AVALANCHE NEWS NO. 26

FEBRUARY 1988

EDITORIAL NOTE

The intention of AVALANCHE NEWS is to assist communication between persons and organizations engaged in snow avalanche work in Canada. Short articles cover reports of accidents, upcoming and past events, new techniques and equipment, publications, personal news, activities of organizations concerned with avalanche safety, education and research.

The editor welcomes and expects contributions; all reasonable comments and discussions will be printed. The articles in AVALANCHE NEWS reflect the views of the authors, and only when it is specifically stated do they represent the opinion of the Canadian Avalanche Association.

No paid advertisements are carried. Suppliers who wish to draw attention to their products should send information to the editor who will publish a note when the equipment has value in avalanche work and safety.

AVALANCHE NEWS is issued three times per year, usually in February, June and October. There is no subscription fee. Requests for copies and notifications of changes of address should be sent to the publisher.

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National Research Council of Canada
3650 Wesbrook Mall
Vancouver, BC
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940 Blanshard Street
Victoria, BC
V8W 3E6 Telephone: (604) 387-6361

AVALANCHE NEWS
Canadian Avalanche Association, 3650 Wesbrook Mall, Vancouver B.C., V6S 2L2

GUIDELINES FOR WEATHER, SNOWPACK AND AVALANCHE OBSERVATIONS

by Committee on Observation Guidelines
Canadian Avalanche Association

At the 1987 Annual General Meeting of the Canadian Avalanche Association a committee was elected with the task of re-examining the Guidelines for Weather, Snowpack and Avalanche Observations (published by the National Research Council of Canada). Committee members are Walter Schleiss, Janice Johnson, Roger McCarthy, Herbert Bleuer, and Peter Schaerer. The Committee has discussed the objectives and content of the Guidelines and arrived at the following conclusions and recommendations.

a) The Canadian Avalanche Association should recommend the Guidelines for application by all operations in Canada that are concerned with avalanche safety.

b) The Guidelines shall contain minimum requirements with respect to the frequency and type of observations. Minimums will apply specifically to the daily weather and the avalanche observations. For weather observations the minimum standards shall distinguish between operations that occupy a base longer than two weeks in the winter and operations that are in the same place for a period shorter than two weeks, such as would be the case in ski guiding.

c) The recommendation for applicaton does not mean that the Guidelines must be adhered to blindly and under any circumstance. Operations that deviate from the recommendations, however, must have a valid reason and do so after careful consideration.

The Committee has examined the Guidelines and amended the text with these conclusions in mind. No changes to the type of observations, observation methods, terminology, symbols, and recording format were introduced, but editorial changes were made with the objective of making the descriptions more understandable.

The Committee invites comments about the proposed amendments and suggestions for additional changes of these Guidelines. Comments and suggestions must be submitted to one of the Committee members by March 26, 1988.

The Committee will consider the comments and propose the revised guidelines for acceptance by the members of the Canadian Avalanche Association at the Annual General Meeting on May 5, 1988. The Committee intends to settle controversial issues before the meeting of the Association, therefore, speak up now!

Following are listed the significant amendments by the Committee with reference to the 1986 edition of the Guidelines for Weather, Snowpack, and Avalanche Observations (Technical Memorandum No. 132, National Research Council of Canada).

Foreword: Last sentence was deleted.

Introduction:

The first paragraph of the Introduction was replaced as follows:

"The objectives of this publication are to establish:

a) uniform terminology and recording methods for observations of the weather, snowpack, and avalanches;

b) uniform techniques for taking weather, snowpack, and avalanche observations;

c) minimum standards of observations applicable in operations affected by avalanches, for example road maintenance, ski areas, ski guiding, and mining.

These Guidelines describe the most important but not all of the observations that are applied for evaluating snow stabilities and avalanche hazards. Additional observations include ski testing, results of the application of explosives, previous slope use, local effects of wind, in-coming and out-going radiation, probing by probe and skipole, settlement of the snowpack, loading tests, shear tests, and acoustic emissions. Many of these observations have no formal data collection procedure and are carried out as required and as circumstances permit.

The Canadian Avalanche Association recommends that these Guidelines be followed with respect to the techniques of data collection and minimum requirements of frequency and type of observation. The recommendation for application does not mean that the Guidelines must be adhered to under any circumstance. Operations that deviate from the Guidelines, however, must do this only after careful consideration and being fully aware of the reasons."

Chapter: "Snow and Weather Observations"

The first three sections were changed as follows:

"1. Objectives

The snow and weather observations are a series of meteorological and snowpack measurements at a properly selected study plot (see Chapter "Observation Sites"). Made at regular intervals the data provide the basis for recognizing changes in the stability of the snow cover and for reporting the state of the weather to the weather office. On a

long-term basis, the observations are used to improve the ability to forecast the hazard and to increase knowledge of the climate of the area. In order to be useful the observations must be made regularly, be complete, accurate, and recorded in a uniform manner."

"2. Type of Observations

2.1 Frequency

Observations made at regular daily times are referred to as standard observations. Preferably, they should be carried out twice daily at 0700 and 1600 hours, but the type of operation and availability of observers might require different frequencies and times. One standard observation per day is a minimum.

Observations between the standard times are referred to as interval observations. They are required when the snow stability is changing rapidly, for example on days with heavy snowfall or high temperatures. Interval observations may contain only a few selected observations or the whole set of standard observations.

2.2 Minimum Standard Observations

All operations, regardless of how long they stay at a location, must make as a minimum the following standard observations:

Location and elevation of observation site

Date and time

Sky conditions

Precipitation type and intensity

Present temperature

New snow or 24-hour snowfall

Storm snowfall

Foot penetration or ram penetration

Wind speed and direction

Operations that occupy a fixed location for more than 14 consecutive days must make as a minimum the following additional observations:

Maximum and minimum temperatures

Depth of snowpack

Water equivalent of new snow by measuring the weight of new snow, or by observation with a precipitation gauge, or by melting a sample

Specific gravity of the new snow

All other observations listed in this chapter are optional."

"3. Equipment

Weather study plots that are used for periods longer than 14 consecutive days must be equipped at the minimum with:

Screen for housing thermometers; height above snow surface adjustable;

Maximum thermometer;

Minimum thermometer;

Two snow boards, about 400 mm x 400 mm, one designated as new snow board, the other one as storm board;

Snow stake = snow depth marker (graduated in cm);

Ruler (graduated in cm);

Snow sampling tube, knife or plate for cutting snow samples, and weigh scale (graduated in g), or precipitation gauge;

Field book of water resistant paper."

"4.7 Depth of Snowfall

The depth of snowfall is observed on boards which had been placed on the surface of the snowpack. Measure with the ruler in several places the depth of snow on the boards. Record the measurements to the nearest centimetre. Record "T" - Trace when the depth is less than 0.5 cm. Treat surface hoar as snowfall.

The boards are re-positioned on the snow surface after they are cleaned of snow.

As a minimum requirement the snowfall must be measured on a new snow board and a storm board. The number of optional, additional boards, for example interval, 24-hour, shoot board depends on the type of operation.

New snow is the depth of snow that has been deposited since the last standard observation. Clear the new snow board at the end of each standard observation.

Storm snowfall is the depth of snow that has been deposited since the beginning of a storm. Clear the storm board at the end of a standard observation prior to the next storm, and after useful settlement observations have been obtained. Add "CL" to the recorded data when the board was cleared."

Definitions of the other boards are unchanged.

Chapter: Snow Profiles

New text of Section 3:

"Snow profiles in representative areas must be observed at the beginning of the operating season. One snow profile per month during the time of operation is considered a minimum."

No other changes are proposed.

Chapter: Test Snow Profiles

A new Section was added:

"3. Frequency of observations.

No firm rule can be set about the frequency of test snow profile observations. The number of profiles should be adequate to supplement other observations relating to snow stability."

Chapter: Observation of Avalanches

The text was re-arranged as follows.

"1. Objectives

Observations and records of avalanche occurrences have the following applications:

a) Avalanche occurrences and non-occurrences, in association with other observations, assist in assessing the snow stability.

b) They identify the areas where avalanches have released earlier in the winter, therefore where the snow stability may differ from undisturbed slopes.

c) They are important information when protective works and facilities are planned, when the effectiveness of control measures is assessed, and when forecasting models are developed by correlating past weather and snow conditions with avalanche occurrences.

All avalanches that are significant to the operation must be recorded. Noting the non-occurrence of avalanches could also be important for snow stability evaluation."

"2. Identification of Avalanche Paths

The avalanche paths must be identified by a key name, number, aspect or combination ..."

(no further change to previous edition).

"3. Minimum Observations

All operations must make a set of minimum observations. The observations are best recorded on the left-hand page of the field book or on photographs."

... Followed by description of observations listed under Section 5 of the 1986 edition.

"4. Additional Observations

Additional observations - recorded on the right-hand page of the field book - are to be selected as applicable from those listed in this section. A number of the additional observations are mandatory in areas where avalanches either are controlled or affect traffic and communication lines.

4.1 Mandatory observations

Operations that control avalanches by explosives must record the following when the information can be obtained:

Type of trigger

Number of explosive charges

Size of charges

Location of avalanche start

Type of failure of the snow

Sliding surface

Number, size, and location of charges applied when no avalanche resulted.

Operations of highways, railways, mines, forestry, etc. must record:

Length of road buried and depth of snow on the road

Location of the toe of the avalanche.

Ski areas must record the following when the information can be obtained:

Type of trigger

Location of avalanche start

Type of failure of the snow

Sliding surface

Width and thickness of slab avalanches at the fracture line."

... Followed by the description of the observations listed under Section 6 of the 1986 edition.

CANADIAN AVALANCHE ASSOCIATION

by John Tweedy
Secretary-Treasurer
Canadian Avalanche Association
P.O. Box 580, Creston, B.C., V0B 1G0

The following activities have taken place in the Canadian Avalanche Association since the meeting in May 1987.

The Directors met on September 28, 1987 at Kamloops for comprehensive discussions. Concerns about membership were the principal topics of business. All active members shall receive at a later date the announcement of the Annual General Meeting together with proposals for changes of the membership bylaws. Possibly a new membership definition of individuals that do not, and probably could never, fulfill the active member definition will be presented for consideration.

The Membership Committee has completed a review of the active membership. Scott Flavelle will report on the findings at the meeting in May 1988.

The Education Committee had positive discussions with BCIT regarding their continued involvement in the professional avalanche courses.

The Training Aids Committee has been actively pursuing other sponsors for a joint venture to produce the videos that were recommended by the Association. To date, no concrete proposals have been accepted, although various organizations have shown a keen interest in becoming involved in this project. The CAA has been invited by the American Association of Avalanche Professionals to become involved in video training production. At this time, the CAA will offer technical assistance.

It is hoped some production field work in the form of good still photography will take place this spring as a back-up for the weather, snowpack, and avalanche observation videos in case actual film production is not possible. If necessary, these videos could then be produced in a similar format to the existing Terrain video.

It looks like we have an international hit with the Terrain video. It has been purchased by users in New Zealand, Colorado, Washington, India, various BC Government agencies, school districts, and others.

The Canadian Avalanche Association is involved, at the request of the Alberta Occupational Health Agency, with assisting in creating a "Code of Practice" for explosives in avalanche control within Alberta. The code of practice will probably be similar to the British Columbia Workers' Compensation Board Explosive Endorsements for Avalanche Control in BC. A working committee is in place with Karl Klassen representing the private ski areas, Tim Laboucane representing Parks Canada, and Chris Stethem offering the Avalanche Association input.

On December 10, 1987, an updated list of active members who expressed their willingness to assist the B.C. Coroner's Service in avalanche accident investigation was sent to the Chief Coroner. The 29 active members who responded are on the list. It appears a good, solid cross-section of the avalanche industry is represented.

The CAA was offered "organizational membership" status in the Alpine Club of Canada. The Directors felt that we could gain more exposure this way than by placing an advertisement in the Club's journal.

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*                                       *
* DATES TO REMEMBER:                    *
*                                       *
* May 3, 4, and 5, 1988                 *
* Technical and Annual General Meeting  *
* Park Lake Hotel, Kelowna, BC          *
*                                       *
* * * * * * * * * * * * * * * * * * * * *
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Please send to me, by late March, any items for discussion you wish to have included on the list of topics for the Annual General Meeting or the Technical Meeting. A more extensive mailing will be forwarded in April to all active and associate members.

AMERICAN GEOPHYSICAL UNION (AGU)
Fall Meeting, December 6-11, 1987, San Francisco, CA

by David M. McClung
National Research Council Canada

The AGU fall meeting had a half-day session entitled "Snow Physics and Avalanche Dynamics." Most of the papers dealt with physical properties of snow rather than applications. Some highlights of the meeting are listed below.

Permeability of snow

E. Chacho (US Army, CRREL) presented data on air permeability of depth hoar in a cold, thin Alaskan snowpack. The results showed much higher values than previously measured for depth hoar.

R. Sommerfeld (US Forest Service) presented data and arguments that current estimates of permeability are too high due to formation of air channels.

Thermal conductivity

E. Chacho read a paper by M. Sturm (US Army, CRREL) on thermal conductivity measurements in depth hoar. He used an electrically heated needle probe. His results showed lower values than for ordinary snow of comparable density.

Snow properties by stereology

R. Davis (Sierra Nevada Research Lab.) presented results on anisotropy of snow using thick sections analyzed under reflected light. His results showed that sections cut parallel to snow layers are isotropic but sections cut perpendicular to layers are inhomogeneous and anisotropic.

Dry snow metamorphism

Three papers dealt with dry snow metamorphism.

M. Criston (Colorado State University) described results from heat and mass flow calculations using numerical methods (finite element calculations). His work extends metamorphism predictions to the complicated geometry of alpine snow. He also estimated thermal conductivity of the alpine snow as 10-30% of ice.

E. Adams (Alpine Polar Engineering) presented theoretical predictions of snow-pack metamorphism using mixture theory. The theory models the material as a two-phase continuum with the phases (air and ice) having the capability to interact. Comparison of the results with field results shows good results for layered snow-packs under high or low temperature gradients.

R. Sommerfeld (US Forest Service) described isotope fractionation in alpine snow under strong temperature gradients. The application is to the description of acid snow. A principal result seems to be that natural variations in isotope content are as large as any changes due to imposed thermal gradients.

Avalanche dynamics

J. Dent (Montana State University) gave a general presentation on flowing snow modelled as a granular material. In the future he hopes to develop deformation models to calculate avalanche speeds and flow properties. This represents a trend away from the traditional fluid modelling in dynamics.

I presented an engineering model to calculate avalanche speeds using granular flow concepts and scaling of avalanche speed measurements. The model estimates the speed profile along the incline for the design (highest speed) avalanche.

INTERNATIONAL
SNOW SCIENCE WORKSHOP

by Organizing Committee ISSW 1988

Attention is drawn to the bi-annual meeting of snow and avalanche workers on:

OCTOBER 12-15, 1988
AT WHISTLER, BRITISH COLUMBIA

THEME: A Merging of Theory and Practice

The topics of discussion will cover all aspects of avalanche formation, forecasting, and motion; avalanche safety; snow deposition and physics of the snow cover; equipment and instrumentation.

Practioners are encouraged to discuss their observations. Descriptive narratives and case histories of successful field methods are most welcome. The presentations may be in the form of short oral discussions, formal research papers, or through poster sessions.

All speakers and persons interested in a poster session should notify Dave McClung by submitting an abstract of 100 to maximum 250 words.

Address: Dr. David McClung
National Research Council Canada
3650 Wesbrook Mall
Vancouver, BC
V6S 2L2
Canada
Telephone (604) 666-8046

The second brochure describing the location of the workshop and containing information about accommodation is in preparation.

FOR REGISTRATION, INFORMATION, AND PAYMENTS CONTACT:

ISSW 88 Committee
P.O. Box 67
Whistler, BC
VON 1B0
Canada

REGISTRATION FEES:	Before March 1, 1988:	$70 Can	or	$55 US
	After March 1, 1988:	$80 Can	or	$65 US

Payments should be made to ISSW 88.

A MULTIDISCIPLINARY APPROACH TO SNOW ENGINEERING

Conference Announcement

The Engineering Foundation in cooperation with the American Society of Civil Engineers and the National Science Foundation is sponsoring a conference on "A Multidisciplinary Approach to Snow Engineering," to be held July 10-15, 1988 at the Sheraton Hotel and Spa, Santa Barbara, California. Conference Chairman is Ronald L. Sack, University of Idaho; Co-Chairman is Michael J. O'Rourke, Rennsselaer Polytechnic Institute. Steering committee members are: J.E. Cermak, Cermak/Peterka & Associates; P.A. Irwin, RWDI; D.A. Taylor, National Research Council of Canada; W. Tobiasson, Cold Regions Research & Engineering Lab.

Purpose of the conference is to bring together people from diverse backgrounds and provide a setting for interchanging ideas, opinions, and working knowledge of the effects of snow. Our understanding of the nature, distribution, and behaviour of snow will be enhanced by examining the respective investigative and design methods used by engineers, architects, and scientists. Through a series of technical presentations, workshops, poster sessions, and panel discussions participants will explore: field measurements, wind tunnel studies, artificial environments, analytical methods, snow mechanics, plus design problems and building standards/codes. All conference attendees are encouraged to contribute full-length papers and papers for poster sessions.

Authors interested in submitting full-length and/or poster papers should send a 200-word abstract (in English) including title, authors' names and affiliations with complete mailing addresses by February 29, 1988 to:

Professor Ronald L. Sack
Department of Civil Engineering
University of Idaho
Moscow, ID
83843
USA

Telephone (208) 885-7326

Engineering Foundation Conferences were established in 1962 to provide an opportunity for the exploration of problems and issues of concern to engineers from many disciplines. The format of the conference is designed to encourage discussions of recent developments and to provoke suggestions concerning profitable methods of approach to achieving progress. It is intended that all attendees will participate actively in the discussions.

Attendance at Engineering Foundation Conferences is by invitation or application. Those wishing to attend should contact the Engineering Foundation for registration information.

The conference fee, which includes registration, accommodation, and meals (from dinner on Sunday through lunch on Friday) are:

Participant (sharing room with guest or other participant) ..... $600 US
Participant (single occupancy room) ..... $785 US
Meals and lodging fee for guests sharing room with participant .. $450 US

For further information, contact:

Engineering Foundation
345 East 47th Street
New York, NY
10017
USA

Telephone: (212) 705-7835
Cable: ENGFOUND NEW YORK
Telex: 126022

PUBLICATION

Schaerer P.A. 1987

Avalanche Accidents in Canada III. A Selection of Case Histories 1978-1984. National Research Council Canada, Publication NRCC 27950, 138 p. Price $10.00

The circumstances, rescue operations, snow and weather conditions, and avalanche data of 49 avalanche accidents in Canada are described. Skiers, mountain climbers, snowmobile operations, workers, and various structures were involved. Statistics of avalanche accidents in Canada from 1978 to 1985 are included.

The publication is a continuation of two earlier ones (NRCC 17292 and NRCC 18525) that have described avalanche accidents. Orders for the publication should be addressed to:

Publication Sales
National Research Council
Ottawa, Ontario
K1A 0R6

and be accompanied by a cheque or money order (made out to the Receiver General of Canada).

AVALANCHE INVOLVEMENT REPORTS

by Peter Schaerer
National Research Council of Canada

The Avalanche Research Centre of the National Research Council continues to collect information about all encounters of persons and equipment with avalanches in Canada. The objective is to obtain statistics about the extent and type of avalanche problems in Canada. Summaries of the data are expected to draw attention to avalanche dangers and to assist in the development of safety measures. Although fatal accidents receive most attention and make the newspapers, it is equally important to know the number of close-calls and the circumstances of lucky escapes. Summaries of avalanche involvements are published annually in the June issue of Avalanche News.

The collection of information on avalanche involvements requires the co-operation of everyone in the avalanche business and those travelling in terrain subject to avalanches. We wish to request that anybody who was involved with an avalanche, or has witnessed or heard about an avalanche encounter, transmit the information in writing or by word of mouth to the Avalanche Research Centre of the National Research Council of Canada. A short form has been designed for this purpose and is attached to this issue of Avalanche News. The form, together with explanations on how to fill it out, was also printed in the Guidelines for Weather, Snowpack, and Avalanche Observations. For reporting an involvement detach the form or copy it. You may request additional copies from me, use the old card-type forms, simply write down the information on a piece of paper and submit it, telephone or mention it during a conversation. The message is important, but not the format.

No names need to be mentioned, not even the location needs to be specific. All the information is kept confidential and will be released in summary form only.

For reporting an avalanche, the following are addresses of the National Research Council:

P.O. Box 2759 Revelstoke, BC V0E 2S0	Telephone:	(604) 837-2435	(Paul Anhorn)
3650 Wesbrook Mall Vancouver, BC V6S 2L2	Telephone:	(604) 666-6741 (604) 666-8046	(Peter Schaerer) (Dave McClung)

NOTE: The old reporting cards contain an old, invalid address.

AVALANCHE TERRAIN VIDEO

Copies of the instructional video tape on avalanche terrain are still available.

The program consists of a series of colour slides with sound track. It summarizes the characteristics of terrain that favour the formation of avalanches. Guidelines for selecting safe routes in the backcountry and safe spots on roads are given. The tape is suitable for presentation in avalanche courses for the general public and professionals, either as an introduction to the lesson on avalanche terrain or as a summary following a discussion of terrain and route finding.

RUNNING TIME .... Nine minutes

PRICE ..... $50.00 (including postage and tax)

Cassettes are available in VHS, but may be produced on Beta and 3/4-inch on request.

Orders with payment should be addressed to:

Canadian Avalanche Association
3650 Wesbrook Mall
Vancouver, BC
V6S 2L2
Canada

Telephone: (604) 666-6741

SHORT REPORT OF AVALANCHE INVOLVEMENT

DATE _____ TIME _____

LOCATION _____

_____

_____

AVALANCHE Size _____ Dry _____ Moist _____ Wet _____

NUMBER OF PERSONS Total number of persons in party _____

Caught _____ Partially Buried _____ Buried _____

Number of those who were Injured _____ Killed _____

ACTIVITY OF THE PERSONS _____

NUMBER OF VEHICLES Trapped _____ Partially buried _____ Buried _____

Damaged _____

Type of Vehicles _____

STRUCTURES DAMAGED _____

_____

_____ Cost _____

ESTIMATED DEPTH OF BURIAL _____ ESTIMATED DURATION OF BURIAL _____

COMMENTS _____

_____

_____

_____

_____

_____

_____

_____

_____

NAME AND ADDRESS OF REPORTER (Who can be contacted for further information). _____

_____

Insert the form in an envelope or fold the form and staple or tape the edges. Mail to:

Avalanche Centre,
National Research Council
3650 Wesbrook Mall,
Vancouver, B.C. V6S 2L2

AVALANCHE

RESOURCE AGENCIES

1. AVALANCHE CONDITIONS, SEARCH AND RESCUE
2. SEARCH AND RESCUE
3. EDUCATION
4. WEATHER OFFICES

AVALANCHE RESOURCE AGENCIES

FEBRUARY 1988

1. AVALANCHE CONDITIONS, SEARCH AND RESCUE

The following agencies and individuals maintain continuous observations of the snow stability and avalanche hazards in their areas. They are also equipped for search and rescue work.

National Parks

Banff National Park:

Correspondence:

The Chief Warden
Banff National Park
P.O. Box 900
BANFF, ALBERTA TOL 0C0

Information concerning avalanche conditions:

Taped message on telephone:	at Banff	403-762-3600
	at Calgary	403-292-6600
Banff Wardens' office (open 24 hours per day)		403-762-4506
Lake Louise Wardens' office		403-522-3866

Avalanche control offices at:

Sunshine Village	Telephone:	403-762-2693
Lake Louise	Telephone:	403-522-3982
Mt. Norquay	Telephone:	403-762-2640

Emergency telephone: 403-762-4506

Jasper National Park:

The Chief Warden
Jasper National Park
P.O. Box 10
JASPER, ALBERTA TOE 1E0

Warden Office (during office hours)	Telephone:	403-852-6156/6157
(24 hours)	Telephone:	403-852-6161

Mount Revelstoke and Glacier National Parks:

Correspondence:

The Superintendent
Mount Revelstoke and Glacier National Parks
P.O. Box 350
REVELSTOKE, B.C. V0E 2S0

Information concerning avalanche conditions:

Parks office at Revelstoke	Telephone:	604-837-5155
Information office at Rogers Pass	Telephone:	604-837-6274

Search and rescue:

The Chief Warden, Revelstoke	Telephone:	604-837-5155
Wardens' office, Rogers Pass	Telephone:	604-837-6274

Yoho National Park
Box 99
FIELD, B.C. V0A 1G0 Telephone: 604-343-6467
Attention: Chief Park Warden

Kootenay National Park
Box 220
RADIUM HOT SPRINGS, B.C. V0A 1M0 Telephone: 604-347-9615
Attention: Chief Park Warden

Waterton Lakes National Park

Correspondence:

The Superintendent
Waterton Lakes National Park
WATERTON, ALBERTA T0K 2M0
Attention: Chief Park Warden

Information concerning avalanche conditions:

Warden office (office hours)	Telephone:	403-859-2477
Taped telephone message	Telephone:	403-859-2352
Emergency (24 hours)	Telephone:	403-859-2636

Kluane National Park
Haines Junction
YUKON Y0B 1L0 Telephone: 403-634-2251
Attention: Chief Park Warden

British Columbia Ministry of Transportation and Highways

Geoff Freer, Head
Snow Avalanche Section
940 Blanshard Street
VICTORIA, B.C. V8W 3E6 Telephone: 604-387-6361

Janice Johnson
Snow Avalanche Section
940 Blanshard Street
VICTORIA, B.C. V8W 3E6 Telephone: 604-387-6361

Jim Bay
Snow Avalanche Section
940 Blanshard Street Telephone: 604-387-6361
VICTORIA, B.C. V8W 3E6 or 604-837-7646

Randy Stevens
Snow Avalanche Section
940 Blanshard Street
VICTORIA, B.C. V8W 3E6 Telephone: 604-387-6361

District Avalanche Technicians:

Gordon Bonwick
1690 Main Street
NORTH VANCOUVER, B.C. V7J 1E3 Telephone: 604-987-9311

Ed Campbell
Box 579
HOPE, B.C. V0X 1L0 Telephone: 604-869-2401

Jack Bennetto
Bag 4500
MERRITT, B.C. V0K 2B0 Telephone: 604-378-9359

Scott Aitken
Box 460
LILLOOET, B.C. V0K 1V0 Telephone: 604-256-4255

John Tweedy
P.O. Box 580
CRESTON, B.C. V0B 1G0 Telephone: 604-428-3242

Bruce Allen
1100 West 2nd Street Telephone: 604-837-7646
REVELSTOKE, B.C. V0E 2S0 or 604-837-7685

Doug Kelly
P.O. Box 490
STEWART, B.C. V0T 1W0 Telephone: 604-636-2625

Mike Zylicz
#300-4546 Park Avenue
TERRACE, B.C. V8G 1V4 Telephone: 604-638-3324

The Ministry of Transportation and Highways have trained personnel and rescue equipment on all mountain highways with avalanche problems.

Parks Branch of British Columbia Ministry
of Environment and Parks

Parks & Outdoor Recreation Division
East Kootenay District
Box 118
WASA, B.C. V0B 2K0 Telephone: 604-422-3212

Parks & Outdoor Recreation Division
West Kootenay District
RR #3 NELSON, B.C. V1L 5P6 Telephone: 604-825-4421

Parks & Outdoor Recreation Division
(Alice Lake)
Box 220
BRACKENDALE, B.C. V0N 1H0 Telephone: 604-898-3678

Alberta Recreation and Parks

Kananaskis Country Region
Box 280
CANMORE, ALBERTA T0L 0M0

Lloyd Gallagher - Alpine Specialist,
Public Safety Co-ordinator Telephone: 403-678-5508
HOME - 678 5370

George Field - Alpine Specialist Telephone: 403-678-5508

Jock Richardson - Snow Study Observer Telephone: 403-678-5508

Gavin More - Resource Specialist Telephone: 403-678-5508

Peter Lougheed Provincial Park
(7 days a week - 0800-1630) Telephone: 403-591-7222

Bow Valley Provincial Park
(M to F 0800-1630, weekends on call) Telephone: 403-673-3663

Elbow District
(M to F 0800-1630, weekends on call) Telephone: 403-949-3754

Taped telephone message Telephone: 403-591-7788

Ski Areas

Whistler Mountain
Whistler Mountain Ski Corporation
Box 67
WHISTLER, B.C. V0N 1B0
Attention: Brian Leighton — Telephone: 604-932-3434

Red Mountain Ski Area
Box 939
ROSSLAND, B.C. V0G 1Y0
Attention: Terry Miller — Telephone: 604-362-7384

Fernie Snow Valley Ski Ltd.
Box 788
FERNIE, B.C. V0B 1M0
Attention: Dave Aikens — Telephone: 604-423-9221

Mt. Washington Ski Resort Ltd.
P.O. Box 217
CAMPBELL RIVER, B.C. V9W 5B1
Attention: Bryce Christie — Telephone: 604-338-1386

Whitewater Ski Resort Ltd
Box 60
NELSON, B.C. V1L 5P7
Attention: Rick Galliver — Telephone: 604-354-4944

Blackcomb Mountain
P.O. Box 98
WHISTLER, B.C. V0N 1B0
Attention: Ken Newington — Telephone: 604-932-3141

Marmot Basin Ski Lifts Ltd.
P.O. Box 1300
JASPER, ALBERTA T0E 1E0
Attention: Karl Klassen — Telephone: 403-852-3816

Heli-Ski Operators

Hans Gmoser, Mark Kingsbury, Kobi Wyss
Canadian Mountain Holidays
Box 1660
BANFF, ALBERTA T0L 0C0 — Telephone: 403-762-4531

Ernst Buehler
Canadian Mountain Holidays, Cariboos
Box 1660
BANFF, ALBERTA T0L 0C0 — Prince George Mobile N699377 "Cariboo Lodge"

Klaus Fux
Canadian Mountain Holidays, Valemount Telephone: 604-566-4487

Dominic Neuhaus
Canadian Mountain Holidays, Monashees Telephone: 604-834-7223

Buck Corrigan
Canadian Mountain Holidays, Revelstoke Telephone: 604-837-2107

Colani Bezzola
Canadian Mountain Holidays, Bobbie Burns Telephone: 604-346-3366

Walter Bruns
Canadian Mountain Holidays, Bugaboos Telephone: 604-346-3366

Franz Fux
Canadian Mountain Holidays, Gothics Telephone: 604-837-4204

Panorama Heli-Skiing
Box 937
INVERMERE, B.C. V0A 1K0 Telephone: 604-342-6941

Rudi Gertsch
Purcell Helicopter Skiing
GOLDEN, B.C. V0A 1H0 Telephone: 604-344-5410

Peter Schlunegger
Selkirk-Tangiers Heli-Skiing
REVELSTOKE, B.C. V0E 2S0 Telephone: 604-837-5271

Allan Drury
Selkirk Wilderness Skiing
MEADOW CREEK, B.C. V0G 1N0 Telephone: 604-366-4424

Mike Wiegele
Wiegele Helicopter Skiing
P.O. Box 159
BLUE RIVER, B.C. V0E 1J0 Telephone: 604-673-8381

Wiegele Helicopter Skiing
P.O. Box 249
BANFF, ALBERTA T0L 0C0 Telephone: 403-762-5548

Whistler Heliskiing
P.O. Box 258
WHISTLER, B.C. V0N 1B0 Telephone: 604-932-4105

Kootenay Helicopter Skiing
P.O. Box 717
NAKUSP, B.C. V0G 1R0 Telephone: 604-265-3121

Mining Companies

Crows Nest Resources Ltd.
Line Creek Mine (Upper Elk Valley)
P.O. Box 2003 — Telephone: 604-425-2555 (24 hours)
SPARWOOD, B.C. V0B 2G0

Attention: Greg F. Allen

2. SEARCH AND RESCUE

The following agencies and individuals can assist in search and rescue work.

Dogs for Avalanche Search - Parks Canada

Dale Portman — Telephone: 403-852-3100 (Pager)
Jasper National Park — 403-852-6156 (Bus)
JASPER, ALBERTA T0E 1E0 — 403-852-5071 (Res)

Gordon Peyto
Glacier National Park — Telephone: 604-837-6274 (Bus)
REVELSTOKE, B.C. V0E 2S0 — 604-344-5041 (Res)

Scott Ward
Banff National Park — Telephone: 403-762-4506 (24 hrs)
BANFF, ALBERTA — 403-762-2488 (Res)

Dogs for Avalanche Search - R.C.M.P.

The followings dogs and their masters have received special avalanche training:

Chilliwack Sub/Division

Cpl. Terry Barter — Telephone: 604-792-4611
Cpl. Mel Haggard

Cranbrook Detachment

Cpl. Gordon Burns — Telephone: 604-489-3471

Courtenay Sub/Division

Cpl. Jim Brewin — Telephone: 604-338-7421

Fort St. John Detachment

Cst. Al Soneff — Telephone: 604-785-6617

Kamloops Sub/Division

Cpl. Wayne Murphy — Telephone: 604-372-3111

Nelson Detachment

Cpl. Brandt — Telephone: 604-354-4104

Penticton Detachment

Cpl. Gary McCormick
Cst. R. C. Horton — Telephone: 604-492-4300

Terrace Detachment

Cpl. Lothar Bretfeld — Telephone: 604-638-0333

Vernon Detachment

Cpl. Tim Boal — Telephone: 604-545-7171

For contacts ask for the R.C.M.P. Radio Room where the location of the dog handlers will be known.

The following detachments will take information and pass it on to the Alberta Provincial Parks:

R.C.M.P., Peter Lougheed (Kananaskis) Provincial Park — Telephone: 403-591-7707

R.C.M.P., Canmore — Telephone: 403-678-5516

R.C.M.P., Banff — Telephone: 403-762-2226

Canadian Avalanche Rescue Dog Association

Bruce Watt
Box 397
Pemberton, B.C. V0N 2L0 — Telephone: 604-894-6262

Michael Morris
RR #1, Site 9
Golden, B.C. V0A 1H0 — Telephone: 604-344-5468

Provincial Emergency Program (Ministry of Attorney-General)

The British Columbia Provincial Emergency Program co-ordinates most local search and rescue groups in the Province. Enquiries can be directed to:

M.C. Stewart, Director
Provincial Emergency Program
3287 Oak Street
VICTORIA, B.C. V8X 1P8 Telephone: 604-387-5956

B. Thorshaug, Search & Rescue Co-ordinator
Provincial Emergency Program
3287 Oak Street
VICTORIA, B.C. V8X 1P8 Telephone: 604-387-5956

Regional co-ordinators are located at:

Vancouver Island Region

Mr. N. Coward (Acting) Telephone: 604-387-5956
(Bus) 3287 Oak Street
VICTORIA, B.C. V8X 1P8

(Res) 37-1287 Verdier Street
BRENTWOOD BAY, B.C. V0S 1A0 Telephone: 604-652-1441

Lower Mainland Region

Mr. F.G. Clegg (Frank) Telephone: 604-660-3723
(Bus) 207-815 Hornby Street (24 hours)
VANCOUVER, B.C. V6Z 2E6

(Res) 6892 Centennial Drive
SARDIS, B.C. V0X 1Y0 Telephone: 604-858-9980

Northern Region

B.C.E. Akehurst (Barry) Telephone: 604-565-6395
(Bus) 1011 4th Avenue 604-565-6130
PRINCE GEORGE, B.C. V2L 3H9 (after hours)

(Res) 753 Faulkner Crescent
PRINCE GEORGE, B.C. V2M 5E1 Telephone: 604-563-5531

Invermere

Columbia Mountain Rescue Group Telephone: 604-342-4200 (Bus)
A. Larson (Arnor), Co-ord. 604-342-6042 (Res)
R. Hendry, Deputy Co-ord. 604-342-3894 (Res)
Box 399
INVERMERE, B.C. V0A 1K0

Kootenay Region

G. Hartley
(Bus) 310 Ward Street
NELSON, B.C. V1L 5S4
Telephone: 604-354-6395
604-354-6399
(24 hours)

(Res) #44 Boneventure Mobile Home Park
RR #1, Box 503
NELSON, B.C. V1L 5R3
Telephone: 604-825-9458

Southern Interior Region

M.E. Dyer (Murray)
(Bus) 455 Columbia Street
KAMLOOPS, B.C. V2C 6K4
Telephone: 604-372-3213
24 hours

(Res) 2478 Young Avenue
KAMLOOPS, B.C. V2B 4M8
Telephone: 604-376-3453

West Kootenay Rescue Group

Box 764
NELSON, B.C. V1L 5R4

To activate, call:
Nelson R.C.M.P. Emergency No.
Telephone: 604-352-3511

3. EDUCATION

Avalanche Centre, National Research Council

Peter Schaerer, David McClung
3650 Wesbrook Mall
VANCOUVER, B.C. V6S 2L2
Telephone: 604-666-6741 (Bus)
P. Schaerer:
604-987-3716 (Res)
D. McClung:
604-228-0425 (Res)

Technical information.

British Columbia Institute of Technology

Industry Services
3700 Willingdon Avenue
BURNABY, B.C. V5G 3H2
Telephone: 604-432-8521 (Bus)

Courses for professional staff.

Outdoor Recreation Council of British Columbia

Suite 100, 1200 Hornby Street
VANCOUVER, B.C. V6Z 2E2
Telephone: 604-687-3333

Safety brochures and slide packages.

Federation of Mountain Clubs of British Columbia

1200 Hornby Street
VANCOUVER, B.C. V6Z 2E2 Telephone: 604-687-3333

Two day awareness courses.

Canadian Ski Patrol System

T. Simper
National Avalanche Training Officer
14 Knowles Place, Box 1117
OKOTOKS, ALBERTA TOL 1T0 Telephone: 403-938-2131

Alberta Avalanche Safety Association

Jack de Bruyn
8711-62nd Street
EDMONTON, ALBERTA T6B 1N5 Telephone: 403-466-6435

Avalanche seminars

Backcountry Avalanche Institute

Box 1050
CANMORE, ALBERTA TOL 0M0 Telephone: 403-678-4102

Awareness courses.

Ptarmigan Tours

Box 11 Telephone: 604-427-2838
KIMBERLEY, B.C. V1A 2Y5 604-422-3270 (eve)

Awareness courses.

Avalanche Films

"Avalanche" - 50 minutes

Industrial Services Section
Ministry of Health
500 Lougheed Highway Telephone: 604-521-1911
PORT COQUITLAM, B.C. V3C 1J0 (Loc. 281)

"The Snow War" - 25 minutes

National Film Board
811 Wharf Street
VICTORIA, B.C. V8W 1T2 Telephone: 604-388-3868

National Film Board
1161 West Georgia Street Telephone: 604-666-0716 or
VANCOUVER, B.C. V6E 3C4 604-666-0718

National Film Board
545 Quebec Street
PRINCE GEORGE, B.C. V2L 1W6 Telephone: 604-564-5657

4. WEATHER OFFICES

Atmospheric Environment Service

Correspondence and equipment:

P. Pender
Regional Director
1200 West 73rd Avenue
VANCOUVER, B.C. V6P 6H9 Telephone: 604-666-6399

G.E. Wells
Pacific Weather Centre
1200 West 73rd Avenue
VANCOUVER, B.C. V6P 6H9 Telephone: 604-666-0523

E. Coatta
Climate Information
1200 West 73rd Avenue
VANCOUVER, B.C. V6P 6H9 Telephone: 604-666-2980

Alberta Weather Office
Edmonton International Airport
EDMONTON, ALBERTA T5J 2T2 Telephone: 403-437-1250

LIST OF WEATHER OFFICES IN BRITISH COLUMBIA

LOCATION	TELEPHONE (604)	OPEN HOURS (local time)
Vancouver	276-6109 Tape 276-6112	24 hours
Victoria	356-6629 Tape 656-3978	24 hours
Prince George	963-7552 Tape 963-9330	0215-2115
Kelowna	765-6598 Tape 765-4027	0445-0015
Kamloops	376-2160 Tape 376-3044	0700-1700
Fort St. John	785-4304	0715-1715
Fort Nelson	774-6461	0715-1715
Castlegar	365-3131	0610-1610
Revelstoke	837-4164	0800-2200
Port Hardy	949-6559	0715-1715
Penticton	492-0539	0700-1700 (M-F) 0800-1600 (S&S)
Terrace	635-3224	0710-1710
Pacific Weather Centre	666-2728	24 hours

(The Pacific Weather Centre is the main contact during hours when the local weather offices are closed).

BANFF, ALBERTA	403-762-2088	0600-1700
WHITEHORSE, YUKON	403-668-2293	24 HOURS
ALBERTA WEATHER CENTRE	403-468-7931	24 HOURS

CHANGES

Changes, additions, or deletions to this list should be reported to the Snow Avalanche Section, British Columbia Ministry of Transportation and Highways.