AVALANCHE NEWS NO. 17

JANUARY 1985

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 or organizations concerned with avalanche safety, education and research. Contributions are expected from the readers.

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

Editor: Peter Schaerer
National Research Council of Canada
3904 West 4th Avenue
Vancouver, B.C. V6R 1P5

Telephone: (604) 732-4829

Publisher: Geoff Freer
Snow Avalanche Section
Ministry of Transportation and Highways
940 Blanshard Street
Victoria, B.C. V8W 3E6

Telephone: (604) 387-1738

AVALANCHE NEWS
Canadian Avalanche Association, 3904 West 4th Ave., Vancouver, B.C., V6R 1P5
JANUARY 1985 No. 17

INTERNATIONAL COMMISSION FOR ALPINE RESCUE

Information submitted by Peter Fuhrmann
Parks Canada, Banff

The annual meeting of delegates of the International Commission of Alpine Rescue (I.K.A.R.) took place on October 7th at Malbun, Liechtenstein. Seventeen of the eighteen member organizations were present. Prior to the meeting eighty specialists discussed techniques and equipment, medical questions, avalanche rescue, and air rescue within subcommittees.

Avalanche rescue transceivers were the most important item discussed by the delegates. In May of 1984 the Executive Committee proposed a resolution (see Avalanche News No. 16), which was presented to the memebers at this meeting and accepted as follows:

RESOLUTION CONCERNING RESCUE TRANSCEIVERS

In Germany, France, Italy, Austria, and Switzerland, tests were carried out utilizing various instruments. These tests were to determine: (1) operating distance; (2) search time; and (3) difference in search patterns. Better results were achieved with high-frequency instruments than with units having a lower frequency capability. Based on the results of these tests, and further examinations, the DIN - NORM has been established in Germany. This norm suggests that using a single frequency of the higher frequency type would be advantageous.

Certain subjects have not been fully resolved at this time. The interference problem in North America will have to be further investigated. The I.K.A.R., at this point in time, is not in a position to make a final recommendation as to the single universal frequency.

During this meeting of the delegates, I.K.A.R. established a clear line of progression and clarification and is asking the producers of transceiver units that:

(a) starting in the fall of 1984, only double frequency instruments be produced;
(b) starting in the fall of 1986, a single compatible frequency be named;
(c) starting in the winter of 1989-1990, only single frequency compatible instruments be sold.

I.K.A.R. thus hopes that, over a reasonable period of time, compatible single frequency instruments will be available to assist in locating buried avalanche victims, and that a clear understanding of the entire transceiver situation will be provided.

DISCUSSION OF TRANSCEIVERS BY THE AVALANCHE SUBCOMMITTEE

The transceiver problem was discussed in greater detail during the meeting of the Avalanche Subcommittee. The results of the tests of the avalanche transceiver systems using 2.275 kHz and 457 kHz were presented. There were deviations as to the way the tests were carried out and analyzed and these were explained. All cases supported the greater operational range of the 457 kHz equipment. The average search time was given at 5 minutes 32 seconds for Autophone 457 kHz. In contrast, using instruments of the 2.275 kHz frequency, an average search time of 11 minutes 27 seconds was obtained. It was also documented and noted that the fine search was more accurate with 457 kHz. Ten countries provided test data, but only seven reports were used. The other three had major deviations or used Ortovox mixed with Autophone and therefore the evaluation committee felt a clear cut result was not obtained.

The problems involving North America were discussed. A major interference problem could exist with the marine bands, especially along the Pacific Coast of the United States. Ski areas are affected by the "Trident" submarine and other marine band transmissions. The other problem is that, according to recent correspondence received from Dr. Lawton, Skadi is reluctant to change from 2.275 kHz to 457 kHz. This could result in Canada ending up with a two frequency problem similar to that experienced in Europe. As we do not have manufacturers in Canada, we will either have to purchase the 2.275 kHz units produced in the United States or the future European 457 kHz units. If this should take place, the present effective single frequency situation in Canada might be a thing of the past.

Dr. Kern, a physicist with the German Alpine Club who worked on the acceptance of the 457 kHz under a DIN - NORM, presented results that show that from his point of view, 457 kHz is the preferable frequency. He recommended a transition period of five years during which double frequency instruments should be produced. The problem, however, is that no one will buy instruments during the transition period if the general public realizes that after five years instruments of a specific frequency will be produced. This may result in people travelling without transceivers altogether.

Dr. Good, of the Snow and Avalanche Research Institute of Switzerland, presented his own evaluation. He basically agreed that the 457 kHz frequency instrument was preferable, especially as other studies have shown that the first half hour during a rescue mission is of vital importance. Therefore, as mentioned above, the substantial difference between average search speed of 2.275 kHz (11 minutes 27 seconds) and 457 kHz (5 minutes 32 seconds) is an important consideration.

Generally, the feeling is that Europe, with the exception of the Austrian delegation, wants to change to 457 kHz. Everyone realizes that North America (the United States and Canada) presents a problem during this switchover. It was resolved that legal problems do not exist in licensing 457 kHz in North

America. The commission will recommend to the Executive Committee of I.K.A.R. that the air marine band interference as far as 457 kHz is concerned will have to be investigated with Canadian and American authorities.

Austria pointed out that they are reluctant to accept the one-frequency system, as recently the OE norm in Austria accepted the two frequency instrument as standard.

The American and Canadian representatives made a joint request that the I.K.A.R. investigate the North American problem concerning interference from outside sources. This should be accomplished by contacting responsible government departments and the National Research Council of Canada. The representative from the United States pointed out that until these problems have been clarified, he will not be voting on this issue. Canada presented a resolution in this connection which was passed by a majority vote at the meeting of the delegates.

AVALANCHE ACCIDENTS

The various countries had compiled information about accidents (see Table). The present statistics, showing only the number of fatal accidents, are extremely limited as they do not show how many people were caught, how many were rescued alive and in which manner the rescue was accomplished. An improvement is necessary, and a study group was formed to develop a new I.K.A.R. statistic based on the data collected, evaluated and available at the Swiss Institute for Snow and Avalanche Research.

The various countries reported on interesting and complex accidents, analyzed situations, explained the various mistakes that were made by parties and rescue crews, and made recommendations to improve systems. It was noted that parties involved in accidents repeated old mistakes:

a) Transceivers were not worn.
b) Parties travelled closely together and did not spread out to maintain safe distances between members.
c) Panic developed during the search.
d) Shovels were not carried.

Canada presented problems arising with the use of snowmobiles. It was documented that four fatalities had occurred during the 1983-1984 season. A short explanation was given as to what a snowmobile is, the types available, the speeds they attain and the type of terrain they travel in. Snowmobiles are virtually unknown in Europe except in Sweden and Norway. After discussion of this particular subject, which was strongly supported by the U.S. delegate, as similar problems exist in the United States, the following resolution was passed:

AVALANCHE FATALITIES 1983-1984

From Statistics Compiled by IKAR Member Countries

	Backcountry Skiers	Mountain Climbers	Skiers Adjacent to Controlled Areas	Inside Ski Areas	Industrial Operations	On Roads	In Buildings	Snow-Mobiles	TOTAL
Switzerland	17	3	5	4	1	4	7	-	41
Austria	25	-	5	-	-	6	5	-	41
France	14	1	11	1	-	-	1	-	28
Italy	9	4	7	-	-	-	-	-	20
U.S.A.	3	4	1	-	4	-	-	-	12
Germany	6	-	-	-	-	-	-	-	6
Poland	-	6	-	-	-	-	-	-	6
Bulgaria	1	5	-	-	-	-	-	-	6
Czechoslovakia	-	5	-	-	-	-	-	-	5
Canada	-	-	-	-	-	-	-	4	4
TOTAL	75	28	29	5	5	10	13	4	169
Percent	44	17	17	3	3	6	8	2	100

Yugoslavia, Liechtenstein, Norway and England reported no fatal accidents.

I.K.A.R. recognizes that the increasing recreational use of snowmobiles is creating an increased risk of avalanche death and injury in some countries. Primarily affected have been Canada and the United States. Canada documented four deaths during the season of 1983-1984.

I.K.A.R. recommends that the general public and the users of snowmobiles in the affected countries be familiarized with the hazards, educated in accident prevention and advised as to proper rescue procedures. These measures and enforcement of applicable regulations should be achieved by the relevant authorities.

OTHER BUSINESS OF THE AVALANCHE SUBCOMMITTEE

The I.K.A.R. will continue to organize courses for instructors of avalanche courses. TV stations and radio stations throughout Europe will be encouraged to advise the general public as to avalanche hazards in a sensible format.

The internationally accepted hazard scale 1-8 was discussed. It was felt that a detailed explanation should be given as to what the figures mean when publicizing hazards. This has proven to be of great value in the past.

A study is underway to look at the problem of tree damage by skiers and packing equipment. In some areas, trees were damaged to such an extent that the areas had to be fenced off and closed to traffic. The ANENA is presently producing a slide collection depicting the tree damage and protection methods.

Instructional films are available, but unfortunately a list of where to obtain films, their language, price, length, and content is not. A recommendation was made that all countries provide data on available films to Karl Eitzenberger directly.

The avalanche glossary is in its final form. Some corrections still have to be made. It is now available in six languages. Slavonic was added during the last year to the original list. The glossary will be printed soon and the various countries will have to undertake distribution.

VARIATION OF SNOW WITH ELEVATION

by Peter Schaerer

In Canada, design snow loads for buildings are determined by estimating a ground snow load and multiplying it by a roof load coefficient that takes into account the type of exposure of the roof. The ground snow load is defined as the weight of the snow on level ground at a sheltered location, observed or exceeded on the average once in 30 years. For the purpose of building design ground loads are given in kilopascals (kPa), but for convenience of measuring and for other applications they may be expressed in millimetres of water equivalent of the snowpack.

For most inhabited areas ground snow loads have been determined from long-term records of snow observations. Little was known, however, about changes with elevation above a valley, although we know that the snow is deeper higher up the mountain. In order to fill this gap in our knowledge the avalanche research staff of the National Research Council have measured ground snow loads at various elevations at twenty mountains between Vancouver and Lake Louise since 1966. One of Paul Anhorn's tasks was to travel through southern British Columbia from January to May every winter and to measure snow water equivalents at different elevations. The study was concentrated in the southern part of British Columbia because the need for information was greatest near inhabited areas there. Limitations in time and personnel did not allow an extension of the program. The observations, carried out from 1966 to 1983, were analyzed by Bernie Claus as part of his thesis for a masters degree in Civil Engineering under the supervision of Professor Dennis Russel at the University of British Columbia.

The annual maximum water equivalents of the snow at each mountain location and each elevation were used in the the calculation of 30-year maximums. The calculated maximums as well as the means were found to increase with elevation above sea level with a quadratic relation. High degrees of fit were obtained by expressing the relation as:

$$\text{Water Equivalent (in mm)} = A + B \times (\text{elevation}) + C \times (\text{elevation})^2$$

At the Pacific Coast the water equivalent, or ground load, was found to increase dramatically with elevation, but the distribution curve flattened as one moved toward the drier Interior. In the dry, cold Rocky Mountain Region, represented in the study by Lake Louise and Kimberley, the water equivalent of the snow increased almost linearly with elevation.

The results are contained in a publication (see reference below). The ground load $\bar{x}$ elevation relationships are depicted in graphs. Tables contain the values A,B, and C of the water equivalent - elevation equation. Guidelines are presented for the calculation of 30-year maximum water

equivalents or ground load for a given location and elevation. The results are valuable not only for designers of buildings but for all those who need to make estimates of the maximum amount of snow on the ground in the mountains. For example, it may be of interest to know how much snow would be available for avalanches in a maximum winter.

Reference: B.R. Claus, S.O. Russel and P.A. Schaerer; "Variation of ground snow loads with elevation in Southern British Columbia." Canadian Journal of Civil Engineering, Vol. 11, No. 3, pp. 480-493; 1984. Reprint by National Research Council Canada, Publication NRCC 23579; Price $1.25.

NOTIFICATION OF SERIOUS AVALANCHE ACCIDENTS

Submission by Jeff Boyd

Recent accidents have demonstrated the need for a notification network following serious avalanche accidents. Prompt dissemination of information about serious accidents has potential preventive and legal benefits to other operators sharing the hazard.

A network is proposed whereby an operator who has an accident resulting in a fatality notifies a contact agency for his particular industry, ideally on the same day. The contact in turn will notify other operators within that industry and the contacts for other industries (who in turn will notify operators in their respective industries).

The information given would be voluntary but should best include a brief description of:

- Location;
- Name of operator and contact person;
- Time of accident;
- Number of persons involved;
- Dimensions of avalanche;
- Other relevant information.

The following organizations and individuals have been designated as contact agencies:

National and Provincial Parks in Alberta and British Columbia

Avalanche Hazards Forecaster
Banff National Park
Box 900
Banff, Alberta T0L 0C0

Telephone: (403) 522-3982 (B)
(403) 762-4506 (24 Hour Service) "Urgent"

B.C. Highways and P.E.P.

Snow Avalanche Section
B.C. Ministry of Transportation and Highways
940 Blanshard Street
Victoria, B.C. V8W 3E6

Attention: Geoff Freer
Jack Bennetto
Janice Johnson

Telephone: (604) 387-1738 (B)
(604) 274-1610 (24 Hour Service) "Urgent"

Helicopter and Snowcat Skiing

Canadian Mountain Holidays
Box 1660
Banff, Alberta T0L 0C0

Telephone: (403) 762-4531

Attention: Mark Kingsbury
Hans Gmoser
Kobi Wyss
Jeff Boyd
Pat Lever

Lift - Serviced Ski Areas

Roger McCarthy
Mountain Safety Manager
Whistler Ski Corporation
Box 67
Whistler, B.C. V0N 1B0

Telephone: (604) 932-3434 (B)
(604) 932-4069 (H)

Kel Fenwick (604) 932-3403 (H)
Brian Leighton (604) 932-3784
Bernie Protsch (604) 932-5090

Other Industries

Avalanche Research Centre
National Research Council
3904 West 4th Avenue
Vancouver, B.C. V6R 1P5

Attention: Peter Schaerer (604) 732-4829 (B)
(604) 987-3716 (H)

CANADIAN AVALANCHE ASSOCIATION

The annual general meeting, exchange of technical information and social bash will be held on May 9-10, 1985 at Revelstoke, B.C. The meetings are open to active members, representatives of associate members, and invited guests only. The members of the Association will be notified by mail about the time, location and agenda. The active and associate members are requested to propose items for discussion in the technical or the business meeting.

INTERNATIONAL SYMPOSIUM ON AVALANCHE FORMATION, MOVEMENT AND EFFECTS

The Swiss Institute for Snow and Avalanche Research has announced a Symposium to provide an opportunity for the discussion of new experimental and theoretical findings of scientific aspects on snow and avalanches. The symposium will be combined with a celebration of the 50th Anniversary of the Institute.

Date: September 14-19, 1986

Location: Davos, Switzerland

Topics: Snow and snowpack properties and stability
Meteorological factors and avalanche formation
Effect of vegetation on snow pack stability
Avalanche movement
Avalanche protection
Geographical distribution of avalanches
Avalanche risk analysis

For more information contact: Dr. C. Jaccard
EISLF
Weissfluhjoch
CH-7260 Davos-Dorf
Switzerland

SNOW PROPERTY MEASUREMENT

A workshop is being held to discuss problems associated with measurements of snow properties. It is being organized on behalf of the Snow and Ice Subcommittee of the National Research Council to provide a forum which will allow snow researchers in Canada an opportunity to discuss common problems in the measurement of the properties of snow. Technical papers have been planned for presentation at the workshop and preprints of these papers will be made available to participants at the workshop.

Sessions have been organized to encourage discussion and facilitate exchange of experience, needs, observations and techniques. Panels of 3-4 members will encourage discussion of general questions of approaches, needs, applications and directions raised by the technical papers.

Three sessions have been organized:

Measurement of Snow Structure and its Mechanical and Physical Properties

Measurement of Snow Cover Distribution / Water Equivalent

Measurement of Precipitation and Blowing Snow

DATE: April 1-3, 1985

LOCATION: Chateau Lake Louise, Alberta
Telephone: (403) 522-3511

ACCOMODATION: The Chateau Lake Louise has set aside a block of rooms for the workshop from Sunday, March 31 to Wednesday, April 3, 1985. The rates, including meals and gratuities, are $61.00 per day per person double occupancy and $86.00 per day per person single occupancy. Rooms should be reserved with one night's deposit by March 1, 1985.

REGISTRATION: Addressed to: Peter Schaerer
National Research Council
3904 West 4th Avenue
Vancouver, B.C. V6R 1P5

Pre-registration by February 28, 1985 is preferred to facilitate planning of physical arrangements for the workshop, but registrations will be accepted at the workshop.

REGISTRATION FEE: $50.00 payable with registration or at the workshop. The fee includes preprints of the papers and a copy of the proceedings.

CORRESPONDENCE: Announcements, registration forms, and preliminary programs may be requested from Peter Schaerer.

ADVANCED AVALANCHE AWARENESS COURSE

Submission by Clair Israelson

An outline for an avalanche awareness course on an advanced level for the general public is in the typing and printing process and will be available for distribution in the near future. The outline of an introductory course was issued in the summer of 1983. The advanced course is intended for skiers and other backcountry travellers who wish to be more knowledgeable about the recognition of hazardous terrain, snow conditions and safety measures. The course outline is structured into seven classroom sessions and four field sessions. Clair Israelson, with the support of the Alberta Mountain Council, has carried out the task of writing the outline. The draft was discussed among experienced avalanche course instructors in meeting room and field sessions at Revelstoke on May 4-6, 1984.

As this advanced course requires instructors who are technically competent and experienced with the evaluation of avalanche hazards in backcountry travel, the distribution of the outline will be restricted to the participants of the workshop on May 4-6, 1984; active members of the Canadian Avalanche Association; Winter and Full Guides of the Association of Canadian Mountain Guides; and other qualified individuals on request.

Requests for copies should be addressed to:

Ron Matthews
The Alpine Club of Canada
Box 1026
Banff, Alberta TOL 0C0

Telephone: (403) 762-4481

AVALANCHE COURSES: NATIONAL RESEARCH COUNCIL/B.C.I.T.

The following five courses were held successfully during the 1984-1985 winter:

Transportation and Industry - Level 1: November 26-30, 1984 at Creston; 24 participants.

Transportation and Industry - Level 1: December 3-7, 1984 at Creston; 21 participants.

Ski Operations - Level 1: December 9-15, 1984 at Whistler; 22 participants.

Ski Operations - Level 1: January 13-20, 1985 at Assiniboine Lodge; 20 participants.

Ski Operations - Level 1: January 20-27, 1985 at Assiniboine Lodge; 22 participants.

Three courses had to be cancelled because of an insufficient number of registrations. These were:

Ski Operations - Level 1: December 9-15, 1984 at Canmore; 8 registrations.

Ski Operations - Level 2: January 5-13, 1985 at Whistler; 4 registrations.

Avalanche Control: January 13-19, 1985 at Whistler; 5 registrations.

The low interest in the Level 1 and Level 2 courses at Whistler came as a surprise, because in the past years the Level 1 course at Whistler has always been filled to capacity with 26 to 30 participants and often the course had to be repeated.

It is hoped that the two remaining courses on the program can be held as planned:

Ski Operations- Level 2: March 3-10, 1985 at Canmore.

Instructors: Peter Schaerer, Willi Pfisterer and Jeff Boyd.

Avalanche Terrain: March 25-29, 1985 at Revelstoke.

Instructors: Peter Schaerer, Geoff Freer and Chris Stethem.

Note that the dates of the Terrain course have been changed from the original announcement. The Avalanche Terrain course deals with the recognition and prevention of avalanche hazards in the planning stage of roads, buildings, mines and utilities; in other words, the course covers aspects of avalanches other than the evaluation of snow stability and hazards on a day-to-day basis.

PUBLICATIONS

Williams, Knox and Armstrong, Betsy.

The Snowy Torrents: Avalanche Accidents in the United States 1972-1979 Teton Bookshop Publishing Company, Box 1903, Jackson, Wyoming 83001; 221 pp.; 1984. Price US $15.00.

ABSTRACT: The book is the third volume of a compilation of case histories of avalanche accidents. It contains 145 accident reports and serves as a text that teaches by example - both good and bad. The authors also comment on risktaking, avalanche zoning, and route finding, including clues to instability and survival techniques.

Salm, Bruno.

Lawinenkunde fur den Praktiker. (Avalanche Information for the Practical Man). Verlag Schweizer Alpen Club, Berne, Switzerland, 1982; 148 pp. (Publication by the Swiss Alpine Club, Berne). Price SFr. 26.00. Text in German.

ABSTRACT: The pocket-size publication is an excellent introduction and handbook on avalanches. It discusses in an easy readable form, with numerous illustrations and tables, the significant properties of the snow, the weather and snowpack observations necessary for evaluating snow stabilities, the nature and classification of avalanches, safety measures, and rescue methods. The individual chapters in general follow the format of the Avalanche Handbook of the U.S. Forest Service and the format usually taught in avalanche courses. The author, a section head at the Swiss Institute for Snow and Avalanche Research, has included the latest scientific information. The book is recommended for travellers in avalanche terrain as well as professionals who have a reading ability in German.

Perla, R.; Lied, K.; and Kristensen, K.

"Particle Simulation of Snow Avalanche Motion." Cold Regions Science and Technology; Vol. 9; pp. 191-202; 1984.

ABSTRACT: The continuum model of a snow avalanche is abandoned, and instead an avalanche is modeled as a collection of $\sim 10^3$ particles that move randomly and independently subject to gravity and resistive forces which have a random fluctuation computed by Monte-Carlo simulation. The model includes entrainment at the avalanche front and the possibility of varying resistive parameters with speed and slope position. Particle statistics computed for an avalanche event in Norway, April 1982, provide a reasonable simulation of recorded speeds and debris distribution.

FOR SALE

Met One System including:

1 Model 120 translator rack
1 Model 010 wind speed sensor
1 Model 020 wind direction sensor
1 Model 083 relative humidity sensor
1 Model 083C-1 temperature sensor
1 Striker bar chart records Model FPM-120
Cables and coupling boxes complete.

Used one season only.

Call Peter Kimmel at 837-3391 after 3:30 p.m.

AVALANCHE RESOURCE AGENCIES

JANUARY 1985

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 403-762-3600
Banff Wardens' office (open 24 hours per day)
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

Glacier and Mount Revelstoke National Parks:

Correspondence:

The Superintendent
Glacier and Mount Revelstoke 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
WATERTON, ALBERTA T0K 2M0 Telephone: 403-859-2352

Attention: Chief Park Warden

Kluane National Park
Haines Junction
YUKON 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: 604-387-1738

J. B. Johnson
Snow Avalanche Section
940 Blanshard Street
VICTORIA, B.C. V8W 3E6 Telephone: 604-387-1738

J. Bennetto
Snow Avalanche Section
940 Blanshard Street
VICTORIA, B.C. V8W 3E6 Telephone: 604-387-1738

District Avalanche Technicians:

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

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

John Tweedy
238-10th Avenue
CRESTON, B.C. V0B 1G0 Telephone: 604-428-9307

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

Allan Dennis
P.O. Box 490
STEWART, B.C. V0T 1W0 Telephone: 604-636-2294

Mike Zylicz
#300-4546 Park Avenue
TERRACE, B.C. V8G 1V4 Telephone: 604-635-6254

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 Lands, Parks and Housing

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

Parks Branch
(Kokanee Creek)
NELSON, B.C. Telephone: 604-825-4421

Parks Branch
(Alice Lake)
BRACKENDALE, B.C. V0N 1H0 Telephone: 604-898-3678

Alberta Recreation and Parks

Kananaskis Country Region
Box 280
CANMORE, ALBERTA T0L 0M0

George Field - Snow Studies Assistant Telephone: 403-678-5508
Lloyd Gallagher - Alpine Specialist Telephone: 403-678-5508
Gavin More - Resource Specialist Telephone: 403-678-5508
Kananaskis Provincial Park Telephone: 403-591-7222
Bow Valley Provincial Park Telephone: 403-673-3663

Ski Areas

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

Attention: Brian Leighton

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

Attention: Simon Walker

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

Attention: Dave Aikens

Mt. Washington Ski Area
P.O. Box 3069
COURTENAY, B.C. V9N 5N3 Telephone: 604-338-1386

Whitewater Ski Society
Box 60 Telephone: 604-354-4944 (hill)
NELSON, B.C. V1L 2W3 Radio Telephone: N699424

Attention: T. Van Alstine

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

Attention: Ken Newington

Canadian Ski Patrol System

Brian Weightman
Avalanche Officer
C.S.P.S. Calgary Zone
2108 Home Road N.W.
CALGARY, ALBERTA T3B 1H7 Telephone: 403-286-7245

Peter Spear
National Avalanche Officer
117 Waskatenau Crescent
CALGARY, ALBERTA T3C 2X7 Telephone: 403-249-0055

George Evanoff
Pacific North Division-Avalanche Officer
1960 Garden Drive
PRINCE GEORGE, B.C. V2M 2V8 Telephone: 604-564-7814

Heli-Ski Operators

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

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

Klaus Fux
Canadian Mountain Holidays, Valemount
VALEMOUNT, B.C. V0E 2Z0 Telephone: 604-566-4487

Dominic Neuhaus
Canadian Mountain Holidays, Monashees
MICA CREEK, B.C. V0E 2L0 Telephone: 604-834-7223

Buck Corrigan
Canadian Mountain Holidays, Revelstoke
REVELSTOKE, B.C. V0E 2S0 Telephone: 604-837-2107

Colani Bezzola
Canadian Mountain Holidays,
Bobbie Burns
Box 827
GOLDEN, B.C. V0A 1H0 Telephone: 604-346-3366

Leo Grillmair
Canadian Mountain Holidays, Bugaboos
BANFF, ALBERTA TOL 0C0 Telephone: 604-346-3366

Ernst Salzgeber
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
BLUE RIVER, B.C. V0E 1J0 Telephone: 604-673-8344

BANFF, ALBERTA TOL 0C0 Telephone: 403-762-4171

2) SEARCH AND RESCUE

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

Dogs for Avalanche Search - Parks Canada

Alphie Burstrom Jasper National Park JASPER, ALBERTA TOE 1EO	Telephone:	403-852-6161 (Bus) 403-852-3555 (Res)
Gordon Peyto Glacier National Park REVELSTOKE, B.C. V0E 2S0	Telephone:	604-837-6274 (Bus) 604-344-5041 (Res)
Dale Portman Banff National Park LAKE LOUISE, ALBERTA TOL 1EO	Telephone:	403-522-3866 (Bus) 604-343-6494 (Res)
Scott Ward Banff National Park BANFF, ALBERTA	Telephone:	403-762-4506 (Bus) 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 (Bus) 604-858-4736 (Res)

Cranbrook Detachment

Cpl. Gordon Burns	Telephone:	604-489-3471

Cochrane, Alberta Detachment

Cpl. Gary McCormick	Telephone:	403-932-2211

Courtenay Detachment

Cpl. Ron Flack	Telephone:	604-338-7421

Kamloops Sub/Division

Cpl. Wayne Murphy	Telephone:	604-372-3111

Nanaimo Detachment

Cpl. Dale Marino	Telephone:	604-754-2345

Penticton Detachment

Cpl. Jim Brewin — Telephone: 604-492-4300 (Bus)
604-494-1687 (Res)

Prince George Detachment

Cst. Al Soneff — Telephone: 604-562-3371

Vernon Detachment

Cpl. Gary Gillette — 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.

Provincial Emergency Program

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

R.E. Neale, 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

Mr. W.C. Dalley (Claude)
(Bus) 2569 Kenworth Road
NANAIMO, B.C. V9T 4P7 — Telephone: 604-758-3951

(Res) 7946 North Wind Drive
LANTZVILLE, B.C. V0R 2H0 — Telephone: 604-390-4546

Lower Mainland

	Mr. F.G. Clegg (Frank)	Telephone: 604-584-6366 or
(Bus)	10334 152nd A Street	604-584-8822
	SURREY, B.C. V3R 7P8	(24 hour)
(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)	1600 3rd Avenue	604-565-6130
	PRINCE GEORGE, B.C. V2L 3G6	(after hours)
(Res)	753 Faulkner Crescent	
	PRINCE GEORGE, B.C. V2M 5E1	Telephone: 604-563-5531

Kootenay Region

	Vacant	Telephone: 604-352-2211
(Bus)	552 Stanley Street	604-352-2131
	NELSON, B.C. V1L 1N2	(24 hour)
(Res)		

Invermere

	Columbia Mountain Rescue Group	Telephone: 604-342-6042 (Res)
	A. Larson (Arnor), Co-ord.	604-342-9741 (Res)
	J. Hetherington, Deputy Co-ord.	
	Box 399	
	INVERMERE, B.C. V0A 1K0	

Southern Region

	M.E. Dyer (Murray)	Telephone: 604-374-9717
(Bus)	1259 Dalhousie Place	604-372-3213
	KAMLOOPS, B.C. V2C 5Z5	(24 hour)
(Res)	2478 Young Street	
	KAMLOOPS, B.C. V2B 4M8	Telephone: 604-376-3453

First Aid Ski Patrol

P.O. Box 2651
VANCOUVER, B.C. V6B 3W8

West Kootenay Rescue Group

Box 764
NELSON, B.C. V1L 5R4

To activate, call either:

Nelson R.C.M.P. Telephone: 604-352-3511

Dennis Herman Telephone: 604-357-2102

3) EDUCATION

Avalanche Centre, National Research Council

P. Schaerer
3904 West 4th Avenue
VANCOUVER, B.C. V6R 1P5 Telephone: 604-732-4829 (Bus)
604-987-3716 (Res)

Technical Information.

British Columbia Institute of Technology

N. Hawker
3700 Willingdon Avenue
VANCOUVER, B.C. V5G 3H2 Telephone: 604-732-8802 (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.

Avalanche Films

"Avalanche" - 50 minutes

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

"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
VANCOUVER, B.C. V6E 3C4 — Telephone: 604-666-0716/0718

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

Canadian Ski Patrol System

Brian Weightman
Avalanche Officer
C.S.P.S. Calgary Zone
2108 Home Road N.W.
CALGARY, ALBERTA T3B 1H7 — Telephone: 403-286-7245

Peter Spear
National Avalanche Officer
117 Waskatenau Crescent
CALGARY, ALBERTA T3C 2X7 — Telephone: 403-249-0055

George Evanoff
Pacific North Division-Avalanche Officer
1960 Garden Drive
PRINCE GEORGE, B.C. V2M 2V8 — Telephone: 604-564-7814

Kananaskis Country Region

Joel Christensen - Visitor Services — Telephone: 403-678-5508

Kananaskis Provincial Park
Ron Chamney (Film - Swept Away) — Telephone: 403-591-7222

Backcountry Avalanche Institute

Box 1050
CANMORE, ALBERTA T0L 0M0 — Telephone: 403-678-4102

Awareness courses.

5) WEATHER OFFICES

Atmospheric Environment Service

Correspondence and equipment:

Regional Director
1200 West 73rd Avenue
VANCOUVER, B.C. V6P 6G5 — Telephone: 604-732-4673

Mountain Weather Forecast -
Supervising Meteorologist — Telephone: 604-732-4298

Officer in Charge
Pacific Weather Centre
1200 West 73rd Avenue
VANCOUVER, B.C. V6P 6G5 — Telephone: 604-732-4163

Attention: Chief Meteorologist

Alberta Weather Office
Edmonton International Airport
EDMONTON, ALBERTA T5J 2T2 — Telephone: 403-955-8313
403-437-1250
(Admin. office)

LIST OF WEATHER OFFICES IN BRITISH COLUMBIA

October 9, 1984

OFFICE	TELEPHONE	OPEN HOURS (local time)
CASTLEGAR	604-365-3131	0630-1630
KAMLOOPS	604-376-0727	0700-1700
KELOWNA	604-765-6598	0445-0015
PENTICTON	604-492-0539	0700-1700
PORT HARDY	604-949-6559	0700-1700
PRINCE GEORGE	604-963-7552	0445-2115
REVELSTOKE	604-837-4164	0400-2200
TERRACE	604-635-3224	0710-1710
VANCOUVER	604-276-6109	24 HOURS
VICTORIA	604-656-3131	24 HOURS
PACIFIC WEATHER CENTRE	604-732-4298	24 HOURS

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

BANFF, ALBERTA	403-762-2088	0415-1715
WHITEHORSE, YUKON	403-668-2293	24 HOURS
ALBERTA WEATHER OFFICE	403-437-1825	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.