

“VANCOUVER ISLAND” WHITE-TAILED PTARMIGAN

Lagopus leucurus saxatilis

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Species Information

Taxonomy

Five subspecies of White-tailed Ptarmigan (*Lagopus leucurus*) are currently recognized including the Vancouver Island White-tailed Ptarmigan (*L. leucurus saxatilis*), which is believed to be endemic to Vancouver Island (Campbell et al. 1990; Braun et al. 1993). This subspecies was described in 1938 by Ian McTaggart-Cowan who found morphological and plumage differences between White-tailed Ptarmigan from Vancouver Island and the mainland of British Columbia and Washington State (McTaggart-Cowan 1938). McTaggart-Cowan reported that the Vancouver Island birds had a darker first primary feather, a greater tail length, and a bill that was more hooked than mainland specimens.

Description

Like other North American ptarmigan, White-tailed Ptarmigan are noted for their cryptic plumage that changes from mottled brown, grey, and white in summer to entirely white in winter. White-tailed Ptarmigan are the smallest grouse in North America, and are easily distinguished from other grouse by their white retrices.

Compared with White-tailed Ptarmigan in Colorado, Vancouver Island birds have shorter wings and a heavier body mass during the breeding season (no data for winter; K. Martin, unpubl. data). Breeding females are approximately 10 g heavier than females in Colorado in July and 40 g heavier in September (Braun et al. 1993; K. Martin, unpubl. data). Breeding males increase mass in late summer

weighing an average of 411 g in September, 50 g heavier than males in Colorado at this same time. Wing chords of Vancouver Island birds average 180 ± 0.63 (s.e.) mm for adult females ($n = 57$) and 185 ± 0.79 (s.e.) mm for adult males ($n = 50$). Mean wing chords are 13 mm shorter for females and 15 mm shorter for males on Vancouver Island than in Colorado.

Distribution

Global

White-tailed Ptarmigan occur in western Alaska, south and central Yukon, and mountain ranges from northern British Columbia to New Mexico (Braun et al. 1993).

British Columbia

The Vancouver Island White-tailed Ptarmigan is considered endemic to Vancouver Island (Campbell et al. 1990; Braun et al. 1993). Historically, the distribution is known to range from as far south as Mount Brenton to as far north as Tsitika Mountain (based on 160 observations gathered from naturalists on Vancouver Island, 1905–2000; Hitchcock et al. 1998). All 25 mountains, ranging from El Capitan to Mount Cain, showed signs of White-tailed Ptarmigan between 1995 and 1999, suggesting the subspecies still occupies most of its historic range.

Forest region and districts

Coast: Campbell River, North Island, South Island

Ecoprovinces and ecosections

COM: NIM, WIM

GED: LIM

White-tailed Ptarmigan - subspecies *saxatilis* (*Lagopus leucurus saxatilis*)



Note: This map represents a broad view of the distribution of potential habitat used by this species. The map is based on several ecosystem classifications (Ecoregion, Biogeoclimatic and Broad Ecosystem Inventory) as well as current knowledge of the species' habitat preferences. This species may or may not occur in all areas indicated.

Biogeoclimatic units

AT:

CWH: vm, xm

MH: mm

Broad ecosystem units

AU, AV, HP, MF

Elevation (K. Martin, unpubl. data)

South Island Island	Central and North Island
Summer: 1240–1890 m Winter: 822–1788 m	Summer: 1320–2200 m Winter: 966–1889 m

Life History

Diet and foraging behaviour

White-tailed Ptarmigan feed on buds, stems, seeds, leaves, fruits, flowers, and insects (Braun et al. 1993). Plants consumed by Vancouver Island birds include *Vaccinium*, *Poa*, and *Carex* species, *Empetrum nigrum*, *Arctostaphylos alpina*, *Cassiope mertensiana*, *Phyllodoce empetriformis*, and *Sedum oregonum* (Weeden 1967; K. Martin, unpubl. data).

Reproduction

Nesting for this typically monogamous species is initiated in early June to mid-July (Braun et al. 1993). Males accompany females from pair formation; mate guarding in this species is thought to be a result of behavioural co-ordination that enhances a female's foraging opportunities during incubation (Artiss and Martin 1995; Artiss et al. 1999). Renesting will occur if the first nest is lost (Braun et al. 1993).

Mean clutch size for *L. leucurus saxatilis* first clutches is 6.2 eggs ($n = 5$; s.d. = 0.45). Brood size of Vancouver Island females ranges from one to eight chicks and the average brood size of successful hens in July and August is 4.1 ± 0.31 (s.e.) chicks ($n = 32$ broods, 1995–1999). Fledging success may be higher on Vancouver Island than in Colorado (Martin and Commons 1997; K. Martin unpubl. data).

Nesting habitat varies but nests are always located

on the ground (Braun et al. 1993). On Vancouver Island, nests were placed in exposed rocky areas with little vegetation and also in sites with good overhead cover from trees and shrubs (K. Martin, unpubl. data from six nests).

Site fidelity

White-tailed Ptarmigans exhibit strong fidelity to breeding territories after first breeding season (Braun and Rogers 1971; Martin et al. 2000).

Home range and movements

The *saxatilis* subspecies occurs at lower elevations and uses a wider range of habitats than White-tailed Ptarmigan on the mainland. Habitat elevation ranges differ between the breeding and winter seasons, and between the south, central, and north parts of the island. The distance that adult birds migrate between winter locations and breeding areas is on average 1.4 km in the southern portion of the island and 2.0 km in the northern portion of the island (based on 66 winter observations; Martin and Hitchcock 1997).

Habitat

Structural stage

- | | |
|------------------|------------------|
| 1: non-vegetated | 6: mature forest |
| 2: herb | 7: old forest |

Important habitat and habitat features

Vancouver Island ptarmigan appear to use coastal alpine habitats differently from mainland White-tailed Ptarmigan. The majority of habitat used by White-tailed Ptarmigan on Vancouver Island could be considered marginal or suboptimal habitat when compared with the large expanses of alpine on the mainland (Martin and Elliot 1996). Although some habitat use data are available, habitat requirements are difficult to determine because of limited data on multiple sightings for individuals. Habitat requirements may vary between south and central island populations.

Nesting

During the breeding season, Vancouver Island birds are typically found in alpine and subalpine

mountain habitats, particularly in rocky tundra areas with sparse vegetation above the treeline. Birds occur in alpine heather communities as well as in subalpine heather communities and fir or hemlock tree islands (K. Martin, unpubl. data). Snowfields are important for cooling, providing food resources, and enabling birds to remain cryptic when their plumage is changing.

Wintering

Like other White-tailed Ptarmigan, some Vancouver Island birds migrate to lower elevations in winter while others remain close to their breeding areas (Martin et al. 2000; K. Martin, unpubl. data). Habitats both above and below the treeline are used in winter; birds can be found in alpine bowls, hemlock and cedar forest, and clearcuts, as well as on unvegetated rocky outcrops and cliffs. Based on 104 observations, 93% and 70% of birds relocated during winter in the south (54 observations) and central (50 observations) portions of Vancouver Island, respectively, were found in the Mountain Hemlock biogeoclimatic zone (K. Martin, unpubl. data). Median tree height in these upper montane forest habitats was 4 m (range: 1–27.5 m, 26 observations). Additionally, 66% of relocated birds were found on south, southeast, or southwest facing slopes.

Unlike birds from Colorado, Vancouver Island White-tailed Ptarmigan have not been found to congregate in large flocks during winter (Martin and Hitchcock 1997). This may be due to patchy alpine habitats and the generally low densities of birds on Vancouver Island.

Dispersal

In Colorado, dispersal to other mountains is thought to sustain White-tailed Ptarmigan populations in patchy alpine habitats (Martin et al. 2000). On Vancouver Island, chicks have dispersed up to 34 km to other mountains (mean = 2.4 km, $n = 7$; Martin and Hitchcock 1997). Based on observations of droppings, marginal or unsuitable habitat such as forested rocky outcrops may be used as stopover points when White-tailed Ptarmigan disperse to other peaks (K. Martin, pers. obs.).

Conservation and Management

Status

The Vancouver Island White-tailed Ptarmigan is on the provincial *Blue List* in British Columbia. Its status in Canada has not been determined (COSEWIC 2002).

Summary of ABI status in BC and adjacent jurisdictions (NatureServe Explorer 2002)

BC	Canada	Global
S3	N3	G5T3

Trends

Population trends

Total population size is unknown. Sufficient data for establishing total population size are currently unavailable so population trends cannot be estimated at this time. Some population size and life history data for different habitats and landscapes have been collected but have not been analyzed yet (K. Martin, unpubl. data).

Habitat trends

Vancouver Island ptarmigan are year-round residents of a variety of alpine, subalpine, and upper montane habitats during the year (Martin and Hitchcock 1997). The amount of alpine habitat on Vancouver Island has remained fairly constant, although ski resort developments in the central and southern portion of the island may have impacted localized areas. Forest harvesting in the southern part of the island may have changed habitat conditions in winter and early spring.

Threats

Population threats

The subspecies is vulnerable to population extinction processes because the birds exist in very low densities in patchy habitats with stochastic population dynamics and environmental conditions

(Martin et al. 2000). Additionally, their distribution is limited to higher elevations (>822 m) on Vancouver Island.

Habitat threats

The Vancouver Island White-tailed Ptarmigan habitat has four main threats: recreation, air- and ground-based pollutants, forest harvesting, and climate change. Generally, the extent of these threats has not been determined.

Numbers of alpine recreationists have increased throughout British Columbia over the past 50 years with the increase in popularity of activities such as skiing, heli-skiing, snowmobiling, mountain biking, and hiking. Human presence in the alpine can be associated with the introduction of generalist predators and exotic plant species and the creation of barriers to animal movement when trails and roads are developed (Martin 2001). The extent to which recreational activities disrupt White-tailed Ptarmigan populations on Vancouver Island is not well understood. However, negative impacts of these activities have been documented elsewhere with other grouse (Storch 2000; Martin 2001). Impacts can include loss of habitat, population declines, increased predation, and altered foraging behaviour (Martin 2001).

Regional air and water pollution is an increasing concern for high elevation species such as the White-Tailed Ptarmigan. Pollutants are carried by wind from urban and industrial centres and deposited at high elevations in many areas, including the Pacific Northwest (Blais et al. 1998; Brace and Peterson 1998). Consequently, the concentration of persistent organic pollutants (POPs) such as polychlorinated biphenyls (PCBs) in alpine snowpacks increases with increasing elevation in Western Canada (Blais et al. 1998). In addition to POPs, several authors have found a positive relationship between elevation and ozone concentration in Washington State; high concentrations of ozone are known to damage vegetation and human health (Brace and Peterson 1998; Cooper and Peterson 2000).

Logging decreases the amount of mature forest and increases fragmentation. Removing forest cover changes microclimate conditions including wind and insolation patterns, which may influence the rate of snowmelt. Fewer or smaller snowfields restrict birds to a smaller amount of snowfield habitat making them vulnerable to increased risk of predation and increasing travel distances between snowfield patches (Martin 2001). Because seasonal migration to lower elevations is a part of the life history of the subspecies, increased fragmentation of montane forest could result in longer seasonal migrations with predicted higher mortality (Martin and Hitchcock 1997).

Climate change, including global warming, has the potential to alter the amount of alpine and sub-alpine habitat and to increase alpine fragmentation because of rising subalpine treelines that may accompany higher temperatures (Roland et al. 2000; Martin 2001). Increased climatic variability and frequency of extreme weather events associated with climate change may impact ptarmigan populations adversely (Martin and Wiebe 2001, submitted). The cost for these cold-adapted birds to adjust behaviourally and physiologically to higher temperatures is also a concern.

Legal Protection and Habitat Conservation

The White-tailed Ptarmigan, its nests, and its eggs are protected from direct persecution by the provincial *Wildlife Act*. Hunting White-tailed Ptarmigan on Vancouver Island is prohibited.

A core area of White-tailed Ptarmigan habitat is protected in Strathcona Provincial Park. There is also an initiative to establish two White-tailed Ptarmigan Important Bird Areas on Vancouver Island: Strathcona Provincial Park and Mount Arrowsmith Area Mountains (see www.ibacanada.com for more information). Although these areas provide no legal protection to the birds or their habitat, this initiative signifies the national priority for conserving this subspecies.

Given that White-tailed Ptarmigan use montane forest, some White-tailed Ptarmigan habitat may be conserved where wildlife tree retention areas or old growth management areas are implemented under the results based code.

Identified Wildlife Provisions

Wildlife habitat area

Goal

Maintain suitable wintering habitat.

Feature

Establish WHAs in upper montane areas where concentrations of White-tailed Ptarmigan are known to occur regularly during the winter.

Size

Typically from 1 to 7 ha; however, size will ultimately depend on site-specific conditions required to maintain windfirmness and microclimatic conditions.

Design

The WHA should be 50–250 m wide on southerly aspects (S, SE, SW) and 25–250 m on northerly aspects (N, NE, NW), and a minimum length of 250 m. The WHA should include upper montane forest that will create a continuous zone around the adjacent subalpine and alpine habitat to provide cover, maintain microclimatic conditions suitable for retaining snowfields, and allow access to lower elevations.

General wildlife measure

Goals

1. Minimize disturbance during the critical winter season and spring dispersal (1 November to 5 May) as well as fall dispersal periods (1 September to 31 October).
2. Maintain microclimatic conditions that sustain subalpine and alpine snowfields during the summer months (5 May to 31 August). Important microclimatic conditions to maintain are low local temperatures and local wind patterns.
3. Ensure WHA boundaries are windfirm.

Measures

Access

- Do not construct roads unless there is no other practicable option. Where there are existing roads, restrict road use during critical times (1 November to 5 May and 1 September to 31 October).

Harvesting and silviculture

- Do not harvest.

Pesticides

- Do not use pesticides.

Recreation

- Do not develop recreation sites or trails.

Additional Management Considerations

Maintain ban on hunting Vancouver Island White-tailed Ptarmigan.

Free running dogs in the alpine should be restricted.

Hikers should be discouraged from leaving food in the alpine to avoid enhancing generalist predator survival.

Avoid spilling toxic substances and discarding cords and wire associated with installations of infrastructure in the alpine and subalpine (e.g., repeater towers).

Minimize the number of ground- and air-based motorized vehicles (such as snowmobiles and helicopters) in alpine and subalpine areas to minimize the disturbance they cause.

Information Needs

1. Breeding season, winter, and dispersal habitat use and requirements.
2. Population size.
3. Seasonal movements.

Cross References

Vancouver Island Marmot

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