

VANCOUVER ISLAND WHITE-TAILED PTARMIGAN INVENTORY



PROGRESS REPORT (1995-1996)

Cite As: Martin, K. and L. Elliott (1996). "Vancouver Island White-tailed Ptarmigan Inventory Progress Report (1995-1996)". Centre for Alpine Studies, Forest Sciences, University of British Columbia. Report WTPVI-1. <http://www.forestry.ubc.ca/alpine/docs/wtpvi-1.pdf>

December 1996

PERSONNEL

Principal Investigator

Dr. Kathy Martin
Department of Forest Sciences
270-2357 Main Mall
University of British Columbia
Vancouver, BC V6T 1Z4
Ph: (604) 822-9695
Fax: (604) 822-5410
kmartin@interchange.ubc.ca

Post Doctoral Associates

Jessica Young
Karen Wiebe

Research Assistants

Sabrina Taylor	Stephanie Melles
Laura Higgins	Jennifer Grant
Lea Elliott	Michelle Sewolt
Len Thomas	Chris Hitchcock
Katrine Voigt	

Collaborators

Forest Renewal British Columbia
Ministry of Environment, Lands and Parks
BC Parks
Conservation Data Centre
Clait Braun (Colorado Division of Wildlife)
Pam Krannitz (Canadian Wildlife Service)
Ministry of Forest, Victoria

Cover Photo: Sandy Briggs
White-tailed Ptarmigan at the summit of Golden Hinde, Vancouver Island

ACKNOWLEDGMENTS

The initiation and continuation of this project would have been impossible without the assistance of many people. Don Doyle (MELP) has been extremely helpful in every aspect of the project. Andy Derocher (MOF) provided seed funding to initiate work in 1995. Susan Holroyd (FRBC) and Don Doyle expedited FRBC funding for 1996-1997 work. Clait Braun provided an evaluation of breeding habitat in 1995. Many hikers, naturalists, parks and industry personnel (listed in Appendix III) gave invaluable support in determining access to the alpine, offering their assistance and giving us information about white-tailed ptarmigan sightings.

Cite As:

Martin, K. and L. Elliott (1996). "Vancouver Island White-tailed Ptarmigan Inventory Progress Report (1995-1996)". Centre for Alpine Studies, Forest Sciences, University of British Columbia. Report WTPVI-1.

Available at: <http://www.forestry.ubc.ca/alpine/docs/wtpvi-1.pdf>

Report Prepared by:

Kathy Martin
Lea Elliott

December 20, 1996

TABLE OF CONTENTS

<u>Section</u>	<u>Page Number</u>
INTRODUCTION.....	5
INVENTORY.....	6
AREAS AND METHODS.....	6
RESULTS AND DISCUSSION	7
OTHER WORK UNDERTAKEN.....	11
WORK PLANNED FOR 1997	13
WORK PLANNED FOR 1997	13
FUTURE ACTIVITIES.....	14
FUTURE ACTIVITIES.....	14
REFERENCES.....	15
Figures	
Figure 1. Areas where white-tailed ptarmigan were collected for use in designating <i>Lagopus leucurus saxatilis</i> as a subspecies specific to Vancouver Island.	16
Figure 2. Vancouver Island white-tailed ptarmigan study areas in 1995 and 1996.	17
Figure 3. Potential white-tailed ptarmigan habitat on Vancouver Island.	18
Figure 4. Vancouver Island banding location for white-tailed ptarmigan.	19
Tables	
Table 1. Observations of white-tailed ptarmigan on Vancouver Island by hikers, naturalists and agency personnel (1905-1996).	20
Table 2. Vancouver Island white-tailed ptarmigan field work summary for 1995.	22
Table 3. Vancouver Island white-tailed ptarmigan field work summary for 1996.	23
Table 4. Summary of white-tailed ptarmigan banded, radioed and seen on Vancouver Island in 1995 and 1996.	25
Table 5. Vancouver Island white-tailed ptarmigan 1995 summer and autumn banding summary.	26
Table 6. Vancouver Island white-tailed ptarmigan 1996 summer and autumn banding summary.	27
Table 7. White-tailed ptarmigan relocated by helicopter on south and central Vancouver Island on December 16th and 17th , 1996.	29

APPENDICES

- Appendix I** Copy of - Cowan, I.T. 1938. The White-tailed Ptarmigan of Vancouver Island.
Condor 41: 82-83. *(not included in on-line version for Copyright reasons)*
- Appendix II** Data sheet given to naturalists, hikers and agency personnel to record white-tailed
ptarmigan sightings.32
- Appendix III** List of Vancouver Island white-tailed ptarmigan contacts.
(not included in on-line version)
- Appendix IV** Summary of the Royal BC Museum specimens Clait Braun verified.33
- Appendix V** Slides for public education presentations.....34

INTRODUCTION

White-tailed ptarmigan, *Lagopus leucurus*, is a hardy alpine grouse that occurs only in North America in alpine areas ranging in elevation from 900 - 4250 metres (Braun et al. 1993). It is one of the very few vertebrates that lives year round above ground in the alpine. Five subspecies of white-tailed ptarmigan are recognized. This and other subspecific designations should be validated using available data on the physical, behavioural and genetic differences, and as well, the geographic boundaries of the subspecies. White-tailed ptarmigan subspecies, *Lagopus leucurus saxatilis*, is believed to be restricted to Vancouver Island.

Lagopus leucurus saxatilis was designated as a subspecies in 1938 (Appendix I, Cowan 1938). The 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, *Lagopus leucurus leucurus* and *Lagopus leucurus rainierensis* respectively (Table 1 & Figure 1, Dwight 1900). The majority of birds measured and described were from the south of the island, only one bird was from the central island (Crown Mountain, Starthcona Park) and no birds from the north island. Five of the 12 individuals were chicks in transitional plumage (collected from August to September). The adults were in either winter plumage (1 bird) or transition from breeding to winter plumage (collected from August to October).

This subspecies is on the BC Blue List (1996), primarily due to a lack of information. Currently, little is known about the distribution and abundance of *L. l. saxatilis*. Nothing is known about how it differs ecologically and genetically from the other subspecies of white-tailed ptarmigan. Ecological traits are possibly different, such as habitats used, and there may be differences in timing and patterns of dispersal between breeding and wintering areas.

Virtually nothing is known about whether the status of the Vancouver Island ptarmigan is changing in relation to habitat loss from forestry logging activities or increase of recreational activities and developments. These activities have the potential to adversely impact both summer production, winter survival and dispersal between breeding and winter sites.

The goal of this inventory is to provide information on the abundance, distribution, and status of this listed subspecies. A preliminary census of white-tailed ptarmigan on Vancouver Island began in 1995. In 1996, with acquisition of FRBC inventory funding, the white-tailed ptarmigan inventory was greatly increased in time, personnel, areas searched and number of ptarmigan located, banded, and radio-tagged. The inventory is ongoing and planned for another four years.

This draft report is a summary of work completed in 1995 and 1996. It is intended to be a preliminary document to solicit feedback on the directions of the inventory of white-tailed ptarmigan and to verify information on historical sightings presented in Table 1.

INVENTORY

AREAS AND METHODS

We searched for white-tailed ptarmigan in the following alpine areas on Vancouver Island in 1995 and/or 1996 (Table 2 & 3, Figure 2):

South Island	Central Island	North Island
El Capitan/ Landalt/ Mt Whymper	Leader Lake Ridge King's Peak	Mt Hkusam Mt Cain/ Mt Abel
Mt Arrowsmith/Mt Cokely Klitsa - 5040 Peak	Mt Albert-Edward/ Mt Jutland/ Mt Frink	Mt Adam
Mt McQuillan Heather Mountain	Marble Meadows/Phillips Ridge/ Greig Ridge	
Big Ugly Green Mountain	Little Jim Lake	

In 1995, 71 people days were spent in the field and in 1996, 153 people days were spent in the field. This time does not include preparation time to go into the field, data management and other activities. Alpine areas were censused for the presence of white-tailed ptarmigan by: audio playbacks, bird dogs, looking for sign of ptarmigan (fresh moulted feathers and/or scat), aerial surveys, and talking to hikers, naturalists, and agency personnel (Braun et al. 1973). Playbacks of the male territory challenge calls were used to elicit male response during the breeding season and were occasionally effective for locating males during the summer and fall. Playbacks of chick distress calls were used during the brood rearing season successfully to locate females with chicks. Once a bird was located an attempt was made to catch it using an extendible noose pole (Zwicker and Bendell 1967). Once caught, if an adult, the bird was banded with a numbered aluminum leg band and a unique colour band combination. The majority of birds were also radio-collared, thus allowing us to determine brood success and seasonal habitat use. Blood and feathers were collected from most birds for genetical analysis and presence of blood parasites. Chicks were tagged with either a numbered wing-tag or aluminum leg band, depending on their size. In 1996, seven chicks were relocated on Mt Albert-Edward and Mt Jutland in

October and radio-collared enabling us to track their dispersal. Areas where white-tailed ptarmigan were banded on Vancouver Island is demonstrated in Figure 3 and Figure 4.

One winter survey was conducted using radio telemetry equipment from a helicopter to relocate radio tagged birds. Areas we originally radio collared birds in were flown over while using the receiver to pick up signals. Once a signal was received an attempt was made to determine the birds latitude, longitude, elevation, who it was with and what habitat it was in.

RESULTS AND DISCUSSION

Abundance

Over both 1995 and 1996, we have located a total of 174 white-tailed ptarmigan on Vancouver Island.

Forty-five white-tailed ptarmigan were caught and banded on Vancouver Island in 1995, 13 of the 45 banded birds were radio-collared (Table 4, 5 & 6). Three other birds were seen, but not caught. A total of 48 birds were located in 1995.

In 1996, 71 ptarmigan were banded on Vancouver Island, 41 of the 71 banded birds were radio-collared, 60 other birds were seen, but not captured (Table 4, 5 & 6). A total of 131 birds were located in 1996. Five of the 71 birds were first captured and banded in 1995 - two males, one adult female and two yearling chicks. Four of the five 1995 birds were found in the same general area; however, one of the yearling chicks was located on a different mountain, approximately 40 kilometres away. Seven chicks were radio-collared on Mt Albert-Edward and Mt Jutland. Further work is required before we can determine accurate estimates of population size for specific areas.

Production

No females were located without chicks during the breeding season in 1995. In 1996, 11 successful females (females with broods) were banded and radio-collared, another six successful females were seen. Nine unsuccessful females (females without broods) were banded and radio-collared, and one other unsuccessful female was located. Brood size ranged from one to seven chicks. Currently, no information is available on clutch size, nesting success and chick survival.

Genetic Analysis

In 1995 and 1996, 20 blood samples were collected each year for use in DNA analysis. Twenty-five of the 40 samples have been extracted. The polymerase chain reaction procedure has been used successfully to amplify a portion of the mitochondrial DNA, which will be sequenced and compared to similar samples from white-tailed ptarmigan subspecies in Colorado (*Lagopus leucurus altipetens*). This will allow us to determine what genetic differences there are between the two subspecies. We have also collected contour feathers from 50 adults that we hope to be able to use for genetical analyses after we compare differences in genetical information derived from feathers and blood samples.

Blood Parasites

Typically, white-tailed ptarmigan are not infected with blood parasites common in other grouse species (Olsen and Braun 1971; Olsen, Haskins and Braun 1978; Stabler, Kitzmiller and Braun 1971; Stabler, Kitzmiller and Braun 1974; Stabler, Haskins, Kitzmiller, Olsen and Braun 1979). However, Nancy Braun of Fort Collins, Colorado examined films from three white-tailed ptarmigan on Vancouver Island taken in 1995 and she found all three were infected with blood parasites. All three were infected with *Trypanosoma*, two of the three were infected with *Haemoproteus*, and one was heavily infected with *Microfilaria*. This unusually high infection rate may be caused by the overlap of white-tailed ptarmigan and blue grouse habitat we observed on the island. Blue grouse are commonly infected with all of these parasites. The implications of the blood parasite infection for white-tailed ptarmigan populations are unknown. Twenty films were taken in 1996 and have yet to be examined.

Historical and Recent White-tailed Ptarmigan Observations

Since the start of the white-tailed ptarmigan inventory in 1995, we contacted local hikers, naturalists, and industry and agency personnel to determine if they have seen any ptarmigan, to inform them of the project and to ask for their assistance by reporting any ptarmigan sightings (Appendix II & III). Most sightings received as of now are included in Table 1. A list of hikers, naturalists, and industry and agency personnel has been compiled, we will maintain contact with these people in 1997 and initiate contact with others. The observation data provided by these people have been invaluable in generating an initial idea of the general distribution of ptarmigan on Vancouver Island.

Summer Range and Habitat Use

The range of the white-tailed ptarmigan on Vancouver Island extends further north and south than previously thought (Campbell et al. 1990). White-tailed ptarmigan have been documented as far south as Mt Brenton (elev. - 1100 m, north of Chemainus River) and as far north as Mt Cain (north of Schoen Provincial Park). We believe that their range is more extensive than known presently, especially in the north, where so far we have done little exploration.

White-tailed ptarmigan on Vancouver Island appear to live at lower elevations and use a wider range of habitats than on the mainland. The majority of the habitat used by white-tailed ptarmigan on Vancouver Island would be considered marginal or suboptimal habitat when compared to the large expanses of alpine on the mainland. A report comparing the habitat on Vancouver Island to the mainland is currently being prepared by Clait E. Braun of Fort Collins, Colorado. All birds captured in Strathcona Park were found above the timberline in moist, rocky, alpine patches dominated by white and pink mountain heather (*Cassiope mertensiana* and *Phyllodoce empetriformis*, respectively). Birds captured in the southern areas occurred in more subalpine areas where krummholz, dwarf Engelmann spruce (*Picea engelmannii*), and subalpine fir (*Abies lasiocarpa*) intermix with patches of mountain heather (*C. mertensiana* and *P. empetriformis*). Vancouver Island ptarmigan were often found in areas in which the alpine interfaced with the subalpine. Consequently, there appears to be much more overlap with blue grouse than observed on the mainland. In the future, core areas used by white-tailed ptarmigan will be identified and risk factors for the subspecies will be assessed.

Winter Range and Habitat Use

The first radio telemetry winter census for white-tailed ptarmigan was conducted on December 16th and 17th, 1996. The southern birds were surveyed on December 16th and the central island birds were surveyed on December 17th (Table 7). The southern birds were checked in using a Lotek scanner and the central island birds were checked in using a non-scanning Telonics scanner, the scanning receiver greatly increased efficiency, consequently, we were more successful in the south than on the central island.

Forty-one white-tailed ptarmigan were radio-collared in 1996 on Vancouver Island, all 41 radio-tagged birds signals were tried in the areas they were banded. Twenty-four of the 41 radio-collared birds signals were picked up. Twelve of the 15 birds signals in the south were received and 12 of the 26 birds on the central island were received. Five of the 41 birds were visually checked in. The majority of birds were located on the same mountain they were banded on, but we did not relocate all birds. Some of the birds we did not relocate could have moved considerable distances, out of the range being surveyed. Most birds were found alone, even if they were banded in a flock, with the exception of a brood female D0611 who was with her chick D0701 and another bird without a radio-collar who could have also been one of her chicks. Birds were located in habitats ranging from rocky open areas to areas with 25 ft trees. During the survey birds were found at elevations ranging from 2700 ft to 5800 ft, one bird was located at 1300 ft, but this bird is likely dead. Weather permitting, aerial telemetry surveys will continue throughout the winter, these surveys will greatly increase our knowledge of winter habitat use.

OTHER WORK UNDERTAKEN

Museum Specimens

All specimens in the Royal British Columbia Museum (Table 1) have been examined and verified as to age and sex in a report submitted by Clait E. Braun of the Colorado Division of Wildlife, Fort Collins, Colorado (Appendix IV). In addition, 10 *L. l. saxatilis* specimens were examined at the Museum of Vertebrate Zoology at the University of California by Jessica Young. These specimens were verified as to age, sex and location collected.

Public Education

- BC Field Ornithologists' lecture, Sydney, British Columbia, Sept. 16, 1995. "Life at high altitudes: how do ptarmigan make a living?"
- Vancouver Natural History Club, Vancouver, British Columbia, Nov. 2, 1995. "The life history, ecology, and physiology of ptarmigan at high altitudes."
- Article on the Vancouver Island white-tailed project in the Western State College (Gunnison, Colorado) alumni publication, Spring, 1996.
- Victoria Natural History Society, Nov. 27, 1996. "The population ecology of white-tailed ptarmigan on Vancouver Island and the mainland."

Alpine Vertebrates On Vancouver Island

We recorded all alpine vertebrate species seen on Vancouver Island while doing our inventory of white-tailed ptarmigan. The following bird species were noted:

Golden-eye sp.	Clark's Nutcracker
Bald Eagle	Northwestern Crow
Red-tailed Hawk	Common Raven
Sharp-shinned Hawk	Chestnut-backed Chickadee
Cooper's Hawk	Red-breasted Nuthatch
Osprey	Winter Wren
Ruffed Grouse	Golden-crowned Kinglet
Blue Grouse	Swainson's Thrush
Band-tailed Pigeon	Varied Thrush
Black Swift	American Robin
Hummingbird sp.	American Dipper
Northern Flicker	Dark-eyed Junco
Stellar's Jay	Pine Siskin
Gray Jay	Red Crossbill

Other vertebrates observed and recorded in the alpine on Vancouver Island:

Shrew sp.	Black Bear
Deer Mouse	Elk
Red Squirrel	Garter Snake - <i>T. sirtalis</i>
Vancouver Island Marmot	Rough-skinned Newt - <i>Taricha granulosa</i>
Tree frog - <i>Pseudacris regilla</i>	

WORK PLANNED FOR 1997

Winter/Spring 97

Radioed birds will be located by helicopter one to two times a month. This will assist in determining winter use areas and natal dispersal.

Spring/Summer 97

Radio-collared birds will be relocated on the ground to determine territories, nesting habitat, annual survival patterns, and timing and patterns of dispersal. Previously searched areas will be visited again to locate any unbanded birds. As well, we plan to search the following new areas as well as others:

South Island

Pea Mountain
Mt Hal
Clayoquot Plateau
Ursus mountain
Taylor river ridges
Mt Brenton

Central Island

Cream Lake
Big Interior
Tom Taylor
Comox Glacier Trail

North Island

Mt Schoen
Mt Hapbush
Mt Victoria
Mt Palmerston
Merry Widow Peak
Maquinna Peak
Rugged Peak
Kurtmützen

We plan to have two field teams in 1997, one in the south and central island and the second team to concentrate on exploring the north island.

FUTURE ACTIVITIES

- Initiate GIS/GPS component, provide habitat maps for each site.
- Emphasize exploration of the north end of Vancouver Island.
- Begin using radios with mortality sensors to increase quality and amount of information concerning dispersal and mortality.
- Bring on graduate students to study habitat selection and winter habitat/migration.
- Continue census of alpine birds on Vancouver Island.
- Coordinate with other wildlife habitat inventories (Goshawk and Vancouver Island Marmot).
- Continue offering public talks concerning Vancouver Island ptarmigan on request (see slides - Appendix V)
- Create a web page for white-tailed ptarmigan.
- Produce a poster - “Wanted - White-tailed ptarmigan” - requesting additional historical and current sightings of white-tailed ptarmigan.
- Produce a project business card to give to hikers etc. that are met on the trail, at talks, etc. with information concerning how to record ptarmigan sightings and where to deliver this information.
- Initiate a partnership with the personnel from the Canadian Wildlife Service, Pacific and Western Region. This partnership will involve Pam Krannitz studying plant ecology and Eric Taylor looking at climate change in areas used by white-tailed ptarmigan.
- We were contacted by Ian Gray of the British Broadcasting Corporation - The Life of Birds series, to do a feature on ptarmigan.
- Write an article for The British Columbia Field Ornithologists’ Newsletter.

REFERENCES

- Braun, C.E., K. Martin, and L.A. Robb. 1993. White-tailed Ptarmigan (*Lagopus leucurus*). In *The Birds of North America*, No. 68 (A. Poole and F. Gill, Eds.). Philadelphia: The Academy of Natural Sciences; Washignton, D.C.: The American Ornithologists' Union.
- Braun, C.E., R.K. Schmidt, Jr. and G.E. Rogers. 1973. Census of Colorado white-tailed ptarmigan with tape recorded calls. *J. Wildl. Manage.* 37: 90-93.
- Campbell, R.W., N.K. Dawe, I. McTaggart-Cowan, J.M. Cooper, G.W. Kaiser and M.C.E. McNall. 1990. *The Birds of British Columbia - Volume II - Nonpasserines*. Royal British Columbia Museum.
- Conservation Data Centre. 1996. Vertebrate Animal Provincial Tracking List (Most recent version of the red and blue List).
- Cowan, I.M. 1938. White-tailed ptarmigan of Vancouver Island. *Condor*, 41: 82-83.
- Dwight. 1900. Moults of Quails and Grouse. Vol 17, p. 149.
- Olsen, O.W. and C.E. Braun. 1971. *Diplotrriaena lagopusi* and *D. andersoni* spp. n. (Diplotrriaenidae: Filariodea) from white-tailed ptarmigan (*Lagopus leucurus*) in North America. *Proc. Helminthol Soc. Washington* 38: 86-89.
- Olsen, O.W., A. G. Haskins, and C.E. Braun. 1978. *Rhabdometra alpinensis* n. sp. (Cestoda: Paruterinidae: Dilepididae) from southern white-tailed ptarmigan (*Lagopus leucurus altipetens* Osgood) in Colorado, USA, with a key to the species of *Rhabdometra* Cholodkowsky, 1906, *Can. J. Zool.* 56: 446-450.
- Stabler, R.M., N.J. Kitzmiller and C.E. Braun. 1971. Hematozoa from 300 Colorado white-tailed ptarmigan, *Lagopus leucurus*. *J. Protozool.* 18 (Suppl.): 14.
- Stabler, R.M., N.J. Kitzmiller and C.E. Braun. 1974. Hematozoa Colorado birds, IV. Galliformes. *J. Parasitol.* 60: 536-537.
- Stabler, R.M., A.G. Haskin, N.J. Kitzmiller, O.W. Olsen and C.E. Braun. 1979. Two new species of coccidia, *Eimeria leucuri* and *E. oreoecetes* (Protozoa: Eimeriidae), in grouse from Colorado. *J. Parasitol.* 65: 272-274.
- Swarth, H.S. 1912. Report on a collection of birds and mammals from Vancouver Island. *Univ. Calif. Publ. Zool.* 10: 25.
- Zwicker, F.C. and J.F. Bendell. 1967. A snare for capturing blue grouse. *J. Wildl. Manage.* 31: 202-204.

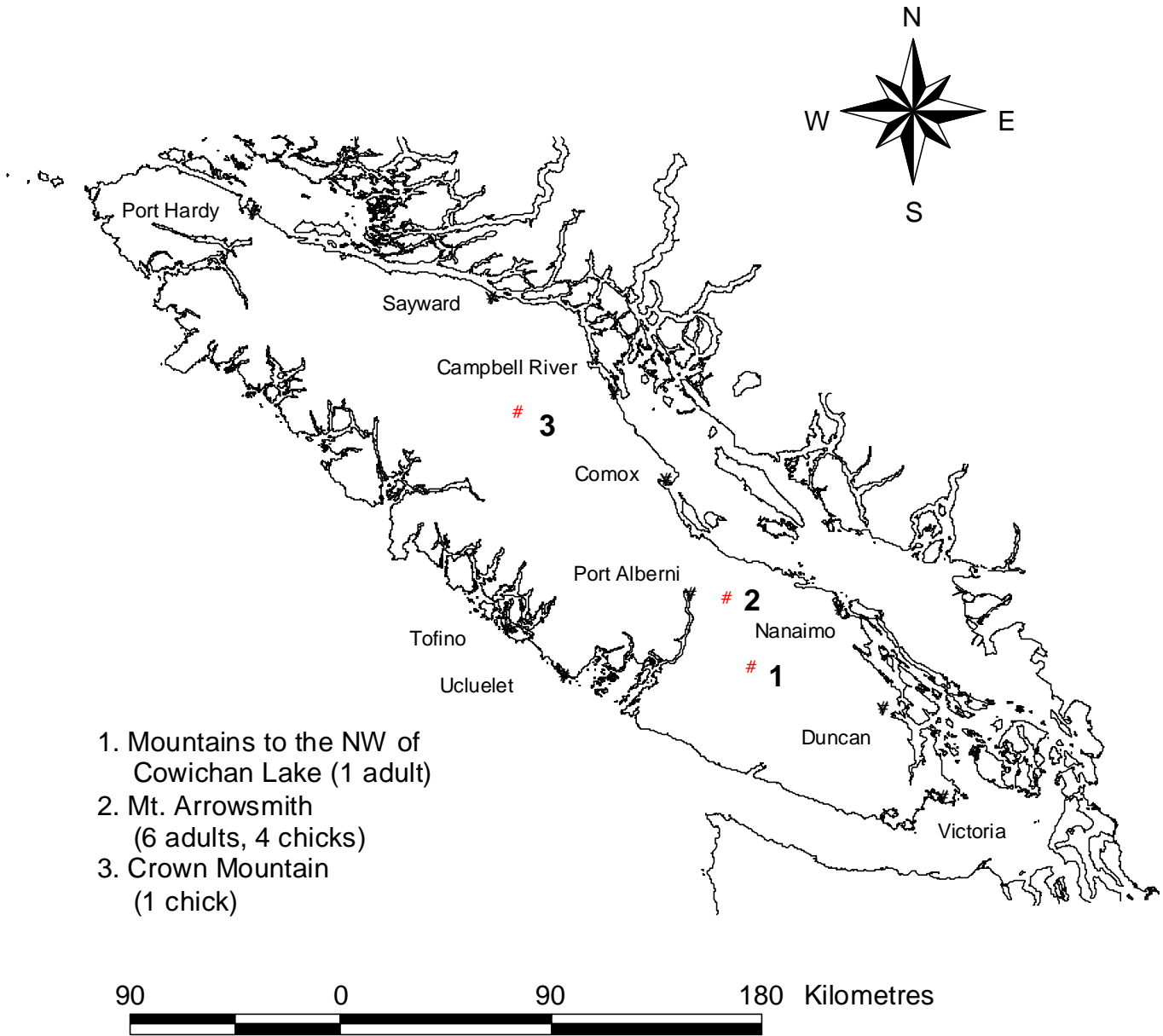


Figure 1. Areas where white-tailed ptarmigan were collected for use in designating *Lagopus leucurus saxatilis* as a subspecies specific to Vancouver Island.

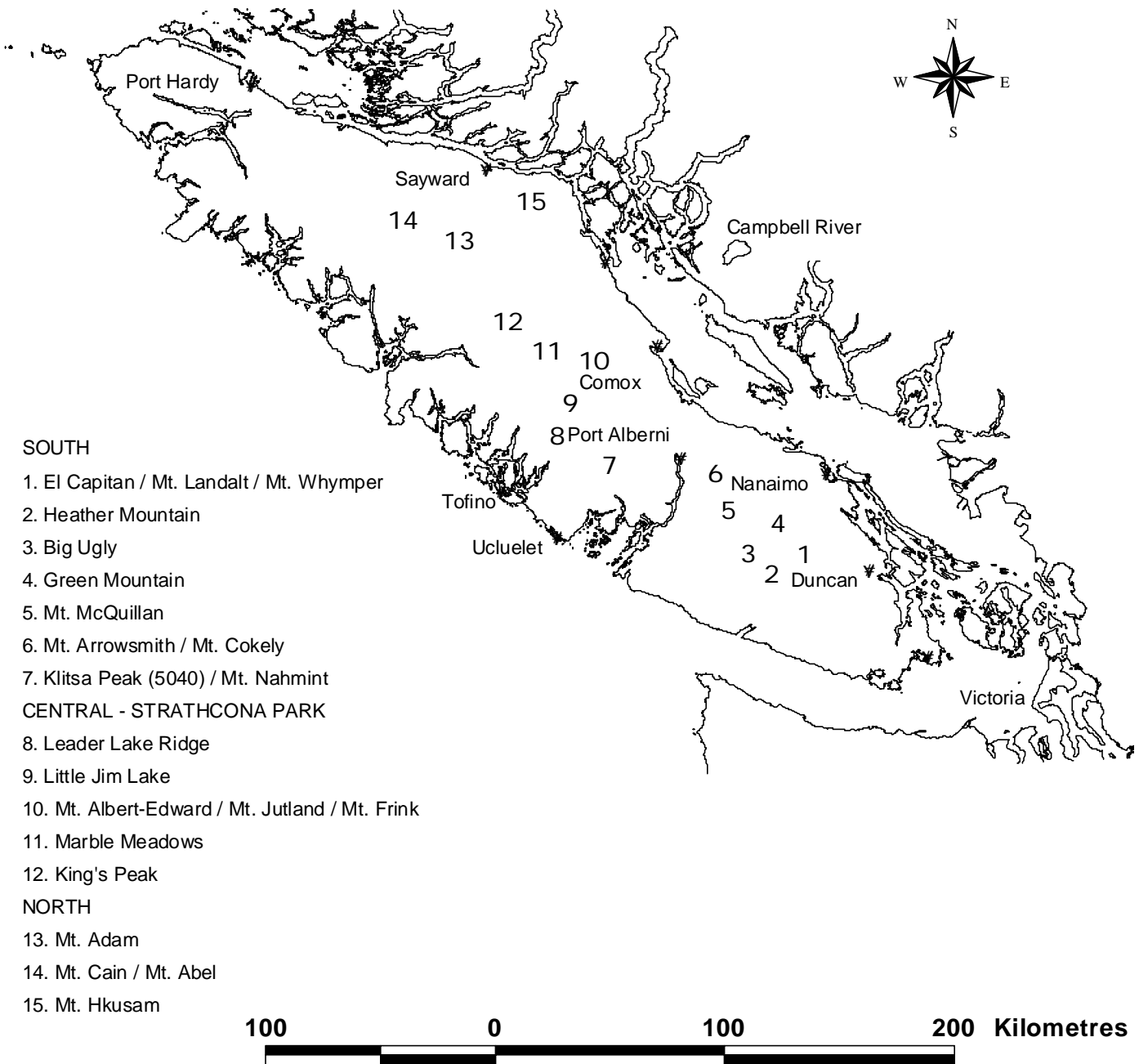


Figure 2. Vancouver Island White-tailed Ptarmigan study areas in 1995 and 1996

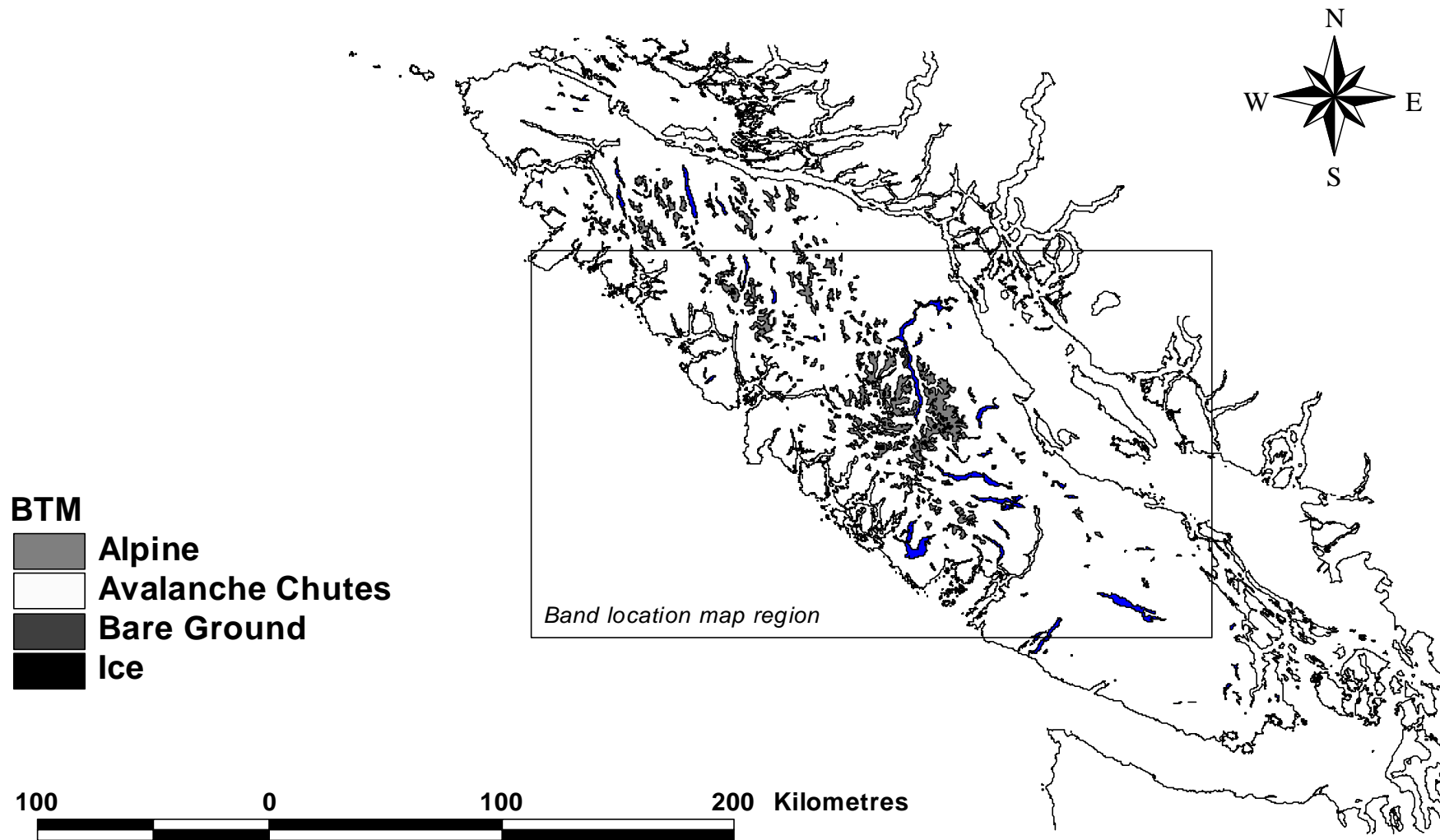


Figure 3. Potential white-tailed ptarmigan habitat on Vancouver Island.
Source: Basemap scale 1: 250 000 Baseline Thematic Map Classification

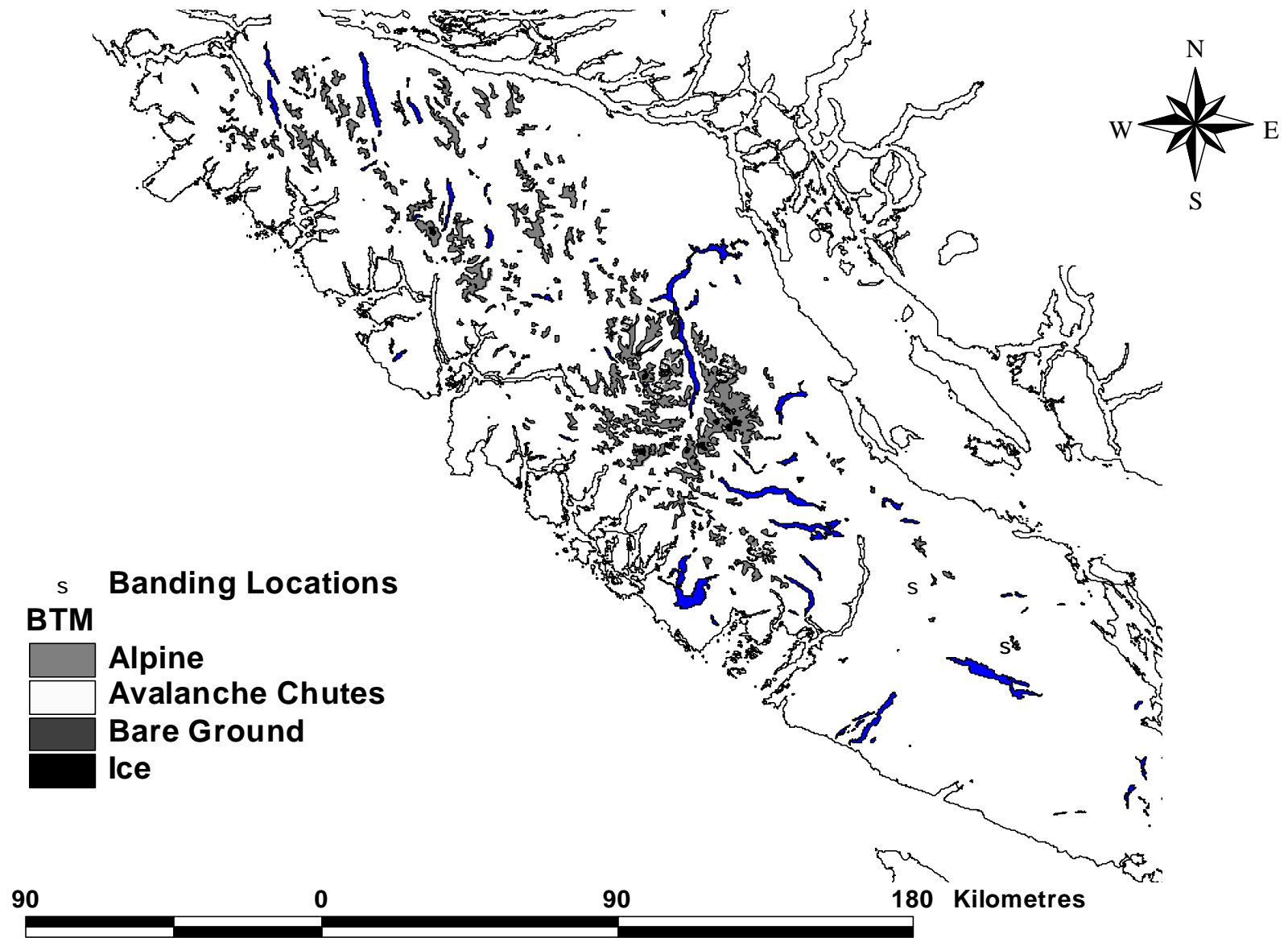


Figure 4. Vancouver Island banding locations for white-tailed ptarmigan.

Table 1. Observations of Vancouver Island ptarmigan by hikers, naturalist, and agency personnel (1905-1996).

Date	Area	Sign/sightings	Observer	Comments
Oct 9, 1905	Mountains at head of Cowichan Lake	1 winter adult	Dr. Stoker	Collected for BC Provincial Museum Reference - Cowan, 1938
Aug, 1912	Crown Mountain	2 chicks	W.B. Anderson	Collected for BC Provincial Museum Reference - Cowan, 1938
Jul 11, 1912	Ridge south of Mount Sanders	1 female	Despard	Reference - Swarth, 1912
Aug 20, 1912	Mountains to NW of Great Central Lake	6 chicks	H.S. Swarth	Collected for California Museum of Vertebrate Zoology Reference - Swarth, 1912
Jul 22, 1932	Mt Evans	2 female chicks		Collected for BC Provincial Museum
Sept 11, 1938	Mt Arrowsmith	6 adults 4 chicks	I.M. Cowan & P.W. Martin	Collected for BC Provincial Museum Reference - Cowan, 1938
Aug 31, 1943	Mt Albert-Edward	1 chick male 1 chick , 1 yearling & 1 adult female		Collected for BC Provincial Museum
Early 1950s	Mt Arrowsmith	observed ptarmigan	Charlie Faulkner in Victoria	note on fax from Bryan Gates Sep 27,95
Jul 19, 1962	Mt Arrowsmith	saw 1 ptarmigan	Bryan Gates	note on fax from Bryan Gates Sep 27,95
Jul 8, 1980	Mt Hooper	1 female with 4 chicks	David Routeledge	fax from Mike deLaronde
Jul 17, 1980	Mt Service	1 adult	David Routeledge	fax from Mike deLaronde
Jul 17, 1980	Mt Whympier	1 female with 3 chicks	David Routeledge	fax from Mike deLaronde
Jul 25, 1981	Mt Albert-Edward & Mt Frink ridge	19 ptarmigan	David Routeledge	fax from Mike deLaronde
Aug 22, 1981	Comox Glacier	Tracks, feathers, scat	David Routeledge	fax from Mike deLaronde
Sept 1, 1984	Mt Hkusam	saw 7-8 ptarmigan possible brood	Les Peterson, MoF	387-3177
1993	Mt Klitsa	1ptarmigan flushed by helicopter	Sandy McRuer, MoF	email from Bryan Gates
Fall 94/95, Jun 95	Mt Klitsa	about 6 ptarmigan (fall 94), some birds in fall 95	Don Cecile	lots of sign observed in June 95 email from Bryan Gates
Jun 6, 1995	Mt Whympier close to repeater at summit	saw 1 bird - responded to male playback	Don Doyle	goshawk crew observed
Jun 7, 1995	Mt Hooker		Don Doyle	saw fresh scat - ptarmigan?
Jul 1, 1995	S end of Beaufort Range, Mt Hal	1 ptarmigan	Sandy McRuer, MoF	email from Bryan Gates
Jul 15, 1995	Ridge between Cokely & Arrowsmith	3 or 4 ptarmigan	Alan Thomson, 952-1862	flying in NW corrie of Arrowsmith email from Bryan Gates

Table 1. Observations of Vancouver Island ptarmigan by hikers, naturalist, and agency personnel (1905-1996).

Date	Area	Sign/sightings	Observer	Comments
Jul 29, 1995	Mt McQuillan right at top	1 female + 4 chicks & 4 adults (males?)	Mike Steini	email from Don Doyle
Jul 30, 1995	Mt Frink	2-3 broods, feathers & scat	Hiker met by K. Martin	
Aug 4-5, 1995	Landalt - above Lomas Lake	1-3 ptarmigan	Hiker met by J. Young	Hikers also saw ptarmigan in 1993
Aug 7-9, 1995	Cream Lake - trail prior to	1 female & 4 chicks	Hiker met by J. Young	
Aug 10, 1995	Albert-Edward	Female with 4 chicks	Richard Guillet - Montreal	Female - D0622 (514) 645-8754
Sept 26, 1995	King's Peak	3 ptarmigan	Hiker met by K. Martin on Forbidden Plateau	
Summer 1996	N ridge of King's Peak	female with 3 chicks & male	Chris Barner	
Summer 1996	Mt Tom Taylor	female with 3 chicks	Ian Morris	Message from Chris Barner
Summer 1996	Mt Big Interior	2 adults	Chris Barner	
Aug 21-22, 96	King's Peak	2 females with 9 chicks	Chris Barner	
Aug, 1996	Albert-Edward	3 females with chicks	Ron Quilter	Looked for bands, but did not see any
Oct, 1996	McQuillan	picked up signal for female yearling D0630 & flushed 3 non-radioed birds from helicopter	Don Doyle	
nd	Klitsa Plateau	brood female (doesn't mention any chicks)	Lloyd Culting/Cutting?	Note written by KM 724-4357 - Port Alberni Naturalist
nd	Mt Hkusam	ptarmigan?	West Sells	He built trail up Mt Hkusam, He has not been contacted as of Dec. 1996 Note written by KM
nd	Mt Cain/ Mt Hapbush ridge	has seen ptarmigan	Sid Watts	Note written by KM
nd	Tsitika Bowl	saw a possible brood	Sid Watts	Note written by KM
nd	Mt Cain	2 birds seen in east bowl	John Deal	?late winter/early spring see KM's notes
nd	high elevation, east side/west aspect		Ron McLaughlin Sept. 26, 1995	summer turds - seeking confirmation of WTP ID for turds - turds sent with letter

Table 2. Vancouver Island white-tailed ptarmigan 1995 field work summary.

Date	Area	Sign/sightings	Personnel¹	Comments
18 May	Forbidden Plateau	No sign	JRY	3 m of snowpack, Snowshoed to Helen McKenzie
20 May	Crest Mountain trail	No sign	JRY	Free of snow until top
22 May	Mt. Cokely/Arrowsmith	No sign	JRY	Played tape during midday - no response
1 June	Green Mountain	1 winter dropping	KM	Accompanied by Don Doyle
2-3 June	Mt. Cain	No sign	KM	Accompanied by John Deal
4 June	Mt. Cokely/Arrowsmith	1 male	KM	On rocky outcropping on Mt. Cokely
28 July	Mt. Cokely/Arrowsmith	Some winter droppings	KM, JRY, CEB, MS	Little sign overall
30 July - 2 Aug	Mt. Albert-Edward & Mt. Jutland	7 males banded(4 radios) 4 brood hens banded & radioed; 20 chicks (7,3,6,4)	KM, JRY, CEB, MS	Females responded to tapes Males did not respond directly to tapes Lots of winter use sign 2 hatched '95 nests found
3 Aug	Mt. Whympier	Feathers/winter droppings	KM, JRY, CEB, MS	Sign at top and west ridge
5 Aug	EI Capitan	2 males banded/radio lots of feathers & winter sign	JRY, MS	Males responded to playbacks in foggy conditions
7-9 Aug	Little Jim Lake	No sign	JRY, MS	Rain, fog
11 Aug	Mt. Landalt	Some droppings/feathers	JRY, MS	Rain, fog
13 Aug	Mt. McQuillan	1 brood female banded/radio 2 chicks banded 4 males (2 banded/radio)	JRY, MS	Accompanied by Steini family, largest amount of winter/summer sign seen, neither female nor males responded to tape - Sunny day.
17 Sept.	Mt. Landalt	Feathers and droppings	KM, ST	got a fast signal - ptarmigan radio (151.620)?
18 Sept.	Klitsa Plateau	1 female banded, lots of sign	KM, CEB, KW, ST	NE face is good habitat
19 Sept.	Mt. McQuillan - W ridge	winter & early spring sign on N face	KM, CEB, ST	got signals for McQuillan birds
20 Sept.	Mt. McQuillan	re-located D0629 + brood, re- located D0632 & new female (D0635), signal for D0633	KM, CEB, ST	female D0629 has 3 chicks, chicks not caught
23-26 Sept.	Mt. Albert-Edward & Mt. Frink	re-located 2 brood females & 5 banded males; banded 7 (tagged) chicks; banded 8 new birds (D0642-649) including 1 female with 3 chicks	KM, ST	weather good on first day, then foggy, then rainy; males responded to challenge calls in foggy weather; most birds were re-located in the area where they were originally caught

¹JRY = Jessica Young, KM = Kathy Martin, CEB = Clait Braun, MS = Michele Sewolt, ST = Sabrina Taylor, KW = Karen Wiebe
N.B. Field totals as of Oct. 31, 1995; 50 birds encountered; 45 birds banded or wing-tagged; 13 radio-tagged

Table 3. Vancouver Island white-tailed ptarmigan 1996 field work summary.

Date	Area	Sign/sightings	Personnel¹	Comments
5 July	Heather Mountain	No ptarmigan sign	JRY, LH	Flew in with Don Doyle
8-10 July	El Capitan/ Mt. Landalt	1 female banded/radioed (D0631) 1 male banded/radioed (D0627) Heard 4 males	JRY, LH	Female was chick banded on McQuillan in 1995
12-15 July	Mt. McQuillan	Saw 1 ptarmigan Feathers/winter droppings	JRY, LH	Accompanied by Mike Steini
17-21 July	Peak 5040/Mt Nahmint	1 male banded/radioed (D0650) 1 female banded/radioed (D0651) (with 2+ chicks) Saw 1 male, heard 4 males	JRY, LH	Rain, fog
23 July	Big Ugly	Some winter feathers	JRY, LH	Flew in with Don Doyle
28-30 July	Leader Lake Ridge	Some ptarmigan sign	JRY, LH	
4-9 Aug	Mt. Albert-Edward, Mt Frink & Mt. Jutland	1 male banded/ radioed (D0705) 5 brood hens banded/radioed (D0611, D0701, D0707, D0711, D0713); 19 chicks (3,5,4,5,2) - 14 banded	JRY, ST, LH, SM, JG	1 male & 2 chicks died during measuring (not included in sign/sightings column)
4-11 Aug	Marble Meadows, Morrison Spire, Limestone Cap, Tibetan Peak, Mt Crystal/Greig Ridge, Mt Judy, 1600 peak, Phillips Ridge	3 males banded/radioed (D0733, D0734, D0676) 4 males heard/seen only 8 females banded/radioed (D0677, D0679, D0700, D0726, D0732, D0735, D0737, D0740) (4 brood hens); 15 chicks (7,4,2,2) - 9 banded 4 females heard/seen only; 10 chicks	KM, LT, KV	
12-14 Aug	Peak 5040/Mt Nahmint	7 males banded/radioed (D0658-660, D0717-719, D0721) 1 female banded/radioed (D0720) 2 brood hens banded/radioed (D0654, D0657); 12 chicks (7,5) - 4 banded 1 brood hen seen; 3 chicks - 1 banded Relocated banded male (D0650)	JRY, ST, JG, SM, LH	
14-15 Aug	Mt. McQuillan	1 female banded/radioed (D0630) lots of sign	JRY, ST, JG, SM, LH	This female was a chick banded in this area in 1995
19-21 Aug	King's Peak	1 male banded/radioed (D0722) 1 female banded/radioed (D0724); 5 chicks - 1 banded 2 males heard only	ST, KV	Rain, fog

Table 3. Vancouver Island white-tailed ptarmigan 1996 field work summary.

Date	Area	Sign/sightings	Personnel¹	Comments
26-31 Aug	Marble Meadows & Limestone Cap	Relocated 7 banded birds (D0726, D0732-735, D0737, D0740) 3 males banded/radioed (D0725, D0741, D0742) 2 males seen only	ST, KV, LE	Conducted behaviour observations on all relocated birds
16 Sept	Mt. Hkusam	1 ptarmigan feather found alpine not very extensive	ST, LE	Les Peterson saw 7-8 ptarmigan here on Sept 1, 1984
17 Sept	Mt. Cain/Mt. Abel	Found some sign	LE, ST	This area needs more exploration
24 Sept	Mt Adam	Found some sign	ST, LE	This area needs more exploration Good idea to heli in, because climb up takes the whole day, steep climb, no trail
28-29 Sept	Mt. Arrowsmith & Mt. Cokely	No sign on Cokely Lots of sign above lake (below ridge) at Arrowsmith	LE, ST	This area needs more exploration
5-9 Oct	Mt. Albert Edward & Mt. Jutland	Relocated 4 brood hens, banded/radioed their chicks D0701 - 3 chicks D0611 - 2 chicks D0707 - 2 chicks D0713 - alone Picked-up signal for male - D0705	ST, LE	
15-16 Oct	5040 Peak	Picked up signal for 3 banded brood hens (D0651, D0654, D0657) Relocated banded male (D0650)	ST, LK	

¹JRY = Jessica Young, KM = Kathy Martin, ST = Sabrina Taylor, LH = Laura Higgins, LE = Lea Elliott, KV = Katrine Voigt, JG = Jen Grant, ST = Stephanie Melles, LK=Lisa Kirkendale

N.B. Field totals as of Oct. 31, 1996; 131 birds encountered; 71 birds banded or wing-tagged; 41 radio-tagged

Table 4. Summary of white-tailed ptarmigan banded, radioed and seen on Vancouver Island in 1995 and 1996.

Year	Sex	Banded ¹	Radioed ²	Seen/Heard Only ³	Total Birds ⁴
1995					
	males	13	8	3	16
	females	10	5	0	10
	chicks	22	0	0	22
	Total	45	13	3	48
1996					
	males	19(2)	14	17	36
	females	20(3)	20	7	27
	chicks	32	7	36	68
	Total	71(5)	41	60	131

1. Represents all birds banded or wing- tagged. Numbers in brackets indicates how many of these birds were first banded in 1995 and subsequently relocated in 1996 (i.e., in 1996 19 males were banded, 2 of these 19 males were banded in 1995).
2. Represents all birds with active radios. All birds with radios have been banded.
3. Represents all birds that were not caught, but only seen or heard, therefore, they are unbanded.
4. Represents all birds banded and unbanded

Table 5. Vancouver Island white-tailed ptarmigan study 1995 summer and autumn banding summary¹

Location	Sex ²	Band # ³	Colour band ⁴	Frequency	Comments ⁵
Mt. Albert-Edward ⁶	F	D0611	BkG/WP	151.259	has 7 chicks; located Sep.95
Mt. Albert-Edward	?	D0636	BkG/RG		aka A394 (D0611 parent)
Mt. Albert-Edward	?	D0637	BkG/RP		aka A390 (D0611 parent)
Mt. Albert-Edward	F?	D0638	BkG/RBlu		aka A387 (D0611 parent)
Mt. Albert-Edward	M?	D0639	BkG/RBk		aka A392 (D0611 parent)
Mt. Albert-Edward	M?	D0640	BkG/RP		aka A389 (D0611 parent)
Mt. Albert-Edward	?	D0641	BkG/RW		aka A388 (D0611 parent)
Mt. Albert-Edward	?	A391			not seen Sep. 95 (D0611 parent)
Mt. Albert-Edward	M	D0612	BkW/GP	151.519	located Sep. 95
Mt. Albert-Edward	M	D0613	BkW/PG	151.700	
Mt. Albert-Edward	M	D0614	BkP/WG	151.440	located Sep. 95
Mt. Albert-Edward	M	D0615	BkP/GW		located Sep. 95
Mt. Albert-Edward	M	D0616	BkG/PW		located Sep. 95
Mt. Albert-Edward	F	D0617	GBk/WP	151.559	has 3 chicks, located Sep.95
Mt. Albert-Edward	F	D0618			chick (D0617 parent)
Mt. Albert-Edward	F	D0619	RG/RP		chick (D0617 parent)
Mt. Albert-Edward	M	D0620			chick (D0617 parent)
Mt. Albert-Edward	M	D0621	GBk/PW		located Sep.95
Mt. Albert-Edward	F	D0622	GW/BkP	151.461	has 6 chicks (3 tagged)
Mt. Albert-Edward	?	A395			chick (D0622 parent)
Mt. Albert-Edward	?	A396			chick (D0622 parent)
Mt. Albert-Edward	?	A397			chick (D0622 parent)
Mt. Albert-Edward	M?	D0642	GR/RG		
Mt. Albert-Edward	F?	D0643	GBlu/RP		
Mt. Albert-Edward	M?	D0644	PG/RBlu		
Mt. Albert-Edward	F	D0645	YG/RP		
Mt. Frink	F	D0649	GP/RBlu		has 3 chicks
Mt. Frink	M	D0646	GBk/RBlu		chick (D0649 parent)
Mt. Frink	?	D0647	GBlu/RBk		chick (D0649 parent)
Mt. Frink	?	D0648	GY/RP		chick (D0649 parent)
Mt. Jutland	F	D0623	GW/PBk	151.278	has 4 chicks (1 dead)
Mt. Jutland	M	D0624			chick (D0623 parent)
Mt. Jutland	M	D0625			chick (D0623 parent)
Mt. Jutland	?	A305			chick (D0623 parent)
Mt. Jutland	?	A306			dead
Mt. Jutland	M	D0626	WG/PBk	151.580	
El Capitan	M	D0627	RY/PBlu	151.621	east facing slope
El Capitan	M	D0628	RW/YP	151.339	east facing slope
Mt. MacQuillan	F	D0629	RY/RP	151.179	has 3 chicks (2 banded only)
Mt. MacQuillan	?	D0630			chick (D0629 parent)
Mt. MacQuillan	?	D0631			chick (D0629 parent)
Mt. MacQuillan	M	D0632	RP/YP	151.309	located in Sep. 95
Mt. MacQuillan	M	D0633	RBlu/PBlu	151.478	signal in Sep. 95
Mt. MacQuillan	F?	D0635	RY/WBlu		
Klitsa Plateau	F	D0634	RY/BluW		5040 peak

1. Total = 45 birds banded as of October 31, 1995.

2. Not always possible to determine sex of young chicks or adults in advanced body moult.

3. Band numbers D0611 - D0633 were caught Jul. 31 to Aug.13. D0634 to D0649 were banded Sep. 17-25.

Band and tag numbers of chicks indented below female parent.

4. Read colours top to bottom, left leg first, right leg second; Bk = black, W = white, P = pink, G = green, R = red, Blu = blue, Y = yellow. Chicks not colour banded until they were at least 75 days old.

5. Located Sep. 95 = caught in July/Aug. and re-located in Sep. 95.

6. Mt. Albert-Edward includes ridges to the North, South and Southwest.

Table 6. Vancouver Island white-tailed ptarmigan Study 1996 summer and autumn banding summary¹

Location	Sex ²	Band # ³	Colour band ⁴	Frequency	Comments ⁵
Mt McQuillan	F	D0630	YR/R Y	151.462	recapture - chick in 1995
El Capitan	F	D0631	BluY/R Y	150.799	with D0627
El Capitan	M	D0627	RY/P Blu	151.621	recapture with D0631
Klitsa - 5040 peak	M	D0650	BluY/RBlu	151.181	Alone
Klitsa - 5040 peak	F	D0651	RW/RP	150.989	with male & 2 chicks(didn't band)
Klitsa - 5040 peak	M	D0717	PW/RBlu	150.559	with 6 other males - 5 banded
Klitsa - 5040 peak	M	D0718	YG/RBlu	150.821	with 6 other males - 5 banded
Klitsa - 5040 peak	M	D0719	PG/BluP	151.192	with 6 other males - 5 banded
Klitsa - 5040 peak	M	D0658	PW/PW	150.861	with 6 other males - 5 banded
Klitsa - 5040 peak	M	D0659	GY/GY	150.412	with 6 other males - 5 banded
Klitsa - 5040 peak	M	D0660	GR/GR	150.982	with 6 other males - 5 banded
Klitsa - 5040 basin	F	D0720	PBlu/WG	150.948	with D0721 & D0650
Klitsa - 5040 basin	M	D0721	YR/YR	151.108	with D0720 & D0650
Klitsa - 5040 peak	F	D0657	YBlu/PBlu	150.493	with 5 chicks, 2 bd-D0655 & D0656
Klitsa - 5040 peak	?	D0655	PBlu/GR		with D0657, D0656 + 3 unbd chicks
Klitsa - 5040 peak	?	D0656	YP/PW		with D0657, D0655 + 3 unbd chicks
Klitsa - 5040 peak	F	D0654	GP/BluY	150.552	with 7 chicks, 2 bd-D0652 & D0653
Klitsa - 5040 peak	?	D0652			with D0654, D0653 + 5 unbd chicks
Klitsa - 5040 peak	?	D0653			with D0654, D0652 + 5 unbd chicks
Mt. Nahmint	?	D0716	GW/RW		chick with F & 2 other unbd chicks
Mt. Albert Edward	F	D0701	YP/RBlu	150.373	South side of ridge to A.E. 3 chicks
Mt. Albert Edward	F?	D0702	WP/WG	151.489	chick[parent D0701]
Mt. Albert Edward	F?	D0703	BluR/WP	151.380	chick [parent D0701]
Mt. Albert Edward	F?	D0704	WY/BluR	151.483	chick [parent D0701]
Mt. Albert Edward	M	D0705	GR/BluW	151.204	NE ridge 100m from top
Mt. Albert Edward	M	D0706			died during measuring
Mt. Albert Edward	F	D0611	BkG/WP	151.879	with 5 chicks
Mt. Albert Edward	?	A402			chick (parent D0611)
Mt. Albert Edward	?	A403			chick (parent D0611)
Mt. Albert Edward	?	A404			chick (parent D0611)
Mt. Albert Edward	F?	D0745	WR/BluG	150.389	aka A405 chick (parent D0611)
Mt. Albert Edward	F?	D0744	RG/YW	150.244	aka A406 chick (parent D0611)
Mt. Jutland	F	D0707	PBlu/RW	151.172	with 4 chicks(3 captured)
Mt. Jutland	?	D0709			chick(parent D0707)
Mt. Jutland	M?	D0743	GBlu/WP	151.214	chick (parent D0707)
Mt. Jutland	M?	D0710	GP/YG	150.029	chick(parent D0707)
Mt. Jutland	F	D0711	PR/BluR	150.770	with 7 chicks-3bd, 2dead, 2unbd
Mt. Jutland	?	A407			chick(parent D0711)
Mt. Jutland	?	A409			chick(parent D0711)
Mt. Jutland	?	A410			chick(parent D0711)

Table 6. Vancouver Island white-tailed ptarmigan Study 1996 summer and autumn banding summary¹

Location	Sex ²	Band # ³	Colour band ⁴	Frequency	Comments ⁵
Mt. Jutland	?	D0714			dead chick(parent D0711)
Mt. Jutland	?	D0715			dead chick(parent D0711)
Mt. Jutland	F	D0713	YR/BluP	151.902	with 2 chicks-one captured=D0712
Mt. Jutland	?	D0712			chick (parent D0713)
McBride/Morrison Ridge	F	D0726	RBlu/PR	150.332	with 6 chicks(5 captured)
McBride/Morrison Ridge	?	D0727			aka A501 chick(parent D0726)
McBride/Morrison Ridge	?	D0728			aka A502 chick(parent D0726)
McBride/Morrison Ridge	?	D0729			aka A 503 chick(parent D0726)
McBride/Morrison Ridge	?	D0730			aka A504 chick(parent D0727)
McBride/Morrison Ridge	?	D0731			aka A505 chick (parent D0726)
McBride/Morrison Ridge	F	D0732	WR/PW	150.730	with male(D0733) no brood
McBride/Morrison Ridge	M	D0733	BluY/PY	150.262	with female (D0732)
McBride/Morrison Ridge	M	D0734	RP/GBlu	150.314	
McBride/ Morrison Ridge	F	D0735	WR/GR	150.620	with 2 chicks(one captured D0736)
McBride/ Morrison Ridge	?	D0736			aka A506 chick(parent D0735)
McBride/ Morrison Ridge	F	D0737	BluR/PY	150.293	with 2 chicks (D0738, D0739)
McBride/ Morrison Ridge	?	D0738			chick(parent D0737)
McBride/ Morrison Ridge	?	D0739			chick(parent D0737)
McBride/ Morrison Ridge	F	D0740	WBlu/PW	150.751	
McBride/ Morrison Ridge	M	D0725	GP/WY		with F (D0740)
McBride/ Morrison Ridge	M	D0741	YW/BluY		alone
McBride/Morrison Ridge	M	D0742	PY/RG		with 2 M (D0741 & unbd), F (D0737)
Limestone Cap	M	D0676	RW/GR	151.002	& 2 chicks (D0738 & D0739)
Limestone Cap	F	D0677	RW/GW	151.162	with female(D0677)
Mt Crystal/Mt Judy Ridge	F	D0700	BluW/RW	150.220	with male (D0676)
MtCrytal/Mt Judy Ridge	?	D0678			with 2 chicks (D0678 + 1 unbd)
Mt Judy/Phillips Ridge	F	D0679	RY/RG	151.092	with D0700 & 1 other unbd chick
King's Peak	M	D0722	YW/BluR	151.700	with 1 unbd male
King's Peak	F	D0724	PY/RY	151.892	alone
King's Peak	?	D0723			with 5 chicks, 1 caught D0723
					with D0724 & 4 other unbd chicks

1. Total 70 birds as of Oct 31,1996.

2. Not always possible to determine sex of young chicks or adults in advanced body moult.

3. Band and tag numbers of chicks indented below female parent.

4. Read colours top to bottom, left leg first, right leg second; Bk = black, W = white, P = pink, G =green, R = red, Blu = blue, Y = yellow. Chicks not colour banded until they were at least 75 days old.

6. Mt. Albert-Edward includes ridges to the North, South and Southwest.

Table 7. White-tailed ptarmigan relocated by helicopter on South³ and Central⁴ Vancouver Island on December

Radio Freq	Band #	Sex ¹	Location First Banded	Relocated Y/N	Area Relocated In	Latitude	Longitude	Elev (feet)	Habitat Relocated In	Comments
150.412	D0659	M	5040 peak	Y	5040 peak	491169	1251607	3800	steep face, dead/live timber	
150.493	D0657	F	5040 peak	Y	5040 peak - at base of peak to W, in draw to E	491220	1251616	4100	in trees	
150.552	D0654	F	5040 peak	Y	5040 peak	491193	1251536	2700	in draws	
150.559	D0717	M	5040 peak	Y	5040 peak- towards Nahmint	491183	1251522	2900	open cedar, fir, hemlock	signal weak, bird flushed - radioed bird??
150.821	D0718	M	5040 peak	Y	5040 peak- back side	491143	1251731	4500	exposed cliff, in shrubby draws	
150.861	D0658	M	5040 peak	Y	5040 peak - back side	491128	1251682	4500		
150.948	D0720	F	5040 peak	Y	5040 peak - on W side to SE	491051	1251904	3200	in fir/cedar clump, weak signal	
150.982	D0660	M	5040 peak	N						
150.989	D0651	F	5040 peak	Y	5040 peak	491195	1251590	3200		strong signal
151.108	D0721	M	5040 peak	Y	5040 peak	491174	1251642	4200	in a lone tree	
151.181	D0650	M	5040 peak	N						
151.192	D0719	M	5040 peak	Y - visual	5040 peak	491121	1251573	4100	in deciduous shrubbery	alone, flushed
150.244	D0744	F?	Albert-Edward	Y - visual	Albert-Edward - NW slope above Gem Lake	494091	1252485	4800	in 1 m clump of deciduous shrubbery & 1-2 m high cedars	with D0611 & unradioed bird - 2nd chick?
150.373	D0701	F	Albert-Edward	N						
150.389	D0745	M?	Albert-Edward	N						
151.204	D0705	M	Albert-Edward	N						
151.380	D0703	F?	Albert-Edward	N						
151.483	D0704	F?	Albert-Edward	N						
151.489	D0702	F?	Albert-Edward	N						
151.879	D0611	F	Albert-Edward	Y - visual	Albert-Edward - NW slope above Gem Lake	494091	1252485	4800	in 1 m clump of deciduous shrubbery & 1-2 m high cedars	with D0701 & unradioed bird - 2nd chick?
150.029	D0710	M?	Jutland	Y	Jutland - W face	494229	1252525	5800		decent location, but not too close
150.770	D0711	F	Jutland	N						
151.172	D0707	F	Jutland	Y	Jutland - on slope on E side, above Sunrise Lake	494262	1252505	5500	25 ft cedar & hemlock	
151.214	D0743	M?	Jutland	N						
151.902	D0713	F	Jutland	N						
151.700	D0722	M	King's peak	Y	King's peak - on E face to S	494853	1254997			inaccurate location

Table 7. White-tailed ptarmigan relocated by helicopter on South³ and Central⁴ Vancouver Island on December

Radio Freq	Band #	Sex ¹	Location First Banded	Relocated Y/N	Area Relocated In	Latitude	Longitude	Elev (feet)	Habitat Relocated In	Comments
151.892	D0724	F	King's peak	Y	King's peak - to W	494879	1255099	5300	on exposed vertical rock face, few trees	
151.002	D0676	M	Limestone Cap	Y - visual	Limestone Cap - low on W side	494052	1254116	5700	on limestone cap	alone, in snow roost
151.162	D0677	F	Limestone Cap	N						
150.262	D0733	M	MM ridge ²	N						
150.293	D0737	F	MM ridge	N						
150.314	D0734	M	MM ridge	Y	MM ridge - closer to Morrison Spire					good signal, no visual
150.332	D0726	F	MM ridge	Y - visual	MM ridge - W side	494245	1254015	5500	low gorge in cedar clump, deep ravine	alone
150.620	D0735	F	MM ridge	N						
150.730	D0732	F	MM ridge	N						
150.751	D0740	F	MM ridge	Y	MM ridge - under/on McBride side of ridge, W side of ridge	494307	1253990	6200		inaccurate location
150.220/1	D0700	F	Mt Judy/Crystal	Y	Mt Judy/Crystal - on W face	493872	1254144	5200	In gorge on vertical face, sparse veg, cedar, huckleberry	bird did not flush
151.092	D0679	F	MtJudy/Phillip	Y	MtJudy/Phillip	493607	1254118	5600		
151.462	D0630	F	Mt McQuillan	Y	Mt McQuillan - on NE side	490687	1243661	4200	draws in timber	
150.799	D0631	F	Mt McQuillan (relocated in 1996 on El Capitan)	Y	On powerline near head of Morrison Creek - N of English Man River S of French Creek	491470	1242462	1300		Female probably dead
151.621	D0627	M	El Capitan	N						

1 Birds with a ? beside sex are chicks .

2 MM (Marble Meadows) ridge is the ridge between Mt McBride and Morrison Spire.

3 South Island birds were relocated on Dec 16, 1996 - 5040 Peak, Mt McQuillan & El Capitan.

4 Central Island birds were relocated on Dec 17, 1996 - Albert-Edward, Jutland, King's Peak, Limestone Cap, Marble Meadow Ridge, Mt Judy, Mt Crystal & Phillip Ridge.

APPENDICES

Appendix I Copy of - Cowan, I.T. 1938. The White-tailed Ptarmigan of Vancouver Island. Condor 41: 82-83. *(not included in on-line version for Copyright reasons)*

Appendix II Data sheet given to naturalists, hikers and agency personnel to record white-tailed ptarmigan sightings.

Appendix III List of Vancouver Island white-tailed ptarmigan contacts. *(not included in on-line version)*

Appendix IV Summary of the Royal BC Museum specimens Clait Braun verified.

Appendix V Slides for public education presentations.

White-tailed Ptarmigan - Vancouver Island Collections

Victoria, British Columbia, Provincial Museum

Mus. #	Location	Age	Sex	Date Collected	Other
2597	Crown Mountain	1+	F	Aug 1912	Late Aug, 1/2 neutral/nuptial
2600	Cowichan Lake	2+	F	29 Oct 1905	White, F based on dark head feathers
8317	Mt. Arrowsmith	1-	F	11 Sep 1938	No Juv. P's are gray, Brown
8319	Mt. Arrowsmith	1-	F	11 Sep 1938	P8 is Gray, Brown
8320	Mt. Arrowsmith	1-	F	11 Sep 1938	F based on black feathers in back. Brown, No Juv P's are gray.
8321	Mt. Arrowsmith	2+	F	11 Sep 1938	1/2 neutral/nuptial, brown-gray
8323	Mt. Arrowsmith	2+	M	11 Sep 1938	Mostly neutral gray-brown
8325	Mt. Arrowsmith	2+	M	11 Sep 1938	Mostly neutral gray (most)-brown
8326	Mt. Arrowsmith	2+	M	11 Sep 1938	Two-thirds white, 1/3 gray-brown
9094	Mt. Albert Edward	1+	F	31 Aug 1943	P10 old, Prob unsuccessful, 2/3 neutral brown
9095	Mt. Albert Edward	2+	F	31 Aug 1943	P10-8 old, Prob success, 1/3 neutral brown
9096	Mt. Albert Edward	1-	F	31 Aug 1943	P8-7 gray, Prob F based on dark feathers on back, gray-brown
9097	Mt. Albert Edward	1-	M	31 Aug 1943	P8-7 gray, Prob M based on gray appearance on back, gray-brown
12632	Mt. Albert Edward	1+	M	Oct 1926	Month incorrect?, 1/3 neutral, P10 & 9 old Juv, M based on plumage
14982	Mt. Evans (No. Island?)	<10 days	F	22 Jul 1932	Typical chick russet cap, brown
14984	Mt. Evans (No. Island?)	<10 days	F	22 Jul 1932	Typical chick russet cap, brown

Appendix V -- Slides of White-tailed Ptarmigan FRBC Inventory Project for Educational and Public Presentations

1. White-tailed Ptarmigan, a small grouse restricted to alpine habitats in North America. Colorado, winter 1991.
2. Female White-tailed Ptarmigan in summer plumage. Strathcona Provincial Park, Vancouver Island, BC, July 1995.
3. White-tailed Ptarmigan species range. The subspecies *Lagopus leucurus saxatilis* is endemic to Vancouver Island and is blue-listed for British Columbia.
4. Satellite photo of Vancouver Island.
5. The Ptarmigan crew hikes into the alpine field sites, July 1995.
6. Marble Meadows, Strathcona Provincial Park, Vancouver Island. Low elevation coastal alpine habitat. August 1996.
7. Helicopters greatly facilitate travel to field sites in summer, and are necessary to conduct winter telemetry surveys.
8. A female White-tailed Ptarmigan is vigilant on a rock near Morrison Spire in Strathcona Provincial Park. Using taped calls, we locate birds from May to October on breeding territories and summering sites. August 1996.
9. We capture ptarmigan using noose poles and snare carpets to take measurements and individually colour band them. We also put radio-transmitters on a sample of males, females and juveniles. Strathcona Provincial park, August 1996.
10. Birds are released at the capture sites, and are relocated throughout the year to monitor survival, dispersal, migration, and habitat use. Strathcona Provincial Park, August 1996.
11. White-tailed Ptarmigan nest on the trail up to Mt. Albert Edward, Strathcona Provincial Park, July 1995.
12. White-tailed Ptarmigan brood hens are located in summer to assess annual productivity and to identify brood-rearing habitats. Strathcona Provincial Park, August 1996.
13. During inventory of alpine patches, tracks and other signs (feathers, scat) reveal the presence of ptarmigan. Strathcona Provincial Park, August 1996.
14. Using White-tailed ptarmigan scat, it is possible to determine the relative abundance/use of alpine habitats during winter, summer, and fall periods. Strathcona Provincial Park, July 1995.
15. In winter, ptarmigan move down from the exposed alpine into the montane forest and to other mountains. Very little is known about winter ecology of White-tailed Ptarmigan on Vancouver Island. Mt. Arrowsmith, December 1995.
16. Radio-tracking White-tailed Ptarmigan to follow birds to winter sites and record winter habitat use. Paradise Meadows, Strathcona Provincial Park, December 1995.
17. White-tailed Ptarmigan winter habitat on southern Vancouver Island. Mt McQuillan, December 1995.
18. We are evaluating the impact of cutting in montane forests surrounding alpine patches on ptarmigan winter habitat. Mt. Whympier, Vancouver Island, July 1995.
19. Increases in hiking and recreational use of alpine habitats may potentially impact White-tailed Ptarmigan on their breeding habitats. Tibetan Peak, Strathcona Provincial Park, August 1996.

20. Albert Edward peak in the mist. On the FRBC inventory project, we are determining the distribution, abundance and status of the little known, blue-listed Vancouver Island White-tailed Ptarmigan. Additionally, we will provide data on the use of alpine sites by other resident and migrating wildlife species. Strathcona Provincial Park, July 1995.

Unless otherwise stated, slides were taken by K. Martin, University of British Columbia.