

The Use of Alpine Habitats by Migratory Birds in B.C. Parks 1998 Summary

**Dr. Kathy Martin
Centre for Applied Conservation Biology
University of British Columbia**

Forest Sciences Centre
University of British Columbia
2424 Main Mall
Vancouver, B.C. V6T 1Z4
phone: (604) 822-9695
fax: (604) 822-9102
email: kmartin@interchg.ubc.ca

Report compiled by: Steve Ogle

Cite as: Martin, K. and S. Ogle. 2000. The Use of Alpine Habitats by Migratory Birds in B.C. Parks: 1998 Summary. Unpublished report, Department of Forest Sciences, Univ. of British Columbia and Canadian Wildlife Service, Pacific and Yukon Region. 15 p.
<http://www.forestry.ubc.ca/alpine/docs/alpmig-2.pdf>

Background and objectives

Our investigation is aimed at determining the relative importance of high-elevation habitats to migratory birds in southwestern British Columbia. Both altitudinal (moving upslope) and latitudinal (traveling south) migrant birds are thought to take advantage of abundant resources that occur in alpine habitats during late summer. This seasonal resource may play a significant role in the survival of many individuals of various species.

Although many high-elevation habitats are protected in parks and reserves, climatologists believe that these areas could be adversely influenced by even minor climatic changes. In southwestern B.C., alpine areas form the headwaters of all major watersheds, and monitoring of avian abundance may help to model the health of downstream water resources. In general, little is known about the ecology of alpine and sub-alpine habitats and we hope that this study will broaden the understanding and awareness of these fragile ecosystems.

This report summarizes our activities from the first season of research conducted in several British Columbian provincial parks (followed by their respective permit numbers in parentheses): Cypress and Mount Seymour, Garibaldi (#GS9810151), E.C. Manning (#OK9810145), Stein Nlaka'pamux and Wells Gray (#9810118).

Methods and results

There were ten study sites in the 1998 season, each selected on the basis of accessibility and the variety and expanse of habitats (see Figure 1 for site map). The purpose of this pilot season was to establish our sites and transect lines, and to determine the correct methodology for accurate density estimates. Across all sites, we traversed 60 km of alpine, 50 km of subalpine and 42 km of subalpine over three months to complete the season with 3311 detections of 6378 individual birds. Overall, we recorded 101 bird species in high elevation habitats (montane up to alpine) in 1998.

Survey protocol (distance sampling by line-transect) consists of walking a straight, pre-established line while accurately recording the position of the bird relative to the observer and transect. We use a combination of sophisticated rangefinders and simple geometry to calculate the

transect-to-bird distance. The computer program DISTANCE is used to estimate densities for each habitat. Our methodology has been verified as appropriate for statistical analysis.

We have stratified habitat types to alpine, subalpine, and montane forest in order to detect any upslope movements and to predict where and when the areas of highest bird abundance and diversity occur at each site. Preliminary results show that early September was the time of peak of avian abundance in 1998. Subalpine habitats appear to hold the highest species diversity in drier interior sites while coastal locales tend to have a greater relative diversity above treeline. Figure 2 displays the patterns in species diversity by habitat for each site.

Summaries by site:

Cypress and Mount Seymour Parks

The portion of our study site within Cypress Provincial Park was located on the southern and southwestern slopes of Mt. Strachan (Figure 1). At Mt. Seymour, our research was conducted around Dinkey Peak, Brockton Point and Pump Peak (Figure 1). Access was by foot for both sites and there was no overnight camping. We visited the sites three times during 1998 in teams of two observers. Each visit generally consisted of one or two day trips.

During the first visit we scouted the landscape and positioned our transect lines. In the forest, these imaginary lines were marked by labeled flagging tape (about 10 cm worth) placed every 25m. Occasionally, additional flagging was placed between intervals so as to guide the observer along the straight line. In the more open subalpine areas, flagging was placed at 25m or 50m intervals. Small cairns were occasionally constructed. We have detailed notes regarding transect placement so the very minimal amount of marking was used. In all cases we were as discrete as possible and no flagging was placed beside trails. Flagging or cairns were not placed in areas that could mislead hikers. A GPS receiver was used to record the position of transect lines at 200m intervals. For the purpose of surveying, physical landmarks are necessary to record the exact location on the line and to remain on the transect. At Cypress, there were four transect lines: two in montane (400m each) and two in the subalpine (275m each). At Mt. Seymour, we placed four transects in each habitat: 650m in montane (150m, 300m, 100m, 100m) and 800m in the subalpine (175m, 150m, 200m, 275m).

Cypress and Seymour were interesting sites due to the high level of human activity. The transects at Cypress are likely to be impacted by development, if they are not changed already.

The mature mountain hemlock forest above the Howe Sound Crest Trail (line M2) was unique among our sites. Noteworthy observations included high numbers of Black Swifts and Band-tailed Pigeons. Mount Seymour was more productive for birds and sightings included a Peregrine Falcon, an unusual visitor to mountain ridges. The forests around Dinkey Peak and Brockton Point harbored several species not encountered at other sites, including Western Tanager, Swainson's Thrush, Solitary Vireo, and Pacific-slope Flycatcher. In total, we recorded 24 species of birds at Cypress (Table 1) and 43 species at Mt. Seymour (Table 2).

Garibaldi Park

The portion of our study site within Garibaldi Park was located along the northwest ridge of Mt. Garibaldi, on the ridge flanking the western side of the Warren Glacier, and at the headwaters of Brohm Creek (Figure 1). Access was by vehicle approach up Brohm Ridge, then by foot from the main lookout at the west end of Brohm Ridge. We did not camp in the park but rather made daytrips from camping areas along Brohm Ridge. We visited the site three times during 1998 in teams of two observers. Each visit generally consisted of two overnight stays with a survey at dawn and dusk.

During the first visit we scouted the landscape and positioned our transect lines. In the forest, these imaginary lines were marked by labeled flagging tape (about 10 cm worth) placed every 25m. Occasionally, additional flagging was placed between intervals so as to guide the observer along the straight line. In the more open subalpine areas, flagging was placed at 25m or 50m intervals. Small cairns were occasionally used. In the rocky alpine, cairns were the means of marking the transects. We have detailed notes regarding transect placement so the very minimal amount of marking was used. In all cases we were as discrete as possible and no flagging was placed beside trails. Cairns were not built in areas that could mislead hikers. A GPS receiver was used to record the position of transect lines at 200m intervals (for the purpose of surveying, physical landmarks are necessary to record the exact location on the line and to remain on the transect). In the alpine, we set up five survey lines of 1100m, 1400m, 550m, 150m and 250m. We had three transects in subalpine habitats of 800m, 400m and 200m. There were two montane lines, of 800m and 400m length.

Garibaldi was an interesting site in that it was very typical of coastal-type habitat (rocky glacial till leading down to mature mountain hemlock forest). There was a relatively low amount

of species diversity relative to the interior sites. However, some species such as Dark-eyed Juncos and American Pipits were recorded in great numbers. In total, we recorded 39 species of birds during our visits (see Table 3). Noteworthy sightings included an Osprey flying across the Warren Glacier, Savannah Sparrows and American Pipits gleaning insects off glacial ice, and sizable overflights of medium-sized songbirds such as bluebirds and grosbeaks. A Brewer's Blackbird was a surprise encounter, seen flying south over Brohm Ridge. There were no observations of mountain goats but very fresh cougar prints (two sets) were encountered at the mini-sharkfin formation. Only a handful of hikers were observed during our visits. No motorized vehicles were seen entering the park, although many tracks were laid along Brohm Ridge.

E. C. Manning Park

The portion of our study site within Manning Park was located along the Three Brothers Trail between the Bonnevier Trail and Kicking Horse Pass (Figure 1). Access was by foot via the main trail, and we camped at the Buckhorn backcountry site. We visited the site three times during 1998 in teams of two observers. Each visit generally consisted of two overnight stays with a survey at dawn and dusk.

During the first visit we scouted the landscape and positioned our transect lines. In the forest, these imaginary lines were marked by labeled flagging tape (about 10 cm worth) placed every 25m. Occasionally, additional flagging was placed between intervals so as to guide the observer along the straight line. In the more open subalpine and alpine areas, flagging was placed at 25m or 50m intervals. Small cairns were occasionally used. In the rocky alpine, of which there is little at this site, small cairns were the means of marking the transects. We have detailed notes regarding transect placement so the very minimal amount of marking was used. In all cases we were as discrete as possible and no flagging was placed beside trails. Cairns were not built in areas that could mislead hikers. A GPS receiver was used to record the position of transect lines at 200m intervals (for the purpose of surveying, physical landmarks are necessary to record the exact location on the line and to remain on the transect). In the alpine, we set up four survey lines of 400m each. In subalpine habitats we ran three transects of 700m, 1000m, and 300m. There was only one line of 900m in the montane forest.

Manning Park was an interesting site due to the huge expanse of subalpine meadows. This was obviously a draw for many park visitors, but also appeared to be a great location for migrant

birds. Hawks were recorded in great abundance, and one mixed flock of juncos, chickadees, sparrows and warblers consisted of a dozen species and over 400 individuals. In total, we recorded 50 species of birds during our visits (Table 4), one of the highest tallies for any site. Noteworthy sightings included two Long-eared Owls (probably juveniles) along the trail in the forest, and Tennessee and Nashville Warblers in mixed flocks in the subalpine. A Prairie Falcon was observed in late September. The areas of highest bird densities appeared to be in the meadows that retained the most soil moisture into the season. Many hikers were observed during the peak flower bloom but numbers trailed into September.

Stein and Well Gray Parks

The portion of our study site within Stein Nlaka'pamux Heritage Park was located at the headwaters of the Cow Creek drainage (Figure 1). Most of the transect lines were situated on the periphery of the park above Devil's Lake. Access was via the Texas Creek east fork, and we camped at the tarn that forms the head of Siwhe Creek. At Wells Gray Park, the study site was situated in the Trophy Meadows area beginning at the terminus of the flower meadows trail. No map is available at this time but can be forwarded upon request (we are visiting the site in the near future for this purpose). We visited these sites three times during 1998 in teams of two observers. Each visit generally consisted of two overnight stays with a survey at dawn and dusk.

During the first visit we scouted the landscape and positioned our transect lines. In the forest, these imaginary lines were marked by labeled flagging tape (about 10 cm worth) placed every 25m. Occasionally, additional flagging was placed between intervals so as to guide the observer along the straight line. In the more open subalpine areas, flagging was placed at 25m or 50m intervals. Small cairns were occasionally used. In the rocky alpine, cairns were the means of marking the transects. They were built as small as possible, and some were accompanied by pieces of flagging so as to gain reference along the line. We have detailed notes regarding transect placement so the very minimal amount of marking was used. In all cases we were as discrete as possible and no flagging was placed beside trails. Cairns were not built in areas that could mislead hikers. A GPS receiver was used to record the position of transect lines at 200m intervals (for the purpose of surveying, physical landmarks are necessary to record the exact location on the line and to remain on the transect). At the Stein site, we have placed 2650m of alpine transect in

four lines, 2250m in the subalpine over five lines, and 1275m in montane forest over two lines. At Wells Gray we set up four lines of 400m length in each of the habitat types, except one 800m transect in the alpine. The total for this area is 5200m of transect.

The Stein was an interesting site due to the vast amount of flat alpine tundra. Coyotes, marmots and old grizzly bear sign were found above treeline. We noted that there were many cattle roaming at the headwaters of Cow Creek. A mountain beaver (*Aplodontia*) was observed in Cow Creek. We recorded 53 species of birds during our visits (Table 5), the most for any site. Noteworthy sightings include Prairie Falcon and Great-horned Owl. No hikers were observed during our visits. At Wells Gray, the flower meadow parklands were the highlight and seemed to hold many songbirds, including a high number of warblers. There were 39 species of birds recorded here (Table 6). We will be on the lookout for eastern species that may have ranges extending into this region.

Figure 1. 1998 study sites for alpine bird migration monitoring (Southwestern BC)

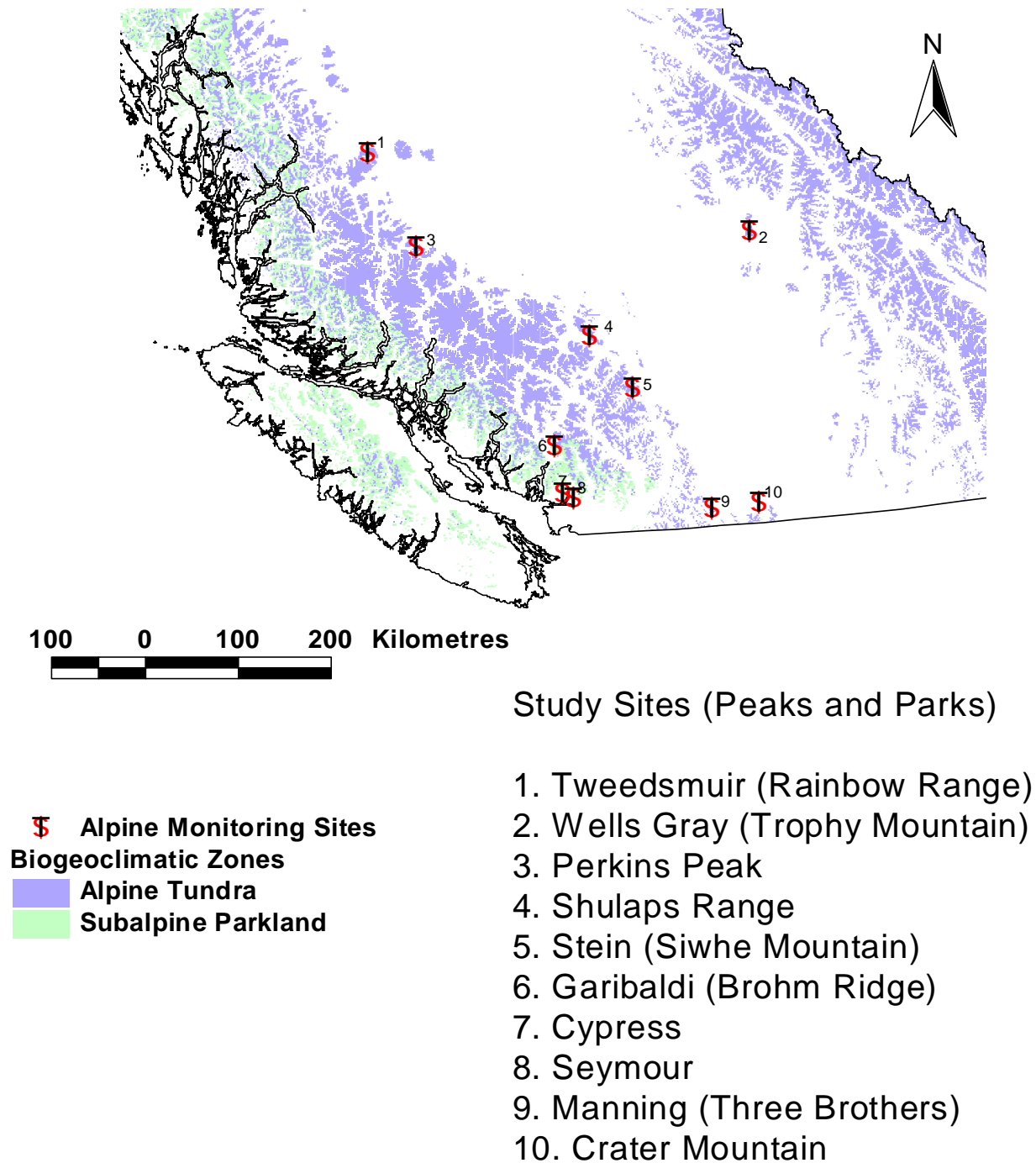


Figure 2: Species totals by habitat for 1998 study sites

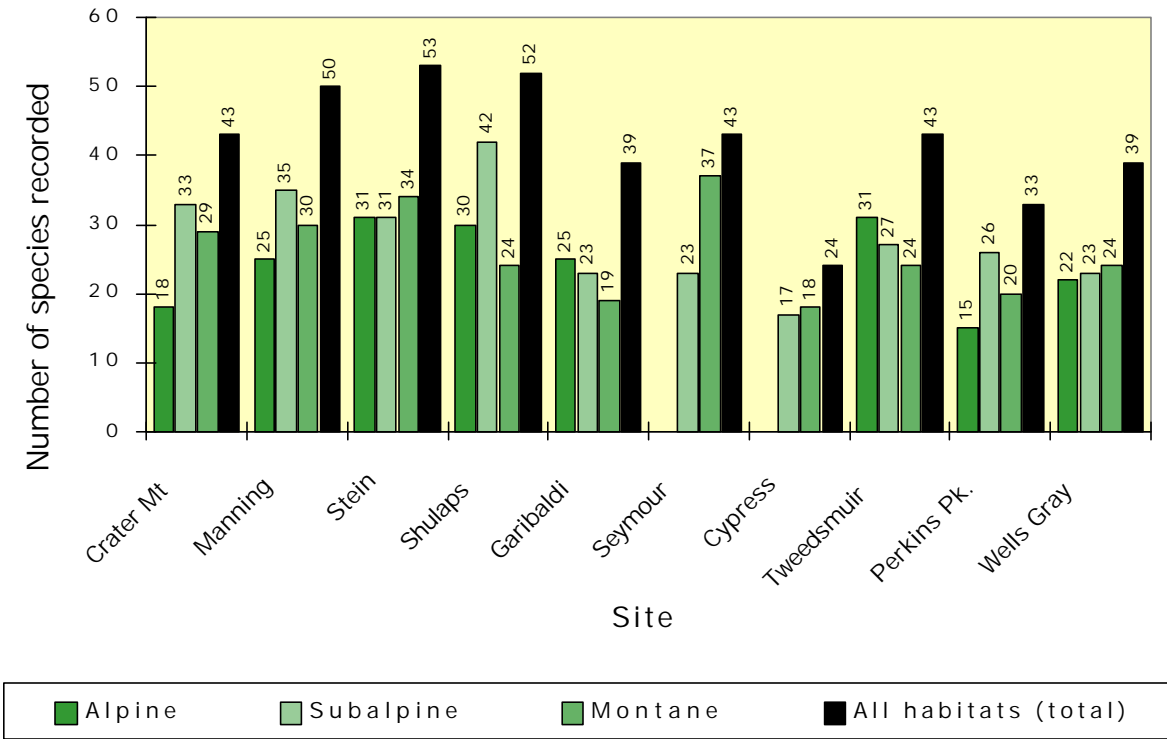


Table 1: Species totals by habitat for Cypress Provincial Park			
Species Name	Habitat		
	Subalpine	Montane	
Bald Eagle	X		
Northern Harrier	X		
American Kestrel		X	
Blue Grouse	X		
Spruce Grouse		X	
Band-tailed Pigeon	X	X	
Black Swift	X		
Northern Flicker	X	X	
Barn Swallow		X	
Gray Jay		X	
Steller's Jay	X		
Common Raven	X	X	
Black-capped Chickadee	X	X	
Chestnut-backed Chickadee		X	
Brown Creeper		X	
Winter Wren	X	X	
Golden-crowned Kinglet	X	X	
American Robin	X	X	
Varied Thrush	X	X	
Hermit Thrush	X		
Yellow-rumped Warbler	X	X	
Spotted Towhee		X	
Dark-eyed Junco	X	X	
White-crowned Sparrow	X	X	Total species:
<i>Total</i>	17	18	24

Table 2: Species totals by habitat for Mt. Seymour Provincial Park

Species Name	Habitat		
	Subalpine	Montane	
Red-tailed Hawk	X	X	
Turkey Vulture		X	
Peregrine Falcon	X		
Band-tailed Pigeon	X	X	
Black Swift	X		
Vaux's Swift		X	
Rufous Hummingbird		X	
Red-breasted Sapsucker	X		
Downy Woodpecker		X	
Northern Flicker	X	X	
Pacific-slope Flycatcher		X	
Violet-green Swallow		X	
Barn Swallow		X	
Gray Jay	X	X	
Steller's Jay	X	X	
Common Raven	X	X	
Black-capped Chickadee		X	
Chestnut-backed Chickadee		X	
Mountain Chickadee		X	
Red-breasted Nuthatch		X	
Brown Creeper		X	
Winter Wren	X	X	
Golden-crowned Kinglet	X	X	
American Robin	X	X	
Varied Thrush	X	X	
Hermit Thrush		X	
Swainson's Thrush		X	
American Pipit	X		
European Starling		X	
Solitary Vireo		X	
Orange-crowned Warbler	X	X	
Yellow-rumped Warbler	X	X	
Townsend's Warbler	X	X	
MacGillivray's Warbler		X	
Wilson's Warbler	X	X	
Western Tanager	X	X	
House Finch		X	
Pine Siskin		X	
Red Crossbill	X	X	
Spotted Towhee		X	
Savannah Sparrow	X		
Dark-eyed Junco	X	X	
White-crowned Sparrow	X		Total species:
<i>Total</i>	23	37	43

Table 3: Species totals by habitat for Garibaldi Provincial Park

Species Name	Habitat			
	Alpine	Subalpine	Montane	
Sharp-shinned Hawk	X	X		
Red-tailed Hawk	X	X	X	
Northern Harrier	X			
Osprey	X			
Blue Grouse	X	X	X	
White-tailed Ptarmigan	X			
Band-tailed Pigeon	X	X	X	
Black Swift	X			
Vaux's Swift			X	
Rufous Hummingbird	X			
Three-toed Woodpecker			X	
Northern Flicker	X	X	X	
Horned Lark	X	X		
Gray Jay		X	X	
Steller's Jay		X	X	
Clark's Nutcracker	X			
Common Raven	X	X	X	
Chestnut-backed Chickadee			X	
Mountain Chickadee	X	X	X	
Red-breasted Nuthatch		X		
Winter Wren		X	X	
Golden-crowned Kinglet			X	
Ruby-crowned Kinglet		X		
American Robin		X	X	
Mountain Bluebird	X			
Townsend's Solitaire		X		
American Pipit	X	X		
Orange-crowned Warbler		X		
Yellow-rumped Warbler	X	X	X	
MacGillivray's Warbler			X	
Brewer's Blackbird	X			
Evening Grosbeak	X			
Pine Grosbeak	X		X	
Rosy Finch	X			
Pine Siskin	X	X	X	
Savannah Sparrow	X	X		
Dark-eyed Junco	X	X	X	
Chipping Sparrow	X	X		
White-crowned Sparrow		X		Total species:
<i>Total</i>	25	23	19	39

Table 4: 1998 species totals by habitat for Manning Park

Species Name	Habitat			
	Alpine	Subalpine	Montane	
Sharp-shinned Hawk	X	X	X	
Cooper's Hawk	X			
Red-tailed Hawk	X	X	X	
Rough-legged Hawk	X			
Golden Eagle	X	X		
Northern Harrier	X	X		
Prairie Falcon		X		
American Kestrel	X			
Blue Grouse		X		
Spruce Grouse			X	
White-tailed Ptarmigan	X			
Long-eared Owl			X	
Rufous Hummingbird	X	X	X	
Hairy Woodpecker			X	
Northern Flicker	X	X	X	
Horned Lark	X	X		
Gray Jay	X	X	X	
Steller's Jay		X	X	
Clark's Nutcracker	X		X	
Common Raven	X	X	X	
Boreal Chickadee		X	X	
Mountain Chickadee	X	X	X	
Red-breasted Nuthatch		X	X	
Brown Creeper			X	
Winter Wren			X	
Golden-crowned Kinglet	X	X	X	
American Robin	X	X		
Varied Thrush		X		
Hermit Thrush			X	
Mountain Bluebird	X	X		
Townsend's Solitaire	X		X	
American Pipit	X	X		
Tennessee Warbler		X		
Yellow-rumped Warbler		X	X	
Townsend's Warbler		X	X	
Wilson's Warbler			X	
Western Tanager			X	
Western Meadowlark		X		
Evening Grosbeak		X	X	
Rosy Finch		X		
Pine Siskin	X	X	X	
Red Crossbill		X		
White-winged Crossbill			X	
Savannah Sparrow	X	X		
Dark-eyed Junco	X	X	X	
Chipping Sparrow	X	X	X	
Golden-crowned Sparrow		X		
White-crowned Sparrow	X	X	X	
Fox Sparrow		X		
Lincoln's Sparrow		X	X	Total species:
<i>Total</i>	25	35	30	50

Table 5: Species totals by habitat for Stein Provincial Park

Species Name	Habitat			
	Alpine	Subalpine	Montane	
Sharp-shinned Hawk	X	X	X	
Cooper's Hawk	X			
Rough-legged Hawk	X			
Golden Eagle	X			
Northern Harrier	X	X		
Prairie Falcon	X	X		
American Kestrel	X	X	X	
Spotted Sandpiper	X	X		
Great-horned Owl	X		X	
Rufous Hummingbird	X			
Red-breasted Sapsucker			X	
Red-naped Sapsucker		X		
Three-toed Woodpecker			X	
Northern Flicker	X	X	X	
Olive-sided Flycatcher			X	
Hammond's Flycatcher		X	X	
Horned Lark	X			
Gray Jay	X	X	X	
Clark's Nutcracker	X	X	X	
Black-billed Magpie		X		
Common Raven	X	X	X	
Mountain Chickadee	X	X	X	
Red-breasted Nuthatch	X		X	
Brown Creeper			X	
Winter Wren	X	X	X	
Golden-crowned Kinglet	X	X	X	
American Robin	X	X	X	
Hermit Thrush		X	X	
Townsend's Solitaire		X	X	
American Pipit	X	X		
Cedar Waxwing	X			
Orange-crowned Warbler			X	
Tennessee Warbler			X	
Nashville Warbler			X	
Yellow-rumped Warbler	X	X	X	
Townsend's Warbler		X		
MacGillivray's Warbler			X	
Wilson's Warbler		X	X	
Evening Grosbeak		X		
Cassin's Finch			X	
Pine Siskin	X	X	X	
American Goldfinch			X	
Red Crossbill	X			
Spotted Towhee			X	
Savannah Sparrow	X	X		
Vesper Sparrow	X			
Dark-eyed Junco	X	X	X	
Chipping Sparrow	X	X	X	
Golden-crowned Sparrow	X	X	X	
White-crowned Sparrow	X	X	X	
Fox Sparrow		X		
Lincoln's Sparrow			X	
Song Sparrow		X		Total species:
<i>Total</i>	31	31	34	53

Species Name	Habitat			
	Alpine	Subalpine	Montane	
Red-tailed Hawk		X		
Northern Harrier	X	X		
Red-naped Sapsucker		X	X	
Hairy Woodpecker			X	
Northern Flicker			X	
Hammond's Flycatcher	X		X	
Gray Jay	X	X	X	
Steller's Jay			X	
Clark's Nutcracker			X	
Common Raven	X	X	X	
Black-capped Chickadee			X	
Mountain Chickadee	X	X	X	
Red-breasted Nuthatch	X	X	X	
Brown Creeper			X	
Winter Wren		X		
Golden-crowned Kinglet	X	X	X	
Ruby-crowned Kinglet	X	X	X	
American Robin	X		X	
Varied Thrush			X	
Hermit Thrush			X	
Mountain Bluebird	X			
Townsend's Solitaire		X		
American Pipit	X		X	
Cedar Waxwing			X	
Solitary Vireo			X	
Yellow-rumped Warbler	X			
Townsend's Warbler	X			
MacGillivray's Warbler	X	X		
Wilson's Warbler	X	X		
Pine Siskin	X	X		
Red Crossbill	X	X	X	
Savannah Sparrow	X	X		
Vesper Sparrow	X	X	X	
Dark-eyed Junco	X	X	X	
Chipping Sparrow	X	X	X	
Clay-coloured Sparrow		X		
White-crowned Sparrow	X	X		
Fox Sparrow		X		
Song Sparrow		X		Total species:
<i>Total</i>	22	23	24	39

Revisions made by K. Martin,

June 20, 2000