avalanche.ca

The journal of Canada's avalanche community

CELEBRATE!
40 YEARS OF TRAINING,
30 YEARS OF THE CAA,
20 YEARS OF INFOEX

TODAY'S TRANSCEIVERS
A COMMON-SENSE APPROACH
TO THE TECHNOLOGY DEBATE

WHICH OBS WHEN?
FOCUSING OBSERVATIONS FOR
BETTER DECISIONS

+ Sledhead Think Tanks, Avaluator Signs, Avalanche Apps, Yukon Gold Rush, and more!

Volume 96 Spring 2011
Cdn Publication #40830518

C·I·L / ORION

"Un Pas En Avant"
Stay a Step Ahead with Custom Avalanche Control Explosives

▲ CIL/Orion On-Site Technical Support

▲ Practitioner Friendly

▲ Safe Reliable Packaging

NOW AVAILABLE

The Snow Slugger 2 kg Avalauncher Bullet

Designed exclusively for Avalanche Control

Featuring:

- ▶ 2 kg highest energy explosives payload
- ▶ Properly aerodynamically engineered
- ▶ Extremely accurate
- ▶ Straight fins will not slow the booster
- ▶ Long-range capability
- ▶ Field-proven tail fin arming system
- ▶ CIL/Orion tail fins made in-house of polypropylene and nylon
- ▶ Bioremediation technology in the TNT
- ▶ Recco chip inside the booster, where it counts
- ▶ CIL tail fins work great with both Snow Sluggers and Stubby Snowlaunchers

When you request CIL/Orion products, you are supporting your industry!

3% of ALL PURCHASES go to the CANADIAN AVALANCHE ASSOCIATION for training purposes.

CONTACT: **David Sly 250.744.8765**
davidgsly@mapleleafpowder.com
www.mapleleafpowder.com

Banff Park Warden Earl Skjonsberg observes a snow profile at Mount Norquay, February, 1969. Photo: Peter Schaerer

Table of Contents

avalanche.ca
The journal of Canada's avalanche community
Volume 96 Spring 2011

Return undeliverable Canadian addresses,
change of address and subscription orders to:
Canadian Avalanche Association
PO Box 2759, Revelstoke, BC V0E 2S0
E-mail: publish@avalanche.ca
Publications Mail Agreement No. 40830518
Indexed in the Canadian Periodical Index ISSN 1911-5342

This journal is the official publication of the Canadian Avalanche Association (CAA), the Canadian Avalanche Centre (CAC) and the Canadian Avalanche Foundation (CAF). The CAA and CAC are non-profit societies based in Revelstoke, BC, serving as Canada's national organizations promoting avalanche safety. The CAF is a registered charity formed to provide a tax-deductible fundraising mechanism for the support of public avalanche safety initiatives. The CAF is based in Canmore, AB.

The goal of *avalanche.ca* is to keep readers current on avalanche-related events and issues in Canada. We foster knowledge transfer and informed debate by publishing submissions from our readers. Responsibility for content in articles submitted by our readers lies with the individual or organization producing that material. Submitted articles do not necessarily reflect the views or policies of the CAA, CAC or CAF.

We always welcome your opinions, teaching tips, photos, research papers, survival stories, new product announcements, product reviews, book reviews, historical tales, event listings, job openings, humourous anecdotes and, really, anything interesting about avalanches or those people involved with them. Help us share what you have. Please send submissions to:

Editor, *avalanche.ca*
Canadian Avalanche Association
PO Box 2759, Revelstoke, BC V0E 2S0
Tel: (250) 837-2435 Fax: (250) 837-4624
E-mail: editor@avalanche.ca

Editor	Mary Clayton
Layout & Design	Brent Strand

Content Deadlines: *avalanche.ca* is published quarterly. Material is due on the 15th of February, May, August and November for our spring, summer, fall and winter editions respectively.
Note: Digital contributions work best for us. For details, contact Brent Strand at bstrand@avalanche.ca.

CAA BOARD OF DIRECTORS

President	Phil Hein
Vice-President	Dave Smith
Secretary/Treasurer	Steve Brushey
Membership Committee Chair	Ken Bibby
Director for Professional Members	Mike Boissonneault
Director for Active Members	Debbie Ritchie
Director for Affiliate Members	Janice Johnson
Director for Associate Members	Aaron Beardmore

CAC BOARD OF DIRECTORS

President	Phil Hein
Vice-President	Dave Smith
Secretary/Treasurer	Steve Brushey
Membership Committee Chair	Ken Bibby
Director	Mike Boissonneault
Director	John Tweedy
Director for Supporters	David Zemrau
Director for Friends	Dan Markham

CAF BOARD OF DIRECTORS

President	Gordon Ritchie
Vice-President	Jack Bennetto
Secretary/Treasurer	Ken Little
Past President	Chris Stethem
Directors	
Keenan Cannady	David Thompson
John Hetherington	John Tweedy
Morgan Hincks	Kevin Williams
Colin Johnston	

COMMITTEES

Audit Committee

Steve Blake (Chair)	Bill Mark
Bruce Allen	Peter Schaerer
Jack Bennetto	Chris Stethem
John Hetherington	Niko Weis
Bruce Jamieson	

Education Committee

Marc Deschênes (Chair)	Sylvia Forest
John Buffery	Janice Johnson
Cam Campbell	Bob Sayer

Explosives Committee

Scott Aitken (Chair)	Joe Lammers
Jim Bay	Steve Morrison
Colani Bezzola	Bernie Protsch
Kyle Hale	Craig Sheppard
Dave Iles	

Information Technology Committee

OPEN (Chair)	Russ Peardon
Daniel Curry	Chris Pooley
Pascal Haegeli	Yves Richard
Alan Jones	Cora Shea

Membership Committee

Ken Bibby (Chair)	Tim Ricci
Mark Austin	Mike Rubenstein
Richard Miller	Johann Slam

Professionalism/Ethics Committee

John Hetherington (Chair)	George Field
Rupert Wedgwood (Co-Chair)	Brian Gould
Peter Amann	Ilya Storm

Technical Committee

Cam Campbell (Chair)	Bob Sayer
James Floyer	Rob Whelan
Bruce Jamieson	Doug Wilson
Dave McClung	

InfoEx Advisory Group

Brad Harrison (Chair)	Anton Horvath
Colani Bezzola	Karl Klassen
Steve Brushey	Niki LePage
Rowan Harper	Joshua Milligan
Phil Hein	Brian Webster

AST Committee

Mitch Sulkers (Chair)	Peter Kimmel
Matthew Atton	Monica Nissen
Scott Grady	Eric Vezeau

CAC Snowmobile Committee

Jason Smith (Chair)	Ray Mason
Les Auston	Deb Paynton
Chris Brookes	Carole Savage
Colin Burke	Shane Spencer
Jeremy Hanke	Joel Wasnidge
Al Hodgson	Amber Wood

Our vision:
To be a world leader in avalanche awareness, education and safety services.

2011 Celebrations

This is a special year for professional avalanche workers in Canada. In 2011 we celebrate three separate achievements: 40 years ago, the first industry training course was held; 30 years ago, the Canadian Avalanche Association was formed; and 20 years ago the Centre of the CAA opened in Revelstoke and InfoEx began.

In honour of these events, we asked Peter Schaerer to write a guest editorial for this issue. We are fortunate indeed to have access to our rich history through the eyes of someone who helped form it. Thank you, Peter.

The industry training program began with a five-day course in December 1971 at Rogers Pass under instructors Peter Schaerer, Fred Schleiss (head of avalanche control at Rogers Pass), and Willi Pfisterer (alpine specialist with Parks Canada). The 21 course participants represented mining, railways, national parks, ski areas, and ski guiding. Numerous and large avalanches in January-March 1972 enabled the course participants to apply their knowledge quickly and stimulated a further interest avalanche safety education. The demand was met with three courses in the following winter, and since then there has been only growth in the number and diversity of training courses. After the British Columbia Institute of Technology had administered the industry avalanche courses for several years, the CAA assumed the responsibility in 1989 and hired its first employee. This move was another milestone in the history of the Association.

The CAA arose from annual meetings of individuals responsible for avalanche safety in ski areas, national and provincial parks, highways, helicopter skiing and mountain guiding in Canada. The objective of the meetings was to exchange information about avalanche occurrences, accidents, and control measures in the preceding winters. Discussions among the approximately 30 participants soon revealed common problems that should be addressed in an organized body.

At a meeting in May 1981 in Banff, a steering committee was elected and given the task of preparing a constitution and by-laws of an association. The Canadian Avalanche Association was registered on 30 December with the Government of British Columbia. The initial members are astonished at the development of the association to its current size and the demand for services. They dreamed only of a permanent office staffed by one person.

In March 1991, the National Research Council of Canada discontinued its avalanche research program which had directed the industry training courses and had advised industries about avalanche hazards. Because the loss of services of the NRCC affected operations in avalanche areas, the president of the CAA Chris Stethem took the initiative of forming a Centre of the Canadian Avalanche Association at Revelstoke. The tasks of the Centre were to organize and administer the training program, to operate a daily exchange among industries about snow stabilities, to make available avalanche information to the public, and to serve the members of the Association. The Avalanche Centre with the information exchange opened formally on 5 October 1991 under the manager Alan Dennis.

The three events we celebrate in this year have the common trait of being responses to needs of industries, and were implemented by dedicated professionals who were active in operation. Avalanche accidents in the mining industry and in national parks pointed to the requirement for training; professional staff needed to solve common concerns through an association; and operations in avalanche areas depended on an exchange of information for assessing snow stabilities. The three accomplishments have not only been successful, but have enjoyed a healthy growth to the pride of the founders.

Peter Schaerer collection

John Kelly

CASE STUDIES IN PUBLIC SAFETY

What do avalanche safety and blood supply have in common? Comparing the Canadian Avalanche Centre to Canadian Blood Services

One of the most important tools for learning in the avalanche profession is the use of case studies. Mother Nature is relentless and continues to throw weather and climate conditions at us that challenge conventional thinking and decision making when it comes to avalanche work. Case studies provide the story about the exception to the rule and the warning for things to look out for. They are vital to our work.

Case studies are valuable in other environments as well, including business. When you think about it, business management and avalanche work are not that different. In our field we work with the variables of weather, snowpack and terrain to study and determine current and future snow stability and avalanche hazard, both short- and long-term trends. In business, managers work with people, local and global economies, governments, banks and others—highly volatile, multivariate environments that are challenging to evaluate and forecast. Sound familiar?

The future of the organizational relationship between the CAA and CAC has been a hot topic of discussion since last year's AGM. Right now, the board is busy preparing their report to you, in response to motions from the floor in both the CAA and CAC annual general meetings. As we determine our needs for future governance, I looked for a suitable case study and discovered the Canadian Blood Services (CBS).

The importance of a robust and consistent blood supply for Canadians may not be that dissimilar to the need for robust and consistent public avalanche safety infrastructure. A disclaimer, this article is not exhaustively researched. It is a compilation of work I've done online, with consultants and many good discussions with some fine people in a variety of positions this winter.

CBS is a not-for-profit charitable organization whose sole mission is to manage the blood and blood products supply for Canadians. CBS has its roots in a time when public confidence in Canada's blood supply

"...ARE INDUSTRY'S INTERESTS IN THE BEST INTERESTS OF PUBLIC AVALANCHE SAFETY?"

network was shaken. A group of stakeholders got together in 1998 and formed a not-for-profit, charitable society to take charge of the situation and established a robust infrastructure to manage Canada's blood supply.

Comparing it to the history of the CAC we find many similarities. In our case, it was the winter of 2003 that brought about a crisis of confidence in Canada's public avalanche safety infrastructure. A group of stakeholders got together and formed a not-for-profit society—the CAC, in 2004.

However, when we start examining the governance structures of the two societies, the similarities end. CBS is a not-for-profit charitable organization with a 13-member board, comprised of a cross-section of interests. In addition to the chair, two members represent consumer interests, six members represent medical, scientific, technical, business and public health interests, and four members represent regional interests across Canada.

Of the CAC's eight-member board, five are automatically appointed from the board of the CAA—the President, Vice-President, Secretary/Treasurer, Membership Committee Chair and the Director for Professional Members. One member represents the CAF, and two others represent each of the CAC membership categories of Supporters and Friends.

Clearly, CAC governance is dominated by industry interests. We know why the current system is in place; our entire public avalanche safety infrastructure is built on the professional avalanche sector's deep and historic commitment to public safety. But the question must be asked: are industry's interests in the best interests of public avalanche safety?

Another similarity between the two organizations is the geographic scope of each mandate. Just like blood supply, public avalanche safety is a national challenge. However, the CAC is firmly situated in the west. While our ties with Quebec, Newfoundland, Yukon and other jurisdictions in Canada dealing with public avalanche safety are growing and maturing, those regions have no representation at the board level.

Funding is another interesting comparison. The CBS has direct funding relationships with the federal government, provinces and territories to ensure the blood supply infrastructure is maintained and operating effectively. Their operating revenues don't stop there. They also have a comprehensive fundraising strategy with multiple levels of options—from individual donations to legacy giving, corporate sponsorship and charitable donation options.

The CAC shares many of these traits. We have direct funding relationships with federal and provincial governments, and we also have a comprehensive fundraising strategy. But again, this is where the CBS case study can shed some light on the CAC and perhaps help us improve into the future.

CBS is a very successful fundraiser with a tightly integrated fundraising strategy. This provides a very refined and tidy package for fundraising. The CAC is not a charity; that role is filled by the Canadian Avalanche Foundation (CAF). This shared approach to fundraising for public avalanche safety is not exactly tidy. There is overlap between the two organizations, and missed opportunities. Clearly, the future of the CAA and CAC also needs to consider the CAF and how to position all three organizations for mutual success down the road.

Interested in learning more about the Canadian Blood Services? Check out their very informative website, in both official languages, at www.blood.ca

Phil Hein collection

History Lesson

2011 marks a number of key milestones for the modern Canadian avalanche community, giving us a great opportunity to reflect upon these memorable decades. Periodically reviewing our collective history is a valuable exercise, marking the advances in knowledge and improved methods in better understanding the avalanche phenomena and associated human risk-management. This is our collective history, involving professionals, recreationists, mountain motorists, through to workers engaged in a mountain workplace.

Canada's avalanche history obviously goes waaay back, and the last century has both a rich and challenging history of humankind's increasing push into mountain terrain, where collision with the natural environment was inevitable and, on many occasions, tragic. Our so-called "modern" history begins with the establishment of the Trans-Canada highway through Rogers Pass in the early 1960s. The Rogers Pass Highway Project is a tremendous example of how a new era in research and analysis of

avalanche problems was established, as appropriate solutions were developed for this spectacular and challenging infrastructure project.

That project also created the foundation of human knowledge that has supported our country's avalanche community into modern times. A number of key individuals lead the way in that era and should be fondly remembered for their many contributions. Historical pioneers such as Noel Gardner, Peter Schaerer, Fred & Walter Schliess and Willi Pfisterer were the original mentors for many of Canada's current practitioners. This foundation has given rise to our industry's current key mentors—Chris Stethem, Clair Israelson, John Tweedy, to name just a few. We should also remember and reflect on the many contributions of numerous Swiss and Austrian mountain guides who also factored highly in Canada's modern development of a mountain safety culture.

There will be more written in future issues about the seminal events we are recognizing this spring—40 years of professional avalanche training, 30 years of the CAA, and 20 years of InfoEx. While we have much to celebrate in our achievements, we must also recognize that success comes with responsibilities. We have ongoing challenges that will require contributions from all of us in order to work out the most beneficial solutions.

Consider what brought us together as an association. Individuals dealing with avalanche management and safety were compelled by certain key needs and events over the years to organize an association. Together they improved the safety of their organizations, and the safety of the public, through open communication and coordinated efforts. These have always been key attributes of avalanche practitioners in Canada from day one—open communication and sharing of technical and experiential knowledge.

This year as we celebrate 30 years of the CAA, we should raise a glass to the foresight of those dedicated and sharing individuals, who put aside competition and self-interest for the greater good. It's amazing how far we've come in developing our individual and mutual understanding, and what has been accomplished as a community.

The CAA is unique in the world. Our professional training schools set a standard admired internationally. While InfoEx has been emulated by others (New Zealand for one) it continues to be a model for technical information sharing between professionals. This relies heavily on the benefits from the scope and breadth of our professional training programs and ongoing continuing professional development.

Where the CAA is truly unique is our role as key contributors to developing worker safety planning and ongoing oversight. CAA membership is named in provincial regulations; this is both a privilege and a profound responsibility. We are learning what it truly means to be looked upon as a professional, and to be recognized as a profession. Government regulators are looking to us for guidance, as the practitioners with the appropriate and well-developed body of knowledge and experience required for managing modern-day avalanche risk-management requirements. This position comes with obligations.

The CAA has a pressing need for members to define their scope of practice. What does it mean to be an avalanche worker in your sector? What's in your area of expertise, and what's outside? Land management and risk determination guidelines are basic minimum standards. Now they're in regulation, and applied across the full spectrum of work in the mountains in the winter. There are areas that need improving, and we all need to work together to ensure that these resources remain appropriate and effective in meeting the expected due diligence in today's professional world.

So please, be or get engaged in your association. Play a role in its governance, as an active member, committee member, or board member. Expectations from both within our organization and from society at large are increasing every day, and our expertise is required in many, many directions.

Think of those keen and dedicated folks 30 years ago, who had the foresight and the commitment to give of their time and expertise, and to join together in meeting and solving the many challenges that the Canadian mountain environment entails. Now it's our turn. Let's all contribute, so we can continue to celebrate our rich and productive history.

20/30/40

What a set of numbers! 2011 is certainly a year to celebrate in the avalanche industry, and this spring's AGM will be a good place to start. Our annual banquet will feature presentations highlighting our history—there are going to be some great stories told! We'll have more historical context in the next few issues of the journal. If you have memories to share, please feel free to submit an article or photos. Let's celebrate what's been accomplished!

Senior engineering and National Parks staff at the summit of Rogers Pass, April 1957.

Avalanche course at Sunshine Village, 1970.

Level 2 students observe fracture line profiles at Lake Louise, 14 January 1983.

Participants of the first Level 2 course on Whistler Mountain, 15 November 1974.

CAA/CAC Spring Conference 2011

This year's Continuing Professional Development topic is **Avalanche Search and Rescue in Canada**. This topic was chosen as a result of the feedback received in the recent member survey. Thanks again to those who responded. The session will include topics such as what we can learn from the European approach, case studies, medical triage and treatment, and transceiver issues. We look forward to seeing you at this year's CPD on May 4, 2011.

AGM Schedule (tentative). All locations at Penticton Ramada, unless otherwise specified.

Monday, May 2

8:00 - 10:00	ITP All instructors meeting
10:00 - 12:30	Level 1 instructors meeting
13:30 - 16:00	Level 2 instructors meeting
13:30 - 15:30	InfoEx Advisory Group meeting
16:00 - 18:30	Level 3 instructors meeting
18:00 - 19:00	New CAA members orientation
19:00 - 21:00	CAC Snowmobile Committee meeting
19:00 - 21:00	InfoEx Subscribers meeting
19:00 - 21:00	CAA Education Committee meeting

Tuesday, May 3

8:15 - 9:00	CAA Affiliate members meeting
8:15 - 9:00	CAA Associate members meeting
9:00 - 11:30	CAA AGM
12:00 - 13:00	CAF AGM
13:30 - 15:00	CAA AGM members only (voting)
15:00 - 17:00	CAA AGM
19:00 - 21:00	CAA Membership Committee meeting
19:00 - 21:00	CAA Explosives Committee meeting
19:00 - 21:00	CAC Snowmobile meeting (Part 1)

Wednesday, May 4

8:00 - 10:00	CAC Snowmobile meeting (Part 2)
8:00 - 10:00	CAC AST Instructors meeting
10:30 - 12:00	CAA CPD Seminar (Penticton Convention Centre)
13:30 - 16:00	CAA CPD Seminar (Penticton Convention Centre)
17:00 - 22:00	20/30/40 Anniversary Dinner and Awards (Penticton Convention Centre)
18:00 - 22:00	Tradeshow (Penticton Convention Centre)

Thursday, May 5

8:30 - 12:00	Case Studies & Research Presentations
12:00 - 13:00	CIL Orion luncheon
13:00 - 17:00	Case Studies & Research Presentations
18:00 - 21:00	CAA/CAC BOD dinner (TBD)
19:00 - 21:00	CAC Youth Education stakeholders meeting

Friday, May 6

8:30 - 12:00	Case Studies & Research Presentations

CAA's Membership Services

By Siobhan Quinn

CAA's Membership Services coordinator Siobhan Quinn presents a Marmot tent to professional member Tomoaki Fujimura, who won the draw for participating in the membership survey.

Brent Strand

The goal of the Membership Services position is to increase the satisfaction of members and to demonstrate to you the return on the investment of your time and annual dues paid to the association. From the feedback that has come my way in the last five months, the question that comes up again and again is "what do I get for my money?" To list the material benefits is easy; it's the intangible benefits that are harder to quantify.

Here are a few of the direct material benefits: access to the Members Only Section of the website, 10% discount on CAA store items, eligibility to use the CAA logo under license, eligibility to become a licensed AST provider and purchase liability insurance, the monthly member email, this quarterly journal, free admission to the AGM, a free booth at the Spring Conference, and InfoEx and Weather discounts for Associate Members.

The intangible benefits are not always as obvious to members, and yet a substantial amount of staff time is dedicated to them. A few of these are:

- Advocacy, representation and issue resolution with government, media and other organizations
- Representation in industry standards development
- Governance of the membership and its code of ethics and conflict resolution within the membership
- Standards maintenance within the industry through member audits of CPD points

The question of value brings me to my main area of focus, as I see that our communication of these benefits could be improved. Communicating with and understanding the needs of members are my most significant goals. In order to give members value for your money, we need to know what you need or want. To get that information, we started by asking you.

The membership survey you recently received by email and renewal notice is something we hope to continue in the future (see sidebar for more on the results of that survey). Two other methods of communicating are the monthly e-newsletter and the website. The newsletter will be revamped this summer and renewed for next season, with a focus on tighter messaging and improved layout. As always, the focus will be on current information, relevant to the membership and the industry. The website is there for the members and we will be updating it as often as possible. Our goal is to make it the number one go-to place for current information and resources.

In addition I have been reviewing and updating administration processes and policies, examining in particular the member renewal process and how we deal with members who are not in good standing. Also under the microscope is the new member application process, member re-instatement policy and how membership data is recorded and stored in our member database. We are working towards being more professional in our approach to keeping our member database current.

Like many things in life, the value you receive is directly proportional to your participation. Your association offers a huge potential for networking and increasing your profile within the industry. Have you submitted an article to the journal or written a letter to the editor? How about volunteering for a committee? Most importantly, have you exercised your right to vote at the AGM on how your membership dues are spent?

Two-way communication means just that—a dialogue between two parties. The staff of the CAA is committed to listening to members and creating value for membership dues. However, members also have a duty to meet staff on that communication highway and tell us what you need, want and value. This association is all about you! We are a member-driven association so help us steer. I'd like to leave you with the following: What are the top issues you are facing as a member and what could the CAA be doing to help you? I would love to hear from you in whatever manner works for you—email, phone, pop by the office or write me a note on a napkin and send it snail mail. We are here for you.

Siobhan Quinn takes care of Membership Services for the CAA

CAA Membership Survey

First, thank you to everyone who took the time to respond to the survey. We had 240 responses which, in survey land, is a very healthy outcome. Of course, we would love to see every member respond but we'll take what we can get.

A complete report of the survey results is on the Members Only section of the website, along with summaries of all the comments and recommendations. Overall, we were very pleased with the number of positive comments and the considerable support that we received from members in the open-ended questions. The suggestions for this spring's CPD seminar played an integral role in the final decision, so thank you for that!

Some responses indicate that a number of members feel they do not get value for their annual dues or that they don't know what that money is used for, so you can expect some more work to be done in that area. There were also concerns raised regarding the online dues payment, CPD tracker tool and email list. Those services will be reviewed thoroughly before we commit to further development.

There was also quite a lot of feedback regarding CAC services, such as the AST curriculum, snowmobile and youth outreach programs, and the public avalanche bulletin. This suggests that members are unclear on the different mandates of the CAC and CAA. From those who make the distinction, there was a feeling that some CAC services are not well aligned with those of CAA members, for example, how High or Extreme danger ratings can affect backcountry guiding or courses.

The goal of the survey was to get your feedback and in turn, use that information to effect positive change in your association. All relevant feedback has been forwarded to the appropriate staff member. Thank you again to all who took part.

How satisfied are you that the CAA is meeting your needs as a member?

	Response Percent	Response Count
Very Satisfied	32.1%	77
Satisfied	57.1%	137
Fairly satisfied	9.6%	23
Not satisfied	1.3%	3

Member Feedback

"Lordy! The CAA and CAC tire me out! Where do you get the energy? All these projects. The distance from the initial CAA inception is now measured in light years! I am humbled to be a member, and I am so proud to be a tiny part of it."
John Tweedy –Professional member

"Outstanding professionalism and concise information consistent with safety principles of the organization! Awesome people that guide the CAA!"
Russell Krasnuik – Active member

Great job!!! Seems like a lot of people are aware of the association and the good work it does and the standards it represents. I am stoked to be a member of the CAA, it outlines what I need to do in order to maintain certain standards, offers guidance for this and is a constant resource of awesome people, vast knowledge and experience and credible representation.
Mark Vesely – Professional member

John Weinel

Explosives Committee

An update and recognition for work well done

Comrades,

Let me take this opportunity to recognize your professional efforts as CAA Explosives Committee members over the past 18 months. Our successes with WorkSafeBC and pride at releasing a CAA Avalanche Control Blasting Instructional DVD are the result of your dedication and passion towards taming avalanches. The challenges thrown our way have run the range from routine to aggravating. All have been met with a professional demeanour of which all the CAA professional members can be proud. Our industry is thriving under close scrutiny and our accomplishments include:

- Acceptance by WorkSafeBC of CAA Content Guide for Writing Avalanche Control Blasting Procedures (available at avalanche.ca)
- Distribution of CAA Avalanche Control Blasting Instructional DVD (for sale at the online store)
- Updating of the CAA generic Explosive Use Procedures (online)
- Clarification of Transport Canada regulations, scope, and jurisdiction
- Consultation with industry partners on fall protection standards
- Sharing success in obtaining approval for WorkSafeBC explosive procedures

Executive Director Ian Tomm has been our champion all along, as have been our partners in the industries and governments we conduct business with and serve. CAA President Phil Hein knows of your dedication and all blasters appreciate it. This season has challenged us operationally on most of the Canadian terrain we choose to work in. The procedures this committee agonize over are the reference for workers tasked with avalanche control responsibility in demanding environments.

A sincere thanks to all of you on the Explosive Committee:

Jim Bay	Steve Morrison
Colani Bezzola	Bernie Protsch
Kyle Hale	Craig Sheppard
Dave Iles	Doug Wilson
Joe Lammers	

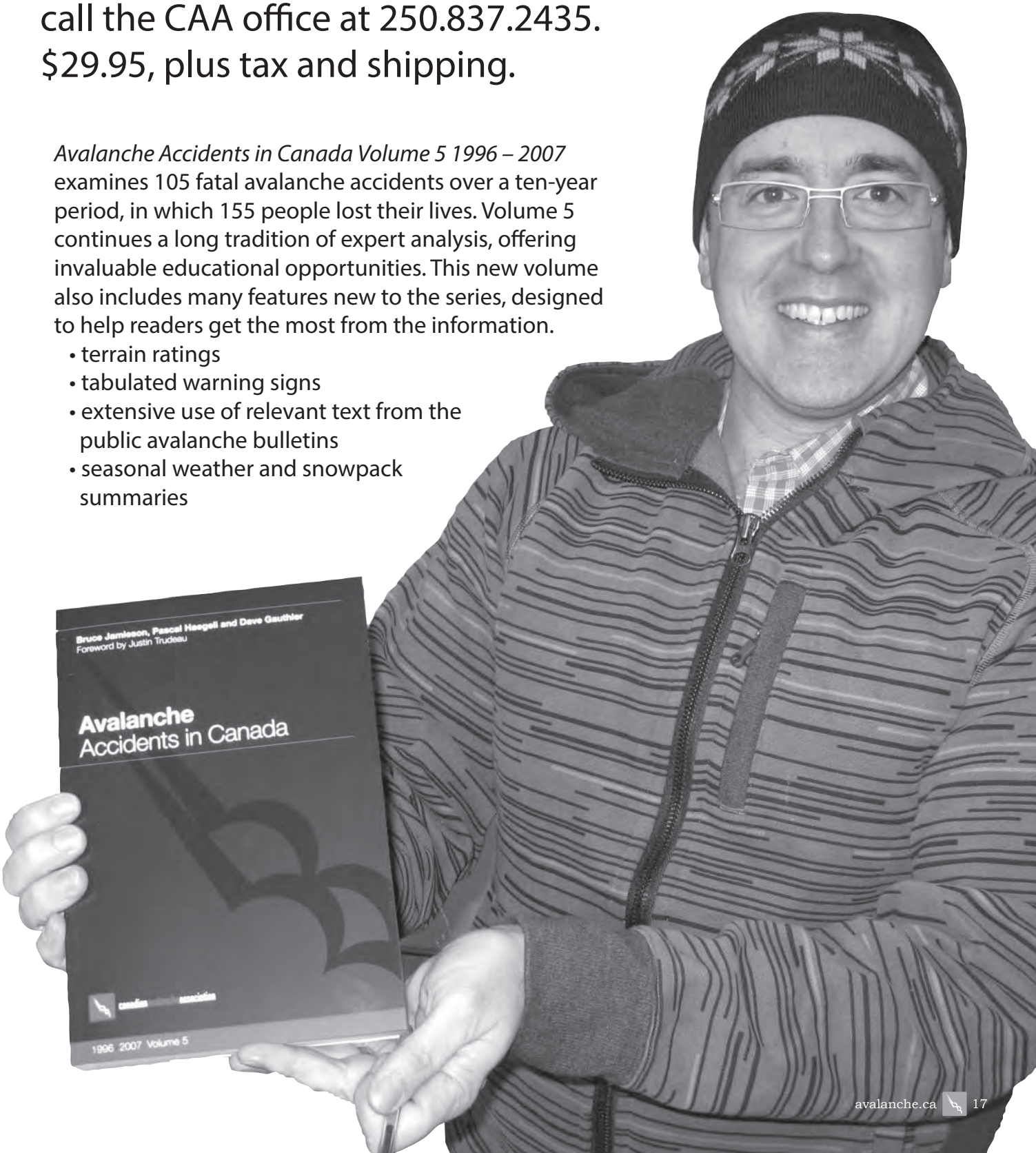
Stay safe
Scott Aitken
Chair CAA Explosives Committee

It's Here!

To order your copy of *Avalanche Accidents Volume 5*, call the CAA office at 250.837.2435. $29.95, plus tax and shipping.

Avalanche Accidents in Canada Volume 5 1996 – 2007 examines 105 fatal avalanche accidents over a ten-year period, in which 155 people lost their lives. Volume 5 continues a long tradition of expert analysis, offering invaluable educational opportunities. This new volume also includes many features new to the series, designed to help readers get the most from the information.

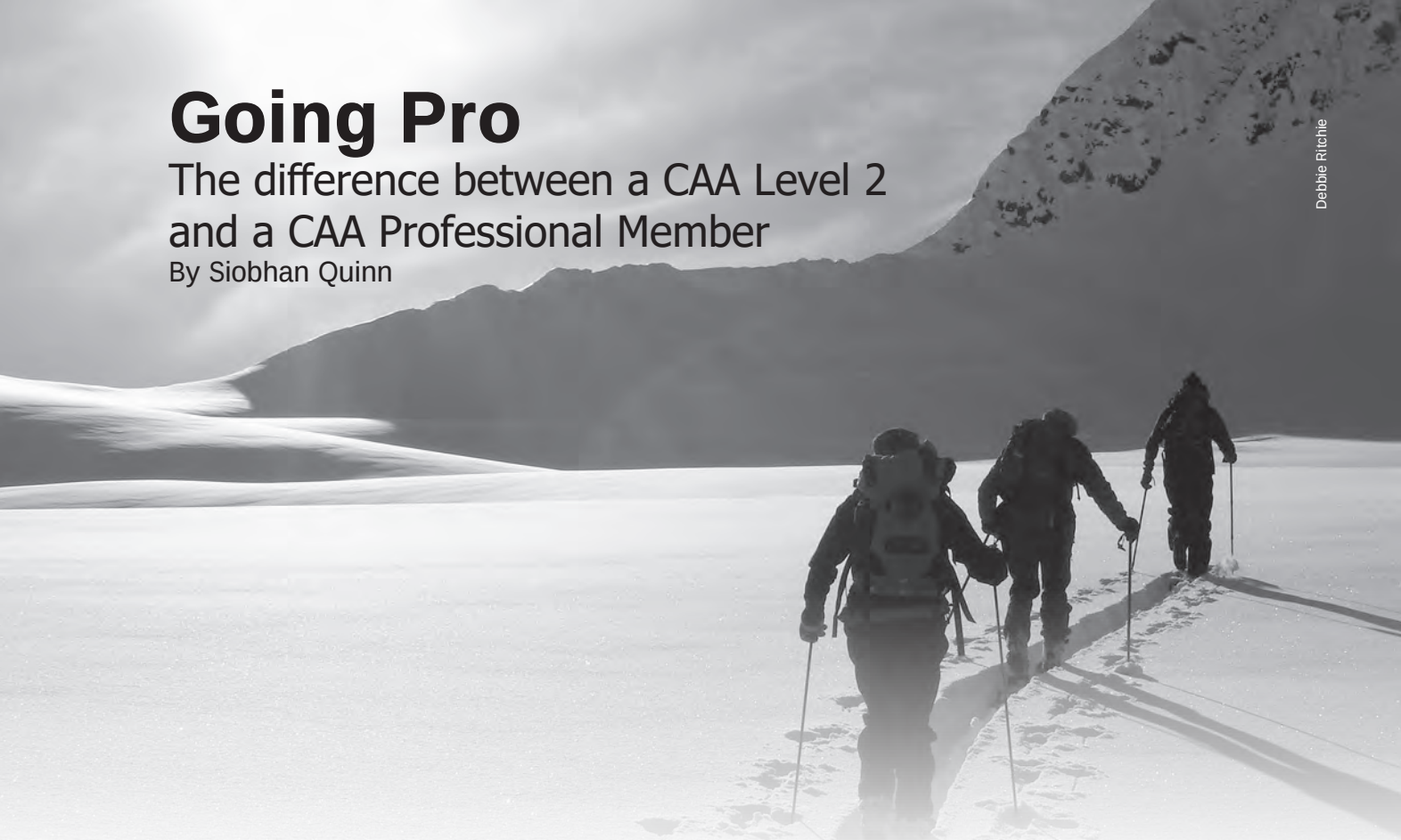
- terrain ratings
- tabulated warning signs
- extensive use of relevant text from the public avalanche bulletins
- seasonal weather and snowpack summaries



Going Pro

The difference between a CAA Level 2 and a CAA Professional Member

By Siobhan Quinn



Debbie Ritchie

An issue we deal with periodically at the CAA is explaining the difference between the Avalanche Operations Level 2 certification and professional membership in the CAA. There is a common misunderstanding, both within and outside the avalanche community, that the two are the same thing. Indeed they are not, and this short article is intended to help clarify the difference and explain why professional membership is so much more than the Level 2 program.

The CAA Avalanche Operations Level 2 course is internationally respected as one of the highest level professional training courses for frontline avalanche forecasters. Depending on the year, up to 20% of our Level 2 students are from other countries, coming from Iceland, Russia, Austria, New Zealand and the United States to participate in the program. When you consider the commitment that international students have to make to attend three separate courses over the course of one or two years, it's a strong testament to the program's quality and reputation.

Domestically, the CAA Level 2 has become the industry standard for anyone in a position of responsibility (forecaster, team leader, guide) in avalanche safety. While the course involves evaluation and a standard of competency, it is not equivalent to professional membership in the CAA.

Being a Professional Member of the CAA is much more than a course; it's a commitment of professionalism, to life-long learning and to the pursuit of excellence in their fields. Professional Members must fulfill annual requirements for Continuing Professional Development (focused on avalanche-related skills, knowledge and competency), adhere to a professional Code of Ethics, and respect the bylaws governing the association and its membership.

For graduates of the Level 2 program, there are no recurrent training requirements. However, this is a point of discussion as our governance review and organization renewal project continues. By contrast, first aid certificates expire after three years and CPR after only one, yet avalanche training has no expiry.

The expectation is that graduates of the Level 2 program who go on to work in the industry will become members of the CAA. However, that isn't always the case, and without CAA membership there are no checks and balances for ensuring currency in the profession. A Level 2 from 1981, 1991, or 2001 is not the same as a Level 2 taken in 2011. Content has change and standards have evolved. Think critically the next time someone says they have their Level 2; it's not the same as being a member of the CAA.

Avalanche work in Canada involves a wide variety of occupations—from avalanche forecasters to foresters, engineers to educators, mountain guides, researchers and wardens. The association has for a long time recognized other professionals (e.g., academics, engineers, foresters) with expertise that allows them to apply for and be granted Professional Membership in the CAA. While still voluntary for anyone whose work includes avalanche risk management, CAA professional membership has become the gold standard in Canada.

So, the next time you are reviewing a résumé, or talking to your co-workers about career development, professionalism and personal growth, think about membership in the CAA. It's not just training; it's a life-long commitment to excellence.

The CAA and the CAC wish to express a deep gratitude to Robert Kennedy and the law firm Farris, Vaughan, Wills & Murphy, for continued guidance and advice on many and various legal matters over the years.

Thank you

Ian Tonim

Thoughts for Japan

With great concern and sadness we watch the events unfold in Japan. In addition to the tsunami on March 11 that caused so much devastation and loss of life, on that same day two members of the Japan Avalanche Network (JAN) were killed in an avalanche accident, Ichikawa Masashi and Ishikawa Tetsuya. A third person, Hayashi Tetsuo, was also killed.

This year marks the 10th anniversary of CAA professional training in Japan. The CAA and JAN are strong partners and our hearts go out to all members of JAN for the loss of their friends and colleagues. We continue to be humbled by the scale of this disaster, and in awe of the resilience and dignity of the Japanese people. As this issue goes to press our thoughts are with our partners in Japan. We send our best wishes that the current crisis ends soon, with no more loss of life.


Ken Zasada

Sledder Level 1

The happy graduates and instructors of the CAA's Snowmobile Avalanche Operations Level 1, class of 2011, gather on the steps of the Glacier House Resort in Revelstoke. "The course was very intense," writes participant Ken Zasada. "It involved long days and challenged my abilities to learn new terminologies and techniques, and to work with new people. The instructors were good. Their different personalities and styles made for variation in the program and their different experiences made for a very informed data base to draw from. The guest help (Ian) was an inspiration with the enthusiasm he displayed and his excitement with riding a Polaris Dragon. If you need any type of endorsement for this course from a recreational rider, please feel free to contact me. This photo comes with a shining endorsement as you people at CAA did a stellar (no pun intended) job at putting together a program that I feel was a success."

"We were very pleased with the enthusiasm with which this course was received by the snowmobiling community," said Emily Grady, manager of the CAA's Industry Training Program. "It was sold out, with a wait list. We'll definitely schedule another one for next winter."

Every year, Nancy Geismar helps communities hold their Avalanche Awareness Days events. This year, she sent materials out to over 40 groups, one of them all the way to Corner Brook, Newfoundland!

Mary Clayton

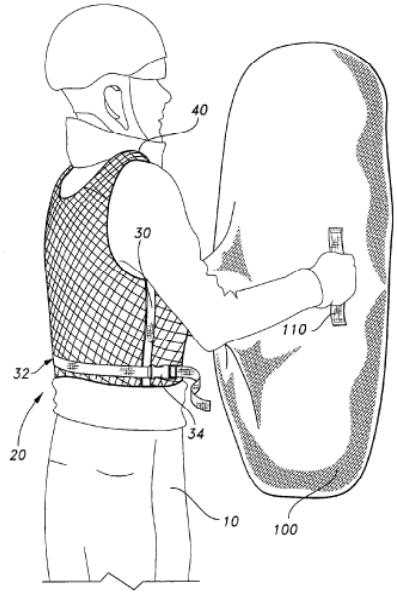
Avalanche Awareness Days

By Nancy Geismar

This year's Avalanche Awareness Days saw over 40 communities take part in a variety of ways. There were many "firsts" which was rewarding for the CAC. Six snowmobile clubs offered community events for the first time, including Crowfoot Mountain (north Shuswap), Eagle Valley (Sicamous), Swan City (Grande Prairie), Hunters Range (Enderby), VARDA (Valemount) and West Kootenay SnoGoers (Nelson). We also had the ski resorts of Silver Star in Vernon, Nakiska in Alberta's Kananskis Country and Kimberley join in the events for their first time over the weekend of Jan. 15-16. Two retail stores included Avalanche Awareness Days activities: Escape Route in Squamish and The Gear Hub in Fernie. And Newfoundland held its first ever Avalanche Awareness Days in Cornerbrook in early February.

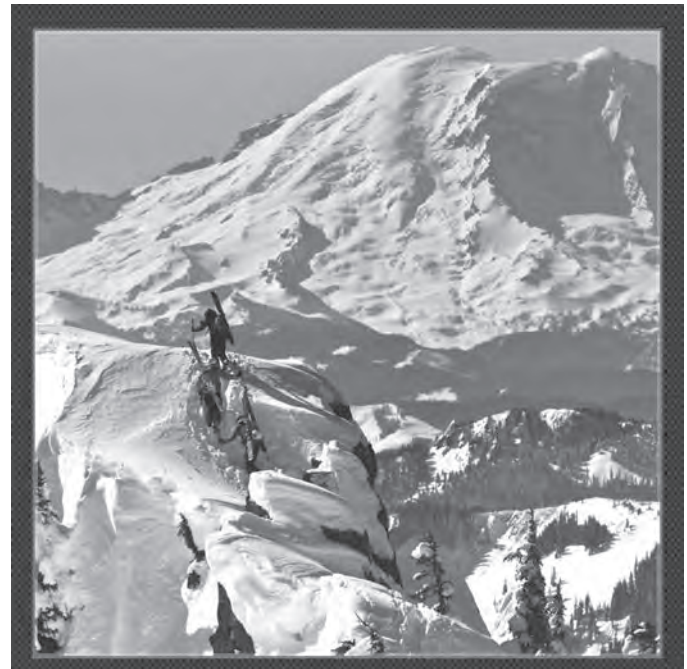
These community events have proven very successful in helping educate the public by having professionals teach beacon, probe and shovel techniques, having CARDA dogs and handlers perform mock rescues, demonstrating explosives techniques at some of the ski resorts. And setting up informational booths where the public can gather more information on avalanches, learn about the proper gear to carry, and how to get further avalanche training. Many of the venues hold fundraisers such as movie nights, speaker presentations, raffles and silent auctions which are fun and informational for the public as well as beneficial for the CAC.

In reading about avalanche survival techniques one idea kept popping up and that is to create a breathing space in front of the face and chest.



That's what I believe I have done in designing the Vest with Airbag (Canadian and US patents). So if the airbag doesn't keep you on top of the snow you'll have a space in front of you filled with breathable air as the bag deflates, where you can move your arms and hands to dig out. I would like to talk to interested investors or manufacturers about getting these into production. Philanthropists who would buy my patent(s) and place them in the public domain for anyone to make are especially encouraged. Please contact Bill at vestwithairbag@gmail.com.


RIGHT NOW THE VIEW IS SPECTACULAR.
Kokanee
GLACIER FRESH BEER
*TM/MC Columbia Brewery
IT'S ALL ABOUT NOW.



CAC Photo Gallery

Radio Waves

We tried something new this winter by recording public service announcements, also known as PSAs. These 30-second spots were written to deliver a strong, simple message about avalanche safety and preparation. They were recorded by Jeremy Hanke (left) who told his personal story of survival, and Buck Corrigan (right) who spoke from his viewpoint as a SAR Manager. Operations Manager John Kelly also recorded one focusing on CAC services. The radio spots ran throughout the winter on the Astral media radio network in central BC (Revelstoke, Golden and Invermere) and northern BC (Dawson Creek, Peace River).

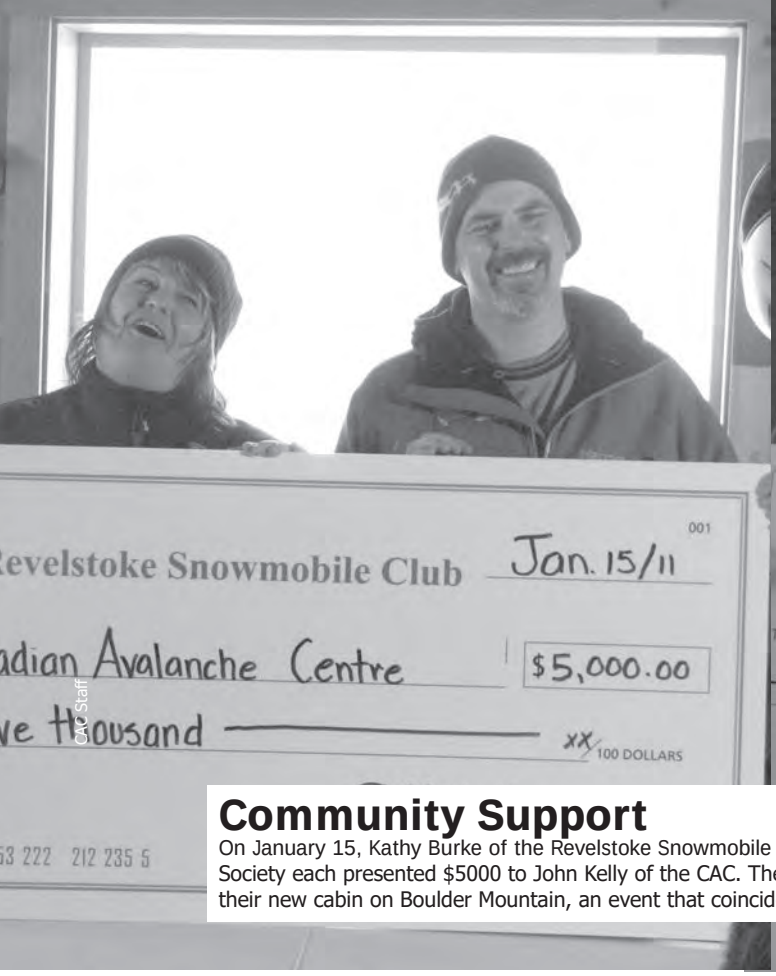
Mary Clayton

Mary Clayton

New Signs

New Avaluator signs, showing the terrain mapped with the Avalanche Terrain Exposure Scale, are cropping up in a variety of backcountry use areas across BC. The CAC's John Kelly poses in front of a kiosk at Paul Ridge in Garibaldi Park. Inset: Riders Bert and Joy Neish examine the terrain information at the Owlhead snowmobiling area, west of Revelstoke BC.

Cam Campbell



CAC Staff

CAC Staff

Community Support

On January 15, Kathy Burke of the Revelstoke Snowmobile Club and Angela Threatful of the Snowmobile Revelstoke Society each presented $5000 to John Kelly of the CAC. The snowmobile club was celebrating the official opening of their new cabin on Boulder Mountain, an event that coincided with the local Avalanche Awareness Days.

Sledder Outreach

Lori Zacaruk, Amber Wood, Tammy Stehr and Carole Savage staffed the CAC booth at the Prince George Snow Show in December, 2010. “This was a great opportunity to connect with the other vendors, tour operators, and snowmobile clubs to build face-to-face connections,” reports Lori.

DEATH REVIEW PANEL UPDATE

An update on the eight recommendations made to the CAC after the deadly winter of 2008-09

Scott Wickson

After the winter of 2008-09, when 19 snowmobilers were killed in avalanches, the BC Coroners Service convened a death review panel to examine the circumstances surrounding these accidents. Sixteen panel members were selected from a wide cross-section of stakeholder interests and subject matter experts. Following the review, the chairperson reported the panel's findings to the Chief Coroner, along with 15 recommendations respecting the prevention of similar deaths.

The report from the death review panel was published in January, 2010. Of the 15 recommendations, eight were directed to the CAC. Below is an update of what has been accomplished in each of those recommendations.

Recommendation # 3
To CAC and ICBC:

Develop avalanche awareness materials to be distributed, in partnership with ICBC, at point of registration of all snowmobiles purchased in BC.

- ICBC, through 30 Driver Service Centres, has delivered 2000 of the CAC's "Thrill is Gone" brochure as an appropriate introduction to the risks of mountain snowmobiling. ICBC has signalled they would like an increased amount of brochures for next season.

Recommendation #4
To CAC and the Government of Alberta:

It is recommended that the CAC partner with Service Alberta to distribute avalanche awareness materials at the point of registration of snowmobiles.

- Service Alberta has signalled a willingness to help distribute awareness materials. Discussions on logistics have not taken place at this time.

Recommendation #5
To the CAC:

Develop a Competency Matrix that clearly outlines qualification criteria and explains the limits of training offered through the AST programs.

- A new lesson plan targeting competency has been incorporated into the current AST 1 curriculum as a mandatory 30-minute session.

Recommendation #6
To the CAC:

Explore the need to either expand the current AST course component dealing with companion rescue or develop an additional course to specifically address companion rescue skills for recreationists.

- We have retained a subject matter expert and earmarked $5000 to deliver a course outline by March 31, 2011. We have engaged in two brainstorming sessions with AST providers to determine the course focus and the most effective instruction techniques. We will be proceeding over the summer with curriculum development, ready for implementation November 2011.

Recommendation #7
To the CAC:

The panel recommends that the CAC provide web feeds, such as RSS, in order to enable the public to receive updates on avalanche conditions reported through Special Public Avalanche Warnings.

- RSS feeds for Special Avalanche Warnings are part of the 2010-2011 CAC avalanche warning service.

Recommendation #11
To the Ministry of Tourism, Culture and the Arts, Ministry of Public Safety and Solicitor General, and the CAC, along with the Ministry of Transportation and Infrastructure:

Develop seasonal signage, with a message raising avalanche awareness, for highway routes leading to popular snowmobiling areas.

- Avalanche awareness signs were designed and developed by the CAC and MoTI over the winter of 2009-10. During the summer and fall of 2010, 23 signs were erected along highways in BC and Alberta.

Recommendation #13
To the integrated Land Management Bureau/GeoBC, the CAC and the Ministry of Tourism, Culture and the Arts:

Engage in a collaborative effort to provide the public with access to Avalanche Terrain Exposure Scale (ATES) information for popular snowmobiling areas.

- A pilot mapping project began in the summer of 2010, funded by MoTCA and managed by the CAC. Nine managed snowmobile areas have been assessed and mapped using the Avalanche Terrain Exposure Scale; signs with this information are now in production for all nine sites. Along with step-by-step instruction on how to assess the avalanche danger of their routes, users can easily see which sections of the riding area are simple, challenging or complex terrain. This project has also delivered a set of mapping tools, conceptual guidelines and a quality assurance framework to Sites & Trails BC, MNRO (formerly MoTCA) so that qualified terrain assessors can complete terrain assessments for 88 trail systems in 49 managed areas.

Recommendation #15
To Alberta Snowmobile Association, ABCSC, BCSF, BCCSOA, and CAC:

The panel recommends the above-listed organizations form a joint committee working towards establishing ongoing dialogue between the CAC and the organized segment of the snowmobiling community, raising avalanche awareness and cultivating a culture of avalanche safety within the snowmobiling community.

- The CAC established a snowmobiling committee in December of 2009, whose members include representatives from the above-listed organizations, as well as other stakeholders in snowmobile avalanche safety. See the following page for more on the CAC Sled Committee.

For a Safe Snowmobile Season

The following is an open letter issued by the CAC's Snowmobile Committee in January of this year:

The CAC Snowmobile Committee (SledCom) was formed by the Canadian Avalanche Centre in December 2009 in an effort to improve the dialogue between the CAC and representatives of the snowmobiling community. The committee is made up of 12 members from a wide variety of snowmobile-related backgrounds. What brings us, and you, together is a passion for snowmobiling in the mountains. We also share, as you should, a common goal of supporting the CAC in reversing the trend in preventable snowmobile avalanche deaths.

Our role is to serve in a constructive and proactive advisory role on issues relating to snowmobile outreach, training and educational initiatives. Skiers have naturally had a relationship with the CAC since its inception. Now we join them as equal partners. Together over the past year, we have worked in the best interests of the snowmobiling public by:

- developing a snowmobile stakeholder resource list for the CAC;
- offering recommendations for key safety messages to mountain sledders;
- building a future relationship between the CAC, snowmobile manufacturers, the Canadian Council of Snowmobile Organizations (CCSO) and the International Snowmobile Manufacturers Association (ISMA);
- making recommendations on the design of avalanche awareness signage for snowmobilers on major transportation corridors throughout BC and Alberta;
- participating in the Newfoundland Lifesaving Society's SledSmart DVD avalanche safety project;
- representing avalanche safety at trade shows;
- bringing the many voices of the various snowmobile associations of Alberta and BC to the table with respect to avalanche safety; and
- making recommendations for a CAC "Ten Commandments of Snowmobiling" presentation.

In early 2010, the BC Coroners Service published a report from a Death Review Panel convened to examine the avalanche deaths of snowmobilers in the winter of 2008 – 09. The 15th and final recommendation from that report was directed to the organized segment of the snowmobiling community and the CAC, suggesting we form a joint committee. Read that recommendation, and see why working together is so important.

When it comes to avalanche safety, all snowmobilers have a role to play. We have a duty to protect ourselves and our friends. Not only because we rely on each other when we ride, but in tribute to the survivors and families of victims from incidents such as Harvey Pass and Boulder Mountain. Snowmobilers have always stuck together; we ride in groups. We need to help each other, and pass on the messaging we get daily from CAC bulletins, incident reports, and our own observations. Here's to keeping us all safe this season.

CAC Supporter Members Everyone Makes a Difference

Each of these individuals and organizations has contributed $200 to the CAC. We thank them for their contribution and encourage you to support the businesses listed below. You too can become a CAC Supporter Member. Just click on "members" under the community tab on our home page and follow the links.

A.I. Mears, P.E., Inc.
ABC Snowmobile Clubs
Adanak Journeys Ltd.
Agostino Guarienti Ing
Alberta Snowmobile Association
Alpine Club of Canada
American Avalanche Association
American Avalanche Association
Apex Mountain Resort
Arcteryx Equipment Inc.
Austin Powder Ltd
Avalanche Pizza
Azimuth Solutions Inc.
Backcountry Access L.L.C.
Backcountry Mountain Training
Baldface Mountain Lodge
Baldwin, John
BC Snowmobile Federation
Bliss Oilfield, Inc.
Blue River Powder Packers
Calgary Board of Education
Cameron Plewes
Canadian Avalanche Foundation
Canadian Avalanche Rescue Dog Association
Canadian Mountain Holidays Inc.
Canadian Pacific Railway
Canadian Ski Guide Association
Canadian Ski Patrol System
Cariboo Helicopter Skiing Ltd.
Carleton Rescue Equipment
Castle Mountain Resort
Castlegar Snowmobile Association
Centre d'avalanche de la Haute-Gaspesie
Coast Range Heliskiing
Coquihalla Summit Snowmobile Club
Crowfoot Mountain Snowmobile Club
District of Elkford Search & Rescue Society
Donald Bissonnette & Deanne Brebner
Downer EDI Works Ltd.
Dr. Alan R. Milnes, Inc.
Duggan, Lori
Eagle Valley Snowmobile Club
Earth Fire Energy
East Kootenay Community Credit Union
Ecko Marine
Ecospirit Adventures
Farris, Vaughan, Wills & Murphy
Federation of Mountain Clubs of BC
Federation Quebecoise de la Montagne et de Lescalade
Fernie Wilderness Adventures
Gigliotti, Mike
Golden & District Search and Rescue
Golden Alpine Holidays
Halcol Construction, Ltd
Hunter's Range Snowmobile Association
Icelandic Meteorological Office
Infomagnetics Technologies Corporation
Iron Horse Racing
Island Lake Resort Group Inc.
Jeff Kowalenko
Justice Institute of BC
Kamloops Snowmobile Association
Kananaskis Country
Karavanier du Monde Inc.
Kelley's Sports International
Kicking Horse Mountain Resort
Last Frontier Heliskiing
Markham, Dan
Mid-Island Sno-Blazers Association
Mount Washington Ski Resort Ltd.
Mountain Equipment Co-op
Mt. Fernie Timberlodge
Mt. Remo Backcountry Society
Nelson Search and Rescue
Norseman Ski Club
Oso Negro Coffee
Panorama Mountain Village, Avalanche Protection Program
Parkland Cross Country Ski Club
Parks Canada Agency
Places Less Travelled Ltd.
Powder Creek Lodge
Powderquest Tours Inc.
Prestige Mountainside Resort
Princeton Ground Search and Rescue
Promet Environmental Group Ltd.
Recco Rescue System - North America
Recreation Outfitters Inc.
Red Shred's Bike and Board Shed
Resorts of the Canadian Rockies - Lake Louise Div.
Revelstoke Snowmobile Club
Revelstoke Snowmobile Club
ROAM - Rivers, Oceans and Mountains
Schultz Motorsports
SEAR Search & Rescue Equipment
Selkirk Backcountry Lodge
Selkirk College
Selkirk Tangiers Helicopter Skiing Ltd.
Selkirk Wilderness Skiing
Signaux Evan Signals Ltd.
Silver Star Mountain Resort
Ski Banff @ Norquay
Slocan Valley Snowmobile Association
Smithers Snowmobile Association
Snowline Associates Ltd.
Sportech Marketing Ltd.
Stanhope, Chris
Survival on Snow
Swiss North Marketing Corp
Technologie Alpine de Securite SA
Teck Coal
Tembec Industries Inc.
Track 'N Trail
University of Calgary Outdoor Program
Valemount Area Recreation Development Association
Valkyr Adventures
Waldroff, Sherry
West Kootenay SnoGoers
Whitewater Ski Resorts Ltd.

A Gala Evening for Avalanche Safety

Canadian Pacific hosts another successful fundraising gala

This year's CAF Calgary fundraiser was generously hosted by Canadian Pacific and Mark Seland, CP's General Manager of Corporate Communications and Public Affairs. Close to 200 people attended the sold-out reception, held in the Canadian Pacific Railway Pavilion. Guest speaker Malcolm Sangster, Rocky Mountain Sherpas' award winning film producer of "The Fine Line," took us behind the scenes to explain avalanche safety in big mountain films.

Guests enjoyed visiting three of the historic Royal Canadian Pacific business cars. These cars were built between 1916 and 1931 and have been beautifully re-finished and fully restored to their original splendour. They have been used to host royalty and numerous dignitaries and are still in active service today.

The evening raised over $50,000 to support the Foundation's mission of helping to reduce the number of avalanche-related injuries and fatalities in Canada. A very special thank you goes to Canadian Pacific and its employees, who did an outstanding job hosting the event.

Thanks to these donors to our silent auction:

- Canadian Mountain Holidays
- Chatter Creek
- Royal Canadian Pacific
- Revelstoke Mountain Resort
- Canadian Pacific
- Techno Sport
- Ridley`s Cycle
- Brad White
- Whistler Blackcomb
- Louise Olinger
- Eric Dumerac and Mountain Skills Academy
- Calgary Opera
- Janet Horbachio Photography
- Backcountry Access

Thanks to the following volunteers:

Peter Spear, Honourary CAF board member
Judy Breese
Elaine Balestra
Greg Cook
Alex Sinickas

Gord Ritchie collection

We're on the train again – Gala attendees and CAF board members climb aboard for another year.
Back row: Jack Bennetto (VP of the CAF), Brad White (Parks Canada), Keenan Cannady (CAF Board), Ian Tomm (Executive Director CAC and CAA), Kevin Williams (CAF Board), Peter Spear (CAF Honorary Director), Malcolm Sangster (Rocky Mountain Sherpas, guest speaker), and John Tweedy (CAF Board).
Front Row: Grant Statham (Parks Canada), Debbie Ritchie (CAA Board), Pattie Roozendaal (CAF Office Administrator), Morgan Hincks (CAF Board) and Gordon Ritchie (CAF President).

A special “thank you” to our corporate sponsors for their generous support.

CANADIAN PACIFIC
DRIVING THE DIGITAL RAILWAY

BMO Capital Markets

FirstEnergy CAPITAL

GIBSONS
GIBSON ENERGY

GOWLINGS

McDaniel & Associates Consultants Ltd.

RCR
Resorts of the Canadian Rockies
Experience the Ultimate

SKI CELLAR SNOWBOARD
YOUR FUN IS OUR OBSESSION!

Chevron Canada Donates

Chevron

CAF Board member Kevin William’s volunteer work with the Foundation attracted attention at Chevron Canada, where he works. A story was written in their employee newsletter, which was well received. As a result of the article, the company’s community relations group encouraged him to apply for an additional grant from the Chevron Employee Involvement Program.

He did apply and, as a result, the CAF received a grant of $900. “Your dedication of time and effort to the Foundation is outstanding and we are happy to be able to support your work in this way,” the committee wrote the grant has been used to pay for the printing of stickers advertising the “Behind the Lines” website and Facebook page. Congratulations Kevin and thank you to Chevron Canada!

John Cocci

Kyle Miller carving in the Gun Barrel chutes on McGill Shoulder.

Canuck Splitfest

A mid-winter gathering of splitboarders celebrates the sport, the snow, and safety

By Wade Galloway

Hoping for great mid-winter powder riding conditions, January 22-23, 2011 was chosen before the snow even started to fall as the date for the inaugural Canuck Splitfest in Rogers Pass, BC. Mother Nature delivered a tremendous amount of snow in the week leading up to the event, which proved to be a double-edged sword; riding conditions were epic, but avalanche hazards were menacing.

The event was an informal gathering with no participant fees or designated daytime activities. Participants were free to select terrain based upon their own avalanche training and experience levels. Parks Canada strove to ensure all participants were up to date with the latest and most accurate information available, and the CAC released a special public avalanche warning for the weekend in response to the unique conditions. The Canuck Splitfest and the special avalanche warning received national media attention, and was the lead story on CBC TV's National News.

While there was no formal registration for the event, approximately 70 to 80 splitboarders attended the event from as far away as California and Washington. New friendships were formed and old acquaintances were re-united. We enjoyed the camaraderie of those who opt to slide sideways down the mountain, and great powder was enjoyed by all. Most importantly, everyone had a great time while safely enjoying the backcountry.

Saturday evening's raffle featured donations from our variety of sponsors. Three lucky attendees competed in a race to change a splitboard over to ski mode and then back again. John Cocci of Seattle, WA was the fastest and won a brand new Prior splitboard of his choice. Matt McDonald of Vancouver was second and took home a Voile splitboard complete with Light Rail bindings. Adam Trom of Lethbridge, AB was third and won a Libtech snowboard.

Following the raffle were several slide show presentations. Revelstoke local Mark Hartley revealed some of his mind-blowing climbs and descents in Rogers Pass, and Kyle Miller wowed the crowd with his exploits in the remote ranges of Washington state.

All proceeds from the raffle (save for $200 for event insurance) have been donated to the Canadian Avalanche Foundation. On behalf of the greater splitboard community, the Canuck Splitfest attendees and sponsors, I'm proud to announce that $2,185 was raised.

John Cocci

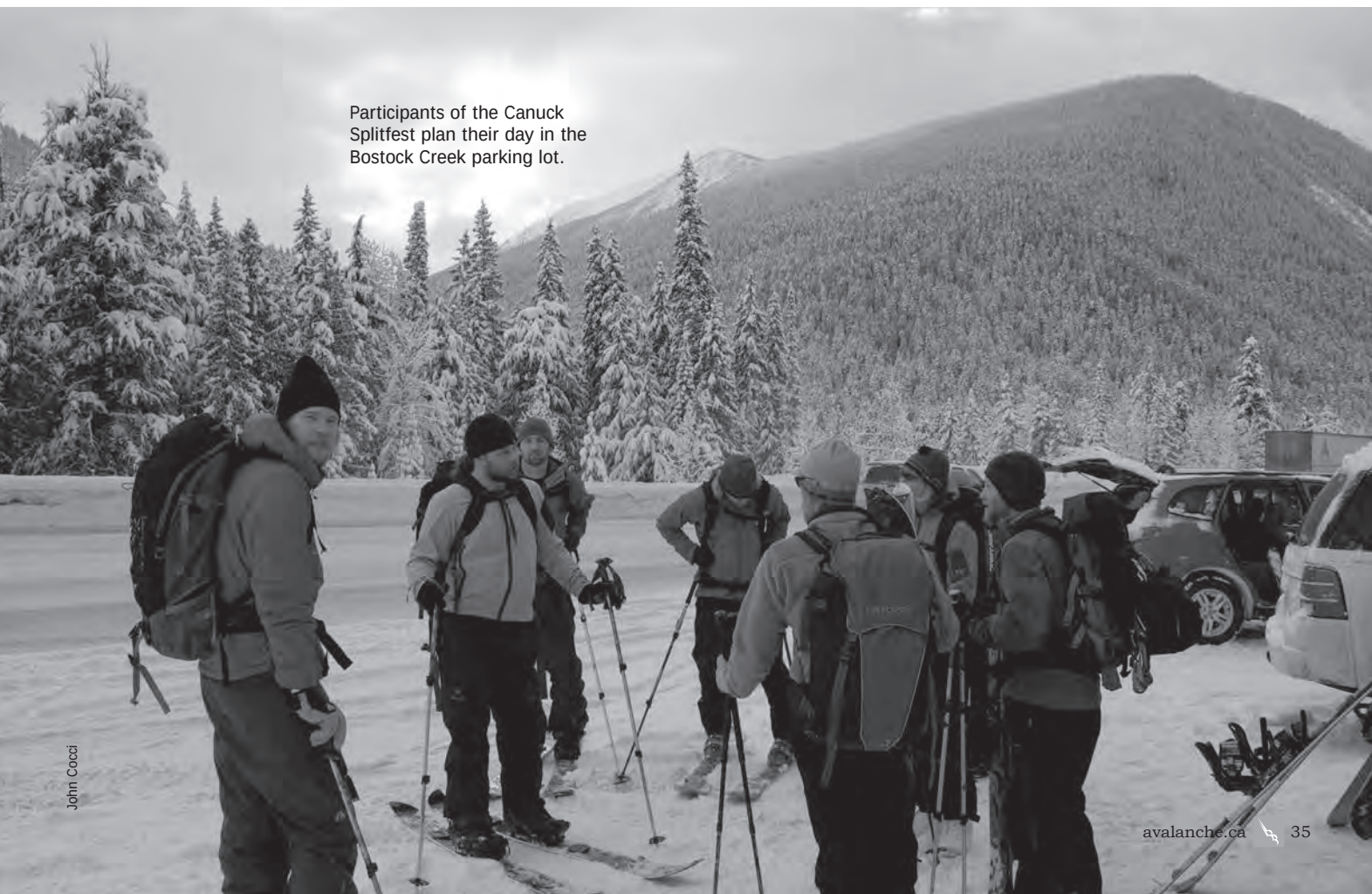
Matt McDonald came in second place in a race to change a splitboard over to ski mode and then back again.

I would like to thank all those who attended, presenting sponsor Prior Snowboards who also brought demo splitboards, all of the sponsors who donated product for the raffle, and the members of the Parks Canada team, including Bruce McMahon, Sylvia Forest, Rick Reynolds, Zuzana Driediger and many more, who worked behind the scenes to assist with the planning of the event and the presentations to attendees.

I would also like to express my gratitude to everyone at the Canadian Avalanche Centre and Canadian Avalanche Foundation, including Gordon Ritchie, Ian Tomm and Jennifer George for their assistance with the event; Greg Johnson for his enthusiasm and knowledgeable presentation; Mark Hartley and Kyle Miller for their slide show presentations; Matt McDonald for the weather forecast; Annie and the staff at the Glacier Park Lodge; MacKenzie Wilson for the Canuck Splitfest stickers; and the CBC for raising the profile of splitboarding to a national level.

We hope to make the Canuck Splitfest an annual event. In the mean time, take a look some of the following splitboard festivals: Echo Lake Splitparty, Scrubfest, Vancouver Island Backcountry Fest, or the Mt Baker Splitboard Festival. Maybe you can even think about organising your own. Keep your skins warm and may all your turns be powder.

Wade Galloway was the organizer of the Canuck Splitfest



Participants of the Canuck Splitfest plan their day in the Bostock Creek parking lot.

John Cocci

An Invitation to Ride

The Association of BC Snowmobile Clubs hosts a media day to demonstrate responsible riding

The idea had been brewing for quite a while in Al Hodgson's head. He was tired of the one-note image of sledders so commonly portrayed in the media. "Snowmobiling is a significant economic driver of the province's economy," he explains. "There has been tremendous growth in mountain sledding and I wanted to demonstrate how most riders enjoy the backcountry—safely and respectfully."

Al is the president of the Association of BC Snowmobile Clubs (ABCSC), and has played a lead role in bringing avalanche safety to the forefront in his community. He wanted to bring attention to the remarkable gains made in education and awareness, so he organized a media day, inviting select members of the media to come snowmobiling for the day to see how the sport really works.

The date was set for January 12. The Eagle Valley Snowmobile Club of Sicamous BC, was the host, providing snowmobiles, helmets, safety gear, and guided access to the Blue Lake Recreational Snowmobile Area. The Best Western Inn of Sicamous helped out with accommodation and meals. CAC Executive Director Ian Tomm and Operations Manager John Kelly were part of the day, along with avalanche survivor Jeremy Hanke.

Media responded quickly and Al soon had the maximum number of riders he could handle. Unfortunately, the weather leading up to and during January 12 was less than ideal for traveling and a number of reporters had to decline at the last moment. Nonetheless, the day went well for the smaller number of media in attendance and the sport received some good coverage thanks to ABCSC's initiative.

"This was a really good opportunity to show snowmobiling as it really is," said Ian Tomm. "The majority of snowmobilers ride with care and attention to safety. We were happy to help demonstrate that avalanche awareness is an integral part of this sport for most riders."

Reporters unloading their gear at the Blue Lake Recreational Snowmobile Area.

John Kelly

Bruce Moores, President of the Eagle Valley Snowmobile Club, presents a cheque to Ian Tomm of the CAC, while Al Hodgson (left, President of the Association of BC Snowmobile Clubs) and Tim Corless (President, Eagle Valley Snowmobile Grooming Society) look on. Both the Eagle Valley club and grooming society made donations to the CAC that day.

John Kelly

Search! | Part 9: The Instructors

By Jay Pugh

Training an avalanche dog requires a huge commitment from the handler, who must be dedicated, passionate and open-minded in order to filter a vast amount of information into what is best for their dog. A lot is expected of CARDA members, but they must also be able to take direction and look to CARDA for guidance. The instructor core of CARDA is made up of two different groups: professional dog handlers from the RCMP and Parks Canada, and handlers from CARDA. This strong combination provides the best possible instruction.

CARDA is privileged to have a close working relationship with the RCMP. One of the many advantages is the yearly provision of several active members of the Canine Division to act as CARDA instructors, bringing bring both the benefits of their own training and invaluable day-to-day real experience. These RCMP handlers spend countless hours working their dogs in different profiles and have a true understanding of the applications of their teachings. They are qualified by the RCMP in avalanche response and come from districts in or adjacent to the mountains.

Some CARDA handlers see instructing as the final stage of their own training. Experienced instructors from within CARDA bring specific mountain skills to the table. They understand the intricacies of the mountain environment, particularly avalanches. Most know the old adage that to truly learn something is to teach it. This is very true in the rescue canine field, as instructors now learn through interactions with every dog they work with as opposed to just their own.

Joining the instructor cadre is a rigorous process. Interested and eligible handlers express their interest to the coordinator who, with the consent of the cadre, assigns the prospective instructor to apprentice under a senior instructor. After a full course as an apprentice, the handler is evaluated and may be accepted as a junior instructor. Depending on demographics, there may also be several years spent with a more senior member to gain valuable insight and experience.

A prospective instructor must have handled at least one dog through its working life. Knowing the level of commitment required and frustrations involved with training is key. However, a good senior handler may not necessarily make a good instructor. There

The author and his dog Laddie doing a probe search demonstration in Whistler.

Zuzana Driedeger

are many different approaches to dog training, and many different types of students. A successful instructor has the ability to put ego aside and find the best solution for the team, and is able to relate to both students and peers. Instructors are part of a group that constantly works together, discussing challenges and soliciting advice from each other. There is no room or time for heated debates or unprofessionalism, even when opinions are strong.

The winter course includes three levels of instruction: puppy, intermediate and advanced. Each level is divided into groups depending on student numbers, but we hope for four student teams and an RCMP and CARDA instructor in each group. Past instalments of this column have described each level of instruction, which all have their own specific challenges. These are met not only by the talents of individual instructors, but also by the whole instructor group. Instructors meet every day of the course to discuss each team—who may be ready for validation attempts, and who may be struggling. As stated before, opinions are solicited for solutions and a best course of action is implemented. In rare cases, a student may be moved from one group to another. The exchange of ideas and experience is one of the true strengths of the program.

Challenges come in two forms: problems with the dog or with the handler. Again, much of this has been discussed previously. Dog problems can be difficult to overcome, but fortunately a dog lacks an ego and does not have its own ideas of what should be done. Instructors must find the balance between consistently approaching a problem (doing it over and over until the team gets it) and recognizing when something is not working and implementing change. This is not an easy task to achieve in only five days.

Instructors sometimes have to find a way to re-motivate a student who is not successful on their initial validation attempt. CARDA, like other outdoor professions, is filled with highly motivated, goal-oriented individuals. A common statement heard after an unsuccessful attempt is "this is the first time I haven't got what I wanted." Getting the handler past the disappointment can be a challenge, especially if they have rarely dealt with failure. In almost every case, once the frustration spike is gone the handler learns from the experience and moves on to success.

The worst part of an instructor's job when they recognize that a team will not become validated. This does happen and is hard on everyone. The main question instructors ask before "scrubbing" a team is whether every chance has been given to succeed. While this is emotionally difficult for an instructor to admit, it is better than pushing an unsuitable team into a life and death situation.

Speaking personally, I am proud and honoured to work with my fellow instructors. The level of commitment from everyone involved from RCMP/Parks Canada and CARDA is humbling. The RCMP members have given CARDA their all, with enthusiasm and openness. I can honestly say that each instructor is dedicated to the success of every team they work with. We rejoice with our students' success and hold ourselves accountable for their failures. Every team teaches us something and the reward is the fulfillment felt when past students become operational. If there is one telling thing that summarizes the character of my fellow instructors, it is that not one of them has ever first asked how much it pays.

Zuzana Driedeger

Tim Boal, Tania Halik with her dog Solo, and Dave Woods. This was at the Blackcomb heli hangar during pre-Olympic HETS training.

Kim Kennedy gets Bree fired up to search.

CARDA

Terms used by CARDA

RCMP Instructor • An active member of the Canine Division of the RCMP. They are certified in the avalanche profile and bring exceptional dog skills to the course.

Parks Canada Handler • Search and Rescue Doghandlers from Jasper and Banff National Park. Have both advanced back-country skills and are trained by the RCMP with RCMP dogs. Usually used as advanced instructors.

CARDA Instructor • An experienced CARDA handler with teaching skills. Brings specific training and experience to the table.

Approaches • The styles of teaching used in CARDA layman terms.

Pat on the Back • Reassurance to the student that they are doing things right. Primarily used to raise self-confidence.

Facilitation • Providing a student with what they need, especially experienced handlers that know the process and what their dog specifically needs.

Instructor Co-ordinator • Responsible for the recruitment and training of new instructors, organization and selection of instructor cadre for spring and winter courses, co-ordination with RCMP, management of instructor meetings and division of student body into groups. Easily recognized by rapid greying hair.

Drill Sgt. • Speaks for itself. Used primarily to ensure the instructor is being heard.

Scrubbed • A team permanently removed from the program.

This is the coolest thing I have ever done • A statement made by a student who, among other things, had climbed Mt. Everest. Sums up what instructors get out of teaching.

Northern Exposure

With backcountry use on the rise, the Yukon Avalanche Association hopes to build better public avalanche safety programs in the north

By Kirstie Simpson

Unlike most of the other mountainous regions of BC, Alberta and Quebec, there is currently no public avalanche forecasting program in the Yukon. The fact that these avalanche risk management services are the standard across Canada has raised the expectation that the Yukon and adjacent areas of Northern BC should also have these basic services.

Winter backcountry usage is steadily increasing in the Yukon and users are accessing higher-risk terrain. There have been six avalanche fatalities in the region over the past 20 twenty years. Serious avalanche incidents, including full and partial burials and serious injuries, as well as the fatalities, have occurred across the region and have involved a wide range of users. Based on local knowledge sharing, discussions with the snowmobile community, public contributions to the CAC discussion board and targeted information gathering, it has been determined that on average, there are 10 potentially serious avalanche accidents per year.

To respond to this need, the Yukon Avalanche Association (YAA) was established in the spring of 2010 as a Yukon-based, non-profit, non-government society. Our primary purpose is to promote avalanche safety and education for winter backcountry users in order to reduce avalanche related deaths and injuries. The YAA is dedicated to developing a self-sustaining avalanche safety capacity in the north, including coordination of public avalanche safety programs, forecasts and avalanche safety warnings, delivery of avalanche awareness and education in partnership with others (Canadian Avalanche Centre, Parks Canada, Canadian Ski Patrol System, Yukon public school system) and serving as the point of contact for public, private and government avalanche information.

The Yukon Avalanche Forecasting and Education Initiative is a proposed project currently being considered for funding from the National Search and Rescue Secretariat's New Initiatives Fund. This project is in support of public lands within the Yukon and the commonly used BC border area. The initiative includes:

- Developing and delivering public avalanche forecasts/bulletins and Special Avalanche Warnings (SPAWs) for the mountainous regions of the Yukon and adjacent parts of BC—an area used primarily by Yukoners.
- Conducting avalanche terrain mapping of high-use backcountry areas using the Avalanche Terrain Exposure Scale (ATES) developed by Parks Canada and making the terrain maps easily available and accessible to the public and key user groups.
- Developing and delivering a broad-based, multi-media awareness and targeted outreach and education campaign to educate individuals and organizations on the assessment of avalanche risks and the importance of acquiring and using the knowledge, skills and equipment needed to minimize injury and/or loss of life.

Based on the success of our NSS funding application, avalanche forecasting in the Yukon could start as early as January 2012. Stay tuned!

Kirstie Simpson is the President of the Yukon Avalanche Association

Yukon Avalanche Association

GOLD RUSH!

Once again, the Yukon lures gold hunters–but there's a risk to those riches

By Kirstie Simpson

Matthias Bindig

The buzz of helicopters, the influx of young men into town—what the heck is going on? Over $1400 an ounce for gold is what's going on!

The last gold rush in the Klondike gold fields of the Yukon and the last time that mineral staking was a winter activity was from 1896 to 1899. During that time there were 17,000 placer gold claims staked. Between January 1, 2010 and January 1, 2011, 78,963 quartz gold claims were staked in the Yukon and by earlier this winter there were over 162,000 quartz gold claims in good standing in the territory. This year's exploration expenditures are likely to exceed last year's expenditures of $160 million.

So why is this relevant to avalanche safety? It's relevant because in the Yukon, mineral staking is still done by crews on the ground with helicopter support. We have a "free entry system"—unique to the three northern territories and northern Alberta—that encourages self-initiated prospecting to acquire the rights to crown minerals. Most of Canada, including BC, uses map-based staking. Currently, many companies are competing with each other for the ground—with lots of hype. This doesn't happen with map staking where one company can tie up a significant amount of ground by itself.

There are upwards of 200 exploration companies operating in the Yukon right now with an incredible number of helicopters supporting them, and this winter staking crews are out in the field en masse. The faster you can move over the landscape and the more claims you can stake in a given day, the more money you earn. Basically, every young man over the

Placer gold: gold found in deposits of sand or gravel in the bed of a river or lake

Quartz gold: gold found underground in quartz veins

age of 18 who can get out there and stake is doing so, either independently or as part of a crew. It's a perfect storm—young men eager to get out into the winter backcountry, a free entry system and the price of gold.

In the Yukon, gold exploration and avalanches have some shared history. On Palm Sunday of 1898 an avalanche killed upwards of 80 "stampeders" as they were travelling over the Chilkoot Pass on their way to the gold fields of the Klondike. Although it's not uncommon for staking crews to initiate avalanches, it took a very close call last year with the full burial of a staker to wake folks up to the hazards of modern winter staking.

In the fall of 2010 exploration companies began requesting avalanche courses specifically designed for their industry and since then crews from across the Yukon and the NWT have participated. These guys travel alone, with three to five others within helicopter distance so the message for the course is terrain, terrain and terrain. Terrain needs to be carefully managed in the planning of field programs, the finalising of staking lines the night before crews are in the field and in the helicopter as lines are flown before dropping off the crews for the day.

Course material includes the limits and rules of claim staking under the quartz mining legislation, risk management based on understanding the terrain, recognising signs of instability, and the use of the Avaluator decision tool. We are now working with the Northern Safety Network Yukon and the Yukon Workers' Compensation Health and Safety Board to create a standard training module for the industry.

McJury/Library and Archives Canada/C-26413

Yukon Archives

SLEDHEAD THINK TANKS

Discussion series for mountain riders brings experience and education to an eager audience

By Joni Krats

Jeremy Hanke spoke candidly about his own experience in an avalanche.

Dan Savage

Jeremy Hanke tells a compelling story. Six years ago, he and his friends were parked at the bottom of a slide path when a rider from another group triggered an avalanche above them. It took 10 minutes for Jeremy's friends to get him out of his 2 metre burial. One young man in the other group wasn't so lucky.

Jeremy told that story as the keynote speaker for the Sledhead Think Tanks, a series of four events held over two weekends in January in Fernie, Sparwood, Elkford and Blairmore. Hosted by Teck Resources, a major employer in the area, and supported by the CAC, College of the Rockies, SnoRiders magazine and Zac's Tracks, the events brought riders and snow safety experts together in a collaborative and constructive setting.

"Jeremy was excellent," said Joni Krats of Teck. "His story is crafted into a powerful tool that delivers a message about personal accountability and consequence. Having that conveyed by a fellow snowmobiler has been key to making this message palatable and welcome. During the talking circle, many members of the crowd expressed gratitude to Jeremy for opening up and becoming an active ambassador for snow safety."

CAC Public Avalanche Forecaster Ilya Storm gave presentations on local terrain and shared his knowledge on how to assess conditions. "Ilya's approach and tone were spot on," said Krats. "His technical analysis gave the sled community a welcome taste of knowledge and the crowd thanked him for providing useful information without any condemnation or judgment. They were completely open to him, sitting forward in their seats and eager to learn more."

Ilya was especially well received in Sparwood, where it was important to work sensitively. A survivor of the Harvey Pass accident was in attendance, as well as people who had participated in the body recovery. "Those men were visibly moved," Krats reported. "One man told Ilya nobody had spoken to them in that way before. He said that usually workshop presenters come in to put down the local sledding community, but Ilya was just telling them things they needed to know. It was a beautiful moment. The trust and warmth growing between the CAC and our local sledding community was palpable."

Clayton Podrasky, superintendent at Teck's Line Creek Mine, led the group through an exercise usually reserved for mine operations. He mapped out the network of people immediately impacted by the result of a bad decision, such as family and friends, sending a message of the consequences. "When you're out there, you have to realize that if you hurt yourself, you are affecting all the other people who are closest to you," said Podrasky.

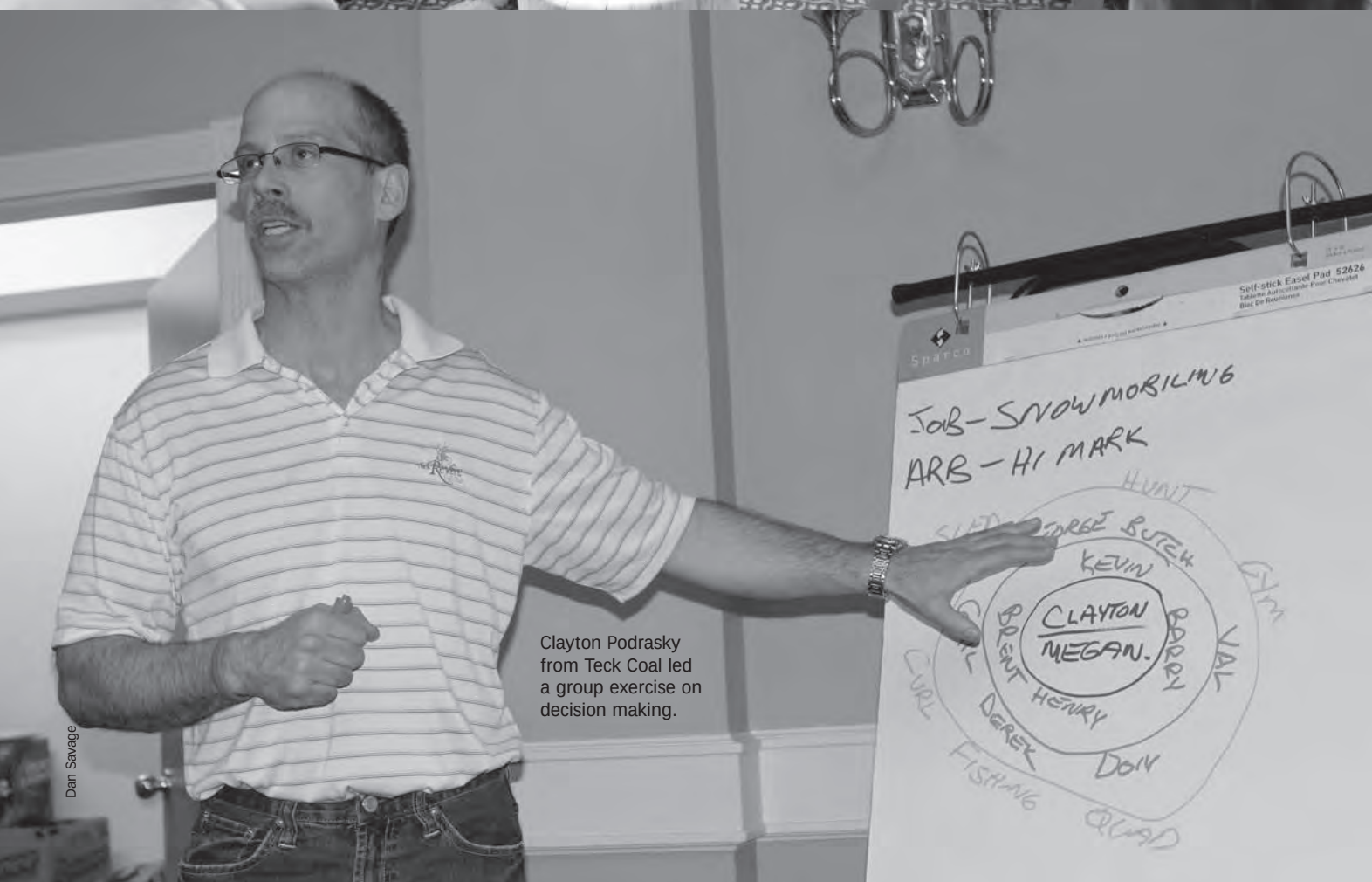
The events also featured safety gear from local businesses, and advice on helicopter evacuation. Each evening ended with an open discussion that included the importance of group dynamics and the need for knowledge, training and awareness.

"The Sledhead Think Tanks were a community-centred initiative," said Nic Milligan, Manager of Government and Community Relations for Teck. "The care and value invested in the Sledhead Think Tank demonstrates Teck's passionate commitment to health and safety in our communities."

Joni Krats is the Communications Coordinator for Teck Coal Limited

Dan Savage

CAC Public Avalanche Forecaster Ilya Storm gave a well-received presentation on choosing terrain.



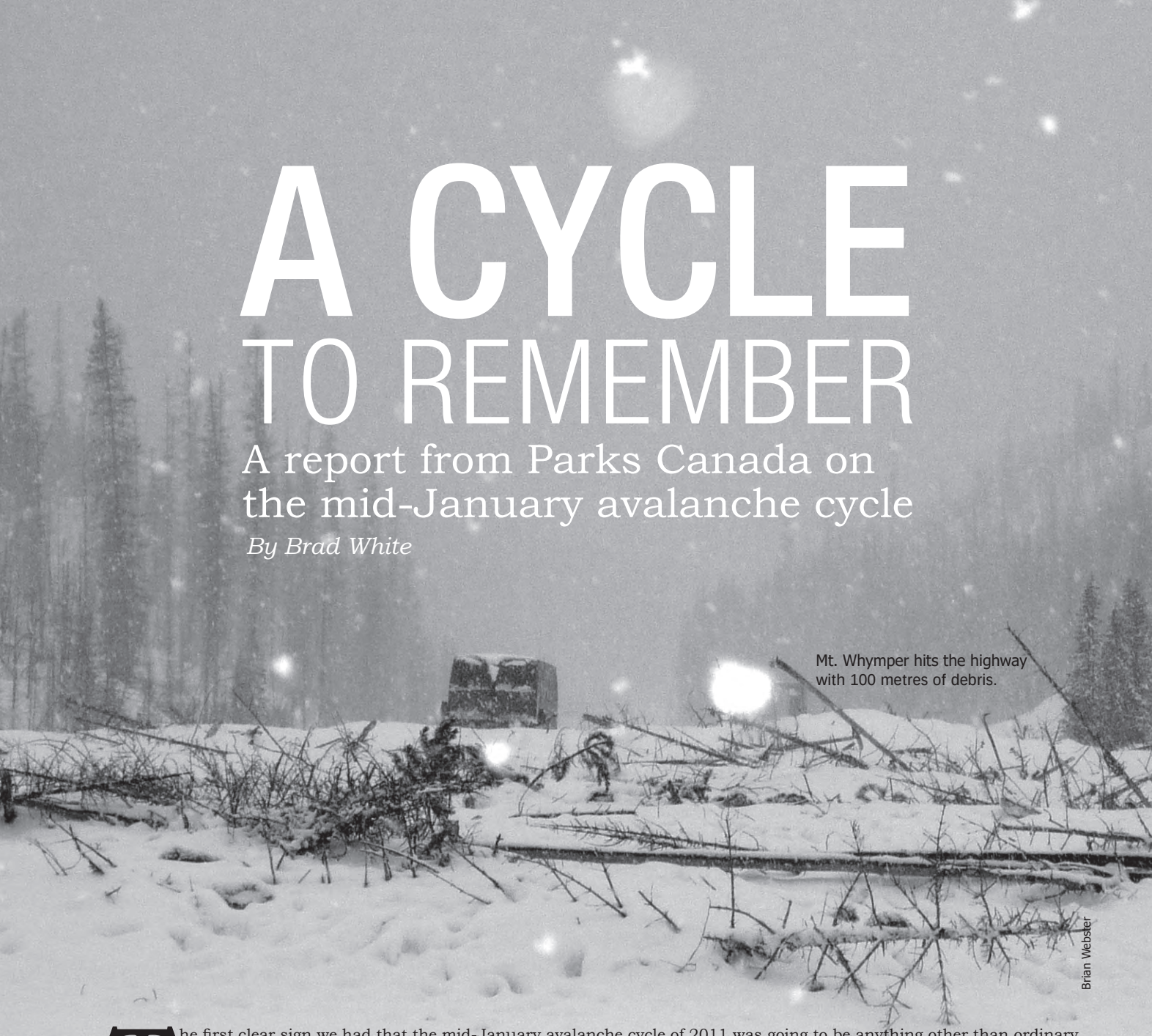
Dan Savage

Clayton Podrasky from Teck Coal led a group exercise on decision making.

A CYCLE TO REMEMBER

A report from Parks Canada on the mid-January avalanche cycle

By Brad White



Mt. Whymper hits the highway with 100 metres of debris.

Brian Webster

The first clear sign we had that the mid-January avalanche cycle of 2011 was going to be anything other than ordinary came at around 6:00 pm on January 15. The report came in that path #2 on Mt. Whymper on Highway 93 South had just run naturally and hit the open road. A southbound car had just managed to stop before being hit by the slide, and the driver had seen a bus driving full speed into the debris from the south. As it luckily turned out, there was only a driver in the bus no one was buried or injured, and there were no damages, but the avalanche required a full rescue response to be sure and the highway was shut down.

My first thought when the call came in was that there had to be some mistake. Whymper had not hit the road in anyone's recent memory, and it had been controlled only five days previously with reasonable cleanouts. As well, it had run size 2.5 just before Christmas, and we had only about 50cm total in the storm since control. How could this path have run to near maximum runout with that load? But it was no mistake. There was 100 metres of debris filled with trees across the highway on a path with an estimated return frequency of more than 30 years, and the fun was just beginning.

We had an extremely shallow snowpack—in the tenth percentile of recorded snow depth—comprised almost entirely of depth hoar and an early-season rain crust. The combination of rapid, warm loading with wind was creating extraordinarily large full depth avalanches with very wide propagations.

We hurriedly re-evaluated, and shut down the Trans-Canada from Lake Louise to Field, as we no longer trusted our forecast for the paths affecting that highway. With Rogers Pass and the Kicking Horse Canyon already closed, this effectively shut down transportation across western Canada, except for Highway #3.

The following day was stormy with little chance to do any heli-bombing, but eventually the crew managed to get into Bosworth and clean out the start zones there. The avalanches that resulted almost certainly would have hit the road and railway had the paths not been cleaned out down to the crust twice previously in the season. However, it was impossible to get to Mt. Stephen to do control there. This meant the town of Field was cut off for another day, requiring a convoy through the avalanche paths to ferry supplies in and allow some trapped residents to leave.

Meanwhile on the 17th, the reports of large uncontrolled avalanches kept coming in. A slide off Mt. Field dusted the road and pushed an empty parked semi-truck right across the highway. A cross country skier on the Tally-ho trail near Emerald Lake came back on her track to find a pile of debris and timber where she had just skied. Control team member Steve Holeczi was driving down the Field hill to coordinate with the Storm Mountain crew for some Daisy Bell control work on the CPR when he was engulfed in a massive dust cloud from a Size 4 that had just filled the Kicking Horse River with an estimated 15 metres of debris.

The path that dusted Steve is one of the paths used for study in the CAA Introduction to Avalanche Mapping course. It is an interesting path to map as many of the camp sites and some of the infrastructure of the Kicking Horse Campground has been developed in the runout zone. In addition, Cathedral Mountain Chalets has a potential to be hit in extreme events. It will be much easier for the students to map now, as numerous sites were run over. One of the picnic shelters was demolished and trees smashed onto the roof of a washroom building. Snow was plastered along the boarded up windows of the chalet buildings with no apparent damage. (The campground and chalets are closed in winter.)

By January 18, the weather had cleared enough to allow for good flying and avalanche control work was completed on both Highway 93 and the Trans-Canada. Results on many paths cleaned out re-growth timber over 30 years old. With the avalanche danger mitigated, the highway crews were able to clean up the mess and the roads were re-opened to traffic. Life returned back to normal for the tired crews.

We thought we were out of the woods, until a 25cm storm on January 29 associated with an arctic front and some reverse loading triggered a Size 4 avalanche on a southwest-facing path north of Observation Peak on Highway 93 North. A parks worker reported dust and branches on the highway. We investigated to find a full-depth avalanche with a debris field 500m wide that had trickled to the edge of the road. The shallow areas that had not been overloaded in the previous cycle were giving notice. This precipitated another round of control work on paths that had not seen control work since the early nineties due to their low hazard index.

As the days get longer and the snowpack is strengthening here in the Rockies, we hope there will not be some other giant surprise out there. However, so far it has been a season outside the forecast teams' general terms of reference, and we know it's not over yet. It will definitely be a year of reference for the future.

The remains of the Kicking Horse campground after a size 4 off Mt Field.

Brad White

Schedule of Coming Events

April 18 – 21, 2011
Western Snow Conference
The theme for the 79th annual conference is: "Satellites and smart instruments—the trend from established instrumentation toward distributed SWE estimation in watersheds."
Where: Lake Tahoe/Stateline, Nevada
Info: www.westernsnowconference.org

April 30 – May 3, 2011
Canada West Ski Areas Association Spring Conference and Trade Show
Where: The Delta Grand Okanagan Resort, Kelowna BC
Info: Phone 250.542.9020 or e-mail office@cwsaa.org

May 2 – 6, 2011
CAA & CAC Spring Conference and Annual General Meetings
Mark your calendar! You won't want to miss any of the presentations, meetings or discussions at this year's AGM.
Where: The Ramada Inn, Penticton, BC

May 6, 2011
HeliCat Canada Annual General Meeting
Where: The Ramada Inn, BC
Info: Phone 250.542.9020 or e-mail info@helicatcanada.com

October 5 – 7, 2011
Wilderness Risk Management Conference
This annual conference focuses on risk management and practical skills for the wilderness adventure and education industry.
Where: Boston, Massachusetts
Info: www.nols.edu/srmc

Jeff Scott

connecting backcountry operations and safety since 1884

Photo by Francis Jolin

For over 125 years, Canadian Pacific has been a pioneer of backcountry exploration, operations and safety in Western Canada. Building the railway opened up the west and helped form a nation. It also taught some difficult lessons about avalanches, and how to manage the risk in mountainous areas. CP and the Canadian Avalanche Centre are proud to continue this legacy, working together to raise avalanche awareness and making the backcountry a safer place for people to work and play.
To support the Canadian Avalanche Centre, visit www.avalanche.ca

www.cpr.ca

CANADIAN PACIFIC
DRIVING THE DIGITAL RAILWAY »

Which Obs For Which Avalanche Type?

Bruce Jamieson
Dept. of Civil Engineering, Dept. of Geoscience, University of Calgary, Calgary AB, Canada
Jürg Schweizer
WSL Institute for Snow and Avalanche Research SLF, Davos, Switzerland
Grant Statham
Parks Canada Agency, Banff AB, Canada
Pascal Haegeli
Avisualanche Consulting and Simon Fraser University, Vancouver BC, Canada

Slightly revised from Proceedings of the 2010 International Snow Science Workshop.

ABSTRACT: At the 2004 ISSW, Roger Atkins proposed that—early in the terrain selection process—backcountry travellers could identify which *types* of avalanches were likely, e.g. wind slab, persistent slab, wet avalanche. These avalanche types are analogous to a set of scenarios in traditional risk analysis. Variations on Atkins' approach have been incorporated into some public bulletins. The types of avalanches that dominate the danger ratings are called Avalanche Types/Characters/Threats/Concerns/ Situations/Problems by different groups. The latest Swiss brochure for recreation in avalanche terrain suggests different observations for the four different types of avalanche situations. To help determine which observations are best for which types of avalanches, a field study was conducted in the winters of 2008-09 and 2009-10 in the Coast Mountains, Columbia Mountains and Rocky Mountains of western Canada. On each field day, an experienced field team rated the local avalanche danger, identified two dominant Avalanche Types and observed a standard set of over 20 quick field observations. The quick observations included avalanches, wind transported snow, snowfall, etc. For correlation analysis, we focussed on two distinct classes of Avalanche Types: 1) Persistent Slabs, and 2) Wind Slabs combined with Storm Slabs. While some observations correlated with the local danger when either class of avalanches dominated the danger rating, other observations correlated best when only one of these two classes dominated the local danger rating. These results may help bulletin writers recommend that recreationists focus on certain local observations for better informed decisions.

1. INTRODUCTION

For decades, risk analysts for natural hazards have identified distinct scenarios (or potential events) which threaten something of value e.g. property or infrastructure. For each scenario, the probability of the natural event affecting the thing of value and the expected consequences are estimated (Kaplan and Garrick, 1981). Mitigation, if required, typically focuses on the scenarios with the highest risk (combination of probability and consequences). If the probability and consequences for each scenario can be quantified, the risk for the can be graphed as in Figure 1. If either the probability or consequence can only be ranked (not quantified), the scenarios are usually presented in a risk matrix (e.g. Ahrens, 2008, p. 22-24). The scenarios with the highest risk (or unacceptable risk) can be targeted for mitigation. This established approach to risk analysis has been used for long-return period avalanches that can affect property (e.g. Wilhelm, 1998). The same concept is also used informally by guides, forecasters and experienced recreationists, who often focus on one or two types of avalanches (scenarios) when assessing the risk on the terrain being considered for the current day.

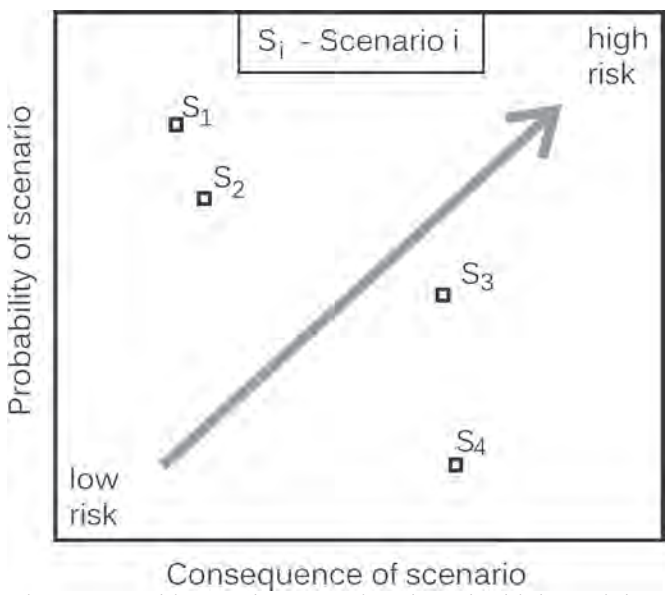


Figure 1. In this graph, Scenario 3 has the highest risk and could be targeted for mitigation.

For many years some Swiss guides and avalanche educators have proposed asking: "What is the main danger today?" On most days, it can be decided whether it is either a *New Snow*, and *Old Snow*, or a *Wet Snow* situation.

Once the situation is recognized, the mitigation strategy can be adapted (Wassermann and Wicky, 2003). Stephan Harvey has further formalized this approach, called it pattern recognition and added one more situation: *Wind Driven Snow*, when an increased avalanche danger often prevails (Harvey, 2008).

In parallel with the Swiss development of Avalanche Situations, at the 2004 ISSW in Jackson Hole, Roger Atkins proposed that the probability and consequences be assessed separately for different types of avalanches, e.g. wind slab, persistent slab, wet avalanche, so the decision makers could focus on the one or two scenarios (Avalanche Types) that posed the greatest risk. Some of his avalanche characteristics incorporated terrain, e.g. wind slabs near ridge tops.

Atkins' concept was used by the Avalanche Danger Scale Project, which was a Canada-US part of the multi-agency project called Avalanche Decision Framework for Amateur Recreationists 2 (ADFAR2). Starting in 2005, the committee of mostly forecasters took a fresh look—actually fresh look after fresh look—at the forecasting process. When they finally had a consensus, the Avalanche Type was a key component of their conceptual forecasting model (Statham et al., 2010). Definitions for the different types of avalanches have been developed. These definitions were the basis for incorporating Avalanche Problems into Canadian avalanche bulletins (Klassen, 2010).

Most recently, Avalanche Type been used as the central theme in a field book for decision-making in avalanche terrain published by the Canadian Avalanche Centre (Klassen et al., 2010). The field book contains templates for recording the relevant observations and facilitates decisions when preparing for and travelling in avalanche terrain.

The concept of Avalanche Type has been and will continue to be applied at various scales. At the slope scale, experienced forecasters and guides can visualize certain types of potential avalanches on the terrain. At the regional scale, some avalanche forecast centres have started to use one, two, or occasionally three Avalanche Types in their public bulletins. Although there is as yet no consistent terminology (Table 1), the concept has caught on and is now used in various applications.

When updating the popular Swiss avalanche awareness brochure "*Caution – Avalanches!*" the idea of Avalanche Situations was merged with the reduction method with the classical 3x3 framework (Harvey et al., 2009). For each of the four Avalanche Situations, a number of key observations are proposed to help recreationists focus on the most important observations for the day (Table 2).

Early experience with this scheme suggests that on some days it is difficult to distinguish between new snow and wind driven snow. Also, the debate continues about whether to explicitly recommend digging when old snow is the dominant avalanche situation. On the other hand, the emphasis is not on digging when either *new snow*, *wind driven snow* or *wet snow* is the primary avalanche situation.

Table 1. "Avalanche Type" terminology and some applications

Source	Application	Name for type of avalanche of concern: type classes
Avalanche Danger Scale Project/Committee (Statham et al., 2010)	Forecasting & forecasting courses	Avalanche Character: loose dry; loose wet; wet slab; storm slab; wind slab; persistent slab, deep persistent slab; cornice falls.
Utah Avalanche Center, USA	Public bulletins	Avalanche Threats: storm snow; persistent slab; wet avalanche; cornice fall.
SLF Davos, Switzerland (Harvey et al., 2009)	Awareness brochure	Avalanche Situations: new snow; wind driven snow; old snow; wet snow.
Canadian Avalanche Centre, Revelstoke, BC, Canada (Klassen et al., 2010)	Public bulletins, field book, awareness courses	Avalanche Problem (formerly Primary Avalanche Concern): loose dry; loose wet; wet slab; storm slab; wind slab; persistent slab, deep persistent slab; cornice falls.

Table 2. Typical signs for four distinct avalanche situations (from the Swiss brochure Caution – Avalanches!)

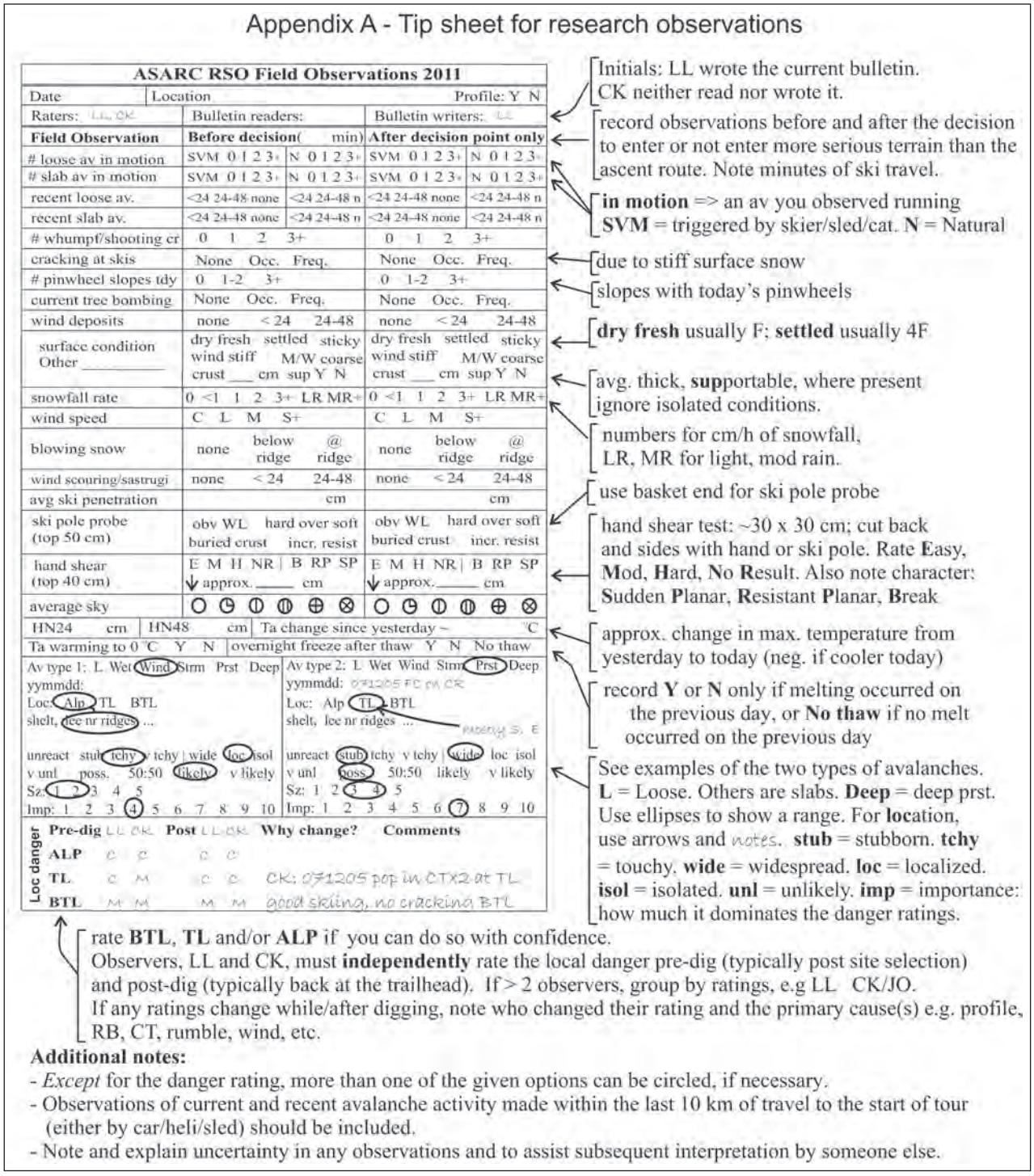
Avalanche Situation	Typical signs and relevant observations
New Snow	Amount of new snow (critical new snow depth is reached), **recent slab avalanching**. Further observations: air temperature evolution and wind during snowfall, type of snow surface prior to snowfall
Wind Driven Snow	Signs of drifting snow, hard packed or soft, varying ski pen when breaking trail, slabby surface layers, **recent slab avalanching, cracking**
Old Snow	Weak layers in the snowpack (simple snowpack tests often useful), **whumpfs**
Wet Snow	Rain, overcast during night, air temperature well above 0°C, strong insolation, deep ski/foot penetration, **natural avalanching** (slab or loose snow)

Alarm signs are marked in **bold**.

The relevant observations for each Avalanche Type in Table 2 are based on experience and an understanding of the processes that form the different types of potential avalanches. Haegeli and Atkins (2010) also present key observations from a survey of experienced avalanche professionals. For this study, we set out to use field data (independent of theory or experience) to identify some key observations when different types of avalanches were dominating the danger rating.

2. METHODS AND DATA

Since the winter of 2007, the Applied Snow and Avalanche Research group at the University of Calgary (ASARC) has been rating the local avalanche danger and making a standard set of over 20 observations (e.g. Jamieson and Haegeli, 2008; Appendix A). Starting in the winter of 2009, we began daily rating the top two Avalanche Types so we could assess which observations were "best" for the various types of expected avalanches. This paper summarizes the results from the winters of 2008-09 and 2009-10.



Appendix A - Tip sheet for research observations

ASARC RSO Field Observations 2011

Date | Location | Profile: Y N

Raters: LL, CK | Bulletin readers: | Bulletin writers: LL

Field Observation	Before decision(min)	After decision point only
# loose av in motion	SVM 0 1 2 3+ N 0 1 2 3+	SVM 0 1 2 3+ N 0 1 2 3+
# slab av in motion	SVM 0 1 2 3+ N 0 1 2 3+	SVM 0 1 2 3+ N 0 1 2 3+
recent loose av.	<24 24-48 none	<24 24-48 n	<24 24-48 none	<24 24-48 n
recent slab av.	<24 24-48 none	<24 24-48 n	<24 24-48 none	<24 24-48 n
# whumpf/shooting cr	0 1 2 3+	0 1 2 3+
cracking at skis	None Occ. Freq.	None Occ. Freq.
# pinwheel slopes tdy	0 1-2 3+	0 1-2 3+
current tree bombing	None Occ. Freq.	None Occ. Freq.
wind deposits	none < 24 24-48	none < 24 24-48
surface condition Other ____	dry fresh settled sticky wind stiff M/W coarse crust ___ cm sup Y N	dry fresh settled sticky wind stiff M/W coarse crust ___ cm sup Y N
snowfall rate	0 <1 1 2 3+ LR MR+	0 <1 1 2 3+ LR MR+
wind speed	C L M S+	C L M S+
blowing snow	none below ridge @ ridge	none below ridge @ ridge
wind scouring/sastrugi	none < 24 24-48	none < 24 24-48
avg ski penetration	cm	cm
ski pole probe (top 50 cm)	obv WL hard over soft buried crust incr. resist	obv WL hard over soft buried crust incr. resist
hand shear (top 40 cm)	E M H NR | B RP SP ↓ approx. ____ cm	E M H NR | B RP SP ↓ approx. ____ cm
average sky	○ ◔ ◑ ◍ ⊕ ⊗	○ ◔ ◑ ◍ ⊕ ⊗

HN24 cm | HN48 cm | Ta change since yesterday ~ °C

Ta warming to 0 °C Y N | overnight freeze after thaw Y N No thaw

Av type 1: L Wet Wind Strm Prst Deep
yymmdd:
Loc: Alp TL BTL
shelt, lee nr ridges ...

unreact stub tchy v tchy | wide loc isol
v unl poss. 50:50 likely v likely
Sz: 1 2 3 4 5
Imp: 1 2 3 4 5 6 7 8 9 10

Av type 2: L Wet Wind Strm Prst Deep
yymmdd: 071205 FC pm CK
Loc: Alp TL BTL
shelt, lee nr ridges ... PARTIALLY S, E

unreact stub tchy v tchy | wide loc isol
v unl poss. 50:50 likely v likely
Sz: 1 2 3 4 5
Imp: 1 2 3 4 5 6 7 8 9 10

Loc danger	Pre-dig LL CK	Post LL CK	Why change?	Comments
ALP	C C	C C		
TL	C M	C C	CK: 071205 pop in CTX2 at TL	
BTL	M M	M M	good skiing, no cracking BTL	

Initials: LL wrote the current bulletin. CK neither read nor wrote it.

record observations before and after the decision to enter or not enter more serious terrain than the ascent route. Note minutes of ski travel.

in motion => an av you observed running
SVM = triggered by skier/sled/cat. **N** = Natural

due to stiff surface snow

slopes with today's pinwheels

dry fresh usually F; **settled** usually 4F

avg. thick, **sup**portable, where present ignore isolated conditions.

numbers for cm/h of snowfall, LR, MR for light, mod rain.

use basket end for ski pole probe

hand shear test: ~30 x 30 cm; cut back and sides with hand or ski pole. Rate **E**asy, **M**od, **H**ard, **N**o **R**esult. Also note character: **S**udden **P**lanar, **R**esistant **P**lanar, **B**reak

approx. change in max. temperature from yesterday to today (neg. if cooler today)

record **Y** or **N** only if melting occurred on the previous day, or **No thaw** if no melt occurred on the previous day

See examples of the two types of avalanches. **L** = Loose. Others are slabs. **Deep** = deep prst. Use ellipses to show a range. For **location**, use arrows and notes. **stub** = stubborn. **tchy** = touchy. **wide** = widespread. **loc** = localized. **isol** = isolated. **unl** = unlikely. **imp** = importance: how much it dominates the danger ratings.

rate **BTL**, **TL** and/or **ALP** if you can do so with confidence.
Observers, LL and CK, must **independently** rate the local danger pre-dig (typically post site selection) and post-dig (typically back at the trailhead). If > 2 observers, group by ratings, e.g LL CK/JO.
If any ratings change while/after digging, note who changed their rating and the primary cause(s) e.g. profile, RB, CT, rumble, wind, etc.

Additional notes:
- *Except* for the danger rating, more than one of the given options can be circled, if necessary.
- Observations of current and recent avalanche activity made within the last 10 km of travel to the start of tour (either by car/heli/sled) should be included.
- Note and explain uncertainty in any observations and to assist subsequent interpretation by someone else.

On most field days in the winters of 2008-09 and 2009-10, ASARC's field teams in the Coast Range, Columbia Mountains and Rocky Mountains rated the local avalanche danger, made over 20 standard observations (Appendix A), and identified the two most important Avalanche Types (Table 1). For this study we used only the Avalanche Type with the greatest importance—based on its contribution to the danger rating. If the two avalanche types had equal importance (50:50), we used the one recorded as Avalanche Type 1.

Many of the observations were made before and after the decision point, i.e. when the team reached treeline. For each observation, e.g. blowing snow, we used the before or after observation that was more conducive to higher avalanche danger. So, if we observed blowing snow in the morning but not in the afternoon, we used the morning observation.

For most of the observation variables, the specific observation values could be ordered from the least associated with avalanching to the most. For example, the observations for blowing snow were ordered: none, at ridge, below ridge.

Appendix A shows that we rated the local danger for one, two or three elevation zones: below treeline, treeline and alpine. We used the treeline rating, except in four cases in which we did not rate the local avalanche danger at treeline, in which case we used the below treeline rating.

Table 3. Number of cases by Avalanche Type

Avalanche Type	No. of cases
Persistent Slab	77
Deep Persistent Slab	12
Wind Slab	42
Storm Slab	18
Loose Snow Avalanche	10
Wet Snow Avalanche	8

In a few cases in which the precipitation was rain, we treated the precipitation rate as missing.

This resulted in the dataset shown in Table 3. Each case is a record of one field team travelling on touring skis in a specific area on a given day.

We excluded Loose Avalanche and Wet Avalanche types from the analysis since there were too few cases. Also because of limited cases, we combined Storm Slab with Wind Slab, and combined Deep Persistent Slab with Persistent Slab.

3. PRELIMINARY RESULTS

Spearman rank correlations between the local danger rating and the ordered observations are shown in Table 4. Correlations for which $p < 0.05$ are marked in **bold**. Correlations for which $p < 0.01$ are marked in ***bold italic***.

3.1 Observations that correlated when either class of Avalanche Type was important?

When either Wind Slab/Storm Slab Avalanches or Deep/Persistent slab avalanches dominated the danger rating, the observations that correlated with the local avalanche danger were: slab avalanches, whumpfs/shooting cracks, clumps of snow falling off trees (tree bombs), deep ski penetration, snow height (snowfall) from in last 24/48 h, and air warming to 0°C (negative) (Table 4). The negative correlation prompted a second look at the data: when the air temperature reached 0°C (usually spring time), the avalanche danger was mostly Low or Moderate.

3.2 Observations that correlated when storm snow or wind slabs were important?

In addition to the observations mentioned in the previous paragraph, the snowfall rate, increased hand shear depth and absence of a surface melt-freeze crust correlated with the local avalanche danger when storm snow or wind slabs dominated the danger rating (Table 4). The key variables include the following observations of current or recent snowfall: snowfall rate, accumulated snowfall in the last 24/48 hours, as well as deep ski penetration.

3.3 Observations that correlated when deep/persistent slab avalanches were important?

In addition to the observations mentioned for both classes of Avalanche Types, low hand shear resistance, pinwheeling, and snow surface cracking at skis correlated with the local avalanche danger when Deep/Persistent Slab Avalanches dominated the local danger rating.

4. DISCUSSION

The observations proposed by the Swiss avalanche awareness brochure *Caution – Avalanches!* (Harvey et al., 2009) and the Canadian Avalanche Centre field book (Klassen et al., 2010) are supported by the correlations in Table 4. For a New Snow Avalanche Situation, recent slab avalanches and new snow amount correlated with the local avalanche danger. For an Old Snow Avalanche Situation, whumpfs correlated with the local avalanche danger. Some correlations, such as the one between pinwheeling and the local danger when Deep/Persistent Slabs are important, are difficult to explain and may not be significant in a larger, more balanced dataset.

For Deep/Persistent Slabs, fewer observations correlated with local danger than for Storm Snow and Wind Slab Avalanches, which is consistent with the greater forecasting challenge for persistent slabs. See also the limited relevant observations in Table 2 for the Old Snow Avalanche Situation.

Research often yields unexpected results. When ASARC's morning stability evaluation was expanded to include identification of the one or two most important Avalanche Types, one of us (Jamieson) expected the usual response to increased paperwork. Instead, the field staff liked the focus that Avalanche Type provided to the morning safety meeting and has retained it. The Avalanche Type is just one part of the rethinking of the forecasting (Statham et al., 2010) that has become popular with ASARC's field staff.

Table 4. Rank correlations with local avalanche danger for two combined classes of Avalanche Type

	Wind/Storm (n = 60)	Deep/Persistent (n = 89)
Avalanche observations		
Recent loose avalanche(s)	0.05	-0.14
Recent slab avalanche(s)	***0.41***	***0.46***
Passive snowpack observations		
Shooting cracks, whumpfs	***0.37***	**0.27**
Snow surface cracks at skis	0.22	**0.25**
Pinwheeling (today)	0.08	0.32
Overnight freeze after thaw	-0.15	0.05
Snow clumps falling from trees	0.34	**0.25**
Deposits of drifted snow	0.19	0.17
Thickness of surface crust	**-0.31**	-0.17
Wind scouring/sastrugi	-0.10	-0.04
Active snowpack observations		
Avg. ski penetration	***0.68***	***0.49***
Ski pole probing in top 50 cm	-0.13	-0.04
Hand shear resistance	0.20	**0.32**
Hand shear depth	**0.33**	0.14
Weather observations		
Snowfall rate	***0.45***	0.14
Typical wind speed	0.18	0.16
Blowing snow	0.15	0.17
Cloud cover	0.15	0.17
Snow height last 24 h	**0.55**	**0.21**
Snow height last 48 h	**0.63**	**0.39**
24 h change in max. air temperature	0.02	0.18
Air warming to 0°C	***-0.42***	**-0.24**

5. SUMMARY

Several regional forecast centres have adopted the concept of Avalanche Character/Type/Threat/Concern/Situation/Problem for use in their public bulletins. This concept is consistent with the scenarios in traditional risk analysis. Harvey (2008) has proposed specific observations for certain classes of Avalanche Situations. For this study, we analysed a dataset of 159 cases (location-days) in which over 20 observations were made and the local avalanche danger was rated. When the dominant Avalanche Type was either Storm Avalanches or Wind Slabs, the observations that correlated (and were consistent with knowledge of avalanche formation) included recent slab avalanches, snowfall rate, snow clumps falling from trees (usually indicative of wind or warming), deep ski penetration and snow height from the last 24/48 hours. When the dominant Avalanche Type was either Deep Persistent or Persistent Slab, the observations that correlated (and made sense) included recent slab avalanches, whumpfs/shooting cracks, deep ski penetration and increased snow height from the last 24/48 hours.

Further field studies are planned. There are other observations that correlated in this study and may benefit from analysis of a larger dataset. However, any recommended observations should be consistent with the current understanding of the processes that form the different types of avalanches.

ACKNOWLEDGEMENTS

For the careful field work we are grateful to Cam Campbell, Spencer Krkosky, Deanna Andersen, Lydia Marmont, Peter Marshall, Chris Geisler, Ali Haeri, Cameron Ross, Thomas Exner, Mark Kolasinski, Katherine Johnston, Cora Shea, Mike Smith, Dave Tracz and Jordan Stiefvater. Thanks also to Mike Smith for proofreading, to Cameron Ross for checking the data and Dave Gauthier for checking the analysis.

For logistical support for the field studies we thank Mike Wiegele Helicopter Skiing, BC Ministry of Transportation and Infrastructure, BC Ministry of Parks, Parks Canada, the Canadian Avalanche Centre, as well as the Avalanche Control Section of Glacier National Park.

For financial support for the field studies and the first author's time, we thank the Natural Sciences and Engineering Research Council of Canada, HeliCat Canada, the Canadian Avalanche Association, Mike Wiegele Helicopter Skiing, Teck Mining Company, Canada West Ski Areas Association, the Association of Canadian Mountain Guides, Backcountry Lodges of British Columbia, and the Canadian Ski Guides Association.

REFERENCES

Ahrens, T. 2008. Risk Analysis. John Wiley & Sons, Chichester, England.

Atkins, R. 2004. An avalanche characterization checklist for backcountry travel decisions. Proceedings of the 2004 International Snow Science Workshop in Jackson Hole, Wyoming, USA, 462-468.

Haegeli, P., Atkins, R. 2010. Exploring the 'It depends' – How do mountain guides assess avalanche situations? In Osterhuber, R. and Ferrari, M. (eds.), Proceedings of the 2010 International Snow Science Workshop in Squaw Valley, California, USA, 130-132.

Harvey, S. 2008. Mustererkennung in der Lawinenkunde. In: I. Kroath (Editor), Sicherheit im Bergland. Oesterreichisches Kuratorium für Alpine Sicherheit, Innsbruck, Austria, pp. 88-94.

Harvey, S., Schweizer, J., Rhyner, H., Nigg, P., Hasler, B. 2009. Caution - Avalanches! 6th edition. Avalanche Prevention in Snow Sports, Core team of instructors, Davos, Switzerland.

Jamieson, B., Haegeli, P. 2008. Can field observations be combined systematically with the regional danger rating to estimate the local avalanche danger? Proceedings of the 2008 International Snow Science Workshop in Whistler, BC, 228-237.

Kaplan, S., Garrick, B.J. 1981. On the quantitative definition of risk. Risk Analysis 1(1), 11-21.

Klassen. K. 2010. The Avalanche Hazard Assessment Web-tool – A structured approach to public avalanche forecasting. Presentation at the Spring Conference of the Canadian Avalanche Association, 6-7 May 2010.

Haegeli, P., Atkins, R., Klassen, K. 2010. Decision Making in Avalanche Terrain. Canadian Avalanche Centre, Revelstoke, BC, 62 pp.

Statham, G., Haegeli, P., Birkeland, K., Greene, E., Israelson, C., Tremper, B., Stethem, C., McMahon, B., White, B., Kelly, J. 2010. In Osterhuber, R. and Ferrari, M. (eds.), A conceptual model of avalanche hazard. Proceedings of the 2010 International Snow Science Workshop in Squaw Valley, California, USA, 686.

Wassermann, E., Wicky, E. 2003. Lawinen und Risikomanagement. Edition Filidor, Reichenbach, Switzerland, 60 pp.

Wilhelm, C. 1998. Quantitative risk analysis for evaluation of avalanche protection projects. In Hestnes, E., ed. Proceedings of the Anniversary Conference 25 Years of Snow Avalanche Research, Voss, 12-16 May 1998. Oslo, Norwegian Geotechnical Institute, Publication 203, 288-293

Wren McElroy

Today's Transceivers

User expectations, performance limitations and marketing messages

By Rob Whelan

I am always impressed with how emotionally attached we are to our avalanche beacons. This winter's debate over compatibility between Pulse and Tracker2 devices was a classic example of the passion these pieces of plastic can elicit. For me, this debate and others like it highlights a serious disconnect: what the user expects from the device; what the device can actually do; and the marketing message delivered to attract customers. Let's look at where this disconnect comes from.

It is always interesting to talk with the engineers who design these products. They are the ones who can tell you not just what the device can do, but also what its limitations are. Next are the sales reps. They'll tell you all about the great new features and benefits of the device, but might not have the technical background to explain certain behaviours. The marketing message focuses on the strengths of the device, which are defined by the design choices of the engineers. In some companies, the engineers are at arm's-length from the marketing group. In others, they are tightly integrated.

Then there are the users. They are informed by their peers, by what they read on the net, and, to a large extent, by us—the instructors and professionals who use these devices every day. While their expectations are influenced by the product's marketing message, users can be fiercely loyal to their brand or technique ("My favorite beacon is the one I have practiced with the most," says Peter Macpherson, IFMGA Mountain Guide).

Let's start with some background. The first avalanche beacons were developed by Skadi in the late 60s. For the first 25 years of development, the signal from the device was optimized for transmission through snow (457 KHz signal propagates well through snow) and for interpretation by human hearing (long beep sound followed by a period of silence). In 1986, this frequency and the allowed pulse periods and pulse widths became an international standard. The standard has since been revised slightly (European Standard EN 300 718-2001, IKAR 2001) but still allows for +- 80 Hz from the specified 457 frequency, pulse periods (duration between beep sounds) from 0.7 to 1.3 seconds and pulse widths (length of the beep sound) from 0.07 to 0.4 seconds (fig. 1).

Within this standard, beacon manufacturers have design options to improve the performance of their products. However, they are constrained by the concept of "downward compatibility." That is, the requirement for the receiving beacon to be able to process the incoming signal from any transmitter that meets the specification.

As early as 1998, some manufacturers were calling for a tighter specification to take advantage of the rapid improvement in digital signal processing technology (Hereford, 1998). A tighter spec would allow longer range, better signal separation for multiple burials, and overall more design options. However, it would also mean that current devices would no longer be compatible with the new specification—rendered obsolete, like the old 2275 Hz beacons after the frequency standardization in 1986.

In the absence of a new specification, the manufacturers have done their best to add new features to the digital devices using the specification originally designed for analog technology. The current spec allows for a wide range of design options, and different manufacturers have different philosophies when it comes to new features.

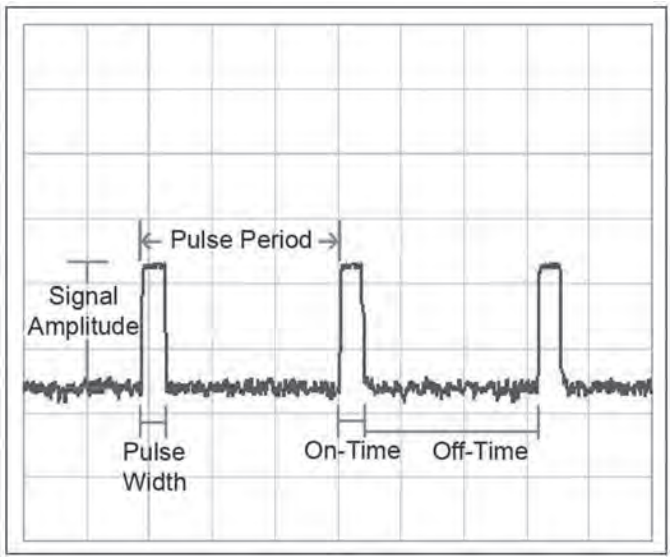


Figure 1. This is what the receiver "sees" after the incoming signal has been de-modulated. This signal has a relatively narrow pulse width, or "on-time" relative to the overall pulse period. High amplitude makes it easy to distinguish from background noise and other transmitters. Figure courtesy of Backcountry Access

> Do we want beacons that are simple to use under stress and accept that they will not be able to solve every situation? Or do we want to be able to solve every complex situation and accept that the user will need more training and practice?

Some have opted for wide band receivers, which can receive older devices that may have fallen outside or at the edges of the specification. This approach has the advantage of great downward compatibility, but with the penalty of reduced range and increased noise. Others have optimized their design for pattern recognition to assist with marking multiple burials. This relies on precise timing of the transmitter, and also on the transmitter having relatively short pulse widths and a unique pulse period. The penalty here is reliance on the transmitting beacon to have tight tolerances, so downward compatibility suffers and user expectations for easy marking may not be met.

These competing design philosophies can result in unexpected performance during searches. Imagine that you are searching with a modern digital device that uses pattern recognition to solve multiple burial scenarios. If the transmitting devices do not have a precise pulse period, the pattern recognition may fail. In addition, if the transmitters have relatively long pulse widths and do not have a unique pulse period, there could be prolonged periods of signal overlap, and once again the pattern recognition may fail (Lund, 2008).

The new user of a modern avalanche beacon is blissfully unaware of these limitations, perhaps analogous to an individual with a new digital camera. The expectation, based on the marketing message, is that the camera should be able to "point and shoot" right out of the box. This gives the user the impression that the camera is "simple." In fact, the camera is using a powerful processor to handle a complex task. It manages focus, lighting, movement and a host of other inputs, and optimizes them for the best result. This is successful most of the time, but not always. Sometimes the user must provide some input to get a good result (turn on the flash, for instance).

In the case of an avalanche beacon, the user gets directions from the beacon—usually a distance and direction indication—and expects to be able to simply follow the direction indicator to the buried victim, and have an indication that they are in the right place to start probing. This is usually successful in a single burial search with a modern device,

and is without a doubt a big improvement over analog single-antenna beacons.

From the engineer's point of view, the focus is to provide simple controls and a friendly interface. One of their big challenges is that the information from the transmitting beacon only updates about once a second. In the rush of a beacon search, a lot can happen in that one second. The user may be moving fast, or swinging the beacon back and forth. Often I hear about "slow processors" in some devices. These modern microcontrollers are not slow—all the signal processing and screen updating is done in the first 50 to 100 milliseconds following the arrival of the incoming pulse. For the remaining 900 ms, the processor is idling waiting for the next pulse.

What may be interpreted as a "slow" processor is often a result of the algorithm used to process and separate signals from the background noise. If the user is moving too fast, or swinging the beacon back and forth, it is hard for the algorithm to keep up (just as with an analog device it is hard to determine the change in volume if the searcher is moving erratically). Under these conditions, the "point and shoot" method can fail and the user's expectations won't be met.

In the case of multiple burials, the search problem can become so complex that the simple point and shoot strategy can break down. If all the transmitters are "marking friendly," i.e. they have short, precisely timed pulse widths and a randomized pulse period, then marking features can work well. This makes it easy for the searcher. They simply perform a single-burial search and probe to confirm location. When it is time to keep searching, they mark the first burial and carry on to the next using the same strategy. This allows for one single-burial search after another. Simple.

In reality, there are numerous influences that can confound this search strategy. From the design perspective, the engineer has to communicate to the user that the situation is complex, and prompt the user to change to a backup strategy. This inevitably complicates the user interface. Thus we arrive at the trade-off. Do we want beacons that are simple to use under stress and accept that they will not be able to solve every situation? Or do we want to be able to solve every complex situation and accept that the user will need more training and practice? That is the design choice facing the engineers at this point. In the next issue, we'll look more closely at the marking functions of the various brands and how to optimize the performance of this important feature.

REFERENCES

Hereford, J. & Edgerly, B. (1998). 457 KHZ *electromagnetism and the future of avalanche transceivers*. Backcountry Access: available online at backcountryaccess.com/index.php?id=171.

Lund, T. (2008). Achieving reliability in multiple burial searches: Backcountry Access: available online at backcountryaccess.com/index.php?id=107.

Rob Whelan collection

Rob Whelan lives near Nelson, BC, and has been working as a guide for CMH for the past 21 years. Rob has a background in electronics and software, and keeps current on the latest avalanche beacon technology as it evolves. He has been involved in research and implementation of the annual beacon training program for the guiding team at CMH.

CAA's Avalanche Balloon Pack Research

This new study wants your information on avalanche incidents involving balloon packs

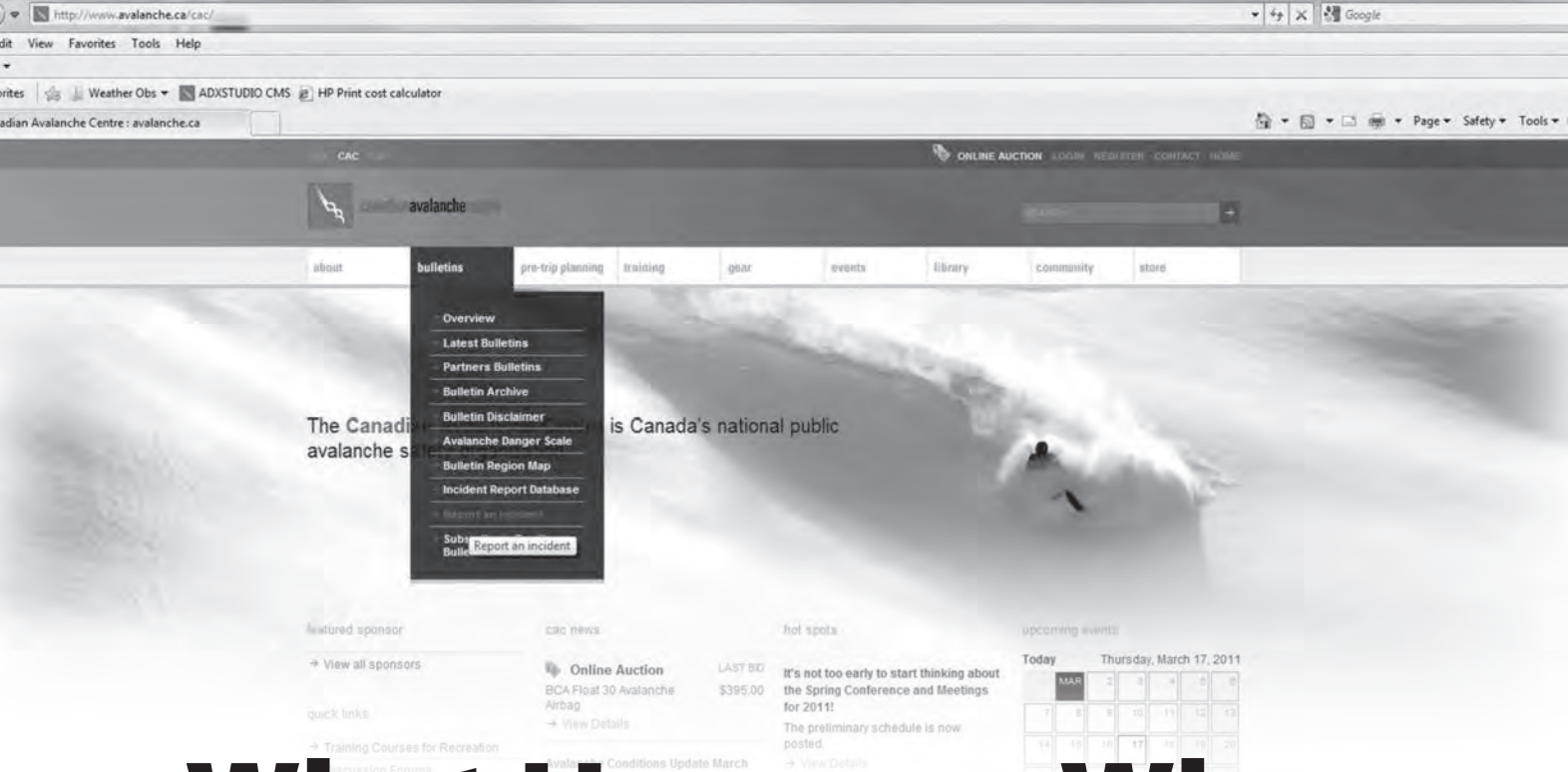
Although the concept of an avalanche balloon pack was developed in Germany in the late 1970s, its use in Canada has only really picked up within the last five years. While there are a small number of studies that examined the effectiveness of avalanche balloon packs in Europe, we cannot rely on these results to make educated choices about this type of safety device in Canada since our winter backcountry activity patterns are very different from those in Europe.

For this reason, the CAA is currently conducting a study that looks at avalanche balloon packs in Canada in more detail. Unfortunately, we have very little information about their use and performance in Canadian avalanche incidents. This is where we need your help!

If you have been part of an avalanche incident that involved an avalanche balloon pack or you are aware of such an incident, whether it was on a private trip or at work, we are interested in hearing about it. Even if the incident occurred a few winters ago or the individual wearing the avalanche balloon pack was carried only slightly by the avalanche, the information is still relevant to our research. Your information is crucial for helping us to better understand the value of avalanche balloon packs in the Canadian context. We will be working on this study over the upcoming summer and we hope to have useful insights ready for you by the beginning of next winter.

To submit your information, go to "report an incident" under the "bulletins" tab on the CAC website. There you will find a link to the Avalanche Balloon Pack Study. The more details you can provide the better, but we are interested in any relevant submissions. If you have any questions or suggestions about this study, please feel free to contact Pascal Haegeli (pascal@avisualanche.ca) our lead researcher on this project.

Greg Paltinger



What Happens When I Press "Submit"?

Detailed information on all avalanche involvements is crucial for the CAA and the CAC for two important reasons. In the short term, the timely submission of avalanche incident reports helps avalanche forecasters better assess the current conditions. In the long term, detailed records of avalanche involvements can help all of us to better identify the factors that lead to avalanche accidents, understand influences on avalanche survival and evaluate the effectiveness of different avalanche safety devices and rescue protocols.

To make it easy for you to contribute to the Canadian avalanche incident data set, the CAC has developed an online wizard for efficiently submitting incident information to the CAC. You can find the wizard by clicking on the "bulletins" tab on the CAC website, and choose "report an incident."

The wizard helps you to describe the most important aspects of the incident by walking you through a short sequence of forms. If you have any photos of the incident (an image often says more than a thousand words), you can attach them to your submission as well. Once you press "submit" at the end of the wizard, your information is added to the CAC avalanche incident database and the CAC forecasters are notified so that they can immediately use your information for their assessment.

By the way, a limited number of fields of the accident database can be accessed by anybody on the CAC website. Check it out. Click on "Avalanche Incident Report Database" under the "bulletins" tab. Can you find the earliest known avalanche accident in Canada?

A good example for the use of this database is the recent study of Pascal Haegeli and colleagues, who used 25 years of CAC avalanche incident records to examine Canadian avalanche survival patterns and compare them to Switzerland. An analysis of Canadian avalanche survival patterns and comparison with the Swiss model was recently published in the Journal of the Canadian Medical Association. Share your information—this is important stuff!

There's an App For That

Mobile technology meets avalanche safety

By Ian Tomm

Last year the CAC in partnership with MEC, brought avalanche safety to mobile devices with its first ever application for the iPhone. Since that time avalanche and backcountry-related applications for mobile devices have exploded. Don't have a smart phone yet? Maybe this will convince you otherwise. Due to the rapid development of mobile technology and applications for a variety of uses this is by no means a comprehensive list of what is out there. Apologies if I've missed a key application from a sponsor or stakeholder!

MEC/CAC iPhone App
Released last winter, this application has been responsible for a 15-20% increase in views of the CAC's Public Avalanche Bulletins. You can access all CAC bulletin regions, partner bulletin regions and remote real-time weather station data. Discussions have just started for Version 2.0. What would you like to see?

Utah Avalanche Centre
Similar to the CAC's iPhone application, the UAC has a feature-rich application that provides public avalanche bulletin information for areas across Utah.

Mammut iPhone App
This is a multi-function application that provides mobile access to avalanche information, avalanche bulletins, a clinometer, compass, altimeter and equipment information. They've recently released a specialized application for packing lists, to make sure you never forget anything on a trip again.

Clinometer
Never again will you be guessing at the slope angle.

Compass
Some straightforward applications are integrated with advanced GPS functions, allowing the storage of way points of stored maps and navigation features similar to any dedicated GPS unit on the market today.

Backcountry
A European-based application dedicated to everything about ski touring, from popular routes to safety equipment, photos and real-time weather and avalanche data.

Canada Radar
Canada Radar provides real-time radar imagery for 30 sites across Canada. The radar images are streamed from Environment Canada's website. Both stills and animations are available and the images automatically updated based on your current location using the built-in GPS of the iPhone.

The Weather Network
The Weather Network is a feature-rich application that can provide a variety of weather forecast information for practically anywhere in Canada.

Whistler Blackcomb
In what may signal the future for ski area maps and resort information, Whistler Blackcomb has released this application that includes daily snow reports, weather conditions, live webcams, trail maps, real-time highway conditions, schedule of events, restaurant info, videos and more.

GPS & Map Applications
There are a multitude of GPS applications for the iPhone, and some include downloadable topo maps. We've started to see these being used on CAA Level 1 and 2 courses.

Ortovox
Only available in German, this application offers users a variety of tools for their travels in the mountain from trip photos and maps, to a digital version of Ortovox's decision aid for avalanche safety called the Check and Ride.

Snowmobiling Applications
The snowmobiling community is also adopting mobile technology. The Ontario Federation of Snowmobile Clubs has a trail map application and there are a variety of other trail map-based applications in the US as well. It would be great to see the combination of trail information and safety information like we see in many of the European and ski-focused applications. That would be something the CAC would certainly be interested in contributing to.

WhiteRisk
This is the mobile version of the popular WhiteRisk DVD. Produced by the SLF in Switzerland this application is essentially an avalanche course on a phone with many tools to use directly out in the field real time. It's currently not in English but it would be great to see the content adapted for the Canadian context.

Where does the future lie for mobile technology and avalanche work in the field? As more and more people adopt this form of technology, the possibilities are endless. Just watch your battery power—these phones don't take AAs.

Ian Tomm is the Executive Director of the CAA and CAC and a dedicated iPhone user.

Ian Tomm collection

Lydia Bradey

Penny Goddard
CAC Public Forecaster

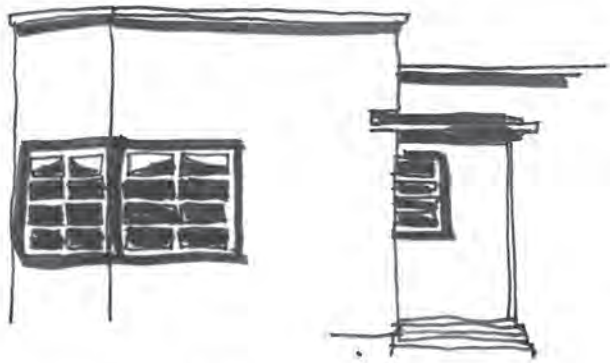
Penny Goddard is a highly accomplished alpinist and aspiring mountain guide from New Zealand who has joined the forecasting team this winter. Born in Christchurch, she's been living winter full-time over the past few years, working as an avalanche forecaster in her home country and as a ski patroller in Canada. "I've also snuck in the odd summer," she says, "with a few climbing trips in the off-seasons, recently to Antarctica, China, Europe and the Himalayas."

Penny has a BSc in Geography and is certified with the New Zealand Mountain Guides Association as an assistant ski guide and an assistant alpine climbing guide. She has been an avalanche forecaster for five seasons in New Zealand, the last three on the famous Milford Road. She's also worked in alpine search and rescue, industrial rope access, teaching avalanche courses, and is the author of Avalanche Awareness in the New Zealand Backcountry.

"I find snow fascinating and can geek out on it," says Penny. "But I also love simple things like just being in the mountains and listening to the weather, sinking into deep powder or climbing along exposed ridge tops." When asked why she wanted to join the team at the CAC, the answer was easy. "I am impressed with the CAC's mission and believe that public safety is a meaningful occupation within the avalanche industry. I'm also looking forward to working with such a high-calibre team. The job is sure to keep me challenged and continually learning."

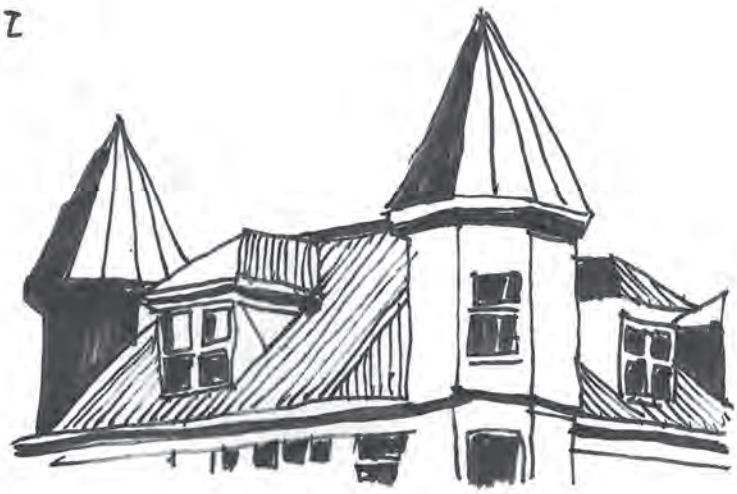
Flakes

With the success of the A.T.E.S scale, the C.A.C. developed the new Roof Avalanche Terrain System or R.A.T.S. to help the user group deal with the threat of Roofalanches...



SIMPLE

CHALLENGING



COMPLEX

"NOW I CAN CHECK THE CONDITIONS BEFORE I SKIN UP."

Get avalanche bulletins on your iPhone with this free application.

Developed in partnership with the Canadian Avalanche Centre.

MOUNTAIN
EQUIPMENT
CO-OP®

Advanced Avalanche Control Systems

Peace of mind using proven technology

Used and trusted worldwide

Safety • Security • 24/7 Reliability

Canadian Distributors

daisybell®

gazex®

O'bell$_x$

T.A.S.
TECHNOLOGIE ALPINE DE SÉCURITÉ
www.groupemnd.com

Remotely controlled hazard reduction devices using powerful gas airblast technology.

- Fixed and mobile solutions for every need
- Combines ease of use with 24/7 reliability
- No residue or duds
- No explosive storage or transportation issues
- ***Daisybell*** – mobility and efficiency – 40 shot capacity
- ***Gazex*** – powerful and permanent
- ***O'Bellx*** – helicopter deployment, light footprint and self contained – 40 shot capacity
- **2000** Gazex exploders in use worldwide
- **25** DaisyBell's in active use worldwide

AvaTek Mountain Systems Inc.
PO Box 990, 1007A 11th Ave. South,
Golden, BC, Canada, V0A 1H0
tel: 250.344.2122 fax: 866.897.9829 e: info@avateksystems.ca

Avalanche Control Technology & Mountain Safety Systems / www.avateksystems.ca