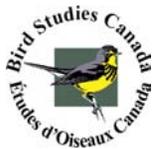


**Strathcona Provincial Park and  
Mt. Arrowsmith Area Mountains  
Important Bird Areas  
Conservation Plan**

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May 2001**



# Vancouver Island White-tailed Ptarmigan IBAs Conservation Plan May 2001

## *Foreword*

### **The issue**

The Vancouver Island White-tailed Ptarmigan is a subspecies of ptarmigan that is found nowhere else in the world. Despite being a Blue-listed subspecies in BC due to its restricted breeding range, little is known about the status of the population (whether it is increasing, decreasing, or stable) or about differences in habitat use during the breeding and non-breeding season, and how developments such as recreation, and resource extraction (forestry) affect productivity and survival.

### **Summary**

This conservation plan provides an overview of the biology of Vancouver Island White-tailed Ptarmigan, discusses the issues that may affect these birds and the habitats that they use, introduces and highlights initiatives that could address some of these issues. This plan was written in conjunction with an action-oriented non-government organization active in the region and is intended to facilitate work that they engage in and to stimulate future work.

### **Availability of report:**

This report is available in digital format from the Important Bird Areas Web Page: [www.ibacanada.com](http://www.ibacanada.com).

# Vancouver Island White-tailed Ptarmigan IBAs Conservation Plan

## May 2001

### *Executive Summary*

**The purpose of this document** is to facilitate the collection of observations of the endemic Vancouver Island White-tailed Ptarmigan (*Lagopus leucurus saxatili*), via the formation of a volunteer Ptarmigan sighting program, and to help generate outreach and educational material appropriate for the conservation of this subspecies both within and outside the bounds of the two White-tailed Ptarmigan IBAs. It is also hoped that the establishment of these two IBAs and the development of this plan will also help raise the profile of this subspecies such that planned development in the alpine areas take White-tailed Ptarmigan habitat requirements into consideration.

### **What is an Important Bird Area?**

An Important Bird Area (IBA) is a site providing essential habitat for one or more species of breeding or non-breeding birds. These sites may contain threatened species, endemic species, species representative of a biome, or highly exceptional concentrations of birds.

**The goals of the Canadian IBA program are to:** 1) identify a network of sites that conserve the natural diversity of Canadian bird species; 2) ensure the conservation of sites through partnerships of local stakeholders who develop and implement appropriate on-the-ground conservation plans.

### **The White-tailed Ptarmigan IBAs**

There are two White-tailed Ptarmigan IBAs on Vancouver Island: Strathcona Provincial Park and Mt. Arrowsmith Area Mountains. Strathcona Provincial Park is located in the central mountainous area of Vancouver Island and is Vancouver Island's largest and oldest park. The Mt. Arrowsmith Area Mountains IBA is further to the south and encompasses the alpine areas of Mt. Arrowsmith, Mt. McQuillan, Mt. Cokely, and Mt. Morairty. These two IBAs represent core areas for the White-tailed Ptarmigan on Vancouver Island. Both IBAs are national level IBAs on the basis of holding a crucial part of a subspecies with a restricted range. Furthermore, both are in close proximity to major urban centres on Vancouver Island and receive a considerable amount of use by the public. These areas are also used extensively for fall migration for a wide range of birds and represent potential habitat for the Vancouver Island Marmot.

### **Why the White-tailed Ptarmigan deserves conservation attention**

Vancouver Island is known to be home to the endemic Vancouver Island Marmot (*Marmota vancouverensis*), arguably the world's most endangered mammal species. Like the Vancouver Island Marmot, the subspecies of White-tailed Ptarmigan found on Vancouver Island (*Lagopus leucurus saxatili*) is found nowhere else in the world. This subspecies is presently Blue-listed by the Provincial Ministry of Environment due to its limited distribution and therefore deserves similar attention that is afforded to the Vancouver Island Marmot.

### **Current Conservation Activities**

Strathcona Provincial Park represents a significant portion of potential White-tailed Ptarmigan habitat. Like most provincial parks in BC, Strathcona Provincial Park plays a dual functional role of providing valuable wildlife habitat while also providing recreational opportunities. Significant portions of the park are presently and will likely remain zoned in ways that are likely compatible with White-tailed Ptarmigan biology. Furthermore, current management directions of the park suggest that wildlife values will be considered in future development activities in the park.

Portions of the Mt. Arrowsmith Area Mountains IBA fall within the boundary of the Mount Arrowsmith World Biosphere Reserve. Since inclusion in this reserve, the Mt. Arrowsmith Area Mountains IBA, and issues associated with it, may now receive greater status than previously

## Vancouver Island White-tailed Ptarmigan IBAs Conservation Plan May 2001

afforded to the area. This biosphere designation will hopefully provide a framework to promote a co-ordinated, sustainable approach to the management of the region's ecosystem.

### Conservation Goals and objectives

The conservation goals and objectives for the Vancouver Island White-tailed Ptarmigan IBAs are relevant to all alpine areas on Vancouver Island. At present, two broad categories are being considered: outreach and education, and research and monitoring. The following goals and objectives have been established for these IBAs.

#### *Outreach and education*

Develop interpretative material that informs Strathcona Provincial Park visitors of the unique biology of Vancouver Island White-tailed Ptarmigan and the role that the park plays in the conservation of this endemic subspecies. This material will also be geared for use in schools, other recreational areas, and for extension to those businesses that operate in alpine areas of Vancouver Island.

#### *Research and Monitoring*

Work with the researchers at the University of BC to develop a formal mechanism for the recording of White-tailed Ptarmigan observations by members of the public. This would include the development of material that would facilitate the proper identification of White-tailed Ptarmigan, the proper reading of leg bands, the recording of appropriate biological indicators present at sighting locations (e.g., the presence of predators of White-tailed Ptarmigan) and the recording of appropriate habitat features.

Support and encourage research on White-tailed Ptarmigan including the following research areas/initiatives:

- a detailed inventory of known sites to determine relative densities and estimate total populations size ;
- an assessment of habitat use during the breeding season;
- an examination of dispersal and mortality of both adults and juveniles;
- habitat selection and winter habitat/migration. In particular it will be important to investigate the potential impact of timber harvest on winter habitat;
- the development of a long-term monitoring program to track abundance and relative densities in representative areas.

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**Vancouver Island White-tailed Ptarmigan IBAs Conservation Plan  
May 2001**

***Table of Contents***

Foreword.....	ii
Executive Summary.....	iii
Table of Contents.....	v
List of Figures.....	vi
List of Tables.....	vi
List of Appendices.....	vi
1. Introduction.....	1
2. The IBA program.....	1
3. IBA Site Information.....	2
4. IBA Species Information.....	5
4.1 Natural history of White-tailed Ptarmigan.....	5
4.1.1 Status as a subspecies.....	5
4.1.2 Biology.....	5
4.1.3 Population range and status (size and trend).....	6
4.2 Conservation concerns.....	6
4.2.1 Lack of data on distribution, abundance and limiting factors.....	6
4.2.2 Alpine areas and development: the European experience.....	7
4.2.3 Use of alpine areas on Vancouver Island: present and planned.....	7
4.2.4 The potential impacts of logging: breaks in vertical connectivity.....	8
4.2.5 Horizontal connectivity.....	9
4.2.6. Climate change:.....	9
5. Other elements of high conservation value.....	9
6. Land ownership and use.....	10
6.1 Strathcona Provincial Park.....	10
6.2 Mt. Arrowsmith Area Mountains IBA.....	10
7. Conservation management achieved at the IBA site.....	11
8. Groups active in the White-tailed Ptarmigan IBAs on Vancouver Island.....	11
9. Conservation Goals and Objectives.....	12
9.1 Outreach and education.....	12
9.2 Monitoring and Research.....	12
9.3 Other research needs.....	13
10. Evaluating success.....	13
11. Acknowledgements.....	13
12. Bibliography.....	15
Appendix 1: IBA Canada Partners.....	18

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**Vancouver Island White-tailed Ptarmigan IBAs Conservation Plan  
May 2001**

***List of Figures***

Figure 1. Alpine areas where White-tailed Ptarmigan are known to occur ..... 2

Figure 2. Areas in Strathcona Park IBA where White-tailed Ptarmigan are known to occur..... 3

Figure 3. Areas where White-tailed Ptarmigan are known to occur in the Mt. Arrowsmith  
and Area Mountains IBA..... 4

Figure 4. Existing and proposed conservation areas in the vicinity of the Mt. Arrowsmith  
and Area Mountains IBA..... 4

***List of Tables***

Table 1. Alpine areas where White-tailed Ptarmigan have been detected on Vancouver Island..... 6

Table 2. Present zonation of Strathcona Provincial Park ..... 10

Table 3. Conservation Goals and Objectives for the Vancouver Island  
White-tailed Ptarmigan IBAs ..... 14

***List of Appendices***

Appendix 1. Canada IBA Partners..... 18

# Vancouver Island White-tailed Ptarmigan IBAs Conservation Plan

## May 2001

### **1. Introduction**

Birds are key components in Canada's ecosystems and bird populations are often used as indicators of overall ecosystem health. The conservation of an area to benefit bird life will also conserve other plants and animals present. The loss and fragmentation of habitat throughout the Americas over the last several decades has resulted in measurable population declines in many bird species in Canada. The future of Canadian wildlife depends on our commitment to provide adequate and good quality habitat throughout their ranges.

Vancouver Island is home to two notable endemics (those species or subspecies that are found in only one area of the world): the Vancouver Island Marmot (*Marmota vancouverensis*) (Nagorsen 1987) and the Vancouver Island White-tailed Ptarmigan (Fraser et al. 1999). The Vancouver Island Marmot is arguably one of the world's most endangered mammals. This population is well studied and research on its status and recovery is well funded. Conversely, the status of the Vancouver Island White-tailed Ptarmigan is largely unknown. A broad-scale inventory and research project was begun in the late 1990's but has suffered from inconsistent funding. As a result, critical aspects of the biology of this subspecies are poorly understood. As recreational use of alpine areas on Vancouver Island grow and commercial forestry impinges upon the high elevation montane forests, the impact of these activities on White-tailed Ptarmigans remains largely unknown.

There are two identified White-tailed Ptarmigan IBAs on Vancouver Island: Strathcona Provincial Park and the areas in the vicinity of Mt. Arrowsmith and Mt. McQuillan. These locations are considered national level IBAs since they represent core areas for the Vancouver Island White-tailed Ptarmigan, a restricted-range subspecies (a subspecies with a range of <50,000 km<sup>2</sup>). However, Ptarmigan occur in numerous alpine locations on Vancouver Island, and consequently its long-term persistence is contingent upon healthy populations across Vancouver Island.

There are large gaps in what we currently know about the biology of White-tailed Ptarmigan on Vancouver Island. The gaps include a detailed knowledge of where on Vancouver Island this species exists, the status of the population (increasing, decreasing or stable), how is this species using the alpine areas (what are the differences in habitat use in summer versus winter), and how development (recreation and/or resource extraction) is affecting population status. The purpose of this plan is to facilitate the formation of a volunteer Ptarmigan sighting program that would involve the hiking and natural history clubs on Vancouver Island and to help generate outreach and educational material for dissemination, both within Strathcona Provincial Park, and within the community in general, that emphasizes the responsible use of alpine areas in order to further White-tailed Ptarmigan and alpine conservation. These activities will be planned and executed with the cooperation of both government and non-government agencies on Vancouver Island including BC Parks, BC Ministry of the Environment, Lands, and Parks, the University of British Columbia, and the Strathcona Wilderness Institute.

### **2. The IBA program**

The IBA program is an international initiative co-ordinated by BirdLife International, a partnership of member-based organizations in over 100 countries seeking to identify and conserve sites important to all bird species world-wide. Through the protection of birds and habitats, they also promote the conservation of the world's biodiversity. There are currently IBA programs in Europe, Africa, the Middle East, Asia, and the Americas.

The Canadian BirdLife co-partners are the Canadian Nature Federation (CNF) and Bird Studies Canada (BSC). The Canadian IBA program is part of the Americas IBA program, which includes the United States, Mexico, and 17 countries in Central and South America. In BC, the IBA program is being jointly overseen by two organizations: the Federation of BC Naturalists (FBCN) and the Wild Bird Trust of BC (WBTBC).

The goals of the Canadian IBA program are to:

# Vancouver Island White-tailed Ptarmigan IBAs Conservation Plan May 2001

1. identify a network of sites that conserve the natural diversity of Canadian bird species and are critical to the long-term viability of naturally occurring bird populations;
2. determine the type of protection or stewardship required for each site, and ensure the conservation of sites through partnerships of local stakeholders who develop and implement appropriate on-the-ground conservation plans; and
3. establish ongoing local involvement in site protection and monitoring.

IBAs are identified by the presence of birds falling under one or more of the following internationally agreed-upon categories:

1. Sites regularly holding significant numbers of an endangered, threatened, or vulnerable species.
2. Sites regularly holding an endemic species, or species with restricted ranges.
3. Sites regularly holding an assemblage of species largely restricted to a biome.
4. Sites where birds concentrate in significant numbers when breeding, in winter, or during migration.

### 3. IBA Site Information

The range of White-tailed Ptarmigan s is not well known but it spans most of the length of Vancouver Island from Mt Cain and Abel in the north, south to Mt Whympier and Landale (Figure 1). The White-tailed Ptarmigan IBAs on Vancouver Island are located in two separate geographic areas. The

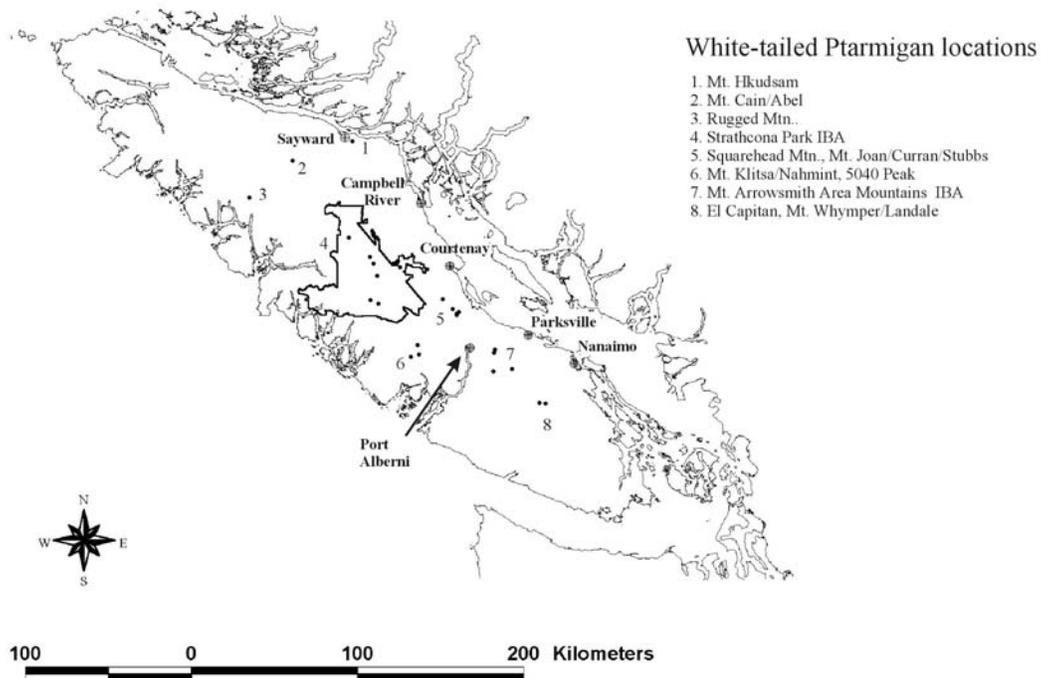


Figure 1. Alpine areas where White-tailed Ptarmigan are known to occur. (adapted from Martin and Elliott 1996, Martin and Commons 1997, Martin and Hitchcock 1997).

## Vancouver Island White-tailed Ptarmigan IBAs Conservation Plan May 2001

larger of the two, Strathcona Provincial Park (CABC265N), is located in the central mountainous area of Vancouver Island. Comprising an area of approximately 219,000 hectares, it is Vancouver Island's largest and oldest park (BC Parks 1993). Strathcona Provincial Park (SPP) is within 50 km of the communities of Campbell River, Gold River, Courtenay and Comox (Figure 2).

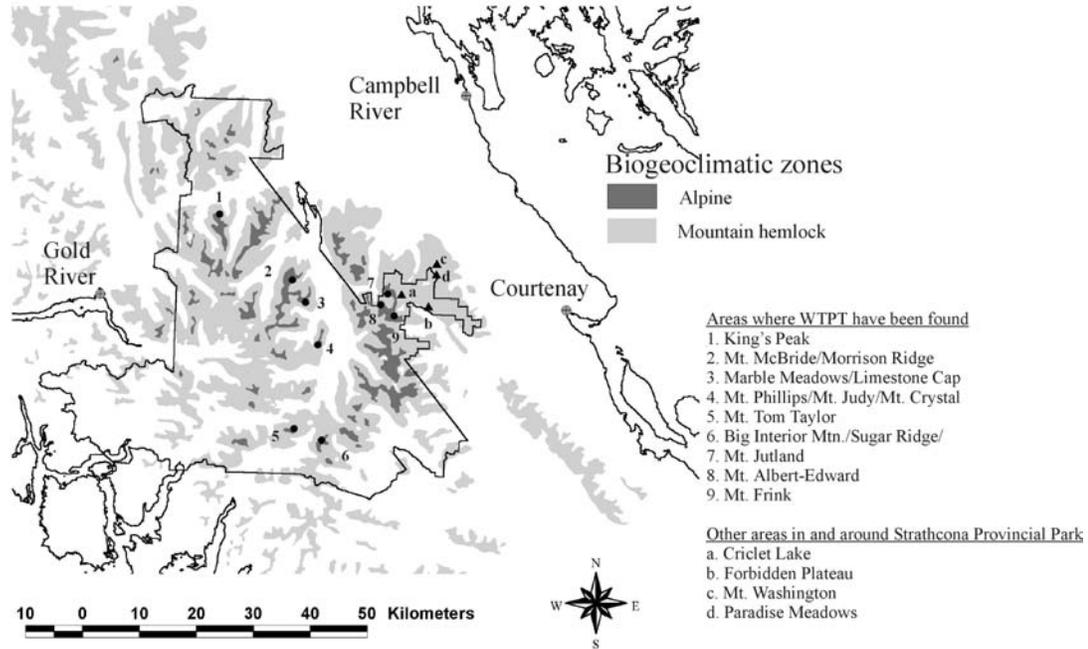


Figure 2. Areas in Strathcona Park IBA where White-tailed Ptarmigan are known to occur. (adapted from Martin and Elliott 1996, Martin and Commons 1997, Martin and Hitchcock 1997)

The second IBA, the Mt. Arrowsmith Area Mountains (CABC271N) encompasses the alpine areas of Mt. Arrowsmith, Mt. McQuillan, Mt. Cokely, and Mt. Morairty. The Mt. Arrowsmith Area Mountains (MAAM) IBA is in close proximity (<30 km) to both Parksville and Port Alberni (Figure 3). The alpine areas are all provincial crown land, while the much of the montane forests below the alpine fall almost entirely within Weyerhaeuser's Timber Farm Licence (TFL 44). Mt Cokely, Arrowsmith, and Morairty fall within the bounds of the Mt. Arrowsmith Biosphere Reserve. Furthermore, Mts. Cokely and Arrowsmith are also located within the bounds of Mt Arrowsmith Regional Park (Figure 4).

The alpine regions on Vancouver Island where White-tailed Ptarmigan have been found include rocky alpine tundra areas dominated by white and pink mountain heather (*C. mertensiana* and *P. empetriformis*). Ptarmigan were also located in patches of dwarf Mountain hemlock (*Tsuga heterophylla*) and subalpine fir (*Abies lasiocarpa*) that are intermixed with patches of mountain heather. During winter, ptarmigan were located in montane forests below the alpine and subalpine areas that were dominated by stands of Mountain hemlock and subalpine fir.

# Vancouver Island White-tailed Ptarmigan IBAs Conservation Plan May 2001

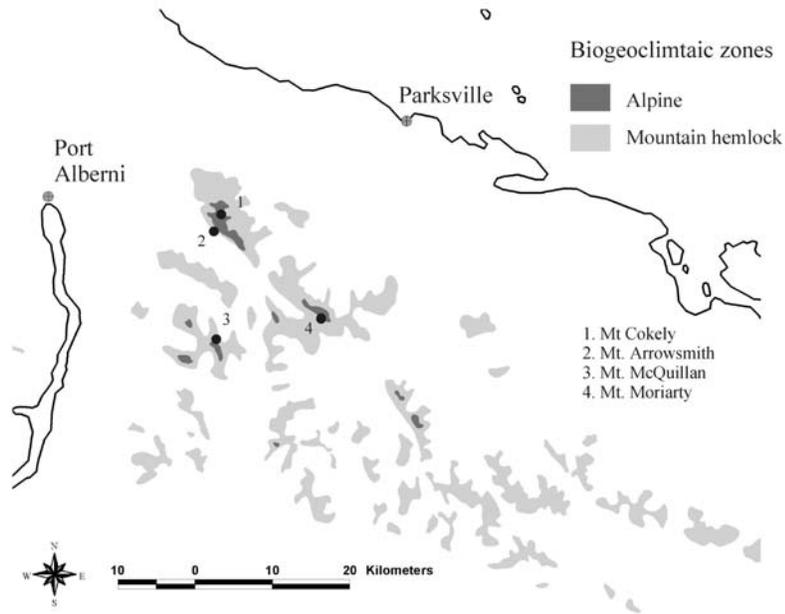


Figure 3. Areas where White-tailed Ptarmigan are known to occur in the Mt. Arrowsmith and Area Mountains IBA (adapted from Martin and Elliott 1996, Martin and Commons 1997, Martin and Hitchcock 1997).

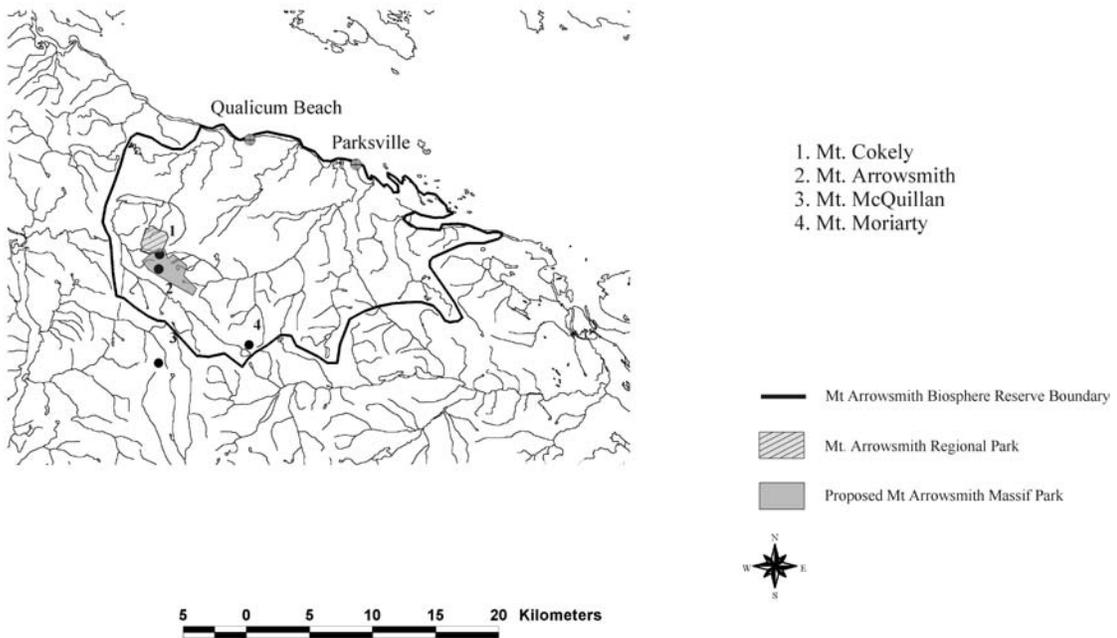


Figure 4. Existing and proposed conservation areas in the vicinity of the Mt. Arrowsmith Area Mountains IBA (from MABR 1999, RDN 2000).

# Vancouver Island White-tailed Ptarmigan IBAs Conservation Plan May 2001

## 4. IBA Species Information

### 4.1 Natural history of White-tailed Ptarmigan

#### 4.1.1 Status as a subspecies

Currently there are five recognized subspecies of White-tailed Ptarmigan, two of which occur in BC. *Lagopus leucurus leucurus* occurs throughout the mainland and *L. l. saxatilis* is restricted to Vancouver Island (Campbell et al. 1990). The Vancouver Island White-tailed Ptarmigan was designated as a distinct subspecies in 1939 (Cowan 1939). This designation was based on comparing plumage and body size (wing, tail and bill length) of 12 specimens on Vancouver Island with 26 specimens from mainland British Columbia and Washington, *L. l. leucurus* and *L. l. rainierensis*, respectively (Cowan 1939). Vancouver Island White-tailed Ptarmigan are considered a restricted range subspecies because the entire range where they are found is <50,000 km<sup>2</sup> (BSC 2001).

#### 4.1.2 Biology

The White-tailed Ptarmigan is the smallest grouse in North America. This species of ptarmigan generally inhabits alpine areas at or above timberline in mountainous regions of western North America. It has both physiological and behavioural adaptations that help conserve energy and enhance its ability to survive and thrive in cold, open, arid and low oxygen environments (Braun et al. 1993). For example, flocks of White-tailed Ptarmigan have been known to roost within snow banks. Additional behaviour that helps conserve energy is their tendency to walk rather than fly, and to seek out microhabitats that are several degrees warmer than ambient temperatures (Braun et al. 1993).

Within BC, White-tailed Ptarmigan have been found to breed between 1280 and 2650 m (Campbell et al. 1990). However, research by Martin and Commons (1997) indicate that during the breeding season, White-tailed Ptarmigans on Vancouver Island appear to live at lower elevations and use a wider range of habitats than on the mainland and that they tend to overlap more extensively with Blue Grouse on Vancouver Island than observed on the mainland. In SPP, ptarmigan are found above the timberline in moist, rocky, alpine patches dominated by white and pink mountain heather (*Cassiope mertensiana* and *Phyllodoce empetrififormis*, respectively). In the southern portions of Vancouver Island, ptarmigan are found in more heavily vegetated areas. In these regions, ptarmigan are located in subalpine areas where dwarf Mountain hemlock and subalpine fir were intermixed with patches of mountain heather (*C. mertensiana* and *P. empetrififormis*).

During the breeding season, pair formation occurs when females arrive on breeding areas (late April to mid-May). For a nest, females scrape out a small hollow in the ground that is then lined with dried vegetation and feathers (Braun et al. 1993). Nest placement varies between regions and among years and can include rocky areas or areas dominated by willow, sedge, and conifers (Wiebe and Martin 1998). On Vancouver Island, nests were placed in exposed rocky areas with little vegetation, but also in sites with good overhead cover from trees and shrubs (K. Martin, unpublished data from six nests). First clutches range from four to eight eggs (average six) in both BC and Colorado (Campbell et al. 1990). Brood sizes on Vancouver Island range from 1-8 chicks and the average brood size of successful hens in July and August is  $4.1 \pm 0.31$  (s.e.) chicks (n=32, 1995-1999; Martin and Forbes 2001.). Only one brood is produced per year. Re-nests occur only if the first clutch is destroyed. Total clutch failure is high and due largely to depredation (Braun et al. 1993). The main nest predators in Colorado were mammalian species: coyote (*Canis latrans*), red fox (*Vulpes vulpes*) and long-tailed weasel (*Mustela frenata*) (Wiebe and Martin, 1998).

White-tailed Ptarmigan tend to move from high elevation breeding sites in summer to lower elevation sites in winter (Braun et al. 1993). In some cases they have been known to make movements to wintering areas of up to 1200 m lower in elevation, and 50 km from the nearest suitable breeding habitat (Campbell et al. 1990). Preliminary information from Vancouver Island suggest that some White-tailed Ptarmigan may move to wintering areas, while others remain in the same place year-round (Martin and Hitchcock 1997). In general, ptarmigan moved less than 3 km between seasons, and ranges from one to

## Vancouver Island White-tailed Ptarmigan IBAs Conservation Plan May 2001

34 kilometres (based on 100 observations, K. Martin, unpublished data, Martin and Hitchcock 1997). There was evidence however, that birds move along an elevational gradient. During winter on the southern part of Vancouver Island, birds were located from 822m to 1788 m and from 1320 m to 2200 m on the central and northern parts of the Island. Wintering birds were found repeatedly in the montane forests of the mountain hemlock biogeoclimatic zone. This movement is thought in part to be in response to the severity of winter, as birds have been known to move well below the timberline during heavy snow years (Braun et al. 1993).

### 4.1.3 Population range and status (size and trend)

The range of White-tailed Ptarmigan s is not well known but it spans most of the length of Vancouver Island from the Mt Cain and Abel in the north, south to Mt Whympier and Landale, (Figure 1, Table 1). The present status of this subspecies is currently unknown, but is likely fewer than 1000 breeding birds (Fraser et al. 1999). Likewise, the overall population trend is unknown. Due to its presumed small population size and local distribution within a restricted range, this subspecies is considered at risk (Fraser et al. 1999). This subspecies is blue-listed in BC meaning that they are at risk, but are not Extirpated, Endangered or Threatened and as a result they are presently being tracked by the Provincial Conservation Data Centre (CDC). Hunting of Vancouver Island White-tailed Ptarmigan was halted in 1974 because of the lack of knowledge of the distribution of this subspecies, and the very few sightings of ptarmigan recorded at that time (D.Doyle, pers. comm.).

**Table 1. Alpine areas where White-tailed Ptarmigan have been detected on Vancouver Island.**

North Island	Central Island	South Island
Mt. Abel	Big Interior Ridge*	5040 Peak
Mt. Cain	King's Peak*	El Capitan
Mt. Hkusam	Limestone Cap*	Klitsa Mtn
Rugged Mt.	Marble Mountain Ridge*	Mt Curran/Squarehead/Joan
	Morrison Ridge*	Mt Whympier
	Mt. Albert Edward*	Mt. Apps
	Mt. Crystal*	Mt. Arrowsmith**
	Mt. Frink*	Mt. Cokely**
	Mt. Judy/Phillip*	Mt. Landale
	Mt. Jutland*	Mt. McQuillan**
	Mt. Tom Taylor*	Mt. Moriarty**
	Sugar Ridge*	Mt. Nahmint
		Mt. Stubbs

\* those locations within Strathcona Provincial Park IBA

\*\* those locations within Mt. Arrowsmith Area Mountains IBA

(from Martin and Elliott 1996, Martin and Commons 1997, Martin and Hitchcock 1997)

## 4.2 Conservation concerns

### 4.2.1 Lack of data on distribution, abundance and limiting factors

Despite being a Blue-listed subspecies due to its restricted breeding range and the potential negative impacts from land development, recreational and forestry related activities, little is known about the Vancouver Island White-tailed Ptarmigan. Some of the most fundamental questions pertaining to this subspecies such as its range on Vancouver Island have yet to be elucidated. Furthermore, the status of the population (whether it is increasing, decreasing, or stable) is also unknown. Likewise little is known about differences in habitat use during the breeding and non-breeding season, and how developments such as recreation, and resource extraction (forestry) affect productivity and survival. An inventory and

## Vancouver Island White-tailed Ptarmigan IBAs Conservation Plan May 2001

research project was begun in the late 1990's by Dr. Kathy Martin, UBC, but has suffered from inconsistent funding. This research has yielded extremely important information regarding the distribution of this subspecies and some information on habitat use; however, more research is required.

### *4.2.2 Alpine areas and development: the European experience*

Alpine areas are generally considered to be without threats primarily because many alpine areas are either free of resource extraction activities or are protected by inclusion in either Provincial or National Parks. Indeed, as Martin (2000) states "probably the largest concern about alpine habitat is the lack of concern about high elevation conservation". Threats to alpine areas in general are associated with human activities such as ski developments and associated offsite activities; recreation activities (including hiking, skiing, mountain biking, snowmobiling) especially when these activities are supported by helicopters; livestock grazing; mining, forestry activities in adjacent montane areas; and pollution. These activities can lead to direct deterioration of alpine habitat, the alteration of the traditional use of wildlife species in alpine habitats, or to alteration of normal ecological processes, particularly the increase in the abundance of generalist predators (Martin 2000).

Pressure on alpine areas is far greater in Europe than in North America. The extensive development of alpine areas for ski resorts has led to dramatic decreases in Black Grouse (*Tetrao tetrix*) populations due to the degradation of the quality of both winter and summer habitats (Menoni and Magnani 1998, Zeitler and Glanzer 1998 as cited in Martin 2000). Significant deterioration of alpine habitats due to recreational activities has been noted in areas of the US Pacific Northwest and Colorado (Willard and Marr 1970, Bell and Bliss 1973, Rochefort and Gibbons 1992, Kirk 1999). Trampling of alpine areas by hikers has led to significant reductions of vegetative cover, leading to further erosion by wind and water (Willard and Marr 1970). The deterioration due to trampling in alpine areas is due largely to the severe environment, short growing season, relatively few species that are both susceptible to damage and have slow growth rates, and a general lack of successional species that can seal the surface of denuded areas (Willard and Marr 1970, Bell and Bliss 1973).

Excessive disturbance in alpine areas has also led to alteration of normal feeding and breeding activity of alpine birds which in turn has led to dramatic population declines (Menoni and Magnani 1998, Zeitler and Glanzer 1998 as cited in Martin 2000,) and the alteration of use of traditional areas (Houard and Muere 1997 as cited in Martin 2000)

It has also been noted that the development of ski resorts resulted in increases in predation risk of alpine wildlife by generalist predators such as corvids (crows, ravens and jays), gulls, canids (such as coyotes and foxes), and possibly some rodents such as marmots. These generalist predators are often sustained either by refuse that often accompanies human development, or by food supplied by the public (e.g., feeders; Watson 1979, Watson 1991 as cited in Martin 2000, Smith et al. 1997). Any development that leads to increased abundance of generalist predators can have a large impact on the number of juvenile ptarmigan (Storch 2000)

### *4.2.3 Use of alpine areas on Vancouver Island: present and planned*

On Vancouver Island, both White-tailed Ptarmigan IBAs are subject to similar pressures, albeit at lower intensities, that is experienced in alpine areas in other regions of North America and Europe. Both areas receive a considerable amount of recreational activity during the summer season. The peaks of Mt. Arrowsmith and Cokely are two of the most accessible mountains in southern Vancouver Island; both can be easily accessed via logging roads from Port Alberni. As a result, portions of this alpine zone have been heavily impacted by recreational activities (P. Rothermel, pers. comm.). In addition, portions of the alpine zone in this area have undergone significant alteration due to the development that has accompanied the infrastructure related to the Mt. Arrowsmith Regional Park and associated ski operation (P. Rothermel, pers. comm.). In addition, there have been several proposals put forth that would see the expansion of the ski facilities in this area. These have included the installation of lifts up to Cokely Peak, the creation of as many as 48 groomed runs to service up to 4,000 skiers per day (Storr 1998), and the development of an alpine village resort on Mt. Cokely. The proposed development on Mt. Cokely would

## Vancouver Island White-tailed Ptarmigan IBAs Conservation Plan May 2001

be situated at about 500 m elevation and would house up to 5000 people. A gondola would also be built that would transport up to 3000 people a day to the ski area (Rothermel 1999). These proposed developments are presently on hold due to financial considerations. Furthermore, portions of the Mt. Arrowsmith IBA also receive use from snowmobiles that gain access to alpine areas via the Mt. Arrowsmith regional park. It is also likely that the construction of logging roads, particularly in the vicinity of the Mt. Arrowsmith IBA, will also result in increased access and hence disturbance in alpine areas of this IBA.

The SPP IBA also receives a substantial number of visitors, particularly in the summer time. During the summer, SPP has approximately 16,000 day use visitors. Most of visits to the park occur during the summer, especially in August (BC Parks 1993) and summer visitation is concentrated in a relatively small area within the park. Most visitors frequent the alpine meadows in the vicinity of Mt. Washington and Forbidden Plateau. From these two access points, hikers gain easy access to alpine areas in the Paradise Meadows, Cirlet Lake and Mt. Albert Edward areas (S. Smith, pers. comm., Figure 2). The construction of a new summer lodge at Mt. Washington and the infrastructure (retail buildings, parking, walking and biking trails, etc.) that will accompany this new development will bring added visitors and hence potential disturbance to this portion of the alpine areas surrounding the park. Recently, visitation to the alpine areas in the Bedwell Lake area has increased. From this area, hikers can gain access to the alpine zone in the vicinity of Mt. Tom Taylor, Cream Lake, and Big Interior Mt (S. Smith, pers. comm.).

Winter visitation impacts a relatively small portion of the park and includes cross-country and back-country skiing, and snow-shoeing. Snowmobiling is prohibited within the park. Private facilities outside the park at Forbidden Plateau and Mt. Washington, and groomed cross-country ski trails developed within the park at Paradise Meadows and the northern part of Forbidden Plateau, provide cross-country ski and snowshoe access within and on the bounds of the park. There are planned expansions of both the downhill and nordic facilities at Mt. Washington. Furthermore, there is a planned expansion of on-site accommodation at the Mt. Washington resort (2200 units maximum). The expansion of the Mt. Washington resort is in its early planning stages and is proceeding in consultation with the Vancouver Island Marmot recovery project, the Ministry of Environment, Lands, and Parks (MELP) and the Regional District of Comox-Strathcona (L Allen, pers. comm.).

How recreational activity impacts White-tailed Ptarmigan in these areas is unclear; anecdotal records suggest fewer Ptarmigan have been recorded in heavily utilized areas (P. Rothermel, pers. comm.). Proposed developments in the alpine areas on the island, if not carefully planned, may lead to similar problems that have occurred throughout Europe.

#### *4.2.4 The potential impacts of logging: breaks in vertical connectivity*

Vancouver Island White-tailed Ptarmigan can move large distances downslope to wintering areas in subalpine and montane forests (Campbell et al. 1990, Martin and Elliott 1996, Martin and Commons 1997). Currently all of the major forestry companies on Vancouver Island are actively harvesting in the montane forests immediately adjacent to alpine areas. In particular, extensive logging is taking place in forests downslope of the Mount Arrowsmith and Area Mountains IBA and is occurring up to the edge of some alpine areas (E. Morton, pers. comm.). Forest harvesting is excluded only from those areas where logging is either restricted due to extreme slopes or due to poor timber value. It is presently unclear how this harvesting will affect winter survival of this subspecies, but it is believed that the harvesting of montane forests adjacent to White-tailed Ptarmigan habitat may negatively affect wintering birds (Fraser et al. 1999). Removing forest cover leads to changes microclimate conditions including wind and insulation patterns, which may influence the rate of snowmelt. Increased snowmelt can lead to fewer or smaller snowfields that can restrict birds to a smaller amount of habitat making them vulnerable to predation and increasing local dispersal distances between snowfield patches (Martin 2001). Furthermore, increased fragmentation of montane forest may result in longer seasonal migration distances and higher bird mortality (Martin and Hitchcock 1997).

## Vancouver Island White-tailed Ptarmigan IBAs Conservation Plan May 2001

### 4.2.5 Horizontal connectivity

Studies of White-tailed Ptarmigan populations in Colorado in a naturally fragmented or discontinuous landscape have shown that local populations persist over time as a result of the dispersal or immigration of individuals of both sexes from outside areas. In other words, a system of recruitment from outside sources allows populations to recover or be “rescued” from events such as severe winters or high predation that normally would have led to local extinctions (Martin et al. 2000). Presently, it is unclear if land use practices could prevent White-tailed Ptarmigan from dispersing from one alpine area to another on Vancouver Island.

### 4.2.6. Climate change:

Global climate change has the potential to significantly alter the amount of alpine and subalpine habitat throughout Vancouver Island. Warming climates may both reduce the amount of alpine areas and increase the amounts of treed sub-alpine areas (Roland et al. 2000, Martin 2001). In addition, the increases in climatic variability, as well as the frequency of extreme weather events that have been linked with global climate change may adversely affect ptarmigans (Martin and Wiebe, 2001). There is also some concern that cold-adapted birds such as ptarmigans may have to endure an energetic cost when faced with higher temperatures (Martin and Forbes 2001).

## 5. Other elements of high conservation value

A total of 53 bird species, including numerous raptors and songbirds, have been recorded as using the alpine and subalpine regions of Vancouver Island as migration routes. (Martin and Ogle 1998). The Vancouver Island Marmot is an endemic marmot that is found in the alpine areas of Vancouver Island. Historically, Marmots had a much wider distribution than today and it appears as though marmot and ptarmigan ranges may have overlapped in numerous areas, including SPP, Mt Arrowsmith, and Mt. McQuillan. However, marmots tend to occur in subalpine meadows with deep soil for burrowing, whereas ptarmigan tend to be restricted to lightly vegetated areas and subalpine heath. However, Vancouver Island Marmots have disappeared from many historic natural habitats that remain in pristine condition. Presently Vancouver Island Marmots appear to overlap with White-tailed Ptarmigan only in the Mt. Moriarty and Mt. Whympere areas (Bryan and Janz 1996, Martin and Commons 1997, Martin and Hitchcock 1997).

Alpine plant communities have not been well inventoried on Vancouver Island and as a result, few occurrences are presently mapped in the BC CDC database (M. Donovan, pers. comm.). There is one occurrence record for each of two presently blue-listed plant communities (*Anaphalis margaritacea* - *Aster foliaceus* and, *Phlox diffusa* - *Selaginella wallacei*) in sub-alpine areas on southern Vancouver Island. Furthermore, although they have not yet been classified as plant communities (note that there are still many unclassified plant communities in BC, especially in alpine and wetland areas), CDC Plant Ecologist, Dr. Adolf Ceska has suggested that the following vegetation associations may be present in the alpine on Vancouver Island: *Lewisia columbiana* - *Allium crenulatum* (Red-listed), stands of *Aster paucicapitatus* (Red-listed), *Carex spectabilis* - *Hedysarum occidentale* (Red-listed) and communities with *Carex scirpoidea* (Red-listed).

Portions of coastal BC escaped the effects of the last ice age. Consequently there are numerous areas of endemism for several species of plants. Vancouver Island is included in five different endemic regions along the coast. These regions also include parts of southeast Alaska, the Queen Charlotte Islands, the mainland coast, the Fraser Valley, and the North Cascades. Twenty-one endemic taxa occur within these five endemic regions (Douglas 1996).

**Vancouver Island White-tailed Ptarmigan IBAs Conservation Plan  
May 2001**

**6. Land ownership and use**

**6.1 Strathcona Provincial Park**

Strathcona Provincial Park (SPP), established in 1911, represents a significant portion of potential White-tailed Ptarmigan habitat. Like most provincial parks in BC, SPP plays a dual functional role of providing valuable wildlife habitat while also providing recreational opportunities. Recently, SPP has undergone a significant review of its role both in terms of conservation and recreation. In the early 1990's the Parks Branch developed a management strategy (BC Parks 1993) in consultation with numerous local groups. Amendments to this Master Plan were made in April 2000. Together, these two documents have laid the path for future development in the park that includes strong support for the recognition and preservation of wilderness values.

Presently the park has five different zones: wilderness conservation, wilderness recreation, natural elements, intensive recreation, and significant features (Table 2). Each zone carries different appropriate uses. Clearly, significant portions of the park are zoned in ways that are likely compatible with White-tailed Ptarmigan biology. However, some activities in these zones may not be entirely compatible with White-tailed Ptarmigan requirements or may conflict with ptarmigan in other, less restrictive zones. In some cases, places where ptarmigan are frequently seen are also common, high-use hiking destinations (e.g., Mt. Albert Edward). Major additions to the park are either completed or are in the final planning stages. These additions help connect some of the montane forests with adjacent alpine areas.

**Table 2. Present zonation of Strathcona Provincial Park**

Zone	% of park	Area (ha)	Appropriate uses
Wilderness conservation	75	165,000	to protect undisturbed natural landscapes and provide unassisted back country recreation dependent upon a pristine environment
Wilderness recreation	5	10,000	to promote undisturbed landscapes and back country recreation
Natural environment	8	17,000	scenic values, back country recreation in a largely undisturbed environment
Intensive recreation	4	8,000	readily accessible, family orientated outdoor recreation that re facility intensive
Special feature	8	19,000	preservation and protection of significant natural or cultural features or processes

Adapted from BC Parks (1999)

**6.2 Mt. Arrowsmith Area Mountains IBA**

All of the alpine areas encompassed by the MAAM IBA are provincial crown land. Portions of the IBA fall within the Mt. Arrowsmith Regional Park. This small regional park (541 ha) falls within the Regional District of Nanaimo; however, the Regional District of Alberni-Clayoquot administers the park. Portions of the site are also part of the proposed Mt. Arrowsmith Massif Regional Park. This proposed 1300 ha park would encompass the mountain peaks and ridges of Mt. Arrowsmith and Mt. Cokely. The new park overlaps with a small portion of Mt. Arrowsmith Regional Park. It will be managed as an area

## Vancouver Island White-tailed Ptarmigan IBAs Conservation Plan May 2001

for recreation and environmental protection (RDN 2000). Furthermore, much of this area also falls within the recently established Mt. Arrowsmith Biosphere Reserve (MABR 1999; Figure 4)

A large portion of the lower slopes of the IBA are situated within Weyerhaeuser's TFL #44. Clearcutting and variable retention are the two silvicultural systems used in these stands. Trees are hand felled and are yarded using conventional cable systems (Grapple Yarders and Towers) as well as ground-based systems such as hoe forwarding.

In summer, portions of this area are a popular hiking destination via a series of well established trails. In winter, Mt. Arrowsmith ski area has provided alpine skiing opportunities but this facility is presently closed. Snowmobilers can gain access to alpine areas via the Mt. Arrowsmith regional park. There have been a series of proposed ski developments in the area, but all are presently on hold due to financial considerations.

### ***7. Conservation management achieved at the IBA site***

SPP has undergone a process that has helped shape its place in BC in terms of its role as a recreation destination and an area for wilderness conservation. The Master Plan for the park written in 1993 and its subsequent amendment in April 2000 have elucidated and planned the direction that the park will take in both the short and long terms (BC PARKS 1993, 2000). There is a strong commitment within these documents to maintain significant areas of the park as undisturbed natural landscapes in order to provide unassisted backcountry recreation. In these areas there is little or no development planned. In addition, there is a desire to take important White-tailed Ptarmigan areas into consideration where development is planned (R. Simmons, pers. comm.).

Portions of the MAAM IBA fall within the boundary of the Mount Arrowsmith World Biosphere Reserve (the alpine areas associated with Mt. McQuillan are not included in the reserve). Inclusion in the Biosphere reserve may result in greater attention being given to activities that may affect White-tailed Ptarmigan conservation. However, the World Biosphere Reserve designation is similar to that of the IBA designation: no official protection is afforded to the site once it is designated. Rather this designation will provide a framework to promote a co-ordinated, sustainable approach to the management of the region's ecosystem (MABR1999). Furthermore, portions of the MAAM IBA are part of the proposed Mt. Arrowsmith Massif Regional Park. This proposed park is 1300 ha in size and contains the mountain peaks and ridges of Mt. Arrowsmith and Mt. Cokely. The proposed park will be managed as an area for recreation and environmental protection (RDN 2000).

### ***8. Groups active in the White-tailed Ptarmigan IBAs on Vancouver Island***

At this time there are five main players in the Vancouver Island White-tailed Ptarmigan IBAs.

- The **Ministry of Environment, Lands and Park (MELP)** is the agency responsible for the management of wildlife needs including those of White-tailed Ptarmigan on Vancouver Island. MELP has supported research conducted on ptarmigan.
- **BC Parks** is responsible for the management of Strathcona Provincial Park. BC Parks currently contract out park interpretive programs. They have also facilitated ptarmigan research within the park
- The **Strathcona Wilderness Institute** is an environmental non-government organization that engages in education and outreach of alpine issues on Vancouver Island. They presently conduct interpretive programs within the park and also present no-trace alpine camping programs in local schools.
- Dr. Kathy Martin at the **University of BC** has been involved in conducting White-tailed Ptarmigan research throughout Vancouver Island.
- The **Alpine Club of Canada (ACC)** as well as some of the **Federation of BC Mountain Clubs (FBMC)** has been involved in the collection of White-tailed Ptarmigan data, and the dissemination of information pertaining to ptarmigan biology.

# Vancouver Island White-tailed Ptarmigan IBAs Conservation Plan

## May 2001

### ***9. Conservation Goals and Objectives***

There is a need and an interest for the public to become involved in White-tailed Ptarmigan conservation by providing detailed descriptions of Ptarmigan sightings. In addition, there is a clear need for the production of information regarding White-tailed Ptarmigan biology and dissemination to the general public, school groups, local governments, tour operators, and businesses on Vancouver Island. This would include activities (i.e., interpretative programs) that take place both within and outside the bounds of the park. Furthermore, there are organizations on Vancouver Island with the ability to develop and implement they types of programs.

The conservation goals and objectives for the Vancouver Island White-tailed Ptarmigan are relevant to all alpine areas on Vancouver Island. At present only two broad categories are being considered: outreach and education, and research and monitoring. Summaries of these goals and objectives can be found in Table 3.

#### **9.1 Outreach and education**

Programs related to outreach and education could follow two themes. A program could be developed for interpretative sessions within the bounds of SPP. This program would be designed to inform park visitors of the unique biology of White-tailed Ptarmigan and the role that the park plays in the conservation of this endemic subspecies. A similar program could be developed for extension outside the bounds of the park. This could be geared for use in schools, other recreational areas, or for extension to those businesses that operate in alpine and montane areas of Vancouver Island, including forest companies. This outreach and education program could include the development of education material (e.g., pamphlets) that could be made available to the general public and o businesses. Signage should also be considered, especially for heavily used alpine areas such as the Mt. Washington ski area. An important component of an education and outreach component should be geared towards developing a formal mechanism for the recording of White-tailed Ptarmigan observations by members of the public. This is discussed further in the monitoring and research section below.

#### **9.2 Monitoring and Research**

It is apparent from discussions from Parks personnel, Ministry of Environment Biologists and UBC researchers that there are large gaps in what we know about the biology of White-tailed Ptarmigan on Vancouver Island. Major gaps include: a detailed knowledge of where on Vancouver Island this species exists, the status of the population (increasing, decreasing or stable), how the species uses the alpine and montane areas (what are the differences in habitat use in summer versus winter), and how development (recreation and/or resource extraction) is affecting population status. Preliminary research has yielded extremely important information regarding the distribution of this subspecies and some information on habitat use. There is a clear need for reliable data on the distribution of White-tailed Ptarmigan within the boundaries of SPP in order to determine if: 1) the current zoning is compatible with the distribution of White-tailed Ptarmigan, 2) there a need to revisit current zoning in order to accommodate White-tailed Ptarmigan, 3) planned activities/expansions are in conflict with White-tailed Ptarmigan. Similar information is required for areas outside the park as well.

Due to lack of adequate funding for a rigorous research program, a volunteer-based inventory program could be instituted to initially take the place of a research program, and to augment an organized research program if and when funds are secured for such a program. The White-tailed Ptarmigan research program has benefited in the past from observations obtained from naturalists (Hitchcock et al. 1998). In addition, there is a considerable amount of interest from mountaineering and hiking groups, as well as professional researchers in further developing this program. Should this program be instituted, it is extremely important that volunteers be adequately trained so that data are accurately collected. This would include the development of material that would facilitate the proper identification of White-tailed Ptarmigan, the proper reading of leg bands, the recording of appropriate biological indicators present at sighting locations (e.g., the presence of predators of White-tailed Ptarmigan) and the recording of appropriate habitat features. This program would be best addressed with the help of a paid volunteer co-

## **Vancouver Island White-tailed Ptarmigan IBAs Conservation Plan**

### **May 2001**

ordinator based on Vancouver Island that would work closely with UBC researchers and the CDC in Victoria.

#### **9.3 Other research needs**

There is a demonstrable need for the continuation of research that was initiated by UBC biologist Dr. Kathy Martin. The work that has been completed by Dr. Martin has produced valuable information on White-tailed Ptarmigan biology; however, there is still a considerable amount of basic research that is required. Topics that need to be addressed include:

- a detailed inventory of known sites to determine relative densities and estimate total population sizes
- the assessment of habitat use during the breeding season
- an examination of dispersal and mortality of both adults and juveniles
- habitat selection and winter habitat/migration. In particular it will be important to investigate the potential impact of timber harvest on winter habitat
- development of a long term monitoring program in order to track abundance and relative densities in representative areas

#### **10. Evaluating success**

The two White-tailed Ptarmigan IBAs on Vancouver Island represent a habitat that in many ways has gone unnoticed from a conservation perspective. This is primarily because much of the alpine area on Vancouver Island is within SPP. However, alpine areas both inside and outside SPP deserve attention due to the fragile nature of this habitat. The success of this conservation plan will be measured by the degree to which we can mobilize concern for this unique bird species, both in terms of producing and disseminating information regarding its biology and by furthering the ability of public to collect meaningful and useful data via a ptarmigan sighting program. Success is dependent upon close cooperation with Provincial Parks personnel, and ptarmigan researchers

#### **11. Acknowledgements**

The Important Bird Areas Program is part of the Natural Legacy 2000 program, a nation-wide initiative to conserve wildlife and habitats on private and public lands. We gratefully acknowledge the financial support of the Government of Canada's Millennium Partnership Program. The Vancouver Foundation and Ducks Unlimited Canada provided additional funding for the preparation of this IBA Conservation Plan. The Canadian Wildlife Service, Delta provided office space and associated amenities during the first year of this project. I would like to thank Marc Johnson, Rob Foster, Frank Hovenden and Heather Johnstone for providing comments on early drafts of this plan. Thanks also to Kathy Martin and Chris Hitchcock for their support. Robert Legg, UNBC, provided valuable GIS assistance. Peter Rothermel and Earl Morton provided valuable information regarding the alpine areas of Vancouver Island. I would also like to thank members of the Strathcona Wilderness Institute for inviting me in to work on this project. In particular, I would like to thank Steve Smith for his hospitality and enthusiasm during all phases of this planning process.

**Vancouver Island White-tailed Ptarmigan IBAs Conservation Plan  
May 2001**

**Table 3. Conservation goals and objectives**

<b>Category</b>	<b>Objective</b>	<b>Action Required</b>	<b>Status</b>	<b>Key contact</b>
<b>Outreach and Education</b> (within SPP)	Inform park users about White-tailed Ptarmigan biology	Develop information about White-tailed Ptarmigan biology for interpretative programs in parks	In progress	SWI, BC Parks
(outside SPP)	Inform general public about White-tailed Ptarmigan biology and status	<ul style="list-style-type: none"> <li>• Develop information about White-tailed Ptarmigan biology school programs</li> <li>• Develop information packages for wider distribution (e.g., businesses that operate in the alpine areas, local government, forest companies)</li> <li>• Write articles regarding White-tailed Ptarmigan biology and conservation for local distribution</li> </ul>	Planned	SWI
			Planned	SWI
			Planned	ACC, BCIBA
<b>Monitoring/research</b>	Determine distribution of Ptarmigan in the alpine areas of Vancouver Island	<ul style="list-style-type: none"> <li>• Mobilize an volunteer sighting program, consider a paid volunteer co-ordinator</li> <li>• Develop facilities/signage at Buttle Lake and Mt. Washington for Ptarmigan sightings</li> </ul>	Planned	SWI, UBC BC IBA, BC Parks
			Planned	SWI, BC Parks
	Determine population dynamics and habitat use by breeding Ptarmigan	Re-establishment of summer research program examination of dispersal and mortality of both adults and juveniles	Needed	Kathy Martin, UBC
	Determine extent of use montane forests by White-tailed Ptarmigan	Re-establishment of winter research program	Needed	Kathy Martin UBC

**SWI**=Strathcona Wilderness Institute, **UBC**= University of British Columbia, **ACC**=Alpine Clubs of Canada

**Vancouver Island White-tailed Ptarmigan IBAs Conservation Plan  
May 2001**

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**May 2001**

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May 2001**

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**Vancouver Island White-tailed Ptarmigan IBAs Conservation Plan**  
**May 2001**

***Appendix 1: IBA Canada Partners***

**Federation of BC Naturalists (FBCN)**

“To know nature and to keep it worth knowing”

The Federation of BC Naturalists is a family of naturalist organizations dedicated to fostering an appreciation and understanding of our natural environment, so that it may be used wisely and maintained for future generations. We believe that negotiation and cooperation are ways to build a lasting conservation strategy in British Columbia. Through partnerships with other organizations and governments we strive to further conservation and natural history education in the province of BC. Our membership is open without prejudice to all who share our goals.

The FBCN was founded in 1969, although many of its member clubs have been in existence for much longer. There are currently 51 federated and affiliated member clubs and approximately 5,300 members from communities all around British Columbia. The FBCN is an affiliate of the Canadian Nature Federation. The FBCN is active in nature education and conservation, and is the British Columbia lead agency for two major projects: The Living by Water Project and the BC Important Bird Areas Program. The FBCN website is [www.naturalists.bc.ca](http://www.naturalists.bc.ca)

**WBT Wild Bird Trust of BC**

Wild Bird Trust is non-profit society dedicated to the protection of birds and their habitats, on the principle that all wildlife must benefit. This mission is carried out through the establishment and management of wildlife sanctuaries, the production of various publications that address conservation and management concerns for birds and their habitats throughout the Province, the housing of the largest regional electronic database and reference library for birds, reptiles and amphibians in the Province, school- and home-based wildlife education programs, volunteer-based inventory programs and an active Heron stewardship program in the Georgia Basin of BC.

**BirdLife International**

A pioneer in its field, BirdLife International (BL) is the first non-government organization dedicated to promoting world-wide interest in and concern for the conservation of all birds and the special contribution they make to global biodiversity. BirdLife operates as a partnership of non-governmental conservation organizations, grouped together within geographic regions (e.g. Europe, Africa, Americas) for the purpose of planning and implementing regional programs. These organizations provide a link to on-the-ground conservation projects that involve local people with local expertise and knowledge. There are currently 20 countries involved in the Americas program throughout North, Central and South America.

For further information about BirdLife International, check the following web site:  
<http://www.birdlife.net/>.

The Canadian Important Bird Areas Program has been undertaken by a partnership of two lead agencies. The Canadian Nature Federation and Bird Studies Canada are the Canadian BirdLife International partners.

**The Canadian Nature Federation (CNF)**

The Canadian Nature Federation is a national conservation organization with a mission to be Canada's voice for the protection of nature, its diversity, and the processes that sustain it. The CNF represents the naturalist community and works closely with our provincial, territorial and local affiliated naturalists organizations to directly reach 100,000 Canadians. The strength of our grassroots naturalists'

## **Vancouver Island White-tailed Ptarmigan IBAs Conservation Plan May 2001**

network allows us to work effectively and knowledgeably on national conservation issues that affect a diversity of ecosystems and human populations in Canada. The CNF also works in partnership with other environmental organizations, government and industry, wherever possible.

Our approach is open and cooperative while remaining firm in our goal of developing ecologically-sound solutions to conservation problems. CNF's web site is <http://www.cnf.ca>.

### **Bird Studies Canada (BSC)**

The mission of Bird Studies Canada is to advance the understanding, appreciation and conservation of wild birds and their habitats, in Canada and elsewhere, through studies that engage the skills, enthusiasm and support of its members, volunteers, staff and the interested public. Bird Studies Canada believes that thousands of volunteers working together, with the guidance of a small group of professionals, can accomplish much more than could the two groups working independently. Current programs collectively involve over 10,000 volunteer participants from across Canada.

Bird Studies Canada is recognized nation-wide as a leading and respected not-for-profit conservation organization dedicated to the study and understanding of wild birds and their habitats. Bird Studies Canada's web site is [www.bsc-eoc.org/](http://www.bsc-eoc.org/).