avalanche.ca

The journal of Canada's avalanche community

COOL SCHOOL

A FRESH TAKE ON YOUTH AVALANCHE EDUCATION

THE YEAR OF SLEDDING DANGEROUSLY

THE TROUBLING TREND IN SNOWMOBILING AVALANCHE DEATHS

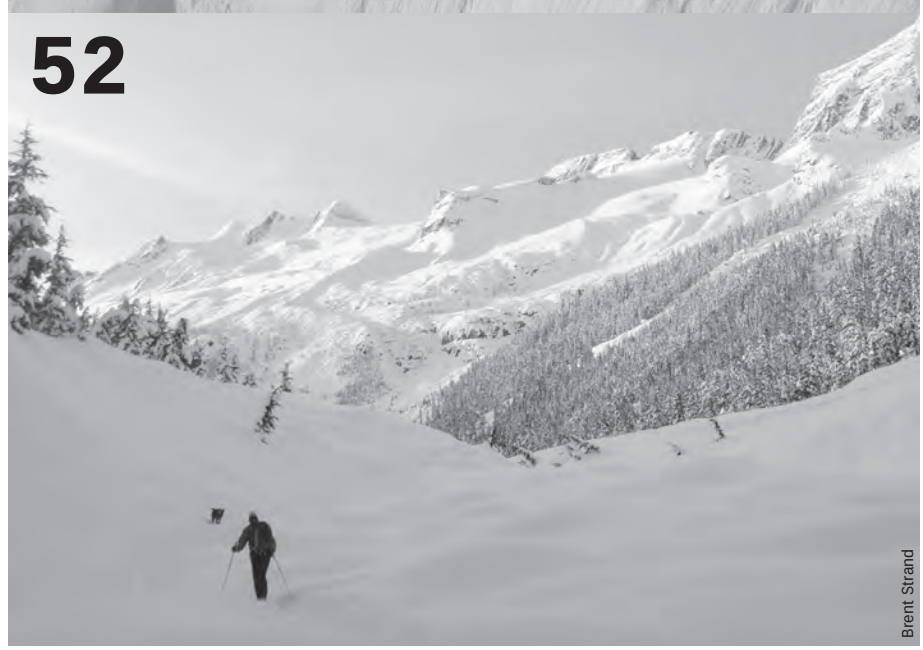
BEHIND THE LINES

KIDS, DON'T TRY THIS AT HOME

Articulating Risk,
Search! Part 3,
Service Awards, AGM and more!

Volume 89 Summer 2009
Cdn Publication #40830518


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



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Cover shot: Lee Johnston drops into a line on the Iron Glacier, in the Duncan River drainage of the Selkirk Mountains.
Photo: Silas Patterson

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 welcomes 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:

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

The Tower of Babel

Many people have noted the similarities between the avalanche tragedies of this past winter and the winter of 2002-03. However, in terms of effecting change, the two appear—at least at this point in time—to have more contrasts than things in common. Granted, we are perhaps not ready to accurately reflect since the winter is only a few short months past and change doesn't happen overnight. But it must be said, in terms of overt and cohesive political will by relevant stakeholders to make improvements in avalanche safety, there is no comparison.

So what's the difference? In his Executive Director's report in this issue, Ian Tomm underscores the necessity to coordinate our efforts, and reminds us how effective we can be as a community when we work together. The changes that came about after 2002-03 are an excellent example of what can be accomplished cooperatively, when there is political will to make things happen. But there is an important distinction to be made when comparing that season with the one just past. After 2002-03 there was also a high degree of cooperation between agencies, and there was money.

Creating new programs and services requires funding. In 2002-03, different levels of government chipped in to make sure that what needed to happen, did happen. A wide variety of stakeholders were consulted, opinions weighed and decisions made. And when push came to shove, there was money to fund the programs that would make a difference. Now, again we've had a horrendous winter and there's a clear need for new programs. But that spirit of cooperation seems sadly lacking, and there's no sign of extra funding.

The current situation is no fault of our current partner and sponsors. They have been steadfast throughout the years and in fact, we've recently had some promising discussions to indicate we may receive a modest increase from some sources, which is especially remarkable given the current economic climate. We remain grateful for their support and honoured by their faith in our work.

The funding agreement established in 2004 to support the CAC depends on three sources: government and industry stakeholders supply 40% each, while the CAC's self-generated funds make up the other 20% of our annual budget. This remains a remarkably strong model and gives our core programs the stability they need to function and evolve. Where this model weakens is when we turn to the issue of snowmobiling.

The mandates of some of our major partners are clearly not aligned with this sport (e.g. Parks Canada, Mountain Equipment Co-op), so it's a stretch to think their funding should go towards snowmobile programs. Instead, we believe it is the duty of the relevant agencies to fund programs specific to their industry. In his article, "The Year of Sledding Dangerously" on pg 32, CAC Operations Manager John Kelly writes, "It has been a difficult sell to the snowmobile stakeholders on the need to bring money to the table for avalanche safety programs."

I've written before about the cultural divide between skiers and sledders. We know the avalanche safety programs and services developed for backcountry skiers and boarders are not "one size fits all" but we do have some pretty clear ideas on how to move forward on developing programs specific for snowmobilers. But it's as if we speak different languages and, like the biblical story of the tower of Babel, our inability to communicate gets in the way of getting the job done. Of course, like all analogies, this one breaks down when you push it too far. We can talk to each other, but we still seem to be having trouble understanding each other's needs, so we're having a difficult time working together. There is much that should be done before next winter, but we all need to be pulling in the same direction. Right now, that just isn't happening.

The tragedy is, as many members have noted, is that we've seen this before. I recently exchanged some e-mails with Randy Stevens on the subject of what might be done for this user group. Many of you will know that Randy was awarded a CAA Service Award this spring, honouring his many years of work in avalanche safety education, including snowmobile programs. "I think we have reached a cross roads in sledding that can only compare to the early days of helicopter skiing," he wrote. "I can remember when the helicopter skiing industry had some difficult years, and not so long ago when other avalanche professionals were involved with some tragic situations."

The backcountry skiing industry took those experiences and learned from them. Individuals and organizations got organized and cooperated to improve avalanche safety for all of them. Can the snowmobilers do the same?

So here we are. As we consult with the members of the snowmobile stakeholder group, we all agree that much needs to be done. Nobody wants a repeat of this past season, that's a given. There are some great ideas on the table right now, and we've identified a number of programs we think are do-able, given more resources. Now, the ball is in their court; our existing funding can't accommodate these new initiatives.

Whatever we do, we'd better do it quick. It's sunny now, but next winter is only few months away. I'll leave the last words to Randy Stevens: "I feel it is only reasonable to respect the changes in the activity of mountain sledding and realize the perception of danger is a complex task. An AST course is always a good start but we need to better understand the world of mountain sledding." Amen to that.

Let's Never Forget

Ian Tomm collection

The 2008-09 season will long be remembered in the avalanche patch for many reasons. A period of transition to new leadership for the CAA and CAC, a time of unique snowpack anomalies (a one in 30+ year winter for the Coast) and a winter of complex stability and elevated avalanche hazard throughout much of the province.

For the professional avalanche worker this year, the challenges of the weak and unpredictable snowpack were eerily familiar. 2002-03 was such a year, a year of learning and sadness, a year that taught us how to do our jobs better. Fortunately the professional community of avalanche workers in western Canada was ready for 2008-09. The CAC's public avalanche safety programs were in place and highly reliable, allowing many user groups to benefit from them.

Unfortunately 2008-09 took its toll, with snowmobilers in particular. While 2002-03 will be remembered for the loss of seven young lives in a massive avalanche in Connaught Creek, 2008-09 will be remembered as the year of multiple snowmobiling avalanche fatalities.

For the professional avalanche community, the spring and summer is a time of deep reflection. What worked well? What didn't? How can we do better? These three questions are really the fundamental reason why over 200 of the leading avalanche practitioners in the world descend upon Penticton every May. The CAA and CAC Annual General Meetings and Spring Conference is entirely about reflection. Listening to case histories from the winter just melting, finding out about new findings from the research community, and discussing—sometimes debating—on how new knowledge and learning can be integrated into frontline best practice.

For the general public, 2008-09 was a very different winter. From the many conversations, e-mails and discussion board postings I read this winter, it would seem this winter was far outside most of the general public's frame of reference. Certainty this was true for the snowmobiling community. The fundamentally weak snowpack combined with improvements to mountain snowmobiling technology created a deadly combination. Any recreational snowmobiler, experienced or not, can access roughly the same amount of avalanche terrain as a heli-skiing group led by a highly trained and certified guide.

The depth of expertise, awareness and knowledge between the two users differs on an order of magnitude; this winter was a winter where that difference meant life and death. Avalanches are something that sift in and out of public conscience with the seasons, sometimes all but forgotten until some unspeakable tragedy strikes one snowy day. While professional avalanche workers remember the unusual winters and pass that knowledge down to the young technicas in training, the recreational backcountry traveler has no mechanism for maintaining this living memory of winters past.

In 2002-03, the coordination of public avalanche safety in Canada was little more than an orphan program kept alive by the professional avalanche community in western Canada through the CAA—the professional association. Then tragedy hit—29 lives lost, 14 in two accidents just two weeks apart. The winter of 2002-03 was the catalyst for an incredible amount of change for public avalanche safety in Canada.

In 2004 the CAC was born as Canada's national public avalanche safety NGO, and with wide stakeholder support and encouragement, the team at the CAC was off to a blindingly fast start. Now, five years later, we are once again looking back at a winter of sadness—26 lives lost, 19 snowmobilers. Remarkably, not a single recreational backcountry skier was killed in western Canada this year.

However, out-of-bounds skiers were caught this year. Long known as a high risk group, one of the main aims of the CAC's ADFAR2 project is to take a thorough and in-depth look at this user group to try and understand what makes them tick. A better understanding the target audience can help shape communication and prevention programs. Indeed that is what the CAC has set out to do, unfortunately not soon enough for the four individuals who lost their lives in out-of-bounds areas this winter.

And then there were the snowmobilers. Not much else needs to be said that hasn't already been said. Intense media coverage, unspeakable tragedy and an accident that kept repeating itself all winter—terrain choices far outside what the conditions of the day, indeed of the season in general, could tolerate.

Five years isn't a long time. The CAC has had many successes over that period of development and growth. But in terms of the snowmobiling community specifically, 2008-09 is a winter where we know all too well our job has only begun. 2002-03 was the catalyst for change for coordinated public avalanche safety in general in Canada. Will 2008-09 be the catalyst for change for avalanche safety in the snowmobiling community?

Look back at the last four or five issues of this journal—snowmobiling has been a central focus of many of the articles published. We've known for a long time this user group is high risk, and we've been doing all we can to address the issues as best we can. More work needs to be done, a lot more. The first public avalanche bulletin of 2009/10 is only six months away.

Lets hope this past winter can help pave the way to proactive prevention and safety initiatives for next season, and all seasons to come. We need your help, especially the snowmobiling community's help, and everything must be coordinated. We know what fractionalized public avalanche safety programming gets—it's eerily reminiscent of the years previous to 2002-03. With no central agency coordinating prevention and awareness initiatives, the message gets lost all too easily and the end user is no further ahead. Now is the time to coordinate our actions, because only by working together will we stop the rising trend in snowmobiling avalanche fatalities.

One of Clair's famous quotes was, "Our very best is barely good enough." As we all know, that's painfully true but when we coordinate and work together, our best can be remarkably effective. Indeed this has been the hallmark of the CAA and CAC since the beginning. While it may be June, with the snowline rapidly disappearing, it may be easy to let the events of the last winter fade in our memory. I would challenge you all—professional and recreational alike—to stop, reflect and learn. Let's not leave a winter like 2008-09 behind.

Professionals are busy at work debriefing the winter, writing up operational and annual reports and developing their avalanche safety programs further. Staff at the CAC are doing the same for public avalanche safety programming for next winter. For the rest still reading this article, especially if you are a recreational snowmobiler, skier or snowboarder, take a moment to remember this winter. Burn it into your memory and don't forget it. It's winters like the one we just had that makes avalanche workers better, so let it help you be better out there as well. The decision not to high mark a slope or ski that line you've been eyeing for years is a good decision on a year like 2008-09. Don't forget that, and next time you encounter a persistent weak layer or a period of elevated danger, remember as all professionals do.

Have a great summer everyone.

Evolution

It is truly amazing, or mildly interesting at the very least, what themes become important to a person at various stages of their live. I once revelled in punk music whereas now I prefer Neil Diamond. This notion applies to the evolution of an organization as well. Look at the CPD events as good examples. Over the years the subject matter has ranged from practical sessions to almost philosophical discussions such as 2004's "Professionalism at a Crossroads." The focus shifted back this year to a highly practical examination of the phenomena that haunts all avalanche workers—the persistent weak layer.

From a board of director's perspective we too do a CPD session that we refer to as a board development workshop. Themes have shifted and evolved in these sessions as well. When I first started on the board, the workshop was specific to board development in the most essential sense. We discussed at length the role of the board, the configuration of the board, the goals of the board and even what type of board we wanted to be. Fascinating. After a number of years on the board we are back to this most basic question. In order for the CAC and CAA boards to function well they must thoroughly understand their roles and responsibilities and how the landscape is changing around them.

I have written about how the CAA board has evolved from a working board to a policy governance board. The CAC board borrowed heavily from the CAA's experience, skipping the working board phase and began functioning in the policy governance realm right away. This model has served us well in many respects but seems to subtly miss the mark in other ways. We have been pondering the options for a more contemporary model for board governance. Enter the "Contemporary Model of Board Governance".

This model is not far from the one we have evolved to using intuitively. But since this evolution was somewhat ad hoc we perhaps missed some of the important principles.

Thomas Abbott of Association Management Consultants sets forth ten principles of contemporary board governance. I won't go through them all but I will touch on a few of the key considerations.

First the board is accountable for the governance as well as the management of the association. While there must be a division of labour between the ED and the board, the buck stops with the board. Second, the ED is designated as CEO, which in business terms means the ED is the officer who has ultimate management responsibility for the organization. The board holds that individual solely and completely responsible for managing all aspects of the association.

This highlights one area where we need to concentrate our efforts; the board will redefine and approve Code of Conduct documents for the directors as well as the ED. These documents have existed but need work with the goal of reducing surprises, helping set realistic expectations and increased accountability. These themes and more will have been well fleshed out at our June board development workshop.

Those who missed the spring conference and AGM may be interested to know the proposed by-law amendment to remove the "in Canada" references regarding membership eligibility has passed. With a near unanimous vote (save for a few abstainers) the membership has concluded that avalanche practitioners from any country in the world who meet the existing standards for CAA membership, and who commit to continuing professional development, will be allowed to become members. The first few applications will no doubt be a bit of work to wade through prior learning evaluations and substantive equivalencies. But following a principled approach the process should become streamlined and efficient.

The CAC has wrapped up another successful but intensely busy winter. After a full five years of operation the CAC is maturing and is widely recognized and respected as the voice of public avalanche safety in Canada.

The sun is shining so I'm signing off. Enjoy your summer.

president@avalanche.ca

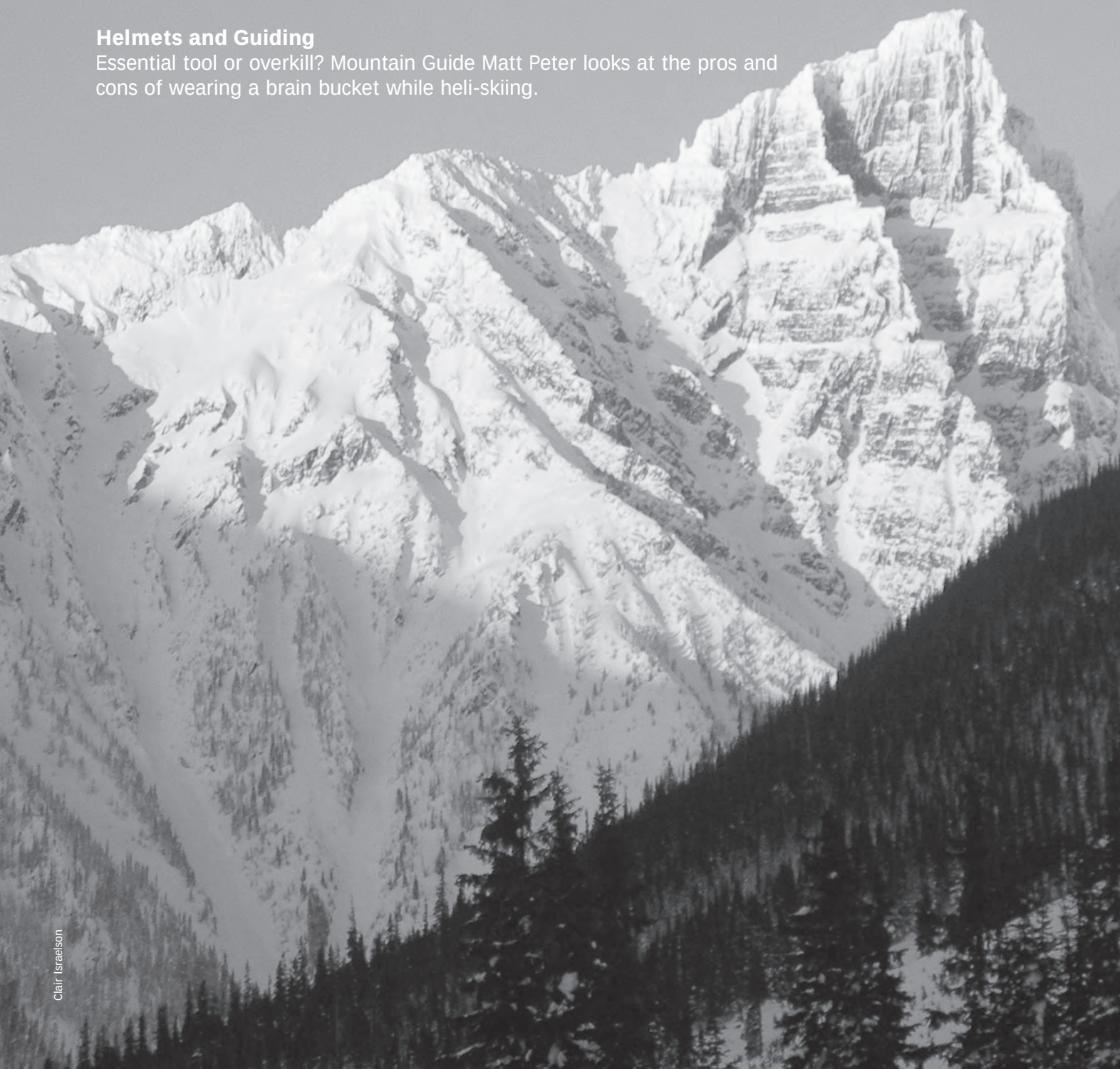
Coming up in the fall issue:

Level 3 Avalanche Risk Management
Chris Stethem gives us a look behind the scenes at the development process of the CAA's highly anticipated new course.

Airbag Use
Ilya Storm t aims to get a handle on airbags and avalanches in Canada

A Conceptual Model of Avalanche Hazard
One of the objectives of the avalanche danger scale project was describing a method for evaluating avalanche hazard. Grant Statham will explain the results.

Helmets and Guiding
Essential tool or overkill? Mountain Guide Matt Peter looks at the pros and cons of wearing a brain bucket while heli-skiing.



Clair Israelson

Audit!

A user's guide for the audit process

By Ken Bibby

As you may or may not know, the CAA's board of directors authorizes and requires the Director of the Membership Committee to randomly select ten professional and five active members annually, and audit their documentation for CPD program compliance. So what does this mean to you?

If you are the lucky recipient of a CPD audit notice from the membership committee, it means your name was randomly selected from the current membership list. Randomly selected, eh? Our incredibly complicated mathematical formula for random selection was published in Vol 86 of *avalanche.ca.* After it appeared, one of our members wrote to me and said, "Ever heard of picking names from a hat?!" Wish I had thought of that.

So with audit letter and the CPD policy document in hand, you sit down at your computer to figure it all out. Here's how it should go.

CPD Policy Document

The CPD policy document has everything you need to complete your audit. There is background and big picture information as well as the lowdown on the intent of the CPD program, its authority, the audit process and the appeal process. "Appendix 1" outlines CPD requirements and discusses where a professional or active member can claim points and how many points can be claimed per activity.

"Appendix 2" is the form you need to fill out and return to your membership committee representative. Take a look at the next pages for an example of appendix 2, filled out by our very own Rocket Miller. Of course, this form should be filled out on an annual basis anyhow and so forwarding the already "solid" document will be a breeze. There are also a few things that everyone should be aware of:

1) Three-year Record

You need to provide information on your CPD activities for the previous three years. To be specific, if you received an audit letter in April 2009, we need information for the 08/09, 07/08 and 06/07 winter seasons. If you have only been a member for a couple of years, then we need the two-year running total. Brand new members (<1 year) are exempt from the audit.

2) Timeline

- April 15, 2009 – notice of audit selection (email)
- July 1, 2009 – first reminder sent out (email and phone)
- August 1, 2009 – second reminder sent out (email and phone)
- August 15, 2009 – final notice sent out (email and phone)
- September 1, 2009 – audit deadline

3) Teeth

So what happens if you miss the audit deadline? If we receive no response and no information, then your membership status will be downgraded to an affiliate member. To regain professional or active status, you will need to reapply for membership in the CAA and pay the application fee again. If you don't meet the CPD requirements for your membership category, your membership status will be downgraded to a type of membership commensurate with your CPD activities.

4) Support

If all your questions are not answered in the CPD policy document, please feel free to contact your membership committee representative for help. That's what we're here for and believe me, we would rather be doing a whole bunch of other things instead of chasing down tardy CPD audits! Have a great summer everyone.

>>Ken Bibby is the Chair of the CAA Membership Committee

Appendix 2

CAA Members Annual CPD Record of Activity

Members are encouraged to use this form to document their CPD activities. Do not send this form to the CAA unless requested to do so by the Director, Membership Committee. **Keep this record in a safe place.**

Name RICHARD MILLER — CPD for calendar (membership) year 2008

Practicing ~~Professional member~~ ✓ — Non-practicing Professional member ____ — Active Member ____ — Career Recess? ____

Signature [signature] — Today's Date

Date	CPD Category	Activity (describe)	Location, organization, other details	CPD points earned	CPD points claimed this year	Carry over to future years
080110	Presentation	MC-Avalanche Awareness Days	Banff Centre for Mountain Culture	3	3	
080308-15	Presentation	CAA ITP Level 1	L. Louise AB	70	17	53
0805 03-07	Informal Learning	CAA AGM Week	Penticton BC	20	10	10
0809 22-26	Informal Learning	ISSW	Whistler BC	30	10	20
0810 18-20	Formal Learning	Wilderness First Responder	CANMORE AB	24	22	2
080505	Formal Learning	CAA AGM CPD seminar	Penticton BC WSBC	8	8	
2008	Professional Practice	EMPLOYMENT	L-LOUISE SKI AREA	50	50	
2008	PARTICIPATION	COMMITTEE WORK	CAA Membership	10	10	
2008	PARTICIPATION	MENTORSHIP	Mentoring aspiring CAA members	10	10	

This year's totals	225	80	145
Previous year's totals	161	80	81
2 year old totals	170	80	90
Current running 3 year total	556	240	226

CAA Approved Interim Continuing Professional Development Policy 060611.
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Membership Committee Report

By Ken Bibby

The CAA Membership Committee has been busy—23 professional, 21 active, 13 affiliate and five new associate memberships were approved over the winter. The CAA now has a total of 846 members: 48% professional, 16% active, 23% affiliate and 13% associate. Overall membership growth as a percentage has slowed, but we're still growing and more applications continue to roll in.

We created, tweaked and ironed out the new CPD audit process (see Audit! on p xx of this issue), completed our 2008 audits and sent out notices to the members who are up for audits this year. We've also spent a bunch of time considering and discussing various issues that came up over the year:

- Regarding professional membership applications, our bylaws currently read that an applicant must have been: "…engaged full-time in avalanche related activities…." What does full-time mean to you? And what does it mean to the membership committee when wading through an application for CAA membership? Rocket Miller posed this question to various key industry stakeholders, crunched the numbers and came up with a total that we felt would make a good "lowest common denominator" between all sectors of our industry. That number was 56 days per season and was presented to the membership at the AGM. We received overwhelming feedback the number was not high enough. And so we'll be heading back to the drawing board to agree on a higher number and create a policy that clarifies this ambiguity.
- Our bylaws also currently state that a professional membership applicant must have been engaged full-time in avalanche-related activities for four of the past six years (or) "…was the direct supervisor of one or more persons engaged in such activities." While this addresses the fact that many of our most senior practitioners now have desk jobs but are no less valuable to our association as professional members (they are in fact a crucial and integral part of our membership), it also opens up the door below the bar for those who have just completed their ITP L2, don't have the requisite experience for professional membership but are in some sort of "supervisory" role to become professional members. Yes, we received an application that looked just like this. So the membership committee feels the need for another interpretation policy so that we can maintain the bar where it should be.
- Given the current political climate, new WorksafeBC regulations and an increased level of public scrutiny and accountability of our association, we've felt increasingly uncomfortable with many of the letters of reference that we receive for CAA membership applications and the application process in general. There seems to be a disconnect between what our bylaws

Silas Patterson

say and the membership's perception of our bylaws regarding minimum requirements for professional and active membership (see sidebar). We've been discussing an overhaul of our application process to get us more in line with best practices for professional organizations. Our summer project…

- Due to our significant workload, we've shifted the onus from the membership director to the applicant when it comes to delving into applications to determine background experience, mileage, etc. In short, if a membership application isn't a "slam dunk," it now gets flipped back to the applicant as "incomplete" and it's now up to the applicant to prove they meet the requirements for membership.
- We had an application for professional membership this past winter that simply didn't look quite right. After a few e-mails and phone calls, it appeared the applicant had falsified the work experience resume provided with the membership application. Membership was denied until the applicant could prove otherwise. This experience brought up some interesting questions. What teeth does the membership committee have in a case like this? What recourse do we have, other than to deny membership? If this person were to reapply next year (with the appropriate work experience) should there not be some consequence for their previous actions? The membership committee feels there should be and we'll be looking into creating a policy that addresses situations like this in the future.

So what does 2009 look like for the CAA Membership Committee? We will be:

- Completing the 2009 CPD audit over the summer;
- Creating a policy regarding the interpretation of our bylaws that speak to the "full-time" and "direct supervisor" issues;
- Updating the membership application form and process;
- Exploring the possibility of creating CAA membership ID cards for professional members—thanks to Ryan Gallagher for this great idea;
- Creating a Membership Committee "handbook" of sorts to amalgamate our collective MembCom wisdom, lessons learned and processes; and
- Attempting to establish policies and procedures for dealing with Prior Learning Assessments (PLA) and determining equivalencies for international membership applications.

Special thanks are owed to Rocket Miller, Mike Rubenstein, Tim Ricci and Johann Slam for their work on the committee this past winter season. Stay tuned, there's always more to come.

>>Ken Bibby is the Chair of the Membership Committee.

Would you write me a letter of reference?

By Richard "Rocket" Miller

As a professional member of the CAA, you may one day be asked to write a letter of reference in support of an individual's application for professional or active membership. You think to yourself, "Sure, why not?" You know you can provide a letter for this person, perhaps you've provided letters in the past. What now? Blast off a quick letter supporting the membership application. Or, ask yourself a few questions first.

How well do I know this person? I may work with them and could give them a great work reference but do they meet the criteria for membership as outlined in our bylaws? Will they represent the membership well? Do they have the miles to really have a solid grasp of what it means to be a professional or active member? How long have they had their Level 2?

It's not a bad idea to ask the applicant to support their request with an avalanche-related resume. That will make it easier on you and ensure the membership is as strong as we all want it to be. And if the person is not quite up to the standards required of professional membership, think about recommending they apply as an active member first. Waiting a year or two before taking on the responsibility of professional membership can be a good place to start for many people.

The prerequisites required to qualify for professional or active membership are clearly laid out in the CAA bylaws and are sufficient guidance in writing your reference (see section 12a, 12b, 12c and 20a, 20b and 20c). Your letter of reference will ultimately bear significance on the membership chair's decision of whether or not to grant membership to the applicant. I urge you to carefully read those sections of the by-laws and be prepared to defend your letter in the event that the membership committee needs clarification. We believe this to be of best interest in maintaining the highest level of professionalism in our association.

>>Rocket Miller is the lead avalanche forecaster at Lake Louise Ski Area and he sits on the CAA's Membership Committee.

Education Committee Report

By Marc Deschênes

This past winter was a busy one for the Education Committee. This report will give a brief summary of the projects we took on.

- Review and provide feedback on the ITP Admissions Policies document in preparation to apply for accreditation with the Private Career Training Institution (PCTIA), the BC body that governs private training institutions). This follows the CAA passing a registration audit with the PCTIA
- Discussion and provide feedback regarding the definition of a CAA Level 2 student, in response to the Worksafe BC regulations. We recommend that the CAA should consider the following:
  - review the L2 admission standards and possibly modify to ensure the focus is on competency rather than a specific tick list.
  - be more inclusive to applicants wishing to become eligible for the L2 program (e.g., international applicants, people with backgrounds outside of ski areas/guiding). Inn short, consider the type of field work
  - determine if a person may be eligible to become Professional member without L2
- Review and provide feedback on the Avalanche Hazard Forecasting and Risk Management course overview in order to move forward with the development of the DACUM and lesson plans.
- Sylvia Forest and Cam Campbell served on a committee, as Educational Committee members, to review an assessment appeal from a L1 student.
- Review and provide feedback on the revised L1 student manual following the feedback provided by the instructor group during the 07-08 season.
- Prior Learning Assessment Recognition for Module 2 of the L2 program

The ACMG training courses have successfully shown that candidates of the Assistant Ski Guide program are receiving the required training/skills development of the CAA Level 2-Module 1 concepts. As a result, there was agreement that L2 applicants with an ACMG Assistant Ski Guide certification will now be granted exemption from the L2-Module 2 course.

- Discussion, comments and guidance with regards to the "grandfathering" process issue for the Qualified Avalanche Planner designation aimed at senior, highly experienced avalanche practitioners. This issue is not resolved. Due to the nature of the WorkSafeBC regulations, guidance is requested from an outside professional consultant who specializes in these types of regulatory processes.

>>Marc Deschênes is the Chair of the CAA Education Committee

Explosive Committee Update

By Scott Aitken

It's late May and the last avalanche control shots this past week have mitigated the threat from those drooping cornices in the Coast Mountains. I've never been happier to see a layer melt as the December depth hoar/crust combo!

The CAA Explosive Committee continues to engage our partners at WorkSafeBC and Natural Resources Canada Explosives Safety and Security Branch (NR Can). The result will keep our industry procedures reflecting the best practices.

- The committee is reviewing and updating avalanche control guidelines with Daryl Mellquist, Blasting and Diving Certification Services/WorkSafe BC. August 2009 is our deadline.
- All Avalaunchers have to meet compliance regarding engineered drawings by Nov 2009. Some operators have opted to purchase new pneumatic cannons instead. The guidelines and required compliance issues are available through Daryl Mellquist Avalanche Coordinator WSBC. darylmellquist@worksafebc.com
- Blasters who store explosives must be in compliance with magazine surveillance requirements (Directive Letter #61). The compliance deadline for this was May 2008. The Mag Guard System is being re-engineered into a more interactive platform. Owners met with representatives to discuss improvements during the CAA meetings. NR Can is aware of the challenges. There have been no reported problems with the Touch Probe System for daily surveillance.
- It has been highly recommended by NR Can that explosive magazines be emptied for the off-season period. These recommendations often become policy at a future date.
- The CAA will soon tender a contract to produce new teaching aids for hand charging, cornice blasting, helicopter deployed charges. Thanks to CIL/Orion's Everett Clausen for project support over many years.

The CAA Explosives Committee welcomes two new members: Joe Lammers, Patrol Director from Revelstoke Mountain Resort, and Craig Sheppard, a veteran from Lake Louise Mountain Resort. The committee also has a new chairperson. Scott Aitken is an Avalanche Technician with MOT who learned his craft in Fernie. Bernie Protsch the former chair will stay on as a member of the committee. Thanks go out to Bernie for his leadership and hard work as chair over the past years.

Many professional members have provided input regarding the review of the existing avalanche control guide lines. Thanks to all who gave their learned feedback. Avalanche control procedures will be embedded in the terrain atlases in our workplaces.

>>Scott Aitken is the Chair of the CAA Explosives Committee

Steve Parsons

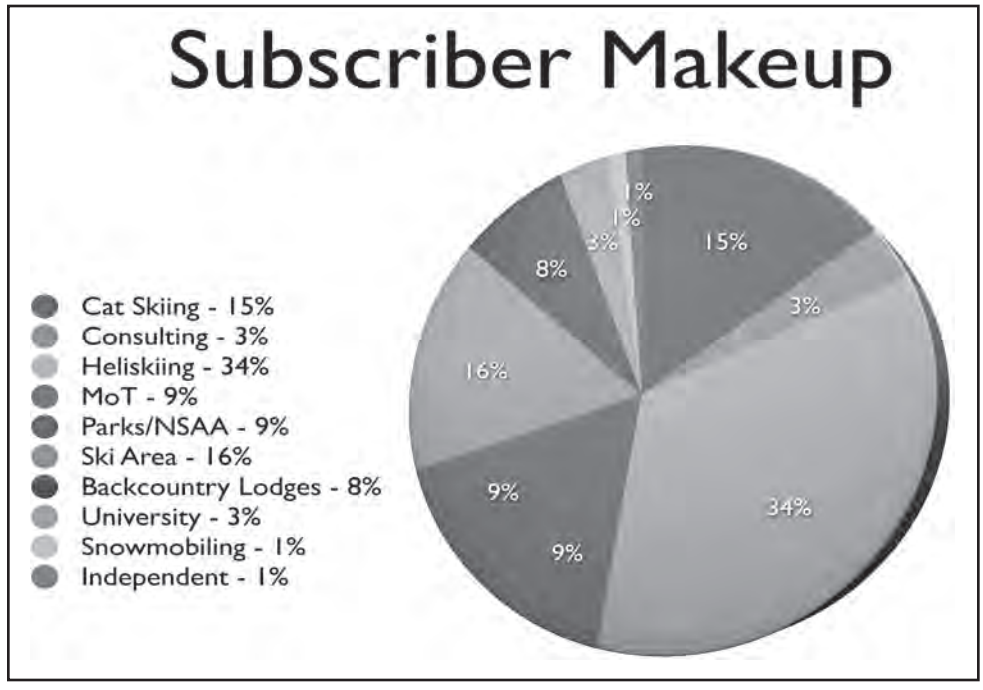
InfoEx Update

By Ian Tomm

Information exchange has been a core focus of the CAA's since its inception. Thinking back over the past couple of years, InfoEx has undergone some pretty significant change recently. We've very successfully transitioned to a fully automated database-driven system, and now this year we've worked on refining our code to allow third-party data management systems to contribute directly to the daily exchange.

A complete overhaul of the subscription models, the first since InfoEx began in 1991, occurred last year. This has resulted in not only increased customer satisfaction but has also allowed smaller operations, such as many members of the Backcountry Lodges of BC Association, to join the exchange. The value of InfoEx to subscribers and to public avalanche safety in Canada grows exponentially with each additional subscriber and their contributed data. I'd like to take this time to thank the InfoEx subscribers for their continued confidence in the CAA to manage and host this program, now entering its 19th consecutive season of operations.

Be on the lookout for new and improved data visualizations and a revamped InfoEx web portal for next season. And for those who haven't heard yet, if you are a Professional Member of the CAA you can get an individual subscription now to the daily InfoEx reports. I'd encourage all members who don't have access to InfoEx on a daily basis to consider an individual subscription and to start submitting data from their own activities into InfoEx.



Annual InfoEx Subscription Rates

10% discount for CAA members. An additional 5% discount is offered for subscribers to both InfoEx and CAA Weather Forecast Services.

Class A: $465

- few avalanche workers (1-2), small client base and small tenure area. (e.g., non-mechanized backcountry lodge, small ski area with very small avalanche control program).

Class B: $1000

- some avalanche workers (2-5), small to medium client base (e.g., cat or heli-skiing operation, typical ski area with control program, highways program).

Class C: $2500

- many avalanche workers (>5), medium to large client base (e.g., large heli-skiing organization with numerous machines out of a single base area).

ITP Season Report

By Ian Tomm

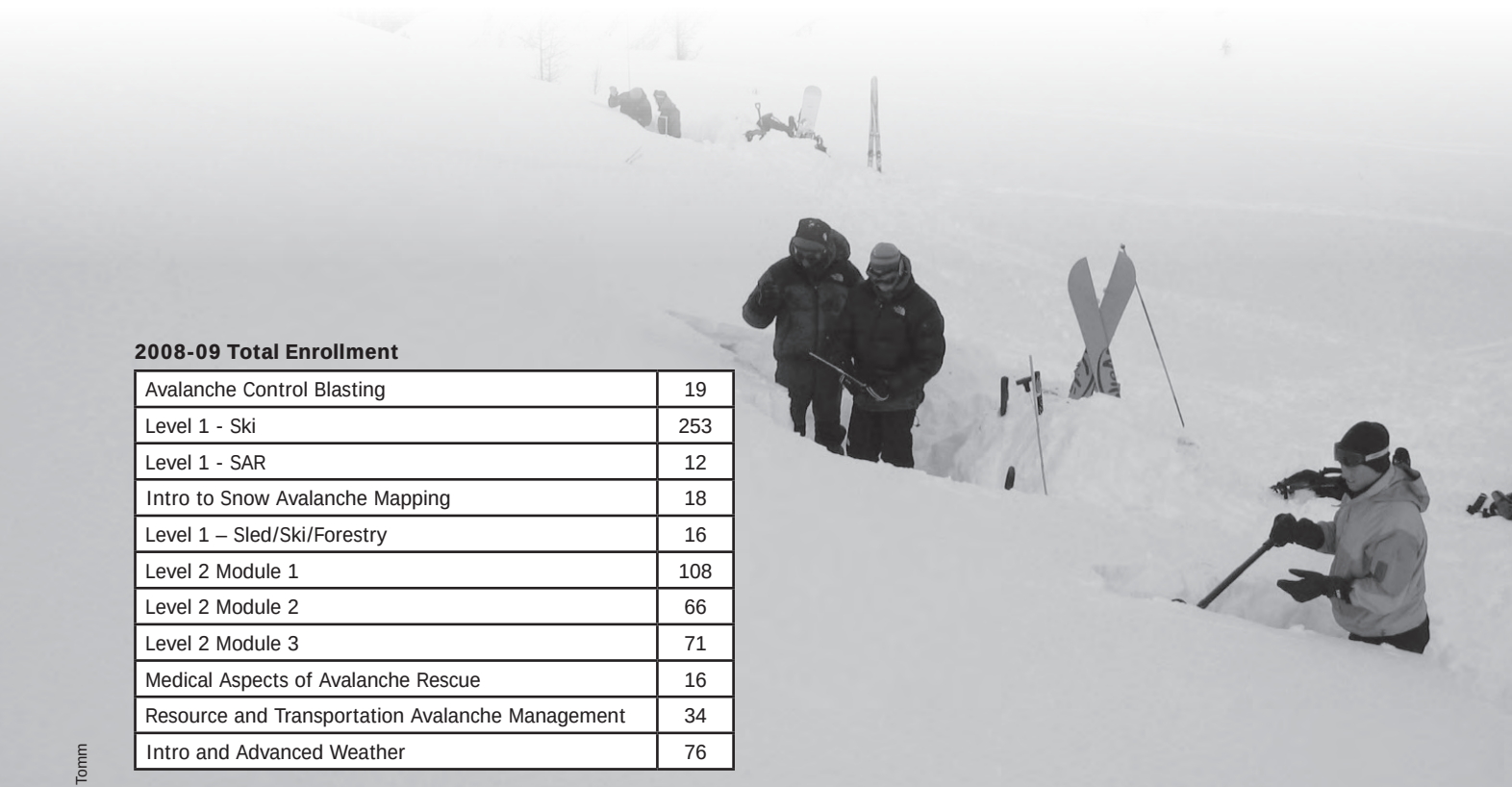
The Industry Training Program is soon to enter its third decade of operation under the management of the CAA, and close to celebrating its 40-year anniversary of training for frontline avalanche workers (the first Level 1 was run in the first week of December 1971). The strength of our training programs, the professionalism they foster and the international reputation they have earned help ensure a robust future for our organization. Our CAA Level 1 program (now in Ski, Snowmobiling and SAR specialties) is considered the minimum level of training for any individual employed in a professional capacity in avalanche risk management work in Canada

At 702 students, the 2008-09 season was an incredible year for the ITP. Looking forward, registration for the CAA's Level 2 program for next season remains strong, and interest in the new Level 3 program is very high. Phone calls from industry regarding our Resource and Transportation programs become more frequent by the day.

This past season's numbers might be hard to repeat but the infrastructure we have in place is scalable, purposefully structured to accommodate the annual fluctuations in enrollment and demand. I think we can look towards another successful year of ITP operations in 2009-10, calls are already coming in for specialty courses motivated by the Olympics and enrollment (or pre-enrollment interest) remains high for all of our programs. If anything, regulatory change like the recent amendments to the Occupational Health and Safety regulations of WorkSafeBC have only solidified the CAA's Industry Training Program as the go-to place for professional level training for frontline avalanche workers in Canada.

Special thanks to:

Mark Bender	Matt Peter
James Blench	Mike Rubenstein
Brad Harrison	Dave Smith
Phil Hein	Randy Stevens
Wren McElroy	Amber Wood



Ian Tomm

2008-09 Total Enrollment

Avalanche Control Blasting	19
Level 1 - Ski	253
Level 1 - SAR	12
Intro to Snow Avalanche Mapping	18
Level 1 – Sled/Ski/Forestry	16
Level 2 Module 1	108
Level 2 Module 2	66
Level 2 Module 3	71
Medical Aspects of Avalanche Rescue	16
Resource and Transportation Avalanche Management	34
Intro and Advanced Weather	76

CAA and CAC Service Awards

Members recognized for their contribution to professional and public avalanche safety

Our first annual CAA and CAC Service Awards were a great success. The number and quality of nominations that came in was an amazing reflection of the depth and breadth of the avalanche safety community in Canada. The difficult job of choosing the winners was the left to the board of directors. "The choice was so hard to make that we ended up giving two awards for each category," explains President Steve Blake. As you'll see, the awards are more than well deserved. Congratulations to the winners as well as everyone who was nominated. We're looking forward to a similar response next year!

CAA Service Awards

President Steve Blake, Everett Clausen and CAA Director for Professional Members Mike Boissonneault.

Everett Clausen

As the head of CIL/Orion, Everett was recognized for his leadership in providing the avalanche industry in North America with dependable and high-quality explosive products. "The industry is certainly safer, more effective and efficient because of the leadership, efforts, abilities, approachability and sincerity of Everett Clausen," wrote his nominator. Everett also donates annually a percentage of CIL Orion's profits to the CAA and the American Avalanche Association.

Randy Stevens

Randy's nominations included references to his "lengthy history with avalanche training programs" and kudos for "sticking it out with the snowmobile ITP classes." Randy has been a leader in avalanche education for many years and his influence is felt in many sectors of professional and public education. For his part, Randy said he was honoured to be recognized by his peers. "I'm amazed at the dedication and passion of our membership," he said. "I feel privileged to be part of this team."

Randy Stevens and Steve Blake.

All photos Mary Clayton

CAC Service Awards


Gord Ritchie, Kirstie Simpson and Steve Blake.

Kirstie Simpson

Kirstie has been actively promoting public avalanche safety and teaching avalanche courses in the Yukon for over 18 years. She is a long-time member of CARDA, and is currently working her third validated avalanche rescue dog. "Kirstie has shown remarkable determination in establishing public avalanche safety initiatives in the North," wrote one of her nominators who also noted her ability to work with a wide variety of agencies to effect change.

Lori Zacaruk

Lori's name has been synonymous with snowmobile avalanche education for a number of years now. Zac's Tracs, the company she owns with her husband Randy, is the single largest snowmobile education provider in Canada. Lori is also an integral part of the CAC's snowmobile outreach team, reaching hundreds of backcountry users each winter. Lori's commitment to avalanche safety has made a real difference and, as her nominator wrote, was "much needed and appreciated this year!"


Yamaha representative Randy Swensen, Lori Zacaruk and Steve Blake.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2


Alpine Club of Canada
3


4


5


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6


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10
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HE RESCUE SYSTEM
11
SNOW SAFETY
OVOX
12
Mount Revelstoke & Glacier
PIEPS

Dave Mossop

Dave Mossop

A huge "thank you" to all our sponsors and associate members who made the Tradeshow/Pro Purchase evening a success.

Pages 20-21

1. Manuel Schmidt of ABS had the company's airbag systems on display.
2. Arc'teryx Designer Mike Blenkarn was ready to answer those all-important gear questions.
3. Executive Director Lawrence White was on hand to represent the Alpine Club of Canada.
4. Backcountry Access western representative Felix Camire shows off their new Tracker beacon.
5. Daniel Curry explains the features of the Avert software system.
6. Chuck Gorton and Jocelyn Wilson demonstrated the Snow Pulse airbag system.
7. David Sly of CIL/Orion gives a hands-on tour of the Nitro Express.
8. Othmar Kagi of Swiss North Marketing had all the latest technology from Pieps.
9. Errol Tolentino of Umbrela Environmental Solutions displayed his company's new weather monitoring system.
10. Bart Ross demonstrated some of the features of the RECCO system.
11. Ryan Johnstone of Ortovox talks with Steve Conger.
12. Danyelle Magnan took questions at the Parks Canada booth.
13. Yamaha's display of one of their newest machine had many onlookers checking under the cowling.

Facing Page:
Despite the lack of the usual sunny weather, the courtyard social was a popular event and the Penticton Ramada did a great job with the dinner and beverages.

Everett Classen of CIL/Orion shows off the new Nitro Express projectile to Gord and Debbie Ritchie and their nephew Rory Allen.

All photos Mary Clayton

VOLUME 5 PHOTO CONTEST

Do you have a great photo of an avalanche in action or an avalanche involvement? Enter the Volume 5 Photo Contest and you could win: Marmot Twilight two-person tent, Marmot Eiger 65 backpack, $500.00 and your photo on the cover of Avalanche Accidents in Canada Volume 5!

Each entry must include the date and location of the photograph and details of the incident. No fatal accidents please.

Entry Deadline: Entries must be received by July 31, 2009.

Photo Formats: High resolution digital (minimum 3 MB in size). No digitally altered images will be accepted. Images must be JPEG, TIFF or RAW format only; all other formats will not be accepted. Digital images may be received on CD, DVD and e-mail bstrand@avalanche.ca (please put "AvAcc photo contest" in title).

AST Wrap-up

Great season includes improved online enrollment and more courses for snowmobilers

By Nancy Geismar

2008-09 was another successful year for the Avalanche Skills Training (AST) program. Instructors could list their courses online and potential students could find courses in their region. The CAC website has been extremely beneficial to many AST instructors (one instructor said his business was booming from website enrollment). We encourage AST instructors to use this resource; you will find that the process has been streamlined and hopefully simplified for all to use.

The numbers of students put through the AST program this past year was very close to last year's totals with 4528 AST 1 and 396 AST 2. This was the second year of AST courses for youth and those numbers were slightly down from last year's tally. We are hoping to turn that around this coming season as we have a new website tab aimed at this market where we list AST instructors who teach courses for teens, either youth specific or incorporated into adult groups.

We are seeing more interest from the public in snowmobiling AST courses. This past season saw an 18% increase in snowmobilers (based on book sales of Sledding in Avalanche Terrain) and we expect this number to increase again next season. For course providers who teach snowmobile courses, there is a sled icon next to the contact info to make it easier for students to find them. We also have a new sled landing page (check out www.avalanche.ca/sled) where sledders can find info on bulletins as well as an AST instructor list sorted by region.

At the Annual General Meeting in Penticton we had 22 AST instructors attend the AST meeting. Much of the meeting was spent learning more about ADFAR 2 from Pascal Haegeli and having a discussion about obvious clues, terminology, use of the Avaluator by novices as opposed to more intermediate learners, and rule-based versus more experienced-based decision making.

Pascal would like any comments or thoughts from AST instructors on the Avaluator. As well, he would like AST providers' thoughts on a field book for AST 2 students, modeled after the CAA 1 field book, which would assist students in making more detailed terrain assessments and facilitate information gathering. If anyone would like to add input into this discussion you can contact Pascal at pascal@avisualanche.ca. For 2009-10, AST providers will be using the same Avaluator sold this past season. Pascal hopes that a new and improved Avaluator will be available for the 2010-11 season.

The Mountain Equipment Co-op is AST's supporting sponsor. MEC donated $17,500 this past year as well as in-kind donations towards the AST program. MEC advertises courses on their website and facilitated the CAC developing a Facebook page to attract the younger audience. We advertise CAC events on Facebook (Backcountry Avalanche Workshops and Avalanche Awareness Days events) and an individual can add wall postings, photos or videos to the site. One AST student posted photos from a course and others posted positive comments in regards to taking an AST course. We hope this will assist in bringing more students to AST courses.

We have just begun beta-testing the new Avalanche Skills Training Video Resource which supports the AST 1 and 2 curriculum. You can find this resource at: http://www.avalanche.ca/cac/training/ast/video-resources on the CAC website. Please try it out, test it and let us know what you think. After some testing, we will raise its profile on the CAC website so it is easier for the public to access. If you have other video links that would be beneficial to add to this resource, send them to me at ngeismar@avalanche.ca.

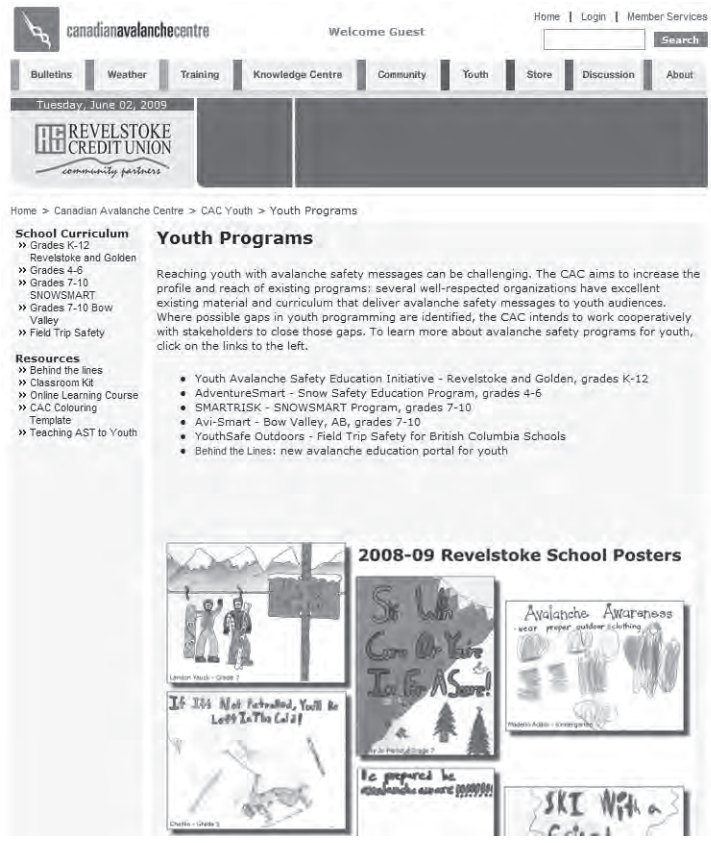
The CAC wants to thank all AST instructors for their dedication in educating the public and providing essential information to the backcountry recreationist. We look forward to expanding and improving our AST network and course delivery for the coming year.

New Tools, New Look

The CAC's Youth website connects kids with backcountry safety

By Bridget Daughney and Nancy Geismar

Forget trying to keep up with the Jones, try keeping up with the youth of today! Never ones for backing down from a challenge, the CAC is trying to do just that with a makeover of the "Youth" tab on our website. We've brought out all the show stoppers—YouTube links, embedded video clips, youth specific course information, ideas and links to the CAF's "Behind the Lines" website, all aimed at youth. We've also created a sub-tab for youth educators, with many new tools and ideas for those who teach avalanche safety for kids.



Why this big makeover? This winter we received numerous emails and phone calls from students, concerned parents and teachers looking for more avalanche information. We want to give all of these groups information and avalanche safety resources that are easy to access. Schools today are well equipped with computers and are using them more and more as a learning tool. What better way than using a tool that everyone else is already comfortable with! How many parents say it's hard to keep their kids off of the computer? Well, why not make it educational.

The main page "For Youth" aims to engage the younger population with videos and imagery. On the home page, we have the CAF's new youth-oriented website "Behind the Lines" embedded as a link. This social networking site allows users to share information, blogs, photos and videos. It also has great safety tips and a knowledge center. It was created through the partnership of the Canadian Avalanche Foundation, the Canadian Avalanche Association, Biglines.com, Rocky Mountain Sherpas and 76 Design.

"The Fine Line" educational DVD has been extremely popular due to its fast pace, artistic cinematography, and clips from skiing, boarding and sledding experts. Recently produced by the Rocky Mountain Sherpas, this film has really connected with the younger audience. So we thought, why not broadcast a good thing? You'll find the teaser for the film at the bottom of the youth page.

From the main youth page, there are also links to YouTube videos, some of which include technical information while others are instructive simply through imagery, by showcasing the power of avalanches. Our aim here is to get away from lengthy text which seems to put off youth learners and instead reach them through accessible visual media.

One of the biggest issues for younger people in the backcountry is that they don't have experience to draw from. Decision making, human factors, terrain choices and other skills are not developed because they have only been skiing/riding/sledding in the back country for a season or two, if that. The CAC thought to address this issue with our new "Mentors" page. This page explains what mentorship is, what you should expect with a mentor and some great places to go find a good one.

This new site also has links which direct the user to Avalanche Skills Training course information, (including a list of AST providers for youth sorted by region), the CAC's Online Avalanche Training Course, Backcountry Checklist and Resources, and links to avalanche bulletins and the weather forecast. We would like to add more photos to the youth site and personalize it for that population. To that end, we plan to have a photo contest or call for submissions from young backcountry users, which will give the site a more colorful and engaging first impression.

Not to be left in the dark we revamped our page for "Youth Educators" to meet the needs of these savvy internet users. YouTube video links were chosen with the idea that they could be used in the classroom. We created a page for curriculum ideas and a resources page. Our goal is to have curriculum ideas available on our website for each grade (K-12) with self-explanatory

instructions on how to teach the lesson to make it accessible to all teachers, with or without avalanche training. Our Resources page gives information on items included in the Avalanche Safety Classroom Kit (these are available for free from the CAC), as well as additional resources such as books and DVDs that can be purchased through the CAC.

One item that hasn't changed is the page with links and descriptions of programs that go out into the community with avalanche education. The CAC's aim is to help all students in BC and Alberta access avalanche safety education. If we can help connect programs and schools that would be great!

Future plans include adding more lesson plans and curriculum onto the Youth Educators' site. The CAC wants to be a hub where educators can share ideas. To this end we have been getting some great ideas and activities from educators from all across the country that we'd like to post and share. We will also be posting SnowSmart's grade 7 and grade 10 curricula online, making it accessible to all teachers at no cost. Along with this is SnowSmart's DVD "Use It or Lose It" which will be available either online or as a resource that we can include in the Avalanche Safety Classroom Kit. Media changes daily and we will continue to add avalanche-related video clips as links on both the Youth Educators and Youth site.

It 's been a blast trying to get all this information together and posted on the web. We are really pleased with the progress we have made on our Youth site and hope that this will help younger backcountry users build their avalanche awareness and education, and help educators as well. We have been getting some great ideas and feedback so the pages are likely going to continue to grow and change over the next year. Keep checking in to see what's new!

>>Bridget Daughney is the CAC Youth Program Coordinator and Nancy Geismar is the CAC Program Services Manager

Beacon practice at Revelstoke Senior Secondary School.

Brent Strand

Lori and Randy Zacaruk of Zac's Tracs present a cheque to the CAC's Jennifer George. The money was collected through donations made by snowmobilers attending the Big Iron Shootout on Revelstoke's Boulder Mountain in late March of this year.

CAC Archives

The Year of Sledding Dangerously

By John Kelly

Graham Helfrick

It began with the Harvey Pass accident on December 28. Eight snowmobilers died in a series of avalanches, amid circumstances that were wrenchingly tragic. Before the season ended there was an unprecedented toll of snowmobile avalanche deaths, representing more than double the previous high-water mark in this category.

Almost immediately as the fatalities began to add up, the CAC avalanche forecasters were seeing common threads in the accidents claiming these lives. In spite of our efforts to craft clear and urgent warnings and to give specific advice on managing a year with a significant persistent weakness in the snowpack, mountain snowmobilers continued to be caught in essentially the same avalanche at a rate never been seen before.

Seasoned professionals remarked to us frequently that the avalanches triggered in these snowmobile incidents were clearly beyond the pale, in terms of the kind of terrain use possible in a year with such a structurally poor snowpack. This conclusion was supported by incident reports and analysis of the incident site photos that revealed some stunningly aggressive terrain choices. As the incident reports piled up, it became obvious there was divergence between the backcountry user groups in how they were selecting where to play in the mountains.

The InfoEx community talked about declaring runs off-limits for the year. Observers of recreational skiing hotspots reported a general decrease in traffic due to snowpack warnings. The snowmobile areas however, continued to see aggressive use of highly complex steep terrain, with a chilling troika of slope characteristics: convex slope shape, thin snow cover, and rocky outcrops or sparse vegetation providing multiple trigger points.

In the majority of reported incidents, a terrain trap magnified the consequences of the triggered avalanche, often sealing the fate of the hapless victim. The traditional snowmobile human factors were also seen. Namely, more than one person on the slope at the same time and people parked in runout zones, exposing themselves to avalanches from above.

It was clear by early January that existing mechanisms—

bulletins, special warnings, media campaigns and incident reports—were not having an effect. From that point forward, the year could best be described as a quest for measures to halt the rising tide. In January we initiated a series of information bulletins with a group of snowmobile stakeholders offering commentary on the challenges that this season was setting up for us (see sidebar).

One of our first questions—and most interesting discussions—was, who are these people getting involved in avalanche accidents? Each subsequent accident involved a victim or a group that seemed on the surface to be different than the last. The victims were equally divided between locals and come-from-aways. Some involved very experienced snowmobilers, others involved riders new to the sport. Unusually, there were several accidents involving members of snowmobiling clubs and a couple involving graduates of recreational avalanche courses.

Our perception of the mountain snowmobiling group has been evolving since 2004. ADFAR trailhead surveys then identified mountain snowmobilers as the most numerous users of the winter mountain backcountry, but with the most conservative risk profile when compared to out-of-bounders and backcountry skiers. This view accorded well with fatality statistics that demonstrated snowmobile fatalities accounted only a quarter of all recreational fatalities—well below what could be expected from the largest user group.

But even with the release of this ADFAR information in 2005 there were experienced snowmobilers who threw into question a broad-brush approach to categorizing mountain snowmobilers. Prominent snowmobile avalanche educator Lori Zakaruk told me on many occasions that there are huge variations in risk taking behaviours within the snowmobile user group. Some sledders are ultra-conservative, while others aggressively test the limits of exposure and triggering on every outing. Disaggregating the snowmobile user group into target segments is therefore imperative from a prevention program standpoint, and pretty standard marketing procedure. By understanding who is at risk, we can produce a strategy on how to influence them.

Frustratingly, we were not able to clarify the picture of the user group substantially this winter, due to the variability in victim profile as discussed above. But we were able to introduce the topic to snowmobile stakeholders and develop a couple of strategic initiatives based on a targeted approach.

On this basis we decided to engage in a couple of targeted activities outside our normal scope of operations. We launched actively into snowmobile discussion forums under the consensus that sledders from Alberta and Saskatchewan were actively seeking out snow conditions from their peers on these sites. Perhaps, it was supposed, these individuals were more likely to be the kind of enthusiastic but unaware sledders who just need to be apprised of the delicate snowpack in order to change their behaviour.

In February we were blessed with a lull in avalanche accidents, but cursed with conditions that, as every day passed, were ripening the likelihood of future occurrences. With time in our favour we took our quest to print media, placing an article directly in community papers across BC.

Thinking about how to influence the user group we decided to try an indirect approach, targeting wives and mothers. All the victims of snowmobile avalanche accidents over the past number of years have been men. Although these guys may not have been paying sufficient attention to assuring proper preparedness, perhaps their wives, partners and mothers have.

"...So how do you know if your man is playing safe out there? Sure, experience is important. But one thing we have come to know over the years—the avalanche doesn't know you are experienced. Here are some pointers to help you figure out if your guy is doing all he can to stack the odds in his favour."

Clearly events as they unfolded gave us pause to wonder if this strategy had any effect at all but our developing stakeholder panel confirmed that it was worth a try, and a tactic that we will bring forward to next year.

Spring efforts became more urgent as the fatalities kept relentlessly mounting. Yes I would say we were flustered at the CAC. It's hard not to take every accident as a sign of failure, and it's hard to watch as the same avalanche accident scenario unfolds again and again.

With some desperation we became very aggressive in our public messaging. In March and April we issued three press releases specifically aimed at sledders. This included a joint press release with the BC Coroner's Service signalling alarm at the dramatic shift in accident trends.

*"**Revelstoke, BC, March 27, 2009:** The Canadian Avalanche Centre (CAC) is calling on the snowmobiling community to help prevent further tragedies.*

'More snowmobilers have died in avalanches in Canada this year than ever before,' says CAC Executive Director Ian Tomm..."

A new departure for the CAC occurred when a posted video of a near miss incident in Clemina Creek went viral on the internet, and we used the opportunity to issue a press release drawing wider public attention to this graphic depiction of "what not to do." Our influence was likely responsible for the national media coverage of this event. In the end it was a very successful awareness exercise but left us with some lingering questions. Once again, we wondered if the messaging was properly targeted. Or, did it hit home with folks already behaving safely and responsibly, leaving the real at-risk sledders completely untouched, perhaps even titillated.

As we moved into late March and April, our focus switched to thinking about the future. Perhaps it is predictable when faced with a difficult reality to daydream about what might happen next year, but really we have come to the hard won knowledge that it takes time and a good head start to mount effective programs. A spring start is barely enough time to put things in place for the following fall.

The main focus of April was stakeholder consultation. Our efforts centred on the need to build a consensus among

Graham Helfrick

interested parties about what kinds of activities and programs might be effective for the user group. Both improvements to existing services and new programs were postulated. To stimulate debate the CAC put together a white paper that outlined 13 possible collaborative initiatives.

We have been open with our stakeholder group that new initiatives will need collective support from the snowmobile stakeholders, including an injection of cash. So, part of the focus of this exercise was to gauge the enthusiasm of the stakeholders for proposed activities and to optimize our chances gaining funding partners.

It has been a difficult sell to the snowmobile stakeholders on the need to bring money to the table for avalanche safety programs. Because they are not versed in the culture and background of the Canadian avalanche safety community it is hard to make them appreciate the impressive collective efforts that supply a foundation to public avalanche safety. The skiing community's in-kind contribution of data and consultation has been estimated at $2 million a year. Skiing-focused interests supply yearly cash funding of over $250,000, and skiers buy the majority of products and services the CAC sells for a further $60,000 to $100,000 dollars of revenue.

This arrangement is not well understood by the snowmobile community who perceive the CAC as more akin to a government agency or a regulatory body with access to a public purse. In order to bring snowmobile-focused avalanche safety activities to life, we will have to rework that perception and obtain vital funding commitments from within the sector.

Our white paper effort went through a couple of rounds of consultation, receiving modest feedback before being presented at the CAC spring meeting in Penticton. There, the stakeholders were invited to identify which initiatives they felt had the best chance of being effective and which ones they were most enthusiastic about.

From this exercise we have recently identified three initiatives to bring forward. These are: development of trail and area signage templates; developing community avalanche bulletins that combine the existing public bulletin with trail and riding information in specific snowmobile areas; and hiring a qualified snowmobiler on the CAC staff. Over the summer we will work on building the infrastructure and support for these initiatives.

Through the same white paper process we also identified areas the CAC will work on with other partners. These are increasing the quality of incident and accident reporting, and supporting research on snowmobiles as triggers for avalanches.

Further to this we are trying to encourage the snowmobile manufacturers to help us market to at-risk sledders. Although they may be difficult to identify and seem impervious to avalanche safety messaging coming from the CAC, one thing we do know is that they buy-in to the manufacturers' marketing message perfectly. These guys have agreed to purchase expensive machinery marketed them as the keys to the mountains. Somehow we need to piggyback avalanche safety messaging on to that same marketing machine.

These initiatives fit within a high level structural framework we have identified as a reasonable target for progress in avalanche safety. For anyone who is familiar with

the avalanche risk reviews from BC and Parks Canada in 2003, this kind of strategic approach will not come as a surprise. Here is what we are focusing on:

Sledders need to be properly informed about the inherent risks to their activity. When people are invited or encouraged to use the mountain backcountry, it is vital that they are informed of the risks they may incur and how they must prepare themselves to properly manage those risks.

Sledders need to know that they must plan their activities according to conditions and not opportunity. More than any other user group, snowmobilers are constrained by commitment-related human factors. The average mountain snowmobiler faces huge expenses and often travels long distances to get to where they can do their activity. If conditions happen to be bad, they still may feel tremendous pressure to go anyway. We have to help them understand how to make relatively safer choices.

Sledders need to be properly equipped with safety and rescue gear and know how to use it. A stance we have sometimes encountered in the snowmobile community is a resigned attitude that avalanche fatalities are inevitable. This may be so, but all of this year's accidents showed serious divergence with one of the three principles listed above. Until we can say that the victims knew the risks, had the information and knew what to do with it we cannot fall back on the argument that *"they knew the risks and made their choice."*

How successful were we in our winter's quest? Well as with all prevention efforts it is impossible to know how effective our actions were in preventing additional avalanche fatalities. What we do know is that, in spite of our collective and urgent efforts, too many snowmobilers perished in situations that were too obviously preventable. Our quest now continues through the summer and into next season.

We do feel an appetite for action from our connections within government and from the public at large. So we can say one thing for certain—change will come in some form. I think we know enough about the prevailing societal mood to know that if change does not come through stakeholder and community action, it will be imposed by the public interest.

"Disappointingly, we received a letter from ISMA (International Snowmobile Manufacturers Association) on June 2, 2009 that states: "The manufacturers, through this organization, are able to extend links off of our web site to your web site and/or other internet sites promoting avalanche safety and awareness, however, with budgets being what they are, there is no way they will contribute money collectively through ISMA to your organization."

Clemina Creek, April 10, 2009.

BCCS

Recognition

A few of us can think back to a special meeting, held in a motel room in Kamloops in 1998. We were discussing the future of the CAA and all the past presidents were there. It's no exaggeration to say the outfit was truly in a total shambles. The cost and effort to support public bulletins were like an anchor pulling us into the undertow and represented a source of conflict among the members. We were struggling to find some funding and the consultant we'd hired told us our accounting and financial management were mickey mouse and we needed to do something about it. He introduced something as fundamental as the need to renew intellectual property and to create an intellectual property fund.

Our scope of practice was under threat from the BC Association of Engineers, there was no risk management, no CPD, insurance was inadequate, we were experiencing major staff burn out and we had no idea what we wanted to be when we grew up. We were hanging on by the skin of our teeth!

Thankfully and remarkably Clair made the decision to take on the role of Executive Director, and what a transformation has taken place since he took over the reins. It's hard to believe we have come this far in such a short time—from tenuous survival to a world class, growing and leading organization.

Here is a brief list of some of the achievements under Clair's leadership. The creation of the CAF as a charitable, fund-raising arm, the creation of the CAC as Canada's national public avalanche safety organization, and a vision for the CAA, CAC and CAF complete with organizational models for each. There is international recognition, a secured (and expanding) scope of practice in western Canada, secure and ongoing funding and productive partnerships with other organizations and sponsors.

The CAA has had explosive growth in its Industrial Training

Program, and members now have an excellent CPD program with annual seminars. The CAA has its own home in Revelstoke (a wonderful real estate investment!) with new systems, new people and new processes. The CAC is recognized as the authority in public avalanche safety, and has moved from an orphaned, unsupported RAC program to the world-class AST with instructor training, and excellent administration and support materials.

The CAA is now a truly national organization, with the CAHG and growing involvement in the Yukon, and Newfoundland & Labrador. It is a learning organization that celebrates its heritage and success; stronger because it understand its roots, history and organizational culture.

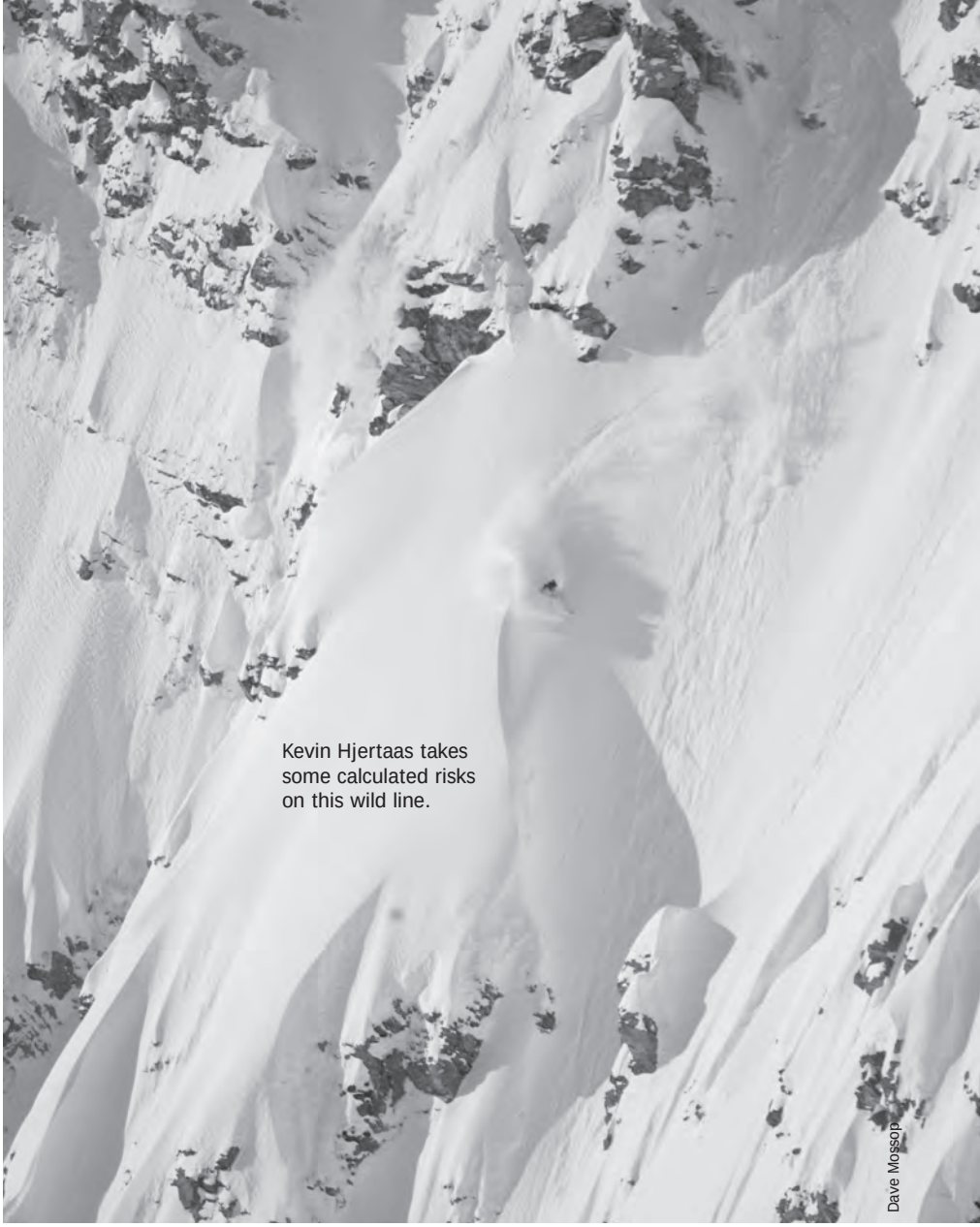
Clair's leadership has played an enormous role in all of these accomplishments, and he can rightfully have enormous pride in the CAA's growth under his direction. We are all indebted to him for the tremendous effort and dedication he has put into the past eight or so years, where he completely reshaped the landscape forever. Each of the CAF Board of Directors want to thank Clair for his contributions and recognize the fact that we would not be where we are today without his contributions.

Sincerely,
Chris Stethem, Jack Bennetto, Gord Ritchie, Peter Schaerer, Scott Flavelle, Donna Broshko, Colin Johnston and Dave Thompson

CAF President Chris Stethem, backed by CAF directors Peter Schaerer, Gord Ritchie and Scott Flavelle, presents Clair Israelson with farewell gifts. The gifts were carefully chosen to reflect the tremendous contribution he has made to avalanche safety in Canada for more than three decades. They included a special certificate of appreciation from the CAF for his contributions to public avalanche safety in Canada, two bottle of vintage Australian red wine and a fishing trip for two to the beautiful Harbourside Lodge in Bamfield, on the west coast of Vancouver Island.

Behind the Lines

New website reveals the secrets behind those wild lines the pros ride



Kevin Hjertaas takes some calculated risks on this wild line.

Dave Mossop

When you were a kid, did you ever try jumping off a roof with an umbrella as a parachute? It worked all the time on the cartoons but, as I can personally attest, an umbrella seriously lacks the requisite drag to slow down a 25 kg eight year old. Robbie Kirkwood probably still bears the scars.

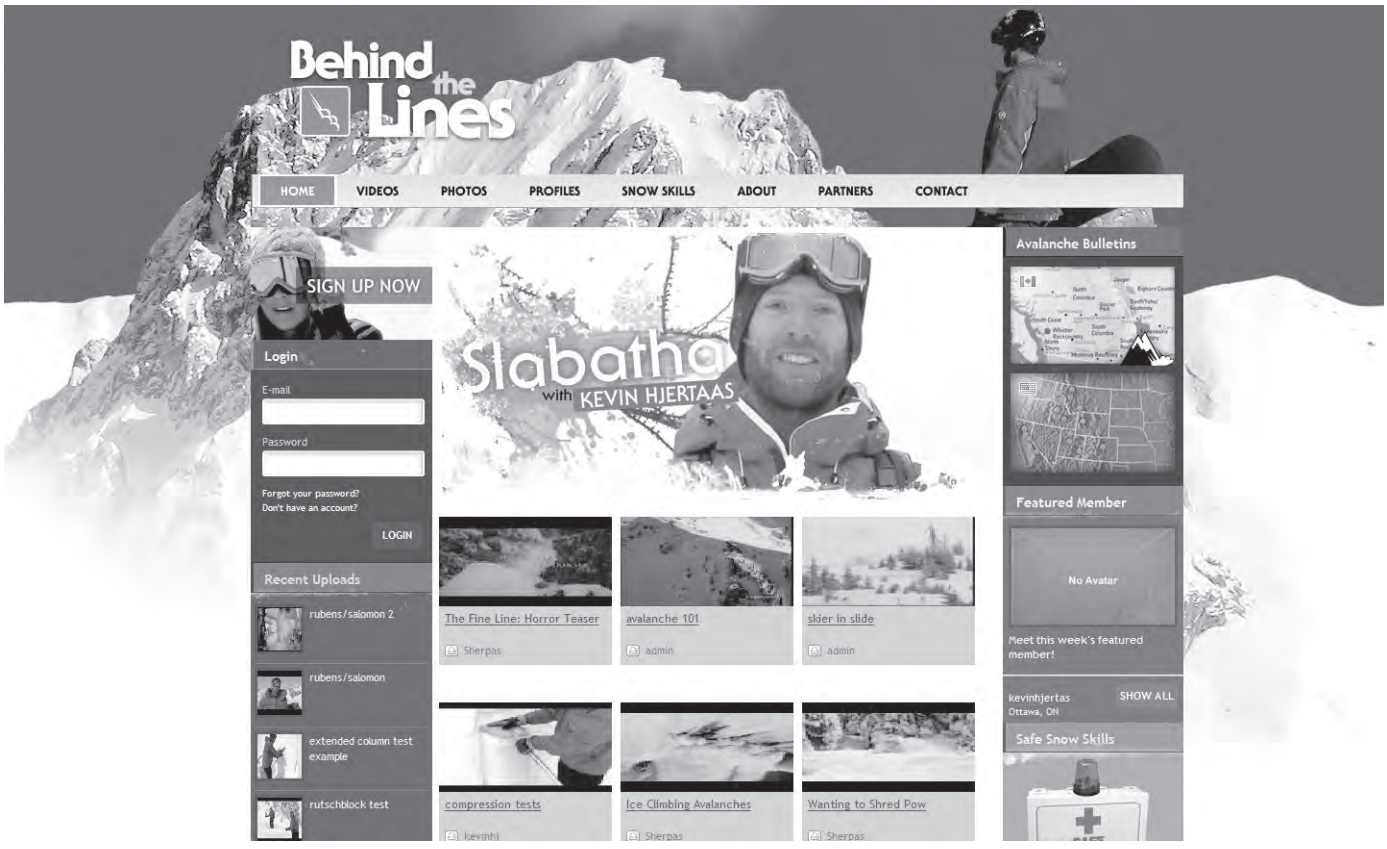
Fast forward a few years (ok, a lot of years) and kids today are seeing way cooler stunts than Sylvester the cat ever stuck. Warren Miller's early ski movies opened the floodgates and now, the definition of extreme just keeps getting rewritten. The effects of these amazing images—with their beautiful snow and spectacular lines—is similar to that which compelled my buddy Robbie to pitch himself off the garage roof. A jolt of reality in the backyard would have saved Robbie a broken leg and a few stitches. That same jolt of reality is needed now in the backcountry to save some lives.

The CAF is hoping their new website "Behind the Lines" will provide that jolt. The site went live in late spring of this year and much work is being done over the summer to have it operating at its full potential for the coming winter. Behind the Lines is an interactive site, where users are encouraged to upload their own videos and photos. The central concept, however, will be videos of and interviews with pro skiers who will talk about the preparation that went into creating the images.

The webmaster is Kevin Hjertaas, a former pro skier and an aspiring avalanche professional. Currently Kevin's own experience is front and centre on the site but "I'm going to get someone else up there as soon as I can," he says. Modesty aside, he tells a pretty compelling story in his online interview, of waiting six years for a window of stability where he felt comfortable enough to tackle a line he calls "Slabatha."

At this point, you have to navigate off the site to see the video of Kevin skiing Slabatha—a jaw-dropping line, on the flank of a peak recognizable to anyone who has ever driven the road to Sunshine Village. In the near future, Kevin plans to have the videos and interviews more closely linked, an approach that seems likely to be highly effective. "I think a lot of kids are interested in the ski movies and pro skiers," he explains. "So we'll be interviewing the pro skiers on the conditions of the day the film was made, whether they used a guide or not, whether they were heli-lifted or climbed the line, details like that. Then we'll get clips of these amazing movies to accompany the interview."

The site is not just about the pro skiers, as the users' own video contributions will also receive high billing. "The idea is to get the kids on there, showing what they're doing and hopefully talking to each other about it," says Kevin. Like any net forum, the discussions will be monitored. When I asked Kevin what will happen if someone posts avalanche safety advice or opinion that's way off the mark, he welcomed the challenge. "We're looking forward to having the users really engage with this forum, and even if they're off base, at least they're thinking," he says. "A situation like that will be a great opportunity for a good discussion."



In addition to all these skiing and boarding videos, there are also tips on snow skills, educational links, and news feeds. Plans for the coming winter include a link to AST courses and an expansion of the snow skills spot to include instructional video. "By fall we want it looking better, with more content and more people," says Kevin. Plans are also being laid for a more high-profile launch of the site as the winter draws closer, with articles in skiing and boarding websites and magazines, as well as other mainstream media.

"Behind the Lines" combines the best of two well-known approaches to prevention education—peer and celebrity testimonials. By revealing some of the mystery behind those extreme images, the CAF and its new website hopes to encourage more aspiring big line skiers to find out more about avalanche and backcountry safety. The words on the home page say it best: "This site is all about teaching you the right place to charge and the right place to ease off; it's about teaching you to pick your pow."

Hey, you want to rip big lines and ski the pow, you want to charge hard? You want to throw down big lines? Then you want to watch out, because you can wreck yourself.
This site is all about teaching you the right place to charge and the right place to ease off, it's about teaching you to pick your pow. So check out our safety tips and our sick videos, or register to add your own.

www.behindthelines.com

Behind the Lines.com was made possible with funding from the CAF's Hugh & Helen Hincks Memorial Fund and the support of Kevin Hjertaas and the Rocky Mountain Free Riders, John Sobol and his team at 76 Design and Malcolm Sangster, Dave Mossop and the gang at the Rocky Mountain Sherpas.

Cool School

Snow safety is on the agenda at schools throughout the Elk Valley, thanks to Fernie Ski Patrol

By Steve Ruskay

Young students from the Fernie Academy tackle beacon practice instead of their ordinary PE classes.

Steve Ruskay

Doesn't this look like a lot more fun than sitting in a classroom?

Steve Ruskay

"Aim your transceiver over here!" yells Jason, an energetic grade six student from the Fernie Academy. Fernie Professional Ski Patroller Meagan gives a chuckle and tells him and the rest of his ski class to continue searching. This group of seven local students has chosen to participate in avalanche education classes as opposed to the traditional phys-ed ski lesson. They are in their seventh week and Meagan, who has taken time out from her regular patrolling duties, has been focusing on companion rescue skills. The team easily finds two buried transceivers and several surface clues. She is impressed with the improvement over the course of the season. Between the snow angels, laughing, and occasional snowball fights, the students are attentive and keen to learn and participate.

Weekly avalanche lessons for local students are just one of many aspects of the Public Education program in Fernie provided by the Fernie Alpine Resort Ski Patrol Team. Each fall, members of the team visit schools all over the East Kootenays and give a one-hour interactive presentation with videos, demonstrations, and a power point slide show.

The local culture in the valley leans strongly to outdoor pursuits, so organizers aim to reveal the dangers in every resident's backyard while educating them how to safely enjoy winter sports. Program coordinators have successfully adapted an existing education program to cater to the unique learning styles of a younger audience. Avalanche awareness programs are now delivered to students as young as kindergarten and participation throughout the season includes ski race teams, youth naturalist clubs, and parents.

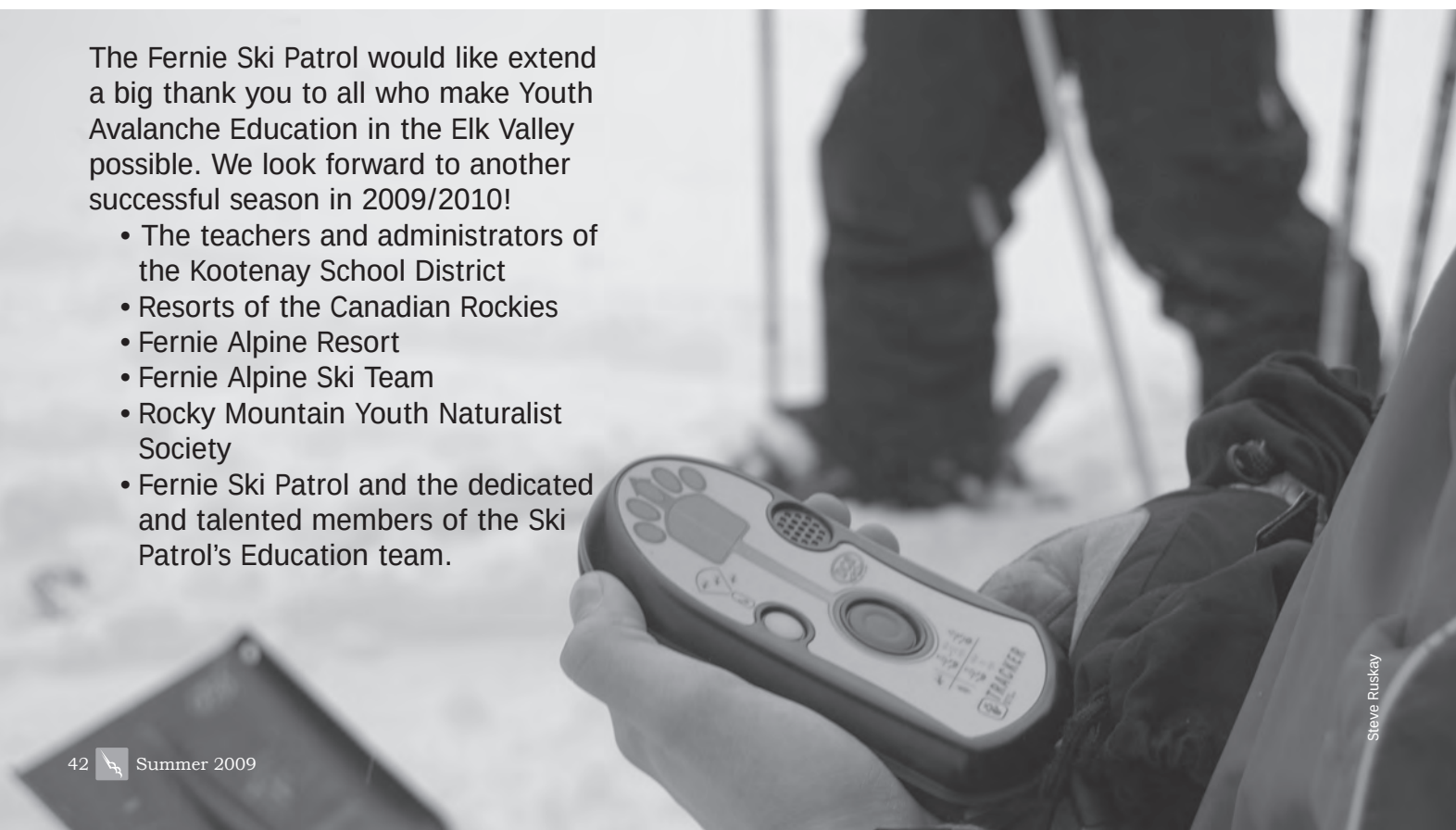
Following the in-class presentations, students are offered avalanche awareness lesson as options for their ski or snowboard lessons during trips to Fernie Alpine Resort. These on-hill practical sessions cover everything from snow profiles and terrain management, to an overview of snow safety operations including control methods and search techniques.

On average, this program reaches 1200 students each year. The education team travels between Kimberley and Elkford, with the majority of time spent in Fernie. Most schools will opt for a more personal presentation of one or two classes at a time. Some larger and secondary schools prefer one large presentation for the entire student body.

Local demographics pose just one of the challenges for program organizers. With only a small percentage of residents interested in skiing or snowboarding, and a slightly larger number participating in snowmobiling, ensuring the information is relevant to all participants can be difficult. With tragic avalanche accidents in the remote backcountry area in the area in recent years, presenters must be sensitive to those students who have lost loved ones, or know others that have. Often it is these tragedies that increase the demand and interest in public avalanche education. Local case studies and first hand accounts are easily supplemented with video and photos from local snow safety operations. Participants leave the program with an increase in awareness and respect for the avalanche hazard regardless of their personal interests.

Steve Ruskay collection

Steve Ruskay is an active member of the CAA and holds a CAA Level 2 certificate. As the reigning 'Griz' champ, Steve works for the Fernie Alpine Resort Ski Patrol as a senior avalanche control route leader, and the public education co-ordinator. During the summer months Steve works in the Arctic, guiding sea-kayaking expeditions.



Steve Ruskay

New Logo for CAHG

By Dominic Boucher

After years of using a version of the municipal logo (that was also found on the recycling bins) the Haute-Gaspésie Avalanche Center finally has its own logo. We find this version a little more a propos and representative of our office but the process was not without its hurdles.

In 2007, we contracted a graphic designer, Monica Gautier. One year passed before we reopened this folder by handing it over to a local design firm, Audace. From the original proposals, Audace came up with many options that were discussed, debated and out-sourced for lots of "no that one is better" talks. The final version was presented to and accepted by the board in mid-December 2008.

We put the logo to use right away on our vehicle and we also created crests for the field team's clothing. They are now more clearly identifiable and this has greatly improved our public image in the area. Of course, the logo is now on our letterhead and all documents. For added visibility we also produced stickers and will have more logoed merchandise next year.

>>Dominic Boucher is the Director of the Centre d'avalanche de la Haute-Gaspésie

Stylin'

New sponsors for the Haute-Gaspésie Avalanche centre keep the forecasters warm and looking good

By Philippe Gautier

As you all know, it is cold, humid, windy and desolate and did I mention windy in the mountains of the Gaspé Peninsula. Last year the program went under a risk management overhaul and we realised that one of our highly prioritized dangers was the environment in which our field team works for the days on end.

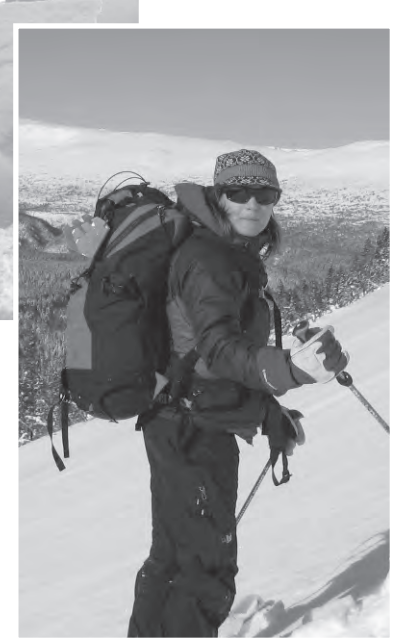
To manage this risk, the avalanche centre committed to providing its employees with some of the best equipment available. We have been working with Black Diamond for quite some time but this year marks the start of two new relationships—Rab clothing and Julbo eyewear.

Rab decided to fully support the avalanche centre's need for outerwear with the donation of a substantial amount of high-quality items. Each of our four team members received a Power Stretch top, Vaporise parka, Latok Alpine eVent shell, Photon Primaloft jacket, Neutrino Endurance down jacket, Latok Alpine pant and the Photon Primaloft pants. We have truly been impressed by the streamlined fit and no-frills approach of the garments, the breathability of the eVent fabric (it replaced our softshells) and the much needed warmth and packability of the down products.

Julbo outfitted the team with goggles, street wear sunglasses and the Explorer mountain/glacier sunglasses. The Explorer glasses are exceptional with a photochromatic lens and excellent wind coverage. The street wear glasses and goggles are hit and miss and we look forward to finding a better fit for next year. Black Diamond keeps supporting us with a beneficial purchase program and each team member uses personalised equipment pieces.

We would like to thank our sponsors for supporting our field program and we look forward to developing a mutually beneficial relationship with them. Please take a look at their websites if you are curious: www.rab.uk.com, www.julbo-eyewear.com and www.bdel.com.

>>Philippe Gautier is a forecaster at the Centre d'avalanche de la Haute-Gaspésie



Left to right: Philippe Gautier freezing his %?#$%# off.
Dominic Boucher taking in the sun.
Jean-Pierre Gagnon inspecting debris.
Stephanie Lemieux looking better than anyone.
All photos: Haute-Gaspésie Avalanche Centre.

Canada's Best Known Mountain Guide

Book Review by Mary Clayton

Deep Powder and Steep Rock: The Life of Mountain Guide Hans Gmoser

By Chic Scott, 346pp.

Hans Gmoser's life story is a remarkable tale, a rags-to-riches story that's even more compelling because it's a person familiar to all of us in the avalanche community. Chic Scott has written a number of guidebooks and histories of Canadian mountaineering and skiing and, as such, has a real affinity for this story. As a personal friend of the Gmosers, Chic was granted complete access to all of Hans' journals and personal correspondence. The result is a multi-faceted story, giving the reader a fascinating view of a life well-lived and sure to be well-remembered.

The book begins with the day that would prove to be Hans' last in the mountains. The author is skilful here, recreating that fateful morning but also setting the stage for Han's life story. Chic zeroes in on a framed photo that sat on Hans' desk, a memento that served to remind the man of the unpredictability of life, the unknown implications of choices, and the need to live each day to its fullest. The photo was taken on a day where luck had saved Hans' life, but that luck was soon to run out. It's a fine place to begin a life story where chance and good fortune had often played an equal role to planning and perseverance.

Luck was not terribly obvious during Hans' childhood. Born and raised in Austria, he was just six years old when Hitler invaded. The second World War and subsequent 10 years of occupation were hard years in which to grow up. Despite the challenges and deprivations, Hans' spirit shine through the journal excerpts chosen by the author. Hans was drawn to the mountains in his early teens and I found it fascinating how the drive, determination and charisma that would characterize the man in his adult life proved so evident in his younger years.

I admit to some impatience in the early pages of the book. Chic's decision to paint a thorough picture of Hans' youth gives the reader an appreciation for some aspects of the man's nature, but I found myself flipping ahead to see how many more pages before Hans makes the move to Canada. Chic's diligence in discovering as much as he could about Hans' youth shouldn't be underestimated; there are many indications that he spared little in his fact-finding efforts. Perhaps that is why he felt reluctant to leave any of it out.

Hans arrived in Canada at 19 years of age, almost penniless and speaking little English. The story of how he achieved the remarkable success known to anyone reading this journal is a fascinating one and Chic tells it well. In any biography, the author must find the dissenting opinions, the unflattering views, to complete the subject. Considering the closeness of the Banff mountain community and Chic's ties to the Gmosers, he does an admirable job. There are a number of examples of Hans' short temper and demanding nature, and the decades-old conflict with former-friend and business rival Mike Wiegele seems fairly, if briefly, described. Rumblings from some of Hans' climbing companions who felt slighted when their parts in an adventure received lesser billing are also included, though more often than not, these types of quotes are anonymous.


Hans Gmoser on Mt Louis in 1961.

Clair Brown

While I really enjoyed finding out more about some of Hans' early colleagues in Canada—such as Philippe Delesalle and Leo Grillmair—I would have liked to hear from more of Hans' colleagues from his later years. It felt a bit odd to me that people like Walter Bruns or Colani Bezzola—who worked with Hans and now occupy the top rungs at CMH—were not included in the book. What is included are some fantastic photos, many in full colour, that highlight the story extremely well. A DVD of three Hans Gmoser films is included as well, that are fascinating in their own right for their cinematography and story lines.

Hans Gmoser's life story is unique tale of adventure, hard work, perseverance and ultimate success. This book tells the tale well and is recommended reading for anyone interested in Canada's colourful mountain community and its history.

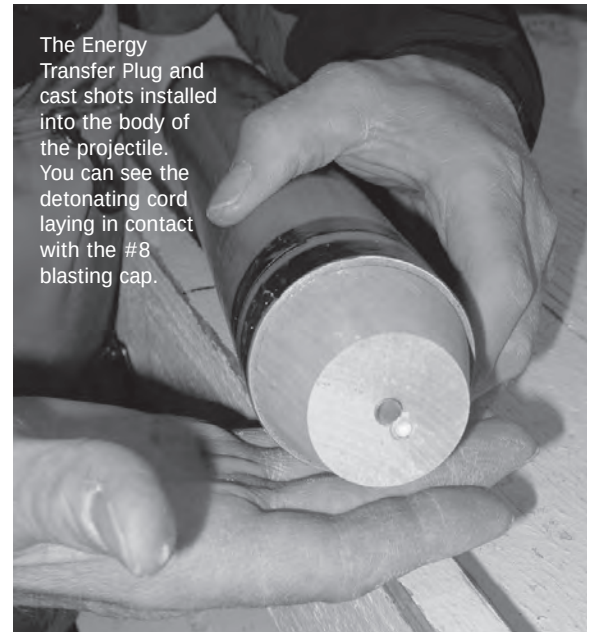
Avalauncher Developments

Story and photos by John Brennan

The impetus to start my company, Avalanche Mitigation Services (AMS) was the result of a quest to uncover the history of the Avalauncher. Monty Atwater, a leading pioneer of avalanche forecasting and safety in North America and co-developer of the Avalauncher, has always held hero status in my world since I cut my teeth on the old blue US Forest Service Avalanche Handbook several decades ago. Ironically, Atwater authored the first version of this handbook late in 1952.

Another irony is that I never liked history in school. Maybe the history of some brewery held allure but even that was short lived. Researching Atwater's involvement in the evolution of the Avalauncher was a labour of love, culminating in a road trip in the Spring of 2005 that helped tie enough loose ends together so that I could publish the results of my research in this journal (see *A Brief History of the Big Bang*, Vol 75, Winter 2005).

It was also at this time that I decided to form AMS. The company has both long- and short-range goals. First up was to introduce an Avalauncher that was scientifically engineered with a bottom line of user safety. We believe strongly that the true art of engineering surrounds simplicity of design. While it is easy to complicate a design and significantly drive up expense, it is through an intricate understanding of not only the mechanics but also the history of the Avalauncher that the Falcon GT was developed. The founding vision of AMS is to hold a *moral liability* to our customers as our primary goal—our contractual insistence on remote firing proves that. Integrity and honesty fall in closely as does our insistence on competitive pricing.

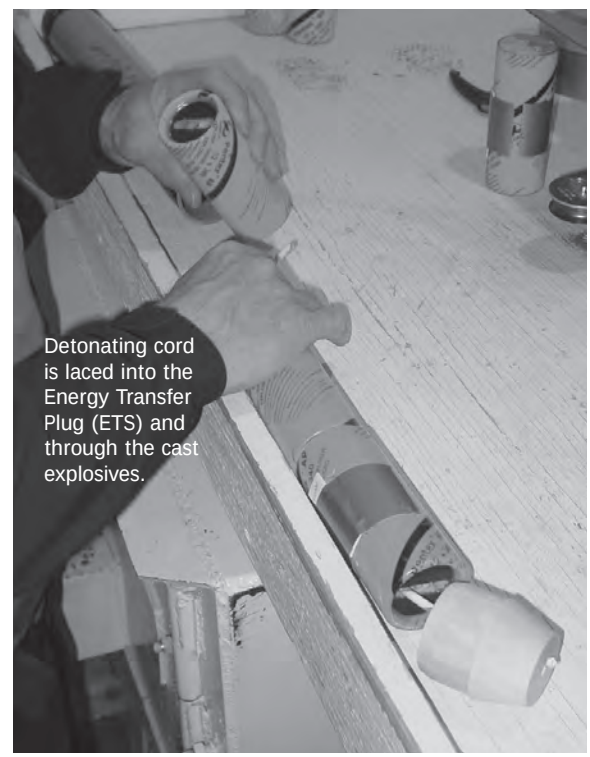


The Energy Transfer Plug and cast shots installed into the body of the projectile. You can see the detonating cord laying in contact with the #8 blasting cap.

Another founding vision of AMS was to complement our Avalauncher with a Variable Payload System projectile (VPS) using readily available, economical, powerful and reliable precast explosives. Although AMS had successfully prototyped and demonstrated two unique systems using this approach since our company's inception, it was with patience and perseverance that we held off entering the market until we had what we considered to be *the* elegant solution—a solution using standard industry materials and practices, as confirmed by industry experts and explosive distributors alike.

Well, the wait is over! The Falcon RT VPS projectile uses 12 ounce/ 340-350 gram precast explosives and 50 grain detonation cord. A tried and true Avalanche Control System's tail fin provides the launch platform. As opposed to some of our earlier R & D efforts, the current production model leaves the #8 Blasting Cap in its customary position on top of the tail fin's 209 primer ferrule.

The "brains," if you will, of the VPS is a short CNC-machined hardwood plug—the ETS, or Energy Transfer System. This technology was developed for our first R & D projectile in 2005. The current plug has two holes drilled into it. One is a blind well which partially encapsulates the detonator while a second tunnel hole accepts 50 grain detonator cord. The holes are oriented so that the det cord lies directly in contact with the entire length of the detonator.



Detonating cord is laced into the Energy Transfer Plug (ETS) and through the cast explosives.

The det cord passes through and couples *every* explosive together in the body of the projectile so that complete and instantaneous detonation of all the precast primers occurs on impact. As advertised with the six-foot-tall French Avalauncher projectile, the benefit of having a significant portion of the projectile detonate above the surface of the snow cannot be overstated. As opposed to the quickly attenuating effect of the snowpack on the energetic effects of the explosive blast, which is common in shorter Avalauncher projectiles, air can transmit the avalanche-producing shockwave over a much greater radius of influence. This air blast affect is most pronounced with our longer projectiles, such as the 48 oz/ 1.4 kg, 60 oz/ 1.7 kg and the 72 oz/ 2.1 kg versions.

From Hans Gubler's ground breaking article *Artificial Release of Avalanches by Explosives*[1], it was stated that, "The minimal effective range results in a minimum radius of 17-120 m for shots above the dry snow cover and of less than 6 m for shots in the snow cover." This statement refers to 1 kg shots. The article also states that "…the best efficiency results from charges ignited 1-2 m above the snow cover, using explosives with high detonation velocities."

Hal Hartman, an applied physicist who has spent over three decades dealing with snow control issues, comments: "Although air blasts are effective triggers, we often overlook, or forget to articulate, the value of detonating explosives in the snowpack. Clearly, detonation results in structural rearrangement of the snowpack which later resists deformation by external loads and serves to interrupt fracture propagation pathways. For example, quantitative strength measurements of blast craters and the snowpack in close proximity to the blast craters show that the advantageous effects persist for up to 45 days. In economic terms, an explosive 'works' for you around the clock at pennies per day, even while you sleep. So it depends on what strategy is being applied—avalanche release, testing the snowpack for instability or actively altering snowpack structure."

It's interesting to note that precast explosives were used in the original Avalauncher projectiles and for well over a decade following the system's introduction in the early 1960s. Thousands and thousands of shots have been fired successfully with precast explosives forming the payload of Avalauncher projectiles—nothing new here. The decision to have the projectiles poured directly with explosive material in the mid-1970s was the result of simple economics—an explosive manufacturer offered the service for almost the same price as the precast explosives.

The latest VPS projectile was tested with varying payloads (24, 36 and 48 ounce versions) this spring at the Aspen Highlands. Snow Safety Director Peter Carvelli was "very impressed by the design, the ease of assembly and the shot repeatability during this trial. I like the flexibility of the system, which allows greater or smaller payloads, as I'm a proponent of larger payloads in general. My employers appreciate the significantly lower price point as well, which will allow me to use a greater number of rounds while still keeping within budget (*author's note: sub $40 total cost to target for 36 ounce version*). I particularly like the ignition system which is simple, straight forward and dependable. Here at the Aspen Highlands we have had an Avalauncher since beginning our expansion into Highland Bowl in 1994. I have been the gunner and mechanic during that time, and as the gun plays a large role in our operation I have a good bit of experience with the various, basic rounds available since 1994, namely the Trojan, Dyno AV 100 and CIL Snowlauncher and Stubby. The AMS round compares very favourably with all of them. This product is definitely worth a try."

RT Projectile Payload Chart

KG	Pound	Ounces	Shots	Length
0.3	0.8	12	1	13"/33 cm
0.7	1.5	24	2	18"/46 cm
1	2.3	36	3	23"/58 cm
1.4	3	48	4	28"/71 cm
1.7	3.4	60	5	33"/84 cm
2.1	4.5	72	6	38"/97 cm

Similar testing took place at Arapahoe Basin and Snow Safety Director Leif Borgeson felt "the components are well conceived, professionally prepared, and easily assembled. We fired a handful of the 24, 36 and 48 ounce rounds out of our Falcon GT gun without issue. The projectiles loaded and launched just like the (projectiles) that we currently buy. Over the years we have used a wide variety of projectiles and this system from John holds the promise of reducing costs and allowing us to tailor our payloads to specific needs. The potential cost reductions will allow us to use more projectiles and still remain within our budget." He adds, "John Brennan and Avalanche Mitigation Services have always been responsive to our questions. I like his pro-active approach to those who use Avalaunchers."

An ASME-certified design of our Avalauncher is now available in both a standard and extended range model (45 litre pressure vessel capacity) and by the time you are reading this, both versions should be ok'ed by WorkSafeBC for sale in BC. AMS is also pleased to announce the introduction of several other new products that address the needs of all Avalauncher owners and explosive users. Please pay a visit to our web site for all our product listings, to see articles that we have published and to learn more about us and our company. At AMS we prefer to let our customers be our main salesman and a testimonial section is filled with their comments. We look forward to your hearing *your* comments and concerns. www.avalanchemitigationservices.com

[1]Journal of Glaciology, Vol. 19, No. 81, 1977

Search!

Part 3: Bridging the Gap.

By Jay Pugh

Yvonne Thornton with Bekka.

Jan Tindle

Possibly the most misunderstood and problematic part of training a CARDA dog team is what has become known as the "gap." This is the year between the first-year puppy course and the second-year validation, when handlers are training to the validation standard. This is a surprisingly short amount of time, given that a lot of the year doesn't include winter conditions and, most significantly, the handlers are generally on their own and have to identify and trouble shoot problems with their dogs without the benefit of consistent instruction..

As CARDA evolves it has been identified that this year poses a key stumbling block. Perfectly good puppy teams have showed up to the second course unprepared or at best, at the same level they left the course the previous year. They do not pass the validation and at worst, drop out of the program. This can be considered a tremendous waste of time and resources for both the program and the handler. Some of the reasons involved are:

- The handlers were unaware of their own responsibilities independent of the dog during the testing;
- The dogs did not learn to search for articles under the snow;
- The dogs were not treated as working dogs and/or training was neglected;
- The team came to the course with a major problem expecting to solve it during the course; or
- The handler came to the course expecting a validation attempt.

The first problem was quite common, with handlers simply not knowing what the expectations for the test are. The next installment of this series will have more details on the validation process, but suffice to say the handlers are expected to handle their dog while conducting themselves as if the dog is not there. They have to interview a witness, perform a hasty/beacon search and be able to cover a 100 x 100 metre area in 10 minutes on their skis. It is multi-tasking to say the least. The handlers also have to be prepared to pass their backcountry skills test. (This is the last year this aspect will be tested in the second year).

The test incorporates buried articles that simulate the scent of a human. As the puppy course uses primarily live quarries, the move to articles can present problems. It can be difficult for the handlers to get properly scented articles, as they must be from someone other than family.

As well, these articles are buried to a depth of 75 cm, which is quite a challenge and requires a gradual process to get the dogs to dig that far down. The handlers have to start immediately after the puppy course and progress through the spring in order to be at testing depth by late December. (The handlers from the eastern Rockies are especially challenged, in that we're lucky if we get 75 cm of snow in total, let alone in the first few months).

One of the most difficult concepts for a new dog handler is finding the balance between pet and working dog. As the dogs are pups in the first year we emphasize letting them be puppies and to not overdo obedience. The problem is, the dogs we choose are highly driven and often have a dominant streak to them. Just like human adolescents, as they mature they begin to test the limits of what they can get away with.

Sometimes the result is a dog team where it is unclear who the Alpha is. The dog may not respond to the handler or may even take the position that everyone in the family is of lower status than them. There are a number of "problem dog" reality TV shows, and this is usually the situation in the case of a destructive and aggressive dog. For a first-time handler, knowing exactly how far to push the dominance issue so that one has a controllable, but not handler-bound dog, is a serious challenge.

The team needs to come to the second course with no major issues and requiring only fine-tuning. If there is a serious problem, such as the dog refusing to pursue a deeply buried article, then there probably will not be enough time to rectify the problem within the week. As some of our handlers are in remote areas and not able to access the instructor group, this can be a fatal issue.

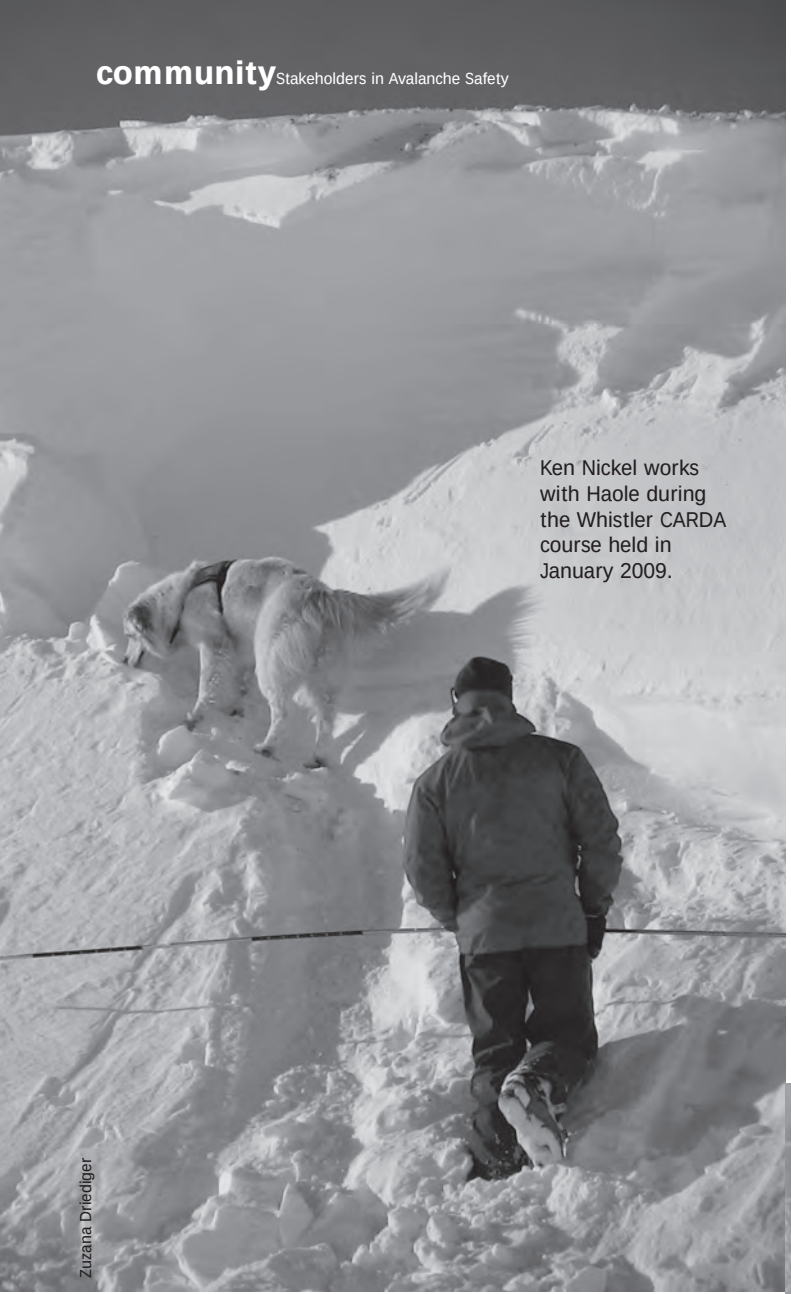
Handlers also need to come to the validation course understanding that it is a week-long evaluation. The team will not even get an attempt at the test until their instructors deem them ready. Validation is stressful and some handlers focus on it to the extent where they become difficult students.

The intermediate instructors have the responsibility of determining who is ready for the examination attempt. They know what goes into the validation and are tasked with preparing the handlers. There must be an understanding from the handlers that they are there to learn. Handlers have to demonstrate that they are prepared for the test.

To deal with this difficult gap situation, CARDA is now providing more information to the handlers and restructured the training process. It is now mandatory for all applicants to have a CAA Level 1 before the initial Spring Course, and the handlers' skills in the backcountry now have to be proven before starting with CARDA. The backcountry skills test now occurs the day before the puppy course, instead of the last day

An 8-week-old puppy enjoys some chairlift evacuation practice.

CSPS



Ken Nickel works with Haole during the Whistler CARDA course held in January 2009.

Zuzana Driedlger

of the validation course, which puts the handler in a position to succeed. By only having to mesh the backcountry skills with the dog handling instead of having to learn all the skills at the same time, the handlers have considerably less on their plates.

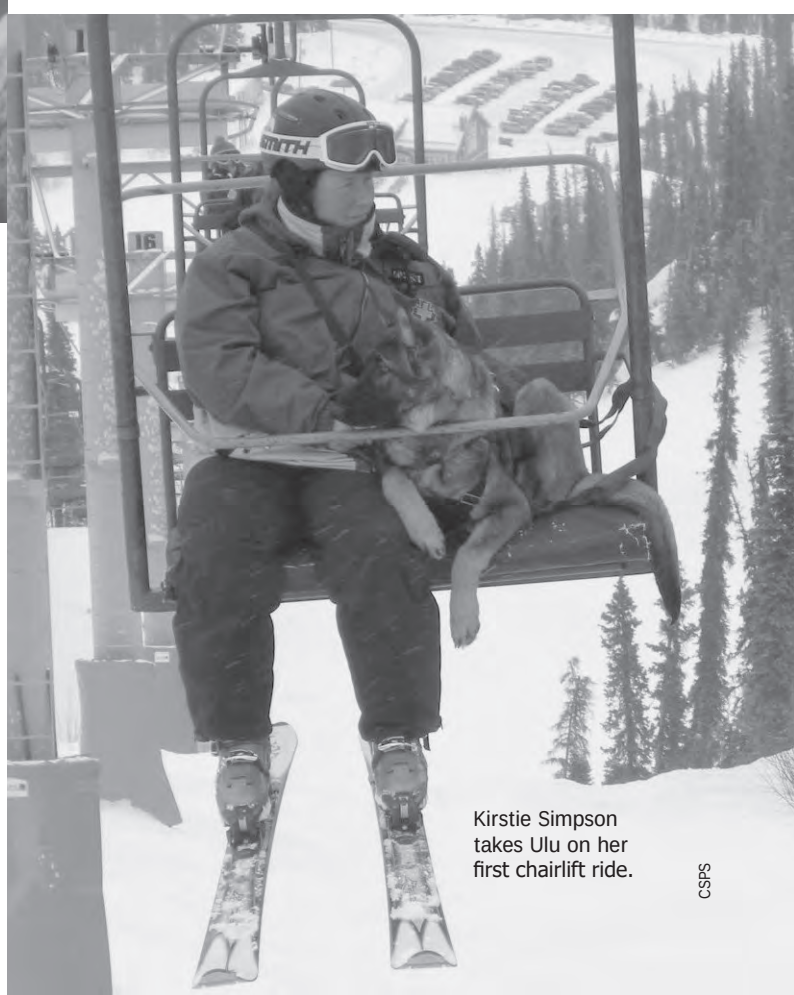
A few years ago, a CARDA instructor suggested the Spring Course be expanded to include the second-year handlers. The idea was to give the second-year group a chance to have their progress evaluated. This has proven so successful, there now is serious consideration to make it mandatory. By attending the Spring Course, these handlers are given help to identify their strengths and weaknesses, and receive instruction on how to correct any problems.

Another innovation for the Spring Course are lectures and instruction on how to train the CARDA way, and the place of the working dog within the family. With this instruction, it is hoped the dogs will learn their place early in their formative years, and therefore be easier to train.

Even with the new progressions there is one requirement that hasn't changed and that is the handler's commitment to time and quality training. All the advice in the world will make no difference if the handler does not put the effort into themselves and their dog. Every new handler is made aware of the resources available to them and the instructors make themselves as available as possible. With our modern forms of communication there is no reason for a handler to be incommunicado with their instructors.

Having said this, we are all well aware that life has a way of changing plans. Some of our handlers live in remote areas, or are there with their jobs. Others have the advantage of living close to other handlers and an instructor for occasional training sessions, but family or other commitments may make coordinating these sessions an exercise in diplomacy. Simply put, CARDA handlers have to learn to trouble shoot on their own and to make the necessary arrangements for quality training.

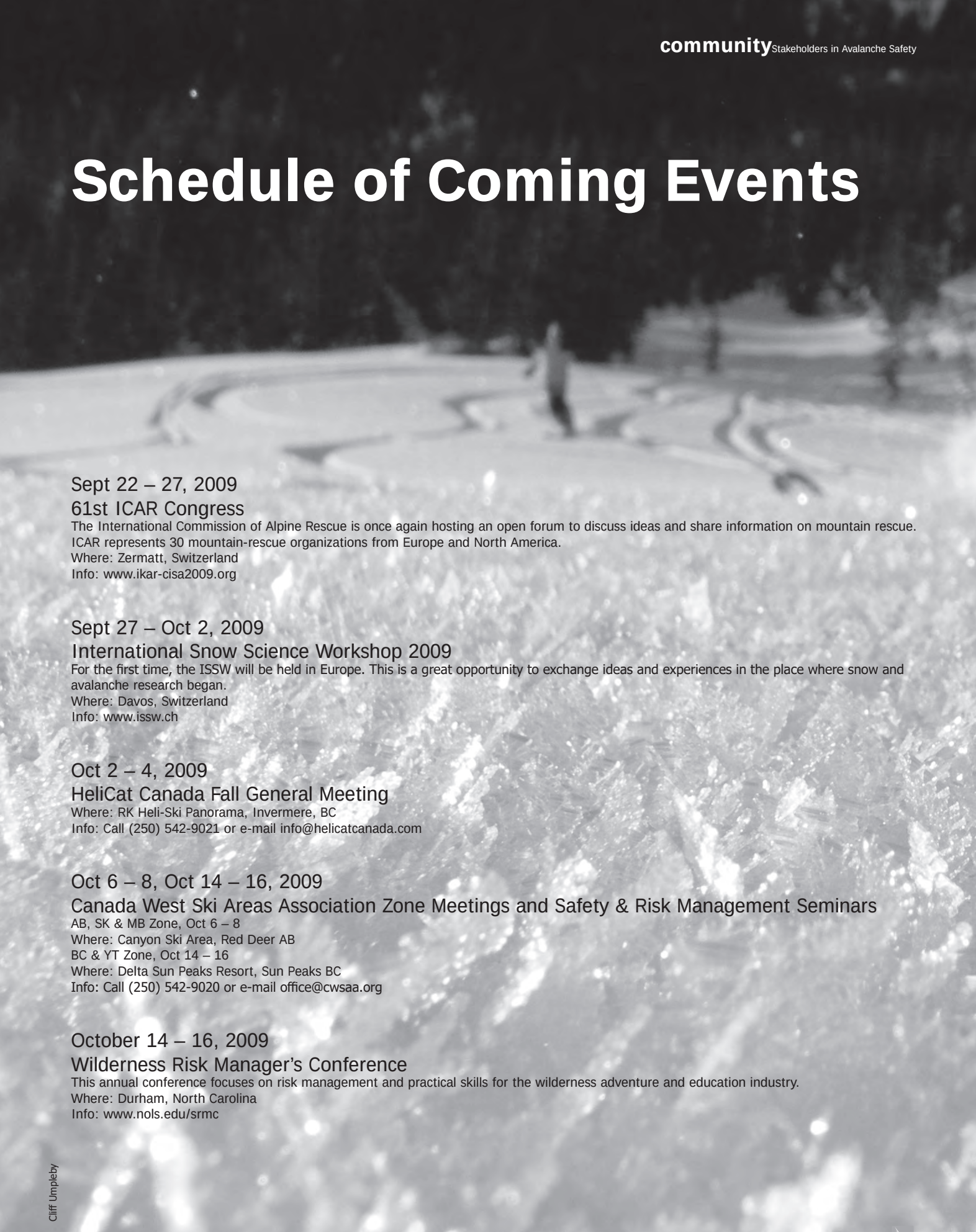
Some bridge the gap successfully, others do not. However, as an instructor I have been constantly amazed and humbled by the effort I see our handlers make. I have known some to make five-hour drives one-way for three hours of training. I have seen family members partake and develop into awesome quarries. I have received and tried to answer countless e-mails and phone calls. I have been privileged to be provided with access to major ski hills for training, thanks to no small effort of a handler employed there. Above all, I have witnessed the commitment to not only their own success but to those they train with. To see that sort of character in so many different people is the most fulfilling part of being a CARDA instructor.



Kirstie Simpson takes Ulu on her first chairlift ride.

CSPS

Schedule of Coming Events



Cliff Umpleby

Sept 22 – 27, 2009
61st ICAR Congress
The International Commission of Alpine Rescue is once again hosting an open forum to discuss ideas and share information on mountain rescue. ICAR represents 30 mountain-rescue organizations from Europe and North America.
Where: Zermatt, Switzerland
Info: www.ikar-cisa2009.org

Sept 27 – Oct 2, 2009
International Snow Science Workshop 2009
For the first time, the ISSW will be held in Europe. This is a great opportunity to exchange ideas and experiences in the place where snow and avalanche research began.
Where: Davos, Switzerland
Info: www.issw.ch

Oct 2 – 4, 2009
HeliCat Canada Fall General Meeting
Where: RK Heli-Ski Panorama, Invermere, BC
Info: Call (250) 542-9021 or e-mail info@helicatcanada.com

Oct 6 – 8, Oct 14 – 16, 2009
Canada West Ski Areas Association Zone Meetings and Safety & Risk Management Seminars
AB, SK & MB Zone, Oct 6 – 8
Where: Canyon Ski Area, Red Deer AB
BC & YT Zone, Oct 14 – 16
Where: Delta Sun Peaks Resort, Sun Peaks BC
Info: Call (250) 542-9020 or e-mail office@cwsaa.org

October 14 – 16, 2009
Wilderness Risk Manager's Conference
This annual conference focuses on risk management and practical skills for the wilderness adventure and education industry.
Where: Durham, North Carolina
Info: www.nols.edu/srmc

Describing Us

Results from a Survey of Skiers, Snowboarders, Climbers and Snowshoers in Western Canada

By Albi Sole and Dr Carolyn Emery

John Kelly

Approaching the Jacobsons group on the Monarch Icefield, Coast Range.

Introduction

Without doubt the physical sciences have made great strides in understanding the avalanche phenomena. We have a long list of physical characteristics that we know to be associated with risk, mechanisms and consequences of an avalanche. However, it still remains true that for every avalanche incident involving a person, had the people involved made different decisions, that incident might not have occurred.

This critical component of avalanche incidents is usually referred to as the "human factor." The human factor is not as well understood, and is very tricky to study. One challenge is our ability to measure basic things like how many people are exposed to avalanche risk, and how are they exposed. When people are involved in serious avalanche incidents, those incidents typically end up in records such as that kept by the Canadian Avalanche Association. But when nothing goes wrong they leave no record of their activities, and this is a problem.

In order to measure an association between a human factor, such as gender, and avalanche risk we need to have a measure of both those who experience an incident and those who don't, for both males and females. One aim of this study was to collect data about everyone who goes into avalanche terrain, describe their activities and determine whether or not they experience an avalanche incident. In order to do that, we needed to find a "representative sample." A representative sample is a group of people who belong to the population of interest, that have the same characteristics and in the same proportions, as the whole exposed population.

In the Winter of 2006/7 a survey of the students taking introductory avalanche courses at the University of Calgary showed that 100% of the climbers, skiers, and snowshoers, and 89% of snowboarders, also shopped at the Mountain Equipment Coop (MEC) (n=399). This discovery suggested that a random sample of MEC customers would provide representative data about the skiing/climbing/snowshoeing community that lives and recreates in Western Canada

Method

A web based survey was developed that included questions about age, sex, income, education, activities

Activity Reported	Days Reported	Days (adjusted only for snowboarders)	95% Confidence Intervals	Estimated days of activity/year for population
Back-Country Ski Touring	3956	3956	3853 - 4060	326,395
Back-Country Telemark Skiing	1665	1665	1590 - 1740	137,363
Back-Country Snowboarding	572	693	643 - 743	57,173
Out-of-Bounds Skiing	1454	1454	1383 - 1525	119,955
Out-of-Bounds Snowboarding	539	653	604 - 702	53,873
Snowshoeing	631	631	583 - 679	52,058
Cross-country skiing	723	723	672 - 774	59,648
Snowmobiling	283	283	250 - 316	n/a
Ice climbing	980	980	821 - 1039	80,850
Mountaineering	1471	1471	1400 - 1542	121,358
Mechanized Skiing	516	516	472 - 560	42,570
Other	292	292	259 - 325	n/a
Total (not inc. Snowmobile or 'Other')	13082	13317	13517 - 13615	1,051,298

Table 1: Distribution of activity in avalanche terrain (n=447)

practiced in avalanche terrain, number of days spent in avalanche terrain, experience, level of avalanche training, who people traveled with and if they had had an incident in the previous 12 months.

During the fall and early winter of 2007, computer stations were set up at MEC stores in Vancouver and Calgary for a total of 12 days. An announcement was made over the PA system every 20-30 minutes inviting "people who had traveled in avalanche country" over the previous 12 months (year 2006/7) to enter a prize draw by completing the survey. To be included in the survey, a person had to be either a permanent or winter resident in Western Canada (n=447).

The CAA provided data on the total number of people who had taken an Avalanche Skills Training course level 1 (AST 1). A comparison between that number and the number of people in the survey who reported that they had taken the AST 1 course enabled an estimation to be made of how many people in Western Canada had a particular characteristic.

Results

Training Levels: Most participants had taken at least a two-day avalanche course (77.57%; 95% CI; 73.66-81.48) (fig. 1). Using CAA data, it was estimated that one in 82.5 people who had taken an AST1 course in the previous three years took the survey. This statistic enabled us to calculate the size of the population who ski, ride, climb or snowshoe in avalanche terrain in Western Canada (table 1).

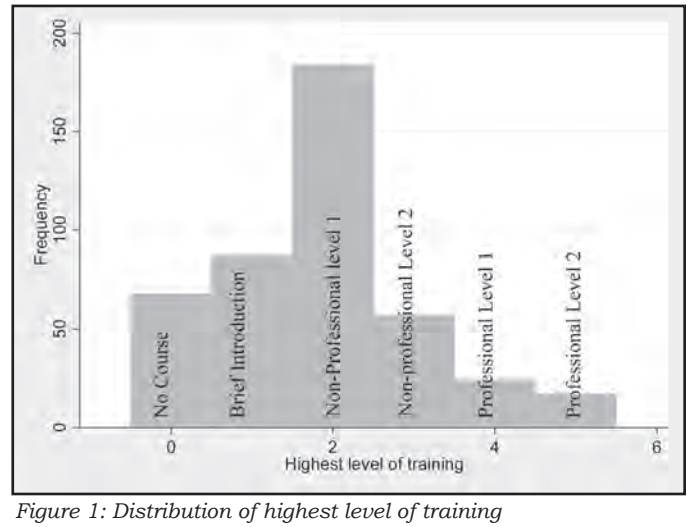


Figure 1: Distribution of highest level of training

Days of Activity in 2006/7: All activities that people reported were recorded (table 1). Since only 89% of snowboarders are thought to shop at MEC, the estimation of their activity was adjusted accordingly.

Gender: 24.83% of participants were female (95% CI; 20.83-28.84)

Age: The median age of participants was 33 years, with a range of 13 to 90 years (Fig. 2).

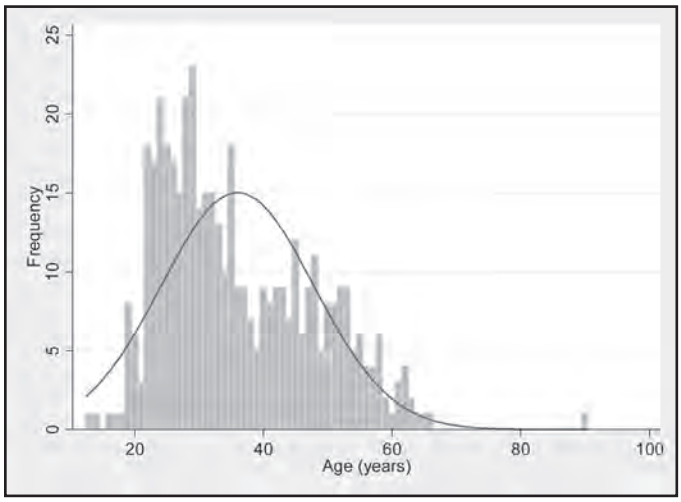


Fig. 2 Distribution of age (with fit to normal curve) (n=447)

Socio-economic Status: Skiers, snowboarders, snowshoers, and climbers, entering avalanche terrain in Western Canada have a high median income of $44,485, (95% CI; 40,711-49,060) and a very high education level (65% with graduate or post graduate degrees vs. a national average of 15%).

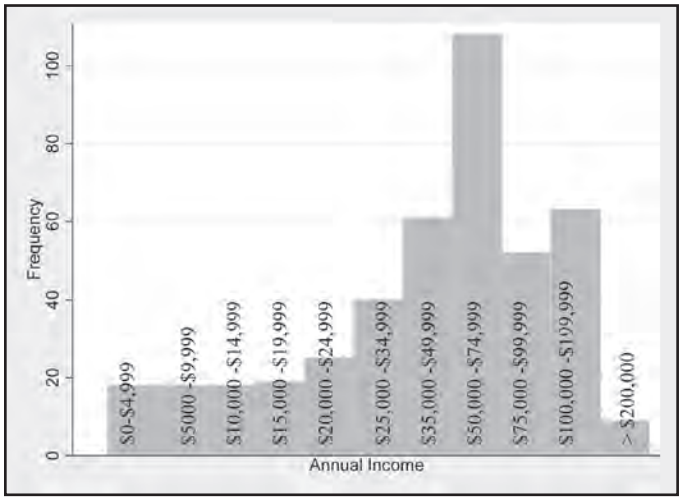


Figure 3: Distribution of Income (n=431)

Highest Education Level	Responses	% of Total
Grade 12	68	15
Diploma	89	20
Bachelors	189	43
Post-graduate	98	22

Table 2: Distribution of highest level of education (n=441)

Changing activity patterns: It appears that as people age, they tend to spend less days skiing out of bounds and more days skiing back-country (table 3).

Size of the Over 21 Years of Age Population: Of the 447 people who participated in the survey, 425 were 22 years of age or older. Of these, seven reported that they only participated in snowmobiling, or only worked in avalanche terrain and were removed from this calculation. Using the CAA avalanche course data it is estimated that there are 34,485 people 22 years of age or older who ski, ride, cross-country ski, climb, or snowshoe in avalanche terrain.

Number of Days Spent In Avalanche Terrain: The (geometric) mean number of days spent in avalanche terrain during 2006/7 was 18.78 days (95% CI; 17.74-19.83) (fig.4).

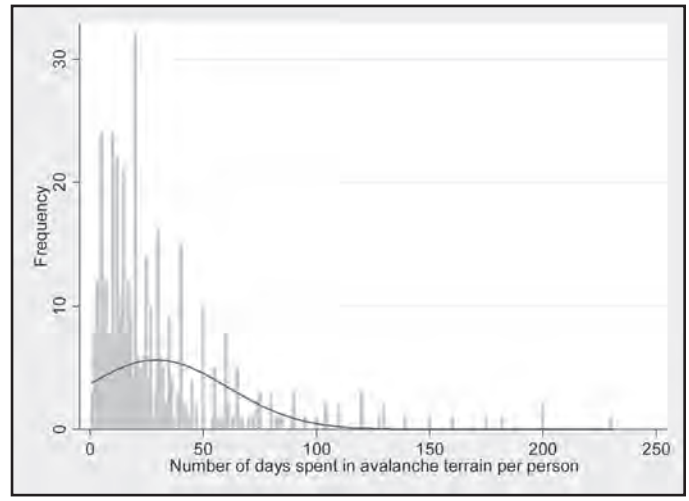


Figure 4: Distribution of days spent in avalanche terrain (with fit to normal curve) (n=447)

Years of Experience: The mean (geometric) number of years spent travelling in avalanche terrain was 8.77 years (95% CI; 8.02-9.60) (Fig 5).

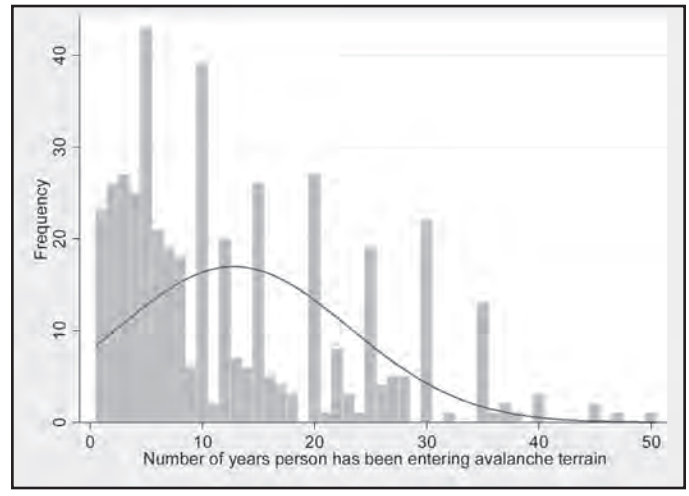


Figure 5: Number of years spent travelling in avalanche terrain (with fit to normal curve) (n=440)

Age	# of days reported backcountry skiing/riding, mechanized skiing, Mountaineering, snowshoeing	# of days reported out-of-bounds skiing/riding	% of time backcountry
under 25 years	15.1	9.03	62.58
25-30 years	41.77	6.11	87.24
over 30 years	29.39	3	90.74

Table 3: Distribution of '# of days of back country vs. out-of-bounds activity in avalanche terrain by age group' (arithmetic means, n=447)

Avalanche Incidents: An avalanche incident was described as "An avalanche incident is an avalanche event that was either unexpected, or behaved in unexpected ways: that had the potential to, or did, bury, injure or kill a person." Thirty five people (7.8%) of study participants reported that they had experienced an avalanche incident in the year of 2006/7. Of these, four people reported having experienced two incidents. Of these four, one person reported four incidents

Study Biases

The data collected for this study is "self-reported." It is well known that this sort of data is subject to a variety of biases with "recall bias" probably being the most important one here. In other words, we cannot be sure that people remembered accurately important details, e.g. how many days they were in avalanche terrain in the previous year.

Although the assumption that 100% of backcountry skiers, climbers and snowshoers, and 89% of back-country snowboarders shop at MEC seems justifiable for people over the age of 22 years. Younger people and people who enter avalanche terrain in out-of-bounds situations are probably much less likely to shop at MEC. This means that there are probably more young people, and more out-of-bounds people than reported.

During surveying, and despite our best efforts, it became clear that many people who had little training or experience in avalanche terrain thought that their lack of avalanche knowledge would disqualify them from taking the survey, and so did not take the survey. This means that the level of training and experience amongst the backcountry enthusiasts is probably lower than reported. Additionally, there are probably more people entering avalanche terrain than reported.

Limitations

The data presented here is very specific to Western Canada and may not be reflective of other geographic regions. Although information from a few snowmobilers was collected, this information provides no insight into that large population of people who expose themselves to avalanche risk on snowmobiles.

Supporters

We would like to thank those who made this project possible. Mountain Equipment Coop for allowing us to survey their customers; the CAA and Cam Campbell for help with surveying; Ortovox, the MEC, Backcountry Access and the University of Calgary Outdoor Centre for providing draw prizes; and Albi Sole's supervisory committee, Dr. Brent Hagel, Dr. Barbara Morrongiello and Dr. Robert Stebbins. Carolyn Emery is funded by the Alberta Heritage Foundation for Medical Research and the Canadian Institutes of Health Research.

Regional Danger Ratings and the Odds of Triggering a Potentially Fatal Avalanche

Bruce Jamieson
Dept. of Civil Engineering, Dept. of Geoscience, University of Calgary

During the small talk before an interview last winter, a reporter said “They went into the mountains when the avalanche danger was Considerable; they must have known someone would die.” I countered by saying there were hundreds of skiers and snowmobilers who had enjoyed themselves on mountain slopes over the weekend—without being caught in avalanches. This conversation reminded me that, outside the avalanche community, the public understanding is limited about how the Avalanche Danger Scale relates to triggering harmful avalanches. In response, I dusted off an abstract I had submitted and withdrawn twice, asked Jürg Schweizer and Cora Shea to help with parts of the analysis, and submitted the abstract to the 2009 International Snow Science Workshop (ISSW) in Davos. The abstract is called *Simple Calculations of Avalanche Risk for Backcountry Recreation*. The word “simple” is important—I’ll come back to it.

Avalanche risk depends on the probability of an avalanche affecting people (or property) and the expected consequences. For the consequence term in our analysis, we chose to ignore injuries and focus on the probability of death. For any size of avalanche, this probability is given in *Avalanche Accidents in Canada 1984-96* on avalanche.ca’s Knowledge Centre. The remaining part of the risk calculation is the probability of being caught. Because upwards of 90% of fatal avalanches are triggered by people, we can focus on the *probability of triggering a potentially fatal avalanche*.

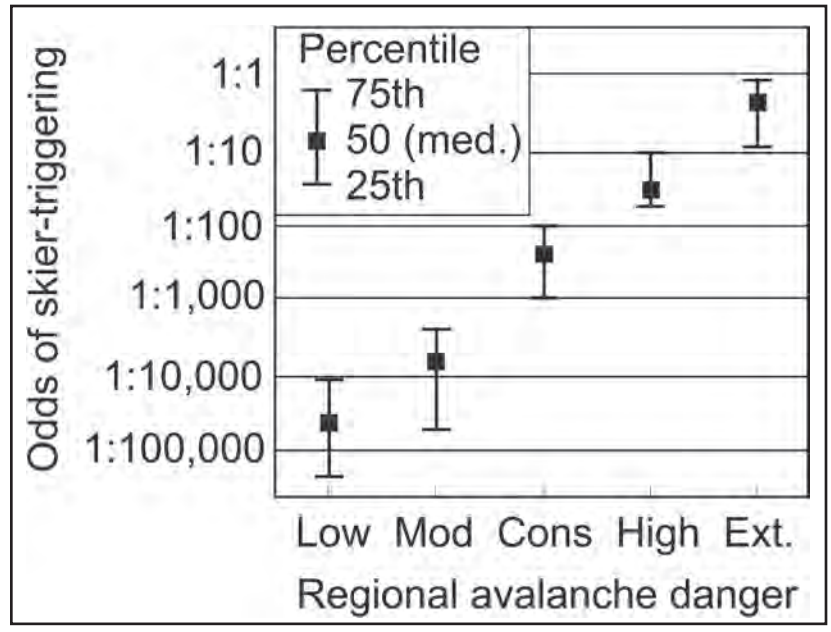
What are the odds? This slab in the Selkirks was triggered by the eighth person down the slope.

There are many factors like snowpack conditions, distribution of trigger points, and skilled route selection that could be included in the analysis. Since there are no reliable data for these factors, our risk calculation is thwarted unless we can simplify some and estimate others. We chose to simplify exposure and focus on one factor: the regional danger level since it includes the probability of human-triggering (certain, likely, probable, possible, unlikely) and includes something about the distribution of trigger zones (e.g. avoid steeper terrain). (The US version of the Danger Scale is much clearer about the distribution of trigger zones.)

The Danger Scale does not specify the *exposure* associated with the words like possible, probable, etc. Do these probabilities or likelihoods apply to one person exposed to one trigger zone? To one person exposed to multiple trigger zones in a typical run? To multiple ascents and descents by one person in a typical day? To a typical group during a typical day? To all of the groups in the region? Does the exposure assume skilled route selection, or centre-punching start zones, or a typical mixture of the two? For our estimates of triggering probability, we chose to define one exposure as one person making fresh tracks while directly ascending, traversing or descending a trigger zone *without* skilled route selection. So in our search for a simple risk calculation, triggering by the second or third or tenth person in the up-track was ignored. Skilled route selection was excluded partly because the level of skill and its effect on the triggering probability are even more difficult to estimate. We also wanted to establish a baseline, upon which factors like skilled route selection and recognition of local conditions could be later applied.

Controversially, we also excluded avalanche size (or consequence) from the triggering probability for a specific level of regional danger because:

- avalanche size is not explicitly in the danger scale we have used in North America since 1996 (although many skilled regional forecasters probably consider the expected avalanche size or consequence when rating the regional danger.)
- we restricted our analysis to potentially fatal avalanches, thus ignoring smaller avalanches
- we wanted to keep our first risk calculation simple by concentrating on one strong factor, in this case, the regional avalanche danger rating. (Remember, I had previously withdrawn the abstract twice.)



For each level of the regional avalanche danger, the graph shows the estimated odds of skier-triggering a potentially fatal avalanche while making fresh tracks in one trigger zone without skilled route selection. The whisker or bar shows the range of the middle 50% of estimates, i.e. from the 25th to the 75th percentile. A square marks the median or 50th percentile.

Alas, there are no data on the probability or odds of triggering a potentially fatal avalanche in a trigger zone at any level of regional danger. However, in analyses of other risks, such as various types of failures of nuclear power plants, the unknown probabilities are estimated by experts. My first attempt at writing a survey for experts was poor. Fortunately, Pascal Haegeli recommended a book on designing this type of survey (Morgan and Henrion, 1990). One of the many good ideas in the book is how to deal with factors which are not in the survey but which some respondents may consider important—like avalanche size in our survey. Respondents are encouraged to estimate the average odds after considering the real variability in unspecified factors.

After many drafts and approval by the University's Ethics Board, the survey was e-mailed to regional forecasters, senior guides and consultants (experts!) in Canada and the US. To date, about half of them have completed the survey. Many clearly expressed their concerns about the simplifications behind the survey. For example, two people thought avalanche size should have been explicitly included in the survey, and two thought the same about the area of the forecast region. While the previous paragraphs may partly explain some of the assumptions, I should have expected their reaction to the simplifications: "Reluctance to simplify interpretations" is characteristic of people who are good at *managing the unexpected* (Weick and Sutcliffe, 2001), and that includes avalanche risk.

As I write this, 18 experts with an average of 26 years of experience have responded to the survey. This is enough to provide a first look at the expert-estimated odds of a skier-triggering a potentially fatal avalanche while making fresh tracks in a single trigger zone without skilled route selection. Sure, there are some strong simplifications. For each rating of regional avalanche danger, the graph shows the median estimate and the range of the middle 50% of estimates. For example, when the avalanche danger is Considerable the median odds of triggering is 1:250, and 50% of experts estimated the odds of triggering to be between 1:100 and 1:1000. Note that the left axis has a logarithmic scale. The median odds of triggering increase roughly by about 10 times for each step in the danger scale. The biggest jump (multiplicative increase) in triggering odds is between Moderate and Considerable Danger, and the lowest jump is between Low and Moderate—both of which warrant further analysis.

Although the full range of estimates for any danger level is not shown, it is clear that the uncertainty in the estimates is greater for lower levels of danger. This uncertainty can be due to many sources including: variability in the factors not specified in the survey; ambiguity in the survey; and uncertainty that is inherent to triggering within a forecast region. The final graph of triggering odds as well as the initial simple risk analysis will be presented at the ISSW in Davos in September 2009.

So what? Well, a missing piece of the recreational avalanche risk puzzle is emerging from the fog. However, I doubt the graph will mean much to the public. Nevertheless, the estimated odds may help those of us who read *avalanche.ca* to explain triggering odds and avalanche risk to those who don't. Perhaps the estimated odds can be used to freshen and re-phrase some important messages. For example, the odds can be decreased by:

- skilled route selection (which requires experience),
- seeking out areas or slopes within the forecast region where human triggering of harmful avalanches is less likely, or
- turning around or choosing more cautious routes when signs or clues indicate higher levels of local danger.

Acknowledgements

Many thanks to the respondents who completed the difficult survey, to Cora Shea, Jürg Schweizer, Pascal Haegeli and Grant Statham for their advice, and to Kisa Elmer, Cameron Ross, Thomas Exner and Mike Smith for proofreading. For financial support, I am grateful to 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.

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Weick, K.E. and K. Sutcliffe. 2001. Managing the Unexpected – Assuring High Performance in an Age of Complexity. Jossey-Bass, A Wiley Company, San Francisco, California, USA.

Bruce holds the NSERC Research Chair in Snow Avalanche Risk Control at the University of Calgary. He has been puzzling over triggering odds for at least 20 years and finally decided to ask the experts.

Bruce Jamieson collection

ASARC Update

The University of Calgary's Applied Snow and Avalanche Research team gets us up to date on their winter

Highlights

- Over 400 person-days of field work last winter, mostly in the Columbia Mountains. Many interesting weak layers. Excellent data for our research topics.
- Propagation Saw Test now used on CAA Level II courses, operationally, and reported in InfoEx.
- Thanks to some nifty programming by Mike, our weather station near Crowsnest Pass is now generating snowpack simulations and sending weather and radiometer data to the forecasters at the Canadian Avalanche Centre in Revelstoke.
- Measurements of the static and dynamic stress below skiers and snowmobiles.
- Strong industry support for a second term of Bruce's research chair to start—hopefully—in September 2009. NSERC, the research arm of Industry Canada, will announce their decision in June 2009.

The Team

Back row, left to right: Jordan Stiefvater (new), Ali Haeri, Cameron Ross, Thomas Exner, Mike Smith, Mark Kolasinski and Cora Shea (new). In front: Bruce. Occasional Research Associates (not shown): Cam Campbell, Laura Bakermans, James Floyer and Dave Gauthier.

Les Campbell

Outreach and seminars

In September 2008, we made 12 presentations of research results at the International Snow Science Workshop (ISSW) in Whistler. Between November and March, we presented the results to over 450 avalanche professionals and over 300 members of

the public at 20 sessions in Alberta and BC. The list of seminars is on our website. In April, Laura and Cora presented on stability tests and a new sampling technique at a conference in India. On May 7 and 8 in Penticton, Bruce and graduate students Thomas, Mike, Cameron and Cora will present at the Canadian Avalanche Association's Spring Conference.

Training December 2008

Those of us in the photo got together at Rogers Pass for two weeks of training in December. The first week was safety training. Mountain guide James Blench led a couple of days of low-risk mountain travel and emergency response (and returned for a few days during the winter to keep our skills tuned). The second week focused on field methods.

Winter 2008-09

- Thomas measured the static and dynamic stress under skiers and snowmobiles, sometimes during warming periods.
- Cameron and the team did many Propagation Saw Tests (PSTs) at recent slab avalanches and whumpfs, extending Dave Gauthier's validation study.
- Mike monitored changes in buried crusts at Rogers Pass with near-infrared images and, at both field stations, with traditional techniques like profiles and shear frame tests.
- It was a great winter for studying surface hoar formation. Using a new sampling design, Cora observed surface hoar growing, and related crystal size to the distance from trees—using Google Earth!
- Banff-Yoho-Kootenay wardens made simple field observations, such as the hand shear and ski pole test (photo to left), to determine which ones are useful for localizing the avalanche danger from the regional bulletin. Cam Campbell made the same field observations on the Coast. Bruce will present results from the Coast, Columbias and Rockies at the Canadian Avalanche Spring Conference in Penticton.
- For the same research topics, technicians Ali Haeri, Mark Kolasinski and Jordan Stiefvater made many fine measurements near Blue River, BC.

Publications

Our list of publications is online and searchable on our new web site. About 80 of our publications can be directly downloaded. We estimate over 20,000 downloads in the last year! These numbers are not totals because some of these articles are also posted on other websites such as the Canadian Avalanche Centre's Knowledge Centre.

Next summer?

Well, the graduate students and Bruce will be busy analyzing the winter's data, writing papers for the International Snow Science Workshop in Davos in September, and taking a couple of weeks off. To write their theses, Thomas and Cameron plan to bolt themselves to their desks.

Thanks!

To all the fine people we work with, and to the organizations that support the research. The logos below have been updated to include organizations that have made commitments to ASARC's future.

Bruce, Ali, Cameron, Cora, Jordan, Mark, Mike and Thomas

Articulating Avalanche Risk

An Operational Model

By Mark Vesely

Introduction

This article introduces a risk identification model that has been developed for use by the snow safety operation at Fernie Alpine Resort. The model is intended to describe avalanche risk conditions relevant to specific user groups. The model was developed as a portion of the 2009 updated snow safety plan and seeks to work with the plan's existing structure and to complement existing avalanche forecasting descriptor scales.

The key elements of the scale include risk levels (represented as numbers), level titles (ranging from low to extreme), a definition (in relation to a consequential event), exposure (statement of acceptability) and forecaster directives (common practices referenced from historical behavior). The scale is intended for relatively short time frames, not to represent long-term risk conditions. Finally the layout of the scale is common to current industry danger or hazard scales and, in the interest of the user, aims for simplicity.

Background

Avalanche risk assessment is a key topic in the current redefining of the avalanche safety industry in BC. Stakeholder agencies include WorkSafeBC, the CAA and every single commercial as well as many non-commercial avalanche safety operations. It is important to note that, within the design of snow safety operations, the risk assessment process is achieved on multiple levels of scale. Examples of long-term risk assessments include map and atlas projections, roadway plans and lift installations. The process also occurs on more immediate, momentary scales such as with a system capable of making a risk assessment on a given day or on a specific slope at a moment in time, as relevant to an avalanche safety worker.

Established avalanche safety programs include communication tools to describe avalanche conditions and parameters of risk inclusive conditions. The scales I make reference to in this model include snow stability, avalanche danger and avalanche magnitude. All of these standard scales are in their own way pieces of the avalanche risk management regime.

The value of these scales is their effectiveness in describing a specific element of the avalanche condition, relevant to a risk-based decision. However, they are not true qualifying risk descriptors. This is an important point

in reference to how snow safety operations use the models that make up the standard base lines for our industrial language. These scales are of highest value if used as they were designed to specifically speak to the one condition they can articulate. For example, the avalanche danger scale can articulate trigger probability and avalanche occurrence likelihood, and make recommendations about the level of caution in terms of terrain use. But the danger rating may not be a clear indicator of the risk to avalanche involvement.

Avalanche involvement is an important point relevant to the interpretation of workplace safety regulations. It should not be assumed within the avalanche risk assessment definition that any level of avalanche involvement is homogenously dangerous and therefore includes an unacceptable degree of risk to avalanche workers. Avalanche risk assessment is rather where the true value of the safety plan may establish clear parameters of what the scale of the problem is and who is exposed in relation to it. The other essential piece is a statement of what degree of exposure is acceptable to whom. Trained avalanche workers will have a higher degree of acceptable exposure to avalanche involvement over general area staff or public area users.

Recognition of this variance is important as it is essentially the articulation of how avalanche workers safely interact with specific avalanche events. Behaviour such as choosing non-prone or less exposed terrain, ski cutting in ideal slab conditions, and position in relation to event release all help to mitigate risk, as do tools such as rescue equipment, radios, partners and explosives. All these and many more factors work in combination to lower the vulnerability of the avalanche worker, while still allowing them to work effectively with a higher degree of exposure to an avalanche event.

On the most micro scale, avalanche risk assessment may be used as a term to describe the probable avalanche magnitude an avalanche forecaster expects his workers to interact with on a given day. It may also extend to the final decision process a route leader makes on whether they commit a ski cut to a prone terrain feature or not. Within this level of scale there is the question of what is a reasonable degree of acceptable exposure to the avalanche worker. The answer to this I believe is based in our definition of what constitutes a consequential event.

“Attempting to manage avalanche involvement risk to a value of zero is unrealistic and in an operation like Fernie Alpine Resort, likely impossible.”

Mark Vesely

Fernie Alpine Resort is well known for its spectacular bowls and gullies. However, the amount of terrain above the rock face and spill zones below the ridge crest can pose a significant problem in terms of avalanche risk mitigation.

Morgan Funston, a technician with Fernie's avalanche control team, inspects a fracture line within the ski area boundaries.

Mark Vesely

The avalanche magnitude scale describes a size 1 avalanche (in simple terrain) as relatively harmless to people, taking into account the event's mass, run length, impact pressures and destructive potential. From this, it may be interpreted that in simple terrain, size 1 avalanches are a reasonable risk for the area's general workers or users. For avalanche safety staff a consequential event may be defined as a size 1.5 avalanche, where due to skill and equipment this may present a reasonable work range for technicians.

The point of this is that there is value in going through the process of establishing the definition of a consequential event so that avalanche safety workers have a commonly understood level of acceptable exposure. Of equal importance is ensuring the workers also have a clear direction on what remaining risk is reasonable for other users to have within the same terrain. The other point of value in this is the emergence of a spectrum in which reasonable levels of specific user group behaviour are defined and their subsequent risk to consequential avalanche involvement is articulated. Attempting to manage this risk to a value of zero is unrealistic and in the case of the terrain configuration in an operation like Fernie Alpine Resort, likely impossible.

Conclusion

At Fernie Alpine Resort, we focus a tremendous amount of energy on managing the risk of avalanche involvement on behalf of a wide variety of user groups. In order to manage this risk effectively there is value in reducing its definition to the lowest denominator—how it affects humans. As we are tasked with managing this risk on behalf of individual avalanche workers, other staff and general area users, it is important that we are able to articulate the risk clearly.

For our operation, it is unrealistic to aim for a value of zero risk for an avalanche. In the case of avalanche safety staff, that approach would impede them in accomplishing their work objectives. A key element of the snow safety plan should be the establishment of a reasonable avalanche interaction level; one that is achievable, articulates acceptable exposure levels, and offers an ideal risk range to be worked within.

In developing an industrial culture of good risk management on all levels there is value in introducing tools that prompt or assist discussion about the risk condition of any given day, just as there is value in articulating snow stability. The risk scale introduced in this article is intended more as a reference tool to guide operational behavior rather then dictate specific avalanche-risk policies. I hope it will prompt discussions about exposure, assist in the awareness of working within the range of ideal risk and offer general guidance in periods when the variables may not be clear. I have designed this scale in hopes that it will complement the other tools currently in use and, in articulating the risk of avalanche involvement, contribute to the constant development of a safer work place.

In closing I wish to give thanks to Grant Statham who wrote the article "Avalanche Hazard, Danger and Risk—A Practical Explanation" which appeared in vol 86 of this journal. This article inspired the process of refining the risk concept and attempting to articulate it specically within our snow safety program. Also of mention is the ski patrol staff and program structure of Fernie Alpine Resort, where I have received mentoring, perspective and skill development in the work of avalanche safety operations and risk management. Finally I wish to acknowledge the wealth of information available for reference and guidance within the CAA, documents including *Observation Guidelines and Recording Standards for Weather, Snowpack and Avalanches* and *Guidelines for Snow Avalanche Risk Determination and Mapping in Canada*. Acknowledgements go out to all the contributing authors of these documents.

Avalanche Involvement Risk Assessment Scale

Risk Level	Title	Definition	Exposure	Forecaster Directives
4	Extreme	Consequential Avalanche Involvement Certain	Unacceptable to ALL USERS	Terrain avoidance is to be exercised by all users Standard routes may need to be re-evaluated, Non-standard area closures may be required
3	High	Consequential Avalanche Involvement Likely	Unacceptable to AREA USERS and AREA STAFF Unacceptable to AVALANCHE SAFETY STAFF	In-boundary areas and above boundary areas closed to access by area users and area staff Avalanche Safety Staff access may be requested utilizing safe travel routes with explosives accompaniment
2	Moderate	Consequential Avalanche Involvement Possible	Unacceptable to AREA USERS inbounds, Acceptable to AREA USERS in above boundary areas with deposits certain to contain outside area boundary Unacceptable to AREA STAFF Acceptable to AVALANCHE SAFETY STAFF	In-boundary areas closed to access, above boundary areas may be considered for open access by area users. Avalanche Safety Staff access may be requested utilizing safe travel routes, ski cut testing in prone terrain may be requested without explosives accompaniment
1	Low	Consequential Avalanche Involvement Unlikely	Acceptable to AREA USERS and ALL STAFF	All areas may be open for access

This scale was designed by Mark Vesely and is still in trial phase, with a hope to actively apply it in 2009/10 operational season. All feedback is welcome: mvesely@skifernie.com

Mark Vesely collection

Mark Vesely is the Snow Safety Director at Fernie Alpine Resort, and has been involved with the avalanche industry since 1998. His background is in ski area operations and outdoor education delivery and program design. Mark currently lives in Fernie, BC.

Transitions

Dave Smith
CAA Vice President

Dave Smith has been guiding and working in the avalanche patch longer than some of the CAA's younger members have been alive. He became a fully certified Mountain Guide in 1975 and began his avalanche career with BC Highways in 1982. In 1989, he became the Avalanche Technician BC Highways in the Nelson area and has held that position ever since. Dave continues to guide in the summer months, and calls guiding his "first interest, if not my primary career."

Born in Spokane, Dave immigrated to Canada in 1971 and became a Canadian citizen in 1975. "I was attracted to Canada and the Kootenays while still in high school, during numerous climbing and skiing trips with the local climbing club," he says. His post-secondary education included stints at University of Montana, University of Washington and University of Besancon in France, before "the outdoor world lured me away from academic pursuits."

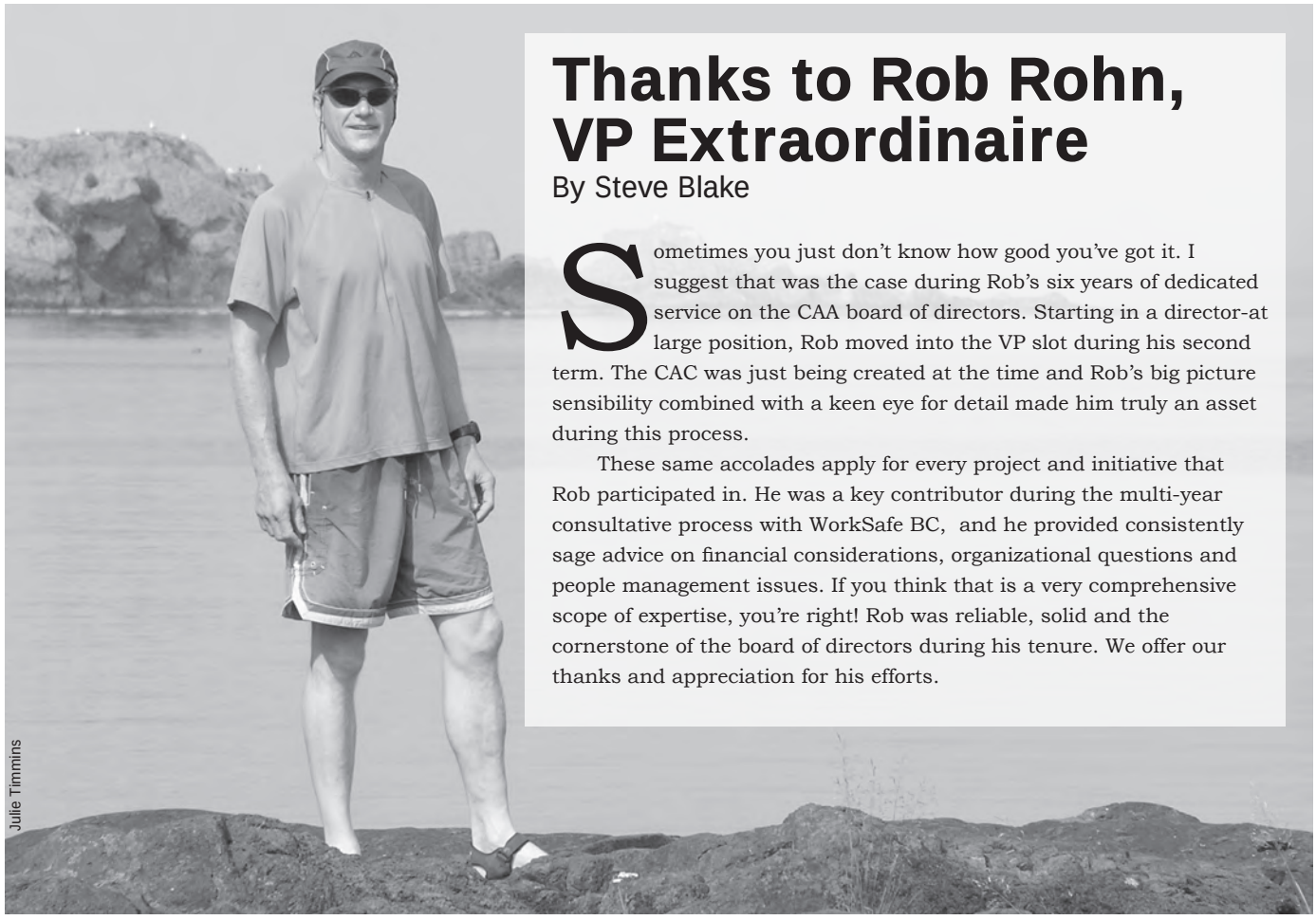
Dave is an active community volunteer; he is the current Treasurer (and Past President) for the Friends of West Kootenay Parks, and the Treasurer for the Nelson Musical Festival Association.

As a long-time member of the CAA, Dave has also been very active within this organization, as the board's Secretary-Treasurer, and as a member and eventual chair of the Education Committee.

"I have an on-going interest in the CAA," he explains. " It is a very dynamic and interesting organization with positive goals, clear objectives and a nice blend of altruism and common sense problem-solving. It also has a dynamic membership that helps to supply the energy that drives this association and has helped it to grow and meet new challenges. It's been a privilege to be part of this growth."

The CAA and CAC Boards welcome Dave's years of experience and his long-term perspective. "I sense the BOD finds itself once again in exciting times, faced with opportunities to grasp on the one hand and problems to resolve on the other. I look forward to the stimulus and working with a fine group of people."

Dave Smith collection



Julie Timmins

Thanks to Rob Rohn, VP Extraordinaire

By Steve Blake

Sometimes you just don't know how good you've got it. I suggest that was the case during Rob's six years of dedicated service on the CAA board of directors. Starting in a director-at large position, Rob moved into the VP slot during his second term. The CAC was just being created at the time and Rob's big picture sensibility combined with a keen eye for detail made him truly an asset during this process.

These same accolades apply for every project and initiative that Rob participated in. He was a key contributor during the multi-year consultative process with WorkSafe BC, and he provided consistently sage advice on financial considerations, organizational questions and people management issues. If you think that is a very comprehensive scope of expertise, you're right! Rob was reliable, solid and the cornerstone of the board of directors during his tenure. We offer our thanks and appreciation for his efforts.

Golden—of the Selkirks

By Pauline Johnson (1861 – 1914)

A trail upwinds from Golden ;
It leads to a land God only knows,
To the land of eternal frozen snows,
That trail unknown and olden.

And they tell a tale that is strange and wild--
Of a lovely and lonely mountain child
That went up to the trail from Golden.

A child in the sweet of her womanhood,
Beautiful, tender, grave and good
As the saints in time long olden.

And the days count not, nor the weeks avail ;
For the child that went up the mountain trail
Came never again to the Golden.

And the watchers wept in the midnight gloom,
Where the canons yawn and the Selkirks loom,
For the love that they knew of olden.

And April dawned, with its suns aflame,
And the eagles wheeled and the vultures came
And poised o'er the town of Golden,

God of the white eternal peaks,
Guard the dead while the vulture seeks !--
God of the days so olden.

For only God in His greatness knows
Where the mountain holly above her grows,
On the trails that leads from Golden.

Jordy Shepherd

Always A Line

By Gord Ohm

The minivan's packed—skis, down bag, cooler.

The border. The interstate. Les Schwab. Bozeman, Montana. It's been 18 years since a patrol exchange. Stayed with Rodney. All the furniture was ammo boxes. A motel offers discounts at Big Sky. It's cheap. Buddy in the office is limping from a crash at Bridger Bowl. There's television but no hockey.

Up early. Big Sky it is. Lone Mountain rises to 11,166 ft in the Tobacco Root Mountains. There's a tram to the summit. There's compact women with packs and twin tips. They rip. The chutes are steep and chalky. I ski 'til four and head for the van. I grab my kit and poach a hotel gym. There's a screen. It's Super Bowl Sunday. Hot shower. Excellent. A roadhouse for the second half. There's a dozen guys drinking beer. Sloppy Joes on a bun are a buck.

After the game I drive to Grand Targhee and crash in the van. It hasn't snowed in a week. They tell me its hardpack. I decide to roll on to Teton Pass. Busy spot. I skin up and ski a creamy low angle. Boot top. I meet Jon and Zack on a treed shot near Edelweiss Bowl. We ski together. They share some mountain culture at the vehicles and invite me to Jackson. Wyoming. People think I'm a local, which is cool. It's a clear, moonlit night. A few beers, crash on their floor. Tomorrow's a travel day. The Great Salt Lake.

Rob and Linda live in Park City. We met at Whitecap. Little do I know I'll be royalty. Beautiful home. Big guest room. Great kids. And Moose, the chocolate Lab. He's a good boy, oh yes. Day 4, Deer Valley. You wanna talk tourism? 14 quads, billiard table groomers, hotels, timber, stone. Stein Eriksen. They got it dialed.

Thursday, Park City. It's still dry. I hook up with "Rip" a legendary UDOT forecaster. We cruise, tell stories, laugh. Check out the slack country. Ski some facets in the Aspen forest. It's sunny. It's good. I'm getting some foot pain so Rip hooks me up with John, a bootfitter. He treats my liner. No charge.

Friday, the southern Wasatch. 10 overnight and snowing hard at Sundance. Steep treed ridges and narrow bowls. It's old school. Fixed grip lifts. A log cabin up top. The single speaker scratches out Bob Marley. There's wind and graupel, the great healer. I'm amped. My boots are silk. The sugar daddies are on fire. I find my mojo. I lost it in 07.

That night we meet at Colemans. Magnificent home. There's guitars. We're jammin. The Dead. And Joel, from Wyoming, who lives in Frisco, flies in from Denver. To historic Park City. These guys know how to party. One last Jager before bed.

Saturday Rob is off. Linda spreads a big breakfast and we hit the Canyons with Joel and Rip. Underground parking? Too funny. We head up and out. Skin and ski some cool shots OB. Yesterday's 40 is skiing pretty fair.

Sushi? Oishi. The place is roaring. Rob's daughter Josephine is the hostess. She ends up driving us home. She finds us amusing. She's great. Her twin sister Jesse is racing at Sun Valley.

Sunday we head for Big Springs. A long approach and big climb to line up our run. North aspect. Steep terrain. CTM (21) down 40. We leapfrog, ski it right, one at a time, eyes wide open. Four grand. Back to the car 9 minutes early. Joel has to catch a flight home. Skoal brother!

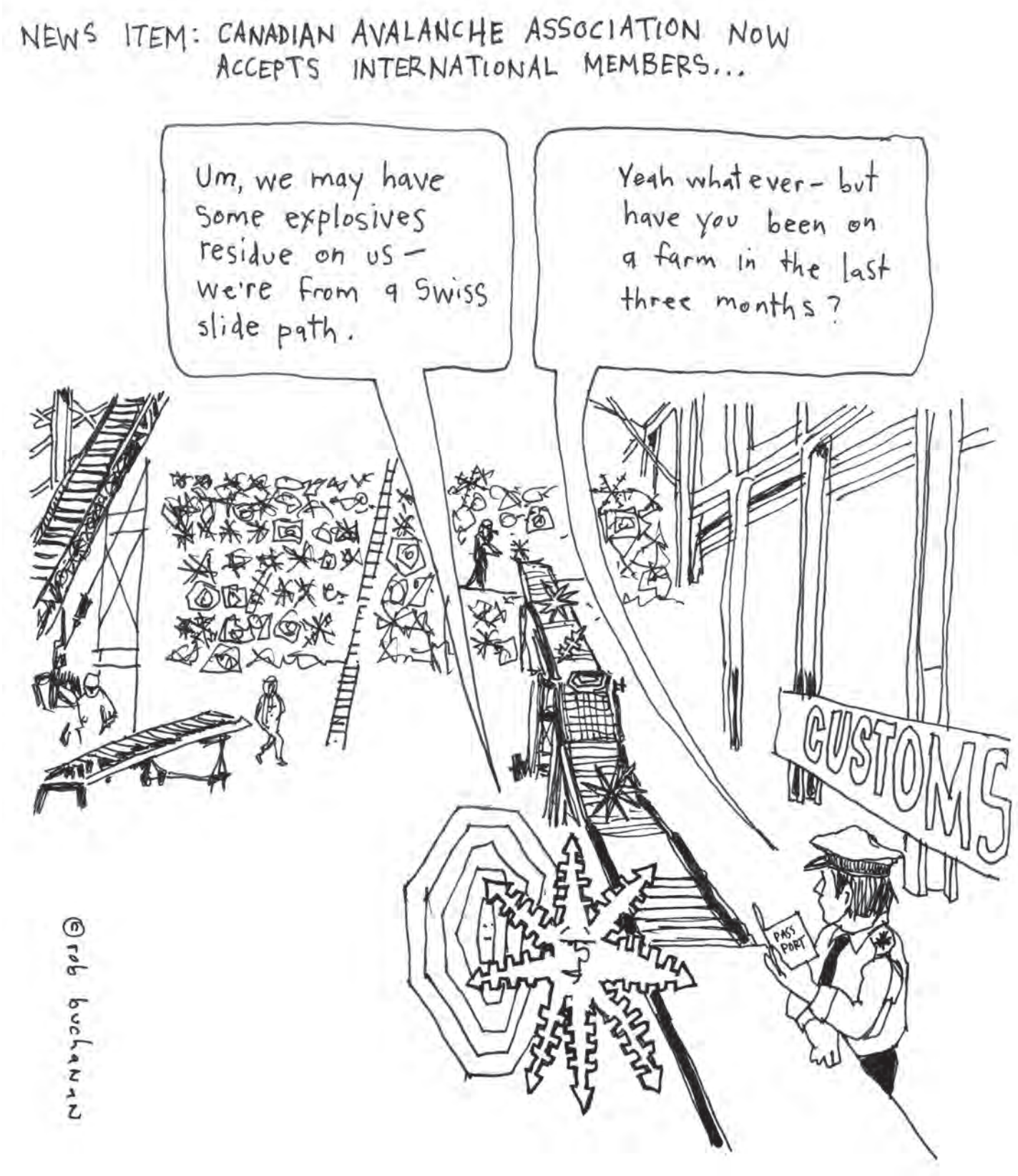
Another 40 overnight spells Alta. Rob has booked off. We follow Jamie around. He's got tape on his skis with 164 132 140 so people will quit asking him. It's blower Utah pow. It's tasty. The roads closing at 1:00 for control so the boys head for work. I porpoise around 'til four and take a bus down canyon.

One last great evening at the Karz'. Jesse plays some Mozart on the clarinet. This family is unreal. Their dog even gets the paper. Don't ya Moosey. Oh yes. You're a good boy. Yes you are.

Tuesday. Another 40. Snowbird. I hook up with Jason and we ski the tram. 3000 foot shots. Blower. I hang in 'til around 1:30. There's a brief clearance. Sunshine. The place is beautiful. My legs are trashed.

I bus down the Little Cottonwood. To the minivan. Set my compass north I got winter in m' blood.

Flakes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