *Xanthocephalus xanthocephalus* | Yellow-headed Blackbird | Yellow | Not Listed | 2 | 2 |
| Bird | *Zenaida macroura* | Mourning Dove | Yellow | Not Listed | 2 | 2 |

***Northern Spotted Owls (Strix occidentalis caurina)***

| CDC Red List | CF Priority 2 (Goal 3) | COSEWIC Endangered | SARA 1 |
|---|---|---|---|

The Skagit Watershed provides critical habitat for the red listed Spotted Owl. Much of the watershed is covered by the mature and old forest that Spotted Owls require for breeding success, and the low-elevation valley provides the best genetic link between owls in BC and the larger Washington population. Outside the Skagit Valley, the north-south dispersal of these owls is limited by human development/habitat depletion and high mountain peaks the birds will not cross. The only other link between BC and Washington is along the western foothills of the Cascade Mountains. The leading cause of the Spotted Owl decline is habitat loss and degradation. Competition for nest sites and prey from Barred Owls, which have been expanding their range into Spotted Owl territory for the past half century, is also having a negative impact on the population (Blackburn and Godwin 2004). A recovery strategy for *S. Occidentalis caurina* was completed by MOE and adopted by Environment Canada under SARA in 2006 (Chutter *et al*. 2004).

One of the recovery strategies proposed by Chutter *et al*. (2004) is augmentation through a captive breeding and release program. This program was initiated in 2007. The Skagit Watershed has been identified as one of the preferred release sites for captive bred owls. The most appropriate habitat for Spotted Owls in the Skagit is protected in PPA, with an additional 4,000 ha protected by the Spotted Owl Habitat Plan in 2009. Barred Owls are being removed from the area (I. Blackburn pers comm. 2011).

**Harlequin Ducks (*Histrionicus histrionicus*)**

| CF Priority 1 (Goal 2) |
|---|

The Harlequin Duck has important breeding habitat along various fast moving stretches of the Skagit and Sumallo Rivers (Freeman and Goudie 2004). Freeman and Goudie (2004) conducted a study on this population between 2000 and 2003 and suggest it may be experiencing a decline. Compared to other ducks, this species has relatively low productivity and can be sensitive to disturbance during the breeding season from early spring to late summer (Hammerson and Cannings 1995). The impacts of disturbance can include (Freeman and Goudie 2004):

- breakdown of pair bonds in spring
- disturbing incubation
- disturbing feeding and resting patterns
- separation of ducklings from adults leaving them more vulnerable to predators
- increasing energetically costly behaviours (e.g. flying)

Though not currently popular on the Skagit, rafting and kayaking would cause considerable disturbance to Harlequins. Heavy use of rafts and kayaks has decreased nesting success of Harlequins in other locations, such as Jasper National Park (Hunt 1988, Canadian Heritage 1998). The current location and level of use on the Skagit River Trail does not seem to present a problem to Harlequins so long as dogs are kept leashed and not permitted to disturb ducks and hikers remain on the trail (Freeman and Goudie 2004).

Mammals

As a taxonomic group, mammals cover the spectrum from species with home ranges of a few hundred square metres, never leaving one small area of the watershed, to those who range over many hundred square kilometres and for whom the watershed is only a part of their territory. The Skagit is home, at least part of the time, to prioritized mammals at both ends of the spectrum and a few in between (Table 7). Studies and inventories of mammals generally focus on smaller taxonomic subsets.

**Table 7. Prioritized mammal species with occurrence records in the Skagit Watershed.**

| Taxonomic Group | Scientific Name | Common Name | CDC List | COSEWIC | Highest Priority | Goal(s) Assigned |
|---|---|---|---|---|---|---|
| Mammal | *Aplodontia rufa ssp rainieri** | Mountain Beaver (rainier ssp)* | Blue | Special Concern | 1 | 2 |
| Mammal | *Aplodontia rufa ssp rufa** | Mountain Beaver (rufa ssp)* | Blue | Special Concern | 2 | 2 |
| Mammal | *Canis lupus* | Grey Wolf | Yellow | Not at Risk | 3 | 1 |
| Mammal | *Corynorhinus townsendii* | Townsend's Big-eared Bat | Blue | Not Listed | 2 | 2 |
| Mammal | *Gulo gulo ssp luscus* | Wolverine (luscus ssp) | Blue | Special Concern | 2 | 2 |
| Mammal | *Lasionycteris noctivagans* | Silver-haired Bat | Yellow | Not Listed | 2 | 2 |
| Mammal | *Lasiurus blossevillii* | Western Red Bat | Unknown | Not Listed | 1 | 3 |
| Mammal | *Lasiurus cinereus* | Hoary Bat | Yellow | Not Listed | 2 | 2 |
| Mammal | *Martes americana* | American Marten | Yellow | Not Listed | 2 | 2 |
| Mammal | *Martes pennanti* | Fisher | Blue | Not Listed | 2 | 3 |
| Mammal | *Myotis californicus* | Californian Myotis | Yellow | Not Listed | 2 | 2 |
| Mammal | *Myotis ciliolabrum* | Western Small-footed Myotis | Blue | Not Listed | 3 | 3 |
| Mammal | *Myotis evotis* | Long-eared Myotis | Yellow | Not Listed | 2 | 2 |
| Mammal | *Myotis keenii* | Keen's Long-eared Myotis | Red | Data Deficient | 1 | 1, 3 |
| Mammal | *Neurotrichus gibbsii* | American Shrew Mole | Yellow | Not Listed | 2 | 2 |
| Mammal | *Oreamnos americanus* | Mountain Goat | Yellow | Not Listed | 1 | 2 |
| Mammal | *Sorex trowbridgii* | Trowbridge's Shrew | Blue | Not Listed | 2 | 2 |
| Mammal | *Spilogale gracilis* | Spotted Skunk | Unknown | Not Listed | NA | None |
| Mammal | *Ursus arctos* | Grizzly Bear | Blue | Special Concern | 2 | 2 |

* uncertainty or expected changes regarding taxonomy which may impel review of rankings

**Small Mammals**

Two small mammal surveys have been carried out in the watershed (Merkens 1994, B.C.'s Wild Heritage 2000), but neither was very extensive. Three prioritized species have been recorded and there is potential to find others (see Appendix A). Small mammals form an important link in the food chain, providing a primary food source for a wide variety of larger animals, some of which are also prioritized species.

**Mountain Beaver (*Aplodontia rufa*)**

| CDC Blue List | CF Priority 1 and/or 2 (Goal 2) | COSEWIC Special Concern | SARA 1 |
|---|---|---|---|

Aplodontia have specific habitat requirements, low reproductive rates, and small dispersal distances making them vulnerable to human-caused disturbances. These rodents construct tunnels in damp soil, usually in riparian areas. The interior of the tunnels must remain cool and moist, and forage is needed within 50m of the tunnel entrance (Species at Risk Public Registry 2010). Mountain Beaver home ranges are very small, as they rarely venture far from the entrance to their burrows. There are two subspecies that have been identified, *Aplodontia rufa rufa* and *A. rufa raineri*, though there is some question whether the split is valid (Nagorsen 2005). If there are two subspecies, the Skagit is identified as a zone of overlap, with *A. rufa rufa* to the west and *A. rufa raineri* to the east (Species at Risk Public Registry 2010). Both subspecies are listed as Blue by the CDC, but *A. rufa raineri* is ranked as priority 1 under the CF and *A. rufa rufa* as priority 2. Seven Aplodontia burrows were located in the watershed outside PPA in 2000 and 2001. There are eight records from the watershed within PPA, all but two dating from the 1950s and earlier.

**Bats (CHIROPTERA)**

Twelve of sixteen species in the province are prioritized species, eight of which have been identified in the Skagit Watershed. General life history information is lacking for most species. Several bat studies have been carried out in the Skagit. Firman and Barclay (1994) spent August 1993 trapping and conducting echolocation surveys. Work for a master's thesis was done during the summers of 2000 and 2001 focussing on community structure and habitat use (Luszcz 2004). In 2008 and 2009 mist netting was done in the Skagit as part of a larger study looking at the genetics of the three long-eared *Myotis* species found on the west coast of the province. Low-flying species have been well sampled by the methods used during these studies and a complete species list has likely been identified for the watershed. High-flying species are more difficult to sample and may be missed (Luscz 2004; Firman and Barclay (1994) detected species using echolocation calls that were not captured by mist net or harp trap). Specific information on critical habitat features including roosting, maternity colony and hibernacula sites is needed so that disturbance of these sites can be prevented (Garcia *et al*. 1995, Blood 1998, Cannings and Ramsay 1998, Chatwin 2004). The Little Brown Bat (*Myotis lucifugus*) is not a prioritized species, but a fungal outbreak known as White Nose Syndrome has caused mortality rates of 80-100% in this species in many hibernacula in eastern North America. This disease has been detected in five other species of bats, including the Big Brown Bat (*Eptiscus fuscus*), also found in the Skagit Watershed (Ministry of Environment 2009b). White Nose Syndrome has spread since being discovered in 2006, but there is no evidence of it yet in western North America (USGS 2011).

**Western Red Bat (*Lasiurus blossevillii*)**

| CDC Unknown | CF Priority 1 (Goal 3) |
|---|---|

The CDC lists only two records for this species in BC, one that was collected in the Skagit Valley in 1905 and an echolocation call that was detected along the Okanagan River in 1982 (Ramsay and Cannings 2007). B.C.'s Wild Heritage (2000) reports an observation of a rust coloured bat along the Silver-Skagit Rd in 1999 and the detection of Western Red Bat echolocation calls in the same location later the same season, but does not consider this a confirmed occurrence because no bat was captured for positive identification.

**Carnivores (CARNIVORA)**

Six prioritized Carnivore species were historically found the Skagit Watershed. Fishers have likely been extirpated from the Cascades, but no directed sampling has been done for most of these species. Carnivores typically have low reproductive rates and are slow to recover following population declines. Most of the prioritized Carnivores in the Skagit are known or suspected to have lower than historic population numbers.

**Western Spotted Skunk (*Spilogale gracilis*)**

| CDC Unknown | CF Not Assessed |
|---|---|

Too little is known about this species for ranking by the CDC. Consequently, it has not been assessed under the goals of the Conservation Framework. A remote camera set up in SVPP as part of the North Cascades Wolverine Project photographed a Spotted Skunk in the spring of 2010. Inventory work is planned for this species for the winter of 20011/12 across its known range in BC (A. Teucher pers. comm. 2011).

**Wolverine *luscus* subspecies (*Gulo gulo luscus*)**

| CDC Blue List | CF Priority 2 (Goal 2) | COSEWIC Special Concern |
|---|---|---|

At the time of writing, a cross-border multi-year study of wolverines in the North Cascades is in progress. Trapping was begun on the Washington side of the border in the winter of 2005/06. Researchers in BC joined the study as a collaborative effort in 2008/09. Captured wolverines are fitted with satellite collars to track their movements across the landscape, estimate home ranges and investigate habitat use (Aubrey *et al*. 2010). The results of this study will help to determine areas that are particularly sensitive for wolverines, such as denning sites and movement corridors.

**Grizzly Bear (*Ursus arctos*)**

| CDC Blue List | CF Priority 2 (Goal 2) | COSEWIC Special Concern |
|---|---|---|


The North Cascades Grizzly Bear Population Unit (approximately 9,800 km$^2$), which includes the Skagit River Watershed, is provincially designated as Threatened. This population straddles the border into Washington where the species is listed as Threatened by the U.S. Fish and Wildlife Service and Endangered by the Washington Department of Fish and Wildlife. It is estimated that this population unit could support up to 300 Grizzlies. Interviews of local residents indicate the population may have been low as far back as the 1930s or earlier. Records show that large numbers of bears were killed for their pelts in the area during the mid-1800s (North Cascades Grizzly Bear Recovery Team 2004). The current population and demographic structure of Grizzly Bears within this unit are unknown. A remote camera set up in the Skagit Watershed in ECMPP as part of the North Cascade Wolverine Project captured photographs of a Grizzly in the spring of 2010. This was the first confirmed record of a grizzly in this population unit on either side of the border in many years. Individual males were translocated to the North Cascades in recent decades following human-bear conflicts elsewhere and may explain periodic sightings in the unit. On their own, these bears would not constitute a reproducing population (T. Hamilton pers comm. 2011). Systematic inventory is needed to determine if a viable population of resident Grizzlies (i.e. including females) currently exists in the North Cascades. This population is isolated from other Grizzly populations by natural and human-made barriers (North Cascades Grizzly Bear Recovery Team 2004). Managing motorized vehicle access has been identified as key to the recovery of this species in the North Cascades.

**Mountain Goat (*Oreamnos americanus*)**

| CF Priority 1 (Goal 2) |
|---|

Photo by Cliff Nietvelt

The Mountain Goat is a species that lives in extreme conditions and has slow population growth. The Skagit Watershed population declined significantly following the construction of the Hope-Princeton Highway (Highway 3) in 1948. This was likely due to increased disturbance and the accessibility the roadway gave hunters and poachers. The last open season for goat hunting in the area was 1969-70. The Skagit Watershed population has not recovered since this hunting closure more than forty years ago. Recent surveys have been conducted to confirm historical seasonal ranges and to identify additional seasonal ranges within the Skagit Watershed (Jex 2007, Nietvelt pers comm. 2011). A Mountain Goat winter range plan for the Fraser Timber Supply Area (which includes all Crown Land in the Skagit Watershed outside

PPA) was approved in March 2008. Goat winter ranges within the Fraser TSA are legally designated under the *Forest and Range Practices Act* and are protected from forest harvest activity.

## 4.0 MANAGEMENT CHALLENGES

### 4.1 Invasive Species

The introduction of non-native species to any ecosystem has the potential for serious negative impacts on endemic species and the overall balance of the ecosystem. Once established, invasive species can be very difficult and costly to control and/or remove.

#### *4.1.1 Introduced Aquatic Species*

Ross Lake Reservoir is a popular destination for fishing and power boating. In most cases, the boats used on the reservoir are also used elsewhere in British Columbia and/or Washington. Across North America there have been numerous exotic aquatic species transferred between bodies of water by unknowing boaters. A well documented example of this is the spread of the Zebra Mussel in the Great Lakes region and beyond (Bossenbroek *et al*. 2001). Various fish species are also frequently introduced intentionally. Redside Shiners (*Richardsonius balteatus*) are thought to have been introduced into Ross Lake Reservoir a little over a decade ago (E. Connor pers. comm.) and are now present in high numbers throughout the reservoir. The *Invasive Alien Framework for BC* (C. Rankin & Associates *et al*. 2004) identifies freshwater ecosystems as being particularly vulnerable.

Non-native Bullfrogs (*Lithobates catesbeiana*) and Green Frogs (*Lithobates clamitans*) have been spreading along the west coast and may be causing population declines in many native amphibian species. Neither of these species has yet been reported from the Skagit Watershed.

#### *4.1.2 Invasive Plant Species*

Many alien plant species have become well established in British Columbia. These non-native plants can have serious negative environmental, economic and social impacts. Many invasive plants initially become established in disturbed sites (Invasive Plant Council of BC 2004). Road corridors provide extensive networks of soil disturbance where invasive plants can become established and quickly spread over large distances. Trails can also facilitate the spread of alien species into less disturbed areas, especially when used by horses or other stock that are given feed containing non-native seeds. People and pets may also unknowingly transport seeds on their clothing, fur or vehicles (Invasive Plant Council of BC 2004).

An invasive plant inventory was undertaken for Skagit Valley Provincial Park in 2005 and 2006. 16 invasive plant species were identified in the park, though most were uncommon (Table 8). Most occurrences were along the Silver-Skagit Road and in campground areas, but several species had become established in Chittenden Meadow. This was particularly true where heavy machinery had disturbed the soil as part of a prescribed fire project from 2003-2005 (Ministry of Environment 2006, McIntosh 2006). McIntosh (2006) did not consider SVPP to have a serious invasive plant problem at the time of the survey. Annual invasive plant removal was recommended to prevent the problem from becoming more serious. GPS locations and precise descriptions are reported for the occurrences found during the study. An invasive plant survey of disturbed areas (roadways, parking lots, campgrounds, trails) on the eastern side of ECMPP (outside the Skagit Watershed) was completed in 2004 (Klym 2004). Klym (2004) recommended that a similar survey be carried out for the western part of ECMPP in 2005, but no record of such a survey was located. The survey may not have been carried out or may have taken the form of an invasive plant mapping project that surveyed many of the western ECMPP trails within the Skagit Watershed in 2005 (Wood and Hecht 2005). This study found relatively few occurrences of alien plants. The Invasive Alien Plant Program keeps records of surveys and treatments and has additional records for the Skagit Watershed from the Ministry of Forests and Range and the Fraser Valley Invasive Plant Council.

**Table 8. Invasive Plant Species Identified in SVPP. Adapted from McIntosh (2006).**

| Scientific Name | Common Name | Frequency (2006) | Degree of Threat (2006) |
|---|---|---|---|
| *Arctium minus* | Common Burdock | Common, locally Abundant | High |
| *Cirsium arvense* | Canada Thistle | Uncommon to Common | High |
| *Cirsium vulgare* | Bull Thistle | Uncommon | Low |
| *Hieracium aurantiacum* | Orange Hawkweed | Uncommon | Low |
| *Hypericum perforatum* | St. John's-wort | Uncommon | Medium |
| *Lapsana communis* | Nipplewort | Uncommon | Low |
| *Leucanthemum vulgare* | Oxeye Daisy | Uncommon to Common | Medium to High |
| *Melilotus officinalis* | Yellow Sweet-clover | Uncommon | Low |
| *Plantago major* | Common Plantain | Uncommon | Low |
| *Rumex crispus* | Curled Dock | Uncommon | Low |
| *Sonchus arvensis* | Perennial Sow Thistle | Uncommon | Low |
| *Tanacetum vulgare* | Common Tansy | Uncommon | Low |
| *Tragopogon dubius* | Yellow Salsify | Uncommon | Low |
| *Trifolium pratense* | Red Clover | Uncommon | Low |
| *Verbascum thapsus* | Great Mullein | Uncommon | Low |

### 4.2 Access

Management concerns related to access have implications for a wide range of wildlife. The types of access available in parts of the Skagit Watershed include road vehicles, all terrain vehicles (ATVs), boats, mountain bikes, snowmobiles, equestrian and pedestrian. Road access has the greatest impact on an area, fragmenting habitat, acting as a barrier to some species, creating disturbed corridors for the spread of exotic plants, insects, diseases, and other species,

causing stream sedimentation and facilitating human disturbances and impacts including off-road vehicle use, poaching, and vehicle-related wildlife deaths. While the impact of trails is less significant, soil compaction and erosion, disturbance of refugia and reduced habitat effectiveness are among the negative effects that trail access can have on some wildlife species (Hamilton and Wilson 2001).

The Silver-Skagit Road provides vehicle access to the southwestern part of the Skagit Watershed in BC, including Skagit Valley Provincial Park. The road is currently maintained as a graded gravel road. MOT was approached by MOE in 2010 about maintenance practices along the road within SVPP including over-grading along the road edges where gravel was being pushed into the trees and inappropriate culvert and channel maintenance practices. Grading has been kept within the road right-of-way, but MOT was willing to work with MOE to alleviate concerns about habitat disruption. Highway 3 enters the northwest corner of the watershed, passes the Sunshine Valley community and bisects E.C. Manning Provincial Park. There is no provincial road access to Cascade Recreation Area. Access roads for resource extraction extend from the Silver-Skagit Road and Hwy 3 in areas of Crown Land and reach the northern edge of Cascade Recreation Area (outside of the Skagit Watershed).

Funding provided by SEEC and labour provided by the Student Conservation Association have allowed for the construction of the Nepopekum Trail and reopening of the Galene Lakes Trail in SVPP in recent years. Several additional trails have been proposed for SEEC funding within the PPA, including an additional linking trail between SVPP and ECMPP.

### 4.3 Water Quality

Highway 3 runs along the Sumallo River and upper reaches of the Skagit River. Motor vehicle accidents along this stretch of highway result in the release of harmful fluids onto the road and the scattering of wreckage which may enter the adjacent waterways. The Sumallo River may also receive contaminants from the community of Sunshine Valley, including run-off from roads and lawns. Mining-related activities in the Silverdaisy area have the potential of introducing various contaminants to the Skagit system. Pollutants may contaminate the plant and invertebrate food sources of fish, ducks, and other wildlife. Contaminants that are stored in fat tissues experience bioaccumulation and biomagnification higher in the food chain.

Baseline water quality testing was carried out in the Skagit Watershed by Limnotek in 2007 and 2008 using the Reference Condition Approach (Perrin and Bennett 2010). The majority of streams sampled were found to be in pristine condition. Only six test sites showed any divergence from the reference samples and only three of these were considered to be more than slightly divergent. Silverdaisy Creek at its confluence with the Skagit River showed high metals concentrations, particularly Cadmium, which was hypothesized to be the result of drainage

from a nearby abandoned mine adit. No potential causes were indicated for the other two significantly divergent samples. Slight divergences were detected at a site downstream from the Sunshine Valley community, a site where cattle grazing occurs in CRA, and a site below Silverdaisy Mountain. No effects were detected from the Giant Copper mine site.

The Hope Mounain Centre for Outdoor Learning, a non-profit organization based in Hope, BC, has taken on the task of continuing with water quality monitoring based on the methods used by Limnotek. Results are entered into Environment Canada's Canadian Aquatic Biomonitoring Network (CABIN) database.

## 5.0 MANAGEMENT STRATEGIES

Prioritized species with Skagit-specific concerns or management strategies, or for which specific provincial strategies or concerns could be addressed in the Skagit, have been identified and actions suggested to address each concern (Table 9). Conservation Framework action binning was used to help direct the proposed management strategies. Actions have been given an importance ranking of: high, moderately high, moderate, moderately low, low, standard practice or future consideration. This ranking is based on a number of factors including:

- the value of the outcome to aid in management,
- threat level,
- the number of species that will be addressed,
- the resources that are required,
- related work that has already been completed or is in progress, and
- opportunities to collaborate or form partnerships with other organizations

Further criteria that can be used for subranking within the importance rankings include economic benefits (e.g. the impact of fish management on angler-days), refined local-scale threat analyses, and cost threshold (i.e. the minimum amount of funding for which it remains worthwhile to carry out a project). Opportunities for partnerships and collaborations, directed funding, and other opportunities to augment resources should be taken into consideration when they arise and may raise the priority ranking of a particular strategy in order to maximize efficiencies.

**Clarification of Importance Rankings**

High through Low rankings – descending order of importance

Standard Practice – a reminder of strategies that should always be followed in the appropriate circumstances; should already be part of normal operations

Future Consideration – a strategy that has been identified to respond to a given set of circumstances; these circumstances do not currently exist, but the potential for them to occur has been recognized; no action is suggested unless the identified circumstances occur

**Clarification of Table 9 Headings**

Category – strategies are grouped by type under the headings of inventory/monitoring, habitat, species management, taxonomy or other

ID – this is for ease of identification only; it does not imply importance

What – a brief statement of the action to be taken

Who – entity who would carry out the bulk of the work

When – appropriate time of year, more specific information if known (e.g. some projects may be multi-year or already have planning for specific years)

Follow-up Monitoring – should this project have follow-up work done at intervals after its conclusion?

Why – reasons the work needs to be done – these reasons support the importance ranking

CF Action Bins – indicates what CF Action Bins identified for the species in question or for species within the taxa in question that the strategy addresses

Number of Species – the first number indicates the number of species and the number in brackets the CF priority. E.g. 2(1), 4(3) would mean two priority 1 species and four priority 3 species are addressed by the strategy. Black numbers are species confirmed to be in the watershed; blue numbers are species that may potentially be in the watershed. UTD = unable to determine, NA = Not Assessed

Resources – a list of the resources that will be needed to complete the strategy, usually some combination of funding and staff time. A very general estimation of quantifying resources is made where very significant > significant > (no qualifier) > minor > minimal.

## Table 9. Management Strategies Ranked by Importance

**IMPORTANCE RANK – HIGH**

| Category | ID | What | Who | When | Follow-up Monitoring | Why | CF Action Bins | Number of Species | Resources |
|---|---|---|---|---|---|---|---|---|---|
| Inventory/ Monitoring | **A** | Conduct comprehensive plant surveys | Consultant | Spring and Summer | Yes | Knowledge gaps, Many species, Baseline data for climate change, Management planning | Inventory, Monitor Trends, Habitat Protection, Habitat Restoration | 12(2), 20(3), 6(1), 64(2), 54(3) | Significant funding, Minor amount of staff time |
| | A1 | prioritized vascular plants | | | Yes | | | | |
| | A2 | prioritized non-vascular plants | | | Yes | | | | |
| | A3 | non-native/invasive species | | | Yes | Compete with native plants, Negatively impact other taxa by replacing native species used for food, shelter, etc., Early detection and removal reduces resources required for successful eradication | | | |
| | **B** | Complete Invertebrate surveys | Consultant | Spring and Summer for three years | Yes | Knowledge gaps, Many species, Baseline data for climate change, Sensitive to small habitat changes, Management planning | Inventory, Monitor Trends, Habitat Protection, Habitat Restoration, Species Management | 1(1), 3(2), 1(3), 1(UTD) 1(1), 10(2), 1(3) | Funding, Minor amount of staff time |
| | B1 | prioritized butterflies, including larval host plants | | | Yes | | | | |
| | B2 | western bumblebee, robber flies, prioritized odonates | | | Yes | | | | |
| | B3 | mollusc surveys – gastropod and bivalve | | | Yes | | | | |
| | **C** | Conduct systematic reptile and amphibian surveys | Consultant and/or MNRO Staff | Spring and Summer | Yes | Knowledge gaps, Multiple species, Bioindicators, Baseline data for climate change, High percentage of prioritized species in taxon, Management planning | Monitor Trends, Habitat Protection, Habitat Restoration, Species Management | 3(1), 3(2), 2(3), 2(1), 1(3) | Significant funding, Staff time TBD |
| | C1 | Pond breeding | | | Yes | | | | |
| | C2 | Stream-dwelling | | | Yes | | | | |
| | C3 | Terrestrial | | | Yes | | | | |
| | C4 | Monitor for presence of introduced Bull and Green Frogs | | | Yes | Invasive species that negatively impact native herpetofauna | | | |
| | **D** | Complete comprehensive bird surveys | | | Yes | Knowledge gaps, Many species, Bioindicators, Baseline data for climate change, Large number of prioritized species in taxon, Management planning | Monitor Trends, Habitat Protection, Habitat Restoration, Species Management | 6(1), 52(2), 3(3), 1(NA), 2(1), 17(2), 3(3) | |
| | D1 | Establish a relationship with BC Federation of Naturalists and HMCOL for sharing records from ECMPP bird blitzes; encourage/assist in establishing blitz in SVPP | MNRO Staff | Any time/ongoing | | Save resources through partnerships and collaboration | | | Minimal staff time |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | D2 | Breeding surveys for areas not covered during blitz; possibly resurvey blitz areas to RISC standards | Consultant or MNRO Staff | Spring and Summer | Yes | | | Funding, Staff time |
| | **E** | Complete multi-year cross-border Wolverine tracking project | MNRO Staff and Assistants | Winter 2011/12 | | Knowledge gaps, Project partially completed, Collaboration with partner organizations, Landscape-level species, Baseline data for climate change | Monitor Trends, Habitat Protection, Habitat Restoration | 1(2) | Funding, Significant staff time, Equipment use |
| | **F** | Conduct systematic inventory and genetic work on Grizzlies | MNRO Staff, Consultant, Partners | Multi-year project 2011-2013 | Maybe | Knowledge gaps, Collaboration with partner organizations, Keystone species, Landscape-level species, Management planning | Monitor Trends, Habitat Protection, Habitat Restoration, Species Management | 1(2) Keystone sp. | Significant funding, Significant staff time |
| | **G** | Continue to monitor fish populations and angler activity the Skagit River, its tributaries and Ross Reservoir | Consultant, MNRO Staff | Summer | Yes | Ross Reservoir has a limited retention fishery, Affects of introduced Redside Shiners unknown, River populations have shown large changes, Monitoring program plans in place, Management planning | Monitor Trends, Species Management | 2(2) | Significant funding, Minor amount of staff time |
| | G1 | Complete final year of 3-year snorkel survey program | | 2011 | | Project partially completed | | | |
| | G2 | Conduct Ross Lake angler survey in partnership with NPS | | 2011 | | Project plans in place, Save resources through partnerships and collaboration | | | |
| | G3 | Conduct Skagit River angler survey in partnership with BC Parks | | 2011 | | Project plans in place, Save resources through partnerships and collaboration | | | |
| | G4 | Conduct Rainbow Trout and char biological sampling | | 2015 | | | | | |
| | G5 | Complete first year of 3-year snorkel survey program | | 2015 | | | | | |
| | G6 | Complete second year of 3-year snorkel survey program | | 2016 | | | | | |
| | G7 | Complete Skagit River and Ross Reservoir angler surveys | | 2016 | | | | | |
| | G8 | Complete third year of 3-year snorkel survey program | | 2017 | | | | | |
| Habitat | **H** | Complete Terrestrial Ecosystem Mapping (TEM) for SVPP | Consultant | Could be multi-year | No | Multitude of uses – assist with project and management planning, Has been completed for the watershed outside of SVPP, Baseline data for climate change | Habitat protection | | Very significant funding, Minor amount of staff time |
| | **I** | Continue to work with MOT to improve maintenance practices on the Silver-Skagit Road | PPA Staff | Ongoing during road maintenance season | Yes | Side-casting gravel along road has buried native plants and created habitat for invasives, Inappropriate culvert and channel maintenance has impacted riparian areas | Habitat Protection, Habitat Restoration | | Minor amount of staff time |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **J** | Establish a relationship with HMCOL for sharing information regarding water quality monitoring | MNRO Staff | Any time/ongoing | | Save resources through partnerships and collaboration | Habitat Protection, Habitat Restoration | | Minor amount of staff time |
| Species Management | **K** | Monitor results of Whitebark Pine augmentation experiment | Consultant and/or Staff | Annually for first 5 years then biannually | Yes | Project partially completed, Keystone species | Species Management | 1(3) Keystone sp. | Minor amount of funding, Staff time |
| | **L** | Prepare Skagit as a release site for captive bred Spotted Owls | MNRO Staff, Consultant/ Assistants | Multi-year project | | Captive breeding program has begun, Skagit has large amount of protected appropriate habitat, Large amount of resources have been invested in recovering this species | Species Management | 1(2) | |
| | L1 | Construct a breeding/release facility for Spotted Owls | MNRO Staff, Consultant/ Assistants | | No | | | | Very Significant Funding, Very significant staff time, Equipment use |
| | L2 | Continue to monitor wild Spotted Owl and Barred Owl populations; Barred Owl removal | Consultant/ Assistants | | Yes | Presence of Barred Owls negatively impacts Spotted Owl recovery | | | Funding, Staff time, Equipment use |
| | **M** | Prevent, detect and respond to the introduction of invasive aquatic species | | | | Potential for significant negative impacts to native species and ecosystem, Once established alien species very difficult to eradicate | Habitat Protection, Habitat Restoration | | |
| | M1 | Post signage reminding boaters to thoroughly clean their boats and motors when moving between bodies of water | PPA Staff | ASAP | No | Boats used on Ross Lake frequently used on other bodies of water | | | Minimal funding, Minimal Staff time |
| | M2 | Post signage stating regulations prohibiting use of live bait and transport/release of live fish between bodies of water | PPA Staff | ASAP | No | Redside Shiners likely introduced intentionally or accidently, Problem activities seen elsewhere | | | Minimal funding, Minimal Staff time |
| | M3 | Develop monitoring and response protocol in collaboration with US agencies | MNRO Staff and Partners | ASAP | | Ross Reservoir straddles international border | | | Significant staff time |
| | M4 | If a practical design can be developed, install a washing station for boats and motors near the Ross Lake boat launch | Contractor | Summer | No | | | | Funding |
| | **N** | Implement the recommendations made in *Invasive Plant Species Inventory for the Skagit Valley Provincial Park* (McIntosh 2006) | Volunteers, PPA Staff | Summer | Yes | Invasive plants compete with native plants, Negatively impact other taxa by replacing native species used for food, shelter, etc., Detection has been completed – delayed treatment decreases accuracy of information and increases the resources required for successful eradication | Habitat Protection, Habitat Restoration | | Funding, Staff time |

**IMPORTANCE RANK – MODERATELY HIGH**

| Category | ID | What | Who | When | Follow-up Monitoring | Why | CF Action Bins | Number of Species | Resources |
|---|---|---|---|---|---|---|---|---|---|
| Inventory/ Monitoring | **O** | Complete migratory bird surveys | Consultant or MNRO Staff | Early Spring and Fall | Yes | Few north-south oriented fly-ways like Skagit, Migration is a vulnerable time, Many species | Monitor Trends, Habitat Protection | ? | Funding, Minor amount of staff time |
| | **P** | Initiate long-term Harlequin Duck monitoring project | MNRO Staff, CWS | Late April/ Early May (~May 1), annually | Yes | Previous study indicated this population may be declining, High priority species, Sensitive to disturbance, Management planning | Monitor Trends | 1(1) | Minimal funding, Minor amount of staff time |
| | **Q** | Conduct comprehensive small mammals surveys | Consultant | Summer | Yes | Knowledge gaps, Multiple species, Important link in food chain | Inventory, Monitor Trends, Habitat Protection, Habitat Restoration | 1(1), 2(2), 4(1) | Funding, Minor amount of staff time |
| | Q1 | Conduct Mountain Beaver surveys | Consultant or MNRO Staff | Summer | Yes | Many records historic, Very restricted range in BC – Skagit has significant area of protected habitat, High priority species, Specialized habitat requirements | | 1(1) | Funding, Staff time |
| | **R** | Monitor Mountain Goat seasonal ranges | MNRO Staff | Following established protocols | Yes | This populations has not recovered from a decline in the 1950s and 1960s, Good baseline data exists, High priority species, Sensitive to disturbance | Monitor Trends, Habitat Protection, Habitat Restoration | 1(1) | Funding for helicopter time, Minor amount of staff time |
| | **S** | Conduct Spotted Skunk Survey (part of geographically larger project) | Staff (Victoria) | Winter 2011/12 | | Provincial status unknown, Detected in Skagit in 2010, Inventory project proposed (across known range in BC) | Inventory | 1(NA) | Funding, Staff time |
| | **T** | Survey for Western Red Bat and other high flying bats | Consultant | Summer | Yes | Provincial status and distribution of Western Red Bat is unknown, High flying species not targeted by previous surveys | Inventory | 1(1) | Funding, Minor amount of staff time |
| | **U** | Initiate long-term cross-border monitoring of Carnivores | Interagency staff from BC and WA | Near Future (2-3 years) | Yes | Multiple species, Save resources through partnerships and collaboration, Landscape-level species, Keystone species, Management planning | Monitor Trends, Habitat Protection, Habitat Restoration, Species Management | 3(2) | Funding, Staff time |
| Habitat | **V** | Conduct research on habitat requirements for prioritized bat species, particularly roosting and maternal colony sites | Consultant | Summer | | Knowledge gaps, Identify critical habitat for protection, Multiple species | Habitat Protection | 2(1), 5(2), 1(3) | Significant funding |

## IMPORTANCE RANK – MODERATE

| Category | ID | What | Who | When | Follow-up Monitoring | Why | CF Action Bins | Number of Species | Resources |
|---|---|---|---|---|---|---|---|---|---|
| Habitat | **W** | Conduct/support study investigating the ecology of Cliff Paintbrush and condition of occurrences | Possible university partnership | Summer | No | Knowledge gaps, Identify critical habitat for protection, Predict new occurrence locations | Habitat Protection | 1(3) | Significant funding, Staff time TBD |
| | **X** | Conduct/support study investigating the ecology of Western Hawksbeard *conjuncta* subspecies | Possible university partnership | Summer | No | Knowledge gaps, Identify critical habitat for protection, Predict new occurrence locations | Inventory | 1(2) | Funding, Staff time TBD |
| | **Y** | Identify Rubber Boa hibernacula | Consultant | Summer and Fall | No | Identify critical habitat feature | Habitat Protection, Species Management | 1(1) | Significant funding, Minor amount of staff time |
| Species Management | **Z** | Communicate with American biologists regarding investigations into the ecology of Redside Shiners and their effect on aquatic community in Ross Reservoir | MNRO Staff | As opportunity arises – interagency meetings, etc. | | Cooperation with partner organizations | Habitat Restoration, Species Management | | Minimal staff time |
| | **AA** | Prevent disturbance of Harlequin Duck families | PPA Staff | Spring and Summer | No | Sensitive to disturbance (esp. By dogs off- leash) | | 1(1) | Staff time |
| | AA1 | Enforce dog-on-leash rule along Skagit River Trail | | | | | | | |
| | AA2 | Post signs marking the boundaries of the Skagit River Cottonwoods Ecological Reserve with No Fishing signs along the river | | | | | | | |
| | AA3 | Encourage hikers to remain on trail | | | | | | | |
| Other | **BB** | Discourage MOT from paving the Silver-Skagit Road | Staff | As need/ opportunity arises | | Increase in traffic and speed – animal-vehicle collisions, Increased recreational pressures | Habitat protection | | Minimal staff time |

## IMPORTANCE RANK – MODERATELY LOW

| Category | ID | What | Who | When | Follow-up Monitoring | Why | CF Action Bins | Number of Species | Resources |
|---|---|---|---|---|---|---|---|---|---|
| Habitat | **CC** | Conduct/support research investigating limiting habitat features for Rubber Boas | Possible university partnership | Summer, possibly multi-year | No | Knowledge gaps, Identify important habitat features | Habitat Protection, Habitat Restoration, Species Management | 1(1) | Funding, Staff time |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Taxonomy | **DD** | Support genetic work to validate split between Mountain Beaver subspecies | Consultant | | No | Subspecies overlap in the Skagit (if split is valid) | Taxonomy | 1(1) | Funding, Minor amount of staff time |

## IMPORTANCE RANK – LOW

| Category | ID | What | Who | When | Follow-up Monitoring | Why | CF Action Bins | Number of Species | Resources |
|---|---|---|---|---|---|---|---|---|---|
| Inventory/ Monitoring | **EE** | Complete winter bird surveys | Consultant or MNRO Staff | Winter | Maybe | Knowledge gaps, Multiple Species, Difficult access, High cost, Less critical season (non-breeding) | Monitor Trends, Habitat Protection | ? | Very significant funding (difficult access), Minor amount of staff time |
| Taxonomy | **FF** | Support the publishing of a peer-reviewed paper naming and describing the Skagit subspecies of the Propertius Duskywing | Consultant | | No | May raise provincial and COSEWIC rankings | | 1(2) | Minor amount of funding, Minimal Staff time |

## IMPORTANCE RANK – STANDARD PRACTICE

| Category | ID | What | Who | When | Follow-up Monitoring | Why | CF Action Bins | Number of Species | Resources |
|---|---|---|---|---|---|---|---|---|---|
| Other | **GG** | Plan new park infrastructure to avoid wildlife trees, prioritized species and ecosystems, and sensitive habitat features | PPA Staff | As need arises | No | Habitat damage, Decreased habitat effectiveness, Damage/death of prioritized species | Habitat Protection | | Staff time |

## IMPORTANCE RANK – FUTURE CONSIDERATION

| Category | ID | What | Who | When | Follow-up Monitoring | Why | CF Action Bins | Number of Species | Resources |
|---|---|---|---|---|---|---|---|---|---|
| Habitat | **HH** | Artificially create wildlife trees | Contractor | As need arises | No | Important habitat for many species, Removed as hazard trees around campgrounds and structures | Habitat Restoration | ? | Funding, Minor amount of staff time |
| Species Management | **II** | Modify regulations regarding fishing and/or kayaking/rafting if disturbance to Harlequin families increases due to these activities prior to mid-July | MNRO Staff, PPA Staff | As need arises | | These activities have been linked to Harlequins abandoning breeding sites in other locations | | 1(1) | Staff time |

# 6.0 LOOKING TO THE FUTURE

## 6.1 Plan Review

New information that may improve management practices is continually being gathered. New management challenges are also regularly brought to light. The Upper Skagit Watershed Ecosystem Management Plan should be reviewed on a five year cycle to ensure that new information and concerns are incorporated, completed initiatives are removed and changing priorities are reflected. SEEC also works on a five-year funding cycle.

## 6.2 New/Increasing Pressures on the Skagit Watershed

There will undoubtedly be future changes to the Skagit Watershed and surrounding areas that will impact ecosystem management strategies. There are currently two obvious and important trends whose impacts should be closely monitored:

### *6.2.1 Increasing Human Population of the GVRD and FVRD*

The Lower Mainland area of British Columbia is experiencing rapid population growth. The current population of Metro Vancouver is estimated to be 2.4 million (BC Stats 2011), with a projected increase to 3.4 million by 2041 (Metro Vancouver 2009). The Fraser Valley Regional District has a current population estimated at 238, 000 (FVRD 2008) which is expected to double in the next twenty years (Urban Futures 2005). The proximity of the Skagit Watershed to this growing concentration of people is likely to result in increased recreational use of the watershed and an interest in expanding housing and commercial opportunities in Sunshine Valley and possibly elsewhere. Traffic volume on Highway 3 (and to a lesser extent on the Silver-Skagit Road) can also be expected to grow, increasing the probability of vehicular crashes, chemical runoff into waterways, and collisions with wildlife. Increased human presence in the watershed will undoubtedly increase the pressures faced by the ecosystem and species living within, including habitat loss and alteration, disturbance, and barriers to dispersal. These heightened pressures can be expected to compound management concerns, especially for sensitive species. Revisions of this plan will need to address managing for changes that have occurred due to increased human use of the watershed.

### *6.2.2 Climate Change*

The impacts of climate change on the Skagit Watershed will present a significant challenge for ecosystem management. While many consequences of climate change can be predicted in a general sense, the exact timing and manifestation of these effects are impossible to determine at this time. Shrinking glaciers, changes in snow pack and melt timing and changes in precipitation patterns are likely to cause lowered/variable stream flows and warmer water temperatures during summer months. These changes will have serious consequences for fish and amphibian species, especially species dependent on cold rivers like Bull Trout and on small, cold streams like Coastal Tailed Frogs. Other changes that are likely to occur include changes in vegetation zones, especially along altitudinal and latitudinal gradients; changing moisture levels; differences in wildfire intervals and intensity; and changes in species ranges and distribution. The impacts these changes will have on low-level trophic species like plants and invertebrates may have consequences that will be felt along the entire food chain. Flexible management strategies will be required to address changing conditions. Future revisions of this plan will need to address climate change concerns with the best available science of the time.

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# APPENDICES

# APPENDIX A
## Potential & Confirmed Species Occurring Within the Skagit Watershed

*Refer to Section 3 for more information on the criteria used to compile this list.*

**Confidence Level**
Confirmed = record from Skagit Watershed, individual source databases have caveats on the status, or confidence of the record.
Potential 1 = highly likely
Potential 2 = possible
Potential 3 = possible, but not as strongly correlated due to distribution or habitat requirements (e.g. species range more strongly associated with interior habitats).

**Location**
SVPP = Skagit Valley Provincial Park
ECMPP = E.C. Manning Provincial Park
CRA = Cascade Recreation Area
OPPA = Outside of Parks and Protected Areas

### *Confirmed With Spatial Reference:*

| Taxonomic Group | Scientific_Name | Common_Name | Confidence_Level | Source | Location | Description | W_Long | N_Lat |
|---|---|---|---|---|---|---|---|---|
| Invertebrate – Butterfly | *Chlosyne hoffmanni* | Hoffman's Checkerspot | confirmed | Knopp and Larkin (2007) | ECMPP | Skyline Trail area | 654658 | 5435173 |
| Invertebrate – Butterfly | *Chlosyne hoffmanni* | Hoffman's Checkerspot | confirmed | Knopp and Larkin (2007) | ECMPP | Skyline Trail area | 654600 | 5437032 |
| Invertebrate – Butterfly | *Chlosyne hoffmanni* | Hoffman's Checkerspot | confirmed | Knopp and Larkin (2007) | ECMPP | Gibson Pass ski hill area | 650901 | 5438780 |
| Invertebrate – Butterfly | *Chlosyne hoffmanni* | Hoffman's Checkerspot | confirmed | Knopp and Larkin (2007) | ECMPP | along Highway #3 | 652675 | 5446523 |
| Invertebrate – Butterfly | *Chlosyne hoffmanni* | Hoffman's Checkerspot | confirmed | Knopp and Larkin (2007) | ECMPP | Gibson Pass ski hill parking lot | 652337 | 5437220 |
| Invertebrate – Butterfly | *Erynnis propertius** | Propertius Duskywing* | confirmed | map | SVPP | Ross Lake Ecological Reserve | 641605 | 5430000 |
| Invertebrate – Butterfly | *Erynnis propertius** | Propertius Duskywing* | confirmed | CDC [in B.C.'s Wild Heritage (2000)] | SVPP | Ross Lake | 641605 | 5430000 |
| Invertebrate – Butterfly | *Erynnis propertius** | Propertius Duskywing* | confirmed | B.C.'s Wild Heritage (2000) | SVPP | Whitworth Meadows | 640600 | 5434000 |
| Invertebrate – Butterfly | *Erynnis propertius** | Propertius Duskywing* | confirmed | B.C.'s Wild Heritage (2000) | SVPP | Whitworth Meadows | 641250 | 5433750 |
| Invertebrate – Butterfly | *Erynnis propertius** | Propertius Duskywing* | confirmed | B.C.'s Wild Heritage (2000) | SVPP | Whitworth Meadows | 641250 | 5433750 |
| Invertebrate – Butterfly | *Erynnis propertius** | Propertius Duskywing* | confirmed | B.C.'s Wild Heritage (2000) | SVPP | Chittenden Meadows | 641250 | 5431200 |
| Invertebrate – Butterfly | *Erynnis propertius** | Propertius Duskywing* | confirmed | B.C.'s Wild Heritage (2000) | SVPP | Whitworth Meadows near entrance by road | 641250 | 5433750 |
| Invertebrate – Butterfly | *Erynnis propertius** | Propertius Duskywing* | confirmed | B.C.'s Wild Heritage (2000) | SVPP | Whitworth Meadows | 641250 | 5433750 |
| Invertebrate – Butterfly | *Oeneis nevadensis** | Great Arctic* | confirmed | Knopp and Larkin (2007) | SVPP | | 614090 | 5465869 |
| Invertebrate – Butterfly | *Oeneis nevadensis** | Great Arctic* | confirmed | Knopp and Larkin (2007) | SVPP | | 627000 | 5443000 |
| Invertebrate – Butterfly | *Oeneis nevadensis** | Great Arctic* | confirmed | Knopp and Larkin (2007) | SVPP | | 627514 | 5443910 |
| Invertebrate – Butterfly | *Oeneis nevadensis** | Great Arctic* | confirmed | Knopp and Larkin (2007) | SVPP | | 612740 | 5443700 |
| Invertebrate – Butterfly | *Oeneis nevadensis** | Great Arctic* | confirmed | Knopp and Larkin (2007) | SVPP | | 614203 | 5431178 |
| Invertebrate – Butterfly | *Papilio indra* | Indra Swallowtail | confirmed | Knopp and Larkin (2007) | ECMPP | summit of Frosty Mountain | 652241 | 5437209 |
| Invertebrate – Butterfly | *Papilio indra* | Indra Swallowtail | confirmed | Knopp and Larkin (2007) | ECMPP | summit of Frosty Mountain | 658132 | 5430908 |
| Invertebrate – Butterfly | *Papilio indra* | Indra Swallowtail | confirmed | Knopp and Larkin (2007) | ECMPP | summit of Frosty Mountain | 658503 | 5430942 |
| Invertebrate – Butterfly | *Papilio indra* | Indra Swallowtail | confirmed | Knopp and Larkin (2007) | ECMPP | summit of Frosty Mountain | 658132 | 5430908 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Invertebrate – Butterfly | *Polites sonora* | Sonora Skipper | confirmed | Knopp and Larkin (2007) | CRA | near Marmot City Horse Camp | 658162 | 5460734 |
| Vascular Plant – Dicot | *Castilleja rupicola* | Cliff Paintbrush | confirmed | CDC | SVPP, OPPA | Finlayson Peak | 630540 | 5437049 |
| Vascular Plant – Dicot | *Castilleja rupicola* | Cliff Paintbrush | confirmed | CDC | SVPP, OPPA | Marmot Mountain | 636612 | 5451044 |
| Vascular Plant – Dicot | *Castilleja rupicola* | Cliff Paintbrush | confirmed | CDC | SVPP, OPPA | Mount Bryce | 640801 | 5445496 |
| Vascular Plant – Dicot | *Dicentra uniflora* | Steer's Head | confirmed | CDC | SVPP | Ross Lake Ecological Reserve | 642505 | 5429901 |
| Vascular Plant – Dicot | *Elmera racemosa* var. | Elmera | confirmed | map, CDC | SVPP | Finlayson Peak | 630141 | 5436260 |
| Vascular Plant – Dicot | *Elmera racemosa* var. | Elmera | confirmed | map, CDC | SVPP | Whitworth Peak, SE slopes | 630456 | 5437520 |
| Vascular Plant – Dicot | *Mitella caulescens* | Leafy Mitrewort | confirmed | B.C.'s Wild Heritage (2000) | SVPP | upstream of 26 Mile Bridge | 633604 | 5443600 |
| Vascular Plant – Dicot | *Mitella caulescens* | Leafy Mitrewort | confirmed | B.C.'s Wild Heritage (2000) | SVPP | near Silvertip Campground | 634340 | 5444999 |
| Vascular Plant – Dicot | *Mitella caulescens* | Leafy Mitrewort | confirmed | B.C.'s Wild Heritage (2000) | SVPP | Skagit River Trail | 633250 | 5443600 |
| Vascular Plant – Dicot | *Mitella caulescens* | Leafy Mitrewort | confirmed | B.C.'s Wild Heritage (2000) | SVPP | Skagit River Trail | 633770 | 5443219 |
| Vascular Plant – Dicot | *Mitella caulescens* | Leafy Mitrewort | confirmed | B.C.'s Wild Heritage (2000) | SVPP | Skagit River Trail near Manning | 640201 | 5451485 |
| Vascular Plant – Dicot | *Mitella caulescens* | Leafy Mitrewort | confirmed | B.C.'s Wild Heritage (2000) | SVPP | Skagit River Trail near Manning | 640378 | 5451017 |
| Vascular Plant – Dicot | *Mitella caulescens* | Leafy Mitrewort | confirmed | B.C.'s Wild Heritage (2000) | SVPP | along Silver-Skagit Road | 634111 | 5442290 |
| Vascular Plant – Dicot | *Anemone drummondii* var. | Alpine Anemone *drummondii* | confirmed | E-Flora BC, CDC | ECMPP, SVPP | Frosty Mountain | 658404 | 5431600 |
| Vascular Plant – Dicot | *Callitriche heterophylla* | Two-edged Water Starwort | potential 1 | map, E-Flora BC | ECMPP | Forth Brother Mountain, SW of | 659106 | 5450101 |
| Vascular Plant – Dicot | *Castilleja rupicola* | Cliff Paintbrush | confirmed | CDC | OPPA | Mount Rideout | 628203 | 5447114 |
| Vascular Plant – Dicot | *Castilleja rupicola* | Cliff Paintbrush | confirmed | CDC | OPPA | Klesilkwa Mountain | 620869 | 5439580 |
| Vascular Plant – Dicot | *Castilleja rupicola* | Cliff Paintbrush | confirmed | CDC | OPPA | Thompson Peak | 624346 | 5434607 |
| Vascular Plant – Dicot | *Castilleja rupicola* | Cliff Paintbrush | confirmed | CDC | OPPA | Mount Outram | 634554 | 5460325 |
| Vascular Plant – Dicot | *Crepis occidentalis conjuncta* | Western Hawksbeard | confirmed | map | ECMPP | Centennial Trail | 653095 | 5434541 |
| Vascular Plant – Dicot | *Epilobium glaberrimum* | Smooth Willowherb | confirmed | CDC, E-Flora BC, map | ECMPP, SVPP | Lightning Lake, SW end | 657104 | 5434700 |
| Vascular Plant – Dicot | *Epilobium glaberrimum* | Smooth Willowherb | confirmed | CDC, E-Flora BC, map | ECMPP, SVPP | Strike Lake | 654379 | 5433528 |
| Vascular Plant – Dicot | *Epilobium glaberrimum* | Smooth Willowherb | confirmed | CDC, E-Flora BC, map | ECMPP, SVPP | Gibson Pass | 653069 | 5437046 |
| Vascular Plant – Dicot | *Lomatium brandegeei* | Bradegee's Lomatium | confirmed | CDC, E-Flora BC | ECMPP | Allison Pass | 655256 | 5442716 |
| Vascular Plant – Dicot | *Mitella caulescens* | Leafy Mitrewort | confirmed | CDC, E-Flora BC | SVPP | Skagit River/Marmotte Creek | 633623 | 5443598 |
| Vascular Plant – Dicot | *Scrophularia lanceolata* | Lance-leaved Figwort | confirmed | map | ECMPP | Skagit Bluffs | 641558 | 5454728 |
| Vascular Plant – Dicot | *Viola purpurea* var. *venosa* | Purple-marked Yellow Violet | confirmed | E-Flora BC | SVPP, ECMPP | Flash Lake, N of | 656104 | 5435100 |
| Vascular Plant – Monocot | *Eleocharis nitida* | Neat Spike Rush | confirmed | E-Flora BC | SVPP | Silvertip Mtn, SW slope | 629021 | 5446009 |
| Vertebrate – Amphibian | *Ascaphus truei* | Pacific Tailed Frog | confirmed | B.C.'s Wild Heritage (2000) | SVPP | International Creek | 639260 | 5429150 |
| Vertebrate – Amphibian | *Ascaphus truei* | Pacific Tailed Frog | confirmed | B.C.'s Wild Heritage (2000) | SVPP | Galene Creek | 638100 | 5433200 |
| Vertebrate – Amphibian | *Ascaphus truei* | Pacific Tailed Frog | confirmed | B.C.'s Wild Heritage (2000) | | Unnamed creek near Skyline Trail | 642350 | 5434080 |
| Vertebrate – Amphibian | *Ascaphus truei* | Pacific Tailed Frog | confirmed | B.C.'s Wild Heritage (2000) | SVPP | Unnamed tributary 3+km N of 26 Mile Bridge | 635100 | 5445130 |
| Vertebrate – Amphibian | *Ascaphus truei* | Pacific Tailed Frog | confirmed | B.C.'s Wild Heritage (2000) | OPPA | Silverdaisy Creek | 640350 | 5450850 |
| Vertebrate – Mammal | *Aplodontia rufa rainieri** | Mountain Beaver ssp *rainieri** | confirmed | CDC map | ECMPP | Taboo Creek, S of | 657461 | 5433196 |
| Vertebrate – Mammal | *Aplodontia rufa rainieri** | Mountain Beaver ssp *rainieri** | confirmed | CDC map | ECMPP | Skaist River | 649843 | 5434588 |
| Vertebrate – Mammal | *Aplodontia rufa rainieri** | Mountain Beaver ssp *rainieri** | confirmed | CDC map | ECMPP | Sowaqua Creek, headwaters | 642089 | 5440884 |
| Vertebrate – Mammal | *Aplodontia rufa rainieri** | Mountain Beaver ssp *rainieri** | confirmed | CDC map | OPPA | Eighteen Mile Creek, headwaters | 645170 | 5442956 |
| Vertebrate – Mammal | *Aplodontia rufa rainieri** | Mountain Beaver ssp *rainieri** | confirmed | CDC map | OPPA | Eighteen Mile Creek | 655158 | 5442812 |
| Vertebrate – Mammal | *Aplodontia rufa rainieri** | Mountain Beaver ssp *rainieri** | confirmed | CDC map | OPPA | Mount Tearse | 649999 | 5451000 |
| Vertebrate – Mammal | *Aplodontia rufa rainieri** | Mountain Beaver ssp *rainieri** | confirmed | CDC map | OPPA | Sumallo River, headwaters | 648681 | 5454066 |
| Vertebrate – Mammal | *Aplodontia rufa rainieri** | Mountain Beaver ssp *rainieri** | confirmed | CDC map | OPPA | Potter Creek | 642850 | 5461687 |

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|---|---|---|---|---|---|---|---|---|
| Vertebrate – Mammal | *Aplodontia rufa rainieri** | Mountain Beaver ssp *rainieri* | confirmed | CDC map | OPPA | Ferguson Creek (Hope Slide) | 637331 | 5459560 |
| Vertebrate – Mammal | *Aplodontia rufa rainieri** | Mountain Beaver ssp *rainieri** | confirmed | CDC map | OPPA | Maselpanik Creek | 635646 | 5458251 |
| Vertebrate – Mammal | *Sorex trowbridgii* | Trowbridge's Shrew | confirmed | BC's Wild Heritage (2000) | SVPP | | 633931 | 5452890 |
| Vertebrate – Mammal | *Sorex trowbridgii* | Trowbridge's Shrew | confirmed | BC's Wild Heritage (2000) | SVPP | | 628305 | 5451706 |
| Vertebrate – Mammal | *Sorex trowbridgii* | Trowbridge's Shrew | confirmed | BC's Wild Heritage (2000) | SVPP | | 624720 | 5456559 |
| Vertebrate – Mammal | *Sorex trowbridgii* | Trowbridge's Shrew | confirmed | BC's Wild Heritage (2000) | SVPP | | 625830 | 5460512 |
| Vertebrate – Mammal | *Sorex trowbridgii* | Trowbridge's Shrew | confirmed | BC's Wild Heritage (2000) | SVPP | | 626926 | 5439361 |

## *Confirmed Without Spatial Reference:*

| Taxonomic Group | Scientific_Name | Common_Name | Confidence_Level | Source | Location | Description |
|---|---|---|---|---|---|---|
| Invertebrate – Butterfly | *Erebia vidleri* | Vidler's Alpine | confirmed | E-Fauna BC | ECMPP | Gibson Pass |
| Invertebrate – Butterfly | *Erebia vidleri* | Vidler's Alpine | confirmed | E-Fauna BC | ECMPP | Strawberry Flats area |
| Invertebrate – Butterfly | *Erebia vidleri* | Vidler's Alpine | confirmed | E-Fauna BC | ECMPP | Strawberry Flats |
| Invertebrate – Butterfly | *Erebia vidleri* | Vidler's Alpine | confirmed | E-Fauna BC | ECMPP | Allison Pass |
| Invertebrate – Butterfly | *Erebia vidleri* | Vidler's Alpine | confirmed | E-Fauna BC | ECMPP | Daynar Creek |
| Invertebrate – Butterfly | *Erebia vidleri* | Vidler's Alpine | confirmed | E-Fauna BC | ECMPP | Skyline Trail |
| Invertebrate – Butterfly | *Erebia vidleri* | Vidler's Alpine | confirmed | E-Fauna BC | ECMPP | Lightning Lake area |
| Invertebrate – Butterfly | *Papilio indra* | Indra Swallowtail | confirmed | Knopp and Larkin (2007) | ECMPP | Allison Pass |
| Invertebrate – Butterfly | *Papilio indra* | Indra Swallowtail | confirmed | Knopp and Larkin (2007) | ECMPP | Gibson Pass |
| Invertebrate – Butterfly | *Papilio indra* | Indra Swallowtail | confirmed | Knopp and Larkin (2007) | ECMPP | Lightning Lakes |
| Invertebrate – Butterfly | *Speyeria hydaspe minor* | Hydaspe Fritillary ssp *minor* | confirmed | E-Fauna BC | ECMPP | Gibson Pass |
| Invertebrate – Butterfly | *Speyeria hydaspe minor* | Hydaspe Fritillary ssp *minor* | confirmed | E-Fauna BC | ECMPP | Skyline Trail |
| Invertebrate – Butterfly | *Speyeria hydaspe minor* | Hydaspe Fritillary ssp *minor* | confirmed | E-Fauna BC | ECMPP | Gibson Pass ski area |
| Vascular Plant – Dicot | *Brickellia oblongifolia oblongifolia* | Narrow-leaved Brickellia ssp *oblongifolia* | confirmed | CDC herbarium record [in B.C.'s Wild Heritage (2000)] | SVPP | along Skagit River |
| Vascular Plant – Dicot | *Cirsium edule* var. *macounii* | Edible Thistle | confirmed | E-Flora BC | OPPA | |
| Vascular Plant – Dicot | *Cirsium edule var. macounii* | Edible Thistle | confirmed | E-Flora BC | SVPP | |
| Vascular Plant – Dicot | *Cirsium edule var. macounii* | Edible Thistle | confirmed | E-Flora BC | ECMPP | |
| Vascular Plant – Dicot | *Cirsium edule var. macounii* | Edible Thistle | confirmed | E-Flora BC | ECMPP | |
| Vascular Plant – Dicot | *Claytonia washingtoniana* | Washington Springbeauty | confirmed | E-Flora BC | SVPP | 1 to 2.5km upstream fr 26 Mile Bridge |
| Vascular Plant – Dicot | *Delphinium glareosum* | Rockslide Larkspur | confirmed | E-Flora BC | ECMPP | Allison Pass |
| Vascular Plant – Dicot | *Draba lonchocarpa* var. *thompsonii* | Lance-fruited Draba | confirmed | E-Flora BC, map | SVPP, ECMPP | |
| Vascular Plant – Dicot | *Epilobium mirabile* | Hairy-stemmed Willowherb | confirmed | Armstrong (2007), CDC | ECMPP | |
| Vascular Plant – Dicot | *Hackelia diffusa* | Spreading Stickseed | confirmed | E-Flora BC, Carl, *et al*. (1952) | ECMPP | Strike Lake Valley |
| Vascular Plant – Dicot | *Heuchera micrantha* var. *diversifolia* | small-flowered alumroot | confirmed | E-Flora BC | SVPP | North of Whitworth Peak |
| Vascular Plant – Dicot | *Heuchera micrantha* var. *diversifolia* | small-flowered alumroot | confirmed | E-Flora BC | ECMPP | Gibson Pass area |
| Vascular Plant – Dicot | *Lewisia columbiana* var. *columbiana* | Columbia Lewisia | confirmed | Carl, *et al*. (1952) | ECMPP | Lone Goat Mountain, near summit |
| Vascular Plant – Dicot | *Polemonium elegans* | Elegant Jacob's Ladder | confirmed | E-Flora BC | SVPP | |
| Vascular Plant – Dicot | *Pyrola elliptica* | White Wintergreen | confirmed | E-Flora | ECMPP | Daynar Creek |

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| Vascular Plant – Dicot | *Rubus lasiococcus* | Dwarf Bramble | confirmed | E-Flora BC, CDC Herbarium Record [in B.C.'s Wild Heritage (2000)] | ECMPP, SVPP | Skagit River near Hozameen |
| Vascular Plant – Dicot | *Senecio elmeri* | Elmer's Butterweed | confirmed | E-Flora | SVPP | unnamed peak 1962m high, S of Wright Peak |
| Vascular Plant – Dicot | *Senecio elmeri* | Elmer's Butterweed | confirmed | E-Flora | SVPP | unnamed peak 1962m high, S of Wright Peak |
| Vascular Plant – Dicot | *Senecio elmeri* | Elmer's Butterweed | confirmed | E-Flora | SVPP | ridge between St. Alice and McNaught Creeks |
| Vascular Plant – Dicot | *Senecio elmeri* | Elmer's Butterweed | confirmed | E-Flora | SVPP | Whitworth Peak, SE slopes |
| Vascular Plant – Dicot | *Senecio elmeri* | Elmer's Butterweed | confirmed | E-Flora | SVPP | Silvertip Mountain |
| Vascular Plant – Dicot | *Senecio elmeri* | Elmer's Butterweed | confirmed | E-Flora | OPPA | Thompson Peak |
| Vascular Plant – Dicot | *Senecio elmeri* | Elmer's Butterweed | confirmed | E-Flora | OPPA | between Marmot Mtn and Mt McConnell |
| Vascular Plant – Dicot | *Smelowskia ovalis* | Short-fruited Smelowskia | confirmed | E-Flora BC | SVPP | |
| Vascular Plant – Dicot | *Stellaria obtusa* | Blunt-sepaled Starwort | confirmed | E-Flora BC | SVPP | near Ross Lake, E side |
| Vascular Plant – Fern/Fern Ally | *Polystichum kruckebergii* | Kruckeberg's Holly Fern | confirmed | E-Flora BC | SVPP | |
| Vascular Plant – Gymnosperm | *Chamaecyparis nootkatensis* | yellow-cedar | confirmed | Carl, et al. (1952) | ECMPP | Skaist Valley |
| Vascular Plant – Gymnosperm | *Pinus albicaulis* | Whitebark Pine | confirmed | Timberline Natural Resource Group (2007) | ECMPP | |
| Vascular Plant – Monocot | *Carex lenticularis lenticularis* | Lakeshore Sedge | confirmed | E-Flora BC | ECMPP | Sumallo Grove area |
| Vascular Plant – Monocot | *Carex rostrata* | Swollen Beaked Sedge | confirmed | Carl, et al. (1952), E-Flora BC | SVPP | Ross Lake, E edge of draw down |
| Vascular Plant – Monocot | *Carex rostrata* | Swollen Beaked Sedge | confirmed | Carl, et al. (1952), E-Flora BC | ECMPP | Poland Lake area |
| Vascular Plant – Monocot | *Carex rostrata* | Swollen Beaked Sedge | confirmed | Carl, et al. (1952), E-Flora BC | OPPA | Hope Slide, SE tip of slide |
| Vascular Plant – Monocot | *Stenanthium occidentale* | Western Mountainbells | confirmed | E-Flora BC | OPPA | SE of Brown Peak |
| Vascular Plant – Monocot | *Stenanthium occidentale* | Western Mountainbells | confirmed | E-Flora BC | SVPP | Ross Lake Ecological Reserve |
| Vascular Plant – Monocot | *Stenanthium occidentale* | Western Mountainbells | confirmed | E-Flora BC | ECMPP | Skyline II Trail, 3km along |
| Vascular Plant – Monocot | *Stenanthium occidentale* | Western Mountainbells | confirmed | E-Flora BC | ECMPP | Daynar Creek |
| Vascular Plant – Monocot | *Streptopus lanceolatus* | Rosy Twistedstalk | confirmed | Carl, et al. (1952) | | Canam Mine? |
| Vascular Plant – Monocot | *Streptopus lanceolatus* | Rosy Twistedstalk | confirmed | E-Flora BC | OPPA | Silverdaisy area, Twentysix Mile Creek? |
| Vertebrate – Amphibian | *Ambystoma gracile* | Northwestern Salamander | confirmed | F.F. Slaney & Co. (1973c) | SVPP | near Ross Lake |
| Vertebrate – Amphibian | *Anaxyrus boreas* | Western Toad | confirmed | Fedoruk pers. obs., CDC | SVPP, ECMPP, CRA, OPPA | |
| Vertebrate – Amphibian | *Ascaphus truei* | Pacific Tailed Frog | confirmed | B.C.'s Wild Heritage (2000) | | Skyline Trail |
| Vertebrate – Amphibian | *Ascaphus truei* | Pacific Tailed Frog | confirmed | B.C.'s Wild Heritage (2000) | ECMPP | Skagit River 3 miles W of Allison Pass |
| Vertebrate – Amphibian | *Ascaphus truei* | Pacific Tailed Frog | confirmed | B.C.'s Wild Heritage (2000) | ECMPP | Skagit River Headwaters, Allison Pass |
| Vertebrate – Amphibian | *Ascaphus truei* | Pacific Tailed Frog | confirmed | B.C.'s Wild Heritage (2000) | SVPP | tributary near Whitworth Ranch |

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|---|---|---|---|---|---|---|
| Vertebrate – Amphibian | *Ensatina eschscholtzii* | Ensantina | confirmed | B.C.'s Wild Heritage (2000) | SVPP | |
| Vertebrate – Amphibian | *Rana luteiventris* | Columbia Spotted Frog | confirmed | B.C.'s Wild Heritage (2000) | | |
| Vertebrate – Bird | *Accipiter gentilis atricapillus* | Northern Goshawk | confirmed | nest record Skyline Trail | SVPP, ECMPP | |
| Vertebrate – Bird | *Aechmophorus occidentalis* | Western Grebe | confirmed | Knopp pers. obs. (1996), B.C.'s Wild Heritage (2000) | SVPP | Ross Lake |
| Vertebrate – Bird | *Aegolius funereus* | Boreal Owl | confirmed | SVPP Bird List (Knopp), ECMPP Bird Checklist | SVPP, ECMPP | |
| Vertebrate – Bird | *Aix Sponsa* | Wood Duck | confirmed | SVPP Bird List (Knopp), ECMPP Bird Checklist | SVPP, ECMPP | |
| Vertebrate – Bird | *Anas acuta* | Northern Pintail | confirmed | Carl *et al*. (1952), NatureServe Explorer, CF | ECMPP | |
| Vertebrate – Bird | *Ardea herodias fannini* | Great Blue Heron ssp *fannini* | confirmed | Knopp pers. obs. (1996, 1998) | SVPP | |
| Vertebrate – Bird | *Asio flammeus* | Short-eared Owl | confirmed | F.F. Slaney & Co. (1973a) | SVPP | |
| Vertebrate – Bird | *Aythya americana* | Redhead | confirmed | SVPP Bird List (Knopp), ECMPP Bird Checklist | SVPP, ECMPP | |
| Vertebrate – Bird | *Aythya marila* | Greater Scaup | confirmed | SVPP Bird List (Knopp) | SVPP | |
| Vertebrate – Bird | *Aythya valisineria* | Canvasback | confirmed | SVPP Bird List (Knopp) | SVPP | |
| Vertebrate – Bird | *Bonasa umbellus* | Ruffed Grouse | confirmed | Fedoruk pers. obs., SVPP Bird List (Knopp), MOE (1986), ECMPP Bird Checklist, F.F. Slaney & Co. (1976b) | SVPP, ECMPP | |
| Vertebrate – Bird | *Bucephala islandica* | Barrow's Goldeneye | confirmed | SVPP Bird List (Knopp), ECMPP Bird Checklist | SVPP, ECMPP | |
| Vertebrate – Bird | *Butorides virescens* | Green Heron | confirmed | B.C.'s Wild Heritage (2000) | SVPP | |
| Vertebrate – Bird | *Carpodacus purpureus* | Purple Finch | confirmed | SVPP Bird List (Knopp), ECMPP Bird Checklist, Carl et al. (1952) | SVPP, ECMPP | |
| Vertebrate – Bird | *Carpodacus purpureus* | Purple Finch | confirmed | Carl *et al*. (1952) | SVPP | Whitworth Ranch |
| Vertebrate – Bird | *Carpodacus purpureus* | Purple Finch | confirmed | Carl *et al*. (1952) | ECMPP | Allison Pass |
| Vertebrate – Bird | *Catharus fuscescens* | Veery | confirmed | SVPP Bird List (Knopp) | SVPP | |
| Vertebrate – Bird | *Catharus ustulatus* | Swainson's Thrush | confirmed | ECMPP Bird Checklist, Carl *et al*. (1952) | ECMPP | |
| Vertebrate – Bird | *Certhia americana* | Brown Creeper | confirmed | SVPP Bird List (Knopp), ECMPP Bird Checklist, Carl *et al*. (1952) | SVPP, ECMPP | |
| Vertebrate – Bird | *Chaetura vauxi* | Vaux's Swift | confirmed | SVPP Bird List (Knopp), ECMPP Bird Checklist | SVPP, ECMPP | |
| Vertebrate – Bird | *Charadrius vociferus* | Killdeer | confirmed | Fedoruk pers. obs, SVPP Bird List (Knopp), ECMPP Bird Checklist | SVPP, ECMPP | |
| Vertebrate – Bird | *Chondestes grammacus* | Lark Sparrow | confirmed | F.F. Slaney & Co. (1973a) | SVPP | Ross Lake |
| Vertebrate – Bird | *Chordeiles minor* | Common Nighthawk | confirmed | SVPP Bird List (Knopp), ECMPP Bird Checklist | SVPP, ECMPP | |
| Vertebrate – Bird | *Circus cyaneus* | Northern Harrier | confirmed | SVPP Bird List (Knopp), ECMPP Bird Checklist | SVPP, ECMPP | |
| Vertebrate – Bird | *Coccothraustes vespertinus* | Evening Grosbeak | confirmed | SVPP Bird List (Knopp), ECMPP Bird Checklist | SVPP, ECMPP | |
| Vertebrate – Bird | *Contopus cooperi* | Olive-sided Flycatcher | confirmed | SVPP Bird List (Knopp) | SVPP | |
| Vertebrate – Bird | *Contopus sordidulus* | Western Wood-Pewee | confirmed | SVPP Bird List (Knopp), ECMPP Bird Checklist | SVPP, ECMPP | |
| Vertebrate – Bird | *Cygnus columbianus* | Tundra Swan | confirmed | SVPP Bird List (Knopp) | SVPP | |
| Vertebrate – Bird | *Cypseloides niger* | Black Swift | confirmed | SVPP Bird List (Knopp), ECMPP Bird Checklist | SVPP, ECMPP | |
| Vertebrate – Bird | *Dendragapus obscurus* | Dusky Grouse (Blue Grouse) | confirmed | SVPP Bird List (Knopp), ECMPP Bird Checklist, F.F. Slaney & Co. (1973b) | SVPP, ECMPP | |
| Vertebrate – Bird | *Dendroica nigrescens* | Black-throated Gray Warbler | confirmed | SVPP Bird List (Knopp) ECMPP Bird Checklist, Carl *et al*. (1952) | SVPP, ECMPP | |

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|---|---|---|---|---|---|---|
| Vertebrate – Bird | *Dendroica petechia* | Yellow Warbler | confirmed | SVPP Bird List (Knopp), ECMPP Bird Checklist, Carl et al. (1952) | SVPP, ECMPP | |
| Vertebrate – Bird | *Dolichonyx oryzivorus* | Bobolink | confirmed | F.F. Slaney & Co. (1973a) | SVPP | |
| Vertebrate – Bird | *Empidonax difficilis* | Pacific-slope Flycatcher | confirmed | SVPP Bird List (Knopp), ECMPP Bird Checklist | SVPP, ECMPP | |
| Vertebrate – Bird | *Empidonax occidentalis* | Cordilleran Flycatcher | confirmed | SVPP Bird List (Knopp) | SVPP | |
| Vertebrate – Bird | *Empidonax traillii* | Willow Flycatcher | confirmed | SVPP Bird List (Knopp), ECMPP Bird Checklist | SVPP, ECMPP | |
| Vertebrate – Bird | *Eremophila alpestris* | Horned Lark | confirmed | SVPP Bird List (Knopp), ECMPP Bird Checklist | SVPP, ECMPP | |
| Vertebrate – Bird | *Falco peregrinus anatum* | Peregrine Falcon ssp *anatum* | confirmed | Carl *et al*. (1952), Fedoruk pers.obs. | ECMPP, SVPP | |
| Vertebrate – Bird | *Falco sparverius* | American Kestrel | confirmed | SVPP Bird List (Knopp), ECMPP Bird Checklist | SVPP, ECMPP | |
| Vertebrate – Bird | *Fulica americana* | American Coot | confirmed | SVPP Bird List (Knopp) | SVPP | |
| Vertebrate – Bird | *Glaucidium gnoma* | Northern Pygmy-owl | confirmed | Carl et al. (1952), NatureServe Explorer, CF | SVPP | |
| Vertebrate – Bird | *Hirundo rustica* | Barn Swallow | confirmed | Fedoruk pers. obs., Knopp | SVPP, ECMPP | |
| Vertebrate – Bird | *Histrionicus histrionicus* | Harlequin Duck | confirmed | Freeman and Goudie reports | SVPP, OPPA | |
| Vertebrate – Bird | *Larus californicus* | California Gull | confirmed | F.F. Slaney & Co. (1973a), ECMPP Bird Checklist | SVPP, ECMPP | Ross Lake |
| Vertebrate – Bird | *Loxia curvirostra* | Red Crossbill | confirmed | SVPP Bird List (Knopp), ECMPP Bird Checklist | SVPP, ECMPP | Ross Lake, International Point |
| Vertebrate – Bird | *Megaceryle alcyon* | Belted Kingfisher | confirmed | SVPP Bird List (Knopp), ECMPP Bird Checklist | SVPP, ECMPP | |
| Vertebrate – Bird | *Megascops kennicottii* | Western Screech-Owl | confirmed | SVPP Bird List (Knopp) | SVPP | |
| Vertebrate – Bird | *Megascops kennicottii* | Western Screech-owl | confirmed | SVPP Bird List (Knopp) | SVPP | |
| Vertebrate – Bird | *Melanerpes lewis* | Lewis' Woodpecker | confirmed | Knopp (1996), B.C.'s Wild Heritage (2000) | SVPP, ECMPP | Ross Lake Campground |
| Vertebrate – Bird | *Myadestes townsendi* | Townsend's Solitaire | confirmed | SVPP Bird List (Knopp), ECMPP Bird Checklist, Carl et al. (1952) | SVPP, ECMPP | Skyline Ridge |
| Vertebrate – Bird | *Numenius americanus* | Long-billed Curlew | confirmed | F.F. Slaney & Co. (1973a) | SVPP | Ross Lake |
| Vertebrate – Bird | *Patagioenas fasciata* | Band-tailed Pigeon | confirmed | SVPP Bird List (Knopp), ECMPP Checklist, F.F. Slaney & Co. (1973b) | SVPP, ECMPP | |
| Vertebrate – Bird | *Petrochelidon pyrrhonota* | Cliff Swallow | confirmed | SVPP Bird List (Knopp), ECMPP Bird Checklist | SVPP, ECMPP | |
| Vertebrate – Bird | *Podilymbus podiceps* | Pied-billed Grebe | confirmed | SVPP Bird List (Knopp), ECMPP Bird Checklist | SVPP, ECMPP | |
| Vertebrate – Bird | *Poecile rufescens* | Chestnut-backed Chickadee | confirmed | SVPP Bird List (Knopp), ECMPP Bird Checklist | SVPP, ECMPP | |
| Vertebrate – Bird | *Selasphorus rufus* | Rufous Hummingbird | confirmed | SVPP Bird List (Knopp), ECMPP Bird Checklist | SVPP, ECMPP | |
| Vertebrate – Bird | *Sphyrapicus thyroideus thyroideus* | Williamson's Sapsucker ssp *thyroideus* | confirmed | COSEWIC (2005) | ECMPP | Lightning Lakes |
| Vertebrate – Bird | *Spinus pinus* | Pine Siskin | confirmed | SVPP Bird List (Knopp), ECMPP Bird Checklist, Carl et al. (1952) | SVPP, ECMPP | |
| Vertebrate – Bird | *Stelgidopteryx serripennis* | Northern Rough-winged Swallow | confirmed | SVPP Bird List (Knopp), ECMPP Bird Checklist | SVPP, ECMPP | |
| Vertebrate – Bird | *Strix occidentalis* | Northern Spotted Owl | confirmed | Blackburn pers. comm., Knopp (1988, 1996) | SVPP, ECMPP, OPPA | |
| Vertebrate – Bird | *Sturnella neglecta* | Western Meadowlark | confirmed | SVPP Bird List (Knopp), ECMPP Bird Checklist | SVPP, ECMPP | |
| Vertebrate – Bird | *Tachycineta bicolor* | Tree Swallow | confirmed | SVPP Bird List (Knopp), ECMPP Bird Checklist | SVPP, ECMPP | |
| Vertebrate – Bird | *Tachycineta thalassina* | Violet-green Swallow | confirmed | SVPP Bird List (Knopp), ECMPP Bird Checklist | SVPP, ECMPP | |
| Vertebrate – Bird | *Tyto alba* | Barn Owl | confirmed | SVPP Bird List (Knopp) | SVPP | |
| Vertebrate – Bird | *Vireo olivaceus* | Red-eyed Vireo | confirmed | SVPP Bird List (Knopp), ECMPP Bird Checklist | SVPP, ECMPP | |
| Vertebrate – Bird | *Wilsonia pusilla* | Wilson's Warbler | confirmed | SVPP Bird List (Knopp), ECMPP Bird Checklist | SVPP, ECMPP | |
| Vertebrate – Bird | *Xanthocephalus xanthocephalus* | Yellow-headed Blackbird | confirmed | SVPP Bird List (Knopp), ECMPP Bird Checklist | SVPP, ECMPP | |

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|---|---|---|---|---|---|---|
| Vertebrate – Bird | *Zenaida macroura* | Mourning Dove | confirmed | SVPP Bird List (Knopp), ECMPP Bird Checklist | SVPP, ECMPP | |
| Vertebrate – Fish | *Salvelinus confluentus* | Bull Trout | confirmed | multiple reports | SVPP, ECMPP, OPPA | |
| Vertebrate – Fish | *Salvelinus malma* | Dolly Varden | confirmed | multiple reports | SVPP, ECMPP | |
| Vertebrate – Mammal | *Aplodontia rufa rufa** | Mountain Beaver ssp *rufa** | confirmed | BC Conservation Status Report | SVPP | |
| Vertebrate – Mammal | *Canis lupus* | Grey Wolf | confirmed | | | |
| Vertebrate – Mammal | *Corynorhinus townsendii* | Townsend's Big-eared Bat | confirmed | Luszcz (2004) | SVPP | |
| Vertebrate – Mammal | *Gulo gulo luscus* | Wolverine ssp *luscus* | confirmed | Aubry *et al*. (2010) | SVPP, ECMPP, CRA, OPP | Allison Pass |
| Vertebrate – Mammal | *Gulo gulo luscus* | Wolverine ssp *luscus* | confirmed | Aubry *et al*. (2010) | ECMPP | Allison Pass |
| Vertebrate – Mammal | *Gulo gulo luscus* | Wolverine ssp *luscus* | confirmed | Aubry *et al*. (2010) | ECMPP | camera |
| Vertebrate – Mammal | *Gulo gulo luscus* | Wolverine ssp *luscus* | confirmed | Aubry *et al*. (2010) | ECMPP | camera |
| Vertebrate – Mammal | *Lasionycteris noctivagans* | Silver-haired Bat | confirmed | Luszcz (2004), CDC, Carl, *et al*. (1952) | SVPP, ECMPP | |
| Vertebrate – Mammal | *Lasiurus blossevillii* | Western Red Bat | confirmed | CDC, B.C.'s Wild Heritage (2000) | SVPP | confluence of Skagit and Klesilkwa |
| Vertebrate – Mammal | *Lasiurus cinereus* | Hoary Bat | confirmed | Luszcz (2000) | | |
| Vertebrate – Mammal | *Martes americana* | American Marten | confirmed | Aubry *et al*. (2010) | SVPP, ECMPP, OPPA | |
| Vertebrate – Mammal | *Martes pennanti* | Fisher | confirmed | BC Conservation Status Report, Identified Wildlife Species Account | SVPP, ECMPP, CRA, OPP | |
| Vertebrate – Mammal | *Myotis californicus* | Californian Myotis | confirmed | Luszcz (2004), CDC, Fedoruk (pers. obs.) | SVPP, ECMPP | |
| Vertebrate – Mammal | *Myotis ciliolabrum* | Western Small-footed Myotis | confirmed | Firman and Barclay (1993), B.C.'s Wild Heritage (2000) | SVPP | lower Klesilkwa and Skagit River wider valley bottoms near water |
| Vertebrate – Mammal | *Myotis evotis* | Long-eared Myotis | confirmed | CDC, Luszcz (2004) | SVPP, ECMPP | |
| Vertebrate – Mammal | *Myotis keenii* | Keen's Long-eared Myotis | confirmed | CDC, C. Lauson pers.comm. | SVPP, ECMPP | |
| Vertebrate – Mammal | *Neurotrichus gibbsii* | American Shrew Mole | confirmed | B.C.'s Wild Heritage (2000), Merkens (1994) | | |
| Vertebrate – Mammal | *Oreamnos americanus* | Mountain Goat | confirmed | Jex (2007) | | |
| Vertebrate – Mammal | *Spilogale gracilis* | Spotted Skunk | confirmed | E. Lofroth pers. comm. | SVPP | |
| Vertebrate – Mammal | *Ursus arctos* | Grizzly Bear | confirmed | E. Lofroth pers. comm. | ECMPP | |
| Vertebrate – Reptile | *Charina bottae* | Rubber Boa | confirmed | B.C.'s Wild Heritage (2000) | SVPP | near international border |
| Vertebrate – Reptile | *Charina bottae* | Rubber Boa | confirmed | B.C.'s Wild Heritage (2000) | SVPP | at km 54 |
| Vertebrate – Reptile | *Elgaria coerulea* | Northern Alligator Lizard | confirmed | Carl *et al*. (1952), CDC | SVPP | Whitworth Ranch |
| Vertebrate – Reptile | *Thamnophis ordinoides* | Northwestern Garter Snake | confirmed | F.F. Slaney & Co. (1973c), B.C.'s Wild Heritage (2000), Summit (2003) | SVPP | Whitworth Ranch |

## *Skagit Watershed Potential Species:*

| Taxonomic Group | Scientific_Name | Common_Name | Confidence_Level | Source | Location | Description |
|---|---|---|---|---|---|---|
| Invertebrate – Butterfly | *Cercyonis sthenele* | Great Basin Wood Nymph | potential 2 | Carl *et al*. (1952), CDC, CF | | |
| Invertebrate – Butterfly | *Callophrys johnsoni* | Johnson's Hairstreak | potential 2_3 | CF | | |
| Invertebrate – Butterfly | *Chlosyne whitneyi* | Rockslide Checkerspot | potential 3 | CF | | |
| Invertebrate – Butterfly | *Danaus plexippus* | Monarch | potential 2 | Armstrong (2007), Summit (2003) | | |
| Invertebrate – Butterfly | *Euphyes vestris* | Dun Skipper | potential 2 | Guppy pers. com. (2011), CF, BC Conservation Status Report | | |
| Invertebrate – Dragonfly/Damselfly | *Erythemis collocata* | Western Pondhawk | potential 2_3 | CF, E-Fauna | | |

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|---|---|---|---|---|
| Invertebrate – Dragonfly/Damselfly | *Macromia magnifica* | Western River Cruiser | potential 3 | CF, CDC Status Report |
| Invertebrate – Dragonfly/Damselfly | *Ophiogomphus occidentis* | Sinuous Snaketail | potential 2 | CF, E-Fauna |
| Invertebrate – Mollusc (Bivalve) | *Sphaerium patella* | Rocky Mountain Fingernailclam | potential 3 | CF |
| Invertebrate – Mollusc (Gastropod) | *Planogyra clappi* | Western Flat-whorl | potential 3 | CF, BC Conservation Status Report |
| Invertebrate – Mollusc (Gastropod) | *Zonitoides nitidus* | Black Gloss | potential 2 | CF, BC Conservation Status Report |
| Non-Vascular Plant – Lichen | *Nephroma occultum* | Cryptic Paw | potential 2_3 | CF, COSEWIC Assessment and Update Status Report |
| Non-Vascular Plant – Lichen | *Pseudocyphellaria rainierensis* | Oldgrowth specklebelly | potential 2_3 | CF, CDC Species Summary |
| Non-Vascular Plant – Moss | *Alsia californica* | | potential 2_3 | CF |
| Non-Vascular Plant – Moss | *Amphidium californicum* | | potential 2 | CF |
| Non-Vascular Plant – Moss | *Amphidium mougeotii* | | potential 2 | CF |
| Non-Vascular Plant – Moss | *Atrichum haussknechtii* | | potential 2_3 | CF |
| Non-Vascular Plant – Moss | *Barbula amplexifolia* | | potential 2 | CF |
| Non-Vascular Plant – Moss | *Brachydontium olympicum* | | potential 2 | CF, CDC Species Summary |
| Non-Vascular Plant – Moss | *Brachythecium frigidum* | | potential 2 | CF |
| Non-Vascular Plant – Moss | *Brachythecium holzingeri* | | potential 2 | CF |
| Non-Vascular Plant – Moss | *Bryum capillare* var. *barbatum* | | potential 1 | CF |
| Non-Vascular Plant – Moss | *Bryum gemmiparum* | | potential 1_2 | CF |
| Non-Vascular Plant – Moss | *Bryum miniatum* | | potential 1 | CF |
| Non-Vascular Plant – Moss | *Bryum muehlenbeckii* | | potential 2 | CF |
| Non-Vascular Plant – Moss | *Bryum schleicheri* | | potential 2 | CF, CDC Species Summary |
| Non-Vascular Plant – Moss | *Buxbaumia aphylla* | | potential 1_2 | CF, CDC Species Summary |
| Non-Vascular Plant – Moss | *Buxbaumia viridis* | | potential 1_2 | CF, CDC Species Summary |
| Non-Vascular Plant – Moss | *Callicladium haldanianum* | | potential 3 | CF |
| Non-Vascular Plant – Moss | *Campylium hispidulum* | | potential 2_3 | CF |
| Non-Vascular Plant – Moss | *Campylopus atrovirens* | | potential 2_3 | CF |
| Non-Vascular Plant – Moss | *Claopodium crispifolium* | | potential 2_3 | CF |
| Non-Vascular Plant – Moss | *Cynodontium polycarpon* | | potential 2_3 | CF, CDC Species Summary |
| Non-Vascular Plant – Moss | *Cyrtomnium hymenophyllum* | | potential 3 | CF, CDC Species Summary |
| Non-Vascular Plant – Moss | *Desmatodon latifolius* var. *muticus* | | potential 2_3 | CF |
| Non-Vascular Plant – Moss | *Desmatodon leucostoma* | | potential 3 | CF, CDC Species Summary |
| Non-Vascular Plant – Moss | *Dichelyma uncinatum* | | potential 2 | CF, CDC Species Summary |
| Non-Vascular Plant – Moss | *Dichodontium olympicum* | | potential 2_3 | CF, CDC Species Summary |
| Non-Vascular Plant – Moss | *Dicranella cerviculata* | | potential 2 | CF, CDC Species Summary |
| Non-Vascular Plant – Moss | *Dicranella pacifica* | | potential 2 | CF, CDC Species Summary |
| Non-Vascular Plant – Moss | *Dicranum spadiceum* | | potential 2 | CF, CDC Species Summary |
| Non-Vascular Plant – Moss | *Ditrichum heteromallum* | | potential 2_3 | CF, CDC Species Summary |
| Non-Vascular Plant – Moss | *Drepanocladus aduncus* var. *kneiffii* | | potential 3 | CF |
| Non-Vascular Plant – Moss | *Drepanocladus aduncus* var. *polycarpus* | | potential 2 | CF |
| Non-Vascular Plant – Moss | *Drepanocladus pseudostramineus* | | potential 2 | CF, CDC Species Summary |
| Non-Vascular Plant – Moss | *Drepanocladus uncinatus* var. *symmetricus* | | potential 3 | CF, CDC Species Summary |
| Non-Vascular Plant – Moss | *Encalypta affinis* ssp. *Macounii* | | potential 2 | CF |
| Non-Vascular Plant – Moss | *Epipterygium tozeri* | | potential 2_3 | CF, CDC Species Summary |

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|---|---|---|---|
| Non-Vascular Plant – Moss | *Eucladium verticillatum* | potential 2_3 | CF |
| Non-Vascular Plant – Moss | *Eurhynchium riparioides* | potential 3 | CF |
| Non-Vascular Plant – Moss | *Fissidens fontanus* | potential 2 | CF |
| Non-Vascular Plant – Moss | *Fissidens limbatus* | potential 3 | CF, CDC Species Summary |
| Non-Vascular Plant – Moss | *Fissidens ventricosus* | potential 3 | CF |
| Non-Vascular Plant – Moss | *Fontinalis hypnoides* | potential 2 | CF |
| Non-Vascular Plant – Moss | *Fontinalis neomexicana* | potential 2 | CF |
| Non-Vascular Plant – Moss | *Funaria muhlenbergii* | potential 2 | CF |
| Non-Vascular Plant – Moss | *Grimmia affinis* | potential 2_3 | CF |
| Non-Vascular Plant – Moss | *Grimmia elatior* | potential 1_2 | CF, CDC Species Summary |
| Non-Vascular Plant – Moss | *Grimmia holzingeri* | potential 3 | CF |
| Non-Vascular Plant – Moss | *Grimmia incurva* | potential 3 | CF |
| Non-Vascular Plant – Moss | *Grimmia montana* | potential 2_3 | CF, CDC Species Summary |
| Non-Vascular Plant – Moss | *Grimmia tenerrima* | potential 2_3 | CF |
| Non-Vascular Plant – Moss | *Hedwigia stellata* | potential 3 | CF |
| Non-Vascular Plant – Moss | *Herzogiella seligeri* | potential 2_3 | CF, CDC Species Summary |
| Non-Vascular Plant – Moss | *Herzogiella striatella* | potential 2_3 | CF |
| Non-Vascular Plant – Moss | *Heterocladium procurrens* | potential 1_2 | CF, CDC Species Summary |
| Non-Vascular Plant – Moss | *Hygrohypnum styriacum* | potential 1_2 | CF |
| Non-Vascular Plant – Moss | *Hymenostylium insigne* | potential 3 | CF |
| Non-Vascular Plant – Moss | *Hypnum dieckii* | potential 2_3 | CF, CDC Species Summary |
| Non-Vascular Plant – Moss | *Hypnum holmenii* | potential 3 | CF |
| Non-Vascular Plant – Moss | *Lescuraea baileyi* | potential 2_3 | CF, CDC Species Summary |
| Non-Vascular Plant – Moss | *Orthotrichum affine* | potential 2_3 | CF |
| Non-Vascular Plant – Moss | *Orthotrichum alpestre* | potential 2 | CF |
| Non-Vascular Plant – Moss | *Orthotrichum consimile* | potential 2_3 | CF |
| Non-Vascular Plant – Moss | *Orthotrichum cupulatum* | potential 3 | CF and CDC Species Summary |
| Non-Vascular Plant – Moss | *Orthotrichum rivulare* | potential 2_3 | CF and CDC Species Summary |
| Non-Vascular Plant – Moss | *Orthotrichum striatum* | potential 2_3 | CF |
| Non-Vascular Plant – Moss | *Oxystegus tenuirostris* | potential 3 | CF |
| Non-Vascular Plant – Moss | *Philonotis yezoana* | potential 2_3 | CF and CDC Species Summary |
| Non-Vascular Plant – Moss | *Plagiobryum zierii* | potential 2_3 | CF and CDC Species Summary |
| Non-Vascular Plant – Moss | *Pohlia atropurpurea* | potential 2 | CF |
| Non-Vascular Plant – Moss | *Pohlia bolanderi* | potential 1_2 | CF |
| Non-Vascular Plant – Moss | *Pohlia cardotii* | potential 2 | CF and CDC Species Summary |
| Non-Vascular Plant – Moss | *Pohlia erecta* | potential 2 | CF and CDC Species Summary |
| Non-Vascular Plant – Moss | *Pohlia filum* | potential 2 | CF |
| Non-Vascular Plant – Moss | *Pohlia ludwigii* | potential 2 | CF and CDC Species Summary |
| Non-Vascular Plant – Moss | *Polytrichum longisetum* | potential 2 | CF |
| Non-Vascular Plant – Moss | *Ptychomitrium gardneri* | potential 2 | CF |
| Non-Vascular Plant – Moss | *Racomitrium lawtonae* | potential 2 | CF and CDC Species Summary |
| Non-Vascular Plant – Moss | *Racomitrium pacificum* | potential 3 | CF and CDC Species Summary |

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|---|---|---|---|---|---|---|
| Non-Vascular Plant – Moss | *Racomitrium pygmaeum* | | potential 2 | CF | | |
| Non-Vascular Plant – Moss | *Rhizomnium punctatum* | | potential 2 | CF | | |
| Non-Vascular Plant – Moss | *Rhytidiadelphus squarrosus* | | potential 1 | CF | | |
| Non-Vascular Plant – Moss | *Schistidium frigidum* | | potential 1_2 | CF | | |
| Non-Vascular Plant – Moss | *Schistidium trichodon* | | potential 2_3 | CF and CDC Species Summary | | |
| Non-Vascular Plant – Moss | *Seligeria campylopoda* | | potential 2 | CF | | |
| Non-Vascular Plant – Moss | *Seligeria tristichoides* | | potential 3 | CF | | |
| Non-Vascular Plant – Moss | *Sphagnum rubiginosum* | | potential 1_2 | CF | | |
| Non-Vascular Plant – Moss | *Tetraplodon angustatus* | | potential 2_3 | CF and CDC Species Summary | | |
| Non-Vascular Plant – Moss | *Tortula bolanderi* | | potential 2_3 | CF and CDC Species Summary | | |
| Non-Vascular Plant – Moss | *Tortula subulata* | | potential 1_2 | CF and CDC Species Summary | | |
| Non-Vascular Plant – Moss | *Trichodon cylindricus* | | potential 2_3 | CF | | |
| Non-Vascular Plant – Moss | *Tripterocladium leucocladulum* | | potential 2 | CF and CDC Species Summary | | |
| Non-Vascular Plant – Moss | *Ulota megalospora* | | potential 2_3 | CF and CDC Species Summary | | |
| Vascular Plant – Dicot | *Actaea elata* | Tall Bugbane | potential 2 | Summit (2003) | | |
| Vascular Plant – Dicot | *Agoseris lackschewitzii* | Pink Agoseris | potential 2_3 | Carl, *et al*. (1952), CF | | |
| Vascular Plant – Dicot | *Arceuthobium americanum* | American Dwarf Mistletoe | potential 1 | Carl, *et al*. (1952) | | |
| Vascular Plant – Dicot | *Artemisia tridentata tridentata* | Big Sagebrush | potential 2_3 | Carl, *et al*. (1952), CF | | |
| Vascular Plant – Dicot | *Bidens amplissima* | Vancouver Island Beggarticks | potential 3 | CF | | |
| Vascular Plant – Dicot | *Cacaliopsis nardosmia* | Silvercrown | potential 1 | CDC | | |
| Vascular Plant – Dicot | *Claytonia perfoliata intermontana* | Miner's-lettuce | potential 2 | CF, Carl, *et al*. (1952) | | |
| Vascular Plant – Dicot | *Crepis atribarba atribarba* | Slender Hawksbeard | potential 3 | Summit (2003) | | |
| Vascular Plant – Dicot | *Delphiniu bicolor bicolor* | Montana Larkspur | potential 1 | Underhill (1965), map | ECMPP, CRA | |
| Vascular Plant – Dicot | *Epilobium halleanum* | Hall's Willowherb | potential 2 | CDC, E-Flora BC | ECMPP, CRA | |
| Vascular Plant – Dicot | *Epilobium leptocarpum* | Small-fruited Willowherb | potential 1 | E-Flora BC, map | ECMPP | |
| Vascular Plant – Dicot | *Gayophytum humile* | Dwarf Groundsmoke | potential 2 | E-Flora BC | CRA | |
| Vascular Plant – Dicot | *Heterocodon rariflorum* | Heterocodon | potential 2 | CF | | |
| Vascular Plant – Dicot | *Idahoa scapigera* | Scalepod | potential 2_3 | CF, E-Flora BC | | |
| Vascular Plant – Dicot | *Lewisia tweedyi* | Tweedy's Lewisia | potential 2 | Armstrong (2007), CDC | | |
| Vascular Plant – Dicot | *Lupinus argenteus* var. *laxiflorus* | Silvery Lupine | potential 3 | CDC | | |
| Vascular Plant – Dicot | *Pedicularis bracteosa* var. *latifolia* | Bracted Lousewort | potential 2 | CF, E-Flora BC, Carl, *et al*. (1952) | | |
| Vascular Plant – Dicot | *Penstemon davidsonii* var. *menziesii* | Davidson's Penstemon | potential 2 | Carl, *et al*. (1952), CF, E-Flora BC | | |
| Vascular Plant – Dicot | *Persicaria hydropiperoides* | Water-pepper | potential 1_2 | CF and BC Conservation Status Report | | |
| Vascular Plant – Dicot | *Phacelia heterophylla virgata* | Varied-leaf Phacelia | potential 2 | Cart, *et al*. (1952), CF | | Sumallo Valley |
| Vascular Plant – Dicot | *Polygonum sawatchense oblivium* | Sawatch knotweed | potential 1 | CF | | |
| Vascular Plant – Dicot | *Potentilla diversifolia* var. *perdissecta* | Diverse-leaved Cinquefoil | potential 2 | Carl, *et al*. (1952), CF | ECMPP | Timberline Valley |
| Vascular Plant – Dicot | *Rupertia physodes* | California-tea | potential 3 | CF | | |
| Vascular Plant – Dicot | *Sedum lanceolatum* var. *nesioticum* | Lance-leaved Stonecrop | potential 2_3 | CF, E-Flora BC | | |
| Vascular Plant – Fern/Fern Ally | *Cryptogramma cascadensis* | Cascade Parsley Fern | potential 2 | CF, E-Flora BC, BC Species Summary | | |
| Vascular Plant – Fern/Fern Ally | *Polystichum andersonii* | Anderson's Holly Fern | potential 2 | CF, E-Flora BC | | |
| Vascular Plant – Monocot | *Alopecurus carolinianus* | Carolina Meadow-foxtail | potential 2 | CF, E-Flora BC, BC Species Summary | | |
| Vascular Plant – Monocot | *Carex comosa* | Bearded Sedge | potential 1_2 | CF, E-Flora BC, BC Species Summary | | |

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|---|---|---|---|---|---|---|
| Vascular Plant – Monocot | *Melica bulbosa bulbosa* | Oniongrass | potential 2 | Armstrong (2007), E-Flora BC | | |
| Vascular Plant – Monocot | *Melica fugax* | Little Oniongrass | potential 1 | CF, BC Species Summary | | |
| Vascular Plant – Monocot | *Sparganium fluctuans* | Water Bur-reed | potential 3 | CF | | |
| Vertebrate – Amphibian | *Plethodon vehiculum* | Western Redback Salamander | potential 2 | CF, BC Conservation Status Report | | |
| Vertebrate – Amphibian | *Rana aurora* | Northern red-legged Frog | potential 2 | B.C.'s Wild Heritage (2000) | SVPP | |
| Vertebrate – Amphibian | *Rana cascadae* | Cascade Frog | potential 2 | Dupuis (2001) | | |
| Vertebrate - Bird | *Aythya affinis* | Lesser Scaup | potential 1 | CF, BC Conservation Status Report | | |
| Vertebrate - Bird | *Botaurus lentiginosus* | American Bittern | potential 2 | CF, NatureServe, BC Species Summary | | |
| Vertebrate - Bird | *Bucephala clangula* | Common Goldeneye | potential 1 | BC Conservation Status Report, NatureServe Explorer | | |
| Vertebrate - Bird | *Buteo lagopus* | Rough-legged Hawk | potential 1 | CF, NatureServe, BC Species Summary | | |
| Vertebrate - Bird | *Buteo swainsoni* | Swainson's Hawk | potential 2 | Armstrong (2007), Summit (2003) | ECMPP, CRA, SVPP, OPPA | |
| Vertebrate - Bird | *Chlidonias niger* | Black Tern | potential 2 | CF, NatureServe, BC Species Summary | | |
| Vertebrate - Bird | *Dendragapus fuliginosus* | Sooty Grouse | potential 2 | CF, BC Species Summary | | |
| Vertebrate - Bird | *Falco mexicanus* | Prairie Falcon | potential 2 | Armstrong (2007), Summit (2003) | | |
| Vertebrate - Bird | *Hydroprogne caspia* | Caspian Tern | potential 2 | CF, NatureServe, BC Species Summary | | |
| Vertebrate - Bird | *Icterus galbula* | Baltimore Oriole | potential 2 | CF, NatureServe, BC Species Summary | | |
| Vertebrate - Bird | *Megascops kennicottii kennicottii* | Western Screech-owl ssp *kennicottii* | potential 1 | | SVPP | |
| Vertebrate - Bird | *Melanitta perspicillata* | Surf Scoter | potential 2 | Armstrong (2007), Summit (2003) | SVPP | |
| Vertebrate - Bird | *Nycticorax nycticorax* | Black-crowned Night-heron | potential 2 | CF, NatureServe, BC Species Summary | | |
| Vertebrate - Bird | *Oporornis philadelphia* | Mourning Warbler | potential 2 | CF, NatureServe, BC Species Summary | | |
| Vertebrate - Bird | *Pelecanus erythrorhynchos* | American White Pelican | potential 2 | SAR Brochure | SVPP, ECMPP | |
| Vertebrate - Bird | *Phalaropus lobatus* | Red-necked Phalarope | potential 2 | Armstrong (2007), Summit (2003) | | |
| Vertebrate - Bird | *Picoides albolarvatus* | White-headed Woodpecker | potential 3 | Armstrong (2007), Summit (2003) | ECMPP, CRA | |
| Vertebrate - Bird | *Rallus limicola* | Virginia Rail | potential 1_2 | CF, NatureServe, BC Species Summary | | |
| Vertebrate - Bird | *Recurvirostra americana* | American Avocet | potential 3 | CF, NatureServe, BC Species Summary | | |
| Vertebrate - Bird | *Salpinctes obsoletus* | Rock Wren | potential 2 | CF, NatureServe, BC Species Summary | | |
| Vertebrate - Bird | *Spinus tristis* | American Goldfinch | potential 1 | CF, NatureServe, BC Species Summary | | |
| Vertebrate - Bird | *Thryomanes bewickii* | Bewick's Wren | potential 2 | CF, NatureServe, BC Species Summary | | |
| Vertebrate - Bird | *Tyrannus tyrannus* | Eastern Kingbird | potential 1 | Carl *et al*. (1952), NatureServe Explorer, CF | SVPP | Whitworth Ranch |
| Vertebrate - Fish | *Oncorhynchus clarkii lewisi*** | Westslope Cutthroat Trout** | potential 2 | D. Jesson pers. comm. | SVPP | |
| Vertebrate - Mammal | *Erethizon dorsatum* | North American Porcupine | potential 1 | CDC, Summit (2003) | SVPP, ECMPP, CRA, OPPA | |
| Vertebrate - Mammal | *Lepus americanus washingtonii* | Snowshoe Hare ssp *washingtonii* | potential 3 | CF | | |
| Vertebrate - Mammal | *Sorex bendirii* | Pacific Water Shrew | potential 3 | BC Conservation Status Report , MOE (2009) | | |
| Vertebrate - Mammal | *Sorex rohweri* | Olympic Shrew | potential 2 | BC Conservation Status Report | | |
| Vertebrate - Mammal | *Synaptomys borealis artemisiae* | Sagebrush Northern Bog Lemming | potential 3 | Gyug and Peatt (2000), Summit (2003) | ECMPP, CRA | |
| Vertebrate - Mammal | *Taxidea taxus* | Badger | potential 3 | Armstrong (2007), Summit (2003) | | |
| Vertebrate - Reptile | *Plestiodon skiltonianus* | Western Skink | potential 3 | Armstrong (2007), Summit (2003) | | |

* Uncertainty or expected changes regarding taxonomy which may impel review of rankings

** Historical records of stocking in the watershed, but not a native species to the Skagit system

## APPENDIX B
### Additional Literature Resources


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