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The journal of Canada's avalanche community

SLEDUCATION
AIMING AT THE RISING TREND IN SLEDDER AVALANCHE ACCIDENTS

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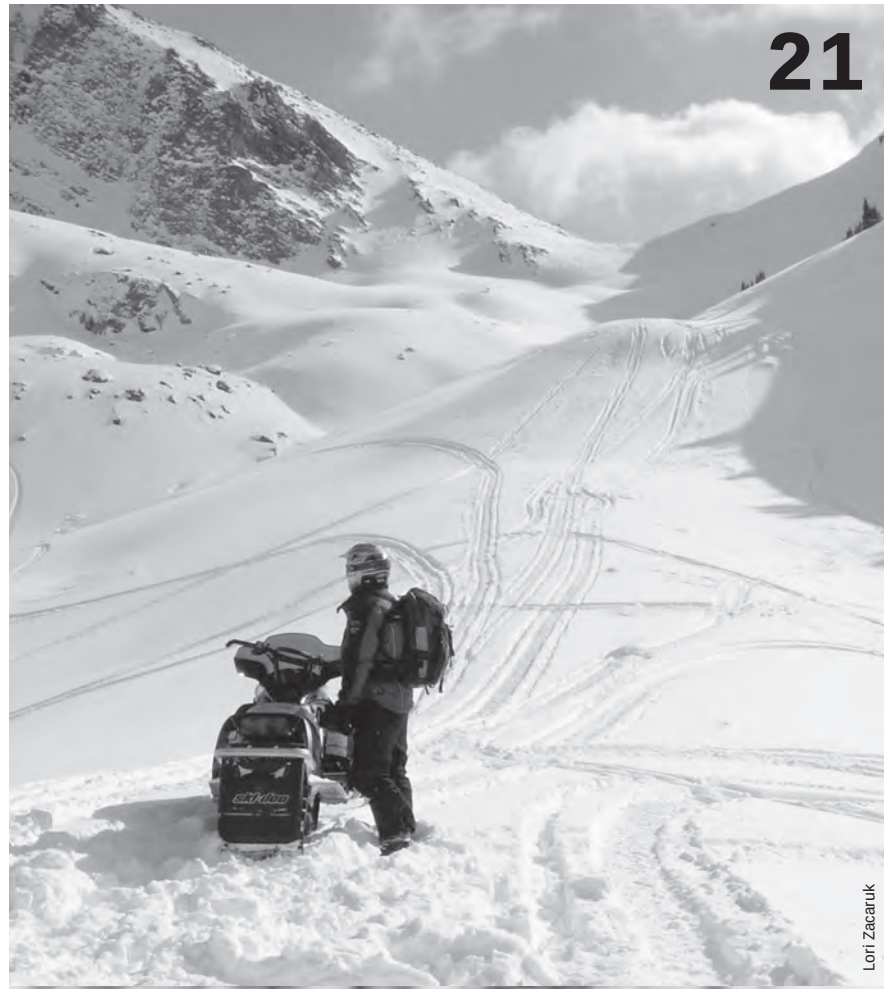
SEARCH!
HOW TO BECOME AN AVALANCHE RESCUE DOG TEAM

+ New International Danger Scale, Gender and Risk, Plus Mind Mapping, and more!

Volume 87 Winter 2008-09
Cdn Publication #40830518

attach to food left in alpine huts



Lori Zacaruk

Dave Healy

Cover shot: Graham Helfrick.

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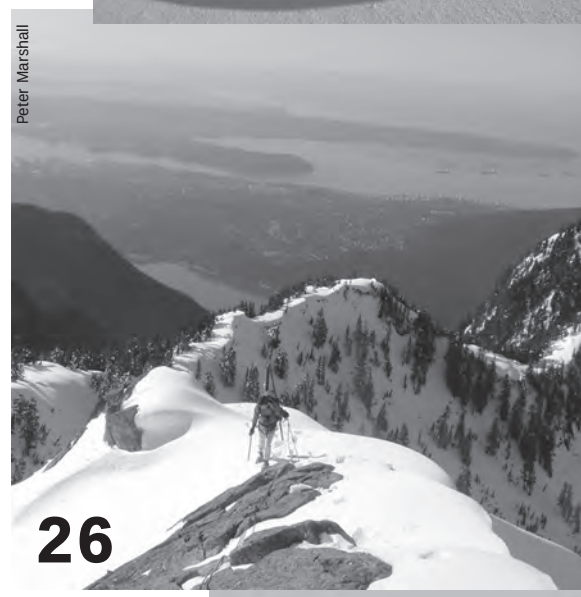

avalanche.ca
The journal of Canada's avalanche community
Volume 86 Fall 2008

failure plane

In the Executive Director's report in the previous issue of *avalanche.ca*, two very important people who volunteered their time to help organize the ISSW in Whistler were not mentioned. Steve Conger was the co-chair of the ISSW Paper Committee and shared equally in the huge effort it took to organize that element of the workshop. Dr. Pascal Haegeli was the Chair of the Poster Committee, a position that requires a tremendous amount of time and energy. Both Steve and Pascal contributed greatly to the success of the ISSW, and we apologize for not acknowledging them in the report.


David Bryan

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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Season Opener

The winter issue of *avalanche.ca* is always a special one to me. Putting it together right before Christmas can be fairly stressful but, like most demanding situations, a little perspective goes a long way. Winter is our season, our big show, and I always find it inspiring to read about all the great things going on in avalanche safety in Canada. Of course, that inspiration doesn't always translate to other Christmas chores like baking or finishing presents, but it's a start.

The dramatic cover photo was chosen to help illustrate one of the CAC's big pushes—increasing avalanche awareness for snowmobilers. The story that goes with it highlights an unsettling trend over the past two years, where we've seen a marked increase in snowmobile fatalities. There are some distinct similarities within the accidents and incidents involving sleds that are reported to our forecasting office. The CAC has the resources to recognize the problem and expertise to work on solutions. I think you'll find the story interesting reading, and a great example of one of the great strengths of this organization.

We're also very pleased to bring you the first look at the new international danger scale, a project that's been in the works, in one form or another, since 2005. While keeping the same five-point scale and its colours, the big change has been in the advice accompanying each rating. The team members from US and Canada wanted to focus on public communication and have worked hard to clarify the messages. The draft version will be in use this winter and feedback gathered by marketing research firm Ipsos-Reid will contribute to a final version in the spring of 2009.

I'm also excited about a story we're bringing you that tells about the dedication and commitment it takes to train an avalanche rescue dog. Written in installments by long-time CARDA examiner Jay Pugh, the first chapter focuses on what to look for in a puppy, the hard questions you need to ask yourself before setting on this course, and some of the early training. This idea has been on my mind for a while now and I'm really happy that it has come to fruition. Jay has done a great job setting the stage and I'm very much looking forward to reading the next installation in our spring issue, as I'm sure you will be too.

We've had a lot of input from Swiss researcher Manuel Genswein recently. In this issue, he brings us a quantitative study of one of our fundamental tools—the shovel. Manuel and his field researchers have been doing a lot of digging lately, and he saw it was a good opportunity to put shovels to a real test. Manuel told me that he bought the shovels himself—three of each model tested—thinking he could resell them used and recoup some of the expense. Unfortunately, as you'll see in the research, not many of them are fit to sell. "Now I've got a basement full of broken shovels!" he said with exasperation. Manuel's loss is our gain, though, and I'll think you'll find his conclusions enlightening.

I'm sure that by the time you read this, the Arctic air we've been sitting in will be just a memory, though undoubtedly reminders of it will remain in the snowpack for some time to come. Have a great winter and look after each other.

Slack Country vs. Out-of-Bounds

This fall will mark the third consecutive year I have given avalanche awareness presentations to kids in Grades 7-10 in the Bow Valley. I am still learning about how these kids think, the terminology they use, and their perceptions with respect to avalanche awareness and skiing out-of-bounds at the ski hill.

It has really been in the past year, while attending the CAA Annual General Meetings and Conference in Penticton and again at the ISSW, that I have been exposed to the term slack country. Recently I told a friend I had concerns with this term and she informed me it was a well-established word /concept in the ski scene. She said it was the same as out-of-bounds but was called slack country because it is terrain easily accessible from the ski areas.

I went to the dictionaries to see how they defined "slack" and I found the following: "Not using due diligence, care, or dispatch," "Lacking in diligence or due care or concern; negligent" and, "To be careless or remiss in doing: slack one's duty." I couldn't find any definition that included the word easy.

Travelling out-of-bounds requires behaviour that is totally opposite to the meaning of the word, so I question the appropriateness of its use. We all know that to travel safely out-of-bounds requires knowledge, training, responsibility, diligence, care and concern: the ultimate motivation being safety. This is the message we are all so desperately trying to get out there but "slack country" implies the opposite.

I'm not sure if this term is in common use among avalanche professionals. I would like to think not. Due care, diligence and concern for safety is what travelling in the mountains is all about, whether out-of-bounds or in the backcountry. In my avalanche awareness program I explain to the kids the difference between backcountry and out-of-bounds, the difference of course being how they are accessed. Travelling in either is anything but slack. It isn't a term I will be using in my avalanche awareness programs.

Julie Timmins
Creator of Parks Canada's
Avi-Smart program

Heather Dempsey


Ian Tomm Collection

Community Values

With Clair's leave of absence this past month I was asked by the Board of Directors to step into some pretty big shoes for the duration of the winter. I was both honoured and nervous when they asked and I thank them for considering me. Most importantly, I thank them for having the confidence in my abilities to fulfill the role of acting Executive Director for the CAA and CAC. Replacing Clair's 35+ years in this industry and his command of professional and public avalanche issues is no small feat, but I commit to represent professional avalanche workers and their employers, and to uphold the CAC's national public safety mandate to the very best of my abilities.

Over the past seven years with the CAA I have worked closely with many of you, either through the InfoEx program, the Industry Training Program or through the numerous new initiatives and special projects I've been fortunate to be involved with. One thing is certain. My dedication to this community and to the causes of the CAA, and now the CAC, is entirely due to my experiences working with the people of this community. As a young assistant guide who got a lucky break (thanks to Clair for his trust in me when he hired me back in 2002) I was welcomed with open arms and enthusiasm from day one by our membership and stakeholders. (Although, to be honest here, I did have to prove myself to several instructors before I earned their respect!)

I've learned a few things along the way that I think will help me in my new role. Firstly, I'm primarily about people. Without people—their commitment, energy, enthusiasm, professionalism and passion—we have little more than a club. The CAA is an organization of world-class avalanche workers, members who are committed to its causes of excellence, communication, technical standards, competence, ethics, education and worker training. That's what motivates me, you and your commitment to the work you do. Maintaining and fostering that level of commitment in our membership is my number one priority.

Secondly, I'm about communication, education and training. I personally consider these the three pillars of the CAA—the foundation upon which we have been able to grow over the years and allowed us to be in position to create the CAC in 2004. The Canadian avalanche community is modeled internationally and it's in no small part due to these pillars of our association.

Our communication methods are varied and all are valuable. Once a year we all descend upon Penticton to spend a full week together in committee meetings, general meetings, social events and the spring conferences—commonly referred to the CAA's mini ISSW. We need effective communication tools for our geographically distributed community—this journal, monthly member emails, a members only website and InfoEx to name a few.

Our Industry Training Program is a testament to our commitment to education. This year, over 700 students, current avalanche workers and the workers of tomorrow, will take a course from the CAA. I think few who were involved in the early years of establishing the Level 1 and 2 programs could have foreseen what the schools have become. Now, with the new Level 3 – Applied Avalanche Risk Management course, we're poised to take yet another step out in front of the international avalanche community.

Standardized training has contributed greatly to our success in the field of avalanche safety. All CAA Professional Members have gone through the exact same training programs, adhere to the same standards of communication and technical competence and contribute to the mentorship, education and training of our successors. That is why we are where we are today.

Lastly, and by no means do I mean the least important, are the values I bring to the table. Our values as an association (CAA), and our values as the national public avalanche safety organization (CAC) dictate our interactions and business relationships with our community. I've been asking myself a lot recently what our core values are. The staff of the CAA and CAC recently worked with a management consultant to define our internal core values, an exercise we all found rather profound. I'd like to finish by asking you what you think our organizational values are. Not our mission, not our vision, not our operating principles, but our core values—those words by which our actions are compared, and tested, against.

Serving the public interest is certainly a core value for all of us (and for both associations) but it runs deeper than that. We're talking about the essence of who we are as a community and the moral imperatives by which we hold ourselves accountable. The values that will guide me as acting Executive Director have been shaped by you—the Canadian avalanche community. Those values are respect, integrity, honesty, openness and trust. With them, I hope to lead this organization to further success and excellence this winter.

Due to the changes at the CAA and CAC this past month and the challenges we face this winter I've had to cancel my winter guiding work so I can focus entirely on this community and the mission of the CAA and CAC. That means, for the first time in my career, I am now in a position to reach out to you directly, to discuss your challenges, concerns, successes and thoughts about working in avalanche safety in Canada. I'd love to hear from you and, if the chance arises, I'd like to come and visit you at your workplace this winter. Stay in touch, drop me a line any time and most importantly have a safe and enjoyable winter. I wish you the very best and look forward to seeing you all this spring at the AGM in Penticton.

Steve Blake

Looking Ahead

Rather than spend a lot of time looking back at the lengthy list of accomplishments of 2008, many of which will be featured in this edition of avalanche.ca, I thought I would spend some time pondering the future and some of the concerns facing the our association that deserve attention from all of us. First, there are the organizational considerations. Who will be the next leaders of the association, the next board of directors? This is a big deal and we clearly need the right people in the right jobs. The CAA's by-laws prescribe the election of four members of the eight-person board each year.

The intent of the two-year terms is to prevent wholesale turnover of the board. By our next AGM we will, at a minimum, be thanking Vice-president Rob Rohn for his dedicated years of service. Rob will have dutifully

"...the membership is not only served *by* the association but also serves the association in turn."

fulfilled his maximum allowable term in office. By spring 2010 (not that far away!) there will more mandated board turnover including the positions of secretary-treasurer and president. It really is time to start giving this some thought; perhaps you or someone you know has something to offer?

Secondly, there are the strategic considerations. Planning, establishing goals and priorities requires careful evaluation of past successes and challenges and thoughtful forward thinking. There is invariably a push/pull dynamic when looking ahead, since there is a strong tendency to reinforce and hold our past successes dear, at the expense of emerging innovation. Change, innovation and evolution must be embraced while carefully maintaining our traditions and core values. Competing priorities, cost/benefit analysis and funding uncertainties add to the challenges we face now and in the future.

And finally there are, let's say, philosophical considerations. These are not so much the what we do but the how we manage our affairs. Even in the few years I have been on the board of directors, societal expectations and norms have changed dramatically around us. Successful organizations of today and tomorrow work hard to foster open content and knowledge sharing. We too, must capitalize on the wealth of wisdom inherent in our membership.

Consultation is subtly replaced by active engagement; engagement not only of our members but also our stakeholders. The concept of our membership will be viewed in a new light—as a body not only served by the association but one that serves the association in turn. Membership is recognized as our most valuable form of capital. Planning remains paramount but flexibility, reactivity and adaptive management is critical to our success. The association as an entity shifts its emphasis from being a knowledge warehouse to a centre of influence, a focal point for creativity in the avalanche industry.

As always I look forward to your thoughts and ideas. president@avalanche.ca.

Cheers,

CAA Quick Hits

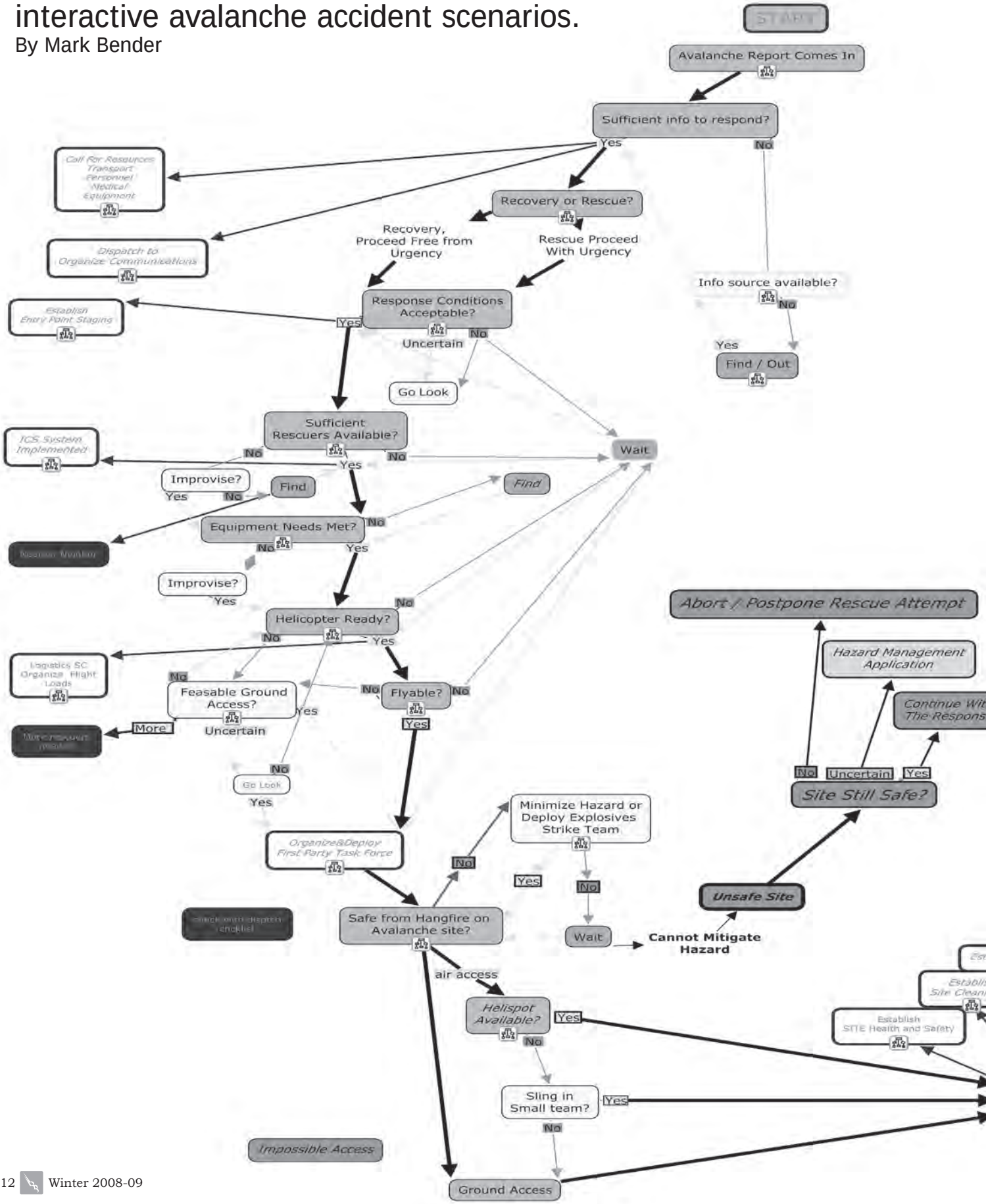
- In the Fall of 2008, the CAA's Level 2 became the only accepted training for teaching avalanche courses on a professional level in Sweden. This decision was made by the SLAO (Swedish Lift Areas Organization) which administers avalanche safety training in that country. According to Stefan Martensson, one of two Level 2 graduates in Sweden, the industry demands for professional courses are increasing.
- A big thanks to Professional Member Greg Paltinger, who volunteered his time in November and got all the ITP weather equipment ready for courses this winter. Thanks Greg, your help is greatly appreciated!
- The Private Career Training Institutions Agency of BC (PCTIA) has identified the CAA's Industry Training School as the top enroller in its category (technical occupations related to natural and applied science). The PCTIA is a non-profit organization which oversees registered education institutions in the province.

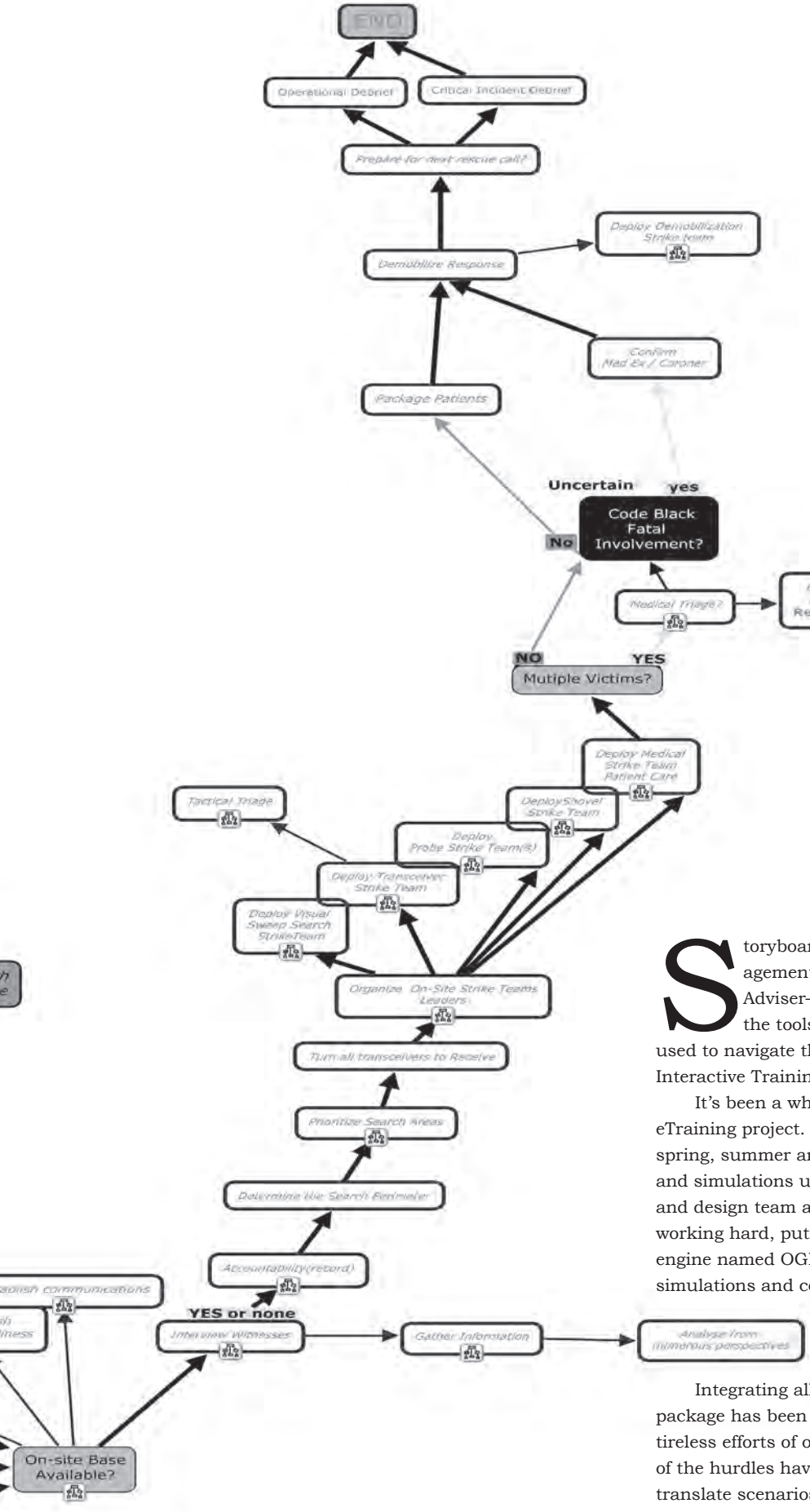
Brent Strand

Mapping Minds

The CAA's eTraining project analyzes expert reactions to create interactive avalanche accident scenarios.

By Mark Bender





This complex flow chart is one of the many "mind maps" used by the eTraining project to translate expert decision making processes during an avalanche rescue.

Storyboards, mind-maps, OGRE engine, content management system, learning interface, simulator, The Adviser—these are just some of the terms describing the tools, components, features, and technology used to navigate the uncharted territory where the eTraining Interactive Training Modules are attempting to go.

It's been a while since there has been an update for the eTraining project. Hard work has been on going throughout the spring, summer and fall months to create interactive exercises and simulations using web-based animation. Our programming and design team at the University of Calgary have also been working hard, putting the finishing touches on a gaming engine named OGRE. OGRE will have the capacity to handle simulations and content, as well as a debriefing component.

Integrating all the technology into one smooth operating package has been a handful to say the least. But thanks to the tireless efforts of our design and programming team, almost all of the hurdles have been overcome. We are now in a position to translate scenarios into computer code.

A combination of storyboarding and mind mapping is helping to create an interface between the avalanche world and the animated computer world. The use of mind-mapping software has helped to draft the thought processes of avalanche professionals involved in organized avalanche rescue. These maps then form the framework of interactive scenarios written in a storyboard format.

Imagine navigating through an animated video-game environment where the user controls all the decisions made. The outcome of the story is directly linked to the decisions the user makes along the way. If you are familiar with the "Choose your own Adventure" book series, you can imagine what the structure of the storyboards is like.

In the simulator component, a series of scenes are linked together differently, depending on the decisions made. Each scene is made up of a number of decision points with numerous choices, and each choice will lead to a different scene. In this way the outcome of the story will be different every time.

Once the simulation is complete, the learning begins. The user will be transferred into the Control Panel, a learning interface where the user will go through a debriefing process. Users will be able to click on thumbnails that are recorded segments of the simulation leading up to each major decision made by the user.

> "One could say the development process for eTraining has been a journey of epic proportions."

Videos, articles, images, case histories, and a best practices content manual will be tagged to themes represented in each decision point. A Content Management System will organize all of these resources, so they are all only one click away. Also tagged to the themes is "The Adviser," a talking head who will offer advice on how to effect better decision making for future avalanche rescue endeavours.

One could say the development process for eTraining has been a journey of epic proportions. It has been a collaboration of minds with extremely diverse backgrounds. Once completed, it will not only offer avalanche professionals a valuable tool for improving their decision-making processes, it will act as a knowledge database that will be further enhanced by every person who signs on to use it.

>>Mark Bender is the Lead Curriculum Developer for the eTraining Project.

The control module.

Where 9-1-1 Doesn't Cut It

CPD Seminar Focuses on Medical Aspects of Avalanche Rescue

By Ian Tomm

November 8, 2008 was a dreary and unseasonably warm, rainy day in Revelstoke. In fact, on this day it would have been hard for any avalanche professional, seated in the conference room of a local hotel, to picture themselves in the middle of winter, snow blowing in their faces, working desperately to apply critical life-saving measures to help an avalanche victim survive as the temperatures dropped and night set in.

That scenario was the focus of the CAA's Continuing Professional Development Seminar this fall. A full house of 20 students packed in to learn more about the world of avalanche-specific medical presentations and receive a theoretical background to medical aspects of avalanche rescue.

The course was taught by Dr. Renata Lewis. Renata has a tremendous amount of knowledge and experience to share and is very generous with her expertise. In addition to her training as an emergency physician she is also a trained SAR medic. In addition to being the CAA's medical advisor, Renata is the medical consultant for a number of backcountry and resort operations in BC.

Members from virtually all avalanche community backgrounds, including ski and mountain guiding, Parks rescue wardens, Ministry of Highways personnel, ski patrol, avalanche course instructors, wilderness first aid instructors and avalanche consultants participated in a very interactive and information-packed day. The goal of the course was to provide an open learning environment and exchange of ideas amongst these members, while providing the key knowledge base for the provision of medical care to victims of an avalanche accident.

The course day was divided into several main topics, during which time participants were able to learn basic concepts, then apply and review these topics through scenario-based individual and group activities, or group discussions guided by student feedback. The main topics of discussion were: the pathophysiology (what actually happens to the body) of living, injury, and dying from an avalanche incident, practical avalanche resuscitation (both from basic life support and advanced life support perspectives), first aid kits and equipment use, medical and tactical avalanche triage for multiple burial events, and optimization of rescue plans from a medical perspective. By all accounts it was an extremely full and fulfilling first day at avalanche medical school.

There has been an incredibly strong response to the success of this seminar and it is obvious this topic is both pertinent and timely for the avalanche community in Canada. The CAA hopes to strike a working committee this spring to further develop the curriculum and look into options for expanding this concept further in the Industry Training Program. Dr. Lewis will be presenting at the CAA's Annual General Meeting, scheduled for May 4-8, 2009 in Penticton, BC.

Student Feedback

"Outstanding!"
"Renata is an excellent resource"
"Very skilled and informative."
"Look forward to expanded course offered in more locations. Everybody needs this."
"Expert knowledge and experience was invaluable."

The CAA Avalanche Forecasting Course

An Update from the Canmore Development Workshop

By Karl Klassen

In the last issue of *avalanche.ca*, Ian Tomm outlined plans for the new Avalanche Forecasting Course (see The Work We Do, Vol 86, p 18-19) which is one of the requirements listed in the recently implemented WorkSafeBC qualified Avalanche Planner designation.

This summer an initial curriculum proposal was developed for the following core subjects:

- The Principles of Avalanche Hazard and Risk
- Heuristics and Bias in Avalanche Hazard Forecasting
- Uncertainty and Confidence
- Avalanche Hazard Evidence and Data Stream
- Avalanche Hazard Analysis, Assessment, and Forecasting
- Avalanche Risk Assessment, Management, and Control
- Communicating Avalanche Hazard and Risk

A number of people were then invited to join a team to develop preliminary ideas about what topics each of these subjects might include in the context of an avalanche forecasting course. These teams were then brought to Canmore in mid-November to participate in a workshop where the curriculum and other aspects of the course were discussed. The team included highly experienced and senior members of the avalanche industry who work in a variety of operational applications including avalanche forecasting and control, guiding, engineering and consulting, etc. Also on the team were some younger, up and coming avalanche professionals who brought a fresh perspective and scientific knowledge or background to the table to augment the views and opinions of the older generation. The team members are pictured on the next page. Pascal Haegeli was not at the workshop but his valuable support and advice has been much appreciated.

The mix of backgrounds and personalities on the team proved highly successful with great ideas and concepts coming from all sides of the table. The discussions initiated vigorous argument and debate, not to mention learning on behalf of everyone involved.

As can be imagined, the development of this course has been a complex and sometimes rocky process, but in the end there was general agreement on most of the major issues. Without going into extensive and arcane details here's a list of some of the major points that were agreed upon:

- The subjects in the initial curriculum proposal are valid and should form the core of the course.
- Definitions of hazard and risk and their various components that were developed by the avalanche danger project were endorsed (see Avalanche Hazard, Danger and Risk—A Practical Explanation, *avalanche.ca* Vol 86, Fall 2008, pp 44-47).
- The course fits into the current ITP progression with this course being the 3rd level that follows the existing Level 1 and Level 2 courses.
- The course name should be "CAA IPT Level 3: Applied Avalanche Risk Management."
- The course should impart fundamental theoretical and scientific principles related to avalanche hazard and risk that are common to all avalanche applications.
- There should be a significant practical component in the curriculum which puts the theory and science into real-world context in a variety of applications.
- Case-studies and hands-on exercises are the best way to develop the practical, real-world aspects of the course.

While there was disagreement about details, consensus was generally reached on how to move forward to resolve contentious points. Again, without going into the details, there's work to be done on some issues including:

- The target candidates for the course
- Prerequisites
- Evaluation/assessment scheme
- Standardization of lesson plans for theoretical aspects of the course
- Development of case-studies and exercises for the practical aspects of the course

All in all, the workshop was a great success. Everyone felt they learned something new and coming to the workshop was worthwhile. Also, there was unanimous agreement that this course has the potential to become highly useful and applicable training for our profession, not to mention an interesting, challenging, and enjoyable experience for both participants and instructors. We all found that hearing other points of view and seeing how various sectors of the industry approached the avalanche forecasting process was stimulating and valuable. Speaking personally, I was struck by how often the younger crowd stole the show by presenting on a topic we all thought we knew produced a Eureka moment, with different approaches and new levels of knowledge. Hmmm…

The next step is for some of the ideas and concepts from this workshop to be presented to the CAA Education Committee for review and discussion. The plan is then to develop the curriculum further over the winter and early spring with the goal of holding a beta version of the course in the late spring or early summer.

The beta course will be partly workshop and partly a test of the curriculum. Likely some of the participants on the next course will be senior members of the avalanche patch, attending by invitation with the idea of soliciting ideas and opinions on the course and the curriculum. However, we hope to have the course material and curriculum developed enough by next spring that we can offer the course to a limited number of the intended target audience—people who are in line to move into senior positions in avalanche operations where they will be taking primary responsibility in avalanche forecasting and risk management roles. Having the true target audience there will offer the very valuable and necessary feedback from and perspective of the learner for whom the course is ultimately designed.

Marc Piché

History in the making. This image records the group unanimously agreeing and adopting the hazard/ risk definitions and associated hazard evaluation process on Friday morning, after a full week of rather fierce debate.

Forecasting Course Development Workshop: (l – r) Dwayne Congdon, Bruce McMahon, Marc Deschêne, Allan Jones, Phil Hein, Dave Smith, Randy Stevens , Karl Klassen, Colani Bezzola, Ian Tomm, Chris Stethem, James Blench, Grant Statham, Dave Stark, Jim Bay, James Floyer, Robb Andersen, Marc Piché. Missing: Rowan Harper

Marc Piché

Backcountry Avalanche Workshops

2008 Event Summary

By Jennifer George

The Backcountry Avalanche Workshops presented by Columbia Brewery are the CAC's premier public outreach event. We focus our efforts on providing new avalanche safety tools and techniques to our audiences immediately prior to the opening of the ski and snowmobile season. Specifically, our goal is to reach the out-of-bounders and amateur backcountry skiers.

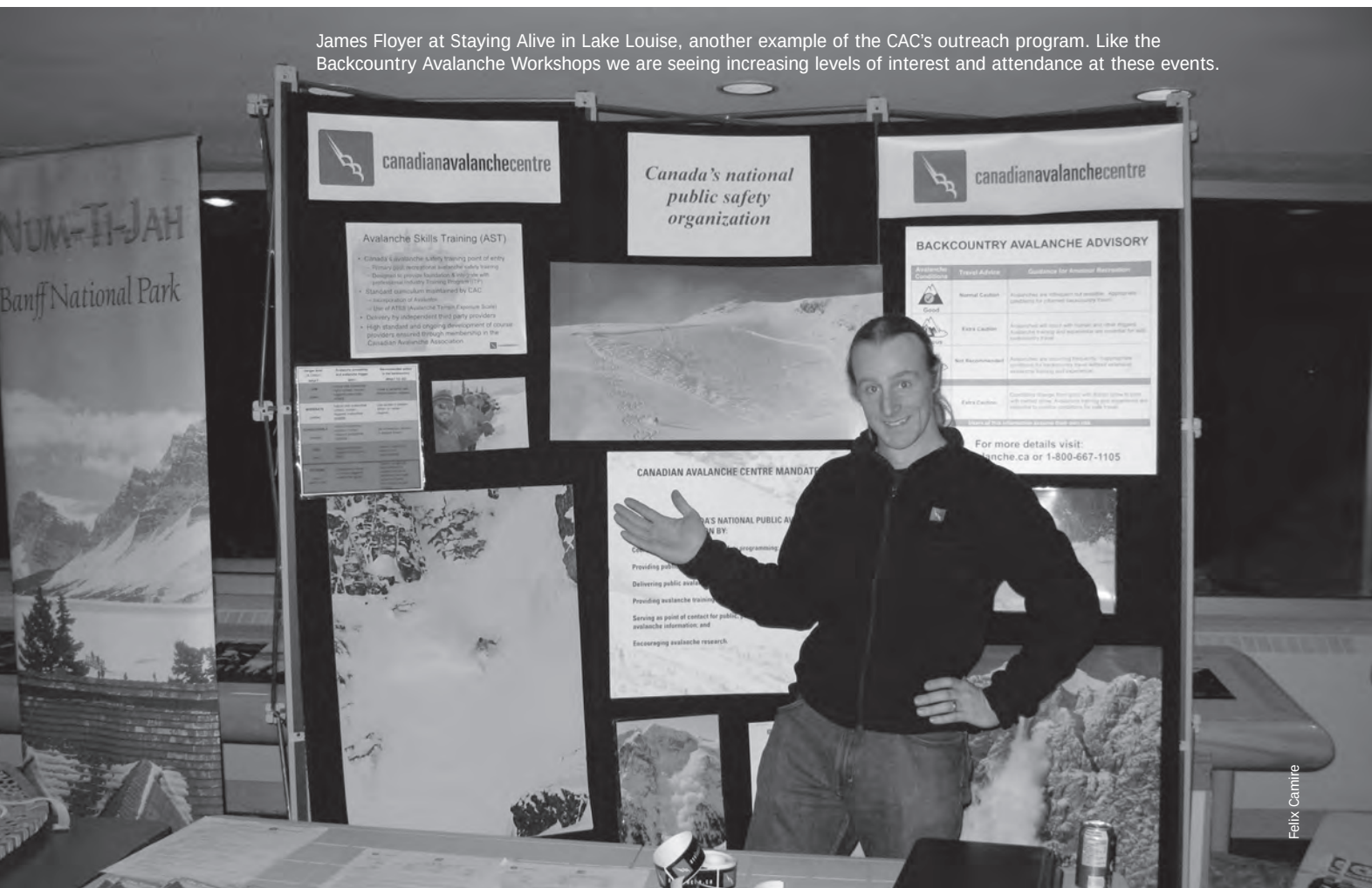
This year we hosted four venues—Banff, Vancouver, Nelson and Whitehorse. Thanks to a well-organized community-based advertising campaign, poster campaign and members and volunteers spreading the word, we had over 420 people attend, which is a record for us. This was our first year in Whitehorse and attendance there far exceeded our expectations, with over 145 participants. "The success of the event demonstrates the desire for a large group of users to become more informed about avalanche safety in the North," said Scott Stewart, Public Safety Coordinator for Kluane National Park and Reserve.

All the events featured speakers from the CAC forecasting team, University of Calgary Applied Snow and Avalanche Research team, Parks Canada and local experts. The presentations included real life stories as well as interactive exercises on terrain selection and gear talk. We received very positive feedback from the audience, particularly regarding the local pros relating real life case studies. Most audience members appreciate our "community approach" to the event that provides known speakers from their local area.

Communities that have hosted these workshops have repeatedly asked the CAC to return each year with this event. Each winter season, we alternate between different mountain communities. For next season we are planning on four or five venues in locations around British Columbia and western Alberta.

These workshops are proving to be a highly effective way of reaching our audience in their backyards. We want to thank Columbia Brewery for their financial support, which allows us to successfully meet the challenge of hosting these events in several communities simultaneously. Look for a workshop in your community next season!

>>Jennifer George is the Marketing and Special Events Coordinator for the CAC



James Floyer at Staying Alive in Lake Louise, another example of the CAC's outreach program. Like the Backcountry Avalanche Workshops we are seeing increasing levels of interest and attendance at these events.

Felix Camire

Backcountry Avalanche Workshop Survey Results

Vancouver: 120 participants
Age: <20: 6 21-30: 31 31-40: 19 41>: 17
Male: 47 **Female:** 26
Primary Activity: Backcountry Ski/Board: 49 Out of Bounds/Off Piste: 18 Other: 14 (snowshoe, mountaineering)
Top 3 things most liked:

1. The Fine Line (26)
2. Interesting and knowledgeable Speakers (22)
3. Good presentations, variety, good mix of photos (20)

Top 3 things to improve (least liked):

1. More Hands on, Q&A (13)
2. The Fine Line (8)
3. More gear demo/reviews (6)

Quotes from participants:
"Informative, interesting and I'm beginning to feel more confident, but will definitely take an Avalanche course now."
"Nice refresher and extension of training plus good place to touch base with friends."
"Very good and informative. Thanks. Helped to reinforce my desire to take AST."

Banff: 85 participants
Age: <20: 0 21-30: 16 31-40: 15 41>: 19
Male: 31 **Female:** 20
Primary Activity: Backcountry Ski/Board: 43 Out of Bounds/Off Piste: 4 Other: 6 (snowshoe, ice climbing)
Top 3 things most liked:

1. Case Studies: accidents, incidents review (26)
2. Informative, good variety of topics (16)
3. Terrain, Route selection exercises (15)

Top 3 things to improve (least liked):

1. More Rocky Mt. assessment of snowpack and practical snow stability tests (e.g. pits) (9)
2. More hand outs, hard copies, where to access more information (links) (8)
3. Don't show Fine Line, or put at the end (7)

Quotes from participants:
"This is a great workshop to do at the beginning of the season to get your head back into thinking about the risks and preparation."
"This was a day well spent for anyone who plans to spend time in the backcountry."
"The day was interesting, informative and thought provoking."

Whitehorse: 145 participants
Age: <20: 3 21-30: 21 31-40: 25 41>: 20
Male: 36 **Female:** 39
Primary Activity: Backcountry: 72 Sledder: 8 Out of Bounds/Off Piste: 6 Other (Kite): 6
Top 3 things most liked:

1. Local info (34)
2. Wide Variety of topics (24)
3. New info (e.g. conveyor shoveling, etc.) (16)

Top 3 things to improve/ least liked:

1. Tighten up the day by working out computer glitches, not letting speakers go on and on, overall time management (15)
2. Handout with useful links to websites and more resources (12)
3. Change the venue (!) People found the seats to be very uncomfortable or shorten the day (10)

Quotes from participants:
" Time well spent. I'll take a course again."
"Knowledgeable and catered to many skill sets."
"Excellent reminders and new info and local networking has me charged up for the winter ahead."


COLUMBIA BREWERY
Kokanee
GLACIER BEER
Kokanee
GLACIER BEER
COLUMBIA BREWERY
BC'S
GLACIER
FRESH
TASTE

SLEDucation

Reversing the Trend in Snowmobile-Related Avalanche Accidents

By Karl Klassen and John Kelly

Over the past 10 years, sledders have accounted for 27% of all avalanche fatalities (Figure 1). Last season, that trend changed. In 2007-08 sledders accounted for 44% of the winter's avalanche fatalities (Figure 2) and that season was the third highest ever recorded for snowmobile fatalities in Canada. Sledders have long been a significant proportion of avalanche deaths, but for the past two years they have maintained parity or near parity with skiers and other recreationists who have traditionally led the fatality count. If this trend continues, sledders will take the lead in avalanche fatalities in Canada, something that has already happened in the USA, where snowmobile incidents are now the largest segment of avalanche fatalities.

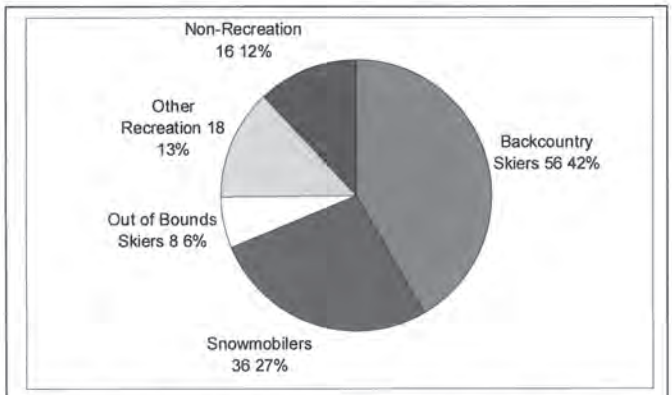


Figure 1: Avalanche Accidents by Activity, 1998–2008

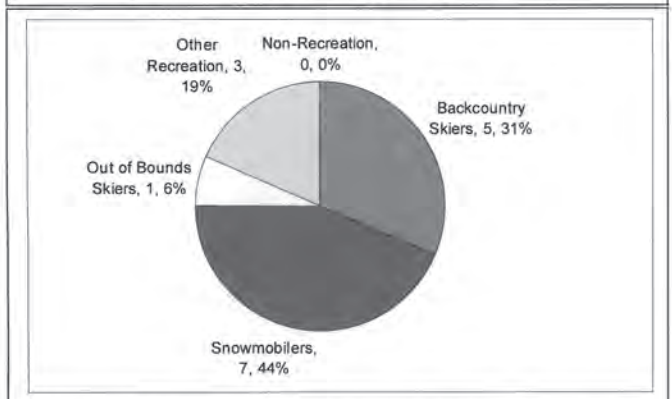


Figure 2: Avalanche Accidents by Activity, 2008 (as of May 1)

The increase in snowmobile fatalities in comparison to other user groups can be seen in these two graphs.

There is no reliable information about the number of users going into the backcountry so it isn't possible to calculate the accident/fatality rate. This is true of all winter backcountry recreation and is unlikely to change—gathering the data is simply not realistic. In spite of not knowing accident or fatality rates, snowmobile avalanche accidents, as in other winter recreation accidents, have a high cost in negative publicity and in societal and human costs. Even a single death is one too many.

Compared to other countries, Canada has a higher number of avalanche deaths when the public avalanche danger rating is high, and the CAC has long suspected sledders are one reason for this statistic. In the winter of 2007-08 five of seven snowmobile fatalities occurred when the danger rating was high. This may indicate snowmobilers might not know where to get or do not understand basic avalanche safety information. Or, more disturbing, they don't believe or ignore clear warnings of increased danger.

Avalanches in which sledders are involved tend to be bigger than those involving other recreationists (Figure 3). Large avalanches occur on large terrain features. This may mean sledders are less aware of the relationship between terrain and avalanches which, if true, indicates a lack of fundamental knowledge that plays the most significant role in staying safe in avalanche terrain. Sledders also have the power to tackle more and bigger slopes in a day than human-powered recreationists. In the case of high-marking, they go up and down avalanche slopes, whereas the slower moving human-powered crowd tends to climb up easier, safer terrain and ride down on the steeps. This means sledders have increased

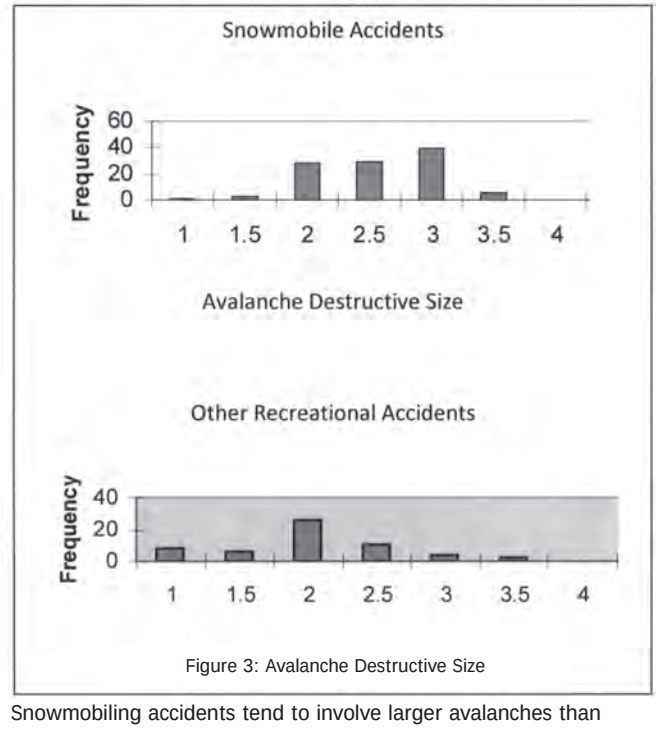


Figure 3: Avalanche Destructive Size

Snowmobiling accidents tend to involve larger avalanches than those of other recreationists.

exposure to avalanche slopes and have less opportunity to observe and assess on-slope conditions on safer terrain before entering avalanche slopes.

Large avalanches also often involve weak layers deeper in the snowpack, especially persistent weak layers (PWL) that allow propagation of failure over greater distances. These layers often produce avalanches long after they are buried and often occur on bluebird days with no overt clues of the lurking hazard. Deeply buried PWLs often require a larger trigger than shallower weak layers. The combined weight of a machine and rider may make sledders more prone to triggering those weak layers deeper in the snowpack, especially if they get bogged down which can cause them to break or dig through supportive layers that may be protecting the weaker layers below. Whatever the cause, it is notable that of the seven sled fatalities last winter, every one involved a persistent weak layer, such as facets on crust or surface hoar. While it's not realistic to ask recreational sledders to have a higher degree of knowledge about fracture mechanics than anyone else, information about persistent weak layers is often provided in avalanche forecasts along with specific advice for managing and reducing the associated risks.

The social nature of sledding means that often large groups are out playing together in the mountains. Reports and photos of accidents or near misses often refer to or illustrate large numbers of people and sleds in avalanche runout zones. This tendency likely has to do with a number of factors including the ease of access provided by sleds, lack of avalanche terrain knowledge, and a low awareness of avalanche runout potential.

While things are improving, snowmobilers are still generally less prepared than other users in terms of carrying safety equipment (Figure 4). It is clear that some sledders are not aware that a successful rescue requires a transceiver to indicate the site of a burial, a probe to pinpoint the victim's location, and a shovel to excavate a buried victim. More recent technologies such as flotation balloon packs are ideally suited to snowmobiling where the minimal extra bulk and weight are less of an issue than in human powered travel.

All this is not to point the finger at sledders—skiers, snowboarders, ice climbers, and mountaineers make similar mistakes or have a pattern all their own. The concern is the rapid rise in the percentage of sled fatalities compared to other user groups. Many snowmobile accidents and fatalities like the ones we have seen over the last few years are preventable with minimal effort and little or no cost.

In order to improve the track record of sled-related avalanches and reverse the trend of incidents and accidents, there needs to be better links between sledders and avalanche knowledge that already exists. Somehow, we need to put public avalanche information, avalanche education, and avalanche rescue gear higher in the sledder mindset. We know this will lead to more informed decision making, terrain choices appropriate to the conditions, more appropriate travel techniques to reduce exposure, and higher chances of surviving if caught. The onus is on both our communities—avalanche forecasters and educators and snowmobile manufacturers, retailers, clubs, media, and users.

So what can the avalanche community do to provide effective tools for sledders? Perhaps we should encourage research that might improve our understanding of the relationship between sleds and avalanches. We need to reach out and recognize different communication styles, make forecasts and information more interesting and accessible to sledders, and improve our comprehension of how snowmobiling interacts with the landscape and snowscape. This will help us

High Marks

Recent advances made in avalanche safety communication to snowmobilers

- More sled oriented activities at Avalanche Awareness Days events in various communities such as the event on Boulder Mountain in Revelstoke January 10th
- Backcountry Access (www.backcountryaccess.com), a manufacturer of avalanche safety equipment, is working with the CAC to promote avalanche safety in the sledding community.
- Snowmobile manufacturers and retailers are coming on board to promote avalanche education and safety:
  - Yamaha is the first sled manufacturer to become a supporting sponsor of the CAC, providing $5,000 in cash and products.
  - Most manufacturers and the International Snowmobile Manufacturers Association have shown interest in helping with avalanche awareness.
  - BRP, the manufacturer of Ski-Doo products, has donated $1,000 to support production and distribution of an avalanche awareness sticker, designed to be attached to mountain sleds by dealers in western Canada. Sponsorship coordinator Jennifer George says requests to other manufacturers look promising.
- BC Snowmobile Federation and the Alberta Snowmobile Association are including CAC avalanche safety brochures in their mail-outs to dealers and retailers.
- The CAC snowmobile outreach program has:
  - Set up booths at the annual snowmobile shows this fall in Edmonton (which attracted 20,000 participants and saw people lined up five deep at the CAC booth), Calgary, Saskatoon, and the inaugural Vernon show.
  - Focused on finding sledders who can talk to sledders about avalanche safety. This plan has proven successful especially in Alberta.
  - The CAC is working on a sled-specific "landing page" on our website at www.avalanche.ca/sled. This will allow sledders to go straight to the information they need (such as course information and bulletins) without navigating our entire very ski-oriented website.
- Our Snowmobile Outreach Team, Lori Zacaruk and Amber Wood, continue to do great work for us throughout western Canada. Both report a marked increase in interest in their courses and presentations.

Graham Helfrick

understand the advantages and disadvantages of sleds in terms of managing avalanche risk. For example, sledders can access infinitely more terrain than skiers and have the ability to test a wide variety of slopes during their travels. By developing and implementing sled-specific avalanche skills, techniques, and risk management procedures we can overcome the challenge of making avalanche education and knowledge applicable to the snowmobiling community.

On the part of the sledding community it's worth noting that recent research for recreational decision making shows the danger ratings issued in regional forecasts are by far the best indicator of local danger, easily outstripping weather, snowpack, and other observations made on site. (Jamieson, B. and P. Haegeli 2008, *Can field observations be combined systematically with the regional danger rating to estimate the local avalanche danger?* Proceedings of the 2008 International Snow Science Workshop in Whistler, BC, Canada, pp. 228-237.) This means danger ratings in public avalanche forecasts are the single most effective decision making and risk management tool available to the average recreational backcountry user. The advice in avalanche forecasts is linked to the danger rating and even though it may not be written in sled-speak, it's applicable if you want to reduce your risk.

The CAC uses the media extensively for special public avalanche warnings and often the messages single out sledders. We need to find a way to convince sledders that if they don't understand the advice given in our bulletins, they need to make an extra effort to do so, especially when warnings are in effect. Another message we need the sledding community to hear is that taking a course will help you recognize avalanche terrain and teaches you how to combine terrain and danger ratings. Using the Avaluator's Trip Planner and Ian McCammon's Obvious Clues Method will help you better understand the avalanche forecasts and will assist you in making informed decisions.

Courses for sledders need to be taught by sledders. Educated and informed people in the sled community need to continue and step up the missionary work. The most effective information exchange in any context is peer to peer and sledding is no exception. Sharing information and advice, writing articles for magazines, and providing local avalanche awareness seminars are great ways to promote avalanche education and get the word out about avalanche safety in general. Posting in online forums is a great way to familiarize people with current, local conditions. Writing up avalanche incidents using the CAC's reporting system (www.avalanche.ca/incidentreport) provides both the CAC and others with critical, real-time information that helps improve avalanche forecasts and assists others in understanding what's going on out there and how to manage their risk. These reports are linked to current avalanche forecasts and are posted on the CAC discussion forums.

Everyone has a role to play. Avalanche forecasters, educators, the CAC and really, the entire avalanche community as a whole need to find ways to more effectively reach this user group. Sled manufacturers and retailers need to step up to the plate and take some responsibility for the images used to market their products. And of course riders themselves, along with their friends and family, have a responsibility to inform and educate themselves. If we can all work together, reversing the trend of avalanche accidents and fatalities in the sledding world is a realistic and achievable goal.

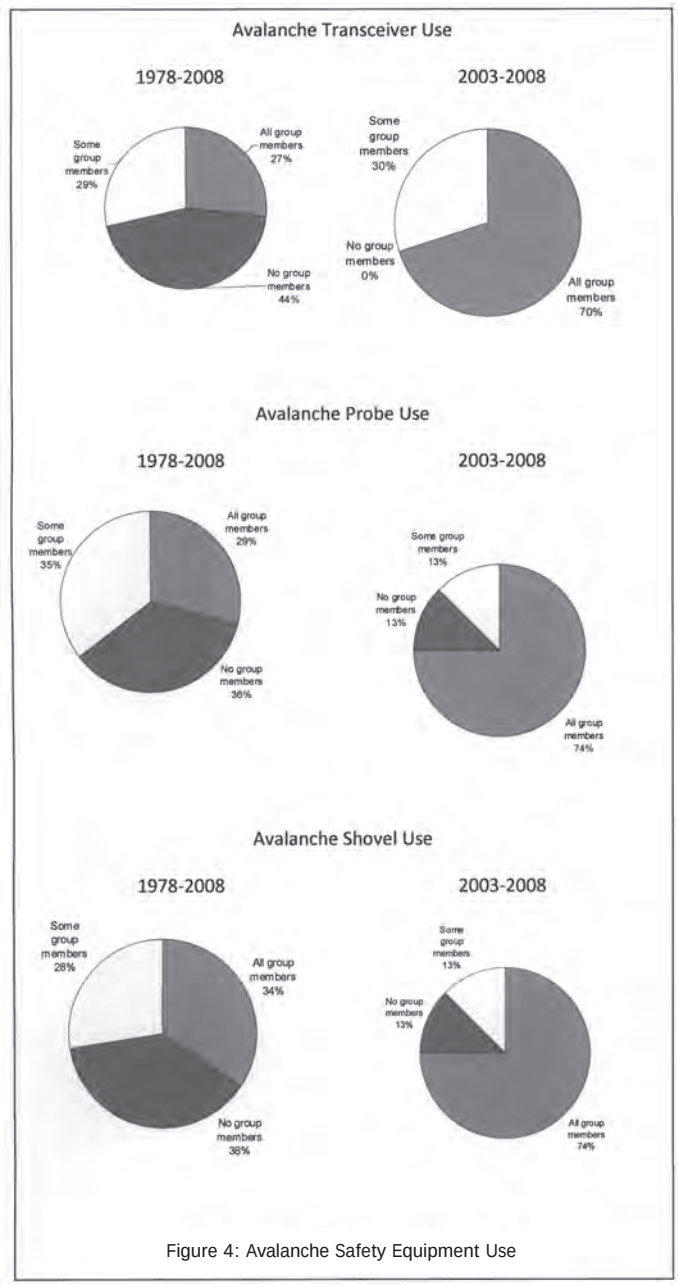


Figure 4: Avalanche Safety Equipment Use

Things are improving, but snowmobilers are still generally less prepared than other users in terms of carrying safety equipment.

Case Studies

Many sled-related avalanche accidents are preventable. In numerous cases, in spite of clear and concise warnings in public avalanche bulletins, sledders were either not aware of the warnings or chose to ignore them. Here are two examples of such situations, one with tragic outcomes.

February 18, 2008 Monitor Creek, Selkirk Mountains, B.C.

The avalanche bulletin:
- Solar radiation and warm temperatures on Sunday/Monday combined with persistent weak layer are primary concerns
- Snowmobiles identified as being a potential trigger
- Thin snowpack on southerly aspects of likely problem area

The avalanche:
- Several sleds on or near the slope at the same time
- Clear sky, intense solar radiation, warm (above freezing) temperatures in the alpine
- Snowmobile high-marking triggered slide
- Huge, SW facing, windward with rocks sticking out (shallow snowpack), 40 ° alpine face
- Size 3, slab avalanche, 300 m wide, ran 400 m

The outcome:
- Several sleds buried
- One person completely buried and injured, requiring outside assistance and helicopter evacuation

South Columbia Avalanche Forecast

Date/Time issued:
Friday, February 15, 2008 at 6:00 PM
Valid until:
Monday, February 18, 2008 at 6:00 PM
Next Scheduled Update:
Monday, February 18, 2008

---------- S. Selkirks & S. Monashees ----------			
	Saturday	**Sunday**	**Monday**
Alpine	3 - CONSIDERABLE	3 - CONSIDERABLE	3 - CONSIDERABLE
Treeline	3 - CONSIDERABLE	3 - CONSIDERABLE	3 - CONSIDERABLE
Below Treeline	2 - MODERATE	2 - MODERATE	3 - CONSIDERABLE
---------- Purcells ----------			
	Saturday	**Sunday**	**Monday**
Alpine	3 - CONSIDERABLE	3 - CONSIDERABLE	3 - CONSIDERABLE
Treeline	3 - CONSIDERABLE	3 - CONSIDERABLE	3 - CONSIDERABLE
Below Treeline	2 - MODERATE	2 - MODERATE	3 - CONSIDERABLE

Confidence: Danger Trend: Fair, Timing: Fair.There is likely to be high variability in the snowfall this will affect avalanche danger. Currently we are thinking Monday will be the warmest day. Warm sunny weather will cause danger to rise on south facing slopes.

Primary Concerns:
- **Wind Slab**: Where the storm snow exceeds 20cm there will be avalanches related to wind slabs on north and east facing alpine terrain, especially Saturday.
- **Deep Slab**: Several recent avalanches stepped down to the January 26 and Dec. 5 deep weak layer. Warming temps mean you might be able to trigger one of these layers with a snowmobile from a thin spot on a south-facing slope beginning Sunday.

February 1, 2008, Koko Claims, Crossing Creek, Tundra Bowl, NW of Elkford, South Rockies, B.C.

The avalanche forecast:
- Concerns include persistent weak layer
- Avoiding avalanche terrain and staying on simple, low angle terrain recommended

The avalanche:
- Group of 10 snowmobilers high-marking in bowl
- Slab avalanche triggered by one of the sledders—120 m wide, ran 1000 m

The Outcome:
- One person completely buried and killed

South Rockies Avalanche Forecast

Date/Time issued:
Wednesday, January 30, 2008 at 4:00 PM
Valid until:
Friday, February 01, 2008 at 12:00 AM
Next Scheduled Update:

	Thursday	**Friday**
Alpine	4 - HIGH	4 - HIGH
Treeline	3 - CONSIDERABLE	3 - CONSIDERABLE
Below Treeline	3 - CONSIDERABLE	3 - CONSIDERABLE

Special Message: My concerns are: 1. Slabs in the alpine and at treeline; 2. Isolated slabs and loose snow avalanches below treeline; 3. At and below treeline in shallow snowpack areas, one or more facet on crust persistent weak layers (PWL) buried early in the season.

Travel Advisory (excerpt)
... I recommend a high degree of caution in all avalanche terrain for the next couple of days. Staying on simple, low angle terrain is what I'd do until I was quite certain things have settled down...

The North Shore Avalanche Advisory

A collaborative effort develops a new avalanche forecast region

By Peter Marshall

The North Shore Avalanche Advisory (NSAA) is experiencing some exciting changes to their program this winter. The NSAA partners (see sidebar) have teamed up with the CAC and the BC Provincial Emergency Program to fund the development of an independent avalanche forecast region. Regular public avalanche forecasts will be issued for the North Shore Mountains through the CAC this winter. Previously, avalanche reports that commented on current conditions were issued by the NSAA.

The North Shore Mountains are a small sub-range of the Coast Mountains that overlook metro Vancouver. These mountains are home to two provincial parks, three ski areas, and an abundance of hiking and mountain bike trails. In winter, the local mountains can see thousands of skiers, snowshoers, or hikers every day. The rugged terrain and severe weather conditions of the North Shore Mountains often contrast the mild urban conditions in the city and regularly catch uninformed travelers off guard.

NSAA partners:
- **BC Parks**
- **Grouse Mountain**
- **Cypress Mountain**
- **Mount Seymour**
- **The District of North Vancouver**
- **Metro Vancouver**
- **North Shore Rescue**

Peter Marshall

In 2001 the need for sharing avalanche and meteorological data between the different North Shore stakeholders was recognized. In turn, this led to the creation of the NSAA and the North Shore public avalanche report. The NSAA came to a crossroads last spring when it was realized that improving the product and meeting CAA recommended qualifications for avalanche forecasters would require additional resources.

This collaboration will help provide structure and financial support for the NSAA and allow the CAC to staff one forecaster on the North Shore for 30 hours per week throughout the winter. This forecaster will relieve some of the workload from the NSAA partners by taking on the administration and coordination of the program. In addition, the NSAA forecaster will provide training and mentoring opportunities to all partners and work to improve data collection and sharing.

This project is meant to be a sustainable initiative for the North Shore and a model for creating other independent avalanche forecast regions. The success of this program could certainly not be achieved without the mutual commitment and support of all partners. We're all excited that this development will help maintain the highest quality avalanche information for the public in the North Shore Mountains.

>>Peter Marshall is an avalanche forecaster with the CAC. He and Cam Campbell will be sharing forecasting duties at the NSAA this winter.

Doug Pope

Signs of Success

Parks Canada's Avi-Smart program is making a difference

By Julie Timmons

The fall of 2008 marks the third season that Parks Canada has been delivering Avi-Smart to students in Grades 7-10 in the Bow Valley (Banff and Canmore). Current levels of resources do not allow us to go beyond these grades. It is hoped that after four years of avalanche awareness that students will have talked to their parents about their interests and desire to take a course and carry the appropriate rescue gear.

There are three very important reasons for the growing success of the Avi-Smart program. The first is Parks Canada's managers. When I first proposed my idea of delivering an avalanche awareness message to youth in the Bow Valley my managers took to it immediately, recognizing it would be a great way to take an important public safety message to our nearest neighbours and hopefully long-time park users.

With four big ski areas within the mountain parks and a propensity for youth to want to deke under the rope to find softer snow for drops, flips and turns, we knew the program was needed. Our belief is backed up by statistics that show 84% of the kids in the Bow Valley (grades 7-10) choose skiing or riding as their primary winter activity. Of these, 52% claimed they had skied out of bounds, 51.5 % of them without rescue gear.

The second reason is the on-going support from the Superintendent of the Canadian Rockies Public Schools, Brian Callaghan. Brian has supported the Avi-Smart program from day one. The fact remains, if you don't have the support of the superintendent in your local school district you just might not get in to the schools.

There are many kid-focused venues in a community but not all kids participate in every activity. I wanted to make sure that *every* kid in our mountain community of our targeted age group received some avalanche awareness education, not just the kids signed up for Outdoor Ed or participating in an outdoors club. Getting in to the schools seemed to be the best way to go. If you have the support of the superintendent, you're guaranteed to have the support of the principals.

The third reason, of equal importance, is the support and encouragement we have received from the CAC. With Parks Canada providing avalanche awareness to communities in and adjacent to the mountain parks, the CAC is able to direct their resources to other communities in equal need of an avalanche awareness program. The wealth of information and resources I have received from John Kelly and others at the CAC has been critical to the development of the Avi-Smart program.

This tripod is our strength. For stability and success, these three inter-relationships must continue to be nurtured and developed. Through our success, the students benefit. Parks Canada has now presented Avi-Smart in Pincher Creek, Invermere, and joined forces with the CAC to present in Revelstoke. We still feel a commitment to communities in or adjacent to the mountain parks and hope that in the future we will be able to present Avi-Smart in Jasper. We also want to assist the CAC in providing avalanche awareness to the community of Golden.

The Avi-Smart Program

The Avi-Smart program changes for each of the targeted grades, with key critical concepts reviewed and reinforced each year. These concepts include ski area signage, the avalanche triangle and the importance of rescue gear and self-rescue. Each year different tools are used to review and reinforce the concepts. These tools include movies, games (Avi-Smart Jeopardy), cross words, and student presentations.

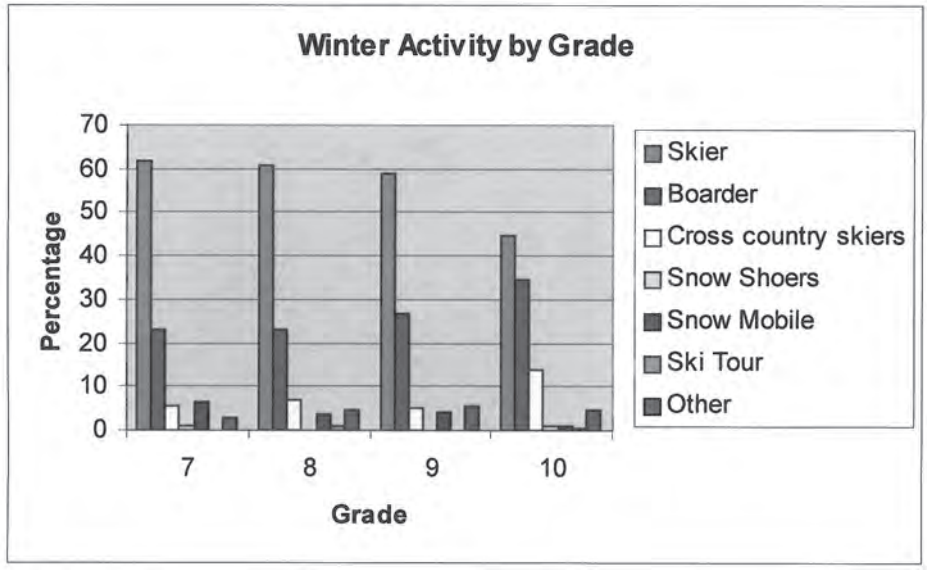
Various video clips are used to support the Grade 7 program. Kids in Grade 8 watch Beating the Odds, in Grade 9 it's Know Before You Go, and those in Grade 10 get A Dozen More Turns. All these films are great, including the oldest one Beating the Odds. Although dated, it is still an excellent reconstruction of a ski trip gone badly. I would like to see a re-make of this movie because the circumstances are very real and the safety concepts very clear. Another movie that can be incorporated quite successfully into the program is The White Book by Recco. The movie I'm looking forward to using this year is the newly released The Fine Line. This movie is THE movie for young and old and will be predominant in future presentations.

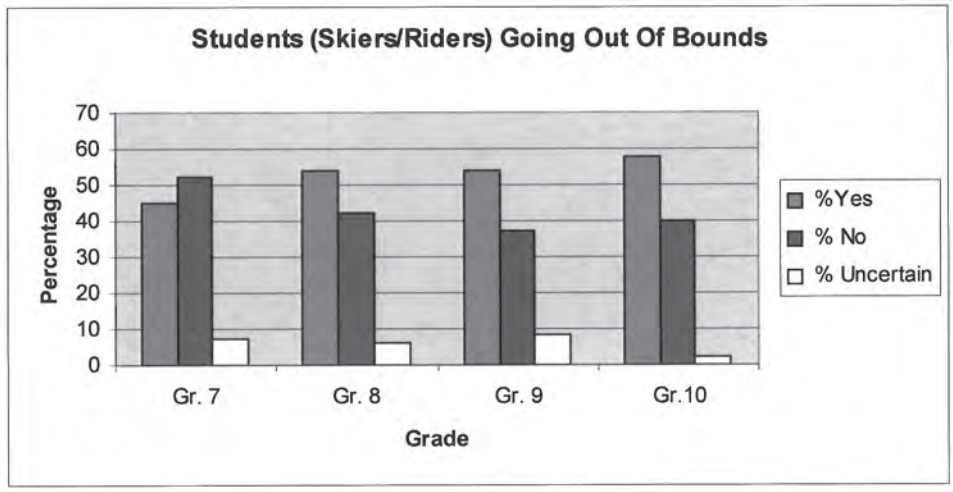
www.peakalpine.com

We don't have any formal reports yet, but the word is that the Avi-Smart presentations have been well received in all the communities. We have been told we're making a difference and kids are more aware and seeking out training. It is my observation that kids in the Bow Valley are now Avi-Smart, and I am confident that most of the kids in this age group now understand the risks they take if they travel in to uncontrolled avalanche terrain.

It has always been my hope that, as a result of Avi-Smart, students will come to their own conclusion that the best choice is to stay in bounds until they have received some training and learned how to use the rescue equipment. When they inquire about the cost of this equipment and in particular the cost of a transceiver, I hear concern. I know that a few of them will continue to take their chances and go out of bounds without the gear, perhaps thinking that getting involved in an avalanche won't happen to them.

Despite this, I believe *more* kids are now making the choice to stay in bounds. Others are pursuing courses and figuring out ways to get the rescue gear. I believe the Avi-Smart program is successful but I haven't yet measured its impact. I am currently working on a student evaluation form to determine if avalanche awareness is indeed changing the behaviour of our younger winter enthusiasts.





Thanks to the Revelstoke Credit Union for their generous contribution towards youth avalanche education in Revelstoke.

REVELSTOKE CREDIT UNION

community partners

CAC on Facebook

Become a Fan of the Canadian Avalanche Centre's Facebook Page

As part of our partnership with Mountain Equipment Coop, their web marketing team collaborates with the CAC to help us maximize our internet exposure, such as including a section focusing on avalanche safety on their website www.mec.ca/avalanche. This season, MEC has been instrumental in creating a Facebook page for us.

For the user, the CAC Facebook page provides an easy and open way to engage with the CAC in a familiar medium. For the CAC, it gives us the opportunity to network with people we might not otherwise have the chance to meet. Facebook has a unique connection to one of our main target groups—youth.

One in ten Canadians is a Facebook user. This fact alone provides the CAC with an unprecedented amount of exposure. Our purpose with this page is to encourage the use of our avalanche bulletins, AST courses and promotion of public outreach events. You can view the CAC Facebook page even if you are not a member. However, to become a fan of the CAC Facebook, you need to be a member. Why become a fan? You will be notified of CAC special events, you'll have access to special MEC contests posted on the Facebook page, and you'll be able to network with other CAC fans.

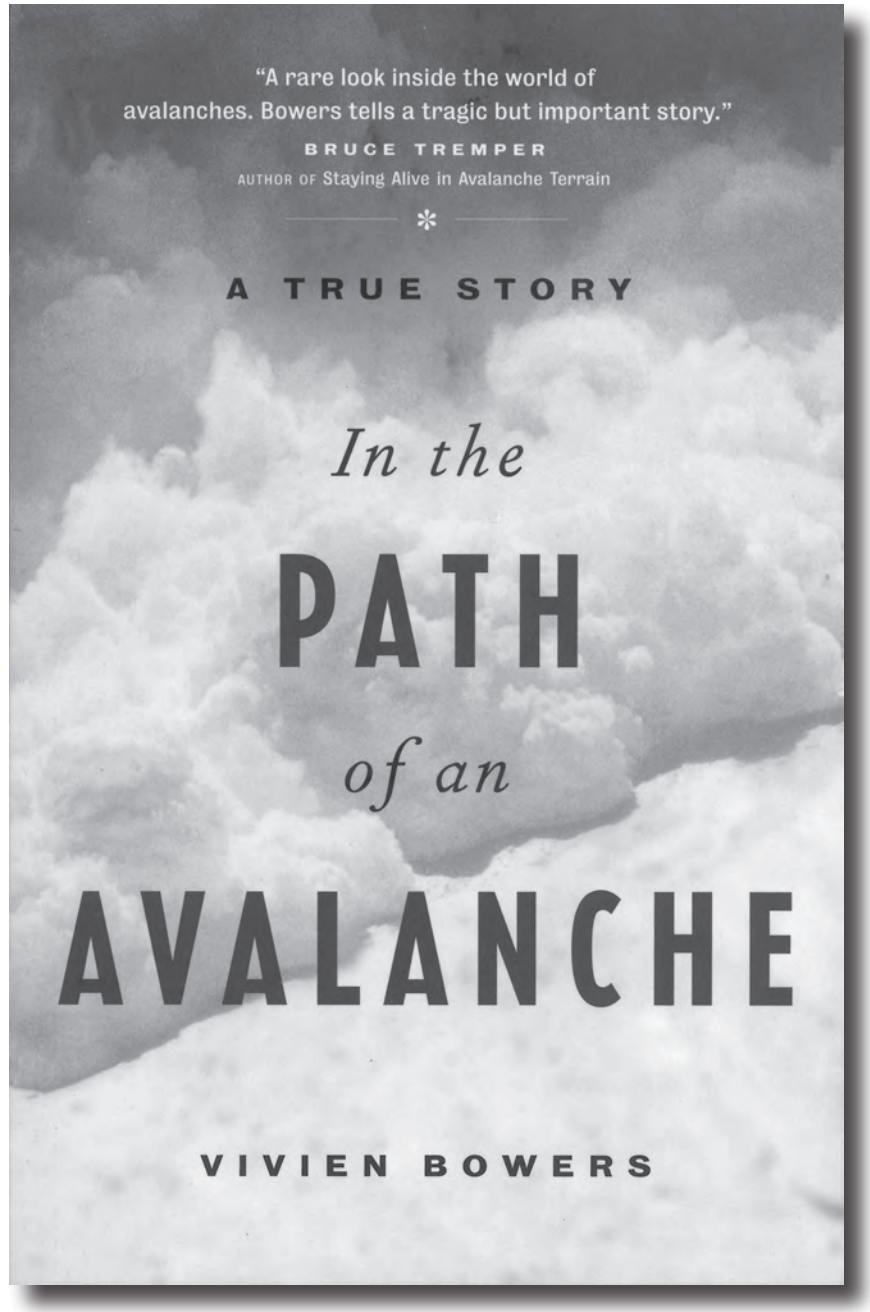
Book Donation

Author Makes Generous Contribution for Avalanche Education

Published in 2003 by Greystone Books, *In the Path of an Avalanche* received excellent reviews from the skiing and avalanche community and was a finalist for the mountain literature award at the Banff Mountain Book Festival. The book interweaves wide-ranging general and scientific information on avalanches with an account of a fatal slide near the Silver Spray cabin in Kokanee Glacier Provincial Park that killed six skiers in January, 1998. The book includes material on the history of the CAA, as well as a description of the role played by this organization before and during an avalanche incident like this. The author interviewed a number of CAA members, including then-operation manager Evan Manners, Dave Smith, Marc Deschêne, John Buffery and Tom Van Alstine.

This past fall, Viven Bowers donated 400 copies of her book to the CAF. "I'm hoping that an organization such as yours might be able to use them as a fundraiser or in some other useful way," she wrote. "It also is more in keeping with why I wrote the book in the first place, and the obligation I feel to all those who contributed to it."

The CAF is passing the books on to the CAC, where they will be used as door prizes and silent auction items at the community Avalanche Awareness Days. "This was a very generous donation and we will certainly put these books to good use," says Jennifer George, CAC special events coordinator. "There is a lot of good information in this tragic story and now it can continue to educate readers about avalanches."



HLH Memorial Golf Day

Fourth annual fundraise for avalanche safety a great success

Story and photos by Morgan Hincks

The Fourth Annual HLH Memorial Golf day was held on Friday, September 12, 2008 at Greywolf Golf Course in Panorama Mountain Village. The event is in memory of Hugh and Helen Hincks and Linda Putnam who perished in an avalanche in St. Anton, Austria in January of 2005. The HLH Memorial provides an important opportunity to gather with friends and family to celebrate their lives. The day involved some great weather for the golf, a dinner reception that included some golf prizes, a couple of auction items and some fabulous wine.

The event was a great success with $35,000 raised at the dinner reception. This will be donated in part to the Hugh and Helen Memorial Fund with the Canadian Avalanche Foundation. Plans are already underway to continue the legacy of the Annual HLH Event, celebrating the lives Hugh, Helen and Linda. The next event will be September 11, 2009, so mark your calendars.

>>Morgan Hincks is the daughter of Hugh and Helen Hincks

Inset right picture from left to right: Paul Boskovich (my husband), Kelly Schmalz (Ted's GF), Nikki Christopher (Dan's GF) and Dan Hincks (my bro).
Inset left picture from left to right: Ken Renton, Jay Westman, Todd Gardiner (Linda Putnam's husband) and Teddy Hincks (my bro).

Hincks memorial bench which is located on the 6th hole- "Cliff-hanger" at Greywolf.

Avalanche Divas

By Wren McElroy

Merging theory and practice is the theme of the ISSW, yet there is so much more gained from these gatherings. Bringing like minds together in formal and informal discussions has a value beyond measure.

At the 2008 ISSW in Whistler there were some 840 delegates from 20 different countries, and just ten percent were female. Many said there were more women at this ISSW than they had ever seen, yet walking through the conference there certainly didn't seem to be a lot of women.

Most women in this industry have spent much of their career as the only woman in their work environment. Forging ahead with thick skin, laughing at the jokes and being one of the guys has just been the way it is—part of the business. These women are strong, capable and accommodating. It is an interesting role to be in and one that is often overlooked by the majority.

A new tradition started at the 2006 ISSW is doing something to help bring that 10% together. Nicole Greene, the event co-Chair, and Leslie Ross of Babes in the Backcountry created the first Divas event with a "Ladies Night" in Telluride, Colorado. More than 100 female ISSW participants gathered together to share stories, acknowledge significant female role models in the field and to foster a professional exchange.

Avalanche Divas 2008: (l-r) Lin Ballard, Margie Jamieson, Lynne Wolfe, Mary Clayton, Nancy Pfeiffer

The goal of the Avalanche Divas event is "to offer female attendees an opportunity to gather, share information and network with other professional women in the snow and avalanche field," Nicole and Leslie explain.

"By honouring pioneering women in our industry, we create a format in which female ISSW participants can connect with other avalanche professionals, and engage in mentorship opportunities." The two have a grander vision in mind as well, hoping to create a scholarship fund for women to pursue objectives in snow related careers.

In 2006, the following women were honored for their contributions to the field of snow and avalanches: Betsy Armstrong, Patti Burnett, Jill Fredston, Fay Johnson, Janet Kellam, Sandy Kobrock, Evelyn Lees and Christine Pielmeier. The late Sue Ferguson was also honoured for her significant contributions, in a moving tribute from special guest and honourary diva, Ed LaChapelle.

This event was so successful that the 2008 ISSW steering committee again partnered with Babes in the Backcountry to host the second biennial ISSW Ladies Night, called the Avalanche Divas' Social. The event included dinner, complimentary drinks, and gift bags containing items from generous sponsors, including skis, hats, sunglasses, goggles and more.

The highlight of the evening was the peer recognition given to the 2008 honourees—Margie Jamieson, Mary Clayton, Nancy Pfeiffer, Lynne Wolfe and Lin Ballard. Each professional was presented to the group by a friend and colleague. Stories of these remarkable women and their commitment and dedication to the avalanche industry were accompanied by images of adventures and highlights. The preservation of the history of this unique industry and the few women who have pioneered in usually tough environments is so important. With this event, the idea of mentorship is fostered in a way that is often talked about in the avalanche patch but very elusive.

At this Divas' night a special tribute was made to Jerry Nunn, who was the first female National Ski Patrol Avalanche Specialist and early proponent of the Avalauncher. Presenter Janet Kellam showed great photos of Jerry as a beautiful young woman, driving around the country with an Avalauncher in the trunk of her car doing demos for ski areas. Stories were also told of Jerry showing up at the first National Forest Service avalanche course in Alta and being told she couldn't participate because she was a female. With a name like Jerry on the course roster, her gender had gone unnoticed. She didn't go away, was

very successful in her course, and ended up contributing an incredible amount to the snow and avalanche industry as well as forging a new path for women.

The opportunity to be in the same room with close to 100 professional female snow and avalanche workers made that ten percent seem suddenly larger. Another aspect to the evening was the cross-border alliances. We weren't Canadian, American or European; we were a group of hard-working committed avalanche workers getting to know each other while providing support and mentorship.

We often work and play with many people over the span of a career in the mountains, but how many of us really know our co-workers and their accomplishments and achievements? There are the obvious names we all know, but there are many unsung heroes in this industry, female and male, who deserve recognition. The Avalanche Divas is not a feminist movement, nor is it a pillow fighting fantasy. This is an opportunity to honour the women who have worked so hard alongside many of the well-known male pioneers.

WHAT'S NEXT?

The next gathering of the Avalanche Divas will be at the inaugural European ISSW at Davos, Switzerland in September, 2009. Diva founders Nicole and Leslie are looking for new leadership to take over and plan for the Divas' night out in Squaw Valley, California for the 2010 ISSW. They would also like to create a formal steering committee to oversee the event.

The Divas are looking to create, establish and administrate a scholarship fund for females working in the snow and avalanche field. Commitment from corporate sponsors is one of the keys to the longstanding success of this program. Sponsors for the 2006 and 2008 events included: American Avalanche Association, American Institute for Avalanche Research and Education, Athleta, Backcountry Access, Backcountry.com, Black Diamond, Clif Bar, Cloudveil, G3, Isis, Julbo, Malakeye.com, Marmot, Oakley, Patagonia, Pistil, Recco and the ISSW 2006 and 2008 Organizing Committees.

>>Wren McElroy is a Professional Member of the CAA and has worked in the avalanche industry for over 15 years.

Women's night out! Divas' Night was a big success at the Whistler ISSW, thanks to organizers Leslie Ross and Nicole Greene.

Leslie Ross

Run Like Hell

By Larry Stanier

In the past few years we have seen a lot of valuable work published on how to speed up an avalanche rescue. Better beacon search methods, shoveling techniques, probing strategies, etc. Now we just need to get our fat little, sitting-behind-the-computer-screen asses to the deposit. When was the last time, you, the reader, and, I assume, avalanche worker, tried moving as fast as you can in deep snow or fresh avalanche debris? As David Bowie said, "It ain't easy".

Avalanche deposits and victims have an annoying habit of not being exactly where we want them to be. Here are three examples of the kind of scenarios that inspired this rant:

1. "Run, fat boy, run!"
As a mechanized ski guide, you watch a size 2 avalanche bury two of your guests 400 linear meters away up a 25 degree slope. Foot pen is 85 cm and you have skins but no touring bindings. The helicopter/snowcat will take at least 20 minutes to pick you up and drop you at the top of the slope.

2. "Should I stay or should I go?"
An avalanche has hit your road. From the edge of the deposit you can see a bit of minivan exposed in the debris. It is snowing 6 cm an hour, blowing like hell and it is 2° C at the road. A bulldozer has been dispatched but it is 30 minutes away.

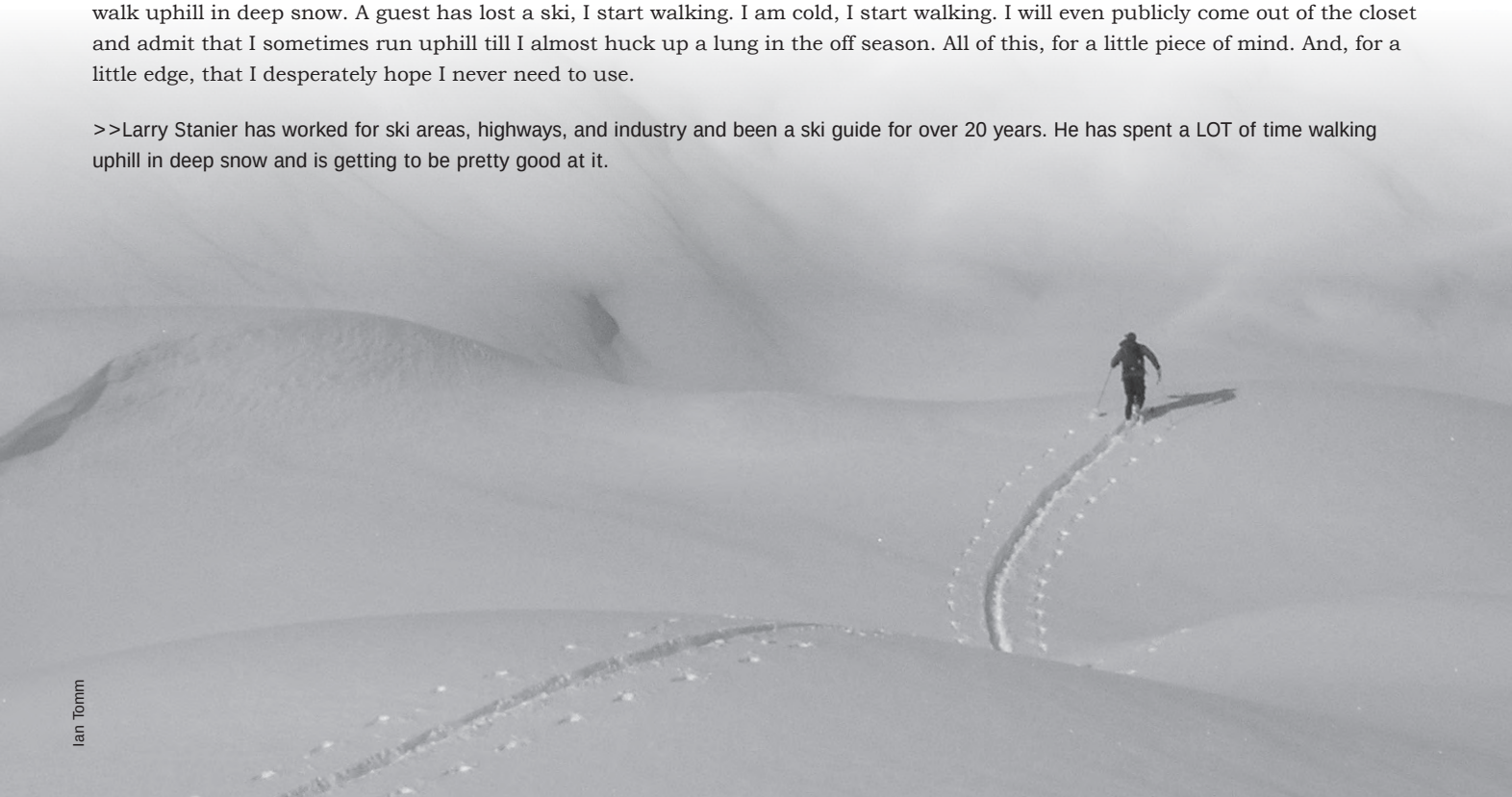
3. "Run, Lola, Run!!"
As a ski patroller, you watch a skier take an early-season ride in an avalanche closure. You are looking at a nasty posthole in 30 cm of settled snow over 60-80 cm facets and depth hoar. The base of the lift is a long ski away and from the top of the lift it is a 10-minute hike to the top of the closure.

I am not advocating we put on legwarmers and dig out our dear mother's "Jane Fonda workout" tapes. I am not going to tell you how fit you need to be. I am going to tell you it could REALLY "suck to be you" if the shit hit the fan and you did not have the exact combination of technique, stamina and awareness to reach the site as efficiently as possible.

There is no substitute for experience. Get off your skis, get out of your truck, get off the piste and walk. Walk for 200-300 meters in any untracked snow condition as fast as you can and still arrive in a sufficient state to be able form a plan, direct others, do a beacon search, probe, shovel, do first aid etc. Do it often. It is not about absolute speed. It is about being sufficiently aware of the condition of the snow, your body and other resources to be able to make the best decision possible.

I have spent a lot of time fretting about how I would perform if one of my guests or coworkers was caught in an avalanche on my watch. I think about scenarios, I run scenarios, I practice with my beacon, I think about moving snow when I do profiles. And, I walk uphill in deep snow. A guest has lost a ski, I start walking. I am cold, I start walking. I will even publicly come out of the closet and admit that I sometimes run uphill till I almost huck up a lung in the off season. All of this, for a little piece of mind. And, for a little edge, that I desperately hope I never need to use.

>>Larry Stanier has worked for ski areas, highways, and industry and been a ski guide for over 20 years. He has spent a LOT of time walking uphill in deep snow and is getting to be pretty good at it.



Ian Tomm

Counting the Uncountable

How can we tell if avalanche prevention programs are effective?

By Marc Ledwidge

In many industries, numbers drive the show—and the funding that supports it. Look at the recent announcement from the federal government to continue twinning the Trans-Canada Highway in Banff National Park. Accident statistics on this stretch of highway were pivotal in securing this funding. This announcement was a good thing for Canadians.

The avalanche safety industry is no different. We use trends in accident statistics to justify funding prevention programs such as public bulletins, decision making tools, and sometimes complete programs. The statistics we most often refer to are fatality numbers. When fatal accident rates are on a downward trend, it is easy to pat ourselves on the back and validate our prevention programs publicly. When they are on the increase, we tend to avoid discussing the effectiveness of our so-called prevention programs.

"Are the statistics on fatal accidents really a good measure of the effectiveness of prevention programs? I don't think so."

Fatal accident rates tend to be cyclical for a number of reasons. The most obvious one is that some winters are simply more stable than others. Are the statistics on fatal accidents really a good measure of the effectiveness of prevention programs? I don't think so.

Perhaps a better indicator would be to count how often people get caught in avalanches, especially in size 2 or bigger. An even better ruler might be to gauge how many people were NOT caught in avalanches, because they heeded bulletins, used terrain ratings to their advantage or used other educational tools. Unfortunately, we have either vague numbers or nothing at all to measure this.

I pointed this out to Grant Statham as he was working on a project and he reminded me of Einstein's famous quote: "Not everything that can be counted counts, and not everything that counts can be counted" Since we have accurate numbers on fatalities, we use them regardless of whether they are a good indicator or not.

The 2003 winter was widely accepted as an example of a "bad" winter for fatal avalanche accidents. The two catastrophic accidents that took place contributed to the high numbers of fatalities for that winter. The next few winters showed a drop in fatality rates and were heralded as a testament to the effectiveness of subsequent prevention programs and initiatives. Last winter, with deaths on the increase again, it would have been easy to question the effectiveness of prevention programs. In reality, when we go through difficult winters with long periods of instability or lingering deep instabilities, accidents and incidents will go up. Our prevention programs perhaps do not do a lot of preventing. However, as already pointed out, who knows?

We may be better served to refer to education programs rather than prevention programs. Prevention is only one objective. Another equally important objective of our services such as bulletins, terrain ratings, trailhead signage and decision tools is to enhance the backcountry user experience. In National Parks, backcountry use is encouraged. We want people to have a meaningful, safe and rewarding experience. This does not mean just surviving the experience. We of course want to do what we can to minimize accidents but we also want people to have a lifelong affinity with their National Parks and gain experience in the process. As their experience increases, they should be able to take on more challenging objectives safely. We promote a philosophy of self reliance, expect people to get avalanche training, and use the proper safety equipment. The education programs we provide are just one part of their overall learning experience.

In that light, perhaps a better assessment of our programs would be to gauge how well we are doing with education. Are we helping people to get better at enjoying their activity? One of the rewarding aspects of any sport or outdoor activity is progression and learning. In some activities such as sport climbing or golfing, it is relatively easy to measure progress since a precise scale is in place. In winter backcountry recreation, the progression is more subtle.

The ski tourer who plans a challenging spring objective and works towards that goal over the winter with trips of varying difficulties is going through a learning process. Programs and services such as AST courses, public bulletins, decision tools and media releases should contribute to this process. Gaining knowledge and experience should be a critical part of a long-term meaningful experience in mountain recreation. Ultimately, this promotes appreciation and respect for our natural landscapes and increases mountain safety. Hopefully, that is where the real success of these programs lies.

Perhaps it is time to put some research efforts to determine how effective we are in delivering on this. There are social scientists with the expertise to do this. No doubt they can help us to be more effective in meeting our long-term goals for education and experience.

>>Marc Ledwidge is the Mountain Safety Manager for Banff, Yoho and Kootenay National Parks. He is a Mountain Guide with the ACMG and a Professional Member of the CAA.

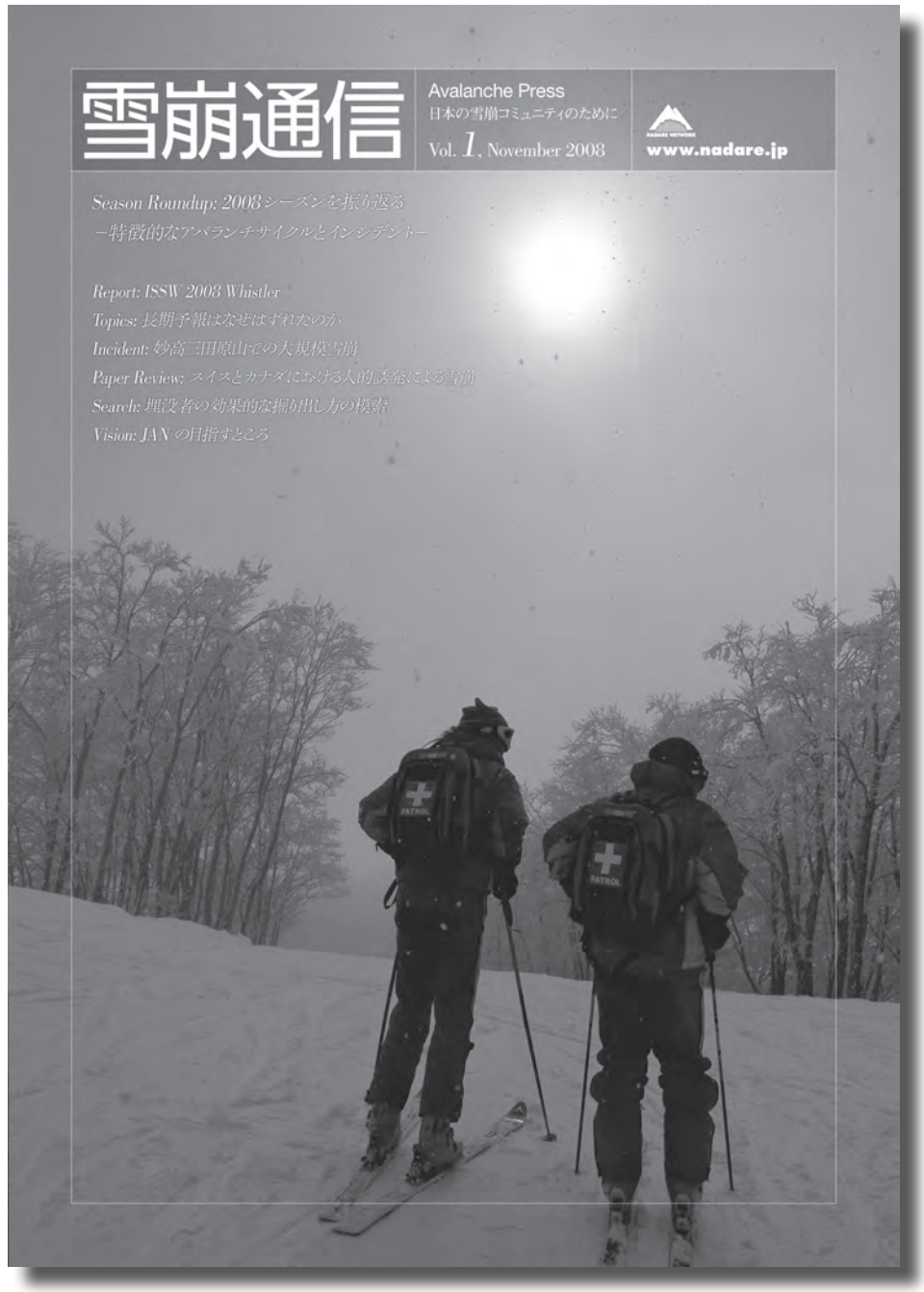
New Publications

New Magazine for Japan Avalanche Network

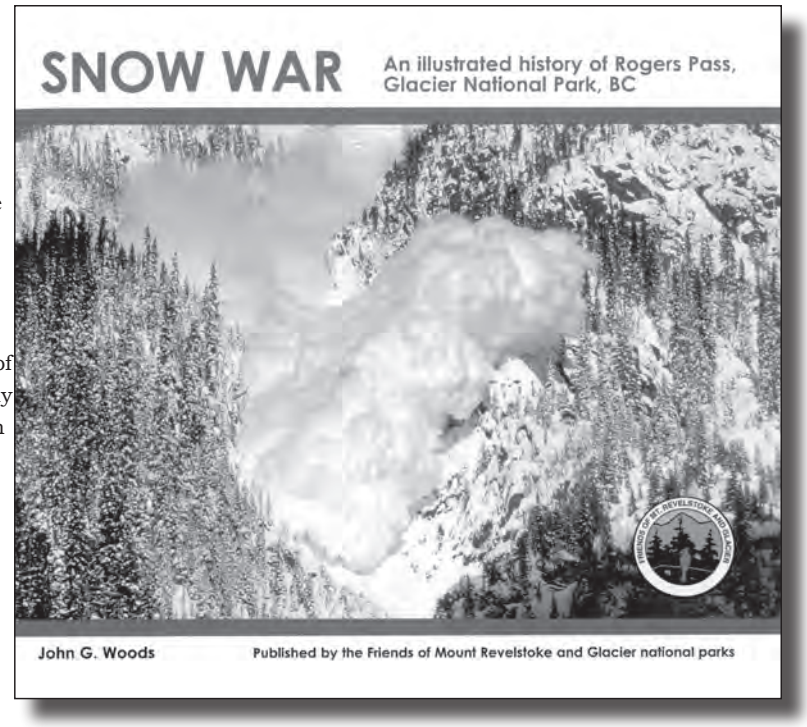
Congratulations to the Japan Avalanche Network (JAN) whose members are now publishing a new magazine. *Avalanche Press* is for the avalanche community of Japan—guides, ski patrollers and enthusiastic backcountry users. Yuske Hirota is one of organizers of this project and he writes, "The avalanche skills of professionals in Japan lag behind the skills of those in North America. We hope this is going to be good resource and reference especially for them."

Avalanche Press will be full colour and 48 pages long. It is available through JAN's website (nadare-net.jp) and selected shops specializing in backcountry gear. The regular price will be around 1,000 yen (about $13 CAN) per copy.

"This is a big challenge for us because in Japan no one has ever published a magazine specializing only in avalanches," says Yuske. A complete outline of JAN and its programs will be in the magazine. Yuske notes there will also be a mention that Japan's avalanche education programs work in cooperation with the CAA, a relationship that continues to be beneficial to both organizations.



Snow War Revised



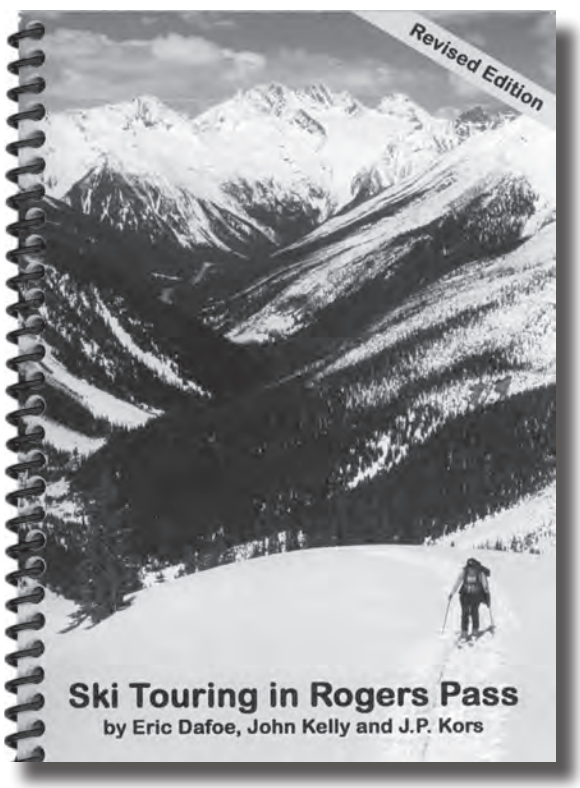
After 25 years, it was time for a change. First published in 1983, a revised edition of Snow War has recently been released by the Friends of Mount Revelstoke and Glacier National Parks. Author John Woods said, "It felt like the right time to do it. With the passing of Fred Schleiss, it's the end of an era."

When he originally wrote the book, John was working for Parks Canada. The book was part of a public education project that included the National Film Board of Canada film of the same name, which still shows regularly at the Rogers Pass Visitor Centre. Retired now but still an avid history buff, John volunteered to write the revision.

There is only one fact change in this version, and that is updating the number of men killed in the 1910 avalanche. Originally put at 62, the real number is 58, a figure reached by Revelstoke Museum and Archives Curator Cathy English after extensive research. There are a number of new photos though, including a shot of a record snowpack at Mt. Fidelity (5.05 m, set in 1991). This version also includes more aspects of the avalanche control program. "It's not exhaustive but there was very little of that in the previous versions," explains John. Included is a modern photo of the avalanche control team and photos of the Howitzer in action.

This history book will appeal to anyone who has spent time at Rogers Pass and marveled at the audacity of pushing a transportation corridor through this rugged terrain. The tremendous amount of time, money and energy spent in laying a rail line through the pass is well illustrated with archival photos and informative captions. True to its title, the book chronicles the war against snow and avalanches that has been waged over the years. Dedicated to Fred and Walter Schleiss, the book is a fitting tribute to their influence that is still felt today.

$14.95, Friends of Mount Revelstoke and Glacier National Parks, www.friendsrevglacier.com, or e-mail fmrg@telus.net



Rogers Pass Guidebook Updated

First published in 1999, this new version of the popular guidebook has more trip descriptions, better photos, and more detailed annotations. All the trips are now ATES rated and, of interest to the less-experienced ski tourer, many have important decision points identified in the text. These decision points describe the options well and also offer advice on what the user should be looking for—in terms of clues for stability—as they make their choices. The authors have also identified relevant closed areas in many of the photos.

$14.95, Friends of Mount Revelstoke and Glacier National Parks www.friendsrevglacier.com, or e-mail fmrg@telus.net

Why is This Man Smiling?

Thanks to industry support, Dr. Bruce Jamieson looks forward to another five years of being buried in his work—and loving it.

Jason Stang

Industry Supports Second Term of Avalanche Research Chair at the University of Calgary

Many people and organizations have been working to build support for a second five year term of the NSERC Research Chair in Snow Avalanche Risk Control at the Schulich School of Engineering at the University of Calgary. We are pleased to announce that we now have the required financial commitments from industry to apply to the Natural Sciences and Engineering Research Council of Canada (NSERC) for substantial matching funds.

The organizations that supported the first research term all increased their commitments for the second term. They are (alphabetically):

- Canada West Ski Areas Association
- Canadian Avalanche Association
- Canadian Avalanche Foundation
- HeliCat Canada Association
- Mike Wiegele Helicopter Skiing and Canadian Ski Guides Association

The Schulich School of Engineering is thrilled to announce four new supporters for the research chair:

- Association of Canadian Mountain Guides
- Backcountry Lodges of BC
- Ducat Developments Ltd.
- Teck Coal Ltd.

We plan to conduct field work at Blue River and Glacier National Park thanks to continued substantial in-kind commitments from Parks Canada and Mike Wiegele Helicopter Skiing. The research topics for the second term proposed for September 2009 to August 2014 include:

- Forecasting for deep slab avalanches
- Hazard mapping
- Decision support for recreation in avalanche terrain
- Modelling snowpack and stability for data sparse areas

The application will go to NSERC and international scientific reviewers in December 2008, in time for a decision by May 2009. The Schulich School of Engineering is very grateful to the new and continuing supporters for their commitment to this applied avalanche research program.

Karl Birkeland

Organizing ISSW 2008

By Brian Gould, Helene Steiner and Andrew Wilkins

During a Penticton CAA meeting just over four years ago, we explored the idea of bringing the ISSW to the west coast, either Whistler or Squamish. In our minds, we felt ready to volunteer "a bit." Thousands of hours of work and e-mails later, it's over. We brought 837 delegates from 20 countries to Whistler and by all accounts, everybody had a good time. Although it is easy to pace yourself when you have over four years to organize an event like this, the commitment increases exponentially in the few months leading up to, and including the event itself. Thank goodness we had a strong and committed team!

At the conference itself, we were still so busy organizing and overseeing everything that we were barely able to say "hi" to all our colleagues, and share a glass of wine. As well, we could hardly take in the proceedings or posters. Good thing the proceedings are on CD as well as streaming video on the Internet (after January 1, 2009 at www.avalanche-research.com).

We are looking forward to visiting a future ISSW just as "normal delegates." Through the experience of organizing a conference of such magnitude, we will know what each organizing team goes through. The experience for us was hard work, great team work, getting to know a lot of our friends and colleagues within that volunteer team work environment, learning an amazing amount of stuff and, in the end, feeling an overwhelming sense of accomplishment. What a great feeling to look over the sea of delegates and knowing that it was us who brought them here. How rewarding, to hear them thank us for a great show.

Would we do it again? Absolutely! Do we think others should experience the same? By all means! Was it worth it? Totally worth it! We encourage you all to think about the future site of the next Canadian ISSW in 2014. Perhaps you know a suitable venue, have an energetic team, and the same spark that we had four and a half years ago. If so, please get in touch, and we can pass on the torch!

Whistler ISSW 2008 organizers Andrew Wilkins, Helene Steiner and Brian Gould are all smiles now that the conference is over. But would they organize another one? "Absolutely!"

Neil Brown

ISSW by the Numbers

837	Delegates
20	Countries represented at the conference
75	Oral presentations
108	Poster presentations
14	Sponsors
17	Booths at the trade show
28	Kegs of beer consumed
2040	Bottles of wine dispatched

www.peakalpine.com

Search!

Becoming an Avalanche Rescue Dog Team

By Jay Pugh

I am a CARDA (Canadian Avalanche Rescue Dog Association) Instructor, a position that is both a privilege and hard work. One of the most common questions we field is "What does it take to be a CARDA dog handler?" The answer is not a short one.

An avalanche dog team consist of two parts—the human handler and the dog. To be a successful and viable team both parts need to be evaluated. The process should really start when an interested party contacts CARDA and talks to an experienced handler. CARDA is looking for people in the avalanche field who are strong skiers and willing to take the time and commitment to train a dog. The candidate can expect two questions: "What are you going to be doing for the next five to ten years?" and, "Why do you want to do this?"

The process of training and then handling an avalanche dog is a long one. Most dogs start training at six months to one-year old and are retired somewhere around eight to ten years old. Training is an ongoing process that never ends throughout the career. A potential handler has to understand the level of the commitment.

Spending the time and effort to train a dog is one thing. Being in a position to actually perform a search is another. There simply is no point to all the work put into training when the finished team is not in a position to respond. The wrong answer to the second question is, "Because my dog likes it." We do not put ourselves in positions where our dog is the difference between life and death because we needed something for our pet to do.

Aspiring avalanche rescue dogs have to be between six months to two years old. Any younger and the dog hasn't matured enough; any older and there is too little working life left after the two full years of training.

Generally CARDA prefers that the potential handlers are somehow connected to the ski/avalanche industry, because the handler has to be in a good position to respond in a timely manner to an avalanche. Ski patrollers are common, as are those in forecasting positions with other institutions. It needs to be said that the potential handler must at least have the skill to ski down any slope in any snow condition. Fitness and backcountry mileage are essential.

The other thing the handlers are judged on is their ability to give the dogs what is needed to reward them. When it comes to rewarding the dog that has just found a simulated victim (quarry) we have a saying, "If you're not acting like an idiot you're doing it wrong." The handler needs to put as much excitement into the dogs as possible. Both their own and, as we quarry for each other, any dog they hide for. If the CARDA member judges that there is a potential candidate then the next step is the CARDA Spring Course held every May in Kamloops.

The CARDA Spring Course is a two-day, five-step process that tests the dog's suitability for avalanche rescue work. This test was adopted from the RCMP when it became apparent that too many inappropriate dogs were coming in to our main program. It is a waste of time and effort for both the handlers and the organization to attempt to train dogs that are unsuitable. For this reason, the Spring Course has been

very successful. Very few of the candidates who pass the evaluation prove unfit later on in the process.

Basically the tests are designed to measure the amount of hunting and prey drive in the dogs. Searching, to the wolf part of a dog's mind, is hunting. Pinpointing the victim is the prey drive. All dogs have some level of these drives. These evaluation tests determine how much.

Over the centuries, dogs have been bred for many things besides hunting. There are breeds for everything from protection to lapdogs. The ones that tend to do the best in the search and rescue game are the hunting breeds. Labradors and golden retrievers are common in CARDA as is the excellent general-purpose German shepherd. There are also the herders (herding is a form of hunting) and a mix of cross breeds. The crosses usually have a hunting breed somewhere in the background.

It surprises many that there are two distinct breeds missing—the St. Bernard and the husky. The St. Bernards have the distinction of being the first avalanche dogs in the 1700s (Barry did exist) but were actually bred to protect herds of sheep and cattle in the Alps. Furthermore, anyone who has ever tried to stuff a dog in helicopter can tell you a Bernard would present logistical difficulties. The Husky is bred to pull sleds. They are notorious for being disinterested in searches.

> **"When it comes to rewarding the dog...if you're not acting like an idiot you're doing it wrong."**

The evaluation also determines if a dog is aggressive to other dogs or humans. These dogs are deemed dangerous and are not acceptable, regardless of how well they search. They must also be of appropriate size and able to handle cold conditions. Obedience is one of the training goals as high-drive dogs tend to be difficult house pets. While the drive should not be overridden by training, the dogs must have the temperament to be controllable in high stress situations.

The testing format is relatively simple. The dog is restrained by the evaluator and the handler/owner runs off waving the dog's favourite rag toy over their head and acting as animated as possible. As soon as the handler drops out of sight the dog is released. The evaluator appraises how excited the dog is while the runaway is in process, how hard the dog looks for the handler and finally, how the dog responds when finding the handler.

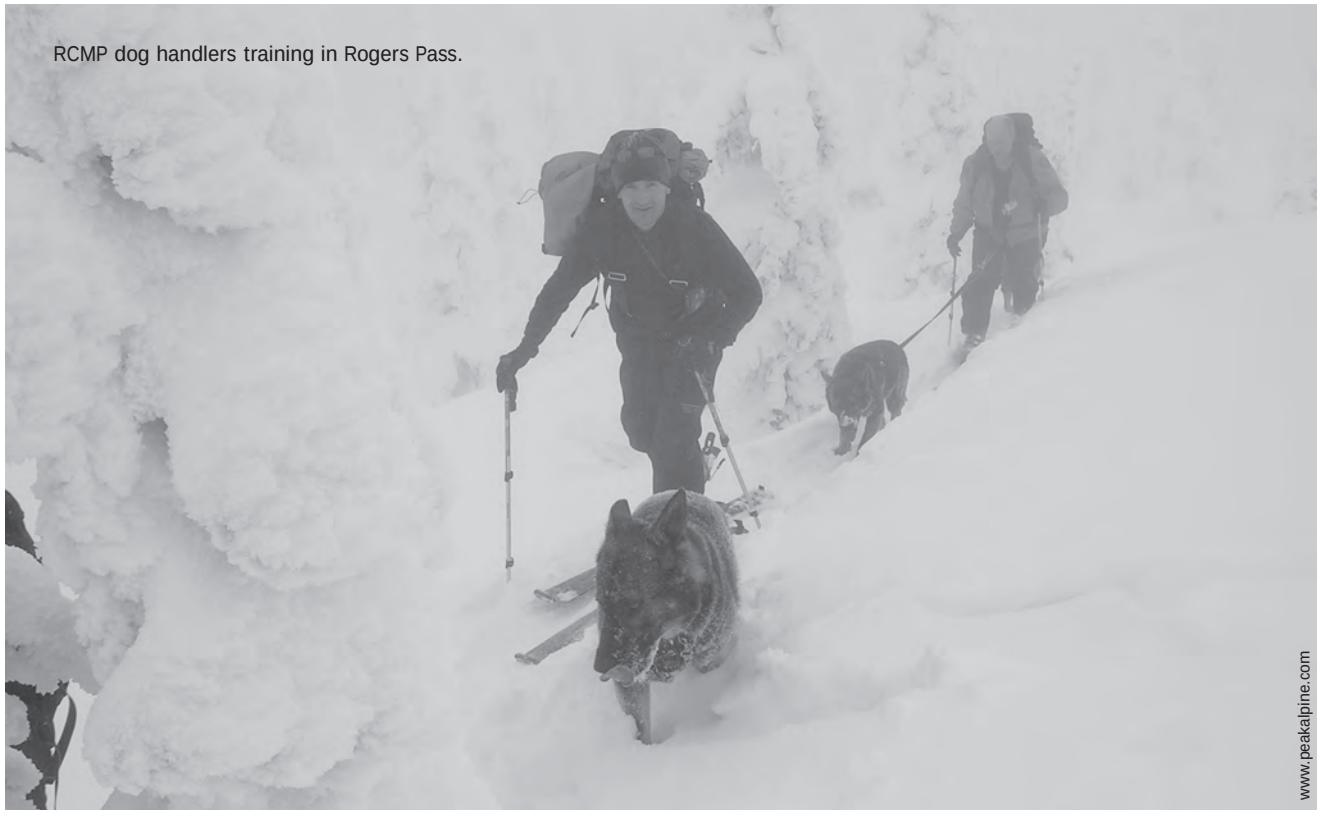
Terms used by CARDA to describe a dog's performance:

Husky Search • This is a phrase meaning that the dog has no interest in searching.

Seventy-five Percenter • This is a dog that is on the border line. Three-quarters of the time it will do the job but the other quarter it will lose focus. The evaluator must determine if the last quarter is something the dog will mature into or, in rare cases, can be trained into the dog.

Solid • A solid dog is one that performs all the tests well and with enthusiasm. They are fast and workmanlike in their approach

Barn Burner • The most desirable dog. Extremely fast and focused, they also tend to be difficult to hold back during the runaways and are awesome at the tug-of-war.



RCMP dog handlers training in Rogers Pass.

www.peakalpine.com

Ironically, we use the dog's instinct to grab a piece of the prey and tear it off as a reward for finding a person. Simply put, we are looking for a wild game of tug-of-war. Long rag toys are used instead of clothing or arms. As the evaluation process continues, a different person is introduced to do the runaway. The time between the runaway and releasing the dog is increased, as is the difficulty of the search.

In the end, it all comes down to a pretty simple question. The evaluators ask themselves, "Do I want this dog searching for me?" This past year, 12 new handlers attended the course and 11 got passes. It remains to be seen how many of them will enroll in the winter course. There are life changes, health issues, and sometimes the candidate finds the commitment simply too much.

For the successful candidates who choose to carry on, the next step is to enroll in the CARDA Winter Course as a "Team In Training." I'll write more about that in the next issue of *avalanche.ca*.

Born and raised in Jasper, Jay Pugh now lives in Cochrane, Alberta and works as a firefighter in Calgary and as a part-time patroller at Mt. Norquay. Jay has been a doghandler with CARDA since 1993 and an instructor since 1998. Laddie is an eight-year-old border collie who is also trained for disaster search and rescue. Jay and Laddie live with Jay's wife Sonja and their twin girls Josie and Elisa.

Jay Pugh Collection

Schedule of Coming Events

January 9 –11, 2009
Avalanche Awareness Days
The CAC's annual event continues the tradition! This year, our national media event will be held on Jan 9 at Revelstoke Mountain Resort. Over the Jan 10-11 weekend, some 30 communities across Western Canada and the US will take part by hosting their own Avalanche Awareness Days. Remember, there's always room for more volunteers!
Where: Revelstoke Mountain Resort
Info: www.avalanche.ca

February 20, 2009
CAF Whistler Gala
This winter's Whistler fundraising Gala will be an evening of fine dining and silent auction bidding. Guest speaker for the evening is Yukon-based guide and avalanche specialist Hector MacKenzie, whose presentation "Northern Avalanches and Polar Adventures" will be the highlight of the evening.
Where: Roundhouse Lodge, Whistler
Info: www.avalanchefoundation.ca
Contact: Call the CAF at 403 678 1235 or e-mail info@avalanchefoundation.ca

April 19 – 24, 2009
European Geosciences Union, General Assembly
Where: Vienna, Austria
Info: www.meetings.copernicus.org/egu2009/

April 20 – 23, 2009
Western Snow Conference
The Western Snow Conference is an annual tradition that began in 1932 as an international forum for individuals and organizations to share scientific, management and socio-political information on snow and runoff. This year's theme is: "What's Normal? Snow—Past, Present and Future."
Where: Radisson Hotel, Canmore AB
Info: www.westernsnowconference.org

May 3, 2009
HeliCat Canada Annual General Meeting
Where: The Delta Grand Okanagan Resort, Kelowna BC
Info: Phone 250.542.9020 or e-mail info@helicatcanada.com

May 4 – 8, 2009
Canada West Ski Areas Association 41st Spring Conference
Where: The Delta Grand Okanagan Resort, Kelowna BC
Info: Phone 250.542.9020 or e-mail office@cwsaa.org

May 4 – 8, 2009
CAA & CAC Annual General Meetings
Mark your calendar! You won't want to miss any of the presentations, meetings or discussions at this year's AGM.
Where: The Ramada Inn, Penticton, BC

Lyle Grisedale

What Does Your Gut Tell You? Research on Intuition in the Decision Process of Ski Guides

By Iain Stewart-Patterson

"Safety is not bankable…all it means is that the unexpected has not yet escaped containment."(Weick, 2001)

Kahneman (2003) describes a two system decision-making process, with an interplay between intuitive and analytical responses. The intuitive process is characterised by operations which are fast, effortless, implicit, can be emotionally charged, are typically governed by habit and can be difficult to control. In contrast, the analytical process is governed by reasoning. Its operations are slower, serial, effortful, potentially rule-based, and can be consciously controlled. There may be a tendency or a bias towards using intuitive options because they come to mind easily and promote confidence. The primary task of the decision maker then, is to evaluate the need to switch from the intuitive choice to the non-intuitive option.

Clarity is needed as to the meaning of intuition, as there are numerous terms which are used interchangeably (Betsch, 2008). These terms include: gut feeling, hunch, know-how, tacit knowledge, and common sense. It is important to recognize that intuition is a process of thinking. The intuitive input comes from knowledge stored in long-term memory, which is processed automatically and without conscious awareness. The output of this process is a feeling that can serve as the basis for judgements and decisions.

We can think of the intuitive and analytical interaction as swinging back and forth along a continuum (Simmons & Nelson, 2006). The process used on a previous decision and its success will affect future decisions. If an intuitive process is used unsuccessfully, there may be a tendency to move to a more analytical process on the next decision and vice versa.

Arguments have been used against the use of intuition (Easen & Wilcockson, 1996). Compared to scientific and rational thought, intuitive thinking can be considered both inferior and unprofessional. The intuitive "feeling" is not the result of a rational process and may be difficult to explain. Adding to this, intuition is generally overused because it is easy.

Pattern recognition is the cornerstone of

Adam Stein

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intuitive accuracy (Hogarth, 1980). It occurs when previous experiences encompass a high degree of similarity or representativeness with a new situation. Experts can rapidly access a greater amount of information and come up with a better decision, faster.

Feedback is the key ingredient in improving decision accuracy. Overt or direct feedback may be present for poor decisions, as seen in near misses, incidents, or accidents. However, feedback is rarely present for good decisions other than nothing bad happening. In these situations, other experts can be a source of high-quality feedback. An example of that would be the traditional evening guides' meeting, where a team of guides consider the decisions of the day.

Hogarth (2008) suggests that feedback is the critical element in the development of intuition. Feedback is described as being relevant or irrelevant in relation to the seriousness of the consequences, which are in turn described as being either lenient or exacting. The probability, or likelihood, of the consequences occurring also factors into how intuition is formed. This creates an environment that can be described at its extremes as being either kind or wicked toward the development of intuition. When faced with a wicked environment, with its lack of relevant feedback, there is the potential for the inventory of intuitions that guide behaviour to be tainted.

The long-term validity of intuitions formed over the last two winters in Western Canada will be markedly different. The winter of 2006/07 had few if any persistent weak layers. The total number of avalanche fatalities was less than half the five-year moving average, but 43% were commercial.

In contrast, decision making during the winter of 2007/08 was much more challenging. The potential for humans to trigger avalanches in the deep, persistent weak layers within the snowpack regularly challenged decision makers in their stability analysis and terrain selection. The number of avalanche fatalities in Western Canada was above average, yet there was not a single fatality in professional guided groups. Last winter could be termed a more "wicked" winter in terms of the development of intuition, while the previous winter could be considered more "kind." The lack of commercial fatalities in 2007/08 can perhaps be attributed to the quality of professional decision-making; however, intuitions formed over the past season may be flawed.

This winter I will be conducting research to investigate the role of intuition in the decision process of ski guides. To date, eight companies and over 30 guides have indicated they will participate in the project. There will be four components to my data collection. At the beginning of the season, participants will complete a background experience questionnaire. During the season, questionnaires will be completed on "good days" when the implicit feedback indicates that all went well. A variation of the questionnaire can be completed if a near miss is experienced. Periodically through the winter, interviews will be conducted in conjunction with direct observation.

In addition to helping generate an understanding of how we make decisions and potentially preventing future accidents, participation in this research is an opportunity for personal reflection. Thus, when thinking about a series of good decisions, or a near miss, participants are encouraged to be analytical about their actions without being critical. In all likelihood, this was the best decision possible at the time, given the information available. By including a reflective element in the research, the information provided by participants can contribute to a greater understanding of how guiding decisions are made. Ultimately the results from this project may influence the way guides make decisions and help create a safer working environment for both guides and guests.

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ASARC's Experience With Incident Peer Narratives

Bruce Jamieson
Applied Snow and Avalanche Research, University of Calgary

"Not another incident report to complete!" That would have been my reaction a few years ago. However, as the format of our incident peer narratives (IPNs) has evolved, the narratives have proven more and more valuable.

First, I should clarify a couple of background points:

- IPNs do not replace the important incident/accident reports for management, workers compensation boards, etc.
- The Applied Snow and Avalanche Group at the University of Calgary (ASARC) did not invent incident peer narratives. We have borrowed the key ideas from other organizations. Perhaps only the acronym, IPN, is new (but not important).

Within ASARC, an Incident Peer Narrative is a story of a workplace incident which:

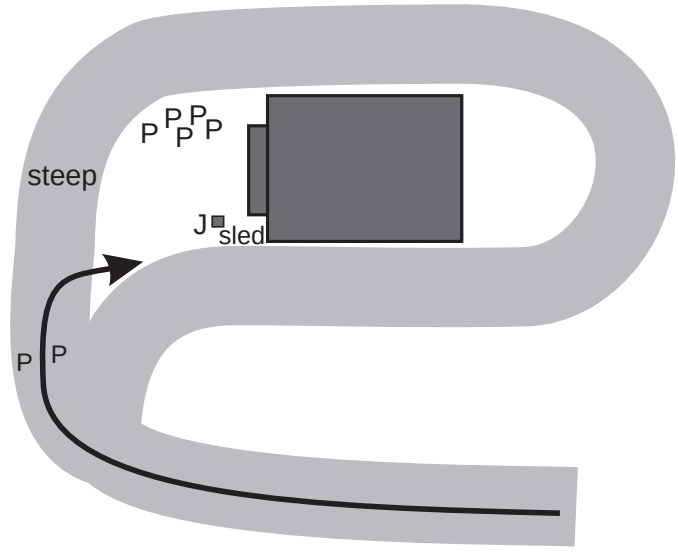
1. in hindsight, involved too much risk (and may or may not have resulted in injury), and
2. will help peers avoid similar incidents.

Format

Our IPNs try to optimize peer communication and learning. I find most paper or pdf forms too restrictive for telling a story. An IPN can be a written note with diagrams or photos, an oral narrative with some photos or sketches, a powerpoint presentation, or perhaps a video of someone narrating their incident. We have not yet videoed someone explaining and showing photos of their incident, but since technicians and graduate students do move on, I am keen to try this soon.

Bruce Jamieson gave a presentation on the evolution of incident reporting at the CAA's spring CPD conference. As the head of University of Calgary's ASARC team for 19 years, Bruce believes a safety culture built on trust is important for workplace safety.

In December 2005, I lost control of a snowmobile and hit a building. I'll use this incident to illustrate some of the points from the left column.



The arrowhead marks the point where I powered the sled through deep snow and then immediately lost control of the snowmobile when the spinning track reached the packed snow road (wide gray strip). The "J" and "sled" show where I hit a post and the sled hit the building. Each P marks a person who observed the crash. Everyone at the scene believes my helmet prevented a head injury.

Who should see (or read) an IPN?

While it might seem that an IPN should be widely shared, many people are more comfortable talking about human factors and what they learned if only their immediate peers are in the room. Put a stranger or two in the room and the story may get sanitized and the lessons muted.

There is a written report with a photo and a diagram of this incident. Also, during our annual sled training day, we go to the site where I can stand at the spot where I gave the sled too much gas and make the story come to life.

Increased audience over time?

Written reports, slide presentations and recordings can potentially increase the number of people who learn from the incident. However, knowing the narration is being recorded one way or another can also cause the narrator to clam up or omit some points. Since the human factors and lessons learned are so important in many incidents, any record of the narrative, e.g. pdf, powerpoint or video should clearly state who it is for. Since I manage the various forms of records, I must establish trust by respecting the narrator's intended audience. If the narrator's comfort level rises over time, the intended audience can be revised—but only with the narrator's permission.

Initially I was only willing to tell the story to ASARC staff and some friends. By the spring of 2008 I was willing to narrate the incident and show photos at the Canadian Avalanche Association's Continuing Professional Development Day. For a written copy of the report, photo and diagram of the snowmobile crash, drop me a line at bruce.jamieson@ucalgary.ca.

Over time, others have come forward, giving permission for wider distribution of their IPN.

Blameless?

The IPNs must be blameless! Any concerns about blame will suppress honest discussion of human factors and some of the lessons learned.

Nameless?

When presenting to our staff, we find the use of names adds impact to the narrative. If the narrative is to go beyond a small group of peers, the names of people involved should be replaced with their roles, e.g. the skier, the first snowmobiler on scene, etc.—unless the individuals involved give written permission to have their names included.

If there was no injury, why share the circumstances?

Any incident involving workplace risk that, in hindsight, was too high and has identifiable lessons is worth sharing by some form of IPN. For us, the incident could involve driving, avalanches, snowmobiling, skiing, etc. We consider road travel to be our highest or second highest risk, and need to capture more of the near misses as IPNs so we can learn from them. When someone says "I was too tired. I should not have driven here last night"—that is worth sharing, so the factors and options can be discussed.

Thinking back, our best IPNs include five elements:

1. events, terrain, conditions, equipment and human factors leading up to the incident
2. the event
3. what was done well
4. actions, equipment and anything that might have helped avoid the specific incident
5. proposed changes to routines or operating procedures that would help avoid similar incidents. Sometimes there are no recommendations.

I think of an incident peer narrative as horizontal communication. It is different from and does not replace upward communication of an accident or injury to management, regulatory agencies, etc. An Incident Peer Narrative is simply a story of a risky workplace incident in which communication to peers and learning are optimized—to help prevent future injuries.

Post-profile Test

By Larry Stanier

This is a simple proposal from a simple mountain guide. I have been using this test for the past two seasons and find it a useful and really efficient test at the end of almost any snow profile you do with another person. Try it out if you like.

Finish whatever you are doing in your profile. Good snow-craft and site selection is, as always, critical. Now, simply smooth out the back wall, just as you would at the beginning of your profile—no side cuts, back cuts etc. Ideally you will have a very clean, smooth wall over 100 cm wide, nice and plumb and extending well below any suspected weak layers.

Roughly similar to a rutschblock test, have a skier or boarder gently come and stand about 1 metre or less above this wall. You are in the pit, observing for any signs of failure and its fracture character. The person on top presses, jumps etc till you give up or get a failure. Personally, I am resisting getting too dogmatic about the test. I am interested in the presence or absence of skier trigger-able weak layers and their fracture character.

I record the failure plane, the fracture character and simply use the old subjective descriptors of easy, moderate or hard to approximately describe the force it took to trigger the failure. I am much more interested in the easily observed fracture character than the very subjective easy, moderate or hard rating.

Example #1.

You finish your profile and find a mixed layer of facets/surface hoar down 50 cm. The wall is smooth, clean and vertical and you get a rider in place about 70 cm above the wall. The rider presses twice and then jumps once. On the jump you get a sudden planar shear on the facets/surface hoar. Result: PPT moderate SP @50 cm on facets/surface hoar. That should have taken about five minutes and you now have a bit of very visual data about how the layer and the snowpack MAY react to a human-sized load.

Example #2

You find nothing significant in your profile. Smooth out the back wall and have your partner gently come in. They press, jump, etc and just make a big mess of your clean wall.

Result: PPT negative. Don't forget, we like to find and record good news too!

A careful observer in this test, and in a rutschblock, also has an opportunity to learn something about how a rider's stress bulb can affect the snow. Is this THE answer? NO! Is it good value as a test? I think so, but only lots of use amongst those of us who work in the field will tell.

Sorry about the lack of photos or diagrams. I figure if you think you can forecast avalanches, you had better have more than enough imagination to work with my words.

Brent Strand

The New North American Public Avalanche Danger Scale

Draft version will be tested this winter

By Grant Statham

In 2005 a group of Canadian and American avalanche forecasters began working together to revise and merge the avalanche danger scales used in both countries, and produce a single danger scale for use across North America. Our primary goals were to make the system based on risk (thus accounting for consequence), and to ensure the system communicates well with the public. To maintain the international nature of the scale, we agreed to not change the five levels, the signal words or the colours.

Soon after the project started, it became more complicated as we began to explore some difficult questions about what avalanche danger meant, and how a danger rating was actually determined. It was apparent that we would not easily agree on these things, but they were important enough concepts that we would need to sort them out before revising the actual danger scale. The danger scale is effectively a public communication tool but in order to communicate well, one needs to be crystal clear on what exactly is being communicated. We had some preliminary work to do before we could start on the danger scale.

As the complexity of the project grew, it became obvious that we needed a better structure and some project funding to get the work done properly. To this point we had been relying on the goodwill and in-kind contribution of people's time. This wasn't going to last long enough to finish, so in 2006 we joined with the CAC's ADFAR2 project. This project is intended to further develop the Avaluator by providing tools for more skilled recreationists. This was a logical place for our danger scale project, as the avalanche danger rating is a key input to the Avaluator. We began again in 2007, with a committee of experts from US and Canada who would represent the interests of their respective groups. We had three main objectives for our project:

1. Clarification of terminology and definitions including avalanche hazard, danger and risk.
2. Develop a conceptual model of avalanche hazard, using this to describe the inputs and process of evaluating avalanche hazard.
3. Revise the Avalanche Danger Scale so it is linked to the evaluation process, and is communicated effectively.

We are now nearing the completion of this project. Our first objective listed above was presented at the ISSW 08 in Whistler, and also published in Volume 86 of this journal (Avalanche Hazard, Danger and Risk – A Practical Explanation, p 44-47). Understanding the meanings of these concepts is fundamental to understanding how avalanche warnings work, and what the limitations of the Avalanche Danger Scale are.

Next we developed a conceptual model for analyzing avalanche hazard. This "thinking" model takes an avalanche forecaster though all the steps of the forecasting process and provides a logical and structured framework for resolving the avalanche hazard. It provides a method for analyzing and combining avalanche character, terrain, sensitivity to triggers, spatial distribution,

Avalanche Danger Scale Team: back row left to right: Karl Birkeland, John Kelly, Chris Stethem, Grant Statham, Clair Israelson, front row left to right: Brad White, Pascal Haegeli, Bruce Tremper, Susan Hairsine, Ethan Greene.

CAC Archives

North American Public Avalanche Danger Scale

Avalanche danger is determined by the likelihood of triggering and the expected size of the avalanche(s).

Danger Rating	Advice for Public Recreation
Low	Generally safe avalanche conditions. Watch for unstable snow on isolated terrain features.
Moderate	Dangerous avalanche conditions on some terrain features. Evaluate the snow and terrain carefully and use good travel habits.
Considerable	Dangerous avalanche conditions. Use conservative decision making, careful route finding, and good travel habits. Training and experience are essential
High	Very dangerous avalanche conditions. Travel in avalanche terrain is not recommended. Extensive skill, experience, and local knowledge are essential.
Extreme	Avoid all avalanche terrain. Travel only on gentle slopes well away from areas affected by avalanches.

The avalanche danger rating is only a starting point. ***YOU CONTROL YOUR OWN RISK*** *by choosing where, when and how you travel.*

DRAFT version of the new danger scale. Feedback from the testing over the winter of 2008/09 will lead to a final revision in the spring of 2009.

likelihood of triggering and avalanche size. Analysis models such as this one are where the complexities of avalanche forecasting belong, rather than within a simple five-level scale intended to warn the public. We plan to publish details on this system and make it available within the coming year.

Last, but certainly not the least, we are revising the Avalanche Danger Scale itself by removing the complexity and focusing on public communication. The version you see here is the result of input from forecasters on both sides of the US/Canada border, and this is the final draft that we'll be testing on the public this winter. To do this testing we've contracted the market research firm Ipsos-Reid to undertake a public test of this proposed scale in early 2009. The target audience is avalanche bulletin readers, so this survey will be linked directly from avalanche bulletins in both countries. Please take a few minutes to complete the survey if you are presented with the link.

Accompanying this article you'll see our latest draft of the proposed "North American Avalanche Danger Scale." This one is quite different from previous scales because it's strictly a communication product, designed to simply and effectively communicate the avalanche danger. The forecaster's analysis of the avalanche danger should not be based entirely on this scale; it should be based on more sophisticated methods that address the complexities of avalanche character, terrain, sensitivity to triggers, spatial distribution, likelihood of triggering and avalanche size. With any luck, our work will expand the discussion about today's danger rating beyond the time-honoured tradition of arguing between "possible" or "probable."

This project will be completed in the spring of 2009, after we incorporate the feedback from this winter and produce a final version of the North American Avalanche Danger Scale. This timing is intentional, giving avalanche warning agencies the summer to implement the new danger scale into their systems (print, web, etc). The official public launch of this new scale is planned for the Fall of 2009, accompanied by some public education on how this new system works.

If you have any comments on the accompanying draft scale, please send them to me at grant.statham@pc.gc.ca.

Shovels That Span the Divide Between Heaven and Hell

By Manuel Genswein and Ragnhild Eide

*This project was carried out under the patronage of The Austrian Alpine Club. All equipment has been purchased and paid for by the authors and none of the involved parties are in any way involved in the manufacturing, sales or promotion of any of the tested equipment. The equipment was tested during the field tests for two recent research projects—the V-shaped Excavation Strategy (*avalanche.ca *vol 84 p 57-60 Spring 2008) and Companion Rescue with Minimal Training (*avalanche.ca*, vol 86 p 57-60, Fall 2008).*

Scope and Description of the Test

The publication of the V-shaped snow conveyor excavation strategy has triggered many questions concerning the quality and efficiency of the working tools—in particular the avalanche shovel. To our big surprise, shovel models that were rated "recommended" by certain European mountain magazines utterly failed during our field tests. It is clear that these shovels had been rated without any serious testing in snow and hard avalanche debris.

Our test focused on avalanche shovels that can be carried in a normal sized backpack. Specialized rescue shovels with large steel blades have not been taken into consideration. The same is true for plastic shovels. They usually break in cold temperatures and hard debris before the first buried subject can be excavated. There are even some shoveling tools available without a shaft. These have not been taken into account due to the inefficiencies of their mechanical and/or ergonomic design.

Only correct shoveling technique was used during the test. All participants were shown how to cut blocks and specifically instructed not to break up the debris by leveraging the handle with a lot of force. All failures and observations were seen during regular use of the shovels and probes in avalanche rescue, the application they are primarily designed and sold for.

Besides testing a selection of the currently available products, the aim of this project is to provide a detailed overview on the many important characteristics and functions of a shovel. The resulting criteria may be used as an evaluation guide for future products. The manufacturers of the tested products have been asked to comment the test result for their product. Their reaction may be found at: www.bergundsteigen.at

1. Shovel selection criteria

From all major manufacturers, only the one or two most promising (mechanically strong, ergonomic, light weight) versions were selected for the test. We purchased three of each of the selected models in a regular mountain sports shop. In addition to a few heavier and larger versions weighing approximately 800 grams, we purposely selected a few lighter shovels in order to see if they can offer comparable properties/qualities as the larger versions. The lighter models were also an attractive choice for those who preferred plastic shovels.

The shovel selection was made with three user groups in mind:

- Professional user—no compromises in mechanical stability, ergonomics and scoop volume
- Randonnee and freeride—lightweight, sturdy and ergonomical
- Light & Fast —ultra light and sturdy

The testers aimed to include at least one product for each user group in the "All Mountain" category. Unfortunately, this goal could only be achieved by adding a third product from one manufacturer to the selection.

2. Shovel Categories

"Hellish"

Shovels in this category not only break, but also damage other equipment during regular use. Shovels with serious safety issues belong in this category, along with shovels likely to break before the first subject has been excavated. Plastic shovels are often preferred for their light weight but are more likely to break in cold temperatures and on hard debris. Furthermore, when plastic shovels do break, typically the entire tool becomes useless. Since there is no weight difference between plastic and the lightest metal shovels in the "mountain" category, plastic shovels should not be considered.

"Life's a Beach"

Shovels in this category allow you to excavate one or two buried subjects in hard avalanche snow, but are not designed to withstand the stress an avalanche shovel is exposed to without being damaged. After short use, these shovels show irreversible structural failures and need to be replaced. Considering that shovels in the "All Mountain" category are not more expensive, and some models are even cheaper, there is no justifiable reason to purchase a "Life's a Beach" shovel. These shovels always fail due to inferior properties of the metal.

"All Mountain"

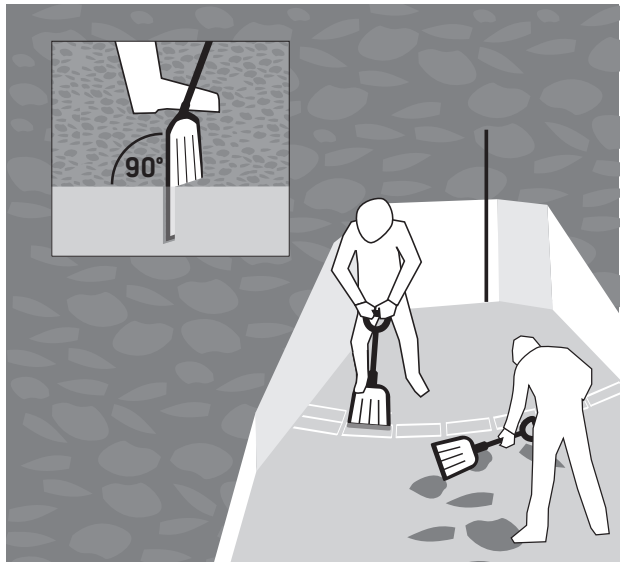
These shovels are made for year-long use in avalanche rescue. Theses shovels are neither heavier nor more expensive than shovels from the beach or hell categories but all of them are made from durable, heat treated alloys. Theses shovels do not suffer damage when chopping through hard debris.

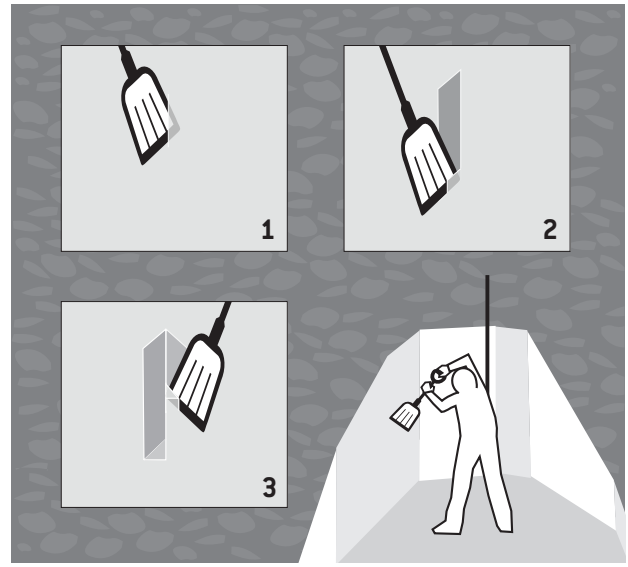
"Heavenly"

Unfortunately these do not exist yet. Imagine a prototype of a solar-powered shovel with high energy lithium batteries…to be released in the near future.

3. Predominant Failure Patterns

Most mechanical failures occurred while chopping blocks in hard debris. Blade deformations were often caused while jamming the shovel blade into the debris by stepping on the blade with a ski boot. When cutting into hard side walls, it was often not possible to cut into the debris by using the entire front of the blade. By using only the corner of the blade, the same applied force is concentrated in a smaller area and therefore more effective. However, in several models, the blade could not withstand this mechanical stress, which led to irreversible deformations.





4. General Description of Important Characteristics and Features

Blade

Shape:

A triangular shaped blade is offered by a few manufacturers. Theoretically the concentrated point of attack is advantageous when chopping hard debris. Unfortunately practice shows that in hard debris the triangular shape creates an unstable position which forces the blade to twist sideways. If the material could withstand the concentrated stress at the tip, or enhance a sideways attack with the blade, one could theoretically see this shape as an advantage. In practice, however, it has been shown that applying force across the full width of the blade while chopping snow leads to more efficient snow removal.

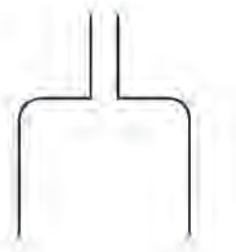
A straight front line of the blade provides a very stable leading edge of the shovel while chopping snow. The mechanical integrity of the main line of attack leads to the greatest blade durability.

A serrated leading edge, with several exposed points of attack on a straight line, delivered the best cutting characteristics.

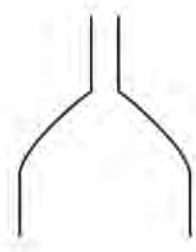
In general rounded tips offer good characteristics for cutting snow, although the rounded shape can lead to some instability.

- Rescue instructions on the shovel blade make sense from an educational point of view: The equipment is always with the owner and therefore offers a good opportunity to familiarize them with the basic rescue instructions. The print should not however, lead to snow sticking to the blade.
- Shovel blades with mounting holes are useful to connect with the tips of the skis or the bindings for improvised, terrestrial transport of a patient.

Design:



A flat top provides a good platform for stepping on while pushing on the shovel from the back in hard debris.



When the top of the blade slopes to the sides at an angle, the boot simply slides off preventing any energy from being transferred from the foot to the shovel. This wastes energy and causes the shoveler to become discouraged.

Radius: Small radiuses in the shape of the blade will lead to more mechanical stress being concentrated in those specific zones of the blade. Therefore, small radiuses are more vulnerable to deformation and eventually cracking.

Size: Small blades take less energy to wield, but make snow chopping and transport less efficient. Contrarily, larger blades can move a lot of snow quickly, but require a very strong person.

Material: Only shovels with blades made of 6061 alloy with T6 heat treatment made it into the "All Mountain" category. Certain other manufacturers claim to work as well with specially treated alloy, but the test did not see the efficiency of alternative materials or heat treatments. It is advised to be very suspicious if 6061 *and* T6 are not clearly specified. The Black Diamond R&D department stated to us in writing that "The mix that we use has taken much work and dedication in order to perfect. For this reason we do not share the specifics." Too bad. We do share with you that their top of the line product ended up in the "Hellish" category.

Scooping Characteristics: The more the cross section of the blade resembles a U-shape, the more reliably the snow will stay on the shovel while lifting or transporting snow.

Angle of the blade in relation to the shaft

The angle between the shaft and the blade is a compromise between efficiency while chopping and efficiency while transporting snow. Whereas the shaft and the blade should be in a straight line for chopping blocks, a more angled version is preferred while transporting snow in rowing motions.

- Alternative blade-shaft angle: Some models offer the possibility of pivoting the blade to be approximately at a right angle to the shaft, thereby transforming the shovel into a hoe. For certain applications, this can be advantageous. However, the versatility of this feature can compromise long-term durability, and is not always ergonomically superior.

Shaft

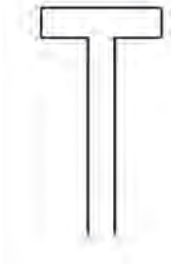
Connnection: Round shafts offer less resistance while adjusting length, but are prone to rotating while adjusting. This means more time is required to ensure proper alignment between the extension holes and alignment pins. Shafts with an asymmetric cross section, such as oval or trapezoid shapes, exhibit more resistance while mounting, removing or adjusting the length, but will not waste time aligning the push-pin with the extension hole.

Length: All testers complained continuously about the inefficiency and discomfort of short, non-telescoping shafts. Short shafts mandate an uncomfortable work position and dramatically reduce the effective range of motion. As soon as you use your shovel for what it is meant for—shoveling snow—you will not regret the extra weight a telescoping shaft adds. Telescoping shafts need sufficient overlap between the two segments in the extended state in order to provide enough mechanical stability.

- The opening of the shaft needs to be covered so that no snow may enter the shaft while shoveling. Snow entering the tubular shaft leads to malfunctioning of the locking mechanisms and the compressed snow will melt into the interior of the backpack after use.
- Some manufacturers supply an additional grip on the shaft of the shovel. The concept of this shaft grip is to provide more precision and stability while shoveling.

Handle

T-shaped handles



This is the least efficient and least ergonomic version. Newer versions of the T-shaped handles with more rounding show fewer problems, except for rescuers with small hands, where the entire handle is too big and does not allow a proper grip any more.

D-shaped handles

This is the most comfortable grip, although a minimum depth and width must be determined for each person's hand.

5. Report on the individual shovels

"Hellish"

Black Diamond Transfer 7

Mechanical Characteristics and Stability

The Transfer 7 shovel cracked where the ramp angle of the blade starts to change towards the shaft of the shovel. The small radiuses on the upper end of the shovel blade do not withstand the force applied to the shovel when cutting blocks and pushing the shovel with the ski boot into the snow, leading to severe deformations.

- Like all smaller Black Diamond shovels, the Transfer 7 has a sharp edge on the top side of the blade. As the blade design has a rounded top, it is necessary to step with the ski boot right next to the shaft onto this cutting edge feature. After the ski boots of three participants had been severely damaged by this sharp edge the shovels were removed from the test. The Vibram soles of the ski boots were severely damaged. In one case even the rigid plastic shell of a Scarpa Denali boot was almost destroyed.

Conclusion

Besides cracking and deforming, Black Diamond's largest and most rigid shovel caused much damage to plastic ski boots. Due to the rounded shape of the top of the blade, it is hard to step on it with boots, making cutting blocks harder. The trapezoidal shaft is strong with good surface structure on the metal. The T-grip has a good ergonomic shape, better than most T-grips, but the size is too big for a person with fairly small hands.

Black Diamond Transfer 7

"Life's a Beach"

Pieps Pro

Mechanical Characteristics and Stability

Unfortunately the Pieps Pro shovel broke before two holes of 2 m burial depths could be excavated. The initial failure starts in the front center of the blade parallel to the company logo which acts as a weak spot. Even when purchasing the shovels, it was clear the blade was far too soft to withstand an avalanche rescue environment. In short order the sides of the blade bent outwards—effectively destroying the structural integrity of the blade.

- The blade cuts snow nicely, but the blade is too weak to withstand the forces an avalanche shovel is subjected to.

Pieps Pro

- The T-grip was not the preferred shape by most of the participants. Pieps Pro has an asymmetric shape for the locking knobs which allows the shovel to mate easily onto the shaft.
- The additional grip on the shaft is strong but shredded gloves that didn't have a durable surface material.

Conclusion

The Pieps Pro is by far the weakest and least recommended product in the Beach category. Unfortunately it illustrates that some manufacturers do not appear to test their products in the real application environment before they are thrown on the market. In particular safety equipment should be thoroughly tested by the manufacturers, as well as in the hands of end users.

Stubai

Mechanical Characteristics and Stability

Rigid shaft, but some deformations of the shovel blade have occurred. Unfortunately, several of the locking pins on the shaft and in the handle broke, rendering the entire shovel useless. The locking pins are obviously weak in the connection between the bolt and the spring.

Conclusion

The small size of the blade limits the amount of snow that can be moved per scoop with this shovel. The overall stiffness is good for cutting blocks. However, removing the blade from the shaft was difficult and required a lot of force. The T-shaped handle felt uncomfortable.

Stubai

Ortovox Grizzly

Mechanical Characteristics and Stability

Unfortunately the Grizzly shovel did not live up to the strength implied in its name. The blade cracked where the ramp angle of the blade starts to change towards the shaft of the shovel and the entire front of the shovel was heavily deformed. The large, flat platform on the upper end of the blade makes it very easy to stomp on the shovel, which is very effective for chopping blocks in the snow.

For general comments about the hoe function, please see "alternative blade-shaft angle." Attempts to lock the shovel in the two available positions weren't reliable, especially when the locking pin iced up. It is disappointing that the shaft cannot be locked in the short length, particularly when working in close proximity to the buried subject.

Ortovox Grizzly

- The hole which holds the locking bolt in place in the hoe working position quickly became ovalized, creating slop in the blade.
- The serrated design of the leading edge of the shovel blade results in excellent cutting characteristics.

Conclusion

The concept of a shovel with a hoe position is interesting, but with the current version many participants felt it was tricky to find the proper locking positions. The lack of a short shaft working position is not optimal. The additional grip on the shaft is very aggressive, even for gloves with a strong leather surface, but still wore out remarkably quickly due to contact with the side of the ski boot when chopping snow.

Ortovox Alaska D

Mechanical Characteristics and Stability

The blade of the Alaska D shovel deformed very easily. When pushing the blade into debris, it deformed dynamically and almost popped out again. Soon the deformations became permanent. There is too much play at all locking points (blade, shaft and extension). The size of the blade allows large amounts of snow per scoop, yet is not too big for a weaker shoveller.

Conclusion

The Alaska D has a very good D-shaped handle and a nice foam /rubber grip on the shaft. The only complaint about the additional grip material is that snow sticks to it, making it slippery. The Ortovox Alaska D was well liked by the participants. Unfortunately it is mechanically weak. Potentially a great shovel for avalanche rescue, but only if it is manufactured with appropriate material.

Ortovox Alaska D

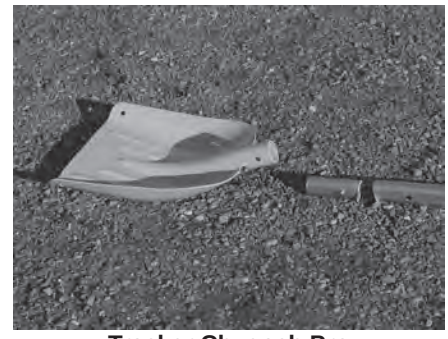
BCA Chugach Pro EXT

Mechanical Characteristics and Stability

The big blade of the Chugach Pro showed little deformation. The shaft slowly started to bend where it meets the blade and eventually broke. Even though the oval shaft is strong for levering, it was unable to handle the forces the large blade exposed it to.

Conclusion

Shovel blades of this size only make sense for particularly strong individuals. All other components, like the shaft, should be designed to withstand these forces. A shovel in this size targets a user group where one would expect the lower shaft to be closed with a cap so that snow won't fill up the shaft.



Tracker Chugach Pro

Mammut Expert

Mechanical Characteristics and Stability

The blade of the Mammut shovel deformed very easily. This shovel was in the companion rescue field test in 2008 and the V-shaped excavation field tests in 2007 and consistently showed the same failure pattern with over 10 shovels. Some failures have occurred at the neck of the blade where the soldered back side broke.

Conclusion

Ergonomic handle, almost oversized and therefore rather big in packing size. Very weak blade.

Mammut Expert

"All Mountain"

G3 AviTECH D-Grip

Mechanical Characteristics and Stability

The AviTech is manufactured in 6061 T6 and withstood the tests without problems. The shovel has a nice flat top for pushing the blade in hard avalanche snow with a boot. However, the radius is a bit too small towards the upper end so that some minor but permanent deformations could be seen in this zone.

Conclusion

Good sturdy avalanche rescue tool. D-grip handle is too small and not optimal in shape for rescuers with big hands or gloves. Top handle bar should be round for ergonomic glide while shoveling.

G3 AviTECH D-Grip

Voilé Telepro T6

Mechanical Characteristics and Stability

All the features one would want are contained in this family of shovels. The Telepro T6 is manufactured with 6061 T6 and withstood the rigors of the tests without any problems. While being subjected to the same abuse as other shovels, Voile blades were unaffected by destruction or deformities. The top of the blade was almost square to allow a good platform to step on, with excellent transfer of power. Though simple, the straight leading edge of the blade was reliable and durable. Finally, it comes with a telescoping shaft and a D-grip, hands down the grip of choice for comfort among our testers.

Conclusion

This a good example of how an avalanche rescue tool should perform: sturdy and ergonomic. A very good choice when you are not concerned that every single gram must count. For serious professional avalanche rescue and daily snow observation.

There are no images of the Voilé Telepro T6, Voilé XLM Pro or the Voilé XLM due to the fact there was no damage to show.

Voilé XLM Pro

Mechanical Characteristics and Stability

The XLM Pro is manufactured in 6061 T6 and withstood the tests without any problems. It has a smaller and thinner blade compared to the Telepro T6, but has a telescoping shaft with an ergonomic D-handle.

Conclusion

A very good choice if you are looking for a sturdy, yet fairly lightweight, ergonomic shovel for touring. The weight is comparable to a heavier plastic shovel.

Voilé XLM

Mechanical Characteristics and Stability

The XLM is manufactured with 6061 T6 and withstood the tests without problems. It has a smaller, thinner blade compared to the Telepro T6, and a very short shaft with a T-grip handle. Participants complained continuously about how uncomfortable shoveling was with such a short shaft.

Conclusion

Sturdy and extremely lightweight. A good choice if weight is the most important criteria, yet the shovel should still be very sturdy, but you are willing to compromise ergonomics. The weight is comparable to the lightest weight plastic shovels available!

Overview of shovels in alphabetic order

	Weight	Packing length	Length short	Length extended
BCA Chugach Pro EXT	1128g	59cm	88cm	109cm
Black Diamond Transfer 7	780g	43cm	71cm	89cm
G3 AviTECH D-Grip	775g	46cm	65cm	87cm
Ortovox Alaska D	905g	50cm	78cm	97cm
Ortovox Grizzly	838g	48cm	Not applicable	87cm
Pieps Pro	738g	46cm	72cm	99cm
Stubai	775g	48cm	67cm	92cm
Voilé Telepro T6	840g	50cm	79cm	99cm
Voilé XLM Pro T6	665g	45cm	71cm	85cm
Voilé XLM T6	520g	36cm	61cm	Not applicable

Product Reviews

Brooks-Range Rescue Sleds

Ultralite Rescue Sled
By Scott Davis

I was excited to try out the "lightweight version" of the standard Brooks-Range Rescue Sled. I also felt I had the perfect opportunity to give it a thorough testing during the ACMG mechanized ski guide training segment of the Assistant Ski Guide course. As part of the instructor team, we had devised a scenario that began with a lost skier, progressed into an avalanche rescue and concluded with the evacuation of two injured victims.

For those not familiar with the Brooks-Range rescue sled, it is based on a ski frame concept, utilizing two spreader bars connecting the tips and the tails of the skis. A long piece of fabric stretches between the bars, tensioning them towards each other. This fabric also provides a cot-like platform to place the patient on. With the ultralight system, an additional bivy sac or other system is required to protect and package the patient.

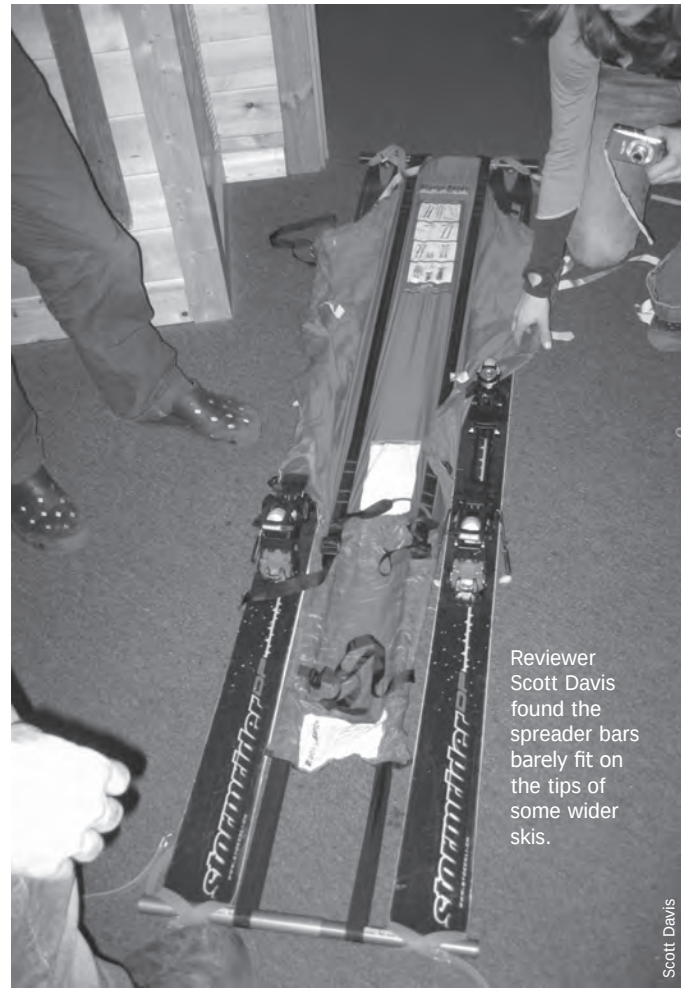
I feel it is important to admit that I am somewhat biased against dedicated sleds for the following reasons: 1) weight and bulk 2) universality—will it work with all skis, and 3) specialized use—it is a rescue sled only and can't be used for anything else, such as a shelter etc. That said, I was actually keen to see if this rig would change my mind and if I would adopt this as my new system.

The product comes in a fairly compact package that contains the spreader bar/tension system as well as a shwack of rubber ski straps for additional strengthening. The assembly instructions come as a separate sheet but are also printed directly on the fabric so that you always have them available. I was happy with the packaging being compact and fairly light at 652 gm, though you have to consider the additional weight and bulk of your bivy sac as part of the system.

The instructions are graphic only which removes any language barriers (and saves them the cost of translating them into French when importing into Canada). I have to admit that some parts don't make sense the way they show them, forcing you to guess that what you are doing is okay as there are no written explanations to back up the illustrations.

Okay let's get this thing on the snow and see how it does! Now I didn't have the chance to play with it before the course but I felt this was reasonable because I wanted to see how it performed straight out of the box. Unfortunately, the answer was not a good one.

First off we tried one pair of skis and the bars barely fit on the tips, and I mean barely. So we chose another candidate's skis with a more pronounced point to the tip in an effort to give us something to strap the ski poles to as per the illustration. There was still nowhere near enough ski tip to gain the purchase necessary for the straps to work and the bars were sure to slip off once any real force was applied. Things were not looking good and time was burning up as we fussed with attaching the ski poles. The ski poles are necessary to provide further rigidity and help keep the system rectangular, rather than trapezoidal, but we had no success in connecting them properly.



Reviewer Scott Davis found the spreader bars barely fit on the tips of some wider skis.

After trying several skis (including a split board) we had to abandon our efforts and continue with the scenario using another toboggan that was ready to go with a victim packaged. Another candidate had the Brooks-Range lightweight system and though they managed to assemble it, when they hauled their patient it pulled itself apart. Not a good first impression for sure!

That evening, in the warm comfort of the lodge, we had a show and tell of all the different systems the candidates had brought along. As we assembled this system again, we scrapped the idea of including the ski poles and just used he spreader bars and tensioning material. This went fairly smoothly and we managed to package someone in a fairly

Attaching the poles to the toboggan proved a challenge. Scott Davis

short period of time, though when we tipped them on their side (as on a sidehill) it was obvious that changes were needed to ensure they were more stable. I also had a chance to look at the beefier Brooks-Range rescue sled. That rig was more stable (because it could be tensioned tighter) and provided a more supportive patient platform compared to what we could manage with the lightweight material and plastic buckles of our version.

My conclusion is that this design concept may have worked well 10 years ago when skis had a more consistent shape and size, but given the wide variety of width and profile of the tips and tails on skis today, any system that relies on the spreader bar fitting over the ends of the skis is doomed to problems. Even if you modify the bar to work on your own skis, that doesn't guarantee it will work on the injured person's skis. If the hole is too big for the skis, the bar slides down to the binding when tension is applied. If the hole is too small for the skis, then you have the problem described above. For my purposes as a guide with clients on everything from skinny old tele skis to mondo Alaskan big mountain boards, I won't be relying on this product to solve my toboggan needs.

All-In-One Rescue Sled/Tarp
Review by Karl Klassen

I've used the slightly heavier standard model of this sled for years with very good results in a variety of situations. For me, the speed of assembly and generally good performance outweigh the disadvantages of having a piece of equipment that's dedicated to a single purpose. I've also been mostly guiding cat skiing in recent years where there's less equipment in the group as a whole, so I carry a tarp too and prefer not to tie up my other gear (shovel, probe, etc.) into a sled. According to Brooks-Range, this little baby weighs in at a hair over 711 grams compared to about 1020 for the standard model and I was curious to see if a lighter weight version would perform well enough to consider ditching my heavier one.

My first impression was that this sled/tarp is so light that in many cases it's going to be a one-use system. The fabric will get shredded if the snow is hard or if there are rocks or brush involved. While true of most lightweight systems, this might be a hard pill to swallow at a retail price of USD$288.00.

I've always liked the idea of an integrated sled/tarp that also allows skis to be used as a frame, and this one comes closer than others I've seen to getting it right. It's light, it's

Packaging a victim with the Ultralite sled requires a separate bivy sac. Scott Davis

The Ultralite sled can be assembled without ski poles but stability is compromised, as can be seen here with the sled tipped on its side, allowing too much movement for the victim.

Scott Davis

set up so you can use the tarp as a shelter or bivy bag, and it packs small. It's not quite there yet, though. The tarp is too small—not long enough to enclose the feet of two or three people. The Velcro closures are a good idea, but they are not set up as well as they could be to maximize effectiveness in bivy sack mode.

You definitely want to check the system out before you set it up for the first time. The straps, buckles, haul loops, and other parts required to attach it to skis and tie a person in are very cleverly stashed in a series of compartments; not at all obvious in the assembly illustrations. There's a good reason for this. When using it as a tarp or bivy bag, you don't want all that stuff in your way, but the downside is that finding all the parts is not at all intuitive.

Having used the pro version for years and giving this one a quick once over before going outside, I found it fairly easy to assemble but it definitely took more time than my older, simpler version. Lashing the skis into an X under the sled was problematic and slowed me down—it doesn't work at all as neatly as the picture shows. Getting to all those hidden parts while trying to get a grip on the very slick material and super-sticky new Velcro closure with gloved fingers definitely adds time.

The straps for tensioning the system are super soft and flexible webbing and, while I didn't see it happen in my limited test, I wonder if they might slip in a long haul. The two-part spreader bars are not as stiff as the old, single-piece bars. The two bars are cleverly designed to fit one inside the other, but at the expense of having a spring clip that has to be fished out and inserted into the right tube before it can be used. You pretty much have to take your gloves off and I'd hate to drop that important little part into deep dry snow.

With the less rigid spreader bars and the extremely lightweight fabric, this sled does not have the rigidity of the heavier, standard version. The instructions suggest making a ski pole X and I'd say that is a necessary part of the system. However, the X brings some disadvantages. In addition to adding time and complexity, it also adds unavoidable drag, making you work harder than with a sled that has a smoother bottom profile.

I didn't give it the full workout but if I do, I'll probably not pull on the haul loops. Even with the more stable standard version, I've always rigged a cordelette to the ski bindings for hauling to prevent the front spreader bar from pulling off or to keep the fabric from stretching and deforming the sled.

And if you ever intend to get this thing back into its original bag, make sure you unfold it carefully so you can remember how to re-fold it—I just gave up and crammed it into a larger stuff sack, which allowed me to leave the spreader-bar spring clip referred to above in place, even though the tubes then do not fit fully and perfectly back together.

I have to wonder if there is such a thing as too light and too small. With this sled, I lose 300 grams but still feel I have to carry my guide's tarp. I also have the additional challenges of doing the ski pole X to make the thing stiff enough and the problem of added drag. That said, if the tarp on this sled were a bit bigger and the Velcro closure system modified a bit, it has the potential to be the best of all worlds: a tarp big enough to shelter several people; something that could be made into a one- or two-person bivy sack strong enough to use as a non-rigid sled in soft-snow conditions; and a rescue sled that incorporates skis when you need something a little more rigid and tracks better in hard snow.

>>Scott Davis is a Mountain Guide and President of the Association of Canadian Mountain Guides

>>Karl Klassen is a Mountain Guide and a CAC Public Avalanche Forecaster

Ultralite™ Rescue Sled
Suggested Retail Price: $238 (US), Weight: 652 g

All-In-One Rescue Sled/Tarp
Suggested Retail Price: $ 288 (US), Weight: 711 g

www.brooks-range.com

Backcountry Skiing and Gender: The Collision of Hormones and Relationships with Decision-Making in Avalanche Terrain Or The possibility of a 'gender heuristic trap'

By Margaret Wheeler

This article first appeared in *The Avalanche Review*, vol 26, no. 4 April 2008

"I like to go into the mountains with women. I feel like I'm safer when I do. When I'm out with my male friends, I know that I have to keep a sharp eye out for competition, pride, and all the other traits that tend to go along with groups of men…"
Bruce Tremper, *Staying Alive in Avalanche Terrain,* 2001

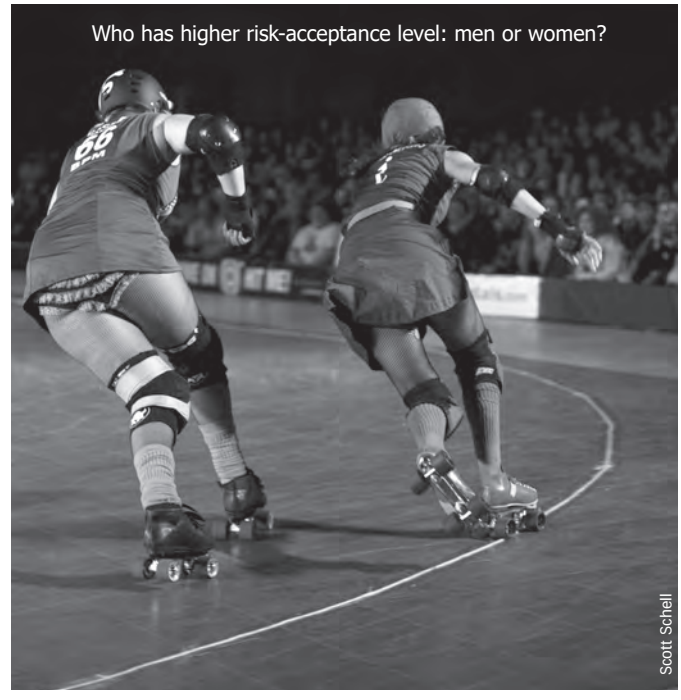
"…under certain circumstances, men in the presence of female peers will behave more competitively, aggressively, or engage in riskier behaviors….Across all groups, accident parties that included women had a significantly higher exposure score."
Ian McCammon, Heuristic Traps*, Avalanche News,* Vol. 68, Spring, 2004

Who are the bigger risk takers, men or women? How does your gender affect your risk exposure level in the backcountry, and therefore your decision-making process? These are tricky and controversial questions, and as such they become a matter of opinion—rather than science—almost immediately. Each of us has had experiences that shape our opinions, and there is some body of knowledge that focuses on these very questions (particularly in the insurance industry). But for the backcountry user, how do we reconcile the contradictions offered by the two quotes above? And how do we integrate this factor of gender into what we know about human factors and decision making?

In considering these questions, it is important to understand the evolving paradigm of backcountry skiing groups. Not only are backcountry users in general increasing, the ratio of men to women is also changing. How many women were skiing in the backcountry 20 years ago? How many women are skiing or riding in the backcountry today? I have no access to numbers (doubtless gathered by marketing research in the industry) but the indicators are out there. Could you buy a women's backcountry ski in 1988? These days, there are not just skis but a whole range of backcountry equipment and clothing designed specifically for women.

If this paradigm is shifting, then it is of utmost importance to understand how the changing fabric of backcountry ski groups figures in to the group decision making dynamics. If we don't consider the ways in which gender shifts or exacerbates human factors in decision making, we stand the risk of creating a gender heuristic. If you believe that skiing in a mixed gender group will keep you safer (see Tremper's quote), how can you protect yourself from the findings described by McCammon? A gender heuristic might look like either of these statements: "If we have at least one woman in our group, we better listen to her so we make better decisions and don't get avalanched." Or how about this one: "If we have a girl in our group then everyone starts acting like chickens without heads, posing and taking big air. Let's just go out as a group of the guys, ok?"

We all have perceptions about gender. We all start sentences with the words, "Women like to…", or, "Men are


Who has higher risk-acceptance level: men or women?
Scott Schell

Author Margaret Wheeler rips it up in Chamonix, winter of 1999.

always…" While these phrases may help us accept the otherwise baffling behavior of our friends and lovers, they may set us up for mistakes in understanding group decision making. One of the best ways to dissect a perception/ stereotype is to pin it up on the wall, and evaluate it with an analytic eye as it squirms under a bright light. To that end, here is a starter list of perceptions I have overheard about groups of men and groups of women in the backcountry.

What are some perceptions about male behavior in the backcountry?

1. Men are driven by testosterone.
2. Men are physically competitive (Who is the strongest? Every day out is a race).
3. Men are bigger risk-takers than women.
4. Men are goal oriented (It isn't a good day unless you get to the top).
5. Men are ruled by their egos.

Now let's look at perceptions we have about women in the backcountry:

1. Women won't take on as much risk as men.
2. Women are more likely to make decisions that lead to group happiness over individual happiness ("I just want everyone to have a good day today").
3. Women are less likely to speak up in a mixed-gender group.
4. Women are better communicators than men.
5. Women are conscious of men's egos, and will seek not to bruise them.
6. Women who are used to being The Only Girl at the Party are competitive with other women.

If each of these could be taken as fact, we could use them as solid guidelines in understanding our human decision making process. But these are stereotypes, and my bet is each of will relate to some, but not all. What if some of these are incorrect, even just some of the time?

I don't have access to a body of research aimed at discovering where these stereotypes have their origin or statistics to help me decide if they are true or not. For now, the best I can do is to share some of my own experiences, and think about how they may reinforce or deny each of the perceptions listed above, and how they correspond to McCammon's heuristic traps.

Consider, then, three anecdotes: one for all-male groups, one for all-female groups, and one for mixed-gender groups.

All Male Groups:
Trying to Be One of the Guys—Ski Bum in Chamonix.

(I realize that my inclusion in this group makes it a mixed-gender group, but this is the closest observation I have!) Ski bum culture is a social hierarchy determined by skiing ability—whoever skis the hardest is the coolest, period. My experience in Chamonix was characterized by the following:

1. Working very hard not be "the girl in the back"—uphill and downhill.
2. Joining the race, every day, that started out of every tram, gondola, or skin track.
3. Asking no questions, expressing no doubts. The decision to go or no go was always made before the day started. After that point, it was total commitment (no turning back).

Looking at this experience from the perspective of gender stereotypes offers me limited insight in understanding the dynamics that developed. Was I exhibiting stereotypical male behaviour, or female? How did my own background and desires affect my behaviour? In contrast, looking at them from the perspective of McCammon's heuristic traps (familiarity, acceptance, consistency, expert halo, social facilitation and scarcity), some patterns emerge. My friends and I were constantly driven by scarcity, we were seeking acceptance


Slot Couloir, Snoqualmie Pass, WA

Scott Schell

from our ski-bum peers, and we would commit each day before leaving our tiny apartment to execute the day's plan. As such, our risk-exposure levels were certainly higher than we realized at the time.

All Female Groups:
Women's Expedition to Hanuman Tibba, Himachel Pradesh, India.

This was a ski expedition in high altitude, high-risk terrain. We were a group of four women—ambitious, motivated, eager to climb and ski a first descent off a big peak. This was an amazing trip, characterized by:

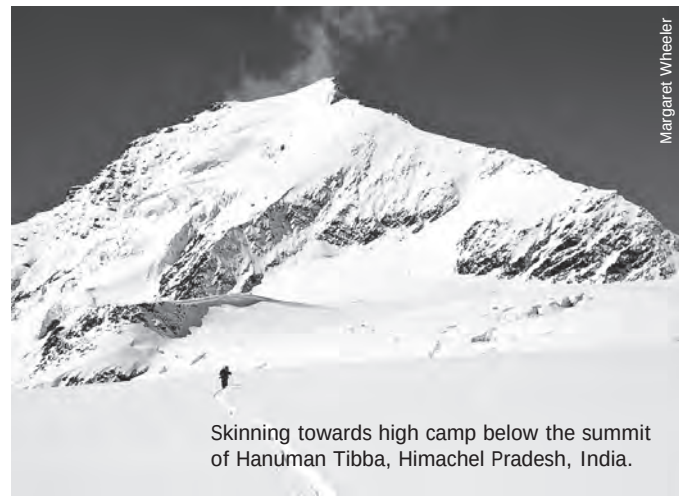
1. Varied experience levels in the group: Some of us had high altitude, big mountain experience, some of us didn't (I was the latter).
2. Ambitious and competitive women: All of us were trying to make a name or build one, in a mostly male-dominated industry
3. High commitment level: We had traveled far to do this, spent time and money— not to mention blood, sweat, and tears—getting to our high camp.
4. High risk acceptance level for the group: Though I'm not sure we fully realized it at the time.

Comparing this experience to my lists of stereotypes, I get mixed results. Yes, we were all used to being the Only Girl at the Party, but did that drive us to be more competitive than we naturally are? I'm not sure. Were we taking on more risk because we felt we had something to prove or because we were ambitious and had a common goal? Again, not sure. Under the stress of high risk and high reward in the mountains, our decision-making process seemed to me to be gender free. From the perspective of heuristic traps, however, I can see that even though we thought our decision-making process was conservative, the expert halo, scarcity and commitment all contributed to a higher risk acceptance level than we realized at the time.

Mixed gender groups:
Day Tour—Slot Couloir, Snoqualmie Pass, WA.

This was a simple day trip—a group of friends and acquaintances looking to ski a great couloir. As the day unfolded, our group committed to skiing the couloir, and realized after doing so that the main hazard wasn't avalanche hazard, it was sliding hazard. This day was characterized by:

1. Group assembled loosely: Friends of friends came along for a chance to ski the couloir. As a result, the skill level of each group member was not clear.
2. Some folks had skied it before, some had not: Those


Margaret Wheeler

Skinning towards high camp below the summit of Hanuman Tibba, Himachel Pradesh, India.

who had skied it were anxious to show the others how great it was; those who hadn't skied it were anxious to ski it!

3. Members of the group who were better skiers went in first, assuming all would be well. The unknown members of the group then followed, and ended up being in way over their heads! Risk of falling and sliding the whole length of the couloir.

In this mixed group our communication was flawed, but why? Was I less likely to talk to the folks I didn't know because I am female, or because I didn't want to bruise any egos? Was it both, or neither? Again, the waters get muddy fast. But looking at the day from the heuristic perspective offers good insight to the dynamic.

"We all have perceptions about gender."

Each group member's communication was limited by the desire to have a good time and to be accepted by the group, and the scarcity of a chance to ski the couloir was driving us all to commit to doing so. The expert halo may have been present that day as well; I was an off-duty guide, trained to take responsibility for groups but not acting in that role on this day.

As I compare these experiences to the list of perceptions about men and women above, some of them are reinforced, and some of them are contradicted. Yet as I go through these stories from the perspective of the heuristic traps, those concepts are all reinforced.

What is the take-away, then? Until science can prove things—definitively—one way or the other, I'm going to rely on what I know about human factors, and be very wary of what I think I know about men and women. Because the rules there are not clear—and even if they were, there will always be an exception to any rule. Better to think: how do your own perceptions stem from your own experiences? How might they be shaped by them, and how might they be leading you astray? What might your experience level, your training, and your background do to shape your personal mindset, and therefore your decision-making dynamic?

Tune your antenna to what effects gender might be having on any group's dynamic, but make your own observations about how age, circumstance, and personality may be shaping each interaction. In dealing with human factors related to or exacerbated by gender, don't let your perceptions and/or stereotypes be a "gender heuristic" trap.

Margaret Wheeler Collection

Margaret Wheeler is a Mountain Guide who has led trips throughout Europe and North America. In 2006, she became the second woman in the United States to complete her international IFMGA/UIAGM guide certification. She is an instructor of guide training for the American Mountain Guides Association (AMGA) and is also president of the organization. She is involved in avalanche education through her work as an AIARE (American Institute for Avalanche Research and Education) instructor and trainer.

How To: The Propagation Saw Test (PST)

Cameron Ross, Dave Gauthier, Bruce Jamieson
ASARC – Applied Snow and Avalanche Research, University of Calgary

OBJECTIVE

The objective of the PST is to test the propagation propensity of a specific weak layer and slab combination independently of any loading required for fracture initiation. The PST can be applied to a slab/weak layer combination ranging from 30 cm to over 250 cm deep and is therefore capable of testing slabs in the skier-triggerable range as well as much deeper slabs.

SITE SELECTION

Although it is important to select an aspect and snowpack representative of the start zone/ski slopes of concern, the PST has been shown to work successfully on flat and shallow slopes, and since it is independent of surface loading it is capable of indicating propagation propensity in deep layers.

EQUIPMENT

The PST requires a shovel, two probes, a Rutschblock cord (4-7mm cord with knots every 20-30cm), and a snow saw that is at least 35cm long. A ruler is easier than a graduated probe for measuring column dimensions and saw cut lengths, and a small brush or crystal screen can help identify the weak layer in the snowpack.

PST PROCEDURE:

STEP 1: identify the weak layer

Many persistent weak layers (PWLs) are obvious in the snowpack wall. For those that aren't, gently brushing the pit wall with a brush, glove, or crystal screen may help find the layer or a standard compression test or deep tap test beside the PST can identify the weak layer.

STEP 2: prepare the PST column

The PST involves a 30 cm cross-slope column with an upslope length of either 100 cm or equal to the weak layer depth if the layer is deeper than 100 cm. For weak layers shallower than 100 cm, the column is always 100 cm long. The column is isolated from the surrounding snowpack by digging out the front and one side wall and cord cutting the back and unexposed side wall using a probe in the back corner much like the Rutschblock test. Measuring the weak layer depth before digging or cord-cutting the side walls is advised to ensure the column will be long enough. Be sure to cord cut to a depth below the weak layer being tested. A second probe or a ruler can be useful while cord-cutting to ensure the cross slope dimension is 30cm for the full depth. For shallow weak layers it is possible to isolate the back and unexposed side wall with the saw provided it is longer than the layer's depth and care is taken to ensure the saw stays vertical while

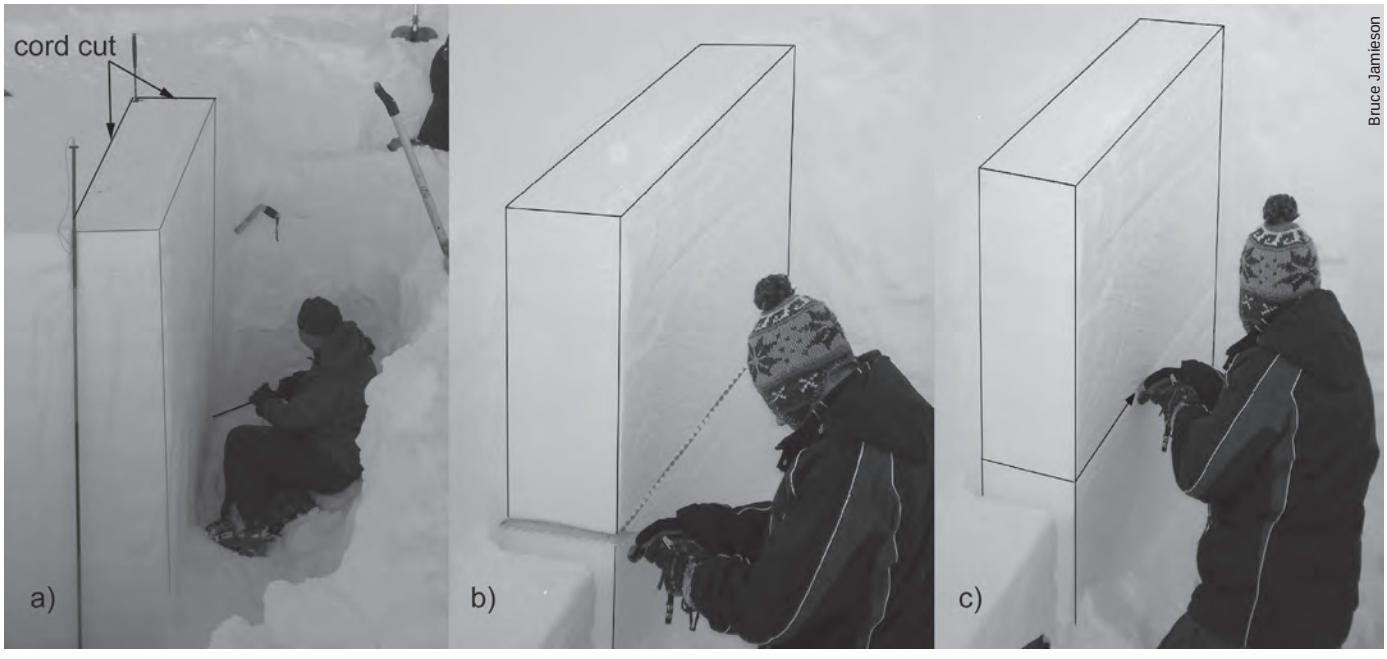


Figure 1: The PST process: (a) isolating the column using probes and cord; (b) identifying the weak layer and preparing to cut; (c) saw-cutting the weak layer until the fracture propagates ahead of the saw.

cutting. If the weak layer is not easily visible, brush the column wall with a glove or brush to gently mark the layer along the column.

STEP 3: saw-cutting the column

With the weak layer clearly visible to the operator, the blunt edge of the saw is drawn upslope along the weak layer until the fracture jumps ahead of the saw at which point the operator stops cutting and marks the point at which propagation began. The test must be repeated if the saw left the weak layer during cutting. (cont. on back)

PST RESULTS

Three possible results can be observed in the PST with the onset of fracture propagation:

a) Propagation arrests somewhere within the weak layer before reaching the end of the column (Arr).
b) Propagation ends at a fracture through the overlying slab (SF).
c) Propagation continues uninterrupted to the end of the column (End).

To interpret the results, it can be said that propagation on nearby slopes is likely only when propagation starts when less than half the column length has been cut and reaches the end of the column (Gauthier and others, 2008). All other results indicate propagation is unlikely, including all results reaching the end when more than half the column was cut. A ruler is helpful in measuring cut length to compare to the isolated column length before interpreting the results.

The standard for recording PST results is PST x/y (Arr, SF or End) down z on yymmdd where x is cut length, y is column length, z is the weak layer depth, and yymmdd is the weak layer ID. For example: PST 34/100 (End) down 56cm on 080224 indicates high propagation propensity.

LIMITATIONS:

The PST has been shown to indicate a larger number of false-stable results than other common stability tests particularly for shallow soft slabs (Gauthier and others, 2008). Additionally, pre-selecting and identifying a weak layer for testing may present an obstacle to inexperienced recreationalists attempting the PST in an unfamiliar snowpack. As with all snowpack tests, one test is rarely sufficient for an accurate stability evaluation, and the PST should be supplemented with a snow-profile, manual observations in the field, and other stability tests.

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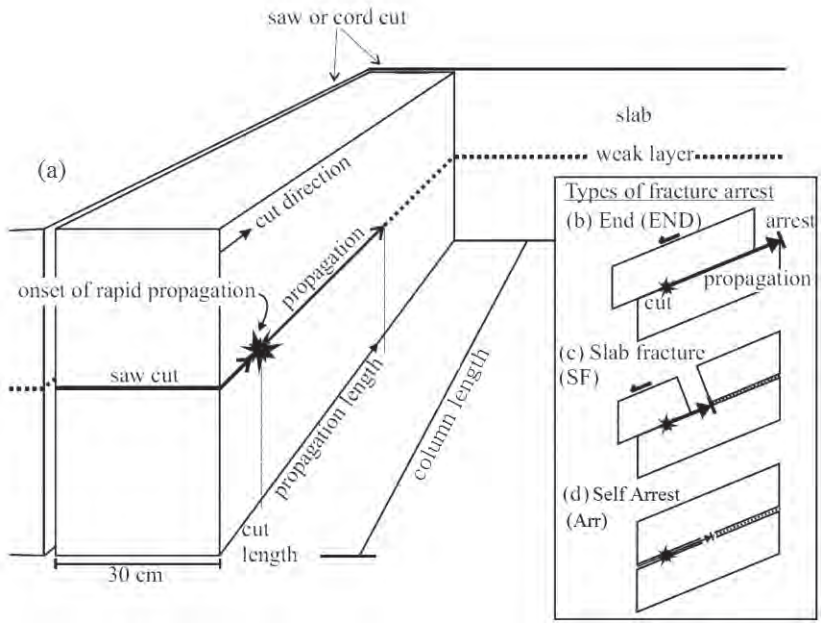

Figure 2: PST Schematic: The PST column is shown (a) with the three possible observable results of propagation to end (b), slab fracture (c), and self arrest (d)

Snow Cream: A Review of Best Practices and Call for the Establishment of a Permanent Research Program

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ABSTRACT: Snow cream, also known as snow ice cream, is a dessert similar to ice cream with the distinction that it is made with snow crystals. Snow cream is typically made by combining and mixing the traditional ingredients of ice cream (whipping cream, sugar, salt, and some sort of flavoring) with fresh snow crystals. The result, to be consumed immediately, has a flavor and texture that is dependent on the type, size, and temperature of the snow crystals as much as the mixing technique and flavorings. In this paper we report the results of a multidisciplinary collaboration among researchers and practitioners aimed at reviewing and systematically studying the best practices of snow cream production. Many variables in the making of snow cream were tested, from the type, size, and temperature of the snow crystals to the myriad potential flavors, both alcoholic and non-alcoholic. The results were rated on categories such as the consistency, flavor, and scooping quality. We conclude that much more research is necessary in order to support the recommendation of professional snow cream standards. Therefore, this collaboration seeks additional funding to establish a long term research program.

KEYWORDS: Dessert, thermodynamics, snow crystals

1. INTRODUCTION

According to The Joy of Cooking, “ice creams are based on carefully cooked well-chilled syrups and heavy custards, added to unwhipped cream” (Rombauer & Becker, 1975). It should come as no surprise that, somewhere along the way, this notion was adapted for backcountry applications by adding snow crystals to whipping cream instead of churning the ingredients in a bucket of ice and salt. Though the origins of the earliest snow cream recipes are unknown, a variety of techniques and ingredients have been passed down for modern enjoyment.

This research project involves cooperation across institutions and disciplines. Members of the University of British Columbia Avalanche Research Group teamed up with members of the University of Calgary Applied Snow and Avalanche Research Crew, guided by the extensive experience of Alison and Tannis Dakin in the backcountry lodge industry. This unprecedented collaboration was an inspirational demonstration of the way that people can come together despite their differences to solve the important problems of our time.

This paper begins with a basic recipe for making snow cream, followed by discussion and observations of snow crystal forms, size, and temperature that are preferred in making snow cream. The next section covers the wide variety of flavours that can be added to snow cream, and this topic is divided into alcoholic and non-alcoholic flavours. We conclude with a discussion of the future direction of this research and a call for funding to continue this research into the future.

2. RECIPE

To make a basic batch of snow cream, have on hand:

- A large metal bowl, such as a salad bowl
- A whisk or spoon for beating (the cream, not the guests)
- 1 pint or 500 mL of heavy whipping cream (have a bit extra on hand as backup)
- 1 tsp salt
- 1 cup white sugar
- Flavouring of choice

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Chris Borstad


Chris Borstad

Instructions:

(1) Set the metal bowl and beater outside during dinner to properly cool.
(2) Once cool, fill the bowl with cold powder snow. The following section outlines desirable snow conditions.
(3) Go back inside and sit in a cool spot away from heat sources
(4) Sprinkle sugar and salt over top of snow
(5) Add about 2/3 of the cold whipping cream
(6) Mix all ingredients thoroughly. Add more cream if the consistency is grainy or more snow if the mixture is runny
(7) Add the desired flavouring
(8) Mix until the snow cream has the texture of stiff, soft ice cream
(9) Serve immediately

3. DESIRABLE SNOW CONDITIONS

The most important component of snow-cream is the snow quality. First of all, go outside and far enough away from the lodge or building to ensure that there is no possibility of ash from the stove or other contaminants in the area. Use a headlamp if necessary to ensure that no yellow snow is present in the sampling area.

In addition to the cleanliness of the snow, the form, size, and temperature of the snow is also very important in determining the final consistency of the snow cream (Table 1). At this stage the size of our data set is much too small to perform a multivariate analysis to determine the relative importance of each individual variable, or the most important variables, in determining the overall quality of the finished product.

Form	Size	Temp	Notes
RG	2 mm	+1°C	Crunchy, grainy results. Poor consistency.
DF	2.5 mm	-2°C	Good scooping density
DF	1.5 mm	-3°C	Good scooping density
PP	1-2 mm	-1°C	Milkshake consistency, a bit grainy and crunchy

Table 1. Observations of snow crystal form, size, and temperature (Canadian Avalanche Association, 2007) along with comments on the finished product.

Based on experience, and relying heavily on the honed intuitive reasoning of seasoned backcountry chefs, ski guides, avalanche forecasters, and snow scientists, we can make the following preliminary recommendations for snow cream production:

- Recent snowfall (ideally HN24 snow) significantly increases the smoothness and quality of the snow cream. Stellars up to 4 mm, and partially settled recent snow of 1-2 mm produce a high quality product.
- Successful snow cream has been produced at air temperatures as warm as -2.0°C and as cold as -18.0°C.
- Take into account that the surface snow may contain a strong temperature gradient in the top 15 cm. Targeted sampling may be necessary in order to select snow at the desired temperature. More research is needed to recommend more specific temperatures, however.
- The following conditions were found to produce undesirable results:

- Snow that has any discernible faceting is likely to produce a more crystalline and sorbet-like product.
- Surface hoar produces a terrible crunchy texture. The bigger it is the nastier the snow cream becomes and spoils the after-dinner party. As surface hoar is to be feared and loathed from a skiing perspective, it is to be feared and loathed from a snow cream perspective.
- Any type or crust, wind slab, or other significant layer is to be avoided
- Depth hoar produces an inedible product and is best used for margaritas or slushies in the springtime.
- Once April has arrived, the opportunities for producing quality snow-cream dwindle rapidly. One has to wait for the occasional cold storm and have ingredients and skiers on hand to take advantage of the timing. It is often best to plan to make margaritas instead, and wait for next December for the cold storm.


Chris Borstad

4. FLAVOURINGS

A variety of flavourings can be used for snow cream. The most common is about 1 tsp pure vanilla extract. Artificial vanilla is not recommended, as it will crystallize in contact with the snow and result in a disappointing crunchy texture.

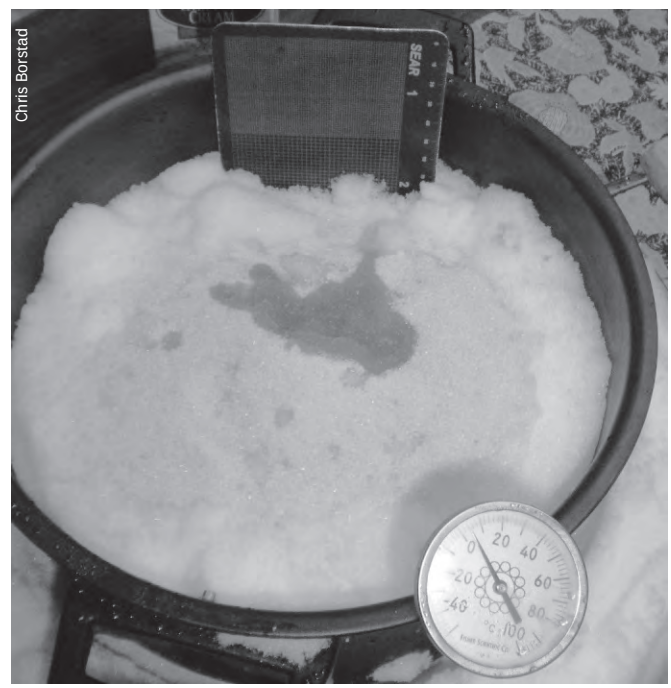
Other non-alcoholic flavours that can be mixed directly into the snow cream include:

- cocoa powder or good hot chocolate powder (~4 Tbsp or to taste)
- finely ground coffee
- fruit jams or jellies (huckleberry, strawberry, raspberry, etc.)
- chocolate or caramel sauce
- fresh berries (these should not be mixed in with snow cream ahead of time because the water content of fresh berries tends to crystalize upon contact with the snow and produces a more granular product)

4.1 Alcoholic Flavourings

We have found that alcoholic liqueurs are quite popular among those that make and enjoy snow cream. We suspect a direct correlation between the percentage of mountain people that enjoy alcohol and the percentage of snow cream recipes that include some sort of alcoholic flavouring. However, our data set is too small to perform a statistical analysis to test this hypothesis.

Furthermore, the single ingredient in a snow cream recipe that is bound to incite the most discussion, and potential protest, is the amount and flavour of alcohol to add to a bowl of virgin snow cream. At this stage we refrain from making any specific recommendations on the amount of liqueur to add to a bowl of snow cream. Much, much more research is necessary to draw quantitative conclusions on this important point. In the meantime, we recommend that you start with an initially small amount and mix thoroughly, keeping an eye on both the flavour and consistency of the snow cream before adding more. Adding extra dry snow may be necessary in stages to prevent a soupy texture.


Chris Borstad

The following is a list of tested and recommended liqueurs for snow cream:

- Irish cream
- creme de cassis (black currant)
- Kahlua® (coffee)
- creme de coconut
- peppermint schnapps
- Cointreau® (orange)
- Drambuie®
- Frangelico® (hazelnut)

We have observed that it is very important to sample and share the selected liqueur with all people present before adding to the snow cream. We believe that this sends important signals to the brain in advance of tasting the finished product.

5. DISCUSSION

A common thread our collective snow cream experience can be tied to both the quality of skiing and the stability of the snowpack. Snow that is the most desirable to ski on—cold, dry powder—is also the best for making snow cream. Additionally, conditions that favour instability in the snowpack—surface hoar, depth hoar, wind slabs, or other crusts—are to be avoided for snow cream making as they are avoided for skiing.

A more in-depth analysis of the thermodynamics of the snow crystal/whipping cream mixture may help elucidate and support the recommendation of specific snow crystal types and temperatures for making snow cream. The partial first-order phase transition of snow crystals from solid to liquid in the whipping cream is likely dependent on the surface area of the original snow crystal. Since new snow and decomposing fragments tend to have the highest specific surface area, they are the most likely to nearly complete the solid to liquid phase transition and minimize the presence of any grainy, remnant ice particles in the finished product. A full discussion and analysis of these points is beyond the scope of this paper, and is planned for a future publication.

Most of the analysis and recommendations in this paper are based on anecdotal experience and intuitive judgement. A small number of controlled experiments were carried out, though many more are needed in order to draw conclusions and specific recommendations. We believe that dessert, and specifically snow cream, is a great means to bring people together from across disciplines and industries. We hope to continue this research indefinitely, and are currently seeking funding for the establishment of a permanent research program.

ACKNOWLEDGEMENTS

We would like to thank all those who sampled our snow cream recipes, provided constructive feedback, and encouraged the authorship of this paper.

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Transitions

James Floyer
Public Avalanche Forecaster

Where were you born?

I was born in London, UK, within the sound of Bow Bells which, technically speaking, makes me a Cockney. I don't feel very Cockney, however and my rhyming slang isn't really up to snuff.

Where do you live now and for how long?

I moved to Canada 7½ years ago. I arrived via New Zealand carrying a backpack and a pair of skis. Since then I've acquired a wife, a house, a cat and a few more pairs of skis. I currently live in Revelstoke; Verena and I moved here 3½ years ago. Revelstoke's definitely the smallest town I've lived in. Before moving here, I lived in Calgary, Vancouver, Edinburgh and London.

Previous work?

I worked for a while as a field geophysicist, doing nasty things to unsuspecting bits of rock, like sticking electricity through them, or hitting them with a sledge hammer to make them vibrate. Mostly, this was in search of ore deposits, and I was diligent in my work, as I wanted to ensure a continued world supply of metal-edged skis. My more recent work has been university related. I researched numerical avalanche prediction for Bear Pass for my masters and layer detection using a snowpack penetrometer for my PhD.

Education?

Rather too much of it, I'm afraid. I studied Geophysics as an undergraduate, numerical avalanche forecasting at the Master's level and layer detection using a snowpack penetrometer for my PhD. I feel privileged to have studied with two of the world's leading avalanche researchers: Dave McClung and Bruce Jamieson. Both have taught me a tremendous amount about snow, ice and avalanches, as well the techniques required for finding out more about our mountain and arctic processes.

The first field-based science project (I can remember) was measuring a flow speed transect across the river Thames in London using an orange.

Why do you want to work for the CAC?

Although I am drawn by the raw and destructive power of the avalanche phenomenon, I cringe at the idea of people being caught by them. Working for the CAC allows me to combine my love for the mountain environment with my desire to help people stay safe when traveling in avalanche terrain. The staff at the CAC are passionate about the mountain environment and it is a huge privilege to work with such a talented, knowledgeable and dedicated group of people.

James Floyer Collection

Peter Marshall
Public Avalanche Forecaster


Peter Marshall Collection

Peter was born and raised in Vancouver. He joined the Grouse Mountain Ski Patrol in 1999 and became the Patrol Director in 2003. He's also been involved with the North Shore Avalanche Advisory (NSAA) in a variety of capacities since 2002 and has worked as a bulletin writer there since 2005. Peter is also professionally trained as a paramedic and a firefighter. He says he "stumbled into emergency services work" while taking a break from school, and has worked as a wild-land fire fighter based out of North Vancouver. While perhaps not as exciting as fighting forest fires, Peter says he wanted to work at the CAC because of the opportunity to work with and learn from some highly experienced avalanche forecasters. "It's a challenging work environment that also promotes personal and professional growth,' says Peter, who had a taste of the forecasting office last year while working on a temporary basis as a technician. Peter's connection with the NSAA helped pave the way to the CAC's new partnership with that organization (see story on p. 26).

Laura Bakermans
Public Avalanche Forecaster


Laura Bakermans Collection

Laura comes to us all way from Smithers BC, where she works as a project engineer for civil and municipal consulting companies. Laura has an MSc in Civil Engineering from the University of Calgary, with a focus on avalanche mechanics. After finishing her Masters, she spent a season working as a research association for Dr. Bruce Jamieson's ASARC program.

Laura says she enjoys her work in northern BC because of the variety of projects, such as new subdivision developments, road upgrading, water treatment and sewage disposal systems. When asked why she wanted to work as a forecaster for the CAC, she says simply, "I like snow." Also, apparently Ilya had told her the CAC has good coffee but that, unfortunately, is not true. The real reason, Laura says, is "the opportunity to work with and learn from the forecasting team and other staff members was too good to pass up." Whatever the motivation, we're all glad she's here.

Kelvin Luck
Webmaster


Kelvin Luck Collection

Where were you born?

On the coast of North Norfolk, England, probably one of the flattest places on the planet. I only lived there until I was about two though and then moved to London.

Where do you live now and for how long?

I now live in Revelstoke and have been here for about two months, after three months living in a big green van driving around Eastern Canada and then across the middle.

Previous work?

I've been freelance for the last five years or so and worked mostly with design or advertising agencies in London, for clients like Volkswagen, the Science Museum, Toshiba, Toyota and British Telecom as well as for smaller and less well known companies and brands. The work I've done has been pretty varied but all related to the internet in one way or another.

Education?

I did a BA in Artificial Intelligence at the University of Sussex in Brighton. It was a really interesting combination of computer stuff and Philosophy/ Psychology. More recently I've done a photography evening class and a basic paragliding course. I'm hoping to do my AST1 & AST2 this winter.

Why do you want to work for the CAA and CAC?

Because I love the snow and snowboarding—this is why I came to Revelstoke in the first place. And I am very interested in developing my backcountry skills so that I can safely explore some of the amazing terrain around here. So what could be better than to work with the experts?

Flakes


CARDA
CARDA
Before I switched to CARDA, I was a bomb-sniffing dog.
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Photo: Canadian Pacific Railway Archives

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