



WILEY

The Historic and Current Distribution of the Vancouver Island White-Tailed Ptarmigan (*Lagopus leucurus saxatilis*) / Distribución histórica y actual de *Lagopus leucurus saxatilis*

Author(s): Kathy Martin, Graeme A. Brown and Jessica R. Young

Source: *Journal of Field Ornithology*, Vol. 75, No. 3 (Summer, 2004), pp. 239-256

Published by: [Wiley](#) on behalf of [Association of Field Ornithologists](#)

Stable URL: <http://www.jstor.org/stable/4151307>

Accessed: 21/10/2014 13:52

Your use of the JSTOR archive indicates your acceptance of the Terms & Conditions of Use, available at <http://www.jstor.org/page/info/about/policies/terms.jsp>

JSTOR is a not-for-profit service that helps scholars, researchers, and students discover, use, and build upon a wide range of content in a trusted digital archive. We use information technology and tools to increase productivity and facilitate new forms of scholarship. For more information about JSTOR, please contact support@jstor.org.



Association of Field Ornithologists and Wiley are collaborating with JSTOR to digitize, preserve and extend access to *Journal of Field Ornithology*.

<http://www.jstor.org>

The historic and current distribution of the Vancouver Island White-tailed Ptarmigan (*Lagopus leucurus saxatilis*)

Kathy Martin,¹ Graeme A. Brown, and Jessica R. Young²

Centre for Applied Conservation Research, Faculty of Forestry, 2424 Main Mall, University of British Columbia, Vancouver, British Columbia V6T 1Z4, Canada

Received 18 November 2002; accepted 12 November 2003

ABSTRACT. *Lagopus leucurus saxatilis*, a subspecies of White-tailed Ptarmigan endemic to Vancouver Island, is listed as vulnerable by the British Columbia Conservation Data Centre, but little is known about its population status or trends. The only previous journal paper concerning this subspecies was published in 1939. Data on distribution, gathered using historical records and public survey (166 records) in combination with our field studies, indicated that this ptarmigan subspecies currently inhabits most, if not all, available habitat on Vancouver Island, and the range has not contracted over the past 25 yr.

SINOPSIS. Distribución histórica y actual de *Lagopus leucurus saxatilis*

Lagopus leucurus saxatilis es una subespecie endémica a la isla de Vancouver, considerada como vulnerable por el Centro de Datos de Conservación de Columbia Británica. Sin embargo, se conoce muy poco sobre cambios poblacionales y de su estatus en general. El único trabajo relacionado con esta subespecie fue publicado en el 1939. Los datos históricos de su distribución, los sondeos públicos (166) en combinación con nuestros estudios de campo, indican que esta especie habita en todo o casi todo el habitat disponible para esta ave en Vancouver y que su distribución, virtualmente, no ha cambiado en los últimos 25 años.

Key words: blue-listed species, British Columbia, distribution, *Lagopus leucurus saxatilis*, Vancouver Island, White-tailed Ptarmigan

There are five recognized subspecies of White-tailed Ptarmigan (*Lagopus leucurus*, Braun et al. 1993). White-tailed Ptarmigan on Vancouver Island (*L. l. saxatilis*) were first described from 12 specimens (six juveniles) collected between 1905 and 1938. Morphological and plumage comparisons between these individuals and mainland ptarmigan led to the recognition of the subspecies endemic to Vancouver Island (Cowan 1939). In 1992, this subspecies was blue-listed (status S3: vulnerable) by the British Columbia Conservation Data Centre because of its small population size, restricted range, and potential susceptibility to anthropogenic and natural disturbances (Fraser et al. 1999). This subspecies is globally ranked as a G5T3 taxon: a vulnerable subspecies of an otherwise secure species (Storch 2000). It is not

listed by the Committee on the Status of Endangered Wildlife in Canada.

Ptarmigan are one of few vertebrates that inhabit upper elevation mountain habitats on Vancouver Island year-round. During summer, it is found in alpine heather communities and in subalpine heather communities with tree islands of spruce (*Picea* spp.) or subalpine fir (*Abies lasiocarpa* (Campbell et al. 1990:84–85; K. Martin, unpubl. data). In winter some individuals move into the upper montane mountain hemlock community, while others remain in or near breeding habitat (Martin and Hitchcock 1997). On Vancouver Island, the largest areas of continuous alpine/subalpine habitats are found in the central region of the island. In the northern and southern regions, suitable ptarmigan habitats are less continuous and generally lower in elevation.

No field studies were conducted on Vancouver Island ptarmigan since the initial collections at the turn of the century. The conservation listing and lack of knowledge about its ecology or population trends were the impetus for the banding and radio tracking study we began in

¹ Corresponding author. Email: kmartin@interchange.ubc.ca

² Current address: Department of Natural and Environmental Sciences, Western State College, Gunnison, Colorado, USA

1995 on its distribution, abundance, and ecology. To reconstruct historic and current distributions, we collated records from museums and community archives, and also solicited observations from naturalists, mountaineers, hikers, and government personnel. Here, we synthesize accumulated records since the first recorded observation in 1905 to provide an assessment of ptarmigan distribution on Vancouver Island.

METHODS

In 1995 we reviewed records of historical observations available at the Royal British Columbia Museum (RBCM) and at the Municipal Archives of Courtenay, British Columbia. Some reports were obtained from newspaper articles and journals. In addition, we distributed a poster highlighting the distinguishing features of this ptarmigan and requested reports from the public. Recent and historic observations were received from biologists, naturalists, and hikers. All reports were screened for reliability by means of photo verification, evaluation of details provided, or by discussions with observers to ensure they correctly identified ptarmigan and could distinguish them from Blue Grouse (*Dendragapus obscurus*). Where possible, we obtained specific information on number, gender, and age of individuals encountered, as well as specific location, habitat description, and the type of detection (visual, vocalization, or sign).

In our field studies from 1995 to 1999, we surveyed sites encompassing the known historic range to detect possible range contractions or expansions. We combined results from the public survey and our field studies to estimate the historic and current distribution of this subspecies.

RESULTS

We gathered 14 observations from the literature or museum archives and 152 observations submitted from the public, representing ptarmigan locations for 78 alpine sites ranging from Tsitika Mt. and Pinder Peak on northern Vancouver Island to Mt. Brenton in the south. These reports included sightings across all seasons, although most were from late summer. We organized the observations into three time periods: “early” records associated with museum collections and town archives (Appendix 1A,

1905–1944); “recent” records gathered from hikers and biologists prior to our field study (Appendix 1B, 1945–1994); and “modern” records obtained from our public surveys and interviews (Appendix 1C, 1995–2002). The early and recent records suggested that ptarmigan have occupied most of the alpine and subalpine habitat on Vancouver Island (Fig. 1; Appendix 1A, 1B). The modern records from public submissions and our field studies showed no reduction in distribution (Table 1; Fig. 1; Appendix 1C). From 1995 to 1999, we found ptarmigan or signs of recent occupation at 36 of 38 sites searched (Table 1). Generally, numbers of observations and the numbers of mountains with ptarmigan sightings increased with each time period (Fig. 2).

Relative abundance data are challenging to collect for this species as access, topography, inclement weather, experience of observers, and other factors strongly influence probability of detecting ptarmigan. From 1995 to 1999, encounter rates were about double in the central region (~ 0.3 birds/h) compared to the north and south regions of the island (~ 0.15 birds/h each), with possibly less annual variation in encounter rates in the central region for sites searched more than one year (Table 1).

DISCUSSION

A lack of historical data for distribution and abundance often hampers accurate estimation of status and trends for listed species. Our public solicitation proved effective for collecting historical and current distribution data with records representing most potential habitat on Vancouver Island and spanning more than 50 yr. Our ongoing communication with individuals and groups who spend time in the mountains of Vancouver Island has generated a large number of modern observations and continues to be an effective means of gathering data (Fig. 1). We believe our solicited reports were reliable because we verified through interviews that observers were able to distinguish between ptarmigan and Blue Grouse, the main species in or near high elevation habitats on Vancouver Island that could be confused with ptarmigan. Many modern records were accompanied by photos, GPS or map coordinates, and feather or scat samples that allowed direct confirmation of species and habitat.

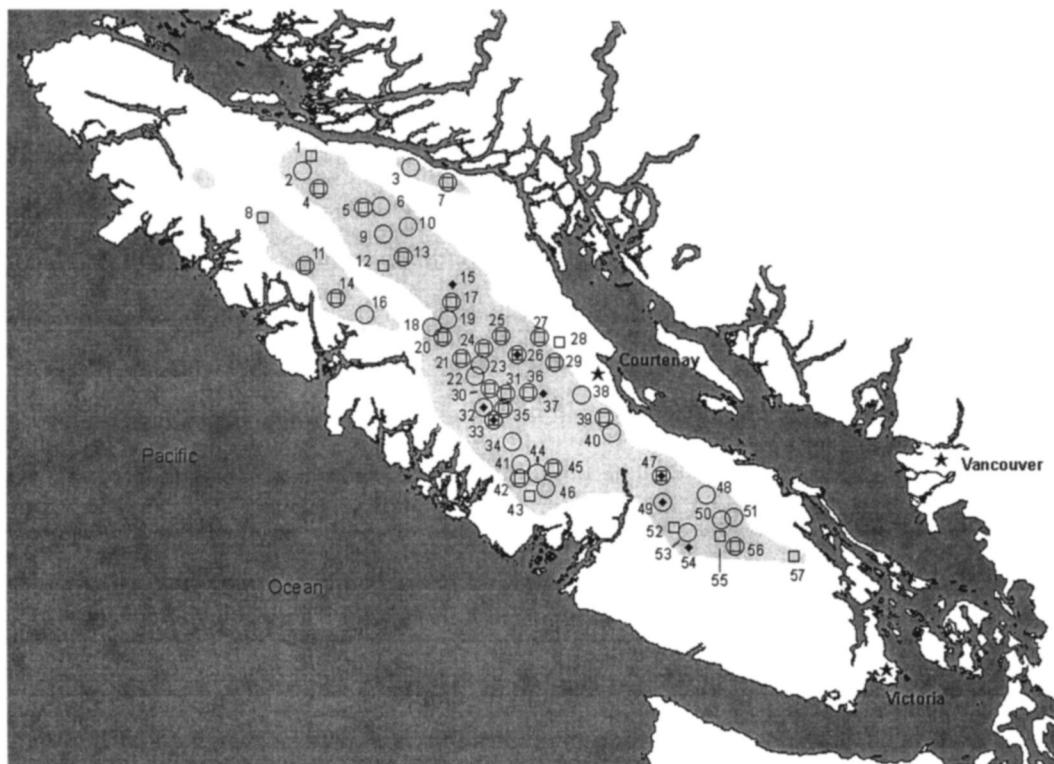


Fig. 1. Geographical distribution of Vancouver Island White-tailed Ptarmigan from public survey records and from field studies (1995–1999). Numbers refer to mountains or mountain groups. Shaded area on map indicates distribution of suitable habitat (alpine and subalpine zones from British Columbia Biogeoclimatic Ecosystem Classification system). Latitude (N) and longitude (W) coordinates given. ♦ indicates early observation, 1905–1944; □ indicates recent observation, 1945–1994; ○ indicates modern observation, 1995–present (either reported by public or field study). Combinations of symbols (e.g., ●) indicate observations in multiple periods. 1, Tsitika Mt. (50°26' 126°39'); 2, Whiltilla Mt. (50°22' 126°42'); 3, Newcastle Ridge (50°24' 126°03'); 4, Mt. Ashwood (50°18' 126°36'); 5, Mt. Cain, Mt. Abel, Hapush Mt. (50°13' 126°19'); 6, Mt. Eden, Mt. Romeo (50°14' 126°15'); 7, Hkusam Mt. (50°20' 125°50'); 8, Pinder Pk. (50°12' 126°56'); 9, Mt. Adam (50°07' 126°13'); 10, Mt. Nora (50°09' 126°06'); 11, Rugged Mt. (50°01' 126°41'); 12, Mt. Alston (50°01' 126°13'); 13, Victoria Pk. (50°03' 126°06'); 14, Mt. Alava, Mt. Bate (49°53' 126°28'); 15, Crown Mt. (49°57' 125°49'); 16, Conuma Pk. (49°50' 126°19'); 17, Crest Mt., Big Den (49°52' 125°50'); 18, Puzzle Mt. (49°47' 125°55'); 19, Kings Pk., Elkhorn (49°48' 125°50'); 20, Mt. Colonel Foster, Rambler Pk. (49°44' 125°51'); 21, Golden Hinde, Peak 1520, Mt. DeVoe (49°40' 125°45'); 22, Phillips Ridge (49°36' 125°41'); 23, Greig Ridge, Tibetan Pk. (49°39' 125°39'); 24, Marble Meadows, Marble Peak, Mt. McBride, Morrison Spire, Limestone Cap (49°42' 125°37'); 25, Mt. Adrian, Roger's Ridge (49°45' 125°32'); 26, Mt. Albert Edward, Mt. Frink, Jutland Mt., Mt. Mitchell, Augerpoint Mt. (49°42' 125°26'); 27, Mt. Washington (49°45' 125°18'); 28, Tsolum Main Rd. (49°44' 125°11'); 29, Mt. Becher, Wood Mt. Ski Park (49°39' 125°13'); 30, Mt. Myra, Mt. Thelwood (49°33' 125°36'); 31, Flower Ridge, Mt. Rosseau (49°32' 125°31'); 32, Mt. Tom Taylor (49°29' 125°38'); 33, Big Interior, Leader Lake Ridge, Little Jim Lake, Sugar Ridge (49°25' 125°34'); 34, Taylor Ridge (49°21' 125°28'); 35, Mt. Septimus, Cream Lake (49°29' 125°31'); 36, Comox Glacier, Argus Mt. (49°32' 125°22'); 37, Kookjai Mt. (formerly Mt. Evans, 49°32' 125°17'); 38, Mt. Stubbs, Mt. Chief Frank (49°30' 125°02'); 39, Beaufort Range: Mt. Apps, Mt. Curran, Mt. Joan, The Squarehead (49°26' 124°54'); 40, Mt. Hal (49°23' 124°53'); 41, Pogo Mt. (49°16' 125°24'); 42, Steamboat Mt. (49°13' 125°25'); 43, MacKenzie Range (49°09' 125°22'); 44, Adder Mt. (49°15' 125°19'); 45, Klitsa Mt. (49°15' 125°14'); 46, Peak 5040, Nahmint Mt. (49°11' 125°15'); 47, Mt. Arrowsmith, Mt. Cokely, Spectators Pk. (49°13' 124°36'); 48, Mt. Moriarty (49°08' 124°27'); 49, Mt. McQuillan, Limestone Mt. (49°06' 124°37'); 50, Green Mt. (49°03' 124°20'); 51, Mt. Hooker (49°05' 124°12'); 52, Mt. Hooper (49°01' 124°31'); 53, Big Ugly (49°00' 124°27'); 54, Heather Mt. (48°57' 124°28'); 55, Butler Pk. (49°00' 124°20'); 56, El Capitan, Mt. Service, Mt. Whympier, Mt. Landale (48°57' 124°13'); 57, Mt. Brenton (48°54' 123°51').

Table 1. Number of ptarmigan encountered during field studies, 1995–1999.

Year	Area	Person- hours	Number and Type ^a				Birds/ hour
			Σ	M	F	Ck	
North Region							
1996	Mt. Cain, Mt. Abel	16	S				
1997	Mt. Cain, Mt. Abel	80	10	2	2	6	0.13
1998	Mt. Cain, Mt. Abel	33	9	2	2	5	0.27
1996	Hkusam Mt.	16	S				
1997	Hkusam Mt.	40	2	1	1		0.05
1998	Hkusam Mt.	24	4	1	3		0.17
1996	Mt. Adam	16	S				
1997	Rugged Mt.	8	1	1			0.13
Central Region							
1996	King's Peak	24	9	3	1	5	0.38
1997	King's Peak	60	3	1	2		0.05
1996	Marble Meadows ^b , Greig Ridge, Phillips Ridge	264	56	14	17	25	0.21
1997	Marble Meadows, Limestone Cap	105	36	9	6	21	0.34
1998	Marble Meadows, Limestone Cap	72	25	2	5	18	0.35
1995	Mt. Albert Edward, Jutland Mt., Mt. Frink	112	53	14	9	30	0.47
1996	Mt. Albert Edward, Jutland Mt., Mt. Frink	236	36	1	9	26	0.15
1997	Mt. Albert Edward, Jutland Mt., Mt. Frink	168	92	14	22	56	0.55
1998	Mt. Albert Edward, Jutland Mt.	180	131	11	31	89	0.73
1997	Mt. Tom Taylor	72	7	3	2	2	0.10
1997	Big Interior	80	6	6			0.08
1998	Big Interior, Sugar Ridge	60	9	3	2	4	0.15
1996	Leader Lake Ridge	30	S				
South Region							
1997	Mt. Stubbs	24	7		2	5	0.29
1998	Mt. Stubbs	52	10	1	2	7	0.19
1997	Mt. Curran	32	S				
1998	Mt. Curran, The Squarehead, Mt. Joan, Mt. Apps	88	10	2	2	6	0.11
1999	Mt. Curran, The Squarehead, Mt. Joan, Mt. Apps	44	2	2			0.05
1995	Klitsa Mt.	32	1		1		0.03
1997	Klitsa Mt.	16	3	2	1		0.19
1998	Klitsa Mt.	24	2	2			0.08
1996	Peak 5040, Nahmint Mt.	204	33	11	5	17	0.16
1997	Peak 5040	128	10	2	2	6	0.08
1995	Mt. Arrowsmith, Mt. Cokely	48	1	1			0.02
1996	Mt. Arrowsmith, Mt. Cokely	21	S				
1997	Mt. Arrowsmith, Mt. Cokely	92	18	2	3	13	0.20
1998	Mt. Arrowsmith, Mt. Cokely	168	37	4	5	27	0.22
1999	Mt. Arrowsmith, Mt. Cokely	48	20	10	2	8	0.42
1997	Mt. Moriarty	40	S				
1998	Mt. Moriarty	100	18	6	9	1	0.18
1999	Mt. Moriarty	32	3	1	2		0.09
1995	Mt. McQuillan	64	13	5	3	5	0.20
1996	Mt. McQuillan	88	2		1		0.02
1997	Mt. McQuillan	36	4	2	2		0.11
1998	Mt. McQuillan	16	3	1	1		0.19
1999	Mt. McQuillan	8	1	1			0.13
1998	Limestone Mt.	1.5	0				
1995	Green Mt.	8	S				
1996	Big Ugly	16	S				
1996	Heather Mt.	12	0				

Table 1. Continued.

Year	Area	Person- hours	Number and Type ^a				Birds/ hour
			Σ	M	F	Ck	
1995	El Capitan, Mt. Whymper, Mt. Landale	80	2	2			0.03
1996	El Capitan, Mt. Landale	35	6	5	1		0.17
1997	El Capitan, Mt. Landale	40	S				
1998	El Capitan, Mt. Landale	16	3	3			0.19
1999	El Capitan, Mt. Landale	24	3	3			0.13

^a Number and type of birds encountered. Σ, total number of individuals seen; S, sign observed but no birds seen; M, male; F, female; Ck, chick. In several cases, birds were seen, but sex or age was not determined.
^b Marble Meadows included Mt. McBride and ridge to Morrison Spire.

Our data suggested that *L. l. saxatilis* inhabited most potential habitat on Vancouver Island, and there has been little, if any, change in distribution. The 14 sites with early or recent, but no modern observations (Fig. 1), can be explained by a lack of recreational visits and survey effort; we visited only one of these sites

(Heather Mt.) on one occasion. In our field studies, we located birds or detected sign of their presence in all but two sites with historic or recent observations. Furthermore, most sites without modern observations were near areas inhabited by ptarmigan. Differences between locations and numbers of historic and modern sightings can be attributed to improved mountain access, a steady increase in alpine recreation, and the initiation of the public survey. For example, the recent development of tourist facilities and hiking trails in Strathcona Provincial Park resulted in increased recreational activity in the central island region and more sightings from these areas. Submissions of modern observations increased dramatically after the Strathcona Wilderness Institute assisted our publicity efforts by posting boxes with ptarmigan observation cards at the trailheads of several heavily used trails. The northern region of the island was and continues to be underrepresented in our data set due to its isolation and lower visitation.

Change in distribution is only one of several manifestations of population change (Wilcove and Terborgh 1984). To evaluate the conservation status, we also need to determine whether ptarmigan populations are stable. Our records data did not allow estimation of population densities because zero counts were not submitted and we could not control for sampling effort or efficiency. Although encounter rates in our field studies were lower and more variable in the north and south regions of the island, perhaps indicating lower population stability, this could be due to generally smaller and more isolated alpine patches in these regions compared to the central island. Demographic studies are required to determine population size

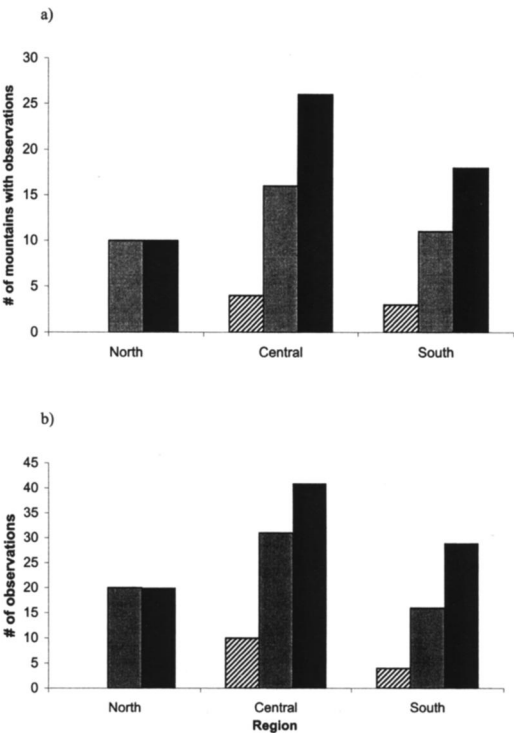


Fig. 2. Summary of (a) number of areas with ptarmigan observations and (b) number of observations of ptarmigan by geographic region and time interval. ▨ indicates observation between 1905 and 1944; ▩ observation between 1945 and 1994; ■ observation between 1995 and present.

and whether the annual variation in vital rates will allow populations to persist with the normal processes of recruitment, emigration, and rescue as shown by other White-tailed Ptarmigan populations (Martin et al. 2000; Martin 2001). There are potential stressors for ptarmigan within and external to alpine habitats, such as climate change or increasing recreational activity or harvesting of montane forest, that may influence dispersal processes. Our ongoing studies will provide further insight into Vancouver Island White-tailed Ptarmigan population dynamics and conservation status.

ACKNOWLEDGMENTS

We thank the many dedicated naturalists, hikers, mountaineers and helicopter pilots on Vancouver Island who made considerable efforts to consult personal journals for ptarmigan records. Often, they provided impressively detailed reports. In particular, we thank Sandy Briggs, Wayne Campbell, Michelle Commons, Ian McTaggart Cowan, Thomas DeMaria, Don Doyle, Lindsay Elms, Laura Higgins, Ruth Masters, Carly Newman, Steve Ogle, Ken Rodenets, Peter Rothermel, Chris Ruttan, Michele Sewolt, Jim Vallance, Fred Zwickel, the Strathcona Wilderness Institute (Steve Smith), the Royal British Columbia Museum, and the BC Ministry of Water, Land and Air Protection for their support and assistance. We thank Fred Zwickel, Clait Braun, and Steve DeStefano for comments on earlier drafts of the manuscript and Marty Mossop for technical assistance. The Natural Sciences and Engineering Research Council of Canada provided undergraduate scholarship support to Graeme Brown and a Discovery Grant to K. Martin.

LITERATURE CITED

- BRAUN, C. E., K. MARTIN, AND L. A. ROBB. 1993. White-tailed Ptarmigan (*Lagopus leucurus*). In: The birds of North America (A. Poole, and F. Gill, eds.), no. 68. Academy of Natural Sciences, Philadelphia, PA, and American Ornithologists' Union, Washington, D.C.
- CAMPBELL, R. W., N. K. DAWES, I. MCT. COWAN, J. M. COOPER, G. W. KAISER, AND C. E. McNALL. 1990. The birds of British Columbia, vol. 2: nonpasserines. Diurnal birds of prey through woodpeckers. The Royal British Columbia Museum, Victoria, BC.
- COWAN, I. MCT. 1939. The White-tailed Ptarmigan of Vancouver Island. *Condor* 41: 82–83.
- FRASER, D. F., W. L. HARPER, S. G. CANNINGS, AND J. M. COOPER. 1999. Rare birds of British Columbia. Wildlife Branch and Resource Inventory Branch, British Columbia Ministry of Environment, Lands and Parks, Victoria, BC.
- MARTIN, K. 2001. Wildlife communities in alpine and subalpine habitats. In: Wildlife-habitat relationships in Oregon and Washington (D. H. Johnson, and T. A. O'Neil, eds.), pp. 239–260. Oregon State University Press, Corvallis, OR.
- , AND C. L. HITCHCOCK. 1997. Vancouver Island White-tailed Ptarmigan inventory: progress report May 1997. Winter Surveys and GIS Work. Report WTPVI-2. Centre for Alpine Studies, Forest Sciences, University of British Columbia, Vancouver, BC. http://www.forestry.ubc.ca/alpine/downloads/ptarmigan_2.pdf.
- , P. B. STACEY, AND C. E. BRAUN. 2000. Recruitment, dispersal, and demographic rescue in spatially-structured White-tailed Ptarmigan populations. *Condor* 102: 503–516.
- STORCH, I. 2000. Grouse status survey and conservation action plan 2000–2004. WPA/Birdlife/SSC Grouse Specialist Group. IUCN, Gland, Switzerland, and Cambridge, UK, and the World Pheasant Association, Reading, UK.
- SWARTH, H. S. 1912. Report on a collection of birds and mammals from Vancouver Island. University of California Publications in Zoology 10: 1–124.
- WILCOVE, D. S., AND J. W. TERBORGH. 1984. Patterns of population decline in birds. *American Birds* 38: 10–13.

Appendix 1. Records of White-tailed Ptarmigan on Vancouver Island, by time period, region, and location^a.

Date	Year	Area	Encounter type ^b	Number and class ^c				Observer/source	Reference and comments	
				Σ	M	F	Ck			
A. EARLY RECORDS (1905–1944)										
Central Region										
August	1912	Crown Mt.	V	2			2	W. B. Anderson	Cowan 1939, Swarth 1912, Collected for Royal British Columbia Museum (RBCM)	
									Collected for RBCM	
October	1926	Mt. Albert Edward	V	1	1				Comox Argus Newspaper, May 10, 1998	
	1928	Mt. Albert Edward	V	1					Comox Argus Newspaper, May 10, 1998	
Summer	1935	Mt. Albert Edward	V	1					Comox Argus Newspaper, May 10, 1998	
2 October	1936	Mt. Albert Edward	V	1				Courtenay Museum	Identified from RBCM photos	
29 August	1939	Mt. Albert Edward	V	1				Courtenay Museum	Identified from RBCM photos	
31 August 22 July	1943	Mt. Albert Edward	V	4		1	2		Collected for RBCM	
	1932	Mt. Kookjai	V	2			2		Collected for RBCM, referred to as Mt. Evans	
20 August	1939	Mt. Frink	V	1				Courtenay Museum	Identified from RBCM photos	
	1910	Mt. Tom Taylor, Big Interior	V	6			6	H. S. Swarth	Cowan 1939, Collected for California Museum of Vertebrate Zoology	
South Region										
9 October	1905	Heather Mt.	V	1				Dr. Stoker	Cowan 1939, Collected for RBCM	

Appendix 1. Continued.

Date	Year	Area	Encounter type ^b	Number and class ^c				Observer/source	Reference and comments
				Σ	M	F	Ck		
19 July	1931	Mt. Arrowsmith	V	6			4-5	Geoffrey B. Capes	Town Archives: Courtenay, BC, On saddle between Arrowsmith and Cokely
11 September	1938	Mt. Arrowsmith	V	10			4	I. McT. Cowan, P. W. Martin	Cowan 1939, Col- lected for RBCM
11 July	1912	Mt. McQuillan	V	1		1		E. Despard	Swarth 1912, referred to as Mt. Saunders
B. RECENT RECORDS (1945-1994)									
North Region									
1 September	1984	Hkusam Mt.	V	7-8				Les Peterson	Possibly a brood
26 August	1989	Mt. Alava	V	1				Syd Watts	
4 July	1974	Mt. Alston	V	1				Syd Watts	
23 July	1984	Mt. Alston	V	1				Syd Watts	
27 July	1976	Mt. Ashwood	V	1				Syd Watts	On south peak
17 July	1979	Mt. Ashwood	V	1				Syd Watts	On north peak
August	1993	Mt. Ashwood	V	2				Peter Curtis	Near summit
April	1994	Mt. Ashwood	C	1				Peter Curtis	1 km south of sum- mit
9 October	1971	Mt. Cain	V	1				Syd Watts	On Mt. Cain/Mt. Hapush ridge
February	1989	Mt. Cain	V	1				Peter Curtis	Below ski lodge in slash; 1050 m
September	1992	Mt. Cain	V	2				Peter Curtis	Flying near summit
26 August	1994	Mt. Cain	V	1				Syd Watts	
16 August	1988	Pinder Peak	V	1				Syd Watts	
15 August	1975	Rugged Mt.	V	1				Syd Watts	
August	1994	Rugged Mt.	V	2				Peter Curtis	At col NW of sum- mit
14 August	1984	Tsitika Mt.	V	≥2				Syd Watts	High alpine meadow on south side, pos- sibly a brood?

Appendix 1. Continued.

Date	Year	Area	Encounter type ^b	Number and class ^c				Observer/source	Reference and comments
				Σ	M	F	Ck		
5 August	1959	Victoria Peak	V	1				Syd Watts	Provided location on map
30 August	1965	Victoria Peak	V	1				Syd Watts	Provided location on map
20 August	1988	Victoria Peak	V	1				Syd Watts	Provided location on map
Central Region									
May August	1991	Argus Mt.	V	2				Lindsay Elms	On summit
	1993	Big Den Mt.	V	25				Lindsay Elms	On south end of summit, adults and chicks
July	1953	Big Interior Mt.	V	≥1				Syd Watts	
July	1952	Comox Glacier	V	1				Syd Watts	
22 August	1981	Comox Glacier	S-T, Sc, f					J. David Routledge	
4 September	1988	Comox Glacier	V	5				Ken Rodenets	On rocky terrain, adults only
July	1986	Flower Ridge	V	≥3	1	1	≥2	Sandy Briggs	Female and number of chicks
19 July	1990	Golden Hinde	V	1		1		Sandy Briggs	On summit, photo submitted
August August	1991 1994	Marble Peak Mt. Adrian	C V	2 1				Syd Watts hiker	Record submitted by Lindsay Elms
27 August	1979	Mt. Albert Edward	S	3				J. David Routledge	Three broken eggshells, white with brown spots, found in rock hollow, given to RBCM
25 July 5 August	1981 1990	Mt. Albert Edward Mt. Albert Edward	V V	19 6		1	5	J. David Routledge Sandy McRuer, P. Dance	On RBCM nest card
13 July	1965	Mt. Becher	V	1				Dave King	Flushed birds; 1170 m

Appendix 1. Continued.

Date	Year	Area	Encounter type ^b	Number and class ^c				Observer/source	Reference and comments
				Σ	M	F	Ck		
12 December	1965	Mt. Becher	V	3				Dave King	Flushed birds near old Becher cabin
27 April	1966	Mt. Becher	S-T	1				Dave King	Had eaten buds of <i>Vaccinium</i> spp.
28 April	1966	Mt. Becher	V	1		1		Dave King	On edge of cliff; yearling female col- lected
3 September	1988	Mt. Colonel Foster	V	1				Sandy Briggs, Don Berryman	Bird flushed; SW slope; bare rock
13 July	1980	Mt. Myra	V	1				Syd Watts	Interviewed by J. R. Young
10 July	1994	Mt. Septimus	V	≥3		1	≥2	Chris Barner	
16 August	1963	Mt. Washington	S-f					Fred Zwickel	On summit
24 November	1965	Mt. Washington	V	3			2	Dave King	Collected two chicks
16 February	1966	Mt. Washington	S-T	1				Dave King	Near top cliff on NW ridge, 1410 m
24 April	1966	Mt. Washington	S-T	1-2				Dave King	SW slope; 1440 m
31 May	1966	Mt. Washington	V	2		1		Dave King	Feeding on alder buds and catkins, collected female
Winter Summer	1981 1958	Mt. Washington Strathcona Park	V V	1 ≥1				Rick Adams Syd Watts	Under blue chairlift Albert Edward to Della Falls via Reese Ridge and Big Interior
August	1961	Strathcona Park	V	≥1				Syd Watts	Della Falls to Burtle Lake via Tom Tay- lor and Mt. Phil- lips
August	1962	Strathcona Park	V	≥1				Syd Watts	Elk River to Burtle Lake via Golden Hinde

Appendix 1. Continued.

Date	Year	Area	Encounter type ^b	Number and class ^c				Observer/source	Reference and comments
				Σ	M	F	Ck		
21 April	1971	Tsolum Main Road	V	2				Fred Zwickel	Conifer plantation near western hemlock, Douglas-fir, willow and amabilis fir, elev. 535 m; probably a spring dispersal event
28 December	1962	Wood Mt. Ski Park	V	4				Fred Zwickel, B. Simard	Roosting on rocks near heather, willow and hemlock; ~800 m, photo and specimen collected, Old Courtenay Lookout (two km west of Wood Mt. Ski Park)
South Region	1980	Butler Peak	V	1				Bud Smith	Photo
	1980	El Capitan	V	1				Bud Smith	
	1993	Klitsa Mt.	V	1				Sandy McRuer	Bird flushed by helicopter
Fall	1994	Klitsa Mt.	V	6				Don Cecile	Above Kennedy River, photo
	1974	Mackenzie Range	V	1				Adrian Dorst	In subalpine terrain
18 September July	1988	Mt. Apps	V	3				Ken Rodenets	
	1947	Mt. Arrowsmith	V	≥1				Syd Watts	
	1950	Mt. Arrowsmith	V	≥1				Charlie Faulkner	Saw ptarmigan in early 1950's
19 July	1962	Mt. Arrowsmith	V	1				Bryan Gates	
May	1980	Mt. Cokely	V	3				Bud Smith	Three birds collected
	1980	Mt. Hooper	V	1				Island Mountain Ramblers	

Appendix 1. Continued.

Date	Year	Area	Encounter type ^b	Number and class ^c				Observer/source	Reference and comments
				Σ	M	F	Ck		
8 July	1980 1993	Mt. Hooper Mt. Landale	V V	5 ≥1		1	4	J. David Routledge hiker	Interviewed by J. R. Young Adult
17 July	1980	Mt. Service	V	1				J. David Routledge	
17 July	1980	Mt. Whymper	V	4		1	3	J. David Routledge	
October	1994	Mt. Whymper	V	12–15				Curly Newman	Interviewed by J. R. Young
July	1987	Steamboat Mt.	V	1				Adrian Dorst	Near snowfield on Clayquot Plateau, photo
	~1990	Mt. Brenton	V	≥1				Curly Newman	NE end in old burn
C. MODERN RECORDS (1995–PRESENT)									
North Region									
September	1997	Hapush Mt.	V	1				Peter Curtis	On flat area 500 m south of summit
July	1998	Hapush Mt.	V	3		1	2	Peter Curtis	On flat area 500 m south of summit
21 June	1998	Mt. Abel	V	1				Mt. Cain Habitat Project	
June	1998	Mt. Abel	V	2				Mt. Cain Habitat Project	
2 June	2002	Mt. Adam	V	1				Lindsay Elms	On summit
August	1997	Mt. Ashwood	V	2				Peter Barratt	Birds flushed by heli- copter
8 August	1998	Mt. Bate	V	2				Sandy Briggs	SE exposure, rock and heather, 1260 m
May	1995	Mt. Cain	C	1				Peter Curtis	On ridge 1 km west of summit
February	1997	Mt. Cain	V	1				Mt. Cain Habitat Project	Bird disturbed by snowmobile

Appendix 1. Continued.

Date	Year	Area	Encounter type ^b	Number and class ^c				Observer/source	Reference and comments
				Σ	M	F	Ck		
29 June	1997	Mt. Cain	C	1				Mt. Cain Habitat Project	Parkland habitat, on upper Mt. Cain, territorial call
6 December	1997	Mt. Cain	V	1				Rick Adams	Bird flushed from ski area into west bowl
5 June	1998	Mt. Cain	C	1				Mt. Cain Habitat Project	Parkland habitat, on upper Mt. Cain, territorial call
1 June	1999	Mt. Eden	C	1				Lindsay Elms	Near summit
7 October	2002	Mt. Nora	V	1				Lindsay Elms	1600 m
17 April	2002	Mt. Romeo	V	2				Dave Webb	Subalpine w/mixed conifers, slightly under heli-pad
	1998	Newcastle Ridge	V	1				Jim Vallance	At col NW of sum- mit
September	1996	Rugged Mt.	V	3		1	2	Peter Curtis	At col and 10 m be- low summit
24 July	1998	Rugged Mt.	V	6	1	2	3	Lindsay Elms	Near snowfield; white patches in plumage
19 July	2002	Victoria Peak	V	4				Nick Elson	Birds flushed by heli- copter
August	1995	Whitilla Mt.	V	2				Peter Barratt	South of summit; ~1500 m
January	1997	Whitilla Mt.	V	1				Peter Curtis	
Central Region									
16 September	2003	Augerpoint Mt.	V	4		1	3	Warrick and Jan Whitehead	Ridge above Jack Shark Lake; 1520 m
August	1996	Big Interior Mt.	V	2				Lindsay Elms	On north glacier
Summer	1996	Big Interior Mt.	V	2				Chris Barner	
1 August	2002	Comox Glacier	V	2		1	1	Lindsay Elms	Below south summit

Appendix 1. Continued.

Date	Year	Area	Encounter type ^b	Number and class ^c				Observer/source	Reference and comments
				Σ	M	F	Ck		
10 August	1997	Conuma Peak	V	1				Sandy Briggs	40 m west of summit, bare rock, near heather, scrub and trees
7 August	1995	Cream Lake	V	5		1	4	hiker	Interviewed by J. R. Young
6 September	1999	Crest Mt.	V	6		1	5	Chris Ruttan	Photo submitted
11 August	2002	Crest Mt.	V	2		1	1	Caroline Affrédou	Foraging near snowfield, chick near adult size
30 July	2003	Crest Mt.	V	1				Don Cameron	~1400 m
12 August	2001	Elkhorn Mt.	V	1				Harry van Oort	West side of Mt. near base of summit in talus
8 September	2001	Elkhorn Mt.	V	2				Peter Rothermel	Interviewed by K. Martin
	2001	Flower Ridge	V	4		1	3	Peter Rothermel	
	1997	Greig Ridge	V	2				Jack Morrison	
	1997	Jutland Mt.	V	8		1	7	Mike Delaronde	
26 September	1995	King's Peak	V	3				hiker	
21 August	1996	King's Peak	V	11		2	9	Chris Barner	On north ridge
	1996	King's Peak	V	5	1	1	3	Chris Barner	
	1997	King's Peak	V	4	2	2		Lindsay Elms	
20 July	2000	King's Peak	V	2				hiker	One pair in alpine, one pair in subalpine below bowl
22 September	1998	Limestone Cap	V	3				Jay Armstrong	At col south of summit; 1700 m
17 August	2003	Limestone Cap	V	2		1	1	Phil Vernon	One bird had red bands on both legs
July	1995	Little Jim Lake	V	≥1				Chris Barner	Northeast corner of mountain
									Interviewed by J. R. Young

Appendix 1. Continued.

Date	Year	Area	Encounter type ^b	Number and class ^c				Observer/source	Reference and comments
				Σ	M	F	Ck		
4 September	1997	Morrison Spire	V	4		1	3	Jack Morrison	On McBride/Morrison ridge, chicks 11–13 cm tall
28 July	2003	Morrison Spire	V	6		1	5	Ursula Knoll	
25 August	1998	Mt. Adrian	S-f					Lindsay Elms	On summit
10 August	1995	Mt. Albert Edward	V	5		1	4	Richard Guillet	Banded female
	1995	Mt. Albert Edward	V	≥1				Wayne French	Interviewed by J. R. Young
5 August	1996	Mt. Albert Edward	V	2				Rhonda Koral	Note left in registrar at peak
August	1996	Mt. Albert Edward	V	≥5		3	≥2	Ron Quilter	Interviewed by L. Elliot; up to 6 birds seen together
	1997	Mt. Albert Edward	V	11				3 groups of hikers	
25 July	1998	Mt. Albert Edward	V	6		1	5	Lindsay Elms	On rock, in open
17 September	2000	Mt. Chief Frank	V	1				Ken Rodenets	
21 August	2002	Mt. Colonel Foster	V	8		1	7	Lindsay Elms	On hump above south col
26 August	2002	Mt. DeVoe	V	4				Warrick and Jan Whitehead	Rocky terrain, feeding, ~1480 m
30 July	1995	Mt. Frink	V	~9		2–3	≥6	hiker	Interviewed by K. Martin; 2–3 broods
20 July	1997	Mt. McBride	V	1				Ken Rodenets	In response to poster
25 May	2002	Mt. Mitchell	V	2				Lindsay Elms	On summit, adult bird, photo
	1999	Mt. Myra	V	1				Michael Brown	
22 August	2002	Mt. Rousseau	V	4		1	3	Daniel Logan	North side
1 September	2002	Mt. Septimus	V	4			2	Carol Yole	1 km north of upper Thelwood Lake, 1488 m
	2003	Mt. Thelwood	V	1		1	3	Frank Hovenden	
Summer	1996	Mt. Tom Taylor	V	4		1	3	Ian Morris	

Appendix 1. Continued.

Date	Year	Area	Encounter type ^b	Number and class ^c				Observer/source	Reference and comments
				Σ	M	F	Ck		
17 August	2002	Mt. Tom Taylor	V	3				Nick Elson	Rocky terrain, near snowfield, 1500 m
5 March	2003	Mt. Washington	V	2				Chris Pielou	Below Raven lodge, in recent clearcut
July	1996	Peak 1520	V	7			5	Lindsay Elms	2 km west of The Behinde, on sum- mit
8 August	1998	Phillips Ridge	V	8				Lindsay Elms	Locations provided on topographical map
8 September	2001	Phillips Ridge	V	2				Randy Carter	On south end of summit
	1995	Puzzle Mt.	V	2				Lindsay Elms	
July	1996	Rambler Peak	V	4			2	Lindsay Elms	On west slope of Elk Pass (Rambler Peak side)
24 August	1998	Roger's Ridge	V	4		1	3	Lindsay Elms	On ridge 2 km NW of summit
25 July	2002	Tibetan Peak	V	3				Marcy Prior	Lots of feathers and scat around
27 December	2003	Wood Mt. Ski Park	V	1				Erica McClaren	Flushed from treed area onto open snow slope by dog; ~760 m
South Region									
13 July	2002	5040 Peak	S	1				Lindsay Elms	Fresh, intact egg on ground, near sum- mit
23 July	2000	Adder Mt.	V	1				Brook George	20 m below summit
11 August	2001	Adder Mt.	S-T, Sc, f					Chris Ruttan	
18 May	2002	Adder Mt.	S-Sc, f					Chris Ruttan	Interviewed by J. R. Young
July	1997	Beaufort Range	S-Sc, f					Otto Winnig	
November	1995	El Capitan	V	2-3				Curly Newman	

Appendix 1. Continued.

Date	Year	Area	Encounter type ^b	Number and class ^c				Observer/source	Reference and comments
				Σ	M	F	Ck		
June	1995	Klitsa Mt.	V	1				Don Cecile	200 m from summit
August	2000	Klitsa Mt.	V	6		1	5	Bryan Gates	
15 July	1995	Mt. Arrowsmith	V	3-4				Alan Thomson	
14 August	1997	Mt. Arrowsmith	V	1				Graham Turnbull	
4 April	1998	Mt. Arrowsmith	V	1				Sandy Briggs	
17 June	2000	Mt. Arrowsmith	V	1				Chris Ruttan	On saddle between Arrowsmith and Cokely
June	2000	Mt. Arrowsmith	V	1				hiker	
August	2000	Mt. Arrowsmith	S-Sc					Bryan Gates	Photo submitted
									On saddle between Arrowsmith and Cokely
June	2001	Mt. Arrowsmith	V	1				Harry van Oort	On saddle between Arrowsmith and Cokely
9 June	2002	Mt. Arrowsmith	V	2				Lindsay Elms	Near summit
July	2000	Mt. Cokely	V	1				Gord McNeil	Bird found dead
1 July	1995	Mt. Hal	V	1				Sandy McRuer	Beaufort Range
7 June	1995	Mt. Hooker	S-Sc					Don Doyle	
5 August	1995	Mt. Landale	V	≥3		1	≥2	hiker	Interviewed by J. R. Young
December	1996	Mt. Landale	V	2-3				Curly Newman	Interviewed by J. R. Young
29 July	1995	Mt. McQuillan	V	9		≥1	4	Mike Stini	Young
October	1996	Mt. McQuillan	V	4				Don Doyle	5 adults
2 September	2001	Mt. McQuillan	V	6-7				Sandy Briggs	3 birds flushed by helicopter, signal for D630
14 June	1997	Mt. Moriarty	V	1				Chris Ruttan	On summit, photo submitted
6 June	1995	Mt. Whympere	V	1	1			Don Doyle	Photo submitted
									Responded to male call playback, near repeater tower

Appendix 1. Continued.

Date	Year	Area	Encounter type ^b	Number and class ^c				Observer/source	Reference and comments
				Σ	M	F	Ck		
2 June	2002	Pogo Mt.	V	2				Chris Ruttan	1 on ridge, 1 near summit, photo submitted
20 September	2002	Pogo Mt.	V	3				Peter Rothermel	Chicks foraging
20 July	2002	Spectators Pk.	V	6		1	5	Barb Sorensen	Beaufort Range
September	1996	The Squarehead	V	1				Ken Rodenets	In heather and lime-
6 September	1998	Steamboat Mt.	V	6				Sandy Briggs	stone fissures, 1110 m
14 August	1997	Taylor Ridge	V	6		1	5	Jim Vallance	Near Taylor repeater tower

^a More complete details are available at <http://www.forestry.ubc.ca/alpine/research/ptarmigan.html>.

^b Encounter type: V, bird seen; C, bird call heard; S, sign observed (T, tracks; Sc, scat; f, feather).

^c Number, sex, age class: Σ, total number of individuals encountered; M, number of males; F, number of females; Ck, number of chicks. The total number encountered included birds that were not identified to age or sex classes.